FOREWORD

These Public Works Standard Construction Specifications are intended to set minimum standards and provide a uniform set of guidelines for public works improvements within the City of Stayton. These Public Works Standard Construction Specifications shall apply to all improvements within existing and proposed public right-of-way, within public utility and other related easements, to all improvements that ultimately will be owned, operated, or maintained by the City, and to all improvements for which the Stayton Municipal Code requires City approval.

Most of the elements contained in these Public Works Standard Construction Specifications are public works oriented and are intended that they apply to both publicly financed public improvements under City contract and privately financed public improvements under private contract designated herein. Private construction firms, Developers, consulting engineers, or any other individuals or business entities engaged in the design and construction of public works improvement projects within the City shall comply in every respect with these Public Works Standard Construction Specifications.

The Public Works Standards are intended to provide the following:

- Summarize, streamline, and provide general guidance and criteria on the administration, design and construction, and operation and maintenance of public works improvements and related facilities within the City.
- Set forth uniform construction standards for the materials and workmanship that is to be used within the City.
- Ensure the long-term viability of City infrastructure and to avoid excessive maintenance and replacement costs.
- Outline the provisions necessary to prevent or reduce adverse impacts to the environment and to the City's essential water resources.
- Supplement applicable public health, safety, and general welfare requirements of the Stayton Municipal Code, Stayton Fire District, State and Federal guidelines, etc.

If any improvements are proposed in the jurisdictional right-of-way of another agency such as Marion County or the Oregon Department of Transportation, the applicable standards from that jurisdiction will govern, including applicable permit requirements. In addition, any improvements in or near wetlands, sensitive areas, floodplains, and floodways may require State and Federal permits and/or approvals from the Army Corps of Engineers and/or the Oregon Division of State Lands (DSL). Other permits and standards may be applicable to specific projects. The Developer shall bear all the responsibility to obtain necessary permits and to apply with applicable standards related to any specific project.

It is anticipated that these Public Works Standard Construction Specifications will be updated periodically by the City and, as such, all persons should ensure they are working with the most current set of Public Works Standard Construction Specifications. In the case of conflicts between the text of the Public Works Design Standards, Standard Construction Specifications, Standard Drawings, and/or Standard Forms, the more stringent as determined by the City Engineer shall apply. Where minimum values are stated, greater values should be used whenever practical; where maximum values are stated, lesser values should be used whenever practical.

This edition of the Public Works Standard Construction Specifications replaces all previous Public Works Standard Construction Specifications. Being a totally new document, there may be some minor discrepancies or omissions. It would be appreciated if the users of these Public Works Standard Construction Specifications would notify the City of any such corrections.

DIVISION 1 – GENERAL POLICIES, PROCEDURES, AND REQUIREMENTS

DIVISION 1

GENERAL POLICIES, PROCEDURES, AND REQUIREMENTS

101 GENERAL

101.01 AUTHORITY AND PURPOSE

101.01.A These Standard Construction Specifications shall apply to all improvements within existing and proposed public right-of-way and public easements, to all improvements to be maintained by the City, and to all improvements for which the City Code requires approval by the City. Most of the elements contained in these Standard Construction Specifications are public works oriented and it is intended that they apply to both publicly financed public improvements under City contract and privately financed public improvements.

101.01.B Private construction firms, Developers, consulting engineers, or any other individuals or business entities engaged in the design and construction of improvement projects that ultimately will be owned, operated, or maintained by the City shall comply with these standards. Where minimum values are stated, greater values should be used whenever practical; where maximum values are stated, lesser values should be used whenever practical.

101.01.C The purpose of these Standard Construction Specifications is to provide a consistent policy under which certain physical aspects of public improvements shall be implemented. All public system improvements and public works facilities shall be designed and constructed in accordance with applicable rules and regulations of the City and any City interpretations of those rules and regulations, including applicable technical guidance manuals, and in accordance with applicable federal, state, and local statutes and rules. Approval of public improvements must be made by the City Engineer or the Public Works Director before construction is permitted. An authorized representative of the City will be available for construction observation during construction of the project.

101.01.D It is important to emphasize that these Standard Construction Specifications are not intended to inappropriately restrict or constrain the originality or innovativeness of the Contractor and his or her ability to exercise and apply professional judgment to each situation and project. The City recognizes that every public improvement project has unique characteristics and situations. These Standard Construction Specifications cannot provide for all situations and are intended to assist, but not to serve as a substitute for competent work. It is expected that the Contractor will bring to each project the standard of care.

101.01.E If the Contractor anticipates challenges in meeting these Standard Construction Specifications, they should contact the City Engineer prior to extensive construction efforts. The City Engineer will seek to work with each Contractor to achieve a satisfactory design and construction project that is in the best long-term interests of the City of Stayton and one that complies with applicable rules and regulations.

101.01.F These Standard Construction Specifications are not intended to limit any innovative or creative effort which could result in better quality, better cost savings, or both. Any proposed departure from the Standard Construction Specifications will be judged; however, on the likelihood that such variance will produce a comparable result, or long-term benefit to the City, in every way adequate for the intended purpose.

101.01.G Requests for alternatives to these Standard Construction Specifications will be considered for approval by the City Engineer as the need arises and conditions warrant modification. Request must show that the variance meets the intent of the Standard Construction Specifications and will not compromise safety, impact other properties or cause an increase in maintenance. This consideration will be on a case-by-case basis and require sufficient justification prior to approval.

101.01.H All franchise utility improvements, including telephone, electrical power, gas and cable TV shall meet the current standards of the appropriate agency as well as City Standards.

101.01.I In the case of conflicts between the text of these Standard Construction Specifications and the Standard Drawings, or between the provisions of these Standard Construction Specifications and the Design Standards, the more stringent as determined by the City Engineer shall apply.

101.01.J All surveys for public works facilities shall be performed under the direction of a Professional Land Surveyor registered in the State of Oregon. All elevations shall be referenced to NAVD 88 vertical datum. Vertical benchmark locations shall be coordinated with the City.

101.01.K On completion of projects to become public works, the Design Engineer shall submit one complete set of reproducible "Record Drawings" (As-Builts), a compact disc (CD) containing electronic PDFs and cad files (AutoCAD or others as approved) to the City Engineer. The drawings shall show any deviations from the original construction drawings and shall include sufficient information to accurately locate public works facilities. No bond will be released until the City Engineer receives an acceptable set of reproducible Record Drawings from the Design Engineer, with his/her stamp of certification.

101.01.L For privately financed public improvements, the Design Engineer at the completion of construction shall submit a completion certificate to the City stating that all work has been completed in accordance with the approved project plans and specifications.

101.01.M Before the City accepts a public works project for operation and maintenance, a one (1) year Warranty Bond on all materials and workmanship incorporated in the project shall be provided to the City.

101.02 APPLICABILITY

101.02.A These Standard Construction Specifications will govern the construction of public improvements and applicable work within the City and its service areas. This document will be routinely referred to as the Standard Construction Specifications.

101.03 REFERENCES

101.03.A These Standard Construction Specifications are intended to be consistent with the most current provisions of the documents and requirements listed below.

- Stayton Municipal Code (SMC)
- Stayton Comprehensive Plan
- Oregon Statewide Planning Goals and Guidelines

- Stayton Transportation System Plan (TSP)
- Stayton Master and/or Facility Plans
- Oregon Administrative Rules Chapter 333, 340(Division 52)
- State of Oregon Specialty Codes (Building and Fire Codes)
- State statutes and regulations
- Federal statutes and regulations

101.04 SPECIAL CONSTRUCTION APPLICATIONS

101.04.A Special construction applications not covered in these Standard Construction Specifications require review and approval by the City. Submittal of information will be required prior to any approval. Such construction applications requiring special review and approval include, but are not limited to, the following:

- Bridge Construction
- Reservoir Construction
- Water and Wastewater Facilities
- Electrical/Monitoring/Telemetry Devices

101.05 DESIGN STANDARDS AND STANDARD DRAWINGS

101.05.A Except as otherwise provided by these Standard Construction Specifications, all design and construction of public improvements shall be in accordance with the current edition of the City of Stayton Public Works Design Standards and Standard Drawings.

101.06 CITY POLICY REGARDING CONSTRUCTION

101.06.A It shall be the policy of the City to require compliance with all laws, ordinances, codes, regulations and rules, (collectively referred to as "Laws" in these Standard Construction Specifications), that relate to the Work or to those engaged in the Work. Where the provisions of the Contract are inconsistent or in conflict, the Contractor shall comply with the more stringent standard. The Contractor shall indemnify, defend, and hold harmless the City and its representatives from liability arising from or related to the violation of Laws by those engaged in any phase of the Work. This provision does not apply to Work performed by City employees.

101.06.B The Contractor shall be appropriately licensed with the Oregon Construction Contractors Board in accordance with ORS 701.035 to 701.055 and shall maintain a valid license during all phases of the capital Work. All subcontractors performing work as described in ORS 701.005(2) (i.e., construction work) shall be appropriately licensed with the Oregon Construction Contractors Board in accordance with ORS 701.035 to 701.055 before the subcontractors commence work and shall maintain a valid license during all phases of the capital Work.

101.06.C The Contractor shall do all work and furnish all labor, materials, equipment, tools, and machines necessary for the performance and completion of the project in accordance with the Contract Documents. Contractor shall be obligated to determine and be responsible for the method of construction.

101.06.D The Contractor shall protect and maintain the Work during construction and until Final Completion, unless otherwise provided in the Contract. The Contractor shall avoid operations whose methods, conditions, or timing may injure people or damage property or the Work.

101.07 CONVENTIONS USED THROUGHOUT THE STANDARD SPECIFICATIONS

101.07.A GENERAL

1. The provisions of Oregon Revised Statutes Chapter 279A and 279C and Oregon Administrative Rules Chapter 137, Divisions 46 and 49, apply to all publicly financed public improvement projects that incorporate the Public Works Standards of the City of Stayton into the Contract. The ORS and OAR provisions control over any conflicting language in the Public Works Standards.

2. In interpreting these Standard Construction Specifications, it is understood that if the context so requires:

   - The singular pronoun shall be taken to mean and include the plural pronoun.
   - The masculine pronoun shall be taken to mean the feminine and the neuter pronoun.
   - All captions used therein are intended solely for the convenience of reference and shall in no way limit any of the provisions of these Standard Construction Specifications.

3. The words “directed”, “required”, “permitted”, “ordered”, “requested”, “instructed”, “designated”, “considered necessary”, “prescribed”, “approved”, “acceptable”, “satisfactory”, or words of like import, refer to actions, expressions, and prerogatives of the City.

4. Command type sentences are used, but are not exclusive of other directives throughout these Standard Construction Specifications. In all cases the command expressed or implied is directed to the Contractor.

5. The words, “as shown”, “shown”, “as indicated”, or “indicated” or words of like import, refer to as indicated on the Plans or Standard Drawings.

6. Certain Sections labeled Measurement and Payment contain statements to the effect that payment will be made at the Contract amounts for the following items (followed by a list of items). In such cases the City shall pay for only those Pay Items listed in the Schedule of Items.

101.07.B REFERENCES TO LAWS, ACTS, REGULATIONS, RULES, ORDINANCES, STATUTES, ORDERS, AND PERMITS

1. References are made in the text of the Specifications to "laws", "acts", "rules", "statutes", "regulations", "ordinances", etc. (collectively referred to for purposes of this Subsection as "Law"), and to "orders" and "permits" (issued by a governmental authority, whether local, State, or federal, and collectively referred to for purposes of this Subsection as "Permits"). Reference is also made to "applicable laws and regulations". The following conventions apply in interpreting these terms, as used in the Specifications.

   - **Statutes and Rules** - Oregon Revised Statutes (ORS) and Oregon Administrative Rules (OAR) referenced in the Specifications are accessible on line, including through the Oregon Legislative Counsel Committee web site and through the Oregon Secretary of State Archives Division website.

- **Law** - In each case, unless otherwise expressly stated therein, the Law is to be understood to be the current version in effect. This also applies where a specific Law is referenced or cited, regardless of whether the text of the Law has been included in the Specifications or not, and regardless of whether the text of the Law has been summarized or paraphrased. In each case, the current version of the Law is applicable under any Contract. The reader is therefore cautioned to check the actual text of the Law to confirm that the text included in the Specifications has not been modified or superseded.
- **Permits** - Orders and permits issued by a government agency may be modified during the course of performing the Work under a Contract. Therefore, wherever the term "order" or "permit" is used in the Specifications, it is intended to refer to the then-current version. That version may be embodied in a modified, superseding order or permit, or it may consist of all terms and conditions of prior orders or permits that have not been superseded, as well as the additional terms added by amendment or supplement. In certain cases, the orders and/or permits are identified by name in the Specifications; in other cases the terms are used in the generic sense. The reader is cautioned to check the text(s) of each order and permit identified either by name or by generic reference.
- **Applicable Laws and Regulations** - Where the phrase "applicable laws and regulations" appears, it is to be understood as including all applicable laws, acts, regulations, administrative rules, ordinances, statutes, and orders and permits issued by a governmental or regulatory authority.

101.08 ORGANIZATION AND CLASSIFICATION OF DIVISIONS

101.08.A ORGANIZATION

1. These Standard Construction Specifications contained herein are divided into categories: DIVISION; SECTION; and SUBSECTION, and are designated as in the following example:

   DIVISION 3 – STREETS AND ALLEYS

   SECTION – 305 ASPHALT CONCRETE PAVEMENT

   SUBSECTION – 305.02 MATERIALS

2. In addition, throughout the Standard Construction Specifications:
   - Reference to a Section includes all applicable requirements of the Section.
   - When referring to a Subsection, only the number of the Subsection is used; the word "Subsection" is implied.
   - Where Section and Subsection numbers are not consecutive, the interval has been reserved for use in the Special Provisions, Supplemental Specifications, or future expansion of the Standard Construction Specifications.
   - Paragraphs under Subsections are shown alphabetical (A), (B), etc. with subparagraphs shown numbered (1), (2), etc. Any further subparagraphs are alternated alphabetical and numerical.

101.08.B CLASSIFICATION OF DIVISIONS

1. The classification of Divisions contained in the Standard Construction Specifications is as follows:

a. DIVISION 1 – Contains specific information for the **GENERAL POLICIES, PROCEDURES, AND REQUIREMENTS** for public works construction. It contains many of the definitions and abbreviations used throughout these Standards. In addition, it provides one of the processes by which the City contracts with the private sector for the construction of capital improvements.

b. DIVISION 2 – Contains the **GENERAL TECHNICAL REQUIREMENTS** for all public works construction that are to be operated and maintained by the City.

c. DIVISION 3 – Contains specific requirements for the construction of **STREETS AND ALLEYS** that are to be operated and maintained by the City.

d. DIVISION 4 – Contains specific requirements for the construction of **WATER DISTRIBUTION** systems that are to be operated and maintained by the City.

e. DIVISION 5 – Contains specific requirements for the construction of **SANITARY SEWERS** that are to be operated and maintained by the City.

f. DIVISION 6 – Contains specific requirements for **STORMWATER MANAGEMENT** and the construction of storm water facilities and storm drains and that are to be operated and maintained by the City.

101.09 CLARIFICATIONS, MODIFICATIONS, AND REVISIONS TO THE STANDARD SPECIFICATIONS OR STANDARD DRAWINGS

101.09.A GENERAL

1. These Standard Construction Specifications and Standard Drawings are intended to be consistent with the most current provisions of the documents and requirements listed and referenced in Subsection 101.03. Periodic revisions to these Standards will be necessary to maintain consistency in that regard. The date appearing on the title page is the date of the latest revision for each Division. Parenthetical notations at the bottom of each page indicate the most recent change. It will be the user's responsibility to obtain and maintain his/her copy of these Standards with the latest changes.

2. Any user of this document may submit a request for clarification, modification, or revision to these Standards.

101.09.B REQUEST FOR CLARIFICATIONS

1. Requests for clarification or suggestions for revisions to these Standards should be submitted in writing to the City as follows:

   City of Stayton
   Public Works Department
   Attn: Construction Specification Clarification
   362 N. 3rd Avenue
   Stayton, OR 97383
   (503) 769-2919

2. Any submitted request for clarifications or interpretations will be provided by the City Engineer. The Public Works Director is the final authority on all questions which may arise as to the interpretation of these Standards.

101.09.C REQUEST FOR MODIFICATIONS

1. Modifications to these Standards may be requested as follows. When requested modifications involve or will have an impact on public safety, the City will rule in the direction of safety.

2. SUBMITTAL REQUIREMENTS FOR MODIFICATION OF STANDARDS

   a. Requests for modifications to these Standards shall be submitted in writing to the City as follows:

      City of Stayton
      Public Works Department
      Attn: Construction Specification Modification
      362 N. 3rd Avenue
      Stayton, OR 97383

   b. This written request shall state the desired modification, the reason for the request and a comparison between the Standard and the modification as far as performance and maintenance requirements.

   c. Any modification or variance of these Standards should be documented and reference nationally accepted standards and must meet or exceed the minimum requirements set forth in these Standards. The use thereof shall not compromise public safety or intent of the City's Standards.

   d. The written request is to include, but is not limited to, the manufacturer's specifications and testing results, design drawings, design calculations, and other pertinent information.

   e. Any deviations or special problems will be reviewed on a case-by-case basis and approved by the City Engineer.

3. CRITERIA FOR MODIFICATION OF STANDARDS

   a. The City Engineer may make project-specific modifications and amendments to an existing City Standard when any one of the following conditions is met:

      - The Standard is inapplicable to a particular situation.
      - Topography, right-of-way, or other geographical conditions or impediments impose an undue economic hardship on the applicant, and an equivalent alternative that can accomplish the same objective is available and does not compromise public safety, accessibility, or anticipated life of facility.
      - A change to a Standard is required to address a specific design or construction problem, and if not modified, the standard will impose an undue hardship on the applicant with little or no material benefit to the public.
      - The modification or amendment will be de minimis, per Subsection 101.09.E.

4. CITY REVIEW PROCESS FOR MODIFICATION OF STANDARDS

   a. The City Engineer will review a request to modify a City Standard relating to, and only for, a specific project. The City Engineer will:

      - Approve the request as proposed;
      - Approve the request with conditions; or
      - Deny the request.

   b. The City Engineer's decision will be documented in writing. A denial of a request will be accompanied with a brief explanation of the reason for the denial.

   c. Whether a request for modification is approved as proposed or with conditions, the approval is for project-specific use and shall not constitute a precedent or general modification of the City Standard.

   d. The applicant may appeal the City Engineer's decision regarding the request to modify a City Standard by filing a written appeal to the Public Works Director within fourteen (14) calendar days of the City Engineer's decision. The Public Works Director will consider the appeal and render a decision within seven (7) calendar days of the date the appeal is received by the City.

   e. The applicant may appeal the Public Works Director's decision regarding the request to modify a City Standard by filing a written appeal to the City Council, as provided in the Stayton Municipal Code.

101.09.D CITY-INITIATED MODIFICATIONS

1. During design or construction of a project, the City Engineer may:

   a. Modify and/or add requirements applicable to a specific City-approved project. Such addition or modification is for project-specific use and shall not constitute a precedent or general modification of the City Standard.

   b. The applicant may appeal the City Engineer's decision regarding the request to modify a City Standard by filing a written appeal to the Public Works Director within fourteen (14) calendar days of the City Engineer's decision. The Public Works Director will consider the appeal and render a decision within seven (7) calendar days of the date the appeal is received by the City.

   c. The applicant may appeal the Public Works Director's decision regarding the request to modify a City Standard by filing a written appeal to the City Council, as provided in the Stayton Municipal Code.

101.09.E REVISIONS

1. These Standards will be periodically updated due to changes in policy or procedures, new technology, design methods, and construction methods. Updates to these Standards will be posted on the City's website.

2. The City will make the following changes or corrections to the provisions of these Standards when the changes or corrections do not alter the sense or meaning of its provisions:

- Misspellings. Misspelled words may be corrected.
- Histories. Erroneous legislative histories may be corrected.
- Cross-references. Cross-references may be changed to agree with new, amended, reenacted, renumbered, re-lettered, reallocated or corrected ordinances or resolutions.
- Capitalization. Improper capitalization may be corrected.
- Headings. Descriptive headings of titles, chapters, sections or subsections may be edited or added to briefly and clearly indicate the subject matter of the title, chapter, section or subsection.
- Renumbering; re-lettering. The numbering or lettering of sections of ordinances and resolutions, including duplicative numbering or lettering created by conflicting enactments, may be corrected or properly arranged.
- Changed job titles; agency names. References in these Standards to specific job titles or agency names that are changed without substantial affect on job or agency responsibilities may be changed to refer to the new job title or agency name.
- Punctuation. Punctuation, including hyphenization, may be corrected.
- Clerical Errors. Typographical or grammatical errors may be corrected.
- Gender. Gender-specific terms that occur in an ordinance or resolution may be changed to gender-neutral terms and necessary grammatical changes to properly use the gender-neutral terms may be made.
- Mandated Changes. Additions, deletions, or revisions to these Standards may be made when required for City compliance with mandatory local, regional, state, or federal regulations.
- De minimis Changes. Additions, deletions, or revisions to these Standards may be made where the addition, deletion, or revision will have no material effect on the cost of constructing the item affected by the changed Standard. A material effect on the cost of constructing an item affected by a changed Standard is an increase or decrease in the cost of constructing an item that is greater than five percent (5%) of the cost of constructing the item under the existing Standards. If a change to a Standard affects a specific project, the change, in addition to having no material effect on the cost of constructing the item affected by the changed Standard, must also have no material effect on the cost of a project. A material effect on the cost of a project is an increase or decrease in the cost of the project that is greater than one-tenth of one percent (0.1%) of the estimated total cost of the project at the time of issuance of the project's permit. If the City Engineer makes two or more de minimis changes to a Standard under the authority of this paragraph that affect a specific project, each de minimis change must meet the above requirements of this paragraph by (a) having no material effect on the cost of constructing the item affected by the changed Standard and (b) having no material effect on the cost of a project. In addition, the combined effect of the multiple changes to the Standards relating to that specific project must not increase or decrease the total cost of a project by more than three-tenths of one percent (0.3%) of the estimated total cost of the project at the time of issuance of the project's site development permit.

101.10 DEFINITIONS AND TERMS

Unless otherwise defined by applicable law or the Contract Documents, the following definitions and terms shall apply whenever used.

Acceptance of Work
See Final Acceptance.

Acts of God or Nature
An act of God of Nature is to be construed to mean an earthquake, flood, cloudburst, tornado, hurricane or other phenomenon of nature of catastrophic proportions or intensity as would reasonably prevent performance.

Addendum
A written or graphic modification added to the scope of work, issued before the opening of Bids, which clarifies, revises, adds to, or deletes information in the Contract Documents or previously issued Addenda.

Additional Work
Increased quantities of any Pay Item, within the scope of the Contract, for which a unit price has been established.

Advertisement
See Invitation to Bid.

Aggregate
Rock of specified quality and gradation.

Agreement
See Contract.

Approved or Approval
Acceptance, given to the Contractor by the City Engineer, for specific materials, construction or manufacturing processes, changes in contract conditions, or any other items to be used in the Work.

Approved Equal
A product, component, or process whose use in or on a particular project is specified as a standard for comparison purposes only. The "equal" product, component, or process shall be the same or better than that named in function, performance, reliability, quality, and general configuration. Determination of equality in reference to the project design requirements will be made solely by the City Engineer.

Arterial Street
See Street.

As-Builts
See Record Drawings.

Attorney-in-Fact
An entity appointed by another to act in its place, either for some particular purpose, or for the transaction of business in general.

Award
Written notification to the Bidder that the Bidder has been awarded a Contract.

Backflow
The reverse of flow from its normal or intended direction of flow. Backflow can be caused by back-pressure or back-siphonage.

Backflow Preventer
An approved means to prevent backflow into the potable water system.

Back-siphonage
Backflow that results from negative pressure (partial vacuum) in the supply piping system.

Base
A Course of specified material of specified thickness placed below the pavement.

Bid
The competitive offer of a Bidder, titled Proposal, binding on Bidder, and submitted in response to an Invitation to Bid which is the basis of the Contract, submitted on the City's official Proposal, to perform stated work at a price or prices quoted.

Bidder
Any individual, firm, co-partnership, corporation, or combination thereof, submitting a Bid in response to the Invitation to Bid for the Work contemplated in the Contract.

Bid Bond
A Bond required to be submitted with each Bid, in an amount of at least ten percent (10%) of the amount of the Bid, serving to guarantee to the City that the Bidder, if awarded the Contract, will execute such Contract in accordance with the Contract Documents, synonymous with Bid Security.

Bid Closing
The date and time after which Bids, Bid modifications, and Bid withdrawals will no longer be accepted.

Bid Opening
The date and time Bids are opened.

Bid Schedule
The list of Pay Items, their units of measurement, and estimated quantities. (When a Contract is awarded, the Bid Schedule becomes the Schedule of Items).

Bid Security or Guarantee
A Certified Check. Cashier's Check, or Bid Bond, in an amount of at least ten percent (10%) of the amount of the Bid, that is submitted with a Bid and serving to guarantee to the City that the Bidder, if awarded the Contract, will execute such Contract in accordance with the Contract Documents.

Bikeway
Any road, path, or way that is some manner specifically open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are shared with other transportation modes. The four types of Bikeways are as follows:

- **Bike Lanes**
  A lane, typically 6 feet in width, in the Traveled Way, designated by striping and Pavement markings for the preferential or exclusive use of bicyclists.

- **Bike Path**
  A designated travel-way for bicyclists that is completely separated from the vehicular travel lanes and is within independent rights-of-way.

- **Shared Bikeway**
  A travel-way for a bicyclist, typically consisting of a paved shoulder that is 4-feet or wider, that is shared with vehicular traffic. The bike way is designated with signs for bicycling (no pavement markings for the bike lanes) and typically shared by bicyclists and pedestrians in rural areas. Synonymous with the term bike route.

- **Shared Roadway**
  A travel lane that is shared by bicyclists and motor vehicles.

Best Management Practices (BMPs)
Schedules of activities, prohibitions of practices, maintenance procedures or other management practices to prevent or reduce the pollution of waters of the state. BMPs for storm water may include operational and structural source controls that minimize and prevent contaminants from entering storm water as well as treatment BMPs that remove contaminants contained in storm water runoff before disposal or discharge.

Borrow
Material lying outside of planned or required roadbed excavation used to complete project earthwork.

Boulders
Particles of rock that will not pass a 12-inch square opening.

Bridge
A single or multiple span structure, including supports, that carries motorized and non-motorized vehicles, pedestrians, or utilities on a roadway, walk, or track over a watercourse, highway, railroad, or other feature.

Building Official
The person(s) empowered by the City Council to administer and enforce the Stayton Municipal Code and building, plumbing, electrical, and other similar codes.

Business Day
See “Working Day”.

Buttress
A rock fill placed at the toe of a landslide or potential landslide in order to resist\slide movement. Also can be a perpendicular wall to retaining wall to reinforce from overturning.

CAD
Computer aided design.

Calendar Day
Any day shown on the calendar, beginning and ending at midnight.

Camber
A slight arch in a surface or structure to compensate for loading.

Change Order
A written order issued by the Design Engineer to the Contractor directing changes in the work, subject to City approval.

Changed Work
Work included in a pay item and within the scope of the Contract that is different from that reflected in the Plans and Specifications.

Check Valve
A valve which allows flow in only one direction.

City
The City of Stayton, a municipal corporation of the State of Oregon, and its elected officials, officers, employees, volunteers and agents.

City Administrator
An appointed official to serve as chief executive and administrative officer to support the information and policy-making needs of the Council, implement Council decisions and directives, and manage the day-to-day operations of City departments. Under the Council/Manager form of government, the Council establishes policies for operations within the City, and it is the City Administrator's responsibility to ensure these policies are carried out. Synonymous with the term City Manager.

City Attorney
A licensed attorney hired or appointed by the City Council to provide legal advice and assistance to the City Council, the Planning Commission, and City officials.

City-Controlled Lands
Lands owned by the City, or controlled by the City under lease or agreement, or under the jurisdiction and control of the City for the purposes of the Contract.

City Engineer
A registered professional engineer licensed to practice in the State of Oregon, or his/her authorized representative, acting under the direction of the Public Works Director, who directs and coordinates engineering activities relating to City of Stayton Public Works.

City Inspector
The authorized representative of the City whose authority, instructions, and decisions shall be limited to the particular duties and responsibilities entrusted to him in making detailed inspections of any or all portions of the work or materials therefore.

Class of Project
A designation based on a Project's funding source, i.e., State or Federal-Aid.

Class of Work
A designation referring to the type of Work in which Bidders must be prequalified, when so required. Classes of Work are limited to those listed in the Contractor's Prequalification Application, if applicable.

Clay
Soil passing a No. 200 sieve that can be made to exhibit plasticity (putty-like properties) within a range of water contents.

Clear Zone
Roadside border area, starting at the edge of the traveled way that is available for safe use by errant vehicles. Establishing a minimum width clear zone implies that rigid objects and certain other hazards within the clear zone should be relocated outside the clear zone, or shielded, or remodeled to make them break away on impact or be safely traversable.

Close Conformance
Where working tolerances are given on the Plans or in the Specifications, Close Conformance means compliance with those tolerances. Where working tolerances are not given, Close Conformance means compliance, in the City Engineer's judgment, with reasonable and customary manufacturing and construction tolerances.

Coarse Aggregate
Crushed rock or crushed gravel retained on a 1/4-inch sieve, with allowable undersize.

Cobbles
Particles of Rock, rounded or not, that will pass a 12-inch square opening and be retained on a 3-inch sieve.

Code
The City of Stayton Municipal Code (SMC) and ordinances any other federal, state, county, or local codes, laws, or regulations affecting the work.

Collector Street
See Street.

Commercial Grade Concrete
Concrete furnished according to Contractor proportioning, placed in minor Structures and finished as specified.

Contract
The written agreement in the Contract Documents that sets forth the rights and obligations of the City and the Contractor for publicly financed public improvements. Synonymous with the term agreement.

Contract Cost or Amount
The aggregate amount of price promised to be paid by City to Contractor upon fulfillment of the Contract for publicly financed public improvements.

Contract Documents
The Contract, including the Invitation to Bid, Instructions to Bidders, the Proposal, Contract, General Conditions (General Requirements), Supplementary Conditions (Special Provisions), Plans, Specifications, schedule of Contract Prices, Addenda, Permits, Payment and Performance Bonds, Insurance Certificate, and Change Orders for any approved revisions made during the performance of the work to any of the above listed documents for publicly financed public improvements.

Contract Item
A specific unit of work for which a price or basis of payment is provided in the Contract.

Contract Time
The amount of time allowed to complete the Work under the Contract, calculated from the date stated in the Notice to Proceed.

Contractor
Any individual, firm, co-partnership, corporation or any combination thereof who has or have entered into a Contract either with the City or will be performing public works improvements as part of a particular development or permitted project. For publicly financed public improvement projects, "contractor" will mean the entity awarded the Contract. For privately financed public improvement projects and other work being performed under permit issued by the City, the "contractor" will mean the entity that is listed on the permit.

Copy
An imitation or reproduction of an original; a duplicate.

Course
A specified Surfacing Material placed in one or more Lifts to a specified thickness.

Coverage
A single Pass by a piece of Equipment over an entire designated area.

Creek
Any and all surface water routes generally consisting of a channel having a bed, banks, and/or sides in which surface waters flow in draining from higher to lower land, both perennial and intermittent; the channel, banks, and intervening artificial components, excluding flows that do not persist for more than twenty-four (24) hours after cessation of 1/2-inch of rainfall in a twenty-four (24) hour period from October through March.

Cross Connection
Any actual or potential connection, link, or channel between a domestic water supply system and a pipe or piping system used or intended to be used for some other purpose or between a domestic water supply system and a plumbing fixture, appliance, receptacle, vessel, or other service, or a source other than the intended source of water supply whereby it may be possible for contaminated water or water of questionable or unsafe quality, or fluid substance other than potable water, to enter any part of the domestic water supply system.

Cross Section
The exact image formed by a plane cutting through an object, usually at right angles to a central axis, to determine area or to show detail.

Curb
A concrete or asphalt line, typically six-inches wide and six-inches of exposure, indicating the edge of the vehicular roadway within the overall Right-of-Way to: serve as a safety barrier to prevent motorists from driving onto the shoulder, median, sidewalk, pavement, or other designated non-vehicular pathway; and/or to control or direct stormwater drainage along a vehicular roadway.

Cut Sheets
Sheets of tabulated data indicating stationings, structures, fittings, angle points, beginning of curve, points on curve, end of curves, street grade, pipe slope, staking offset, various elevations, and offset cuts for streets, waterlines, wastewater sewers, and storm drains.

Day
Calendar Day, any and every day shown on the calendar, Sundays and Holidays included, unless otherwise specified in the Contract Documents.

Definition of Words
That whenever in these Standard Construction Specifications, the words “shall”, “will”, "directed", "required", "permitted", "ordered", "designated", or words of like importance are used, they shall be understood to mean the direction, requirement, permission, or order of designation of the Contractor. Similarly, the words "approved", "acceptable", or "satisfactory", shall mean approved by, acceptable to, or satisfactory to the City Engineer.

Design Engineer
A registered Professional Engineer licensed to practice in the State of Oregon who is responsible for the design of a public improvement project and has stamped and sealed the plans.

Developer
Any individual, partnership, corporation, joint venture, or other legal entity in the primary business of developing real property.

Development
Any man-made change to improved or unimproved real estate, whether public or private for which a permit is required, including but not limited to, construction, installation, or alteration of buildings or other structures, condominium conversion, land division, establishment or termination of a right of access, parking or storage facilities on real property, tree cutting, and clearing, mining, dredging, filling, grading, paving, excavation or drilling operations. Development encompasses both new development and redevelopment.

Development Footprint
The new or redeveloped area covered by buildings or other roof structures and other impervious surface areas, such as roads, parking lots, and sidewalks.

Direct Discharge
Any stormwater discharge from a developed site that has not passed through approved water quality treatment or detention facility prior to its ultimate outfall to a natural drainageway, wetland, or other natural resource area.

Discharge Point
The ultimate destination for the stormwater leaving a particular site, also known as the stormwater disposal point. Discharge can be through: onsite infiltration (surface infiltration facilities, soakage trenches, etc.) or offsite flow to ditches, drainageways, streams, or public or private separate stormwater piped systems.

Distribution System
Distribution main pipelines, pumping stations, valves, and associated equipment used to transmit water from the supply source to the service line.

Domestic Sewer
The liquid and water-borne waste derived from the ordinary living processes, free from industrial wastes, and of such character to permit satisfactory disposal, without special treatment, into the public sanitary sewer system or by means of private sanitary sewer disposal system.

Double Check Valve Assembly (DCVA)
An assembly composed of two single, independently acting approved check valves, including tightly closing shut-off valves located at each end of the assembly and fitted with properly located test cocks.

Double-Detector Check Valve Assembly (DDCVA)
An approved double check valve assembly with a parallel meter. The purpose of this assembly is to provide double-check valve protection for the distribution system and at the same time provide partial metering of the fire system showing any system leakage or unauthorized use of water.

Drainageway
An open linear depression, whether constructed or natural, that functions for the collection and drainage of surface water. It may be permanently or temporarily inundated.

Drawings
See Plans.

Durable Rock
Rock that has a slake durability index of at least ninety percent (90%) based on a two-cycle slake durability test, according to ASTM D 4644. In the absence of test results, the City Engineer may evaluate the durability visually.

Easement
An area outside public right-of-way in which the property owner (grantor) conveys a privilege to a second party (grantee) the right to construct, operate, and maintain public works facilities on such property. The City is typically grantee for public easements, and a neighboring property owner is typically grantee for private easements.

Emulsified Asphalt
An emulsion of asphalt cement and water with a small quantity of an emulsifying agent.

Emulsified Asphalt Concrete
A mixture of emulsified asphalt and graded aggregate.

Engineer of Record
See Design Engineer.

English System
Standard dimensions used in customary units of measurement, also known as "English units".

Entity
A natural person capable of being legally bound, sole proprietorship, limited liability company, corporation, partnership, limited liability partnership, limited partnership, profit or nonprofit unincorporated association, business trust, two or more persons having a joint or common economic interest, or any other person with legal capacity to Contract, or a government or governmental subdivision.

Equipment
All machinery, tools, manufactured products, and fabricated items needed to complete the Contract or specified for incorporation into the Work.

Establishment Period
The time specified to assure satisfactory establishment and growth of planted Materials.

Existing Surfacings
Pavements, slabs, curbs, gutters, walks, driveways, and similar constructions of bricks, blocks, Portland Cement Concrete, bituminous treated materials, and granular surfacing materials on existing streets and alleys.

Expansion Joint
A joint to control cracking in the concrete surface structure and is filled with preformed expansion joint filler.

Extra Work
Work not included in the Contract, but deemed by the City Engineer to be necessary to complete the Project.

Final Acceptance
The date at which the City accepts the public improvements for ownership and operation upon successful correction of any noted Warranty deficiencies and upon payment of all fees and charges to the City.

Final Completion
The date at which the work, and all related aspects of the work, has progressed to the point where, in the opinion of the City Engineer, all requirements of the Contract Documents have been met with the exception of Warranty obligations; all construction equipment and unused materials have been removed; all waste has been removed and the project area thoroughly cleaned and restored and when the Work is one-hundred percent (100%) complete in every respect and can be utilized for the purpose for which it was intended and the Project

Final Inspection
The inspection conducted by the City Engineer to determine that the Project has been completed in accordance with the Contract.

Fine Aggregate
Crushed rock, crushed gravel, or sand that passes a 1/4-inch sieve, with allowable oversize.

Fire Protection Service
A connection to the public water main intended only for the extinguishment of fires and the flushing necessary for its proper maintenance.

Flood Insurance Rate Map (F.I.R.M.)
The official map on which the Federal Emergency Management Agency shows flood elevations for various creeks and rivers and has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.

Floodplain
Areas shown on the Flood Insurance Rate Map as areas of special flood hazard.

Floodway
The channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than 1 foot.

Flow Control
The practice of limiting the release of peak flow rates and volumes from a site. Flow control is intended to protect downstream properties, infrastructure, and natural resources from the increased stormwater runoff peak flow rates resulting from development.

Force Account Work
Force account work is extra work that is not covered under unit-price or lump-sum items in the Contract Documents and where negotiated price or prices have not been agreed upon.

Foreign Contractor
Contractor who is not domiciled in or registered to do business in the State of Oregon.

Granular Material
Graded and selected free-draining material composed of particles of rock, sand, and gravel.

Grade
The degree of inclination of a road or slope.

Gravel
An unconsolidated mixture of rock fragments or particles of rock, rounded or not, that will pass a 3-inch sieve and be retained on a No. 4 sieve.

Highway
Every road, street, thoroughfare and place, including bridges, viaducts and other structures within the boundaries of the State, open, used or intended for use by vehicular traffic.

Holidays
The following shall be recognized as legal holidays: Veteran's Day, Thanksgiving Day, Christmas Eve, Christmas Day, New Year's Day, Martin Luther King Jr. Birthday, and President's Day.

Hydrant Lead
The waterline connecting the fire hydrant to the auxiliary valve on the City distribution main. Synonymous with the term Hydrant lateral.

Impervious Surfaces/Areas
Any surface that has a runoff coefficient greater than 0.80, as defined in PWDS Section 603. Common impervious surfaces include, but are not limited to rooftops, concrete or asphalt sidewalks, walkways, patio areas, driveways, parking lots or storage areas and graveled, oiled, macadam or other hard surfaces. Slatted decks and some gravel surfaces are considered pervious unless they cover impervious surfaces or the gravel surfaces are compacted to a degree that causes their runoff coefficient to exceed 0.80.

Improvements
General term encompassing all phases of work to be performed under a Contract and is synonymous with the term Project or Work.

Incidental
A term identifying those acts, services, transactions, property, or other items for which the City will make no separate or additional payment.

Industrial Waste
Solid, liquid, or gaseous waste resulting from any industrial, manufacturing, trade, or business process from development, recovery, or processing of natural resources.

Infiltration
The percolation of water into the ground. Infiltration is often expressed as a rate (inches per hour), which is determined through an infiltration test. See also Subsurface Infiltration and Surface Infiltration.

Infiltration Test
Infiltration tests are conducted to determine the feasibility of on-site stormwater percolation for every new development.

Inlet
A structure or other appurtenance (i.e., catch basin) that collects stormwater runoff from the ground surface for the purpose of conveying it through a piped storm system. Also used to describe the connection point of a pipe conveying stormwater into a junction structure.

Invitation to Bid
The public announcement inviting Bids for Work to be performed or Materials to be furnished; synonymous with the term advertisement for bid or notice to contractors.

Leveling
Placing a variable-thickness course of Materials to restore horizontal and vertical uniformity to existing pavements, normally continuous throughout the Project.

Lift
The compacted thickness of material specified for use in the construction of the Project or for incorporation into the Work placed by equipment in a single Pass.

Local Street
See Street.

Longitudinal Joint
An interface between two adjacent asphalt or concrete mats, which in regards to hot-mixed asphalt surfacing of roadways, typically follows a course approximately parallel to the centerline of the roadway.

Low Impact Development
A sustainable landscaping approach that can be used to replicate or restore natural watershed functions and/or address targeted watershed goals and objectives.

Lump Sum
A method of payment providing for one all-inclusive payment for the work described to be done, complete and accepted without further measurement, as such work is covered under the applicable lump sum pay item.

Major Trees
Trees that are 30-inches or larger in diameter and are either within the right-of-way or public easement or are within 10-feet of the right-of-way or public easement. Major trees are important to the City and design modifications of public facilities may be required to accommodate tree preservation.

Manufactured Treatment Device
A manufactured device, often proprietary, in which stormwater receives treatment before being discharged to another BMP or to the receiving water. This is a broad category of BMPs with a variety of pollutant removal mechanisms and varying pollutant removal efficiencies.

Master Plans
Documents adopted by Stayton City Council that describe and evaluate the City's public infrastructure, including existing and planned transportation, water, sanitary sewer, and storm drain systems.

Materials
Any natural or manmade substance specified for use in the construction of the Project or for incorporation into the Work.

Maximum Extent Feasible
The extent to which a requirement or Standard must be complied with as constrained by the physical limitations of the site, practical considerations of engineering design, and reasonable considerations of financial costs and environmental impacts.

Median
The portion of a divided highway or street separating traffic traveling in opposite directions.

Multiple Course Construction
Two or more courses, exclusive of patching or leveling, placed over the entire roadway width.

Multi-Use Path
That portion of the highway or street Right-of-Way or a separate Right-of-Way, physically separated from motor vehicle traffic and designated for use by pedestrians, bicyclists and other non-motorized users.

MUTCD
Manual on Uniform Traffic Control Devices published by the U.S. Department of Transportation.

Natural Grade
The grade of the land in an undisturbed state.

Natural Location
The location of channels, swales, and other non-manmade conveyance systems, as defined by the first documented topographic contours existing for the subject property, either from maps or photographs.

Neat Line
Theoretical lines specified or indicated on the Plans for measurement of quantities.

Nondurable Rock
Rock that has a slake durability index of less than 90% based on a two-cycle slake durability test, as tested by ASTM D-4644, or rock that is observed to readily degrade by air, water, and mechanical influence.

Notice
A written communication delivered by hand or by mail to the authorized individual, member of the firm or officer of the corporation for which it is intended. If delivered or sent by mail it shall be addressed to the last known business address of the individual, firm or corporation. In the case of a Contract with two (2) or more persons, firms or corporations, notice to one shall be deemed notice to all.

Notice of Final Acceptance
Written confirmation by the City Engineer stating that the City has made Final Acceptance of the Project and thereby authorizing the release of the Warranty.

Notice of Final Completion
Written confirmation by the City Engineer that the Project has reached Final Completion, thereby initiating the Warranty period.

Notice of Substantial Completion
Written confirmation by the City Engineer when the Work, or a specified part thereof, has reached Substantial Completion. The Notice of Substantial Completion may also provide a punch list of remaining items for the Project that have yet to be completed.

Notice to Contractors
See Invitation to Bid.

Notice to Proceed
Written Notice authorizing the Contractor to begin performance of the Work.

ODOT/APWA Standard Specifications for Construction
The latest edition of the Specification Document published by the Oregon Department of Transportation and the American Public Works Association entitled Oregon Standard Specifications for Construction. This document is available from the Oregon Department of Transportation, Salem, Oregon.

Offsite Stormwater Facility
Any stormwater management facility located outside the property boundaries of a specific development but designed to reduce pollutants from and/or control stormwater flows for that development.

On-Site Stormwater Facility
Any stormwater management facility located within the property boundaries of a specific development and designed to reduce pollutants from and/or control stormwater flows for that development.

Offer
See Bid.

On-Site Work
Any Work taking place on the Project Site, including designated staging areas adjacent to the Project Site.

Oregon Construction Contractors Board
The Construction Contractors Board of the State of Oregon in charge of regulating construction contracting businesses. Construction contractors shall be licensed with the Oregon Construction Contractors Board (CCB) in accordance with the Oregon Revised Statutes, Chapter 701.

Oregon Landscape Contractors Board
The Landscape Contractors Board of the State of Oregon in charge of regulating landscape contracting businesses. Landscape contractors shall be licensed with the Oregon Landscape Contractors Board (LCB) in accordance with the Oregon Revised Statutes, Chapter 671.

Organic Soil
A soil with sufficient organic content to influence the soil properties.

Outfall
The point at which collected, concentrated stormwater is discharged, generally from a pipe(s), from a development to an open drainage element such as a ditch, channel, swale, stream, river, pond, lake or wetland.

Owner
The owner of record of real property as shown on the latest tax rolls or deed records of the County, and includes a person who furnishes evidence that he/she is purchasing a parcel of property under a written recorded land sale contract. For public improvement projects, the owner is the City of Stayton, acting through its legally constituted City Council.

Panel
The width of specified Material being placed by Equipment in a single Pass.

Pass
One movement of a piece of Equipment over a particular location.

Patching
Placing a variable-thickness Course of Materials to correct sags, dips, and/or bumps to the existing grade and Cross Section, normally intermittent throughout the Project.

Pavement
Asphalt concrete or Portland Cement Concrete placed for the use of motor vehicles, bicycles, or pedestrians on roadways, shoulders, multi-use paths and parking areas.

Pay Item (Contract Item)
A specific unit of Work for which a price is provided in the Contract.

Payment Bond
The approved security furnished by the Contractor's Surety as a guaranty of the Contractor's performance of its obligation to pay promptly in full all sums due for materials, equipment, and labor furnished to complete the Work.

Peat
A soil composed primarily of vegetative matter in various stages of decomposition, usually with an organic odor, dark brown to black color, and a spongy consistency.

Performance Bond
The approved security furnished by the Contractor's Surety as a guaranty of the Contractor's performance for the materials, equipment, and labor furnished to complete the Work.

Plans
The official construction plans or drawings, which may include some or all of the following: profiles, cross sections, elevations, details, and other working, supplementary, and detail drawings, or reproductions thereof, that shows the location, character, dimensions, and details of the Work to be performed. The construction plans for privately financed public improvements are not deemed "official" or "approved" unless stamped and signed by the Design Engineer and marked approved by the City Engineer. For publicly funded public works improvement projects, construction plans may either be bound in the same book as the balance of the Contract Documents or bound in separate sets and are a part of the Contract Documents, regardless of the method of binding. Synonymous with the term Drawings.

Post-Developed Condition
The site conditions as they exist after development in terms of topography, vegetation, land use, and rate, volume, or direction of runoff.

Potable Water
Water that is satisfactory for drinking, culinary, and domestic purposes and meets the requirements of the health authority having jurisdiction.

Pre-Developed Condition
The site conditions as they exist prior to development in terms of topography, vegetation, land use, and rate, volume, or direction of runoff. Pre-Developed Conditions as it relates to stormwater calculations shall be as approved by the City Engineer.

Prequalification
Process to ensure that contractors who are bidding, proposing, or who will otherwise be constructing a public improvement will have the experience, skill, financial resources and integrity needed to perform the type and size of work involved so that the public improvements will be completed only by responsible and qualified contractors. Prequalification will be required only when stated as such in the Contract Documents.

Preliminary Review
Review of the construction plans by the City Engineer as outlined in these Standards. All City Engineer comments and provisions of these Standards must be addressed prior to final review and approval for construction.

Private Road or Street
Any roadway for vehicular travel which is privately owned and maintained and which provides the principal means of access to abutting properties.

Private Service
That part of each property's utility service line that is on private property outside of any public rights-of-way or easements.

Private Storm Drain
A privately owned and maintained storm drain system located outside the building envelope which serves one or multiple building storm drains, catch basins, area drains, or other drainage facilities on private property outside of public easements and rights-of-way.

Project
General term encompassing all phases of the work to be performed under the Contract and is synonymous with the term Improvement or Work.

Project Site
The geographical dimensions of the real property on which the Work is to be performed, including designated contiguous staging areas.

Pronouns (Use Of)
As used herein, the singular shall include the plural and the plural the singular; any masculine pronoun shall include the feminine or neuter gender; and the term "person" includes natural person or persons, firm, co-partnership, corporation, or association, or combination thereof.

Proposal
See Bid.

Provide
When related to an item of work, the word “provide” shall be understood to mean furnish and install the work complete in place.

Publicly-Owned Equipment
Equipment acquired by a state, county, municipality or political subdivision primarily for use in its own operations.

Public System
Any street, water, sanitary sewer, storm drain, or other public infrastructure in public right-of-way or easement operated and maintained by the City.

Public Traffic
Vehicular or pedestrian movement not associated with the Work, on a public way.

Public Works Director
The person employed or designated by the City as responsible for implementing policy and administrative issues related to public works. The Public Works Director will coordinate with the City Engineer with regard to issues involving technical and engineering aspects or decisions.

Public Works Standards
The Public Works Standards adopted by the City of Stayton and containing Design Standards, Standard Construction Specifications, Standard Drawings, and Standard Forms.

Public Works Superintendent
The superintendent for the Wastewater, Water, Stormwater, or Streets divisions of the City of Stayton’s Public Works Department, authorized by the Public Works Director, who oversees and performs the administrative, supervisory, and technical work for their respective division.

Railroad
Publicly or privately owned rail carriers, including passenger, freight, and commuter rail carriers, their tenants, and licensees. Also, utilities that jointly own or use such facilities.

Receiving Bodies of Water
Creeks, streams, lakes, and other bodies of water into which waters are artificially or naturally directed.

Record Drawings
Construction plans signed and dated by the Design Engineer indicating that the plans have been reviewed and revised, if necessary, to accurately show all as-built construction. Also referred to as As-Builts.

Redevelopment
Any development that requires demolition or complete removal of existing structures or impervious surfaces at a site and replacement with new impervious surfaces. Maintenance activities such as top-layer grinding, repaving (where all pavement is not removed), and reroofing are not considered to be redevelopment. Interior remodeling projects and tenant improvements are also not considered to be redevelopment. Utility trenches in streets are also not considered to be redevelopment. Redevelopment within the City of Stayton is regulated as Development.

Reduced Pressure Principle Backflow Prevention Device (RPBD)
A device for preventing backflow which has two check valves, a differential relief valve located between the two check valves, two shut-off valves, one on the upstream side and the other on the downstream side of the check valves, and four test cocks for checking the water tightness of the check valves and the operation of the relief valve.

Reference Specifications
Bulletins, standards, rules, methods of analysis or test, codes and specifications of other agencies, Engineering societies, or industrial associations referred to in the Contract Documents. All such references specified herein refer to the latest edition thereof, including any amendments, updates, or new editions thereto which are in effect and published at the time of the Invitation to Bid for a publicly financed public improvements or date of development application for privately financed public improvements.

Resident Bidder
Resident Bidder is as defined in ORS 279A.120.

Responsible and Responsive Bidder
This term denotes a Bidder who has the capability in all respects to perform fully the Contract, and the integrity and reliability which will assure good faith performance and who has submitted a Bid under a competitive sealed bid which conforms in all respects to the Invitation to Bid so that all Bidders may stand on equal footing with respect to method and timeliness of submission and as to the substance of any resulting Contract.

Right-of-Way (R/W or ROW)
A general term denoting public land, property, or interest therein, acquired for or devoted to a public street, public utility, public access or public use. Typically, the area between boundary lines of a street.

Roads
See Streets.

Roadbed
Completed excavations and embankments for the subgrade, including ditches, side slopes, and slope rounding, if any.

Roadside
The area between the outside edges of the shoulders and the Right-of-Way boundaries. Unpaved median areas between inside shoulders of divided highways and infield areas of interchanges are included.

Roadway
That portion of a highway or street and its appurtenances between curbs, gutters, or ditches, improved, designed, or ordinarily used for vehicular travel. If a highway or street includes two or more separate roadways, the term "Roadway" refers to any such roadway separately, but not to all such roadways collectively. (See Traveled Way.)

Rock
Natural deposit of solid material composed of one or more minerals occurring in large masses or fragments.

Sand
Particles of rock that will pass a No. 4 sieve and be retained on a No. 200 sieve.

Sanitary Sewer System
The Sanitary Sewer System shall include all interceptors, mainlines, service laterals, force mains, pump stations, manholes, cleanouts, and related facilities, all of which are located within dedicated public Right-of-Way or easements and all of which are owned, operated, and maintained by the City. Overall, that public infrastructure maintained and operated by the City for collecting, pumping, and conveying domestic sewer and industrial waste.

Schedule of Items
The list of pay items, their units of measurement, estimated quantities, and prices. (When a Contract is awarded, the Bid Schedule becomes the Schedule of Items).

Schedule of Values
The breakdown of the values of the component elements comprising a lump sum pay item.

Sedimentation
Deposition of erosional debris soil sediment transported by water.

Shall
An auxiliary word used to express a command which describes a specific requirement or course of action that is required of the Contractor and/or Design Engineer.

Shop Drawings and Submittals
Supplementary plans or data or other information which the Contract requires the Contractor to submit to the City Engineer.

Shoulder
The part of a Roadbed contiguous to the Traveled Way or Roadway, whether paved or unpaved, for accommodating stopped vehicles, for emergency use and for lateral support of Base and surface Courses. Term applies to uncurbed streets and roads.

Shown
As used herein, the word “shown”, or “as shown”, shall be understood to refer to Work shown on the Plans or Standard Drawings in the Contract Documents.

Sidewalk
A path along the side of a road for pedestrians. A Right-of-Way deeded, dedicated, and designated for the use of non-motorized vehicles and pedestrians.

Silt
Soil passing a No. 200 sieve that is non-plastic or exhibits very low plasticity.

Single Course Construction
A wearing course only, not including patching or leveling courses or partial width base course.

Slope
Vertical distance to horizontal distance, unless otherwise specified.

Soil
Accumulations of particles produced by the disintegration of rock, which sometimes contains organic matter. Particles may vary in size from clay to boulders.

Special Provisions
The special directions, provisions, and requirements specific to a Project that supplement or modify the Public Works Standards. Permits and orders governing the Project that are issued directly to the City by a governmental or regulatory authority are considered to be part of the Special Provisions, to the extent and under the conditions stipulated in the Special Provisions. This includes any amended or supplemental permits or orders issued during the course of performing the Work under a Contract.

Special Services
Work services that the Contractor and City Engineer agree cannot be satisfactorily performed by the Contractor’s and subcontractors’ forces, e.g., fabrication and machining work that is most effectively performed away from the Project Site, or rental of operated special equipment.

Specified
As used herein, the word “specified”, or “as specified”, means as required by the Contract.

Special Specifications
Requirements peculiar to the project and changes and modifications of the Standard Construction Specifications.

Standard Construction Specifications
The terms, directions, and provisions set forth which contain construction materials and workmanship requirements included herein and included as a permanent part of the Public Works Standards. Synonymous with the term Specifications or Standard Specifications.

Standard Drawings
Detailed representation of structures, devices, or instructions as set forth in the Public Works Standards as adopted by City as a standard. Synonymous with the term Standard Plans or Standard Details.

State
The State of Oregon.

State of Oregon Plumbing Specialty Code
The State of Oregon Plumbing Specialty Code adopted by the International Association of Plumbing and Mechanical Officials (current edition) as revised by the State of Oregon and called the "Oregon Plumbing Specialty Code".

Station
A distance of one-hundred (100) feet measured horizontally along the established centerline of a street, sewer, or other work, unless specified otherwise.

Stormwater Management Facility
A technique used to reduce pollutants from, detain and/or retain, or provide a discharge point for stormwater to best preserve or mimic the natural hydrologic cycle, and/or to fit within or improve the capacity of existing infrastructure.

Stormwater Quality Facility
A stormwater management facility that has a primary purpose of improving water quality. This includes any structure, landscape, or drainage device that is designed, constructed, and maintained to collect and filter, retain, or detain surface water runoff during and after a storm event for the purpose of maintaining or improving surface and/or groundwater quality, as further outlined in the most current edition of the City of Portland Stormwater Management Manual.

Stormwater Quantity Facility
A stormwater management facility with a primary purpose of controlling stormwater flow to the City's waterways. This includes any structure or drainage device that is designed, constructed, and maintained to collect, retain, infiltrate, or detain surface water runoff during and after a storm event for the purpose of controlling post-development quantity leaving the site, as further outlined in the most current edition of the City of Portland Stormwater Management Manual.

Stormwater Sump
A drainage facility (or system), also called "underground injection control", designed to utilize the infiltration capability of the ground, commonly referred to as percolation, to return surface and stormwater to the soil.

Street
Any street, avenue, boulevard, alley, lane, bridge, road, public thoroughfare or public way and any land over which a right-of-way has been obtained or granted for any purpose of public travel. The City has the following designated streets:

- **Principal Arterial (Major Arterial)**
  A street that carries the highest volume of traffic in the City and primarily provides access through the City or from the City to other cities. The principal arterial streets are identified in the Stayton Transportation System Plan.

- **Minor Arterial**
  A street that collects and distributes traffic from the principal arterials to streets of lower functional classifications providing for movement within specific areas of the city. Minor arterials service through traffic and provide direct access for commercial, industrial, office, and multi-family development but, generally not for single family residential properties. The minor arterial streets are identified in the Stayton Transportation System Plan.

- **Major Collector**
  A street that provides for land access and circulation within and between residential neighborhoods and commercial and industrial areas. Collectors provide direct access to adjacent land uses but still service through traffic. The major collector streets are identified in the Stayton Transportation System Plan.

- **Minor Collector**
  A street that is primarily within a residential area that is used to funnel traffic to major collectors. Minor collectors allow direct access for abutting properties. The minor collector streets are identified in the Stayton Transportation System Plan.

- **Local Street**
  A street used exclusively for access to abutting properties and offers the lowest level of traffic mobility. Through-traffic movement is deliberately discouraged. Also sometimes referred to as a minor or residential street.

- **Cul-De-Sac**
  A short, dead-end street with a circular vehicular turn-around at the dead-end.

- **Dead-End Street**
  A street or series of streets that can be accessed from only one point. Dead-end streets can be either temporary (intended for future extension as part of a future street plan) or permanent. Permanent dead-end streets must provide adequate turn-around capability.

- **Partial-Width Street**
  A portion of the ultimate width of a street, usually along the edge of a subdivision where the remaining portion of the street shall be provided when adjacent property is subdivided. See also PWDS Section 303.

- **Three-Quarter Street**
  A partial-width street with at least 3/4 of the standard street classification width. Where a 3/4-street improvement is required, the right-of-way and pavement width requirements will be as determined by the City Engineer. See also PWDS Section 303.

- **Half-Street**
  A partial-width street with at least 1/2 of the standard street classification width. A development with frontage improvements required on an existing substandard street will be responsible for constructing a continuous 1/2-street improvement, unless otherwise directed by the City Engineer. See also PWDS Section 303.

Street Tree
A street tree is defined as a living, woody plant typically having a single trunk of at least 1.5 inches in diameter at a point 4 feet above mean ground level at the base of the trunk that is located in the public right-of-way.

Structures
Bridges, retaining walls, endwalls, cribbing, buildings, culverts, manholes, catch basins, drop inlets, sewers, service pipes, underdrains, foundation drains, and other similar features which may be encountered in the Work.

Subbase
A course of specified material of specified thickness between the subgrade and a base.

Subcontractor
An individual, partnership, firm, corporation, or any combination thereof, which the Contractor has selected to perform part of the Work.

Subgrade
The top surface of completed earthwork on which subbase, base, surfacing, pavement, or a course of other material is to be placed.

Substantial Completion
The Work (or a specified part thereof) has progressed to the point where, in the opinion of the City Engineer, it is sufficiently complete in accordance with the Contract Documents, so that the Work (or specified part) can be utilized for the purposes for which it is intended.

Substructure
Those parts of a structure which support the superstructure, including bents, piers, abutments, and integrally built wingwalls, up to the surfaces on which bearing devices rest. Substructure also includes portions above bearing surfaces when those portions are built integrally with a substructure unit (e.g., backwalls of abutments). When substructure and superstructure elements are built integrally, the division between substructure and superstructure is considered to be at the bottom soffit of the longitudinal or transverse beam, whichever is lower. Culverts and rigid frames are considered to be entirely substructure.

Subsurface Infiltration
The percolation of water into the ground through a subsurface fluid distribution system or undergound injection control (UIC) system. Subsurface infiltration systems are generally regulated by DEQ under existing UIC rules.

Superintendent
The authorized representative of the Contractor who is responsible for continuous field supervision, coordination, and completion of the Work and is authorized to receive and fulfill instructions from the City Engineer.

Superstructure
Those parts of a structure above the substructure, including bearing devices.

Supplemental Agreements
Agreements made between the City and other governmental agencies, utility companies, or other entities that are included in the Contract Documents and affect some aspect of the work.

Surety
The corporate body which is bound with and for the Contractor, for the acceptable performance of the Contract, and for the payment of all obligations arising out of the Contract Documents. Surety shall be licensed to conduct the business of surety in the State of Oregon and named in the current list of approved sureties published by the U. S. Treasury Circular 570.

Surface Infiltration
The percolation of water into the ground through an open-surfaced stormwater management facility. Surface infiltration systems need to be verified by the Design Engineer whether or not the open-surfaced stormwater management facility is regulated by DEQ under existing UIC rules.

Surfacing
The course or courses of material on the traveled way, auxiliary lanes, shoulders, or parking areas for vehicle use.

Surveyor
A registered professional licensed to practice surveying in the State of Oregon having special knowledge of the principals of mathematics, the related physical and applied sciences, and the relevant requirements of law, who is or will be responsible for surveying of the Project.

Swale
A broad-bottomed, shallow, vegetation-lined channel that allows for reduced flow velocity and filtration of stormwater, generally with flow depths less than 1-foot.

Terrace
A relatively level step constructed in the face of a grade surface for drainage, erosion control, and maintenance purposes.

Ton
The short ton of 2,000 pounds avoirdupois.

Topsoil
Soil ready for use in a planting bed.

Traffic Lane
That part of the traveled way marked for moving a single line of vehicles.

Transverse Joint
An interface between two adjacent asphalt or concrete mats, which in regards to surfacing of roadways, typically follows a course approximately perpendicular to the centerline of the roadway.

Traveled Way
That portion of the roadway for the movement of vehicles, exclusive of shoulder, auxiliary lanes berms, and shoulders.

Typical Section
That Cross Section established by the Plans which represents in general the lines to which the Contractor shall work in the performance of the Contract.

Unit Price
A Contract item of work providing for payment based on specific unit of measurement; e.g., linear foot or cubic yard, as indicated in the Bid.

Unsuitable Material
Frozen material, or material that contains organic matter, muck, humus, peat, sticks, debris, chemicals, toxic matter, or other deleterious materials not normally suitable for use in earthwork.

Underground Injection Control (UIC)
Any system, structure, or activity that is intended to discharge fluids below the ground surface and classified by the Oregon Department of Environmental Quality (DEQ) as an underground injection system (UIC). UICs are regulated by DEQ to limit and control injection of wastes into the subsurface to protect existing groundwater quality for current and future beneficial uses including use as a source for drinking water.

Utility
Tracks, overhead or underground wires, pipelines, conduits, ducts, or structures, owned, operated or maintained, typically within or across a public right-of-way or easement. A line, facility, or system for producing, transmitting, or distributing communications, power, electricity, heat, gas, oil, water, steam, waste, storm water, or any other similar commodity which directly or indirectly serves the public. The term may also mean the utility company, district, or cooperative owning and operating such facilities, including any wholly-owned or controlled subsidiary.

Warranty
The Contractor's responsibility to the City for the repair or replacement of defective materials and/or workmanship relative to the work or a portion or a component part thereof.

Warranty Bond
The approved security furnished by the Contractor's Surety as a guaranty of the Contractor's performance of its Warranty obligations.

Wastewater
See Sanitary Sewer.

Water Distribution System
Water distribution pipelines, pumping stations, reservoirs, valves, and ancillary equipment used to transmit water from the supply source to the service line.

Water Main
The water-supply pipe for public or community use.

Water Service Line
The pipe connection from the City water main to the metering device, hydrant, or fire line backflow prevention assembly.

Waterway
A surface water route consisting of a channel having a defined bed, banks, and/or sides in which surface water flows, draining from higher to lower elevations. May also refer to a closed pipe system or bridge structure under limited circumstances.

Wet Weather Construction Season
Defined for the purposes of construction and development in the City as the period between October 1st and the following May 31st. The Wet Weather Construction Season is not to be confused with the wet weather period typically used for calculating current or prevailing sewage flow rates.

Wetlands
An area inundated or saturated by surface or ground water at a frequency and duration sufficient to support and which, under normal circumstances, does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands are considered to be part of the watercourse and drainage system of the City. Wetlands generally include swamps, marshes, bogs, and similar areas, but also include seasonally wet meadows, farmed wetlands and other areas that may not appear “wet” all the time. They may be, but are not necessarily, characterized by special soils such as peat, muck, and mud.

Wetland Protection Area
An area subject to the provisions of Title 17 of the Stayton Municipal Code that includes all wetlands determined to be locally significant.

Will
Used in the Standards as an auxiliary verb to express a determination to meet a specific requirement or to take a specific course of action or to describe the inevitable.

Work
All materials, labor, tools, equipment and, incidentals necessary to successfully complete any individual item or, if the context requires, the entire Project including the successful completion of all duties and obligations imposed by the Contract Documents.

Working Day
Calendar day, any and every day shown on the calendar, excluding Saturdays, Sundays and Legal Holidays.

Working Drawings
Supplemental Plans, not furnished by the City, that the Contractor is required to submit to the City Engineer.

Written Notice
See Notice.

101.11 ACRONYMS AND ABBREVIATIONS

Meanings of acronyms and abbreviations commonly used in these Standard Construction Specifications, Supplemental Specifications, Special Provisions, Standard Drawings, on the Plans, in the Contract Documents, and other related documents are as follows:

AAN	American Association of Nurserymen
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ABC	Associated Builders and Contractors, Inc.
AC	Asphalt Concrete
ACI	American Concrete Institute
ACP	American Concrete Pavement
ACWS	Asphalt Concrete Wearing Surface
AGA	American Gas Association
AGC	Associated General Contractors of America
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APA	Engineered Wood Association
APWA	American Public Works Association
AREMA	American Railway Engineering and Maintenance of Right-of-Way Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATPB	Asphalt-Treated Permeable Base
AWG	American Wire Gauge
AWPA	American Wood Protection Association
AWS	American Welding Society
AWWA	American Water Works Association
CAgT	Certified Aggregate Technician
CAT-I	Certified Asphalt Technician I
CAT-II	Certified Asphalt Technician II

CBM	Certified Ballast Manufacturers
CCO	Contract Change Order
CCT	Concrete Control Technician
CDT	Certified Density Technician
CEBT	Certified Embankment and Base Technician
CMDT	Certified Mixture Design Technician
CPF	Composite Pay Factor
CRSI	Concrete Reinforcing Steel Institute
CFR	Code of Federal Regulations
CS	Commercial Standard, Commodity Standards Division, U.S. Department of Commerce
D1.1	Structural Welding Code - Steel, American Welding Society, current edition
D1.5	Bridge Welding Code, American Welding Society, current edition
DBE	Disadvantaged Business Enterprise
DEQ	Department of Environmental Quality, State of Oregon
DOGAMI	Department of Geology and Mineral Industries, State of Oregon
DSL	Department of State Lands, State of Oregon
EA	Each
EAC	Emulsified Asphalt Concrete
EPA	U.S. Environmental Protection Agency
ESCP	Erosion and Sediment Control Plan
FHWA	Federal Highway Administration, U.S. Department of Transportation
FSS	Federal Specifications and Standards, General Services Administration
GSA	General Services Administration
HMAC	Hot Mixed Asphalt Concrete
ICEA	Insulated Cable Engineers Association (formerly IPCEA)
IES	Illuminating Engineering Society
IMSA	International Municipal Signal Association
ISO	International Standards Organization
ITE	Institute of Traffic Engineers
JMF	Job Mix Formula
LS	Lump sum
MFTP	(ODOT) Manual of Field Test Procedures
MIL	Military Specifications
MSC	Minor Structure Concrete
MUTCD	Manual on Uniform Traffic Control Devices for Streets and Highways,
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NESC	National Electrical Safety Code
NIST	National Institute of Standards and Technology
NPDES	National Pollutant Discharge Elimination System
NPS	Nominal Pipe Size (dimensionless)
NLMA	National Lumber Manufacturer's Association
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture
ODOT	Oregon Department of Transportation
ORS	Oregon Revised Statutes
OR-OSHA	Oregon Occupational Safety and Health Division of the Department of Consumer and Business Services
OSHA	Occupational Safety and Health Administration, U.S. Department of Labor
PCA	Portland Cement Association
PCC	Portland Cement Concrete
PCI	Precast/Prestressed Concrete Institute
PCP	Pollution Control Plan

PF	Pay Factor of a constituent
PLS	Professional Land Surveyor
PMBB	Plant Mixed Bituminous Base
PTI	Post-Tensioning Institute
PUC	Public Utility Commission, State of Oregon
QA	Quality Assurance
QC	Quality Control
QCT	Quality Control Technician
QL	Quality Level
QPL	Qualified Products List
RAP	Reclaimed Asphalt Pavement
REA	Rural Electrification Administration, U.S. Department of Agriculture
RMA	Radio Manufacturers Association or Rubber Manufacturers Association
SAE	Society of Automotive Engineers
SI	International System of Units
SMC	Stayton Municipal Code
SRCM	Soil and Rock Classification Manual (ODOT)
SSPC	Steel Structures Painting Council
T	Tolerances, AASHTO Test Method
TM	Test Method (ODOT)
TV	Target Value
UBC	Uniform Building Code (as adopted by the State of Oregon)
UL	Underwriters Laboratory, Inc.
UPC	Uniform Plumbing Code (as adopted by the State of Oregon)
USASI	United States of America Standards Institute
USC	United States Code
WAQTC	Western Alliance for Quality Transportation Construction
WCLIB	West Coast Lumber Inspection Bureau
WWPA	Western Wood Products Association

102 CONSTRUCTION PROCEDURES AND REQUIREMENTS FOR PRIVATELY FINANCED PUBLIC IMPROVEMENTS

102.01 CONSTRUCTION PLAN APPROVAL

102.01.A GENERAL

1. Engineered construction plans and specifications shall be reviewed and signed approved by the City Engineer, prior to construction. No construction work on privately financed public improvement projects may commence until the City issues a public works permit.

2. Privately financed public improvement projects shall obtain a public works permit within six (6 months) from the date construction plans are signed approved by the City Engineer, unless otherwise approved. If a public works permit is not obtained within this period, the approval of the construction plans shall become null and void. Renewal of the approval for the construction plans may result in additional conditions to meet new standards, changed conditions, or new information discovered since the original approval.

102.01.B PHASED CONSTRUCTION

1. A development that has been approved by the City to be constructed in phases, the construction plans for each phase shall be capable of standing alone and City approval of one phase shall be independent of the approval for all other phases. Approval of the construction plans by the City and the time by which construction must begin shall apply to each phase independently.

102.02 REQUIRED PUBLIC WORKS PERMITS

102.02.A Public works permits shall be issued on all public improvement projects within public rights-of-way, or easements, which will eventually be maintained and operated by the City of Stayton. Any permits required by federal, state, and local governments shall be obtained by the applicant proposing the improvements. Public improvement projects requiring permits from the City of Stayton shall include, but not necessarily be limited to, improvements or upgrades to streets, sidewalks, curbs, driveway approaches, water systems, sanitary sewer systems, and storm drainage systems. Projects that also require plan review and public works permits include all private storm drainage, sanitary sewer, and water systems that will be connected to or that will discharge into a system under the jurisdictional control of the City of Stayton.

102.02.B A public works permit for privately financed public improvement projects shall not be issued unless the subject development, and any other development of the Developer within the City of Stayton, is in substantial compliance with applicable federal, state, and local laws, rules, regulations, permits, and the approved plans relating to such developments. Developer is responsible for ensuring compliance; however, if there is a material violation of any such requirement prior to issuance of a permit, the City may elect to withhold the permit for privately financed public improvement projects until such time as the violation has been resolved to the satisfaction of the City.

102.02.C The construction, repair, or replacement of all other utilities located within a public right-of-way or public easement, including, but not exclusively, power, telephone, gas, and cable television, shall be required to submit plans for review and approval and obtain a public works permit.

102.02.D The following is a list of pertinent Public Works Permits issued by the Public Works Department:

1. Right-of-Way Permit – This permit covers the construction of utilities, streets, alleys, sidewalks, driveway approaches, curbs and gutters and other site improvement projects within the City of Stayton public rights-of-way and/or easements. All work is required to conform to the Stayton Municipal Code, Public Works Standards, applicable permits, laws, and regulations, and is subject to the general terms and conditions shown on the back of the permit.

2. Site Development Permit – This permit covers the construction of privately financed public improvement projects and other development projects. All work is required to conform to the Stayton Municipal Code, Public Works Standards, applicable permits, laws, and regulations, and is subject to the general terms and conditions shown on the back of the permit.

102.03 CONSTRUCTION PERIOD

102.03.A Privately financed public improvement projects shall begin construction, as deemed acceptable by the City, within six (6) months from the date a public works permit has been issued. If construction does not begin within this period, the approvals of both the construction plans and the public works permit will become null and void. Renewal of the approval for the construction plans and public works permit may result in additional conditions to meet new standards, changed conditions, or new information discovered since the original approval.

102.03.B Privately financed public improvement projects shall be completed within two (2) years of the issuance of the public works permit unless the City extends the completion date. The City Engineer may require additional bonding and impose other conditions before granting such an extension.

102.04 APPLICABLITY OF STANDARD CONSTRUCTION SPECIFICATIONS

102.04.A The Public Works Standards are applicable to all public improvements constructed within the City of Stayton, including privately financed public improvement projects.

102.04.B The Standard Construction Specifications contains provisions relating to offers and contracts with the City for publicly financed public improvement projects. These provisions are not applicable to privately financed public improvement projects and are noted as such in each Section. The remaining provisions of the Standards are applicable to privately financed public improvement projects. If a Section or Subsection of the Standard Construction Specifications is not applicable in its entirety to privately financed public improvements, it is so noted in the title of the Section or Subsection. If not noted in the title as ("Not applicable to privately financed public improvements"), the Section or Subsection is applicable to privately financed public improvements except as specifically stated in the Subsection.

102.05 BONDING REQUIREMENTS

102.05.A GENERAL

1. All bonds signed on behalf of the Surety shall be accompanied by a certified copy of the authority to act. Surety shall be licensed to conduct the business of surety in the State of Oregon and named in the current list of approved sureties published by the U. S. Treasury Circular 570. If the Surety on any bond furnished by the Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in the State of Oregon, or it ceases to meet the requirements and be listed as an approved surety, Contractor shall within five (5) days thereafter, substitute another Bond and Surety, both of which shall be acceptable to City.

102.05.B PERFORMANCE BONDING (PERFORMANCE GUARANTEE)

1. Where public improvements are required, a performance guarantee is required to be in place, prior to issuance of a public works permit for privately financed public improvement projects. A performance guarantee is a financial commitment that warrants that certain required public improvements will be constructed in accordance with the plans and specifications approved by the City. The Developer shall provide a Performance Bond, or other form of performance guarantee acceptable to the City Administrator and City Attorney, in the amount of one-hundred and twenty-five percent (125%) of the estimated cost of construction.

2. The estimated cost of construction shall be determined by the Design Engineer's estimate, the tabulation of bids, or other method acceptable to the City Engineer. The Performance Bond shall be conditioned upon compliance with and fulfillment of all terms and provisions of the Stayton Municipal Code, the approved plans and specifications, and any agreement relating to the construction of the public improvements.

3. Double bonding will not be required on elements of the project where Marion County or ODOT requires Performance Bonding.

102.05.C WARRANTY BONDING (QUALITY ASSURANCE GUARANTEE)

1. A warranty bond is a financial commitment that warrants that the improvements were made according to the approved plans and specifications and that the workmanship and materials used in constructed public improvement project will satisfactorily perform for a warranty period of not less than one (1) year.

2. Record Drawings shall comply with the requirements outlined in Section 202 of the Design Standards and shall be submitted prior to issuance of the Notice of Final Completion, initiating the one (1) year warranty period.

3. After the project is deemed complete, the Developer shall provide the one (1) year warranty bond, or other form acceptable to the City Administrator and City Attorney, in the amount of thirty percent (30%) of the Performance Bond. The one (1) year warranty period begins on the date of construction approval on the Notice of Final Completion. Warranty bond shall continue in force until released by written release from the City (bond may extend beyond one (1) year if Contractor corrections are outstanding).

4. If no defects are found by the end of the one (1) year warranty period, the City will make final acceptance of the work for ownership and operation and the warranty bond will be released.

102.06 INSURANCE AND INDEMNIFICATION

102.06.A The Developer shall indemnify and hold harmless the City and the City Engineer, their officers, employees, and consultants, from and against all claims, demands, penalties, damages, losses, expenses, including attorney's fees, and causes of action of any kind or character, including the cost of defense thereof, arising or alleged to have risen in favor of any person on account of personal injury, death, or damage to property arising out of or resulting from, or alleged to have risen out of or resulted from, in whole or in part, any act or omission of the Developer, the Developer's Design Engineer, the Developer's Contractor, or anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable. See Subsection 108.11 of the Standard Construction Specifications.

102.06.B The City may require additional assurances from the Developer including, but not limited to, Certificates of Insurance from insurance companies or entities acceptable to the City and authorized to issue insurance in the State of Oregon. When required, the Certificate shall specify all of the parties who are named additional insured. At minimum, the City of Stayton and City Engineer shall be named additional insured. The Developer shall be responsible for paying all deductibles, self-insured retentions and/or self-insurance included under these provisions. See Subsection 108.12 of the Standard Construction Specifications.

102.07 PREQUALIFICATION OF CONTRACTORS

102.07.A Contractor's need not be prequalified for privately financed public improvements.

102.08 PRE-CONSTRUCTION CONFERENCE

102.08.A A pre-construction conference, as required in Subsection 109.02 of the Standard Construction Specifications, shall be scheduled before commencement of construction. The meeting is to include the City Engineer, Developer's representative, Design Engineer, Contractor, Marion County and/or ODOT representative (as applicable), and all affected utility companies. The purpose of the pre-conference is to discuss the construction schedule and times of the work which require special coordination.

102.08.B The Developer shall be responsible for notifying ODOT, Marion County, and all private utility companies of the time and location of the pre-construction conference, and requesting that a representative be present. The Developer may be required to submit proof of notification to the City prior to the pre-construction conference. Copies of notification letters sent by the Developer or Design Engineer are acceptable.

102.09 CONSTRUCTION REQUIREMENTS

102.09.A GENERAL

1. During the construction period, the City will maintain three (3) sets of approved plans and specifications. The Contractor shall retain at minimum one (1) set of approved, stamped, and signed plans and specifications at the construction site at all times.

102.09.B CONSTRUCTION SURVEYING

1. EXISTING SURVEY MONUMENTS

   a. Before beginning any construction activity, the applicant's engineer/surveyor shall adequately reference all permanent survey monuments, property corners, stakes, or benchmarks on the subject site, or markers that may be subject to disturbance in the construction area or during the construction of any off-site improvements. It shall be the responsibility of the Contractor to protect survey monuments throughout the construction process. The Contractor shall not disturb permanent survey monuments without written consent from the City's authorized representative.

   b. If any survey monument is disturbed, moved, relocated, or destroyed as a result of construction activity, the Contractor shall, at Contractor's cost, retain the services of a Professional Land Surveyor registered in the State of Oregon to restore the monument to its original condition and shall file all documentation required by Oregon law. A copy of the recorded documentation shall be submitted to the City Engineer.

c. In accordance with ORS 209.150, any person or public agency removing, disturbing or destroying any survey monument of record in the office of the County Surveyor shall cause a registered Professional Land Surveyor to file a reference with the County Surveyor and replace the monument within ninety (90) days of the removal, disturbance, or destruction. Failure to comply with this provision is subject to penalty according to ORS 209.990.

2. NEW SURVEY MONUMENTS

a. Street centerline monumentation shall be in accordance with ORS 92.060 (2). The centerlines of all street right-of-way shall be monumented before the City will accept a street improvement. Monuments shall be set under the direction of a registered Professional Land Surveyor. A record of survey must then be filed in compliance with ORS 209.250 and any additional requirements set forth by the City.

b. All centerline monuments shall be placed in a monument box in accordance with the Standard Drawings. Monument boxes shall be of a type approved by the City before installation and the top of the box shall be set at design finished grade.

c. All sanitary and storm sewers shall be placed in positions that do not interfere with centerline monumentation.

102.09.C RAILROAD CROSSINGS

1. Crossings of railroad rights-of-way shall be done in a manner that conforms to the requirements of the railroad having jurisdiction. If any bonds or certificates of insurance protection are required, they shall be furnished by the Contractor or Developer to the railroad company concerned, with the City and City Engineer as an additionally named insured.

2. Permits or easements for such crossings shall be obtained by the Developer. All the terms of such permits or easement shall be met by the Developer and Contractor.

102.09.D STREAM CROSSINGS

1. Stream crossings shall be avoided whenever possible, whether by roads, utilities, or other development. If streams must be crossed, impacts shall be minimized by preferring bridges to culverts, and by designing bridges and culverts to pass at least the 100-year flood and meet the Oregon Department of Fish and Wildlife (ODFW) Fish Passage Criteria, or latest edition.

2. The Contractor shall comply with the regulatory requirements of the Oregon Department of State Lands, ODFW, U.S. Fish and Wildlife Department, U.S. Army Corps of Engineers, National Marine Fisheries Service, and any other state and federal agencies having jurisdiction.

3. Before any work may be performed in any stream, the method of operation and the schedule of such work shall be approved in writing by the City Engineer. The timing of in-water work shall comply with the guidelines established by the jurisdictional agency. Mechanized equipment shall enter streams only when necessary and only within the immediate work area.

102.09.E OBSERVATIONS, INSPECTIONS, AND TESTING OF CONSTRUCTION.

1. GENERAL

   a. All public construction falling under the jurisdiction of the City of Stayton shall be inspected by a State of Oregon registered engineer, or a qualified individual under the supervision of a State of Oregon registered engineer. The City will not authorize work to begin on public improvements without designation of the Design Engineer's Inspector by the Owner or Developer. In addition, the Owner, Developer (if different than Owner), and the Design Engineer shall sign the City's Developer-City Agreement form before construction can begin.

   b. The Developer, directly through service contract or agreements, shall pay for required testing and all inspection costs, including costs for the City's authorized representative and City Engineer's time. The City will require inspection costs to be included in the contract surety.

   c. The Developer shall be responsible for providing the name of a compaction-testing firm that will be paid by the Developer and that will supply the City Inspector with the compaction tests needed to certify that the soils, aggregate, and surface materials meet the minimum requirements of these Standards. The testing firm hired by the Developer shall be required to be under the direct supervision of a professional engineer registered in the State of Oregon whose area of expertise is geotechnical engineering.

   d. The Developer shall also be responsible for providing the name of a materials-testing firm that will be paid by the Developer and that will supply the City Inspector with the concrete-strength tests and other materials tests as required to certify that the materials meet the minimum requirements of these Standards. The testing firm hired by the Developer shall be required to be under the direct supervision of a professional engineer registered in the State of Oregon.

   e. An engineer whose firm, or any member of the firm, has any form of real property interest in the development for which the improvements are required cannot be designated Design Engineer's Inspector. The Design Engineer's Inspector's relationship to the project must be solely that of a professional service nature.

   f. The City will not provide full-time construction observation services for work in progress on privately financed public improvement projects. The City will, however, perform limited site observations as part of the Public Works Permit process (see appropriate permit general conditions).

   g. The Contractor shall not make connections between existing work and new work until completing necessary inspection and testing on the new work. This new work must conform in all respects to the requirements of the plans and specifications.

h. The Design Engineer (or his/her designated Inspector) shall visit the job site and make contact with the Contractor as necessary to verify that materials and construction are meeting specifications. Amount of time spent at job site depends on the size, complexity of project, and cooperation and reliability of contractor. If the City determines the Design Engineer is not keeping adequate control of the job, or is not spending enough time at the job site, the City representative may issue a stop work order for the project until the Design Engineer's Inspector provides adequate inspection/ observation. The Design Engineer is responsible to monitor all construction and testing.

2. CITY'S CONSTRUCTION OBSERVATION OF WORK IN PROGRESS ACTIVITIES

a. Construction observation of work in progress provided by the City Inspector will typically include the following activities:

- Act as a liaison between the Design Engineer and/or Design Engineer's Inspector and the City;
- Monitor both the work in progress and the required performance tests, as deemed desirable by the City Engineer;
- Issue stop work orders upon notifying the Design Engineer's Inspector of the City's intention to do so. If the City Inspector cannot contact the Design Engineer's Inspector verbally, then the City Inspector shall send a written notification.
- Inform the City Engineer of all proposed plan changes, material changes, stop work orders, or errors or omissions in the approved plans or specifications as soon as practical. Revisions to the approved plans must be under the direction of the Design Engineer. The Design Engineer shall submit three (3) copies of the proposed revision for approval; no work affected by the revision shall be done until approved by the City Engineer.
- Operate or coordinate operation of all valves, including fire hydrants, on existing waterlines.

b. The City Inspector shall at all times have access to the project and will make routine observations of work in progress. Should any observation of work in progress or test results reveal that the construction of the improvements is not proceeding according to the approved plans and the specifications in this document, the City Engineer may order all work stopped, all defective work removed, or both.

c. The Contractor shall give the City Inspector a minimum of 48 hours (two working days) advance notice before a required "milestone" test or inspection. It is the responsibility of the permit holder or Contractor to obtain inspections and approvals for all work installed.

d. Construction observation of the work in progress for the "milestone" tests and inspections shown below is to be witnessed by the City Inspector. The Contractor and/or Design Engineer's Inspector shall coordinate with the City Inspector as necessary during construction.

e. The following list of minimum "milestone" tests and inspections are required.

1) STREETS

- Curb inspection
- Subgrade testing or proof rolls
- Aggregate base rock proof rolls and testing
- AC pavement placement and testing
- Sidewalk/Handicap Ramp installation

2) WATER

- ❖ All installation requiring chlorine swabbing
- ❖ Filling of water system
- ❖ Mainline or Hydrant Blowoff operations
- ❖ Pressure and leakage tests
- ❖ Disinfection

3) SANITARY SEWERS

- ❖ Air testing of sanitary sewer mains and laterals
- ❖ Hydrostatic or vacuum testing of manholes

4) STORM DRAINS

- ❖ Air or Hydrostatic testing as required

f. Failure to give advance notice to the City Inspector for required inspections, receive adequate inspections, or violation of other regulations, ordinances, resolutions, rules, and City Codes as outlined in these Standards can result in one or more of the following, as determined by the City:

- ❖ Uncovering or removal of work not inspected
- ❖ Stoppage of work until problem is resolved
- ❖ Suspension of future inspections
- ❖ Withholding certification of projects as complete, which is required to begin warranty period and eventual City acceptance for maintenance and operation
- ❖ Citation for violation of the Stayton Municipal Code and its penalties and provisions

3. DESIGN ENGINEER'S INSPECTOR ACTIVITIES

a. The following minimum activities are required of the Design Engineer or his/her designated Inspector (Design Engineer's Inspector). The Design Engineer must personally perform all activities marked below by an asterisk (*), and must supervise all individuals performing delegated activities. A recognized testing firm or another registered engineer must accomplish material testing not performed by the Design Engineer.

1) * Execute Developer-City Agreement form to provide engineering services including construction staking, construction inspection/observation, and Record Drawing preparation;

2) Maintain a project log that contains at least the following information:

- ❖ Job number, name of Design Engineer's Inspector and designee(s);
- ❖ Date and time of site visits, including arrival and departure times;
- ❖ Weather conditions, including temperature;
- ❖ A description of construction activities;
- ❖ Statements of directions to change plans, specification, stop work, reject materials or other work quality actions;
- ❖ Public agency contacts;
- ❖ Perceived problems and action taken;
- ❖ General remarks related to construction activities;
- ❖ Final and "milestone" inspections;
- ❖ Record all material, soil and compaction tests; and
- ❖ Citizen contact or complaints;

NOTE: If requested by the City Engineer, all active site development projects shall be required to turn in daily inspection/observation reports to the City on a weekly basis containing information as outlined above. Upon the City's request for the daily inspection/observation reports, if the compiled reports become more than two (2) weeks in arrears, the City representative may post a stop work order on the project site.

3) Obtain and use a copy of City-approved construction plans and specifications;

4) Review and approve all installed erosion control measures prior to any site clearing or ground-disturbing activities by the Contractor;

5) Review and approve all pipe, aggregate, concrete, asphaltic concrete, and other materials to ensure their compliance with City standards;

6) * Approve all plan or specification changes in writing and obtain City approval (See City Activities above). All changes shall be with the approval of the City before the commencement of work affected by the revision;

7) Monitor construction activities to ensure end products meet City specifications;

8) * Perform (or have performed) material, composition and other tests required to ensure City specifications are met;

9) Periodically check that curb, sanitary sewer work, storm sewer work, and pavement grades are in accordance with adopted plans;

10) Periodically certify to the City the amount of work completed to enable release of monies or a reduction of assurance amount;

11) File a completion report that contains:

- The original of the project completion certification;
- A complete copy of the log, signed by the Design Engineer and/or Design Engineer's Inspector, compiled from the contractor's, Design Engineer's Inspector, and City inspector's records;
- A complete set of as-built/record drawing plans compiled from the contractor's, Design Engineer's Inspector, and City inspector's records;
- The results of materiel tests, compaction tests, and soil analysis as detailed in the log.

12) Call to the City's attention, by the end of that workday, all plan changes, material changes, stop work orders, or errors or omissions in the approved plans or specifications;

13) Observe and record as-built/record drawing information on job site at: time of construction. The Design Engineer's Inspector should observe, approve, and document any minor deviations from plans and specifications not requiring City approval. This could include minor changing of manhole elevations, correcting unforeseen field conditions, and so forth;

14) Ensure that contractor notifies police, fire, school bus, public transportation officials, and local affected residences and businesses of proposed utility outages, street closures, or traffic detouring or disruption;

15) Verify that traffic control signing is in place before the start of construction, and in compliance with City-approved traffic control plan and construction sign plan.

4. MAJOR INSPECTION CHECKLIST – The following is the responsibility of the Design Engineer or his/her designated Inspector (Design Engineer's Inspector).

a. SANITARY SEWERS -

- Be present at initial opening of trench to verify grade and alignment and answer any questions.
- Verify grade and alignment of sewer a minimum of once for each run between manholes. If alignment and grade does not check, additional checks shall be made to ensure grade and alignment are achieved.
- Verify materials and construction meets specifications including bedding, pipe, pipe zone, tracer wire, warning tape, backfill, manholes, etc.
- Be present at air test and supply City with copy of air test results.
- Be present at compaction testing of trenches and supply City with copy of results.
- Be present at pavement patching of trenches. Verify that tack coat has been applied before paving and that all trench joints are sand-sealed following paving.
- Be present periodically when traffic is being detoured or streets are closed to monitor traffic control measures.
- Notify City when line is ready for CCTV inspection. Monitor CCTV inspections.
- Verify that manhole tops are at proper finish elevation with correct amount of grade rings.
- Be present at manhole testing. Test manhole for acceptance only after completion of surface restoration including paving and final adjustment to grade. DEQ's manhole test record form or equivalent shall be used to record the test.
- Attend final inspection of project.

b. WATER LINES -

- Be present at initial opening of trench to verify line, grade, and connection to existing water line meets specifications.
- Verify materials and construction meets specifications including bedding, pipe, pipe zone, warning tape, backfill, etc.
- Verify that a minimum of three feet (3') of cover from finish street grade is maintained. Grade stakes shall be required when water line is installed before coring of street. When water line varies from standard cover of three feet (3'), water line depths shall be recorded at grade breaks and every 100 lineal feet and referenced to final grade.
- Verify valve, fitting, and blow-off installation as per plan and location. Inspect materials before installation for compliance with plans and specifications.
- Verify joint restraint and thrust blocking as per the Standard Drawings.
- Verify service lines are proper size and material, and meter stop is at correct horizontal and vertical location.
- Verify fire hydrants meet specifications at correct horizontal and vertical location.
- Monitor water line pressure and leakage test. Notify City Inspector of time of test. Provide all test results to the City.
- Monitor water line flushing and chlorination.

- Method of introducing chlorine to waterline must meet City and State requirements.
- Design Engineer's Inspector to coordinate with City Inspector for water samples for bacteriological test of water purity. City Inspector will report results to Design Engineer.
- The Design Engineer shall ensure the bacteriological tests passed and obtain approval from the City Inspector before connecting the new water system to the existing water system.
- Discharging of the highly chlorinated water used for disinfection shall not be discharged into surface waters. The Design Engineer shall ensure Contractor disposes of flushed chlorinated water in accordance with applicable federal state and local regulations concerning said discharge.

❖ Be present at compaction testing of trenches and supply City with copy of results. Verify proper bedding and backfill process.
❖ Be present at pavement patching of trenches. Verify that tack coat has been applied prior to paving and that all trench joints are sand-sealed following paving.
❖ Notify Public Works ((503) 769-2919) two (2) working days before any required public water shutdown.
❖ Periodically be present to observe when traffic is being detoured or streets are closed to monitor traffic control measures.
❖ Attend final inspection of project.

c. STORMWATER SYSTEMS -

❖ Verify erosion and sediment control provisions are properly installed and maintained throughout the project.
❖ Be present at initial opening of trench to verify grade and alignment and answer any questions.
❖ Verify grade and alignment of storm drains a minimum of once for each run between manholes. Number of checks depends on quality of work being done by contractor.
❖ Verify materials and construction meets specifications including bedding, pipe, pipe zone, tracer wire, warning tape, backfill, manholes, etc.
❖ Be present at compaction testing of trenches and supply City Inspector with copy of results.
❖ Be present at pavement patching of trenches. Verify that tack coat has been applied before paving and that all trench joints are sand-sealed following paving.
❖ Periodically be present when traffic is being detoured or streets are closed to monitor traffic control measures.
❖ Verify that manhole tops are at proper finish elevation with correct amount of grade rings.
❖ Verify catch basin inlet installation per specifications at proper grade and location.
❖ Verify stormwater quantity and quality facilities are constructed in accordance with the plans and specifications.
❖ Attend final inspection of project.

d. STREET CONSTRUCTION -

❖ Monitor and document subgrade, grade elevation, and compaction testing. Observe subgrade for soft spots and unsuitable materials. Document corrective actions.
❖ Verify subbase rock meets specifications and grade elevation. Monitor compaction testing.

- Monitor curb alignment and elevation per survey stakes. Verify curbs meet specification requirements and that drainage blockouts, wheelchair ramps, and driveway cuts (where required) are placed correctly.
- Notify City Inspector so he/she may be present during proof rolling of subgrade, rock placement, and before paving.
- Verify installation of survey monuments at street intersections.
- Monitor asphalt placement:
  - Submit ready-to-pave notice to City for approval.
  - Apply tack coat and saw cut existing pavement.
  - Tack-coat existing curbs, manholes, and pavement before paving.
  - Test asphalt temperature against specifications.
  - Ensure depth of asphalt meets specifications.
  - Ensure class of asphalt meets specifications.
  - Ensure compaction and procedures meet specifications. Monitor compaction testing where required.
  - Provide supplier's certification showing rock gradation and asphalt content of materials.
- Be present periodically when traffic is being detoured or streets are closed to monitor traffic control measures.

102.10 COMPLETION

102.10.A NOTICE OF SUBSTANTIAL COMPLETION

1. When the improvements are sufficiently and substantially complete, as determined by the City Engineer, the City will inspect the improvements and create a list of any deficient items (punch list). Punch list items shall be completed within a specified period of time provided in the Notice of Substantial Completion prior to the City's construction approval of the public improvements.

102.10.B NOTICE OF FINAL COMPLETION

1. Public improvements and public utilities required for a Partition or Subdivision shall be fully constructed and a Notice of Final Completion provided by the City Engineer prior to the recording of the final plat and prior to any building permit applications being accepted or issued, unless the required improvements are deferred under a non-remonstrance or other agreement approved and signed by the City Administrator and City Attorney. Submission of Record Drawings is required prior to receiving a Notice of Final Completion.

2. Public improvements and public utilities required for issuance of a Building Permit shall be fully constructed and a Notice of Final Completion provided by the City prior to the issuance of a Certificate of Occupancy.

102.11 RECORD DRAWINGS (AS-BUILTS)

102.11.A For all public works improvements the Design Engineer shall submit certified as-built record drawings and electronic CD for all approved plans within three (3) months of the completion of construction. As-built record drawings shall comply with the Record Drawing requirements of Subsection 109.24 of the Standard Construction Specifications and Record Drawing plan development requirements specified in Section 202 of the Design Standards. All submittals of the Record Drawings shall be of archival quality.

102.12 WARRANTY RELEASE AND FINAL ACCEPTANCE BY THE CITY

102.12.A The City will inspect the project approximately one (1) month prior to conclusion of the warranty period and notify the Developer in writing of any deficiencies which need to be corrected. The Developer shall be responsible for correcting any deficiencies prior to the warranty expiration. The City will not authorize the release of the Warranty Bond and the privately financed public improvements will not be accepted by the City for ownership and operation until all requirements have been completed to the satisfaction of the City, and all fees and charges have been paid.

102.12.B Upon successful correction any noted deficiencies and upon payment of all fees and charges to the City, the City Engineer will authorize the release of the warranty and issue a Notice of Final Acceptance stating that the City accepts the public improvements for ownership and operation.

103 BIDDING REQUIREMENTS AND PROCEDURES

(Not applicable to privately financed public improvements)

103.01 COMPLIANCE WITH APPLICABLE LAWS

103.01.A The provisions of Oregon Revised Statutes Chapter 279A and 279C and Oregon Administrative Rules Chapter 137, Divisions 46 and 49, apply to all publicly financed public improvement projects that incorporate the Public Works Standards of the City of Stayton into the Contract. The ORS and OAR provisions control over any conflicting language in the Public Works Standards.

103.01.B Bidders are advised to review Subsection 108.01 and Subsection 108.02 regarding applicable laws, ordinances and venue and other agencies affecting City contracts.

103.02 PREQUALIFICATION OF BIDDERS

103.02.A The City does NOT require prospective Bidders to be prequalified, unless otherwise stated in the Special Provisions.

103.02.B Bidders, prior to award of Contract, shall be qualified and competent to perform the Work. Any or all Bidder(s), if so requested by the City, shall submit written evidence such as financial data, previous experience, present commitments, and such other data necessary to demonstrate Bidder's qualifications. Nothing indicated herein will prejudice City's right to seek additional pertinent information regarding Bidder's qualifications to perform the Work.

103.02.C Bidders shall comply with the following provisions:

1. Bidders shall hold or obtain such licenses, prior to award of Contract, as required by State Statutes, and Federal and local Laws and Regulations, and in the manner designated in the Invitation to Bid.

2. Bidder shall NOT be listed on the Bureau of Labor and Industries list of persons having violated prevailing wage rate laws, as required in ORS 701.227.

3. Bidder shall NOT be in violation of any tax laws, as required in ORS 305.385.

4. Bidder shall have an employee drug-testing program, as required in ORS 279C.505.

103.03 BID PROVISIONS

103.03.A No Bid will be received or considered by the City unless the Bid contains a statement by the Bidder as a part of its Bid that the provisions of ORS 279C.840 are to be complied with. The existing prevailing rate of wage in the form of a Bureau of Labor and Industries (BOLI) document is included in the Contract Documents.

103.03.B Each Bidder must identify in the Bid whether the Bidder is a "resident bidder" as defined in ORS 279A.120.

103.03.C The Bidder need not be licensed under ORS 468A.720 relating to asbestos abatement unless otherwise noted in the Special Provisions.

103.03.D No Bid for a construction contract shall be received or considered by the City unless the Bidder is licensed with the Oregon Construction Contractors Board. In the case of work to be performed by a landscape contractor, the Bidder must be licensed with the State Landscape Contractors Board.

103.04 EXAMINATION OF THE CONTRACT DOCUMENTS, WORK SITE, AND CONSIDERATION OF CONDITIONS TO BE ENCOUNTERED

103.04.A Before submitting a Bid, Bidders shall carefully examine the site of the proposed Work, the Plans, and Specifications. Bidders shall also contact utility owners to verify all utilities' anticipated involvement on the Project Site. Bidders are encouraged to review any subsurface investigation material that may be available. Submission of a Bid will constitute confirmation that the Bidder has examined the Project Site and Contract Documents, finds the Plans and Specifications to be sufficiently detailed and accurate to enable Bidder to properly perform the Work, and understands the conditions to be encountered in performing the Work and all requirements of the Contract.

103.04.B The Bidder is responsible for loss or unanticipated costs suffered by the Bidder because of the Bidder's failure to fully examine the site and become fully informed about all conditions of the Work, or failure to request clarification of Plans and Specifications Bidder believes to be erroneous or incomplete. See Subsection 103.09

103.05 SUBSURFACE INVESTIGATIONS

103.05.A If the City or its consultant has conducted subsurface or geologic investigations of the proposed Project Site, the results of the investigations may be included in written reports. If reports have been prepared, copies will be available from the City.

103.05.B If the City has retained subsurface samples, they will also be available for inspection. Bidders and the Contractor may make arrangements for viewing the samples through the City.

103.05.C The availability of subsurface information from the City is solely for the convenience of the Bidder and shall not relieve the Bidder or the Contractor of any risk, duty to make examinations and investigations as required by Subsection 103.04, or other responsibility under the Contract Documents. It is mutually agreed to by all parties that:

- The written report(s) are reference documents and not part of the Contract Documents.
- The subsurface investigations made by the City are for the purpose of obtaining data for planning and design of the Project.
- The data for individual test boring logs apply only to that particular boring and is not intended to be conclusive as to the character of any material between or around test borings.
- If Bidders use this information in preparing a Bid, it is used at their own risk, and Bidders are responsible for all conclusions, deductions, and inferences drawn from this information

103.06 MATERIAL, EQUIPMENT AND METHOD SUBSTITUTIONS

103.06.A When the Contract specifies certain Materials, Equipment, and/or methods, the Bidder shall include those Materials, Equipment, and/or methods in the Bid unless the City Engineer has issued an addendum granting approval to substitute. The procedure for requesting approval is as follows:

1. WRITTEN REQUEST - If a Bidder proposes to use Materials, Equipment and/or methods other than those specified, the Bidder shall send a written request to the City Engineer, at least seven (7) Calendar Days prior to Bid Opening, including complete descriptive and technical information on the proposed Materials, Equipment and/or methods.

2. FUNCTIONAL SIMILARITY - Materials and Equipment proposed for substitution shall be similar in design, and equal or better in quality and function to those specified.

3. MANUFACTURER'S INFORMATION - If manufacturers' brochures or information is needed, the Bidder shall submit three (3) copies of each with all pertinent information clearly marked.

4. DIFFERENCES - The Bidder shall specifically note all differences between the specified Materials, Equipment and/or methods and the proposed substitutes.

5. COST - Where a substitute will result in alteration of the design or space requirements, or any other modifications to the Plans, the Bidder shall include in the substitution request all items of cost for the revised design and construction.

6. NOTIFICATION OF PLAN HOLDERS - If the City Engineer approves any proposed substitution, such approval, and any modifications necessitated to the design and construction by the substitution, will be acknowledged by Addenda. Unless the City Engineer has approved substitutions of Materials, Equipment, and/or methods prior to opening of Bids, the Bidder must furnish the items specified in the Contract.

103.06.B Substitution after Award is addressed in Subsection 109.14.

103.07 USE OF CITY-OWNED PROPERTY FOR STAGING OR STORAGE AREAS

103.07.A WITHIN NORMAL RIGHT-OF-WAY LIMITS

1. If approved by the City Engineer, the Contractor may use available property within the normal Right-of-Way limits for the purpose of storing materials to be used in the construction of improvements under the Contract.

2. Where the City owns, or has rights to, other adjacent properties in the Project area, "normal Right-of-Way" is limited to a line drawn across that property connecting the normal Right-of-Way limits on either side of the property.

103.07.B OUTSIDE NORMAL RIGHT-OF-WAY LIMITS

1. The Contractor may not use City-owned property outside of normal Right-of-Way limits for the Project without the approval of the City Engineer.

103.07.C RESTRICTIONS ON USE

1. Contractors shall comply with applicable laws, ordinances, and regulations pertaining to use of City-owned property, and shall:

   - ❖ Not cause unreasonable impacts on traffic and other facility users.
   - ❖ Clean up all hazardous materials deposited by, or resulting from, Contractor operations.
   - ❖ Be responsible for all costs associated with use of the property.

103.08 INTERPRETATION OF QUANTITIES IN BID SCHEDULE

103.08.A The estimate of quantities of work to be done is approximate and is given only as a basis of calculation for comparison of Bids and award of the Contract. The City does not warrant that the actual amount of work will correspond to the amount as shown or estimated. Payment to the Contractor will only be made for work actually performed or materials actually furnished according to actual measurements that were necessary to complete the work.

103.08.B Bidders must include in their unit prices the entire cost of each item of work set forth in the Bid, and when, in the opinion of the City, the prices in any Bid are obviously unbalanced, such Bid may be rejected.

103.08.C The unit prices for the various Contract items shall be full compensation for all labor, materials, supplies, equipment, tools, and all things of whatsoever nature are required for the complete incorporation of the item into the work the same as though the item were to read "In Place."

103.08.D Quantities of Work to be performed and materials to be furnished may each be increased, decreased, or omitted as provided in Subsection 103.10 and Subsection 105.05.

103.09 INTERPRETATION OF CONTRACT DOCUMENTS AND REQUESTED CHANGE OF A SOLICITATION PROVISION

103.09.A Any clarification of the Contract Documents needed by the Bidder for a Project shall be requested in writing to the City Engineer. Notification of erroneous or incomplete Contract Documents shall also be submitted in writing to the City Engineer. Oral explanations or interpretations given before receiving Bids for a Project will not be binding. To be binding, interpretation of the Contract Documents by the City must be made by written Addenda furnished to all Plan Holders.

103.09.B A Bidder may protest or request a change of a solicitation provision, evaluation criteria, plan, specification, or contract term no later than ten (10) calendar days prior to the Bid Closing. The protest or request for change shall include the reason and any proposed change. The City Engineer shall consider the protest or request for change and may reject the protest or request for change, issue an addendum, or cancel the Invitation to Bid. No protest of the selection of a contractor or the award of a contract because of a solicitation provision, evaluation criteria, Plan, Specification, or contract term will be considered after such time.

103.10 ADDENDA TO CONTRACT DOCUMENTS

103.10.A GENERAL

1. The City reserves the right to issue Addenda making changes or corrections to the Contract Documents including the Plans, Specifications, or quantities. The City reserves the right to increase or decrease the amount of any class or portion of the work. No such change in the work shall be considered as a waiver of any condition of the Contract nor shall such change invalidate any of the provisions thereof.

2. If, in the opinion of the City Engineer, additional information or interpretation of the Contract Documents is required, Addenda will be issued.

3. Any Addenda issued by the City that may include changes, corrections, additions, interpretations, or information and issued seventy-two (72) hours or more before the scheduled closing time for submission of Bids, Saturday, Sunday, and legal holidays not included, shall be binding upon the Bidder.

4. Oral instructions or information concerning the contract or the project given out by officers, employees, or agents of the City to prospective Bidders shall not bind the City.

103.10.B ADDENDA ISSUED BY MAIL, FAX, OR ELECTRONIC TRANSMITTAL

1. Unless stated otherwise in the Invitation to Bid, Addenda to the Contract Documents will be mailed, faxed, or electronically transmitted to potential Bidders and plan centers that have obtained a copy of the Contract Documents from the City and who are listed on the City's official plan holders list.

103.10.C ADDENDA ISSUED THROUGH CITY WEBSITE

1. If stated in the Invitation to Bid, the City may provide Addenda by publishing them on the City's website at: http://www.staytonoregon.gov. Bidders shall be responsible for checking and downloading Addenda from the City web site. Bidders should frequently check the web site until Bid Closing.

2. Bidders, not the City, shall be responsible for failure of Bidders to check and download Addenda. Bids shall incorporate all Addenda. Bids will be rejected if opened and found by the City to not be based on all Addenda published on the website before Bid Closing.

103.11 PREPARATION AND SUBMITTAL OF BIDS

103.11.A Bidders shall not alter, in any manner, the documents bound within the Contract Documents. Bidders shall complete the certifications and statements according to the instructions. Signature of the Bidder's authorized representative thereon constitutes the Bidder's confirmation of and agreement to all certifications and statements contained in the Contract Documents.

103.11.B Using figures, Bidders shall fill in all blank spaces in the Bid Schedule. For each item in the Bid Schedule, Bidders shall enter the unit price and the product of the unit price multiplied by the quantity given. Bidders shall also enter the total amount of the Bid obtained by adding amounts for all items in the Bid Schedule.

103.11.C All Bids must be clearly and distinctly typed or written with blue or black ink and be on the form furnished by the City and, in addition to necessary unit price items and total prices in the column of totals to make a complete Bid, all applicable blanks must be filled in and the Bid signed by the Bidder or a duly authorized agent. Corrections or changes of item entries shall be in ink, with incorrect entry lined out and correct entry entered and initialed. Bidders shall include in the Bid the address to which all communications concerning the Bid and Contract should be sent. Any statement accompanying and tending to qualify a Bid may cause rejection of such bid, unless such statement is required in a Bid embracing alternative Bids.

103.11.D Bidders shall enclose the Bid, any documents required to be submitted with the Bid, and a Bid security in a sealed, labeled, and addressed envelope and submit the envelope as required in the Invitation to Bid. The outside of the envelope should plainly identify the Project name and the Bid opening date and time. Facsimile and electronic data interchange Bids shall not be accepted unless otherwise specified in the Special Provisions.

103.11.E The Bidder, in submitting the Bid, certifies that the Bidder is eligible to receive a contract for a public work pursuant to ORS 279C.860. Bidder agrees, if awarded a Contract, that every subcontractor will eligible to receive a Contract for a public work pursuant to ORS 279C.860.

103.11.F State whether business is being done as an individual, a co-partnership, a corporation, or a combination thereof, and if incorporated, in what state, and if a co-partnership, state names of all partners. The person signing on behalf of a corporation, a co-partnership, or combination thereof shall state their position with the firm or corporation and state whether the corporation is licensed to do business in the State of Oregon.

103.11.G Unless otherwise specified, Bidders shall Bid on all items included in the Contract Documents, and the low Bidder shall be determined as noted in Subsection 104.01. Except as provided herein, Bids that are incomplete or fail to reply to all items required in the Contract Documents may be rejected.

103.12 BID SECURITY

103.12.A All Bids must be accompanied by a Bid Security guaranteeing that the Bid will be irrevocable for sixty (60) days, unless specified otherwise, in the form of a certified check or cashier's check payable to the order of the City, or a Bidder's Surety in an amount of at least ten percent (10%) of the amount of the Bid (see also ORS 279C.365(4)). If a Surety bond is submitted, Bidders shall use the City's standard Bid Bond form included in the Contract Documents or such form as is approved by the City Attorney. Bidders shall submit the bond with original signatures and the Surety's seal affixed.

103.12.B Surety shall be licensed to conduct the business of surety in the State of Oregon and named in the current list of approved sureties published by the U. S. Treasury Circular 570. If the Surety on any bond furnished by the Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in the State of Oregon, or it ceases to meet the requirements and be listed as an approved surety, Contractor shall within five (5) days thereafter, substitute another Bond and Surety, both of which shall be acceptable to the City.

103.12.C Bonds shall be signed by the Surety's authorized Attorney-in-Fact, and the Surety's seal shall be affixed to the Bond. A Power of Attorney for the Attorney-in-Fact shall be attached to the Bond in the Contract Documents, which shall include Bond numbers, and the Surety's original seal shall be affixed to the Power of Attorney.

103.12.D Such Bid Security shall be forfeited if the Bidder shall fail or neglect to furnish the performance and payment bonds, certificate of insurance, and to execute and return the Contract within fifteen (15) calendar days, unless otherwise specified, after issuance of the Contract, per Subsection 104.08. See Subsection 104.09 for return of Bid Securities.

103.13 DISCLOSURE OF FIRST-TIER SUBCONTRACTORS

103.13.A Bidders are required to disclose information about certain first-tier subcontractors when the Contract value for a public improvement is greater than $100,000, or such other limit prescribed by ORS 279C.370.

103.13.B Specifically, when the Contract amount of a first-tier subcontractor furnishing labor or labor and materials would be greater than or equal to (i) 5% of the project bid, but a least $15,000, or (ii) $350,000 regardless of the percentage, the Bidder must disclose the following information about that subcontract in its Bid submission or within two (2) working hours after bid closing:

- The subcontractor's name.
- The dollar value.
- The category of work that the subcontractor would be performing.

103.13.C If the Bidder will not be using any subcontractors that are subject to the above disclosure requirements, the Bidder is required to indicate "NONE" on the accompanying form.

103.13.D The Subcontractor Disclosure Form may be submitted either:

- By filling out the subcontractor Disclosure Form included in the Contract Documents and submitting it together with the Bid at the time and place designated for receipt of Bids.
- By removing it from the Contract Documents, filling it out and submitting it separately to the City of Stayton within the stated deadline.

103.13.E THE CITY OF STAYTON MUST REJECT A BID IF THE BIDDER FAILS TO SUBMIT THE DISCLOSURE FORM WITH THIS INFORMATION BY THE STATED DEADLINE (see OAR 137-49-0360).

103.14 NON-COLLUSION AND CONFLICT OF INTERESTS

103.14.A A Bidder submitting a Bid thereby certifies that no officer, agent, or employee of the City who has a pecuniary interest in the Bid has participated in the Contract negotiations on the part of the City, that the Bid is made in good faith without fraud, collusion, or connection of any kind with any other Bidder, and that the Bidder is competing solely on its own behalf without connection with, or obligation to, any undisclosed person or firm.

103.15 RECIPROCAL PREFERENCE FOR OREGON RESIDENT BIDDERS

103.15.A This Subsection applies only to Contracts for Projects financed without federal funds. Bidders shall complete the certificate of residency provided by the City in the Contract Documents. Failure to properly complete the form will be cause to reject the Bid. As used in the certificate of residency and this Subsection, "Resident Bidder" means a Bidder who has:

- Paid unemployment taxes or income taxes in the State of Oregon during any of the twelve (12) calendar months immediately preceding submission of the Bid,
- A business address in the State of Oregon, and
- Certified in the Bid that the Bidder qualifies as a Resident Bidder.

103.15.B "Nonresident Bidder" means a Bidder who is not a Resident Bidder as defined above. In determining the lowest Bid, the City will, for the purpose of awarding the Contract, add a percentage increase to the Bid of a Nonresident Bidder equal to the percentage, if any, of the preference given to that Bidder in the state in which the Bidder resides (ORS 279A.120). The percentage preference applied in each state will be published on or before January 1 of each year by the Oregon Department of Administrative Services. The City may rely on these percentages without incurring liability to any Bidder (ORS 279A.120).

103.15.C This increase will only be applied to determine the lowest Bid, and will not cause an increase in payment to the Contractor after Award of the Contract.

103.16 WITHDRAWAL, MODIFICATION, OR ALTERATION OF BID

103.16.A Bids may be withdrawn by written notification on company letterhead signed by an authorized officer and received prior to the time and date set for Bid closing. Bids also may be withdrawn in person prior to the scheduled Bid closing upon presentation of appropriate identification. Unopened Bids, withdrawn as specified above, may be released to the Bidder after voiding any date and time stamp used. Envelopes containing written requests to withdraw Bids shall be clearly marked as follows: (1) BID WITHDRAWAL, (2) the project name, (3) the Bid opening time and date, and (4) the Bidder's name.

103.16.B Prior to Bid opening, changes may be made provided the Bidder or the Bidder's agent initials the change. If the intent of the Bidder is not clearly identifiable, the interpretation most advantageous to the City will prevail.

103.16.C Proposals, modifications, and withdrawal requests received after the scheduled closing time for filing bids, as set forth in the Invitation to Bid, will be rejected and returned unopened to the bidder unless such closing time is extended by the City.

103.16.D No Bidder may withdraw a Bid after Bid opening unless sixty (60) days or period stated in the Contract Documents have elapsed and the City has not awarded a Contract.

103.17 OPENING AND COMPARING BIDS

103.17.A Bids will be opened and the total price for each Bid will be read publicly at the time and place indicated in the Invitation to Bid and the Contract Documents. Bidders and other interested parties are invited to be present.

103.17.B Bids for each Project will be compared on the basis of the total amount of each Bid. The total amount of the Bid will be the total sum computed from quantities listed in the Bid Schedule and unit prices entered by the Bidder. While price extensions are required as a matter of convenience, in the event of error in extensions, the unit prices will govern and the City may make arithmetic corrections on extension amounts. In the event of discrepancy between the written and numerical amounts, the written prices will govern.

103.17.C After opening and reading Bids, the City will check them for correct extensions of unit prices and totals. The total of extensions, corrected where necessary, will be used by the City for Award purposes. The City reserves the right to waive minor informalities and irregularities. The City may correct obvious errors, when the correct information can be determined from the face of the document, if it finds that the best interest of the City and the public will be served thereby. Bids will be considered and a Contract awarded, if at all, within forty-five (45) calendar days after the date of opening of Bids, unless specified otherwise in the Contract Documents and unless an extension beyond that time is agreed to by both parties and acknowledged in writing by the Bidder.

103.18 REJECTION OF BIDS

103.18.A The City may reject any Bid not in compliance with all prescribed public bidding procedures and requirements and may, for any reason, reject any or all Bids upon a finding it is in the public interest to do so. An example for rejection in the public interest is the City's determination that any of the unit Bid prices are significantly unbalanced to the City's potential detriment.

103.18.B Where competitive Bids are required and all Bids are rejected, and the Project has not been abandoned, new Bids may be called for.

103.18.C Bids received after the scheduled closing time for submission of Bids as set forth in the Invitation to Bid will be rejected and returned unopened to the Bidder

103.18.D A Bid will be considered irregular and will be rejected if the irregularity is deemed by the City to render the Bid non-responsive. Examples of irregularities include without limitation:

- The Bid Section documents provided are not properly used or contain unauthorized alterations.
- The Bid is incomplete or incorrectly completed.
- The Bid contains improper additions, deletions, alternate Bids, or conditions.
- The Bid or Bid modifications are not signed by a person authorized to submit Bids or modify Bids.
- A member of a joint venture and the joint venture submit Bids for the same Project. Both Bids may be rejected.
- The Bid has entries not typed or in ink, or has signatures or initials not in ink.
- Each change or correction is not individually initialed.
- White-out tape or white-out liquid is used to correct item entries.
- The price per unit cannot be determined.
- The Bid Security is insufficient or improper.
- The original Bid Bond form, if provided in the Contract Documents, is not used or is altered.
- The Oregon Construction Contractors Board registration number and expiration date are not shown on the Bid if required in the Contract Documents. This requirement applies to State-funded Projects (Not required on Federal-Aid Projects).
- A disclosure of first-tier subcontractors, if required, is not received within two (2) working hours of the time Bids are due to be submitted, or the disclosure form is not complete.
- The Bid does not evidence recognition of Addenda.
- The Bid entries are not expressed in U.S. dollars and cents.

103.19 DISQUALIFICATION OF BIDDERS

103.19.A The Bid(s) of a disqualified Bidder will be rejected. Any of the following reasons is sufficient to disqualify a Bidder:

- More than one Bid is submitted for the same Work by an entity under the same or different name(s).
- Evidence of collusion among Bidders. Participants in collusion will be found not responsible, and may be subject to criminal prosecution.
- Any of the grounds for disqualification cited in ORS 279C.440.

103.19.B A Bidder will be disqualified if the Bidder has:

- Been declared ineligible by the Commissioner of the Bureau of Labor and Industries under ORS 279C.860;
- Not been registered (licensed) by the Oregon Construction Contractors Board (CCB) or been licensed by the State Landscape Contractors Board before submitting a Bid (ORS 279C.365(1)(k), ORS 701.021, ORS 701.026, and 671.530). The Bidder's registration number and expiration date shall be shown in the Bid form, if requested. Failure to furnish the registration number, if requested, will render the Bid non-responsive and subject to rejection. (Not required on Federal-Aid projects.); or
- Been determined by the CCB under ORS 701.227 not to be qualified to hold or participate in a public contract for a public improvement.

103.20 REJECTION OF BID ON GROUNDS OF NONRESPONSIBILITY OF BIDDER

103.20.A The Bid of a Bidder who is found to be non-responsible according to the criteria listed in Subsection 104.01 or ORS 279C.375(3) will be rejected.

104 AWARD AND EXECUTION OF THE CONTRACT

(Not applicable to privately financed public improvements)

104.01 AWARD OF THE CONTRACT

104.01.A After the Bids are opened and a determination is made that a Contract is to be awarded, the Contract will be awarded to the lowest responsible Bidder. For the purposes of this Section, "lowest responsible Bidder" means the responsible Bidder that submitted the lowest responsible Bid who is not on the list created by the Oregon Construction Contractors Board pursuant to ORS Chapter 701, and who has:

- Substantially complied with all prescribed public Bidding procedures and requirements;
- Available the appropriate financial, materials, equipment, facility and personnel resources and expertise, or ability to obtain the resources and expertise, necessary to indicate the capability of the prospective Bidder to meet all contractual responsibilities;
- A satisfactory record of performance. In evaluating a Bidder's record of performance, the City may consider, among other things, whether the Bidder completed previous contracts of a similar nature with a satisfactory record of performance. For purposes of evaluating a Bidder's performance on previous contracts of a similar nature, a satisfactory record of performance means that to the extent that the costs associated with and time available to perform a previous contract remained within the Bidder's control, the Bidder stayed within the time and budget allotted for the procurement and otherwise performed the contract in a satisfactory manner;
- A satisfactory record of integrity. In evaluating a Bidder's record of integrity, the City may consider, among other things, whether the Bidder has previous criminal convictions for offenses related to obtaining or attempting to obtain a contract or subcontract or in connection with the Bidder's performance of a contract or subcontract;
- Qualified legally to contract with the City;
- Supplied all necessary information in connection with the inquiry concerning responsibility. If a prospective Bidder fails to promptly supply information requested by the City concerning responsibility, the City shall base the determination of responsibility upon any available information, or may find the prospective Bidder not to be responsible;
- Not been disqualified by the City under ORS 279C.440.

104.01.B If the Bidder is found not to have a satisfactory record of performance or integrity, the City will document the record and the reasons for the unsatisfactory finding.

104.01.C Determination of the lowest responsible Bidder and award are subject to review and determination by the City Attorney, as to legal sufficiency of any Bid submitted.

104.01.D If all responsive Bids from responsible Bidders exceed the City's cost estimate, the City may elect to negotiate with the lowest responsive, responsible Bidder prior to awarding the Contract, in order to solicit value engineering and other options to attempt to bring the Project within the City's cost estimate. Negotiation will not result in significant changes from the scope of the Project in the Contract Documents.

104.01.E Preference may be given to services, articles, or materials produced or manufactured in Oregon if price, fitness, availability, and quality are otherwise equal.

104.01.F Upon selection of the Contractor, the City will issue a Notice of Intent to Award and/or post the bid tabulations showing the apparent low bidder. The City may at its discretion, provide the Notice of Intent to Award on the City's web site at: http://www.staytonoregon.gov. If Notice of Intent to Award is posted on the City's web site, the Award will not be final until the later of the following:

- ❖ Three (3) working days after the Notice of Intent to Award has been posted.
- ❖ The City has provided a written response to each timely protest, denying the protest and affirming the Award.

104.01.G If the City accepts a Bid and awards a Contract, the City will send the successful Bidder written Notice of Award. Award and issuance of the Contract for signing and execution shall be made within forty-five (45) calendar days, unless otherwise specified in the Special Provisions or a written mutual agreement, after the date of opening of Bids.

104.02 SELECTION PROTEST

104.02.A A Bidder adversely affected or aggrieved, limited to the three (3) apparent lowest Bidders and any other Bidder directly in line for Contract Award, may protest the Notice of Intent to Award. No protest because of a solicitation provision, evaluation criteria, plan, specification or contract term that could have been raised as a requested Change of a Solicitation Provision (see Subsection 103.09) will be considered. The selection protest must be submitted in writing within three (3) working days of the date of the Notice of Intent to Award. The protest shall be submitted to the City Engineer.

104.02.B The selection protest must state all the relevant facts that establish that all lower Bidders were ineligible for selection because their Bids were non-responsive or the City committed a substantial violation such that the protester would have, but for the substantial violation, been the lowest responsible Bidder. A written decision will be sent to the protester.

104.02.C The City is not obligated to consider late protests.

104.03 CANCELLATION OF AWARD

104.03.A Without liability to the City, the City may for good cause cancel Award at any time before the Contract is executed by all parties to the Contract, as provided by ORS 279C.395 for rejection of Bids, upon finding it is in the public interest to do so.

104.04 CONTRACT BONDS, CERTIFICATES, AND REGISTRATIONS

104.04.A GENERAL

1. Before the City will execute the Contract, the successful Bidder shall furnish the required bonds, certificates, and registrations.

2. Surety shall be licensed to conduct the business of surety in the State of Oregon and named in the current list of approved sureties published by the U. S. Treasury Circular 570. If the Surety on any Bond furnished by the Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in the State of Oregon, or it ceases to meet the requirements and be listed as an approved Surety, Contractor shall within five (5) days thereafter, substitute another Bond and Surety, both of which shall be acceptable to City.

3. Bonds shall be signed by the Surety's authorized Attorney-in-Fact, and the Surety's seal shall be affixed to the Bond. A Power of Attorney for the Attorney-in-Fact shall be attached to the Bond in the Contract Documents, which shall include Bond numbers, and the Surety's original seal shall be affixed to the Power of Attorney.

104.04.B PERFORMANCE AND PAYMENT BONDS

1. When Awarded the Contract, the successful Bidder shall furnish a Performance Bond and a Payment Bond of an authorized Surety.

2. The successful Bidder shall submit the standard Bond forms, where provided in the Contract Documents. Faxed or photocopied bond forms will not be accepted. The Bonds or other financial assurance is subject to approval by the City Administrator and City Attorney.

3. The amount of each Bond shall be equal to the Contract price based upon the estimate of quantities and unit prices or lump sum as set forth in the Contract.

4. The Performance Bond and the Payment Bond shall be continuous in effect and shall remain in full force and effect until compliance with and fulfillment of all terms and provisions of the Contract, including the warranty obligation of Subsection 108.21, all applicable laws, and the prompt payment of all persons supplying labor and/or material for prosecution of the work. Bonds shall not be canceled without the City's consent, nor will the City normally release them, prior to Contract completion.

5. The Performance Bond and the Payment Bond must be signed by the Surety's authorized Attorney-in-Fact, and the Surety's seal must be affixed to each Bond. A power of attorney for the Attorney-in-Fact shall be attached to the Bonds in the Contract Documents, which must include bond numbers, and the Surety's original seal must be affixed to the power of attorney.

6. SUPPLEMENTAL WARRANTY BOND FOR COATING SYSTEMS

   a. When a coating system Warranty is required for the Project by the Contract Documents, the Contractor shall furnish a Supplemental Warranty Performance Bond, in addition to the regular Performance Bond for the Contract to the City, executed by a Surety authorized to do business in the State of Oregon. The Supplemental Warranty Performance Bond shall be in the sum of one hundred (100) percent of the full Contract amount or eighty (80) percent of the Bid items for the coating system. The Bond is to secure the performance by the Contractor of correction Work on any coating system defects that the Contractor may be directed by the City to perform. The Contractor shall use the City-provided form for the Bond except that if the Surety is a multiple Surety, a copy of the form for a Bond with multiple Sureties shall be obtained from the City.

   b. The Supplemental Warranty Performance Bond shall be signed by the Surety's authorized Attorney-in-Fact, and the Surety's seal shall be affixed to the Bond. A Power of Attorney for the Attorney-in-Fact shall be attached to the Bond in the Contract Documents, which shall include Bond numbers, and the Surety's original seal shall be affixed to the Power of Attorney.

c. Upon Final Completion, the Supplemental Warranty Performance Bond shall become effective and shall continue in full force and effect of not less than one (1) year and until the City has advised the Contractor in the Notice of Final Acceptance that:

- ❖ There are no coating system defects, or
- ❖ If the Contractor has been notified that there are coating system defects, the defects have been repaired by the Contractor to the satisfaction of the City as specified under the coating system Warranty and the full Warranty period has expired Supplemental Warranty Performance Bonds cannot be canceled nor can they be released due to possible claims.

104.04.C CERTIFICATES OF INSURANCE

1. The successful Bidder shall furnish the City certificates of insurance applicable to the Project, in accordance with Subsection 108.12. The insurance coverages shall remain in force throughout the performance of the Contract and shall not be allowed to lapse without prior written approval of the City. Bidders may refer to Subsection 108.12 for minimum coverage limits and other requirements. For specified Contracts, certified copies, and in some instances the original, of insurance policies may be required by the Special Provisions.

104.04.D WORKERS' COMPENSATION

1. If required by the Special Provisions, in order to certify compliance with the workers' compensation insurance coverage required by Subsection 108.12.C the successful Bidder shall complete and sign the "Certification of Workers' Compensation Coverage" form bound in the Contract Documents.

104.04.E REGISTRATION REQUIREMENTS

1. ORS 701.021, ORS 701.026, and ORS 671.530 require that Bidders be registered with the Oregon Construction Contractors Board or licensed by the Oregon Landscape Contractors Board prior to submission of a Bid on a Project not involving federal funds. Registration with the Oregon Construction Contractors Board or licensing by the Oregon Landscape Contractors Board is not a prerequisite to bidding on Federal-Aid Projects; however, the City will not execute a Contract until the Contractor is so registered or licensed.

2. Bidders must be registered with the Corporation Division, Oregon Secretary of State, if bidding as a corporation, limited liability company, joint venture, or limited liability partnership, or if operating under an assumed business name and the legal name of each person carrying on the business is not included in the business name.

3. A Contractor registered under ORS Chapter 701 may bid on a landscaping Project or perform a construction Project that includes landscape contracting as a portion of the Project if the landscape contracting is subcontracted to a licensed landscaping business as defined in ORS 671.520.

4. A landscaping business may bid on a Project or perform a Contract that includes the phase of landscape contracting for which it is not licensed if it employs a landscape Contractor, or subcontracts with another licensed landscaping business, licensed for that phase.

104.05 EXECUTION OF THE CONTRACT

104.05.A The Bidder to whom award is made shall execute and return the Contract in the required number of copies, and shall furnish separate Performance Bond and Payment Bonds, certificates of insurance, and certification of worker's compensation coverage if required, satisfactory to the City Administrator and City Attorney within fifteen (15) calendar days, or period otherwise agreed to by both parties, after the date on which the Contract was sent or otherwise conveyed to the Bidder receiving Award. The Bidder shall return the originals of all documents received from the City and named in this Subsection, with original signatures. Certificates of insurance shall also be originals. It shall be the Bidder's responsibility to confirm the accuracy and completeness of all copies of the Contract submitted by the City to the Bidder for signature.

104.05.B The effective date of the Contract will be the date the City Administrator or designee executes the Contract.

104.05.C The federal tax identification number or social security number of the successful Bidder shall be supplied to the City.

104.06 EMPLOYEE DRUG TESTING

104.06.A As required by ORS 279C.505(2), the Contractor awarded the Contract shall certify to the City that it has an employee drug-testing program in place for its employees.

104.06.B By executing and returning the Contract, the Contractor certifies, represents, and warrants to the City that a qualifying Employee Drug-testing Program is in place at the time of execution, will continue in full force and effect for the duration of the Contract, and that the Contractor will comply with the provisions of this Subsection. Further, the City's performance obligation (which includes, without limitation, the City's obligation to make payment) is contingent on the Contractor's compliance with this representation and warranty.

104.07 TRANSFER OF THE CONTRACT AND INTERESTS THEREIN

104.07.A Excepting Surety assignment under the Performance and Payment Bonds, the Contract is not assignable to any other party or parties without the prior written consent of the City Administrator. In case of such attempted transfer without permission, the City Administrator may refuse to carry out the Contract either with the Contractor or the transferee, but all rights of action for any breach of the Contract by said Contractor is reserved to the City. No officer of the City, or any person employed in its service, is or shall be permitted any share or part of the Contract or is or shall be entitled to any benefit which may arise from the Contract.

104.07.B Any assignment of money shall be subject to all proper setoffs and withholdings in favor of the City and to all deductions provided for in the Contract and particularly all money withheld, whether assigned or not, shall be subject to being used by the City for completion of the work in the event the Contractor should be in default therein.

104.08 FAILURE TO EXECUTE THE CONTRACT AND BONDS

104.08.A Failure on the part of the Bidder to whom the Contract is awarded to execute the Contract and to deliver the Contract, the required performance and payment bonds, the certificate of insurance, and the certification of worker's compensation coverage if required, shall be just cause for cancellation of the award, withdrawing of the Contract and forfeiture of the Bid Security to the City.

104.08.B Award may then be made to the next lowest responsible and responsive Bidder, or the work may be re-advertised, or otherwise, as the City may decide.

104.08.C The forfeited Bid Security will become the City's property, not as a penalty but as liquidation of damages resulting from the Bidder's failure to execute the Contract and provide the certificates, certifications, and Bonds as required by the Contract Documents.

104.09 RETURN OF BID SECURITY

104.09.A The Bid security of unsuccessful Bidders will be returned after the Bids have been opened and the Contract has been awarded. The City reserves the right to retain the Bid Security of the three (3) lowest Bidders until the Contract has been signed and returned. The Bid Security of the Contractor shall be returned upon execution of the Contract by the City.

104.10 RESTRICTIONS ON COMMENCEMENT OF WORK

104.10.A Until the City sends the Contractor written Notice to Proceed with the Work, the Contractor shall not go onto the property on which the Work is to be done, nor move Materials, Equipment or workers onto that property, unless otherwise approved by the City.

104.10.B The Contractor will not automatically be entitled to extra compensation because the commencement of Work is delayed by failure of the City to send the Contract for execution. However, if more than sixty (60) Calendar Days elapse between the date the Bid is opened and the date the City sends the Contract to be executed, the City will consider granting an adjustment of time for completion of the Work to offset any actual delay to Contract completion resulting directly from delay in commencement.

105 SCOPE OF WORK

105.01 PURPOSE OF CONTRACT

105.01.A The purpose of the Contract is to set forth the rights and obligations of the parties and the terms and conditions governing completion of the Work. The Contractor's obligations shall include without limitation the following:

- The Contractor shall furnish all Materials, Equipment, labor, transportation, and Incidentals required to complete the Work according to Plans, Specifications, and terms of the Contract.
- The Contractor shall perform the Work according to the lines, grades, Typical Sections, dimensions, and other details shown on the Plans, as modified by written order, or as directed by the City Engineer.
- The Contractor shall perform all Work determined by the City Engineer to be necessary to complete the Project.
- The Contractor shall contact the City Engineer for any necessary clarification or interpretation of the Contract.

105.02 CONTRACT DOCUMENTS

105.02.A The Contract Documents, which include the standard construction specifications, special provisions, plans, and any other pertinent specifications, permits, regulations, and requirements unique to the project, will govern the work to be done. When a particular specification, regulation, or requirement is referred to in the Contract Documents, such reference shall be to current revisions or amendments, if any that are in effect at the time of the Invitation to Bid.

105.02.B Anything mentioned in the Specifications and not shown on the Plans, or shown on the plans and not mentioned in the Specifications, shall be of like effect as though shown or mentioned in both. Specifications and plans referred to in any part of the Contract Documents shall be considered as being included in the document in which such reference is made.

105.02.C When a particular Standard Drawing or Standard Construction Specification is referred to, such reference shall be to the Standard Drawing or Standard Construction Specification that is in force at the time of the Invitation to Bid. The phrases, "Contractor shall", "Contractor will", etc. may not always be specifically stated in all paragraphs but is considered understood where not specifically stated otherwise.

105.03 TYPICAL SECTIONS

105.03.A The Typical Sections are intended to apply in general. At other locations where the Typical Section is not appropriate, the Contractor shall perform construction to the identified alignment as directed by the City Engineer.

105.04 THICKNESS

105.04.A The thickness of Courses of Materials shown on the Plans, given in the Specifications, or established by the City Engineer is considered to be the compacted thickness. Minor variations are acceptable when within tolerances defined in the Specifications or Plans, or when approved by the City Engineer.

105.05 CHANGES IN THE WORK

105.05.A Changes to the Plans, quantities, or details of construction are inherent in the nature of construction and may be necessary or desirable during the course of Project construction. Without notice to a Surety, the City may, at any time, order additions, deletions or revisions in the Work. A written amendment, a change order, or a work change directive will authorize these additions, deletions or revisions. Upon receipt of any such document, the Contractor shall promptly proceed with the Work under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

105.05.B Without impairing the Contract, the City reserves the right to require changes it deems necessary or desirable within the scope of the Project. These changes may modify, without limitation:

- Specifications and design
- Grade and alignment
- Cross Sections and thicknesses of Courses of Materials
- Method or manner of performance of Work
- Increases and decreases in quantities
- Additional Work
- Elimination of any Contract item of Work
- Project Limits
- Acceleration or delay in performance of Work

105.05.C Upon receipt of a Change Order, the Contractor shall perform the Work as modified by the Change Order. If the Change Order increases the Contract Amount, and if required by the City, the Contractor shall notify its Surety of the increase and shall provide the City with a copy of any resulting modification to Bond documents. The Contractor's performance of Work pursuant to Change Orders shall neither invalidate the Contract nor release the Surety.

105.05.D Payment for changes in the Work shall be made in accordance with Subsection 110.11. Contract Time adjustments shall be made in accordance with Subsection 109.18.

105.06 EXTRA WORK

105.06.A The City shall have the right to require and Contractor hereby agrees to do extra Work over and above that which is indicated by the Contract Documents and covered by the unit prices of the Contract, or negotiated price or prices, that is reasonably necessary to accomplish the intent of the Contract arising from reasonably unforeseeable conditions, changed requirements, or new information. Such additional work shall be undertaken only upon written instructions from the City Engineer.

105.06.B Only Work not included in the Contract as awarded but deemed by the City Engineer to be necessary to complete the Project will be paid as extra Work. Regardless of alterations and changes, any item of Work provided for in the Contract will not constitute extra Work. Payment for alterations and changes to Work will be made in accordance with Subsection 105.05 above.

105.06.C If directed by the City Engineer's written amendment, the Contractor shall perform Work not included in the Contract. The Contractor shall perform this extra Work according to:

- Standard Construction Specifications
- Supplemental Specifications, if any
- Other Plans and Specifications issued by the City.

105.06.D Compensation for extra Work will be paid only for Work authorized in writing by the City Engineer and performed as specified. Otherwise, except in an emergency endangering life or property, extra Work shall be performed only in pursuance of a written order from the City Engineer stating that the City has authorized the extra Work. No claim for additional payment shall be valid unless so ordered. Work performed before issuance of the City Engineer's written authorization shall be at the Contractor's risk.

105.06.E Extra Work will be paid as determined by the City Engineer, in accordance with Subsection 110.11. Contract Time adjustments, if any, will be governed by Subsection 109.18.

105.07 FORCE ACCOUNT WORK

105.07.A The Contractor shall perform Work on a Force Account basis upon written notice by the City Engineer in accordance with Subsection 110.11.B.3. If the City Engineer determines the work increases the amount due under the Contract, payment will be made pursuant to Subsection 110.11.B.3.

105.08 DISPUTED WORK

105.08.A The Contractor may dispute any part of a Change Order, written order, or an oral order from the City Engineer by the procedures set forth in Section 111.

105.09 DIFFERING SITE CONDITIONS

105.09.A The following constitute differing Project Site conditions provided such conditions are discovered at the Project Site after commencement of the Work:

- Subsurface or latent physical conditions that differ materially from those indicated in the Contract Documents, or
- Unknown physical conditions of unusual nature that differ materially from those ordinarily encountered and generally recognized as inherent in the Work provided for in the Contract.

105.09.B The party discovering such a condition shall promptly notify the other party, in writing, of the specific differing conditions before they are disturbed and before the affected Work is performed. The Contractor shall not continue Work in the affected area until the City Engineer has inspected such condition according to Subsection 110.05 to determine whether an adjustment to Contract Amount or Contract Time is required.

105.09.C Payment adjustments due to differing Project Site conditions, if any, will be made according to Subsection 110.05. Contract Time adjustments, if any, will be made according to Subsection 109.18.

105.10 ENVIRONMENTAL POLLUTION CHANGES

105.10.A ORS 279C.525 will govern any increases in the scope of the Work required as a result of environmental or natural resources laws enacted after the submission of Bids for the Contract.

105.10.B In addition to ORS 279C.525, the City has compiled a list of those federal, State and local agencies, of which the City has knowledge, that have enacted ordinances or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that may affect the performance of City contracts in Subsection 108.02.

105.11 SALVAGE

105.11.A When shown or specified in the Contract Documents or as directed by City Engineer, carefully salvage and stockpile within the construction area all castings, pipe, and other reusable items from removed or abandoned structures and systems. If directed by the City Engineer, the Contractor shall deliver any salvaged materials to a location designated by the City Engineer.

105.11.B Other salvageable materials not shown or specified in the Contract Documents shall become the property of the Contractor and shall be disposed of by the Contractor away from the site of the Work.

105.12 COST REDUCTION PROPOSALS

105.12.A GENERAL

1. The Contractor may submit written proposals to the City Engineer that modify Plans, Specifications, or other Contract Documents for the sole purpose of reducing the total cost of construction.

2. Unless otherwise agreed to in writing by the City, a proposal that is solely or primarily a proposal to reduce estimated quantities or delete Work, as determined by the City Engineer, is not eligible for consideration as a cost reduction proposal and will instead be addressed under Section 105.05, whether proposed or suggested by the City or the Contractor.

105.12.B PROPOSAL REQUIREMENTS

1. The City will not adopt a cost reduction proposal that impairs essential functions or characteristics of the Project including but not limited to service life, economy of operation, ease of maintenance, designed appearance, or design and safety standards.

2. To conserve time and funds, the Contractor may first submit a written request for a feasibility review by the City Engineer. The request should contain a description of the proposal together with a rough estimate of anticipated dollar and time savings. The City Engineer will, within a reasonable time, advise the Contractor in writing whether or not the proposal would be considered by the City, should the Contractor elect to submit a detailed cost reduction proposal.

3. A detailed cost reduction proposal shall include without limitation the following information:

   - A description of existing Contract requirements for performing the Work and the proposed change;
   - The Contract items of Work affected by the proposed change, including any quantity variation caused by the proposed change;
   - Pay Items affected by the proposed change including any quantity variations;
   - A detailed cost estimate for performing the Work under the existing Contract and under the proposed change. Cost estimates shall be made according to Subsection 110.11.B.3. Costs of re-design, which are incurred after the City has accepted the proposal, will be included in the cost of proposed work; and
   - A date by which the City Engineer must accept the proposal in order to accept the proposed change without impacting the Contract Time or cost reduction amount.

105.12.C CONTINUING TO PERFORM WORK

1. The Contractor shall continue to perform the Work according to Contract requirements until the City Engineer issues a Change Order incorporating the cost reduction proposal. If the City Engineer fails to issue a Change Order by the date specified in the proposal, the proposal shall be deemed rejected.

105.12.D CONSIDERATION OF PROPOSAL

1. The City Engineer is not obligated to consider any cost reduction proposal. The City will not be liable to the Contractor for failure to accept or act upon any cost reduction proposal submitted.

2. The City Engineer will determine in its sole discretion whether to accept a cost reduction proposal as well as the estimated net savings in construction costs from the adoption of all or any part of the proposal. In determining the estimated net savings, the City Engineer may disregard the Schedule of Items. The City Engineer will establish prices that represent a fair measure of the value of Work to be performed or to be deleted as a result of the cost reduction proposal.

105.12.E SHARING INVESTIGATION COSTS

1. As a condition for considering a Contractor's cost reduction proposal, the City reserves the right to require the Contractor to share in the City's costs of investigating the proposal. If the City exercises this right, the Contractor shall provide written acceptance of the condition to the City Engineer. Such acceptance will authorize the City to deduct its share of investigation costs from payments due or that may become due to the Contractor under the Contract.

105.12.F ACCEPTANCE OF PROPOSAL REQUIREMENTS

1. If the Contractor's cost reduction proposal is accepted in whole or in part, acceptance will be made by a Change Order that will include without limitation the following:
    - ❖ Statement that the Change Order is made according to Subsection 105.12;
    - ❖ Revised Contract Documents that reflect all modifications necessary to implement the approved cost reduction measures;
    - ❖ Any conditions upon which the City's approval is subject;
    - ❖ Estimated net savings in construction costs attributable to the approved cost reduction measures; and
    - ❖ A payment provision according to which the Contractor will be paid 50% of the estimated net savings amount as full and adequate consideration for performance of the Work of the Change Order.

2. The Contractor's cost of preparing the cost reduction proposal and the City's costs of investigating the proposal, including any portion paid by the Contractor, will be excluded from determination of the estimated net savings in construction costs. Costs of re-design, which are incurred after the City has accepted the proposal, will be included in the cost of the Work attributable to cost reduction measures.

3. If the City accepts the cost reduction proposal, the Change Order that authorizes the cost reduction measures will also address any Contract Time adjustment.

105.12.G RIGHT TO GENERAL USE

1. Once submitted, the cost reduction proposal becomes the property of the City. The City reserves the right to adopt the cost reduction proposal for general use without additional compensation to the Contractor when it determines that a proposal is suitable for application to other contracts.

105.13 USE OF PUBLICLY OWNED EQUIPMENT

105.13.A The Contractor is prohibited from using publicly-owned Equipment except in the case of emergency. In an emergency, the Contractor may rent publicly-owned Equipment provided that the City Engineer provides written approval that states that such rental is in the public interest; and the rental does not increase the Project cost.

105.14 FINAL TRIMMING AND CLEANUP

105.14.A Before Final Inspection as described in Subsection 110.12.B, the Contractor shall neatly trim and finish the Project and remove all remaining unincorporated Materials and debris. Final trimming and cleanup shall include without limitation the following:

- The Contractor shall re-trim and re-shape earthwork, and shall repair deteriorated portions of the Project Site.
- Where the Work has impacted existing facilities or devices, the Contractor shall restore or replace those facilities to their pre-existing condition.
- The Contractor shall clean all drainage facilities and sanitary sewers of excess Materials or debris resulting from the Work.
- The Contractor shall clean up and leave in a neat, orderly condition, Rights-of-Way, Materials sites, and other property occupied in connection with performance of the Work.
- The Contractor shall remove temporary buildings, construction plants, forms, falsework and scaffolding, surplus and discarded Materials, and rubbish.
- The Contractor shall dispose of Materials and debris including without limitation forms, falsework, scaffolding, and rubbish resulting from clearing, grubbing, trimming, clean-up, removal, and other Work. These Materials and debris become the property of the Contractor. The Contractor shall dispose of these Materials and debris immediately.

105.14.B Unless the Contract specifically provides for payment for this item, the City will make no separate or additional payment for final trimming and cleanup.

106 CONTROL OF WORK

106.01 AUTHORITY OF THE CITY ENGINEER

106.01.A Subject to such authority as is delegated by the City, the City Engineer will decide questions that may arise as to the quantity, quality, and acceptability of Materials furnished and Work performed; the rate of progress of the Work; interpretation of the Contract Documents; the measurement of all quantities; and the acceptable fulfillment of the Contract on the part of the contractor. The City Engineer's estimates and decisions in these matters shall be final, binding, and conclusive upon all parties to the Contract.

106.01.B The authority of the City Engineer is such that the Contractor shall at all times acknowledge and comply with directions from the City Engineer insofar as they concern the work not in compliance with the Contract. Upon failure on the part of the Contractor to comply with any provisions of the Contract, the City Engineer shall have the authority to suspend Work, cause unacceptable and/or unauthorized Work to be remedied, removed, or replaced, or to have such Work remedied, removed, or replaced by a third party, and to deduct the costs thereof from any monies due or to become due to the Contractor.

106.01.C All work to be done under the Contract Documents will not be considered completed until it has passed Final Inspection by the City Engineer and is accepted by the City. It is further understood that the authority of the City Engineer is such that the Contractor shall at all times carry out and fulfill the instructions and directions of the City Engineer insofar as they concern the work to be done under the Contract Documents.

106.01.D Approval by City Engineer signifies favorable opinion and qualified consent; it does not carry with it certification, nor assurance of completeness, quality, or accuracy concerning details, dimensions, and quantities. Such approval will not relieve contractor from responsibility for errors, improper fabrication, nonconformance to requirements, or for deficiencies within Contractor's control.

106.01.E Whenever in the Contract Documents the terms "as ordered," "as directed," "as required," "as allowed," "as approved," or terms of like effect or import are used, or the adjectives "reasonable," "suitable," "acceptable," "proper," or "satisfactory," or adjectives of like effect or import are used to describe a requirement, direction, review, or judgment of City Engineer as to the work, it is intended that such requirement, direction, review, or judgment will be solely to evaluate the work for compliance with the Contract Documents (unless there is a specific statement indicating otherwise). The City and City Engineer will not be responsible for the Contractor's health and safety precautions or to means, methods, techniques, sequences or procedures required for the Contractor to perform his work. The use of any such term or adjective shall not be effective to assign to City or City Engineer any duty or authority to supervise or direct the furnishing or performance of the Work or any duty or authority to undertake responsibility for Contractor's means, methods, techniques, sequences, or procedures of construction, or the health and safety precautions and programs incident thereto; and the City and City Engineer will not be responsible for Contractor's failure to perform or furnish the Work in accordance with the Contract Documents.

106.01.F The City and/or the City Engineer will not be responsible for the acts or omissions of Contractor or of any subcontractor, any supplier, or of any other person or organization performing or furnishing any of the Work.

106.01.G In the City Engineer's sole discretion, minor defects in the Work may be accepted. These may be subject to a reasonable deduction from the Contract price or other credits to the City. Such determination by the City Engineer shall be final.

106.01.H The City Engineer is not authorized to waive any written notice required of the Contractor by the Contract Documents.

106.02 AUTHORITY AND DUTIES OF INSPECTORS

106.02.A The City may designate persons to inspect Material used and all Work done. Such inspection may extend to any or all parts of the Work and to the preparation or manufacture of Materials to be used. Inspectors are not authorized to change the provisions of the Contract Documents. An Inspector is placed on the Work to keep the City Engineer informed of progress of the Work and the manner in which it is being done. In addition, the Inspector shall call to the attention of the Contractor any deviation from the Plans or Specifications. An Inspector is not authorized to inspect, accept, or approve any changes to the Work in the Contract Documents unless such changes have been previously approved by the City and the Design Engineer.

106.02.B An Inspector will not be authorized to approve or accept any portion of the work or to issue instructions contrary to the plans and specifications. Furthermore, the Inspector is not authorized to waive any written notices required by the Contract Documents. The Inspector will have authority to reject defective Material and to suspend any Work that is being improperly done, subject to final decision by the City Engineer.

106.02.C In instances where the Contractor did not afford the Inspector appropriate opportunity or notice to inspect, the Inspector may require the removal and replacement of the un-inspected item(s) at no expense to the City.

106.03 RESPONSIBILITY OF THE CONTRACTOR

106.03.A Do all Work and furnish all labor, Materials, Equipment, tools, and machines necessary for the performance and completion of the Project in accordance with the Contract Documents. Be obligated to determine and be responsible for the method of construction.

106.03.B The Contractor shall be solely liable for any accident, loss, or damage happening to Work referred to in the Contract Documents prior to completion and acceptance thereof.

106.04 COORDINATION OF CONTRACT DOCUMENTS

106.04.A GENERAL

1. In general, the Contract Documents will govern the work to be done. The Special Provisions, the Plans, Supplemental Specifications, and the Standard Construction Specifications are intended to collectively describe all of the items of Work necessary to complete the Project.

106.04.B ORDER OF PRECENDENCE

1. In case of conflict, the order of precedence of the following documents in controlling the Work shall be:

    a. Addenda, change orders and other written amendments, supplemental agreements, and approved revisions to plans and specifications.

    b. Contract
    c. Bid (for publicly financed public improvements).
    d. Permits from outside agencies required by law.

e. Special Provisions.
f. Plans (for publicly financed public improvements).
g. Public Work Standards, including Design Standards, Standard Drawings, and Standard Construction Specifications.
h. Approved Plans (for privately financed public improvements).
i. ODOT/APWA Standard Specifications for Construction (latest revision).
j. Reference Standards

2. In case of any ambiguity or dispute over interpretation of the provisions of the Contract, the decision of the City will be final.

106.04.C IMMATERIAL DISCREPANCIES

1. The Contract Documents set forth details for the construction and completion of the Work. If Contract Documents describe portions of the Work in sufficient detail but are silent in some minor respect, the Contractor may proceed utilizing the current best industry practices.

106.04.D MATERIAL DISCREPANCIES

1. If the Contractor identifies a discrepancy, error, or omission in the Contract Documents that cannot be resolved by the approach set forth in Subsection (B) above, the Contractor shall immediately request clarification from the Design Engineer.

106.05 SHOP DRAWINGS AND OTHER SUBMITTALS

106.05.A Plans and Specifications furnished and included with the Contract Documents indicate the Work proposed and the results that are intended to be accomplished.

106.05.B Unless otherwise specified, Contractor shall furnish all layout, detail, shop, and working drawings, product data and samples required by the Plans and Specifications to be submitted or as requested by the City Engineer. Drawings shall be of sufficient size and scale to clearly show details and four (4) originals shall be provided. Faxes and copies will not be accepted. After review and approval by the City Engineer, two (2) sets will be returned to the Contractor. The Contractor shall submit such additional number of submittals to the City Engineer for processing that the Contractor would like to have returned.

106.05.C By submitting drawings, product data and samples, the Contractor represents that they have determined and verified all Materials, field measurements, and field construction criteria related thereto, and that they have checked and coordinated the information contained within such submittals with the requirements of the work and of the Contract Documents and that they are satisfied they conform to the Contract Documents.

106.05.D All required drawings, product data and samples shall be furnished to the City Engineer for review and any required testing before any of the Work or related Work is performed, or products or Material ordered prior to the City Engineer's review and completion of any testing will be at the Contractor's risk.

106.05.E The City Engineer will review drawings, product data, and samples and conduct such tests as are required by the Contract Documents within a reasonable time but in no event will the City Engineer be required to complete such review or conduct such tests in less than fourteen (14) calendar days after receipt of the submission by the City. The City Engineer will return marked-up submittal copies indicating one of the following actions:

1. If review and checking indicate no exceptions, copies will be returned marked "NO EXCEPTIONS TAKEN" and Work may begin immediately on incorporating the material or equipment covered by the submittal into the work.

2. If review and checking indicate limited corrections are required, copies will be returned marked, "MAKE CORRECTIONS NOTED", and upon making the corrections noted, work may begin immediately to incorporate the Material or Equipment covered by the submittal into the Work.

3. If review and checking indicate insufficient or incorrect data have been submitted, copies will be returned marked "REVISE AND RESUBMIT." No Work may begin on incorporating the Material or Equipment covered by the submittal into the Work until the submittal is revised, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

4. If review and checking indicate the Material or Equipment submittal is unacceptable, copies will be returned marked "REJECTED." No work may begin on incorporating the Material or Equipment covered by the submittal into the Work until a new submittal is made and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

5. If review and checking indicate additional information is required, copies will be returned marked "SUBMIT SPECIFIED ITEM." Work may begin immediately on incorporating the Material or Equipment covered by the submittal into the Work, only if it is not affected by the item to be submitted. If any material or equipment is affected, no work may begin on incorporating that Material or Equipment into the Work until it and the submittal are submitted and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

106.05.F The review by the City Engineer of any shop drawings, product data, samples, construction methods and equipment or other submittals is only for conformance with the general design concept of the Project and does not extend to consideration of structural integrity, safety, detailed compliance with Contract Documents, or any other obligation of the Contractor. Any Work shown is subject to the requirements of the Contract Documents.

106.05.G The Contractor is responsible for confirming and correlating all dimensions; fabricating, and construction techniques; coordinating their entire Work in strict accordance with the Contract Documents. The review does not relieve the Contractor from their obligation fully to perform all requirements of the Contract Documents, nor shall such review give rise to any right of action or suit in favor of the Contractor or third persons against the City Engineer or the City. The review of submittals by the City Engineer shall not relieve the Contractor from deviations from the Contract Documents, unless the Contractor has called specific attention to such deviations in writing by a letter accompanying the submittals and the City Engineer approves the change or deviations in writing at the time of submission. When the Contractor does call such deviations to the attention of the City Engineer, the Contractor shall state in the letter whether or not such deviations involve any deduction or extra cost adjustments. The approval of a separate item as such will not indicate approval of the assembly in which the item functions.

106.06 INSPECTIONS AND OBSERVATIONS

106.06.A OBSERVATION BY CITY ENGINEER

1. The City Engineer will make periodic visits to the site to observe the progress and quality of the executed Work and to determine, in general, if the Work is proceeding in accordance with the Contract Documents. The City Engineer will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The City Engineer's observation efforts will be directed toward providing assurance for the City that the completed project will generally conform to the requirements of the Contract Documents.

2. In addition, the City Engineer, and/or authorized representatives, may test Materials furnished by the Contractor to ensure Contract compliance.

3. If the Contractor performs Work without the required inspections, or uses Materials that is not approved, the portions of the Work may be required to be removed at the Contractor's expense. The foregoing sentence shall not apply if the inspection of the Work was not performed within a specific period of time required in the Contract, or in the absence of a specific period of time, within a reasonable period of time after receiving the Contractor's timely written request for inspection or testing.

4. At the City's direction, any time before the Work is accepted, the Contractor shall uncover portions of the completed Work for inspection. After inspection, the Contractor shall restore these portions of Work to the standard required by the Contract. If the City rejects Work due to Materials or workmanship, or if the Contractor performed such Work without providing sufficient advance request for inspection, the Contractor shall bear all costs of uncovering and restoring the Work. If the City accepts the uncovered Work, and the Contractor performed the Work only after providing sufficient advance notice, the costs of uncovering and restoring the Work will be paid for by the City as extra Work.

106.06.B INSPECTION BY THIRD PARTIES

1. Where third parties have the right to inspect the Work, the Contractor shall coordinate with the City and shall provide safe inspection access.

106.06.C INSPECTION BY OTHERS

1. Inspection of Work by persons other than duly designated representatives of the City will not constitute inspection by the City.

2. Private laboratories and/or Engineering firms may in some cases be retained by the City to provide testing and/or inspection duties.

106.06.D SPECIAL INSPECTION (STRUCTURAL AND/OR SOILS)

1. The City or the registered design professional in responsible charge acting as the City's authorized representative, and not the Contractor, shall employ one or more approved special inspectors who shall perform structural and/or soils special inspections for the types of Work specified in Chapter 17 of the Oregon Structural Specialty Code and these Standard Construction Specifications.

2. Special inspectors shall not inspect Work performed, or Materials supplied, by a Contractor, Sub-Contractor, or Material vendor with whom the inspector is employed.

3. During the execution of the Work, special inspectors shall not undertake or engage in any task or occupation which would tend to interfere with the proper performance of their required duties of inspection.

4. Special inspection, as defined in Chapter 17 of the Oregon Structural Specialty Code, is required for Materials, installation, fabrication, erection or placement of components and connections requiring expertise to ensure compliance with approved Construction Documents and referenced Standards.

5. Although the special inspectors and testing agencies will fulfill their duties, such inspections and testing, as defined in Chapter 17 of the Oregon Structural Specialty Code, is not to be relied upon by others as a guarantee of the Work, nor to be construed to relieve the Contractor of its obligation and responsibilities under the construction Contract, approved permit Documents, and the applicable workmanship provisions of the Oregon Structural Specialty Code and referenced standards.

6. The City shall employ a registered design professional in responsible charge to perform structural observation for the conditions listed in Chapter 17 of the Oregon Structural Specialty Code.

7. All references to building inspector shall mean the inspector employed by the City and/or County who performs inspections as required by Chapter 1 of the Oregon Structural Specialty Code.

8. When in the opinion of the City the nature of the Work requires special inspection by a specialist or professional consultant having certain technical knowledge and skill in a specialized type of Work, the City may designate the special inspector to perform the inspections.

9. Prior to performing the special inspections, the special inspector shall verify that the permit Documents at the site have the proper approval.

10. Unless otherwise allowed by the City and County in writing, Work requiring special inspection shall not be commenced until the permit holder or contractor posts the inspection record card and the building permit in a conspicuous place on the premises that is accessible for sign-offs. This card shall be maintained in such place until final approval has been granted by the City and County.

11. It is the duty of the permit holder or Contractor doing the Work requiring inspection to notify, either orally or in writing, both the special inspector and the City and/or County that the Work is ready for inspection. Requests for special inspections shall be made at least two (2) working days in advance of the inspection.

12. It is the duty of the permit holder or Contractor requesting inspection of the work under construction to provide both access to and the means for proper inspection.

13. It is the Contractor's responsibility to review the special inspector's daily reports and the non-compliance list and to initiate corrective actions. The Contractor shall schedule a re-inspection with the special inspector to verify that non-complying items have been resolved.

14. It is the Contractor's responsibility to notify the special inspector when all Work requiring special inspection is complete, allowing the special inspector time to perform a review and a site visit, prior to issuance of a Final Summary Report for special inspection.

106.06.E INSPECTION FACILITIES

1. The Contractor shall furnish walkways, railings, ladders, tunnels, platforms and other facilities necessary to permit the City to have safe access to the Work to be inspected. The Contractor shall require producers and fabricators to provide safe inspection access as requested by the City.

106.06.F SAMPLING

1. The Contractor shall furnish the City with samples of Materials for required tests. All of the Contractor's costs related to this required sampling are Incidental.

106.06.G CONTRACTOR'S DUTY TO MAKE CORRECTIONS

1. The Contractor shall perform all Work according to the Plans and Specifications. The Contractor shall correct Work that does not comply with the Plans and Specifications at its own expense. Inspection of the Work by the City does not relieve the Contractor of responsibility for improper prosecution of the Work.

106.07 ACCEPTABILITY OF MATERIALS AND WORK

106.07.A The Contractor shall furnish Materials and shall perform Work in Close Conformance to the Plans and Specifications. The Contractor's responsibility for material shall begin at the point of delivery thereof to said Contractor or on the day of the award of the Contract for publicly financed public improvement projects for Materials existing on the construction site prior to that time. The Contractor shall examine all Material at the time and place of delivery and shall reject all defective Material. Materials shall conform to all specified requirements. Records of specific tests and/or affidavits of compliance shall be supplied for appropriate Materials upon request.

106.07.B Materials delivered to the site which does not meet the requirement of the Plans and Specifications, approval of the City Engineer, or which become unsuitable or unacceptable for use after approval shall be rejected by the City Engineer and shall not be used. No Materials shall exist on the construction site which is not suitable for installation.

106.07.C Materials which are rejected due to defects in manufacture or which become damaged or otherwise unsuitable for use after acceptance, regardless of cause, shall be promptly removed from the site by the Contractor. Materials found to be defective in manufacture prior to final acceptance of the Work and installed without discovery of such prior defects shall be replaced with sound Material by the Contractor. Materials damaged during construction or found to be defective during the Warranty period following final acceptance shall be replaced with sound Material by the Contractor. In either case, the Contractor shall furnish all incidentals, labor, and equipment necessary to replace any defective Materials to the satisfaction of the City Engineer all at the expense of the Contractor.

106.07.D If the City Engineer determines that the Materials furnished or the Work performed are not in Close Conformance with the Plans and Specifications, the City Engineer may:

- ❖ Reject the Materials or Work and order the Contractor, at the Contractor's expense, to remove, replace, or otherwise correct any non-conformity; or

- ❖ Accept the Materials or Work as suitable for the intended purpose, adjust the amount paid for applicable Pay Items to account for diminished cost to the Contractor or diminished value to the City, document the adjustment, and provide written documentation to the Contractor regarding the basis of the adjustment.

106.07.E Where specific brand names and/or models of Materials are mentioned on the Plans or in the Specifications, it shall be understood that such Materials are of the required and acceptable quality. Other Materials may be substituted only if the Contractor provides the City Engineer with appropriate and sufficient technical information regarding the proposed substitution and the City Engineer subsequently determines that the Materials are of acceptable quality and approves the substitution prior to bidding.

106.07.F Miscellaneous Materials and appurtenances not specifically mentioned on the Plans or in the Specifications shall be new and of equal or better quality than other specified Materials that their usage is dependent upon; and, in the event such a comparison cannot be made then only Materials approved by the City Engineer shall be furnished.

106.07.G The City Engineer's decisions concerning acceptability of Materials or Work will be final.

106.08 COOPERATION AND SUPERINTENDENCE BY THE CONTRACTOR

106.08.A The Contractor is responsible for full management of all aspects of the Work, including superintendence of all Work by Subcontractors, Suppliers, and other providers. The Contractor shall appoint a single Superintendent and may also appoint alternate Superintendents as necessary to control the Work. The form of appointment of the alternate shall state, in writing, the alternate's name, duration of appointment in the absence of the Superintendent, and scope of authority. The Contractor shall:

- ❖ Provide for the cooperation and superintendence on the Project by:
  - Furnishing the City Engineer all data necessary to determine the actual cost of all or any part of the Work, added Work, or changed Work.
  - Allowing the City Engineer reasonable access to the Contractor's books and records at all times.
  - To the extent permitted by public records laws, the City Engineer will make reasonable efforts to honor the Contractor's request for protection of confidential information.
  - Keeping one complete set of Contract Documents on the Project Site at all times, available for use by all the Contractor's own organization, and by the City Engineer if necessary.
- ❖ Appoint a single Superintendent and any alternate Superintendent who shall meet the following qualifications:
  - Appointees shall be competent to manage all aspects of the Work.
  - Appointees shall be from the Contractor's own organization.
  - Appointees shall have performed similar duties on at least one previous project of the size, scope and complexity as the current Contract.
  - Appointees shall be experienced in the types of Work being performed.
  - Appointees shall be capable of reading and thoroughly understanding the Contract Documents.
- ❖ The appointed single Superintendent, or any alternate Superintendent shall:
  - Be present for all On-Site Work, regardless of the amount to be performed by the Contractor, Subcontractors, Suppliers, or other providers, unless the City Engineer provides prior approval of the Superintendent's or alternate Superintendent's absence.

- Be equipped with a two way radio or cell phone capable of communicating throughout the project during all the hours of Work on the Project Site and be available for communication with the City Engineer.
- Have full authority and responsibility to promptly execute orders or directions of the City Engineer.
- Have full authority and responsibility to promptly supply the Materials, Equipment, labor, and Incidentals required for performance of the Work.
- Coordinate and control all Work performed under the Contract, including without limitation the Work performed by Subcontractors, Suppliers, and Owner Operators.
- Diligently pursue progress of the Work according to the schedule requirements of Section 109.08.
- Cooperate in good faith with the City Engineer, Inspectors, and other contractors in performance of the Work.
- Provide all assistance reasonably required by the City Engineer to obtain information regarding the nature, quantity, and quality of any part of the Work.
- Provide access, facilities and assistance to the City Engineer in establishing such lines, grades and points as the City Engineer requires.
- Carefully protect and preserve survey marks and stakes.

106.08.B Any Superintendent or alternate Superintendent who repeatedly fails to follow the City Engineer's written or oral orders, directions, instructions, or determinations, shall be subject to removal from the project.

106.08.C If the Contractor fails or neglects to provide a Superintendent, or an alternate Superintendent, and no prior approval has been granted, the City Engineer has the authority to suspend the Work according to 109.21. Any continued Work by the Contractor, Subcontractors, Suppliers, or other providers may be subject to rejection and removal. The Contractor's repeated failure or neglect to provide the superintendence required by these provisions constitutes a material breach of the Contract, and the Engineer may impose any remedies available under the Contract, including but not limited to Contract termination.

106.08.D USE OF CONSULTANTS

1. When indicated as such by Special Provision, the Contractor is advised that the availability of City personnel on Projects is limited and the City may hire consultants to perform some of its responsibilities for Material testing, Material weighing and checking, and/or surveying. The Contractor shall provide the City Engineer with a written notification that such personnel are needed a minimum of two (2) working days before performing Work requiring Material testing, Material weighing and checking, and/or surveying.

2. If the Contractor suspends Work for more than three (3) working days on Work items requiring Material testing, Material weighing and checking, and/or surveying by the City, the Contractor shall again provide notice as set forth above.

3. The City will not be responsible for delays occasioned by the Contractor's failure to provide the required written notice. The Contractor shall provide such notice whether or not the City hires a consultant to perform the required services.

106.09 DELIVERY OF NOTICES

106.09.A Written notices to the Contractor, the City Engineer, or the City shall be delivered via first class mail, faxed, electronically, or in person to the current office address as shown in the records of the City. Notices delivered via first class mail shall be deemed delivered five business days following the postmarked date.

106.10 EXISTING UTILITIES AND IMPROVEMENTS

106.10.A Information shown on the Plans as to location of utilities and associated appurtenances, existing improvements, and all topographical features is provided for the Contractor's information and convenience and is not in any way warranted to be accurate by the City. The Contractor shall verify all such information and shall deal with varying conditions at its own expense.

106.10.B Operation of water valves and hydrants by unauthorized personnel is strictly prohibited. Obtain written permission from and pay any fee required by the Public Works Department prior to using hydrant water.

106.10.C The Contractor is responsible to provide for the flow of sewers, drains, or watercourses interrupted during the progress of the work, and restore such drains or watercourses as approved by the City Engineer at no additional cost to the City.

106.10.D The Contractor is responsible for all costs for the repair of any and all damage to any utility, whether previously known or disclosed during the Work, as may be caused by the Work. Maintain in place utilities not shown on the drawings to be relocated or altered by others. If the Contractor requires temporary relocation, for convenience or because of a method of construction or as a result of site conditions, the Contractor shall bear all costs for said temporary relocation and must obtain the appropriate approvals from the City and the utility prior to relocation. Maintain utilities that have been relocated by others in their relocated positions in order to avoid interference with structures that cross the Project Work.

106.10.E The Contractor must make excavations and borings ahead of Work, as necessary, to determine the exact location of interfering utilities or underground structures. If the Contractor damages a utility, the utility owners shall have the right to enter upon the Right-of-Way and upon any structure therein for the purpose of making new installations, changes, or repairs. Conduct operations so as to provide the time needed for such Work to be accomplished during the progress of the improvement, at no additional cost to the City.

106.10.F It is understood that there will be interfering utilities, service laterals, and other underground pipes, drains, or structures encountered on underground Projects that are not shown or are shown incorrectly on the Plans and/or have not been previously discovered in the field. The Contractor agrees this is a normal and usual occurrence in the construction of underground improvements. Furthermore, the Contractor understands and agrees that Work in some cases must be done in close proximity to said utilities and underground pipes, drains, and structures not shown or shown incorrectly on the plans which may require a change in operations and may cause sloughing of the trench, additional traffic control, additional excavation, backfill and restoration costs, and time. The Contractor agrees that these occurrences are usual and ordinary on underground Projects and are reflected in the Bid and construction schedule.

106.10.G The Design Engineer will require a reasonable amount of time (at minimum 3 business days) to perform design changes necessitated by directly conflicting utilities and/or the utility owners will require a reasonable amount of time (at minimum 3 business days) to make necessary utility relocations. The Contractor agrees to provide for these conflicts and interferences and agrees to provide for a reasonable amount of time (at minimum 3 business days) for design changes and/or utility relocations due to said interference, that the cost of these conflicts and interferences has been incorporated into the Bid, and Contractor understands that no additional compensation for interruption of schedule, extended overhead, delay, or any other impact claim or ripple effect or any other costs whatsoever or additional time will be made for these conflicts or interferences.

106.10.H Contractor may submit a request under Subsection 110.03 if the Contractor believes work is beyond usual and ordinary circumstances.

106.11 ADJUSTMENT OF UTILITIES AND NOTIFICATIONS

106.11.A GENERAL

1. Unless otherwise set forth in any Supplemental Specifications, in the Special Provisions, or on the Plans, existing Utilities requiring adjustment may be adjusted by the Utility before, during, or after Project construction. "Adjustment of Utilities" shall mean the alteration, improvement, connection, disconnection, relocation, or removal of existing Utility lines, facilities, or systems in temporary or permanent manner.

2. The Contractor shall be solely responsible for notifying the appropriate agencies prior to commencing Work, requesting on-site utility locations by phone and confirming by letter a minimum of forty-eight (48) hours prior to commencing Work, and adhering to notification requirements during the progress of the Work where location of utilities is necessary as the Work progresses.

3. The Contractor shall coordinate relocation of all privately or publicly owned utility conduits, lines, poles, mains, pipes, and such other facilities with the utility owner where such relocation is necessary in order to conform said utility and other facilities with the Plans and ultimate requirements of the Project.

106.11.B CITY RESPONSIBILITIES

1. When indicated as such by Special Provision, the City will make preliminary arrangements for planned Adjustment of Utilities before Bids are received. The City will list in the Special Provisions the estimated completion dates or times for adjustment Work by the utility owner, and will include a general statement describing any relocation. The Plans will not normally show the anticipated new location of Utilities that have been or will be adjusted.

106.11.C CONTRACTOR'S RESPONSIBILITIES

1. When performing Work in streets and easements, whether inside or outside the City's legal boundaries, the Contractor shall notify all of the affected local agencies about the operations so as to properly coordinate and expedite the Work in such a manner as to cause the least amount of conflict and interference between the operations and those of other agencies.

2. Notifications shall include, but may not be limited to, the time of commencement and completion of Work, names of streets or location of alleys to be closed, and schedule of operations and routes of detours where possible. Other specific information may be required depending upon the nature of the Work.

3. If the Project or Work there under involves the crossing of any railroad line or encroachment on any railroad Right-of-Way, adequate notice shall be given prior to construction as required in the Contract Documents.

4. Damages or claims resulting from improper or insufficient notification of the affected agencies shall be the responsibility of the Contractor.

5. The Contractor shall not place required notifications in U. S. Postal Service mail boxes.

6. Unless noted otherwise in the Special Provisions, the Contractor shall conduct all negotiations, make all arrangements, and assume all costs for the adjustment of utilities and costs that arise from such changes for completion of the Work. The Contractor shall:

   - Contact utility owners during Bid preparation and after the Contract is awarded to verify all Utilities' involvement on the Project Site;
   - Coordinate Project construction with the Utilities' planned adjustments, take all precautions necessary to prevent disruption of Utility service, and perform its Work in the manner that results in the least inconvenience to the utility owners;
   - Include all Utility adjustment Work, whether to be performed by the Contractor or the Utilities, on the Contractor's construction schedule submitted under Subsection 109.08;
   - Protect from damage or disturbance any Utility that remains within the area in which Work is being performed;
   - Not disturb an existing Utility if it requires an unanticipated adjustment, but shall protect it from damage or disturbance and promptly notify the City Engineer; and
   - Report to the City Engineer any utility owner who fails to cooperate or fails to follow the planned Utility adjustment.

7. The Contractor may adjust the Utilities, subject to the City Engineer's and utility owners' approval, by requesting that the utility owners move, remove, or alter their facilities in ways other than as shown on the any Supplemental Specifications, or in the Special Provisions. The Contractor shall conduct all negotiations, make all arrangements, and assume all costs that arise from such changes.

106.11.D DELAYS

1. If the Contractor complies with Subsection (C) above, and if Utility adjustments are completed later than the date specified in the Special Provisions, thus causing Contract completion to be delayed, additional Contract Time will be considered under Subsection 109.18, and additional compensation, if applicable, will be considered under Subsection 110.06.

106.11.E UTILITY NOTIFICATIONS

1. The Contractor and its subcontractors must comply with all provisions of OAR 952-001-0010 through 952-001-0090 and ORS 757.542 to 757.562 and 757.993 including notification of all owners of underground facilities at least two (2) working days before but not more than ten (10) working days before beginning Work. Notify in writing at least two (2) working days before commencing any work on the project. The Utilities notification system telephone number is 1-800-332-2344. The Contractor may contact the Oregon Utility Notification Center at (503) 232-1987 about these rules.

2. See Appendix B for Agency and Utility Contact Information.

106.11.F WATER WORKS PROJECTS

1. Except in an emergency, the Contractor shall be responsible for notifying the City Engineer and the Stayton Fire District at least forty-eight (48) hours prior to any scheduled interruption of water service. These notifications may be made by telephone. The Contractor shall also give forty-eight (48) hours advance, written notice to all affected water users prior to any scheduled interruption of water service. The Contractor shall provide notices for use in making the required notifications. A copy of this notice shall be presented to the City Engineer for approval prior to distribution to water users.

2. The notification shall include details indicating the date, time of day, and expected duration of the proposed shutdown. The notification shall also include the Contractor's name, contact person's name, and phone number of the contact person. These notifications shall be delivered in person to the service address and shall be secured to the customer's primary entrance.

3. In the event that the water line is required to be out of service for a longer period than given in the original notice, or is to be taken out of service again after service was restored, the contractor shall immediately notify, in person, a many of the affected water users as possible that received the original notice.

4. Where water lines or hydrants are taken out of service without the required notice due to an emergency endangering life or property, the contractor shall notify, in person, the affected water users as soon as the emergency is under control.

106.11.G STREET CLOSURES

1. In addition to other notifications, the Contractor shall obtain prior approval from the City for closing or partial closing of any street. The Contractor shall give at least two (2) working days advance notice of such closure to all agencies providing emergency services, including without limitation police, fire, and ambulance services. Notification shall include, but not be limited to, the time of commencement and completion of Work, names of streets or location of alleys to be closed or partially closed, schedule of operations, and routes of detours where applicable. All Temporary Traffic Control measures shall conform to the requirements of Section 202.

2. When access to private, public, or commercial property will be denied or impaired, the Contractor shall give occupants of affected properties at least forty-eight (48) hours prior notice. In the absence of required notice, the Contractor shall immediately undertake to provide the desired access when directed to do so by the City Engineer.

3. For commercial properties, in addition to the required notice, the Contractor shall provide and maintain appropriate signing to advise potential customers and commercial traffic of alternate routes to the property.

106.12 FURNISHING TEMPORARY SERVICES AND FACILITIES

106.12.A When necessary or when directed by the City Engineer, install, furnish, and maintain temporary light, power, water, and any temporary services or facilities complete with connecting piping, wiring, lamps, and similar Equipment during construction of the Work, including testing and start up. Remove temporary facilities upon completion of Work. Obtain all permits and bear all costs in connection with temporary services and facilities. Conform to applicable statues, rules, codes, and other requirements in the use of these facilities.

106.13 CONSTRUCTION STAKES, LINES AND GRADES

106.13.A For publicly financed public improvement Projects, the Contractor shall give notice to the City Engineer not less than three (3) working days in advance of when City-provided survey services by Surveyor will be required in connection with any portion of the work.

106.13.B For privately financed public improvement projects, the Contractor shall give notice to the Design Engineer not less than three (3) working days in advance of when survey services by Surveyor will be required in connection with any portion of the Work.

106.13.C The Surveyor will furnish and set construction stakes establishing lines and grades as determined necessary for all Work under the Contract Documents. The Contractor will be responsible for maintaining the stakes provided to areas of Work.

106.13.D The Surveyor will furnish appropriate offset lines and grades as deemed necessary for all Projects including those involving trenching operations. The Contractor will be responsible for the transfer of the offset lines or grades into the ditch, to batter boards, string lines, or any other point within the Work. Work done without lines and grades having been established by the Surveyor or Work done beyond the lines and grades will be considered as unauthorized and will not be paid for and may be ordered removed, replaced, or corrected at no expense to the City.

106.13.E The Surveyor shall furnish cut sheets to the Inspector prior to construction of the facility.

106.13.F Permanent property corners and intersection survey monuments must be set prior to final inspection.

106.14 COOPERATION WITH OTHER CONTRACTORS

106.14.A The City reserves the right to perform other Work on or near the Project Site, including without limitation any Materials site, with forces other than those of the Contractor. If such work takes place within or next to the Project Site, the Contractor shall have the following obligations:

- The Contractor shall coordinate Work with other Contractors or forces;
- The Contractor shall cooperate in good faith with all other Contractors or forces;
- The Contractor shall perform the Work set forth in the Contract in a way that will minimize interference and delay for all forces involved;
- The Contractor shall place and dispose of the Materials being used so as not to interfere with the operations of other forces;
- The Contractor shall join the Work with that of other forces in a manner acceptable to the City Engineer or the City, and shall perform it in the accepted sequence with the Work of the other force.

106.14.B The City Engineer will resolve any disagreements under this Subsection that may arise among the Contractor and other work forces, or between the Contractor and the City. The City Engineer's decision in these matters is final, as provided in Subsection 106.01. When the schedules for Work of the Contractor and the Work of other forces overlap, each contractor involved shall submit a current, realistic progress schedule to the City Engineer.

106.14.C Before the City Engineer accepts the schedule, each party shall have the opportunity to review all schedules. After this review and any necessary consultations, the City Engineer will determine acceptable schedules.

106.14.D The Contractor waives any right it may have to make claims against the City for any damages or claims that may arise because of inconvenience, delay, or loss due solely to the presence of other Contractors working on or near the Project Site.

106.14.E If the Contract gives notice of work to be performed by other forces that may affect the Contractor's Work under the Contract, the Contractor shall include any costs associated with coordination of the Work in the appropriate Pay Item or as a portion of a Pay Item.

106.14.F In an emergency, the Contractor most immediately able to respond may repair a facility or Utility of another Contractor in order to prevent further damage to the facility, Utility, or other Structure as a result of the emergency.

106.15 CONSTRUCTION EQUIPMENT RESTRICTIONS

106.15.A LOAD AND SPEED RESTRICTIONS FOR CONSTRUCTION VEHICLES AND EQUIPMENT

1. The Contractor shall comply with legal mass (weight) and speed restrictions when moving Materials or Equipment beyond the limits of the Project Site.

2. The Contractor shall control vehicle and Equipment loads and speeds within the Project Site according to the following restrictions, unless the Special Provisions provide otherwise:

   - ❖ The Contractor shall restrict loads and speeds as necessary to avoid displacement or loss of Materials on subgrades and aggregate Bases.
   - ❖ The Contractor shall restrict weights to legal loads, and shall travel at speeds of no more than the posted construction speed or legal speed limit, whichever is less, on treated bases, pavement, or wearing courses.
   - ❖ The Contractor shall not cross bridges or other structures with Equipment or vehicles exceeding the legal load limit without obtaining required permission and/or permits from the City, Marion County, and/or ODOT. The Contractor shall make any such request in writing, describing the loading details and the arrangement, movement, and position of the Equipment on the structure. The Contractor shall comply with any restrictions or conditions included as part of the permit.

106.15.B PROTECTION OF BURIED ITEMS

1. The Contractor shall use temporary fill or other methods to avoid overload of pipes, box culverts, and other items that are covered, or to be covered, by fill or backfill.

106.15.C RESPONSIBILITY FOR DAMAGES

1. The Contractor shall assume responsibility for damages caused by excessive Equipment speed or loads while performing the Work, both inside and outside the Project Site. Permission to cross Bridges and other Structures, according to Subsection (A) above will not relieve the Contractor from responsibility for load-caused damages.

106.16 PROTECTION AND MAINTENANCE OF WORK DURING CONSTRUCTION

106.16.A The Contractor shall protect and maintain the Work during construction and until Final Completion, unless otherwise provided in the Contract. For the purposes of this Subsection, "maintenance" shall include measures to prevent deterioration of roadway and structures at the Project Site, and to keep them in good condition at all times during the prosecution of the Work. The Contractor shall continuously allocate sufficient Equipment and workers to achieve such maintenance.

106.16.B If the Contract requires the placement of a course upon a previously constructed course or subgrade, the Contractor shall maintain the previous course or subgrade during all construction operations.

106.16.C The Contractor shall include costs of protecting and maintaining the Work during construction in the unit prices Bid for the various Pay Items. The Contractor will not be paid an additional amount for this Work, unless otherwise specified.

106.16.D The City will notify the Contractor of Contractor's noncompliance with this Subsection. If the Contractor fails to remedy unsatisfactory protection or maintenance within 24 hours after receipt of such notice, the City may proceed to remedy the deficiency, and deduct the entire cost from monies due or to become due the Contractor under the Contract.

106.17 PROTECTION OF SURVEY MARKERS

106.17.A PERMANENT SURVEY MARKERS

1. Notify the City Engineer (City-provided survey services), Design Engineer, and Surveyor not less than three (3) working days prior to starting work in order that the Surveyor may take necessary measures to ensure the preservation of survey monuments, stakes, lot stakes, and benchmarks. Do not disturb permanent survey monuments, stakes, lot stakes, or benchmarks without the consent of the Surveyor. The Contractor shall bear the expense of replacing any that may be disturbed.

2. When a change is made in the finished elevation of the pavement of any roadway in which a permanent survey monument is located, preserve the monument and adjust the monument box to the new grade at no expense to the City.

106.17.B CONSTRUCTION AND SURVEY MARKERS

1. The Contractor shall preserve construction survey stakes and marks for the duration of their usefulness during construction. If any construction survey stakes are lost or disturbed during the work by the Contractor and its subcontractors and in the judgment of the City Engineer need to be replaced, such replacement shall be made by the Surveyor at no expense to the City. The cost of replacement may be charged against, and deducted from, payments for Contract work.

106.18 PROTECTION OF PROPERTY

106.18.A THE CONTRACTOR SHALL

1. Protect all public and private property insofar as it may be endangered by operations, and take every reasonable precaution to avoid damage to such property.

2. Restore and bear the cost of any public or private improvement, facility, structure, or land and landscaping within the Right-of-Way or easement which is damaged or injured directly or indirectly by or on account of an act, omission, or neglect in the execution of the Work. Restore to a condition substantially equivalent to that existing before such damage or injury occurred, by repairing, rebuilding, or otherwise effecting restoration thereof, or if this is not feasible, make a suitable settlement with the owner of the damaged property.

3. Give reasonable notice, typically three (3) working days, to occupants of buildings on property adjacent to the Work to permit the occupants to remove vehicles, trailers, and other possessions as well as salvage or relocate plants, trees, fences, sprinkler systems, or other improvements in the Right-of-Way which are designated for removal or which might be destroyed or damaged by Work operations.

4. Protect all designated trees, lawns, and planted areas within the Right-of-Way or easements. Restore all on-surface, disturbed areas by methods as set forth in the Special Provisions. If conditions are such that the method specified cannot be done, provide erosion control surface covering of such quality and quantity as will prevent erosion from occurring, without adverse impacts to the environment, at no additional cost to the City.

5. Review with the City Engineer the location, limits, and methods to be used prior to clearing Work. Clearing and grubbing shall be performed in strict compliance with all local, state, and federal laws and requirements pertaining to clearing and burning.

106.19 RIGHTS-OF-WAY, EASEMENTS, AND PREMISES

106.19.A Confine construction activities within property lines, rights-of-way, limits of easements, and limits of permits as shown or specified in the Contract Documents unless arrangements are made with the owner(s) of adjacent private property. If additional space or property is needed to accommodate the Contractor's method for construction of the Work or for the convenience of the Contractor, the Contractor shall bear all related costs and responsibilities. Prior to the use of any private property outside the specified boundaries, submit to the City Engineer written permission from the property owner(s).

106.19.B Do not unreasonably encumber the specified Work areas with Materials and Equipment. Obtain and bear the costs of permits for special occupancy and use of the specified Work areas from the proper agencies. Comply with all requirements regarding signs, advertisements, fires, and smoking.

106.20 DETRIMENTAL OPERATIONS

106.20.A The Contractor shall avoid operations whose methods, conditions, or timing may injure people or damage property or the Work. Damage may include without limitation, staining surfaces with mud or asphalt.

106.20.B When any such damage occurs, the City Engineer will determine if it is to be corrected by repair, replacement, or compensatory payment by the Contractor. If compensatory payment is required, the City Engineer will determine the amount. Compensatory payment may be deducted from monies due or to become due to the Contractor under the Contract.

106.21 ACCESS TO THE WORK

106.21.A Provide access to the Work for representatives of the City, Marion County, the State of Oregon, the Federal Government, and other entities having jurisdiction in the area.

106.21.B Allow access to the City Engineer, Design Engineer, and Inspector and their representatives to all parts of the Work at all times and coordinate access to plants of manufacturers. Furnish them with every reasonable facility for ascertaining if the Work meets requirements and intent of the Contract Documents.

106.21.C It shall be the duty of the Contractor to cause the Work to remain accessible and exposed for inspection purposes. The City shall not be liable for expense entailed in the removal or replacement of any Material required to allow inspection.

106.22 USE OF WORK DURING CONSTRUCTION

106.22.A The City shall have the right to take possession of and use any completed or partially completed portions of the Work. Such use shall not be considered as acceptance of the Work or portions thereof.

106.22.B Such action by the City will not relieve the Contractor of responsibility for injury or damage to said completed portions of the Work resulting from use by public traffic, action of the elements, the Contractor's operations, defective Work, or negligence, or from any other cause, except for injury or damage resulting from the City's negligence. The Contractor will not be required to again clean up such portions of the Work prior to Final Acceptance, excepting for such clean up as results from the Contractor's operations or defective Work. Use of any completed or partially completed portions of the Work does not relieve the Contractor from the Warranty responsibility nor shall the Warranty period commence to run until final completion and acceptance of the Work.

106.23 RAILROAD CROSSINGS OR RAILROAD RIGHT-OF-WAY

106.23.A Submit a schedule of proposed operations to the City Engineer whenever Work involves the crossing of any railroad line or the encroachment on any railroad Right-of-Way. The schedule shall be approved by the appropriate railroad officials and the City Engineer before the Work is started within such area. Pay for services of flag persons and/or watch persons furnished by the railroad company and provide and drive piling, set cribbing, build bridges or tunnels, install enclosing pipe, and do all other Work required by the railroad company or necessary for safety or maintenance of railroad traffic, including working on weekends, holidays, and providing extra shifts.

106.23.B Furnish any Bond or insurance required by the railroad company as a result of such intended operations and indemnify the City for any and all expenses incurred by the City, and assume any and all liability or claims thereof imposed on the City as a result of operations in railroad Right-of-Way area. Bear all costs resulting from interferences, obstructions, or liabilities set forth in this Subsection, whether or not herein specifically mentioned.

106.24 NOISE, WATER AND AIR POLLUTION CONTROL

106.24.A During performance of the Work, the Contractor's operations shall conform to applicable laws of the State and Federal Government and regulations of the Oregon Department of Environmental Quality, other agencies of the State and Federal Government, the ODOT Erosion Control Manual, as well as other local ordinances and resolutions designed to prevent, control, and abate water and air pollution.

106.24.B During all phases of the Work, protect Work sites, storage, and disposal areas from washout and erosion, and take precautions to control or abate dust nuisance and air pollution by cleaning up, sweeping, sprinkling, covering, enclosing, or sheltering Work areas and stockpiles, and by promptly removing from paved streets earth or other Material which may become airborne or may be washed into waterways or drainage systems.

106.24.C Conform and comply with applicable noise regulations as established in Stayton Municipal Code 7.20.

106.24.D Equipment used during the course of the Work that employs the use of internal combustion engines shall be equipped and maintained with serviceable mufflers or other noise reducing devices of a type recommended by the manufacturer of the Equipment.

106.25 UNACCEPTABLE OR UNAUTHORIZED WORK

106.25.A The Contractor shall correct or remove Unacceptable Work and remove Unauthorized Work, as directed by the City Engineer in writing. The Contractor shall replace such work with Work and Materials conforming to the requirements of the Contract.

106.25.B For the purposes of this Subsection, "Unacceptable Work" shall include all Work that does not conform to the requirements of the Contract Documents.

106.25.C For the purposes of this Subsection, "Unauthorized Work" shall include without limitation the following:

- Work that extends beyond lines shown on the Plans or otherwise established by the City Engineer;
- Work that is contrary to the City Engineer's instructions; and
- Work that is conducted without the City Engineer's written authorization.

106.25.D Upon discovery, immediately remove Unacceptable Work and replace by Work and Materials that conform to the Contract Documents. This provision shall have full effect regardless of the fact that the Unacceptable Work may have been done or the defective Materials used with the full knowledge of the Inspector.

106.25.E The City will not pay the Contractor for Unacceptable Work or Unauthorized Work. The City Engineer may issue a written order for the correction or removal of such Work at the Contractor's expense.

106.25.F If, when ordered by the City Engineer, the Contractor fails to correct or remove Unacceptable Work or Unauthorized Work, the City Engineer may have the correction, or removal and replacement, done by others and deduct the entire cost from monies due or to become due the Contractor under the Contract.

106.25.G Work that cannot be inspected due to subsequent Work may be deemed Unacceptable and the subsequent Work shall be removed at the Contractors expense if:

1. The Inspector had directed that the subsequent Work not be done until the original Work was inspected, or

2. The Inspector reasonably believes that the original Work may be Unacceptable.

106.25.H If the subsequent Work was done with the full knowledge of the Inspector and the Inspector did not direct that the subsequent Work not be done until the original Work was inspected, the City shall pay the cost of removal of the subsequent Work if the original Work conforms to the requirements of the Contract Documents.

106.26 WORKING HOURS

106.26.A The Contractor shall limit construction activities to the hours between 7:00 a.m. and 6:00 p.m., Monday through Friday.

106.26.B If the Contractor desires to perform construction Work on Saturdays, Sundays, City holidays, or outside the eight (8) hour, regular working day, the Contractor shall request of the City Engineer permission to do so, in writing, a minimum of seventy-two (72) hours prior to commencing such Work. Such Work shall be subject to the approval of the City Engineer. Prior to the start of such Work, the Contractor shall arrange with the City Engineer for inspection of the Work, surveys, and tests of Materials, when necessary.

106.26.C Any overtime costs, including billable costs by the City Engineer due to such Work shall be fully paid by the Contractor. Overtime for City Personnel shall be in accordance with Subsection 108.15. Failure by the Contractor to pay such costs incurred by the City or City Engineer shall result in the costs thereof being deducted from any payment due the Contractor.

106.26.D The Contractor shall agree, pursuant to ORS Chapter 279C.520, that no person shall be employed for more than ten (10) hours in any one day, or forty (40) hours in any one week, except in cases of necessity, emergency, or where the public policy absolutely requires it. In such cases, the worker shall be paid at least time and one-half for all overtime and for Work performed on Saturday, Sunday, and on any legal holiday.

106.27 VERBAL AGREEMENTS OR REPRESENTATIONS

106.27.A No verbal agreement or conversation by or with any officer, agent, or employee of the City, either before or after execution of the Contract, shall affect or modify any of the terms or obligations contained in any of the Contract Documents. Any such verbal agreement or conversation is in no way binding upon the City.

106.28 MAINTENANCE WARRANTIES AND GUARANTEES

106.28.A Prior to Final Completion, the Contractor shall transfer to the City all unexpired manufacturers' warranties and guarantees for Materials and Equipment installed on the Project. Such warranties and guarantees shall recite that they are enforceable by the City.

106.29 RESPONSIBILITY FOR MATERIALS AND WORKMANSHIP

106.29.A As stated in the Performance Bond, the Contractor shall perform the Work according to the terms, conditions and requirements of the Contract.

106.29.B Whether before or after the City's acceptance of the Work, the Contractor shall be responsible for the Contractor's legal relations and responsibilities in accordance with Section 108, including:

- Correcting or repairing any defects in, or damage to, the Work which results from the use of improper Materials or workmanship; or
- Replacing, in its entirety, the Work affected by the use of improper Materials or workmanship to the extent provided by law; and Correcting or repairing any Work, Materials, structures, existing surfacings, pavement, utilities, or sites, including without limitation Wetlands, damaged or disturbed in that correction, repair, or replacement.

107 CONTROL OF MATERIALS

107.01 ORDERING, PRODUCING, AND FURNISHING MATERIALS

107.01.A CONTRACTOR'S DUTIES

1. In purchasing, producing, or delivering Materials, the Contractor shall take into account the following:
   - Kind of work involved;
   - Amount of work involved;
   - Time required to obtain Materials; and
   - Other relevant factors.

2. The Contractor shall not place orders for or produce full quantities of Materials anticipated to be required to complete the Work until the Work has advanced to a stage that allows the quantities to be determined with reasonable accuracy.

107.01.B APPROVAL OF QUANTITY OF MATERIALS ORDERED

1. Materials quantities shown on the Plans, or indicated by quantities and Pay Items, are subject to change or elimination. Therefore, the Contractor is cautioned to order or produce Materials only after having received the approval of the City Engineer. The Contractor is responsible for payment for excess Materials delivered to the Project Site or storage sites without advance authorization from the City Engineer. Unless otherwise specified in the Contract, the City will not be responsible for:
   - Materials the Contractor may deliver or produce in excess of Contract requirements;
   - Extra expense the Contractor may incur because Materials were not ordered or produced earlier; or
   - The Contractor's expenses related to Materials ordered by the Contractor that are not subsequently approved for use.

2. Any Allowance made to the Contractor for excess Materials will be at the sole discretion of the City Engineer.

107.02 PREFERENCE FOR USE OF OREGON PRODUCTS

(Not applicable to privately financed public improvements)

107.02.A Pursuant to ORS 279A.120, the Contractor shall give preference to materials produced or manufactured in Oregon, if price, fitness, availability, and quality are otherwise equal. These provisions do not apply to Contracts on Projects financed wholly or in part by federal funds.

107.03 CITY-FURNISHED MATERIALS

107.03.A Unless otherwise specified in the Special Provisions, Materials listed as City-furnished will be available to the Contractor free of charge.

107.03.B The Contractor shall be responsible for all Materials furnished by the City and shall pay all demurrage and storage charges. The Contractor shall replace at its expense City furnished Materials lost or damaged due to any cause.

107.03.C The locations at which City-furnished Materials are available will be designated in the Special Provisions. If the locations are not listed in the Special Provisions, the City furnished Materials will be furnished to the Contractor at the Project Site. In either case, all costs of handling, hauling, unloading, and placing City-furnished Material shall be considered included in the price paid for the Pay Item involving such Material.

107.03.D All City-furnished Materials not incorporated into the Work remains the property of the City. The Contractor shall deliver such Materials as directed by the City Engineer.

107.04 CITY-FURNISHED SOURCES

107.04.A GENERAL

1. The City may list in the Special Provisions, or show on the Plans, borrow pits or aggregate sources from which the Contractor may, or shall, obtain Materials. These sources will be identified and referred to as prospective or mandatory sources. A Development Plan will be included when such sources are shown on the Plans.

107.04.B WORKING IN A DIFFERENT AREA OF THE MATERIALS SOURCE

1. If the Contractor desires to Work in a different area of the Materials source than that shown on the Development Plan, the Contractor must submit a written request stating the reasons for the requested change. If a new land use permit, Development Plan, or reclamation Plan is needed, the Contractor must submit it and obtain approval from the City Engineer before starting Work in any area other than that shown on the Plans. Approval for work in a different area will not entitle the Contractor to any added compensation or adjustment of Contract time.

2. The City will not be responsible for the availability of sources other than as stated in the Special Provisions. If the Contractor has given notice of intent to use, but does not use the source(s) on the Project, the Contractor shall reimburse the City for any costs the City incurs in making such source(s) available.

107.04.C COST OF SOURCES

1. Unless otherwise specified in the Special Provisions, any Prospective or Mandatory Source will be provided by the City for use without payment of royalty or other charge.

107.04.D EXHAUSTION OF SOURCES

1. If the City Engineer determines that the quantities of specified Materials that can be produced from a Mandatory Source are insufficient for the Work, and it becomes necessary to move to another source, the City will pay for the reasonable cost of moving the plant to, and erecting it at, a new approved source from which specified Materials can be produced. Adjustment in hauling costs, other costs, and Contract Time will be determined as provided in Subsection 105.05.

2. No allowance, reimbursement, compensation, or adjustment will be made for changes in the use of sources, or for moving from one source to another, except as provided above.

107.05 CONTRACTOR-FURNISHED MATERIALS AND SOURCES

107.05.A The Contractor shall furnish, at its own expense, all products and Materials required for the Project from sources of its own choosing, unless such sources have been designated in the Special Provisions or Plans as Prospective or Mandatory Sources.

107.05.B The Contractor shall acquire, at its own expense, the rights of access to, and the use of, all sources the Contractor chooses which are not City-controlled and made available by the City to the Contractor.

107.05.C Except for continuously-operated commercial sources, Work shall not begin, nor will any Materials be accepted by the City Engineer, until the Contractor has:

1. Given to the City Engineer a copy of permits from, or proof that permits are not required from:
   - ❖ The Department of Geology and Mineral Industries, as required under ORS 517.790;
   - ❖ The Department of State Lands, as required under ORS 196.815 (when removing material from the bed or banks of any waters or from any Wetland); and
   - ❖ Local governmental authorities having jurisdiction over land use at the source location.
2. Furnished to the City Engineer written approval of the property owner, if other than the Contractor, for the Contractor's proposed Plans of operation in, and reclamation of, the source. The Contractor shall include in the document containing the property owner's written approval a summary of the requirements of the permits described above, which shall be subject to the City Engineer's approval.

107.06 CITY-CONTROLLED LAND; LIMITATIONS AND REQUIREMENTS

107.06.A The Contractor shall have no property rights in, or right of occupancy on, City-Controlled Land. Nor shall the Contractor have the right to sell, use, remove, or otherwise dispose of any Material from City-Controlled Land, areas, or property, except as specified in the Special Provisions or by the written authorization of the City Engineer.

107.06.B Unless authorized in the Contract, the Contractor shall not disturb any material within Rights-of-Way without written authorization from the City Engineer. Unless otherwise specified in the Contract, the ownership of all Materials originating on City-Controlled Lands will at all times vest in, and remain within the control of, the City.

107.06.C All waste, excess, and by-product Materials, collectively referred to in this Subsection as "By-Products", from the manufacture or production of Materials from City-Controlled Land shall remain City property. Unless otherwise ordered by the City Engineer in writing, By-Products shall be placed as required by the development plan:

- ❖ In stockpiles at designated locations;
- ❖ At locations and in shapes that are readily accessible; and
- ❖ In such a manner as to avoid fouling areas containing useable materials, or interfering with future plant setups to use materials from the property.

107.06.D The City will not compensate the Contractor for handling and stockpiling By-Products in accordance with the Development Plan requirements. If by written order the City Engineer directs the Contractor to stockpile or place designated By-Products at alternate sites, the By-Products designated shall be loaded, hauled, and placed as directed, and this Work will be paid for as Extra Work.

107.07 REQUIREMENTS FOR PLANT OPERATIONS

107.07.A Before operating mixing plants, Rock crushers, or other Equipment, the Contractor shall provide the City Engineer copies of all applicable discharge permits for noise, air contaminants, and water pollutants from DEQ or applicable local jurisdictions, or a letter from DEQ or the local jurisdiction stating that no permits are required for the use of the Equipment and sites.

107.08 REQUIREMENTS FOR SOURCES OF BORROW AND AGGREGATE

107.08.A The Contractor shall conduct operations according to all applicable federal, State, and local laws (including without limitation ORS Chapter 517 and OAR Chapter 632, Division 30) when developing, using, and reclaiming all sources of Borrow Material and Aggregate. The Contractor shall provide erosion control at Borrow sources that are not within the Project Site. The Contractor shall not operate in Wetlands except as allowed by permit. The Contractor shall comply with all requirements for pollution and sediment control, including without limitation the National Pollutant Discharge Elimination System where applicable.

107.08.B Except for continuously-operated commercial sources, the Contractor shall also conform to the following:

1. If a natural growth of trees or shrubs is present, preserve a border of such to conceal land scars.

2. Excavate Borrow sources and Aggregate sources, except for those in streams and rivers, to provide:

   - Reasonably uniform depths and widths;
   - Natural drainage so no water stands or collects in excavated areas, when practicable;
   - Slopes trimmed to blend with the adjacent terrain upon completion of operations;
   - Slopes covered with native soil, or acceptable plant rejects to support plant growth, if required by Specifications, Plans, or permits; and
   - A vegetative cover that blends with the adjacent natural growth.

3. Excavate in quarries so that:

   - Faces will not be steeper than vertical (no overhang);
   - Vertical faces conform to Oregon OSHA standards, Division 3, and as shown on an approved Development Plan;
   - Floors or benches are excavated to a uniform slope free of depressions and will drain and not interfere with the down land owner's property; and
   - Upon completion, the quarry is left appearing neat and compatible with surrounding terrain.

4. Obliterate haul roads specifically built for access to sources, and restore the areas disturbed by these roads as nearly as practicable to the conditions that existed before the roads were built, unless otherwise directed by the landowner or regulatory body.

107.09 QUALITY OF MATERIALS

107.09.A Materials, parts, products, and equipment that are to be incorporated into the Work shall be new and shall conform to the Contract Documents.

107.09.B The Contractor shall incorporate into the Work only Materials conforming to the Specifications and approved by the City Engineer. The Contractor shall incorporate into the Work only manufactured products made of new Materials unless otherwise specified in the Contract.

107.09.C Materials not meeting the Specifications at the time they are to be used are unacceptable and must be removed immediately from the Project Site, unless otherwise directed by the City Engineer.

107.10 REJECTED MATERIALS

107.10.A The City Engineer may reject any Materials that appear to be defective. The Contractor shall not incorporate any rejected Materials into the Work. Rejected Materials whose defects have been corrected may not be incorporated into the Work until the City Engineer has approved their use. The City Engineer may order the removal and replacement by the Contractor, at Contractor's expense, of any defective Materials.

107.11 SAMPLING AND TESTING

107.11.A Tests of the Work may be made by the City at any time during construction of the Work or during the production, fabrication, or preparation and use of Materials, parts, products and equipment.

107.11.B The City reserves the right to require samples and to test Materials, parts, products, and Equipment for compliance with pertinent requirements irrespective of prior certification of the Materials, parts, products, and Equipment by the manufacturer.

107.11.C When such tests of the Work are required by the Contract Documents, or as necessary as determined by the City Engineer, such tests will be made by an Independent Testing Agency approved by the City, at the Contractor's expense unless otherwise specified.

107.11.D When such tests of Materials are required, collection of samples and subsequent testing shall be made by and at the expense of the Contractor. The Contractor shall withhold from use the Materials represented by the samples until tests have been made and the Materials found equal to requirements of the Contract Documents. No claim will be allowed for any delay caused by collection of samples, testing, or awaiting test results.

107.11.E Contractor shall provide such facilities and cooperate as required for collecting and forwarding samples. In all cases furnish the required samples without charge and in ample time to permit testing prior to use. Provide safety measures and devices to protect those who take the samples.

107.11.F In the absence of any reference in the specification, it shall be understood that construction Materials shall meet the Specifications and the requirements of the American Society for Testing and Materials (ASTM), the American Association of State Highway and Transportation Officials (AASHTO), or the Standard Specifications for Construction (ODOT/APWA), as directed by the City Engineer. When there is no pertinent coverage under ASTM, AASHTO or ODOT, the Material concerned shall meet Specifications and the requirements of applicable Commercial Standards of the Commodity Standards Division of the U.S. Department of Commerce. Lacking such coverage, materials shall meet requirements established by reputable industry for a high-quality product of the kind involved.

107.11.G In the event that a Special Provision requires testing at the City's expense and the Work fails, the Contractor shall bear all costs for all subsequent testing necessary to meet specified requirements.

107.12 MATERIALS CONFORMANCE DOCUMENTS (MANUFACTURER'S CERTIFICATION)

107.12.A The City Engineer, at his/her sole discretion, may, in lieu of any other required sampling and testing, accept from the Contractor two (2) original Materials Conformance Documents with respect to the product involved, under conditions set forth as follows:

1. Certification shall state that the named product conforms to the City's requirements and that representative samples thereof have been sampled and tested as specified.

2. Certification shall either be accompanied with a certified copy of test results, or certify that such test results are on file with the manufacturer and will be furnished to the City Engineer upon request.

3. Certification shall give the name and address of the manufacturer and the testing agency and the date of tests; and shall set forth the means of identification which will permit field determination of the product delivered to the project as being the product covered by the certification.

4. Neither the Contractor nor the City shall be responsible for any costs of certification or for any costs of the sampling and testing of products in connection therewith.

107.12.B All Material Conformance Documents shall be originals, copies will not be accepted. Provide a minimum of 5 original documents.

107.13 USE OF MATERIALS WITHOUT ACCEPTABLE MATERIALS CONFORMANCE DOCUMENTS

107.13.A The Contractor shall not incorporate Materials into the Project prior to submittal of Materials Conformance Documents acceptable to the City Engineer. The City Engineer may waive this requirement temporarily if Materials are necessary for immediate traffic safety.

107.13.B If Materials are incorporated into the Project for immediate traffic safety before acceptable Materials Conformance Documents are available, no payment will be made for the value of the Materials, or the costs of incorporating them, until Materials Conformance Documents have been submitted to and approved by the City Engineer, or the Materials are otherwise found through testing to comply with Specifications.

107.13.C CONTRACTOR'S REQUEST FOR TESTING ASSISTANCE

1. If acceptable Materials Conformance Documents are not available, the Contractor may either have the necessary tests performed at a private laboratory or request in writing that the City Engineer:
    - ❖ Determine if the City or its agents can sample and test;
    - ❖ Estimate the cost to the Contractor for the testing service; and
    - ❖ Estimate the time required to obtain the test results.

2. The City Engineer will provide this information to the Contractor in writing. If the Contractor requests the City Engineer, in writing, to proceed, the City Engineer will arrange for the sampling and testing, at the Contractor's expense. If these tests determine the Material complies with the Specifications, the Materials may be incorporated into the Project, or for Materials previously incorporated pursuant to (B) above, payment will be authorized.

107.14 STORAGE AND HANDLING OF MATERIALS

107.14.A Store items to be incorporated into the work to assure the preservation of their quality and fitness for the work. Stored items, even though approved before storage, may be re-inspected and are subject to rejection prior to being incorporated into the Work.

107.14.B The Contractor shall restore all storage sites to their original condition according to Subsection 105.13, or to comply with any applicable permits, orders, or agreements, at the Contractor's expense.

107.14.C Stored Materials:

- Shall be located and readily accessible so as to facilitate their prompt inspection.
- May be stored on approved parts of the Right-of-Way; and
- May be stored on private property if written permission of the owner and lessor is obtained.

107.15 TRADE NAMES, EQUALS, OR SUBSTITUTIONS

107.15.A In order to establish a basis of quality, certain processes, types of machinery or Equipment, or kinds of Materials may be specified either by description of process or by designating a manufacturer by name and referring to a brand or product designation or by specifying a kind of Material. Generally it is not the intent of the Specifications to exclude other processes, Equipment, or Materials of equal value, utility or merit.

107.15.B Whenever a process is designated or a manufacturer's name, brand, or item designation is given or whenever a process or Material covered by patent is designated or described with the words "or equal" following such name, designation, or description, submittals for other processes, types of machinery or Equipment, or kinds of Materials may be submitted to the City Engineer for evaluation. This "or equal" clause is not a Warranty by the City, either expressed or implied, that an equal exists.

107.15.C The Contractor may offer to furnish Materials or Equipment of equal or better quality and performance other than that specified as a substitute after the Contract is executed. If the offer necessitates changes to or coordination with any other portion of the Work, the data submitted shall include drawings and details showing all such changes. The Contractor agrees to perform these changes as part of the substitution of Material or Equipment. Acceptance by the City Engineer shall not relieve the Contractor from full responsibility for the efficiency, sufficiency, quality and performance of the substituted Material or Equipment in the same manner and degree as the Material and Equipment specified by name. For publicly financed public improvement projects, any cost differential associated with a substitution shall be reflected in the Contract Price and the Contract shall be appropriately modified by Change Order as approved by the City Engineer.

107.15.D If the Contract Documents includes a list of Equipment, Materials or articles for which the Contractor must name the manufacturer at time of submission of the Bid, no substitutions therefore will be permitted unless approved in writing at the sole discretion of the City Engineer.

107.15.E All approved Materials or Equipment of equal or better quality offered by the Contractor for substituting shall be approved by the City Engineer prior to incorporation into the Project in accordance with Subsection 109.09.

107.16 MEASUREMENT AND PAYMENT FOR CONTROL OF MATERIALS

107.16.A No separate measurement will be made of Work performed under this Section.

107.16.B No separate or additional payment will be made for sampling, testing, certification, or other associated Work performed under this Section, whether performed by the Contractor, manufacturer, producer or supplier. No payment will be made for providing quality control personnel.

108 LEGAL RELATIONS AND RESPONSIBILITIES

108.01 APPLICABLE LAWS, ORDINANCES AND VENUE

108.01.A The Contractor shall comply with all laws, ordinances, codes, regulations and rules, (collectively referred to as "Laws" in this Section), that relate to the Work or to those engaged in the Work. Where the provisions of the Contract are inconsistent or in conflict, the Contractor shall comply with the more stringent standard. The Contractor shall indemnify, defend, and hold harmless the City, City Engineer and its representatives from liability arising from or related to the violation of Laws by those engaged in any phase of the Work. This provision does not apply to Work performed by City employees.

108.01.B Any disagreements, protests, or claims shall be in accordance with Section 111.

108.01.C In any litigation, the entire text of any order or permit issued by a governmental or regulatory authority, as well as any documents referenced or incorporated therein by reference, shall be admissible for the purpose of Contract interpretation.

108.01.D The Contract shall not be construed against either party regardless of which party drafted it. Other than as modified by the Contract, the applicable rules of contract construction and evidence shall apply. This Contract shall be governed by and construed according to the laws of the State of Oregon without regard to principles of conflict of laws.

108.01.E Any dispute between the City and the Contractor that arises from or relates to this Contract and that is not resolved under the provisions of Section 111 shall be brought and conducted solely and exclusively within the Circuit Court for the State of Oregon in Marion County; provided, however, if a dispute must be brought in a federal forum, then it shall be brought and conducted solely and exclusively within the United States District Court for the District of Oregon. In no event shall this Subsection be construed as a waiver by the City on any form of defense or immunity, whether sovereign immunity, governmental immunity, immunity based on the Eleventh Amendment to the Constitution of the United States or otherwise, from any claim or from the jurisdiction of any court. CONTRACTOR BY EXECUTION OF THE CONTRACT HEREBY CONSENTS TO THE IN PERSONAM JURISDICTION OF THE COURTS REFERENCED IN THIS SECTION.

108.02 OTHER AGENCIES AFFECTING CITY CONTRACTS

108.02.A The Bidder and Contractor shall be familiar with all federal, state, and local laws, ordinances, and regulations that in any manner affect those engaged or employed in the Work or the Materials or equipment used in the proposed construction, or which in any way affect the conduct of the Work. If the Bidder or the Contractor discovers any provision in the Contract Documents that is contrary to or inconsistent with any law, ordinance, or regulation, it shall immediately be reported to the City Engineer in writing.

108.02.B Pursuant to ORS 279C.525, Representatives of regulatory bodies or units of government who's Laws may apply to the Work may include but are not limited to those in the following list of federal, state and local agencies. This includes any enacted ordinances or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that may affect the performance of the Contract.

Federal Agencies

Agriculture, Department of
Army Corps of Engineers
Coast Guard
Defense, Department of
Energy, Department of
Environmental Protection Agency
Federal Energy Regulatory Commission
Federal Highway Administration
Forest Service
Health and Human Services, Department of
Housing and Urban Development, Department of
Indian Affairs, Bureau of
Interior, Department of
Labor, Department of
Land Management, Bureau of
Mine Safety and Health Administration
Mines, Bureau of:
Geological Survey
Minerals Management Service Reclamation, Bureau of
Natural Resources Conservation Service
Occupational Safety and Health Administration
Solar Energy and Energy Conservation Bank
Transportation, Department of
U.S. Fish and Wildlife Service
Water Resources Council

Oregon Tribal Governments

State Agencies

Administrative Services, Department of
Agriculture, Department of
Columbia River Gorge Commission
Consumer and Business Services, Department of
Energy, Department of
Environmental Quality, Department of
Fish and Wildlife, Department of
Forestry, Department of
Geology and Mineral Industries, Department of
Human Resources, Department
Land Conservation and Development Commission
Oregon Occupational Safety and Health Division
Parks and Recreation, Department of
Soil and Water Conservation District
State Engineer
Department of State Lands
Water Resources Department

Local Agencies

City Councils
County Commissioners, Board of
County Courts
County Service Districts
Fire Protection Districts
Historical Preservation Commissions
Metropolitan Service Districts
Planning Commission
Port Districts
Sanitary Districts
Water Districts
Other Special Districts

108.03 ASSIGNMENT OF ANTITRUST RIGHTS CLAIMS

(Not applicable to privately financed public improvements)

108.03.A By entering into the Contract, the Contractor, for consideration paid to the Contractor under the Contract, does irrevocably assign to the City any claim for relief or cause of action which the Contractor now has or which may accrue to the Contractor in the future, including, at the City's option, the right to control any such litigation on such claim for relief or cause of action, by reason of any violation of 15 USC 1-15 or ORS 646.725 or ORS 646.730, in connection with any goods or services provided to the Contractor by any person, which goods or services are used, in whole or in part, for the purpose of carrying out the Contractor's obligations under the Contract.

108.03.B In the event the Contractor hires subcontractors to perform any of the Contractor's duties under the Contract, the Contractor shall require the subcontractor to irrevocably assign to the City, as a third party beneficiary, any right, title, or interest that has accrued or may accrue to the subcontractor by reason of any violation of 15 USC 1-15, ORS 646.725 or ORS 646.730, including, at the City's option, the rights to control any litigation arising there-under, in connection with any goods or services provided to the subcontractor by any person, in whole or in part, for the purpose of carrying out the subcontractor's obligations as agreed to by the Contractor in pursuance of the completion of the Contract.

108.03.C In connection with this assignment, it is an express obligation of the Contractor that it will take no action that will in any way diminish the value of the rights conveyed or assigned hereunder to the City. It is an express obligation of the Contractor to advise the City Attorney:

1. In advance, of its intention to commence any action on its own behalf regarding such claims for relief or causes of action; and

2. Immediately, upon becoming aware of the fact that an action has been commenced on its own behalf by some other person(s), of the pendency of such action; and

3. The date on which it notified the obligor(s) of any such claims for relief or causes of action of the fact of its assignment to the City. Furthermore, it is understood or agreed that in the event that any payment under any such claim is made to the Contractor, it shall promptly pay over to the City its proportionate share thereof, if any, assigned to the City hereunder.

108.04 PATENTS, COPYRIGHTS, AND TRADEMARKS

108.04.A Prior to use of designs, devices, Materials, or processes protected by patent, copyright, or trademark, the Contractor shall obtain from the entity entitled to enforce the patent, copyright, or trademark all necessary evidence of legal right.

108.04.B The Contractor shall indemnify, defend and hold harmless the City and the City Engineer, its employees and consultants, and all third parties and political subdivisions having a possessory or ownership interest or regulatory authority over the Project or Project Site from claims of patent, copyright or trademark infringement, and from costs, expenses and damages the Contractor or City may be obligated to pay as a result of such infringement during or after completing the Work.

108.05 LICENSES AND PERMITS

108.05.A Secure all Municipal, County, State, Federal or other permits or licenses, necessary or incidental to performance of the work under the Contract Documents. Comply with all permit requirements pertaining to the project.

108.06 RECORD REQUIREMENTS

108.06.A GENERAL

1. For purposes of this Subsection the term "Contractor" includes the Contractor, all subcontractors, Material Suppliers, and providers of rented operated Equipment (except non-DBE truck drivers), at all tiers, for all subcontracts with first-tier Subcontractors, all subcontracts between the first-tier Subcontractors and their subcontractors and any other lower tier subcontracts, and "Related Entities" as that term is defined in OAR 731-005-0780. The Material Suppliers included in this definition are those for Aggregates, Asphalt Cement Concrete, Portland Cement Concrete and the supply and fabrication of structural steel items or Material Suppliers that provide quotes.

108.06.B RECORDS REQUIRED

1. The Contractor shall maintain all records, whether created before or after execution of the Contract, or during Contract performance, or after Contract completion, to clearly document:
    - ❖ The Contractor's performance of the Contract or a subcontract;
    - ❖ The Contractor's ability to continue performance of the Contract or a subcontract; and
    - ❖ All claims arising from or relating to performance under the Contract or a subcontract.

2. These records shall include all records, including fiscal records, regardless of when created for the Contractor's business. The records for the Contractor's business include without limitation the:
    - ❖ Bidding estimates and records, worksheets, tabulations or similar documents.
    - ❖ Job cost detail reports, including monthly totals.
    - ❖ Payroll records (including without limitation the ledger or register, and tax forms) and all documents which establish the periods, individuals involved, the hours for the individuals, and the rates for the individuals.
    - ❖ Records that identify the Equipment used by the Contractor and subcontractors in the performance of the Contract or subcontracts, including without limitation, Equipment lists, rental contracts and any records used in setting rental rates.
    - ❖ Invoices from vendors, rental agencies, and subcontractors.
    - ❖ Material quotes, invoices, purchase orders and requisitions.
    - ❖ Contracts with subcontractors and contracts with Material Suppliers, Suppliers and providers of rented equipment.
    - ❖ Contracts or documents of other arrangements with any Related Entity as defined in OAR 731-005-0780.
    - ❖ General ledger.
    - ❖ Trial Balance.
    - ❖ Financial statements (including without limitation the balance sheet, income statement, statement of cash flows, and financial statement notes).
    - ❖ Income tax returns.
    - ❖ All worksheets used to prepare bids or claims, or to establish the cost components for the Pay Items, including without limitation, the labor, benefits and insurance, Materials, Equipment, and subcontractors.

3. The following are examples, but not an exhaustive list, of records that would be included, if generated by the Contractor. If the Contractor generates such records, or equivalent records, they are included among the records subject to Section 108.06.

   - Daily time sheets and supervisor's daily reports.
   - Collective bargaining agreements.
   - Earnings records.
   - Journal entries and supporting schedules.
   - Insurance, welfare, and benefits records.
   - Material cost distribution worksheet.
   - Subcontractors' and lower tier subcontractors' payment certificates.
   - Payroll and vendor's cancelled checks.
   - Cash disbursements journal.
   - All documents related to each and every claim together with all documents that support the amount of damages as to each claim.
   - Additional financial statements (including without limitation the balance sheet, income statement, statement of cash flows, and financial notes) preceding the execution of the Contract and following final payment of the Contract.
   - Depreciation records on all business Equipment maintained by the business involved, its accountant, or other Entity. (If a source other than depreciation records is used to develop cost for the Contractor's internal purposes in establishing the actual cost of owning and operating Equipment, all such other source documents.)

4. The Contractor shall maintain all fiscal records in material compliance with generally accepted accounting principles, or other accounting principles that are accepted accounting principles and practices for the subject industry and adequate for the nature of the Contractor's business, and in such a manner that providing a complete copy is neither unreasonably time consuming nor unreasonably burdensome for the Contractor or the City. Failure to maintain the records in this manner shall not be an excuse for not providing the records.

5. The Contractor shall include in its subcontracts, purchase orders, and all other written agreements, a provision requiring all subcontractors, Material Suppliers and providers of rented operated Equipment, (except non-DBE truck drivers), at all tiers to comply with Section 108.06. The Contractor shall also require all subcontractors, Material Suppliers, and providers of rented operated Equipment, (except non-DBE truck drivers), at all tiers and Related Entities to include in their contracts, purchase orders, and all other written agreements, a provision requiring all lower tier subcontractors, Material Suppliers and providers of rented operated Equipment (except non- DBE truck drivers) to comply with Section 108.06. The Material Suppliers to which this applies are those for Aggregates, Asphalt Cement Concrete, Portland Cement Concrete and the supply and fabrication of structural steel items or Material Suppliers that provide Material quotes and Related Entities as defined in OAR 731-005-0780.

108.06.C ACCESS TO RECORDS

1. The Contractor shall provide the City Engineer access to or a copy of all Contractor records upon request. A City Engineer's authority to request or access records is subject to OAR 731-005-0780(9). During the record retention period the City, City Engineer, employees of the City, representatives of the City, or representatives of regulatory bodies or units of government may:

   - Inspect, examine and copy or be provided a copy of all Contractor records;
   - Audit the records, a Contract or the performance of a Contract;

- ❖ Inspect, examine and audit the records when, in the City's sole discretion, the records may be helpful in the resolution of any claim, litigation, administrative proceeding or controversy arising out of or related to a Contract.

2. Reasons for access to audit, inspect, examine and copy records include without limitation, general auditing, reviewing claims, checking for collusive bidding, reviewing or checking payment of required wages, performance and contract compliance, workplace safety compliance, evaluating related Entities, environmental compliance, and qualifications for performance of the Contract, including the ability to perform and the integrity of the Contractor.

3. Where such records are stored in a computer or in other digital media, the Engineer may request, and the Contractor shall provide, a copy of the data files and such other information or access to software to allow the Engineer review of the records.

4. Nothing in Section 108.06 is intended to operate as a waiver of the confidentiality of any communications privileged under the Oregon Evidence Code. Nothing in Section 108.06 limits the records or documents that can be obtained by legal process.

108.06.D RECORD RETENTION PERIOD

1. The Contractor shall maintain the records and keep the records accessible and available at reasonable times and places for at least 3 years from the date of final payment under the Contract, or until the conclusion of all audits, litigation, administrative proceedings, disputes and claims arising out of or related to the Contract, whichever date is later.

108.06.E PUBLIC RECORDS REQUESTS

1. If records provided under this section contain any information that may be considered exempt from disclosure as a trade secret under either ORS 192.501(2) or ORS 646.461(4), or under other grounds specified in Oregon Public Records Law, ORS 192.410 through ORS 192.505, the Contractor shall clearly designate on or with the records the portions which the Contractor claims are exempt from disclosure, along with a justification and citation to the authority relied upon. Entire records or documents should not be designated as a trade secret or otherwise exempt from disclosure. Only specific information within a record or document should be so designated.

2. To the extent allowed by the Oregon Public Records Law or other applicable law related to the disclosure of public records, City will not disclose records or portions of records the Contractor has designated as trade secrets to a third party, who is not a representative of the City, to the extent the records are exempt from disclosure as trade secrets under the Oregon Public Records Law or other applicable law, except to the extent City is ordered to disclose in accordance with the Oregon Public Records Law or by a court of competent jurisdiction. Application of the Oregon Public Records Law or other applicable law shall determine whether any record, document or information is actually exempt from disclosure.

3. In addition, in response to a public records request, the City will not produce or disclose records so identified as exempt by the Contractor to any person other than representatives of the City, and others with authorized access under Section 108.06.C, without providing the Contractor a copy of the public records request, unless:

   - ❖ The Contractor consents to such disclosure; or
   - ❖ City is prohibited by applicable law or court order from providing a copy of the public records request to the Contractor.

108.07 HEALTH, SAFETY AND SANITATION PROVISIONS

108.07.A GENERAL

1. The Contractor shall comply with all Laws concerning health, safety and sanitation standards. The Contractor shall not require workers to perform Work under conditions that are hazardous, dangerous, or unsanitary. Workers exposed to traffic shall wear upper body garments or safety vests that are highly visible. Workers exposed to falling or flying objects or electrical shock shall wear hard hats. Upon their presentation of proper credentials, the Contractor shall allow inspectors of the U.S. Occupational Safety and Health Administration (OSHA) and the Oregon Occupational Safety and Health Division (OR-OSHA) to inspect the Work and Project Site without delay and without an inspection warrant.

2. The Contractor shall also comply with "U.S. Department of Labor Occupational Safety and Health Act," the "Construction Safety Act" administered by the U.S. Department of Labor, the "Manual of Accident Prevention in Construction" published by the Associated General Contractors of America, and the "Manual on Uniform Traffic Control Devices", except where these are in conflict with state laws, in which case the more stringent requirements shall be followed.

3. The City or City Engineer are not responsible to provide design and construction observations relating to the Contractor's health, safety, and sanitation precautions or to means, methods, techniques, sequences or procedures required for the Contractor to perform his work. The duty of the City Engineer to conduct construction observation of the Contractor's performance is not intended to include review of the adequacy of the Contractor's safety measures in, on, or near the construction site.

4. The Contractor will be solely and completely responsible for conditions of the work site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours. Safety provisions shall conform to applicable State, County, and local laws, ordinances and codes, and to the current safety regulations as set forth in the Oregon Safety Codes adopted and published by the Workmen's Compensation Board, Salem, Oregon.

5. The Contractor shall maintain at his office or other well known place at the work site, all articles necessary for giving first-aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of all persons (including employees) who may be injured on the work site.

6. If death or serious injuries or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the City Public Works Director. In addition, the Contractor must promptly report in writing to the City Public Works Director all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses. If any claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the City Public Works Director, giving full details of the claim.

7. Pursuant to ORS 468A.720, the Contractor or a subcontractor who performs Project Work involving asbestos abatement shall possess a valid DEQ asbestos abatement license.

108.07.B PUBLIC HEALTH

1. Sewage flows in existing facilities shall not be interrupted. Should the Contractor be required to disrupt existing sewer facilities, for any reason, the sewage shall be conveyed in closed conduits and disposed of in a sanitary sewer system, or transported to an approved disposal site in Equipment designed for that purpose. Transporting and disposal of sewage shall be in conformance with all applicable state and local regulations.

2. Sewage shall not be discharged into or allowed to flow in storm drains, trenches, creeks, ditches, and similar drainage ways. Sewage spills or accumulations shall be cleaned up promptly.

3. The Contractor shall protect all existing water distribution systems during the course of the Work. Appropriate precautions shall be taken to prevent contamination when repairing damaged water lines.

108.07.C EMPLOYEE SAFETY

1. The Contractor shall at all times be responsible for the safety of their employees and their subcontractor's employees. The Contractor shall maintain the job site and perform the Work in a manner which meets the Contractor's (and the City's, if any) responsibility under statutory and common law for the provision of a safe place to Work and which complies with safety regulations. Conduct the project with proper regard for the safety and convenience of the public.

108.07.D PUBLIC SAFETY AND CONVENIENCE

1. The Contractor shall at all times conduct their Work so as to ensure the least possible obstruction to traffic and convenience to the general public and residents in the vicinity of the work and to ensure the protection of persons and property. No road or street shall be closed to the public except with the permission of the City Engineer and proper governmental authority. Fire hydrants on or adjacent to the Work shall be kept accessible to fire fighting equipment at all times. Temporary provisions shall be made by the Contractor to ensure the use and proper functioning of sidewalks, private and public driveways, all gutters, sewer inlets, drainage ditches and culverts, irrigation ditches, and natural watercourses. The Contractor will minimize inconvenience to others due to mud and dust.

2. When the Project involves use of public ways, provide necessary flag persons and install and maintain means of reasonable access to all fire hydrants, service stations, warehouses, stores, houses, garages, and other property.

3. Close up or plate all open excavations at the end of each working day in all street areas unless approved otherwise by the City Engineer and in all other areas when it is reasonably required for public safety or as directed by the City Engineer. At night, mark all open Work and obstructions by lights. Install and maintain all necessary signs, lights, flares, barricades, railings, runways, stairs, bridges, and facilities. Observe all safety instructions received from the City Engineer or governmental authorities, but following of such instructions shall not relieve the Contractor from its responsibility or liability for accidents to workers or damage or injury to person or property. The City, the City Engineer, the Design Engineer, and the Inspector shall have no obligation or duty to monitor or enforce the Contractor's safety responsibility.

108.07.E SAFETY PROGRAM

1. The Contractor shall adopt a written safety program complying with the requirements of employee and public safety set forth hereinabove and any applicable Special Provisions. The safety program shall also comply with OAR Chapter 437, Division 3 and 29 CFR Part 1926 regarding general safety and health provisions.

108.07.F SANITATION FACILITIES AT CONSTRUCTION PROJECTS

1. Contractors shall comply with 29 CFR 1926.51 as adopted by OR-OSHS by reference in OAR 437-003-0001(4)(b). In addition, and as required by ORS 654.150, if the Contract price is estimated (unit prices) or offered (lump sum) by the Contractor at $1,000,000 or more or when indicated by Special Provision, the Contractor shall provide at the site toilet facilities, and facilities for maintaining personal cleanliness for the use of employees on the construction Project according to ORS 654.150. Flush toilets shall be provided and the washing facilities shall consist of warm water, wash basins and soap. A building or a mobile, self-contained unit may be provided for such facilities. The number, types and maintenance of facilities shall conform to minimum standards set by the Director of the Department of Consumer and Business Services.

2. The Contractor shall be responsible for all costs (which costs shall be included in the offer whether or not a specific item is provided therefore) that may be incurred in complying with or securing exemption or partial exemption from the requirements of ORS 654.150 (Sanitary facilities at construction Projects; standards, exemptions) and the rules adopted pursuant thereto.

3. Determination of applicability of ORS 654.150 to the Project is the sole responsibility of the Contractor.

108.08 SUBCONTRACTORS

108.08.A Use of subcontractors, material suppliers, or equipment suppliers shall in no way release the Contractor from any obligations to the City.

108.08.B The Contractor will provide in all subcontract agreements that the subcontractor, Material supplier, and Equipment supplier will be bound by the terms and conditions of the Contract Documents to the extent that they relate to the subcontractor's Work, Material, or Equipment. For publicly financed public improvement projects, subcontracts are assignable to the City at the City's option, in the event the Contract is terminated for default of the Contractor.

108.08.C For publicly financed public improvements projects the Contractor will require each subcontractor providing labor for the Project to:

1. Demonstrate to the Contractor that it has a qualifying Employee Drug-testing Program for the subcontractor's subject employees. Subcontractors shall represent and warrant to the Contractor that the qualifying Employee Drug-testing Program is in place at the time of subcontract execution and will continue in full force and effect for the duration of the subcontract; or

2. Require that the subcontractor's subject employees participate in the Contractor's qualifying Employee Drug-testing Program for the duration of the subcontract.

108.09 NO WAIVER OF LEGAL RIGHTS

(Not applicable to privately financed public improvements)

108.09.A The City shall not be precluded or stopped by any measurement, estimate, or certificate made either before or after completion and acceptance of Work or payment therefore, from showing the true amount and character of Work performed and Materials furnished by the Contractor, or from showing that any such measurement, estimate, or certificate is untrue or incorrectly made, or that Work or Materials do not conform to the Contract Documents. The City shall not be precluded or stopped, notwithstanding any such measurement, estimate, or certificate, or payment in accordance therewith, from recovering from the Contractor and the Surety such damages as it may sustain by reason of failure to comply with terms of the Contract Documents, or from enforcing compliance with the Contract Documents. Neither acceptance by the City, or by any representative or agent of the City, of the whole or any part of the Work, nor any extension of time, nor any possession taken by the City, nor any payment for all or any part of the Project, shall operate as a waiver of any portion of the Contract Documents or of any power herein reserved, or any right to damages herein provided. A waiver of any breach of the Contract shall not be held to be a waiver of any other breach.

108.10 OTHER CONTRACTS

108.10.A The City reserves the right to award other Contracts or issue permits for Work that may require coordination with the Work to be performed under the Contract Documents.

108.10.B When other Contracts or permits are awarded or issued for different portions of the Work, "the Contractor" in each case shall be the person who signs the other Contract or is the holder of the permit.

108.10.C The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their Materials and Equipment and the execution of their Work, and shall properly connect and coordinate said Work with theirs.

108.10.D If any part of the Contractor's Work depends, for proper execution or results, upon the Work of any other Contractor, the Contractor shall inspect and promptly report to the City Engineer any apparent discrepancies or defects in such work that render it unsuitable for such proper execution and results. Failure of the Contractor to inspect and report shall constitute an acceptance of the other Contractor's Work as fit proper to receive the Work, except as to defects that may develop in the other Contractor's Work after the execution of the Contractor's Work.

108.10.E Should the Contractor cause damage to the Work or property of any other Contractor which results in a claim against the City, and if the claim is not satisfied by the Contractor and the other Contractor sues the City or initiates an arbitration proceeding on account of any damage alleged to have been so sustained, the City shall notify the Contractor who shall defend if requested such proceedings at the Contractor's expense, and if there is any judgment or award against the City, the Contractor shall pay or satisfy it and shall reimburse the City for all attorney's fees and court or arbitration costs which the City has incurred.

108.10.F The Contractor shall be responsible for any cutting, fitting, and patching that may be required to complete the Work except as otherwise specifically provided in the Contract Documents. The Contractor shall not endanger any Work of any other Contractors by cutting, excavating or otherwise altering any Work and shall not cut or alter the Work of any other Contractor. Any costs caused by defective or ill-timed work shall be borne by the party responsible therefore.

108.10.G If a dispute arises as to the responsibility for cleaning up or finishing Work, the City may clean up and charge the cost thereof to the Contractor and other Contractors as the City Engineer shall determine to be just.

108.11 LIABILITY AND INDEMNIFICATION

108.11.A The Contractor shall assume all responsibility for the Work and shall bear all losses and damages directly or indirectly resulting to the Contractor or to the City, on account of:

- The character or performance of the Work.
- Unforeseen difficulties.
- Accidents.
- Any other cause whatsoever.

108.11.B To the fullest extent permitted by law, and except to the extent otherwise void under ORS 30.140, the Contractor shall indemnify, defend (with counsel approved by the City) and hold harmless the City, City Engineer, the Design Engineer, the Design Engineer's consultants, and their respective officers, directors, agents, employees, partners, members, stockholders and affiliated companies (collectively "Indemnitees") from and against all liabilities, damages, losses, claims, expenses (including reasonable attorney fees), demands and actions of any nature whatsoever which arise out of, result from or are related to the following:

- Any damage, injury, loss, expense, inconvenience or delay described in this Subsection.
- Any accident or occurrence which happens or is alleged to have happened in or about the Project Site or any place where the Work is being performed, or in the vicinity of either, at any time prior to the time the Work is fully completed in all respects.
- Any failure of the Contractor to observe or perform any duty or obligation under the Contract Documents which is to be observed or performed by the Contractor, or any breach of any agreement, representation or Warranty of the Contractor contained in the Contract Documents or in any subcontract.
- The negligent acts or omissions of the Contractor, a subcontractor or anyone directly or indirectly employed by them or any one of them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder.
- Any lien filed upon the Project or Bond claim in connection with the Work.

108.11.C Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Subsection.

108.11.D In claims against any person or entity indemnified under this Subsection by an employee of the Contractor, a subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Subsection shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

108.12 INSURANCE

108.12.A GENERAL

1. The Contractor shall provide and maintain during the life of the Contract the insurance coverage described below. All costs for such insurance shall be borne by the Contractor at no expense to the City.

2. The Contractor may however, contractually obligate an appropriate subcontractor to obtain, at the subcontractor's expense or at the Contractor's expense, and keep in effect during the term of the Contract, pollution liability coverage, asbestos liability, lead liability, or automobile liability with pollution coverages, or such other types of insurance coverage that, before execution of the Contract, the City approves as types of insurance coverage that may be obtained by appropriate subcontractors. If both the Contractor and an appropriate subcontractor will perform pollution related Work or other Work that would be covered by the other above-described types of insurance permitted to be obtained by an appropriate subcontractor, the insurance coverages listed below that correspond to such Work shall be obtained, at the Contractor's or subcontractor's expense, and shall cover the liability of the Contractor and the subcontractor, either under the same or separate insurance policies.

3. In case of the breach of any provision of this Subsection, the City may elect to take out and maintain, at the expense of the Contractor, such insurance as the City may deem proper. The City may deduct the cost of such insurance from any monies that may be due or become due the Contractor under the Contract. Failure to maintain insurance as provided is also cause for immediate termination of the Contract.

108.12.B CERTIFICATE OF INSURANCE

1. Contractor shall furnish the City Engineer certificates of insurance, which must be acceptable to the City Attorney prior to execution of the Contract by the City and before the Contractor or any subcontractor commences work under the Contract.

2. The certificate shall show the name of the insurance carrier, coverage, type, amount (or limits), policy numbers, effective and expiration dates, and a description of operations covered. The certificate will include the deductible or retention level and required endorsements. Insuring companies or entities are subject to the City Attorney's acceptance. If requested, copies of insurance policies shall be provided to the City Attorney.

3. The Contractor shall be responsible for all deductibles, self-insured retention's, and/or self-insurance. Approval of the insurance shall not relieve or decrease the liability of the Contractor hereunder.

108.12.C WORKERS' COMPENSATION

1. The Contractor shall provide and shall require all subcontractors to provide workers' compensation insurance in compliance with ORS 656.017. All employers, including the Contractor, that employ subject workers who Work under the Contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. The Contractor shall ensure that each of its subcontractors complies with these requirements.

    a. In addition to the statutory benefits outlined above, the Contractor and all subcontractors shall provide employers' liability insurance with limits of not less than:

        - $100,000 each accident for bodily injury by accident
        - $100,000 each employee for bodily injury for disease
        - $500,000 policy limit for bodily injury by disease

2. The Contractor shall certify in the Contract that the Contractor is registered by the Oregon Workers' Compensation Division either as a carrier-insured employer, a self-insured employer, an exempt employer, or is an independent Contractor who will perform the Work without the assistance of others. The Contractor shall ensure that its insurance carrier files a guaranty contract with the Oregon Workers' Compensation Division before performing any Work.

3. The Contractor shall defend, indemnify, and hold harmless, the City and the City Engineer and its officers, agents, and employees against any liability that may be imposed upon them by reason of the Contractor's or subcontractor's failure to provide workers' compensation and employers liability coverage.

108.12.D GENERAL LIABILITY AND AUTOMOBILE LIABILITY FOR PUBLICLY FINANCED PUBLIC IMPROVEMENT PROJECTS

1. The Contractor shall provide a commercial general liability policy that provides coverage for bodily injury, personal injury and property damage and commercial automobile liability insurance. Coverage shall be written on an occurrence basis. Such insurance must protect the Contractor, City, City Engineer, and their officers, employees, and consultants from all things or damage which may arise out of the Contract or in connection therewith, including all operations of subcontractors.

   a. Such insurance shall provide coverage for not less than the following limits of liability:

      - $1,000,000 each occurrence
      - $2,000,000 general aggregate
      - $1,000,000 product and completed operations aggregate
      - $50,000 fire damage (any one fire)
      - $500,000 employers liability
      - $1,000,000 combined single limit automobile liability for owned, non-owned, and hired automobiles. "Symbol One" coverage shall be designated

   b. The policy shall provide that any aggregate applies separately to the Contract. This coverage shall be by endorsement physically attached to the certificate of insurance.

   c. The insurance shall be written on a form that includes coverage for broad form contractual liability; broad form property damage; personal and advertising injury; the owners and Contractor protective; premises/operations; and products/completed operations. Coverage shall not exclude excavation, collapse, underground, or explosion hazards. Such insurance shall be maintained until the expiration of the Warranty period required by the Contract.

2. The Contractor shall provide a letter from the insurance company that states that such insurance shall be without prejudice to coverage otherwise existing.

3. If there are insufficient insurance proceeds and assets of the Contractor to fully indemnify the City, and the City Engineer if not an employee of the City, then the City will be indemnified first with any remaining insurance proceeds and assets to be used to indemnify the City Engineer if not an employee of the City.

4. If set forth in a Special Provision, additional insured's may be the City's consultant, the Design Engineer (if not an employee of the City), other governmental bodies with jurisdiction in the area involved in the Project, and their officers and employees and such agents as may be specified.

108.12.E OTHER INSURANCE COVERAGES

1. POLLUTION LIABILITY

   a. If indicated by Special Provision, Pollution Liability Insurance covering the Contractor's liability, or the liability of an appropriate subcontractor, if the coverage is obtained by the subcontractor, for bodily injury and property damage, and environmental damage resulting from sudden and accidental pollution, gradual pollution, and related clean-up costs incurred by the Contractor, or by the subcontractor if the coverage is obtained by the subcontractor, while performing Work required by the Contract. If the coverage is obtained by the Contractor, the coverage may be written in combination with the Commercial General Liability Insurance with separate limits for Pollution Liability and Commercial General Liability. Combined single limit per occurrence shall not be less than the dollar amount indicated in the Special Provisions. The annual aggregate limit shall not be less than the dollar amount indicated in the Special Provisions. The policy shall be endorsed to state that the annual aggregate limit of liability shall apply separately to the Contract. All Insurance costs shall be at the Contractor's expense.

2. ASBESTOS LIABILITY

   a. If indicated by Special Provision, the Contractor, or the subcontractor, if the coverage is obtained by the subcontractor, shall provide an Asbestos Liability endorsement to the pollution liability coverage. If an endorsement cannot be obtained, The Contractor or subcontractor shall provide separate Asbestos Liability Insurance at the same combined single limit per occurrence and annual aggregate limit as the Pollution Liability Insurance with the policy endorsed to state that the annual aggregate limit of liability shall apply separately to the Contract. All Insurance costs shall be at the Contractor's expense.

3. LEAD LIABILITY

   a. If indicated by Special Provision, the Contractor at its expense, or the subcontractor, if the coverage is obtained by the subcontractor, shall provide a Lead Liability endorsement to the pollution liability coverage. If an endorsement cannot be obtained, the Contractor or subcontractor shall provide separate Lead Liability Insurance at the same combined single limit per occurrence and annual aggregate limit as the Pollution Liability Insurance with the separate policy endorsed to state that the annual aggregate limit of liability shall apply separately to the Contract. All Insurance costs shall be at the Contractor's expense.

4. BUILDERS RISK

   a. If required by a Special Provision, the Contractor shall obtain, at its expense, and maintain for the benefit of the parties to the Contract, as their interest may appear, all-risk Builder's Risk insurance on an all risks of direct physical loss basis, including without limitation, earthquake and flood damage, for an amount equal to 100 percent of the value of the project. The policy shall include the City as loss payee. Coverage shall also include:

      - Formwork in place.
      - Form lumber on site.
      - Temporary structures.
      - Equipment.
      - Supplies related to the work while at the site.

b. Any deductible shall not exceed $5,000 for each loss, except that the earthquake and flood deductible shall not exceed 5% of each loss or $50,000, whichever is greater.

c. In the event the Contractor fails to maintain such insurance, the City may arrange for such insurance and any premium incurred shall be at the expense of the Contractor.

108.12.F ADDITIONAL INSURED

1. For general liability insurance and automobile liability insurance, the City and the City Engineer its agents, officers, and employees will be Additional Insured's by endorsement, but only with respect to the Contractor's services to be provided under the Contract. This coverage shall be by endorsement physically attached to the certificate of insurance.

108.12.G TAIL COVERAGE

1. If any of the required liability insurance coverages are on a "claims made" basis, "tail" coverage will be required at the completion of the Contract for a duration of 24 months, or the maximum time period reasonably available in the marketplace. The Contractor shall furnish certification of "tail" coverage as described, or continuous "claims made" liability coverage for 24 months following Contract completion. Continuous "claims made" coverage will be acceptable in lieu of "tail" coverage, provided its retroactive date is on or before the effective date of the Contract. If Continuous "claims made" coverage is used, the Contractor shall keep the coverage in effect for a duration of not less than 24 months from the end of the Contract. This will be a condition of Final Acceptance.

108.12.H NOTICE OF CANCELLATION OR CHANGE

1. There shall be no cancellation, material change, reduction of limits or intent not to renew the insurance coverage(s) without 30 days written notice from the Contractor or its insurer(s) to the City Engineer. This notice provision shall be by endorsement physically attached to the certificate of insurance.

2. The Contractor shall be responsible for ensuring that insurance coverage(s) obtained by an appropriate subcontractor, as permitted by the City, are not cancelled, changed materially, or have any action taken by the subcontractor showing intent not to renew the insurance coverage(s) without 30 days' advance written notice from the Contractor or the insurer(s) to the City. Any failure to comply with the reporting provisions of this insurance shall not affect the coverage(s) provided to the City, County, or other applicable political jurisdiction or to the City's governing body, board, or Commission and its members, and the City's officers and employees.

108.12.I CLAIMS ON PROJECT

1. The Contractor, when notified of a claim by an affected party, shall:

   - ❖ Refer claim to the Contractor's insurance carrier or claims administrator.
   - ❖ The Contractor's insurer will copy the City Engineer on acknowledgment of claim.
   - ❖ The Contractor's insurer will copy the City Engineer on notice to claimant of disposition of claim.

108.13 LABOR NONDISCRIMINATION

108.13.A Contractor must comply with the City of Stayton's Equal Opportunity Policy for Contractors. The Contractor shall not discriminate against minorities, women, or emerging small business enterprises in the awarding of subcontracts.

108.13.B Upon notification in writing from the City Engineer, remove immediately from the job for its duration any laborer, workman, mechanic, foreman, superintendent, or other person employed who is found to be incompetent, intemperate, troublesome, disorderly or otherwise objectionable, or who fails or refuses to perform their work properly or acceptably.

108.13.C Comply with ORS Chapter 659 relating to unlawful employment practices and discrimination by employers against any employee or applicant for employment because of race, religion, color, sex, or national origin.

108.13.D Particular reference is made to ORS 659.030, which states that it is unlawful employment practice for any employer, because of the race, religion, color, sex, or national origin of any individual, to refuse to hire or employ or to bar or discharge from employment such individual or to discriminate against such individual in compensation or in terms, conditions or privileges of employment.

108.14 MINIMUM WAGE AND OVERTIME RATES FOR PUBLIC WORKS PROJECTS

(Not applicable to privately financed public improvements)

108.14.A GENERAL

1. The Contractor is responsible for investigating local labor conditions. The City does not imply that labor can be obtained at the minimum hourly wage rates specified in State or federal wage rate publications, and no increase in the Contract Amount will be made if wage rates paid are more than those listed.

2. The Contractor shall comply with the pertinent provisions of ORS 279C.520 and ORS 279C.540.

3. The Contractor shall comply with ORS 279C.800 to 279C.870, Oregon's Prevailing Wage Law.

108.14.B STATE PREVAILING WAGE REQUIREMENTS

1. MINIMUM WAGE RATES

   a. The Bureau of Labor and Industries (BOLI) determines and publishes the existing State prevailing wage rates in the publication "Prevailing Wage Rates for Public Works Contracts in Oregon". The Contractor shall pay workers not less than the specified minimum hourly wage rate according to ORS 279C.838 and ORS 279C.840 and shall include this requirement in all subcontracts.

   b. See the Project Wage Rates page included with the Special Provisions for additional information about which wage rates apply to the project and how to access the applicable wage rates.

   c. The applicable BOLI wage rates will be included in the Contract.

2. PAYROLL AND CERTIFIED STATEMENTS

   a. As required in ORS 279C.845, the Contractor and every subcontractor shall submit written certified statements to the City Engineer on the form prescribed by the Commissioner of BOLI in OAR 839-025-0010 certifying compliance with wage payment requirements and accurately setting out the Contractor's or subcontractor's weekly payroll records for each worker employed upon the project.

   b. The Contractor and subcontractors shall preserve the certified statements for a period of 6 years from the date of completion of the Contract.

3. ADDITIONAL RETAINAGE:

   a. As required in ORS 279C.845(7) the City will retain 25% of any amount earned by the Contractor on the project until the Contractor has filed the certified statements required in ORS 279C.845 and in FHWA Form 1273, if applicable. The City will pay to the Contractor the amount retained within 14 Days after the Contractor files the required certified statements, regardless of whether a subcontractor has failed to file certified statements.

   b. As required in ORS 279C.845(8) the Contractor shall retain 25% of any amount earned by a first-tier subcontractor on the project until the first-tier subcontractor has filed with the City the certified statements required in ORS 279C.845 and in FHWA Form 1273, if applicable. Before paying any amount retained, the Contractor shall verify that the first tier subcontractor has filed the certified statement. Within 14 Days after the first tier subcontractor files the required certified statement the Contractor shall pay the first-tier subcontractor any amount retained.

4. OWNER/OPERATOR DATA

   a. The Contractor shall furnish data to the City Engineer for each owner/operator providing trucking services. Furnish the data before the time the services are provided and must include without limitation for each owner/operator:

      - Drivers name;
      - Copy of drivers license;
      - Vehicle identification number;
      - Copy of vehicle registration;
      - Motor vehicle license plate number;
      - Motor Carrier Plate Number;
      - Copy of ODOT Motor Carrier 1A Permit: and
      - Name of owner/operator from the side of the truck.

108.14.C STATE OVERTIME REQUIREMENTS

1. MAXIMUM HOURS OF LABOR AND OVERTIME PAY

   a. According to ORS 279C.540, no person shall be employed to perform Work under this Contract for more than 10 hours in any 1 Day, or 40 hours in any 1 week, except in cases of necessity, emergency, or where public policy absolutely requires it. In such instances, the Contractor shall pay the employee at least time and a half pay:

      - For all overtime in excess of 8 hours a day or 40 hours in any 1 week when the work week is 5 consecutive days, Monday through Friday; or

- ❖ For all overtime in excess of 10 hours a day or 40 hours in any 1 week when the work week is 4 consecutive days, Monday through Friday; and
- ❖ For all Work performed on Saturday and on any legal holiday specified in ORS 279C.540.

b. For additional information on requirements for overtime and establishing a work schedule see OAR 839-025-0050 and OAR 839-025-0034.

2. NOTICE OF HOURS OF LABOR

a. The Contractor shall give written notice to employees of the number of hours per day and days per week the employees may be required to work. Provide the notice either at the time of hire or before commencement of work on this Contract, or by posting a notice in a location frequented by employees.

3. EXCEPTION

a. The maximum hours of labor and overtime requirements under ORS 279C.540 will not apply to the Contractor's Work under this Contract if the Contractor is a party to a collective bargaining agreement in effect with any labor organization. For a collective bargaining agreement to be in effect it shall be enforceable within the geographic area of the project, and its terms shall extend to workers who are working on the project (see OAR 839-025-0054).

108.14.D STATE TIME LIMITATION ON CLAIM FOR OVERTIME

1. According to ORS 279C.545, any worker employed by the Contractor is foreclosed from the right to collect any overtime provided in ORS 279C.540 unless a claim for payment is filed with the Contractor within 90 Days from the completion of the contract, provided the Contractor posted and maintained a circular as specified in this provision. Accordingly, the Contractor shall:

- ❖ Cause a circular, clearly printed in boldfaced 12-point type containing a copy of ORS 279C.545, to be posted in a prominent place alongside the door of the timekeeper's office or in a similar place which is readily available and freely visible to any or all workers employed to perform Work; and
- ❖ Maintain such circular continuously posted from the inception to the completion of the Contract on which workers are or have been employed.

108.14.E ADDITIONAL REQUIREMENTS WHEN FEDERAL FUNDS ARE INVOLVED

1. When federal funds are involved, the following requirements shall apply in addition to the requirements of Section 108.14.A through Section 108.14.D. The Contractor shall include these provisions in all subcontracts as well as ensure that all Subcontractors include these provisions in their lower tier subcontracts.

a. FHWA REQUIREMENTS

1) For Federal-Aid projects, the Contractor shall comply with the provisions of FHWA Form 1273, "Required Contract Provisions Federal-Aid Construction Contracts".

b. MINIMUM WAGE RATES

1) The Contractor shall pay each worker in each trade or occupation employed to perform any work under the contract not less than the existing State (BOLI) prevailing wage rate or the applicable federal prevailing wage rate required under the Davis-Bacon Act (40 U.S.C. 3141 et seq.), whichever is higher. The Contractor shall include this provision in all subcontracts.

2) See the Project Wage Rates page included with the Special Provisions for additional information about which wage rates apply to the project and how to access the applicable wage rates.

3) The applicable Davis-Bacon and BOLI wage rates will be included in the Contract.

c. PAYROLL AND CERTIFIED STATEMENTS

1) In addition to providing the payroll information and certified statements required under ORS 279C.845 (see 00170.65(b-2)), the Contractor and every subcontractor shall submit written certified statements that also meet the requirements in Section IV of FHWA Form 1273 except the Contractor and every subcontractor shall preserve the certified statements for a period of 6 years from the date of completion of the Contract.

d. OVERTIME

1) With regard to overtime pay, the Contractor shall comply with the overtime provision affording the greatest compensation required under FHWA Form 1273 and ORS 279C.540.

108.15 OVERTIME FOR CITY PERSONNEL

108.15.A For publicly financed public improvement projects, in the event that the Contractor wishes to proceed with an overtime operation, the Contractor must first notify and obtain approval from the City Engineer to do so, prior to commencing such Work (minimum 3 working days). The Contractor must provide documentation to the City Engineer's satisfaction detailing when and for how long the overtime work will occur.

108.15.B For overtime Work the Contractor shall pay the applicable wage rate, including fringe benefits, for the City's personnel, and other staff required at the Project during the overtime hours at one and one-half (1.5) times the regular rate of pay for all overtime worked, except for holidays where the rate will be two and a half (2.5) times the regular rate of pay. Overtime is defined as hours outside of the hours of an employee's regularly scheduled forty (40) hour workweek. Work performed on City-recognized holidays would also constitute overtime.

108.15.C This Subsection does not apply to labor performed in the manufacture or fabrication of any Material ordered by the Contractor or manufactured or fabricated in any plant or place other than the place where the main Work is to be performed.

108.16 REQUIRED PAYMENTS BY CONTRACTORS

108.16.A GENERAL

1. The Contractor shall comply with ORS 279C.505 and ORS 279C.515 during the term of the Contract.

108.16.B PROMPT PAYMENT BY CONTRACTOR FOR LABOR AND MATERIALS

1. As required by ORS 279C.505, the Contractor shall:
   - ❖ Make payment promptly, as due, to all Entities supplying labor or Materials under the Contract;
   - ❖ Pay all contributions or amounts due the Industrial Accident Fund, whether from the Contractor or a subcontractor, incurred in the performance of the Contract;
   - ❖ Not permit any lien or claim to be filed against the State or any political subdivision thereof, on account of any labor or Material furnished in performance of the Contract; and
   - ❖ Pay to the Department of Revenue all sums withheld from employees pursuant to ORS 316.167.

108.16.C PROMPT PAYMENT BY CONTRACTOR TO FIRST-TIER SUBCONTRACTOR(S)

1. In accordance with ORS 279C.580(3)(a), after the Contractor has determined and certified to the City that one or more of its subcontractors has satisfactorily performed subcontracted Work, the Contractor may request payment from the City for the Work, and shall pay the subcontractor(s) within ten (10) Calendar Days out of such amounts as the City has paid to the Contractor for the subcontracted Work.

108.16.D INTEREST ON UNPAID AMOUNT

1. If the Contractor or a first-tier subcontractor fails, neglects, or refuses to make payment to an Entity furnishing labor or Materials in connection with the Contract within thirty (30) days after the Contractor's receipt of payment, the Contractor or first-tier subcontractor shall owe the entity the amount due plus interest charges that begin at on the end of the 10 day period within which payment is due under ORS 279C.580(3) and that end upon final payment, unless payment is subject to a good-faith dispute as defined in ORS 279C.580(5)(b). As required by ORS 279C.515(2), the rate of interest on the amount due shall be 9 percent per annum. The amount of interest shall not be waived.

108.16.E CITY'S PAYMENT OF THE CONTRACTOR'S PROMPT PAYMENT OBLIGATIONS

1. If the Contractor fails, neglects or refuses to make prompt payment of any invoice or other demand for payment for labor or services furnished to the Contractor or a subcontractor by any entity in connection with the Contract as such payment becomes due, the City may pay the entity furnishing the labor or services and charge the amount of the payment against monies due or to become due to the Contractor under the Contract. (The City has no obligation to pay these Entities, but will refer them to the Contractor and the Contractor's Surety.) The payment of a claim by the City in the manner authorized in this Subsection shall not relieve the Contractor or the Contractor's Surety from obligations with respect to any such claims.

108.16.F RIGHT TO COMPLAIN TO THE OREGON CONSTRUCTION CONTRACTORS BOARD

1. If the Contractor or a subcontractor fails, neglects, or refuses to make payment to an entity furnishing labor or Materials in connection with the Contract, the entity may file a complaint with the Oregon Construction Contractors Board, unless payment is subject to a good-faith dispute as defined in ORS 279C.580(5)(b).

108.16.G NOTICE OF CLAIM AGAINST BOND

1. An entity claiming not to have been paid in full for labor or Materials supplied for the prosecution of the Work may have a right of action on the Contractor's Bond, Cashier's Check, or Certified Check as provided in ORS 279C.600 and ORS 279C.605.

108.17 RESPONSIBILITY FOR DAMAGE TO WORK

108.17.A GENERAL

1. The Contractor shall perform Work, and furnish Materials and Equipment for incorporation into the Work, at the Contractor's own risk, until the entire Project has been completed and accepted by the City. The Contractor shall repair all damages to Work performed, Materials supplied, and Equipment incorporated into the Work, except as otherwise provided in this Section.

108.17.B REPAIR OF DAMAGE TO WORK

1. Until Final Acceptance, the Contractor shall promptly rebuild, repair, restore, and make good damages to all portions of the permanent or temporary Work, except to the extent the City has assumed responsibility according to the provisions of (c) below. The Contractor shall perform all repairs of damage to Work at no additional cost to the City, except for repairs necessitated by damage caused by:
    - ❖ Acts of God or Nature, or
    - ❖ Actions of governmental authorities.

108.17.C RESPONSIBILITY FOR DAMAGE TO WORK CAUSED BY PUBLIC TRAFFIC

1. GENERAL

    a. The Contractor may apply for relief of responsibility for damage to Work caused by public traffic by submitting a signed Contractor's Request for Relief of Responsibility, ODOT form 734-2768, to the City Engineer by mail, personal delivery or courier, by FAX, or other agreed-upon method.

    b. The City Engineer will process a maximum of two forms per month and return the forms within 7 Calendar Days indicating each item as "approved" or "denied".

    c. The approval of the City Engineer is limited, and is made only for the purposes of determining relief of responsibility for damage to completed portions of the Work caused by public traffic. The completed portions of the Work are not considered complete, and are not finally accepted for any other purposes under the Contract.

    d. If the Contractor disagrees with the City Engineer's findings, the Contractor may request a review by the Public Works Director.

2. REQUEST FOR RELIEF

a. The City will only accept a request for relief from and will only assume responsibility for damages caused by public traffic, to the following completed portions of the Work:

- A segment of roadway, drainage facilities, Slopes, lighting, traffic control devices and access facilities;
- A bridge or other structure within a segment of roadway;
- Traffic signals and appurtenances at an intersection;
- Permanent, passive traffic control devices;
- Complete circuits of a roadway lighting system; and
- Portions of a building open to public use.

b. The City will approve a request for the City to assume responsibility for damages to the completed portions of the Work caused by public traffic only under the following conditions:

- The completed portions of the Work are completed according to Contract Change Orders, the Plans or approved stage construction plans;
- The traffic control complies with approved traffic control plans; and
- All required materials conformance and quality compliance documents pertaining to the completed portions of the Work are on file with the City Engineer.

3. SCOPE OF RELIEF

a. When the City assumes responsibility for damage to completed portions of the Work caused by public traffic any damages will be repaired by the Contractor on a Changed Work basis, or by City forces, or by other means as determined by the City Engineer. If completed portions of the Work are damaged by public traffic before Final Inspection, and the City requires the Contractor to repair the damages, the City Engineer will reimburse the Contractor for the Changed Work at 75% of the total amount calculated according to Section 110.11.

b. If completed portions of the Work are damaged by public traffic after Final Inspection, and the City requires the Contractor to repair the damages, the Engineer will reimburse the Contractor for the Work at 100% of the total amount calculated according to Section 110.11.

c. If any additional Work is performed by the Contractor on completed portions of the Work for which the City has assumed responsibility for damages caused by public traffic, and the Work is performed outside of the approved stage construction Plans or approved traffic control Plans, the Contractor shall become fully responsible and liable, and shall make good all damages caused by public traffic at no additional cost to the City.

108.17.D VANDALISM AND THEFT

1. Vandalism includes damage to or destruction of Work or portions of Work that remain on the Project Site resulting from vandalism, criminal mischief, arson, or other criminal or illegal behavior.

2. The Contractor shall provide reasonable protection of the Work from vandalism until Final Completion. If reasonable protection has been provided, the Contractor's responsibility for damage resulting from vandalism will be limited to $5,000.00 per occurrence. Requests for reimbursement of amounts in excess of $5,000.00 shall be in writing and directed to the City Engineer. Upon receipt, the City Engineer will investigate, evaluate the amount of damages and their cause, determine the number of occurrences, and determine whether, and how much, the Contractor will be compensated.

3. Theft includes the loss of Work or portions of Work that are lost or stolen or otherwise unaccounted for from the Project Site or from Materials or fabrication locations. The Contractor shall remain solely responsible for all losses caused by theft, including without limitation theft that occurs in conjunction with vandalism.

108.17.E VERMIN CONTROL

1. At the time of occupancy by City, any structure or structures entirely constructed under the Contract shall be free of rodents, insects, vermin, or pests. The Contractor shall arrange and pay for extermination Work as may be necessary as part of the Contract Work within the Contract time. Work shall be performed by a licensed agency in accordance with the requirements of governing authorities. The Contractor shall assume responsibility for any injury to persons or property resulting from extermination Work and for the elimination of any offensive odors resulting from extermination operations.

108.18 RESPONSIBILITY FOR DAMAGE TO PROPERTY AND FACILITIES

108.18.A GENERAL

1. As used in this Subsection, the term "Contractor" shall include the Contractor's agents, subcontractors, and all workers performing Work under the Contract; and the term "damage" shall include without limitation soiling or staining surfaces by tracking or splashing mud, asphalt, and other Materials, as well as damage of a more serious nature.

2. The Contractor shall be solely responsible for damages arising from

   - The Contractor's operations;
   - The Contractor's negligence, gross negligence, or intentional wrongful acts; and
   - The Contractor's failure to comply with any Contract provision.

3. The City may withhold funds due the Contractor or the Contractor's Surety until all lawsuits, actions, and claims for injuries or damages are resolved, and satisfactory evidence of resolution is furnished to the City.

108.18.B PROTECTION AND RESTORATION OF CITY PROPERTY AND FACILITIES

1. The following requirements apply to highways, highway structures and other improvements that are existing, under construction, or completed. The Contractor shall:

   - Provide adequate protection to avoid damaging City property and facilities;
   - Be responsible for damage to City property and facilities caused by or resulting from the Contractor's operations; and
   - Clean up and restore such damage by repair, rebuilding, replacement, or compensation, as determined by the City Engineer.

108.18.C PROTECTION AND RESTORATION OF NON-CITY PROPERTY AND FACILITIES

1. The Contractor shall determine the location of properties and facilities that could be damaged by the Contractor's operations, and shall protect them from damage. The Contractor shall protect monuments and property marks until the City Engineer has referenced their location and authorized their removal. The Contractor shall restore property or facilities damaged by its operations to the condition that existed before the damage, at no additional compensation.

2. The Contractor shall provide temporary facilities when needed, e.g., to maintain normal service or as directed by the City Engineer, until the required repair, rebuilding, or replacement is accomplished.

3. The Contractor shall protect signs from damage, whether the signs are to remain in place or be placed on temporary supports. The Contractor shall repair or replace damaged signs at no cost to the City.

108.19 OTHER RESPONSIBILITIES REGARDING THE WORK

108.19.A PROTECTION OF UTILITY, FIRE-CONTROL, AND RAILROAD PROPERTY AND SERVICES; COORDINATION

1. The Contractor shall avoid damaging the properties of utilities, railroads, railways, and fire-control authorities during performance of the Work. The Contractor shall cooperate with and facilitate the relocation or repair of all utilities and utility services, as required under Subsection 106.11, and of railroad and fire-control property and railways.

2. The Contractor shall conduct no activities of any kind around fire hydrants until the City and Fire District have approved provisions for continued service.

3. The Contractor shall immediately notify any utility, railroad, or the City whose facilities have been damaged.

4. If an entity has a valid permit from the proper authority to construct, reconstruct, or repair utility, railroad, or fire-control service in the roadway, the Contractor shall allow the permit holder to perform the Work.

108.19.B RESTORATION OF ROADWAY AFTER REPAIR WORK

1. The Contractor shall restore the roadway to a condition at least equal to that which existed before the repair work addressed under this Subsection was performed, as directed by the City Engineer.

108.19.C FENCING, PROTECTING STOCK, AND SAFEGUARDING EXCAVATIONS

1. The Contractor shall be responsible for loss, injury, or damage that results from its failure to restrain stock and persons. The Contractor shall restrain stock to lands on which they are confined using temporary fences or other adequate means. The Contractor shall provide adequate temporary fences or other protection around excavations to prevent animals and unauthorized persons from entering. The Contractor shall repair, at Contractor’s expense and to the City Engineer's satisfaction, fences damaged by the Contractor's operations and the operations of the Contractor’s agents, employees and subcontractors.

108.19.D TRESPASSING

1. The Contractor shall be responsible for its own, its agents' and employees', and its subcontractors' trespass or encroachment upon, or damage to, property during performance of the Contract.

108.19.E EXPLOSIVES

1. The Contractor shall comply with all Laws pertaining to the use of explosives. The Contractor shall notify anyone having facilities near the Contractor's operations of Contractor's intended use or storage of explosives. The Contractor shall be responsible for all damage resulting from its own, its agents' and employees', and its subcontractors' use of explosives.

108.20 RESPONSIBILITY FOR DEFECTIVE WORK

108.20.A GENERAL

1. The Contractor shall make good any defective Work, Materials or Equipment incorporated into the Work, in accordance with the provisions of Section 106.

108.20.B LATENT DEFECTS

1. The Contractor shall remain liable for all latent defects resulting from causes other than fraud or gross mistakes that amount to fraud until the expiration of all applicable statutes of limitation and ultimate repose, the Performance Bond, Warranty Bond, or Warranty period, whichever is released last. The Contractor shall remain liable for all latent defects resulting from fraud or gross mistakes that amount to fraud regardless of when those latent defects may be discovered, and regardless of whether such discovery occurs outside any applicable statutes of limitation or ultimate repose or any applicable Performance Bond, Warranty Bond, or Warranty period.

108.20.C WARRANTIES

1. Contractor warrants that all Work, including Changed Work, Additional Work, Incidental Work, On-Site Work, and extra Work, and Materials and Equipment incorporated into the Work, shall meet the technical and performance Specifications required under the Contract in accordance with the Warranty requirements of Subsection 108.21.

108.21 ONE-YEAR WARRANTY

108.21.A In addition to and not in lieu of any other Warranty required under the Contract Documents, make all necessary repairs and replacements to remedy, in a manner satisfactory to the City Engineer and at no cost to the City, the failure to conform with Contract Documents including installation of any sidewalk conditioned to the development that is not constructed, and any and all defects, breaks, or failures of the repairs due to faulty or inadequate Materials or workmanship occurring within one (1) year following the date of signature by the Contractor of the Notice of Final Completion (on publicly financed public improvement projects) or following the date of acceptance of the public facilities for ownership and operation (for privately financed public improvement projects). Additionally, on privately financed public improvement projects, the Warranty shall cover failures of the design by the Design Engineer that are discovered during the same Warranty period.

108.21.B In addition to and not in lieu of any other warranty required under the Contract Documents, furnish any and all manufacturer's and installer's standard warranty forms setting forth terms, conditions, and limitations. Contractor shall enforce such warranties during the one (1) year warranty period. Contractor hereby assigns such warranties to the City.

108.21.C Contractor shall repair damage or disturbances to other improvements under, within, or adjacent to the repairs, whether or not caused by settling, washing, or slipping, when such damage or disturbance is caused, in whole or in part, from activities of the Contractor in performing their duties and obligations under the Contract Documents when such defects or damage occur within the Warranty period. The Contractor shall be responsible for meeting the technical and performance Specifications required, making good the Work, and for all repairs of damage to the Work and other improvements, natural and artificial structures, systems, equipment, and vegetation caused by, or resulting in whole or in part from occurrences beginning during the warranty period and are the result of defects in Materials, Equipment, and workmanship. The Contractor shall be responsible for all costs associated with completing the repair of the defects and for associated Work including but not limited to permitting, mobilization, traffic control, erosion control, surface restoration, site cleanup and remediation caused by, or resulting in whole or in part from, defects in Materials, Equipment, or workmanship, and other Work determined by the City Engineer to be necessary to complete the repair of the defects.

108.21.D If performance of Warranty repairs results in a street being cut or dug up, the Contractor shall comply with Subsection 108.22 at no expense to the City.

108.21.E The one (1) year Warranty period and Warranty guarantee shall, with relation to any required repair, be extended one (1) year from the date of completion of such repair.

108.21.F If the Contractor, after written notice, fails within two (2) months to complete the necessary Warranty repairs in compliance with the terms of this Subsection, the City may have the defects corrected, and the Contractor and the Surety shall be liable for all expenses incurred. In case of an emergency where, in the opinion of the City Engineer, delay would cause serious loss or damage, repairs may be made without notice being given to the Contractor, and the Contractor or the Surety shall pay the cost of repairs. Failure of the City Engineer to act in case of an emergency shall not relieve the Contractor or the Surety from liability and payment of all such costs.

108.21.G WATER WORKS FACILITIES

1. City waterline facilities that require repair or replacement during the one (1) year Warranty period shall be repaired by the City or under the direction of the City and the Contractor and the surety shall be liable for all expenses incurred. The timely completion of Warranty repairs on water works projects is especially critical since the failure of any component may adversely affect numerous water users or may cause extensive damage or water contamination.

2. After receiving either written or verbal notification from the City, the Contractor shall complete Warranty repairs within the time period specified in that notification. The time period specified to complete a Warranty repair will be dictated by the urgency of the problem as determined by the City Engineer.

108.21.H The one (1) year Warranty provision shall survive expiration or termination of the Contract.

108.22 CHARGES FOR EARLY EXCAVATION (STREET MORATORIUM)

108.22.A The surface of any street shall not be cut or dug up for a period of five (5) years after acceptance by the City of a street improvement, capital improvement, or major maintenance Work, except upon payment of a penalty charge in accordance with SMC 12.04.140.

108.23 OWNERSHIP OF WORK

(Not applicable to privately financed public improvements)

108.23.A All Work products of the Contractor that result from the Contract, including but not limited to background data, documentation, and staff work that is preliminary to final reports, are the property of the City. Draft documents and preliminary work submitted to the City for review and comment shall not be considered as owned, used, or retained by the City until the Final Document is submitted.

108.23.B The City shall own all proprietary rights, including but not limited to copyrights, trade secrets, patents, and all other intellectual or other property rights in and to such work products. Preexisting trade secrets of the Contractor shall be noted as such and shall not be considered as a work product of the Contract. All such work products shall be considered "works made for hire" under the provisions of the United States Copyright Act and all other equivalent laws.

108.23.C Any materials designated as "confidential" that may be provided to the Contractor by the City at any time relating to the Contract Documents shall be treated confidentially by the Contractor, and shall not be disclosed to any other person by the Contractor without the advance written permission of the City Engineer. The Contractor shall return all confidential materials upon request.

108.24 CONTRACTOR IS INDEPENDENT CONTRACTOR

(Not applicable to privately financed public improvements)

108.24.A The Contractor shall perform the Work required by the Contract as an independent Contractor. Although the City reserves the right to:

- Specify the desired results.
- Determine (and modify) the delivery schedule for the work to be performed.
- Evaluate the quality of the completed performance, the City cannot and will not control the means or manner of the Contractor's performance.

108.24.B The Contractor is responsible for determining the appropriate means and manner of performing the Work.

108.24.C The Contractor represents and warrants that Contractor:

- Is not currently an employee of the Federal Government, State of Oregon, or the City, and
- Meets the specific independent Contractor Standards of ORS 670.600.

108.24.D The Contractor represents and warrants that all subcontractors shall also meet such independent Contractor standards.

108.24.E The Contractor will be responsible for any Federal or State taxes applicable to any compensation or payment paid to the Contractor under the Contract.

108.24.F The Contractor is not eligible for any federal Social Security, unemployment insurance, state Public Employees' Retirement System, or workers' compensation benefits from compensation or payments to the Contractor under the Contract.

108.25 CONFLICT OF INTEREST

108.25.A The Contractor shall not give or offer any gift, loan, or other thing of value to any member of the City's governing body or employee of the City in connection with the award or performance of any Contract. The Contractor shall not rent, lease, or purchase Materials, supplies, or Equipment, with or through any City employee or member of the City's governing body. No ex-employee of the City who has worked for the City on any phase of the Project within the prior two (2) years may be employed by the Contractor to perform Work on the Project.

108.26 SUCCESSORS IN INTEREST

(Not applicable to privately financed public improvements)

108.26.A The provisions of the Contract shall be binding upon and shall inure to the benefit of the parties hereto, and their respective successors and approved assigns, if any.

108.27 SEVERABILITY

108.27.A If any term or provision of the Contract Documents are declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the Contract Documents did not contain the particular term or provision held invalid.

108.28 MERGER CLAUSE

(Not applicable to privately financed public improvements)

108.28.A The Contract constitutes the entire agreement between the parties. No waiver, consent, modification, or change of terms of the Contract shall bind either party unless in writing and signed by both parties. Such waiver, consent, modification, or change, if made, shall be effective only in the specific instance and for the specific purpose given. There are no understandings, agreements, or representations, oral or written, not specified herein regarding the Contract. By its signature, the Contractor acknowledges it has read and understands the Contract, and agrees to be bound by its terms and conditions.

108.29 NO THIRD-PARTY BENEFICIARIES

(Not applicable to privately financed public improvements)

108.29.A The City and the Contractor are the only parties to the Contract and are the only parties entitled to enforce its terms. Nothing in the Contract gives or provides any benefit or right, whether directly, indirectly, or otherwise, to third persons unless such third persons are individually identified by name and expressly described as intended beneficiaries of the terms of the Contract.

108.30 COMPLIANCE WITH OREGON REVISED STATUTES (ORS) CHAPTERS 279A and 279C

108.30.A Contractor shall comply with all federal, state, and local laws, regulations, executive orders and ordinances applicable to the work under the Contract, including without limitation, ORS 279A.120, ORS 279C.505, ORS 279C.510, ORS 279C.515, ORS 279C.520, ORS 279C.530, ORS 279C.570, and ORS 279C.580

108.30.B In addition, the provisions of ORS 279C.525 (Provisions concerning environmental and natural resources laws); ORS 279C.540 (Maximum hours of labor on public contracts); ORS 279C.545 (Claims for overtime); ORS 279C.550 to ORS 279C.565 (Retainage); ORS 279C.585 (Authority to substitute undisclosed first-tier subcontractor); ORS 279C.590 (Complaint process for substitutions of subcontractors); ORS 279C.600 to ORS 279C.625 (Bonds); ORS 279C.650 to ORS 279C.670; (Termination for Public Interest) and ORS 279C.800 to ORS 279C.870 (Prevailing Wages) are all incorporated into the Contract by this reference as though set forth in full.

108.30.C Without limiting the foregoing, Contractor expressly agrees to comply with: (i) Titles VI and VII of the Civil Rights Act of 1964, as amended; (ii) Sections 503 and 504 of the Rehabilitation Act of 1973, as amended; (iii) the Americans with Disabilities Act of 1990, as amended; (iv) Executive Order 11246, as amended; (v) the Health Insurance Portability and Accountability Act of 1996; (vi) the Age Discrimination in Employment Act of 1967, as amended, and the Age Discrimination Act of 1975, as amended; (vii) the Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended; (viii) ORS Chapter 659, as amended; (ix) all regulations and administrative rules established pursuant to the foregoing laws; and (x) all other applicable requirements of federal and state civil rights and rehabilitation statutes, rules and regulations.

108.30.D A condition or clause required by law to be in the Contract shall be considered included by the above listed references.

109 PROSECUTION AND PROGRESS OF WORK

109.01 NOTICE TO PROCEED

109.01.A Unless stated otherwise in the Special Provisions, written Notice to Proceed will be given by the City Engineer within thirty (30) days of the date of the Contract. Do not commence Work under the Contract until such written notice has been given. Notify the City Engineer forty-eight (48) hours in advance of the time and place Work will be started.

109.01.B Notice to Proceed may be delayed by the City Engineer up to an additional thirty (30) days (for a total of sixty (60) days from date of the Contract if, in the City Engineer's opinion, necessary easements or permits have not been obtained, or required utility relocation, construction, or reconstruction has not been completed or has not progressed to a degree that will allow Work to commence.

109.01.C Commence Work within ten (10) working days after the date of the Notice to Proceed, or such other date as may be fixed by the Notice to Proceed.

109.02 PRECONSTRUCTION CONFERENCE

109.02.A Before any Work is performed, and within thirty (30) Calendar Days of the Notice to Proceed unless otherwise approved in writing by the City Engineer, the Contractor shall attend a preconstruction conference.

109.02.B The objectives of the Preconstruction conference include, but are not limited to the following:

- Establish working relationships.
- Identify key persons and channels of communication.
- Identify emergency contact personnel.
- Review and discuss preliminary construction items such as the Notice to proceed, Project construction schedule and progress reports, construction sequencing, and salvage of Materials, if any.
- Discuss relocation and potential conflicts with utilities.
- Assure that the Contractor is aware of project Work and responsibilities, including safety, quality control and submittal documentation, surveying, environmental and permit regulations, etc.
- Discuss with Contractor typical procedures for progress payments and retainage, certified payroll report requirements, Work change directives and change orders, adjustments of Contract time, Substantial and Final Completion, Final Payment, and Warranty requirements.
- Identify potential problem areas and establish procedures for resolving such problems in a timely fashion.
- Other construction issues as necessary.

109.02.C Representative(s) of the Contractor expected to be directly involved with the project, as well as, representatives from all agencies impacted by the Work shall be in attendance. The Contractor shall comply with information and instructions provided at the preconstruction conference as recorded in the minutes of the meeting prepared by the Design Engineer. Persons who shall attend a preconstruction conference include the following:

- City Engineer and/or his authorized representative.
- City Inspector and/or his authorized representative.

- Design Engineer and his authorized representative.
- Key personnel from Contractor.
- Key personnel from subcontractor.
- Project surveyor.
- Representatives of involved or affected utilities.
- Representatives of involved or affected agencies.
- Others as may be necessary.

109.03 ASSIGNMENT/DELEGATION OF CONTRACT

109.03.A Unless the City gives prior written consent, the Contractor shall not assign, delegate, sell, or transfer to any entity, or otherwise dispose of any Contract rights or obligations, including without limitation:

- The power to execute or perform the Contract, or
- Any of its right, title or interest in the Contract.

109.03.B Any attempted assignment, delegation, or disposition without prior City consent shall be void. Such City consent will not normally be given except for the assignment of funds due under the Contract, as provided in Subsection 109.04. If written City consent is given to assign, delegate, or otherwise dispose of any Contract rights or obligations, it shall not relieve the Contractor or its Surety of any part of their responsibility under the Contract.

109.04 ASSIGNMENT OF FUNDS DUE UNDER THE CONTRACT

109.04.A Assignment of funds due or to become due under the Contract to the Contractor will not be permitted unless:

- The assignment request is made on the form provided by the City;
- The Contractor secures the written consent of the Contractor's Surety to the assignment; and
- The City Engineer approves the assignment.

109.05 RESPONSIBILITY FOR CONTRACT

109.05.A The Contractor shall direct and coordinate the operations of its employees, subcontractors and agents performing Work, and see that the City Engineer's orders are carried out promptly. The Contractor's failure to direct, supervise and control its employees, subcontractors and agents performing Work will result in one or more of the following actions, as the City Engineer deems appropriate:

- Suspension of the Work;
- Withholding of Contract payments, as necessary to protect the City;
- Ordering removal of individuals from the Project Site; or
- Termination of the Contract.

109.06 ENGLISH SUBMITTALS

109.06.A The Contractor shall use English units for all calculations and measurements, Working Drawings, Materials certifications, delivery tickets, and other documents submitted in conjunction with performance of the Contract, unless directed otherwise in the Special Provisions.

109.07 LIMITATION OF OPERATIONS

109.07.A The Contractor shall comply with all Contract provisions and shall:

- ❖ Conduct the Work at all times so as to cause the least interference with traffic, and
- ❖ Not begin Work that may allow damage to Work already started.

109.07.B The Contractor shall not begin On-Site Work until the Contractor has:

- ❖ Met with the City at the required preconstruction conference;
- ❖ Received Notice to Proceed;
- ❖ An approved construction schedule;
- ❖ An approved Traffic Control Plan;
- ❖ An approved Pollution Control Plan, If required;
- ❖ An approved Erosion and Sediment Control Plan; and
- ❖ Assembled all Materials, Equipment, and labor on the Project Site, or has reasonably assured that they will arrive on the Project Site, so the Work can proceed according to the construction schedule.

109.08 CONTRACTOR'S CONSTRUCTION SCHEDULE

109.08.A GENERAL

1. The Contractor's construction schedule is intended to identify the sequencing of activities and time required for prosecution of the Work. The schedule is used to plan, coordinate, and control the progress of construction. Therefore, the construction schedule shall provide for orderly, timely, and efficient prosecution of the Work, and shall contain sufficient detail to enable both the Contractor and the City Engineer to plan, coordinate, analyze, document, and control their respective Contract responsibilities. This working schedule shall take into account the passage and handling of traffic with the least practicable interference therewith.

2. Contractor's activity related to developing, furnishing, monitoring, and updating these required schedules is Incidental.

3. If it is desirable to carry on operations in more than one location simultaneously, submit a schedule that addresses all locations at least one (1) week in advance of beginning such operations.

4. If the Contractor's proposed construction schedule does not meet the necessary construction program schedule as determined by the City Engineer, immediately submit a revised construction schedule for approval. The Contractor shall not commence Work until the revised construction schedule is approved by the City Engineer.

5. At any time the City Engineer considers that the Work, or any portion of the Work, is more than ten percent (10%) behind the approved schedule, or whenever the City Engineer reasonably requests, the Contractor shall submit an updated schedule to the City Engineer for review and approval.

109.08.B CONSTRUCTION SCHEDULE DETAILS

1. INITIAL SCHEDULE

   a. Before or during to the preconstruction conference, the Contractor shall provide to the City Engineer two (2) copies of an initial time-scaled bar chart construction schedule showing:

      - The priority and interdependence of all major segments of the Work;
      - Expected beginning and completion date of each activity, including all staging; and
      - Elements of the Traffic Control Plan as required under Section 202.

   b. The initial schedule shall show all Work intended for the first sixty (60) days of the Contract.

2. DETAILED SCHEDULE

   a. In addition to the above requirements, and within One (1) week in advance of starting work, the Contractor shall provide the City Engineer two (2) copies of a detailed time-scaled bar chart construction schedule indicating the critical course of the Work, including the following:

      - Construction activities;
      - Submittal and approval of Material samples and shop drawings;
      - Procurement of critical Materials;
      - Fabrication, installation, and testing of special Material and Equipment; and
      - Duration of Work, including completion times of all stages and their sub-phases.

   b. For each activity, the construction schedule shall list the following information:

      - A description in common terminology;
      - The quantity of Work, where appropriate, in common units of measure;
      - The activity duration in normal workdays; and
      - Scheduled start, completion, and time frame shown graphically using a time-scaled bar chart.
      - The schedule shall show the Work broken down into logical, separate activities by area, stage, or size. The duration of each activity shall be verifiable by manpower and Equipment allocation, in common units of measure, or by delivery dates.

   c. The bar chart shall be prepared as follows:

      - The length of bar shall represent the number of normal workdays scheduled.
      - The time scale shall be appropriate for the duration of the Contract.
      - The time scale shall be in normal workdays (every day except Saturday, Sunday, and legal holidays).
      - The smallest unit shown shall be one (1) Calendar Day.
      - The first day and midpoint of each month shall be identified by date.
      - Distinct symbols shall be used to denote multiple shift, holiday, and weekend Work.

   d. The bar chart drawing(s) shall include a title block showing the Contract name and number, Contractor's name, date of original schedule, and all update dates; and a legend containing the symbols used, their definitions, and the time scale, shown graphically. To ensure readability the bar chart shall be drawn on a reasonable size of paper up to a maximum of 11 inches x 17 inches, using multiple sheets when needed.

e. Within seven (7) workdays after submission of the construction schedule, the City Engineer and the Contractor shall meet to review the construction schedule as submitted. Within ten (10) days after the meeting, the Contractor shall resubmit to the City Engineer four (4) copies of the construction schedule, including required revisions.

f. The approved construction schedule shall represent all Work, as well as the planned sequence and time for the Work. Review of this and subsequent schedules by the City Engineer shall not relieve the Contractor of responsibility for timely and efficient execution of the Contract.

3. REVIEW AND REPORTING - The construction schedule may require revision as the Work progresses. Therefore, the Contractor shall monitor and when necessary revise the construction schedule as follows:

a. REVIEW WITH THE CITY ENGINEER

1) The Contractor shall perform ongoing review of the construction schedule and progress of the Work with the City Engineer. If the City Engineer or the Contractor determines that the construction schedule no longer represents the Contractor's own plans or expected time for the Work, a meeting shall be held between the City Engineer and the Contractor. At this meeting, the Contractor and the City Engineer shall review Project events and any changes for their effect on the construction schedule. After any necessary action has been agreed upon, the Contractor shall make required changes to the construction schedule.

2) The Contractor shall collect information on all activities worked on or scheduled to be worked on during the previous report period, including shop drawings, Material procurement, and Contract Change Orders that have been issued. Information shall include commencement and completion dates on activities started or completed, or if still in progress, the remaining time duration.

3) The Contractor shall develop detailed sub-networks to incorporate changes, Additional Work, and extra Work into the construction schedule. Detailed sub-networks shall include all necessary activities and logic connectors to describe the Work and all restrictions on it. The restraints shall include those activities from the construction schedule that initiated the sub-network as well as those restrained by it.

4) The Contractor shall evaluate this information and compare it with the Contractor's project schedule. If necessary, the Contractor shall make an updated bar chart schedule to incorporate the effect changes may have on the Project completion time(s). For any activity that has started, the Contractor shall add a symbol to show the actual date the activity started and the number of normal workdays remaining until completion. For activities that are finished, a symbol shall be added to show the actual date. The Contractor shall submit four (4) copies of the updated bar chart to the City Engineer within seven (7) days after the progress meeting, along with a progress report as required by (b) below.

b. PROGRESS REPORT

1) For City funded projects over $300,000, for all State and Federally funded projects, and for other projects where deemed necessary by the City, the Contractor shall submit a progress report to the City Engineer each month. The report shall include the following:

- ❖ Sufficient narrative to describe the past progress, anticipated activities, and stage Work;
- ❖ A description of any current and expected changes or delaying factors and their effect on the construction schedule; and
- ❖ Proposed corrective actions.

109.08.C SPECIFIED CONTRACT TIME NOT SUPERSEDED BY SCHEDULE REVISIONS

1. The predicted completion date(s) for the construction schedule shall be within the specified Contract time(s) or adjusted Contract time or as shown on pending requests for adjustments of Contract time. If the Contractor believes that additional Contract time is due, the Contractor shall submit, with the updated construction Schedule, a request for adjustment of Contract time according to Subsection 109.18.

109.08.D FLOAT TIME

1. Float time shown on the construction schedule, including any time between a Contractor's scheduled completion date and the specified Contract completion date, does not exist for the exclusive use of either party to the Contract and belongs to the Project.

109.08.E SCHEDULES DO NOT CONSTITUTE NOTICE

1. Submittal of a construction schedule with supporting narrative does not constitute or substitute for any notice the Contractor is required under the terms of the Contract to give the City.

109.08.F FAILURE TO PROVIDE SCHEDULE

1. The construction schedule is essential to the City. The Contractor's failure to provide the schedule, schedule information, progress reports or schedule updates when required will be cause to suspend the Work, or to withhold Contract payments as necessary to protect the City, until the Contractor provides the required information to the City Engineer.

109.09 COMMENCEMENT AND PERFORMANCE OF WORK

109.09.A From the time of commencement of the Work to the time of Contract completion, the Contractor shall:

- ❖ Provide adequate Materials, Equipment, labor, and supervision to perform the Work;
- ❖ Perform the Work as vigorously and as continuously as conditions permit, and according to the construction schedule that ensures completion within the Contract time or the adjusted Contract time. Failure to diligently pursue the work may jeopardize additional Contract time;
- ❖ Not voluntarily suspend or slow down operations without prior written approval from the City Engineer; and
- ❖ Not resume suspended Work without the City Engineer's written authorization.

109.10 SUBCONTRACTING LIMITATIONS

109.10.A The Contractor's own organization shall perform Work amounting to at least thirty percent (30%) of the original Contract amount. The value of subcontracted Work is the full compensation to be paid to the subcontractor(s) for all pay items in the subcontract(s).

109.10.B The term "own organization", as used in Section 109, includes only employees of the Contractor, Equipment owned or rented by the Contractor, Incidental rental of operated Equipment, and Materials and Equipment to be incorporated into the Work purchased or produced by the Contractor.

109.10.C The use of Equipment rented with operators will be permitted only if the following requirements are met:

1. WRITTEN REQUEST - The Contractor has submitted to the City Engineer a written request describing the service to be provided, its estimated cost, and the estimated duration. The City Engineer must approve the request before the service is provided.

2. LIMITATIONS - The services are limited to:

   - Truck hauling of Materials, each truck with the name of the owner/operator clearly displayed on the side of the truck, and
   - Performing minor, Incidental, short-duration work under the direct supervision of the Contractor or subcontractor, with Equipment not customarily owned, leased, or operated by a Contractor, or with Equipment that is temporarily unavailable to the Contractor.

3. SUBMITTALS – Where requested by the City Engineer, the Contractor shall provide the City Engineer with a copy of the rental agreement or purchase order covering the service to be provided. For owner/operator trucking, attach copies of the data required under Subsection 108.14.E. The Contractor shall make certain that the provider of approved services submits payrolls required under Section 108 and complies with applicable Contract provisions, including without limitation Section 108.06. The service provider will not be considered a subcontractor under the Contract, but will be considered an agent of the Contractor in the performance of Work.

4. REVOCATION OF APPROVAL - The City Engineer may revoke approval for the services provided through rented, operated Equipment at any time the City Engineer determines that the work is outside that authorized under Subsection 109.10.C.2. Unless the Contractor promptly submits to the City Engineer a subcontract agreement for consent under Subsection 109.11, the service provider shall be immediately removed from the Project Site.

109.11 SUBCONTRACTING

109.11.A GENERAL

1. The Contractor shall not subcontract or perform any portion of the Contract by other than the Contractor's own organization without the City's prior written consent. A request for consent to subcontract, at any tier, solely for the furnishing of a labor force will not be considered.

2. When requested by the City Engineer, the Contractor shall provide the City Engineer with a written request for consent to subcontract any portion of the Contract at any tier. When required by the City Engineer, the consent shall be accompanied by background information showing that the organization proposed to perform the Work is experienced and equipped for such Work. The City will review the Contractor’s submission to verify compliance with Contract requirements, confirm the percentage of Work subcontracted, and evaluate the proposed subcontractor's ability to perform the Work. If the City approves the Contractor's request to subcontract, the City will provide its consent to the Contractor's request as follows:

- If the subcontractor is not providing any of the insurance coverages as permitted under Subsection 108.12, the City will respond within seven (7) Calendar Days after the City Engineer's receipt of the request.
- If the subcontractor is providing any of the insurance coverages as permitted under Subsection 108.12, the City will respond within thirty-five (35) Calendar Days after the City Engineer's receipt of the request. The City has twenty-eight (28) Calendar Days to review and approve the Certificates of Insurance required by Subsection 108.12 plus seven (7) Calendar Days to review and approve the subcontract request.

109.11.B SUBMITTAL OF REQUESTS

1. When requested by the City Engineer, the Contractor shall submit requests for consent to subcontract any portion of the Contract, at any tier. The Contractor shall attach a duplicate original subcontract agreement. The Contractor must also submit in writing any amendments or modifications proposed to City-approved subcontract agreements, at any tier, before the affected Work begins. The City's written consent will be required before such amendments or modifications become effective.

109.11.C SUBSTITUTION OF DISCLOSED SUBCONTRACTORS

1. The Contractor may only substitute a previously undisclosed first-tier subcontractor in accordance with the provisions of ORS 279C.585. The Contractor shall provide the City Engineer with a written notification that identifies the name of the proposed new subcontractor and the reason for the substitution.

2. Authorized reasons for substitution are limited to the following circumstances (See ORS 279C.585(1) through (10)):

   - The disclosed subcontractor fails or refuses to execute a written contract that is reasonably based either upon the Project Plans and Specifications, or the terms of the subcontractor's written Bid, after having had a reasonable opportunity to do so;
   - The disclosed subcontractor becomes bankrupt or insolvent;
   - The disclosed subcontractor fails or refuses to perform the Contract;
   - The disclosed subcontractor fails or refuses to meet the Bond requirements of the prime Contractor that had been identified prior to the Bid submittal;
   - The Contractor demonstrates to the City that the subcontractor was disclosed as the result of an inadvertent clerical error;
   - The disclosed subcontractor does not hold a license from the Oregon Construction Contractors Board and is required to be licensed by the board;
   - The Contractor determines that the Work performed by the disclosed subcontractor is not in substantial compliance with the Plans and Specifications, or that the subcontractor is substantially delaying or disrupting the progress of the Work;
   - The disclosed subcontractor is ineligible to Work on a public improvement pursuant to the applicable statutory provisions;
   - The substitution is for "good cause" as defined by the Oregon Construction Contractors Board rule; or
   - The substitution is reasonably based on the Contract alternates chosen by the City.

109.11.D TERMS OF SUBCONTRACTS

1. Subcontracts shall provide that work performed under the subcontract shall be conducted and performed according to the terms of the Contract. Compliance with Section 108.06 is required. All subcontracts, including Contractor's with the first-tier subcontractors and those of the first-tier subcontractors with their subcontractors, and any other lower tier subcontracts shall contain a clause or condition that if the Contractor or a subcontractor fails, neglects, or refuses to make payment to an entity furnishing labor or Materials in connection with the Contract, the entity may file a complaint with the Oregon Construction Contractors Board, unless payment is subject to a good-faith dispute as defined in ORS 279C.580. Additionally, in accordance with the provisions of ORS 279C.580, subcontracts shall include:

   a. A payment clause that obligates the Contractor to pay the first-tier subcontractor for satisfactory performance under the subcontract within ten (10) Calendar Days out of amounts the City pays to the Contractor under the Contract.

   b. A clause that requires the Contractor to provide the first-tier subcontractor with a standard form that the first-tier subcontractor may use as an application for payment or as another method by which the subcontractor may claim a payment due from the Contractor.

   c. A clause that requires the Contractor, except as otherwise provided in this subsection, to use the same form and regular administrative procedures for processing payments during the entire term of the subcontract. The Contractor may change the form or the regular administrative procedures the Contractor uses for processing payments if the Contractor:

      - Notifies the subcontractor in writing at least 45 Calendar days before the date on which the Contractor makes the change; and
      - Includes with the written notice a copy of the new or changed form or a description of the new or changed procedure.

   d. An interest penalty clause that obligates the Contractor, if the Contractor does not pay the first-tier subcontractor within thirty (30) calendar days after receiving payment from the City, to pay the first-tier subcontractor an interest penalty on amounts due in the case of each payment the Contractor does not make in accordance with the payment clause included in the subcontract pursuant to paragraph (1) of this Subsection. The Contractor or first-tier subcontractor is not obligated to pay an interest penalty if the only reason that the Contractor or first-tier subcontractor did not make payment when payment was due is that the Contractor or first-tier subcontractor did not receive payment from the City or the Contractor when payment was due. The interest penalty applies to the period that begins on the day after the required payment date and ends on the date on which the amount due is paid; and shall be computed at the rate specified in Subsection 108.16.D.

   e. A clause that requires the Contractor's first-tier subcontractor to include a payment clause and an interest penalty clause that conforms to the standards of ORS 279C.580 in each of the first-tier subcontractor's subcontracts, and to require each of the first-tier subcontractor's subcontractors to include such clauses in their subcontracts with each lower-tier subcontractor or Material supplier.

   f. These payment clauses shall require the Contractor to return all retainage withheld from the subcontractor, whether held by the Contractor or the City.

2. **CONTRACTOR'S RESPONSIBILITIES**

a. As a condition of the City's grant of consent to subcontract, whether or not stated in the subcontract agreement itself, the Contractor shall remain solely responsible for administration of the subcontract, including but not limited to:

- Performance of subcontracted Work;
- Progress of subcontracted Work;
- Payments for accepted subcontracted Work; and
- Disputes and claims for additional compensation regarding subcontracted Work.
- The City Engineer's consent to subcontract will not create a Contract between the City and the subcontractor, will not convey to the subcontractor any rights against the City, and will not relieve the Contractor or the Contractor's Surety of any of their responsibilities under the Contract.

3. **FAILURE TO COMPLY**

a. Failure to comply with Subsection 109.11 will be cause for the City Engineer to take action reasonably necessary to obtain compliance. This action may include, but is not limited to:

- Suspension of the Work;
- Withholding of Contract payments as necessary to protect the City; and
- termination of the Contract.

109.12 PAYMENTS TO SUBCONTRACTORS AND AGENTS OF THE CONTRACTOR

109.12.A To the extent practicable, the Contractor shall pay in the same units and on the same basis of measurement as listed in the schedule of Items for subcontracted Work or other Work not done by the Contractor's own organization. In making payment to subcontractors and to its other agents performing Work and furnishing Materials and Equipment to be incorporated into the Work, the Contractor shall assume all losses resulting from overpayment.

109.12.B If requested in writing by a first-tier subcontractor, the Contractor shall send to the subcontractor, within ten (10) Calendar Days of receiving the request, a copy of that portion of any invoice or request for payment submitted to the City, or pay document provided by the City to the Contractor, specifically related to any labor, Equipment, or Materials supplied by the first-tier subcontractor.

109.13 MATERIALS, EQUIPMENT, AND WORK FORCE

109.13.A The Contractor shall furnish suitable and sufficient Materials, Equipment, and personnel to properly prosecute and complete the Work. The Contractor shall use only Equipment of adequate size and condition to meet the requirements of the Work and Specifications, and to produce a satisfactory quality of Work. Upon receipt of the City Engineer's written order, the Contractor shall immediately remove, and not use again on the Project without the City Engineer's prior written approval, Equipment that, in the City Engineer's opinion, fails to meet Specifications or produce a satisfactory product or result.

109.13.B The Work force shall be trained and experienced. Upon receipt of the City Engineer's written order, the Contractor shall immediately remove from the Project Site, and shall not employ again on the Project without the City Engineer's prior written approval, any supervisor or employee of the Contractor or any subcontractor who, in the City Engineer's opinion, does not perform satisfactory Work or whose conduct interferes with the progress of the Work.

109.13.C If the Contractor fails to remove Equipment or persons as ordered, or fails to furnish suitable and sufficient Materials, Equipment and personnel for the proper prosecution of the Work, the City Engineer may suspend the Work by written notice until such orders are complied with and such deficiencies are corrected, or the City Engineer may terminate the Contract under the provisions of Subsection 109.26.A.

109.14 REQUIRED MATERIALS, EQUIPMENT AND METHODS

109.14.A GENERAL

1. When the Equipment and methods to be used are not specified in the Contract, any Equipment or methods that accomplish the Work as required by the Contract will be permitted.

2. When the Contract specifies certain Equipment or methods, the Contractor shall use the Equipment or methods specified unless otherwise authorized by the City Engineer in writing.

109.14.B SUBSTITUTION OF MATERIALS AND EQUIPMENT TO BE INCORPORATED INTO THE WORK

1. After execution of the Contract, the Engineer may approve substitution of Materials and Equipment to be incorporated into the Work as follows:

   a. REASONS FOR SUBSTITUTION - The City Engineer will consider substitution only if:

      - The proposed Materials or Equipment are equal to or superior to the specified items in construction, efficiency and utility, or
      - Due to reasons beyond the control of the Contractor, the specified Materials or Equipment cannot be delivered to the Project in sufficient time to complete the Work in proper sequence.

   b. SUBMITTAL OF REQUEST - The Contractor shall submit requests for substitution to the City Engineer, including manufacturers' brochures and other information needed to verify equality of the proposed item(s).

109.14.C SUBSTITUTION OF EQUIPMENT SPECIFIED TO PERFORM WORK

1. The City encourages development of new or improved Equipment and innovative use of Equipment. When the Specifications require Equipment of a particular size or type to be used to perform certain portions of the Work, the Contractor may submit a request to the City Engineer to use Equipment of a different size or type. The request shall:

   - Be in writing and include a full description of the Equipment proposed and its intended use;
   - Include the reasons for requesting the substitution; and
   - Include evidence, obtained at the Contractor's expense and satisfactory to the City Engineer, that the proposed Equipment is capable of functioning as well as or better than the specified Equipment.

2. The City Engineer will consider the Contractor's request and will provide a written response to the Contractor, either permitting or denying use of the proposed Equipment. The City Engineer's decision is final.

3. Permission may be granted on a trial basis to test the quality of Work actually produced, subject to the following:

   - There will be no cost to the City, either in Contract Amount or in Contract time;
   - The permission may be withdrawn by the City Engineer at any time if, in the City Engineer's opinion, the Equipment is not performing in all respects equivalent to the Equipment specified in the Contract;
   - If permission is withdrawn, the Contractor shall perform the remaining Work with the originally-specified Equipment; and
   - The Contractor shall remove and replace non-specification Work resulting from the use of the Contractor's proposed Equipment, or otherwise correct it as the City Engineer directs, at no additional compensation.

109.14.D SUBSTITUTION OF METHODS

1. The City encourages development of new, improved, and innovative construction methods. When the Plans or Specifications require a certain construction method for a portion of the Work, the Contractor may submit to the City in writing a request for a change. The City Engineer will consider the Contractor's request and will provide a written response to the Contractor, either permitting or denying use of the proposed methods. The City Engineer's decision is final.

109.15 ALTERNATIVE MATERIALS, EQUIPMENT, AND METHODS

109.15.A Whenever the Contract authorizes certain alternative Materials, Equipment, or methods of construction for the Contractor's use to perform portions of the Work, and leaves the selection to the Contractor, the City does not guarantee that all listed alternative Materials, Equipment, or methods of construction can be used successfully throughout all or any part of the Work.

109.15.B The Contractor shall employ only those alternatives that can be used to satisfactorily perform the Work. No additional compensation will be paid for corrective work necessitated by the Contractor's use of an inappropriate alternative.

109.16 THE CITY'S RIGHT TO DO WORK

109.16.A Failure or refusal to comply with any of the terms or conditions of the Contract Documents will permit the City to supply or correct any deficiency or defect or take other appropriate action without prejudice to any other remedy. Except as otherwise provided in Subsection 106.16.D, such action by the City shall be taken only after seven (7) days notice by the City Engineer to the Contractor and their surety, unless in the judgment of the City Engineer an emergency or danger to the work or to the public exists, in which event action of the City as set forth above may be taken without any notice whatsoever. The cost of such action by the City shall be at the Contractor's expense and shall be billed to the Contractor or deducted from payment owed the Contractor.

109.16.B The Contractor remains fully responsible for all aspects of the Contract Documents, even if this right is exercised. Nothing in this Subsection shall be construed to require the City to do any work to cure any deficiency or defect.

109.16.C Action by the City under this provision will not prejudice any other remedy it may have.

109.17 CONTRACT TIME

109.17.A GENERAL

1. Time shall be considered of the essence of the Contract. The time allowed to complete the Work or pay item will be stipulated in the Contract Documents.

109.17.B **KINDS OF CONTRACT TIME** - The Contract time will be expressed in one or more of the following ways:

1. FIXED DATE CALCULATION - The calendar date on which the Work or Pay Item shall be completed, or

2. CALENDAR DAY CALCULATION - The number of calendar days from a specified beginning point in which the Work or pay item shall be completed.

109.17.C **BEGINNING OF CONTRACT TIME** - When the Contract time is stated in calendar days, counting of Contract calendar days will begin in the calendar date shown in the Notice to Proceed.

109.17.D RECORDING CONTRACT TIME

1. All Contract time will be recorded and charged to the nearest one-half (1/2) day.

2. On calendar day pay items, the Contractor will furnish the City Engineer a weekly statement of Contract Time charges for approval. The statement will show the number of calendar days counted for the preceding week and the number of days remaining prior to the established completion date for that pay item.

3. For Contracts with fixed completion dates for pay items, the City Engineer will furnish the Contractor a weekly statement of Contract time charges only after expiration of the Contract time. The statement will show the number of days of liquidated damages that have been assessed, if any.

4. These statements will include any exclusions from, or adjustments to, Contract time.

109.17.E EXCLUSIONS FROM CONTRACT TIME

1. Regardless of the way Contract time is expressed in the Contract, certain days will not be charged against Contract time. These exclusions will be allowed when the Contractor is prevented from performing Work due to one of the following reasons, resulting in delay:

   - Acts of God or Nature;
   - Court orders enjoining prosecution of the Work;
   - Strikes, labor disputes or freight embargoes that, despite the Contractor's reasonable efforts to avoid them, cause a shutdown of the entire Project or one or more major operations. "Strike" and "labor dispute" may include union action against the Contractor, a subcontractor, a Materials supplier, or the City; or
   - Suspension of the Work by written order of the City Engineer for reasons other than the Contractor's failure or neglect.

109.17.F TIME CALCULATION PROTEST

1. In the event the Contractor disputes the accuracy of the statement of Contract Time charges, it shall immediately contact the City Engineer and attempt to resolve the dispute. If the dispute cannot be resolved informally, the Contractor shall submit a formal written protest to the Engineer within seven (7) Calendar Days of the date the Engineer mailed or delivered the statement. Failure to submit a formal written protest within the seven (7) Calendar Day period constitutes the Contractor's approval of the time charges, or adjusted time charges, itemized in the statement.

109.17.G END OF CONTRACT TIME

1. When the City Engineer determines that the Work has been completed, except for the items listed below, the City Engineer will issue a Notice of Substantial Completion in accordance with Subsection 110.12.A.

2. The Notice of Substantial Completion will list:
   - ❖ The date the time charges stopped;
   - ❖ Final trimming and cleanup tasks;
   - ❖ Equipment to be removed from the Project Site;
   - ❖ Minor corrective work not involving additional payment to be completed; and
   - ❖ Submittals, including without limitation all required certifications, bills, forms, Warranties, certificate of insurance coverage, and other documents, required to be provided to the City Engineer before Final Completion will issue.

3. The Contractor shall complete all tasks listed in the Notice of Substantial Completion in an expeditious manner within the time frame proposed by the Contractor and accepted by the City Engineer.

109.18 ADJUSTMENTS OF CONTRACT TIME

(Not applicable to privately financed public improvements)

109.18.A GENERAL

1. Contract Time established for the Work will be subject to adjustment, either by increase or decrease, for causes beyond the control of the Contractor, according to the terms of this Subsection. After adjustment, the Contract time will become, and be designated as, the "Adjusted Contract Time".

2. An adjustment of Contract time as herein provided shall be the Contractor's sole remedy for any delay in completion of the project arising from causes beyond the control of the Contractor, except for unreasonable delay caused by acts or omissions of the City or persons acting therefore. In no event shall the Contractor be entitled to collect or recover any damages, loss or expense incurred by reason of such delay, except for an unreasonable delay caused by acts or omissions of the City.

3. If the Contractor is delayed due solely to a breach by the City, the Contractor will be entitled to recover damages limited to reimbursement for necessary rental of unused equipment, services of watch persons, documented direct overhead costs, documented direct unavoidable expenses accruing by reason of the suspension, plus fifteen (15%) percent of the foregoing to cover Contractor's profit. The Contractor shall not be entitled to indirect costs or any other damages arising out of the delay, including but not limited to, interruption of schedules, or any other impact claim or ripple effect. If a delay is caused by the City and the Contractor (joint delay), the Contractor shall only be entitled to a time extension.

109.18.B CONTRACTOR'S REQUEST NOT REQUIRED

1. The City Engineer may increase or decrease the Contract time or the adjusted Contract time if Change Orders or extra Work orders issued actually increase or decrease the amount of time required to perform the Work. The City Engineer may also increase Contract time in the event of Right-of-Way and Access delays (see Subsection 109.20) and those delays due to causes beyond the Contractor's control specified in Subsection 109.17.E. The City Engineer will promptly inform the Contractor of adjustments made to Contract time pursuant to this Subsection, and will include the reasons for adjustment.

2. If the City anticipates delay during performance of the Contract, and specifies its expected duration in the Special Provisions, the City Engineer will only consider additional delay beyond the stipulated duration in determining whether to adjust Contract time.

109.18.C CONTRACTOR'S REQUEST REQUIRED

1. In the event the Contractor believes that additional Contract Time is due, the Contractor shall, within forty-eight (48) hours of the start of the occurrence, give notice to the City Engineer of the cause of the potential delay and estimate the possible time extension involved. Within ten (10) days after the cause of the delay has been remedied the Contractor shall give notice to the City Engineer of any actual time extension requested as a result of the occurrence in accordance with Subsection 110.06. The City Engineer will not consider untimely requests.

2. The City Engineer will make the decision on each request. All extensions of time shall be approved by the City Engineer. The City regards as timely only those requests for adjustment of Contract Time that:

   - ❖ Accompany an updated construction schedule submitted according to Subsection 109.08; or,
   - ❖ Are not otherwise deemed waived and are submitted within twenty-one (21) days after the date of Substantial Completion, if Substantial Completion has been issued.

3. The City Engineer will not grant an adjustment of Contract time for events that occurred prior to the date of the last revision of the construction schedule. The City Engineer will not authorize, nor the City pay, acceleration costs incurred by the Contractor prior to its submittal of a request for adjustment of Contract time to which the acceleration costs relate.

4. The Contractor's request for adjustment of Contract time shall be submitted to the City Engineer on a form provided by, or in a format acceptable to, the City Engineer, and shall include a copy of the written notice required under Subsection 109.19. The request shall include without limitation:

   - ❖ Consent of the Contractor's Surety if the request totals more than thirty (30) Calendar Days of additional Contract time;

- Sufficient detail for the City Engineer to evaluate the asserted justification for the amount of additional Contract time requested;
- The cause of each delay for which additional Contract time is requested, together with supporting analysis and data;
- Reference to the Contract provision allowing Contract time adjustment for each cause of delay;
- The actual or expected duration of delay resulting from each cause of delay, expressed in Calendar Days; and
- A schedule analysis based on the current approved construction schedule for each cause of delay, indicating which activities are involved and their impact on Contract completion.

109.18.D BASIS FOR ADJUSTMENT OF CONTRACT TIME

1. In the adjustment of Contract Time, the City Engineer will consider causes that include, but are not limited to:

   - Failure of the City to submit the Contract and bond forms to the Contractor for execution within the time stated in Subsection 104.04, or to submit the Notice to Proceed within the time stated in Subsection 109.01;
   - Errors, changes, or omissions in the supplemental Drawings, quantities, or Specifications;
   - Performance of extra Work;
   - Failure of the City or Entities acting for the City to act promptly in carrying out Contract duties and obligations;
   - Acts or omissions of the City or entities acting for the City that result in unreasonable delay referenced in Subsection 110.06;
   - Causes cited in Subsection 109.17.E;
   - Right-of-Way and access delays referenced in Subsection 109.20; and
   - Due to court orders enjoining the prosecution of the project, unavoidable strikes, earthquake, flood, cloudburst, tornado, hurricane, or other phenomenon of nature of catastrophic proportions or intensity, unusual and extraordinary action of the elements that are of such severity to stop all progress of the work, or act or neglect of the City not authorized by the Contract.

2. The City Engineer will not consider requests for adjustment of Contract time based on any of the following:

   - Contentions that insufficient Contract time was originally specified in the Contract;
   - Delays that do not affect the Contract completion date;
   - Delays that affect the Contractor's planned early completion, but that do not affect the specified or adjusted Contract time;
   - Shortage or inadequacy of Materials, Equipment or labor;
   - Late delivery of Materials and Equipment to be incorporated into the Work, except under those conditions referenced in Subsection 109.17.E. The Contractor shall be fully responsible for the timely ordering, scheduling, expediting, delivery, and installation of all Equipment and Materials. Extensions of time will be considered for delayed delivery of the City-specified equipment "without equal.";
   - Weather conditions normal to the area and time of year in which the work is being performed or reasonably predictable weather conditions; or
   - Other matters within the Contractor's control or Contract responsibility.

109.18.E CONSIDERATION AND RESPONSE BY CITY

1. The City Engineer will only consider a Contractor's request for Contract time adjustment submitted in accordance with the requirements of Subsection 109.18.C. The City Engineer may elect not to consider claimed delays that do not affect the specified or adjusted Contract Time required to complete the Work.

2. The City Engineer may adjust Contract Time for causes not specifically identified by the Contractor in its request.

3. The City Engineer will review a properly submitted request for Contract time adjustment, and within a reasonable time will advise the Contractor of the City Engineer's findings. Unless the Contractor submits a timely written request to the City Engineer for a meeting to review the findings, the findings shall become the City Engineer's final decision ten (10) calendar days after they are mailed to the Contractor. If a review meeting is requested, the City Engineer's final decision on Contract time adjustment will be issued promptly following the meeting.

4. The provisions of Section 111 do not apply to adjustment of Contract time unless additional compensation, other than return of liquidated damages, is also requested for the same reasons or causes.

109.19 NOTICE OF DELAY

109.19.A The Contractor shall notify the City Engineer of any delay that will likely prevent completion of the Work or a pay item by the date specified in the construction schedule. The notice shall be in writing and shall be submitted within seven (7) Calendar Days of when the Contractor knew or should have known of the delay. The notice shall include, to the extent available, the following:

- The reasons or causes for the delay;
- The estimated duration of the delay and the estimated resulting cumulative delay in
- Contract completion;
- Except for Subsection 109.17.E and Subsection 109.20 delays, whether or not the Contractor expects to request an adjustment of Contract Time due to the delay; and
- Whether or not the Contractor expects to request additional compensation due to the delay. (Except for Subsection 109.17.E and Subsection 109.20 delays, failure to include this information will constitute waiver of the Contractor's right to later make such a request.)

109.19.B The City Engineer is not required to respond to a notice of delay.

109.20 RIGHT-OF-WAY AND ACCESS DELAYS

109.20.A Right-of-Way and access delays will be taken into consideration in adjusting Contract time, and in approving additional compensation if the performance of the Work is delayed because of the City's failure to make available to the Contractor:

- Necessary Rights-of-Way;
- City-owned or City-controlled Materials sources that are offered in the Contract for the Contractor's use; or
- Access to, or rights of occupancy of, buildings and other properties the Contractor is required to enter or to disturb pursuant to Contract requirements.

109.20.B If the ending date of an anticipated delay is stated in the Special Provisions, only the delay occurring after that date will be considered for adjusting Contract time or providing additional compensation.

109.21 SUSPENSION OF WORK

109.21.A IF THE WORK IS SUSPENDED BY THE CITY ENGINEER FOR PUBLIC INTEREST

1. Temporarily suspend Work on the project wholly or in part for public interest as directed by the City Engineer. In the event of such suspension, the City Engineer shall, except in emergency and except as hereinafter provided, give the Contractor three (3) days notice.

2. For publicly financed public improvements, Work shall be resumed within five (5) days after notice has been given by the City Engineer to the Contractor to do so. The City Engineer shall allow the Contractor an extension of time for completion corresponding to the total period of temporary suspension.

3. The Contractor will be entitled to recover damages limited to reimbursement for necessary rental of unused equipment, services of watch persons, documented direct overhead costs, documented direct unavoidable expenses accruing by reason of the suspension, plus fifteen percent (15%) of the foregoing to cover Contractor's profit.

4. The Contractor shall not be entitled to indirect costs or any other damages arising out of the delay, including but not limited to interruption of schedules, or any other impact claim or ripple effect.

109.21.B IF WORK IS SUSPENDED BY THE CITY ENGINEER WHEN CONDITIONS ARE UNSUITABLE FOR SATISFACTORY PERFORMANCE OF THE WORK

1. Immediately suspend Work on the project, wholly or in part, as directed by the City Engineer, for reasonable periods of time as the City Engineer may deem necessary, when conditions are unsuitable for satisfactory performance of the Work.

2. For publicly financed public improvement projects the City shall allow the Contractor an extension of time for completion corresponding to the total period of suspension, but the Contractor shall not be entitled to reimbursement for any costs or damages arising under this clause.

109.21.C IF WORK IS SUSPENDED BY THE CITY ENGINEER FOR CAUSE

1. The Contractor agrees to immediately suspend Work on the project as directed by the City Engineer if the City Engineer determines any of the following conditions exist:

   a. Failure to correct unsafe conditions for working personnel, the general public, or the City's employees.

   b. Failure to immediately correct defective and unacceptable work in accordance with Subsection 108.20

   c. Failure to carry out provisions of the Contract Documents.

d. Failure to carry out orders or directives issued by the City Engineer, the City, or any regulatory authority. The City Engineer may direct all or a portion of the Work be suspended and the conditions under which work may commence.

e. Any reason considered by the City to be in the public interest.

109.21.D VOLUNTARY SUSPENSION BY THE CONTRACTOR

1. Such suspension shall not relieve the Contractor from the responsibility to complete the Work within the prescribed time specified in the Contract Documents. Should operations be discontinued, the Contractor shall notify, in writing, the City Engineer at least twenty-four (24) hours in advance of resuming operations.

2. For publicly financed public improvement projects, there shall be no voluntary suspension or slowing of operations without the prior written approval of the City Engineer and such approval shall not relieve the Contractor from the responsibility to complete the work within the prescribed time in the Contract Documents.

109.21.E RESPONSIBILITIES OF THE CONTRACTOR

1. At the commencement of and during any suspension of Work, protect all work performed to prevent any damage or deterioration of the Work. Provide temporary protection devices to warn, safeguard, protect, guide, and inform traffic during suspension, the same as though the Work had been continuous and without interferences.

2. Contractor shall bear all costs for providing suitable provisions for traffic control and for maintenance and protection of the work during suspension unless the suspension was for convenience.

3. When Work is resumed after suspension, unless otherwise specified in the Contract, the Contractor shall perform the following at no additional compensation:

   - ❖ Replace or repair any Work, Materials, and Equipment to be incorporated into the Work that was lost or damaged because of the temporary use of the Project Site by the public, and
   - ❖ Remove Materials, Equipment, and temporary construction necessitated by temporary maintenance during the suspension, as directed by the City Engineer.

109.21.F COMPENSATION AND ALLOWANCES FOR SUSPENSION

1. Compensation and allowance of additional Contract time due to suspension of any portion of the Work will be authorized only for City-initiated suspensions for reasons other than the Contractor's failure or neglect. (Refer to Subsection 109.17.E and Subsection 109.20 and Subsection 110.06.)

109.21.G In all cases of suspension, except voluntary suspension by the Contractor, Work will be resumed only upon written order of the City Engineer.

109.22 CONTRACT INCENTIVE

(Not applicable to privately financed public improvements)

109.22.A When indicated in the Special Provisions, if the Contractor completes the project before the time specified in the Contract or any extension thereof by the City, the City shall receive a benefit by reason of the early completion.

109.22.B It is therefore agreed that, if a per diem amount for a contract incentive is included in a Special Provision, the City shall pay to the Contractor the per diem amount for each and every calendar day the work is substantially and/or finally complete as specified before the time established in the Special Provision.

109.23 FAILURE TO COMPLETE ON TIME; LIQUIDATED DAMAGES:

(Not applicable to privately financed public improvements)

109.23.A TIME IS OF THE ESSENCE

1. Time is of the essence in the Contractor's performance of the Contract. Delays in the Contractor's performance of the Work may inconvenience the traveling public, interfere with business and commerce, and increase cost to the City. It is essential and in the public interest that the Contractor prosecute the Work vigorously to Contract completion.

2. The City does not waive any rights under the Contract by permitting the Contractor to continue to perform the Contract, or any part of it, after the Contract time or adjusted Contract time has expired.

109.23.B LIQUIDATED DAMAGES

1. The City will sustain damage if the Work is not completed within the specified Contract time. However, in certain City projects it may be unduly burdensome and difficult to demonstrate the exact dollar value of such damages. The City will identify such projects in the Special Provisions related to them. In these projects, the Contractor agrees to pay to the City, not as a penalty but as liquidated damages, the amount shown in the Table below unless otherwise specified in the Special Provisions for each calendar day the Contractor expends performing the Contract in excess of the Contract time or adjusted Contract time.

SCHEDULE OF LIQUIDATED DAMAGES		
ORIGINAL AMOUNT OF CONTRACT		AMOUNT OF LIQUIDATED DAMAGES $/PER CALENDAR DAY
FOR MORE THAN	UP TO AND INCLUDING	
$100,000	$500,000	$150
$500,000	$1,000,000	$225
$1,000,000	$2,000,000	$300
$2,000,000	$5,000,000	$450
$5,000,000		$600

2. Assessment of liquidated damages shall continue until such time as all Work has been fully completed, including, but not necessarily limited to, construction, restoration, final testing, cleanup, and completion of any additional Work requirements discovered during the final inspection. Assessment of liquidated damages may be stopped, temporarily discontinued and restarted, or waived, in part or whole, at the discretion of the City Engineer.

3. Payment by the Contractor of liquidated damages does not release the Contractor from its obligation to fully and timely perform the Contract according to its terms. Nor does acceptance of liquidated damages by the City constitute a waiver of the City's right to collect any additional damages it may sustain by reason of the Contractor's failure to fully perform the Contract according to its terms. The liquidated damages shall constitute payment in full only of damages incurred by the City due to the Contractor's failure to complete the Work on time.

4. Permitting the Contractor to continue and finish the Work or any part thereof after the Contract time or adjusted Contract time, as pertinent, has expired shall in no way operate as a waiver on the part of the City or any of its rights under the Contract.

5. If the Contract is terminated according to Subsection 109.26.A and if the Work has not been completed by other means on or before the expiration of Contract time or adjusted Contract time, liquidated damages will be assessed against the Contractor for the duration of time reasonably required to complete the Work.

109.24 RECORD DRAWINGS

109.24.A For all public works improvements, the Contractor shall maintain at the site, one set of clean, readable Plans, specifications, shop drawings, and supplemental drawings that shall be available for inspection by the City. Field observations or changes made during construction shall be noted legibly on the Plans by striking out the old with new added beside. All Record Drawings shall accurately represent as-built construction and shall be graphically and mathematically correct, i.e., drawing shall represent changes in dimensioning during construction. Upon completion of the work, the Contractor's field as-built drawings shall be turned over to the Design Engineer prior to final payment or release of funds by the City.

109.24.B For all public works improvements the Design Engineer shall submit certified as-built drawings for all plans that were approved for construction within three (3) months of the completion of construction.

109.24.C The Design Engineer shall submit to the City with the reproducible Record Drawings, a compact disc (CD) containing electronic PDFs and cad files (AutoCAD, Civil 3D, or other as approved) of all public improvements constructed during and in conjunction with the project.

109.24.D The Design Engineer shall be responsible for any As-built surveying of the project to incorporate information including, but not limited to, ends of sewer laterals, manhole locations, and depths of pipes at manholes for inclusion in record drawings, and shall submit, along with the as-built drawings, a statement certifying that all work for which plans were approved has been completed in accordance with the Standard Construction Specifications.

109.24.E As-built drawings shall comply with the Record Drawing development requirements specified in Section 202 of the Design Standards and shall be of archival quality. At a minimum, the Record Drawings shall be of high-quality bond paper or four (4)-mil mylar with permanent, UV resistant marking medium.

109.25 CONFLICTS, ERRORS, OMISSIONS, AND ADDITIONAL DRAWINGS

109.25.A The Contractor shall check and compare all Contract Documents prior to construction and notify the Design Engineer and the City Engineer of any discrepancies, omissions, or conflicts in order to permit correction by the Design Engineer. Coordination of Plans and Specifications is intended.

109.25.B The Contractor shall furnish labor and Materials required for the Work if indicated in one part of the Contract Documents and not the other as fully as if mentioned or indicated in all places. Should any Work or Materials be reasonably required or intended for carrying the project to completion that are inadvertently omitted in the Contract Documents, Contractor shall furnish same as fully as if particularly delineated or described.

109.25.C The intent of the Plans and Specifications is to show and describe a complete project within the limits stated. Dimensions shown on plans shall be followed, rather than scale measurements. Whenever the Plans are not sufficiently detailed or explicit, the Design Engineer will be required to furnish additional detail drawings or written instructions at the request of the Contractor or the City. The Contractor shall perform the work in accordance with the additional details or instructions.

109.26 TERMINATION OF CONTRACT AND SUBSTITUTED PERFORMANCE

(Not applicable to privately financed public improvements)

109.26.A TERMINATION FOR DEFAULT

1. If Contractor fails to begin work as required by the Contract, or if the Contractor should be adjudged bankrupt, or if the Contractor should make a general assignment for the benefit of their creditors, or if a receiver should be appointed on account of insolvency, or if the Contractor should refuse to or fail to supply enough properly skilled workers, proper Materials, or proper Equipment for the efficient prosecution of the project, disregard laws, ordinances or the instructions of the City, or otherwise be in violation of any provision of the Contract Documents, the City Engineer may, without prejudice to any other right or remedy and after giving the Contractor and its surety seven (7) days written notice, terminate the services of the Contractor and take possession of the premises and of all Materials, tools, and appliances thereon as well as all other Materials whether on the premises or not, on which the Contractor has received partial payment, and finish the Work by whatever method it may deem expedient.

2. In the event action as above indicated is taken by the City, the Contractor, or its Surety, shall provide the City with immediate and peaceful possession of all of the Materials, tools, and appliances located on the premises as well as all other Materials whether on the premises or not, on which the Contractor has received any progress payment. Upon termination, in the event that the Surety does not complete the Contract, at the election of the City, the Contractor shall assign any and all subcontracts and Material Contracts to the City or the City's designee. Further, the Contractor shall not be entitled to receive any further payment until the Work is completed.

3. On completion of the Work by the City, determination shall be made by the City Engineer of the total amount the Contractor would have been entitled to receive for the Work, under the terms of the Contract, had the Contractor completed the Work. If the difference between said total amount and the sum of all amounts previously paid to the Contractor, which difference will hereinafter be called the "unpaid balance," exceeds the expense incurred by the City in completing the Work, including expense for additional Managerial and administrative services, such excess will be paid to the Contractor, with the consent of the Surety. If the expense incurred by the City exceeds the unpaid balance, the amount of the excess shall be paid to the City by the Contractor or its Surety. The expense incurred by the City as herein provided, and the damage incurred through the Contractor's default, shall be as determined and certified by the City Engineer.

4. In addition to and apart from the above-mentioned right of the City to terminate the employment of the Contractor, the Contract may be canceled at the election of the City for any willful failure or refusal on the part of the Contractor to faithfully perform the Contract according to all of its terms and conditions; provided, however, that in the event the City should cancel the Contract, neither the Contractor nor its Surety shall be relieved from damages or losses suffered by the City on account of the Contractor's breach of the Contract.

5. The City may, at its discretion, avail itself of any or all of the above rights or remedies and invoking of any one of the above rights or remedies by the City will not prejudice or preclude the City from subsequently invoking any other right or remedy set forth above or elsewhere in the Contract.

6. None of the foregoing provisions shall be construed to require the City to complete the Work, to waive or in any way limit or modify the provisions of the Contract, including damages suffered by the City on account of the project not being completed within the time prescribed.

109.26.B SUBSTITUTED PERFORMANCE

1. In accordance with the City's procedures, and upon the City Engineer's recommendation that sufficient cause exists, the City, without prejudice to any of its other rights or remedies and after giving the Contractor and the Contractor's Surety ten (10) Calendar Days' written notice, may:

   - ❖ Terminate the Contract;
   - ❖ Substitute the Contractor with another entity to complete the Contract;
   - ❖ Take possession of the Project Site;
   - ❖ Take possession of Materials on the Project Site;
   - ❖ Take possession of Materials not on the Project Site, for which the Contractor received progress payments under Subsection 110.07;
   - ❖ Take possession of Equipment on the Project Site that is to be incorporated into the Work;

- ❖ Take possession of Equipment not on the Project Site that is to be incorporated into the Work, and for which the Contractor received progress payments under Subsection 110.07; and
- ❖ Finish the Work by whatever method the City deems expedient.

2. If, within the ten (10) calendar day notice period provided above, the Contractor and/or its Surety corrects the basis for declaration of default to the satisfaction of the Engineer, or if the Contractor's Surety submits a proposal for correction that is acceptable to the Engineer, the Contract will not be terminated.

109.26.C TERMINATION FOR PUBLIC CONVENIENCE

1. It is hereby agreed that the City has the right to terminate the Contract for convenience in whole or in part when it is considered to be in the public interest.

2. The City Engineer will provide the Contractor and the Contractor's Surety seven (7) calendar days' written notice of termination for public convenience. After such notice, the Contractor and the Contractor's Surety shall provide the City Engineer with immediate and peaceful possession of the Project Site, and of Materials and Equipment to be incorporated into the Work, whether located on and off the Project Site, for which the Contractor received progress payments under Subsection 110.07.

3. In the event the Contract is terminated as being in the public interest, the Contractor shall be entitled to a reasonable amount of compensation for preparatory Work and for all costs and expenses arising out of the termination excluding lost profits.

4. The amount to be paid to the Contractor:

   a. Shall be determined on the basis of the Contract price in the case of any fully completed separate item or portion of the Work for which there is a separate lump sum or unit price; and

   b. In respect to any other Work, the Contractor will be paid a percent of the Contract price equal to the percentage of the Work completed.

110 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

110.01 MEASUREMENT OF QUANTITIES

110.01.A GENERAL

1. Payments shall be based on measurements of completed Work in accordance with the United States Standard Measures and as set forth in the Specifications.

2. Unless otherwise specified in the Contract, the City Engineer will round off all quantity computations using the following convention:
   - ❖ The final significant digit will not be changed when the succeeding digit is less than five (5).
   - ❖ The final significant digit will be increased by one when the succeeding digit is five (5) or greater.

3. The measurement provisions contained in the Specifications for each pay item will supplement or modify the above convention by:
   - ❖ Imposing measurement limitations.
   - ❖ Describing measurement or computation procedures.
   - ❖ Giving conversion factors or adjustment conditions.
   - ❖ Providing for determination of reasonably accurate and representative pay item quantities.

4. Measurements required or allowed to be made by the Contractor will be subject to the City Engineer's verification. The City Engineer's decision about measurement is final.

110.01.B LENGTHS AND DIMENSIONS

1. Lengths and dimensions will be measured horizontally and vertically, at least to the nearest tenth (0.1) foot, unless otherwise specified in the Contract. Measurements will be limited to the dimensions shown or specified, or as directed by the City Engineer.

110.01.C AREA

1. Areas will be determined by measuring width and length to the nearest tenth (0.1) foot and computed to the nearest tenth (0.1) square foot or tenth (0.1) square yard as appropriate unless otherwise specified in the Contract.

110.01.D VOLUME OF MATERIALS

1. Measured in the vehicles by which they are transported will require computing of the volume of the vehicles to the nearest tenth (0.1) cubic yard for its approved capacity, and identification of the vehicle and its capacity. Pay quantities will be determined by vehicle measurement at point of delivery with no allowance for settlement of Material during transit.

2. Loads shall be level and uniform. Payment will not be made for material in excess of the approved capacity of the vehicle and deductions will be made for loads below approved capacity.

110.01.E VOLUME OF CONCRETE AND MASONRY

1. Volume of concrete and masonry structures will be measured according to neat lines as shown on the plans or as altered on order of the City Engineer.

110.01.F VOLUME OF EARTHWORK

1. Volume of earthwork particularly excavation and embankment, will be computed by the average end area method or by other methods of equivalent accuracy.

110.01.G STANDARD MANUFACTURED ITEMS

1. If standard manufactured items, such as fence, wire, plates, rolled shapes, pipe, conduit and other similar items are specified in the Contract by properties such as gage, unit weight, or section dimensions, the manufacturing tolerances established by the industry involved will be accepted unless more stringent tolerances are cited in the Contract.

110.01.H LUMP SUM

1. Lump sum, when used, means the Work described shall be completed and accepted without measurement unless changes are ordered in writing by the City Engineer. If estimated quantities of the Work to be performed are listed in the Special Provisions, they provide only a basis for adjusting payment amounts. Estimated quantities are approximate only, and are made from a reasonable interpretation of the Contract Documents. Computations based on the details and dimensions shown in the Contract Documents are not guaranteed to equal estimated quantities.

2. If the City issues no Change Order, the City will make no pay adjustment for quantities based on the Contractor's computations that overrun or underrun the estimated quantities.

3. If the City issues Change Orders for changes in the Work, the City Engineer will measure such changes according to the standards set by Subsection 110.03 to determine adjustment of payment.

110.01.I TIME

1. Time will be measured to the nearest half (0.5) hour unless otherwise specified.

110.01.J WEIGHT

1. When payment for Materials other than bituminous cements is on a weight basis and unless otherwise set forth in the Specification under which Material is to be furnished, pay quantities will be determined by weighing Material on weigh scales provided by the Contractor as set forth hereinafter. Such weighing is to be of Material in the hauling vehicle as loaded for delivery. Determination of tare weights and weight of loaded vehicles will be to the nearest ten (10) pounds. Tare weights will be determined by weighing empty vehicles at intervals of such frequency as the City Engineer deems necessary to ensure accuracy of payload weights.

2. Portland cement will be measured by the pound, hundredweight, ton, sack, bag, or barrel. The term "barrel of cement" will mean three hundred seventy-six (376) pounds, avoirdupois, of cement. The terms "sack" and "bag" of cement will each mean ninety-four (94) pounds, avoirdupois, of cement.

3. Quantities of asphalt cements, liquid asphalt Materials, and other bituminous cements normally shipped in tank cars or tank trucks, when they are to be paid for by the gallon (U.S. Standard) or by the ton, will be determined from volume computations of the Materials when at a temperature of 60° F, with standard recognized correction factors applied when the Materials are measured at any temperature other than 60° F. Net certified scale weights based on certified volumes in the case of rail shipments will be used as a basis of measurement, subject to correction when bituminous Material has been lost from the car or the distributor, wasted, or otherwise not incorporated in the Work. When bituminous Materials are shipped by truck or transport, net certified weights or volume, subject to correction for loss or foaming, may be used for computing quantities.

4. Weights of metals and of metallic coating will be determined on the basis set forth in the Contract Documents under which their use is required.

110.01.K SCALES

1. When the Contract Documents call for Materials that are to be measured by weighing on scales, the Contractor shall provide suitable scales and transport Materials to scales at no expense to the City. Before use of scales is commenced, and as frequently as the City Engineer may deem necessary to ensure accuracy, have the scales examined by an official of the Oregon Department of Agricultural Measurement Standards Division, and bear all resulting costs. Maintain the scales in accurate condition at all times.

2. Furnish and locate scales so that the amount of hauling involved in the delivering of materials is no greater than if no weighing were required; if not, bear expense of whatever extra hauling is required. If hauling of materials is to be paid for as a separate pay item, the distance shall be via the most direct practicable route and no allowance will be made for any extra hauling required to reach the scales.

3. A representative of the City may be present at all times to witness the weighing and to check and compile records of scale weights.

110.02 SCOPE OF PAYMENT

110.02.A Quantities listed in the schedule of prices do not govern final payment. Payments to the Contractor will be made only for actual quantities of items performed in accordance with terms of the Contract and for items of Work actually performed as extra Work or under supplemental agreement in accordance with the terms of the Contract.

110.02.B Payment constitutes full compensation to the Contractor for furnishing all Materials, Equipment, tools, labor, and Incidentals necessary to complete the Work; and for risk, loss, damage, and expense arising from the nature or prosecution of the Work or from the action of the elements, subject to the provisions of Subsection 108.17. The Contractor shall include the costs of bonds and insurance for the Project in the unit price for each pay item of Work to be performed.

110.02.C When the Specifications state that the unit price for a pay item is compensation for certain Materials or Work essential or incidental to the pay item, the same Materials or Work will not be measured or paid under any other pay item.

110.02.D The City certifies that sufficient funds have been appropriated to make payments required by the Contract during the fiscal year the Contract was executed by the City. Payment for Work performed after June 30 of any given year is subject to funds being appropriated by the Stayton City Council. If funds are not appropriated, the City may terminate the Contract by notice to the Contractor.

110.03 COMPENSATION FOR ALTERATION OF THE CONTRACT

110.03.A Unless changes and alterations in the Plans, Specifications, or quantities, or details of construction materially change the character of the Work to be performed or the unit price thereof, the Contractor shall accept as payment in full, so far as Contract items are concerned, payment at the same unit prices as are provided under the Contract for the accepted quantities of Work done. If the Contract is done on a lump sum basis, the adjustment for increases or decreases may be based, at the sole discretion of the City Engineer, on a theoretical unit price. The price will be determined by dividing the Contractor's applicable breakdown category price (as listed in the Special Specifications or as set forth in the Bid) by the estimated quantities of all units of Work within the applicable breakdown category.

110.03.B If either (1) the total cost of the Work, using actual quantities and unit prices, or (2) the total quantity of any major contract item, using actual quantities, changes more than twenty-five percent (25%), then that part of the increase or decrease exceeding twenty-five percent (25%) shall be adjusted as the parties agree. A major item is any contract item, except lump sum items, having an actual cost greater than ten percent (10%) of the contract price. If the parties cannot agree, the City Engineer will determine the equitable adjustment of time, payment, or both. The basis of the equitable adjustment of time will be in accordance with Subsection 109.18. The basis of the equitable cost adjustment for decreases will take into account a redistribution of fixed costs. The basis of the equitable cost adjustment for increases will be by using one of the following methods:

- Unit prices
- Other means of establishing costs
- Force Account

110.03.C The Contractor shall obtain written consent of the surety or sureties if: (1) changed work increases the total cost by more than twenty-five percent (25%) of the original total contract price, or (2) the City Engineer requests such consent.

110.03.D The City will not adjust for increases or decreases in quantities if the City has entered the quantity of an item in the lump sum Bid schedule. The Contractor shall review such stated quantities and bear all costs that result from such increases or decreases.

110.04 ELIMINATED ITEMS

110.04.A City Engineer will have the right to eliminate, omit, or cancel (herein collectively termed elimination) portions of the Contract Documents relating to construction of any item or part of any item therein by payment to the Contractor of a fair and equitable amount covering all items of actual cost incurred directly in connection with eliminated Work and prior to the date of elimination of Work by order of the City Engineer. When practicable, Work completed before elimination will be paid for at unit prices; otherwise, Contractor will be allowed a profit percentage on Materials used and construction work actually performed at rates as provided for Force Account Work; but no allowance will be made for anticipated profits. Acceptable materials ordered by Contractor, delivered on the Work, or properly stored at sites approved by the City Engineer prior to date of elimination of Work by order of City Engineer may be purchased from Contractor by the City at actual cost and, thereupon, will become the property of the City.

110.05 DIFFERING SITE CONDITIONS

110.05.A Upon written notification, as required in Subsection 105.09, the City Engineer will investigate the identified conditions. If the City Engineer determines that the conditions materially differ and cause an increase or decrease in the cost or time required to perform any Work under the Contract, an adjustment in the Contract Amount or Contract Time, excluding loss of anticipated profits, will be made, and the Contract modified accordingly, in writing. The City Engineer will notify the Contractor as to whether or not an adjustment of the Contract is warranted.

110.05.B No Contract adjustment which benefits the Contractor will be allowed unless the Contractor has provided the required written notice.

110.06 UNREASONABLE DELAY BY THE CITY

110.06.A If the Contractor believes that performance of all or any portion of the Work is suspended, delayed, or interrupted for an unreasonable period of time in excess of that originally anticipated or customary in the construction industry, due to acts or omissions of the City, or persons acting for the City, and that additional compensation, Contract time, or both, are due the Contractor because of the suspension, delay or interruption, the Contractor shall immediately file a written notice of delay in accordance with Subsection 109.19. The Contractor shall then promptly submit a properly supported request for any additional compensation, Contract time, or both, in accordance with the applicable provisions in Subsection 109.18 through Subsection 109.21.

110.06.B The City Engineer will promptly evaluate a properly submitted request for additional compensation. If the City Engineer determines that the delay was unreasonable, and that the cost required for the Contractor to perform the Contract has increased as a result of the unreasonable suspension, delay or interruption, the City Engineer will make an equitable adjustment, excluding profit, and modify the Contract in writing accordingly. The City Engineer will notify the Contractor of the determination and whether an adjustment to the Contract is warranted.

110.06.C Under this provision, no Contract adjustment will be allowed:

- Unless the Contractor has provided the written notice required by Subsection 109.19;
- For costs incurred more than ten (10) Calendar Days before the City Engineer receives the Contractor's properly submitted written request;
- For any portion of a delay that the City Engineer deems to be a reasonable delay, or for which an adjustment is provided for or excluded under other terms of the Contract; or
- To the extent that performance would nevertheless have been suspended, delayed or interrupted by causes other than those described in this Subsection.

110.07 PROGRESS PAYMENTS AND RETAINAGE

110.07.A Payment for all Work under the Contract will be made at the price or prices offered, and those prices shall include full compensation for all incidental Work.

110.07.B If the Contract is for a Public Work and the Contract price is $25,000 or more, supply and file, and require every subcontractor to supply and file, with the City Engineer a statement in writing that conforms to the requirements of ORS 279C.845.

110.07.C Make progress estimates of Work performed in any calendar month and submit to the City Engineer for approval, before the fifth (5^{TH}) of the following month, or as mutually agreed between the Contractor and the City Engineer. These estimates shall include value of labor performed and Materials incorporated in the Work since commencing work under the Contract. Such estimates need not be made by strict measurements and may be approximate only, and shall be based upon the whole amount of money that will become due according to terms of the Contract when the Project has been completed.

110.07.D If the Contract price is determined, in whole or in part, on a lump sum basis, prepare an itemized cost breakdown relating thereto and have the City Engineer approve it before commencing Work; progress estimates based on said itemized cost breakdown may be the basis for progress payments. Upon direction by the City Engineer provide for revision of the costs breakdown to reflect the true costs of the Work as it progresses.

110.07.E If the Contract price is determined wholly on a unit price basis, the City Engineer may use the unit prices in making progress estimates on the Work. In case said unit prices do not, in the opinion of the City Engineer, truly represent actual relative costs of different parts of Work, a percentage of the unit price may be used in making progress estimate adjustments.

110.07.F If the City Engineer receives written notice of any unsettled claims for damage or other costs due to the Contractor's operations including, without limitation, claims from any City department or other governmental agency, an amount equal to the claim may be withheld from the progress payments, final payments, or retainage until such claim has been resolved to the satisfaction of the City Engineer.

110.07.G Progress payments will be made by the City on a monthly basis within thirty (30) days from sign-off by the Contractor of the progress payment or fifteen (15) days after the payment is approved by the City Engineer of Work performed. Payment will be issued by the City for the amount of the approved estimate, less five percent (5%) retainage. Such amount of retainage shall be withheld and retained by the City until it is included in and paid to the Contractor as part of the final payment of the Contract Price. When specified in the Special Provisions, securities in lieu of retainage will be accepted, or if the Contractor elects, retainage as accumulated will be deposited by the City in an interest-bearing account pursuant to ORS 279C.570.

110.07.H The City Engineer may decline to approve an application for payment and may withhold such approval if, in the City Engineer's opinion, the Work has not progressed to the point indicated by the Contractor's submittal. The City Engineer may also decline to approve an application for payment or may reduce said payment or, because of subsequently discovered evidence or subsequent inspections, the City Engineer may nullify the whole or any part of any payment previously made to such extents as may be necessary in their opinion to protect the City from loss because of:

- Defective work not remedied.
- Third party claims filed or failure of the Contractor to make payments properly to subcontractors for labor, Materials, or Equipment, unless surety consents to such payment.
- Reasonable doubt that the work can be completed for the unpaid balance of the Contract price.
- Damage to another contractor's Work.
- Reasonable indication that the Work will not be completed within the Contract time.
- Unsatisfactory prosecution of the Work by the Contractor.
- Claims against the Contractor by the City.
- Failure to submit a construction schedule or failure to keep said construction schedule updated as set forth in Subsection 109.08.
- Exceeding Project Work limits.

- ❖ When any or all of the criteria set forth above have been remedied satisfactorily to the City Engineer, payment shall be made for amounts withheld because of them. Withholding of progress payments or partial payments under the criteria set forth above shall not entitle the Contractor to interest on such withheld payments or partial payments.

110.07.I If the Contractor fails to complete the Project within the time limit fixed in the Contract or any extension, no further estimate may be accepted or progress or other payments allowed until the Project is completed, unless approved otherwise by the City Engineer.

110.07.J Progress estimates are for the sole purpose of determining progress payments and are not to be relied on for any other purpose. The estimates upon which progress payments are based are not represented to be accurate estimates. All estimated quantities are subject to correction in the final estimate. If the Contractor uses these estimates as a basis for making payments to Subcontractors, the Contractor assumes all risk and bears any losses that result.

110.07.K The City's payment of progress payments, or determination of satisfactory completion of Pay Items or Work or release of retainage, shall not be construed as Final Acceptance or approval of any part of the Work, and shall not relieve the Contractor of responsibility for defective Materials or workmanship or for latent defects and warranty obligations.

110.07.L When the progress estimate indicates that the progress payment would be less than $1,000, no progress payment will be made for that estimate period, unless approved by the City Engineer.

110.07.M DEFERMENT OF PAYMENTS

1. No partial or final payment will be made until all communications made by City Engineer to Contractor in accordance with the Specifications are complied with, nor until all claims or liens filed or prosecuted against City, its officers, or employees contrary to provisions of the Contract are satisfied.

2. In the event a complaint or charge of unlawful employment practices pursuant to the provisions of ORS Chapter 659A is filed against the Contractor by anyone, including the City, and the Commissioner of Labor issues a cease and desist order as defined in ORS Chapter 659A.820 through 659A.865, no further payments will be made on the Contract until such time as all of the provisions of the cease and desist order have been complied with by contractor.

110.08 ADVANCE ALLOWANCE FOR MATERIALS ON HAND

110.08.A GENERAL

1. If the total value of Materials on hand is at least $1,000 or the total value of a single class of Materials on hand is at least $500, the City Engineer may authorize an advance allowance for the Materials in the progress payments.

2. Such a payment shall be conditioned upon submission by the Contractor of bills of sale or such other documentation satisfactory to the City Attorney to establish the City's title to such Materials or Equipment or otherwise protect the City's interest including applicable insurance and transportation to the site, and a statement from the Contractor explaining why it is necessary to procure said Equipment and/or Materials.

3. When such payments are made, the Contractor Warrants and guarantees that the title to all Materials and Equipment covered by a progress payment, whether incorporated in the project or not, will pass to the City upon receipt of such payment by the Contractor, free and clear of all liens, claims, security interests, or encumbrances.

110.08.B The City will not make advance allowances on the Materials unless the following three conditions are satisfied:

1. REQUEST FOR ADVANCE ALLOWANCE - If Materials on hand meet the requirement of (2) below, an advance allowance will be made if:
   - ❖ A written request for advance allowance for Materials on hand has been received by the City Engineer at least five (5) calendar days before the pay period cutoff date; and
   - ❖ The request is accompanied by written consent of the Contractor's Surety, if required by the City.

2. STORED OR STOCKPILED CONDITIONS

   a. The Materials shall have been delivered and/or acceptably stored or stockpiled in accordance with the Specifications and as follows:
      - ❖ At the Project Site;
      - ❖ On City-owned property;
      - ❖ On property in the State of Oregon on which the property owner has authorized storage in writing. The written authorization must allow the City to enter upon the property and remove Materials for at least six (6) months after completion of the Project. The Contractor shall furnish a copy of the written permission to the City;
      - ❖ On property outside the State of Oregon on which the property owner has authorized storage in writing, provided that such storage location is allowed by the Special Provisions or authorized in writing by the City Engineer. The permit must allow the City to enter upon the property and remove Materials for at least six (6) months after completion of the Project. The Contractor shall furnish a copy of the written permission to the City.

   b. To be eligible for advance allowance, the Materials shall:
      - ❖ Meet Specification requirements;
      - ❖ Have the required Materials conformance and quality compliance documents on file with the City Engineer (See Section 107);
      - ❖ Be in a form ready for incorporation into the Work; and
      - ❖ Be clearly marked and identified as being specifically fabricated, or produced, and reserved for use on the Project.

3. RESPONSIBILITY FOR PROTECTION

   a. The Contractor has full control and responsibility for the protection of Materials on hand from the elements and against damage, loss, theft, or other impairment until the entire Project has been completed and accepted by the City.

   b. If Materials are damaged, lost, stolen, or otherwise impaired while stored, the monetary value advanced for them, if any, will be deducted from the next progress payment.

c. If these conditions in (B) above have been satisfied, the amount of advance allowance, less the retainage described in Subsection 110.07, will be determined by one of the following methods as elected by the City Engineer:

- ❖ Net cost to the Contractor of the Materials, F.O.B. the Project Site or other approved site;
- ❖ Price (or portion of it attributable to the Materials), less the cost of incorporating the Materials into the Project, as estimated by the City Engineer.

110.08.C PROOF OF PAYMENT

1. The Contractor shall provide the City Engineer with proof of payment to the Materials suppliers for purchased Materials within thirty (30) calendar days of the date of the progress payment that includes the advance allowance.

2. If proof of payment is not provided, sums advanced will be deducted from future progress payments, and the City Engineer will not approve further prepayment advance allowance requests.

110.08.D TERMINATED CONTRACT

1. If the Contract is terminated, the Contractor shall provide the City immediate possession of all Materials for which advance allowances have been received, as provided above. If, for any reason, immediate possession of the Materials cannot be provided, the Contractor shall immediately refund to the City the total amount advanced for the Materials.

2. The City may deduct any amount not so refunded from final payment.

110.09 PAYMENT UNDER TERMINATED CONTRACT

110.09.A GENERAL

1. Payment for Work performed under a Contract that is terminated pursuant to the provisions of Subsection 109.26 will be determined under (B) or (C) of this Subsection.

110.09.B TERMINATION FOR DEFAULT

1. Upon termination of the Contract for the Contractor's default, the City will make no further payment until the Project has been completed. The City will make progress payments to the party to whom the Contract is assigned, but may withhold an amount sufficient to cover anticipated City costs, as determined by the City Engineer, to complete the Project.

2. Upon completion of the Project, the City Engineer will determine the total amount that the defaulting Contractor would have been entitled to receive for the Work, under the terms of the Contract, had the Contractor completed the Work (the "cost of the Work").

3. If the cost of the Work, less the sum of all amounts previously paid to the Contractor, exceeds the expense incurred by the City in completing the Work, including without limitation expense for additional Managerial and administrative services, the City will pay the excess to the Contractor, subject to the consent of the Contractor's Surety.

4. If the expense incurred by the City in completing the Work exceeds the Contract Amount, the Contractor or the Contractor's Surety shall pay to the City the amount of the excess expense.

5. The City Engineer will determine the expense incurred by the City and the total amount of City damage resulting from the Contractor's default. That determination will be final as provided in Subsection 106.01.

6. If a termination for default is determined by a court of competent jurisdiction to be unjustified, it shall be deemed a termination for public convenience, and payment to the Contractor will be made as provided in Subsection (C) below.

110.09.C TERMINATION FOR PUBLIC CONVENIENCE

1. GENERAL - Full or partial termination of the Contract shall not relieve the Contractor of responsibility for completed or performed Work, or relieve the Contractor's Surety of the obligation for any just claims arising from the completed or performed Work.

2. MOBILIZATION - If mobilization is not a separate pay item, and payment is not otherwise provided for under the Contract, the City may pay the Contractor for mobilization expenses, including moving Equipment to and from the Project Site. If allowed, payment of mobilization expenses will be based on cost documentation submitted by the Contractor to the City Engineer, up to a maximum 8% of total contract amount.

3. ALL OTHER WORK - The City shall pay the Contractor at the unit price for the number of pay item units of completed, accepted Work. For units of Pay Items partially completed, payment will be as mutually agreed, or, if not agreed, as the City Engineer determines to be fair and equitable. No claim for loss of anticipated profits will be allowed. The City will purchase Materials left on hand in accordance with Subsection 110.10 below.

110.10 ALLOWANCE FOR MATERIALS LEFT ON HAND

110.10.A PURCHASE OF UNUSED MATERIALS

1. If Materials are delivered to the Project Site, or otherwise acceptably stored at the order of the City Engineer, but not incorporated into the Work due to complete or partial elimination of pay items, changes in Plans, or termination of the Contract for public convenience pursuant to Subsection 109.26, and it is not commercially feasible for the Contractor to return them for credit or otherwise dispose of them on the open market; the City will purchase them according to the formula and conditions set forth in (B) of this Subsection.

110.10.B PURCHASE FORMULA AND CONDITIONS

1. FORMULA - The City will apply the following formula in determining the Contractor's allowance for Materials left on hand:

   - Contractor's Actual Cost, plus five percent (5%) Overhead Allowance, minus Advance Allowances under Subsection 110.08, but no markup or profit.

2. CONDITIONS - The City will not purchase the Contractor's Materials left on hand unless the Contractor satisfies the following conditions:

   - Requests the City's purchase of unused Materials;
   - Shows acquisition of the Materials in accordance with Subsection 107.01;
   - Shows that the Materials meet Specifications; and
   - Provides receipts, bills and other records of actual cost of Materials delivered to the designated delivery points.

110.11 PAYMENT METHODS; PAYMENT FOR CHANGE ORDERS; PAYMENT FOR FORCE ACCOUNT WORK

110.11.A GENERAL

1. Payment or credit for any alterations covered by a change order shall be determined by one or a combination of the methods set forth in (B) of this Subsection.

2. Any request for quotations on alterations to the Work shall not be considered authorization to proceed with the Work prior to the issuance of a formal change order, nor shall such request justify any delay in existing Work. Lump sum quotations for alterations to the Work shall include substantiating documentation with an itemized breakdown of the Contractor and subcontractor costs, including labor, Material, rentals, and approved services, overhead, and profit calculated as specified under payment method "3" in (B) of this Subsection.

3. In payment methods "1" and "2" of (B) of this Subsection, the Contractor's quotations for change orders shall be in writing and firm for a period of thirty (30) days. Any compensation paid in conjunction with the terms of a change order shall comprise total compensation due the Contractor for the Work or alteration defined in the change order. By signing the change order, the Contractor acknowledges that the stipulated compensation includes payment for the Work or alteration plus all payment for the interruption of schedules, extended overhead, delay, or any other impact claim or ripple effect, and by such signing specifically waives any reservation or claim for additional compensation or time in respect to the subject of the change order.

4. The Contractor shall perform extra Work at prices agreed upon between Contractor and City, but in no event exceeding unit prices established in the Contract. When such order pertains to Work of a class or classes for which no unit prices are established, the agreed adjustment will be based either on unit prices decided on fair and equitable grounds or will be a lump sum similarly decided, as City may determine, or such Work may be done as extra Work at Force Account. The Contractor shall not make any claim for extra Work unless ordered as such.

110.11.B PAYMENT METHODS

1. METHOD 1 UNIT PRICES

   a. If applicable, those unit prices stipulated in the Bid or unit prices negotiated and mutually acceptable to the Contractor and the City Engineer.

2. METHOD 2 LUMP SUM

   a. A total sum for the Work negotiated and mutually acceptable to the Contractor and the City Engineer.

3. METHOD 3 FORCE ACCOUNT WORK

   a. The Contractor shall perform Work on a Force Account basis upon written notice from the City Engineer. Payment will be made as set forth herein.

   b. The Contractor must maintain records in such a manner as to provide a clear distinction between direct cost of Work performed on Force Account basis and costs of all other operations performed in connection with the Contract.

c. Daily, furnish to the City Engineer signed reports itemizing Materials used and setting forth the cost of labor and charges for Equipment rental, delineating whether said Equipment is Contractor or subcontractor owned. Provide names, identifications, and classifications of workmen, the hourly rate of pay and hours worked, and the size, type and identification number of Equipment and hours of Equipment operation. Substantiate Material charges by vendor's invoices, submit such invoices with the reports; or, if not available, submit with subsequent reports. In the event said vendor's invoices are not submitted within forty-five (45) days after completion of the Force Account Work, the City reserves the right to establish the cost of such Materials.

d. The City Engineer will review the records and reports furnished by the Contractor, make any necessary adjustments, compile the costs of Work paid for on a Force Account basis and issue a change order covering the Work.

e. When Work is ordered to be paid for on a Force Account basis, such Work will be paid for on the basis of cost, plus a negotiated percentage allowance, not to exceed the maximum set forth herein.

f. Items of cost for which payment will be made and to which payment will be restricted, together with the maximum percentage allowance applicable to the respective items, are as follows:

ITEMS OF COST FOR WHICH PAYMENTS WILL BE MADE	MAXIMUM PERCENTAGE ADDITIONAL ALLOWANCE TO ACTUAL COSTS
Labor, while engaged directly on Force Account Work	20%
Materials and supplies used on Force Account Work	15%
Rental on Equipment having a value in excess of $300	No allowance except as provided in Subsection (B.3.i) through (B.3.l) below

g. Payment for labor used in the Work will be computed at the rates actually paid by the Contractor, but not to exceed prevailing straight time rates established by the Oregon Bureau of Labor and Industries, plus allowable allowance set forth above. Time allowed shall be the number of hours worked directly on Force Account operations. The employer's cost for accident and unemployment compensation premiums, labor insurance cost, public liability and property damage insurance costs and fringe benefits will be included in the direct labor cost item before applying the additional allowance. Any overtime worked on Force Account operations will be compensated at the straight time rates unless previous approval was obtained from the City Engineer.

h. Payment for Materials and supplies used on Force Account Work must be supported by paid invoices. The Contractor and subcontractors shall take advantage of all practicable discounts on bills for Materials and supplies, and such discounts shall be reflected on all bills and invoices submitted to the City for payment. Freight will be considered to be part of the cost of Materials and supplies and will be paid for as Materials and supplies. Materials and supplies will be paid for as agreed in writing prior to their production or use. If there is no price agreement, the City Engineer shall establish a reasonable price for such Materials and supplies.

i. For the use of the Contractor's Equipment, the Contractor will be paid at the monthly rental rates and the hourly operating costs set forth in the current edition of the "Rental Rate Blue Book for Construction Equipment" and the "Rental Rate Blue Book for Older Construction Equipment" which are published by the Equipment Guidebook Company, 2800 W. Bayshore Road, Palo Alto, California 94303. Reference copies of the above publications are on file at the Oregon Department of Transportation and the area offices of the Associated General Contractors of America. While using the Blue Book to determine allowable rental rates for Equipment, the hourly rate will be calculated by using the monthly rate as set forth in the book, divided by one-hundred seventy-six (176) hours. The rental rates will be the total compensation for all costs including fuel, supplies, repairs, and renewals. No further allowance will be made for these items. For the use of Equipment not listed in said documents, the rental rates shall be as agreed to in writing between the Contractor and the City Engineer prior to use of said unlisted equipment. If there is no prior agreement, the City Engineer shall establish a reasonable price for such Equipment.

j. Time allowed for the Contractor's Equipment shall be only the number of hours that the Equipment actually operated directly on Force Account Work.

k. Compensation on Equipment not owned by the Contractor will not exceed the rates actually paid by the Contractor and must be supported with an invoice that represents an arm's length transaction. The Contractor and the City Engineer will agree on the Equipment to be used and the appropriate rental rates before using said Equipment on Force Account Work. If prior approval is not obtained, the City Engineer will establish the rates by either comparing the available Equipment and using the applicable rate for the least expensive Equipment that will accomplish the Work, or utilizing the applicable Blue Book rates as established above. Rental cost for Equipment not owned by the Contractor will be established so as to minimize the cost to the City. The hourly rate will be used unless the accumulated cost using the hourly rate exceeds the accumulated cost using the daily rate. The daily rate will be used unless the accumulated cost using the daily rate exceeds the accumulated cost using the weekly rate. This system will be expanded to utilize monthly or yearly rates as appropriate. These rental rates will be considered total compensation for all costs, including move-in, move-out, fuel, supplies, repairs, and renewals. No further allowance will be made for these items without specific approval of the City Engineer before the Work is commenced. Payment for rental on Equipment not owned by the Contractor shall be at the rental costs so determined, plus a negotiated percentage not to exceed the allowance for Materials and supplies.

l. Individual pieces of Equipment having a value of $350 or less will be considered to be tools or small Equipment, and no rental will be allowed on such, unless not normally on Work site and must be rented from others. Then Subsection 110.11.B.3.k above will apply.

m. No standby charges will be considered as a compensable part of any Force Account Work. When a piece of Equipment and operators thereof are hired, rented, or furnished as a unit, (owner/operator), the additional percentage to be allowed shall be five percent (5%) and the Contractor shall not be entitled to twenty percent (20%) on the time of operators of such Equipment. Neither shall the Contractor be entitled to payment for contributions made under terms of the Worker's Compensation Act, Unemployment Compensation Act, or Social Security Act or any other benefits to cover the time of these operators.

n. The percentage allowances made to the Contractor in accordance with terms outlined herein will be full reimbursement and compensation for all supervision, use of tools and small Equipment, overhead expense, Bond costs, record keeping expense, insurance premiums, profits, indirect costs, and all other items of cost not specifically designated herein as items for which payment is to be made, whether or not the services, costs, and other items involved are furnished or incurred by the Contractor or subcontractor.

o. When Work is performed on a Force Account basis by a subcontractor, the Contractor will be allowed a supplemental markup of five percent (5%) on amount charged by subcontractor, provided the City will pay no more than a reasonable amount for Work performed by a subcontractor.

4. METHOD 4 PAYMENT DETERMINED BY THE CITY ENGINEER

a. In case no other basis can be agreed upon and the City Engineer has not directed the Work to be paid for on a Force Account basis, then an allowance may be made, either for or against the Contractor, in such amount as the City Engineer may determine to be fair and equitable.

110.12 COMPLETION, FINAL PAY ESTIMATE, AND FINAL PAYMENT

110.12.A SUBSTANTIAL COMPLETION

1. The Contractor shall notify the City Engineer in writing when all or a portion of the Work is considered substantially complete. Substantial completion of the Work under the Contract shall be understood to be not less than ninety-seven and one-half percent (97.5%) of the Work. If it appears to the City Engineer that the Work is not substantially complete, the City Engineer shall not authorize an inspection. The City Engineer may provide a general list of major Work components remaining before inspection will be authorized.

a. If it appears that the Work is substantially complete, the City Engineer shall, within fifteen (15) days after receiving notice, authorize an inspection and determine if the Work is substantially complete. If the Work is not substantially complete, the City Engineer shall notify the Contractor of the Work that must be performed prior to requesting another inspection.

b. If substantially complete, the City Engineer shall prepare a Notice of Substantial Completion. The Notice will include a general list of items (Punch List) remaining to be completed. The date of substantial completion of all the Work shall stop the accrual of liquidated damages, if applicable.

c. After acceptance of the Notice of Substantial Completion by both parties, the City may elect to begin using the work. If the City so elects, the City shall be responsible for operation and maintenance of the Work utilized. Contractor shall continue to be responsible for the Warranty requirements of Subsection 108.21, protection of the Work as required by Subsection 106.18, and all other applicable terms of the Contract.

110.12.B FINAL COMPLETION

1. Notify the City Engineer in writing when Work is one-hundred (100%) complete. If it appears to the City Engineer that the Work is not one-hundred (100%) complete, the City Engineer will not authorize a Final Inspection. The City Engineer may provide a general list of major Work components remaining. If it appears that the Work is one-hundred percent (100%) complete, the City Engineer will, within fifteen (15) days after receiving notice, authorize a Final Inspection and either accept the Work or notify the Contractor of Work yet to be performed.

2. If the Work is one-hundred percent (100%) complete, the City Engineer shall prepare a final pay estimate and Notice of Final Completion accepting the Work as of a certain date. A Notice of Final Completion shall not be prepared until all provisions of the Contract have been met, including but not limited to, the submission by the Contractor of a signed Certificate of Compliance. The Contractor shall execute and return the final pay estimate and Notice of Final Completion within five (5) working days of receipt. Unless otherwise provided as a Special Provision, when the City Administrator accepts the Notice of Final Completion, the date the Contractor signs the Notice of Final Completion shall be the date the City accepts ownership of the Work and the start date of the Warranty period.

3. The City Engineer shall include in the final pay estimate an addition to the Contract price for any Contract incentive or a deduction from the Contract price for any liquidated damages and a deduction from the Contract price in a fair and equitable amount for any damages to the City or for any costs incurred or likely to be incurred by the City due to the Contractor's failure to meet the Contract Documents other than timely completion.

110.12.C If the Contractor believes the quantities and amounts specified in the final pay estimate prepared by the City Engineer to be incorrect, the Contractor shall submit to the City Engineer within five (5) working days of receipt of the City Engineer's final pay estimate, an itemized statement of any and all claims for additional compensation under the Contract which are based on differences in measurements or errors of computation. Any such claim not so submitted and supported by an itemized statement within said period is expressly waived and the City shall not be obligated to pay the same. Nothing contained herein shall limit the requirements of Section 111.

110.12.D The Contractor shall commence any suit or action to collect or enforce the claim or claims for any additional compensation arising from errors of computation in the final estimate within a period of 1-year following the original mailing of the City Engineer's final estimate and Notice of Final Completion to the Contractor's last known address as shown in the records of the City Engineer. The City Engineer's issuance of a revised final estimate pursuant to this Subsection does not alter the original final estimate date. If said suit, action, or proceeding is not commenced in said 1-year period, the final estimate and Notice of Final Completion or revised final estimate and Notice of Final Completion, if revisions are made, shall be conclusive with respect to the amount earned by the Contractor, and the Contractor expressly waives any and all claims for compensation and any and all causes of suit or action for the enforcement thereof that the Contractor might have had.

110.12.E Upon return of the fully executed Notice of Final Completion from the Contractor, the City Engineer will submit the Notice of Final Completion and final estimate to the City Administrator for approval. Upon approval and acceptance by the City Administrator, the Contractor will be paid a total payment equal to the amount due under the Contract including retainage within thirty (30) days in accordance with ORS 279C.570.

110.12.F Monies earned by the Contractor are not due and payable until the procedures set forth in the Contract for inspection, approval, and acceptance of the Work; for determination of the Work done and the amount due therefore; for the preparation of the final estimate and Notice of Final Completion and processing the same for payment; for consideration of the Contractor's claim, or claims, if any; and for the preparing of a revised final estimate and Notice of Final Completion and processing same for payment all have been carried out.

110.12.G As a prerequisite to final payment, if the Contractor is not domiciled in or registered to do business in the State of Oregon, the Contractor will provide the City Engineer with evidence that the requirement of ORS 279A.120(3) has been satisfied.

110.12.H If the City declares a default of the Contract, and Surety completes the Contract, all payments made after declaration of default and all retainage held by the City shall be paid to surety and not to the Contractor in accordance with the terms of the Contract.

110.12.I Unless otherwise specifically noted and documented as required in this Subsection, acceptance by the Contractor of final payment shall release the City, City Engineer, and the Design Engineer from any and all claims by the Contractor whether known or unknown, arising out of and relating to the Work. No payment, however, final or otherwise, shall operate to release the Contractor or its Sureties from warranties or other obligations required in the performance of the Contract.

111 DISPUTE RESOLUTION: DISAGREEMENTS, PROTESTS AND CLAIMS, MEDIATION, ARBITRATION AND LITIGATION/APPEALS

111.01 GENERAL

111.01.A This Section details the process through which the parties agree to resolve any dispute or disagreement concerning additional compensation or concerning a combination of compensation and Contract time. These provisions do not apply to disagreements concerning only Contract time (see Subsection 109.18) or return of liquidated damages.

111.01.B The City will not consider direct disagreements, protests, or claims from subcontractors, suppliers, or any other entity not a party to the Contract.

111.02 PROCEDURE FOR RESOLVING DISAGREEMENTS/DISPUTES

111.02.A When disagreements occur, the Contractor shall first pursue resolution through the City Engineer of all issues in the dispute, including without limitation the items to be included in the written notice in Subsection 111.03.

111.02.B If the discussion fails to provide satisfactory resolution of the disagreement, the Contractor shall follow the protest procedures outlined in Subsection 111.03.

111.02.C If the City Engineer denies all or part of the Contractor's protest, and the Contractor desires to further pursue the issues, the Contractor must submit a claim for processing according to Subsection 111.04.

111.03 PROTEST PROCEDURE

111.03.A GENERAL

1. If the Contractor disagrees with anything required in a Change Order or other written or oral order from the City Engineer, including any direction, instruction, interpretation, or determination, or if the Contractor asserts a disagreement or dispute on any other basis, except Section 110.12, that, in the Contractor's opinion, entitles or would entitle the Contractor to additional compensation or a combination of compensation and Contract Time, the Contractor shall do all of the following in order to pursue a protest and preserve its claim.

111.03.B ORAL NOTICE

1. Give oral notice of protest to the City Engineer and outline the areas of disagreement before starting or continuing the protested Work.

111.03.C WRITTEN NOTICE

1. File a written notice of protest on ODOT form 734-2887 with the City Engineer within seven (7) calendar days after receiving the protested order. In the notice the Contractor shall:
    - ❖ Describe the acts or omissions of the City or its agents that allegedly caused or may cause damage to the Contractor, citing specific facts, persons, dates and Work involved;
    - ❖ Describe the nature of the damages;

- ❖ Cite the specific Contract provision(s) that support the protest;
- ❖ Include the estimated dollar cost, if any, of the protested Work, and furnish a list of estimated Materials, Equipment and labor for which the Contractor might request additional compensation; and
- ❖ If additional compensation is estimated to be due, include the estimated amount of additional time required, if any.

2. Failure to comply with these notice requirements renders the notice improper.

111.03.D RECORDS

1. Keep complete records of all costs and time incurred throughout the protested Work, and allow the City Engineer access to those and other supporting records.

2. Provide daily records of protested Work, on a weekly basis, on a schedule to be set by agreement with the City Engineer.

111.03.E COMPARISON OF RECORDS

1. Provide the City Engineer adequate facilities for keeping cost and time records of the protested Work. The Contractor and the City Engineer will compare records and either bring them into agreement at the end of each day, or record and attempt to explain any differences.

111.03.F WORK TO PROCEED

1. In spite of any protest, proceed promptly with the Work ordered by the City Engineer.

111.03.G EVALUATION OF PROTEST

1. The City Engineer will promptly evaluate all protests after the Contractor has fully complied with the requirements described in Section 111.03.C. If the protest is denied, the City Engineer will notify the Contractor in writing of the reasons for full or partial denial. If a protest is found to be valid, the City Engineer will, within a reasonable time, make an equitable adjustment of the Contract. Adjustment of time will be evaluated according to Subsection 109.18

2. The City Engineer has no responsibility for evaluating and may reject a protest that does not comply with Section 111.03.C. If the protest is rejected, the City Engineer will notify the Contractor in writing of the reasons for rejection.

111.03.H PROTEST EVALUATION BY NEUTRAL THIRD PARTY

1. If the City Engineer agrees that the Contractor has fully complied with the requirements described in Subsection 111.03.C, and if the City Engineer fully or partially denies, in writing, the Contractor's protest according to Subsection 111.03.G, the Contractor may request that a mutually selected Neutral Third Party review the protest. Procedures for selecting, using, and paying for the cost of the Neutral Third Party will be specified by Change Order.

2. If the Contractor does not accept the City Engineer's evaluation of the protest, or either the Contractor or City Engineer disagrees with the resolution recommended by the Neutral Third Party, the Contractor may pursue a claim as described in Subsection 111.04.

111.04 CLAIMS PROCEDURE

111.04.A GENERAL

1. If the Contractor believes that additional compensation is due, and has pursued and exhausted all the procedures provided in Subsection 111.02 and Subsection 111.03 to resolve a disagreement and protest, the Contractor may file a claim. If the requirements of Subsection 111.03, have not been met, or if a claim is not filed as provided in Subsection 111.04, the Contractor waives any claim for additional compensation or for a combination of additional compensation and Contract time.

2. The City's Contract is with the Contractor. There is no contractual relationship between the City and any subcontractor, suppliers, or any entity other than the Contractor. It is the Contractor's responsibility to fully evaluate any claim before presenting it to the City. In addition, when a claim includes Work done or costs incurred by any subcontractor, supplier, or any entity other than the Contractor, the Contractor remains solely responsible for presenting the claim to the City.

3. Claims that include Work done or costs incurred by any subcontractors, suppliers, or any entity other than the Contractor will not be considered by the City unless the Contractor has:

   - Completed and provided its own written evaluation of the claim;
   - Verified by its own independent review and evaluation of the amount of compensation sought; and
   - Certified the claim in accordance with Section 111.04.C.6.j (Part 10).

4. No claim shall be made by the Contractor for any loss of anticipated profits because of any alterations or changes made pursuant to the provisions of Subsections 105.05 and Subsection 110.11, nor by reason of any variation between the approximate quantities and the quantities of Work as done. Unless specifically authorized in Subsection 110.11, no allowance will be made for any increased expense, loss of expected reimbursement or loss of anticipated profits suffered or claimed by the Contractor resulting directly from such alterations or changes or resulting indirectly from unbalanced allocation of overhead expense among the Contract items by the Contractor in its offer and subsequent loss of expected reimbursements therefore or from any other cause.

5. The requirements of this Subsection shall apply to claims for additional or extra compensation or time arising from any situation that may occur except for claims of error in the final estimate as provided in Subsection 110.12.

111.04.B CLAIMS NOTIFICATION

1. In any case where the Contractor claims that he/she is entitled to or will be entitled to additional compensation and/or additional Contract time, the Contractor shall notify the City Engineer, in writing, of their intention to make a claim within five (5) days of the occurrence of the event giving rise to the claim. If the Contractor considers any interpretation or order by the City Engineer to require additional compensation or contract time, or is a breach of the Contract, the Contractor shall notify the City Engineer prior to beginning the work or conforming to the interpretation on which the claim is based.

2. The Contractor's written notification shall be a written statement describing the following:

- ❖ The event or the act of omission or commission by the City or its agent that allegedly caused damage to the Contractor;
- ❖ The nature of the claimed damage;
- ❖ The clauses of the Contract or general legal principles upon which the claim is based;
- ❖ The factual occurrences upon which the Contractor bases the claim.

3. Submission of notice of claim as specified shall be mandatory, and failure to comply shall be a conclusive waiver to such claim for damages by the Contractor. Oral notice will not be sufficient nor will notice after the specified time period since it tends to hinder, if not prevent, the City's investigation of the pertinent facts.

4. After said written notification (if the claim is not resolved or withdrawn in writing) and only upon written direction by the City Engineer, proceed without delay to perform the work pursuant to the decision of the City Engineer. While the work on an unresolved claim is being performed, the Contractor shall keep track of costs and maintain records in the manner set forth in Subsection 110.11.B.3, at no cost to the City. Such notice by the Contractor and the fact that the Contractor and the City Engineer are keeping track of costs and maintaining records as required by Subsection 110.11.B.3 shall not in any way be construed as proving the validity of the claim or the costs thereof.

111.04.C CLAIMS REQUIREMENTS

1. A fully documented claims package shall be submitted in writing to the Public Works Director at any time during the progress of the Work, but no later than forty-five (45) days after the occurrence of the event upon which the claim is based and no later than fifteen (15) calendar days following the date of Substantial Completion, claims for additional compensation or a combination of additional compensation and Contract Time additional to that specified in the Contract. A claim not submitted within the above specified time period is deemed waived by the Contractor, and the City may reject it.

2. Written claims to the City by the Contractor shall be delivered to the City of Stayton, Attn: Public Works Director, 362 N. Third Avenue, Stayton, OR 97383 and shall be delivered:

   - ❖ By U.S. Postal Service first class mail or priority mail (which at the sender's option may include certified or registered mail return receipt requested); or
   - ❖ By overnight delivery service of a private industry courier.

3. Claims will be considered as having been received by the City:

   - ❖ At the time of actual receipt or 7 Calendar Days after the postmarked date when deposited for delivery by first class or priority mail, whichever is earlier; or
   - ❖ At the time of actual receipt or 3 Calendar Days after deposit with a private industry courier for overnight delivery service, whichever is earlier.

4. The City reserves the right at any time and at any step in the claim decision or review process to request additional information, records or documentation related to the claim or the Contract either directly or through agents working toward resolution of the disputed or claimed events and issues.

5. Claims shall be made in writing, and shall include all information, records and documentation necessary for the City to properly and completely evaluate the claim.

6. To be considered, claims for additional compensation, or for additional compensation and Contract Time, shall be completed according to Section 111.04 and shall be submitted with the required information and in the format below and labeled as required below for each claimed issue:

   a. (Part 1) Summary (label page 1.1 through page 1.X) - In the summary, include a detailed, factual statement of the claim for additional compensation and Contract Time, if any, with necessary dates and locations of Work involved in the claim and the dates of when the event arose. Also include detailed facts supporting the Contractor's position relative to the City Engineer's decision);

   b. (Part 2) Proof of notice (label page 2.1 through page 2.X) - Submit a copy of ODOT form 734-2887, with all attachments, that was given to the City. Include the date when that written notice and the date when oral notice was given:

   c. (Part 3) Copies of the Contract Specifications that support the Contractor's claim (label page 3.1 through page 3.X);

   d. (Part 4) Theory of entitlement supporting the claim (label page 4.1 through page 4.X) – Include a narrative of how or why the specific Contract Specifications support the claim and a statement of the reasons why such Specifications support the claim;

   e. (Part 5) Itemized list of claimed amounts (label page 5.1 through page 5.X) – Claimed damages that resulted from the event with a narrative of the theories and records and documents used to arrive at the value of the damages;

   f. (Part 6) Additional Contract Time requests (label page 6.1 through page 6.X) - If the claim is for a combination of additional compensation and Contract Time, submit a copy of the schedule that was in effect when the event occurred and a detailed narrative which explains how the event impacted Contract Time. In addition, if an City-caused delay is claimed:

      - Include the specific days and dates under claim;
      - Provide detailed facts about the specific acts or omissions of the City that allegedly caused the delay, and the specific reasons why the resulting delay was unreasonable; and
      - Provide a schedule evaluation that accurately describes the impacts of the claimed delay. Also see Section 109.18 for additional requirements regarding claims for Contract Time and causes that are eligible and ineligible for consideration;

   g. (Part 7) Copies of actual expense records (label page 7.1 through page 7.X) – Include documents that contain the detailed records and which support and total to the exact amount of additional compensation sought. Include the information and calculations necessary to support that amount. That amount may be calculated on the basis of Section 110.11.B.3, if applicable, or may be calculated using direct and indirect costs presented in the following categories:

      - Direct Materials;
      - Direct Equipment. The rate claimed for each piece of Equipment shall not exceed the actual cost. In the absence of actual Equipment costs, the Equipment rates shall not exceed 75 percent of those calculated under the provisions of Section 110.11.B.3. For each piece of Equipment, the Contractor shall include a detailed description of the Equipment and attachments, specific days and dates of use or standby, and specific hours of use or standby;

- ❖ Direct labor;
- ❖ Job overhead;
- ❖ General and administrative overhead; and
- ❖ Other categories as specified by the Contractor or the City;

h. (Part 8) Supporting records and documents (label page 8.1 through page 8.X) – Include copies of, or excerpts from the following:

- ❖ Any documents that support the claim, such as manuals standard to the industry and used by the Contractor; and
- ❖ Any daily reports or diaries related to the event, photographs or media that help explain the issue or event (optional), or all other information the Contractor chooses to provide (optional);

i. (Part 9) Certification (label page 9.1 through 9.X) - A certified statement, signed by a person authorized to execute Change Orders, by the Contractor, subcontractor, Supplier, or Entity, originating the claim, as to the validity of facts and costs with the following certification:

Under penalty of law for perjury or falsification, the undersigned, (Name), (Title), (Company) certifies that this claim for additional compensation for Work on the Contract is a true statement of the actual costs incurred (in the amount of $_____, exclusive of interest) and is fully documented and supported under the Contract between the parties.
Signature:
Date: _____, 20___
Subscribed and sworn before me this ____ day of _____, 20___
Notary Public
My commission expires.

j. (Part 10) Contractor evaluation of a lower tier claim (label page 10.1 through 10.X) - If the claim includes Work done or costs incurred by any subcontractors, Suppliers, or any Entity other than the Contractor, the following are required:

- ❖ Data required by the other Subsections of 111.04;
- ❖ Copies of the contractor's, subcontractor's, supplier's and entity's, at all tiers above the level of which the claim originates, separate evaluation of entitlement;
- ❖ Copies of the contractor's, subcontractor's, supplier's and entity's, at all tiers above the level of which the claim originates, independent verification and evaluation of the amount of damages sought; and
- ❖ A person authorized to execute Change Orders on behalf of the contractor, subcontractor, supplier and entity, at all tiers above the level of which the claim originates, must sign a statement with the following certification:

Under penalty of law for perjury or falsification, the undersigned, (Name) (Title), (Company) certifies that this claim originating from the subcontractor, supplier or entity (Company) for additional compensation for Work on the Contract is a reasonable statement, independently verified, of the costs incurred (in the amount of $_____, exclusive of interest) and is fully documented and supported under the Contract between the parties.
Signature:
Date: _____, 20___
Subscribed and sworn before me this ____ day of _____, 20__
Notary Public
My commission expires.

7. If the Public Works Director determines that additional information, records or documentation is needed to allow proper evaluation of the claim submittal, the Public Works Director will request the information, records or documentation. The Contractor shall submit to the Public Works Director within 14 Calendar Days, or as otherwise agreed by the parties, the required additional information, records and documentation.

8. If the Public Works Director determines that the claim submittal with the additional information, records and documentation submitted is incomplete and not accepted as a claim, the Public Works Director will notify the Contractor in writing and the submittal will be rejected and will not be considered under Section 111.06.

111.04.D RECORDS REQUIRED

1. The Contractor shall keep full and complete records of the costs incurred for the submitted claim in accordance with Section 108.06. These records shall include all worksheets used to prepare the claim establishing the cost components for items of the claim.

111.04.E COMPLIANCE REQUIRED

1. Full compliance by the Contractor with the provisions of this Section is a condition precedent to the commencement of any exercise by the Contractor to pursue any claim.

2. Provided the claim or claims have been submitted in accordance with the requirements of this Subsection, the Public Works Director will, as soon as possible, consider and investigate the claim or claims of the Contractor for additional compensation. The Public Works Director will promptly advise the Contractor of the decision to accept or reject the claim or claims, in full or in part.

3. The Contractor shall commence any exercise to pursue any claim filed in accordance with this Subsection within a period of six (6) months following the mailing of the Public Works Director's full or partial denial. If said suit is not commenced in said six (6) month period, the Contractor expressly waives any and all claims for additional compensation and any and all causes of suit for the enforcement thereof that the Contractor might have had.

111.05 THE CITY'S RIGHT TO ACCESS TO THE CONTRACTOR'S RECORDS

111.05.A In the event that the Contractor makes a claim under Subsection 111.04 or performs Force Account Work under Subsection 105.07, the City or its designated representative shall have access and a right (at any time) to inspect, audit, and copy the Contractor's books, records, documents, diaries, and logs and other evidence (hereinafter referred to as records) pertinent to performance and payment of the Contract and amendments, change orders, and any claims made in relation to the Contract. If an audit is conducted, it shall be in accordance with generally accepted auditing standards.

111.05.B The Contractor will make its records available within the boundaries of the City of Stayton, Oregon, or pay all additional costs for travel and per diem or other additional expenses incurred by the City in examining, auditing, inspecting, and copying the Contractor's records, by reason of said records not being available within said boundaries.

111.05.C The Contractor shall provide the City and/or its agents access to all Contractor records required to determine the facts, contentions, and costs involved in the claim. The City and/or its agents may perform an audit of these records. The Contractor shall retain all Contract records for a period of at least three (3) years after Final Acceptance of the Project by the City, or until all disputes, including litigation, if any, are resolved (the "record retention period"). The City and/or its agents shall be provided full access to all Contract records during the record retention period.

111.05.D The Contractor agrees to the disclosure of all records and to their admission as evidence in any proceeding between the parties involving a claim or Force Account Work.

111.05.E In the event that the Contractor's records establish a discrepancy, favorable to the City, in the representations the Contractor has made to the City involving claims or Force Account Work, the Contractor shall bear all costs incurred by the City in conducting the audit and inspection provided herein.

111.05.F All costs referenced in (B) and (E) of this Subsection may be withheld and/or deducted from any amount due or that becomes due the Contractor.

111.06 CLAIM DECISION; REVIEW; EXHAUSTION OF ADMINISTRATIVE REMEDIES; MEDITATION, ARBITRATION AND LITIGATION/APPEALS

111.06.A GENERAL

1. The City intends to resolve claims at the lowest possible administrative level. The Public Works Director will also determine whether multiple claims should be advanced separately or together.

2. If the City Engineer denies the claim, in full or in part, pursuant to (A) of this Subsection, the Contractor may request review of the denial. The disputed claim may then be resolved, in full or in part, at any of the progressive steps of claim review procedure as set forth in (C) through (G) of this Subsection.

3. A person authorized by the Contractor to execute Change Orders on behalf of the Contractor must be present and attend all claim hearings.

4. All of the actions and review under each step of the review process shall occur before the review can be advanced to the next higher step. The City Engineer may determine to skip the Step 1: Decision by the City Engineer, in which case the claim or claims will advance to Step 2: Public Works Director.

111.06.B STEP 1: DECISION BY THE CITY ENGINEER

1. Once the Public Works Director determines the City is in receipt of a properly submitted claim, the Public Works Director will arrange a meeting, within twenty-one (21) Calendar Days or as otherwise agreed by the parties, with the City Engineer and the Contractor in order to present the claim for formal review and discussion. The City Engineer will, as soon as practicable, consider, investigate, and evaluate a Contractor's claim for additional compensation, or for additional compensation and Contract time, if submitted as required by Subsection 111.04.

2. If the City Engineer determines that the Contractor must furnish additional information, records or documentation to allow proper evaluation of the claim, the City Engineer will schedule a second meeting to be held within fourteen (14) calendar days, or as otherwise agreed by the parties, at which the Contractor shall present the requested information, records and documentation.

3. The City Engineer will provide a written decision to the Contractor within thirty (30) calendar days of the final Step 1 meeting.

4. If the Contractor does not accept the City Engineer's decision, the Contractor may, within ten (10) calendar days of receipt of the written decision, request in writing that the City Engineer arrange a review at Step 2 (See (C) of this Subsection).

111.06.C STEP 2: PUBLIC WORKS DIRECTOR

1. The Contractor shall request a meeting with the Public Works Director in order to present the denied or partially denied claim for formal review and discussion. The meeting will take place within twenty-one (21) calendar days of the City's receipt of the request, or as otherwise agreed by the parties.

2. If the Public Works Director determines that the Contractor must furnish additional information, records or documentation to allow proper evaluation of the claim, the Public Works Director will schedule a second meeting, to be held within fourteen (14) calendar days, or as otherwise agreed by the parties, at which the Contractor shall present the requested information, records and documentation.

3. The Public Works Director will provide a written decision to the Contractor, subject to 111.07 if applicable regarding the claim within thirty (30) calendar days of the final Step 2 meeting.

4. If the Contractor does not accept the Step 2 decision, the Contractor may, within ten (10) calendar days of receipt of the written decision, request in writing that the City Engineer arrange a review at Step 3 (See (D) of this Subsection).

111.06.D STEP 3: CITY ADMINISTRATOR REVIEW

1. The Contractor shall request a meeting with the City Administrator in order to present the claim for final City review. The presentation will take place within twenty-one (21) calendar days of the City's receipt of the Contractor's written request, or as otherwise agreed by the parties.

2. If the City Administrator determines that the Contractor must furnish additional information, records or documentation to allow proper evaluation of the claim, the City Administrator will schedule a second meeting, to be held within fourteen (14) calendar days or as otherwise agreed by the parties, at which the Contractor shall present the requested information, records and documentation.

3. The City Administrator will provide a written decision to the Contractor, subject to 111.07 if applicable regarding the claim within thirty (30) Calendar Days of the final Step 3 meeting.

4. If the Contractor does not accept the Step 3 decision, the Contractor may, within ten (10) calendar days of receipt of the written decision, request in writing through the City Administrator that the claim be advanced to Step 4, 5 or 6 (See (E), (F) and (G) of this Subsection), as applicable.

5. For purposes of determining which process to use for claims under Step 4, 5 or 6 concerning a combination of additional compensation and Contract Time or for Contract Time only, the value of the claim or portion of the claim for Contract Time will be assumed to be the appropriate Liquidated Damages given in the Special Provisions multiplied by the number of Calendar Days in question. If applicable, advancement of the claim is subject to the provisions of Section 111.07 regarding waiver and dismissal of the claim or portions of the claim.

111.06.E STEP 4: MANDATORY MEDIATION

1. Notwithstanding the formal claims procedure set forth herein, the parties shall enter into nonbinding mediation at any time, in which case the parties may also agree to suspend the time requirements in Section 111 pending the outcome of the mediation process. The rules, time and place for mediation, as well as selection of the Mediator, shall be established in accordance with Oregon Law.

2. Mediation filing costs and any mediator's fees shall be divided equally between the Contractor and the City.

3. Mandatory Mediation shall take place at this step if it has not occurred earlier in the course of the dispute resolution process.

4. If the parties cannot settle the matter through Mediation, then, they shall proceed to Step 5.

111.06.F STEP 5: ARBITRATION; CLAIMS REVIEW BOARD

1. CLAIMS LESS THAN $50,000

   a. At this step, the claim will be resolved by binding arbitration before a single arbitrator according to the Construction Industry Arbitration Rules of the American Arbitration Association or such other arbitration service and rules as agreed by the parties.

   b. Arbitration filing costs and any arbitrator's fees will be divided equally between the City and the Contractor.

   c. The Arbitrator shall be chosen from the list of Arbitrators used by the Marion County Circuit Courts.

2. CLAIMS OF $50,000 TO $500,000

   a. Claims in excess of $500,000 may be reviewed under this step only upon the agreement of the Contractor and the City Administrator pursuant to Subsection 111.06.F.3 below.

   b. The Contractor shall present the claim for binding arbitration to a Claims Review Board (referred to as "Arbitrators" "Board") for consideration, review and resolution. The Board of Arbitrators will be comprised of three persons. The City Administrator and Contractor will select the panel from the qualified individuals listed as arbitrators by the Marion County Circuit Courts.

   c. If a claim within the scope of this step is properly referred for Board consideration and review, copies of biographies of all persons on the arbitration panel will be sent to the City Administrator and the Contractor. Within twenty (20) calendar days after the biographies are mailed, the Contractor and the City Administrator shall each nominate, in writing, three (3) individuals from the panel available to serve on the Board.

d. Within ten (10) calendar days after receipt of the nominations, the Contractor and the City Administrator shall (a) each appoint to the Board one of the three individuals by the other, and (b) inform each other of the appointment. The two (2) appointees, now Board Members, shall select an individual from the panel to serve as the third Board Member. If the two Board Members cannot agree on the selection of the third Board Member, the Circuit Court of Marion County, State of Oregon, will make the selection. In this event, the City Administrator will act through the City's legal counsel to request the Circuit Court to select an individual from the panel to serve as the third Board Member. Once the three Board Members have been selected, the three Board Members will decide which of the three will be the Board Chair.

e. The Board may request the City Administrator to designate a person not associated with the Contract to act as the recording secretary for the Board. The recording secretary is not a Board member, and will only assist the Board with administrative tasks related to its consideration and review of the referred claim.

f. The City and the Contractor will equally share the costs of the arbitrators serving as Board members. The City will pay the costs of the Board's recording secretary.

g. Members of the Board are to act impartially and independently as arbitrators in the consideration of facts and conditions surrounding the dispute. Board rulings/decisions concerning the dispute shall be binding on the parties.

h. The Board will schedule and conduct an informal hearing at which the Contractor and the City will each have an opportunity to present evidence and argument. The Contractor and the City shall each submit a brief written summary of the claim to each Board member and the other party at least ten (10) calendar days before the hearing. Unless directed otherwise by the Board Chair, the summary shall include, for each issue under dispute:

- A short statement describing the disputed issue;
- A short position statement by the party on the issue;
- A clear and concise explanation of the contractual basis for that position, including specific reference to Contract Documents;
- A clear and concise description of the costs claimed for each issue, including without limitation specific documents demonstrating productivity, time and costs; and
- Exhibits, including without limitation copies of Plan sheets, extracts from the Standard Construction Specifications, Supplemental Specifications, and Special Provisions, correspondence, photographs, or other evidence to support the position.

i. The proceedings will be conducted in a manner determined by the Chair, in consultation with the other Board members following guidelines appropriate for arbitration proceedings under Oregon Law. Unless directed otherwise by the Chair, the hearing will be conducted according to the following guidelines:

- The hearing will be informal;
- The witnesses will be sworn;
- The Contractor will present its case first;
- The City will then present its case;
- Both parties will then have opportunity to present rebuttal;
- The Board may ask questions and, to promote open discussion of the issues, both parties may respond or emphasize issues;

- ❖ The parties' attorneys may observe the hearing and may respond to direct questions from the Board, and may make factual presentations or legal arguments; and
- ❖ The Board will conclude the hearing when it appears to the Board Chair that each party has had sufficient opportunity to support its case and the Board has no further questions.

j. Within ten (10) calendar days after conclusion of the hearing, the Board will forward to the City's designated representative and the Contractor the Board's written decision resolving the claim. Within ten (10) calendar days of its receipt of the Board's recommendation, the City will provide to the Contractor the City's written decision regarding the claim.

k. The Board's decision shall be binding on the parties subject to appeal in accordance with 111.06.G STEP 6 below. If the Contractor does not accept the Board's decision regarding the claim, the Contractor may proceed to litigation and appeals as described in Step 6 (See (G) of this Subsection).

3. CLAIMS OVER $500,000

a. Claims Over $500,000 - If the Contractor and the City Administrator agree, the parties may employ the Step 5 Board review process according to Section 111.06.F.2. If not, the Contractor may proceed to Step 6 (see (G) below).

111.06.G STEP 6: LITIGATION

1. This step applies to:
   - ❖ Litigation of claims over $500,000 and;
   - ❖ Appeals of City decisions issued under Step 5 at Subsection 111.06.F.2 above according to ORS 36.600 through ORS 36.740.

2. The Contractor must follow each step in order, and exhaust all available administrative remedies before resort to litigation. Lawsuits must be properly filed in a court of competent jurisdiction within six (6) months from the date of the final decision that exhausted the Contractor's available administrative remedies under this Section 111.

3. The Contractor shall comply with Section 108.06.

111.07 REVIEW OF DETERMINATION REGARDING RECORDS

111.07.A If not all of the records requested by the Public Works Director under Section 111.06.C Step 2 were provided, then the Public Works Director will determine:

- ❖ If the records are of the type described in Section 108.06; and
- ❖ If the records have not been maintained or the records, or access to the records, has not been provided to the City as required by Section 108.06 and this Section; and
- ❖ If the records are material and necessary for proper evaluation of part or all of the claim; and
- ❖ The portions of the claim for which the records are material and necessary for proper evaluation.

111.07.B If the Public Works Director makes the foregoing determinations, then subject to the review process described below, all portions of the claim for which the Public Works Director determined the records are material and necessary for proper evaluation are immediately waived and irrevocably dismissed.

111.07.C Even if the records have not been maintained or the records, or access to the records, have not been provided to the City in a given instance, the Public Works Director may determine that sufficient records have been provided for the City to properly evaluate the claim in that instance. If the Public Works Director makes this determination, the claim or portions of the claim will not be waived or dismissed under this provision.

111.07.D If the Contractor does not accept the Public Works Director's written determination that the records are material and necessary for proper evaluation of part or all of the claim, and the portions of the claim for which the records are material and necessary, the Contractor may, within 14 Calendar Days of receipt of the Public Works Director's determination, request, in writing, a review of such determination by the City Administrator. If the Contractor does not request a review of the Public Works Director's determination, the Public Works Director's determination shall then become the City's final determination as of the expiration of the time limit to request review.

111.07.E If the Contractor requests the review, the City Administrator will schedule a review meeting within 14 Calendar Days, or as otherwise agreed by the parties, of when the City Administrator receives the written review request.

111.07.F The City and the Contractor will each have an opportunity to explain their respective positions at the review meeting in a manner determined by the City Administrator.

111.07.G Within 10 Calendar Days of the review meeting, the City Administrator will issue a written proposed finding of whether the records not maintained or not provided to the City, or for which access was not provided to the City, are material and necessary for proper evaluation of part or all of the claim.

111.07.H If the City Administrator makes that finding, then the City Administrator will also make a proposed written finding as to what portions of the claim the records are material and necessary and, therefore, waived and irrevocably dismissed.

111.07.I Even if the records have not been maintained or the records, or access to the records, have not been provided to the City in a given instance, the City Administrator may determine that sufficient records have been provided for the City to properly evaluate the claim in that instance. If the City Administrator makes this determination, then the claim or portions of the claim will not be waived or dismissed under this provision.

111.07.J The City Administrator's proposed findings will be submitted to the Contractor. The Contractor may submit written objections concerning the proposed findings to the City Administrator within 5 Calendar Days of receipt of such findings. If written objections are submitted, the City Administrator may adopt or modify the proposed findings, and the City Administrator's findings shall be the City's final determination. If no written objections are submitted within the 5 Calendar Day time limit, the City Administrator's proposed findings shall then become the City's final determination as of the expiration of the time limit to submit written objections.

111.07.K If the City's final determination is that the records are material and necessary for proper evaluation of part or all of the claim, then the claim or that portion of the claim for which the records are material and necessary is waived and irrevocably dismissed, unless the Contractor provides the records, or access to the records, to the City Administrator within 5 Calendar Days of the City's final determination. If the Contractor provides the records, or access to the records, within this time limit, the City Administrator will schedule a meeting with the Contractor within 14 Calendar Days or as otherwise agreed by the parties, to discuss the records.

111.07.L The City's final determination that records are material and necessary for proper evaluation of part or all of the claim, and the City's final determination of the portions of the claim for which the records are material and necessary, shall be final and binding.

111.07.M If the entire claim is waived and irrevocably dismissed pursuant to the City's final determination there will be no further decision by the City on the claim or further review of the claim under Section 111.06. If only portions of the claim are waived and irrevocably dismissed pursuant to the City's final determination, the City Administrator will provide a written decision to the Contractor regarding the remaining portions of the claim within 30 Calendar Days of the final Step 2 meeting, or the City's final determination regarding the records, whichever is later. There will be no further decision by the City on or further review under Section 111.06 of the portions of the claim waived and irrevocably dismissed pursuant to City's final determination.

END OF DIVISION

DIVISION 2 – GENERAL TECHNICAL REQUIREMENTS

DIVISION 2

GENERAL TECHNICAL REQUIREMENTS

201 MOBILIZATION

201.01 DESCRIPTION

201.01.A This section covers, but is not limited to, work necessary to obtain all bonds, insurance, licenses, and permits; move in personnel and equipment; set up all offices, buildings, and facilities; provide all required light, power, and water; install project information signs if required; prepare for construction completion; demobilize, including removal of all facilities; and all other work to successfully complete the project that is not covered in other bid items.

201.02 MATERIALS

201.02.A Provide all materials required to accomplish the work as specified.

201.03 CONSTRUCTION

201.03.A Set up construction facilities in a neat and orderly manner within designated or approved work areas. Provide for an acceptable material and equipment storage area. Supply all labor and equipment necessary to accomplish the work as specified. Conform to applicable requirements of Section 106 including, but not limited to, required notifications, protection of surveying monuments and other markers, temporary traffic control, temporary utility connections, protection of property, water and air pollution, and noise.

201.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

201.04.A LUMP SUM BASIS

1. When mobilization is listed as a separate pay item on the Bid, it will be paid for on a lump sum basis. Normal retainage will be deducted from partial payments. Progress payments for mobilization will be equal to the percentage of total work completed and accepted by the City.

201.04.B INCIDENTAL BASIS

1. When not listed in the Bid, all mobilization costs will be considered incidental work for which no separate payment will be made.

202 TEMPORARY TRAFFIC CONTROL

202.01 DESCRIPTION

202.01.A This section covers all work necessary to conduct construction operations so as to offer the least possible obstruction and inconvenience to the public and to protect pedestrian and vehicular traffic.

202.01.B REQUIRED SUBMITTAL

1. Formulate and submit a Temporary Traffic Control Plan and a work schedule to minimize the disruption of traffic in conformance with the Manual on Uniform Traffic Control Devices (MUTCD), current edition, published by the U.S. Department of Transportation, and the Oregon supplements to the Manual published by the Oregon Department of Transportation.

2. For Temporary Traffic Control zones of three (3) days or less, the Oregon Temporary Traffic Control Handbook, prepared by the Oregon Department of Transportation, as a supplement to the Manual on Uniform Traffic Control Devices may be used in preparation of the required Temporary Traffic Control Plan.

3. Plan shall be submitted at the pre-construction conference. If no conference is held, plan shall be submitted at least five (5) working days in advance of beginning work, ten (10) working days in advance of beginning work if a street closure is involved. Obtain approval of plan and schedule from City Engineer and any other governing authority before commencing work. Allow traffic to pass through the work with as little inconvenience and delay as possible.

4. The Temporary Traffic Control Plan shall contain a complete signing plan for semi-permanent and portable signs, barricades, and other traffic control provisions to keep the signs or devices current with the construction activities and the illumination of all detours and obstructions during hours of darkness. Be responsible for furnishing, installing, and maintaining all traffic control devices. Maintain these devices at all times including non-working hours.

5. The following information must be included in all Temporary Traffic Control Plans prior to submitting for approval:

   - ❖ State date and time of day that construction will take place.
   - ❖ Specify what kind of work is being performed.
   - ❖ Provide name and number of person who can be contacted at all hours in case of emergency.

6. Approval by the City Engineer of a general submittal for Temporary Traffic Control that does not identify specific request(s) for variance to the standards, such as outside lane restrictions of normal hours, will be deemed a denial of those specific items.

7. It will be the Contractor's responsibility to ensure that all Temporary Traffic Control Plans follow the guidelines as outlined in the MUTCD.

8. Temporary Traffic Control Plans shall conform to the applicable requirements of other jurisdictional agencies including the Marion County and ODOT if the work is located within other jurisdictional right of ways.

9. Contractor is required to notify and provide a copy of the Temporary Traffic Control Plan to the fire department, police department and all other emergency service providers, school bus services and other bus services if lane closure is on a bus route, after the Temporary Traffic Control Plan has been approved, and a minimum of 48-hours prior to scheduled construction.

202.02 MATERIALS

202.02.A UNIFORM TRAFFIC CONTROL DEVICES

1. The term “traffic control devices” shall include barricades, detour and warning signs, traffic delineators, flagpersons, and any other devices or personnel of whatever nature or function that are necessary to conduct construction operations in a manner that will protect the public and offer the least possible obstruction and inconvenience to motorists and pedestrians.

2. Provide barricades, signs, and traffic control devices built in conformance with the Manual on Uniform Traffic Control Devices (MUTCD), current edition, published by the U.S. Department of Transportation, and the Oregon supplements to the Manual published by the Oregon Department of Transportation.

202.03 CONSTRUCTION

202.03.A GENERAL

1. The Contractor shall assign at least one appropriately trained and certified person on each project to have day-to-day responsibility for assuring that the traffic control elements are operating effectively and that any needed operational changes are brought to the attention of their supervisors.

2. Use flag persons and provide and maintain such signs, barricades, warning lights, and other traffic control devices in conformance with the manuals referenced in Subsection 202.01.B. Adequately warn the public at all times of existing conditions on all streets affected by work operation.

3. Patrol the construction area at least twice daily and reset all disturbed signs and traffic control devices immediately. Remove or cover non-applicable signs when not needed. Prior to closing or partial closing of any street, conform to Subsection 106.11.G.

4. The Contractor shall be responsible for damages to property, injury to persons, loss, expense, inconvenience, and delay caused by or resulting from any act, omission, or neglect of the Contractor, the Contractor's subcontractors and suppliers, or their employees while performing the work.

5. Road users should be guided in a clear and positive manner while approaching and within construction, maintenance, and utility work areas.

6. Do not stop or hold vehicles, block driveways, intersections, or connections for more than five (5) minutes unless otherwise authorized. Allow emergency vehicles immediate passage.

7. Provide and maintain, in a safe and functional condition, temporary access to business and residence driveways, temporary intersections, and temporary connections with roads, streets, bikeways, sidewalks, and footpaths.

8. While working on subgrade and other construction, provide adequate access to business, residences, intersections, and connections by maintaining existing gravel connections with well graded aggregate ramps and existing asphalt and concrete connections with temporary cold or hot mix asphalt ramps. Dispose of the temporary material in a manner satisfactory to the Manager.

9. Provide approved access to private properties at all times, except during stages of construction when it is impractical to perform construction and maintain access to private property simultaneously, as determined by the City Engineer. When access is to be denied, notify occupants of affected properties at least 24-hours in advance.

10. Steel road plates are allowed for a maximum of five (5) days per opening and must have a cold mix ramp transition on all edges exposed to traffic. Steel plates shall be removed after five (5) days and will be replaced with either a temporary cold or hot asphalt mix. In either case a smooth transition over the construction project will be required at all times. When Steel road plates shall be placed with temporary cold or hot mix placed around the edges exposed to traffic to form a smooth transition. Steel road plates shall be pinned down at all intersections or roads where the speed limit is higher than 25 MPH. Contractor shall make permanent repairs to the asphalt surface immediately after underground work has been completed.

11. Keep the surface being used by bicycles free of all dirt, mud, gravel, and other harmful materials. These surfaces include bike paths, bike lanes, roadway shoulders, or the outside six (6) feet of the roadway.

12. When, in the judgment of the City Engineer, vehicular parking is a hazard to through traffic or to the work, furnish and place 'NO PARKING' signs on any street that is directly involved in the construction work.

13. At the end of each working day, backfill pavement edge excavations to the elevation of the existing pavement with permanent base material or with temporary wedge of aggregate as shown on the Plans.

14. Do not excavate along both edges of the pavement adjacent to traffic at the same time. Before excavating at the edge of the pavement on the opposite side of the roadway, complete the construction to existing pavement elevation on the side that was excavated first.

15. Remove the temporary wedge of aggregate material, if used, before placing permanent base material, and place it in the shoulder slope area or spread it uniformly over the subgrade.

202.03.B LANE AND SIDEWALK RESTRICTION REQUIREMENTS

1. Obtain the City Engineer's approval before closing any lanes or sidewalks and do not close any lane or sidewalk until the area is signed according to the plans and the requirements of this section.

2. In general the existing lanes of traffic should be open and in operation through the project at all times.

3. One lane may be closed to traffic in the immediate work area but only during hours work is actually performed and in accordance with an approved traffic control plan.

4. All lanes may be closed to traffic if such closure is determined to be in the public's interest. Submit proposed methods of street closure times in each instance to the City Engineer for approval in ample time to allow the traveling public to be notified through the news media.

5. Do not perform work that would restrict or interrupt traffic movement on opposite sides of the traveled way at the same time unless explicitly approved by the City Engineer.

6. More than one intersection cannot be closed concurrently without prior explicit approval by the City Engineer. The Contractor shall notify the Police and Fire Departments in the jurisdiction of the closing and opening of streets. Pedestrian detours shall not exceed one block in length without City Engineer approval and all footbridges shall be provided with adequate handrails.

7. When construction requires the closure of a sidewalk or sidewalk ramp, place a Type "W1" 'SIDEWALK CLOSED' sign at each point of closure. Also use a Type "W1" directional arrow rider, as needed, to direct pedestrian traffic. Mount each sign above the striped panel on a Type II barricade that is placed across the sidewalk facing pedestrians approaching the work area. Close the sidewalk at a point where there is an alternate way to proceed.

8. Do not close any traffic lanes between:

   - 3:00 p.m. on Fridays and 12:00 midnight on Sundays.
   - 12:00 noon on the day preceding legal holidays or holiday weekends and 12:00 midnight on legal holidays or the last day of holiday weekends.

9. For the purposes of this section, legal holidays are as follows:

   - New Year's Day on January 1.
   - Memorial Day on the last Monday in May.
   - Independence Day on July 4.
   - Labor Day on the first Monday of September.
   - Thanksgiving Day on the fourth Thursday in November.
   - Christmas Day on December 25.

10. When a holiday falls on Sunday, the following Monday shall be recognized as a legal holiday. When a holiday falls on Saturday, the preceding Friday shall be recognized as a legal holiday.

202.03.C CONSTRUCTION AND MAINTENANCE OF DETOURS

1. Construct and maintain temporary detours for protection of the work and the safe passage of traffic around work area as required in the contract documents, the MUTCD, or as directed by the City Engineer.

2. When detours are not available, the Contractor shall confine operations to a width that provides for safe passage of traffic. If, in the judgment of the City Engineer, one-way piloted traffic is necessary, the Contractor shall provide at least two flagpersons to control traffic, one flagperson being stationed at each end of the roadway being limited to restricted use, and furnish a pilot car and driver to lead traffic. At the end of each day, the project area shall be left in such condition that it can be traveled without damage to the work and without danger to pedestrians and motor vehicle traffic.

3. Conform to Health and Safety requirements for detours in Subsection 108.07.

202.03.D FLAGGING REQUIREMENTS

1. The Contractor shall provide and maintain such signs, barricades, and warning lights as are necessary to warn and protect the public at all times on highways, roads, or streets affected by work operations. In addition, the Contractor shall also provide all necessary flag persons and guards necessary to warn and protect the public. Each flagger on duty shall wear a hard-hat and vest that conform to ODOT and/or OSHA requirements and shall be equipped with a highly visible, reflectorized "Stop/Slow" hand sign conforming to current standards for daylight use and with illuminated stand area of high visibility for night use.

2. For work zones on low volume rural roads that require flaggers, a single flagger may be adequate if the flagger is visible to approaching traffic from all appropriate directions.

3. QUALIFICATIONS FOR FLAGGERS

   - ❖ Completed and passed an ODOT-approved work zone, traffic control course within the past three (3) years.
   - ❖ The mental and physical ability to provide timely, clear, and positive guidance.
   - ❖ A sense of responsibility for safety of public and work crew.
   - ❖ A neat appearance.
   - ❖ A courteous but firm manner.

202.03.E NONCOMPLIANCE WITH SPECIFIED REQUIREMENTS

1. Partial compliance or failure on the part of the Contractor to provide and maintain temporary traffic control as specified in the Contract Documents, or as directed by the City Engineer, will result in a suspension of work or a reduction in payment for traffic control, or both, until such time the Contractor is in compliance with specified requirements.

2. In situations involving an immediate hazard to traffic, the City Engineer may, at his/her discretion, have the necessary traffic control established by others with the costs thereof deducted from any payment due the Contractor.

202.04 MEASUREMENT AND PAYMENT

202.04.A LUMP SUM BASIS

1. When listed in the Bid as a separate pay item, payment for Temporary Traffic Control will be made on a lump sum basis and shall include the provision, fabrication, installation, placement, and maintenance of all traffic control devices used during the course of the work.

2. Payment for this Bid item will include compensation for additional traffic control, including access signing for commercial or other properties, not called for in the Contract Documents but required by the MUTCD or as directed by the City Engineer as a result of unforeseen circumstances affecting the protection of the work or the public, and no additional payment will be made.

3. Progress payments for Temporary Traffic Control will be equal to the percentage of total work completed and accepted by the City.

202.04.B INCIDENTAL BASIS

1. When not listed in the Bid for separate payment, all Temporary Traffic Control will be considered incidental work for which no separate payment will be made.

203 TEMPORARY DRAINAGE FACILITIES

203.01 DESCRIPTION

203.01.A This work consists of furnishing, installing, and removing Temporary Drainage Facilities.

203.02 MATERIALS

203.02.A Provide all materials required to accomplish the Work as specified.

203.03 CONSTRUCTION

203.03.A Furnish and install Temporary Drainage Facilities of sufficient capacity and strength to carry traffic over the facility, and water flow in or under the facility. Contractor shall determine the actual size, strength and type of facility needed as approved by City Engineer. The sizes of facilities shown on the Plans are minimum only.

203.03.B Contractor shall install until approved. Remove Temporary Drainage Facilities when they are no longer needed. The facilities remain the property of the Contractor.

203.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

203.04.A LUMP SUM BASIS

1. When Temporary Drainage Facilities are listed as a separate pay item on the Bid, it will be paid for on a lump sum basis. Payment will be payment in full for furnishing, placing, maintaining and removing Temporary Drainage Facilities as specified.

203.04.B INCIDENTAL BASIS

1. When not listed in the Bid, all Temporary Drainage Facilities costs will be considered incidental work for which no separate payment will be made.

204 TEMPORARY BYPASS PUMPING AND FLOW CONTROL

204.01 DESCRIPTION

204.01.A This section covers all work necessary for the purpose of controlling the flow in storm drain or sanitary sewer lines and laterals to allow for inspection, maintenance, repair or replacement. This is accomplished by either blocking or plugging the incoming lines to restrict flow or through the use of pumps to bypass the flow around the work area until the work is completed.

204.01.B The Contractor shall furnish all materials, labor, equipment, power, maintenance, etc., including stand-by or backup equipment, to implement the necessary flow control system and control the flow around and/or through the work area for the duration of the work.

204.01.C The Contractor shall be responsible for damages to private or public property that may result from the temporary bypass and flow control operations. The Contractor shall be responsible for any violations of laws, regulations or permits and shall indemnify and hold the City harmless for any and all damages, including but not limited to, fines, penalties and law suits which arise from such violations.

204.01.D The design and installation of the necessary systems as well as the operation of the temporary pumping systems (if necessary) shall be the Contractor's responsibility.

204.01.E If Bypass pumping and/or pump station shut down is required, the Contractor shall coordinate with the City Engineer and Public Works Superintendent.

204.01.F NOTIFICATION

1. Public notification and coordination with the property owners shall be identified in the submittals and accomplished according to the following:

    a. Five (5) to seven (7) days prior to the shutdown of service or reduction in service to any line segment, the Contractor shall go door-to-door to distribute a City approved notification, mailing, and door hanger describing the work to be performed and schedule.

    b. On the day the service is to be shutdown or reduced, prior to commencing the work, the Contractor shall knock on the doors of all structures potentially impacted by the work and personally notify the occupants.

    c. Notify the City Engineer twenty-four (24) hours prior to commencing the bypass pumping operation.

204.01.G SUBMITTALS

1. The Contractor shall submit to the City Engineer for approval, a Temporary Bypass Pumping and Flow Control Plan a minimum of three (3) days prior to controlling flows which includes, but not limited to, the following information:

    - ❖ Estimate of peak flow to be controlled.
    - ❖ Detailed procedures for handling peak estimated flow.
    - ❖ Schedule for controlling flow.
    - ❖ Listing of equipment needed for flow control.
    - ❖ Operation plan.
    - ❖ Emergency procedures.
    - ❖ Permits to close roads or lanes if necessary.
    - ❖ Drawing of plug, bypass pump and pipeline locations (if bypass pumping is required).
    - ❖ Bypass pump sizes, capacities, number of each size to be onsite (including standby equipment) and power requirements (if bypass pumping is required).
    - ❖ Bypass pipeline sizes and material types (if bypass pumping is required).

204.02 MATERIALS

204.02.A Provide all materials required to accomplish the Work as specified.

204.03 CONSTRUCTION

204.03.A FLOW CONTROL

1. Flow control will be required to conduct inspection or other maintenance/rehabilitation operations when the existing flow in the lines is above the following levels:

   a. MAXIMUM DEPTH OF FLOW FOR CCTV INSPECTION - The entire circumference of the pipe (360 degrees) shall be viewable to the satisfaction of the City Engineer. Contractor shall dewater the pipe as necessary to allow the required visibility.

   b. MAXIMUM DEPTH OF FLOW FOR JOINT SEALING

      6" - 12" Pipe .....40% of pipe diameter
      15" - 24" Pipe .....45% of pipe diameter
      > 24" Pipe .....50% of pipe diameter

2. Whenever flows in a sewer or storm drain line are blocked, plugged or bypassed, sufficient precautions shall be taken to protect the lines from damage that might be inflicted by excessive surcharging. Further precautions shall be taken to ensure that flow control operations do not cause flooding or damage to public or private property being served by the system involved.

204.03.B PLUGGING OR BLOCKING

1. A sewer line plug permanently marked with a Contractor identification tag, shall be inserted into the line upstream of the pipe segment being inspected or repaired. Where necessary, plugs permanently marked with a Contractor identification tag, shall also be installed into the storm drain pipe. Plugs shall be so designed that all or any portion of the flow can be released. All plugs shall have a tag line attached to them that extends outside of the manhole in addition to the air line in case of air line rupture. During CCTV inspection and sealing operations, flow shall be reduced to within the limits specified in (A) above.

2. After the Work has been completed and restricting the flow is no longer needed for the work, then the flow shall be restored to normal. Flow shall be restored by removing the plugs in an order that permits sewage flow to slowly return to normal without surcharging or causing other major disturbances downstream.

3. Temporary plugs shall be removed and the flow restored to normal at the end of each working day. If downstream work is not or cannot be completed during the workday then the Contractor shall be required to provide, operate, and maintain bypass pumping system on a twenty-four (24) hour basis.

4. The Contractor shall use bypass pumping if the work cannot be scheduled or cannot be completed at a time when flow is within the flow levels specified by (A) above.

204.03.C PERFORMANCE REQUIREMENTS

1. It is essential that the sewer service have no interruption through the duration of the Work. If the storage capacity of the upstream line is not adequate to store the flow during the duration of the work or if the line is to be shut down for a period greater than eight (8) hours, then the Contractor shall provide adequate bypass pumping so that there is no interruption in the flow of sewage throughout the duration of the work. Therefore, Contractor shall provide, maintain and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units) as necessary to intercept the sewage flow before impacts the work area, and carry it past the work area and return it to the existing sanitary sewer system downstream of the work.

2. Dumping, spilling, backup, or free flow of sewage in construction trenches or on private property, gutters, streets, sidewalks, or into storm gravity pipes is not allowed. The Contractor is liable for all cleanup, damages, and resultant fines in the event of a spill.

204.03.D FLOW ELIMINATION

1. The sewage or storm drainage flow may be reduced or completely eliminated when required for pipe replacement or structural concrete repairs in deteriorated manholes. Installation of cured-in-place pipe will require complete elimination of sewage flow.

2. Flow elimination may be accomplished by temporary shutdown of sewage pump stations where possible, or by plugging upstream pipes or manholes and bypass pumping of flows, as required. Temporary shutdown of sewage pump stations shall only be done by City staff.

3. Requests by the Contractor to eliminate or adjust the flow of sewage or storm drainage within the system shall be made in writing to the City.

4. City and Contractor recognize and acknowledge that the elimination and/or adjustment of the flow are a cooperative effort and that the time and effort required achieving the desired flow varies. City and Contractor declare and agree that Contractor shall not be allowed, due, or paid any additional compensation, whatsoever, for Contractor's work, effort, time, material, labor, rentals, equipment, expenses, etc., during, as a result of, or arising from the elimination or adjustment of the flow.

204.03.E PUMPING AND BYPASSING

1. The Contractor shall obtain approval and secure all permits for placement of temporary bypass pumping system and pipeline within public right-of-way and/or required approval from property owners.

2. Bypass pumping may be required whenever pump stations are shut down or flow in gravity sewer lines are restricted or blocked. The Contractor shall supply the necessary pumps, conduits, and other equipment to divert the flow of wastewater around the pump station, restriction, blockage, or other structure in which work is to be performed. Temporary shutdowns shall be performed by City staff only. The bypass system shall be of sufficient capacity to handle existing flows plus additional flow that may occur during periods of a rainfall. Electric pumps or diesel silent pack pumps shall be used. No other type of pump will be acceptable without prior approval of the City.

3. The Contractor shall be responsible for furnishing the necessary equipment, power, labor, and supervision to set up and operate the pumping and bypassing system. If pumping is required on a twenty-four (24) hour basis, all equipment shall be operated in a manner to keep the pump noise at a minimum in accordance with the Stayton Municipal Code noise ordinance.

4. The Contractor shall be solely responsible for clean-up, repair, property damage costs and claims resulting from failure of the diversion system.

5. Bypass Pumping shall not damage private or public property, or create a nuisance or public menace. Dumping or free flow of sewage on private or public property, gutters, streets, sidewalks, or into storm drains is prohibited.

6. Pumped sewage shall be in an enclosed pipe that is adequately protected from traffic, and shall be redirected into sanitary sewer system or alternatively into an enclosed tank for hauling to the wastewater treatment plant.

7. Pump out or otherwise positively drain all locations, a minimum of once every twenty-four (24) hours, where the gravity pipe service is disconnected from the main gravity pipe for more than one day. Use more frequent pumping in locations where flows exceed the capacity of temporary storage provided.

8. The Contractor shall make all arrangements for bypass pumping during the times when the main is shut down for any reason. The Contractor shall also perform the work during a low-flow period whenever possible.

9. The Contractor shall furnish, install, and maintain power, primary and standby pumps, equipment, and bypass piping required to maintain existing flows and services. Pumps shall comply with the following requirements.

    a. Pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. Pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.

    b. The Contractor shall provide the necessary stop/start controls for each pump.

    c. The Contractor shall included one stand-by pump of each size to be maintained on site. Back-up pumps shall be on-line and isolated from the primary system by a valve.

    d. In order to prevent the accidental spillage of flows, all discharge systems shall be temporarily constructed of a secure, tight, leak free discharge piping system. Discharge piping systems will require approval by the City Engineer.

10. The Contractor shall be responsible for continuity of sanitary sewer service to each facility connected to the section of sewer main during the execution of the work, and shall also bypass the main sewer flow around the pipe to be replaced, or into adjacent sanitary sewers.

11. The pumps and the bypass lines shall be of adequate capacity and size to handle all flows without sewage backup to private property or public right of way.

12. Make temporary tie ins and remove the bypass plugs between the bypassed section and the existing system at the end of each working day. After the work is completed, return flow to the replaced gravity pipe and remove all temporary equipment.

204.03.F SERVICE LATERAL DISCONNECTION

1. Disconnected sewer service lateral connections shall be accommodated by bypass pumping or containment of the flow from time of disconnection to time of reconnection. This shall be accomplished by a mechanical pump and manifold system or by a storage system such as a bladder tank system. The storage system shall be capable of holding adequate sewage from each sewer service lateral connection for a period of twenty-four (24) hours. Each storage system shall be emptied or pumped during each twenty-four (24) hour period and properly disposed of.

2. When a service lateral must be disconnected from the main for more than one (1) work day, the lateral shall be positively drained or pumped a minimum of once every twenty-four (24) hours. The Contractor shall monitor status of flow and storage, and pump lateral more frequently if flows exceed the storage capacity of the lateral or the temporary storage.

3. Reconnect services in uncompleted sections during times of construction inactivity.

4. Notify building occupants and property owners when work is complete and full uninterrupted service restored.

5. No service is to remain shutdown for more than a period of eight (8) hours, unless Contractor provides substitute services for the residents. If the service is to be shutdown for more than eight (8) hours and Contractor cannot provide substitute services, then Contractor shall be required to provide temporary living quarters (i.e. hotel) for the resident at no additional cost to City or the resident. Temporary living quarters shall be approved by City Engineer.

204.03.G FIELD QUALITY CONTROL AND MAINTENANCE

1. TESTING: The Contractor shall perform leakage tests of the bypass pumping discharge piping using clean water prior to operation.

2. INSPECTION: The Contractor shall inspect the bypass-pumping system no less than once every 2 hours to ensure that the system is working correctly.

3. MAINTENANCE OF SERVICE: The Contractor shall ensure that the temporary pumping system is properly maintained and a responsible operator shall be on hand at all times when pumps are operating.

204.03.H CLEANING

1. Before the bypass pumping system is dismantled, either to be moved to the next section or at the completion of the work, discharge sewage remaining in the bypass discharge pipeline and pumping equipment into the working sanitary sewer.

2. Upon completion of the bypass pumping operation, disturbed areas shall be cleaned and restored to their original condition. This restoration should restore the site to a condition which is at least equal to or better than the condition which existed prior to the start of the work.

204.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

204.04.A LUMP SUM BASIS

1. When Temporary Bypass Pumping and Flow Control is listed as a separate pay item on the Bid, it will be paid for on a lump sum basis. Payment will be made for furnishing, placing, maintaining, removing, and all other related items required to complete the work for Temporary Bypass Pumping and Flow Control as specified.

204.04.B INCIDENTAL BASIS

1. When not listed in the Bid, all Temporary Bypass Pumping and Flow Control costs will be considered incidental work for which no separate payment will be made.

205 EROSION PREVENTION AND SEDIMENT CONTROL

205.01 DESCRIPTION

205.01.A This section covers all work necessary for implementing structural and non-structural Best Management Practices (BMP) for the purpose of controlling soil erosion by wind or water and keeping eroded sediments and other construction-generated pollutants from moving off project sites.

205.01.B REQUIRED SUBMITTAL

1. Contractor shall formulate and submit an Erosion and Sediment Control Plan (ESCP) in conformance with Section 610 of the Design Standards, the ODOT Erosion Control Manual and Section 00280 of the ODOT/APWA Oregon Standard Specifications for Construction.

2. Contractor shall comply with Federal, State, and local laws, rules and regulations, and the National Pollutant Discharge Elimination System (NPDES) 1200 Permit or Permits applicable to the project. Unless otherwise indicated in the Special Provisions, Contractor shall obtain DEQ Stormwater Permit No. 1200C for construction activities where one (1) acre or more are disturbed.

3. Contractor shall not begin any site activities that have potential to cause erosion or sediment movement until the ESCP and implementation schedules are approved by the City Engineer and a 1200C permit has been obtained.

4. Contractor shall indicate on the ESCP all the BMP proposed and installed for erosion and sediment control to minimize clearing, stabilize exposed soil, divert or temporarily store flows, limit runoff from exposed areas, and filter transported sediment. Include all temporary slopes, constructed for staging or other reasons, which may not have been identified in the original contract plans.

5. Contractor shall keep a copy of the approved ESCP with updated changes on-site during all construction activities. During inactive periods longer than seven (7) Calendar Days, keep the ESCP on-site or provide a copy to the City Engineer to retain.

6. Continually update the ESCP and schedules as needed for unexpected storm or other events to ensure that sediment-laden water does not leave the construction site. If there are approved changes, add them to the ESCP no later than twenty-four (24) hours after implementation.

7. Requirements described in the ODOT Erosion Control Manual and Section 00280 of the ODOT/APWA Oregon Standard Specifications for Construction and shown on the Plans are part of the project ESCP and are the minimum for all project construction sites and conditions. Contractor shall supplement the ESCP as necessary to ensure compliance with 1200C permit.

205.02 MATERIALS

205.02.A Provide all materials required in conformance with the ODOT Erosion Control Manual and in conformance with Section 00280 of the ODOT/APWA Oregon Standard Specifications for Construction.

205.03 CONSTRUCTION

205.03.A Construction shall conform to the ODOT Erosion Control Manual and Section 00280 of the ODOT/APWA Oregon Standard Specifications for Construction.

205.03.B If construction reveals soils contaminated with hazardous materials or chemicals, or if soil is suspected to be contaminated, the Contractor shall cease earthwork activity immediately, ensure that no contaminated material is hauled from the site, remove their workforce from the immediate vicinity of the contaminated area (leaving all machinery and equipment), and secure the area from access by the public until an OSHA certified HAZMAT response team has relieved them of that responsibility. The Contractor shall immediately notify the City Engineer, the Design Engineer, and the Oregon Department of Environmental Quality (DEQ) of the situation.

205.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

205.04.A LUMP SUM BASIS

1. When shown in the Bid, payment for erosion prevention and sediment control provisions will be made on a lump sum basis for all erosion and sediment control provisions within the limits specified.

205.04.B INCIDENTAL BASIS

1. When not listed in the Bid for separate payment, all Erosion Prevention and Sediment Control provisions will be considered incidental work for which no separate payment will be made.

206 ENVIRONMENTAL PROTECTION

206.01 DESCRIPTION

206.01.A This Section describes the Contractor's duties and obligations with respect to protection of the land, waters, air, wildlife, and other environmental resources of the State.

206.01.B Comply with all applicable federal, State, and local environmental, health, safety, and other laws, acts, statutes, regulations, administrative rules, ordinances, orders, and permits, as they may be amended from time to time (referred to in this Section as "Laws"). Comply with all applicable Laws, whether or not specifically referenced in this Section or elsewhere in the Contract.

206.01.C Federal, State, and local agencies known to have enacted ordinances and regulations relating to environmental pollution and the preservation of natural resources that may affect the performance of the Contract are listed in Subsection 108.02.B

206.01.D If any provision of these Standard Construction Specifications appears to conflict with one or more Laws, the more stringent requirement shall apply, unless the City Engineer directs otherwise in situations where these Standard Construction Specifications are more stringent.

206.01.E Comply with all additional requirements or Laws imposed by any agency or governmental unit having authority to enforce the Endangered Species Act (ESA) and other Laws.

206.01.F All penalties assessed against the City because of the Contractor's violation of Laws referenced above, or permits applicable to the Project, will be withheld from the progress or final payments according to Subsection 110.12. Any penalty assessed against the City that is in excess of remaining progress payments or final payment shall be paid for by Contractor.

206.01.G No condition of the Contract releases the Contractor from any responsibility or requirement under any environmental or other Law.

206.02 MATERIALS

206.02.A Provide all materials required to accomplish the Work as specified

206.03 CONSTRUCTION

206.03.A Construction shall conform to Section 00290 of the ODOT/APWA Oregon Standard Specifications for Construction.

206.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

206.04.A LUMP SUM BASIS

1. When shown in the Bid, payment for Environmental Protection provisions will be made on a lump sum basis for all Environmental Protection provisions within the limits specified.

206.04.B INCIDENTAL BASIS

1. When not listed in the Bid for separate payment, all Environmental Protection provisions will be considered incidental work for which no separate payment will be made.

207 CLEARING AND GRUBBING

207.01 DESCRIPTION

207.01.A This section covers work necessary to clear, remove, and dispose of all debris and vegetation such as stumps, trees, logs, roots, shrubs, vines, grass, and weeds within the designated limits, to preserve from injury or defacement such objects and vegetation as are designated to remain in place, and to perform clean-up of the designated clear and grub area.

207.01.B Clearing is defined as cutting of trees, bushes, vines, and other vegetative growth at or above ground surface and removal from the site of all such cut or downed vegetation.

207.01.C Grubbing shall consist of the elimination of wooden and vegetative matter occurring at or below ground surface including, but not limited to, stumps, trunks, roots, canes, stems, debris remaining from clearing work, and sticks having a diameter of one inch or more.

207.01.D Review with the City Engineer the location, limits, and methods to be used prior to commencing work under this section.

207.01.E No explosives shall be used without the expressly written permission of the City Engineer.

207.01.F The Contractor shall obtain the required permits as specified in Subsection 108.05 and perform clearing work in conformance thereto.

207.01.G For publicly financed improvements, removal of man-made structures including, but not limited to, concrete slabs, walls, vaults, footings, asphaltic surfaced areas, and graveled areas, shall be included in payment for excavation or excavation and backfill and will not be included in clearing and grubbing. Clearing and Disposal shall be in accordance with Subsection 207.03.

207.01.H As indicated in Subsection 106.18, owners of buildings fronting to the work shall have salvage rights to plants, trees, shrubs, fences, and other improvements in the right-of-way. Contractor shall notify adjacent property owners. Contractor does not assume ownership of clearing and grubbing items until after fulfilling the requirements of Subsections 106.18 and 207.03.B.

207.02 MATERIALS

207.02.A Materials shall conform to requirements of Section 208.

207.02.B Explosives shall be supplied, stored, and used in conformance with Subsection 108.19.E.

207.03 CONSTRUCTION

207.03.A GENERAL

1. Remove trees and plants as designated within the area of work and remove all sod, topsoil, and organic earth within designated areas.

2. Remove and stockpile as directed all topsoil that is free of roots, rocks, and other objectionable material and is determined by the City Engineer to be suitable for future use. Take reasonable care to prevent topsoil from becoming mixed with subsoil.

3. For publicly financed improvements, provide imported topsoil per Subsection 209.02.G at no expense to the City, when existing topsoil is not adequately segregated as determined by the City Engineer.

207.03.B TIMBER SALVAGE

1. TREES IN STREET RIGHT-OF-WAY

   a. The adjacent property owner shall have the right to any trees felled in the right-of-way adjacent to owner's property. Contractor shall notify adjacent property owners by mail or door-hanger at least 48-hours prior to felling trees. Trees shall be stacked and decked on owner's property or removed from the construction site if the owner does not reserve the right of ownership.

2. TREES ON CITY-OWNED PROPERTY

   a. City reserves the right to merchant timber as designated in the Contract Documents and as marked at the project site by the City Engineer. The Contractor shall cut, trim, and handle marked merchantable timber in such a manner as to ensure the best sale value to City and dispose of resulting waste materials as hereinafter specified, and shall assume ownership, remove, and dispose of all other timber.

207.03.C PROTECTION OF EXISTING VEGETATION

1. Protect all trees, shrubbery, and other vegetation not designated for removal from damage caused by the work. Cut and remove trees and branches only where approved by the City Engineer. When directed by the City Engineer, remove branches other than those required to provide a balanced appearance of any tree. The Contractor will provide adequate protection or trees, shrubbery, and other vegetation adjacent to the work areas that are to remain, as indicated on the plans. No roots projecting into the excavation will be cut except in the presence of the City Engineer. All roots authorized to be cut will be cut neatly with a sharp tool to avoid torn root endings. Remove branches only as directed by the City Engineer and treat scars with approved tree sealant.

207.03.D CLEARING

1. The Contractor shall clear the area above the natural ground surface of all vegetation and objectionable materials in accordance with approved plans. Cut timber and timber growth so that no stump extends above ground surface more than 6-inches. Prune all limbs over paved streets to an elevation 14-feet above the pavement on arterial and collector streets, and 11-feet above the pavement on residential streets. Prune all limbs over sidewalks to an elevation 7.5-feet above the sidewalk. All such pruning shall be done in accordance with accepted arboricultural standards, and shall be approved by the City Engineer.

207.03.E CLEARING BORROW AND WASTE DISPOSAL AREAS

1. The Contractor shall clear areas designated as borrow and waste disposal areas to designated limits and dispose of all waste as herein specified.

207.03.F GRUBBING AND STRIPPING

1. The Contractor shall completely remove all stumps and roots within the limits of required excavations and fill areas. No stumps or portion thereof shall come within 3-feet of fill subgrades or slope surfaces. Use of explosives for stump removal shall conform to requirements of Subsection 108.19.E and 208.02.B. Obtain any and all permits required for use of explosives from controlling jurisdiction.

2. On areas to be occupied by fills, remove all grass, roots, and embedded wood to a depth not less than 3-feet below subgrade or slope surface on which the fill is to be constructed.

3. On excavation areas, remove all roots and embedded wood to a depth not less than 1-foot below subgrade or slope surface through which excavation is required.

207.03.G DISPOSAL OF WASTE MATERIAL

1. The Contractor shall remove and dispose of all waste material or debris from the site and shall obtain all necessary permits for disposing of waste materials. Copies of such permits shall be provided to the City Engineer prior to disposal.

207.03.H BACKFILLING AND CLEAN-UP

1. The Contractor shall fill all holes and depressions caused by clearing and grubbing with material acceptable to the City Engineer and reshape area to drain properly and to conform to adjacent undisturbed topography.

2. The Contractor shall leave the work area in a clean and slightly condition, free from litter and debris.

207.03.I REMOVAL AND REPLACEMENT OF SIGNS, MAILBOXES, POSTS, ETC.

1. The Contractor will be responsible for the removal and replacement of all signs, mailboxes, posts, etc., when not specifically designated otherwise by the City Engineer. The Contractor shall contact property owner(s) prior to removal and reinstallation of mailbox. Mailboxes in work area must be temporarily moved to allow clearing and excavation as well as easy access by mail carrier and residents. Upon completion of excavation, mailboxes shall be permanently replaced behind curb to postal service regulations.

207.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

207.04.A LUMP SUM BASIS

1. When shown in the Bid, payment for Clearing and Grubbing will be made on a lump sum basis for all clearing and grubbing within the limits specified.

207.04.B INCIDENTAL BASIS

1. When not listed in the Bid for separate payment, all Clearing and Grubbing will be considered incidental work for which no separate payment will be made.

208 MATERIALS - TYPES AND USE

208.01 DESCRIPTION

208.01.A This section covers certain types of materials and their uses that are common to appropriate forms of construction contained throughout these Standard Construction Specifications.

208.02 MATERIALS

208.02.A GENERAL

1. Unless specified otherwise in the Contract Documents or Standard Drawings, materials contained herein will be used in required work.

208.02.B EXPLOSIVES

1. Explosives must be fresh, stable materials manufactured to the standards of the "Institute of Makers of Explosives" and conform to applicable requirements of ORS Chapters 476 and 480

2. Explosives shall be supplied, stored, and used in conformance with Subsection 108.19.E.

208.02.C WATER

1. Water used in all work must be reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable matter, or other deleterious substances. Use water conforming to AASHTO T-26 for mixing and curing Portland Cement Concrete, mortar, or grout. Water of approved potable quality may be used without test.

208.02.D AGGREGATES

1. Aggregate for trench foundation stabilization, bedding and pipe zone, and trench backfill shall be as specified in Section 209.

2. Aggregate for aggregate base shall be uniformly graded 1”-0” dense-graded crushed aggregate base meeting all appropriate requirements for aggregate base and shoulder materials as specified in Section 00641 of the current ODOT/APWA Oregon Standard Specifications for Construction. Aggregate base shall be uniformly graded from coarse to fine. Aggregate base shall be meet the compaction and density requirements as specified in Subsection 209.03.Q.

3. Other aggregates shall conform to the requirements of appropriate types of work contained within applicable sections throughout these specifications.

4. The determination of sizes and grading of aggregate shall conform to AASHTO T-27 and AASHTO T-11.

5. When crushed gravel is furnished, it shall have at least two mechanically fractured faces on not less than the following percentages (by weight) of the material as determined by ODOT WAQTC TMI.

Types of Use	Percentages
Asphalt Concrete Pavement	75
Asphalt Surface Treatment	95
Asphalt Treated Bases	75
Aggregate Bases	70
Aggregate Trench Backfill	70

6. Aggregates shall be subject to approval at the source or at the actual stockpile from which the aggregate is taken for incorporation in the work. During production of the aggregate, provide samples of each size for testing if requested by the City Engineer. On the basis of testing, modify or adjust crushing and screening operations to bring each separate size of aggregate within gradings, proportions, and quantities as specified. Costs associated with the collection and testing of samples shall be borne by the Contractor.

7. In all stages of production, transporting, and stockpiling, handle aggregates in such a manner as will prevent the segregation of materials and the intermingling of separate gradings or kinds of aggregates.

208.02.E PORTLAND CEMENT

1. TYPES

   a. Furnish one or more of the following types as specified:

Type I	For general use when special properties of other type cements are not required
Type IA	Air-entraining cement for same uses as Type I, where air-entrainment is required.
Type II	For use when moderate sulfate resistance of moderate heat of hydration is required.
Type IIA	Air-entraining cement for same uses as Type II, where air-entraining is required.
Type III	For use when high early strength is required.
Type IIIA	Air-entraining cement for same use as Type III, where air-entraining is required.

   b. Differing brands or types of cement, or the same brand or type of cement from different plants, shall not be mixed during use nor be used alternately. Cement may be sampled either at the plant or site of work at the option of the City Engineer.

2. SPECIFICATIONS

   a. Portland cement shall conform to AASHTO M-85 for low alkali cement except as follows:

      1) Total alkali content (sodium and potassium oxide calculated as Na20+0.658K20) shall not exceed 0.8 percent.

2) Types I, IA, III, or IIIA must contain a maximum of 10 percent tricalcium aluminate.

3) Time-of-setting tests shall be by either the Gilmore test or the Vicat test or both, as City Engineer elects.

3. APPLICATIONS

a. When not otherwise specified, use Type I. Contractor may use Type III Portland Cement (high early strength) in lieu of Type I in the identical quantity specified for the latter.

b. Type II cement concrete shall be used for all sewer and water main construction and appurtenances thereto.

c. Type III Portland Cement (high early strength) shall be used when patching trenches in Portland Cement Concrete pavement.

208.02.F PORTLAND CEMENT MORTAR

1. Use either standard premixed mortar conforming to ASTM C-387, or mortar proportioned with 1-part Portland Cement to 2-parts clean, well-graded sand which passes a 1/8-inch screen and which conforms to AASHTO M-45. Admixtures may be used, but do not exceed the following percentages of cement by weight: hydrated lime -10%; diatomaceous earth or other inert materials - 5%. Testing shall conform to ASTM C-109 for mortar strength.

208.02.G PORTLAND CEMENT GROUT

1. TYPE "A" GROUT

a. Utilize grout that consists of 1-part Portland Cement, 3-parts clean and well-graded sand by volume. Use minimum amount of water to produce a thick, creamy consistency.

2. TYPE "B" GROUT

a. Where Type "B" grout is specified, use a mixture consisting of 1-part Portland Cement, 5-parts clean and well-graded sand, and 7-parts pea gravel, by volume. Use minimum amount of water to produce a thick, creamy consistency.

3. NON-SHRINK GROUT

a. Non-shrink grout shall be non-metallic, cementitious commercial grout exhibiting zero shrinkage per ASTM C-827 (Sika 212, Euco N-S, Five-Star, or approved equal). Grout shall not be amended with cement or sand, and shall not be reconditioned with water after initial mixing. Unused grout shall be discarded after twenty (20) minutes and shall not be used.

b. Non-shrink grouts shall be placed or packed only with the use of an approved commercial concrete bonding agent applied to all cured concrete surfaces being grouted. The bonding agent shall be compatible with the brand of grout being used. Water as a substitute for commercial bonding agent for non-shrink grout will not be allowed.

208.02.H EPOXY CEMENT

1. Epoxy cement shall be a two (2)-compound epoxy resin adhesive conforming to requirements of AASHTO M-235.

208.02.I MIX DESIGN

1. CLASSES OF CONCRETE

   a. Classes of concrete shall designate design field strength of concrete in 28-days (PSI) followed by maximum size of aggregate to be used in the concrete, i.e., Class 330011/2 shall constitute a mix with a compressive strength of 3300psi in 28-days with 1-1/2-inch maximum size aggregate used in that concrete.

   b. Use the class of concrete as specified or shown for each component part of the project. If not so specified or shown, use Class 330011/2 concrete.

208.02.J PORTLAND CEMENT CONCRETE

1. MIX DESIGN

   a. Before beginning any concrete work, the Contractor shall submit a concrete mix design to the City Engineer for approval with sufficient written documentation to demonstrate that the concrete will meet the specified requirements. Concrete used in the work shall conform to the approved mix design.

   b. During progress of the work, if concrete strength and quality, as determined by the test results, fail to attain the requirements specified, suspend all concrete work and make necessary adjustments to obtain required results.

   c. A mix using different proportions or aggregate sizes of any of concrete materials in the mix may be requested by the City Engineer. Any requested and authorized alteration to proportions of any of the concrete materials in the mix shall be made at the Contractor's sole expense.

   d. The mix design shall meet the following requirements:

      - Entrained air range 3% to 6% (percent by volume). AASHTO T-152
      - Slump range – two (2) inches to four (4) inches. AASHTO T-119
      - When using 3/4-inch maximum size aggregate, the fine aggregate shall be between 40 percent and 48 percent of the total aggregate used.
      - When using 1 1/2-inch maximum size aggregate, the fine aggregate shall be between 35 percent and 45 percent of the total aggregate used.
      - When specified, use a water-reducing admixture in conformance with manufacturer's recommendations.

e. COMPRESSIVE STRENGTH

1) Portland cement concrete shall have a 28-day design compressive strength of 3,300psi for curbs, sidewalks, and poured-in-place manholes and catch basins, and 5,000psi minimum for Portland Cement Concrete pavement and commercial driveways per AASHTO T-22 and T-23. Portland Cement Concrete shall have a maximum aggregate size of 1 1/2 inches, a slump of between 2-inches and 4-inches, and a minimum of 658 pounds of Portland Cement per cubic yard.

f. FLEXURAL STRENGTH

1) Flexural strength requirements will be specified in the Contract Documents.

2) When a minimum flexural strength is specified, the Contractor shall conduct such sampling and testing as is necessary to establish a correlation between the compressive and flexural strength for each mix design used in the work.

g. Tests for strength shall be made in accordance with the following

- Molding concrete specimens in the field AASHTO T-23.
- Compressive strength of molded cylinders AASHTO T-22.
- Curing of cylinders shall conform to AASHTO T-23 except as modified herein.

h. In general, use a mixture that contains the minimum amount of water consistent with required workability. Consistency of concrete shall be gauged by ability of equipment to properly place it without segregating or honeycombing, and not by the difficulty in mixing or transporting.

2. AGGREGATES

a. Aggregates used in the production of Portland Cement Concrete shall conform to requirements in Section 02690 of the current ODOT/APWA Oregon Standard Specifications for Construction.

3. WATER

a. Potable water shall be used in all work.

4. ADMIXTURES

a. AIR-ENTRAINING ADMIXTURES

1) Air-entraining admixtures shall conform to AASHTOM 154 (ASTM C-260) using one or another of several tests as directed by the City Engineer. Chloride content of admixture must not exceed 0.5 percent by weight.

b. WATER-REDUCING, RETARDING, AND ACCELERATING ADMIXTURES

1) Water reducing, retarding, and accelerating admixtures shall conform to AASHTO M 194 (ASTM C-494) using one or more of several tests as the City Engineer may direct. Chloride content of admixture must not exceed 0.5 percent by weight.

c. MINERAL ADMIXTURES

1) The use of fly ash requires approval of the City Engineer. Where approved, the weight of fly ash shall not exceed 20 percent of the weight requirement for Portland cement. Fly ash shall conform to applicable requirements in ASTM C-141, 595, and 618.

5. SAMPLING AND TESTING

a. During progress of work, if concrete strength and quality as determined by sampling and testing conducted by the City Engineer fail to attain the requirements specified, the Contractor shall suspend all concrete work and make necessary adjustments to obtain required results.

b. Portland Cement Concrete shall be sampled and tested in accordance with the following ASTM test methods:

Description	ASTM Standard
Sampling fresh concrete	C-172
Obtaining drilled cores	C-42
Molding and curing specimens	C-31
Compressive strength	C-39
Flexural strength	C-78
Slump	C-143
Air content	C-173 or C-231
Unit weight yield	C-138
Setting of mortar	C-191 or C-266

6. STEEL REINFORCEMENT

a. Use steel deformed bars conforming to ASTM A-615, Grade 40; except, longitudinal bars in continuously reinforced concrete pavement shall be Grade 60.

b. Ties and supports shall be of 16-gauge, black, soft-annealed wire and bar supports for the intended uses. Bar supports in beams and slabs exposed to view after stripping must be galvanized or plastic coated. Use concrete supports for reinforcing in concrete placed on grade. Galvanizing shall conform to ASTM A-152 Class D. Plastic shall not chemically react with concrete, shall be impervious and have a minimum thickness of 3/32-inches at point of contact with form.

7. WELDED WIRE FABRIC REINFORCEMENT

a. Welded wire fabric, when specified in the Contract Documents, shall be properly placed and held in position during the placement of Portland Cement Concrete by use of chairs or other approved devices. Welded wire fabric shall conform to ASTM A-185.

8. DOWELS

a. Utilize steel dowels that conform to ASTM A-306 Grade 70. Where specified, dowels shall be coated with plastic or other approved material for bond prevention.

9. JOINT MATERIAL

   a. FLATWORK JOINTS - For joints in Portland Cement Concrete pavement refer to Section 211. For curbs, gutters, driveways, sidewalks, and pathways, refer to Subsection 307.03.J.

   b. PREFORMED EXPANSION JOINTS - Preformed expansion joint fillers for concrete shall conform to AASHTO M-153 or AASHTO M-213 except that those furnished under AASHTO M-213 shall be tested in conformance to ASTM D-1751. Fillers conforming to AASHTO M-213, except the binder if other than bituminous material, may also be used provided that they otherwise meet these specifications and provide further that they have been demonstrated to be rot and vermin proof for a period of at least 5-years. Preformed elastomeric joint seals must conform to AASHTO M-220. Poured filler must conform to AASHTO M-173.

   c. WATER STOP - Water stop shall be either plastic or rubber as specified in the Contract Documents or as approved by City Engineer.

10. EXTRUSION

   a. Where slip-form paving machines or concrete extruding machines are used for placing Portland Cement Concrete, they shall meet the following requirements

      - The machines shall be approved by the City Engineer prior to commencement of the work.
      - The vibrators on the equipment shall be adequate to produce a dense mass free of voids with a smooth surface free of honeycombing.
      - The equipment shall have automatic grade and line control.
      - The equipment shall, in a single pass, provide the specified shape and cross-section for the concrete items to be constructed.

11. PROTECTION AND CURING MATERIALS

   a. Portland Cement Concrete shall be protected against damage from rain, dust, rapid temperature change or other adverse weather effects. For at least seven (7) days after finishing, Portland Cement Concrete shall be protected against freezing and against damage by any form of traffic until the concrete has attained the specified compressive strength.

   b. Methods and materials used for protecting Portland Cement Concrete from damage shall be entirely the responsibility of the Contractor, and shall be subject to prior approval of the City Engineer.

   c. Concrete damaged by moisture loss, freezing, rain, traffic, construction operations, or any other cause, shall be repaired, or removed and replaced, to the satisfaction of the City Engineer, at the Contractor's expense.

d. Immediately after finishing, the Portland Cement Concrete shall be protected against moisture loss by the application of an approved curing material. Conform to one or more of the following requirements for curing materials; choice of method to be used is dependent on weather and existing conditions:

Coverings	Standard
White burlap-polyethylene sheets	AASHTO M-171
White polyethylene film	AASHTO M-171
Waterproof paper	AASHTO M-171
Burlap cloth (Jute or Kenaf)	AASHTO M-182
Curing Compound	**Standard**
White, pigmented liquid, membrane-forming curing compound	AASHTO M-148 (test to ODOT TM 721)

e. If the use of the above other curing materials is impractical, the surfaces shall be kept moist by flushing or sprinkling with water in a manner approved by the City Engineer. The application of water shall be such that the concrete and surfaces of all forms will be kept damp for a period of seven (7) days after placing of concrete. Curing and finishing shall be coordinated when both requirements are to be met at same time. Water used for curing shall be free of harmful amounts of deleterious materials that will stain, discolor, or adversely affect the physical properties of the concrete. Care shall be taken to avoid thermal shock due to the use of cold water or high rates of evaporative cooling.

f. Curing compound testing shall be done according to ODOT TM 721. The specified drying time requirement will be waived. The test application rate shall be 1 gallon per 200 square feet. All compounds shall be class A. Solvent-based compounds shall be Type 1-D.

g. Curing compound required for curbs and Portland Cement Concrete pavement, but do not use on bridges or box culverts. Curing compounds shall also not be used on a surface where a bond is required with additional Portland Cement Concrete to be placed later.

h. Curing compounds shall be applied by spraying with pressure equipment. To ensure complete coverage, approximately one-half the quantity for a given area shall be applied in one direction and the remainder applied at right angles to this direction.

208.02.K ASPHALT CEMENT MATERIALS

1. GENERAL

a. Unless otherwise specified herein or in applicable subsections, types and grades of asphalt materials shall conform to applicable sections of Part 00700 – Wearing Surfaces of the current ODOT/APWA Oregon Standard Specifications for Construction.

b. The asphalt cement furnished under this specification shall be petroleum asphalt prepared by the refining of crude petroleum and, when necessary, by the addition of modifiers designed to provide the asphalt characteristics specified. It shall be homogeneous and free from water and it shall not have been distilled at a temperature high enough to injure by burning or high enough to produce flecks of carbonaceous matter.

2. ASPHALT CEMENT

   a. Use performance grade PG 64-22 or PG 70-22 asphalt cement as specified in Section 00745.11 of the current ODOT/APWA Oregon Standard Specification for Construction.

3. TACK COAT

   a. Use CSS-1 or CSS-1h emulsified asphalt as specified in Section 00730 of the current ODOT/APWA Oregon Standard Specifications for Construction.

4. CRACK SEAL

   a. Provide liquid asphalt or rubberized hot-poured sealants of the type intended for use in sealing cracks in asphalt concrete pavement that meet the requirements of ASTM D-3405 and AASHTO M-301, as specified in Section 00746 of the current ODOT/APWA Oregon Standard Specifications for Construction.

5. SLURRY SEAL

   a. The emulsified asphalt shall conform to Section 00706 – Emulsified Asphalt Slurry Seal Surfacing of the current ODOT/APWA Oregon Standard Specifications for Construction.

208.02.L ASPHALT CONCRETE PAVEMENT

1. APPLICATIONS

   a. Asphalt concrete pavement shall conform to Section 00745 - Hot Mixed Asphalt Concrete (HMAC) of the current ODOT/APWA Oregon Standard Specifications for Construction.

   b. HMAC used in the work shall be Level 2 or Level 3 dense graded mixture. The type of mix shall be 3/4-inch (Class B-mix), 1/2-inch (Class C-mix) or 3/8-inch (Class D-mix) as specified in the Contract Documents.

   c. Where the type of HMAC is not specified a Level 2, dense graded 1/2-inch mix shall be used for the top lift, or wearing course, and Level 2, dense graded 1/2-inch mix shall be used for base lifts. Level 2, dense graded 3/8-inch mix shall be used where the compacted thickness of the top lift, or wearing course, will be less than 1 1/2 inches.

2. MIX DESIGN

   a. Hot mixed asphalt concrete mix design shall conform to Section 00745.13 of the current ODOT/APWA Oregon Standard Specification for Construction and shall be newly developed or be an ODOT approved and current (within the last 2 years) from its anticipated use. When required by the City Engineer, the Contractor shall submit a new job-mix formula.

   b. The job-mix formula shall indicate the gradation and proportion of each of the several aggregate constituents to be used in the mixture. The job-mix formula shall also indicate the ASTM bulk specific gravity of each aggregate constituent, the measured maximum specific gravity of the mix at the optimum asphalt content determined in accordance with ASTM D-2041, the percent of asphalt lost due to absorption by the aggregate, and any other information pertinent to the design of the mix.

c. The Contractor shall submit a new job mix formula to the City Engineer for approval should conditions, as determined by the City Engineer, justify a change in materials.

3. MATERIALS

a. Asphalt cement shall conform to requirements of Subsection 208.02.K.

b. Aggregates used in the production of Asphalt Concrete Pavement shall conform to Section 00745.10 of the current ODOT/APWA Oregon Standard Specifications for Construction.

c. Asphalt Cement additives used in the production of asphalt concrete shall conform to applicable requirements of Section 00745.11 of the current ODOT/APWA Oregon Standard Specifications for Construction.

d. PROPORTIONS OF MATERIALS

1) Proportions of materials that comprise the various classes of asphalt concrete shall be within the range of proportions and tolerances specified in Sections 00745.12, 00745.13, and 00745.14 of the current ODOT/APWA Oregon Standard Specifications for Construction.

e. ACCEPTANCE OF MATERIALS

1) Asphalt and aggregate shall be subject to approval preceding mixing. Mixtures will be subject to final approval after blending and mixing, either at the plant or at the place of delivery prior to rolling. Approval will be based on periodic sampling and testing of the materials at the discretion of the City Engineer.

2) The Contractor shall collect and analyze as many samples as the City Engineer determines necessary to confirm that the mixture, and the materials that comprise the mixture, is in conformance with the mix design and all other applicable requirements specified herein.

3) Costs associated with the collection and testing of samples shall be borne by the Contractor.

208.02.M GEOSYNTHETICS

1. GENERAL

a. Unless otherwise shown or specified, provide all materials required with type and grade for specific application of geosynthetics in conformance with Section 00350 and Section 02320 of the current ODOT/APWA Oregon Standard Specifications for Construction.

b. Furnish all geosynthetics meeting the following requirements:

- Free of defects, cuts or tears.
- Resistant to ambient temperatures, acid and alkaline conditions, micro-organisms and insects.
- For the intended purpose and have dimensional stability.

c. Provide geosynthetic as furnished by the manufacturer and protect against damage and deterioration. Prevent excessive mud, wet concrete, epoxy and like materials from coming in contact with the geosynthetic. Store all geosynthetics in a dry place and off the ground at all times according to ASTM D 4873. Cover all geosynthetics with a dark protective covering when received. The geosynthetic will be rejected for use if the City Engineer determines it has defects or deterioration, or has been damaged.

2. DEFINITION AND TYPES

a. DRAINAGE GEOTEXTILE - For installation as a filter in subsurface drains or other drainage locations. Drainage geotextiles are typically a nonwoven geotextile which allows water to pass through it while keeping existing soils in place

b. EMBANKMENT GEOTEXTILE - For installation as a reinforcement within embankments and/or as a separator under embankments. Embankment geotextiles are typically a heavy weight nonwoven geotextile.

c. GEOGRID - A geosynthetic used for reinforcement which is formed by a regular network of tensile elements with apertures of sufficient size to allow strike-through of surrounding soil, rock or other geotechnical material.

d. GEOTEXTILE - A permeable geosynthetic comprised solely of textiles.

1) *NONWOVEN GEOTEXTILE* - A textile produced by bonding and/or interlocking of fibers by mechanical, heat or chemical means. Nonwoven geotextiles resemble felt, provide planar water flow, and are commonly known as filter fabric. Typical applications for Non-woven geotextiles include:

- Paving
- Pavement overlay
- Erosion Control
- RipRap
- Separation/Drainage
- Stream Crossings
- Embankments
- Subgrade (filter/separation)
- Retaining Walls (filter/separation)

2) *WOVEN GEOTEXTILE* - A textile comprising of two or more sets of filaments or yarns interlaced in such a way that they result in a uniform pattern. Woven geotextiles are generally preferred for applications where high strength properties are needed and filtration requirements are less critical. Typical applications for woven geotextiles include:

- Retaining Walls (stabilization)
- Subgrade (stabilization)

e. PAVEMENT OVERLAY GEOTEXTILE - For installation as a reinforcement beneath an asphalt concrete overlay. Typically, a pavement overlay geotextile is nonwoven paving geotextile designed to hold the asphaltic cement tack coat and withstand the extreme temperatures associated with paving. It functions by creating a moisture barrier between the old asphalt layer and the overlay, decreasing introduction of water into the base, reducing the effects of reflective cracking, and aiding in the flexibility of the pavement.

f. RIPRAP GEOTEXTILE - For installation as a filter and/or separator behind or beneath riprap, buttresses, inlays, shear keys and/or erosion control applications. Riprap geotextiles are typically a nonwoven geotextile which allows water to pass through it while keeping existing soils in place.

g. SUBGRADE GEOTEXTILE - For installation as a separator and/or reinforcement on subgrades and in other material separation applications. Typically, a subgrade geotextile is a woven geotextile placed between the aggregate base rock and the subgrade to stabilize the soil, preserve the aggregate, and reinforce the surrounding soil.

h. WALL GEOTEXTILE - For construction of retained earth walls.

3. GEOTEXTILES

a. Furnish woven or non-woven geotextiles meeting the following requirements:

- Be composed of long chain, synthetic polymeric filaments or yarns formed into a stable network that retains its relative structure during handling, placement and design service life. At least 95 percent, by weight, of the long chain polymers shall be a polyolefin or polyester.
- Meet or exceed the properties specified in Section 02320 (Table 02320-1) of the ODOT /APWA Oregon Standard Specifications for Construction.
- Be free of any chemical treatment or coating which might significantly reduce permeability.
- Have the selvage finished so the outer fibers are prevented from pulling away from the fabric.

4. GEOGRIDS

a. Furnish geogrids, as approved by City Engineer, meeting the following requirements:

- A regular network of integrally connected, polymer, tensile elements with aperture geometry sufficient to permit significant mechanical interlock with the surrounding soil or rock.
- Dimensionally stable and able to retain their geometry under manufacture, transport and installation.

208.03 CONSTRUCTION

208.03.A Construction will conform to the specific section within these specifications that is applicable to the type of work specified as modified below.

208.03.B GEOSYNTHETICS

1. Construction shall conform to Section 00350 of the current ODOT/APWA Oregon Standard Specifications for Construction, as modified below.

2. WALL GEOTEXTILE

   a. Begin wall construction at the lowest portion of the excavation and place each layer horizontally as shown on the plans. Complete each layer in its entirety before the next layer is started. Seams will be allowed only at the wall face. Either overlap geotextile sheets perpendicular to the wall or sew seams parallel to the wall face. Stretch the geotextile in a perpendicular direction to the wall face to eliminate slack before backfilling.

   b. Use a temporary form system at the wall face during construction. Use pegs, pins, or the manufacturer's recommended method as approved by the City Engineer, in combination with the forming system, to hold the geotextile in place until the cover material is placed.

   c. Compact the backfill for the wall within the limits shown on the plans or as directed by the Design Engineer. Compact each layer to 95 percent of maximum density as determined AASHTO T-180. Maintain the water content to within ± 3 percent of the optimum moisture content. Sheepsfoot rollers and vibratory rollers or other rollers with protrusions will not be allowed within 3-feet of the wall face. Compact this area using approved light mechanical tampers, without damaging or distorting the wall facing or reinforcing layers.

3. SUBGRADE GEOTEXTILE

   a. Subgrade geotextile shall be installed in accordance with Subsection 308.03.B.

4. PAVEMENT OVERLAY GEOTEXTILE

   a. Pavement overlay geotextile shall be installed in accordance with Subsection 308.03.C.

208.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

208.04.A Measurement and payment of materials will conform to the specific section within these specifications that is applicable to the type of work specified unless shown otherwise below.

208.04.B GEOSYNTHETICS

1. SQUARE UNIT BASIS (MEASUREMENTS)

   a. Each geosynthetic installation will be measured along the lines and grades of the installation to the nearest square yard of surface area actually covered according to the plans or as required, except for drainage and wall geotextile applications.

   b. The number of square yards of drainage geotextile will be computed by multiplying the length of the trench where geotextile is used by the perimeter of the trench as determined from the neat lines shown.

   c. Geotextile walls will be measured to the nearest square foot of wall face computed by multiplying the length times the sloped height of the wall.

2. SQUARE UNIT BASIS (PAYMENT)

a. The accepted quantities for geosynthetics will be paid for at the contract price per unit of measurement for the following items:

Pay Item	Measurement
Drainage geotextile	Square Yard
Embankment geotextile	Square Yard
Riprap geotextile	Square Yard
Wall geotextile (includes all backfilling costs and geotextile as shown on the Plans)	Square Yard
Subgrade geotextile	Square Yard
Pavement overlay geotextile (includes preparation work, sealant, and geotextile)	Square Yard
Geogrid	Square Yard

b. Payment will be payment in full for all equipment, tools, labor, and incidentals necessary to complete the work. No separate payment will be made for constructing laps, seams, joints, and patches unless the City Engineer orders additional amounts over the minimum. For laps wider than the minimum or specified width, payment will be made for the added lap width at the Contract unit prices.

c. If the City Engineer orders geosynthetics with properties more stringent than specified, price adjustment will be allowed only for the difference in material cost.

209 EXCAVATION, EMBANKMENT, BEDDING, AND BACKFILL

209.01 DESCRIPTION

209.01.A This section covers work necessary for excavation, construction of embankment, foundation stabilization, pipe bedding and pipe zone, trench backfill, and disposal of material required in construction of streets, wastewater systems, water systems, storm drain systems, structures, and appurtenances thereto.

209.01.B UNCLASSIFIED EXCAVATION

1. Unclassified excavation is defined as all excavation, regardless of type, nature, or condition of materials, encountered unless separately designated. The Contractor shall assume full responsibility to estimate the kind and extent of various materials to be encountered in order to accomplish the work.

209.01.C ROCK EXCAVATION

1. Rock excavation is defined as the removal of all material that, by actual demonstration, cannot, in the City Engineer's judgment, be reasonably excavated with equipment comparable to types listed in the Table below and equipped with rippers or similar approved equipment and which is, in fact, systematically drilled and blasted or broken by power-operated tools designed for rock excavation. The City Engineer may waive the demonstration if material encountered is well-defined rock. The term "rock excavation" shall be understood to indicate a method of removal and not a geological formation.

Type	Minimum Net Horsepower	Type of Excavation
Trench Excavator	125	Trench
Dozer	300	Grading & Structural

2. In trenches, boulders, or pieces of concrete below grade larger than half cubic yard will be classified as rock if drilling and blasting or other approved methods are actually used for their removal from the trench. If material that would be classified as rock by the above definition is mechanically removed without blasting, breaking, or splitting, it will be considered unclassified excavation, or upon approval by the City Engineer if larger equipment is specifically brought in for the sole purpose of rock removal, as defined above, then such removal will be considered rock excavation.

209.01.D TRENCH EXCAVATION

1. Trench excavation is defined as removal of all material encountered in the trench to the depths and widths as shown and, unless otherwise classified by the Contract Documents, shall be considered unclassified or rock excavation.

209.01.E EMBANKMENT

1. Embankment is defined as furnishing, placing, and compacting embankment materials to the depth and configuration as shown in the Contract Documents or as directed by the City Engineer.

209.01.F FOUNDATION STABILIZATION

1. Foundation stabilization is defined as the removal of unsuitable material in the bottom of an excavation as approved by the City Engineer and replacement with specified material for support of a roadbed, pipe, structure, or appurtenances thereto.

209.01.G BEDDING AND PIPE ZONE

1. Material supplied and placed under and partially around the pipe in accordance with the appropriate standard drawing.

2. Bedding and pipe zone is defined as the full width of the trench from subgrade (minimum six (6) inches below outside of the pipe barrel) to a point twelve (12) inches above the top outside surface of the pipe barrel.

209.01.H TRENCH BACKFILL

1. Trench backfill is defined as furnishing, placing, and compacting backfill material in the trench between the top of the pipe zone and the bottom of the pavement base or ground surface. Trench backfill will be classified as either native or select backfill.

209.01.I BASE COURSE

1. Material supplied and placed between the trench backfill and the bottom of pavement surface or other structures constructed over the trench.

209.01.J OVERBREAK

1. Any material that is excavated, displaced, or loosened outside and beyond slopes, lines, or grades as staked or reestablished, regardless of whether overbreak is due to blasting, to inherent character of any formation encountered, or to any other cause.

209.02 MATERIALS

209.02.A EMBANKMENT MATERIALS

1. The Contractor shall provide native or imported embankment materials approved by the City Engineer of earth, sand, crushed aggregate, bank-run or river-run gravel or combinations hereof, that can be compacted to the densities specified, free of peat, humus, muck, frozen ground, organic matter, or other materials detrimental to construction of firm, dense, and sound embankments. Maximum size of material shall be four (4) inches in diameter unless otherwise approved by the City Engineer.

209.02.B FOUNDATION STABILIZATION

1. Use foundation stabilization consisting of imported bank-run or river-run gravel or crushed aggregate ranging in size from 3"-0" to 3/4"-0" as specified from a source approved by the City Engineer. Approval of material from a location does not mean approval of the entire site, but only as material continues to meet specification.

2. Material shall be well graded from coarse to fine unless otherwise specified by the City Engineer, shall be free from organic material, and shall not have more than 5 percent by weight passing the #200 sieve.

209.02.C BEDDING AND PIPE ZONE MATERIAL

1. CRUSHED AGGREGATE OR GRANULAR BASE ROCK

   a. Unless otherwise indicated in the Special Provisions, bedding and pipe zone material shall 3/4"-0" dense-graded base aggregate conforming to the requirements of Section 02630 of the ODOT/APWA Oregon Standard Specifications for Construction. Bedding and pipe zone aggregate shall be uniformly graded from coarse to fine. Sieve analysis shall be determined according to AASHTO T-27.

2. SAND

a. Sand shall only be used if required in the Contract Documents or as directed by City Engineer and shall be as specified below.

1) Sand shall consist of fine granular material naturally produced by the disintegration of rock produced from crushed gravel or from river dredging. Sand must be reasonably free of organic material, mica, clay, and other deleterious substances.

2) The grading of sand shall conform to one of the following grading requirements as specified. Gradation and sizes shall be determined per AASHTO T-27 and T-11.

	Percentage Passing by Weight	
Sieve Size	**Coarse Sand**	**Fine Sand**
1”	100	100
3/8”	95-100	-
#4	80-100	90-100
#30	10-30	-
#100	-	2 – 10
#200	0 – 8	0 – 4
Sand Equivalent	50 minimum	50 minimum

3) Table ranges are inclusive of tolerances. Material must be able to stand on a minimum 60º angle from horizontal following compaction to specified density. For the purpose of this specification, specified density will be a minimum of 9 percent of relative density as determined by AASHTO T-180 at optimum moisture.

209.02.D NATIVE BACKFILL MATERIAL

1. Native backfill material use is limited to trench backfill where the trench is not beneath a roadway or a designated future roadway, and its use must be approved by the City Engineer.

2. The Contractor shall use native material excavated from within limits of the project that can be compacted to the density specified, that is free from vegetation and other deleterious material, and that contains no frozen ground.

3. Maximum particle size shall not exceed four (4) inches in diameter.

209.02.E SELECT BACKFILL MATERIAL

1. GENERAL

a. The Contractor shall use imported granular material for backfill consisting of crushed aggregate, as specified. Controlled density fill shall be used only where approved or required by the City Engineer.

2. GRANULAR BACKFILL

   a. Unless otherwise indicated in the Special Provisions, granular backfill shall be 3/4"-0" dense-graded base aggregate conforming to the requirements of Section 02630 of the current ODOT/APWA Oregon Standard Specifications for Construction. Crushed aggregate shall be uniformly graded from coarse to fine. Sieve analysis shall be determined according to AASHTO T-27.

209.02.F RIPRAP

1. Unless otherwise indicated in the Special Provisions, riprap shall conform to the requirements of Section 00390 of the ODOT/APWA Oregon Standard Specifications for Construction.

209.02.G IMPORTED TOPSOIL

1. Unless specified otherwise, imported topsoil shall be used. Provide natural, fertile, friable topsoil, representative of local productive soil, and 90 percent free of clay lumps or other foreign matter larger than 2-inch diameter, not frozen or muddy, with pH 5.0 to 7.0, and not less than 3 percent humus as determined by loss on ignition of moisture-free samples dried at 100º C. Gravel portion (particles larger than 2-mm) shall not exceed 15 percent of total volume. Imported topsoil shall be free of quack grass, horsetail, and other noxious vegetation and their seeds. Should such regenerative material be present in the soil all resultant growth, both surface and root, shall be removed and replaced to original specifications at the Contractor's expense within the warranty period.

209.02.H NATIVE TOPSOIL

1. When specified, use topsoil from the site. Save, store, protect, and reuse approved native topsoil taken from the top 12-inches of the excavation. Ensure that topsoil is free from grass, overburden and roots, sticks, hard clay, and any stones that will pass a 1-inch square opening. Wherever native topsoil cannot be saved or is not satisfactory for reuse, use imported topsoil conforming to Subsection 209.02.G, but only with the approval of the City Engineer.

209.02.I WATER

1. Use water that conforms to requirements of Subsection 208.02.C. Provide water at the Contractor's sole expense. Whenever City water is to be used, the Contractor shall obtain a meter issued by the City.

209.02.J UNDERGROUND WARNING MARKING TAPE

1. Underground warning marking tape shall be chemically inert material that will not degrade when exposed to acids, alkalies and other destructive substances commonly found in soil. Marking tape shall be a minimum of 3-inches wide and 4 mils thick. Marking tape color shall be in accordance with the APWA national color code.

2. Permanent marking on the tape (i.e. “Caution Water Line Buried Below”) shall coincide with the corresponding utility it will serve.

3. Acceptable non-detectable underground warning marking tape:

   - Reef Industries .....Terra Tape (Standard or better)
   - Mutual Industries.....Non-detectable Tape
   - Presco .....Non-detectable Tape
   - Approved equal

4. Acceptable detectable underground warning marking tape:

   - Reef Industries .....Sentry Line
   - Mutual Industries.....Detectable Tape
   - Presco .....Detectable Tape
   - Approved equal

209.02.K LOCATING (TRACER) WIRE

1. Locating tracer wire for non-metallic piping shall conform to Subsection 501.02.J.

209.03 CONSTRUCTION

209.03.A GENERAL

1. Conform to all requirements of Section 106 including, but not limited to, Construction Stakes, Lines and Grades, Protection of Survey Markers, Protection of Property, Protection and Maintenance of Work During Construction.

2. Sampling and Testing shall conform to Section 107.11.

209.03.B UTILITY PERMITS

1. PERMIT STANDARDS AND CONDITIONS

   a. Permits are issued, subject to the approval of City, State, or other governmental agencies having either sole or joint supervision over the section of road, to jurisdictions for approval of a storm or sanitary sewer system, or authority to regulate land use by means of zoning and/or building regulations. It shall be the applicant's responsibility to determine the necessity of and obtain any such easements and approvals that may be required.

   b. Granting of a permit is conditioned upon replacement or restoration and any adjacent impacted areas by the applicant of the road right-of-way by the applicant to an equal or better condition than existed prior to permit issuance.

2. PERMIT IMPLEMENTATION

   a. Applicant or his Contractor shall advise the City at least forty-eight (48) hours in advance of commencing construction of the facility authorized by the permit. The City may require adjustment of the construction schedule to permit inspection by the City.

   b. The road approach or other facility shall be constructed in conformance with the Special Provisions and exhibits contained in and attached to the permit. Applicant shall notify the City when construction of the facility has been completed. If the work has not been constructed in a satisfactory manner, the applicant shall promptly correct any deficiencies outlined by the City.

3. ALLOCATION OF COSTS

a. The entire cost of installing, maintaining, repairing, operating or using the road approach, sidewalk, pole line, buried cable, pipe line, sign, or miscellaneous facility; of performing miscellaneous operations; and of any other expense whatsoever incidental to the facilities or operations authorized by the permit shall be paid by the applicant.

b. The applicant shall reimburse the City for any reasonable and necessary expense that the City may incur in connection with the facilities or operations authorized by the permit. The reimbursement to the City shall be made by the applicant within thirty (30) days after receiving a statement thereof from the City. These may include, but are not limited to, the following:

- ❖ Emergency repair by persons other than the permittee when authorized by the City.
- ❖ Emergency traffic control by persons other than the permittee when authorized by the City.
- ❖ Quality testing as required under the terms of the permit, or when ordered by the City to establish permit compliance.
- ❖ Repair of non-conforming installation (non-emergency) thirty (30) days after notification by the City of non-conforming installation.

c. In the above instances, the owner of the utility, facility, or structure shall bear the full cost of the work. This cost would include all City costs and shall be paid to the City within thirty (30) days after receipt of written notice of cost incurred by the City and request for payment. If payment is not made and the City must go to court to receive payment, the owner of the utility, facility, or structure shall bear all cost incurred by the City to receive payment associated with the court case.

209.03.C EXCAVATION

1. Excavate, remove, and dispose of all formations and materials, natural or man-made, irrespective of nature or conditions, encountered within limits hereinafter defined or as specified, necessary for construction of the project. Method of excavation used is optional. Over-break shall be removed at the Contractor's expense.

2. Use hand methods for excavation that cannot be accomplished without endangering existing or new structures or other facilities. Over-excavation under footings shall be filled with concrete of a strength equal to that of the footing, and cuts below grade shall be corrected by similarly cutting adjoining areas and creating a smooth transition, all at the Contractor's expense. When the precise location of subsurface structures is unknown, locate such structures by hand excavation prior to utilizing mechanical excavation equipment.

3. Excavate to the depths and widths designated, allowing for forms, shoring, working space, base material, and finish topsoil where required. Do not excavate deeper than elevation shown. Excavation carried below grade lines shown or established without approval shall be replaced with approved compacted material at the Contractor's expense.

4. Furnishing, installing, and removal of all shoring, sheeting, and bracing as required to support adjacent earth banks and structures, and for the safety of the public and of all personnel working in the excavation shall be the Contractor's responsibility and shall be considered incidental to the construction.

209.03.D ROCK EXCAVATION AND EXPLOSIVES

1. DEPTH OF EXCAVATION

   a. Excavate to the depths designated or as shown on the appropriate plan or standard drawing. Correct over-excavation with compacted material as directed at no additional expense to City. In trenches for sewers and water mains or conduits, remove all material necessary to provide a minimum clearance of 6-inches under the pipe and replace with bedding material in conformance with Subsection 209.02.C.

2. METHODS AND RECORDS REQUIRED

   a. Before rock removal by systematic drilling and blasting, or other methods, will be permitted, notify the City Engineer who, with Contractor or its representative, will determine the amount of material to be removed as rock excavation and will record the information. Then drill, blast, or break with power-operated tools specially designed for rock excavation, and excavate the material.

3. USE OF EXPLOSIVES

   a. Obtain any and all permits required for use of explosives required by the City and other governing agencies. No explosives shall be used without the expressed written permission of the City Engineer.

   b. Use of explosives shall be avoided as far as practicable, and in no case shall tunnel-blasting methods be used. Such blasting as must be done shall be controlled in a manner that will avoid possible shattering or loosening of materials back of lines to which the excavations are to be made. All blasting shall be supervised and/or done by a state-certified powder person. Be responsible for any and all damages to property or injury to persons resulting from blasting, or accidental or premature explosions that may occur in connection with the use of explosives. Give adequate warning to all affected persons and adjacent property owners prior to blasting.

   c. Where excavations in hard solid rock is to be made to depths of 10-feet or more, blasting thereof shall be done by the pre-splitting or pre-shearing method unless other methods are approved by Engineer.

4. TRENCH BLASTING

   a. When blasting rock in trenches, cover area to be shot with blasting mats or other approved types of protective material that will prevent scattering of rock fragments outside of the excavation.

209.03.E PRESERVATION OF EXISTING IMPROVEMENTS

1. Conduct operations in such a manner that existing streets, utilities, railroad tracks, structures, and other facilities which are to remain in place will not be damaged, as specified in Section 106. Furnish and install cribbing and shoring, or whatever means necessary to support material carrying existing facilities, or to support the facilities themselves, and maintain such supports until no longer needed.

2. Protect temporary facilities, until they are no longer required, and remove and dispose of temporary supports and other protective means when they are no longer required.

209.03.F EXCAVATION OF EXISTING IMPROVEMENTS AND MISCELLANEOUS

1. Unless otherwise specifically provided for, excavation or excavation and backfill includes all excavating, removing, hauling, and depositing, including but not limited to, existing pavements, walks, driveways, surfaces, slabs, curbs, gutters, and similar cement concrete structures, bituminous materials, all rock or gravel road surfacing materials, abandoned sewers, pipes and conduits, logs, piling, footings, foundations, vaults, and chambers, when such materials are within the limits of excavation.

2. Remove remaining ends of abandoned pipes, or portions of other items partially removed under this work, that would be left exposed after final excavation, to a minimum of 1-foot below the finished grade or elevation. Plug or seal ends of abandoned pipes with concrete in backfill or embankment areas. Storm drainpipe shall be reconnected as directed by the City Engineer.

3. The Contractor shall notify the City Engineer prior to filling or capping any pipes that are encountered during the course of the Work. The Contractor shall allow the City Engineer sufficient time to determine whether such pipes should be abandoned or maintained in serviceable condition. The costs of waiting or "down" time to determine serviceability and the subsequent abandonment or repair of such pipes shall be borne by the Contractor.

4. Payment for all work in this section and repair of any damage will be considered incidental to the work and included under Bid items for Excavation, Excavation and Backfill, or other specified earthwork items.

209.03.G SLOPE GRADING

1. Make slopes free of all exposed roots, unstable rock, and loose stones exceeding 3-inches in any dimension. Shape tops of banks to circular curves with, in general, not less than a 6-foot radius, unless rock makes such work impractical. All surfaces shall be neatly and smoothly graded and shall blend in with existing topography.

209.03.H FOUNDATION STABILIZATION

1. If, in the judgment of the City Engineer, having consulted with the Contractor, material in the bottom of an excavation is unsuitable for supporting foundations, piers, retaining walls, cribbing, sewers, pipes, or similar facilities, the Contractor shall over-excavate as necessary for successful construction of the facility and backfill to required grade with thoroughly compacted foundation stabilization material conforming to Subsection 209.02.B.

209.03.I DISPOSAL OF EXCESS MATERIAL

1. Excavated materials not suitable or not required for backfill or embankment shall be deposited at pre-designated sites specified, or sites supplied by the Contractor. An embankment permit will be necessary within the City for any embankment exceeding fifty (50) cubic yards before the Contractor places any excavated material from City projects on any property. The Contractor shall make all arrangements for disposal of excess material, obtain the necessary permits when not provided by the City at pre-designated sites, and bear all cost or retain any profit incidental to such disposal. Disposal sites shall be operated in a manner that will meet all safety and health requirements of federal, state, and local agencies.

2. Where disposal sites are designated in the Contract Documents, the material shall be placed as directed and the site cleaned and uniformly graded to conform to existing contours upon completion of the work. The natural drainage of the site shall be maintained and under no circumstances will the site be graded such that runoff will be impounded.

3. Excavated materials shall not be deposited on public property anywhere within the City limits unless directed to do so by the contract documents. The Contractor may be liable for the cost of removing excavated materials that are placed on unauthorized locations, whether publicly or privately owned.

209.03.J TEMPORARY LOCATION OF EXCAVATED MATERIALS

1. Place excavated material specified for embankment or backfills only, not excess material, within the construction easement, right-of-way, or specified working area. Pile in such a manner that it will cause a minimum of inconvenience to the public. Furnish the City Engineer a copy of written approval from each property owner prior to stockpiling material on private property outside of easements. Conform to all Federal, State, and local codes governing the safe loading of ground adjacent to trenches with excavated material.

2. Provide free access to all fire hydrants, water valves, and meters, and leave clearance to enable free flow of stormwater in all gutters, conduits, and natural watercourses.

209.03.K SURFACE REMOVAL AND REPLACEMENT FOR TRENCHES

1. REMOVAL AND REPLACEMENT OF TOPSOIL

   a. When specified and where trenches within easements cross lawns, garden areas, pasture lands, cultivated fields, or other areas on which topsoil conditions exist, remove all topsoil to a depth of at least 12-inches for the full width of the trench to be excavated. Stockpile topsoil to one side of the easement in an approved location and do not mix with remaining excavated material.

   b. Topsoil shall be protected from weather conditions or other situations that may render the topsoil unsuitable for reuse. Stockpiled topsoil shall be placed in the top of the backfilled trench to the depth removed and lightly compacted.

   c. Finished grade of topsoil shall conform to the area adjacent to the trench. Damage to adjacent topsoil caused by work operations shall be repaired. Rock, gravel, clay, and any other foreign materials shall be removed from the surface of the ground, the area regraded, and additional topsoil added as required.

   d. Maintain finished grade of topsoil level with area adjacent to the trench until final acceptance by the City Engineer. Repair damage to adjacent topsoil caused by work operations. Remove all rock, gravel, clay, and any other foreign materials from surface; re-grade and add topsoil as required.

   e. In lieu of stockpiling topsoil, Imported Topsoil as defined in Subsection 209.02.G may be substituted and replaced to the actual depth removed at the Contractor's expense. If, in the opinion of the City Engineer, the Contractor does not take precautions to protect the stockpiled topsoil from contamination by rocks, clay, excess water, etc., the Contractor will be required to import topsoil meeting the requirements of Section 209.02.G at Contractor's own expense.

f. For publicly financed improvements, payment for removing, stockpiling, and replacing topsoil in the trench is included in the Trench Excavation and Backfill Bid item.

2. REMOVAL OF PAVEMENT, CURBS, DRIVEWAYS, AND SIDEWALKS

a. Cut all asphalt pavement to full depth with a pavement saw or other suitable pavement cutter prior to excavation of trenches. The method of removal shall preclude or minimize damage to pavement adjacent to the trench.

b. Portland Cement Concrete pavement, curbs, and sidewalks shall be sawcut to a minimum depth of 4-inches or half the concrete thickness, whichever is greater. Subsequent removal may be accomplished by using a jackhammer; but, if the Contractor damages the portion of the facility that is to remain, it shall be replaced to the nearest joint at no expense to the City.

c. Use of a jackhammer or backhoe to remove concrete shall be limited to areas isolated by sawcutting or existing cold joints. Edges that are spalled or cracked during removal of adjacent material shall be recut. The Contractor shall be responsible for recutting edges damaged during surface removal and no payment will be made for additional sawcutting or surface replacement. Full depth cut by pavement saw can be done at the option of the Contractor. Use of any machine utilizing a falling or swinging weight in the form of a "headache ball" will not be permitted.

d. No slurry, dust, or other material created by sawcutting will be allowed to enter the storm drain system.

e. Width of cut shall be as shown on the plans or standard drawings and shall follow lines parallel to pipe or conduit centerline. Remove all loose, undermined, or damaged pavement.

f. When the distance between the final sawcut pavement edge and a curb, gutter, pavement edge, construction joint, or other concrete structure or improvement will be less than 3-feet, the Contractor shall remove the intervening pavement and include that area in the pavement restoration. This requirement is intended to prevent subsequent settlement, displacement, or premature breakup of narrow, noncontiguous sections of pavement.

g. Joints shall not be located in wheel paths. Prior to paving, all loose, cracked, sunken, or otherwise damaged edges will be sawcut in continuous straight cuts. Straight-line sawcut lengths will not be less than 50-feet. Cut angles will not exceed 15 degrees.

h. Pavement and concrete materials removed shall be hauled from the site and not used for trench backfill. Replacement of pavement, curb, and sidewalk shall conform to the requirements of Section 212.

209.03.L TRENCH EXCAVATION AND SHORING

1. MAXIMUM LENGTH OF OPEN TRENCH

   a. Length of trench excavated in advance of the pipe laying shall be kept to a minimum, and in no case shall it exceed two hundred (200) feet unless otherwise authorized by City Engineer. The length of un-restored work area and total unfinished trench construction shall not exceed a length of six hundred (600) feet for main line pipe laying operation unless otherwise authorized. Trench construction will not be considered completed until all restoration is completed. If the unfinished trench or restoration exceeds six hundred (600) feet in length, the main line construction shall be suspended and shall not be resumed until authorized by the City Engineer.

   b. Suitable barricades shall be erected and maintained around all unattended, open excavations, regardless of depth. In no case will any trench be left unfinished or uncovered overnight or outside working hours. The use of steel sheets to cover excavations shall be limited to locations where there is daily, ongoing work. Other excavations shall be backfilled and temporarily resurfaced the day they are excavated.

   c. For purposes of this subsection, trench shall be considered as unfinished until excavation, construction, backfilling, and resurfacing with temporary cold mix or the same material as the adjacent finished surface has been installed to finish grade, and cleanup operations have been completed. Cleanup of backfilled and construction area shall include resurfacing and cleaning of area so as to allow use of trench and adjacent construction area for normal use as required in Section 215.

   d. Where paved shoulders adjacent to excavations are less than 4-feet wide, protect the traffic at the end of each working day, backfill pavement edge excavations to the elevation of the existing pavement with permanent base material or with temporary wedge of aggregate as shown on the plans.

2. TRENCHING MACHINES

   a. Trenching machines, earth saws, and other similar types of equipment designed to excavate trenches that are less than 12 inches in width shall not be used unless the use of such equipment is specified in the Contract Documents or approved by the City Engineer.

3. TRENCH WIDTH

   a. The maximum trench width at the ground surface will be kept to a minimum necessary to install the pipe in a safe manner. Trenches shall be of sufficient width to allow for shoring and permit proper joining of pipe and compaction of the backfill material along the sides of the pipe. Minimum trench width of unshored trenches shall provide a clear working space of at least 10-inches on each side of the outside diameter of the pipe bell. Shoring requirements shall be independent of trench widths.

b. Trench width at the top of the pipe will be the pipe nominal diameter plus 18-inches, except where specifically shown on the drawings, or specified in the Special Provisions. The pipe will be centered in the trench online and grade at all times. When authorized by the City Engineer, the Contractor may use pipe of greater strength or install a superior pipe bedding in lieu of maintaining the trench widths shown. If maximum width shown is exceeded by Contractor (without written authorization), the Contractor shall provide pipe of a higher strength designation, a higher class of bedding, or both, as approved by the City Engineer, at no expense to the City.

c. Make the excavation for manholes and other structures wide enough to provide a minimum of 12-inches between sides of structure and sides of excavation.

d. Confine top width of trench to dedicated rights-of-way or construction easements. Special written agreements to extend width may be made by the Contractor with affected property owners, provided such agreements are approved by the City Engineer.

4. GRADE

a. Excavate trench to lines and grades shown or as established by the City Engineer, with proper allowance for pipe thickness, pipe bedding, and foundation stabilization. The subgrade upon which bedding is to be placed shall be firm, undisturbed, and true to grade. If the trench is over-excavated without approval of the City Engineer, restore to grade with thoroughly compacted foundation stabilization material or pipe bedding material at the Contractor's expense. Place material over full width of the trench in compacted layers to established grade with allowance for pipe bedding.

5. SHORING AND BRACING OF TRENCHES

a. During trenching operations, the Contractor shall provide ladders, bracing, sheeting, shoring, and other equipment and materials as necessary to protect adjacent earth banks and structures, property, personnel working in the excavation, and the public.

b. Sheeting shall be installed and secured such that the bottom edges of the sheets are positioned and maintained above the top of the bedding.

c. When using a moveable trench shield or box and similar types of equipment, the sides of the trench at the bottom of the excavation shall be formed such that the bottom edges of the trench shield will be supported above the top of the bedding. Trench boxes shall be placed and moved in a manner that will preclude the possibility of displacing or disturbing the bedding under the pipe.

d. Sheeting and shoring shall be maintained until pipe has been placed and backfilled through the pipe zone. Sheeting and shoring shall be removed as backfilling is accomplished, in a manner that will not damage the pipe or permit voids in the backfill.

e. Ladders, sheeting, shoring, trench boxes, and related materials and equipment shall conform to the latest revision of the Occupational Safety and Health Administration (OSHA) regulations governing the equipment and the application of the equipment to the particular work being undertaken.

209.03.M DEWATERING

1. Furnish, install, and operate all necessary machinery, appliances, and equipment to keep excavations free from water during construction. Remove and dispose of all water entering the trench excavation continuously during the time the trench is being prepared for the pipe laying, during the pipe laying, when concrete is being placed, and until the backfill has been completed. Dewater and dispose of water so as to prevent injury to public or private property, and to prevent nuisance or menace to the public. Drainage of trench water through the pipeline under construction is prohibited unless otherwise approved by the City Engineer. At all times the Contractor shall have on hand sufficient pumping equipment and machinery in good working condition for all ordinary emergencies, including power outage. The Contractor shall have available, at all times, competent workers for operation of the pumping equipment. Control surface runoff to prevent entry or collection of water in excavations.

2. Control ground water such that softening of the bottom of excavations or formation of "quick" conditions or "boils" during excavation is avoided to the extent possible given specific site conditions. Design and operate dewatering systems so as to prevent removal of natural soils and so that ground water level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property.

3. Before dewatering is started, submit to the City Engineer a statement of the method, installation, and details of the dewatering system proposed to be used. Open and cased sumps shall not be used as primary dewatering for excavations deeper than 3-feet below static water table.

4. Release ground water to its static level in such a manner as to maintain the undisturbed state of natural foundation soils. Prevent disturbance of compacted backfill and flotation or movement of structures, water mains, sewers, and other utilities.

5. All foundation, vault, and trench de-watering water that has similar characteristics to stormwater runoff at the site, shall be discharged into a controlled conveyance system prior to discharge to a sediment trap or sediment pond.

6. Clean, non-turbid de-watering water, such as well-point groundwater, can be discharged to the public system. These clean waters should not be routed through sediment traps or sediment ponds with stormwater.

7. Highly turbid or otherwise contaminated de-watering water, such as from construction equipment operation, clamshell digging, concrete pour, or work inside a cofferdam, shall be handled separately from stormwater at the site.

8. Other disposal options, depending on site constraints, may include

   - Sanitary sewer discharge with City Wastewater Services approval.
   - Over-land infiltration.
   - Filter fabric/media filtration, or
   - Transport off-site in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute local or state waters.

9. For publicly financed improvements, dewatering shall be considered as incidental to, and all costs included in, the various contract pay items in the Bid.

209.03.N EMBANKMENT

1. PREPARATION OF EMBANKMENT FOUNDATIONS

   a. Prior to construction of embankments, excavate and dispose of unstable material or unsuitable foundation material. Limit excavation to lines, grades, and cross sections shown. Fill basements, trenches, and holes that occur within embankment limits with specified material. Compact natural ground underlying embankments to the depth of grubbing, or a minimum of eight (8) inches to density specified for the embankment material to be placed. Embankment construction shall also comply with requirements of Subsection 207.03.F.

2. EMBANKMENT CONSTRUCTION

   a. Construct embankments to the lines and grades shown. Deposit material in layers thin enough to ensure compaction requirements are achieved throughout the entire lift and not exceeding 8-inches deep across the full width of the embankment. Place material in continuous horizontal layers. Compact each lift to the appropriate density

   b. Embankment for structural foundations and roadways, the maximum aggregate size shall not exceed three (3) inches and shall be compacted to not less than a relative maximum density of 95 percent as determined by AASHTO T-180 throughout the embankment.

   c. For all non-structural embankments, the compacted materials within three (3) feet of established subgrade elevation shall have a density in place of not less than 95 percent of relative maximum density as determined by AASHTO T-180, and below three (3) feet shall have a density in place of not less than 90 percent of relative maximum density as determined by AASHTO T-180. Embankment shall not show any appreciable deflection or adverse reaction under the compacting equipment during compaction.

   d. If the surface of the prepared foundation or the compacted surface of a preceding lift is too dry or smooth to bond properly with the next layer of material, moisten or scarify, or both, before the next layer of material is placed. Compact slopes of all embankments thoroughly, and true to line and grade.

   e. Do not place embankment material when the material, foundation, or previously placed embankment material is frozen. Embankment material shall not be placed in final position until moisture in excess of optimum moisture has been removed. Water settling of embankments will not be permitted.

3. PIPELINE EMBANKMENT

   a. Where pipelines are to be placed within an embankment, construct the embankment to its final specified elevation prior to trench excavation for the pipeline. Place pipe bedding and pipe zone materials in accordance with applicable portions of Subsections 209.03.O and 209.03.P. Place trench backfill material as specified in Subsection 209.03.Q.

209.03.O BEDDING AND PIPE ZONE

1. GENERAL

   a. Construct bedding and pipe zone in conformance with the appropriate Standard Drawing.

   b. In the absence of a specific requirement, granular bedding and pipe zone material shall be used with all flexible and rigid pipes. Concrete cradle bedding shall be used only when specified in the Contract Documents or by the City Engineer.

   c. Bedding and pipe zone placement shall be considered to include the full width of excavated trench from the bottom of the trench or top of the foundation stabilization material and consists of leveling the bottom of the trench or top of the foundation material and placing pipe bedding select material in uniform compacted lifts to the horizontal centerline (springline) of the pipe.

   d. Install a continuous 12 gauge locating wire at the top of pipes for all non-metallic mains and laterals in accordance with Subsection 501.03.G. Refer to the Standard Drawings.

2. CONCRETE CRADLE BEDDING OR PIPE ENCASEMENT

   a. Pipe cradle or encasement shall consist of Portland Cement Concrete conforming to Section 208.02.J. Bottom of trench shall be fully compacted before placement of pipe, cradle, or encasement. Install concrete reinforcement and place concrete in such a manner that no dirt or foreign material becomes mixed with the concrete. Allow concrete sufficient time to reach initial set before any additional backfill material is placed in the trench.

3. GRANULAR BEDDING AND PIPE ZONE

   a. Bedding and pipe zone material shall be spread smoothly to proper grade so that pipe is uniformly supported along the barrel. Excavate bell holes at each joint to permit proper assembly and inspection of the entire joint.

   b. Bring lifts up together on both sides of the pipe and carefully work under pipe haunches. Place subsequent lifts of not more than six (6)-inch thickness up to the horizontal centerline of the pipe. Bedding under pipe shall provide a firm, unyielding support along the entire pipe length.

   c. Attention shall be given to the area from the flow line to the horizontal centerline of the pipe to ensure that firm support is obtained to prevent any lateral movement of the pipe during the final backfilling of pipe zone. The remainder of the pipe zone material shall be carefully placed and compacted around the pipe in six (6)-inch layers. Care shall be taken to prevent lateral or upward movement of the pipe during placement and compaction of pipe zone material.

   d. Material for bedding and pipe zone shall be as specified and placed lifts of not more than six (6)-inch thickness to the top of pipe zone and individually compacted with mechanical vibrating or impact tampers to minimum 90 percent of maximum dry density as determined by AASHTO T-180.

209.03.P TRENCH BACKFILL

1. GENERAL

   a. The type of backfill to be used above the pipe zone is indicated on the drawings. The right is reserved to modify the use, location, and quantities of the type of backfill during construction as the City Engineer considers being in the best interest of the City.

   b. When backfill is placed mechanically, push the backfill material onto the slope of the backfill previously placed and allow it to slide down into the trench. Do not push backfill into the trench in such a way as to permit free fall of the material until at least two (2) feet of cover is provided over the top of the pipe. Under no circumstances allow sharp, heavy pieces of material to drop directly onto the pipe or the tamped material around the pipe.

   c. Take reasonable precautions to prevent excavated material that is designated to be used for backfill from becoming wet and exceeding the critical moisture limits. If native material does become wet and exceeds the critical moisture limits due to the Contractor's operations, replace with imported granular material at the Contractor's expense.

   d. Underground non-detectable (for metallic piping) or detectable (for non-metallic piping) acid and alkali resistant safety warning marking tape shall be provided 12-inches minimum to 18-inches maximum from finish grade along the full length of all trench sections for mainlines and service lines. Underground warning marking tape shall be continuous the entire length of mains and laterals installed. Warning marking tape for service laterals shall be extended from the mainline to the back of all Public Utility Easements.

2. GRANULAR BACKFILL

   a. Backfill the trench above the pipe zone with imported crushed rock backfill material. Compact the entire trench depth in suitable lifts not to exceed four (4) feet in depth, loose measure, with mechanical vibrating compactors with sufficient compactive effort to meet the specified density. Determine the type of equipment, method of placing lifts, and the amount of compacting effort required to prevent subsequent settlement. Compaction with hydra-hammer equipment will not be approved.

   b. The top five (5) feet of select backfill shall be compacted to 95 percent of maximum dry density as determined by AASHTO T-180. Below the top five (5) feet of backfill compact to 92 percent of maximum dry density as determined by AASHTO T-180.

   c. Any subsequent settlement of the finished surface during the warranty period shall be considered to be a result of improper or insufficient compaction and shall be promptly repaired by the Contractor at the Contractor's expense.

3. NATIVE BACKFILL

   a. Where called for in the Contract Documents, the trench above the pipe zone and to within twelve (12) inches of the surface, shall be backfilled with excavated trench material. Material will be compacted to a minimum of 90 percent maximum dry density as determined by AASHTO T-180.

b. The Contractor shall estimate and install sufficient native backfill material so that, after normal settlement, the finished surface will meet the existing grade. The Contractor shall neatly windrow the material over the trench and remove all excess. Any excess or shortage of backfill material that becomes apparent after settlement and within the warranty period shall be corrected by re-grading and adding additional material where required. Remove rocks larger than two (2) inches in any dimension from the upper eight (8) inches of the backfill.

c. The Contractor shall take reasonable precautions to prevent excavated native material designated to be used for backfill from becoming unsuitable for reuse as a result of Contractor's operations. If native material becomes unsuitable for reuse due to the Contractor's operations, as determined by the City Engineer, the backfill shall be replaced with imported native type materials or granular material at the Contractor's expenses.

d. In areas where topsoil existed or is required, the top twelve (12) inches of trench shall be backfilled with native or imported topsoil. Topsoil, regardless of source, shall meet minimum requirements in Subsection 209.02.G or H.

e. Topsoil shall be lightly compacted to resist settlement.

4. WATER COURSE UNDERCROSSINGS

a. The type of backfill material, dimensions, and installation requirements will be specified in the Contract Documents.

5. TRENCH MAINTENANCE

a. In graveled areas, maintain surface of the backfilled trench level with the adjacent and existing grade, before and after the area is opened to traffic, with 1"-0" or 3/4"-0" compacted granular base material. In paved areas, temporary hot or cold mix asphalt pavement shall be used until the final pavement replacement is completed. The temporary asphalt or steel plating shall be in place at the end of each workday. Place temporary hot or cold mix asphalt in conformance with Subsection 212.03.C.

b. Maintain backfilled trench surface between any two successive manholes until the following operations have been completed and accepted by the City Engineer:

- Service connections installed, backfilled, and compacted.
- Construction of manholes and appurtenances.
- Air testing.
- Cleanup and restoration of all physical features, including concrete curbs, gutters, and driveways.
- Utilities restored to their original condition or better.
- All work required between the two manholes accomplished.

c. Maintain backfilled trench surface between any two successive valves until the following operations have been completed and accepted by the City Engineer:

- Service connections installed, backfilled, and compacted.
- Valves, valve boxes, and hydrants installed.
- Hydrostatic testing.
- Flushing and disinfection.
- Cleanup and restoration of all physical features, including concrete curbs, gutters, and driveways.

- ❖ Utilities restored to their original condition or better.
- ❖ All work required between the two valves accomplished.

d. Do not undertake final pavement replacement until all items outlined above have been completed and accepted, unless otherwise approved by the City Engineer.

e. Maintenance of backfilled trenches is considered as incidental to this item of work and payment for such maintenance will be considered as included in payment for Excavation and Backfill.

209.03.Q COMPACTION AND DENSITY REQUIREMENTS

1. GENERAL

a. Compaction shall be by mechanical methods only.

b. Compaction equipment shall be of suitable type and adequate to obtain the amount of compaction specified.

c. Compaction equipment shall be operated in strict accordance with the manufacturer's instructions and recommendations and shall be maintained in such condition that it will deliver the manufacturer's rated compactive effort.

d. Structures damaged by settlement shall be restored to their original condition by the Contractor at the Contractor's expense.

2. COMPACTION AND DENSITY REQUIRMENTS

ENGINEERED FILL:	
Minimum percent compaction required	95 percent
Test method required to determine maximum density	AASHTO T-180
Frequency of density testing	8-inch lifts, 3 test for each 2‘ of fill placed
ROAD SECTION – EMBANKMENT:	
Minimum percent compaction required	95 percent
Test method required to determine maximum density	AASHTO T-180
Frequency of density testing of embankment	8-inch lifts, 3 tests for each 2' of embankment placed
ROAD SECTION – SUBGRADE:	
Minimum percent compaction required	95 percent
Minimum percent compaction required to what depth below subgrade	12-inches
Test method required to determine maximum density	AASHTO T-180
Frequency of density testing of subgrade	As needed

ROAD SECTION – AGGREGATE BASE:

Minimum percent compaction required	95 percent
Test methods required to determine maximum density	AASHTO T-180
Frequency of density testing of aggregate base	8-inch lifts, 150' intervals or as needed

UTILITY TRENCH: (beneath pavement and sidewalk)

Minimum percent compaction required for bedding and pipe zone	90 percent
Minimum percent compaction required trench backfill above pipe zone	92 percent below top 5' of trench backfill and 95 percent within top 5' of trench backfill
Minimum percent compaction required in unimproved, non-engineered fill areas	90 percent
Test method required to determine maximum density	AASHTO T-180

ADDITIONAL INFORMATION/COMMENTS:

When using nuclear gauge, two readings at each site, the second at right angles to the first. The two reading will be averaged to obtain test density.

3. COMPACTION SAMPLING AND TESTING

a. Sampling and testing of materials for determination of compliance with the specified compaction requirements shall comply with Section 107.11 and may be taken at any location and time as the City Engineer may determine. Excavate test pits in the backfill as directed by the City Engineer for the purpose of testing the backfill compaction.

b. At the option of the City Engineer, density tests may be taken on a lift of compacted backfill immediately before placing the next lift. All costs in connection with excavating test pits, providing and installing safety shoring as required to protect the testing person, and standby time during field density test shall be considered incidental to backfill and shall be included in unit price bid for the various items involved.

c. When compaction testing indicates that the required density has not been obtained by the Contractor, the Contractor shall bear all costs for all subsequent retesting in the areas of non-compliance.

d. The Contractor shall be totally responsible for rescheduling compaction testing with the City Engineer. Any and all costs for tests associated with delays due to retesting shall be the sole responsibility of the Contractor.

e. If required density has not been obtained, remove the backfill from the trench, replace with backfill, and re-compact as many times as it is necessary to obtain the required specified minimum densities.

f. Any settlement noted in backfill, embankment, or in structures built over the backfill or embankment within the warranty period, in accordance with the Subsection 108.21, will be considered to be caused by improper compaction methods and shall be corrected at the Contractor's expense.

209.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

209.04.A UNCLASSIFIED EXCAVATION

1. All unclassified excavation will be measured on a cubic yard basis, or on a linear foot basis for trench excavation and backfill when so shown in the Bid, all in original position prior to excavation. The quantity measured for payment will include only material excavated from within the limits defined herein. Any additional excavation outside of these limits, unless ordered in writing by the City Engineer, shall be considered as having been made for Contractor's benefit and will be considered as incidental to the work.

2. Excavation required for the volume displaced by new concrete curbs, driveway, sidewalks, steps, and pathways shall be considered incidental to the work and no payment will be made for removal of this material.

3. The unit cost per cubic yard will be considered full compensation for the excavation and the disposal or temporary storage of excavated materials, removal of interfering sections of existing surface and subsurface utilities and structures, the control of ground and surface waters, the preparation and compaction of the subgrade, and all other materials, labor, and equipment of whatsoever nature that is necessary to complete the work as defined in the Contract Documents and to begin placement of the backfill or base materials.

4. ROADBED AND SLOPE EXCAVATION

   a. Pay quantities shall be computed to the neat lines of cross sections as staked or as otherwise specified.

5. TRENCH EXCAVATION AND BACKFILL

   a. Length of all trenches will be measured horizontally along center of pipe or conduit from center-to-center of valves, fittings, couplings, manholes, structures, or end of pipe or conduit, whichever is applicable. Measurement through structures will be deducted if the Bid carries a separate item of structure excavation applicable to the structures.

   b. Measurement and payment for trench excavation and backfill shall include all work specified herein, or not specifically paid for in other pay items.

   c. If a portion of the native material is approved as backfill material in areas requiring such, there may be a need for additional granular backfill to be imported. No additional payment will be made for the granular backfill. It will be considered incidental to the bid item for native backfill material.

   d. Trench backfill above the pipe zone will either be native crushed aggregate or CDF for purposes of payment. Payment will be made based on the type of backfill actually installed.

e. The price per linear foot for trench excavation and backfill shall be considered full compensation for the removal, protection, and replacement if damaged or interfering portions of existing sewers, storm drains, waterlines, and other improvements; the plugging or removing of abandoned conduit and structures; the excavations of the trench; disposal of excess excavation; the control of ground and surface waters; the preparation of subgrade; backfilling the trench; removing, stockpiling, and replacing topsoil; and all other work necessary to install the pipe or conduit, complete in place.

6. GRAVITY SANITARY SEWERS AND STORM DRAINS

a. When contained in the Bid, trench excavation and backfill will be paid for on a linear foot basis for type and depth of backfill used, and all incidental work, with depth being measured from original ground or paved surface to invert of the pipe. The price bid per linear foot shall include the excavation required to provide space for the pipe bedding and any excavation and backfill necessary to widen the trench for installation of manholes and appurtenances.

b. For gravity sanitary sewers and storm drain installations, payment for trench excavation and backfill will be included within the "Pipe Installation" bid item, Subsection 501.04 and Subsection 601.04.

7. PRESSURE SEWERS, WATERLINES, AND CONDUITS

a. Payment for trench excavation and backfill will be made at the respective unit prices stated in the Bid for the trench excavation, the type of backfill used, and all incidental work, including all extra excavation required to provide space for pipe bedding, and shall also include any incidental excavation and backfill necessary to widen the trench for installation of branch-line fittings and appurtenances.

b. For waterline installations, payment for trench excavation and backfill will be included within the "Pipe Installation" bid item, Subsection 401.04.

c. For pressure sewer installations, payment for trench excavation and backfill will be included within the "Pipe Installation" bid item, Subsection 501.04.

209.04.B ROCK EXCAVATION

1. STRUCTURAL ROCK EXCAVATION

a. Rock excavation will be measured on a cubic-yard basis for the actual quantity removed within the limits of excavation as defined for unclassified excavation. Quantity for payment shall be the amount approved by the City Engineer.

2. ROADBED AND SLOPE ROCK EXCAVATION

a. Rock excavation will be measured on a cubic-yard basis for the actual quantity removed within the limits of excavation as defined for unclassified excavation. Quantity for payment shall be the amount approved by the City Engineer.

3. TRENCH ROCK EXCAVATION

a. Rock excavation will be measured on a cubic-yard basis as follows:

1) *Length* - Length will be the entire horizontal distance where rock is encountered, measured on a lineal foot basis along the centerline of the trench.

2) *Width* - For sewers, storm drains, and water mains, the width for payment of trench rock excavation shall not exceed the inside pipe diameter plus 18-inches, except at manhole locations where the width will be the manhole diameter plus 2-feet where rock is encountered.

3) *Depth* - Measurement for depth will be the vertical distance from the top of the rock to the bottom of the rock or a depth that is 6-inches below the sewer pipe, storm drain, water main, or structure, whichever is less. Depth will be measured at intervals of 25-feet for sewers and 50-feet for water mains along the centerline of the trench, beginning at the first location that rock is encountered and ending where the rock stops. The average depth between measuring points will be the depth used for computing depth of rock.

b. Payment for rock excavation will be based on the unit price per cubic yard stated in the Bid and will be paid in addition to the payment for trench excavation and backfill. Payment for rock excavation shall include full compensation for all work necessary to excavate the rock material. No payment will be made for rock excavated below the required grade or outside the widths mentioned above.

209.04.C HARD SURFACE REMOVAL AND REPLACEMENT FOR TRENCHES

1. Measurement and payment for the removal and replacement of Portland Cement Concrete pavement, asphaltic concrete pavement and surfaces, curbs, driveways, and sidewalks shall conform to the provisions of Section 212.04.

2. Payment for removal will be covered under excavation unless specifically stated otherwise in the Contract Documents.

209.04.D EMBANKMENT

1. Measurement for payment for embankment compacted in place will be made on a cubic yard basis. Computation of volume for payment will be based on field measurement of the actual number of cubic yards constructed within limits shown or directed. Where applicable, this shall be within neat lines of the staked cross section.

2. No payment will be made for quantities required due to subsidence or settlement of ground or foundation, for settlement of materials within the embankment or for shrinkage, settlement, washout, slippage, or loss regardless of cause.

3. Deduction may be made for piers, columns, pipes, or miscellaneous construction features constructed within embankment limits.

4. Payment shall constitute full compensation for all work and all materials used, whether obtained from the site of work or imported.

5. Trench excavation, bedding, and backfill placed in the compacted embankment will be paid for separately for the particular item and class of construction.

209.04.E FOUNDATION STABILIZATION

1. Payment for this item will be based on the unit price per cubic yard stated in the Bid. Measurement will be based upon actual in-place measurements by the City Engineer. Payment for this item shall constitute full compensation for all materials, labor, equipment, and incidentals necessary to furnish materials at the site and for placing and compacting it and for the extra depth of excavation required below the pipe base grade structure or roadway to provide for a stable base. This item is to provide for unstable base encountered in the progress of the work and shall be used only under the direction of the City Engineer. Foundation stabilization will only be paid in those areas where the City Engineer has given written direction for installation.

209.04.F BEDDING AND PIPE ZONE

1. Payment for pipe bedding and pipe zone will be included in the lineal foot payment for pipe as specified in Subsection 401.04, Subsection 501.04, and/or Subsection 601.04.

209.04.G RIPRAP AND FILTER BLANKET

1. Riprap and filter blanket material will be measured for payment on a cubic yard or ton basis only when listed in the Bid as a separate bid item, or when directed by the City Engineer. Measurement will be based upon individual trip tickets of actual truck measure furnished to the Inspector for the cubic yards or tons used under this item. Trip tickets shall be presented to the Inspector for signature on the day the material is delivered. No payment will be allowed on trip tickets not so validated by the Inspector.

2. Payment for riprap and filter blanket shall include all work necessary to furnish and place the material complete. When not listed in the Bid, payment for riprap and filter blanket shall be incidental to other items of work.

209.04.H IMPORTED TOPSOIL

1. Measurement and payment for the imported topsoil will be made on a cubic yard or ton basis and only when listed in the Bid as a separate bid item or when directed by the City Engineer. Measurement will be based upon individual trip tickets of actual truck measure furnished to the Inspector the cubic yards or tons used under this item. Trip tickets shall be presented to the Inspector for signature on the day the material is delivered. No payment will be allowed on trip tickets not so validated by the Inspector.

2. Payment for imported topsoil shall constitute full compensation for all work necessary to furnish materials onsite, placing material, and for full compaction in place.

209.04.I SHORING BRACING

1. Shoring, bracing, and cribbing, including all work and materials expended in furnishing, placing, and removing such shoring, bracing, and cribbing necessary to complete the excavation, shall be considered incidental to the pay item for excavation.

209.04.J DEWATERING

1. Dewatering shall be considered as incidental to and included in the pay item for excavation.

209.04.K INCIDENTALS

1. Other materials, labor, and equipment required to complete the excavation, embankment, bedding and backfill work in conformance with the Contract Documents and not listed as separate pay items in the Bid will be considered incidental to other items of work and no separate payment will be made.

210 BORING AND JACKING

210.01 DESCRIPTION

210.01.A GENERAL

1. Conform to all federal, state and local laws and regulations pertaining to tunneling and specifically to the standards set forth in the Oregon Safety Code for Places of Employment, Chapter 24, Safety Code for Mining, Tunneling and Quarrying, published by the Oregon Industrial Accident Commission, latest revision.

210.01.B PERMITS

1. All necessary permits for the undercrossing shall be obtained by the Contractor unless otherwise specified in the Special Provisions.

2. The term “permitter” shall designate the owner of railroad tracks or other facilities with prior rights, under which a pipe or conduit must be bored or jacked.

3. The operation across the permitter's right-of-way must conform to the requirements of the permitter as outlined in a pipeline crossing agreement made between the permitter and the City. The Contractor shall conform to all requirements of the pipeline crossing agreement.

4. Before work is commenced, the Contractor shall be solely responsible for obtaining and delivering to the permitter a public liability and property damage insurance policy in the amount required in the pipeline crossing agreement. The insurance company writing the policy shall be authorized to do business in the State of Oregon and shall be satisfactory to the permitter. The insurance policy or policies shall be delivered to and remain in the possession of the permitter. If any special agreement is required between the Contractor and the permitter, it shall be completed and signed before the Contractor enters upon or commences work on the permitter's property.

5. Before the start of the work, submit satisfactory evidence to the City Engineer that all insurance coverage requirements called for by the permitter have been complied with. If required, proposed construction methods and materials shall be submitted to the permitter before the start of construction. Written authorization to proceed from the permitter shall be submitted to the City Engineer before the start of construction.

6. Prior to starting construction, all required labor, materials, and equipment shall be on the site. Notify all permitters at least forty-eight (48) hours in advance of working within their right-of-way unless otherwise specified in the permit.

210.01.C BORING

1. Boring shall include all methods by which a pipe or conduit is pushed or pulled into place and by which the excavation method precludes the stationing of a worker within the pipe or conduit without stopping or removing the excavation equipment.

210.01.D JACKING

1. Jacking shall include all methods by which a pipe or conduit is pushed or pulled into place and one or more workers inside the conduit excavate and assist in keeping the conduit on a straight and true grade and alignment.

210.02 MATERIALS

210.02.A PIPE ZONE AND BACKFILL MATERIAL

1. Conform to the requirements of Section 209 unless otherwise specified in the Contract Documents.

210.02.B CARRIER PIPE

1. Conform to Section 401, Section 501, or Section 601 for the strength, class, and type as specified and shown in the Contract Documents. If not shown in the Contract Documents, carrier pipe shall be Class 52 ductile iron, except at railroad crossings, which shall be Class 56 ductile iron pipe unless otherwise approved by City Engineer.

2. Uncased, jacked concrete pipe shall conform to ASTM C 76 as modified in Section 401. The pipe shall have tongue and groove joints designed to provide a minimum 3/4-inch wide annular space on the interior of the joint for grouting after jacking is completed. The pipe shall have double circular cage reinforcement with additional longitudinal reinforcing steel as necessary for jacking operations.

210.02.C CASING PIPE

1. Casing pipe shall be smooth steel pipe conforming to AWWA C-201. Provide casing of size to permit proper construction to the required lines and grades. Minimum wall thickness shall correspond to the size of casing selected from the following Table, unless shown otherwise in the Contract Documents. However, Contractor shall be responsible for selecting the thickness consistent with the operations and the specified requirements of the permitter and as determined necessary by the casing installer based on anticipated jacking loads.

Carrier Pipe Diameter (inches)	Minimum Smooth Steel Casing Pipe Diameter (inches)	Minimum Smooth Steel Casing Wall Thickness (inches)
< 6”	12”	0.25 (1/4")
6”	12”	0.25 (1/4")
8”	16”	0.313 (5/16")
12”	20”	0.313 (5/16")
15”	24”	0.375 (3/8”)
18”	30”	0.375 (3/8”)
24”	36”	0.375 (3/8”)
> 24”	As specified by the Design Engineer	

2. Casing pipe shall conform to the above requirements or the requirements of the permitter, whichever is more stringent. The Contractor shall be ultimately responsible for providing and installing materials consistent with the method of installation and the specified requirements of the permitter.

3. Casing pipe diameters for carrier pipes not shown in the Table above shall be installed to the next larger casing pipe requirement shown. Lengths of casing pipe shall be as long as practical for crossing and site conditions. Joints shall conform to the requirements of AWWA C-206. Joints between sections shall be completely welded to the preceding sections. Prior to welding joints, the Contractor shall ensure that both ends of the casing sections being welded are square.

4. Equip jacked casings twenty four (24)-inch and larger with nipples at the springline and crown at 10-foot centers when pressure grouting is specified.

210.02.D CASING SPACERS

1. Casing spacers shall be used on all pipes within the casing, and shall be as manufactured by Pipeline Seal and Insulator, Inc., Advance Products and Systems, Inc., Calpico, Cascade Waterworks Mfg, Inc., or approved equal. Casing spacers shall restrained type bolted spacers and shall have a maximum spacing as shown in the Contract Documents or closer as recommended by manufacturer.

2. Casing end seals shall be synthetic neoprene rubber pull-on type end seals with stainless steel bands, as manufactured by Pipeline Seal and Insulator, Inc., Advance Products and Systems, Inc., Calpico, Cascade Waterworks Mfg, Inc., or approved equal.

210.02.E STAINLESS STEEL BANDS

1. One-half (1/2)-inch wide by 0.020-inch thick steel bands, or equal.

210.02.F GROUT

1. When shown on the Plans or in the Special Provisions, grout for filling the annular space between the carrier pipe and casing pipe shall be a mixture of one (1)-part portland cement, five (5)-parts sand, and seven parts 3/8-inch maximum size rounded aggregate by volume, or as approved by City Engineer, and proportioned to allow complete filling of the annular space. The mixture shall have a creamy consistency that enables it to be pumped with a concrete pump.

2. Grout for pressure grouting outside jacked carrier or casing pipe shall be a mixture of one part Portland Cement (Type 1-P) and three parts sand by volume proportioned to allow complete filling of all voids. The maximum allowable slump shall be 5-inches.

210.02.G SAND

1. When shown on the Plans or in the Special Provisions, sand for filling the annular space between the carrier pipe and the casing pipe shall be clean, sharp, and well graded so that 100 percent passes the No. 8 sieve, and between 10 percent and 35 percent passes the No. 50 sieve, or as approved.

210.03 CONSTRUCTION

210.03.A EXCAVATION

1. Excavation shall be unclassified and shall include whatever materials are encountered to the depths as shown or as required. The Contractor will visit the site and make an estimate of the kind and extent of various materials that may be encountered in the excavation.

210.03.B ALTERNATE OF JACKING OR BORING

1. Jacking or boring may be allowed in lieu of the open trench method. However, written authorization by the City Engineer must first be obtained. The City Engineer retains the right to reject either the jacking or boring method without rejecting the other. Authorization by the City Engineer shall in no way relieve the Contractor of the responsibility for making a satisfactory installation meeting the requirements set forth herein.

210.03.C BORING AND JACKING

1. Borings shall be at 90-degrees to all crossings unless otherwise shown in the Contract Documents or approved by City Engineer.

2. Equip the leading section of pipe or conduit with a jacking head securely anchored thereto to prevent any wobble or alignment variation during the jacking or boring operation. For jacking, all excavation shall be carried out entirely within the jacking head and no excavation in advance thereof shall be permitted. For jacking, every effort shall be made to avoid any loss of earth outside the jacking head. Remove excavated material from the pipe or conduit as excavation progresses, and do not allow such material to accumulate within the pipe or conduit.

3. Jack or bore all pipes or conduits to true line and grade. The boring of the hole and installation of the casing pipe shall be simultaneous. Bore hole diameter shall essentially be the same as the outside diameter of the casing pipe to be installed. Should any deviation from true line and grade be considered excessive, in the judgment of the City Engineer, the Contractor shall correct at no expense to the City.

4. Should appreciable loss of ground occur during the jacking or boring operations, backpack all voids promptly. Fill all remaining voids upon completion of the operations; such filling or backpacking shall be with grout.

5. The design of all sewer pipe or conduit is based upon the superimposed loads and not upon the loads resulting from the jacking or boring operations. The Contractor shall be responsible for any increase in pipe strength necessary to withstand jacking or boring loads and grouting.

210.03.D CONCRETE PIPE AND BOX SECTION

1. Protect the driving ends of concrete pipe or conduit against spalling and other damage. Intermediate joints shall be similarly protected by the installation of sufficient bearing shims to properly distribute the bearing stresses. Remove any section of pipe or conduit showing signs of failure and replace with a new section.

210.03.E SMOOTH STEEL CASING

1. Join sections of smooth steel casing to be jacked or bored by welding the joints with a continuous weld for full circumference or by other means approved by the City Engineer. Provide joints that are capable of resisting the jacking and boring forces without failure.

2. Welding of steel pipe used in jacking or boring operations shall conform to applicable American Welding Society specifications. Welders performing this type of work shall meet American Welding Society certification requirements and shall be prepared to present proof of such certification upon demand.

3. Brace pipe or conduit installed in a casing to prevent shifting and flotation. Fill the void between the casing and the pipe or conduit with clean sand, or unless otherwise specified by the permitter or the Contract Documents.

210.03.F GROUTING VOIDS OUTSIDE CASING (24-INCH CASING AND LARGER)

1. After the casing, or carrier pipe where no casing is specified, has been jacked or bored into position, pressure grout to fill all voids outside the casing through the grout holes provided. Start grouting at the springline hole at one end and pump grout until grout appears in the grout hole at the crown; then start grouting through the opposite springline hole until grout appears at the hole in the crown. Next grout through the hole at the crown until grout appears in the next set of holes along the pipe. Plug the holes at the starting point and move to the next set of holes and repeat grouting sequence until full-length of jacked pipe has been grouted. Grouting once commenced at any one point shall be completed without stopping.

2. Nipples installed in grout holes must be removed and the holes grouted flush with the pipe wall, or nipples should be cut off flush with pipe wall and grouted over, or use flush mount pipe nipples and plugs.

210.03.G CASED PIPE

1. Provide casing spacers under barrel of pipe, join pipe and slide into casing. Pipe barrel shall bear continuously on spacers. Pipe installation shall conform to applicable requirements in Section 401, Section 501, or Section 601, including spacers air testing and line and grade.

2. Spacers shall be center-restrained configured. Spacers shall be installed with 2 restrained spacers 6- to 12-inches from ends of the casing and one 6- to 12- inches from each side of joints with 6-feet max spacing along the center of pipe lengths and as recommended by casing spacer manufacturer. See Standard Drawing.

210.03.H GROUTING VOID BETWEEN CARRIER PIPE AND CASING

1. There will be no filling of the annular space between the casing and the carrier pipe unless otherwise specified by the permitter, City Engineer, or the Contract Documents. Where required, fill the voids by continuously pumping sand or grout from one end of casing pipe until sand or grout appears at the other open end. When filling the annular space, use low pressure pumping equipment. The pressures shall not be greater than the design loads of the carrier pipe. The Contractor shall, at his sole expense, remove and replace any pipe sections that fail during the filling process.

210.03.I RAILROAD CROSSINGS

1. The right is reserved by the City to require jacking or boring under any or all crossings.

2. Should open trench construction be required by the City at a railroad crossing, the railroad will take up and relay the tracks at no expense to the Contractor. Submit a schedule of operations to the railroad company and to the City seventy two (72) hours before trenching within twenty (20) feet of the railroad right-of-way. Construct the pipe crossing and compact backfill through the track location within seventy two (72) hours after the tracks have been removed by the railroad unless otherwise specified.

210.03.J CONTRACTOR'S RESPONSIBILITY

1. The Contractor shall be fully responsible for settlement or deterioration of the finished crossing during the warranty period after final acceptance by the City.

210.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

210.04.A BORING AND JACKING

1. Measurement and payment for bored and jacked pipe or conduit will be made on a linear foot basis, complete in-place. Payment will include, but is not limited to, all excavation, shafts, portals, jacking pits, backfill, lubricant, grouting voids outside of casing, filling the annular space between the pipe and the casing, pipe casing, and all appurtenances.

2. Where casing is not required but is used at the option of the Contractor, the casing and the backfill between the pipe or conduit and the casing shall be included in the pay item for boring or jacking as applicable and no separate payment for pipe will be made.

3. Measurement for jacking and boring will be made on a linear foot basis along the centerline of the pipe or conduit between the limits shown. Jacking and boring extensions beyond the limits shown shall be considered to be for the Contractor's convenience, unless ordered in writing by City Engineer, and measurement and payment for said extension shall be made as if the open trench method of construction had been used.

4. Final payment for each crossing will be made after the Contractor furnishes a satisfactory release from the permitter stating that all claims for labor and materials have been satisfied and that the Contractor's work across the permitter's right-of-way has been completed to the satisfaction of the permitter.

210.04.B JACKING OR BORING IN LIEU OF OPEN TRENCH

1. Where jacking or boring of a conduit is authorized in lieu of open trench construction, measurement and payment will be made as though the open trench method had been used and will include all the pay items that would have been applicable if the open trench construction method had been used.

211 CONCRETE STRUCTURES

211.01 DESCRIPTION

211.01.A This section contains requirements that pertain to the mixing, delivery, handling, placing, funishing, and curing of plain and reinforced Portland Cement Concrete including culverts, retaining walls, catch basins, footings, foundations, curbs, sidewalks, and similar structures.

211.01.B Additional requirements applicable to specific types of concrete structures are contained in other applicable sections of these specifications.

211.02 MATERIALS

211.02.A Provide materials conforming to requirements of Section 208.

211.03 CONSTRUCTION

211.03.A GENERAL

1. When purchasing concrete from others during performance of the Contract, Contractor shall be fully responsible for such concrete conforming to all requirements contained herein.

211.03.B MEASUREMENT OF MATERIALS

1. Provide facilities for weighing and accurately measure all materials by weight, except water, when batching concrete; weigh fine and coarse aggregates separately. Take representative samples and determine moisture content for each kind of aggregate. Store or handle aggregates so that their water content remains constant during any day's run.

2. Equipment for weighing materials shall provide convenient and positive means of determining quantities in the batch of concrete, and means shall be provided for addition or removal of small quantities of materials to obtain exact weight per batch. Device for measuring water shall show accurately the quantity in gallons and be so designed that the water supply will be automatically cut off while water is being discharged into the mixer. Water shall be assumed to weigh 8.34 pounds per gallon.

211.03.C MIXING AND DELIVERY OF CONCRETE

1. GENERAL

   a. Concrete shall be machine mixed. Concrete shall be transported in transit mixer trucks.

   b. Concrete that has developed an initial set, or is partially hardened, shall not be retempered or remixed and shall be removed from the job site and disposed of by the Contractor.

   c. Manufacturing facilities and transportation equipment shall ensure continuous delivery of concrete as required by the type of construction and shall provide for the proper handling and placement of the concrete at the job site.

   d. Methods of delivery and handling concrete shall allow placing with a minimum of rehandling and without damage to the structure or concrete.

2. MIXING AT SITE

   a. Batch mixers of a size and type that will ensure a uniform distribution of materials throughout the mass shall be used for mixing concrete on site.

   b. Mixers shall be equipped with adequate water storage and a device for accurately measuring and automatically controlling amount of water used in each batch.

3. TRUCK MIXING

   a. Revolving drum-type truck mixers shall be used for truck mixing concrete. Truck mixers shall be watertight and constructed such that concrete can be mixed to ensure a uniform distribution of materials throughout the mass.

   b. Truck mixers shall have suitable means by which the amount of water added to the mix on-site can be readily verified by the City Engineer.

4. TIME OF HAULING AND PLACING MIXED CONCRETE

   a. All concrete shall be discharged and placed into the forms within ninety (90) minutes after the introduction of mixing water to cement and aggregate, or cement to aggregate, or before two-hundred fifty (250) revolutions of the truck drum or blades, whichever comes first.

   b. This time shall be reduced during conditions that contribute to accelerated setting of concrete, or when the temperature of the concrete is 85° F, or above.

   c. Water shall not be added to concrete during hauling or before discharge, unless directed or approved by the City Engineer.

211.03.D FORMS

1. Forms shall be constructed for all concrete work. Adjacent surfacing such as asphalt concrete shall not be used as a form for placing concrete. Make all forms mortar-tight; set them so finished concrete will conform to the proper dimensions and contours; and make them sufficiently rigid to prevent distortion due to the pressure of the concrete and other loads incidental to the construction operations. Construct and maintain forms to prevent warping and opening of joints.

2. Design forms to withstand the effects of vibration of concrete as it is placed.

3. Support deck forms for concrete box girder spans by girder stems. Posts or other supports for deck forms will not be permitted to come in contact with the bottom slab of the box girder.

4. Make wood forms for concrete surfaces, not subject to backfill, of dressed lumber of uniform thickness with a form liner of an approved type. Wood forms for interior cells of box girders may be made with or without a form liner. Shiplap or S4S boards are acceptable provided forms are mortar-tight. Plywood will be acceptable as a form liner if sufficiently supported. Ensure that all formwork for exposed concrete surfaces is smooth with the grain running in the same direction to give a good finished appearance. Construct metal ties or anchorages within forms to permit their removal to a depth of at least 1-inch from face without injury to the concrete. Where wire ties are permitted, all wires, upon removal of forms, shall be cut back at least 1/4-inch from the face of the concrete with chisels or nippers; for green concrete, nippers are necessary. Design all fittings for metal ties so that upon their removal, cavities that are left will be of the smallest possible size. Fill cavities with cement mortar and leave surface sound, smooth, even, and uniform in color.

5. Fillet forms at all sharp corners and bevel or draft all projections, such as girders and copings, to ensure easy removal. For narrow walls and columns, where the bottom of the form is inaccessible, leave the lower form boards loose so that they may be removed for cleaning out extraneous material immediately before placing of the concrete.

6. Keep the forms in place for periods that shall be determined hereinafter. When the forms appear to be unsatisfactory in any way to the City Engineer, either before or during the placing of concrete, work shall be stopped until defects have been corrected.

7. Maintain shape, strength, rigidity, water-tightness, and surface-smoothness of re-used forms at all times. Do not re-use warped or bulged lumber, and do not re-use any forms which are unsatisfactory in any respect. Thoroughly clean re-used forms of all dirt, mortar, and foreign matter.

8. Treat all forms with form oil or wax or saturate with water immediately before placing concrete. Do not use material that will adhere to or discolor the concrete.

211.03.E FALSEWORK

1. For structures requiring poured-in-place concrete superstructures, working drawings and calculations for falsework prepared by an Engineer registered to practice in the State of Oregon may be required to be submitted to the City for review. For a guideline on designing formwork and falsework, the Contractor is referred to the current version of the ACI Standard, "Recommended Practices for Concrete Formwork" (ACI 347).

2. Design and construct all falsework to support the total applied loads with a deflection/span ratio not to exceed 1/500 in any falsework span. Employ screw jacks or hardwood wedges to take up any settlement in formwork either before or during the placing of concrete. Set falsework for post-tensioned structures to carry full dead load and any additional vertical or horizontal loads caused by the prestressing operation.

3. Contractor is directed to the fact that post-tensioned structures are not self-supporting until post-tensioning is complete and Contractor shall consider this fact in the design, maintenance, and protection of falsework.

211.03.F REMOVAL OF FALSEWORK AND FORMS

1. Assume full responsibility for all damage resulting from premature removal of forms. Do not place earth backfill against walls below grade, and do not remove forms and shoring from structural slabs or beams until concrete has reached an actual field strength equal to 75 percent of the specified 28-day design field strength. Actual field strength shall be determined from field cured test cylinders that shall be cured under conditions equivalent to the most unfavorable conditions for the portions of concrete that the cylinders represent.

2. Do not use methods of form removal likely to cause over-stressing of the concrete. Remove supports in such a manner as to permit concrete to uniformly and gradually take the stresses due to its own weight.

3. Remove all form work from cells of concrete box girders to which access is provided and all form work, except that necessary to support deck slab, from the remaining cells of the box girder.

211.03.G WEATHER LIMITATIONS

1. GENERAL

   a. The Contractor shall assume full responsibility for the concrete work during any weather conditions, including, but not limited, too hot and cold weather. Any work not in conformance to the Contract Documents may be rejected by the City Engineer. Replacement or repairs shall be at the Contractor's sole expense.

2. HOT WEATHER

   a. Take special precautions for hot weather in placing, finishing, and curing concrete when the ambient temperature reaches 85º F or higher and whenever relative humidity, wind velocity, or exposure to the sun at lower air temperatures are expected to cause hot weather conditions for the concrete. Specify cool materials for the mix; add additional water to the forms, subgrades, and other areas to be in contact with concrete, but allow no standing water when concrete is placed; schedule work carefully to place and finish concrete as rapidly as possible; reduce evaporation from the concrete with windbreaks, covers, and fog nozzles; and begin curing as soon as possible.

3. COLD WEATHER

a. Do not place concrete when ambient temperature is below 35º F. Enclose structure in such a way that concrete and air within the enclosure can be kept above 50º F for a period of seven (7) days after placing the concrete. When enclosures are used to maintain specified temperatures, furnish a 24-hour temperature-recording thermometer to record all temperature within the enclosure.

b. Supply heating apparatus such as stoves, salamanders, or steam equipment and the necessary fuel. When dry heat is used, provide means of maintaining atmospheric moisture. Heat all aggregates and mixing water to a temperature of at least 70º F, but not more than 150º F; aggregates may be heated by either steam or dry heat.

c. Where practicable, forms insulated with at least 2-inch thick blankets made of fiberglass, rock wool, balsam wood, or similar commercial material capable of maintaining the surface of the concrete at no less than 50º F may be used in lieu of other protection of concrete involving housing and heating. When forms are insulated, protect exposed horizontal surfaces with a similar layer of the insulating materials securely fastened in place. If insulated forms do not maintain proper temperature at the surface of the concrete, use auxiliary protection and heat. The Contractor may also use plastic and straw to protect the concrete. The Contractor will keep the straw confined to the surfaces being protected and clean up all materials as soon as the concrete no longer requires the protection. No staining of the concrete will be accepted due to the use of straw as a method of protection.

211.03.H HANDLING AND PLACING

1. GENERAL

a. In preparation for placing of concrete, remove all sawdust, chips, and other construction debris and extraneous matter from interior of forms. Remove struts, stays, and braces, serving temporarily to hold forms in correct shape and alignment prior to placing of the concrete when the concrete has reached a position rendering their service unnecessary. Remove these temporary members entirely from the forms and do not leave them buried in the concrete.

b. Do not use concrete that does not reach its final position in forms within time stipulated in Subsection 211.03.C.

c. Place concrete so as to avoid segregation of material and displacement of reinforcement. Do not use long troughs, chutes, and pipes for conveying concrete from mixer to forms.

d. For open troughs and chutes, use steel or steel lined material. Where steep slopes are required, equip chutes with baffles or make in short lengths that reverse direction of movement. Keep all chutes, troughs, and pipes clean and free from coatings of hardened concrete by thoroughly flushing with water after each run; discharge water used for flushing clear of structure and do not discharge into any sewer or culvert or appurtenances thereto.

e. When placing-operations would involve dropping concrete more than 3-feet, deposit through an "elephant trunk." Aluminum pipe will not be allowed.

f. After initial set of concrete, do not jar forms nor place strain on the ends of the reinforcing bars that project.

g. Thoroughly compact concrete during and immediately after depositing.

h. Provide compaction by mechanical vibration subject to the following provisions:

1) Use internal vibration or other methods provided herein.

2) Use vibrators of a sufficient type and design, capable of transmitting vibration to concrete at frequencies of not less than 4,500 impulses per minute.

3) Provide intensity of vibration such as to visibly affect the mass of the concrete of 1-inch slump over a radius of at least 18-inches.

4) Provide a sufficient number of vibrators to properly compact each batch immediately after it is placed in forms.

5) Manipulate vibrators so as to thoroughly work concrete around reinforcement and embedded fixtures and into corners and angles of forms.

6) Apply vibration at the point of deposit and in the area of freshly deposited concrete. Insert vibrators and withdraw from concrete slowly. Use vibration of sufficient duration and intensity to thoroughly compact concrete but do not continue so as to cause segregation. Do not continue vibration at any one-point to the extent that localized areas of grout are formed.

7) Make application of vibrators at points uniformly spaced and not farther apart than twice the radius over which vibration is visibly effective.

8) Do not apply vibration directly or through reinforcement to sections or layers of concrete that have hardened to the degree that concrete ceases to be plastic under vibration. Do not use vibration to make concrete flow in forms over distances so great as to cause segregation, nor to transport concrete in forms.

9) Supplement vibration by such spading as is necessary to ensure smooth surfaces and dense concrete along form surfaces and in corners and locations impossible to reach with vibrators.

i. Place concrete in horizontal layers not more than 12-inches thick except as hereinafter provided. When less than a complete layer is placed in one operation, terminate in a vertical bulkhead. Place each layer and compact before the preceding layer has taken initial set to avoid surfaces of separation between the layers. Compact each layer so as to avoid formation of a surface of separation with a preceding layer.

j. When placing of concrete is temporarily discontinued and after concrete has become firm enough to retain its form, clean off laitance and other objectionable material to a sufficient depth to expose sound concrete. Smooth top surface of the concrete adjacent to forms with a trowel. Where a "feather edge" might be produced at a construction joint, as in the sloped top surface of a wing wall, use inset formwork to produce a blocked out portion in the preceding layer that produces an edge thickness of not less than 6-inches in succeeding layer. Do not discontinue work within 18-inches of the top of any face unless provision has been made for a coping, in which case a construction joint shall be made at the under side of the coping.

2. PUMPING

a. Placement of concrete by pumping will be permitted provided clean equipment is used that is of sufficient size and capacity to satisfactorily handle the concrete mix specified. For discharge line of pump, use steel or rubber pipe. Provide additional cement or additives required to obtain a pumpable mix at the sole expense of the Contractor.

b. Furnish evidence of backup means of placing structural concrete in the event of failure of equipment during placement.

211.03.I JOINTS IN PORTLAND CEMENT CONCRETE

1. GENERAL

a. Joints in concrete structures will be designated as construction joints, contraction joints, and expansion joints and shall be constructed as specified herein and in other sections of these specifications applicable to specific structures.

2. CONSTRUCTION/COLD JOINTS

a. Wherever possible, the placing of concrete shall be continuous and without the use of intermediate construction joints.

b. The Contractor shall install a construction joint at the termination point of each day's work, at the beginning of temporary work stoppages, and at any other time where the concrete will be allowed to harden or take its initial set prior to resumption of work.

c. Construction joints shall be located and constructed such that one of two or more adjacent concrete structures can be removed without damage to the structures that are to remain in place.

d. Construction joints shall be formed by shaping the leading edge of the concrete as necessary to form a vertical face with an edge thickness of not less than 4 inches. Construction joints shall be constructed transverse to the longitudinal axis of these structures.

e. Where a construction joint is required in the sloped top surface of a retaining wall, or similar type work, additional formwork shall be used to produce a blocked out portion in the preceding layer that will produce an edge thickness of not less than 6 inches in the succeeding layer. Placing of concrete shall not be discontinued within 18 inches of the top of any face during wall construction.

f. Before placing fresh concrete against concrete that has hardened or attained initial set, the surface of the previously placed concrete shall be roughened in a manner that will not leave loosened particles of aggregate or damaged concrete at the surface. The surface shall be thoroughly cleaned and saturated with water prior to resumption of work.

3. CONTRACTION/CONTROL JOINTS

a. Contraction joints shall be of the weakened plane type in the exposed surfaces of concrete structures and constructed by pushing a thin steel sheet, or similar tool, vertically into the fresh concrete to separate the coarse aggregate at the joint. Contraction joints shall be installed in a straight line, transverse to the longitudinal axis of the structure. The edges of the joint shall be tooled.

b. Contraction joints shall be located and formed:

- Over contraction joints in concrete underlying the new concrete structure.
- Opposite contraction joints in abutting concrete.
- At locations to confine joint spacing to a maximum of 15 feet.
- Be not less than 1/8 inch or more than 1/4 inch wide.
- Be a depth of one-third (1/3) the thickness of the concrete.
- Have clean, unfilled grooves (if preformed expansion joint filler is not used).

4. EXPANSION JOINTS

a. Construct expansion joints of the preformed filler type in concrete structures as shown and the following:

- Not less than 1/2 inch wide, except where abutting or underlying concrete joints are larger, then the width shall match those joints.
- At right angles to the structure alignment and normal to the structure surface.
- Which completely separate the concrete segments.
- Placed flush or no more than 1/8 inch below the concrete surface.

b. Curbs, Islands, and Traffic Separators

- Opposite abutting expansion joints in abutting concrete.
- Over existing expansion joints in concrete underlying the new concrete structure.
- At each point of tangency in the structure alignment.
- Not over 200-foot spacing.

c. Driveways, Walks, Monolithic Curbs and Sidewalks, and Surfacings

- Between driveways and concrete pavement.
- Transversely in walks opposite expansion joints in adjoining curbs and elsewhere so the distance between joints does not exceed 45 feet.
- Transversely in walks at a distance of 16 feet to 8 feet from ends of walks which abut curbs.
- Around poles, posts, boxes, and other fixtures which protrude through or against the structures.

d. Stairs

1) Provide expansion joints for stairs at the top and bottom landings as shown.

5. KEYWAY JOINTS

a. Keyway joints in walls, slabs, and other structures shall be located and formed/installed as specified in the Contract Documents or as directed by the City Engineer.

6. PREFORMED ELASTOMERIC JOINT SEALS

a. Use compression joint seals in the longest practicable lengths for longitudinal joints. In transverse joints, one factory splice will be permitted in joint seals where required length of material in any one joint exceeds manufacturers' standard stock lengths. Make such splices true and smooth on outside surfaces with no offsets of abutting sections and with complete bond on all abutting surfaces. Make joints clean and dry and free of spalls and irregularities that would impair a tight seal in service. Place seals in the joint under compression, as recommended by manufacturer, using a lubricant adhesive as a covering film applied to both sides of the seal just prior to its installation.

b. For lubricant adhesive material, use a compound of same base polymer as the joint seal with which it is used, blended with a suitable volatile solvent. Lubricant adhesive shall be compatible with joint seal and concrete and be relatively unaffected by normal moisture in the concrete. It shall maintain a suitable consistency at the temperature at which joint seal is installed.

c. Set seal as shown and make sure it contacts walls of joint throughout its length. Longitudinal elongation of an installed seal by 3 percent or more of its original length will be cause for its removal and reinstallation.

d. Remove all lubricant adhesive that comes upon the exposed top of an installed seal before it dries, and remove all seals that show twist, curl, nicks, or other malformation as installed. Seal all ends of preformed elastomeric joint seals with watertight plug prior to installation of joint seal. Use a foam rubber plug or other acceptable closed-cell cellular material that is compressible to 15 percent of its uncompressed thickness. Plug shall be a minimum of 2-inches in length and be secured in elastomeric joint seal with an adhesive that will ensure a watertight plug.

211.03.J SURFACE FINISHING

1. GENERAL

a. After forms have been removed, carefully point all depressions resulting from removal of form ties, or from other causes, with mortar conforming to Section 208. Maintain thorough saturation of concrete surface during pointing and patching. Type of finish to be used shall be as specified or as shown.

2. SLAB, DRIVEWAY, AND SIDEWALK FINISHES

a. GENERAL

1) Refrain from excessive use of "jitterbugs" or other special tools designed for the purpose of forcing coarse aggregate away from surface. Dusting of surfaces with dry materials will not be permitted. Compact thoroughly by vibration and round off edges and tops of surfaces with a 1/2-inch radius, steel-edging tool unless specified otherwise.

b. MONOLITHIC FINISH

1) Finish by screeding and floating with straightedge to bring surfaces to the required finish elevation shown. While concrete is still green, but sufficiently hardened to bear a person's weight without deep imprint, wood float to a true, even plane with no coarse aggregate visible. Apply sufficient pressure on wood floats to bring moisture to surface.

2) After surface moisture has disappeared, steel trowel concrete to produce a smooth, impervious surface free from trowel marks. Give an additional troweling to surface for the purpose of burnishing. Final troweling shall produce a ringing sound from the trowel. Do not use dry cement or additional water in troweling. Do not use excessive troweling.

c. ROUGH FINISH

1) Finish surfaces by screeding with straightedges to bring surface to required finish plane. Remove all laitance and leave surface clean. Subject to approval, an acceptable aggregate-revealing material may be used and laitance washed off when concrete has set.

d. WOOD FLOAT FINISH

1) Finish by screeding with straightedges to bring surface to required line and grade as shown on the Plans. While concrete is still green, but hardened sufficiently to bear cement finisher's weight, work flat surface to a true and uniform plane with no coarse aggregate visible.

e. BROOMED FINISH

1) Finish concrete as specified for monolithic finish above, except omit final troweling, and finish surface by drawing a fine-hair broom lightly across surface broom surface in transverse direction. Do all other brooming in same direction and parallel to expansion joints; or in cases of inclined slabs, curbs, and retaining walls, perpendicular to slope.

f. POWER MACHINE FINISH

1) In lieu of hand finishing, a power machine may be used for finishing concrete in conformance with directions of machine manufacturer.

211.03.K CURING

1. Immediately after the final floating, surface finishing, and edging has been completed and while the concrete surface is still moist, cover the entire exposed concrete and cure in accordance with one of the following provisions as specified.

a. Apply membrane-forming compound of the white-pigmented type uniformly to damp concrete by pressure-spray methods at a rate that will form an impervious membrane.

b. Apply white polyethylene film, waterproof paper, or burlap polyethylene sheets to damp concrete as soon as it can be placed without marring the surface. Place in intimate contact with the surface. Extend over and beyond the sides or edges of the slabs or forms, and weight as approved to hold the covering in position as a moisture proof covering. Laps shall be of approved dimensions and design to maintain tightness equivalent to the covering.

c. If the use of other curing materials is impractical, the surfaces shall be kept moist by flushing or sprinkling with water in a manner approved by the City Engineer. The application of water shall be such that the concrete and surfaces of all forms will be kept damp for a period of seven (7) days after placing of concrete. Curing and finishing shall be coordinated when both requirements are to be met at same time. Water used for curing shall be free of harmful amounts of deleterious materials that will stain, discolor, or adversely affect the physical properties of the concrete. Care shall be taken to avoid thermal shock due to the use of cold water or high rates of evaporative cooling.

d. The use of straw, earth, sand, sawdust, or other similar materials that have been saturated with water shall be used only when approved by the City Engineer.

2. Use covering that is best suited to existing conditions. Regardless of which of the above methods the Contractor chooses, keep the curing medium intact and effective for a period of not less than 72-hours after application.

3. Protect slab concrete exposed to conditions causing premature drying during placing operations by providing wind breaks, fog spray, or by other necessary methods.

211.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

211.04.A GENERAL

1. Concrete will be measured on a lump sum basis, square yard surface basis, square foot surface basis, or on a cubic yard basis for payment as shown in the Contract Documents. In all cases the part or parts of work to be measured on each basis shall be as shown and as specified in the Contract Documents.

2. Materials, labor, and equipment required to complete the work in conformance with the Contract Documents and not listed as separate pay items in the Bid will be considered incidental to other items of work and no separate payment will be made.

211.04.B LUMP SUM BASIS

1. Measurement and payment will be made on a lump sum basis as shown in the Contract Documents.

211.04.C SQUARE YARD SURFACE BASIS

1. Measurement and payment will be made on a square yard surface basis for each class of concrete as shown in the Contract Documents.

211.04.D SQUARE FOOT SURFACE BASIS

1. Measurement and payment will be made on a square foot surface basis for each class of concrete as shown in the Contract Documents.

211.04.E CUBIC YARD BASIS

1. Measurement and payment will be made on a cubic yard basis for each class of concrete as shown in the Contract Documents.

212 RESURFACING

212.01 DESCRIPTION

212.01.A This section covers the work necessary to replace all pavement, pavement base, curbs, sidewalks, rock surfacing, and other surface features with the exception of landscaping impacted either directly or indirectly by the operations related to the construction of sewers, storm drains, water distribution systems, and conduits.

212.02 MATERIALS

212.02.A ASPHALT CEMENT MATERIALS

1. Use asphalt cement materials for resurfacing trenches that conforms to Section 208.

212.02.B ASPHALT CONCRETE

1. Use hot mix asphalt concrete 1/2-inch dense, Level 2 mix conforming to the requirements for hot mix asphalt concrete in Section 305 and Section 208, unless otherwise specified.

212.02.C PAVEMENT BASE

1. Use pavement base material for resurfacing trenches that conforms to Section 303.

212.02.D FORMS

1. All forms shall conform to requirements for forms in Section 211.

212.02.E ROCK SURFACING

1. Rock surfacing shall be 1”-0” crushed aggregate as specified in Section 209.02.E.2.

212.02.F SUBGRADE

1. Subgrade material shall conform to the requirements for Subgrade in Section 301.

212.03 CONSTRUCTION

212.03.A SAWCUTTING AND SURFACE REMOVAL

1. All sawcutting and surface removal shall conform to the requirements of Subsection 209.03.K.2

212.03.B PAVEMENT MAINTENANCE

1. Maintain all trenches as specified under Section 209.

212.03.C TEMPORARY HOT OR COLD MIX ASPHALT

1. Excavations on hard surfaces shall be paved with a temporary hot or cold mix asphalt patch at the end of each workday. The extent of such temporary surface restoration will be determined by the City Engineer.

2. Place and compact temporary hot or cold mix asphalt to a minimum depth of two (2) inches over the backfilled and compacted trench areas as specified under Section 209. Spread with a mechanical spreading machine or place by hand methods. Distribute into place by means of shovel, or suitable forks, and spread with rakes in a loose layer of uniform density.

3. After spreading, the mixture shall be thoroughly and uniformly compacted with a power-driven roller capable of providing compression of two-hundred (200) to three-hundred (300) pounds per linear inch as soon as raking is complete. Compact areas inaccessible to the roller by tamping. After compaction, the temporary asphalt shall have the minimum thickness specified and shall match the adjacent existing grade. The temporary asphalt patch shall be maintained such that a continuous surface will exist without depressions or potholes.

212.03.D PAVEMENT BASE

1. Place pavement base to the specified depth; when not specified, place to a compacted depth of 12-inches. Bring the top of the pavement base to a smooth, even grade at a distance below finished grade equivalent to the required pavement depth.

2. Compact the pavement base with mechanical vibratory or impact tampers to a density of not less than 95 percent of the maximum dry density as determined by AASHTO T-180.

3. Compaction tests shall be required on the finish rack grade prior to any final trench restorations.

212.03.E ASPHALT CONCRETE PAVEMENT

1. TACK COAT

   a. Tack coat shall be applied in accordance with Subsection 305.03.D.

2. ASPHALT CONCRETE PLACEMENT

a. Sawcut the existing pavement a minimum of 6-inches from the edge of the existing pavement at the side of the trench. The sawcut shall be a straight line and shall follow lines parallel to the pipe centerline to remove any pavement that has been damaged or that is broken and unsound. The sawcut pavement edges shall be free of irregularities. Provide a smooth, sound edge for joining the new pavement. Asphaltic concrete placement must also comply with requirements of Subsection 209.03.K.2.

b. Place the asphalt concrete on the prepared subgrade over the trench to the specified depth, or the depth of the adjacent pavement, whichever is greater. When a prime coat is specified, place asphalt concrete after the prime coat has set. Maximum thickness for any one lift of pavement shall not exceed 3-inches when compacted. The minimum thickness for placement of compacted pavement shall not be less than twice the nominal maximum aggregate size. Spread and level the asphalt concrete with hand tools or by use of a mechanical spreader, depending upon the area to be paved. Bring the asphalt concrete to the proper grade and compact by rolling or the use of hand tampers where rolling is impossible or impractical.

c. If the existing asphaltic concrete being replaced is pervious asphalt, it must be replaced in kind.

d. Roll with power rollers capable of providing compression of two-hundred (200) to three-hundred (300) pounds per linear inch. Begin the rolling from the outside edge of the replacement progressing toward the existing surfacing, lapping the existing surface at least half the width of the roller. If existing surfacing bounds both edges of the replacement, begin rolling at the edges of the replacement, lapping the existing surfacing at least half the width of the roller, and progress toward the center of the replacement area. Overlap each preceding track by at least half the width of the roller and make sufficient passes over the entire area to remove all roller marks and to produce a smooth, uniform surface. Density requirements for asphalt concrete pavement shall conform to those in Section 305.

e. Finished surface of the new, compacted paving shall be flush with the existing surface and conform to the grade and crown of the adjacent pavement.

3. CRACK SEAL

a. Immediately after the new paving is completed, apply a crack seal coat of liquid asphalt, conforming to Subsection 208.02.K, to all joints between the new and original asphalt pavement. The crack seal coat shall be a minimum of 6-inches in width and shall be centered on the joint. The liquid asphalt shall be applied such that it completely covers the joint. The minimum application rate shall be 1.7 gallons per 100 linear feet.

b. Immediately after the liquid asphalt has been applied and before the asphalt has solidified, cover the crack seal coat asphalt with clean, dry masonry sand. The sand shall be applied in a layer thick enough to prevent tracking of seal coat. Before opening the street to traffic, the Contractor shall clean up all loose sand.

4. SURFACE SMOOTHNESS

a. Surface smoothness must comply with requirements of Subsection 305.03.S.

5. WEATHER CONDITIONS

   a. Weather conditions must conform to requirements of Subsection 305.03.L.

6. PROTECTION OF STRUCTURES

   a. The Contractor shall take necessary precautionary measures to protect exposed structures and any other adjacent property, including motor vehicles and surface improvements, from paving materials and paving operations.

   b. Provide whatever protective coverings may be necessary. Remove any oil, asphalt, dirt, or any other undesirable matter that may come upon these structures by reason of the surfacing operations.

   c. Where existing structures (e.g., water valve boxes, manholes, catch basins, or other underground utility appurtenances) are within the area to be surfaced, make the resurfacing level with the top of the existing finished elevation of these facilities. The Contractor shall be responsible for adjusting the existing structures as specified in Section 310. Consider any delays experienced from such obstructions as incidental to the paving operation. No additional payment will be made. Protect all covers during asphalt application.

7. EXCESS MATERIALS

   a. Dispose of all excess materials. Make arrangements for the disposal and bear all costs or retain any profit incidental to such disposal.

212.03.F PORTLAND CEMENT CONCRETE PAVEMENT

1. Pavement replaced shall be the same thickness as that removed, or a minimum of 6-inches, unless otherwise specified. Protect the newly placed concrete from traffic for a period of at least seven (7) days.

2. Sawcut the existing pavement a minimum of 6-inches from the edge of the existing pavement at the side of the trench. The sawcut shall be a straight line following lines parallel to the pipe centerline, and shall remove any pavement that has been damaged or that is broken and unsound. The sawcut pavement edges shall be free of irregularities. Provide a smooth, sound edge for joining the new pavement.

3. If the existing pavement being replaced is pervious concrete, it must be replaced in kind.

4. Handle, place, finish, and cure concrete pavement in conformance with the applicable provisions of Section 306.

212.03.G ROCK SURFACING

1. Place rock surfacing only where shown or directed on streets, driveways, parking areas, street shoulders, and other areas disturbed by the construction. Spread the rock by tailgating and supplement by hand labor where necessary. Level and grade the rock surfacing to conform to adjacent existing grades and surfaces as directed.

212.03.H CONCRETE DRIVEWAYS, SIDEWALKS, AND CURBS

1. Replace concrete driveways, sidewalks and curbs to the same section, width, depth, line, and grade as that removed or damaged. If the existing concrete being replaced is pervious concrete, it must be replaced in kind. Saw broken or jagged ends of existing concrete on a straight line and to a vertical plane. Prior to replacing the concrete sections, properly backfill and compact the backfill to prevent subsequent settlement.

2. Replace concrete driveways and sidewalks between scored joints unless otherwise directed by the City Engineer. Provide a minimum 4-inch thick compacted leveling course of clean 3/4" 0" crushed aggregate. All concrete replacement work shall be completed prior to the placement of adjacent asphalt concrete. Restoration and clean up shall be as specified under Section 215.

3. Construct forms to match existing. Place concrete and finish exposed surfaces similar to adjacent surface in conformance with Section 307.

4. Sidewalks, driveways, and curbs damaged outside the limits of construction shall be replaced at the expense of the Contractor.

212.03.I REPAIR OF EXPLORATORY EXCAVATIONS (POTHOLES)

1. Any exploratory excavation within the pavement of the curb to curb section of the public right of way for the purpose of determining location and depth of existing public or private utilities using a Vactor or similar and resulting in an approximate 8-inch diameter hole of varying depth shall restore the existing street subgrade and pavement section as follows:

   a. EXCAVATED MATERIAL – All excavated material shall be removed from the site and shall not be used for backfill.

   b. BACKFILL MATERIAL - The pothole shall be backfilled with controlled density fill material for the entire depth of the excavation below subgrade. Crushed aggregate, 3/4”-0, may be used as a backfill material where approved by the City Engineer.

   c. BACKFILL COMPACTION – The top three (3) feet of crushed aggregate shall be compacted with a pneumatic (rammer) type compactor in a manner satisfactory to the City Inspector.

   d. PAVEMENT RESTORATION - The thickness of pavement restoration shall match the thickness of the surrounding pavement or as directed by the City Engineer. The pavement restoration material shall also match the surrounding material. HMAC pavement material shall be Level 2, 1/2-inch dense grade, hot mixed asphalt concrete compacted to at least 91 percent of the Rice theoretical maximum density as specified in Section 208.02.L. PCC pavement material shall be Class 5000 as specified in Section 208.02.J. The interior surface of the core shall be cleaned before the new concrete is placed in the pothole. For a period of up to six (6) months from the date of excavation, temporary cold mix asphalt concrete with a compacted depth of no less than four (4) inches may be used until permanent paving can occur. In all cases, the surface restoration shall be flush with the surrounding pavement surface.

e. POTHOLE MAINTENANCE - The pothole excavator shall be responsible for maintaining the pothole restoration in good condition, free from settlement greater than 1/4-inch, raveling, cracking and other deterioration for a period of six (6) months from the date of excavation.

212.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

212.04.A TEMPORARY HOT OR COLD MIX ASPHALT

1. Measurement and Payment for temporary hot or cold mix asphalt pavement placed in all paved areas to be maintained over trench backfill shall be based on the unit price per linear foot stated in the Bid.

2. The unit price will include all work and materials required to place and maintain the surface. If not included in the Bid, then it will be considered incidental to the work and included in the unit price for pavement replacement.

212.04.B ROCK SURFACING

1. Measurement and Payment for replacement of rock surfacing shall be based on the unit price per ton or cubic yard as stated in the Bid. The quantity of rock replaced shall be the actual number of tons or cubic yards used as directed by the Design Engineer, and shall be based on weight tickets from state certified weigh stations. The Contractor will supply certified conversion factors to get from ton to cubic yard. Trip tickets shall be presented to the City Engineer for his signature on the date of use. No payment will be allowed on trip tickets not so validated by the City Engineer. The unit price for the rock shall include payment for excavating to provide space for the rock if necessary and disposal of all excess excavated material.

212.04.C ASPHALT CONCRETE AND PORTLAND CEMENT PAVEMENT PLACEMENT

1. Measurement and Payment for asphalt concrete and Portland Cement Concrete pavement will be based on the unit price per lineal foot stated in the Bid for each.

2. Payment for asphalt cement concrete and portland cement concrete will include compensation for labor, equipment, and materials necessary for sawcutting the existing pavement; excavation and removal of sufficient material to provide space for the surfacing; supplying, placing, and compacting the base and leveling course materials; supplying and placing specified surfacing materials, including tack coat and joint sealer; restoration of pavement markings; disposal of excess excavated materials, including temporary cold mix asphalt; and all other labor, materials, and equipment of whatsoever nature required to complete pavement restoration.

212.04.D SIDEWALK AND DRIVEWAY REPLACEMENT

1. Measurement and Payment for sidewalk and driveway replacement will be based on the unit price bid per square foot, as stated in the Bid. No differentiation will be made between concrete and asphalt sidewalks. All sidewalks and driveways damaged outside of 3-feet of the pipe centerline shall be replaced at the expense of the Contractor.

2. The leveling course will be considered as included in the bid price for sidewalk and driveway replacement, as stated in the Bid.

3. Payment for sidewalk and driveway replacement will include compensation for labor, equipment, and materials necessary for additional sawcutting of the existing sidewalk and driveway materials; excavation and removal of sufficient material to provide space for the restoration; supplying, placing, and compacting the base and leveling course materials; supplying and placing concrete, including curing and joint materials; formwork; and restoration of markings; disposal of excess excavated materials, including temporary surfacing materials; and all other labor, materials, and equipment of whatever nature required to complete restoration of the sidewalks and driveways.

212.04.E CURB REPLACEMENT

1. Measurement and Payment for replacing concrete curbs, curb and gutter, or gutter sections shall be based on the unit price bid per linear foot as stated in the Bid. All curbs damaged outside of three feet of the pipe centerline shall be replaced at the expense of the Contractor.

2. No differentiation for payment will be made between curb and monolithic curb and gutter sections.

3. Payment for concrete curbs, curb and gutter, or gutter sections will include compensation for labor, equipment, and materials necessary for additional sawcutting of the existing curb; excavation and removal of sufficient material to provide space for the restoration; supplying, placing, and compacting the base and leveling course materials; supplying and placing concrete, including formwork, curing materials, and joint materials; restoration of markings; disposal of excess excavated materials; and all other labor, materials, and equipment of whatsoever nature required to complete restoration of the concrete curbs.

212.04.F REMOVAL AND REPLACEMENT OF CULVERTS, STORM DRAINS, OR CATCH BASINS

1. Measurement and Payment for the removal and replacement of existing culverts or storm sewers lying parallel to and within 3-feet of pipe centerline will be based on the unit price per linear foot, irrespective of size, as stated in the Bid. Payment shall be considered to include full compensation for all work and material required to remove and replace the pipe and restore the culvert or storm sewer to at least its original condition and function. Replacement of existing culvert headwalls will also be included in this payment.

2. Payment for removal and replacement of catch basins will be based on the unit price for each, regardless of size or shape, as stated in the Bid. Payment shall be considered to include full compensation for all work required to remove and replace the catch basins and restore the basins to their original condition and intended function.

212.04.G EXPLORATORY EXCAVATIONS

1. Measurement and Payment for potholing and the repair of potholes will be based on the unit price for each, regardless of size or shape, as stated in the Bid. No differentiation will be made between concrete and asphalt. Payment shall be considered to include full compensation for all work required and to restore the pavement to their original condition and intended function.

212.04.H INCIDENTALS

1. Other materials, labor, and equipment required to complete the resurfacing work in conformance with the Contract Documents and not listed as separate pay items in the Bid will be considered incidental to other items of work and no separate payment will be made.

213 LANDSCAPING AND LANDSCAPE RESTORATION

213.01 DESCRIPTION

213.01.A This section covers the work necessary for finish grading, addition of topsoil, fertilizer, and weed control, establishment of lawns or grass areas by sod or seeding; and maintenance of lawn or grass areas, mulching, fertilization, and planting of ground cover; establishment of nursery stock, such as trees, shrubs, and small plants; and maintenance of ground cover and nursery stock, irrigation system, and subsurface drainage.

1. Selection, provision, planting, and maintenance of street trees shall comply with the standards contained in this section.

2. Requirements contained in this section shall be used in the development of landscaping plans as required for publicly or privately financed public improvements. These standards are intended to ensure that new trees planted within the public right-of-way are of the highest quality, require low maintenance, and will not compromise public safety.

3. The species of trees to be planted shall be selected from the City approved Street Tree Species List as shown in the Design Standards or as specifically approved by the City.

213.02 MATERIALS

213.02.A PLANTS

1. Names of plants to conform to standardized names of the American Joint Committee on Horticultural Nomenclature. Names of varieties not included therein conform to names generally accepted in the nursery trade. Provide plants that are nursery-grown with habit of growth that is normal for the species, sound, healthy, vigorous, and free from insects, diseases, and injuries and equal to or exceeding measurements specified when measured before pruning with branches in normal position. Provide sizes and methods of handling according to the code of standards recommended by the American Association of Nurserymen (AAN).

213.02.B STREET TREE QUALITY AT TIME OF PLANTING

1. The tree shall have a straight trunk perpendicular to the ground with a minimum branching height of four feet above the ground for trees 1 1/2-inch in caliper to a minimum of six feet above the ground for trees 2-inches in caliper.

2. Plant material shall be grown to the current standards and specifications of the American Association of Nurserymen, American Standard for Nursery Stock. Plant material shall be of standard quality or better, true to name and type of their species or cultivar.

3. Tree material originating within the state shall have the Oregon inspection certificate attached. Nursery stock imported from other states shall be accompanied by a certificate of inspection from the place of origin as required by Oregon law.

4. Certificates shall be given to the City's Representative prior to tree approval. The Contractor shall be responsible for making all arrangements with the State Department of Agriculture for inspection of tree materials shipped from out of state.

5. Trees shall be provided reasonably free, as defined by nursery industry standards for street trees, from insects and disease, decay, major structural defects, and damage to the trunk, branches, and root system.

6. Trees' structural scaffold branches shall be well proportioned where they attach to the main trunk, with an average spacing of at least six inches.

7. Plant materials that have been pruned immediately before or during the time of planting will be rejected.

8. The City shall be notified and will have the right to inspect all trees and shrubs before they are planted. The City reserves the right to reject any materials at any time. The Contractor will replace materials with specified plants at the Contractor's expense.

213.02.C STREET TREE SIZE AT TIME OF PLANTING

1. Trees for residential classed streets shall be a minimum of 1 1/2-inches in caliper, measured 6-inches above mean ground level, 8- to 10-feet in height.

2. Trees for collector or arterial streets and abutting commercially zoned properties shall be a minimum of 2-inches in caliper, measured 6-inches above mean ground level, 10- to 12-feet in height.

213.02.D STREET TREE CONDITION AT TIME OF PLANTING

1. BALLED AND BURLAPPED AND IN WIRE BASKETS

   a. Trees shall have a sound ball with a firm attachment of the trunk with the root ball. The trunk shall not be loose, but firmly held within the root ball.

   b. The size and condition of root balls shall conform to the current standards and specifications of the American Association of Nurserymen and the American Standard for Nursery Stock.

   c. Root balls of trees shall not be allowed to dry out at any time from the nursery to final planting.

   d. Trees shall have a well developed root system and not be root bound or have circling/girdling roots.

2. IN A CONTAINER

   a. The trees shall be free of circling, girdling roots.

b. The trees shall have been grown in the container for a maximum period of one year.

3. BARE ROOT

a. Trees in a bare root condition shall not exceed 1 1/2-inches in caliper, measured 6-feet above mean ground level.

b. The roots shall not be allowed to dry out and shall be kept moist at all times from the nursery to final planting.

c. The roots shall be well-established and full of live and vigorous fibrous roots along with the larger structural roots.

213.02.E SEED

1. Provide tested grass and legume seed from blue tag stock and from the latest crop available. Deliver each variety or mixture in standard containers labeled in accordance with Oregon State laws and U.S. Department of Agriculture rules and regulations under the Federal Seed Act. Provide with label showing the following: seed variety, percentage of purity, germination, maximum weed content, and date of test (must be within nine (9) months of date of delivery). Seed must be tested as set forth in the General Seed Certification Standard by the Oregon State University Certification Board. Mold or evidence of container having been wet or otherwise damaged will be cause for rejection of each lot of seed.

213.02.F SOD

1. Provide grass sod that is from a certified or approved source, strongly rooted, and free of pernicious weeds. Sod should be composed of several seed varieties excluding blue and bent grass varieties.

213.02.G TOPSOIL

1. Conform to the applicable requirements of Subsections 209.02.G and 209.02.H.

213.02.H SAND

1. Conform to the requirements of Subsection 209.02.C2.

213.02.I ORGANIC MATERIAL FOR SOIL AMENDMENT

1. Use a peat consisting of natural residue formed by decomposition of reeds, sedges, or mosses from freshwater site. Peat must be free from lumps, roots, and stones and capable of absorbing at least 4-times its dry weight of water. It must contain organic matter not less than 90 percent on a dry weight basis, and have a maximum moisture content at time of delivery of 65 percent by weight.

213.02.J LIME

1. Provide a lime composed of ground dolomitic limestone not less than 85 percent total carbonates and magnesium; ground so that 50 percent passes #100 sieve and 90 percent passes #20 sieve. Coarser material may be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing #100 sieve.

213.02.K SUBDRAINS

1. Use perforated PVC drainpipe. Perforated PVC pipe shall conform to ASTM D-1785, Schedule 40. The perforations shall consist of two (2) rows of 2-inch slots. The slots shall be transverse to the axis of the pipe. Two rows of slots shall be 120 degrees on centers. Slot size shall be 0.4-inches.

213.02.L IRRIGATION AND WATER SYSTEMS

1. Conform to the requirements of Section 214.

213.02.M FERTILIZER

1. Use fertilizer conforming to the recommended content as provided for in Subsection 213.03.B. Furnish fertilizer in moisture-proof bags with weight and the manufacturer's certified analysis of the contents showing the percentage for each ingredient. Furnish fertilizer in a dry condition, free from lumps and caking, in a uniform-granular or palletized form of standard commercial grade conforming to all state and federal regulations and to the standards of the Association of Official Agricultural Chemists. Fertilizer may be furnished in bulk form if an approved transfer hopper is provided.

213.02.N MULCH AND GROUND COVERS

1. Use one or more of the following types of mulch:

    a. Organic mulch of clean, ground Douglas fir or hemlock bark graded so that 50 percent consists of particles larger than 1/4-inch, but not exceeding 1-inch, and 20 percent will pass a #10 sieve.

    b. Fiber-glass mulch of approved commercial grade fiber-glass yarn mat.

    c. Straw mulch of threshed straw of oats, wheat, or rye, free from seed of noxious weeds or clean salt hay.

    d. On steep slopes use approved mesh to reinforce mulch or plantings such as fiber mulch of heavy, twisted jute mesh, or other material as approved, with openings between strands approximately 1-inch square.

    e. Spray mulch of a verdyol complex with nontoxic, 100 percent organic, water-soluble powder-binding agent with silva fiber used in hydraulic seeding operations.

213.02.O TIE-DOWNS

1. Use one or more of the following materials as needed:

    a. Eye-bolt masonry anchors of galvanized steel with approved lead shield or flush shell for setting into masonry joint or concrete.

    b. 2-inch x 2-inch x 96-inch clear, straight cedar wood stakes.

    c. 12-gauge pliable galvanized steel wire for guys or for fastening trees to stakes.

d. 2-ply reinforced rubber garden hose for guy wire encasement having a minimum 5/8-inch diameter threaded openings fitted with screw eyes.

e. Zinc-coated turnbuckles with a 6 1/2-inch lengthwise opening and 3/8-inch diameter threaded openings fitted with screw eyes.

213.02.P SOIL STERILANT

1. Soil sterilant shall be approved by the Engineer and shall be applied conforming to manufacturer's recommendations.

213.03 CONSTRUCTION

213.03.A GENERAL

1. Conform to the following standards, the manufacturer's and supplier's recommendations and instructions, and to accepted practices in the industry.

213.03.B SOIL TEST

1. If directed by the City Engineer, have a soil test performed. The test may be performed by any Oregon State University County Extension Agent or by any other approved soils testing laboratory. The soils analysis shall provide a chemical analysis of the soil and recommendations for soil improvement for the vegetation to be grown. The recommendations shall be used to select the particular fertilizer and soil improvement materials to be used prior to planting.

213.03.C LAWNS AND GRASS

1. PROJECT SCHEDULE

   a. Within twenty (20) calendar-days of the date specified for commencement of work, submit for approval a time schedule indicating dates for beginning and completion of the following operations:

      - Delivery of materials.
      - Preparation of seedbed.
      - Planting grass.
      - Maintenance.

2. DELIVERY, HANDLING, AND STORAGE OF SOD

   a. Deliver sod immediately on lifting and after lawn bed is prepared for planting. Protect sod from drying by covering during delivery to protect from sun and wind. Store materials only in designated areas.

   b. If sod is not laid within two (2) days of delivery, spread out flat with grass side up in cool place and keep moist. Rolled or stacked sod that becomes yellow will not be accepted.

3. PREPARATION OF SUBGRADE

   a. After rough grading is completed and before topsoil is spread, apply lime and/or super phosphate, as determined by soil analysis, and mix to a depth of four (4) to six (6) inches. Conform to manufacturer's recommendations for applying lime and super phosphate simultaneously and schedule application or applications accordingly.

4. SUBSURFACE DRAINAGE

   a. Lay drainage pipe as specified in Subsection 213.02.K on firm bed of 3/4"-0" crushed rock with minimum fall of 0.5 percent and located and sized as shown on the plans. Begin laying pipe at the outlet end of the pipeline and proceed upgrade. Install PVC drainpipe with slots facing upward. Place pipe at a minimum depth of twenty four (24) inches and not any deeper than required to produce minimum fall. Backfill trenches and pipe zone with 3/4-inch crushed rock, to within four (4) inches of subgrade. Cover backfill with fiberglass mat or approved material to prevent infiltrations of soil

   b. Complete backfilling of trenches with a 4-inch layer of coarse sand as specified in Subsection 209.02.C and tamp for compaction, as approved.

5. TOPSOIL AND FINISH GRADING

   a. Spread topsoil and soil conditioner over the prepared rough grade using a rubber-tired tractor with grader blade or equivalent, weighing a maximum of 3 1/2-tons. Imported topsoil must be incorporated with at least a 2-inch layer of subsoil. Thoroughly mix the applied materials to a depth of 8-inches using a disc or cultivator over the entire area in two directions at right angles. Rake topsoil areas to a uniform grade so that all areas drain as shown on the plans or as approved. Remove all trash and any stones exceeding 1-inch in diameter from the area to a depth of two (2) inches prior to preparation and planting grass.

6. SOIL STERILANT – Apply specified soil sterilant at the rate recommended and by the method approved by the manufacturer or as specified in the Contract Documents.

7. SEEDING

   a. Plant grass seed only at times when local weather and other conditions are favorable to the preparation of the soil, and to the germination and growth of grass seed. Sow grassed areas evenly with a mechanical spreader at the recommended rate and method approved by Oregon Department of Agriculture Extension Service. Method of seeding may be varied as approved; however, the responsibility to establish a smooth, uniformly-grassed area will not be waived. Hydroseeding will be permitted unless otherwise specified.

8. SODDING

   a. Before sod is laid, correct soft spots and irregularities in grade of the prepared bed as approved by the City Engineer. Lay sod and tamp or roll so that no voids occur. Water sod thoroughly. Complete sod surface true to finished grade, even and firm. On slopes steeper than one (1) to two (2), fasten sod with wooden pins 6-inches long driven through the sod into the soil, flush with the top of the sod at intervals approved by the City Engineer.

9. MULCHING AND PROTECTION OF SLOPES

a. Mulch all areas with a slope from 5 percent to 20 percent by spreading a uniform light cover of straw mulch over the seeded area at a rate of 1 1/2-tons per acre.

b. In areas with slopes between 20 percent and 25 percent, install erosion control netting. In non-turf areas, cover netting with fir bark mulch.

c. Mulch all areas with a slope steeper than 25 percent with spray mulch applied at a rate of fifteen (15) gallons per 1,000 square feet after wetting the ground, with water penetrating at least 1-inch deep.

d. Protect new seeded area from pedestrian traffic. Unless otherwise approved by the City Engineer, erect a fence of 6-foot tall steel fence posts spaced 10-feet on center and strung with orange mesh safety fencing.

213.03.D TREES, SHRUBS, AND GROUND COVER

1. STREET TREE PLANTING LOCATION

a. GENERAL

1) On public streets without sidewalks, trees shall be located so as to accommodate future sidewalk placement and with regard to current and future utility line corridors. Trees and shrubs (which attain a height of 18-inches or more) that may form a hedge or screen shall not be allowed within the "Clear Vision Zone" of a street or alley intersection so as to obscure required traffic sight distances. The clear vision area consists of a triangular area, two sides of which are lot lines or a driveway and a lot line for a distance specified in this section, or, where the lot lines have rounded corners, the lot lines extended in a straight line to a point of intersection and so measured, and the third side of which is a line across the corner of the lot joining the non-intersecting ends of the other two sides. The following measurements shall establish the clear vision areas:

Type of Intersection	Measurement Along Each Lot Line
Controlled Intersection (stop sign or signal)	20 feet
Uncontrolled Intersection (60' right-of-way)	30 feet
Uncontrolled Intersection (less than 60' right-of-way)	30 feet
Commercial and Industrial District driveways	20 feet

b. MINIMUM STREET TREE PLANTING CLEARANCES

1) MINIMUM RECOMMENDED DISTANCES FROM FEATURE

Feature	Small Tree (up to 35' height)	Medium Tree (up to 60' height)	Large Tree (over 60' height)
Sidewalks	2 feet	3 feet	4 feet
Driveways	5 feet	5 feet	10 feet
Fire Hydrants	5 feet	5 feet	5 feet
Intersections	35 feet	35 feet	35 feet
Water Meters	5 feet	5 feet	5 feet
Utility Boxes	5 feet	5 feet	5 feet
Utility Poles	5 feet	10 feet	10 feet
Street Lights	10 feet	20 feet	30 feet
Stop Signs	35 feet	35 feet	35 feet
Regulatory Signs	Not to block sign		

2) *MINIMUM DISTANCE FROM SIDEWALKS AND CURBS* – Trees shall be centered in the planting strip between the sidewalk and the street curb. If centering within the planting strip is not possible or desirable due to design considerations, the tree must be located at least 2-feet from the sidewalk edge or the curb edge.

3) MINIMUM DISTANCE FROM BURIED UTILITY LINES THAT TRAVERSE THE PLANTING STRIP

- 8"-10" water and sewer line ..... 10 feet
- 12"-16" water and sewer line..... 15 feet
- 18" and greater water and sewer line ..... 20 feet
- All other services ..... 10 feet

4) *OVERHEAD UTILITY LINES* – No tree with the potential of reaching a mature height of more than 35-feet shall be planted in the right-of-way under "primary" overhead wires.

5) MINIMUM RECOMMENDED DISTANCE FROM BUILDINGS

- Small trees (potential growth of up to 35' height) ..... 10 feet
- Medium trees (potential growth of up to 60' height) ..... 10 feet
- Large trees (potential growth of over 60' height) ..... 15 feet
- Shrubs ..... 3 feet
- Any tree planted 10-feet or closer to a building shall have an impenetrable root barrier installed near the building. The root barrier shall run the length of the planting area or the structure, and reach a depth of at least 18-inches.

6) *VEHICULAR AREA* – Provisions shall be made to prevent any parts of the vehicles from touching trees.

7) *SHRUBS PLANTED IN THE STREET-SIDE RIGHT-OF-WAY* – Shrubs shall follow the minimum distance requirements for trees for curbs, sidewalks, and utilities. No shrub shall be planted within 3-feet of a building.

8) *LINEAR SPACING* – Trees shall be placed an average of every 30-feet. Depending on the size, species, and variety, the City may approve planting distances which may be as close as 10-feet and as far as 40-feet to 50-feet based on the size and growth habit of the tree.

c. WIDTH OF PLANTING AREA WITHIN CITY RIGHT-OF-WAY (I.E., DISTANCE BETWEEN THE CURB AND SIDEWALK)

1) Trees shall not be planted where the rooting space is less than 4-feet in width without prior approval of the City.

2) The minimum width of a planting site for each tree will be governed by the approved street tree list.

3) Trees that commonly produce a large-buttress root system shall be planted in a site greater than 8-feet wide (i.e., Quercus phellos, Acer macrophyllum, Liquidambar styraciflua).

d. WIDTH OF MEDIANS

1) No tree shall be planted in any median that is less than 10-feet in width. On State rights-of-way, Oregon Department of Transportation's "Guidelines for Planting Within Highway Right-of-Way" apply.

e. EXEMPTIONS TO THE TREE LOCATION STANDARDS

1) Where special conditions exist, the City may waive these tree planting location standards. Such a waiver will be on a case-by-case basis and will require written approval of the City.

2. PLANTING SEASON

a. Bare root trees may be planted only between October 15th and March 15th unless otherwise approved by the City. Balled and burlapped or container grown trees may be planted only between September 15th and April 15th unless otherwise approved by the City.

3. DELIVERY, PREPARATION, AND STORAGE

a. Dig plants designated in the Contract Documents as balled and burlapped with firm, natural balls of earth of diameter and depth sufficient to encompass the fibrous and feeding root system required for full recovery of the plant. Firmly wrap balls with burlap and bind with twine, cord, or wire mesh. Where necessary to prevent breaking or cracking of the ball during the process of planting, or where the tree exceeds 4-inches in diameter, secure the ball to a platform. Meet or exceed the current edition of AAN standards.

b. Dig bare root plants during dormant period to remove earth with the least possible injury to the fibrous root system. Cover the roots with thick coating of mud immediately after digging by puddling or wrapping in wet straw, moss, or other suitable packing material for protection until delivery.

c. Furnish container-grown plants with self-established root systems sufficient to hold earth together after removal from the container but not root-bound. Plants shall have grown for at least three (3) months in the container with inside diameter specified. Meet or exceed the current edition of AAN standards.

d. If plants are not in the dormant state, spray with anti-desiccant to cover foliage as recommended by manufacturer prior to digging the plants. During shipment, protect the plants with tarpaulin or other approved covering to prevent excessive drying from the sun and wind.

e. Cover balls of balled and burlapped plants and containers of container-grown plants that cannot be planted immediately upon delivery with moist mulch to protect from drying. Plant or heel-in bare root plants immediately upon delivery. Water plants as necessary to prevent drying until planted.

f. Open and separate all bundles of heeled-in bare root plants before the roots are covered. Avoid leaving air pockets among the roots.

4. SOIL CONDITIONING

a. After the specified chemical analysis report for topsoil is received, prepare the topsoil mixture for plant pits and beds by thoroughly mixing the approved topsoil with soil conditioner materials, fertilizer, and lime. Thoroughly mix with rotary mixer or other approved method in the following proportions:

Topsoil Classification by Clay Content	Topsoil	Required Mixture		Parts by Volume	
		Sand	Peat	Fertilizer*	Lime
Clay 5 – 10%	4	0	1lb./CY	1/2 lb./CY	(1)
Clay 10 – 15%	2	2	1lb./CY	1/2 lb./CY	(1)
Clay 15 – 25%	2	4	1 1/2 lbs./CY	1/2 lb./CY	(1)
*Adjust in accordance with soil test chemical analysis report.					

b. Store and protect topsoil mixture and other materials at designated area of the site. Protect topsoil mixture from excessive leaching by covering with tarpaulin if stored for more than 6-weeks.

5. PLANTING PROCEDURES

a. PLANTING SCHEDULE

1) Within twenty (20) calendar-days after receiving the notice to proceed, submit a time schedule for approval indicating dates for commencement and completion of the following operations:

- Tagging of plants in the nurseries
- Survey and staking of plant locations
- Delivery of topsoil and other materials
- Digging and preparation of plant pits and beds
- Delivery of trees and plants to the site
- Planting of trees and other plants
- Fertilization and application of pre-emergent herbicide
- Guying, staking and mulching

- ❖ Completion of work for start of guarantee period

2) At least twenty (20) days before start of the guarantee period, submit a schedule of proposed maintenance operations indicating the number of man-hours contemplated for each operation by season during autumn, winter, spring and summer.

b. PREPARATION OF TREE AND SHRUB PLANTING HOLES

1) GENERAL

a) Dig plant pits and have soil mixture for planting ready before plants are delivered. Excavate circular pits with vertical sides in accordance with the Standard Drawings.

b) For trees, excavate pits to depth sufficient to accommodate ball or roots when plant is set to finished grade plus 18-inches. Place a minimum of 12-inches of compacted soil mixture in the bottom of pit.

c) For shrubs, excavate pits to depth sufficient to accommodate ball or roots when plant is set to finished grade plus 6-inches. Place a minimum of 4-inches of compacted soil mixture in the bottom of pit.

d) For hedges, excavate trenches a maximum of 6-inches deeper and 12-inches wider than spread of roots or diameter of balls. Make adjustments to spacing if necessary to fill trench evenly with the quantity of plants shown on Plans.

2) BALLED AND BURLAPPED AND CONTAINER GROWN

a) A shallow, broad, planting hole at 2-times the diameter of the root ball shall be excavated to a depth that will position the trunk flare level with finish grade in accordance with the Standard Drawings.

b) The inner surfaces of the excavation shall be scored or roughened to the extent necessary to encourage rooting in the existing native soil.

3) BARE-ROOT STOCK

a) Planting holes shall be minimum 1-foot wider than the spread of the roots. Holes shall have sufficient depth to position the trunk flare level with finish grade.

b) A mound of native soil shall be left in the center of the hole to support the roots. The roots shall be draped and spread in their natural position over the mound.

6. <u>PLANTING CONDITIONS</u>

a. BALLED AND BURLAPPED PLANTINGS

1) Plantings shall have a sound root ball that has not been allowed to dry out at any time. The root ball shall be firmly attached to the trunk.

2) Planting materials that are untreated and biodegradable may be left around the root ball after planting. Other debris shall be removed from the planting hole prior to backfilling with soil.

3) Tie material shall be removed and the burlap peeled back as necessary to expose the top of the root ball prior to planting.

4) Spread roots in normal position. Cut all broken or frayed roots off cleanly.

5) Wire baskets shall be cut off to a minimum depth of 18-inches from the top of the root ball.

b. CONTAINER GROWN PLANTINGS

1) Plantings shall be carefully removed from the container and the root mass gently loosened.

2) The roots shall be inspected for a girdling or circling condition. Plantings found to have girdling or circling roots shall not be planted.

3) Container grown plantings shall not exceed 12-months in the container prior to planting.

c. BARE ROOT PLANTINGS

1) Roots shall not be exposed to sunlight or otherwise allowed to dry out at any time.

2) Dead, damaged, broken, or frayed roots shall be pruned off prior to planting.

7. SEATING OF PLANTINGS

a. Plant trees before surrounding smaller plants and covers are placed. Plant bulbs in ground cover beds to recommended depths for each bulb type as shown on plans. Plant ground covers in beds having minimum 8-inchs of prepared soil mixture. Treat ground cover beds with soil fumigant, after preparation for planting but before any plants are installed within bed area, to destroy weed seeds. Apply according to manufacturer's directions, delaying planting for the recommended minimum period to allow dissipation of herbicide.

b. Plantings shall be set plumb, upright, and faced for best appearance or relationship to adjacent structures. Broken branches shall be pruned after planting.

c. The hole shall be backfilled one-half full with original soil and the hole flooded with water to remove any air pockets.

d. After backfilling is complete, the entire planting area shall be thoroughly saturated with water to remove any remaining air pockets. After ground settles, fill with additional soil to level of finished grade.

e. Mulch shall be applied to a depth of 2- to 4-inches around the tree. Mulch shall be kept free of an area within 2-inches of trunk.

f. A continuous 3-inch high raised berm shall be constructed around the planting hole to direct water to roots. The berm shall be removed after 1-year.

8. STAKING

a. Hardwood stakes shall be driven firmly into the ground outside of the hole. Care shall be taken to avoid driving the stakes through the root structure.

b. Trees shall be attached to the stakes at knee height using nonbinding tree ties or tree ties that are at least one inch wide to prevent damage to the tree trunk. Ties shall be attached to the tree in a manner that will allow the tree to move but still be held firmly in place.

c. Use three (3) stakes equally spaced as shown on plans for all trees 4-inches in diameter or less. Use four (4) stakes equally spaced as shown on plans for all trees greater than 4-inches in diameter.

9. TREE PROTECTION

a. Trees shall be protected during the establishment period by the use of the following measures:

1) MULCH

a) Installation of bark mulch in the drip line, which is the area directly below the tree's branches, 2- to 4-inches in depth, and a minimum of three feet by 3-feet by 3-feet.

2) ROOT ZONE PROTECTION

a) No construction or human activity shall take place within the tree's critical root zone. The critical root zone for trees 3-inches or smaller in caliper shall be an area with a radius of at least 3-feet from the trunk.

b) The critical root zone for trees over 3-inches in caliper shall be an area with a radius of at least 1 1/2-feet from the trunk for every 1-inch of caliper size.

c) No soil grade changes shall take place within the critical root zone.

d) No storage of material shall be allowed within the critical root zone or protected area of the tree.

3) PROTECTIVE FENCING

a) Protective fencing shall be constructed if construction or landscaping has not been completed on the abutting property.

b) Where required, the critical root zone or tree protection zone shall have a protective fence installed at its perimeter. The protective fence shall be at least four feet in height and made of orange plastic material or approved equivalent.

c) The protective fencing shall be installed prior to any construction/landscaping activity around the tree and be maintained in place during the construction/landscaping activities and removed only when the final construction is completed.

4) TREE WRAPPING

a) Where shown on Plans, wrap trunks of trees spirally from ground line to height of second branches. Make all wrappings neat and snug and hold material in place by raffia cord at top and bottom.

213.03.E ESTABLISHMENT AND MAINTENANCE STANDARDS

1. LAWN MAINTENANCE

a. Begin maintenance immediately after each portion of lawn is planted and continue for a minimum of eight (8) weeks after all lawn planting is completed.

b. Water to keep surface soil moist. Repair washed-out areas by filling with topsoil, fertilizing, and seeding. Replace mulch on banks when washed or blown away. Repair fencing as needed. Mow to 2-inches after grass reaches 3-inches in height, and mow frequently enough to keep grass from exceeding 3-inches. Weed by local spot application of selective herbicide only after first planting season when grass is established.

2. TREES, SHRUBS AND GROUND COVER MAINTENANCE

a. During the establishment period, and until final inspection, the Contractor shall be responsible for care of the planting to maintain a vigorous growing condition by watering, cultivating, repairing, adjusting tree stakes, spraying for pest control, removing dead trees or trees not showing vigorous growth, and replacing missing or damaged plants

b. Begin maintenance immediately after each plant is installed and continue to maintain until the end of the guarantee period. Perform the following operations:

- Watering as often as required to maintain capillary water within two (2) inches of the soil surface around plants. A watering schedule will be required. The schedule shall be submitted to the City for review.
- Weeding of plant beds, planting saucers, and plant pockets to keep free of weeds using approved selective herbicide according to the manufacturer's directions for use, and/or weeding by hand methods.
- Mulching monthly to replenish mulch within a 3-foot by 3-foot planting area around each tree with a layer of bark mulch 2- to 4-inches in depth. The mulch shall be kept at least 2-inches away from the trunk of the tree, and the mulched planting area around the tree shall be kept free of weeds.
- Tightening and repairing guys to keep trees erect and supported without damage to bark.
- Resetting plants to proper grades or upright position.
- Restoration of planting saucers.
- Seasonal spraying to control disease or insect pests that may impair plant vigor.

c. Replace plants required by the plant guarantee on a regular monthly basis, except during the months of December, January, and February.

3. TREES, SHRUBS AND GROUND COVER REPLACEMENT

a. Any planting that falls under one or more of the following conditions shall be replaced by the developer during the next approved planting season after receipt of the corrective notice.

- ❖ No live growth originating in the scaffolding branches.
- ❖ Have lost a minimum of 50 percent of its total foliage, or have a reduction of 50 percent of normal leaf size for that species.
- ❖ Trees that are not listed on the Approved Street Tree Species List or that have not been approved by the City.

b. Remove unsatisfactory plantings of the same kind, quality, and size as originally specified. All plant replacements to be alive and in vigorous growing condition 2-years after replacement. Bear all costs of replacement except for replacements resulting from removal, loss or damage due to occupancy of project in any part, vandalism, or acts of neglect on the part of others. Replace plants that die immediately, unless during a season unfavorable for planting. When season is unfavorable, plant during the first month of the next favorable planting season.

4. TREE PRUNING REQUIREMENTS

a. Dead, broken, or split branches shall be pruned at the time of planting.

b. Trees shall be pruned to remove branches that are crossing, damaged, diseased, broken, or have included bark.

c. Trees shall not be topped or reduced in height without specific approval of the City.

d. Trees shall be pruned so at least two thirds of the tree's height is canopy with one third of the height being the trunk.

e. The lower limbs shall be pruned off or tipped back to comply with clearance requirements for sidewalks and streets.

f. Pruning shall be performed according to the approved urban forestry pruning standards and specifications.

5. ESTABLISHMENT PERIOD

a. LAWN GUARANTEE

1) If, at the end of the 8-week lawn maintenance period a satisfactory stand of grass has not been produced, immediately renovate and reseed the unsatisfactory portions of lawn; or when approved, reseed at the beginning of the next planting season. If a satisfactory stand of grass develops by June 1 of the following year, the lawn will be accepted. If the lawn is not accepted, a complete replanting will be required during the ensuing planting season.

2) A satisfactory stand is defined as a lawn or section of lawn that has:

- ❖ No bare spots larger than 2-square-feet.
- ❖ Not more than 10 percent of the total area with bare spots larger than 1-square-foot.
- ❖ Not more than 15 percent of the total area with bare spots larger than 6-inches square.

3) Submit a written notice eight (8) weeks after the start of maintenance on the last section of completed lawn. Within 15-days of such written notice the City Engineer will make an inspection of the lawn to determine if a satisfactory stand of grass has been produced.

b. TREES, SHRUBS, AND GROUND COVER GUARANTEE

1) Guarantee all plants and trees for a minimum of one (1) year to be alive and in vigorous growing condition at the end of the guarantee period. Guarantee period shall begin from the Notice of Final Completion or the date the planting is replaced, and extend for a one (1) year period from that date. See Subsection 108.21 for Warranty requirements.

2) Initial structural pruning shall be performed at the end of the establishment period. A strong scaffold branch structure shall be developed by pruning to select the primary scaffold branches.

213.03.F IRRIGATION SYSTEMS

1. When specified, provide and install irrigation system as specified in Section 214.

213.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

213.04.A UNIT PRICE BASIS

1. When so listed in the Bid, payment for the landscaping items will be made on a unit price basis for the number of items actually placed and accepted.

213.04.B LUMP SUM BASIS

1. When so listed in the Bid, measurement and payment will be made at the contract lump sum pay item for landscaping, complete.

213.04.C INCIDENTAL BASIS

1. When not specified or shown as a separate pay item in the Bid, payment for all landscaping and landscape work is considered to be incidental to the construction.

214 LANDSCAPE IRRIGATION SYSTEMS

214.01 DESCRIPTION

214.01.A This work consists of installing irrigation systems and associated equipment at locations shown or specified and as directed.

214.01.B The Contractor shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to completing the Work as shown on the Plans and in complete accordance with the Specifications.

214.01.C All supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation, whether or not shown on the Plans or addressed in the Specifications, shall be provided and installed as part of the Work.

214.01.D MANUFACTURER'S CERTIFICATION

1. The Contractor shall furnish manufacturers certification for construction materials when such information is requested by the City Engineer. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. All information and cut sheets shall be originals, copies will not be accepted. A minimum of 5 original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

214.02 MATERIALS

214.02.A GENERAL

1. Only materials designed for potable water service and meeting the current National Sanitation Foundation Standard (NSF) 61, Section 9, Drinking Water System Components – Health Effects, or equivalent shall be used in those elements of the water system which are in contact with potable water.

2. Irrigation pipe and fittings shall be of the size, strength, material, and joint type specified on the Plans and/or in the Contract Documents. Jointing material shall be as specified for each pipe material. Each piece of pipe shall be clearly identified as to strength, class, and date of manufacture. The manufacturer or fabricator shall furnish appropriate certification, based on manufacturer's routine quality control tests, that the materials in the pipe and fittings meet the requirements specified herein.

3. It is not intended that materials listed herein are to be considered equal or to be generally interchangeable for all applications. The type, class, and size of pipe as applicable, will be specified in the Contract Documents. The Design Engineer shall determine the materials suitable for the project and so specify.

4. Furnish only commercial quality materials and equipment. All items proposed for use will be subject to testing to ensure compliance with the Specifications. Provide materials of the same function that are of the same type and the same manufacturer.

5. Submit a list of proposed materials for approval as soon as practicable after award of the Contract for publicly financed public improvement projects and before arranging for procurement of any materials, especially those materials or products not shown or specified. If any initially proposed materials are not approved, submit substitutes for approval. Any materials installed without approval will be subject to removal and replacement with acceptable material at no additional cost to the City.

6. Materials may be designated by trade name or by manufacturer's catalog information as shown or specified. The use of a substitute material may be allowed if a written request for substitution and proof of equivalent quality and suitability are furnished. Make any request for substitution with ample time for approval without delaying the work.

7. When alternate equipment, such as sprinkler heads, is proposed for use with hydraulic characteristics differing from that originally shown, the following will be required:

a. A redrafted, legible plan that shows the redesigned layout, location, or sizes of every affected system element as required for proper operation as originally designed. Furnish a plan showing every relevant system element, site feature, and plan element that was shown on the original plan. A plan made by marking up the original plan will not be accepted.

b. A hydraulic calculation table for the alternate equipment. At a minimum, show a complete calculation for one average sprinkler zone (section) and a complete calculation for the "worst case" sprinkler zone (i.e., the section that is farthest from the point of connection (P.O.C.), is the largest, or otherwise presents the most challenging hydraulics). Starting from the P.O.C., show the calculation with a step-down method with flow and loss at each piece of equipment and length of pipe run between equipment. Show the new total water required for each zone and the total for all zones to ensure that maximums for meter size, pipe sizes, and watering times will not be exceeded.

c. Where any controller run-time change will be required, submit a separate page showing the total timing per controller required for each section, to show that timing changes will still allow all zones to be run within a reasonable time period.

d. A cost page showing the Contractor's actual discount cost from the supplier(s), comparing the original plan costs versus the proposed equipment costs for each type of item, such as pipe by size, where there is a change required. Show the line total of each type of item and the grand total for the proposed change.

214.02.B PIPE, TUBING, AND FITTINGS

1. Furnish PVC or polyethylene pipe as shown or specified that meets the following requirements. No substitutions will be allowed without prior approval of the City Engineer.

   a. POLYVINYL CHLORIDE PIPE AND FITTINGS

      1) Furnish PVC pipe and fittings of PVC compound Type 1, Grade 1, conforming to ASTM D-2241 and certified approved by the National Sanitation Foundation. Provide pipe and fittings free from defects caused by poor materials, low quality of work, or rough handling. Dimensional and quick burst tests of pipe and fittings may be required after arrival at the job site before materials will be accepted.

      2) Furnish pipe and fittings as follows:

USE	CLASS OR SCHEDULE
Main and lateral lines	Class 200 or Schedule 40 PVC
Irrigation sleeves	Schedule 40 PVC
Caps	Schedule 80 PVC
Direct bury pipe, not in sleeves, placed under road beds or other paved areas	Schedule 40 PVC

      3) Unless otherwise specified, furnish entire Project with one pipe class or schedule type.

4) Furnish PVC threaded pipe of PVC 1120, schedule 80 material conforming to ASTM D 1785.

5) Provide PVC solvent-weld pipe of PVC 1120 materials having a 200 psi minimum pressure rating with SDR 21 walls that conform to ASTM D-2241.

6) Furnish PVC pipe fittings conforming to ASTM D 2466, Type I, Grades 1 or 2.

7) Pipe may be belled on one end with the dimensions of the tapered bell conforming to ASTM D-2672.

8) Install PVC pipe with walls heavier than SDR 21 when shown or specified.

b. NON-POTABLE COLORED CODED PIPE

1) Wherever non-potable, reclaimed or reuse water is used, furnish PVC pipe that is tinted purple and imprinted with the warning "Caution: Reclaimed Water – Do Not Drink". Provide pipe meeting the same AWWA and ASTM specifications as the potable water pipe sizes on which they are based.

c. POLYETHYLENE PIPE

1) Furnish polyethylene pipe of Class 80, SDR 15, medium density, meeting the requirements of ASTM D-2239, conforming to U.S. Commercial Standard CS-255, and approved by the National Sanitation Foundation (NSF).

a) *Micro Tubing and Fittings* - Where drip emitters are not required, furnish a blank type and provide any connections necessary. Provide tubing consisting of nominal-sized linear, low-density, minimum 1/4-inch outside diameter (OD) polyethylene.

b) *Low Volume (Drip) Tubing* - Furnish drip tubing manufactured from specially formulated, chemical-resistant, low to medium density, virgin polyethylene or polybutylene which is selected for excellent weatherability and stress cracking resistance, and is designed specifically for use in drip irrigation systems. Provide drip tubing having a minimum wall thickness of 0.044-inch.

214.02.C AUTOMATIC CONTROLLERS

1. Provide Underwriter's Laboratories (UL) approved controller(s) as shown or specified. Furnish each outdoor controller with either a pedestal or wall mount brackets when appropriate. Provide and install the controller in a weatherproof and vandal-proof cabinet of corrosion-resistant metal. Furnish the controller housing or cabinet with hasp and lock or locking device. Provide locks or locking devices that are master-keyed and include three sets of keys for the locks. If the irrigation system serves both lawns and planting beds, furnish a controller that has a dual programming capability. Provide controllers that are compatible with and capable of operating the irrigation system as constructed.

2. The following are definitions of some controller-associated equipment:

a. RAIN SENSOR - A sensor able to interrupt the power from the irrigation controller to the valves when the rainfall exceeds a pre-selected amount. Furnish rain sensors that are compatible with the system controller and are fully adjustable.

b. SOIL MOISTURE SENSOR - A sensor that interrupts programmed irrigation cycles until the soil moisture reaches a predetermined condition at the sensor's probe location.

c. CENTRAL CONTROLLER - A computer system programmable to receive data from and provide commands to multiple irrigation systems remotely located from the central system location.

d. SATELLITE CONTROLLER - A satellite controller similar to a normal stand-alone controller and able to operate as one, but designed to be operated by a central controller located off-site.

e. FLOW SENSOR - The hardware located in a pipeline that senses water flow and sends resulting data by electronic pulses to the pulse output transmitter.

f. PULSE OUTPUT TRANSMITTER - A device that reads electronic pulses from the flow sensor and sends data to the pulse-decoding device.

g. PULSE DECODER - A microprocessor-based device designed to read electrical pulses originating at the flow sensor (or other type of monitoring device) and send the data to a central control system for analysis and action. When reading water flow data, the pulse decoder may also be referred to as a flow monitor.

h. WEATHER STATION - A field station that collects and stores various weather data for access and use by a central control system in modifying an irrigation program for weather conditions. Typical data collected over a time period are wind speed, wind direction, relative humidity, rainfall, solar radiation and air temperature.

214.02.D QUICK-COUPLING EQUIPMENT

1. Furnish quick coupling equipment with a body of cast leaded semi-red brass alloy No. C84400 conforming to ASTM B 584, and a service rating not less than 125 psi for non-shock cold water. Provide couplers having standard male pipe threads at the top and standard female pipe threads at the base. Ensure that the valve is designed to open only upon inserting a coupler key and close completely after removing the key, with absolutely no leakage of water between the coupler and valve body. Provide valve bodies to receive couplers that are designed with double worm slots to allow smooth opening and closing action with a minimum of effort. Ensure that slots notched at the base will hold the coupler firmly in the open position.

2. Furnish couplers of one piece construction with steel reinforced side handles attached, a locking top and of the same material as the valve body. The coupler shall have stainless steel double guide lugs to fit the worm slots. Furnish two (2) couplers and two (2) hose swivels for operation of the valves, and two (2) keys for the locking caps if quick-coupling valves are required. For non-potable water systems, furnish a color-coded, purple tinted cap that bears the printed warning "Caution: Reclaimed Water - Do Not Drink".

214.02.E HOSE BIBS

1. Furnish bronze or brass hose bibs, with angle-type thread to accommodate a 3/4-inch hose connection, and with a key- operated design that prevents operation by wrench or pliers.

214.02.F CROSS-CONNECTION CONTROL DEVICES

1. Furnish and install cross-connection control devices meeting the requirements of the Oregon Department of Human Services Drinking Water Program. .

214.02.G WATER METER

1. Water meter procurement, installation, and associated costs will be the responsibility of the Contractor. Contractor shall coordinate water meter needs in a timely fashion with the City.

214.02.H VALVES

1. GATE VALVES - Furnish gate valves of heavy-duty bronze conforming to the requirements of ASTM B-62. Provide valves of the same size as the pipes on which they are placed and install with union or flange connections. Service rating (for non-shock cold water) shall be 150 psi. Valves shall be of the double disk, taper seat type, with rising stem, union bonnet and hand wheel or suitable cross wheel for standard key operation. The valves shall have the manufacturer's name, type of valve, and size clearly cast on them.

2. DRAIN VALVES - Furnish bronze or brass drain valves, 1-inch or 3/4-inch in size, manual angle globe type, with rising stem, hex brass union, removable bonnet and stem, and adjustable packing gland. Ensure that valves are designed for underground installation with a suitable cross wheel operable with a standard key. The valves shall have a service rating of not less than 150 psi non-shock cold water. Furnish three standard operating keys.

3. CHECK VALVES - Furnish heavy duty stainless steel check valves which function by means of a hinged disc suspended from the body, and which is able to close of its own weight. Furnish valves that are of the same size as the pipes on which they are placed, unless otherwise specified, and with union or flanged connections. Provide valves that are rated for non-shock cold water service of not less than 150 psi. The valves shall have the manufacturer's name, valve type, and size cast on them.

4. PRESSURE-REDUCING VALVES - Furnish pressure-reducing valves with a minimum of 150 psi working pressure and an adjustable outlet range of 20 psi to 70 psi, rated for non-shock cold water service up to 175 psi. The valves shall be factory set as shown or specified.

5. ISOLATION VALVE - Furnish isolation valves as shown on the plans or Special Provisions. If no isolation valve is shown, furnish ball valves as shown below.

6. BALL VALVES - Furnish bronzed-bodied ball valves conforming to ASTM B-62 and with a hard, chrome plated ball conforming to ASTM B-124. The valve shall be non-shock cold water service-rated at not less than 400 psi.

7. AIR RELIEF VALVE - The air relief valve automatically relieves air pressure to break an air vacuum in the pipe section where it is located. Install air relief valves at the exact high point of each pipe section where relief is needed. (Note: air relief valves are not associated with backflow prevention).

8. CONTROL VALVES

   a. MANUAL CONTROL VALVES - Furnish manual valves of bronze or brass, angle type, with hex brass union, and with a service rating not less than 150 psi non-shock cold water. Provide valves for underground installation designed with a cross wheel suitable for operation with a standard key. Furnish three suitable operating keys per irrigation system. Furnish valves that have removable bonnet and stem assembly, with adjustable packing gland housing for the long acme-threaded stem to ensure full opening and closing. Provide valves with discs that are full floating with replaceable seat washers.

   b. AUTOMATIC CONTROL VALVES - Furnish automatic control valves of a normally closed design, operated by an electric solenoid of the required rating, but not more than 6.5 W and operating on 24 V AC power. Ensure that solenoids directly attached to the valve bonnets or bodies have completely internal control parts. Provide bodies that are not less than 150 psi if brass or bronze and not less than 125 psi if plastic, with a manual control bleed cock to operate the valve without electric current. Ensure that the closing speed is not less than five (5) seconds and the opening speed is not less than three (3) seconds. Both shall be at a constant rate of opening and closing so the water flow is completely stopped when the valve is either manually or electrically closed. Provide valves having manual shutoff stems with cross handles that will adjust the valve from fully closed to wide open with the valve automatically operable in the adjusted position.

   c. AUTOMATIC CONTROL VALVES WITH PRESSURE REGULATOR - Furnish valves of the same manufacture as the automatic control valves, capable of reducing the inlet pressure to a constant lower pressure regardless of supply fluctuations, and which are fully adjustable.

214.02.I VALVE BOXES AND PROTECTIVE SLEEVES

1. Provide automatic control valves, flow control valves, pressure reducing valves, backflow preventers, filters and other serviceable fixtures with valve boxes that are extendable to obtain the depth required. Furnish boxes constructed of thermoplastic, with locking lids, green in color, and of the type shown or specified. Include a protective sleeve and cap with all manual drain valves and manual control valves.

214.02.J ELECTRICAL WIRE AND SPLICES

1. Unless otherwise specified, furnish direct burial electrical wiring used as a hot wire for each zone between the automatic controller and automatic valves of copper, minimum size AWG No. 14, and red in color. Furnish common wire that is a minimum AWG No.12 and white in color. Furnish type USE that is chemically cross-linked polyethylene or thermoplastic. Furnish Type UF that is color-coded or marked with number identification.

2. Make low voltage splices with one of the following:

   a. Furnish a kit containing a "T" shaped open cell with a centering device and a plastic bag of urethane and hardener, which is mixed at the time of installation. The resin used with the "T" shaped centering device shall be a quick curing, flexible compound with a set-up time of about four minutes at 70° F. Acceptable kits are "3-M DBY", "RainBird Snap-Tite", "Pen-tite PVC Socket and Sealing Plus" or approved equal.

b. Heat-shrinkable insulating tubing manufactured for use in irrigation electrical systems. Furnish heat-shrink tubing of a mastic-lined, heavy-wall, polyolefin cable sleeve.

3. Provide and install an extra wire with all wiring runs that is the same gauge, but of a different color than the hot wire and common wire. The extra wire will be reserved for future use or modifications to the system.

214.02.K COMMUNICATION CABLE

1. Furnish communication wire in central satellite control systems that is 18 gauge polyethylene (PE) 89, minimum six (6) pair, or approved equal. Provide sufficient pairs to connect all decoding, sensing and monitoring devices to the Central Control Unit.

214.02.L DETECTABLE WIRE AND MARKING TAPE

1. Provide a detectable wire using continuous No. 12 gauge, UF single strand locator wire that is blue in color. Provide marking tape consisting of inert polyethylene plastic that is impervious to all known alkalis, acids, chemical reagents, and solvents likely to be encountered in the soil. Furnish color-coded tape with the type of line buried below and the word "Caution" imprinted continuously over its entire length in permanent black ink. Provide tape of the width recommended by the manufacturer for the depth of installation used.

214.03 CONSTRUCTION

214.03.A GENERAL

1. SCHEMATIC DESIGN

a. The irrigation plans are a schematic design and may require adjustment. Do not install the sprinkler system as shown if it is evident that obstructions, grade differences, or differences in area dimensions create conditions different than anticipated in the design. Bring all such obstructions or differences to the attention of the City Engineer. In the event this notification is not performed before construction begins on a part of the system where discrepancies exist, any revisions necessary to make the system operate as designed will be the Contractor's responsibility.

2. PLUMBING

a. Install all parts of the irrigation system according to the Oregon Plumbing Specialty Code and State and local laws. Make water service connections as shown and specified. Ensure that water velocities in PVC pipe do not exceed five (5) feet per second, unless approved in writing by the City. Bring any velocities exceeding five (5) feet per second created by pipe sizes shown on the plans to the attention of the City before beginning construction. Correct excess velocities existing after construction, or caused by changes from the plans, at no additional cost to the City, unless a written agreement has been made authorizing otherwise.

3. DOUBLE CHECK VALVE ASSEMBLY (DCVA)

   a. Install, inspect, and test the DCVA according to applicable portions of the Oregon Plumbing Specialty Code and applicable regulations of the Oregon Department of Human Services. Furnish test records on forms approved by the Oregon Department of Human Services. Furnish forms filled out by a State-licensed Backflow Device Tester documenting that the DCVA is in good operating condition before any flushing and testing of downstream water lines. During the life of the Contract, test the DCVA annually, or more often if successive inspections indicate repeated failure. Repair or replace the DCVA whenever it is found to be defective.

4. REDUCED-PRESSURE BACKFLOW DEVICE (RPBD)

   a. Install, inspect, and test the RPBD according to the applicable portions of the Oregon Plumbing Specialty Code and applicable regulations of the Oregon Department of Human Services. Apply the same specific testing requirements as stated for the DCVA above.

5. ELECTRICAL SERVICE

   a. Install electrical service according to the National Electrical Code, and all State and local laws. Power sources will be as shown or as directed. Be responsible for coordination and installation of electrical service. Furnish and install meter bases at the power source conforming to the requirements of the power supplier. Give the power supplier's representative notice before making any installation. Provide a separate, dedicated circuit for the controller.

214.03.B LAYOUT OF IRRIGATION SYSTEM

1. Stake the irrigation system, following the schematic design on the plans, before construction begins. With prior City approval, make alterations and changes in the layout to conform to ground conditions and to obtain adequate coverage of water. Comply with the requirements of Section 106.11.

214.03.C EXCAVATION

1. Excavate trenches no wider than necessary to lay the pipe or install the equipment. Keep the top six (6) inches of topsoil, if applicable, separate from subsoil and replace this topsoil as the top layer when backfilling. Provide smooth trench bottoms of sand or other material, free from rocks and unsuitable material. Excavate trenches in rock or other unsuitable material at least six (6) inches below the required depth and backfill with sand or other suitable material free from rocks.

2. Exercise care when excavating near existing trees. Where roots are two (2) inches and greater in diameter, except in the direct path of the pipe, hand excavate and tunnel the pipe trench. When large roots are exposed, wrap them with heavy burlap for protection and to prevent excessive drying. When digging trenches by machine adjacent to trees having roots two (2) inches and less in diameter, hand trim the sides of the trench, making a clean cut of the roots. Treat all cut and trimmed roots ½-inch or larger in diameter with an approved tree wound dressing. Backfill trenches having exposed tree roots within twenty four (24) hours unless protected by continuously moist burlap or canvas.

3. Place detectable marking tape and tracer wire in the trench directly above, parallel to, and along the entire length of all nonmetallic water pipes and all nonmetallic and aluminum conduits installed under existing or planned pavement. Use tape widths recommended by the manufacturer for the burial depth.

4. Pipe installation using a "pipe puller" may be approved if there is adequate topsoil depth and the topsoil is free of rock. Obtain the Engineer's approval before using a pipe puller. Include any resultant changes in material or design with the request for use of this method.

5. If unforeseen bedrock is encountered during excavation that prevents the pipe from being buried at the specified depth, immediately bring it to the attention of the Engineer.

214.03.D PIPING

1. Backfill all pipe between the top of the pipe and finished grade with a minimum of eighteen (18) inches of fill according to Section 214.03.J. Where possible, place mains and laterals or section piping in the same trench. Separate all pipes by at least two (2) inches. Place all pipe lines a minimum of three (3) feet from the edge of concrete sidewalks, curbs, guardrail, fences, traffic barriers or walls unless otherwise approved.

2. Place marking tape and tracer wire above all pressurized mainline, according to the manufacturer's instructions.

3. Place all live mains to be constructed under existing pavement in sleeves jacked under the pavement, unless otherwise shown. Place all PVC pipe installed under pavement in pipe sleeves of Schedule 40 PVC, unless steel sleeving is shown or specified. Furnish pipe caps of Schedule 80 PVC.

4. Install sleeves two (2) feet below subgrade when passing under roadways. Extend sleeves two (2) feet beyond the edge of gravel, edge of sidewalk or back of curbs. Mark sleeves with a 2-foot piece of No. 4 rebar driven flush with the ground or other adjacent surface. Place PVC caps over both ends of sleeves but do not glue. Solvent-weld sleeve sections. Pipe bedding and backfill shall conform to Section 209.

5. Extend the sleeve a minimum of twelve (12) inches beyond the edge of pavement. Perform all jacking operations according to an approved jacking plan. If obstacles are encountered during required jacking, notify the Engineer, who may authorize corrective measures according to Section 105.06. Provide for complete drainage of all pipe lines with manual drain valves installed at section low points. Drain valves may not be shown on the plans.

214.03.E PIPE JOINTING

1. GENERAL - During construction, plug or cap pipe ends to prevent entry of dirt, rocks and other debris.

2. PVC PIPE - Handle and install PVC pipe, couplings and fittings according to the manufacturer's recommendations. Chamfer the outside of the PVC pipe to a minimum of 1/16-inch at approximately 22 degrees. Join pipe and fittings by solvent welding. Use only solvents that penetrate the surface of both pipe and fitting with a result of complete fusion at the joint. Use solvent and cement only as recommended by the pipe manufacturer. On plastic to metal connections, work the metal connection first. Use a non-hardening compound on threaded connections. Thread connections between metal and plastic using only female threaded PVC adapters with threaded Schedule 80 PVC nipples.

3. POLYETHYLENE PIPE - Install polyethylene pipe and fittings according to the manufacturer's recommendations. Cut the ends of the polyethylene pipe square and insert the fitting to its full depth. Use stainless steel clamps for insert fittings.

214.03.F INSTALLATION:

1. SPRINKLER HEADS - Position turf heads and other pop-up heads between 1/2- inch and 1-inch above finish grade, measured from the top of the sprinkler. Place sprinklers as close as practical to walks, curbs, pavement and lawn edges, but leave enough space to allow height adjustment. Do not place heads on risers in areas with any potential for pedestrian traffic, unless otherwise shown. Use swing riser assemblies that allow positioning for correct sprinkler height.

2. DRIP EMITTERS - Install emitters directly above the root mass of the plant being watered, according to the plans or the manufacturer's recommendations.

3. LOW VOLUME DRIP TUBING - Install drip irrigation tubing as shown and the manufacturer's recommendations.

4. CONTROLLERS - Install controllers according to the manufacturer's recommendations and as shown. Receive approval of the location before installing. Since the controller will need to be accessed frequently, install it at a height, position, and location that allow ease of access.

5. VALVE BOXES AND QUICK COUPLERS - Position the tops of valve boxes, capped sleeves, and quick coupler valves between 1/2-inch and 1-inch above finish grade or mulch.

6. VALVES - Install valves so that access for maintenance is maintained.

7. CENTRAL CONTROL EQUIPMENT - If shown or specified, install the following equipment according to the manufacturer's recommendations:

   - Rain sensors
   - Soil moisture sensors
   - Flow meters
   - Central control system with satellite controllers
   - Weather stations

214.03.G LOW VOLTAGE ELECTRICAL INSTALLATION

1. Use direct burial wiring between the automatic controller and automatic valves. The wiring may share a common neutral. When more than one automatic controller is required, provide a separate common neutral for each controller and the automatic valves it controls. Run separate control conductors from the automatic controller to each valve. Provide and install an extra wire according to Section 214.03.A.

2. Install wire adjacent to or beneath the irrigation pipe. Use plastic tape or nylon tie-wraps to bundle wires together at 10-foot intervals. Snake the wire from side to side in the trench to provide slack in the wire run. When it is necessary to run wire separate from the irrigation pipe, bundle and place the wire under detectable marking tape. Splices will be allowed only at junction boxes, valve boxes, pole bases, or control equipment. Leave a minimum of two (2) feet of excess conductor at all splices, terminals and control valves to facilitate inspection and future splicing.

214.03.H FLUSHING AND TESTING

1. GENERAL

   a. Provide gauges used in the testing of water pressures that are certified correct by an independent testing laboratory immediately before use on the Project. Retest gauges when directed.

   b. Test automatic controllers by actual operation for a period of two weeks under normal operating conditions. If adjustments are required, adjust according to the manufacturer's direction and test until operation is accepted as satisfactory.

2. SPRINKLER HEAD FLUSHING - Flush all sprinkler heads as recommended by the manufacturer.

3. SPRINKLER HEAD TESTING - Test for leaks in heads and connections and correct as required.

4. MAIN LINE FLUSHING - To remove debris that may have entered the line during construction, flush main supply lines twice with the supply valve fully open. Flush first before placing valves and again after placing valves and before pressure testing.

5. MAIN LINE TESTING - Purge all main supply lines of air and test with static water pressure of at least 150 psi for 60 minutes without introduction of additional service or pumping pressure. Test with one pressure gauge installed on the line where directed. Install an additional pressure gauge at the pump when directed. Lines showing loss of pressure exceeding 5 psi at the end of the specified test period will be rejected. Correct rejected installations and retest for leaks.

6. LATERAL LINE FLUSHING - Flush all lateral lines once with the supply valve fully open prior to placement of sprinkler heads, emitters and drain valves. Flush long enough to remove any debris that enters the lateral lines during construction.

7. LATERAL LINE TESTING - Purge all lateral lines of air and test under operating line pressures with risers capped and drain valves closed. Maintain operating line pressures for 30 minutes through open valves and pressure regulating devices. Lines showing leaks when visually inspected at the end of the specified test periods will be rejected. Correct and retest lateral line installations that have been rejected.

8. LATERAL LINE ALTERNATE TEST METHOD - When conditions prevent effective visual inspection of lateral lines, the Engineer may require that the lines be tested by use of pressure gauges. In that event, maintain the static water pressure equal to the operating line pressure in the lines for 30 minutes, with valves closed and without introduction of additional service pressure. Lateral lines showing loss of pressure exceeding 5 psi at the end of the specified test period will be rejected. Correct and retest lateral line installations that have been rejected.

9. TESTING OF MICRO TUBING - Micro tubing will be tested by visual inspection while operating and before burial. Tubing that has obvious leaks or that doesn't operate as designed will be rejected. To fully test micro tubing, a water collection procedure recommended by the manufacturer may be required. Correct all faults before retesting.

214.03.I ADJUSTING SYSTEM

1. Before final inspection, adjust and balance all sprinklers to provide adequate and uniform coverage. Balance spray patterns by adjusting individual sprinkler heads with the adjustment screws or by replacing nozzles to produce a uniform pattern. Unless otherwise specified, water spray will not be allowed on pavement, walks or structures.

214.03.J BACKFILL

1. Do not start backfill until all piping has been inspected, tested and approved.

2. Complete backfilling as soon as possible after approval. Ensure that backfill material placed within 6 inches of the pipe is free of rocks or other unsuitable material that might cut or otherwise damage the pipe. Backfill from he bottom of the trench to approximately 6 inches above the pipe with continuous compaction in a manner that will not damage the pipe or wiring, and proceed evenly on both sides of the pipe. Thoroughly compact the remainder of the backfill without using heavy equipment within 18 inches of any pipe. Ensure that the top 6 inches of the backfill is topsoil material or, if suitable, is the first 6 inches of material removed in the excavation.

3. Pipe bedding material conforming to Section 209 may be authorized in quantities determined by the City Engineer. When authorized to proceed, fill the bottom 2 inches of the trench with approved bedding before laying pipe. After the pipe is in position, add enough bedding material to bring the backfill height to 2 inches above the pipe. Continue backfilling as usual.

4. If sufficient suitable backfill material is not available from trench excavation or other sources on the Project, notify the City Engineer. Provide an estimate of imported backfill required, if possible. Unless otherwise shown or specified, imported pipe bedding material will be authorized according to Section 105.06.

214.03.K SYSTEM OPERATION (during maintenance period)

1. Repair, flush and test all main and lateral lines that sustain a break or disruption of service. Upon restoration of the water service, bring the affected lines up to operating pressure. After pressurizing, conduct a thorough inspection of all sprinkler heads, emitters, and other fittings, located downstream of the break or disruption of service, and repair. This inspection is required to ensure that the entire irrigation system is operating properly.

2. Completely install and test the irrigation system, and make it automatically operable before planting in a unit area except where otherwise shown, specified, or approved. Be fully responsible for all maintenance, repair, testing, inspection and automatic operation of the entire system until Final Acceptance.

3. This responsibility includes, but is not limited to, draining the system before winter and reactivating the system in the spring and at other times as directed.

4. Be responsible for having an annual inspection and test performed on all cross connection control devices as required by the Department of Human Services – Drinking Water Program until Final Acceptance.

5. In the spring when the drip irrigation system is in full operation, make a full inspection of all emitters. This involves visual inspection of each emitter under operating conditions. Make all adjustments, flushing or replacements to the system at this time to ensure the proper operation of all emitters.

214.03.L WARRANTY

1. Irrigation system warranty requirements shall be as specified in Subsection 108.21.

214.03.M RECORD DRAWINGS AND SYSTEM ORIENTATION

1. Upon completion of the work, submit corrected working drawings, schematic circuit diagrams, or other drawings necessary for the Design Engineer to prepare corrected plans showing the work as constructed. Provide drawings in accordance with Section 202 of the Design Standards on 8 1/2 inches x 11 inches, 11 inches x 17 inches, or 22 inches x 34 inches sizes. Prepare and present a training and orientation session covering the operation, adjustment and maintenance of the irrigation system. Review corrected drawings and explain all features. Show locations of drain valves, if any, on the drawings. At this session, provide the City Engineer with parts lists and service manuals for all equipment. Notify the City Engineer in writing two weeks before the proposed date of the training and orientation session. The date and time of the session will be mutually agreed to.

214.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

214.04.A LUMP SUM

1. All Work performed under this Section shall be paid for on a lump-sum basis as stated in the Contract Documents. Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified. No separate or additional payment will be made for excavation, backfill, electrical service, and system orientation.

214.04.B INCIDENTALS

1. All materials, labor, and equipment required to complete the landscape irrigation system work in conformance with the Contract Documents and not listed as separate pay items in the Bid will be considered incidental to other items of work and no separate payment will be made.

215 CLEANUP AND SITE RESTORATION

215.01 DESCRIPTION

215.01.A This section covers the work necessary to restore and clean up the site and remove all construction equipment, refuse, and unused materials of any kind resulting from project activities.

215.02 MATERIALS

215.02.A Provide all materials required to accomplish the work as specified.

215.03 CONSTRUCTION

215.03.A SURFACE DRESSING

1. Slopes, sidewalk areas, planting areas, and roadway shall be smoothed and dressed to the required cross section and grade by means of a grading machine, insofar as it is possible to do, without damaging the work or existing improvements, trees, and shrubs. Unless specified otherwise, the maximum slope shall be two (2) to one (1) in cut and fill. Supplement machine dressing by hand work as necessary.

2. Upon completion of the cleaning and dressing, the project shall appear uniform in all respects. Grade all areas true to line and grade as shown. Excavated areas adjoining new walkways and curbs shall be backfilled with topsoil. Where the existing ground is below the sidewalk and curb, fill and dress the area to the walk. Wherever fill material is required in the planting area, make finish surface high enough to allow for final settlement. Surface improvements, other than topsoil, which are adjacent to new walkways or curbs, such as asphalt paving or brickwork, shall be replaced with like materials.

215.03.B REMOVAL OF EQUIPMENT AND MATERIALS

1. Remove and dispose of all excavated or construction materials, equipment, and trash of all kinds resulting from the work. Where brush and trees have been disturbed, remove and dispose of or restore same as directed by the City Engineer at the Contractor's expense.

215.03.C CLEANING PAVED SURFACES AND APPURTENANCES

1. Clean pavement surfaces, whether new or existing, within the limits of the project. All haul routes will be kept free of dust, dirt, gravel, and debris at all times.

2. Clean new and existing improvements, including but not limited to, curbs, gutters, walls, sidewalks, lamp poles, vaults, signs, castings for manholes, cleanouts, monuments, and water valves.

3. Sweep the street with a vacuum sweeper and hand broom all sidewalks.

215.03.D CLEANING WATER DISTRIBUTION SYSTEMS AND FACILITIES

1. Clean all water distribution system components including fire hydrants, valve box castings, and other water system components of all excess material or debris that is the result of the work.

2. Valve boxes and castings shall be removed and seating surfaces cleaned.

215.03.E CLEANING SANITARY SEWER SYSTEMS AND FACILITIES

1. Upon completion of the work, sanitary sewer piping and structures such as manholes and cleanouts shall be cleaned of silt, rock, and other excess material or debris that is the result of the work.

2. Where possible, such materials shall be removed through the top of the structure. When flushing is required to completely remove the materials, appropriate precautions shall be taken to trap the debris at the nearest downstream structure.

3. Manhole and cleanout castings shall be removed and seating surfaces cleaned.

215.03.F CLEANING STORM DRAIN SYSTEMS AND FACILITIES

1. Upon completion of the work, storm drain piping, culverts, open swales/ditches, and structures such as manholes, inlets, and catch basins shall be cleaned of silt, rock, and other excess material or debris that is the result of the work.

2. Where possible, such materials shall be removed through the top of the structure. When flushing is required to completely remove the materials, appropriate precautions shall be taken to trap the debris at the nearest downstream structure.

3. Manhole castings shall be removed and seating surfaces cleaned.

215.03.G RESTORING PLANTED AREAS

1. Planted areas, including grassy areas, shall be raked by hand as necessary to remove gravel, clay, construction debris, and deleterious materials.

2. Areas where the sod has been damaged shall be leveled and raked as necessary to conform to the original surface and shall be free of holes, rough spots, or other surface features detrimental to seeding or placement of sod.

3. Grassy and planted areas damaged by oil, gasoline, or other hazardous and/or poisonous materials shall be excavated and the contaminated soil removed and replaced with suitable topsoil to the satisfaction of the City Engineer.

4. Grass and other plantings shall be replaced in kind. Grass shall be restored by seeding or with sod as required by the City Engineer.

5. Shrubs and trees located outside the limits of construction that have been disturbed or damaged shall be removed and replaced, in kind, as directed by the City Engineer and at the Contractor's sole expense.

6. Adequate drainage shall be maintained in all restored areas.

215.03.H RESTORING MOBILIZATION, BORROW, AND DISPOSAL AREAS

1. Clean all properties that were disturbed during construction of the project. Dispose of all uprooted stumps, felled trees, brush, excess excavation, rock, discarded materials, rubbish, and debris. Remove all plants, equipment, tools, and supplies and restore the property to a neat, clean, and orderly condition in equal or better condition to that existing before mobilization

215.03.I REMOVAL OF SIGNS

1. Do not remove warning, regulatory, guide, or project signs prior to formal acceptance except as directed.

215.03.J RESTORING CURBS, SIDEWALKS, AND DRIVEWAYS

1. Repair or replace all curbs, sidewalks, driveways, and other structures damaged during construction of the work. Construct curbs, sidewalks, driveways, and other structures in conformance with the applicable requirements in DIVISION 3 – STREETS AND ALLEYS.

215.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

215.04.A INCIDENTAL BASIS

1. When not listed in the Bid for separate payment, all restoration and cleanup will be considered incidental work for which no separate payment will be made.

END OF DIVISION

DIVISION 3 – STREETS AND ALLEYS

DIVISION 3

STREETS AND ALLEYS

301 SUBGRADE

301.01 DESCRIPTION

301.01.A This section covers work necessary for preparation of the subgrade, complete. See also Section 207 and Section 209.

301.01.B Subgrade is defined as the area of new or existing roads, streets, the alleys, driveways, sidewalks, or other locations upon which additional materials are to be placed as a part of work or by future work. Where applicable, subgrade may be considered to extend over the full width of the specified base course.

1. UNTREATED SUBGRADE

    a. The material placed in fills or unmoved from cuts in the normal grading of the roadbed, and that is brought to true line and grade, shaped and compacted, as required by these specifications to provide a foundation for the pavement structure.

301.02 MATERIALS

301.02.A WATER

1. Conform to the requirements in Subsection 208.02.C.

301.03 CONSTRUCTION

301.03.A PREPARATION OF SUBGRADE

1. Subgrade upon which pavement, sidewalk, curb and gutter, driveways, or other structures are to be directly placed shall not vary more than .05-feet from the specified grade and cross section. Subgrade upon which subbase or base material is to be placed shall not vary more than .10-foot from the specified grade and cross section at any point. Variations within the above specified tolerances shall be compensating so that the average grade and cross section specified are met.

2. In advance of setting line and grade, complete clearing and grubbing as specified in Section 207 of these specifications. Clearing and grubbing shall be completed in advance of staking final lines and grades. Depressions or ruts containing water shall be drained and the subgrade bladed to remove irregularities and to produce a uniform surface.

3. Prior to starting subgrade work, including backfill, all underground work contemplated in the area of the subgrade shall be completed. This requirement includes the Contractor's work and work to be performed by the City or by others.

4. The Contractor shall remove all soft or otherwise unsuitable material as directed and replace with approved material. The Contractor shall compact to a line 1-foot beyond the edge of pavement structure, base rock, curb, or form.

5. Subgrade areas that cannot be compacted to specified density but, in the judgment of the City Engineer, otherwise meet the requirements herein, may be removed and aerated or stabilized with an approved soil stabilizing material, all at no additional expense to the City.

6. Subgrade materials that cannot be compacted to specified density due to excess moisture shall be dried out to bring materials to within ±2 percent of optimum moisture. The Contractor shall aerate, drain, re-handle, amend with lime or cement, or by other means at his option remove the excess moisture. All costs involved in the removal of excess moisture from the material are the responsibility of the Contractor for which no additional payment will be made.

301.03.B GRADING OF AREAS NOT TO BE PAVED

1. When specified, areas within and adjacent to the project that are intended for lawns, planting areas, flower beds, and similar uses shall be finished with 4-inches of topsoil and graded smooth as directed. Topsoil for such finishing shall be fertile, loamy, natural-surface soil consisting of sands, silts, clays, and organic matter and shall be free of toxic substances, weeds, roots, refuse, sticks, large rocks, or lumps. Topsoil available from required excavation shall be used to the greatest extent possible in this work. The premature disposal of suitable topsoil material shall be prohibited.

301.03.C EXCAVATION

1. Excavation and backfill shall conform to applicable requirements of Section 209.

301.03.D OVER-EXCAVATION AND FOUNDATION STABILIZATION

1. When, in the opinion of the City Engineer, unsuitable material or other conditions are discovered that render the subgrade unable to be compacted to the specified density, then the City Engineer may order the Contractor to remove and dispose of the unsuitable material and then backfill with crushed rock as specified in the applicable portions of Section 209. Geotextiles may be required before backfilling.

301.03.E EMBANKMENT

1. Embankment shall conform to applicable requirements of Section 209.

301.03.F SLIDES AND SLIP-OUTS

1. Material outside the planned roadway or ditch slopes that, in the opinion of the City Engineer, is unstable and constitutes potential slide material that may come into the roadway, channel, or ditch, and material that has slipped out of new or old embankments shall be excavated and removed. The material shall be excavated to designated lines or sloped either by benching or in such a manner as directed by the City Engineer. Such material shall be used in the construction of the embankments or disposed of as directed by the City Engineer.

2. The above provisions shall not be so construed as to relieve the Contractor of his obligation to maintain all slopes true and smooth.

301.03.G SLOPES

1. Excavation and embankment slopes shall be finished in conformance with the lines and grades shown on the plans.

301.03.H FINISHING AND CLEANUP

1. All roadbeds, planting areas, ditches, embankments, and other areas on which earthwork is performed shall be trimmed reasonably close to established lines, grades, and cross sections and shall be finished in a thoroughly workmanlike manner. They shall be kept free, throughout the work, of debris and foreign matter of all kinds; prior to final acceptance the entire right-of-way shall be cleaned up and finished as directed by the City Engineer.

301.03.I COMPACTION AND DENSITY REQUIREMENTS

1. The density of compacted materials in-place will be determined by nuclear densometer or other methods as approved by the City Engineer, and the maximum density will be determined by AASHTO T-180.

2. The Contractor shall compact all embankments, fills, and backfills within 3-feet of established subgrade elevation to a minimum density in place of 95 percent of maximum density. Below said 3-foot limit compaction shall be a minimum density in-place of 90 percent of maximum density.

3. Roadbed cuts and foundations for structures to a depth of 1-foot below established subgrade or foundation elevation shall be 3-inch maximum material and shall be compacted to a minimum density in-place of 95 percent of maximum density.

301.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

301.04.A PREPARATION OF SUBGRADE

1. Labor, materials, and equipment required to prepare the subgrade in conformance with the Contract Documents, including any additional work necessary to obtain optimum moisture content for the subgrade materials, will be considered incidental to excavation and backfill.

301.04.B OVER-EXCAVATION AND FOUNDATION STABILIZATION

Measurement for over-excavation and foundation stabilization will be made on "neat line", cubic-yard basis for quantities removed. Payment for over-excavation and foundation stabilization will be made on a cubic-yard basis.

301.04.C EMBANKMENT-IN-PLACE

1. Embankment-in-place will be measured by the cubic yard of embankment in conformance with applicable requirements for embankment in Section 209.

301.04.D INCIDENTALS

1. Other materials, labor, and equipment required to complete the subgrade work in conformance with the Contract Documents and not listed as separate pay items in the Contract Documents will be considered incidental to other items of work and no separate payment will be made.

2. Water used in the work (compaction, dust control, etc.) will be considered incidental to and included in the various other items of work in the Contract Documents.

302 WATERING

302.01 DESCRIPTION

302.01.A This section covers work necessary to furnish and apply water for roadway excavations, fills, subgrades, roadbeds, backfill, subbases, bases, and surfacings, and water used for the alleviation or prevention of dust within the project limits.

302.02 MATERIALS

302.02.A WATER

1. Conform to the requirements in Subsection 208.02.C.

302.03 CONSTRUCTION

302.03.A The Contractor shall make all arrangements necessary for the procurement of water and its application. The Contractor shall obtain a hydrant meter from the City for the purposes of measuring all City water used on the project.

302.03.B Water by means of tank trucks equipped with spray bars, by hose and nozzle, or by other approved equal means that ensure uniform and controlled application. The use of splashboards will not be permitted without prior approval.

302.03.C Perform watering at any hour of the day and on any day of the week as necessary. Make all necessary arrangements and pay all costs for obtaining water. Maintain an adequate supply of water at all times to complete the required work.

302.04 MEASUREMENT AND PAYMENT

302.04.A WATER ON AN INCIDENTAL BASIS

1. When neither specified nor shown in the Contract Documents for separate payment, all water will be considered incidental to the other items of work and no separate payment will be made.

303 AGGREGATE BASES

303.01 DESCRIPTION

303.01.A This section covers work necessary to furnish and place all courses of aggregates and water, as base, on a prepared surface.

303.02 MATERIALS

303.02.A AGGREGATE

1. Aggregates for aggregate base and subbase shall be 1”-0” dense-graded crushed aggregate base. No sand may be used in road base. Aggregate base shall conform to requirements of Section 208.02.D.

2. Foundation stabilization shall conform to Subsection 209.02.B.

303.02.B ACCEPTANCE

1. Acceptance will be based on periodic samples taken following mixing or placement.

303.03 CONSTRUCTION

303.03.A PREPARATION OF SUBGRADE

1. Ensure that all surfaces and materials on which subbase or base is to be constructed are firm and have been prepared as specified in the applicable portions of Section 301.

303.03.B PLACING

1. WEATHER LIMITATIONS

   a. When the weather is such that satisfactory results cannot be secured, the Contractor shall suspend operations. The City will not be liable to damages or claims of any kind by reason of operations being suspended due to weather limitation.

2. EQUIPMENT

   a. Furnish equipment that will provide for efficient and continuous operations insofar as practicable.

   b. Equipment shall be capable of spreading or striking off material to the designed line, grade, and transverse slope with surface texture of uniform appearance without excessive segregation or fracture of material.

303.03.C SURFACE CONDITIONS

1. GENERAL

   a. The contractor shall not place aggregate materials in standing water or on a soft, muddy, frozen, or otherwise unsatisfactory subgrade.

   b. The contractor shall be solely responsible for any damage that occurs to the subgrade, aggregate materials, or completed aggregate base. Subgrade, aggregate materials, or completed aggregate base so damaged shall be restored, removed, or reconstructed, as determined to be applicable by the City Engineer, at the Contractor's expense.

2. THICKNESS OF LIFTS

   a. If the required compacted depth of the base course exceeds 8-inches, construct in two (2) or more layers of approximate equal thickness. Maximum compacted thickness of any 1-layer shall not exceed 8-inches. Place each layer in widths as wide as practicable and to full width of the course before a succeeding lift is placed.

303.03.D COMPACTION AND DENSITY REQUIREMENTS

1. At the time compaction begins, the materials shall be at optimum moisture content ±2 percent. Compaction of each layer shall continue until a density of 95 percent of maximum density has been obtained according to AASHTO T-180. Water shall be added to the materials as necessary during the compaction to maintain the proper moisture content.

2. Compaction equipment shall be operated in accordance with the manufacturer's instructions and recommendations and shall be maintained in such condition that it will deliver the manufacturer's rated compaction effort.

3. The Contractor shall use compaction equipment that will not crush the aggregate.

303.03.E SURFACE FINISH

1. Surface of the base shall parallel the established cross section and grade for the finished surface within 0.04-foot. The finished surface of base, when tested with a 12-foot straight edge, shall not vary from the testing edge by more than 0.04-foot at any point. Variations within the above specified tolerances shall be compensating so that the average grade and cross section specified are met.

303.03.F SAMPLING AND TESTING

1. The Contractor shall collect samples of aggregate materials for testing and conduct subsequent analysis of the samples as provided for in Subsection 107.11.

2. Aggregate base materials and the source of such materials require approval by the City Engineer prior to delivery to the job site.

303.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

303.04.A AGGREGATE BASE AND SUB-BASE

1. Measurement and Payment will be made on square yard, cubic yard, or ton basis as shown on the Contract documents Payment for this item will constitute full compensation for materials, labor, and equipment necessary to prepare the subgrade, furnish aggregate base materials at the site, and to place and compact the materials in conformance with the contract documents.

2. The quantity measured for payment will include only that material placed within the limits defined in the Contract Documents. No payment will be made for any unauthorized material placed.

3. Aggregate base and sub-base materials under curbs, gutters, combination curb and gutter, and sidewalks are not included in this pay item.

4. Any conversions between cubic yards and tons shall only be performed by certified conversion factors by material supplier and shall required approval by the City Engineer.

5. SQUARE YARD BASIS

   a. Measurement of aggregate base made on a square-yard basis will be made of width and length of each separately-constructed strip of aggregate base incorporated in the work and accepted wherein width is the design width or edge-to-edge width of aggregate base, whichever is the lesser, and length is from end to end along the center of the strip. Measurement shall be on the surface of the aggregate base to the nearest 0.1-foot and the square yardage shall be to the nearest full square yard.

   b. Extra thickness of aggregate base, when directed by the City Engineer, will be measured by conversion on a proportionate volume basis to an equivalent number of square yards of specified standard thickness of base.

6. CUBIC YARD IN-PLACE BASIS

   a. Measurement of aggregate base made on a cubic yard, in-place basis will be made taking depth tests or cores at the rate of one depth test for each three-hundred (300) square yards of base course, or by means of average end areas on the complete work computed from elevations to the nearest 0.01-foot. On individual depth measurements, thicknesses more than 1/2-inch in excess of that shown shall be considered as specified thickness, plus 1/2-inch in computing the yardage for payment.

7. TON BASIS

   a. Measurement made on a ton basis will be for the number of tons of aggregate base as weighed on approved and tested scales. Give scale tickets to the City Engineer for his signature as the material is delivered. Each trip ticket shall show the date and time of delivery, truck number, driver's name, and net weight of material and will be considered as valid delivery receipts only when signed by the City Engineer. Deductions in weight will be made at the point of weighing for moisture in excess of the optimum moisture content determined for the material being supplied.

303.04.B INCIDENTALS

1. Other materials, labor, and equipment required to complete the aggregate base work in conformance with the Contract Documents and not listed as separate pay items in the Contract Documents will be considered incidental to other items of work and no separate payment will be made.

304 CEMENT-TREATED BASE

304.01 DESCRIPTION

304.01.A This section covers the work necessary for the furnishing and construction of the Cement Treated Base (CTB) complete in-place.

304.02 MATERIALS

304.02.A COMPOSITION OF MIXTURE

1. The CTB mixture shall be comprised of aggregate, Portland Cement, and water in the proportions and amounts established by the mix design. The cement content normally is to be between 4.5 percent and 5.5 percent of the dry weight of the aggregate. The mixture shall be proportioned to provide for a minimum 28-day ultimate compressive strength of 1,000psi. The proportions of the materials will be subject to change as required to meet the herein specifications.

2. In all plants the weight or rates of feed of aggregates and water shall be within 5 percent of the amounts of each material that is specified. The weights or rates of feed of cement shall be such that the variations in cement content in samples taken from any part of a mixed batch, or from different batches, or from time to time from the product of Construction Standard Specifications continuous mixers, or from mixtures spread on the roadbed shall not have variations above or below the cement content designated by the City Engineer of more than 0.5 of a percentage point.

304.02.B AGGREGATE

1. The aggregate shall meet the requirements of Subsection 208.02.D.

304.02.C PORTLAND CEMENT

1. Cement to be used shall be Portland Cement Type I or Type II conforming to the requirements of AASHTO M-85 for low alkali cement. The total alkali content shall not exceed 0.8 percent and the tricalcium aluminate content shall not exceed 10 percent.

304.02.D WATER

1. Conform to the requirements in Subsection 208.02.C.

304.02.E ASPHALT MATERIALS

1. Conform to the requirements of Subsection 208.02.K.

304.02.F MIX DESIGN AND CERTIFICATION

1. Ten days prior to production, the Contractor shall furnish the City Engineer a complete mix design showing the proportions of all constituents proposed for use, and strength test results of samples prepared using the proposed proportions and constituents for a minimum of 7-day, 14-day, and 28-day curing periods. Also accompanying the mix design, the Contractor shall submit the manufacturer's certification and a copy of test results with respect to the product involved. The certification shall consist of the name of the project, the name and address of the manufacturer, and the testing agency and the date of testing. The certification shall also set forth a means of identification that will permit field determination of the product delivered to the project as being the product covered by the certification.

2. The Contractor shall be responsible for all costs of certification and testing of products in connection therewith.

304.03 CONSTRUCTION

304.03.A PREPARATION OF UNDERLYING COURSE

1. Prior to the production or placing of CTB, complete all utility work and prepare the subgrade in strict accordance with Section 301.

304.03.B MIXTURE

1. The CTB mixture shall be mixed at a centrally located plant of the batch type or of the continuous mixing type, capable of providing a mix of aggregate, cement, and water of uniform proportions and consistency as designated by the mix design.

304.03.C WEATHER LIMITATIONS

1. The CTB shall be constructed in accordance with the weather limitations as set forth in Section 211.03.G

2. The Contractor shall not place CTB in standing water or on a soft, muddy, frozen, or otherwise unsuitable subgrade.

3. The Contractor shall be solely responsible for any damage that occurs to the subgrade, CTB mixture, or the completed CTB. Subgrade, CTB mixture, or the completed CTB so damaged shall be restored, removed, or reconstructed as determined to be applicable by the City Engineer, at the Contractor's expense.

304.03.D EQUIPMENT

1. Equipment used shall conform to the following requirements unless otherwise approved by the City Engineer.

2. HAULING EQUIPMENT

   a. Vehicles for hauling the mixture shall be watertight, agitating or non-agitating, and capable of discharging the mix without waste and with practicable minimum amount of separation.

3. SPREADING EQUIPMENT

   a. The equipment shall be capable of spreading the material and striking it off to the required thickness and the designated line, grade, and transverse slope without segregation, dragging, or fracture of material.

   b. Spreading equipment that rides on freshly spread material and produces tracks or partially compacted areas thereon will be acceptable provided no displacement of material or filling of tracks occur, and provided further that the tracks are not of such depth as to be visible after compaction is completed.

4. OTHER EQUIPMENT

   a. Equipment shall be provided to apply water by spray method to the CTB mixture during its compaction, the spray attachments being of a type that will produce a uniform and controlled fine spray. Equipment for application of the bituminous curing seal shall provide application by pressure spray method in a uniform and controlled application. Motor graders shall be available for correction of unavoidable segregation at edges of the mix.

5. COMPACTING EQUIPMENT

   a. Compaction shall be with vibrating type, pneumatic tire type, steel wheel type, or other approved type compactor, as the Contractor may elect; provided, however, that compactors with lugs, projections, or other features that would leave ruts, holes, grooves, or uneven surfaces in the CTB after compaction or that would loosen the mixture while operating will not be permitted. Either a pneumatic tire roller or a smooth steel wheel roller shall be provided for the final rolling and compacting of the mixture.

304.03.E HAULING AND PLACING

1. Maintain the surface of the underlying course in a wet condition by sprinkling just in advance of placing. The CTB mixture shall be delivered and deposited without delay. Mixture that has begun to harden and take an initial set prior to placement, or that has been re-tempered in transit with water, will be rejected by the City Engineer and will not be considered for payment.

2. The CTB mixture shall be placed and compacted within two (2) hours of mixing. Any CTB mixture that is not placed and compacted within this 2-hour period shall be subject to rejection, removal, and replacement as the City Engineer determines to be applicable. Costs associated with such removal and replacement shall be borne by the Contractor.

3. The mixture shall be delivered to the spreading machine by direct deposit in the receiving hopper, by placing in windrows in front of the machine, or by other means acceptable to the City Engineer. If material is placed in windrows, it shall be deposited on the roadbed at a uniform quantity per lineal foot; quantity shall be sufficient to provide the required compacted thickness without resorting to excess spotting, picking-up, or otherwise shifting of the mixture. The mixture shall be delivered and placed without hauling equipment operating over any uncured material.

4. The mixture shall be spread and screeded by specified equipment in one or more layers to provide the compacted thickness called for by the Contract Documents. Placing shall be in strip widths that will hold the number of longitudinal joints to a practicable minimum, normally to a minimum of 10-foot widths.

5. The depositing and spreading shall progress continuously without breaks insofar as is practicable. Should stoppage of operations be of such duration as to allow the mixture to take its initial set, the Contractor shall construct a transverse construction joint as hereinafter provided.

6. The mixture shall be spread and screeded to required thickness and to designated line, grade, and transverse slope without segregation, dragging, or fracture of the components of the mixture.

7. The CTB mixture shall be placed in a manner such that excessive shifting or re-handling will not be necessary to place the mixture to the required thickness and to the designated line and grade.

8. The mixture shall be placed such that the number of longitudinal joints shall be held to a practical minimum.

9. Motor graders shall be used to correct unavoidable segregation at edges and to reprocess minor areas of deficiency.

304.03.F THICKNESS AND NUMBER OF LAYERS

1. If the required compacted depth of CTB exceeds 6-inches, it shall be constructed in two (2) or more layers of approximate equal thickness. The maximum compacted thickness of any one-layer shall not exceed six (6) inches.

304.03.G CONSTRUCTION JOINTS

1. When it is necessary, due to the termination of the day's run or to shutdown, to discontinue placing the mixture for a period of time, which will allow the placed mixture to take its initial set, the Contractor shall construct a temporary transverse construction joint. This joint shall be formed with a wooden block, such as a 6-inch thick timber with width equal to or greater that the depth of the course, or with other devices acceptable to the City Engineer, extending across the width of the strip and held firmly against the vertical end of the strip of mixture that is to terminate at the joint. The top of the joint form shall be set true to the slope and grade of the CTB and shall be firm under pressure from compacting equipment. When construction of the CTB is resumed, the form shall be removed without damage to the adjacent CTB.

304.03.H COMPACTION AND DENSITY REQUIREMENTS

1. Compaction of the CTB mixture with specified compactors shall begin as soon as it has been spread and shall be continuous until completion. Not more than sixty (60) minutes shall elapse between the start of the mixing and the time of starting compaction of the CTB mixture on the prepared subgrade.

2. Successive passes of the compactor shall be so spaced that no more than 75 percent of the compactive width of the compactor shall be on an un-compacted area at any time.

3. During compacting, sprinkling with water by fine spray application shall be done at the time and in the amounts required. Surfaces of uncompacted, partially-compacted mixture shall be kept moist at all times until the bituminous seal has been placed thereon.

4. Compaction on the completed CTB shall be 95 percent of the maximum density indicated by the mix design.

5. Compaction shall be by vibratory, drum-type compactors and shall be adequate to compact the CTB to the density specified herein.

6. Compaction equipment shall be operated in accordance with the manufacturer's instructions and recommendations and shall be maintained in such condition that it will deliver the manufacturer's rated compaction effort.

304.03.I SURFACE FINISH

1. The CTB surface shall parallel the cross section and grade of the finished surface within 0.04-foot and, when tested with a 12-foot straight edge, shall not vary from the testing edge by more than 0.04-foot at any point.

2. When Portland Cement Concrete (PCC) pavement is to be placed on the CTB, the surface of the CTB at any point shall not extend above the grade established by the City Engineer. The specified finish shall be attained by the following method:

   a. After compaction of the final lift, the surface of the CTB shall be brought within the specified tolerances by trimming with a subgrade planner, by motor grader equipped with an electronically controlled blade, or by grinding. Areas on which trimming or grinding is performed shall be rolled until a smooth surface is attained.

3. The excess material may be used at other locations in the work area provided said excess material complies with applicable specification requirements.

304.03.J BITUMINOUS CURING SEAL

1. As soon as possible after each layer of the CTB is constructed as hereinbefore specified and while it is still moist, the surface and exposed edges shall be covered with a bituminous curing seal. The liquefied asphalt (curing seal) shall be applied by a pressure spray method at a uniform rate (a rate necessary to provide a continuous unbroken curing membrane) between .25 gallon and .35 gallon per square yard.

2. After the curing seal has been applied it shall cure for a period of 4-days and, during this period, no vehicle shall be permitted to use the section.

3. The curing seal on any lift of CTB may be omitted if, within two (2) hours after the start of mixing of the preceding lift of CTB, a succeeding lift of material (CTB, bituminous base, or asphalt concrete) is placed over the preceding lift. Vibratory rollers will not be permitted in the compaction of any succeeding lift of CTB, bituminous base, or asphalt concrete during the period of time from two (2) hours to ninety-six (96) hours after the mixing of any of the underlying lifts of CTB.

4. CTB that is damaged during the curing period shall be removed and reconstructed and the curing seal replaced, all at the contractor's expense.

304.03.K CARE OF WORK

1. During the construction of the CTB, the Contractor shall exercise care to protect the work from damage. Following construction of each strip and each layer of the base and following construction of the entire course of the CTB, the Contractor shall perform such work as specified and as the City Engineer may determine to be necessary to prevent raveling and rutting, to prevent segregation of materials, and to maintain the layer or course of the CTB to the specified compaction and surface finish all until the strip, layer, or course is covered by a following layer or course of material as specified or until all work under the Contract Documents is completed.

304.03.L MODIFICATION OF EQUIPMENT AND METHODS

1. On tapers and other areas of irregular shape, limited length, restrictive width, or other conditions where the City Engineer determines that full compliance with the above equipment and construction requirements is not practicable, the specified equipment and construction requirements may be modified subject to approval by the City Engineer.

304.03.M TIMING OF OPERATIONS, ADEQUACY OF ORGANIZATION, AND REJECTION OF MIXTURE

1. All operations involved in constructing the CTB shall be so timed and coordinated that, regardless of daily or seasonal variations in weather, temperature, or humidity, such work shall result in a finished CTB conforming in all respects to specified requirements.

2. In this respect, the Contractor shall provide and have readily available at all times adequate equipment, tools, material, and labor, and shall achieve the hauling, spreading, compacting, and trimming of the CTB mixture within two (2) hours after mixing.

3. Any CTB mixture not placed and trimmed within this 2-hour period shall be subject to rejection, wasting, removal, and replacement as the City Engineer determines to be applicable, and all costs involved in such removal, wasting, and replacement shall be borne by the Contractor.

304.03.N HANDLING TRAFFIC OVER CEMENT-TREATED BASE

1. At locations where traffic must be routed over the CTB, the CTB mixture shall be made with Type III or Type IIIA (high-early strength) cement to expedite development of strength at an early date. Any extra costs of using high-early strength cement shall be considered as incidental with payment, therefore, covered in the pay item "Portland Cement in CTB mixture."

2. If the City Engineer so directs, traffic over recently constructed CTB shall be controlled as to speed and routing.

304.03.O TESTING

1. MATERIALS AND MIXTURE

   a. Aggregate and cement will be subject to acceptance as specified under Section 208. Plant mixed mixtures will be subject to final acceptance after blending and mixing either at the plant or place of delivery. Acceptance will be based on periodic sample taking.

b. When specified, the Contractor shall furnish certified laboratory tests that show results of the tests at no expense to the City. The City Engineer may do sampling and/or testing of the materials at the sole expense of the Contractor. If evidence of non-compliance with the requirements exists, additional tests may be required to assure that the materials meet the requirements as specified

2. IN-PLACE SAMPLE

a. The City Engineer shall be permitted to cut samples or take cores, or to require the Contractor to cut samples or take cores, from the full depth of the compacted mixture or from the separate layers and courses thereof for testing purposes and at such locations and at such frequencies as the City Engineer determines necessary for proper representation. Sampling shall be at the expense of the Contractor. Where samples have been taken and where the samples show deficiencies according to these specifications, the Contractor shall repair the cuts or cores with like material and shall make repairs to the pavement as directed by the City Engineer at no expense to the City.

304.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

304.04.A CEMENT TREATED BASE

1. Measurement and payment for CTB will be made on a square-yard, in-place basis. The quantity measured for payment will include only that material placed within the limits defined in the Contract Documents.

2. Measurement will be based on the surface length and width up to the specified length and width of the CTB measured to the nearest 0.1-foot and the area measured to the nearest square yard.

3. Payment for this item will constitute full compensation for materials, labor, and equipment necessary to prepare the subgrade, furnish CTB mixture at the site, place and compact the mixture, and to furnish and apply a bituminous curing seal in conformance with the Contract Documents.

4. CTB placed under curbs, gutters, and combination curb and gutter will not be included in this pay item.

304.04.B INCIDENTALS

1. Other materials, labor, and equipment required to complete the cement treated base work in conformance with the Contract Documents and not listed as separate pay items in the Contract Documents will be considered incidental to other items of work and no separate payment will be made.

305 ASPHALT CONCRETE PAVEMENT

305.01 DESCRIPTION

305.01.A This section covers work necessary for the construction of hot mix asphalt pavements on prepared aggregate base. Hot mix asphalt concrete is defined as a mixture of asphalt cement, high quality aggregate well graded, mineral filler and additives as required, heated and plant mixed into a uniformly coated mass; hot laid on a prepared aggregate base and compacted to specified density.

305.02 MATERIALS

305.02.A GENERAL

1. Asphalt and aggregate shall meet the current ODOT/APWA Oregon Standard Specification for Construction requirements for dense-graded asphalt concrete pavement and will be subject to approval preceding mixing. Plant mixed mixtures will be subject to final approval after blending and mixing, either at the plant or at the place of delivery, prior to rolling. Approval will be based on periodic sampling and testing of the materials

305.02.B ASPHALT CEMENT

1. Asphalt materials incorporated in the mix shall be performance graded (PG) 64-22 or PG 70-22 that conforms to the requirements of Subsection 208.02.K.

305.02.C AGGREGATES

1. Aggregates shall conform to requirements of Section 208.

305.02.D MINERAL FILLER

1. Mineral filler shall conform to the requirements of AASHTO M-17.

2. Collector dust may be used as mineral filler, in whole or in part, provided the dust or the resultant mineral filler mixture conforms to the above requirements.

305.02.E ADDITIVES

Additives may be used to prevent stripping or separation of asphalt coatings from aggregates, and admixtures may be used to aid in the mixing or use of asphalt mixes. Use admixtures and additives of standard, recognized products of known value for the intended purpose, and obtain approval on the basis of laboratory tests prior to their use. They shall have no deleterious effect on the bituminous material. Silicones shall not be used as an additive.

305.02.F COMPOSITION AND PROPORTION OF MIXTURES

1. The class of asphalt concrete to be used shall be as shown and shall conform to the following requirements. Table ranges are inclusive of tolerances.

Sieve Size Passing	DENSE-GRADED		
	Percentage (%) of Total Aggregate (by weight)		
	3/4" Dense "Class B"	1/2" Dense "Class C"	3/8" Dense "Class D"
1"	100	-	-
3/4"	90 – 100	100	-
1/2"	0 – 90	90 – 100	100
3/8"	-	0 – 90	90 – 100
#4	-	-	0 – 90
#8	23 – 49	28 – 58	32 – 67
#200	2.0 – 8.0	2.0 – 10.0	2.0 – 10.0
Asphalt Cement*	4 – 8	3 – 8	4 - 8
*Percent (%) of total mix (by weight)			

2. Asphalt cement to be added to the recycled mixture will vary from 3 percent to 8 percent.

3. Class "B", "C", and "D" asphalt concrete shall meet the following qualifying test requirements:

TEST		TEST METHOD		REQUIREMENTS
Stability, first compaction		ODOT standard test*		35 min. (residential streets)
				40 min. (arterial streets)
Voids, first compaction		ODOT standard test*		7% max.
Voids, second compaction		ODOT standard test*		1% min.
Retained strength		AASHTO T-165 Modified		70% min.
*Available from ODOT's Pavement Services Engineer in Salem, Oregon				

305.02.G JOB-MIX FORMULAS

1. The Contractor may be required to submit a job-mix formula for review by the City Engineer.

2. Job-mix formulas shall meet the requirements of ODOT Level 2 mix, except that on arterials and collectors the City Engineer may require that a formula meeting ODOT Level 3 mix be used.

	LEVEL 2	LEVEL 3
Design Method	Superpave	Superpave
Compaction Level	65 Gyration	80 Gyration
Air Voids, percent (%)	4.0	4.0
VMA, percent (%) minimum	3/4 - 13.0	3/4 - 13.0
	1/2 - 14.0	1/2 - 14.0
	3/8 – 15.0	3/8 – 15.0
VMA, percent (%) maximum	Min + 2.0%	Min + 2.0%
P #200/Eff AC ratio	0.8 to 1.6	0.8 to 1.6
TSR, percent (%) minimum	80	80
VFA, percent (%)	65 - 78	65 - 75
	3/8-inch: 70-80	3/8-inch: 70-80

3. The job-mix formula shall indicate the gradation of each of the several aggregate constituents to be used in the mixture and shall establish the exact proportion of each constituent to be used to a combined gradation of aggregate within the appropriate limits stated above.

4. The job-mix formula shall also indicate: ASTM bulk specific gravity of each aggregate constituent; the measured maximum specific gravity of the mix at the optimum asphalt content determined in accordance with ASTM D-2041; all properties as stated in Subsection 305.02.F of these specifications for at least four (4) different asphalt contents other than optimum, two (2) of which will be below optimum and two (2) of which will be above optimum; the percent of asphalt lost due to absorption by the aggregate; and any other information pertinent to the design of the mix.

305.02.H RECYCLED ASPHALT PAVEMENT (RAP) MATERIALS PERMITTED

1. Where approved by the City Engineer, the Contractor shall have the option of using processed recycled asphalt pavement materials in the production of new asphalt concrete pavement.

2. The RAP materials proposed for use in the recycled mix shall contain hard, sound, and durable aggregates and asphalt of a composition to provide properties equivalent to asphalt as specified in these specifications when in the mix. Recycled material that is used in the asphalt concrete pavement shall be no larger than the specified maximum allowable aggregate size prior to entering the cold feed. If there is evidence of the recycled material not breaking down during the heating and mixing of the asphalt concrete mixture, the City Engineer may elect to modify the maximum size requirement.

3. Not more than 20 percent by weight of recycled materials may be used in the mix.

305.02.I TOLERANCES

1. After the mix formula is submitted, the several constituents shall meet the following tolerances, but always within the range of proportions specified in Subsection 305.02.F:

Asphalt Concrete Mix Tolerances Tolerance (+/- to job mix formula)	
	Specifications
Aggregate passing 1", 3/4", 1/2" sieves	within range of the proportions specified in Subsection 305.02.F
Aggregate passing No. 4 sieve	5%
Aggregate passing No. 8 & No. 30 sieve	4%
Aggregate passing No. 200 sieve	2.0%
Asphalt cement	0.5%
Temperature of mixture at time it is placed in final position	240 – 300° F

2. Each day the City Engineer shall be permitted to take as many samples as considered necessary for checking the uniformity of the mixture. When unsatisfactory results or other conditions make it necessary, the City Engineer may require a new mix formula.

3. Should a change in source of material be made, or should conditions arise that the City Engineer determines to be justified, the Contractor shall establish a new job-mix formula.

4. The materials to be used in the work shall be of such nature that a mixture of them, proportioned in accordance with the mix formula, will have a retained strength of no less than 70 percent when tested in accordance with AASHTO T-165 as modified by ODOT test methods. The City Engineer shall be permitted to take as many samples as he considers necessary for checking the uniformity of the mixture.

305.02.J FEATHERING

1. Wedge cutting or bench grinding shall be used when connecting all classifications of street pavements. Feathering will not be allowed, unless specifically approved by the City Engineer.

2. Where approved by the City Engineer, asphalt concrete for use in feathering at curb or gutter lines, in spot patching, and under similar conditions shall be a fine mix of asphalt concrete, Class "D", 3/8-inch mix.

305.02.K PAVEMENT MARKINGS AND MARKERS

1. PAVEMENT MARKINGS

   a. Pavement markings shall consist of a hi-performance, instant dry acrylic latex traffic paint and shall conform to Section 00861 of the ODOT's Oregon Standard Specifications for Construction. Pavement markings shall be as shown on the Plans, in accordance with the Standard Specifications, and as directed by the City Engineer.

2. RAISED, REFLECTORIZED PAVEMENT MARKERS

   a. Where required, raised, reflectorized pavement markers and adhesive shall conform to applicable requirements of Section 00860 of the ODOT/APWA Oregon Standard Specifications for Construction. Raised reflectorized pavement markers shall be placed as shown on the Plans and as directed by the City Engineer.

305.03 CONSTRUCTION

305.03.A PRE-PAVING CONFERENCE

1. The Contractor and his supervisory personnel, plus any subcontractors and their supervisory personnel, who are to be involved in the paving work shall meet with the City Engineer and his representatives for a pre-paving conference at a time mutually agreed upon. At this conference, the Contractor shall discuss his methods of accomplishing all phases of the paving work. The plan of the work, order of paving, and other details of performance shall meet with the approval of the City Engineer.

305.03.B PREPARATION OF BASES

1. Pavement bases constructed under these Contract Documents shall be completed and finished as prescribed under the applicable specification for its construction.

2. Manholes, inlets, water valve boxes, and other such structures shall have been completed, cured, and otherwise prepared as applicable and made clean and ready for asphalt pavement. Unless otherwise approved, manholes shall be adjusted to designed finish grade prior to paving. If otherwise approved, manholes shall be adjusted to finished grade after paving according to the Standard Drawings. Cover top surfaces with paper or other material to prevent adherence of asphalt pavement or tack coat.

3. Paint vertical surfaces that will come in contact with asphalt pavement with tack coat material to provide a good bond and seal in accordance with Section 305.03.D.

305.03.C RECONDITIONING EXISTING AGGREGATE BASE

1. This work consists of reconditioning and preparing previously constructed roadbed subgrades, existing stone bases and surfacings, and existing pavements; none of which were constructed by the Contractor under the pertinent Contract, but on which an additional layer or course of material is to be placed.

2. Existing aggregate subbases, bases, and surfacings shall be bladed, scarified, leveled, and compacted in conformance to lines, grades, and cross sections as established and the density and tolerance requirements of Section 303.

3. The Contractor shall not recondition existing aggregate bases or make use of existing aggregate base material unless such work is authorized by the Contract Documents or approved by the City Engineer.

4. Pre-level uneven or broken asphalt, cement concrete, or brick surfaces with asphaltic concrete as specified. Spread and compact pre-leveling asphaltic concrete to the density and surface condition as directed.

305.03.D TACK COAT

1. Asphalt shall consist of emulsified asphalts (CSS-1 or CSS-1h) or an approved equal.

2. Spread asphalt by means of pressure-spray equipment that will provide uniformity of application at prescribed rates. Do not apply aggregate cover material to the tack coat. Asphalt shall be applied to the prepared surface at a residual rate of 0.08 to 0.15 gallons per square yard. The tack coat shall not be applied during wet (or when the temperature is below 40° F) or during darkness; apply only so far in advance as is appropriate to maintain a tacky, sticky condition of the asphalt. Apply tack coat in such a manner as to offer the least interference to traffic and to permit at least one-way traffic without pickup or tracking of asphalt.

3. Tack coat shall be applied to the previous lift of asphalt when more than four (4) hours have elapsed before the time of placing the subsequent lift.

4. Tack coat shall be applied to all edges of existing pavement, gutter face, manhole castings, inlet boxes, and like items prior to placement of the first lift of asphalt. Surfaces that are to receive a tack coat shall be thoroughly cleaned of dust, dirt, and loose debris. Tack shall be applied in a manner that ensures complete, uniform coverage of all surfaces. Tack coat on vertical surfaces shall not extend more than 3/4-inches above finish asphalt pavement finish grade. Excess tack coat above this limit shall be thoroughly removed at Contractor's expense.

305.03.E MIXING

1. Mix the asphalt concrete by combining aggregate, asphalt, and additives at an approved central mixing plant equipped with controls to accurately measure and monitor the various components of the mix to produce a uniform, homogeneous mixture at the specified temperature.

2. The discharge temperature of the mix will vary with the type of mixing plant, climatic conditions, and other variables. However, the temperature shall be sufficient to provide thorough mixing and coating and to provide a mass viscosity of the mix on the grade that will permit compaction to required density. Mix temperatures and asphalt in storage shall generally not exceed 325º F.

305.03.F PLACING

1. Conform to the Contract Documents for order of paving, lift thickness, and other requirements of performance as approved.

2. Transport the asphalt concrete mixture from the mixing plant to the point of use in trucks. Send no loads so late in the day as to prevent the spreading and compacting of the mixture during daylight, unless approved lighting is provided.

3. Bituminous paving machines shall be capable of spreading and finishing layers of bituminous mix material in lane widths to the thicknesses, lines, grades, and cross sections specified in the Contract Documents. The paving machine shall be operated at a speed that provides for uniform spreading and finishing of the mix.

4. When the capacity of the paver to properly spread and finish exceeds the rate of delivery of mixture, operate the paver at a reduced and uniform speed to give continuous spreading and finishing.

5. Take care at all times to prevent segregation in the mixture as evidenced by areas of fine and coarse materials, and correct any such segregation with fresh mixture either spread and worked into the surface or by complete removal and replacement of segregated mixture as deemed appropriate by the City Engineer. This work shall be done at no expense to the City. At no time shall the course aggregate segregated from the mix from hand spreading or raking of joints be scattered across the paved mat. Such material shall be collected and disposed of.

6. On areas to be patched with asphalt concrete mixture and on areas of irregular shape or limited size, the spreading and finishing requirements may be modified as approved by the City Engineer.

7. Boils and slicks occurring in the pavement must be immediately removed and replaced with suitable materials at the sole expense of the Contractor.

8. The Contractor shall not allow motor vehicle traffic, including dump trucks and other construction equipment, to travel over any lift of asphalt pavement until the mixture has been compacted and has cooled sufficiently to preclude tracking or displacement of the mixture.

9. Paving operations shall progress continuously. Should operations be stopped for a length of time sufficient for un-compacted mixture to harden, the Contractor shall remove such mixture to the extent necessary to construct a transverse construction joint at the end of the work as specified herein.

10. TEMPERATURE OF MIX

    a. The temperature of Class “C” mix asphalt at the time it is spread into final position shall be between 240° F and 325° F. The temperature of Class “D” mix at the time of placing shall be between 200° F and 250° F.

    b. If the temperature of any quantity of asphalt mixture is allowed to fall below 240° F, or 200°F for Class “D” mix, the mixture shall be removed from the job site.

11. During paving operations, compaction equipment shall be operated in a manner that will remove all roller marks and produce a smooth, uniform surface. Any displacement of the mixture occurring as a result of the reversing of the direction of a roller, or from any other cause, shall be corrected immediately.

305.03.G PROTECTION OF STRUCTURES

1. Protection of structures must conform to Subsection 212.03.E.6.

305.03.H PAVING PLANT EQUIPMENT

1. All plant and equipment used by the Contractor in the preparation and mixing of asphalt concrete shall conform to the requirements of the latest edition of ODOT/APWA Oregon Standard Specifications for Construction.

305.03.I WEIGH SCALES

1. When materials are to be measured for payment by weighing on vehicle scales, the Contractor shall provide the scales and transport the materials to the scales provided.

2. The vehicle scales furnished shall be accurate within the tolerances required by state law and shall be licensed with the Oregon Department of Agriculture. Scales shall be suitable for the weighing to be done and shall be properly installed, maintained, and tested.

3. At each end of the vehicle scale there shall be a straight approach in the same plane as the platform. The approaches shall be of sufficient length and width to ensure the level positioning of combination vehicles longer than the scale platform during weight determinations. All vehicle brakes shall be released while combination vehicle are being weighed.

4. Vehicle scales shall be inspected and the accuracy tested every six (6) months by either the State Department of Agriculture or a scale service company. Scales installed at a new site shall be inspected and the Construction Standard Specifications accuracy tested before use. Testing by a scale service company shall be done by using a minimum of 10,000 pounds of test weights certified by the State Department of Agriculture.

305.03.J HAULING EQUIPMENT

1. Vehicles used for hauling asphalt concrete mixtures shall have tight, clean, and smooth beds that have been thinly coated with a minimum amount of paraffin oil, lime solution, soapy water or other approved release agent to prevent the mixture from adhering to the beds.

2. During each application of an approved coating material and prior to loading, the vehicle bed shall be drained of all excess coating material by raising the truck bed, opening belly dump gates, or operating the conveyer belt as appropriate for the type of equipment being used.

3. Vehicles that cause excessive segregation, that leak badly, or that delay normal operations as such are determined by the City Engineer, shall not be used.

4. Contractor's hauling vehicles shall be constructed and equipped with covers to protect against moisture and against heat loss, and shall have a 3/8-inch diameter hole near the middle of the left sidewall of the bed to allow access for a thermometer.

305.03.K ASPHALT CONCRETE PAVERS

1. Pavers shall be self-contained, power-propelled units provided with an activated screed or strike-off assembly, heated if necessary, and capable of spreading and finishing layers of asphalt concrete material in lane widths applicable to the specified typical sections and to required thicknesses, lines, grades and cross sections.

2. Extensions added to the paver when used on travel lanes shall have the same auguring and screeding equipment as the rest of the paver.

3. The paver shall be equipped with a receiving and distribution system of sufficient capacity for a uniform spreading operation, and be capable of placing the mixture uniformly in front of the screed without segregation of materials.

4. The paver shall be designed to compensate for minor irregularities of the base on which it is supported so that such will not be reflected immediately in the surface of the layer being placed. The weight of the paver shall be supported on tracks or wheels, none of which shall contact the mixture being laid. The contact area of the screed or strike-off assembly shall be uniform over the entire width of the strip of mixture being placed.

5. The screed or strike-off assembly shall produce a finished surface of the required evenness and texture without tearing, shoving, or gouging the mixture. The paver shall be equipped with either a manual or electronic line and grade control.

305.03.L WEATHER LIMITATIONS

1. Asphalt concrete mixtures shall be placed on dry prepared surfaces when the air temperature in the shade and the surface temperature is not less than those specified in the following table:

SURFACE TEMPERATURE LIMITATIONS		
Compacted Thickness of Individual Courses	Travel Lanes/Wearing Course	All Other Courses
Less than 1 1/2 inches	60º F	55º F
1 1/2 inches to 2 1/2 inches	50º F	45º F
Over 2 1/2 inches and other	40º F	35º F

2. Placing of any mixture during rain or other adverse weather conditions normally will not be permitted except that mix in transit at the time these adverse conditions occur may be laid if of proper temperature, if the mix has been covered during transit, if placed on a foundation free of pools or flow of water, and if all other requirements of these specifications are met. Asphalt concrete mixtures shall not be placed when the underlying layer is frozen or when, in the opinion of the City Engineer, weather conditions either existing or expected will prevent the proper handling, finishing, or compaction of the mixtures.

3. Operations associated with the construction of the pavement shall be so coordinated that regardless of daily or seasonal variations in weather, temperature, and humidity such work shall result in a completed pavement that conforms in every respect to specified requirements.

4. Asphalt pavement shall not be constructed when the atmospheric temperature is lower than 40°F in the shade, during rainfall, or when the surface upon which the paving material is to be placed is frozen or damp unless precautionary measures have been taken and are approved by the City Engineer.

5. Class “D” asphalt wearing surfaces shall be placed when the existing pavement temperature is 60° F or higher. The contractor shall be solely responsible for any damage that occurs to the subgrade, aggregate base, asphalt mixture, or the completed pavement that is a result of the Contractor's operations. Subgrade, aggregate base, asphalt mixture, or the completed pavement so damaged shall be restored, removed, or reconstructed as determined to be applicable by the City Engineer, at the Contractor's expense.

305.03.M COMPACTORS

1. Rollers shall be steel wheel, vibratory, or a combination of these types as the Contractor may elect. They shall be in good condition and capable of reversing without backlash. Roller wheels shall be moistened with water or other approved material as necessary to prevent pickup of the mixture by the roller.

2. STEEL WHEEL ROLLERS

   a. Steel wheel rollers shall have a minimum gross static weight of eight (8) tons and a minimum static weight on the drive wheel of two-hundred and fifty (250) pounds per inch of width. For finish rolling a 6-ton minimum gross static weight is acceptable and the two-hundred and fifty (250) pounds per inch of width will not be required.

3. VIBRATORY ROLLERS

   a. Vibratory rollers shall be equipped with amplitude and frequency controls and shall be specifically designed for compaction of asphalt concrete mixtures. The rollers shall be capable of frequencies of not less than two-thousand (2,000) vibrations per minute and a static weight of eight (8) tons.

305.03.N COMPACTION AND DENSITY REQUIREMENTS

1. Compaction equipment shall be operated in accordance with the roller manufacturer's instructions and recommendations and shall be maintained in such condition that it will deliver the manufacturer's rated compaction effort. The Contractor will not be permitted to use any equipment that crushes the aggregate to any extent. However, the Contractor will be required to obtain the densities required.

2. The density of asphaltic concrete shall be at least 91 percent of Rice theoretical maximum density as determined in conformance with AASHTO T-209.

3. Asphaltic concrete pavements that do not meet the requirements for compaction but are deemed by the City Engineer to be suitable for use, may be left in place if the Contractor so elects. A price reduction for such materials will be determined in accordance with Section 305.04.

4. Asphaltic concrete pavements that do not meet the requirements for compaction and are deemed by the City Engineer to be not suitable for use will be rejected and removed at no cost to the City. Any asphalt concrete pavement with a density less than 89 percent will not be considered suitable.

5. Samples and tests will be taken as frequently and at such locations as the City Engineer elects, and the results will be made known to the Contractor as soon as practical. However, it shall be the responsibility of the Contractor to obtain specified density at all times and delay in advising the Contractor of test results shall not act as a waiver of this responsibility. When it is determined that specified density is not being obtained, discontinue all paving operations until corrective measures have been taken.

6. Any displacement occurring as a result of the reversing of the direction of a roller or from other causes shall be corrected at once by the use of rakes and addition to fresh mixture when required. Do not displace the line and grade of edges. Moisten steel roller wheels with water or other approved material to the least extent necessary to prevent pickup of mixture and yet not cause spotting or defacement of the surface of the mixture.

7. Along curbs and walls, on walks, irregular areas, and other areas not practicably accessible to specified rollers, compact the mixture with small rollers, mechanical tampers, hot hand tampers, or smoothing irons. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed area. Top lift of AC shall be a minimum of 1.5-feet in width, mechanically compacted such that no bridging of work area by compacting equipment occurs.

8. Remove and replace any mixture that becomes loose and broken, mixed with dirt, or is defective in any way. Remove and replace any area showing an excess or deficiency of bituminous cement. Removal and replacement under these provisions shall be at the sole expense of the Contractor.

305.03.O TRANSVERSE AND LONGITUDINAL JOINTS

1. The configuration, location, and other details relating to the construction of transverse and longitudinal joints require the approval of the City Engineer.

2. The Contractor shall schedule and conduct paving operations in a manner that limits the number of transverse and longitudinal joints to a practical minimum.

3. Longitudinal cold joints are not permitted. For the purpose of this requirement, a cold joint is defined as one found between compacted mixture that has cooled overnight or longer and mixture that is placed at the resumption of the paving operation.

4. The contractor shall divide paving projects into full-width sections of a length that will allow for the entire width and length of a section to be paved on the same day.

5. TRANSVERSE JOINTS

   a. Form transverse joints by cutting back on the previous run to expose the full depth of the layer or course.

   b. Place a course or strip of asphalt concrete as nearly continuous as practicable. Carefully construct transverse joints using vertical faces and thoroughly compacted to provide a smooth riding surface. Apply a coat of bituminous material to contact surfaces just before mixture is placed against previously rolled mixture. The Contractor shall use a 12-foot straight edge to determine the location of the full depth vertical faces.

   c. At bridge ends or at joints with other rigid type structures, existing bases shall be conditioned and compacted and place asphalt concrete to extra thickness and compact in transverse direction as well as longitudinally.

   d. When the end of a course or strip of asphalt concrete is to be temporarily subject to traffic, the end shall be left on a bevel of approximately 20:1 (horizontal to vertical) being later cut back to a vertical edge.

6. LONGITUDINAL JOINTS

   a. Before any paving is started the Contractor shall submit to the City Engineer for review a drawing indicating locations of longitudinal joints.

b. Placing of a course or strip of asphalt concrete shall be as nearly continuous as practicable. Transverse joints shall be carefully constructed and thoroughly compacted to provide a smooth riding surface.

c. The mixture shall be laid in strips of such widths as to hold to a practical minimum the number of longitudinal joints required. Longitudinal joints in the wearing course shall not occur within the area or width of a traffic lane or auxiliary lane. On median lanes and on shoulder areas such joints shall occur only at points of change in the transverse slopes as shown on the plans or designated by the City Engineer. The longitudinal joints in one layer shall offset those in the layer immediately below by a minimum of 6-inches. Underlying longitudinal joints shall be within 12-inches of the edge of a lane or within 12-inches of the center of a lane, except in irregular areas or if otherwise shown on the plans. Joints shall not be located in wheel paths.

d. When the end of a course or strip of asphalt concrete is to be temporarily subjected to traffic, the end shall be on a bevel of approximately 20:1 (horizontal to vertical). Install paper joint, grind, or cut back to a vertical edge to provide a fresh surface against which subsequently placed asphalt concrete is to abut.

e. When placing of asphalt concrete pavement in layers in excess of 2-inch nominal thickness is being performed under traffic, work shall be scheduled in a manner such that at the end of each working day the full width of the area to be paved shall be completed to the same elevation with no longitudinal drop-offs within this width.

f. When placing of asphalt concrete pavement in layers of 2-inches or less in thickness is being performed under traffic, work shall be scheduled in a manner such that at the end of each working shift one strip of new travel lane pavement shall not extend ahead of the adjoining strip of travel lane pavement more than the distance normally covered by each shift.

g. Where abrupt or sloped drop-offs occur at the edge of the paved surface, the Contractor shall construct and maintain a wedge of asphalt concrete at a Slope 10:1 or flatter along the exposed joint.

305.03.P CRACK SEALING

1. Crack sealing shall conform to Section 00746 of the ODOT/APWA Oregon Standard Specifications for Construction.

305.03.Q THICKNESS AND NUMBER OF LAYERS

1. Asphalt concrete shall be placed in the number of courses and to the total compacted thickness per course called for by the typical cross sections given on the plans or the minimum section shown in the standard details, whichever is greater.

2. In case the course of pavement involves the placing of a layer of variable thickness as for leveling existing irregular surfacings, the course may include or consist of a layer of asphalt concrete of variable compacted thickness, the thickness of which layer shall not exceed the following:

Type of Mix	COMPACTED THICKNESS LAYERS	
	Minimum	Maximum
3/4-inch, Class "B"	2 1/2-inches	3- inches
1/2-inch, Class "C"	1 1/2-inches	3-inches
3/8-inch, Class "D"	1-inch	2-inches

3. The top surface of each layer of asphalt concrete shall be spread at grade and cross section closely paralleling the specified top surface of the finished pavement.

305.03.R PAVEMENT SAMPLES

1. The Contractor shall collect samples of asphalt mixture, and component parts thereof, for testing and conduct subsequent analysis of the samples, as required by the Contract Documents.

2. The asphalt mixture, and component parts thereof, shall be subject to testing at the time of delivery to the job site and during placing and compaction operations to ensure compliance with the mix formula and other requirements specified herein.

3. The City Engineer shall be permitted to cut samples or to take cores from the full depth of compacted mixture or from the separate layers and courses thereof for testing purposes, and at such locations and at such frequencies as the City Engineer determines necessary for proper representation. Where samples have been taken and when directed by the City Engineer, the Contractor shall furnish new like material for filling the holes at no cost to the City.

305.03.S PAVEMENT SMOOTHNESS

1. The finished surface of each course or layer of asphalt shall be of uniform texture, smooth, free of all defects, and shall parallel the line and grade specified for the top surface of the finished pavement. The finished surface of the pavement shall provide for positive drainage and shall not impound water to any extent.

2. The surface of each layer shall be tested for trueness to specified line, grade, and transverse slope at selected locations with a 12-foot straightedge. Any variations of the pavement surface from the testing edge of the straightedge between any two contact points with the pavement surface shall at no point exceed 0.02 of a foot on the underlying courses or the top course or wearing surface of the pavement.

3. When tests show the pavement is not within the above tolerances, the Contractor shall take immediate action to correct equipment or procedures in the paving operation. Corrective measures shall consist of removing and replacing the surface course by the Contractor in the deficient areas as determined by the City Engineer.

4. When utility appurtenances such as manhole covers and valve boxes are located in the travels way and they are not required to be adjusted or are required to be adjusted before paving, these tolerances will not apply at the utility appurtenance.

5. Unless otherwise directed, all corrective work shall be completed within ten (10) working days following notification from the City Engineer that the pavement does not meet the specified tolerances will not apply at the utility appurtenance.

6. All corrective work, including furnishing of materials, shall be performed at no expense to the City. No adjustment in contract time will be made for corrective action work.

305.03.T PAVEMENT MARKINGS AND MARKERS

1. PAVEMENT MARKINGS

   a. Pavement markings shall be installed in accordance with Section 00861 of the ODOT/APWA Oregon Standard Specifications for Construction, the Manual on Uniform Traffic Control Devices, and manufacturer's recommendations

2. RAISED, REFLECTORIZED PAVEMENT MARKERS

   a. Where required, raised, reflectorized pavement markers and adhesive shall be installed in accordance with Section 00860 of the ODOT/APWA Oregon Standard Specifications for Construction, the Manual on Uniform Traffic Control Devices, and manufacturer's recommendations

   b. Unless directed otherwise, pavement markers shall be ground in flush with the pavement surface.

305.03.U SPECIAL PROTECTION UNDER TRAFFIC

1. In addition to other required provisions for traffic, the following shall apply to pavement construction: No traffic or equipment shall come in contact with the compacted mixture until it has cooled and set sufficiently to prevent marking; edges shall be protected from being broken down; and edge drop-offs one or more inches in height shall be marked with warning devices visible by day and night to the traveling public and placed at spacings indicated on the Plans or as directed by the City Engineer.

305.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

305.04.A ASPHALT CONCRETE PAVEMENT

1. GENERAL

   a. Measurement and payment for asphalt concrete pavement will be made on a ton or square-yard, in-place basis. The quantity measured for payment will include only that material placed within the limits defined in the Contract Documents.

b. Payment for this item will constitute full compensation for materials, labor, and equipment necessary to prepare the subgrade and aggregate base, furnish asphalt concrete mixture at the site, and to place and compact the mixture in conformance with the Contract Documents.

c. No additional payment over the Contract Documents unit price will be made for pavement having a thickness greater than shown or directed. When the pavement is found deficient in thickness by more than 0.2-inch but not more than 1/2-inch as determined by test cores of reasonable test samplings, payment for pavement will be made adjusting the unit price downward 4 percent for each tenth of an inch below the specified depth. Pavement found deficient in thickness by over 1/2-inch will not be accepted or paid for. If paid by on a ton basis, excess tonnage shall be subtracted.

d. Pay quantities for hot mix asphalt concrete and other asphalt construction under this section will be measured by one of the methods as set forth hereinafter.

2. ASPHALT CONCRETE ON TON BASIS

a. When pay items in the Contract Documents so indicate, the quantity of asphalt concrete used in the accepted work as specified will be measured on a ton basis. There will be no separate measurement of bituminous cement or additives contained in the mixture or used otherwise in the work. Measurement will be made on the number of tons of asphalt concrete required to complete the work in conformance with the contract documents, as weighed on approved and tested scales. Give trip tickets to the City Engineer for his signature as the material is delivered. Each trip ticket shall show date and time of delivery, truck number, driver's name, and net weight of material, and the City's project number and will be considered as valid delivery receipts only when signed by the City Engineer. No material will be accepted or paid for without a trip ticket being available at the time of delivery.

b. Asphalt mixture and the hauling vehicles shall be weighed on scales that are licensed for commercial use by the Weights and Measures Division of the Oregon State Department of Agriculture or by the Oregon Department of Transportation.

3. ASPHALT CONCRETE ON SQUARE YARD BASIS

a. When the pay items in the Contract Documents so indicate, asphalt concrete complete in-place as specified and accepted will be measured on a square yard basis. Measurement will be made of width and length of each separately constructed strip of pavement wherein width is the design width or edge-to-edge width of pavement, whichever is the lesser, and length is from end to end of the pavement along the center of the strip. Measurement will be on the surface length and width of the asphalt pavement measured to the nearest 0.1-foot and the square yardage will be to the nearest full square yard.

b. The City Engineer may take core samples of the pavement or use other methods to determine the actual pavement thickness constructed. Extra thickness of pavement as shown or as directed will be measured by conversion on a proportionate volume basis to an equivalent number of square yards of specified standard thickness pavement.

4. COMPONENT TOLERANCE DEDUCTIONS

a. A deduction of 1 percent of the in-place price will be made for each 1 percent cumulative deviation from the allowable tolerance of each component of the job mix formula required by the specification, except as follows:

1) Deviations in asphalt cement shall be weighted 8-times; deviations in #200-minus material shall be weighted 2-times the deviation in other specified aggregate sieve sizes.

2) All materials furnished where the cumulative deviation equals or exceeds 12 percent shall be removed and replaced with acceptable material at the sole expense of the Contractor.

3) When asphalt paving materials with a cumulative deviation of less than 12 percent are furnished, the City shall notify the Contractor, in writing, to remove and replace defective materials at the sole expense of the Contractor or to pay to the City liquidated damages in accordance with the above deduction schedule.

5. COMPACTION REQUIREMENT DEDUCTIONS

a. Asphaltic concrete pavements that do not meet the requirements for compaction but are deemed by the City Engineer to be suitable for use, may be left in place if the Contractor so elects. A price reduction for such materials will be determined as follows:

1) The percentage below the required density will be squared and then rounded off to the nearest whole figure and a percentage deduction made to the in-place price will be made as shown in the table below. Any asphalt concrete pavement with a density less than 89 percent will not be considered suitable.

IN-PLACE ASPHALT PRICE REDUCTION SCHEDULE	
% Maximum Theoretical Density (Rice Method)	**% Pay***
91.0 and above	100
90.5 to 90.9	90
90.0 to 90.4	80
89.5 to 89.9	70
89.0 to 89.4	60
89 and below	0

* Applies to price for in-place asphalt concrete, including asphalt cement where measured and paid for separately.

305.04.B PAVEMENT MARKERS AND MARKINGS

1. Payment for these bid items will be on a lineal-foot-applied or per-each basis as indicated in the Contract Documents and will include all labor, equipment, materials, and incidentals required to complete the work.

305.04.C INCIDENTALS

1. Other materials, labor, and equipment required to complete the asphalt concrete pavement work in conformance with the Contract Documents and not listed as separate pay items in the Contract Documents will be considered incidental to other items of work and no separate payment will be made.

306 PORTLAND CEMENT CONCRETE PAVEMENT

306.01 DESCRIPTION

306.01.A This section covers work necessary for construction of Portland Cement Concrete pavements, with or without reinforcement, on a prepared subgrade or base course complete.

306.02 MATERIALS

306.02.A All material shall conform to requirements of Section 208.

306.03 CONSTRUCTION

306.03.A GENERAL

1. The plant, equipment, and tools required in the performance of the work must be of the design, capacity, and in condition to efficiently perform their respective functions of the work. Schedule and coordinate all operations involved in constructing the pavement so that regardless of the daily or seasonal variations in weather, temperature, and humidity under which the work is permitted to proceed, such work will result in a finished pavement conforming in all respects to specified requirements. Provide and have available at all times adequate equipment, tools, materials, and labor to achieve these results. Failure to so provide will be cause for discontinuance or rejection of the work as determined by the City Engineer. Conform to applicable requirements of concrete construction in Section 211.

306.03.B PREPARATION OF PAVEMENT BASE

1. Pavement bases shall be constructed in conformance with Section 303 and the applicable Standard Drawings.

2. Manholes, inlets, and other such structures shall have been completed, cured as applicable, and otherwise prepared for construction of the pavement.

3. Top surfaces of structures, such as manhole and valve box covers, shall be protected from the concrete.

4. Pavement bases that are damaged during the course of the work, regardless of cause, shall be repaired far enough in advance of the paver so as to cause the least disruption of the paving operation.

306.03.C RECONDITIONING EXISTING AGGREGATE BASE

1. Reconditioning of existing aggregate bases shall conform to provisions of Subsection 305.03.C.

306.03.D PREPARATION OF CONCRETE MIX

1. Before beginning any concrete work the Contractor shall have the concrete mix designed and submit the mix design for approval. The mix design shall be tested by a laboratory approved by the City Engineer and by preparing trial batches of which four (4) standard test cylinders shall be cast, cured, and tested as specified for the concrete. Certified copies of all laboratory reports stating whether or not the items reported meet specifications shall be sent directly to the City Engineer from the testing laboratory.

2. Portland Cement, fine aggregate, coarse aggregate (in required separated sizes), water, air-entraining agents, and other admixtures as required shall be used in the concrete in such proportions as may be determined to be necessary to produce a concrete of suitable workability, plasticity, and entrained-air content and of such strength as required. The proportions may be changed by the City Engineer during the progress of the work, but they shall at no time be such that test cylinders of the resultant concrete made in accordance with the applicable provisions of AASHTO T-23, will show compressive strengths of less than five-thousand (5,000) pounds per square inch or as specified in the Contract Documents at an age of twenty-eight (28) days, whichever is greater.

3. The 28-day strength test value shall be the average compressive strength of three (3) cylinders tested in accordance with AASHTO T-22. If the compressive strength of a single test specimen varies by more than 10 percent from the average of the other two (2) specimens taken during the same pour, that compressive strength value shall be disregarded and the average compressive strength test of the two (2) remaining specimens will be used. The 28-day strength test value shall not be less than the specified strength for the mix design.

4. Changes in proportions, and particularly in the proportion of cement, may be made not only for the purpose of causing the concrete to meet specified 28-day requirements, but also to produce concrete of high-early strength when concrete of that kind is required. The maximum amount of cement to be used shall be seven-hundred and fifty (750) pounds per cubic yard of concrete.

5. The proportions of water to be used shall be determined by the Design Engineer, it being the intent of the specification to have the water/cement ratio held as low as is consistent with the production of a workable, uniform, and dense concrete. The maximum water/cement ratio shall be six (6) gallons of water per ninety-four (94) pounds of cement.

6. Entrained air in the concrete shall be as directed by the Design Engineer and normally will be from 4 percent to 6 percent by volume. The entrained air shall be obtained by use of air-entraining cement, by air-entraining additives or admixtures, or by combinations thereof.

7. The Contractor shall provide and use approved means for adding controlled amounts of additives, admixtures, and retardants to the mix.

8. No change in the source or character of any material shall be made without due notice to the City Engineer. No material shall be used in the mix until the Design Engineer has approved such material and has designated the proportions of the materials in the mix based on the use of such approved materials.

306.03.E HAULING

Hauling of Portland Cement Concrete shall conform to the provisions of Subsection 211.03.C.

306.03.F FORMS

Conform to the applicable requirements of forms in Section 211.03.D.

306.03.G HANDLING AND PLACING

1. Conform to requirements for handling and placing in Section 211.03.H.

2. During the placing of concrete, make provisions for the construction of joints and the placing of dowels, tie bars, and other devices as shown.

306.03.H PREPARATION OF ROADWAY

1. Before beginning paving operations, the base constructed under the Contract Documents shall be in accordance with the applicable specification for its construction. Old base and foundations constructed under other contracts shall be brought, by the Contractor, to an acceptable condition as prescribed in these standards by the Contractor.

2. In addition to the base under the pavement, an area of sufficient width alongside the pavement base that will support the paving equipment shall be brought to proper grade and compacted so as to support the equipment at proper grade and cross section. The base for the pavement shall be maintained firm and true to established grade and cross section until the concrete is placed thereon.

3. Manholes, inlets, and other such structures shall have been completed, adjusted, cured, and otherwise prepared, as applicable, and made clean and ready to have concrete placed in contact therewith. Manhole frames and other independent metal structures in the pavement area shall be painted with suitable asphalt material.

4. The conditioned base shall be in a compacted and smooth condition when the concrete is placed thereon and shall be moist. Watering of the base shall be thorough and uniform.

306.03.I WEATHER LIMITATIONS

1. The Contractor shall conform to applicable provisions of Section 211.03.G and the following requirements relating to weather limitations.

2. Except with written permission from the City Engineer, construction of Portland Cement Concrete pavement shall not be in progress or continued when a descending air temperature in the shade and away from artificial heat reaches 35º F. Unless otherwise permitted, the temperature of the mix shall be not less than 50º F or more than 80º F at the time of placing. Material containing frost or lumps of hardened material shall not be used.

3. Concreting operations shall be discontinued if there is insufficient natural light, unless an adequate and approved artificial lighting system is provided and operated.

4. When concrete is being placed during cold weather and the air temperature may be expected to drop below 35° F, a sufficient supply of blankets as specified in Subsection 211.03.G.3 shall be provided along the work. Any time within seven (7) days of placing the concrete the air temperature may be expected to reach the freezing point during the day or night, the material so provided shall be placed over the pavement to prevent freezing of the concrete. Any concrete injured by frost action shall be removed and replaced at the Contractor's expense.

5. The Contractor shall have available at all times, materials for the protection of the edges and surface of the unhardened concrete from the effects of rain or other precipitation. Protective material may consist of sheets of burlap, paper, or plastic film. It will be the Contractor's responsibility to protect the pavement from damage, and failure to properly protect unhardened concrete will constitute cause for the removal and replacement of defective pavement at no expense to the City, as determined by the City Engineer.

6. The Contractor shall schedule and coordinate all operations involved in constructing the pavement so that regardless of the daily or seasonal variations in weather, temperature, and humidity such work shall result in a finished pavement conforming in all respects to the specified requirements.

7. Concrete pavement shall not be constructed during rainfall or when the surface upon which the concrete is to be placed is frozen or has impounded water unless precautionary measures have been taken and are approved by the City Engineer.

8. The Contractor shall be solely responsible for any damage that occurs to the subgrade, aggregate base, concrete, or the completed pavement. Subgrade, aggregate base, concrete, or completed pavement so damaged shall be restored, removed, or reconstructed as determined to be applicable by the City Engineer, at the Contractor's expense.

306.03.J PAVING MACHINES

1. The concrete shall be placed with paving machines that are designed to spread, screed, and float finish the freshly placed concrete in one complete pass of the machine in such a manner that a minimum of hand finishing shall be required to provide a dense and homogeneous pavement in conformance with the specified thickness, grade, and cross section.

2. Paving machines shall be operated in a manner that shall cause minimal displacement of the base.

3. Portions of paving machines or other equipment that ride on pavement, concrete gutter, or other improved surfaces shall be offset sufficiently to prevent breakage of the edges of these structures. The contractor shall provide supports, protective pads, or other suitable means to prevent the paving machine from marring or chipping pavement, gutters, or other adjacent improved surfaces or structures.

306.03.K SLIP FORM PAVING

1. Place the concrete uniformly in final position by the slip-form method in one complete pass in such a manner that a minimum of finishing will be necessary to provide a dense and homogeneous pavement in conformance to true grade and cross section without aggregate separation at the surface. The machine shall vibrate the concrete for the full width and depth of the pavement being placed. Such vibration shall be accomplished with vibrating tubes or arms working in the concrete. The sliding forms shall be rigidly held together to prevent spreading of the forms. Use forms of sufficient length so that no appreciable slumping of the concrete will occur.

2. Operate the slip form paver with as nearly continuous forward movement as possible and coordinate all operations of mixing, delivery, and spreading concrete to provide uniform progress. Stopping and starting the paving machine shall be held to an absolute minimum. If, for any reason, it is necessary to stop the forward motion of the paver, stop the vibratory and tamping elements immediately. Apply no tractive force to the machine except that which is controlled from the machine. The Contractor shall stop his operation immediately if the finished work is not of specified quality. Deficient areas shall be repaired before the concrete starts to set.

3. Ensure that supports of the slip-form paver and other equipment that ride on previously placed pavement are offset over that pavement sufficiently to prevent breakage of the edge thereof and provide such supports with suitable protective means to avoid marring or chipping of the previously placed pavement.

4. Hand-spreading and distributing shall be with shovels, not rakes, and the concrete shall not be fouled with foreign matter, nor shall joint devices be disturbed during such operations. The Contractor shall furnish hand operated mechanical vibrators of a type and design approved by the City Engineer. These vibrators shall be used in the consolidation of the concrete pavement within at least 6-feet on each side of construction and expansion joints and such other areas as the City Engineer may direct.

5. During the placing of concrete, provision shall be made for the construction of joints and the placing of dowels, tie bars, and other devices as called for by the plans or as directed by the City Engineer.

6. Concrete that is not in place within ninety (90) minutes after being mixed (or one (1) hour if mixed at a central plant or in transit) shall be subject to rejection and wasting at the direction of the City Engineer. Concrete that has begun to harden or take an initial set prior to placement, or that has been re-tempered with water will be rejected and shall be wasted by the Contractor in an approved manner and at no expense to the City.

306.03.L COMPACTION, TAMPING, AND SCREEDING

1. Compact the concrete pavement by means of vibrating screeds, mechanical tampers, tamping templates, and such other implements as approved. A vibratory screed or an automatic screeding and tamping machine may be substituted for a tamping template, subject to approval by the City Engineer. Operate the equipment in such a manner that a satisfactory compaction of the concrete is produced and the surface of the pavement is uniform, true to grade and cross section.

2. Immediately after placing concrete upon the subgrade and before initial set has occurred, strike off the concrete and tamp by means of a tamping template used at right angles to the centerline of the street until the concrete is thoroughly consolidated to specified grade and crown section, and sufficient mortar is brought to the surface for finishing purposes. If the design or location of the base is such as to preclude the possibility of tamping as previously described (such as a variable crown section, curb being constructed monolithic with base, in alleys, or where the grade exceeds 10 percent), employ other approved methods to obtain the prescribed results.

306.03.M FINISHING

1. After the concrete is placed and compacted, strike it true to line, grade, and cross section as shown and float to a smooth, even texture with an approved long-handled wood or aluminum float having a troweling or smoothing surface from 6 to 12-inches wide, or other approved floating device. Apply the float to the surface of the concrete with its length parallel to the centerline of the street and operate it from bridges, planing off the high places and filling the low places. Lap-preceding applications of the float by at least one-half its length.

2. If low places are discovered in the surface of the concrete, add specified grade, cross section, and surface tolerance with a surface free from laitance, soupy mortar, marks, or irregularities.

3. The Contractor shall take precaution during floating operations to ensure that the aggregate in the concrete does not become excessively forced down; therefore, leaving a weak concrete paste on the surface subject to spalling.

4. Fill any areas of minor honeycomb or other minor defect in composition of the concrete along the exposed edges with a stiff mortar or cement and fine aggregate applied to the moistened concrete in a workmanlike manner. Areas showing serious defects in composition of the concrete shall be cause for removal of affected pavement and replacement with pavement of specified quality for the full width of strip between longitudinal joints or edges and for a length not less than 10-feet.

5. Tool the free edges of new pavement and joints with previously placed Portland Cement Concrete with an approved edging tool to remove laitance and mortar resulting form finishing operations and to provide a clean rounded edge to the new pavement. Tooling shall not form ridges on the surface of the concrete. Perform tooling of edges at transverse joints and longitudinal joints as directed.

6. Upon completion of the floating, straightedge testing, and edge-tooling, and before initial set of the surface concrete, give the surface of the concrete a textured finish. Accomplish the textured finish with a steel-tine tool with 1/8-inch tines that will mark the finished concrete to a depth of 1/8-inch to 3/16-inch. Randomly space the markings from 1/2-inch to 1 1/4-inch as approved. Avoid overlaps of the texturing. Markings shall be transverse to the roadway centerline and full roadway width.

306.03.N JOINTS

1. Conform to applicable requirements of Section 211.03.I.

306.03.O SURFACE TOLERANCE AND TESTING

1. The surface of finished pavement shall not deviate from longitudinal and transverse smoothness more than the prescribed limits. Testing shall be done under the supervision of the City Engineer with equipment furnished and operated by the contractor at the Contractor's expense as soon as the hardness of the concrete permits.

2. At the conclusion of the finishing operation, the surface of the pavement shall not vary from a true surface, when tested with a 12-foot testing straight-edge, more than 0.02 of a foot in 12-feet.

3. The finished surface shall not vary more than 0.03-foot from the design elevations at any point.

4. GRAPHIC PROFILE TESTING AND TOLERANCE

   a. The longitudinal surface of all travel lanes, including ramps, of the concrete pavement shall be tested for smoothness by the graphic profile method according to ODOT TM 770. The profilograph shall be the California-type complete with recorder for determining the profile index of highway pavement. The pavement shall have a profile index of 7.0-in./mile or less for each wheelpath in each 600-foot segment or partial segment, and shall have no individual deviation of 0.025 of a foot.

306.03.P CORRECTION OF DEFICIENCIES

1. If the pavement does not conform to the prescribed limits of deviation, the following corrections shall apply:

2. PLASTIC PCC FAILURE TO MEET STRAIGHTEDGE

   a. The paving operations shall be stopped until revised methods, changes in equipment, or correction of procedures are made or proposed for trial and are approved by the City Engineer.

3. HARDENED PCC FAILURE TO MEET SMOOTHNESS REQUIREMENTS

   a. For any segment or partial segment failing to meet the straightedge or profilograph test requirements, the Contractor shall take corrective action as follows:

      1) Remove the non-specification concrete pavement as determined by the City Engineer and replace with specification concrete pavement.

      2) If permitted by the City Engineer, profile with abrasive grinder(s), equipped with a cutting head comprised of multiple diamond blades. The Contractor shall determine and mark the areas to be profiled. Areas corrected by grinding shall have the required surface texture as specified in Subsection 211.03.J and shall have the transverse joints restored to contract specifications by sawing with diamond blade saws.

   b. Retest the entire length with the graphic profile testing method of all segments requiring corrective work with the profilograph by the Contractor under the supervision of the City Engineer. Perform all corrective work and graphic profiling at the Contractor's expense, including traffic control. Any work not passing this second test shall be corrected by the Contractor followed by retesting until the project passes the required tests.

306.03.Q CURING AND PROTECTION OF CONCRETE

1. Cure and protect concrete in accordance with Subsection 208.03.K.

306.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

306.04.A PORTLAND CEMENT CONCRETE PAVEMENT

1. Measurement of Portland Cement Concrete pavement will be made on a square yard basis for the pavement complete in-place as specified and accepted. Measurement will be made of width and length of each separately constructed strip of pavement, wherein the width is the design width or edge-to-edge width of pavement, whichever is the lesser, and the length is from end to end of pavement to the nearest 0.1-foot and the calculated square yardage shall be to the nearest square yard.

2. Extra thickness of pavement, when shown or specifically directed to be placed, will be measured by conversion on a proportionate volume basis to an equivalent number of square yards of specified standard thickness pavement.

3. Payment for concrete pavement, whether continuously reinforced, reinforced, or plain shall be full compensation for furnishing and placing all materials including, but not limited to, water, reinforcement, joint materials, dowels, tie bars, and performing all work specified to complete the item including preparation of the base. Payment for this item will constitute full compensation for materials, labor, and equipment necessary to prepare the subgrade and pavement base, furnish Portland Cement Concrete mixture at the site, and to place, consolidate, finish, and cure the concrete in conformance with the Contract Documents.

306.04.B INCIDENTALS

1. Other materials, labor, and equipment required to complete the Portland Cement Concrete Pavement work in conformance with the Contract Documents and not listed as separate pay items in the Contract Documents will be considered incidental to other items of work and no separate payment will be made.

307 CURBS, GUTTERS, DRIVEWAYS, AND SIDEWALKS

307.01 DESCRIPTION

307.01.A This section covers work necessary for the construction of curbs, gutters, combination curb and gutter, islands, traffic separators, driveways, sidewalks, and pathways, hereinafter referred to collectively as structures. Conform to applicable requirements of Section 211.

307.02 MATERIALS

307.02.A GENERAL

1. Materials shall conform to requirements of Section 208 and to additional requirements contained herein.

2. Curbs, gutters, sidewalks, driveway approaches, and wheelchair ramps shall be constructed of Portland Cement Concrete.

307.02.B PORTLAND CEMENT CONCRETE FOR EXTRUSIONS

1. Grade the combined aggregates within the following limits:

SIEVE SIZES	TOTAL PASSING PERCENT (%) BY WEIGHT
1/2”	100
3/8”	75 - 100
No. 4	50 - 75
No. 16	20 - 40
No. 50	5 - 15
No. 100	0 - 5

307.02.C PORTLAND CEMENT CONCRETE

1. Portland Cement Concrete shall conform to Subsection 208.02.J except that extruded curbs and/or gutters shall have a maximum slump of 2-inches.

307.02.D AGGREGATE

1. Aggregate materials for curbs, gutters, driveways, sidewalks, ramps, and approaches shall be conform to 1”-0” or 3/4"-0” dense-graded granular base rock as specified in Subsection 209.02.C.1.

2. Foundation stabilization shall conform to Subsection 209.02.B.

307.03 CONSTRUCTION

307.03.A GENERAL

1. For new construction projects, specific types of curbs, gutters, sidewalks, driveway approaches, and wheelchair ramps will be specified in the Contract Documents or as approved by the City.

2. For smaller improvement projects, such as those undertaken by private homeowners, specific construction requirements pertaining to the construction or modification of these structures, that are not covered in the Standard Specifications or included as a part of the right-of-way encroachment permit, will be determined by the City Engineer.

307.03.B PREPARATION OF SUBGRADE

1. Subgrade shall be prepared as specified in Section 301.

307.03.C PREPARATION OF BASE

1. EARTHWORK

   a. Earthwork shall conform to applicable requirements of Section 209.

2. FOUNDATION OR BEDDING

   a. Construct sidewalk structures on aggregate foundation course or bedding of selected granular material as specified.

   b. When structures are to be constructed on areas where approved aggregate material is already in place, such materials may be salvaged and reused as bedding.

   c. Foundation courses or beddings involving the furnishing of new materials shall be constructed in conformance to the applicable requirements of Section 303.

3. BASE FOR PORTLAND CEMENT CONCRETE

   a. All bases upon which new cement concrete structures are to be constructed shall be firm and free of all deleterious matter. Thoroughly dampen surfaces upon which new cement concrete is to be placed. No separate payment will be made for water and the work of placing base materials. The cost of preparing bases shall be considered as incidental to the construction of structures. See Subsection 301.03.I and 303.03.D for compaction requirements.

   b. When new concrete is placed by the mechanical extrusion method, if approved by the City Engineer, vertical dowel fastening to underlying concrete or asphalt may be eliminated when the bond between new concrete and underlying concrete or asphalt is provided with epoxy cement applied in conformance with the manufacturer's recommendations. Spread epoxy at a rate that will provide a thorough coating to the surface with all voids and depressions filled. Place new structure on the epoxy cement within fifteen (15) minutes after spreading.

307.03.D WHEELCHAIR RAMPS

1. Wheelchair ramps shall be installed in all new curb return construction and in all existing curb returns that are to undergo reconstruction.

307.03.E FORMS

1. Conform to requirements for forms in Section 211.03.D.

2. Completed form work for curbs, gutters, sidewalks, driveway approaches, and wheelchair ramps shall be approved by the City Engineer prior to placing concrete.

307.03.F EQUIPMENT

1. Conform to the requirements of Sections 305 and 306 unless otherwise specified herein by the City Engineer.

2. The machine for extruding cement concrete curb shall be of the self-propelled type equipped with a material hopper, distributing screw, and adjustable curb forming devices capable of placing and compacting cement concrete to the lines, grades, and cross section as shown in an even homogeneous manner. Cement concrete curb shall be free of honeycomb and cracks.

3. Set top of curb grade by an offset guideline using the survey marks to line and grade, as approved by the City Engineer. The forming tube portion of the extrusion machine shall be readily adjustable vertically during the forward motion of the machine to provide, when necessary, a variable height of curb conforming to the predetermined curb grade. A grade line gauge or pointer shall be attached to the machine in such manner that a continual comparison can be made between the curb being placed and established curb grade as indicated by the offset guideline.

4. In lieu of the above method for maintaining the curb grade, the extrusion machine may be operated on approved rails or forms set at the proper relative grade.

307.03.G PLACING MATERIAL

1. Construct Portland Cement Concrete structures between specified forms or by a mechanical extrusion method as the Contractor may elect. If forms are used, maintain a 2 to 4-inch slump and thoroughly compact and strike off. If the structures are constructed by a mechanical extrusion method, maintain a maximum slump of 2-inches. Feed cement concrete into the extruding machine at a uniform rate and operate the machine under sufficient restraint in a forward motion to produce a well-compacted mass of concrete. Concrete shall be placed and consolidated in conformance with applicable requirements in Section 211.

2. Concrete shall be placed with equipment that will provide a dense and homogeneous concrete structure in conformance with the specified thickness, grade, and cross section.

3. Concrete shall not be placed until the base and forms have been inspected and approved by the City Engineer.

4. Where Portland Cement Concrete sidewalks or pathways are to be placed around or adjacent to manholes, pipe inlets, or other miscellaneous structures, form around the miscellaneous structure and allow one panel of clearance. After the sidewalk is poured and cured, adjust miscellaneous structures to grade and finish placing the sidewalk or pathway panel(s).

307.03.H FINISHING

1. SIDEWALKS AND OTHER STRUCTURES

   a. Finish surface of concrete to grade and cross section with a bull float, trowel smooth, score if required, and then finish with a broom. Use floats of not less than 6-inches in width. Finish concrete adjacent to expansion joints with an edger tool. Light brooming shall be transverse to the line of traffic; if water is necessary it shall be lightly applied to the surface immediately in advance of brooming.

   b. The surface of concrete shall be marked into squares based on full width with a scoring tool that will leave the edges rounded. For widths greater than 7-feet, scoring and dimensions shall be as shown on the appropriate plan sheet or as directed by the City Engineer. Sidewalks shall have a slope of 2 percent from the top of curb to the back of walk. The faces that are to be exposed shall be free from chips, cracks, air holes, honeycomb, or other imperfections. If portions of the work are deemed unacceptable by the City Engineer, they shall be removed and replaced between the nearest joints at no expense to the City.

2. STRAIGHT CURBS AND CURBS AND GUTTERS

   a. All concrete curbs shall be cast-in-place.

   b. Remove forms after the concrete has taken initial set and while the concrete is still green. Minor defects shall be repaired with mortar containing one (1) part Portland Cement and two (2) parts sand. Plastering will not be permitted on the faces and exposed surfaces. Structurally defective concrete shall be removed and replaced at no expense to the City. While the concrete is still green, finish exposed surfaces as required to provide a uniform texture and smooth surface.

   c. When constructing concrete curbs, the proportions of sand, gravel, and cement, the type of forms used (if applicable), and the method of compacting the concrete in the forms shall all be such that as dense, smooth, and uniform a surface as is practicable for a concrete masonry unit will be obtained on the finished curb.

   d. Furnish and install a minimum of two (2), 3-inch PVC Schedule 40 pipe curb drains to serve each lot per the Standard Drawings. Curb drains shall be installed during curb construction. In cases where curb drains are installed in existing cured concrete curbs, the curb must be cored. Breaking or sawing out sections of the curb for curb drains will not be permitted. PVC pipe shall conform to ASTM D-2241. Curb drains will be considered incidental work for which no separate payment will be made.

307.03.I SURFACE TOLERANCE

1. Construct all structures within 1/4-inch of true line and within 1/4-inch of established surface grade, cross-section, and slope and within 1/4-inch of specified thickness. Finished surfaces shall be free from humps, sags, or other irregularities. When a 12-foot long straightedge is laid on a finished surface, the surface shall not vary more than 0.02-feet from edge of the straightedge. At no time shall the concrete surface be allowed to pool water.

307.03.J CURING PORTLAND CEMENT CONCRETE

1. After the concrete has been placed and finished in structures as specified, it shall be cured by application of a white pigmented, liquid membrane-forming compound applied uniformly to the damp concrete by pressure spray methods according to Subsection 211.03.K. The concrete structure shall be kept free from contact and public traffic for at least seven (7) days.

307.03.K JOINTS IN PORTLAND CEMENT CONCRETE

1. COLD JOINTS

   a. Concrete pavement, curbs, driveway approaches, wheelchair ramps, and sidewalks shall be separated by cold joints when constructed concurrently.

2. CONTRACTION JOINTS IN WALKS AND INCIDENTAL SURFACING:

   a. Form transverse contraction joints of the weakened plane type in the exposed surfaces of cement concrete walks and incidental surfacings at such locations as required to confine the contraction joint spacing to a maximum of 15-feet. The joints shall be formed to a depth of 1/3 of the thickness of concrete and to a width of about 1/8-inch. Joint edges shall be tooled. Contraction joints in walks should coincide with joints in existing curbs.

3. CONTRACTION JOINTS IN CURBS AND GUTTERS:

   a. Place contraction joints in curbs or curbs and gutters at intervals not exceeding 15-feet. Contraction joints shall be of the open joint type and shall be provided by inserting a thin, oiled steel sheet vertically in the fresh concrete to force coarse aggregate away from the joint. In curbs, contraction joints shall be installed to a minimum depth equal to 1/2 the height of the curb. In gutters, the contraction joint shall be installed to a minimum depth equal to 1/2 the thickness of the gutter section. After initial set has occurred in the concrete, the steel sheet shall be removed with a sawing motion. Finish with a steel-edging tool. Contraction joints of curbs should coincide with joints in sidewalks and streets. The line shall not bulge at the completed joint.

   b. DRIVEWAY APPROACHES

      1) Contraction joints shall be installed in driveway approaches when the length or width of the approach exceeds 15-feet.

      2) Contraction joints in driveway approaches shall be located as specified in the standard details or as directed by the City Engineer.

   c. CURB DRAINS

      1) Contraction joints shall be installed in curb sections and sidewalks over curb drains. The installation of these joints shall not affect specified minimum contraction joint spacing in the sidewalk or curb.

4. EXPANSION JOINTS:

   a. Transverse expansion joints for curbs shall be provided opposite abutting expansion joints in Portland Cement Concrete and over expansion joints in concrete underlying the new concrete. Additional transverse expansion joints shall be provided at other locations as required to confine the expansion joint spacing to the maximum distance indicated on the plans. The width of joint and thickness of filler shall match those of the joints in abutting or underlying concrete, and elsewhere shall be 1/2-inch. Each expansion joint shall be at right angles to the structure alignment, normal to the structure surface, and shall provide complete separation of new concrete.

   b. Expansion joints for sidewalks and driveways shall be provided around poles, posts, boxes, pipes, and conduit that protrude through, into, or against the structures, and alongside or transverse to the new surfacing at such locations and frequencies as is necessary to provide for expansion of both new and abutting Portland Cement Concrete.

5. REQUIREMENTS NEAR EXISTING STRUCTURES:

   a. Existing curbs, walks, driveways and other such structures shall be saw cut back to permit the new construction. Where the new structures are to be constructed against or within 4-inches of the end, edge, or side of other structures, the new construction shall include the construction of approved connections therewith using the same kind of concrete as is used in the new construction. Make the joint between the old and new material with a saw-cut at the nearest existing joint.

307.03.L DOWELS, TIE BARS, AND REINFORCING

1. Provide metal reinforcing bars and wire fabric reinforcement when and as shown. When shown, provide and place dowels with "slip sleeves" as load transfer mediums. Provide and place dowels (without "slip sleeves") as fastenings or ties between new concrete and existing underlying concrete when shown. Place reinforcing dowels and tie bars in conformance to the applicable requirements in Section 208.

307.03.M PROTECTION OF CONCRETE

1. The contractor shall protect the concrete in conformance with applicable requirements in Section 211.

307.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvement projects)

307.04.A CURBS AND COMBINATION CURB AND GUTTER

1. Measurement of curb and combination curb and gutter will be made on a linear-foot basis as measured along the face of the curb.

2. Payment for this item will constitute full compensation for materials, labor, and equipment necessary to prepare the subgrade; supply aggregate; construct base; construct and remove forms; furnish Portland Cement Concrete at the site; and place, consolidate, finish, joint, and cure the concrete in conformance with the Contract Documents.

307.04.B SIDEWALKS AND DRIVEWAY APPROACHES

1. Measurement of sidewalks and driveway approaches will be made on a square-yard basis as determined by surface measurements.

2. Payment for this item will constitute full compensation for materials, labor, and equipment necessary to prepare the subgrade; supply aggregate; construct base; construct and remove forms; furnish Portland Cement Concrete at the site; and place, consolidate, finish, joint, and cure the concrete in conformance with the Contract Documents.

307.04.C WHEELCHAIR RAMPS

1. The construction of wheelchair ramps in existing curb and/or sidewalk will be paid for on a per-each basis as stated in the Contract Documents.

2. The construction of wheelchair ramps in new curbs and/or sidewalk will be paid for on a per-each basis when stated in the Contract Documents. Otherwise, wheelchair ramps will be considered incidental to other items of curbs, gutters, driveways and sidewalk work and no separate payment will be made.

3. Payment for each wheelchair ramp will constitute full compensation for materials, labor, and equipment necessary to sawcut the existing concrete; excavate and remove excavated materials; prepare the subgrade and aggregate base; construct and remove forms; furnish Portland Cement Concrete at the site; and to place, consolidate, finish, joint, and cure the concrete in conformance with the Contract Documents.

307.04.D CONCRETE VALLEY GUTTER

1. Concrete valley gutter will be measured on a lineal foot basis for the actual length of gutter constructed.

307.04.E TRAFFIC ISLANDS

1. Traffic islands will be measured by component parts of curb and sidewalks as described above.

307.04.F DRIVEWAYS

1. Measurement of Portland Cement or asphalt concrete driveways, sidewalks or pathways will be made on a square yard basis on the actual surface of the specified thickness concrete or asphalt completed and accepted.

307.04.G SAWED JOINTS

1. When listed as separate pay items in the Contract Documents, sawed joints will be measured on a lineal foot basis for each joint sawed, cleaned, and sealed as specified and directed by the City Engineer. Otherwise, sawed joints will be considered incidental to other items of curbs, gutters, driveways and sidewalk work and no separate payment will be made.

307.04.H AGGREGATE BASE

1. When specifically listed as a separate pay item for curbs, gutters, driveways, and sidewalks in the Contract Documents, quantities of aggregate base material will be measured as set forth in Section 303. Otherwise, aggregate will be considered incidental to other items of curbs, gutters, driveways and sidewalk work and no separate payment will be made.

307.04.I INCIDENTALS

1. Other materials, labor, and equipment required to complete the curbs, gutters, driveways and sidewalk work in conformance with the Contract Documents and not listed as separate pay items in the Contract Documents will be considered incidental to other items of work and no separate payment will be made.

308 GEOTEXTILE FABRICS

308.01 GENERAL

308.01.A This work consists of furnishing and placing geotextile fabrics on subgrades and beneath an asphalt overlay as shown on the plans or as directed by the City Engineer.

308.02 MATERIALS

Geotextile materials shall conform to Subsection 208.02.M.3.

308.03 CONSTRUCTION

308.03.A GENERAL

1. General requirements for placement of geotextile shall be in accordance with Subsection 208.03.

308.03.B SUBGRADE GEOTEXTILE

1. For roadbed subgrade separation, prepare the subgrade according to Section 301.

2. Correct geotextile failures, as evidenced by soil pumping or roadbed distortion, by removing any covering material in the affected area and placing a geotextile patch on the exposed geotextile. The patch shall overlap the exposed geotextile a minimum of 12-inches. Cover the patch with the specified cover material and compact before proceeding.

308.03.C PAVEMENT OVERLAY GEOTEXTILE

1. GENERAL

   a. Place geotextile and pavement overlay in four basic steps:

      - ❖ Surface preparation
      - ❖ Sealant application
      - ❖ Geotextile placement
      - ❖ Overlay placement

2. WEATHER LIMITATIONS

   a. Place sealant and geotextile in accordance with Subsection 305.03.L, except the minimum air temperature shall be 50º F for paving grade asphalt sealant placement and 60º F for asphalt emulsion sealant placement.

3. SURFACE PREPARATION

   a. Prepare the pavement surface on which the sealant is to be placed according to specifications and the following:

      - ❖ Clean and fill cracks exceeding 1/8 inch width with an approved asphalt crack filler.
      - ❖ Repair minor irregularities or depressions as directed.
      - ❖ Allow crack filling material to cure before placing geotextile.
      - ❖ Where the pavement is severely cracked, rutted, deformed, or otherwise distressed, place a leveling course as directed by the City Engineer instead of extensive surface preparation.

4. SEALANT APPLICATION

   a. Use a normal paving grade asphalt. A cationic or anionic emulsion may be used as approved. Do not use cutbacks or emulsions that contain solvents.

b. Uniformly spray the asphalt sealant at normal application temperature by means of a pressure distributor on the prepared dry pavement surface. Apply at the normal rate of 0.20 to 0.30 gallon per square yard or as recommended by the geotextile manufacturer when directed by the City Engineer.

c. If using emulsions, increase the application rate 50 percent or as directed by the City Engineer. Some underlying surfaces may require a higher application rate. Within street intersections, on steep grades, or in other zones where vehicle speed changes are commonplace, reduce the normal application rate by 20 percent or as directed by the City Engineer.

d. The target width of sealant application shall be geotextile width plus 6-inches. Apply the sealant only as far in advance of geotextile installation as appropriate to ensure a tacky surface at the time of geotextile placement. Place geotextile the same day as the sealant. Do not allow traffic on the sealant. Clean excess asphalt from the road surface.

5. GEOTEXTILE PLACEMENT

a. Place the geotextile into the sealant using mechanical or manual lay-down equipment capable of providing a smooth installation with a minimum amount of wrinkling or folding before the sealant loses tackiness. When asphalt emulsions are used, allow the asphalt to separate from the water (break) before placing the geotextile.

b. Slit wrinkles or folds exceeding 1-inch and lay flat. Shingle-lap not more than 6-inches in the direction of the paving. Broom and/or pneumatic roll to maximize geotextile contact with the pavement surface. Additional hand-placed sealant material may be required at laps as determined by the City Engineer.

c. Limit traffic to necessary construction equipment and emergency vehicles on the geotextile before and during paving unless otherwise directed. Turn the paver and other vehicles gradually. Keep turning to a minimum to avoid geotextile movement and damage. Avoid abrupt starts and stops.

6. OVERLAY PLACEMENT

a. Place the overlay the same day the geotextile is placed. Remove sealant that bleeds through the geotextile. Do not windrow asphalt concrete material on the geotextile ahead of the paving machines. Do not use an asphalt concrete material pickup machine. In the event of rain, the Contractor shall place sand over uncovered fabric to absorb sealant.

308.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

308.04.A SQUARE YARD BASIS

1. Payment for the work in this section shall be in accordance with Subsection 208.04 by the square yard in place. Measurement will be to the nearest square yard. No allowance will be made for material in laps and seams. This payment shall constitute full compensation for all materials and work as specified within.

308.04.B INCIDENTALS

1. Other materials, labor, and equipment required to complete the geotextile fabric work in conformance with the Contract Documents and not listed as separate pay items in the Contract Documents will be considered incidental to other items of work and no separate payment will be made.

309 COLD PLANE PAVEMENT REMOVAL

309.01 GENERAL

309.01.A This work shall consist of preparing a foundation for placement of new surfacing by removal of existing surfacing to the depth, width, and cross section shown on the plans.

309.02 WORKMANSHIP

309.02.A EQUIPMENT

1. The existing surfacing shall be removed with a self-propelled planning machine or grinder. The equipment shall be capable of accurately establishing profile grades within a tolerance of 0.02-foot by reference from either the existing pavement or from independent grade control, and shall have a positive means for controlling cross slope elevations. The equipment shall incorporate a totally enclosed cutting drum with replaceable cutting teeth and shall have an effective means for removing excess material from the surface and for preventing dust from escaping into the air. The use of a heating device to soften the pavement will not be permitted.

2. When existing structures exist in the area of work, smaller equipment and handwork may be necessary to remove the material adjacent to the structures.

309.02.B PAVEMENT REMOVAL

1. The existing pavement shall be removed to the depth, width, grade, and cross section shown on the plans or as directed by the City Engineer to provide a surface profile true to specified grade and transverse slope.

2. Except where samples are taken to establish a job mix formula, the existing surfacing shall not be removed more than five (5) days prior to construction of the new surfacing unless otherwise approved by the City Engineer.

3. Wherever samples are obtained from existing surfacing more than five (5) days prior to construction of the new surfacing, the Contractor shall patch the samples areas with asphalt concrete at no expense to the City.

4. All material to the depths specified shall be removed adjacent to existing structures and the structures shall be adjusted in accordance with Section 310 at no additional expense to the City.

309.02.C SURFACE TOLERANCE

1. The new surface resulting from the pavement removal will be tested by the City Engineer for trueness to specified grade and transverse slope at selected locations. Testing will be with a 12-foot straightedge. The variation of the surface from the testing edge of the straightedge between any two (2) contact points shall not exceed 0.02-foot.

309.02.D DISPOSAL OF MATERIALS

1. Materials removed under this specification that are not recycled and used on the project shall become the property of the Contractor at the point of removal and shall be disposed of off the limits of the project in a manner satisfactory to the City Engineer.

2. The Contractor is encouraged to salvage any removed, cold-planed materials that are not recycled and used on the project for use on future projects.

309.03 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

309.03.A SQUARE YARD BASIS

1. Materials removed under this specification, regardless of thickness, will be measured for payment on a square yard basis. The pay quantities will be determined by measurement of the actual surface of the area from which the materials have been removed and computed to the nearest 0.1 square yard.

309.03.B INCIDENTALS

1. Other materials, labor, and equipment required to complete the cold plane pavement removal work in conformance with the Contract Documents and not listed as separate pay items in the Contract Documents will be considered incidental to other items of work and no separate payment will be made.

310 ADJUSTMENT OF STRUCTURES TO GRADE

310.01 DESCRIPTION

310.01.A This section covers the work necessary for adjusting tops of structures (e.g., manholes, sumps, catch basins, inlets, valve boxes, meter boxes, monument boxes, and similar structures) to required elevation and/or horizontal alignment complete.

310.02 MATERIALS

310.02.A GENERAL

1. Materials used in adjustment of existing structures shall be materials salvaged from the existing installation and brought to a condition approved for reuse by the City Engineer. If existing materials cannot be brought to a condition approved for reuse, new materials must be supplied at no additional cost to the City.

310.03 CONSTRUCTION

310.03.A GENERAL

1. Excavation shall be unclassified and shall include whatever materials are encountered to the depths as necessary to accomplish the work.

2. Except for overlay work, structures such as manholes, sumps, catch basins, inlets, and similar structures shall be adjusted to final finished grade before the final lift of paving. When these structures are affected during overlay work, adjust them according to Standard Detail 645. Do not use a jackhammer for pavement cutting. For all paving work, structures such as valve boxes, monument boxes, and similar structures shall be loosened and otherwise repaired prior to final lift of paving and shall be adjusted to final finished grade during the installation of the final lift of paving.

3. Backfill shall be done in accordance with the applicable requirements of Section 209.

310.03.B SALVAGE OF EXISTING STRUCTURES

1. Metal frames, covers, grates, and fittings may be salvaged from structures to be adjusted or abandoned.

2. Salvaged components to be reused shall be cleaned of foreign material by solvents, sand blasting, or other methods that will not harm the component but will restore it to a nearly new condition. Undamaged salvaged structures not reused on the project shall become the property of the City.

310.03.C RAISING TOPS OF MASONRY STRUCTURES

1. After existing frames, covers, and grates have been removed, expose the top surface on which new concrete is to be placed and chip away at least 1/2-inch to expose firm concrete. The new surface shall be cleaned by brushing and shall be moistened with water at the time of placing new concrete. New concrete shall then be placed to required grade and cured at least seven (7) days after which the frame shall be seated in fresh mortar and brought to the proper grade.

2. Masonry of bricks or concrete blocks shall be raised with new bricks, blocks, mortar, or combinations thereof or with Portland Cement Concrete as conditions may require. Concrete boxes may be lifted and placed on precast concrete box extensions, on new brick, or on cast-in-place concrete as may be suitable.

3. Mortar for building up existing masonry shall not be placed to a depth exceeding 1-inch. Concrete shall not be placed to a depth of less than 4-inches. To conform to these requirements, existing shells or walls of structures to be raised shall be cut down as necessary to provide space for the new construction.

4. Fabricated metal rings or plates may be furnished and used in adjustment work, provided the metal and its fabrication design is at least equal to specified characteristics of strength and support required of the covers or grates to be placed, that uniform bearing of bearing surfaces is assured, and that positive provision is afforded against displacement when in service.

310.03.D LOWERING TOPS OF MASONRY STRUCTURES

1. Where the top of an existing masonry structure is to be lowered, the masonry portion of the structure shall be exposed to required depth and cut off or removed to an elevation below that established for the bottom of metal frame or cover which is to be reset on masonry, and shall then be built up with mortar, concrete, brick, or concrete blocks, or with metal rings or plates to required elevation and top design.

2. Joining of new material to old (minimum thicknesses of new mortar and concrete, limitations, curing, and other details) shall be as specified in Section 211. The Design Engineer shall certify that the strength and loading capacity of the structure has not been compromised or the structure shall be removed and replaced with a structure with adequate strength and loading capacity.

310.03.E ADJUSTING METAL STRUCTURES

1. Metal inlets, valve boxes, metal boxes, monument boxes, or other like structures shall be normally raised or lowered to grade by resetting the entire structure on firm foundation. In the case of raising the structure to a point where it would not enclose or protect its contents, add metal extensions of like design below the original structure.

2. Contractor may replace the structure with a new structure of adequate design as approved and at no expense to the City. Salvaged structures not reused on the project shall become the property of the City. Conform to applicable Sections of Divisions 4, 5, AND 6.

310.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

310.04.A EACH UNIT IN PLACE

1. When listed in the Contract Documents, measurement and payment will be the actual number of manholes, sumps, catch basins, inlets, valve boxes, meter boxes, monument boxes, and other like structures adjusted under this section, measured as units in place, completed and accepted. Separate measurement will be made of each specific type or of each separate grouping of types of structures for which separate items are shown in the Contract Documents. Required earthwork, backfill, replacement of base drains, stone bases, pavements, and other miscellaneous work will be considered as incidental to the adjusting work and no separate measurement thereof will be made.

310.04.B INCIDENTALS

1. When no pay item is listed in the Contract Documents, adjustment of structures to grade work will be considered as incidental to the other pay items and no separate payment will be made.

311 STREET LIGHTING

311.01 DESCRIPTION

311.01.A This section covers work necessary to procure and install street lighting poles, luminaries, wiring, and other related items.

311.01.B The Contractor shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to completing the Work as shown on the Plans and in complete accordance with the Specifications.

311.01.C Supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation, whether or not shown on the Plans or addressed in the Specifications, shall be provided and installed as part of the Work.

311.01.D MANUFACTURER'S CERTIFICATION

1. The Contractor shall furnish manufacturers certification for construction materials when such information is requested by the City Engineer. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. Information and cut sheets shall be originals, copies will not be accepted. A minimum of 5 original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

311.02 MATERIALS

311.02.A POLES AND ARMS

1. Fiberglass poles shall be designed to produce a 25-foot mounting height (unless otherwise indicated), be gray in color, have a natural finish, and be of the direct burial type.

2. Acceptable fiberglass poles and arms:

   - Whatley .....E-4030-01-58/PGE 93 with T06-2 (arm)
   - Shakespeare.....BH30-99N2BL20D1(PGE) with OPAR-6 (arm)
   - Approved equal

3. If a different mounting height is called for, used the same model numbers as listed above, changed only by the pole length.

311.02.B JUNCTION BOXES AND COVERS

1. Junction boxes and covers shall be made of polymer concrete. Covers shall have a skid resistant surface marked "ELECTRIC" and bolt to the junction box. Boxes shall be 14 3/4" x 14 3/4" x 12 3/4" in size.

2. Acceptable junction boxes and covers:

   - Quazite .....PC1211BA12.
   - Approved equal

311.02.C WIRING

1. Street light wire shall be 3-#10 conductors as manufactured by Okonite, Rome, or Southwire, and meeting the following specifications:

   a. #10 AWG, 600 volt, 3 conductor, Class B stranding, Type TC with Sunlight resistant 45-mil PVC jacket, suitable for direct burial installations. Insulation to be black, red, and green per NEMA WC-7 for NEC applications (TFN, THWN, THHN), with fillers or binding tape added to produce rounded outer jacket, rate 90°C dry and 75°C wet.

311.02.D LUMINAIRES

1. Luminaires shall be Cobra head type using the wattage shown in the Contract Documents or Plans with a high pressure sodium light source that can be energized by either a 120 or 240 volts through a normal power factor reactor ballast. The luminaire shall have an Acrylic or Flat lens as specified. The fixture shall produce a medium distribution, semi-cutoff, Type II lighting pattern.

2. Acceptable luminaires (100 watt models):

   - American Electric 113-53712-6
   - Cooper OVZ10SNF2E4
   - General Electric M2RR10S7N2AMS2
   - Approved equal

3. For various wattages, use the same model number luminaire as listed above, changed only by the wattage.

311.02.E PHOTOELECTRIC CONTROL RELAY

1. One of the following preapproved photoelectric control relays (twist-lock) shall be used

   - Fisher-Pierce .....6690B SLS
7790B SLS
   - General Electric PEC0TL
   - Lampas 6390-CH1
   - Approved equal

311.03 CONSTRUCTION

311.03.A GENERAL

1. Street lighting shall be installed after all other earthwork and utility installations are completed, including rough grading of the property (lots), to prevent damage to the poles.

2. The Contractor shall notify the Inspector prior to any work starting on the street lighting system so an Inspector can be present to inspect the work.

311.03.B POLES

1. Street lighting poles shall be set to a depth according to the manufacturer's specifications (minimum 5-feet). Crushed rock backfill is required, with sand or clean soil cushion surrounding the conductors, or with protective hose through the granular backfill. See the Standard Drawings.

311.03.C TRENCHING

1. Trenching shall be kept to a minimum of 12-inches in width and provide for 30-inches of cover over wire. If rock or shale is encountered in the trench, a sand cushion or conduit is required. A conduit is also required where conductors pass under concrete or graveled driveways. Size and type of conduit shall be as required by the National Electrical Code, current edition.

    a. The trench shall be dug from the street light pole to a splice pit at one of the following three locations, as indicated on the Plans:

        - ❖ To the street light conductor "stub up".
        - ❖ To a point 2-feet from the transformer.
        - ❖ To a point over the existing street light conductors as determined by the utility.

    b. When street light conductor "stub ups" are not present at a pole location, the Contractor shall install a trench to reach the power supply.

    c. If existing "stubbed up" wires are long enough to be pulled inside the pole base and spliced inside, no junction box will be required.

311.03.D WIRING

1. Install the street light wires from the luminaire to the junction box or to the point of splice in the pole base. The Contractor shall then complete one of the following installations as indicated on the Plans:

    a. The trench shall be dug from the street light pole to a splice pit at one of the following three locations, as indicated on the Plans.

        - ❖ Pull existing street light "stubbed up" wires into the junction box or into the pole base.
        - ❖ Install wires from the junction box to a 3-foot x 3-foot splice pit located 2-feet from the existing transformer leaving 6-feet of spare wire for utility crews to extend into the transformer.
        - ❖ Install wires from the junction box to a 3-foot x 3-foot splice pit over existing street light wire circuit leaving 6-feet of spare wire for utility crews to splice.

    b. All splices are to be made by the utility providing the power source.

311.03.E INSPECTION AT POWER SOURCE

1. It shall be the Contractor's responsibility to give Pacific Power and Light Company a 48-hour notice ((503) 588-9016) before excavating within 24-inches of their primary conductors. Pacific Power and Light Company may then choose to have their inspector on site at the time of that excavation. Contractor shall document time and number of inspection that are made (for the City's use).

311.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

311.04.A EACH UNIT IN PLACE

1. When listed in the Contract Documents, measurement and payment for street lights will be the actual number of street lights as units in place, completed and accepted.

2. Payment for each street light will constitute full compensation for materials, labor, and equipment necessary, including excavation and backfill, to install the street light pole and arm, junction boxes and covers, luminaire and wiring, and coordination of final connection with the utility involved, and all other work necessary to provide a complete street light in conformance with the Contract Documents.

311.04.B INCIDENTALS

1. When no pay item is listed in the Contract Documents, Street Lighting will be considered as incidental to the other pay items and no separate payment will be made.

END OF DIVISION

DIVISION 4 – WATER DISTRIBUTION

DIVISION 4

WATER DISTRIBUTION

401 WATER PIPE AND FITTINGS

401.01 DESCRIPTION

401.01.A This work consists of furnishing and installing water mainline pipe and fittings normally used for water distribution systems.

401.01.B The Contractor shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to completing the Work as shown on the Plans and in complete accordance with the Specifications.

401.01.C Supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation, whether or not shown on the Plans or addressed in the Specifications, shall be provided and installed as part of the Work.

401.01.D MANUFACTURER'S CERTIFICATION

1. The Contractor shall furnish manufacturers certification for construction materials when such information is requested by the City Engineer. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. Information and cut sheets shall be originals, copies will not be accepted. A minimum of 5 original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

401.02 MATERIALS

401.02.A GENERAL

1. Only materials designed for potable water service and meeting the current National Sanitation Foundation Standard (NSF) 61, Section 9, Drinking Water System Components – Health Effects, or equivalent shall be used in those elements of the water system which are in contact with potable water.

2. Water pipe and fittings shall be of the size, strength, material, and joint type specified on the Plans and/or in the Contract Documents. Jointing material shall be as specified for each pipe material. Each piece of pipe shall be clearly identified as to strength, class, and date of manufacture. The manufacturer or fabricator shall furnish appropriate certification, based on manufacturer's routine quality control tests, that the materials in the pipe and fittings meet the requirements specified herein.

3. It is not intended that materials listed herein are to be considered equal or to be generally interchangeable for all applications. The type, class, and size of pipe as applicable, will be specified in the Contract Documents. The Design Engineer shall determine the materials suitable for the project and so specify.

4. Water system components shall have minimum pressure ratings that will accommodate maximum pressures expected to be experienced during pressure and leakage testing.

401.02.B DUCTILE IRON PIPE

1. GENERAL

   a. Pipe for water lines, with the exception of 1-inch and 2-inch copper service lines, shall be cement-lined ductile iron of domestic manufacture, centrifugally cast of 60- 42-10 iron, and shall conform to AWWA C 151 (ANSI A21.51). Cement-mortar lining and seal coating shall be in conformance with AWWA C104 (ANSI A21.4).

   b. The minimum thickness class for all sizes of ductile iron pipe shall be class 52. Ductile iron pipe that is to be threaded for flanges shall be class 53. Under extreme conditions, such as in deep trenches and/or corrosive soils, higher thickness classes may be required as indicated on the Plans.

   c. When specified in the Special Provisions, ductile iron pipe shall be polyethylene encased in conformance with AWWA C105 (ANSI A21.5). Materials and installation for electrical continuity or bond bars may also be necessary in corrosive soils.

   d. The rubber-ring gaskets shall be suitable for the specified pipe sizes and pressure, shall conform to applicable parts of the latest Federal Specification WW-P-421, and shall be furnished by the pipe manufacturer. A nontoxic vegetable soap lubricant shall be supplied with the pipe in sufficient quantities for installing the pipe. Materials and installation requirements for electrical continuity or bond bars, as may be necessary in corrosive soils, shall be specified in the Contract Documents.

   e. Acceptable ductile iron pipe:

      - American
      - U.S. Pipe
      - Pacific States
      - Griffin Ductile Iron Pipe
      - Approved Equal.

401.02.C DUCTILE IRON PIPE JOINTS

1. GENERAL

   a. Ductile iron pipe shall be supplied with push-on joint connections, unless shown otherwise in the Standard Drawings or Contract Documents.

b. Where thrust restraint is required or specified, new water mains shall be constructed using ductile iron pipe with an internal, push-on joint restraint system. Ductile iron pipe 12-inches in diameter and smaller shall be restrained through the utilization of locking gaskets in push-on joint connections. Internal restraint for ductile iron pipe larger than 12-inches in diameter shall be achieved using a push-on joint restraint system that provides a positive axial lock between the interior surface of the bell and the spigot end of the pipe.

2. PUSH-ON JOINTS

a. Single, rubber gasket, push-on joints shall conform to AWWA C 111 (ANSI A21.11). Unless otherwise specified, gaskets and lubricant shall be of domestic manufacture provided by the manufacturer of the pipe on which they are to be used.

b. Acceptable push-on joint restraint systems for ductile iron pipe:

- TR Flex brand as manufactured by U.S. Pipe.
- Thrust-Lock brand as manufactured by Pacific States Cast Iron Pipe Company.
- Locking gaskets for "Tyton" style joints shall be Field-Lok brand as manufactured by U.S. Pipe.
- Locking gaskets for American ductile iron pipe shall be "Fast-Grip" brand as manufactured by American.
- Approved equal.

3. MECHANICAL JOINTS

a. Mechanical joint ends on ductile iron pipe shall not be used without the approval of the City Engineer.

b. Where approved, components of mechanical joints shall be in conformance with AWWA C 111 (ANSI A21.11).

c. Gaskets and glands shall be of domestic manufacture and provided by the manufacturer of the pipe or fitting on which they are to be used.

d. Bolts and nuts shall be of domestic manufacture and made of low carbon steel conforming to ASTM A-307, Grade B, or ductile iron.

4. RETAINER GLANDS

a. The use of retainer glands is limited to applications specified in the Standard Drawings and Contract Documents. Retainer glands shall be compatible with pipe being restrained and shall be installed in accordance with manufacturer's recommendations.

b. Approved retainer glands:

- Mega-Lug brand as manufactured by EBAA Iron, Inc., Eastland, Texas.
- Uni-Flange Series 1400 as manufactured by Ford Meter Box Co., Inc.
- Romagrip Brand as manufactured by Romac Industries, Inc.
- Approved equal.

5. FLANGED JOINTS

a. Flanged connections on ductile iron pipe shall not be used without the approval of the City Engineer.

1) Where approved, flanged joints for ductile iron pipe, shall be in conformance with AWWA C 115 (ANSI A21.15).

2) Gaskets shall be 1/8-inch thick red rubber, either ring or full face, conforming to the pipe manufacturer's requirements.

3) Bolts and nuts shall be of domestic manufacture and made of low carbon steel conforming to ASTM A-307, Grade B, or ductile iron.

4) Threaded flanges for use in making custom ductile iron spools shall be forged steel, Class D, hub-type and shall conform to AWWA C 207.

401.02.D RED-BRASS PIPE

1. Seamless, red-brass pipe shall be of domestic manufacture and supplied in conformance with ASTM B-43.

2. Diameter of brass pipe used in the installation of air valves, blowoff assemblies, and other applications will be specified in the Contract Documents.

401.02.E GALVANIZED STEEL PIPE AND FITTINGS

1. Galvanized steel pipe and fittings shall not be used unless specified in the Contract Documents.

2. Hot-dipped, zinc-coated (galvanized), welded, or seamless steel pipe and galvanized steel fittings shall be of domestic manufacture and supplied in conformance with ASTM A-120.

401.02.F DUCTILE AND CAST IRON FITTINGS

1. Tees, crosses, elbows, reducers, sleeves, adapters, combinations thereof, and other miscellaneous iron fittings shall be ductile or cast iron, of domestic manufacture, and shall be in conformance with AWWA C 110 (ANSI A21.10) and AWWA C 153 (ANSI A21.53). Fittings shall be supplied with mechanical joint connections unless specified otherwise in the Contract Documents.

2. Fittings, with the exception of solid sleeve couplers, shall be cement lined. Cement lining shall be in conformance with AWWA C 104 (ANSI A21.4).

3. Fittings that have a damaged cement lining or no cement lining will be rejected at the job site. Cement linings installed or repaired by the distributor/supplier shall be completed in strict accordance with AWWA C 104 (ANSI A21.4).

4. Cement linings shall not be repaired at the job site.

5. The minimum working pressure for all ductile iron fittings 4 inches through 24 inches in diameter shall be 350 psi for mechanical joint fittings and 250 psi for flanged fittings. In all cases, fittings shall have minimum pressure ratings that will accommodate maximum pressures expected to be experienced during pressure and leakage testing.

6. Acceptable ductile and cast iron fittings, couplers, and adapters:

   - American.
   - U.S. Pipe.
   - Mueller.
   - U.F.C.
   - Tyler.
   - Approved equal.

401.02.G LIGHTWEIGHT MECHANICAL COUPLINGS AND ADAPTERS

1. Lightweight, multipurpose, mechanical couplings and adapters are limited in their application to connection of new pipe work to existing water lines, temporary installations, and where specific ally called for in the Contract Documents.

2. Lightweight, multipurpose, mechanical couplings and adapters shall consist of a ductile iron sleeve, ductile iron follower rings, rubber gaskets, and corrosion-resistant bolts and hex nuts.

3. Mechanical couplings and adapters shall have minimum pressure ratings that will accommodate maximum pressures expected to be experienced during pressure and leakage testing.

4. Acceptable mechanical couplings and adapters:

   - EBAA Iron, Inc.
   - Romac.
   - Ford.
   - Smith Blair (Rockwell).
   - Approved equal.

401.02.H BACKFILL

1. Backfill material shall conform to requirements in Section 209.

401.03 CONSTRUCTION

401.03.A EXCAVATION AND BACKFILL

1. GENERAL

   a. The trench shall be prepared for pipe laying and backfill as specified in Section 209 and applicable Standard Drawings.

   b. The trench bottom shall conform to the line and grade to which the pipe is to be laid, allowing for pipe thickness and bedding material, and shall form a continuous uniform bearing and support for the pipe between bell holes.

2. WORKING AROUND EXISTING AC WATER LINES

   a. The actual location of AC water lines shall be determined ahead of the excavator. Hand excavation shall be used in conjunction with excavating equipment when working around or looking for AC water lines.

b. Compaction equipment shall not be operated directly over or immediately adjacent to AC water lines, regardless of methods used to stabilize backfill and to support appurtenances. Traffic or construction equipment shall not be permitted to pass over temporarily backfilled excavations containing AC pipe.

401.03.B OPERATION OF EXISTING VALVES

1. The City Engineer will operate or supervise the operation of existing valves during the course of the work. The Contractor shall not operate any existing valve unless specific ally instructed to do so by the City Engineer.

2. The Contractor shall be responsible for coordination of the work with the City Engineer to provide for the timely operation of existing valves.

3. When so instructed by the City Engineer, the Contractor shall provide assistance in operating existing valves.

401.03.C GRADE AND ALIGNMENT

1. Water mains shall be installed with a minimum depth of bury of 3-feet as measured from the top of pipe to finish grade. A greater depth may be necessary to avoid underground obstructions. A minimum of 6-inches of clearance shall be maintained between the pipe and obstructions.

2. Where pipe lines are intended to be laid in a straight line, the deviation from the Plans for each section of pipe shall not be in excess of 0.2-foot horizontally for line and 0.2-foot vertically for grade.

3. Where pipe lines are intended to be laid along a curved alignment, the pipe shall follow the approved Plans. The minimum radius will be based on the allowable pipe deflection limits as specified in Subsection 401.03.G.5. In no case will a pipe be allowed to exceed allowable pipe deflections.

4. A combination air/vacuum release valve shall be permanently installed at high points on all water mains where air can accumulate at locations shown in the Contract Documents.

401.03.D UTILITY CONFLICTS

1. The Contractor shall be responsible for exposing potential utility conflicts far enough ahead of pipeline construction sufficient to make necessary adjustments in grade and alignment of the new work within the specified limits of pipe and fitting deflection and/or the lines and grades stated in the Contract Documents. The intent of this requirement is to preserve the option of adjusting the horizontal and vertical alignment of the new water line to avoid such utilities without the need for additional fittings and thrust restraint.

2. The Contractor shall be responsible for performing this work and for informing the City Engineer of the need for a grade and/or alignment adjustment.

3. The Contractor shall not deviate from the design line and grade stated in the Contract Documents or from pipe and fitting deflection requirements specified herein without the approval of the City Engineer.

4. Special care shall be taken to avoid compromising concrete thrust restraint on the existing water system. Where existing thrust restraint is compromised, the Contractor shall provide and install appropriate temporary blocking and maintain such blocking until the existing water line is properly abandoned.

401.03.E CONNECTION TO EXISTING, IN-SERVICE MAINS

1. Existing water mains or individual service lines shall not be taken out of service without proper notification to the City Engineer and affected water users. Generally, scheduled interruptions of water service shall not occur on Fridays, weekends, holidays, and on days immediately preceding holidays.

2. Due to varying outside pipe diameters and the incompatibility of AC pipe fittings with modern waterworks materials, AC pipe shall be excavated and examined at each location where connections are to be made to existing pipe or fittings.

3. The Contractor shall be prepared to begin work immediately after the scheduled beginning of the water shutoff. The excavation shall be completed and materials preassembled as much as possible prior to the scheduled time for the water shutoff. Scheduled water shutoffs will be cancelled by the City Engineer if the Contractor is not prepared to begin cutting and draining the existing water line at the designated time for the work to begin. A scheduled water shutoff may also be cancelled if the project manager determines that the Contractor does not have adequate equipment, including pumps and cut-off saws, to complete the work within the allotted time.

4. Once service has been turned off for scheduled work, the Contractor shall work continuously, without interruption, and as expeditiously as possible to perform the required work. In every instance of a water shutoff, water service shall be restored as quickly as possible, regardless of the scheduled duration of the shutoff. To that end, it is expected that scheduled breaks, including lunch breaks, shall occur before or after such work.

5. Existing valves may not fully shut off water to the desired area. The Contractor shall be prepared to make required connections in situations where there is still a partial flow of water after the appropriate valves have been closed.

6. In situations where an existing pipe joint is found adjacent to a proposed cut-in and the City Engineer determines that construction operations may compromise the joint, the Contractor shall remove the existing pipe between the joint and the new work, or as directed by the City Engineer, and replace that section with new materials.

401.03.F PIPELINE CROSSINGS

1. GENERAL

   a. Minimum allowable clearance between pipes at crossings shall be 6-inches. Special consideration for proper pipe support is required when both pipelines are new and clearance between them is less than 12-inches, when a new pipeline is crossing over an existing pipeline and the clearance between them is less than 12-inches, at all pipe crossings where a new pipeline is crossing under an existing pipeline.

2. SANITARY SEWER CROSSINGS

a. In locations where the new water line crosses over a sanitary sewer pipe with less than 18-inches of clearance between the two pipes or where the new waterline crosses under a sanitary sewer pipe, the Contractor shall replace the sewer pipe with a 20-foot minimum length of equivalent size ductile iron or C-900 PVC pressure pipe centered on the new water line. Watertight, mechanical couplers shall be used to reconnect the existing sewer pipe to the new ductile iron or C-900 PVC pipe section.

401.03.G PIPE AND FITTING INSTALLATION

1. SANITARY PRACTICES DURING INSTALLATION

a. Pipe shall not be laid in standing water. Every precaution shall be taken to prevent dirt, debris, or other foreign materials from entering the pipe during all phases of construction. Tools, rags, and other materials shall be kept out of the pipe work at all times.

b. Whenever the trench site is left unattended, the open ends of the pipe shall be sealed with a watertight plug to prevent trench water, foreign materials, and rodents and pests from entering the pipe. If water is in the trench, the seal shall remain in place as long as water is able to enter the pipe.

2. PIPE AND FITTING INSTALLATION

a. Pipe, fittings, and hydrants shall be lowered into the trench in such a manner that will preclude the possibility of the materials being damaged.

b. Pipe shall be laid and joined one length at a time to the required line and grade. Pipe shall be placed with the bell end facing the direction of laying except for lines on a grade in excess of 15% in which case bells shall face upgrade.

c. Excess tar coating shall be removed from the bell and spigot end of each pipe and fitting prior to installation. The outside of the spigot and the inside of the bell shall be cleaned before the pipe or fittings are installed. If the pipe contains excessive dirt or other foreign matter that will not be removed during the flushing operation, the interior of the pipe shall be cleaned as necessary to remove the material.

d. After the first length of pipe is installed in the trench, the pipe shall be secured in place with approved backfill material tamped under and along sides to prevent movement. Pipe ends shall be kept clear of backfill. Backfill shall be placed after each section of pipe is joined to prevent movement of the previously laid pipe.

3. PIPE CONNECTION PROCEDURES

a. Connection procedures shall be in accordance with the manufacturer's recommendations.

b. Lubricant for push-on joint and mechanical joint pipe shall be of a nontoxic vegetable soap type provided by the pipe manufacturer.

c. The use of slip-on flanges with retaining screws is not permitted unless specifically called for in the Contract Documents.

d. Coupling of ductile iron pipe with plain ends of the same diameter in new construction shall be accomplished with ductile iron, solid sleeve couplers with mechanical joints. Coupling of plain ends to flange ends during new construction shall be accomplished with solid ductile iron mechanical joint × flange (MJ × FLG) adapters/reducers.

e. The following are given as general guidelines for each type of pipe joint:

1) FLANGED JOINTS

a) Contact faces and gaskets for flanged connections shall be cleaned as necessary to remove any foreign matter before the connection is made.

b) Flanged joints shall be fitted so the contact faces bear uniformly on the gasket. Bolts shall be tightened progressively in a sequential, uniform manner to torque values recommended by the manufacturer of the flange and/or fitting.

c) Flanged fittings shall be properly anchored, supported, or restrained during installation to prevent bending or torsional strains at the connection during and after the jointing procedure.

2) MECHANICAL JOINTS

a) The pipe shall be inserted in the socket and supported as necessary to keep the pipe centered in the joint and to maintain uniform exposure of the gasket recess. The gasket shall be pressed firmly and evenly into the gasket recess prior to installing the bolts through the gland.

b) Bolts shall be tightened progressively in a sequential, uniform manner to torque values recommended by the manufacturer of the fitting. The gland shall not be allowed to deform during the tightening process.

c) Any required deflection of joints shall be made after the joint is assembled, but before final tightening of the bolts.

d) The jointing procedure shall be repeated if effective sealing is not attained at the maximum torque.

e) Bolts shall be tightened to manufacturer's specifications. Bolts shall not be overstressed to compensate for ineffective sealing or poor installation practices.

3) THREADED JOINTS

a) Threaded joint connections shall be made after all threaded surfaces have been thoroughly cleaned and prepared with sealing tape or pipe jointing compound approved by the manufacturer for use in potable water systems. Sealing tape and pipe jointing compound shall be applied in strict accordance with the manufacturer's instructions. Excessive use of sealing materials will not be permitted.

4. CUTTING DUCTILE IRON PIPE

   a. Cutting of ductile iron pipe for inserting valves, fittings, or closure pieces shall be done with a milling-type cutter or saw and in a manner that precludes damage to the pipe or cement lining and leaves a smooth end at right angles to the axis of the pipe. Flame cutting ductile iron pipe will not be permitted.

   b. The cut end of the pipe shall be ground smooth and for push-on joint connections shall be beveled as necessary to remove sharp edges that may damage the gasket. The width and general appearance of the bevel shall closely resemble the bevel on an original pipe end.

   c. Any lining or coating damaged to a significant degree during the cutting process, as determined by the City Engineer, shall be cause for removing the damaged section by re-cutting the pipe or for rejecting the pipe altogether.

5. ALLOWABLE DEFLECTION OF PIPE

   a. Curved alignment for waterlines or mains is permitted and shall be parallel to the street centerline when practical. The minimum allowed radius will be based on allowable pipe deflection for the pipe diameter and the pipe laying length. All abrupt changes in vertical or horizontal alignment shall be made with a fitting and adequate thrust restraint. In all cases, when push-on or mechanical joint pipe is to be laid on a curve or abrupt angle either in the horizontal or vertical plane, the amount of deflection shall not exceed the maximum limits recommended by the pipe and fitting manufacturer or the restrained retainer gland manufacturer, whichever is less.

   b. If any joint in any run of pipe appears be deflected in excess of those specified herein, as determined by the City Engineer, the Contractor shall, upon request of the City Engineer, expose a sufficient length of the newly laid pipe for the purpose of determining the actual deflection at any joint. The Contractor shall take up and reinstall pipe that is found to have joint deflection in excess of that specified herein.

401.03.H STANDARD DEAD-END MAIN BLOWOFFS

1. Dead-ends on new water lines shall be closed with a cast iron, mechanical-joint plug threaded to accept an adequate blow-off assembly (velocity of 2 ft/sec min) in conformance with the applicable Standard Drawing. Valve boxes (and meter boxes for blowoffs in non-traffic areas) shall be kept free of rocks and debris and shall be installed flush with finished grade.

401.03.I ANCHORAGE

1. GENERAL

   a. Water pipe and fittings shall be mechanically restrained in lieu of using conventional concrete blocking. New water mains shall not be restrained with concrete blocking without specific approval of the City Engineer. See Standard Drawings.

   b. Calculations for determining restrained lengths of pipe to protect specified bends and other assemblies shall be based on the following general parameters:

      - Minimum 2:1 safety margin.
      - Minimum 150 PSI test pressure.
      - Minimum 3-feet of cover at the time of pressure testing.

- ❖ Marginal trench and backfill conditions.

c. Details relative to materials and length of pipe runs to be restrained will require review and approval by the City Engineer.

2. MECHANICAL THRUST RESTRAINT

a. New water mains shall be mechanically restrained through utilization of internal, push-on joint restraint (pipe) and retainer glands for mechanical joint connections (fittings, valves, and pipe).

b. Mechanical joint fittings and bends 11-1/4 degrees and larger shall be restrained in accordance with Standard Drawings. Tees shall be restrained with a run of restrained pipe consistent with the length required to restrain a dead-end run of pipe.

c. The use of tie-back rods is not permitted.

3. CONCRETE THRUST BLOCKING

a. NOTE: Water mains shall not be restrained with concrete blocking without specific approval of the City Engineer, see Subsection 401.03.I.1.a

b. Concrete used for thrust blocking shall have a minimum compressive strength of 3,300 psi within twenty-eight (28) days.

c. Concrete thrust blocking shall be poured in place between undisturbed earth and the fittings to be anchored.

d. If, in the opinion of the City Engineer, the undisturbed earth against which the bearing surface has been established is compromised by adjacent trenches or excavations, the Contractor shall, as directed by the City Engineer, excavate additional material as required to establish a new bearing surface that is consistent with the size, configuration, and location of the piping.

e. The area where the blocking is to be placed shall be sufficiently excavated to receive the concrete so that the proper shape and bearing surface is attained. The bearing surface shall be placed so that the pipe and fitting joints will be accessible for repair. Concrete shall in no case extend around more than one-half the circumference of the fitting at any point.

f. A plastic sheet or other similar protection shall be placed between the concrete and any portions of the valve, fitting, or nuts and bolts with which the concrete comes in contact.

g. The size of thrust blocks shall be determined by the size, configuration, and location of the piping. Minimum bearing areas for thrust restraint are outlined in the Standard Drawings. The Contractor shall not increase the size of the bearing area or volume of concrete without the approval of the City Engineer. Thrust blocks with volumes of concrete that are in excess of or less than that specified for the size and configuration of the piping shall be removed by the Contractor, at the Contractor's expense, when directed to do so by the City Engineer.

h. Concrete gravity blocking is not permitted under any circumstances.

i. Joints between thrust collars and fitting assemblies shall be mechanically restrained.

401.03.J POLYETHYLENE ENCASEMENT

1. When specified in the Special Provisions or Contract Documents, polyethylene encasement shall be installed per the manufacturer's recommendation.

401.03.K REPAIR OF DAMAGED WATER LINES

1. It is the Contractor's responsibility to make emergency repairs to existing water lines that are damaged during the course of construction.

2. Procedures and materials used in repair work of this nature shall be as approved by the City Engineer.

3. This requirement will apply to existing water lines that have been previously located and marked by the owner prior to commencement of construction operations.

401.03.L SURFACE RESTORATION

1. Surface restoration shall be in conformance with applicable requirements of Section 212, Section 213, and Section 215.

401.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

401.04.A PIPE INSTALLATION

1. Measurement and payment for installation of water line pipe will be made on a linear-foot basis within the limits shown in the Contract Documents for the actual footage of pipe installed.

2. Payment for pipe installation will constitute full compensation for all labor; equipment; materials; clearing the construction area; trench excavation; pipe bedding, pipe zone material, backfill, and compaction operations; thrust blocking, flushing, testing, and disinfection; all fittings, spools, and mechanical couplings required to complete the pipeline as designed; connection to and abandonment of existing water lines; and any other incidental expenses necessary to prepare the constructed water line for use.

401.04.B ASSEMBLIES

1. Assemblies (including blowoff assemblies) will be paid for on a lump-sum basis as stated in the Contract Documents. Payment for each assembly will constitute full compensation for furnishing and installing the fitting assembly, complete, including mechanical couplings, joint restraint, and any other incidental expenses or materials necessary to complete the installation.

401.04.C INCIDENTALS

1. Other materials, labor, and equipment required to complete the water pipe and fitting work in conformance with the Contract Documents and not listed as separate pay items in the Bid will be considered incidental to other items of work and no separate payment will be made.

402 WATER SERVICES

402.01 DESCRIPTION

402.01.A This work consists of furnishing and installing water services for water distribution systems.

402.01.B The Contractor shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to completing the Work as shown on the Plans and in complete accordance with the Specifications.

402.01.C All supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation, whether or not shown on the Plans or addressed in the Specifications, shall be provided and installed as part of the Work.

402.01.D MANUFACTURER'S CERTIFICATION

1. The Contractor shall furnish manufacturers certification for construction materials when such information is requested by the City Engineer. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. All information and cut sheets shall be originals, copies will not be accepted. A minimum of 5 original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

402.02 MATERIALS

402.02.A GENERAL

1. Materials shall be in conformance with the general requirements set forth in Section 401.02.A.

2. Water service components shall be of one type of material throughout and have minimum pressure ratings that will accommodate maximum pressures expected to be experienced during pressure and leakage testing.

3. Private water service pipe (on the customer side of the meter) shall be Schedule 80 PVC sized to match the existing service. An approved tracer wire shall be installed with PVC water service. The tracer wire shall be bonded to existing metallic service piping, where found. The tracer wire shall be accessible within the meter box.

402.02.B COPPER WATER TUBE

1. Seamless copper tubing for use in the installation of water service lines shall be Type K, soft, supplied in conformance with ASTM B 88.

2. Copper tubing shall be of domestic manufacture.

3. Copper tubing for use as water service lines shall be 1-inch or 2-inch diameter, depending on the application.

402.02.C BRASS/BRONZE FITTINGS

1. CORPORATION STOPS

   a. Corporation stops for services, air valves, and pressure testing shall be supplied in conformance with AWWA C 800-66.

   b. Corporation stops for service installations shall be 1-inch or 2-inch diameter, depending on application.

   c. Sizing for corporation stops used in air valve applications will be specified in the Contract Documents.

   d. Corporation stops used for pressure testing shall be replaced with a threaded brass plug with AWWA taper threads after completion of chlorination and pressure testing of the water line.

   e. Acceptable corporation stops:

      - Ford .....FB-1000-4 (for 1" service)
        ... .FB-1000-7 (for 2" service)
      - Mueller P-25008
      - Approved equal

2. ANGLE METER VALVES

   a. Angle meter valves shall be supplied in conformance with ASTM B 62.

   b. Angle meter valves shall have 1-inch inlet and 3/4-inch outlet with padlock wings.

   c. Acceptable 1-inch x 3/4-inch angle meter valves:

      - Ford .....BA 43-342W
      - Mueller P-24258
      - Approved equal

3. 1 1/2-INCH AND 2-INCH METER SETTER

   a. For 1 1/2-inch and 2-inch meter installations, a 2-inch meter setter shall be used in lieu of an angle meter valve.

   b. Acceptable meter setters:

      - Ford.....VBB77-18HB 47-77
      - Mueller .....B-2423-99000 with P-15428 Coupling (Inlet) and V15440 Coupling (Outlet)
      - Approved equal

   c. NOTE: Specified couplings are required to adapt female IPT inlet on the setter to pack-joint inlet and outlet. The Ford setter comes supplied with the appropriate coupling. Use Ford A67 adapters to install 1 1/2-inch meters in 2-inch meter setters.

   d. These meter setters have a height of 18-inches and have a high-offset bypass.

4. COPPER SERVICE COUPLINGS

   a. Intermediate couplings for copper water service tubing are not permitted unless specified in the Contract Documents or approved by the City Engineer.

   b. When authorized for use, brass and bronze couplings for copper tubing shall have compression joint connections as specified for corporation stops and angle meter valves.

   c. ACCEPTABLE COPPER WATER SERVICE COUPLINGS:

      - Ford .....C44-44 for 1-inch and C44-77 for 2-inch
      - Mueller P-15403
      - Approved equal

5. CUSTOMER SERVICE VALVES

   a. A customer service valve shall be installed between the meter and the private service line and shall be located within the meter box. Customer service valves shall be constructed of waterworks brass with lever or hand wheel operation. Valve connections shall be consistent with the type of existing private service line encountered. Brass components shall be used between the meter and the customer service valve.

   b. Acceptable customer service valves:

      - Ford .....SG 13-332 (3/4-inch straight)
        SG 13-444 (1-inch straight).
      - Approved equal

402.02.D SERVICE SADDLES

1. Double stainless steel strapped, ductile iron bodied service saddles will be required for all service taps on 4-inch ductile iron pipe main lines and for all service taps on steel and cast iron pipe main lines.

2. Double Stainless steel strapped, stainless steel bodied, services saddles will be required for all service taps on asbestos cement pipe regardless of main line size.

3. Service taps on ductile iron pipe main lines 6-inches and larger in diameter shall be direct tapped for 1-inch services.

4. Saddles are required for all 1 1/2-inch and larger service taps regardless of pipe material or main line size.

5. Acceptable service saddles:

   - Ford .....Style FSD202
   - Mueller .....DR25 Series
   - Approved Equal

6. Service saddles shall be supplied with AWWA taper thread.

402.02.E METERS

1. The City will supply meters and adapters as required.

402.02.F CONCRETE METER BOXES

1. Precast meter boxes shall be constructed of polymer concrete with a minimum compressive strength of 4,000 psi.

2. Covers furnished with the boxes shall be polymer concrete with a drop-in reading lid and knockouts for touch-read sensors. Use specified covers in traffic areas.

3. Acceptable concrete meter boxes:

   a. 3/4-inch & 1-inch meters (13" x 24" x 12")

      - Armorcast .....A6001946PCX12 with:
        A6001866-DQ-H1 cover and
        A6000487 drop-in read lid. Use
        A6001969-H1 cover in traffic areas.
      - Approved equal

   b. 1 1/2-inch & 2-inch meters (17" x 30" x 12")

      - Armorcast .....A6001640PCX12 with:
        A6001643-DZ-H1 cover and
        A6000482 drop-in read lid. Use
        Brooks No. 66-TR steel traffic cover in traffic areas.
      - Approved equal

402.02.G BACKFILL

1. Backfill material shall conform to requirements in Section 209.

402.03 CONSTRUCTION

402.03.A EXCAVATION AND BACKFILL

1. The trench shall be prepared for pipe laying and backfill as specified in Section 209 and applicable Standard Drawings.

2. The trench bottom shall conform to the line and grade to which the pipe is to be laid, allowing for pipe thickness and bedding material, and shall form a continuous uniform bearing and support for the pipe between bell holes.

402.03.B PIPE AND FITTING INSTALLATION

1. PIPE INSTALLATION

   a. Copper service piping shall be of the size shown in the Standard Drawings or Contract Documents.

   b. Generally, water service lines shall be installed with a minimum depth of bury of 30-inches as measured from the top of pipe to finished grade. A greater depth may be necessary to avoid existing underground utilities or other obstructions. When extending new service piping across existing streets, the minimum cover shall be established at the gutter elevation and the copper service extended across the street at a flat grade.

c. Copper service piping shall be direct buried and bedded in select rock backfill such that no portion of the service assembly is in contact with native soil. Service lines shall not be installed by jacking or other methods which will result in the completed service assembly being in contact with native soil. Copper service piping may be installed in PVC casings where approved by the City Engineer.

d. When two or more water service lines are installed in a common trench, the minimum spacing between services shall be 1-foot.

e. Piping shall be extended from the corporation stop at the main to the angle meter valve at the meter with a continuous length of pipe and without the use of intermediate couplers.

f. Piping shall be carefully deflected as necessary to complete the service connection but at no time shall the pipe be allowed to become kinked so as to reduce its cross-section. Kinked or twisted piping shall be replaced by the Contractor at the Contractor's expense in its entirety from the corporation stop on the main to the angle meter valve at the meter.

g. Individual service assemblies, including the service tap, copper piping, and angle meter valve, shall not be backfilled until they have been inspected and approved by the City Engineer. The Contractor shall coordinate the inspection of service assemblies with the City Engineer.

2. CUTTING, SIZING, AND BENDING COPPER TUBING

a. Copper tubing shall be cut, reamed, sized, and configured using tools and practices specific to those operations.

3. SERVICE TAPS

a. Service taps required on new water mains shall be performed by the Contractor. Service taps required on existing water mains will be constructed by the City, unless stated otherwise. Tapping operations shall be performed with industry standard equipment manufactured solely for the purpose of tapping potable water lines.

b. Generally, ductile iron water lines shall be direct tapped with AWWA taper threads. Service saddles are required in some applications. See Subsection 402.02.D and the appropriate Standard Drawing for specific applications for service saddles.

c. Standard service taps shall be located at 10:00 or 2:00 on the circumference of the pipe.

d. Taps shall be made with a minimum clear distance of 18-inches from any pipe joint or between taps on the water main.

4. CORPORATION STOPS AND ANGLE METER VALVES

a. Threaded joint connections shall be made after all threaded surfaces have been thoroughly cleaned and prepared with sealing tape or pipe jointing compound approved for use in potable water systems.

b. Generally, angle meter valves shall be installed in the correct position relative to the proposed meter location prior to pressure and leakage testing. Angle meter valves shall not be repositioned, removed, or the copper tubing re-cut after final acceptance of pressure and leakage testing. Removal and/or relocation of the angle meter valve, or any other components, after pressure and leakage testing shall require retesting of the new water main prior to acceptance by the City. Details relative to the retesting of water mains will be determined by the City Engineer.

402.03.C METER AND METER BOX INSTALLATION

1. The Contractor shall install the angle meter valve such that the operating nut is 8 to 12-inches below the top of the meter box cover.

2. Both the angle meter valve and customer service valve operating nuts/handles shall operate freely without striking the inside of the meter box.

3. Reconnection of existing house service lines to new meters shall be made with Schedule 80 PVC pipe and appropriate fittings sized to match the existing service.

4. Each angle meter valve or meter assembly shall be covered by a meter box. Each meter box shall be set on 4-inches of compacted 1-inch minus crushed aggregate at an elevation that places the top of the meter box cover flush with the existing or proposed grade.

5. Meter box locations shall be kept clear of pedestrian hazards during the different phases of service installation.

6. Open excavations shall be kept covered with plywood or other approved materials. Water system components, meter boxes, and other debris shall not be allowed to accumulate in the parking strip.

402.03.D REPAIR OF DAMAGED WATER LINES

1. It is the Contractor's responsibility to make emergency repairs to existing water lines damaged during the course of construction.

2. Procedures and materials used in repair work of this nature shall be as approved by the City Engineer.

402.03.E SURFACE RESTORATION

1. Surface restoration shall be in conformance with applicable requirements of Section 212, Section 213, and Section 215.

402.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

402.04.A SERVICES

1. Payment for installation of services shall be made on a linear-foot basis as stated in the Contract Documents. Pipe will be measured horizontally from the center of the water line to the angle meter valve.

2. Payment for copper service installation shall constitute full compensation for labor; equipment; materials; trench excavation, backfill, and compaction operations; installation of copper service line including service saddle, corporation stop, and the angle meter valve; flushing, testing, and disinfection; and any other incidental expenses necessary to prepare the constructed service line for use.

402.04.B METER ASSEMBLIES

1. Payment for meter assemblies and installation will be made on a unit-price basis per assembly and will include all labor; materials; equipment; trench excavation, bedding, and backfill operations; any required adapters, meter setter, customer service valve, and meter box; connection to and abandonment of the existing service; and restoration of the ground surface to original condition.

402.04.C INCIDENTALS

1. Other materials, labor, and equipment required to complete the water services work in conformance with the Contract Documents and not listed as separate pay items in the Bid will be considered incidental to other items of work and no separate payment will be made.

403 VALVES AND RELATED EQUIPMENT

403.01 DESCRIPTION

403.01.A This work consists of furnishing and installing valves and related equipment typically used for water distribution systems.

403.01.B The Contractor shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to completing the Work as shown on the Plans and in complete accordance with the Specifications.

403.01.C All supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation, whether or not shown on the Plans or addressed in the Specifications, shall be provided and installed as part of the Work.

403.01.D MANUFACTURER'S CERTIFICATION

1. The Contractor shall furnish manufacturers certification for construction materials when such information is requested by the City Engineer. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. All information and cut sheets shall be originals, copies will not be accepted. A minimum of 5 original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

403.02 MATERIALS

403.02.A GENERAL

1. Only materials designed for potable water service and meeting the current National Sanitation Foundation Standard (NSF) 61, Section 9, Drinking Water System Components – Health Effects, or equivalent shall be used in those elements of the water system which are in contact with potable water.

403.02.B RESILIENT-SEATED, IRON BODY GATE VALVES

1. Gate valves shall be used on 8-inch diameter and smaller pipe lines.

2. Resilient-seated, iron body gate valves shall meet or exceed the provisions of AWWA C 509 and shall be a non-metallic seat, non-rising stem-type with O-ring seals. The valves shall be designed to withstand water-working pressures of 200 psi or more. All valves shall be furnished with a 2-inch-square operating nut and shall open counter clockwise when viewing valve from above. Valves shall be coated inside and out with epoxy coating complying with AWWA C550.

3. Operation of the valve shall permit full withdrawal of the disc from the waterway to provide a clear, unrestricted passage when the valve is in the open position. The valve shall be furnished with joint ends as specified on the Plans. Where flanges are furnished on valves, they shall be designed for direct burial and conform to ANSI Specification B-16-1, Class 125.

4. Acceptable resilient-seated gate valves:

   - Clow "Resilient Wedge".
   - Kennedy "Ken-Seal" U.S. Pipe.
   - M & H.
   - Mueller.
   - U.S. Pipe.
   - Waterous "Series 500".
   - Approved equal.

403.02.C BUTTERFLY VALVES

1. Butterfly valves shall be used on 10-inch diameter and larger pipe lines.

2. Butterfly valves shall meet or exceed the provisions of AWWA C 504, Class 150B and bubble-tight at 150psi pressure with flow in either direction. They shall be designed for direct burial and be satisfactory for application involving valve operation after long periods of inactivity. Butterfly valves shall be short-bodied, cast iron construction

3. Valves shall be of the watertight closing type with 2-way thrust bearing and shall be equipped with a 2-inch square operating nut that opens the valve when turned counterclockwise.

4. Acceptable butterfly valves:

   - Dresser "450".
   - Kennedy.
   - M & H.
   - Mueller "Lineseal III".
   - Pratt "Ground Hog".

- U.S. Pipe.
- Approved equal.

403.02.D TAPPING VALVES AND SLEEVES

1. TAPPING VALVES

   a. Tapping valves shall have a flange on one end for bolting to the sleeve and a flanged or mechanical joint outlet.

   b. The valves shall accommodate full-sized cutters.

   c. In all other respects, tapping valves shall meet the requirements specified herein for iron-body gate valves.

   d. Acceptable tapping valves:

      - Clow.
      - Kennedy.
      - M & H.
      - Mueller.
      - U.S. Pipe.
      - Approved equal.

2. TAPPING SLEEVES

   a. Tapping sleeves shall be 2-piece, epoxy-coated, fabricated steel; full-circle stainless steel with stainless steel flange; or fabricated steel with mechanical joints. The type of tapping sleeve required is dependent upon the type of pipe material being tapped and the size of the tap relative to the receiving pipe. Where the City approves the use of a tapping sleeve, the type of sleeve for each application will be indicated on the construction permit or within the Contract Documents.

   b. Generally, full-circle stainless steel sleeves shall be used on all asbestos-cement and cast iron water lines and on ductile iron water lines with size-on-size taps. Where stainless steel sleeves are indicated, the entire sleeve assembly, including body, outlet flange, and nuts and bolts shall be stainless steel.

   c. Size-on-size taps on O.D. steel pipe water lines shall be weld-on style. In applications where the tap is smaller than the receiving O.D. steel pipe, a 2-piece fabricated steel sleeve may be used. Due to the possible presence of a bead weld on this type of pipe, full-circle, stainless steel sleeves shall not be used on O.D. steel pipe.

   d. Fabricated steel, mechanical joint tapping sleeves are generally used in larger diameter pipe applications where there is no stainless steel tap alternative.

   e. Tapping sleeves shall be supplied with 3/4-inch test ports and flanged outlets.

   f. Nuts and bolts used for the installation of the sleeves shall be stainless steel and supplied by the sleeve manufacturer.

   g. Fabricated steel, mechanical joint tapping sleeves shall be supplied with a fusion-bonded epoxy coating.

h. Acceptable tapping sleeves:

1) 2-Piece Fabricated Steel

- Ford FTSC.
- JCM.
- Romac.
- Approved equal.

2) Full-Circle Stainless Steel

- Mueller H-304 w/SS FLG.
- JCM 432.
- Romac SST III w/SS FLG.
- Ford FAST w/SS FLG.
- Approved equal.

3) Fabricated Steel, Mechanical Joint

- Romac FTS 425.
- JCM 414.
- Smith Blair.
- Kennedy.
- Approved equal.

403.02.E VALVE OPERATOR EXTENSIONS

1. A valve operator extension shall be provided for every valve where the operating nut is in excess of 3-feet below finished grade. The extension shall be of such length that its operating nut in place is within 2 to 3-feet of finished grade.

2. Valve operator extensions shall consist of 1-inch round or square bar stock with a valve wrench cup attached to one end and a 2-inch square operating nut to the other. The valve wrench cup and operating nut shall be attached to the ends in such a manner as to withstand, without damage, an input torque of three-hundred (300) foot-pounds.

3. Valve operator extensions shall be equipped with a plate at the upper end to catch rocks and debris and to maintain central alignment of the extension within the valve box. See the appropriate Standard Drawing.

403.02.F ADJUSTABLE VALVE BOX ASSEMBLIES

1. The valve box assembly shall consist of a maximum of two (2) components; the adjustable cast iron valve box (frame and cover) and a 6-inch diameter 3034 PVC spool in one piece from the valve to the box.

2. Adjustable valve boxes shall be supplied without bottom flanges.

3. The valve box cover shall have the word WATER cast into it.

4. Acceptable adjustable valve box assemblies:

- Olympic Foundry, Inc. .....Part No. VB910
- Approved equal

5. See appropriate Standard Drawing.

403.02.G COMBINATION AIR VALVE ASSEMBLIES

1. GENERAL

   a. Air valves shall be a combination air valve type that performs both the functions of air release and air/vacuum valves which permits entrained air to escape from the line while retaining water upon filling and under pressure and which permit a reverse flow of air into the line upon draining.

   b. The valve body, cover, and lever frame shall be cast iron or approved alloy. The float shall be stainless steel and shall close against a rubber valve seat. Other internal parts shall be either stainless steel or bronze or other approved non-corrodible material.

   c. Acceptable combination air valves:

      - Apco .....143C or 145C
      - Val-Matic .....201C or 202C
      - Approved equal

2. VENT OULET PIPING

   a. Combination air valve assemblies shall be properly vented above grade and screened. Vent outlet piping shall be schedule 80 PVC and shall extend 18-inches above grade. Outlet venting shall be a double outlet screened vent assembly as manufactured by Morrison Bros. Figure 155 Series or approved equal.

3. HAND OPERATED VALVES

   a. Acceptable hand valves:

      - A.Y. McDonald.....No. 6102T with hand Lever 6120B
      - Mueller .....No. B-25172 with hand lever B-20298-99000
      - Approved equal

4. FIBERGLASS FLIP-TOP INSULATED ENCLOSURE

   a. Approved insulated flip-top enclosure:

      - “Hotbox” .....Model EZ.75
      - Approved equal.

403.03 CONSTRUCTION

403.03.A VALVES AND VALVE BOXES

1. VALVE INSTALLATION

   a. Valves that are 12-inches and larger shall be set to grade on a precast concrete pad placed on undisturbed earth such that the pipe will not be required to support the weight of the valve.

b. Following installation, the valve shall be operated from the fully open to fully closed position to ensure the valve does not bind during operation.

2. VALVE BOX INSTALLATION

a. A valve box assembly shall be installed over every valve.

b. Valve box assemblies shall be set such that the completed assembly is straight and plumb with a minimum overlap of 6-inches between the frame and riser section. The completed valve box assembly shall be centered over the operating nut of the valve and shall not transmit shock or stress to the valve, operating nut, or valve operator extension.

c. The exposed end of the valve box assembly shall remain accessible at all times. The Contractor shall be responsible for keeping the valve box assembly free of rocks and other debris for the duration of the project.

d. Valve box assemblies shall be set flush with finish grade during final surface restoration.

e. Misalignment of the valve box assembly components or misalignment of the valve box assembly over the operating nut shall be corrected by the Contractor prior to final surface restoration. Damaged riser ends and frame and cover assemblies shall be replaced by the Contractor prior to final surface restoration.

403.03.B TAPPING VALVES AND SLEEVES

1. Tapping sleeves and valves shall be installed in accordance with the manufacturer's requirements by a tapping Contractor approved by the City Engineer. Generally, provision and installation of tapping sleeves and valves and the actual tap shall be by Contractors who are solely engaged in this type of work.

2. With the exception of size-on-size taps, full-size cutters shall be used in making taps.

3. Tapping valves shall be supported by concrete blocks placed on compacted backfill material or undisturbed, stable subgrade to preclude rotation or settlement of the sleeve on the pipe being tapped.

4. Live-tap assemblies shall be supported at all times when working with AC pipe. Permanent support by means of precast or cast-in-place concrete is required. Precast support blocking shall utilize permanent hardwood shims to transfer the load to the blocks. Cast-in-place concrete support will require temporary support that is shimmed to support the assemblies prior to placing concrete. To reduce potential for shear, the size of the excavation shall be strictly limited to that required to install the improvements. The methods used to meet these requirements will require review and approval by the City Engineer prior to construction.

403.03.C COMBINATION AIR VALVES

1. Piping for combination air valves shall be threaded-brass pipe or 1-inch copper service pipe connected to a corporation stop installed in the main by the Contractor. If 1-inch copper service pipe is used, there shall be no intermediate couplings between the corporation stop and the ball valve. Fittings shall be cast bronze.

2. The supply line shall be on a positive slope of at least two percent from the main to the combination air valve and shall be supported by a precast concrete block set directly below the valve. A hand operated valve shall be provided out the bottom of the air valve.

3. The assembly shall be protected by two (2), stacked Brooks No. 66 concrete meter boxes set so the lid is flush with finished grade. The vertical clearance between the top of the air valve and the Brooks No. 66 large meter box cover shall not exceed 6-inches. The inner box area shall be kept free of backfill material or other foreign matter at all times so the valve is readily accessible.

4. Drainage shall be accomplished by placing 1-inch minus crushed gravel to a depth of at least 6-inches below the supply line pipe for the full trench width from the air valve to the main.

5. The combination air valve vent shall be extended 18-inches above grade to prevent backflow contamination. The combination air valve vent shall be installed in an insulated enclosure "Hotbox" Model LB.75 fiberglass flip-top enclosure or approved equal to a Brooks No. 66 traffic rated cover using 1" x #14 SST self tapping screws. See appropriate Standard Drawing.

6. Details relative to installations located in streets, driveways, or other areas subject to vehicular traffic will require review and approval of the City Engineer.

403.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

403.04.A VALVE ASSEMBLIES

1. Valves shall be paid for on a per-each basis as stated in the Contract Documents.

2. Payment for each valve shall constitute full compensation for furnishing and installing the valve complete, including concrete valve pad, valve box, mechanical couplings, concrete thrust blocking, and any other labor, materials, and equipment required to complete the installation.

403.04.B INCIDENTALS

1. Other materials, labor, and equipment required to complete the valves and related equipment work in conformance with the Contract Documents and not listed as separate pay items in the Bid will be considered incidental to other items of work and no separate payment will be made.

404 FIRE HYDRANTS

404.01 DESCRIPTION

404.01.A This work consists of furnishing and installing fire hydrant assemblies for water distribution systems.

404.01.B The Contractor shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to completing the Work as shown on the Plans and in complete accordance with the Specifications.

404.01.C All supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation, whether or not shown on the Plans or addressed in the Specifications, shall be provided and installed as part of the Work.

404.01.D MANUFACTURER'S CERTIFICATION

1. The Contractor shall furnish manufacturers certification for construction materials when such information is requested by the City Engineer. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. All information and cut sheets shall be originals, copies will not be accepted. A minimum of 5 original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

404.02 MATERIALS

404.02.A GENERAL

1. Only materials designed for potable water service and meeting the current National Sanitation Foundation Standard (NSF) 61, Section 9, Drinking Water System Components – Health Effects, or equivalent shall be used in those elements of the water system which are in contact with potable water.

404.02.B FIRE HYDRANTS

1. Fire hydrants shall be manufactured in accordance with AWWA C 502, be of center-stem and safety-flange construction with a 5 1/4-inch main valve opening against the pressure, and the inlet connection shall be a 6-inch mechanical joint.

2. Operating nuts shall be national standard, pentagon shape, 1½-inch point to flat and shall turn counterclockwise to open.

3. Hydrants shall have two, 2 1/2-inch hose nozzles with national standard threads (7 1/2 threads per-inch), one, 4 1/2-inch pumper nozzle with national standard threads (4 threads per-inch).

4. Hydrants shall be "high gloss safety yellow" in color, painted or epoxy coated by the manufacturer.

5. Acceptable fire hydrants:

    - Kennedy K-81D Guardian.
    - Waterous 5 1/4 Pacer
    - Approved Equal.

404.02.C FIRE HYDRANT EXTENSIONS

1. Extension assemblies for fire hydrants shall be supplied by the manufacturer of the hydrant for which the extension is required.

404.02.D REFLECTIVE PAVEMENT MARKERS

1. All fire hydrant locations shall be identified by the installation of reflective pavement markers. The markers shall be blue in color with two reflective sides.

2. Acceptable reflective pavement markers:

   - 3M™ Raised Pavement Marker RPM-295
   - Stimsonite Model C88-AB
   - Ray-O-Lite Model AA
   - Astro Optics Corp Hydrant-Lite
   - Approved equal.

404.02.E BACKFILL

1. Backfill material shall conform to requirements in Section 209.

404.03 CONSTRUCTION

404.03.A EXCAVATION AND BACKFILL

1. The trench shall be prepared for pipe laying and backfill as specified in Section 209 and applicable Standard Drawings.

2. The trench bottom shall conform to the line and grade to which the pipe is to be laid, allowing for pipe thickness and bedding material, and shall form a continuous uniform bearing and support for the pipe between bell holes.

404.03.B FIRE HYDRANTS

1. No fire hydrant shall be installed on a water main of less than 8-inch inside diameter unless it is in a looped system of 6-inch mains and is approved by the City Engineer. Hydrants shall be located as close to the mainline as possible and in no case shall be over 40 feet away unless protected by a City approved backflow assembly.

2. Fire hydrants shall stand plumb and shall be set so that the center of the safety breakaway flange is located a minimum of 2-inches and a maximum of 6-inches above finished sidewalk or ground level and as shown on the applicable Standard Drawing.

3. When placed in the open area between the curb and sidewalk or directly behind the curb where no sidewalk is proposed, the hydrant barrel shall be set so that no portion of the pumper or hose nozzle cap will be less than 18-inches, nor more than 24-inches from the gutter face of the curb. When set behind the sidewalk, no portion of the hydrant or nozzle cap shall be less than 6-inches or more than 18-inches from the sidewalk.

4. Fire hydrants shall not be installed closer than 5-feet from an existing utility pole or guy wire nor shall a guy wire or utility pole be placed less than 5-feet from an existing hydrant. Hydrants shall be:

   - As near as possible to the corner of street intersections (curb returns),
   - At the end of a dead-end line, unless the line is less than 8-inches, or the dead-end line meets the criteria for a blow-off.
   - At property lines extended into the right-of-way so as to not interfere with driveways.
   - Installed with fire hydrant gate valve locations corresponding to hydrant locations, wherever possible.

5. It shall be the Contractor's responsibility to ensure such horizontal clearances are satisfied regardless of approximate distances from the main as may be noted on the Plans. The Contractor shall make any necessary horizontal adjustment to improperly set hydrants at the Contractor's sole expense.

6. Hydrants set too high shall be removed and replaced with an appropriate hydrant by the Contractor at Contractor's own expense. Where approved by the City Engineer, extensions required for hydrants set too low shall be supplied and installed by the Contractor at Contractor's own expense. Extensions shall be installed per manufacturer's recommendations.

7. Drainage shall be provided for the hydrant by placing 1-inch to 1 1/2-inch drainage rock from the bottom of the trench at the base of the hydrant to at least 6-inches above the inlet pipe. Crushed granular base rock (3/4-inch minus) shall be placed in the inlet pipe trench for the full length from the hydrant to the main.

8. Following installation, the Contractor shall cover each hydrant with a tarp, plastic sheet, or other approved covering until the water main is put into service.

9. Marring, chipping, or other damage to the factory paint shall be repaired to the extent necessary to restore the hydrant to as-new condition. Paint meeting the manufacturer's specification shall be used to touch up or restore the factory finish.

404.03.C REFLECTIVE PAVEMENT MARKERS

1. Reflective Pavement Markers shall be installed in accordance with manufacturer's recommendations and placed 6-inches from the centerline on the side that the fire hydrant is located on. If there are no centerline markings identified, then a centerline shall be assumed, and the reflective markers placed accordingly.

2. Reflective pavement markers shall not be placed in crosswalks. If reflective pavement marker placement falls within the crosswalk, it shall be placed outside of crosswalk as close to the fire hydrant location as possible.

404.03.D SURFACE RESTORATION

1. Surface restoration shall be in conformance with applicable requirements of Section 212, Section 213, and Section 215.

404.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

404.04.A HYDRANT ASSEMBLIES

1. A complete fire hydrant assembly includes the mainline tee and hydrant valve, all ductile iron pipe between the hydrant valve and the hydrant, hydrant, and associated internal thrust restraint.

2. Payment for fire hydrant assemblies will be paid for on a per-each basis as stated in the Contract Documents.

3. Payment for each hydrant assembly will constitute full compensation for costs of labor, materials, equipment, and excavation and backfill.

404.04.B REFLECTIVE PAVEMENT MARKERS

1. Materials, labor, and equipment required for reflective hydrant markers will be considered incidental to all other work and no separate payment will be made.

404.04.C INCIDENTALS

1. Other materials, labor, and equipment required to complete the fire hydrant work in conformance with the Contract Documents and not listed as separate pay items in the Bid will be considered incidental to other items of work and no separate payment will be made.

405 DISINFECTION, PRESSURE AND LEAKAGE TESTING

405.01 DESCRIPTION

405.01.A This work consists of performing the required disinfection, pressure and leaking testing of water distribution systems.

405.01.B The Contractor shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to completing the Work as shown on the Plans and in complete accordance with the Specifications.

405.01.C All supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation, whether or not shown on the Plans or addressed in the Specifications, shall be provided and installed as part of the Work.

405.02 MATERIALS

405.02.A GENERAL

1. Only materials designed for potable water service and meeting the current National Sanitation Foundation Standard (NSF) 61, Section 9, Drinking Water System Components – Health Effects, or equivalent shall be used in those elements of the water system which are in contact with potable water.

2. Contractor shall be responsible for providing all necessary disinfection and pressure and leakage test equipment including the following minimum test equipment in proper working order:

   a. Pump, pressure-relief valve, shut-off valve, and hoses rated for a minimum of 150% of required or actual test pressure.

   b. Pressure gauge with 3-inch minimum diameter face, minimum 200 psi minimum operating pressure, and maximum dial graduation increments of 1 psi.

3. Prior to calling out the City Engineer to witness the pressure test, set up all equipment completely ready for operation and successfully perform the test to ensure that the pipe is in a satisfactory condition.

405.03 CONSTRUCTION

405.03.A PRESSURE AND LEAKAGE TESTING

1. GENERAL

   a. Hydrostatic pressure and leakage tests shall be made on all sections of the new water line including hydrant assemblies and copper service lines. Depending on the diameter, length, and number of appurtenances that comprise the new water line, the City may require the water line be tested for acceptance in sections rather than in its entirety. New valves shall be tested in the closed position against test pressure at some point during acceptance testing. The City Engineer will monitor all final testing of the completed system.

   b. The Contractor shall be reasonably sure the system will pass the required testing prior to scheduling an appointment with the City Engineer to witness testing.

   c. Testing shall be against closed hydrants with hydrant valves open and against the closed angle meter valve with the corporation stop open.

   d. Entrapped air shall be vented from system at high points using services, hydrants, or taps specifically installed for air release. No additional payment shall be made for taps made specifically for air release or testing.

   e. Backfill shall be in place and compaction requirements satisfactorily met and approved by the City Engineer prior to conducting final pressure and leakage testing.

   f. When allowed, concrete thrust blocking required for any reach of pipe shall be allowed a minimum of five (5) days cure time prior to pressure testing. If high-early concrete is used, the time may be reduced to two (2) days.

   g. The leakage test shall be conducted concurrently with the pressure test. The Contractor shall furnish all necessary apparatus and shall conduct the test.

   h. Pressure testing and disinfection operations shall not be conducted concurrently unless there is a physical separation between the new and existing water lines or there is an approved backflow device installed between the new and existing water lines.

   i. Testing equipment shall be set up in a manner that will ensure an accurate method of measurement for the amount of water required to maintain the specified test pressure for the duration of the test.

2. PRESSURE AND LEAKAGE TESTING

   a. GENERAL

      1) The minimum test pressure shall be 150 psi. The test pressure shall not be allowed to drop below 150 psi for the duration of the test. The test pressure shall be applied and maintained for a 2-hour duration. If the test pressure drops below 150 psi at any time, the test will be void.

2) Provide additional pumping during the test period to continuously maintain pressure within 5 psi of that required. If possible during the test, observe the section being tested to detect any visible leakage.

3) Use a clean container to hold water for pumping up pressure on the main being tested. Sterilize this makeup water by adding chlorine to a concentration of 25 mg/l Accurately determine the quantity of water required to maintain and restore the required pressure at the end of the test period by pumping through an approved positive displacement water meter or other method approved by City Engineer.

4) The test pressure shall be calculated for the point of highest elevation of the water line but shall not exceed 200 psi at any point.

5) Maximum length of main(s) to be included in a single test shall be 1,500 feet unless longer sections are approved by the City Engineer. The City Engineer may require that the first installed section of pipe installed by each crew, not less than 1,000 feet in length be tested. Do not continue pipe laying more than an additional 1,000 feet until the first section has been tested successfully.

b. ISOLATED LOCATIONS

1) New pipe and fittings not subjected to standard pressure testing procedures shall be tested at system pressure after final connections to the existing water system have been made. Pipe and fittings at these locations shall be kept open until the City Engineer can conduct a visual inspection for leaks.

c. ALLOWABLE LEAKAGE

1) Allowable Leakage Formula:

$$L = \frac{N * D * P^{0.50}}{8400}$$

Where:

L = Allowable leakage in gallons per hour (gph)
N = Number of joints in the length of pipe tested (+)
D = Nominal diameter of the mainline pipe in inches
P = Test pressure during the leakage test in psi
(+) = Each service installation completed shall constitute one joint)

2) *Allowable Leakage Table* - Allowable leakage at various pressures and pipe sizes are shown in the Table below:

ALLOWABLE LEAKAGE PER 100 JOINTS – gph										
Average Test Pressure	Pipe Diameter - Inches									
	4	6	8	12	16	20	24	30	36	42
200	0.67	1.00	1.35	2.02	2.69	3.37	4.04	5.05	6.06	7.07
195	0.67	0.99	1.33	2.00	2.66	3.33	3.99	4.99	5.98	6.98
190	0.65	0.98	1.31	1.97	2.63	3.28	3.94	4.92	5.90	6.89
185	0.65	0.97	1.30	1.94	2.59	3.24	3.89	4.86	5.83	6.80
180	0.64	0.96	1.28	1.92	2.55	3.20	3.83	4.79	5.75	6.71
175	0.63	0.94	1.26	1.89	2.52	3.15	3.78	4.73	5.67	6.61
170	0.62	0.93	1.24	1.86	2.48	3.10	3.73	4.66	5.59	6.52
165	0.61	0.92	1.22	1.83	2.45	3.06	3.67	4.59	5.51	6.42
160	0.60	0.90	1.20	1.81	2.41	3.01	3.61	4.52	5.42	6.33
155	0.59	0.89	1.19	1.78	2.37	2.97	3.56	4.45	5.34	6.23
150	0.58	0.88	1.17	1.75	2.33	2.91	3.50	4.37	5.25	6.12

3) Leakage shall be defined as the quantity of water necessary to maintain the specified test pressures for the duration of the test period. If the main(s) being tested contains sections of various diameters, the allowable leakage shall be the sum of the computed leakage for each size using the above Formula or Table.

d. ACCEPTANCE

1) Acceptance shall be based upon Allowable Leakage being greater than or equal to the actual leakage measured during the Leakage Test. Leakage amount shall be the actual volume of water required to pump the test section back to the initial test pressure at the start of the test.

2) After the pipe test has been completed, test each fire hydrant gate valve in turn by closing it and relieving the pressure beyond. This test of the gate valve will be acceptable if there is no immediate loss of pressure on the gauge when the pressure beyond the valve is relieved. Verify that the pressure differential across the valve does not exceed the rated working pressure of the valve.

e. CORRECTION AND RETESTING

1) Any defective components of the new water system shall be removed and replaced by the Contractor and the tests repeated until test results meet the specified requirements.

2) The use of bell repair clamps or other similar devices to stop leaks due to defective materials or poor workmanship will not be permitted.

3) No additional compensation shall be paid to the Contractor for correcting and retesting.

405.03.B DISINFECTION OF WATER MAINS

1. GENERAL

   a. New water mains, repaired portions of existing mains, and extensions to existing water mains shall be disinfected in strict accordance with AWWA C-651 and the Oregon Department of Human Services – Drinking Water Program (DHS-DWP). In situations where they differ, the Oregon DHS-DWP shall supersede AWWA requirements.

   b. Testing equipment, chlorination chemicals, temporary valves, temporary blow-off assemblies, backflow devices, or other water control equipment and materials required for proper disinfection of new water mains shall be furnished by the Contractor. No procedures or materials shall be used which may be injurious to the water main or compromise its long-term function.

2. FLUSHING

   a. GENERAL

      1) The Contractor shall coordinate flushing operations with the City Engineer. The Contractor shall give the City Engineer a minimum 24-hours advance notice of the flushing schedule. Flushing operations shall not commence without the approval of the City Engineer.

      2) Prior to chlorination, the main shall receive a complete flushing through all hydrants and blowoffs such that a minimum velocity of 2½-feet per second is developed in the main.

      3) Valves shall be operated through their extreme open and closed positions during flushing. Each hydrant shall be inspected after flushing to see that the entire valve operating mechanism is in good condition.

      4) Flushing water onto the street subgrade will not be allowed at any time. Prior to any flushing operations, the Contractor shall make provisions for the disposal of the water onto areas where no damage will be caused.

   b. WATER FOR FLUSHING

      1) The City will provide the water necessary for a flushing duration of:

         T (in sec.) = L,

         Where, L = the length of the line in feet.

      2) Additional water for a flushing duration in excess of this time period shall be computed by the City and shall be provided at the Contractor's sole expense. Water usage shall be computed by using an estimated main velocity of 2 1/2-feet per second and the actual time of flushing beyond the allowed time (T). The charge for this extra use shall be at a rate of $.50 per 100 cubic feet of water.

3. CHLORINATION

a. GENERAL

1) The maximum allowable initial concentration of chlorine to be used in disinfecting new water lines shall be fifty (50) milligrams per liter (mg/L).

2) The point of chlorine application shall be not more than 10-feet downstream from the beginning of the new main. If a corporation stop is utilized to feed the chlorine, it shall be located on the top of the pipe, and shall be removed and plugged with a brass plug prior to putting the line in service.

3) Chlorination shall be performed in such a manner that will prevent super-chlorinated water from backflowing into the City's potable water system.

4) A mixture of water and a chlorine-bearing compound of known chlorine content shall be used in disinfection. Acceptable compounds are calcium or sodium hypochlorite. Prior to use, these compounds shall be thoroughly mixed with water to yield a one percent chlorine solution. If powdered or granular chlorine is used, it must be fully dissolved before being introduced into the new water main.

5) The Continuous Feed Method shall be used to disinfect new water mains. The chlorine/water solution shall be uniformly introduced into the water main via an electronic metering pump as manufactured by Wallace & Turnin, or approved equal. The Contractor shall meter the flow of chlorine/water solution being introduced into the water main and the flow of the water at the outlet point to ensure the proper chlorine content is obtained throughout the water main. Water from the existing distribution system shall be controlled so as to flow slowly into the main to be chlorinated. The feed rate of the chlorine mixture shall be in such proportion to the rate of flow of the water entering the pipe that a minimum free chlorine residual of twenty-five (25) milligrams per liter (mg/L) will be introduced into the system in a manner that results in a complete distribution of the solution throughout the system.

6) The solution shall remain in place 24-hours. Valves shall be operated through their extreme open and closed positions during chlorination.

7) After the 24-hour period, a free chlorine residual of not less than 10 mg/L shall remain in the water at all points. This residual may ordinarily be expected with an initial application of 25 mg/L although some conditions may require more.

b. DISPOSAL OF CHLORINATED WATER

1) Chlorinated water with concentrations greater than 0.1 mg/L shall not be discharged onto the ground or into other surface drainage ways unless an approved procedure is followed. Disposal of chlorinated water shall be in accordance with the following guidelines:

a) Chlorinated water with concentrations under 0.1 mg/L may be discharged onto the ground, into surface drainage ways, or into the storm drainage system.

b) Chlorinated water with concentrations between 0.1 mg/L and 4.0 mg/L may be discharged into storm drainage systems if the distance between the point of discharge and the receiving stream is over 1,000-feet. Generally, this requirement applies to water discharged during initial flushing of the water line. If the distance to the receiving stream is less than 1,000-feet, the chlorine concentration shall be reduced to 0.1 mg/L before being discharged into the storm drainage system. Methods and/or materials used to lower the chlorine concentration to acceptable limits shall require review and approval of the City. City of Stayton drinking water has a chlorine concentration range of 0.4 mg/L to 1.2 mg/L depending upon the location within the system.

c) Chlorinated water with concentrations over 4.0 mg/L and up to 50.0 mg/L shall be discharged into sanitary sewer systems where approved by the City. Generally, this requirement applies to water discharged during the disinfection process and final flushing of the chlorine solution from the system. Chlorinated water shall be conveyed to the sanitary sewer in closed conduits. An air gap shall be maintained between the discharge conduit and the rim of the receiving manhole. The rate of discharge shall not exceed the capacity of the system.

d) Chlorinated water with concentrations over 50 mg/L shall require dechlorination prior to discharge into the sanitary sewer. Methods and/or materials used to lower the chlorine concentration to acceptable limits shall require review and approval of the City.

c. CONNECTION ASSEMBLIES AND EMERGENCY REPAIRS

1) Disinfection procedures will not be possible for some limited portions of new water line construction and for emergency repairs to in-service water lines. These situations include, but are not necessarily limited to, short runs of pipe and fittings used to connect newly disinfected water lines to existing laterals, emergency, or otherwise unscheduled work on existing water lines, and other similar situations.

2) The City Engineer will review and approve procedures used to meet specified disinfection requirements for connection assemblies prior to commencement of the work. The City Engineer will make timely on-site assessments of disinfection procedures for situations involving emergency and unscheduled work.

3) At a minimum, materials that will not be subject to standard disinfection procedures, regardless of the situation, shall be thoroughly cleaned and then washed with an application of 300 mg/L hypochlorite solution. Materials shall be sealed or similarly protected in a manner that will preclude the materials from being contaminated prior to installation. The local water system shall be flushed immediately following completion of the work.

4. BACTERIOLOGICAL TESTING

a. Following chlorination, chlorinated water shall be thoroughly flushed from the pipeline at all points including each individual service until the replacement water throughout its length shall, upon test, be 1.2 mg/L or less. Upon testing, this satisfactory chlorine residual level shall be found to exist in the main twenty-four (24) hours after final flushing.

b. Unless shown otherwise in the Special Provisions, the Contractor shall conduct all sampling and testing procedures required for testing the bacteriological quality and final chlorine residuals. Should the initial disinfection treatment fail to result in the specified conditions, the original chlorination procedure shall be repeated at the Contractor's expense until satisfactory results are obtained. No extra payment or extension of contract time will be allowed the Contractor for the time elapsed to achieve acceptable disinfection of the water system.

405.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

405.04.A INCIDENTALS

1. All materials, labor, and equipment required to complete the disinfection, pressure, and leakage testing work in conformance with the Contract Documents and not listed as separate pay items in the Bid will be considered incidental to other items of work and no separate payment will be made.

*** END OF DIVISION***

DIVISION 5 – SANITARY SEWERS

DIVISION 5

SANITARY SEWERS

501 SANITARY SEWER PIPE AND FITTINGS

501.01 DESCRIPTION

501.01.A This work consists of furnishing and installing gravity and pressure sanitary sewer pipe and fittings and sewer laterals typically associated with sanitary sewer systems.

501.01.B The Contractor shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to completing the Work as shown on the Plans and in complete accordance with the Specifications.

501.01.C Supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation, whether or not shown on the Plans or addressed in the Specifications, shall be provided and installed as part of the Work.

501.01.D MANUFACTURER'S CERTIFICATION

1. The Contractor shall furnish manufacturers certification for construction materials when such information is requested by the City Engineer. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. Information and cut sheets shall be originals, copies will not be accepted. A minimum of 5 original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

501.02 MATERIALS

501.02.A GENERAL

1. Use sewer pipe and fittings of the size, strength, material, and joint type specified on the drawings and/or in the Contract Documents. Use jointing material as hereinafter specified for each pipe material. Each piece of pipe shall be clearly identified as to strength, class, and date of manufacture. The manufacturer or fabricator shall furnish appropriate certification, based on manufacturer's routine quality control tests, that the materials in the pipe and fittings meet the requirements specified herein. Strength, permeability, hydrostatic tests, and pipe joints will be used as the basis of acceptance as described under Subsection 501.03.Q. Minimum length of pipe shall be 3 1/2-feet.

2. It is not intended that materials listed herein are to be considered equal or to be generally interchangeable for all applications. The type, class, and size of pipe as applicable, will be specified in the Contract Documents for all City improvement projects. The Design Engineer shall determine the materials suitable for the project and so specify.

3. Use pipe and fittings for service branches of one type of material throughout; no interchanging of pipe and fittings will be allowed. Use 4-inch minimum diameter pipe for residential services when not otherwise specified.

4. Do not coat pipes for sewers, internally or externally, with any substance of any type in an attempt to improve its performance when air or hydrostatically tested.

5. The Contractor shall furnish Materials and shall perform Work in Close Conformance to the Plans and Specifications. See Section 106.07 for acceptability of Materials and Work.

501.02.B DUCTILE IRON PIPE

1. Ductile iron pipe shall be Class 52 or greater, shall be centrifugally cast of 60-42-10 iron, and shall conform to ANSI/AWWA C-151/A21.51. Joints shall normally be push-on, or mechanical joint, conforming to ANSI/AWWA C-111/A21.11. If specified and approved by the City in writing, flanged pipe may be used and shall conform to ANSI/AWWA C-115/A21.15.

2. Ductile iron pipe shall be lined with cement mortar and seal-coated in accordance with ANSI/AWWA C-104/A21.4.

3. When specified, tube type polyethylene encasement shall conform to ANSI/AWWA C-105/A21.5.

501.02.C POLYVINYL CHLORIDE (PVC) PIPE NON PRESSURE PIPE & FITTINGS

1. PVC pipe for non-pressure applications for pipe sizes 4-inches through 15-inched in diameter shall conform to ASTM D-3034, SDR-35.

2. PVC pipe for non-pressure applications for pipe sizes 18-inches through 27-inches in diameter shall conform to ASTM F-679, SDR-35.

3. Joints shall be bell and spigot joints with a rubber gasket conforming to ASTM D-3212 and ASTM F-477.

4. Additives and fillers, including but not limited to, stabilizers, antioxidants, lubricants, etc., shall not exceed ten (10) parts per one-hundred (100) by weight.

5. Where required for added strength, AWWA C-900 or C-905 may be used.

6. The Contractor shall use the same material for all pipes and fittings for both the sewer mainline and any service connections between consecutive manholes. Pipe bedding for PVC pipe shall be in accordance with Section 209.

501.02.D POLYVINYL CHLORIDE (PVC) PRESSURE PIPE & FITTINGS

1. PVC pressure pipe and fabricated fittings for pipe diameters 4-inches to 12-inches shall conform to AWWA C-900 Class 150, max SDR-18 or as specified.

2. PVC pressure pipe and fabricated fittings for pipe diameters 14-inches and above shall conform to and AWWA C-905 Class 165, max SDR-25, or as specified.

3. Fittings shall be mechanical joint ductile iron and shall conform to the requirements of AWWA C110, Class 250. The PVC pipe bevel shall be modified per AWWA C111 for use with ductile iron fittings.

501.02.E HIGH DENSITY POLYETHYLENE (HDPE) PIPE, SOLID WALL

1. Provide pipe and fittings meeting the requirements of ASTM F-714 and ASTM D-3261 as modified for the specified material. Use pipe made from premium high-density polyethylene resin qualified as Type III, Category 5, Class C, Grade P34 as specified in ASTM D-1238. This material shall have a long-term hydrostatic strength of 1,600psi when tested and analyzed in accordance with ASTM D-2837 and shall be listed by the Plastic Pipe Institute as a PE 3408 resin. Pipe sizing is to be according to ASTM F-714 and ASTM D-3035.

MINIMUM ENGINEERING DESIGN PROPERTIES		
Tensile Strength Yield	ASTM D-638 (2"/min)	3200 psi
Elongation at Break	ASTM D-638	750%
Modulus of Elasticity	ASTM D-638	105,000psi
Flexural Modulus	ASTM D-3350	124,000psi
Environmental Stress Crack Resistance, Condition C	ASTM D-1693	F_{20} at >5,000 hours
Long-term Hydrostatic Strength @ 73.4° F	ASTM D-2837	1,600psi

2. The pipe shall contain no recycled compound except that generated in the manufacturer's own plant from resin of the same specification from the same raw material supplier.

3. The polyethylene pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, or other injurious defects. The pipe shall be uniform in color, opacity, density, and other physical properties. The raw material shall contain a minimum of 2 percent and not more than 3 percent by weight of well-dispersed and finely divided carbon black when tested according to ASTM D 1603 and ASTM D 4218. Additives that can be conclusively proven not to be detrimental to the pipe may be also used, provided the pipe produced meets the requirements of this standard.

4. Pipe and fittings shall be marked including nominal size, OD base (ie: 12-inch ductile iron pipe sizing, DIPS), dimension ratio, pressure class, manufacturer's name, manufacturer's production code including day, month, and year extruded, and manufacturer's plant and extrusion line.

5. Compliance with requirements of these specifications shall be certified in writing by the pipe supplier.

6. <u>JOINTS FOR HDPE PIPE</u>

   a. High-density polyethylene (HDPE) pipe and fittings shall be jointed by the thermal butt fusion per ASTM A-2657 and the manufacturer's specific recommendations or approved coupler. The temperature of the heater plate should be 400 degrees F to 450 degrees F. The tensile strength at yield of the butt fusion joints shall be not less than that of the pipe.

b. The HDPE pipe may be adapted to fittings or other systems by means of an assembly consisting of a HDPE stub-end, butt-fused to the pipe, a backup flange of ductile iron made to Class 150, ANSI B1 6.1/B1 6.5 dimensional standards with exceptions, bolts of comparable material, and a gasket of suitable neoprene, red rubber or non-asbestos rubber compound cut to fit the joint. In all cases, the bolts shall be drawn up evenly and in line.

c. HDPE pipes of the same outside diameter but different wall thickness shall be joined by means of a flange assembly as designated above or by thermal butt fusion, and will only be allowed when expressly approved by the City Engineer.

d. The pipe supplier shall be consulted to obtain machinery and expertise for the joining by butt fusion of HDPE pipe and fittings. No pipe or fittings shall be joined by fusion by any Contractor until he is qualified in the techniques involved.

7. SERVICE BRANCHES

a. Tee and wye fittings to connect service branches shall be either molded butt fusion fittings, or molded saddle fusion fittings.

501.02.F JOINTING MATERIALS (GASKETS)

1. GENERAL

a. Only lubricants for jointing materials approved by the manufacturer shall be used.

b. Furnish to the City Engineer a certified statement from the manufacturer of the gaskets, setting forth the basic polymer used in the gaskets, and results of the tests of the physical properties of the compound. Gaskets shall be shipped in containers with identification of the batch from which the gaskets were fabricated.

2. DUCTILE IRON PIPE

a. Rubber gaskets shall conform to ANSI A21.11/AWWA C-111.

3. POLYVINYL CHLORIDE (PVC) PIPE

a. Rubber gaskets for PVC pipe shall conform to ASTM F-477.

501.02.G FITTINGS

1. GENERAL

a. Provide tee or wye fittings in the sewer main for sewer service laterals. Manufactured tees and wyes for sewer service laterals shall be a minimum of 4-inches nominal diameter, unless otherwise specified. Fittings shall be of sufficient strength to withstand all handling and load stresses encountered, including pressure testing that will be encountered in the work.

b. Fittings shall be of the same materials as the pipe, unless otherwise specified. Material joining the fittings to the pipe shall be free from cracks and shall adhere tightly to each joining surface. Use the same type of joints on all fittings that are used on the main sewer pipe. Tee or wye fittings shall not be closer than 18-inches to any joint or bell of main line sewer.

c. Where approved by the City Engineer, connections to existing sewers shall be made with an insert-a-tee connection compatible with the pipe being connected.

2. DUCTILE IRON FITTINGS

Use mechanical-joint, cast-iron fittings conforming to ANSI A21.10/AWWA C-110, and a class of at least equal to that of the adjacent pipe. Use push-on fittings of gray cast iron with body thickness and radii of curvature conforming to ANSI A21.10 and joints conforming to ANSI A21.11/AWWA C-111.

3. POLYVINYL CHLORIDE (PVC) FITTINGS

a. PVC fittings shall be in conformance with the requirements of ASTM D-3034, SDR-35 and ASTM F-679 as applicable.

b. Ductile iron fittings conforming to the requirements above shall be used with PVC AWWA C-900 and AWWA C-905 pressure pipe.

c. PVC PIPE CONNECTIONS TO MANHOLES

1) Pipe shall be connected to sanitary sewer manholes using a flexible, watertight Kor-N-Seal, or approved equal pipe-to-manhole connector or other approved equal specifically manufactured for the intended service. Field fabricated waterstops or improvised adapters such as gaskets stretched over the pipe will not be allowed.

2) Connections requiring the use of grout for installation, such as sand collars, shall be used only on a case-by-case basis, where approved by the City Engineer. Where approved, connections shall be bonded, anchored, and finished using an approved non-shrink grout as specified in Subsection 208.02.G.3. Plain Portland Cement mortar is not acceptable. Sand collars shall be fabricated by an approved manufacturer and not field made. Sand collars shall be coated with an epoxy adhesive compatible with both PVC and concrete grout and coated with aggregate. The installation of the sand collar shall be such that the bell portion of the adapter is adjacent and external to the wall of the manhole, and the spigot shall protrude through and into the manhole 3-inches beyond the interior of the wall of the manhole.

4. HDPE PIPE FITTINGS

a. The pipe used to fabricate fittings shall comply with AWWA C-906 and ASTM D-1248 requirements for Type III, Class C, Category 5, Grade P34 polyethylene material. Standard fittings and special fittings shall be manufactured from the same class of material as the pipe and be fully compatible.

b. Fittings shall be manufactured in accordance with ASTM D-3261. Fabricated fittings shall be pressure-rated to match the system piping.

c. HDPE PIPE CONNECTION TO MANHOLES

1) Pipe shall be connected to sanitary sewer manholes using a flexible, watertight Kor-N-Seal, or approved equal pipe-to-manhole connector or other approved equal specifically manufactured for the intended service. Field fabricated waterstops or improvised adapters such as gaskets stretched over the pipe will not be allowed.

501.02.H PIPE COUPLING ADAPTERS

1. GENERAL

a. Rigid couplers (solid sleeves) shall be used for connecting pipe, unless otherwise approved by City Engineer.

2. COUPLINGS FOR HDPE PIPE

a. Mechanical connections of polyethylene pipe to fittings or other materials shall be by means of flanged connections (flanged coupling adapters and ANSI backup rings rated for the same pressure service as the system piping) or flexible couplings designed for joining polyethylene pipe to polyethylene pipe or to another piping material such as a head PVC coupler as applicable, as approved by the City Engineer.

b. Flanged joints shall use bolts of compatible material. Gaskets shall be required when joining to non-polyethylene materials. In all cases, the bolts shall be evenly torqued using a crisscross pattern. Flanged joints are to be re-torqued after one (1) hour or more has passed since initial torquing.

501.02.I CLEANOUTS

1. Pipe for cleanouts shall be of the same material as the main line. Cleanouts shall be of the same size as the line it is serving or shall be 8-inch nominal diameter, whichever is smaller.

501.02.J LOCATING (TRACER) WIRE

1. Locating wire shall be a minimum of 12 AWG, UF solid copper wire with green colored insulation. The use of THHN wire will not be acceptable. Splices shall only be used when necessary. At splices, the connecting ends of the wires shall be stripped, overlapped, and tied. Splice shall made waterproof with an approved waterproof silicone splice kit. Contractor shall ensure splices have a waterproof electrical connection at all times.

501.02.K SERVICE CONNECTION MARKERS

1. Service connection markers shall be 2-inch x 4-inch pressure treated random length lumber. Markers shall be continuous and extended at least 2-feet above the ground surface.

501.03 CONSTRUCTION

501.03.A EXCAVATION AND BACKFILL

1. Excavation and backfill shall conform to the requirements of Section 209 as further specified herein.

2. EXCAVATION

Excavation shall be unclassified, unless otherwise specified.

3. BACKFILL

a. TRAFFIC AREA TRENCH BACKFILL

For public sewer pipe installations within dedicated street rights-of-way or where current or future hard-surfaced improvements will be made, select backfill material as specified in Subsection 209.02.E.2 for granular backfill shall be used.

b. NON-TRAFFIC AREA TRENCH BACKFILL

For public sewer pipe installations outside of dedicated street rights-of-way, or where current or future hard-surfaced improvements will not be made, native backfill material as specified in Subsection 209.02.D for use above the pipe zone may be used.

501.03.B LINE AND GRADE FOR GRAVITY AND PRESSURE SANITARY SEWERS

1. GENERAL

a. Do not deviate from the line or grade, as established by the City Engineer, more than 1/2-inch for line and 1/4-inch for grade, provided that such variation does not result in a level or reverse sloping invert. Due to permissible variations in pipe wall thicknesses, measure for grade at the pipe invert and not at the top of the pipe.

b. Line and grade for pipe shall be established and maintained by the use of pipe lasers. The Contractor shall check the line and cut from the offset stakes at maximum intervals of 50-feet.

c. Impounding of water, regardless of amount, will not be permitted in any section of the completed sanitary sewer system.

d. Any pipe or run of pipe that has not been installed within the allowable tolerance for line and grade or impounds water to any extent shall be removed and reinstalled or replaced as necessary to bring the work into compliance with the specified requirements

2. LINE AND GRADE FOR SEWER SERVICE LATERALS

a. Sewer service laterals shall have a minimum diameter of 4-inches and shall be installed with a minimum slope of 1/4-inch per foot of run. Minimum depth of service laterals at the flow line of curb and gutters within street right of ways, or edge of pavements in easements, shall be 5-feet below finish surface grade, unless otherwise approved by City Engineer. More depth may be required to accommodate existing site conditions.

b. Individual sewer service laterals shall not be connected to manholes unless specified as such in the Contract Documents or approved by the City Engineer.

c. The maximum line or grade change made with any one fitting shall not exceed 45 degrees.

d. Ends of service lines and service fittings shall be provided with approved watertight plugs, caps, or stoppers, suitably braced to prevent blowoff during internal air testing. Such plugs or caps shall be removable without damage to the pipe or fitting.

e. Deep trench service connections shall be constructed as specified in the Contract Documents and the applicable Standard Drawing.

501.03.C PIPE DISTRIBUTION AND HANDLING

1. Distribute material on the job no faster than it can be used to good advantage. Unload pipe only by means recommended by the pipe manufacturer. Do not unload pipe by dropping it to the ground. For publicly financed improvement projects, do not distribute more than one (1) week's supply of material in advance of installation, unless approved by the City Engineer.

2. Pipe shall be stored as recommended by the pipe manufacturer, including those recommendations for storage of pipe to prevent UV damage. Pipe shall not be unloaded or stored in the public right-of-way or easement unless it has been certified and accepted by the City Engineer. Inspect all pipe and fittings prior to lowering into trench to ensure no cracked, chipped, broken, or otherwise defective materials are used. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after laying.

3. Use proper implements, tools, and facilities for the safe and proper protection of the work.

4. Construction materials that are showing kinks, cracks, buckles, cuts, gouges or any other damage or that do not have approved certification shall be immediately removed from the job site or stockpiled in a location away from, or separate from, the work area

501.03.D PIPE LAYING AND JOINTING OF PIPE AND FITTINGS

1. GENERAL

a. Sheet shoring and movable trench shields shall be placed, removed, and/or operated in conformance with applicable requirements in Subsection 209.03.L. Take special care to prevent movement of the pipe after installation when placed within a movable trench shield.

b. Cracked, broken, or otherwise defective pipe and fittings shall not be used. Pipe shall be lowered into the trench by slings or other suitable means. Do not drop or dump pipe into trenches.

c. Pipe and fittings with damaged protective coatings shall be repaired using methods and materials recommended by the manufacturer of the pipe and/or fittings.

d. Proceed with pipe laying upgrade with spigot ends pointing in direction of flow. Place pipe in such a manner as to ensure solid bearing between the pipe and the full cross-sectional area of the bedding for the full length of the pipe between joints. Make assembly of the joint in accordance with the recommendations of the manufacturer. Take care to properly align the pipe before making the joint. Upon completion of pipe placement, all pipe joints shall be in the "home" position, which is defined as the position where the least gap (if any) exists, when the pipe components that comprise the joint are fitted together as tightly as the approved joint design will permit. Joints with gaps exceeding the normal gap in the "home" position by more than 1/4-inch shall be repaired as required by the City Engineer at no cost to the City. In cases where gaps exist in joints but do not exceed the normal gap in the "home" position by more than 1/4-inch, the City Engineer may require repair of the joint if, in his judgment, these detract from the integrity of the joint based upon soil conditions and the intended use of the pipeline.

e. After installation, each length of pipe shall be covered with a sufficient amount of backfill to maintain the pipe at the specified line and grade during subsequent construction operations.

f. When pipe laying operations are not in progress, the open end of the pipe shall be covered to prevent entry of rock and debris. Each section of pipe shall be cleaned as necessary to remove excessive amounts of dirt or other debris that may not be removed during the flushing operation.

g. Plug pipes that are stubbed out for manhole construction or for connection by others by use of a cap or plug designed for that purpose. Such plugs or caps shall be removable and their removal shall provide a bell end suitable for extension of the line.

h. When cutting and/or machining of the pipe is necessary, use only tools and methods recommended by pipe manufacturer. All types of pipe shall be sawcut when special lengths or end configurations are needed to complete the work as specified. Striking concrete pipe with hammers or other similar tools to induce transverse cracking of the pipe barrel is not permitted. PVC and ductile iron pipe ends that have been sawcut shall be beveled as necessary to prevent damage to the gaskets in push-on joint connections.

i. Pipe alignment shall not be deflected from a straight line in either the vertical or horizontal plane, unless such deflections are specified in the Contract Documents or approved by the City Engineer. Where approved, pipe and fitting connections shall not be deflected in excess of that recommended by the manufacturer of the pipe and fittings.

j. Fittings shall not be installed closer than 12-inches to any joint in a main line sewer that is 12-inches or less in diameter.

k. Pipe and fitting ends shall be cleaned and properly aligned before making the joint connection.

l. Joints shall be fitted together as tightly as the joint design will permit. Gaps at pipe joints shall not exceed that recommended by the manufacturer of the pipe and fittings.

M. Fabricated fittings and connections incorporating materials or methods of construction not specified herein or in the Contract Documents shall not be used in the work.

2. DUCTILE IRON PIPE

a. Ductile iron pipe and fitting connections shall be made in conformance with Subsection 401.03.G.

3. POLYVINYL CHLORIDE (PVC) PIPE

a. The Contractor shall use the same material for pipe and fittings for both mainline and service laterals between two consecutive manholes, unless otherwise approved by the City Engineer.

b. Connections to manholes shall be made by an approved flexible, watertight pipe-to-manhole connection.

c. Service laterals shall be connected to new mainline PVC sewer pipe with full-line tees or wyes and bends. Service laterals for existing sewers shall be with an insert-a-tee as approved by City Engineer.

4. HIGH DENSITY POLYETHYLENE (HDPE) PIPE

a. Fusing of pipe joints shall meet the requirements of ASTM D2657. Installation practices shall follow the standard practices as set forth in ASTM F-585.

b. Prior to placing the HDPE pipe, joints shall be complete except as noted. The full length of each section of pipe shall rest solidly upon the pipe bed. Pipe that has the grade of the joint disturbed after laying shall be taken up and re-laid.

c. Pipe fusion shall be performed as recommended by the manufacturer and shall not be done in water or when trench conditions are unsuitable for the work. Water shall be kept out of the trench until joining is completed. When work is not in progress, the open ends of pipe and fittings shall be securely closed so that no trench water, earth, or other substance will enter the pipe or fittings. Pipe ends left for future connections shall be immediately plugged or capped.

d. HDPE pipe shall be brought to within 5 degrees F of earth temperature prior to cutting to length for placement of tee, elbows, or other fittings.

e. HDPE pipe shall be joined by the thermal, butt-fusion method or other coupling methods specifically approved by the City Engineer prior to installation.

f. Joints shall have a smooth, uniform, double rolled back bead made while applying the proper melt, pressure, and alignment. The joint shall be allowed adequate cooling time before removal of pressure. The fused joint shall be watertight and shall have tensile strength equal to the pipe.

g. Any jointing shall be only conducted by personnel possessing the qualifications and certifications specified herein. The joining sites shall be cleared and graded, if necessary, to provide enough space for pipe storage and fusion. The site shall be free of rocks, stumps, and other debris that could cut, scar, gouge, or otherwise damage the pipe. The Contractor shall provide a shelter over the joining operation during adverse weather conditions. Particular caution is required to prevent any water from coming in contact with the heater plate.

h. The Contractor shall be responsible to provide training and instruction for his personnel at no cost to the City. Training shall include, but not be limited to, familiarization with HDPE pipe and fittings, fusion, testing, and installation of pipe. The personnel requiring training includes, but is not limited to, quality control personnel and polyethylene fusion machine operators as applicable for the project. Only instructed personnel will be allowed to perform the installation or supervision of polyethylene fusion joints.

i. A listing of those authorized for polyethylene fusion work shall be submitted and approved by the City Engineer prior to any installation or work on the HDPE pipe.

j. The Contractor shall make training sessions available to City Engineer and Inspectors and other quality assurance personnel at no charge and shall schedule the training sessions at a date, place, and time agreeable to the City.

501.03.E PIPE COUPLING ADAPTERS

1. Prior to installing mechanical couplers and adapters, pipe ends shall be sawcut as necessary to produce an edge that is free of cracks or other irregularities. Pipe ends shall be cut perpendicular to the length of the pipe.

2. After installation of the coupler or adaptor, pipe zone materials shall be thoroughly compacted to maintain proper alignment of the flow line and to prevent any movement of the pipe ends.

501.03.F INSTALLATION OF SEWER SERVICE LINES, TEES, AND WYES

1. Sewer service lines shall be constructed in accordance with the Plans, Standard Drawings, Standard Construction Specifications, and applicable provisions of the Oregon Plumbing Specialty Code.

2. Existing sewer service shall not be interrupted without the approval of the City Engineer and sewer service owner and/or user. The Contractor shall obtain all necessary permits required to construct service lines on both public and private property.

3. Connection of service lines to new or existing gravity sewer lines shall be as per the Plans and shall be inspected and accepted by the City Engineer prior to backfilling. All sewer service connections shall be watertight utilizing appropriate tees, wyes, and approved taps or service saddles. An approved tee or wye manufactured fitting shall be used when new sewer mains are being constructed. All holes and taps into an existing sewer main shall be cut using an approved tapping machine in the presence of the City Engineer.

4. The minimum slope of service lines shall be 1/4-inch per foot unless otherwise approved by the City Engineer. The pipe size of service lines shall be a minimum 4-inch diameter unless otherwise specified. Maximum vertical deflection permissible with any one fitting shall not exceed 22.5 degrees, unless otherwise approved. No horizontal deflection is allowed. Ends of service lines shall be at the location and elevation shown on the Plans.

5. Install continuous 12 gauge green locating wire from mainline wire up to the ground surface at the property line cleanout, then loop back down to the end of the service, and then up along the service connection marker, as shown in the Standard Drawings.

6. Provide pipe-bedding material, compacted to a minimum of 90 percent of maximum density as determined by AASHTO T-180, under tees, wyes, and service branch fittings extending to the springline of the fittings. Place pipe bedding material on undisturbed native material or compacted foundation stabilization material.

7. Provide ends of service lines and fittings with approved watertight plugs or caps suitably secured and braced to prevent blow-off during internal air testing. Such plugs or caps shall be removable and their removal shall provide a socket suitable for making a flexible joint service connection or extension.

501.03.G LOCATING (TRACER) WIRE

1. A continuous looped solid copper tracer or locating wire shall be installed along the top of all mainlines and service lines. These wires shall be secured to the top of the pipe at maximum 10-foot intervals using 6-inch strips of 2-inch wide duct tape. All splices shall be tied, electrically continuous, and made waterproof. Access to terminal ends of the locating wire shall be made at all manholes, catch basins, service line cleanouts, etc. and as shown on the Plans. Locating wire penetrations into manholes shall be 3/8" diameter holes drilled within 18-inches of the rim elevation and adjacent to the manhole steps. Extend the locating wire through the opening in the manhole wall and provide a minimum 3-foot of additional wire. Coil and tie the locating wire to the top manhole step, or otherwise support to allow retrieval from the outside of the manhole. Seal the opening in the manhole wall with silicone sealant.

2. The result of this installation shall be a continuous wire circuit electrically isolated from the ground. The Contractor shall be responsible for testing continuity and for testing isolation from the ground in the wire after all work has been completed on the test section. The Contractor is advised to do intermediate testing after backfilling operations and prior to surface restoration work to be sure continuity is maintained. If there is a break or defect in the wire, it shall be the Contractor's responsibility to locate and repair the defect. The continuity of the location wire shall be tested from one test load point to the next by use of a temporary wire laid between test points in-line with an ohmmeter.

501.03.H SERVICE CONNECTION MARKERS

1. In new subdivisions, undeveloped areas, and where connections will not be made after the service is installed, block the capped or plugged end and install a continuous 2-inch x 4-inch pressure treated marker. Extend markers at least 2-feet above the ground surface.

2. The top portion of the marker shall be painted after its installation with first-quality green, quick-drying enamel. After the paint has dried, use black, quick-drying enamel and neatly indicate the distance from the natural ground surface to the top of the service pipe in feet and inches. If curbs are present or to be poured as part of the project, stamp the top of the curb and gutter pan with an "SS" over the service crossing.

3. Markers shall be in one continuous piece. Splicing of lumber used for markers is only permitted in situations where the depth of the pipe is in excess of standard lumber lengths. Markers shall be installed in a vertical position with the bottom end of the marker against the end of the pipe. Markers that are broken, too short, or are not installed vertically in the ground shall be replaced by removing the backfill and replacing and/or repositioning the marker. In areas where it is not practical to extend markers above the ground surface, as approved by the City Engineer, the tops of the markers shall be installed flush with the ground surface.

501.03.I CLOSURE COLLARS

1. <u>GENERAL</u>

   a. The use of concrete closure collars in lieu of mechanical-type couplers or other specified or approved connection materials and procedures is not permitted unless approved by the City Engineer.

2. CONCRETE CLOSURE COLLARS

a. Use concrete closure collars only when specified or approved. Concrete closure collars shall be constructed in conformance with the details provided and the following additional requirements:

1) Concrete shall conform to applicable requirements in Section 208.

2) Concrete shall be contained in forms constructed in conformance with applicable requirements in Section 211. Backfill materials or earth shall not be used in lieu of forms. Concrete shall be confined to the specified dimensions of the collar. Forms shall be constructed such that the concrete will not be allowed to enter the pipe or structure around which the collar is being constructed.

3) Concrete reinforcement materials shall be supplied and placed in conformance with applicable requirements in Section 211.

4) Surfaces of pipe and fittings that are to come into contact with the concrete shall be thoroughly washed to remove all dirt and loose material.

5) Concrete shall not be placed on non-compacted base materials or in water.

6) The entire amount of concrete necessary to construct the collar shall be placed in one continuous operation. If the concrete is allowed to harden or obtain initial set prior to completion of the collar, the Contractor shall remove the concrete and reconstruct the collar.

7) Concrete shall be consolidated in conformance with applicable requirements in Subsection 211.03.H. The concrete shall be thoroughly consolidated around the pipe or structure as necessary to ensure that no voids will be formed in the collar.

8) Concrete shall be allowed to obtain initial set prior to placing backfill over the collar. Concrete shall be allowed a minimum of seven (7) days of cure time prior to compacting the backfill over and adjacent to the collar.

3. FLEXIBLE COUPLING CLOSURE COLLARS

a. Use flexible coupling collars only when specified or approved. Couplings must incorporate full length and full diameter stainless steel shear bands. Couplings shall be of the type produced by "Fernco", "Mission", or approved equal.

501.03.J DISCONNECT AND RECONNECT EXISTING SEWER LATERALS

1. When shown or required, disconnect existing sewer laterals from existing sewers and reconnect them to the new sewers. The Contractor shall be responsible for locating the existing sewer laterals prior to installing the tee or wye in the new wastewater line. The Contractor shall verify and reconnect all active sewer laterals to the wastewater main line.

501.03.K REPAIR OF EXISTING UTILITIES

1. Existing utilities that are damaged as a result of the Contractor's operations shall be repaired immediately at the Contractor's expense.

501.03.L UTILITY CROSSINGS

1. Minimum allowable clearance between pipes at crossings shall be 6-inches, unless otherwise approved by City Engineer.

2. In locations where new sanitary sewers cross over an existing water line or under an existing water line with less than 18-inches of clearance between the two pipes, the Contractor shall substitute the specified sewer pipe with a full length of AWWA C900 PVC (DR 18) or Class 52 ductile iron pipe of equivalent size, centered at the crossing point. Watertight, mechanical couplers or adapters shall be used to connect the sewer pipe to the C900 PVC or ductile iron pipe, as approved by the City Engineer.

501.03.M CONCRETE PIPE ENCASEMENT

1. Where required or approved by the City Engineer, the installation of concrete encasement for sanitary sewer pipe shall conform to applicable requirements in Section 209.03.O.2.

501.03.N FIELD FABRICATED CONNECTIONS

1. The use of field fabricated connections is not permitted unless approved by the City Engineer. "Insert-a-tees" or approved equal shall be used in lieu of field fabricated connections. See Standard Drawings.

501.03.O CLEANOUTS

1. Cleanouts shall be constructed per the Standard Drawings. The cleanout shall stand vertical and the Contractor shall bring compacted bedding material up around the vertical portion of the top. Frames and covers shall be per Standard Drawings and comply with requirements of Subsection 502.02.G.

501.03.P SURFACE RESTORATION

1. Surface restoration shall be in conformance with applicable requirements of Section 212, Section 213, and Section 215.

501.03.Q TESTING SANITARY SEWERS

1. GENERAL

   a. Gravity sanitary sewers including service branch sewers and appurtenances shall successfully pass an air test prior to acceptance and shall be free of leakage and visible infiltration of water. Pressure sewer lines shall be tested in accordance with the Contract Documents.

   b. Manholes shall be tested as specified in Subsection 502.03.G.

   c. Pressure sewer force mains shall be pressure and leakage tested in accordance with applicable portions of Section 405, when not otherwise specified.

d. Perform the tests in a manner satisfactory to the City Engineer. Calibrate gauges for air testing with a standardized test gauge provided by the Contractor at the start of each testing day. The calibration shall also be witnessed by the Inspector; notify the Inspector at least twenty-four (24) hours prior to each test.

e. The City Engineer may require testing of manhole-to-manhole sections as they are completed in order to expedite the acceptance of completed portions of the system and allow connections prior to the whole system being completed.

f. Deflection testing shall be performed on sanitary sewers and storm drains when such systems are constructed of PVC pipe.

g. Sewer pipe 30-inches in diameter and larger may be tested using an approved pneumatic joint testing device. Such testing methods and equipment shall meet the approval of the City Engineer.

h. Sanitary sewers shall not be coated internally or externally with any substance of any kind in an effort to improve the performance of the pipe when tested

i. All testing, including but not limited to deflection and air tests and closed-circuit television (CCTV) inspections, must be passed prior to any paving operations.

j. At the Contractor's expense, the City will make a televised inspection of the sanitary sewer pipe after the Contractor has completed the installation of the sewer pipe, including backfill, deflection, and air testing. When the Contractor has jetted and cleaned the sewer pipe, the inspection shall be scheduled by the Contractor with the Inspector. Any defects in material or workmanship shall be satisfactorily corrected at no expense to the City. The Contractor shall re-TV the pipe after any corrections in accordance with Subsection 501.03.Q.9 and supply the CCTV video and the report to the City Engineer for review and approval. This process will repeat until the pipe complies with the specifications. Acceptance is required prior to any paving operations.

2. WATER AND EQUIPMENT FOR TEST

a. The Contractor shall make arrangements, perform the test, and provide personnel, plugs, and other necessary equipment to complete the tests at no cost to the City except that the initial CCTV inspection will be performed by the City at the Contractor's expense. The method, equipment, and personnel shall be subject to approval by the City Engineer.

3. CLEANING PRIOR TO TESTING AND ACCEPTANCE

a. Prior to any testing for acceptance, the Contractor shall jet rod and clean all parts of the system. Remove accumulated construction debris, rocks, gravel, sand, silt, and other foreign material from the system at or near the closest downstream manhole. If necessary, use mechanical rodding or bucketing equipment. The Contractor shall continue to clean the system until the CCTV inspection shows no foreign material in the pipe. City Engineer's re-inspection may be required if the amount of debris is, in the City Engineer's opinion, excessive.

4. TESTING PROCEDURE

   a. Perform the tests in a manner satisfactory to the City Engineer. Any arrangement of testing equipment which will provide observable and accurate measurements of air leakage under the specified conditions will be permitted. Notify the City Engineer twenty-four (24) hours prior to each test.

   b. Make tests of sections of constructed sanitary sewer for acceptance only after service connections, manholes, backfilling, and compaction are completed between the stations to be tested. City may require testing of manhole-to-manhole sections as they are completed in order to expedite the acceptance of sections of sewer and allow connections prior to the whole system being completed.

5. REPAIRS

   a. Repair or replace in accordance with Subsection 501.03.D, and in a manner satisfactory to the City Engineer, any section of pipe not meeting the air test requirements, deflection test requirements, joint testing requirements, alignment requirements, or that has leakage. Re-rounding of the pipe will only be allowed if approved by the City Engineer.

6. DEFLECTION TEST FOR FLEXIBLE PIPE (HDPE AND PVC)

   a. In addition to air testing, perform a deflection test for sanitary sewers constructed of flexible pipe not less than thirty (30) days after the trench backfill and compaction has been completed, unless otherwise specifically approved by the City Engineer. The test shall be conducted by pulling an approved solid pointed mandrel having at least six (6) vanes through the completed pipeline. The diameter of the mandrel shall be 95 percent of the internal pipe diameter. Conduct testing on a manhole-to-manhole basis, and only after the manholes have been channeled and the line has been completely cleaned. Locate and repair any sections failing to pass the test and retest the section at the Contractor's sole expense.

7. STANDARD AIR TESTING

   a. GENERAL

      1) The Contractor shall furnish necessary testing equipment and shall perform the tests in a manner satisfactory to the City Engineer. Testing equipment shall provide observable and accurate measurements of air leakage under the specified conditions.

      2) Plugs used to close the pipe for the air test must be capable of resisting the internal pressures and must be securely braced. Place all air testing equipment above ground and allow no one to enter a manhole or trench where a plugged pipe is under pressure. Release pressure before the plugs are removed. The testing equipment used must allow continuous monitoring of the test pressures in order to avoid excessive pressure. Use only qualified personnel to conduct the test.

      3) The entire sewer system shall be cleaned prior to air testing. The system shall be flushed as many times as necessary to remove debris.

      4) Air testing shall be accomplished after service connections, manholes, and backfilling and compaction operations have been completed between the stations to be tested.

5) The testing equipment shall include a pressure relief device designed to relieve pressure in the sewer under test at 10 psi or less and shall allow for continuous monitoring of the test pressures in order to avoid excessive pressure.

6) Only qualified personnel will be allowed to conduct the test. Plugs used to close the system for the testing shall be capable of resisting the expected internal pressures. Securely brace plugs, if necessary.

b. GROUND WATER

1) The presence of ground water will affect the results of the test. Determine the average height of ground water over the pipe immediately before starting the test.

2) In every case, determine the height of the water table at the time of the test by exploratory holes or such other methods satisfactory to the City Engineer. The City Engineer will make the final decisions regarding test height for the water in the pipe section being tested.

3) The test pressures shall be increased 0.433 psi for each foot of average water depth over the invert of the pipe, as further outlined below.

c. METHOD

1) Use the time-pressure drop method for air testing. The test procedures are described as follows:

Step	Procedure
1	Clean the pipe to be tested and remove debris where noted.
2	Wet the pipe prior to testing, if desirable.
3	Plug pipe outlets with suitable test plug. Brace each plug securely.
4	Check the average height of the groundwater over the pipe. The test pressures required below shall be increased 0.433 psi for each foot of average water depth over the invert of the pipe.
5	Add air slowly to the section of pipe being tested until the internal air pressure is raised to 4.0 psig greater than the average backpressure of any groundwater that may submerge the pipe.
6	After the internal test pressure is reached, allow at least 2-minutes for the air temperature to stabilize, adding only the amount of air required to maintain pressure.
7	After the temperature stabilization period has passed and the pressure has been elevated to the specified test pressure, disconnect the air supply.
8	Determine and record the time, in seconds, that is required for the internal air pressure to drop from 3.5 psig to 2.5 psig greater than the average backpressure of any ground water that may submerge the pipe.
9	Compare the time recorded in step 8 with the time required as determined hereinafter.

d. ACCEPTANCE

1) The tested section will be acceptable if the time recorded in step 8 above is greater than the required time, in seconds (T), computed by the formula: T=K/C

Where:

K = The sum of the computations (0.011 D^2*L) for each size of pipe and its length in the section
C = The sum of the computations (0.0003882 D*L) for each size of pipe and its length in the section, except that the minimum value for C shall be 1.
D = Inside diameter of the pipe, in inches.
L = Length of pipe, in feet.

2) The time required shall be as computed according to the following procedure:

a) Record the diameter in inches (D) and the length in feet (L) of pipe in the section to be tested, including the house service laterals.

b) Compute values for K and C by using the above formulas (D=inside diameter in inches and L=length in feet) and record them in the table.

c) Add all values of K and all values of C for the section being tested.

d) If the total of all the C values is less than one, the time required by the specifications shall be the total of the K values.

e) If the total of all the C values is more than one, the time required by the specifications shall be found by dividing the total of all the K values by the total of all the C values. The quotient is the time required by the specifications.

e. SUBSEQUENT FAILURE

1) Following a successful air test, visible infiltration of ground water in any section will be considered evidence that the original test was in error or that failure of the section has occurred. Correct such failures and retest the repaired sections at no expense to the City.

8. JOINT AIR TESTING FOR SEWERS WITH PIPE DIAMETERS GREATER THAN 36-INCHES

a. GENERAL

1) Because of the difficulty of adequately restraining plugs and the inherent danger of air pressure on large surfaces, the Contractor is encouraged to test each individual joint for leakage using a pneumatic joint testing apparatus in lieu of performing the above required pipe section air testing. Such testing apparatus for each pipe size to be tested shall be tested, calibrated, and approved prior to acceptance testing.

2) The City Engineer may, at any time, require a calibration check of the instrumentation used. A pressure gauge having a minimum division of 0.1 psi and an accuracy of 0.0625 psi shall be used for the check. All air shall pass through a single control panel.

b. GROUNDWATER

1) The presence of ground water will affect the results of the test. Determine the average height of ground water over the pipe immediately before starting the test.

2) In every case, determine the height of the water table at the time of the test by exploratory holes or such other methods satisfactory to the City Engineer. The City Engineer will make the final decisions regarding test height for the water in the pipe section being tested.

3) The test pressures shall be increased 0.433 psi for each foot of average water depth over the invert of the pipe.

c. EVALUATION

1) The allowable minimum for a drop in the test air pressure from 3.5 to 2.5 psi greater than the average backpressure of any groundwater will be the time per unit length, along centerline of pipe, (T) in seconds, from the following table. Minimum time = T.

PIPE INSIDE DIAMETER INCHES	TIME PER UNIT LENGTHS (ALONG CENTERLINE OF PIPE) SEC./IN.
36	11.1
42	12.9
48	14.8
54	16.7
60	18.4
66	20.2
72	22.0
78	23.9
84	26.0

d. TESTING

1) Testing of individual mainline pipe joints shall be done as mainline pipe laying progresses. It is the intent of this specification that a joint test will be made immediately after each mainline pipe section is laid and backfilled, and the joint gap, excluding settlement allowance, is found to be within acceptable tolerances.

2) At the sole discretion of the City Engineer, upon satisfactory installation and testing of the first ten (10) successive pipe joints of each pipe size, the Contractor may elect to test joints at no greater than one (1) work-day intervals instead of making tests after laying each pipe section.

3) If a joint does not meet the test time established herein, a reinforced concrete closure collar shall be constructed around the joint or the joint shall be reassembled as approved by the city engineer at no expense to the City.

e. SUBSEQUENT FAILURE

1) Following a successful air test, visible infiltration of ground water in any section will be considered evidence that the original test was in error or that failure of the section has occurred. Correct such failures and retest the repaired sections at no expense to the City.

9. CLOSED-CIRCUIT TELEVISION INSPECTION (CCTV) OF SANITARY SEWERS

a. Upon completion of sewer construction, repairs, cleaning, and required tests, notify the Inspector that all lines are ready for CCTV inspection. The City may, at its own option, perform a deflection test at the same time it performs its CCTV inspection. Any discrepancies that are noted by the City Engineer during the television inspection shall be corrected by the Contractor prior to acceptance of the system.

b. Upon correction of deficiencies revealed by CCTV inspection, the Contractor shall be responsible for providing a CCTV inspection and verifying repairs at no expense to the City. The CCTV inspection shall be conducted by a technical service that is equipped to make audio-visual DVD recordings. The audio-visual DVD recording shall:

- Be in color DVD format and be continuous from beginning to end of each pipe run.
- Be clear, usable, and free of visual distortions; the image in the video shall appear level.
- Include a visual footage meter recording on the DVD.
- Include a voice recording of suspected deficiencies.
- Use a 360 degree pan and tilt camera.
- Be performed by experienced personnel trained in locating breaks, obstacles, and service connections by CCTV utilizing a 360 degree pan and tilt camera.
- Identify visually, with audio, and on the written report the location of the beginning and end of each pipe run, the lineal feet of pipe, deficiencies, the name of the company creating the tape recording, name of the operator, and date and time of the DVD recording.
- Include a 360º inspection of each joint.
- Include a clear view up each lateral connection.
- Identify groundwater infiltration sources associated with construction or materials defects.

c. Submit the audio-visual DVD and written report to the City Engineer for review. Correct deficiencies that are revealed in the DVD and written report. Make an additional CCTV inspection of repaired pipes at no additional cost to the City. All DVDs and written reports shall become the property of the City.

d. Locate and repair any sections failing to pass the required tests and inspections. Repeat the specified test and inspections on those sections at no expense to the City.

10. NON-COMPLIANCE WITH SPECIFIED TEST REQUIREMENTS

a. The Contractor shall replace or repair, in a manner satisfactory to the City Engineer, any section of pipe not meeting the specified test requirements.

b. Infiltration of ground water in an amount greater than 3.84 gallons per day per inch diameter per 100 feet, following a successful air test as specified, shall be considered as evidence that the original test was in error or that subsequent failure of the pipeline has occurred. The Contractor shall locate and correct such failures occurring within the warranty period in a manner satisfactory to the City Engineer and at the Contractor's sole expense.

501.03.R CLEANING

1. Final cleaning shall comply with requirements of Section 215.

501.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

501.04.A SANITARY SEWER PIPE AND SERVICE LATERALS

1. Measurement and payment for Installation of sanitary sewer pipe, including gravity sewers and pressure line sewers, will be made on a lineal foot basis for the various classes, types, and sizes of pipe listed in the Contract Documents and as actually installed.

2. All pipes, except service lateral pipe, will be measured horizontally from center-to-center of manholes or to the ends of the pipe, whichever is applicable. No deductions will be made for fittings or for structures unless specifically called out in the Contract Documents or elsewhere in these Standards Specifications.

3. Measurement and payment for service lateral pipe will be made on a horizontal foot basis for the type and size of pipe installed as shown in the Contract Documents. Length will be measured as the horizontal distance, commencing at the point of connection to the tee, wye, manhole, or pipe, as applicable and terminating at the end of the pipe or at the point of reconnection to the existing service lateral pipe, including all fittings, measured along the horizontal centerline of the service if risers are not included in the Contract Documents.

4. Payment for disconnecting and reconnecting existing service laterals will be made at the unit price for each as shown in the Contract Documents. Payment shall include full compensation for locating the existing service lateral, rerouting any flow, making the disconnection, and reconnecting the new service line with the existing service lateral. When not shown as a separate item in the Contract Documents, the disconnection and reconnection will be included in the service lateral cost.

5. Payment for pipe installation shall constitute full compensation for labor; equipment; materials; clearing and grubbing; trench excavation; provision and installation of pipe bedding, pipe zone material, and backfill; compaction operations; anchorage and reaction blocking for pressure systems; flushing and cleaning; testing; fittings, spools, and mechanical couplings required to complete the pipeline as designed; connection to and abandonment of existing pipe systems; installation of markers; toning wire and marking tape; surface restoration, unless included in the Contract Documents as a separate pay item; and any other incidental expenses necessary to construct the pipeline in conformance with the Contract Documents.

501.04.B SERVICE RISERS

1. Measurement and payment for service risers will be made on a unit price for each type and size as shown in the Contract Documents. Compensation will include all pipe, fittings, bedding, pipe zone, backfill, labor, and equipment to install the riser complete in place. If a wye and a 1/8 bend are used in place of a tee, payment will begin at the wye at the main line. If no separate item is included in the Contract Documents, then compensation for the riser assembly will be included in the price per foot for the service lateral.

501.04.C TEE AND WYE FITTINGS

1. Measurement and payment for service tees and wyes installed in the sewer lines will be made at the unit price for each size and type as shown in the Contract Documents. If no item is listed in the Contract Documents, then the tee and wye fittings will be incidental to the service branch and main line installation and no extra compensation will be allowed. Since no deduction will be made under the payment item for pipe for the length of the tee or wye, the unit price for tee and wye fittings shall include only the additional cost of furnishing and installing the tee or wye fitting over the cost of furnishing and installing an equivalent straight run of pipe. Payment will include full compensation for pipe plugs, stoppers, or caps installed.

501.04.D CLOSURE COLLARS

1. Measurement and payment for closure collars will be made at the unit price each as shown in the Contract Documents and actually constructed. Payment shall include full compensation for all materials, equipment, and labor necessary to complete the work.

501.04.E CLEANOUTS

1. Measurement and payment for cleanouts will be made at the unit price each for the type and size as shown in the Contract Documents. Payment shall include full compensation for all materials, equipment, and labor necessary to complete the work.

501.04.F INCIDENTALS

1. Other materials, labor, and equipment required to complete the sanitary sewer pipe and fittings work in conformance with the contract documents and not listed as separate pay items in the proposal will be considered incidental to other items of work and no separate payment will be made.

502 MANHOLES AND CONCRETE STRUCTURES

502.01 DESCRIPTION

502.01.A This work consists of furnishing and installing manholes, drop assemblies, special concrete structures, concrete encasements, anchor walls, and other concrete structures typically associated with sanitary sewer systems.

502.01.B The Contractor shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to completing the Work as shown on the Plans and in complete accordance with the Specifications.

502.01.C All supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation, whether or not shown on the Plans or addressed in the Specifications, shall be provided and installed as part of the Work.

502.01.D MANUFACTURER'S CERTIFICATION

1. The Contractor shall furnish manufacturers certification for construction materials when such information is requested by the City Engineer. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. All information and cut sheets shall be originals, copies will not be accepted. A minimum of 5 original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

502.02 MATERIALS

502.02.A GENERAL

1. It is not intended that materials listed herein are to be considered equal or to be generally interchangeable for all applications. The type, class, and size as applicable, will be specified in the Contract Documents. The Design Engineer shall determine the materials suitable for the project and so specify.

502.02.B BASE ROCK

1. Use 3/4"-0" or 1"-0" granular base rock as approved, conforming to the requirements for aggregate base material in Subsection 208.02.D.

502.02.C FORMS

1. Forms for exposed surfaces shall be steel or plywood. Other surfaces shall be formed by means of matched boards, plywood, or other approved material. Form all vertical surfaces. Trench walls, large rock, and earth shall not be used as form material.

502.02.D CONCRETE AND REINFORCING STEEL

1. Concrete and reinforcing steel shall conform to Section 208.

502.02.E PORTLAND CEMENT CONCRETE AND MORTAR

1. When specified for use, cement mortar shall conform to Section 208. Consistency of mortar shall be such that it will readily adhere to the pipe. Mortar mixed for longer than thirty (30) minutes shall not be used.

502.02.F MANHOLES

1. GENERAL

   a. Standard, 48-inch inside diameter manhole components shall be used for pipe that is 21-inches in diameter or smaller.

   b. Manhole diameter and requirements for components for larger pipe will be specified in the Standard Drawings or Contract Documents.

c. Manhole components shall be supplied with steps.

d. Permeability tests of manhole components may be required by the City Engineer. When such testing is required, the materials to be tested will be selected at random by the City Engineer from stockpiled materials that are to be supplied for the job. Permeability testing shall be conducted at the location where the materials were manufactured. Test specimens shall meet permeability test requirements of ASTM C-14 and ASTM C-497

2. PRECAST MANHOLE SECTIONS

a. Precast manhole sections shall conform to the Standard Drawings. Precast, reinforced concrete manhole bases, barrel sections, cones, flat slab tops, and grade rings shall conform to ASTM C-478 and shall be used in the construction of all manholes. Minimum wall thickness shall be 5-inches. Top and bottom of all sections shall be parallel. Tongue and groove manhole sections will not be allowed.

b. Provide eccentric cones for manholes over 4-feet from crown of pipe to rim. Eccentric cone sections shall conform to all the requirements of ASTM C-478, with the exception of the steel reinforcement requirement, and shall have same wall thickness and reinforcement as the riser manhole sections. Eccentric cones shall be designed to withstand AASHTO H-20 loadings.

c. Flat slab tops with precast grooves reinforced to withstand AASHTO H-20 loadings shall be provided for manholes that are 4-feet or less deep from crown of pipe to rim. Manholes with 2- to 4-feet from crown of pipe to rim shall have eccentric access flat slab tops. Manholes with less than 2-feet from crown of pipe to rim shall have concentric access flat slab tops.

3. PRECAST CONCRETE BASES

a. Manholes, except as otherwise specified or approved by the City Engineer, shall be constructed using precast, reinforced concrete bases. Construction of precast bases shall conform to the requirements of ASTM C-478. The base riser section shall be integral with the base slab and shall extend a minimum of 8-inches above the crown of the largest mainline pipe entering the manhole exclusive of drop sewers.

b. Sanitary sewer manhole bases shall be provided with core-drilled openings and flexible, watertight Kor-N-Seal, or approved equal manhole-to-pipe connectors for the pipe connections.

c. Steps installed in base sections shall be located as shown in the Standard Drawings, typically 180 degrees from the manhole outlet.

4. CAST-IN-PLACE MANHOLE BASES

a. The Contractor may use cast-in-place manhole bases only where approved by the City Engineer. Concrete shall conform to Section 208.

5. MANHOLE GRADE RINGS

a. Concrete grade rings for extensions shall be key-lock joint and shall be a maximum of 6-inches in height and designed to withstand AASHTO H-20 loadings.

6. JOINTING MATERIALS

   a. Preformed, plastic gasket material conforming to requirements of AASHTO M-198 or confined O-ring-type joints with rubber gaskets conforming to ASTM C-443 shall be used.

502.02.G MANHOLE AND CLEANOUT FRAMES AND COVERS

1. GENERAL

   a. All castings shall be true to size, weight, and tolerances shown on the Standard Drawings. Delivered weight shall be ±5 percent of the specified weight. The bearing seat shall not rock when checked by the test jig. The foundry shall supply test gauges and shall not subcontract any of the work other than testing procedure, patterns, machining, and cartage. The casting shall not be made by the open-mold method and shall be free of porosity, shrink cavities, cold shuts, cracks, or any defects that would impair serviceability. Repair of defects by welding or by the use of "smooth-on" or similar material will not be permitted. Castings shall be shot or sand blasted and the application of paint or other coating will not be permitted. Each casting shall have directly cast upon it the initials of the manufacturer and the year of the cast. These characters shall be a minimum of 1 1/4-inch in height and 1/8-inch in relief. The heat number shall be cast upon each casting. The foundry or Contractor shall provide all labor and equipment for handling all castings during testing and inspection.

   b. All manhole and cleanout frames and covers located outside of the right-of-way shall be tamper-proof, unless approved otherwise.

2. MATERIALS

   a. Conform to ASTM A-48, Class 30B and AASHTO M-105, Class 30B, with the following modifications and additional requirements:

      Tensile Strength .....30,000 psi
      Traverse Strength (1.2 diameter bar 18" centers):
            Load .....2,600 – 3,000 lbs.
            Deflection .....0.22" – 0.34"
      Brinell Hardness (as cast) .....173 – 200

   b. Where the ASTM A-48 and AASHTO M-105 specifications differ, the more stringent shall apply.

   c. The foundry shall certify as to the tensile and traverse properties and the Brinell Hardness. The City reserves the right to require a rough transverse bar (size of bar 1.2-inch diameter x 20-inches long) and/or a tensile bar as per ASTM A-48 for each twenty (20) castings, or heat when less than twenty (20) castings are made.

3. CAP SCREWS

   Cap screws and washers for tamperproof and watertight manhole covers shall be stainless steel with 60,000 psi minimum tensile strength conforming to ASTM A-453.

502.02.H STEPS FOR PRECAST MANHOLES

1. Precast manhole base assemblies, barrel sections, and cones shall be supplied with steps. Step assemblies shall be installed by the manufacturer of the manhole components. Steps shall be aligned in each manhole component so as to form a continuous ladder with steps equally spaced vertically in the assembled manhole at a maximum design distance of 12-inches apart. Steps installed in base sections shall be located 180 degrees from the manhole outlet.

2. Steel reinforced polypropylene steps are to be driven into pre-formed holes in precast concrete manhole cones and sections by the manhole manufacturer prior to delivery to job site.

3. Steps for concrete manholes shall be steel reinforced polypropylene plastic, M. A. Industries, Inc., No. PS-2PFS, or Lane No. P-13850, or approved equal with red reflectorized markers on the top of the step wings. Steps shall be in conformance with ASTM C-478 and ASTM C-497 except that the minimum horizontal pullout load shall be 1,500 pounds. The polypropylene shall conform to ASTM D-4101, Type II. The steps shall be capable of withstanding an impact load of 70 pounds at 20 degree F without cracking or fracturing.

4. The entire polypropylene plastic material surrounding the reinforcing steel bar shall be encased monolithically and have a minimum thickness over the steel of 1/16-inch. Loose steps or those having excessive voids will be cause to have the steps rejected by the City.

502.02.I NON-SHRINK GROUT

1. Conform to requirements of Subsection 208.02.G.3.

502.02.J PIPE AND FITTINGS

1. Conform to requirements of Section 501.

502.03 CONSTRUCTION

502.03.A GENERAL

1. EXCAVATION AND BACKFILL

   Conform to applicable provisions in Section 207 and Section 209. Backfill around manholes, cleanouts, and other appurtenances shall be of the same quality as the trench backfill immediately adjacent.

2. BASE ROCK

   Place crushed aggregate base rock and thoroughly compact with a mechanical-vibrating or power tamper.

3. FOUNDATION STABILIZATION

   If material in bottom of excavation is unsuitable for supporting manholes and other sewer appurtenances, excavate below subgrade as required by soil conditions and backfill to required grade with rock conforming to Foundation Stabilization in Subsection 209.03.H.

502.03.B MANHOLES

1. Prepare the soil and base rock for manholes by leveling and compacting to provide a uniform bearing surface. If necessary, install foundation stabilization material as specified in Subsection 502.03.A.3 above.

2. Base rock shall be graded and thoroughly compacted before placing the precast base section. The manhole base shall be fully and uniformly supported by the base rock at the specified grade and alignment and shall be set such that the top of the base section is level and plumb. The use of spacers between riser sections to accommodate an out-of-plumb base section is not permitted.

3. Cracked, broken, or otherwise damaged precast manhole bases, riser sections, and cones shall not be used in the construction of sanitary sewer manholes.

4. When placing precast manhole sections, clean the ends of any foreign material prior to placing any jointing material. Then place the jointing material and the next precast section.

5. Preformed plastic gaskets shall be installed in strict accordance with the manufacturer's recommendation. Only pipe primer furnished by the gasket manufacturer will be approved. When using preformed plastic gaskets, manhole sections with chips or cracks in the joint surfaces shall not be used. Completed manholes shall be rigid and manholes shall pass the vacuum or hydrostatic test. Construct manhole inverts in conformance with the Standard Drawings and with smooth transitions to ensure an unobstructed flow through manhole. Where a manhole is poured over a section of pipe, the top portion of the pipe to the full width of pipe and diameter of the manhole shall be removed. Smooth and then cover the exposed edges of pipe completely with mortar. Trowel all mortar surfaces smooth. Apply an approved curing compound or use a comparable approved method to cure cement-based grouts and mortar. Chip-out, remove, and replace defective or cracked mortar.

6. Holes for installing pipe into precast manhole sections shall be core drilled. Making a hole for a pipe in a manhole section by impact-based methods (jackhammer, percussion hammer, etc.) or sawcutting will not be allowed.

7. Channels shall be sloped such that the design drop through the manhole is uniformly graded between the inlet and the outlet pipes. When more than one pipe enters a manhole, the lowest inlet pipe will be uniformly graded to the outlet pipe and the other inlet pipes shall uniformly meet the grade of the channel. Channels shall be formed to allow a 3-foot long by 6-inch diameter CCTV camera to enter all pipes. If at the time of CCTV acceptance testing it is found that the camera is obstructed from entering any pipe, the Contractor shall, at his sole expense, revise the channels as necessary.

8. Manhole channels shall be constructed in conformance with the appropriate Standard Drawing. Water and debris shall be removed from precast base sections prior to placing concrete for the channel. Construct cast-in-place channel and shelf in the field in one operation. Channels shall be constructed with smooth troweled surfaces and smooth transitions at all changes in direction. Channel bottoms shall not impound water.

9. Surface irregularities in the interior of the manhole, including joints between precast risers, pick holes, and other voids, shall be filled with non-shrink grout. When completed the interior of the manhole shall be smooth and free of surface irregularities.

10. CAST-IN-PLACE MANHOLE BASES

    a. Cast-in-place manhole bases shall be constructed only where specified in the Contract Documents or approved by the City Engineer.

    b. Construction of cast-in-place manhole bases shall conform to the applicable Standard Drawing and additional requirements specified herein.

    c. The concrete for the base shall be contained in forms as necessary to conform to the specified requirements.

    d. Rock backfill, earth, or similar materials shall not be used as means to contain concrete.

    e. Pipe stubouts shall be placed at the specified grade and alignment prior to placing concrete.

    f. Concrete shall not be placed in water.

    g. The concrete shall be consolidated as necessary to provide a watertight seal between the base and the first riser section and around all pipe connections.

    h. The first precast riser section shall be placed in position before the concrete has obtained initial set. The base riser section shall be level and plumb. The remaining riser sections shall not be placed until the concrete has cured a minimum of 24 hours.

11. PIPE CONNECTIONS TO MANHOLES

    a. Openings for pipe connections shall be core-drilled and fitted with flexible, watertight Kor-N-Seal, or approved equal pipe-to-manhole connectors. Pipe connections to the cone section of a manhole are prohibited unless specifically approved by the City Engineer prior to construction.

502.03.C PIPE STUB-OUTS FROM MANHOLES

1. Where required by City Engineer or at locations shown on plans, install stub-outs from manholes. Provide flexible, watertight Kor-N-Seal, or approved equal pipe-to-manhole connectors for PVC pipe connections.

502.03.D MANHOLE GRADE RINGS

1. In general, manhole grade rings will be used on all manholes in streets or roads or other locations where a subsequent change in existing grade may take place. Extensions will be limited to an overall maximum height of 12-inches.

2. Install appropriate combination of grade rings to a height that will accommodate the finish manhole surface elevation as shown on the plans. Lay grade rings in mortar with sides plumb and tops level. All mortared sanitary sewer manhole necks and all grade ring joints shall be constructed using an approved commercial concrete bonding agent applied to all cured concrete surfaces being mortared. No joints, necks, frames, grade rings, or sanitary sewers shall be mortared without an approved bonding agent. Water as a substitute for commercial concrete bonding agent will not be approved. Grade ring extensions shall be watertight.

502.03.E MANHOLE FRAMES AND COVERS

1. Set frame in a bed of mortar carried over the flange of the frame. The frame and cover assembly shall be adjusted to finish grade with precast concrete grade rings. The maximum distance between the top of the manhole cone section and final surface grade shall not exceed 12-inches. The joints between grade ring extensions shall be watertight. The top step assembly shall be removed if found to be less than 16-inches from finish grade.

2. In unimproved areas, the frame and cover shall be set to 1-foot above existing ground unless otherwise directed by City Engineer. When frames and covers are installed in unpaved vehicular accessways, a 5-foot x 5-foot pad, 4-inches thick of asphaltic concrete, shall be placed to finished grade centered around the frame.

3. In areas to be paved, the frame and cover shall be re-verified and adjusted to final finish grade after the first lift of AC has been placed and prior to the final lift. The void between the frame and the first lift of AC will be filled with Type B grout conforming to Section 208.02.G.

4. After final surface restoration, finish elevation of the manhole frame and cover assemblies shall be within .01 of a foot of the adjacent street grade. If the difference in elevation exceeds .01 of a foot, a 4-foot by 4-foot square of asphalt shall be removed and the entire area excavated to a depth of 9 1/2-inches below finish grade of the street. Concrete shall be placed to a depth of 8-inches within the entire cut out area. The concrete shall be covered with Class “D” asphalt with a minimum depth of 1-inch and a maximum depth of 1 1/2-inches. See the appropriate Standard Drawing for additional requirements.

5. CONCRETE SURFACES

    a. When located in concrete surfaces, manhole frame and cover assemblies shall be adjusted to finish grade with grade rings prior to replacing the concrete surface. Grade rings shall be limited to a maximum height of 12-inches. Grade rings shall be set in mortar with sides plumb and tops level. The joints between grade ring extensions shall be watertight.

502.03.F MANHOLE STEPS

1. Steel reinforced polypropylene steps are to be installed in precast concrete manhole cones and sections by the manhole manufacture prior to delivery to the job site.

2. Installation of the steps shall be in accordance with the manufacturer's recommendations and as approved by the City Engineer. Steps within a manhole shall be of the same design, type, and size (mixing of unmatched steps within the same manhole is not permitted). Steps shall be aligned vertically and loose steps shall be cause for rejection of the manhole cone or section.

502.03.G LEAKAGE TESTING OF MANHOLES

1. All sanitary sewer manholes, except those with pipes larger than 27-inches in diameter, shall be tested for acceptance after backfilling, compaction, and paving. Manholes with pipes larger than 27-inches in diameter will only be visually inspected for infiltration.

2. Any visible infiltration of water in sanitary sewer manholes will be considered unacceptable.

3. Sanitary sewer manholes that exhibit visible water infiltration or do not pass leakage testing shall be repaired by the Contractor using materials and/or methods approved by the City Engineer.

4. The Contractor shall conduct leakage testing by vacuum testing according the following method. Hydrostatic testing will be allowed only as approved by City Engineer:

   a. VACUUM TESTING

      1) All surface restoration shall be completed prior to conducting manhole acceptance tests, including finish paving and final adjustments to grade. Any test conducted prior to surface restoration completion will be considered unacceptable.

      2) All lift holes shall be plugged with an approved non-shrink grout. Manhole frame to grade ring or cone connection shall use commercial concrete bonding agent and non-shrink grout.

      3) All pipes entering the manhole shall be plugged, taking care to securely brace the plug from being drawn into the manhole.

      4) The test head shall be placed at the inside of the top of the manhole frame and the seal inflated in accordance with the manufacturer's recommendations. The seal at the grade rings and frame shall be subject to the test.

      5) A vacuum of 10-inches of mercury shall be drawn and the vacuum pump shut off. With valves closed, the time shall be measured for the vacuum to drop from 10-inches to 9-inches.

      6) For manholes with a depth of 10-feet or less, the manhole will pass if the time recorded is greater than 60 seconds for 48-inch diameter, 75 seconds for 60-inch diameter, and 90 seconds for 72-inch diameter manholes. For manholes 10-feet to 15-feet in depth, add 15 seconds to the time requirements. For manholes 15-feet to 20-feet in depth, add 30 seconds to the time requirements.

   b. HYDROSTATIC TESTING (Where Approved)

      1) All lift holes shall be plugged with an approved non-shrink grout. Manhole frame to grade ring or cone connection shall use commercial concrete bonding agent and non-shrink grout.

      2) Hydrostatic testing shall consist of plugging all inlets and outlets and filling the manhole with water to a height determined by the City Engineer. A manhole may be filled twenty-four (24) hours prior to time of testing to permit normal absorption of water into the manhole walls to take place.

      3) Leakage in each manhole shall not exceed 0.1 gallon per hour per foot of head above the invert when tested over a 4-hour period.

502.03.H PIPE ANCHOR BLOCKS

1. See Standard Drawings. Do not over-excavate in the areas where the anchor blocks are to be poured. Construct suitable forms that will allow the downhill wall face to have a full-bearing surface against undisturbed earth. Cure concrete 5 days before conducting sewer air testing.

502.03.I SPECIAL CONCRETE STRUCTURES

1. Conform to the details shown in Contract Documents.

502.03.J DROP ASSEMBLIES

1. Construct drop connection assemblies at locations indicated on the Plans in accordance with the Standard Drawings. Drop connection assemblies shall not be constructed for pipes where the depth between the inlet and receiving piping is equal to or 2-feet or less.

2. Drop connection assemblies shall be installed on the outside of the manhole. Outside drop connections shall be adequately supported and shall be constructed in conformance with the Contract Documents and Standard Drawing.

3. Inside drop connection assemblies will only be permitted where specified in the Contract Documents or approved by the City Engineer. Where permitted, inside drop assemblies shall be constructed in conformance with the Standard Drawing, as approved by the City Engineer.

502.03.K CLEANING

1. Upon completion of the work, structures shall be cleaned of silt, rock, and other debris.

2. Where possible, such materials shall be removed through the top of the structure. When flushing is required to completely remove the materials, appropriate precautions shall be taken to trap the debris at the nearest downstream structure.

3. Final cleaning shall comply with requirements of Section 215.

502.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

502.04.A MANHOLES

1. Measurement and payment for manholes will be made on a unit price basis for each type shown in the Contract Documents for concrete manholes 0 to 8-feet deep, plus the unit price per foot shown in the Contract Documents for extra depth of manholes over 8-feet. No deduction will be made for depths less than 8-feet. Measurement of manhole depth will be from the top of the manhole frame and cover to the manhole invert at the center of the manhole to the nearest 1/10-foot.

2. Measurement and payment for manhole steps shall be made as part of the installation or modification of manholes. No separate payment shall be made for manhole steps.

3. Payment shall include full compensation for materials, labor, and equipment necessary for excavation and disposal of excess materials; preparation of aggregate base; construction of the manhole including installation of the channel, pipe connections, and installation of the frame and cover assembly to finish grade; and acceptance testing.

502.04.B PIPE STUBOUTS FROM MANHOLES

1. Measurement and payment for pipe stubouts from manholes shall be made at the unit price per Subsection 501.04.A for pipe of equal size. Unit price will include all required materials, fittings (including end plug), and work to install the stubout.

502.04.C TAMPERPROOF AND WATERTIGHT MANHOLE FRAME AND COVERS

1. Measurement and payment for tamperproof and watertight manhole frame and covers shall be considered as incidental to the construction of manholes and no separate payment shall be made.

502.04.D PIPE ANCHOR BLOCKS

1. Measurement and payment for anchor blocks shall be made on a unit price basis for each unit installed. Payment shall include full compensation for all materials, equipment, and labor necessary to construct the work complete-in-place.

502.04.E SPECIAL CONCRETE STRUCTURES

1. Measurement and payment for special concrete structures will be made on a lump sum each basis. Payment shall constitute full compensation for materials, equipment and labor required to construct the work complete in place.

502.04.F DROP ASSEMBLIES

1. Measurement and payment for drop assemblies will be made on a unit price basis as shown in the Contract Documents for drop assemblies. No deduction will be made for drop assemblies for depths equal to 2-feet or less. Payment shall include full compensation for all materials, labor, and equipment required to construct the work complete-in-place.

502.04.G INCIDENTALS

1. Other materials, labor, and equipment required to complete the manholes and concrete structures work in conformance with the Contract Documents and not listed as separate pay items in the proposal will be considered incidental to other items of work and no separate payment will be made.

503 WORK ON EXISTING SANITARY SEWERS

503.01 DESCRIPTION

503.01.A This section covers the work necessary to join new work to existing, the abandoning of sanitary sewer lines and structures, and adjusting existing utility structures to finished grades, and shall include the requirements of Sections 501 and 502 unless otherwise modified herein.

503.01.B MANUFACTURER'S CERTIFICATION

1. The Contractor shall furnish manufacturers certification for construction materials when such information is requested by the City Engineer. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. Information and cut sheets shall be originals, copies will not be accepted. A minimum of 5 original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

503.02 MATERIALS

503.02.A GENERAL

1. Conform to requirements of Section 501, 502, and 208, the Contract Documents, and additional requirements contained herein.

503.02.B PREFABRICATED INSIDE DROPS (OREGON DROPS)

1. This type of connection will only be allowed with prior approval by the City Engineer. Materials proposed to be used in construction shall be submitted to the City Engineer for approval.

503.03 CONSTRUCTION

503.03.A EXCAVATION AND BACKFILL

1. Conform to requirements of Section 209.

2. Backfill around manholes and other appurtenances shall be the same type as the adjacent trench backfill.

503.03.B MANHOLES OVER EXISTING SANITARY SEWERS

1. The Contractor shall be responsible for maintaining flow through existing lines at all times in conformance with applicable requirements in Subsection 108.07.B and Section 209.

2. Advise City Engineer of system for diverting flow and obtain authorization before starting. The Contractor shall be solely responsible for maintaining adequate capacity for flow at all times and adequately protecting new and existing work.

3. Construct manholes over existing operating sewer lines at locations shown. Perform necessary excavation and construct new manholes in conformance with applicable requirements of Section 502. The type of manhole construction will be specified in the Contract Documents. Cast-in-place manholes shall not be constructed unless specified in the Contract Documents or approved by the City Engineer.

4. Precast and cast-in-place manholes shall be constructed in conformance with applicable requirements in Section 501, Section 502, the Standard Drawings; the Contract Documents; and to applicable requirements specified herein.

5. The Contractor shall take preventive measures to ensure that backfill, concrete, and other construction materials and debris do not enter the existing pipes.

6. When constructing cast-in-place manholes over clay or non-reinforced concrete pipe, the manhole base shall be constructed prior to opening the pipe. A minimum clear space of 6-inches shall be obtained under the pipe prior to placing the concrete for the base. The Contractor shall take adequate precautions to prevent the pipe from breaking or settling due to removal of underlying material.

7. Manholes constructed over existing PVC sanitary sewers shall be performed after first applying a dense coating of clean mortar sand to all pipe surfaces that will be in contact with the manhole, using PVC solvent cement. After the cement has cured, commercial concrete bonding agent shall be applied to the sand prior to placement of concrete. Water as a substitute for commercial bonding agent will not be allowed.

8. Manholes shall be constructed over existing concrete sanitary sewers after first cleaning and applying approved commercial concrete bonding agent to all surfaces of the pipe that will be in contact with the manhole. Prevent broken material or debris from entering sewer flow. Maintain flow through existing sewer lines at all times. Protect new concrete and mortar for a period of seven (7) days after placing. Sanitary sewer manholes shall be tested in accordance with Subsection 502.03.G. Premature breakage into the existing sewer prior to testing shall not excuse the requirement for testing.

9. After completion of manhole, the top section of the existing pipe shall be sawcut and removed to the full width of pipe and diameter of the manhole. Exposed edges of the pipe shall be trimmed and covered with mortar as necessary to provide a smooth surface.

503.03.C CONNECTION TO EXISTING STRUCTURES

1. The Contractor shall be responsible for maintaining flow through existing lines at all times and adequately protecting new and existing work in conformance with applicable requirements in Subsection 108.07.B and Section 209.

2. The connection of new pipes to existing manholes and similar structures shall be in conformance with the contract documents and to applicable requirements specified herein.

3. The Contractor shall take preventive measures to ensure that backfill, concrete, and other construction materials and debris do not enter the existing pipes.

4. Openings for pipe connections to existing sanitary sewer manholes shall be core-drilled and fitted with flexible, manhole-to-pipe connectors. Pipe connections shall be watertight.

5. Openings for pipe connections to existing storm drain manholes, catch basins, inlets, and related structures shall be core-drilled. Pipe ends shall be installed flush with the interior surface of the structure. Pipe connections shall be sealed with non-shrink grout. Interior surfaces of the grout seal shall be smooth and free of surface irregularities that may trap debris.

6. The Contractor shall not disturb the base portion of any cast-in-place manhole or similar structure unless such work is specified in the Contract Documents or approved by the City Engineer. Where pipe connections or other modifications to a cast-in-place base are required and core drilling is not possible, the concrete shall be removed with hand tools, small pneumatic hammers, or other methods that will limit the possibility of damaging the structure beyond that necessary to install the pipe stubout or make the modification. After the stubout is set to specified grade and alignment, non-shrink grout shall be used to fill the annular space between the pipe and the base.

7. No service branch or building sewer shall be connected to an existing sewer without prior inspection and approval of the pipe for water-tightness and proper construction in accordance with the State plumbing code. Previous use of the service branch or building sewer for septic tank or other application, or absence of usable cleanouts for accessing the building sewer, shall not excuse the requirement for testing except as may be authorized by the State building codes inspector.

8. Connections of service branches to existing sewers shall be made watertight. Connection shall be made where possible to existing tees or wyes previously installed and plugged. The plug shall be removed and connection made in accordance with the applicable portions of this section. Transition couplings between dissimilar pipe materials shall be made using approved commercial adapters with stainless steel bands such as Fernco, Caulder, or equal.

9. Where tees or wyes for connection are absent or unusable, connection of service branches shall be made with an approved tap such as Sealtite saddle, insert-a-tee, or equal commercial tap.

10. All taps shall be inspected and approved by the Inspector prior to covering.

11. Taps shall be installed without protrusion into or damage to the existing sewer. No compromise of the sewer will be allowed, such as undermining and settlement of the sewer grade, debris in the sewer, or longitudinal or transverse cracking of the sewer pipe. Any necessary repairs will be at the Contractor's sole expense. If it is necessary to cut in a tee, rigid couplers shall be used on both sides of the tee.

503.03.D REMOVAL OF EXISTING STRUCTURES

1. Manholes and similar structures shall be completely removed in situations where the structures will not serve any future use. These structures shall be abandoned in place only when such methods are specified in the Contract Documents or approved by the City Engineer.

2. Removal and abandonment in place of manholes and similar structures shall conform to the Contract Documents and to applicable requirements specified herein. Existing pipelines, manholes, and appurtenances that lie in the line of and are to be replaced by the new construction shall be removed from the site and disposed of as provided for in Section 207.

3. The entire structure, including the bases of cast-in-place and precast manholes and similar structures, shall be completely removed and the ends of exposed pipes plugged with concrete. The excavation shall be backfilled with materials as specified in the Contract Documents or approved by the City Engineer.

4. When sewers are extended from cleanouts, the entire cleanout assembly, including the wye, shall be removed.

5. Filling, removing, and/or abandoning of sanitary sewer systems shall be per Marion County and DEQ procedures and permits.

503.03.E ABANDONMENT OF MANHOLES

1. Existing structures shown to be abandoned shall be filled with sand or granular base rock material as specified in Section 209.02.C. Compact to at least 90 percent maximum density as determined by AASHTO T-180.

2. Where abandonment in place is specified or approved for manholes and similar structures, the frame and cover assembly, cone, and intermediate riser sections shall be removed to a depth of 8-feet below finish surface grade. Exposed pipe ends shall be plugged with concrete and the remainder of the structure filled with 3/4-inch or 1-inch minus crushed aggregate.

3. The top 6-inches of the structure shall be filled with concrete after removal of the grate and frame assembly.

4. The concrete shall be finished in conformance with applicable requirements in Section 211.

503.03.F EXISTING MANHOLE FRAMES AND COVERS

1. Manhole frames and covers removed by the Contractor that will not be reused on the project shall become the property of the City. Notify the City Engineer a minimum of 1 day prior to removal to arrange for picking up the removed frames and covers.

503.03.G PERMANENT PLUGS

1. Clean interior contact surfaces of all pipes to be cut off or abandoned. Construct concrete plug in end of all pipe 18-inches or less in diameter. Minimum length of concrete plugs shall be one pipe diameter or 12-inches, whichever is greater. For pipe 21-inches and larger, the plugs may be constructed of common brick or concrete block. Plaster the exposed face of block or brick plugs with mortar. Plugs shall be watertight and capable of withstanding all internal and external pressures without leakage. Where required by the City Engineer, abandoned pipes may be required to be filled with sand, grout, and/or Controlled Density Fill.

503.03.H ADJUSTING EXISTING STRUCTURES TO GRADE

1. Existing manholes, inlets, catch basins, and similar structures shall be brought to the specified finished grade by methods of construction as required in Section 310.

503.03.I RECONSTRUCT MANHOLE BASE

1. Conform to applicable requirements of Section 502. Exercise caution in chipping out existing concrete base to prevent cracking of manhole walls. Prevent material from entering the sewer flow. Pour new base to a minimum of 6-inches below the lowest projection of the pipe. Construct new channels to the elevations shown. Conform to details for channel construction in the Standard Drawings. Repair any cracks that occur, as a result of work operations, with new grout to form a watertight seal.

503.03.J CONNECTIONS TO EXISTING SANITARY SEWER PIPES

1. GENERAL

   a. The methods and materials used in tapping existing sanitary sewer pipes shall conform to requirements specified in the Contract Documents and to applicable requirements specified herein.

   b. Tap connections shall not protrude beyond the interior wall surface of the existing pipe.

2. SANITARY SEWER TAPS

   a. Connections to sanitary sewer pipes shall be made with approved mechanical taps or tees that are compatible with the size and type of pipe being tapped.

   b. Tee installations shall utilize solid-sleeve gasketed couplers compatible with the size and type of pipe being joined.

   c. Core-drilled holes shall be used for mechanical taps in all types of sanitary sewer pipe and shall be performed in the presence of the City Engineer.

   d. Connections made to sanitary sewer pipe shall be watertight.

503.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

503.04.A MANHOLES OVER EXISTING SANITARY SEWERS

1. GENERAL

   a. Measurement and payment for manholes constructed over existing sanitary sewer and storm drain pipe will be made in conformance with Subsection 502.04.A.

   b. Payment shall also include full compensation for materials, labor, and equipment necessary for maintaining flow through the existing pipe and for removal, replacement, or reconstruction of the existing pipe during construction of the manhole.

2. DROP ASSEMBLIES

   a. Measurement and payment for drop assemblies will be made in conformance with Subsection 502.04.F.

503.04.B REMOVAL OF EXISTING PIPES, MANHOLES, AND APPURTENANCES

1. Payment for removal and disposal of existing pipes, manholes, and appurtenances will be considered as incidental to the work and included in the bid item for excavation and backfill as specified in Section 209.

503.04.C CONNECTION TO EXISTING MANHOLES

1. Measurement and payment for connection to existing manholes will be made on a unit price each basis. If no item is included in the Contract Documents for "connection to existing manholes", all costs will be considered incidental work for which no separate payment will be made.

2. Payment shall include full compensation for materials, labor, and equipment necessary for excavation and disposal of excess materials; core drilling and/or sawcutting of the existing structure as specified; preparation of aggregate base; construction of a grout seal or installation of flexible mechanical connectors where required; and installation of the stubout.

3. Taps, tees, and similar connections to existing sewer pipes will be considered incidental to other appropriate bid items and no separate payment will be made.

503.04.D ABANDONMENT OF MANHOLES

1. Measurement and payment to filling abandoned manholes will be made on a unit price each basis. If no item is included in the Contract Documents for "abandonment of manholes", all costs will be considered incidental work for which no separate payment will be made.

2. Payment shall include full compensation for materials, labor, and equipment necessary for excavation and disposal of excess materials; removal and disposal of abandoned concrete structures where specified; plugging of exposed pipes; backfill and compaction operations; and resurfacing as specified.

503.04.E ADJUSTING EXISTING STRUCTURES TO GRADE

1. Measurement and payment for adjusting existing manholes, cleanouts, and similar structures will be made on a unit price each basis for the type shown in the Contract Documents. If no item is included in the Contract Documents for "adjust existing structures to grade", all costs will be considered incidental work for which no separate payment will be made.

503.04.F RECONSTRUCT MANHOLE BASE

1. Measurement and payment for reconstructing manhole base will be made on a unit price each basis if shown in the Contract Documents. If no item is included in the Contract Documents for "reconstruct manhole base", all costs will be considered incidental work for which no separate payment will be made.

503.04.G PREFABRICATED INSIDE DROPS

1. Measurement and payment for prefabricated inside drops will be made on a unit price each basis if shown in the Contract Documents. If no item is included in the Contract Documents for "prefabricated inside drop", all costs will be considered incidental work for which no separate payment will be made.

503.04.H INCIDENTALS

1. Other materials, labor, and equipment required to complete the work on existing sanitary sewers in conformance with the Contract Documents and not listed as separate pay items in the proposal will be considered incidental to other items of work and no separate payment will be made.

504 PIPE REHABILITATION

504.01 DESCRIPTION

504.01.A This work consists of rehabilitating existing pipes by furnishing and installing pipe liners by pipe bursting, slip lining, and cured-in-place lining as shown.

504.01.B The Contractor shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to completing the Work as shown on the Plans and in complete accordance with the Standard Construction Specifications.

504.01.C All supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation, whether or not shown on the Plans or addressed in the Standard Construction Specifications, shall be provided and installed as part of the Work.

504.01.D DEFINITIONS

1. PIPE BURSTING - Breaking and expanding the diameter of an existing pipe and inserting a new pipe inside the broken pipe.

2. CURED-IN-PLACE PIPE (CIPP) - Inserting a resin impregnated lined tube into an existing pipe, expanding it, and curing it to form a new lined pipe.

3. GRAVITY PIPE - Pipe designed to convey fluids under conditions where the hydraulic gradient and free-water surface are coincident.

4. SLIP LINING - Inserting a new pipe inside an existing pipe.

504.01.E SUBMITTALS

1. GENERAL

   a. Submit the following to the City Engineer for review and approval ten (10) calendar days prior to the preconstruction conference:

      - Catalog cuts, specifications, dimensioned drawings, installation details, and sketches.
      - Manhole connection and service connection details.
      - A detailed written narrative of the pipe lining construction procedure and sequence.
      - Bypass pumping plan. Include an emergency response plan for the sewage bypass pumping system to divert the flows in the event of a failure of the bypass pumping system. In addition, submit the plan again at least twenty (20) calendar days prior to pipe installation.
      - Traffic Control Plan
      - The pipe fusion equipment operator technician's experience and verifiable references.
      - The pipe insertion equipment operator technician's experience and verifiable references.
      - The pipe bursting and insertion equipment operator technician's experience and verifiable references.

2. CIPP SUBMITTALS

   a. In addition of the submittals described above, submit the following for CIPP ten (10) calendar days prior to the preconstruction conference:

      - Documentation showing the installer meets the installation qualifications listed in Section 504.02.F.
      - Certification by the lining system manufacturer that the installer is fully licensed and certified as competent to perform the work.

- Proof of certification that manufacturing and installation processes operate under a quality management system which is third-party certified to ISO 9000 or other recognized organization standards.
- Manufacturer's certification of successful previous CIPP installation in the United States of proposed product of 1,000,000 feet or 4,000 manhole-to-manhole segments.
- Certification from the manufacturer that the materials meet the requirements of these specifications and intended use. Certification of test results confirming that the liner and resin meet the minimum chemical resistance requirements according to ASTM F-1216 and ASTM F-1743.
- Catalog data, and manufacturer's technical data showing complete information on material composition, physical properties, and dimensions of system components of the tube and resin system. Include manufacturer's recommendation for handling, storage, insertion, curing, trimming, finishing, and repair of damaged liner.
- A list of the key qualified personnel who are assigned to and will work on this project and Certification of worker training for installing CIPP liners.
- Flow diversion plan for the mainline including service laterals (if applicable).
- Detailed method for samplings, including recommended location and size of each sample, method of removal, and method of liner repair including a procedure to repair the cured liner when core/plate samples are taken.
- Calculations for the volume of resin to be used for each segment including the calculated amount of excess resin necessary to account for liner material properties, changes in the resin's physical and chemical characteristics due to polymerization and the structural condition of the gravity pipe.
- Detailed description of the wet out process. Include tube and resin manufactures wet out recommendations including the roller gap, material feed speed and vacuum requirements for each liner size and thickness. If wet out occurs off-site, provide certification by the person in responsible charge that the entire wet out process including handling and delivery to the site followed the defined procedures.
- Detailed narrative description and sketches to describe all proposed manhole preparation, modification, preservation, and restoration activities.
- A letter identifying the cleaning methods Contractor plans to employ to remove sediment, debris, grease, scale, encrustation, mineral deposits, and roots throughout the gravity pipe to be lined and in the structures to be repaired. The letter shall include a detailed explanation of the cleaning process and a schedule of activities, references where Contractor has used the identified cleaning method successfully in the past and a list of the actions to mitigate any impact to the public during the cleaning operation.
- A plan for the process of removing resin impregnated uncured liner from the host conduit, including protection of the host system from escaping resin.
- Independent third party test results for the gravity CIPP product for approval supporting the structural performance (short-term and long-term) of the product. Test samples shall be prepared so as to simulate installation methods and trauma of the product.
- Statement of experience of the manufacturer's representative(s) who will be on site during the work.
- Resin manufacturer installation procedures including curing and cooling temperature and time requirements and sequences.

b. Submit to the City Engineer for review, fourteen (14) calendar days prior to fabricating the CIPP tube, a stamped design of the proposed CIPP liner according to Section 106.05. Provide a design meeting the requirements of subsection (G) below. Detailed calculations shall confirm the liner thickness for the proposed resin system. List all assumptions, design criteria, and material characteristics whether they are based the information in the specification, plans, and City provided materials or not.

c. Submit to the City Engineer property owner notification records five (5) calendar days prior to beginning installation.

d. Submit a log of the actual volume of resin used prior to Notice to Proceed.

3. SLIP LINING SUBMITTALS

a. In addition of the submittals described in (1) above, submit the following for Slip lining a minimum of five (5) calendar days prior to the start of the grouting operation:

- ❖ The proposed grouting mix and all performance data relative to this section such as, but not limited to: flow characteristics, viscosity, set time, bleed segregation, shrinkage and manufacturer.
- ❖ The proposed densities.
- ❖ The proposed grouting method.
- ❖ The maximum injection pressures.
- ❖ Twenty-four (24) hour and twenty-eight (28) day projected compressive strengths.
- ❖ Proposed grout stage volumes.
- ❖ Proposed bulkhead designs.
- ❖ Grout flow control.
- ❖ Buoyancy force calculations for the liner pipe.
- ❖ Provisions for service connections and laterals.

b. These shall be submitted as a complete package for the grouting requirements and the Contractor shall notify the Engineer of any changes to be made at any time after approval is granted.

504.01.F MANUFACTURER'S CERTIFICATION

1. Furnish a certificate of compliance for all pipe and fittings furnished confirming that the materials supplied conform to the specified requirements. Include certified laboratory testing data confirming satisfactory results were obtained on a sample of the pipe to be provided under the Contract.

2. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. Information and cut sheets shall be originals, copies will not be accepted. A minimum of five (5) original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

504.01.G CURED-IN PLACE PIPE DESIGN PARAMETERS

1. Follow the design considerations of ASTM F-1216 and meet the following conditions and parameters:

Condition	Parameter
Service Life	Greater than 50 years
Pipe Conditions	Fully deteriorated
Load Conditions	
Soil	*
Traffic	*, AASHTO HS-20-44 minimum
Groundwater Elevation	*
Design Thickness	Calculate and express this thickness as the absolute minimum thickness that will be acceptable (Minimum thickness allowed is 1/4 inch)
Pipe Ovality	*, 2% minimum
Modulus of Soil Reaction	*
Enhancement Factor	*
Long-term Flexural	
Strength	50% of initial (ASTM D 790)
Modulus of Elasticity	50% of initial (ASTM D 790)
Maximum Deflection	5%
Minimum Factor of Safety	2.0
Resin Migration Allowance	10% maximum
Allowable Deformity	*
Minimum Thickness (=<10” dia.)	6 mm
Minimum Thickness (>10” dia.)	7.5 mm

2. * These parameters will be listed in the Special Provisions.

3. Design the CIPP wall thickness to withstand all imposed loads, including live loads and, if applicable, hydrostatic pressure. Include considerations for ring bending, deflection, combined loading buckling and ovality in the design of the CIPP.

504.02 MATERIALS

504.02.A HDPE PIPE

1. Furnish HDPE pipe meeting the requirements of ASTM D-3035 and Section 501.02.E and having a minimum SDR of 17. At the date of installation, the HDPE materials shall not be more than 6 months old from the date of manufacture.

504.02.B CURED-IN PLACE PIPE TUBE

1. Furnish CIPP tube that consists of one or more layers of absorbent non woven felt fabric meeting the requirements of ASTM F-1216, Section 5.1, ASTM F-1743, Section 5.2.1 and the following minimum standards:

Characteristic	Test Method	Polyester Resin	Vinylester and Epoxy Resins
Flexural Strength	ASTM D 790	4,500 psi	5,000 psi
Flexural Modulus of Elasticity	ASTM D 790		
❖ Short-term		250,000 psi	400,000 psi
❖ Long-term		125,000 psi	200,000 psi

2. Fabricate the tube to a size that when installed, conforms to the internal circumference and length of the original pipe. Make allowance for circumferential or longitudinal stretching during inversion. Provide flexible tubing exhibiting the following characteristics:

   - ❖ Be homogeneous across the wall thickness containing no intermediate or encapsulated elastomeric layers.
   - ❖ No part of the tube shall be less than 100 percent saturated by resin.
   - ❖ Shall have a relatively uniform thickness that when compressed at the installation pressures will equal or exceed the calculated minimum design thickness.
   - ❖ Shall not contain material that may cause delamination in the cured CIPP.
   - ❖ Shall be coated with an impermeable, flexible material on the outside layer of the tube (before inversion).
   - ❖ Seams shall be stronger than the non-seamed felt material.

504.02.C CURED-IN PLACE PIPE RESIN

1. Furnish CIPP resins meeting the requirements of ASTM F 1216, Section 5.2 and ASTM F 1743, Section 5.2.3. The resin installed CIPP liner system shall produce a CIPP that will comply with the structural requirements specified and be inert with respect to the flow media in the gravity pipe.

2. Provide resin that is compatible with the rehabilitation process, is able to cure in the presence or absence of water, and has an initiation temperature for cure as recommended by the resin manufacturer. Provide a general purpose or enhanced strength unsaturated, thermosetting, polyester, vinylester, or epoxy resin and a catalyst system compatible with the installation process.

3. Use a sufficient quantity of resin for tube impregnation to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. Use a serial vacuum impregnation process. Use a roller system to uniformly distribute the resin throughout the tube.

4. Color the resin with a pigment compatible with the resin system, as specified by the resin manufacturer, and reviewed by the City Engineer. Submit documentation from the resin manufacturer specifically describing the chemical characteristics of the resin system, including allowable mixing, impregnation, and handling time, transportation and storage time, and recommended curing cycle including temperatures, pressures, and times.

5. The resin manufacturer's documentation shall also include maximum allowable time for handling the impregnated tube prior to insertion and the maximum allowable elapsed time from insertion to exotherm. If remedial measures are available to extend either of the maximum allowable times indicated above, without affecting the physical properties of the resin, the resin manufacturer shall describe these measures and the time limits beyond which even these measures will not prevent alteration of the physical properties of the resin.

504.02.D CURED-IN PLACE PIPE PERSONNEL

1. Perform CIPP installations with installers who are qualified, fully licensed, and certified by the manufacturer of the CIPP product system to be used on the Project. In addition, the installer shall have installed at least 50,000 feet of the CIPP product system.

2. Provide a manufacturer's representative with a minimum of two years experience with continuous in line mixing, wet out, and curing of CIPP in gravity pipes.

3. The manufacturer's representative shall be on-site during the initial CIPP wet out and cure. At other times when the representative is not on-site, provide the telephone number of a manufacturer's representative who is available on a twenty-four (24) hour basis throughout the Project duration.

504.02.E PIPE BURSTING, FUSION, AND PIPE ASSEMBLY EQUIPMENT

1. Use equipment, approved by the pipe manufacturer and the City Engineer, designed for pipe bursting, slip lining, and butt fusion welding. Do not use copper or copper-alloy heating faces.

2. HDPE pipe jointing shall conform to Section 501.03.D.

504.02.F PERSONNEL QUALIFICATIONS

1. Operate butt fusion equipment with technicians who have been certified by the pipe manufacturer and who have a minimum of two (2) years experience of butt fusion welding eight inch or larger diameter pipe liners.

2. Operate pipe bursting and insertion equipment with technicians who have a minimum of three years experience in the installation of HDPE pipe using slip lining technology and pipe bursting technology as appropriate.

504.02.G CELLULAR FOAM GROUT

1. GENERAL – Cellular grout for the annular space shall contain the same materials as neat cement grouts, blended with pre-generated aqueous foam to form macroscopic non-interconnected air cells uniformly distributed throughout the grout. The "air cells" may account for up to 90 percent of the grout mix. Foam shall be added to the grout on-site by a licensed foam Contractor.

2. COMPRESSIVE STRENGTH – The grout shall have a minimum compressive strength of 25 psi in twenty-four (24) hours when tested in accordance with ASTM C-403 and a minimum of 100 psi in twenty-eight (28) days when tested in accordance with ASTM C-495 or C-109.

3. DENSITY – The Contractor shall design a grout mix with a density that will not float the pipe while maintaining an apparent viscosity that does not to exceed 18 seconds as tested in accordance with ASTM C-939. Density shall be verified by ASTM C-138 or by other methods as approved by the City Engineer.

4. PERFORMANCE REQUIREMENTS – The Contractor shall establish proposed grout material and mixes, equipment, placement procedures, applicator, set-up, and criteria that the grouting operations shall meet. The grouting system shall have sufficient gauges, monitoring devices and tests to determine the effectiveness of the grouting operation. The Contractor must document compliance with the project and slip liner pipe specification design limits. The grouting operation shall be modified if the grouting does not perform as submitted and not approved by the City Engineer.

5. MIX DESIGNS – Mixes shall be developed to completely fill the annular space between the host pipe and the liner pipe and shall meet the following requirements:

   - Accommodate the size of the annular void.
   - Accommodate the void size of the surrounding soil.
   - Accommodate the absence or presence of groundwater.
   - Provide the acceptable strength and durability.
   - Set-up or harden to prevent movement of the liner pipe.
   - Shrinkage shall not exceed 1 percent by volume.

6. GROUTING EQUIPMENT – The materials shall be mixed in equipment of sufficient size and capacity to provide the desired amount of grout material for each stage in a single operation. The equipment shall be capable of mixing the grout at densities required for the approved procedure and shall also be capable of changing densities as dictated by field conditions any time during the grouting operation. Gauges shall be attached immediately adjacent to an injection port at the bulkhead; the gauge shall conform to an accuracy of no more than 2 percent error over the full range of the gauge operation.

504.03 CONSTRUCTION

504.03.A GENERAL

1. Handle and store all HDPE pipe to ensure that the pipe is not cut, gouged, scored, or otherwise damaged. Store the pipe so that it is not deformed axially or circumferentially. Before installing the pipe, inspect all liner pipe to verify its condition with the City Engineer. Cut out and remove from the site liner pipe segments with cuts, gouges, or scoring in the pipe wall exceeding 10 percent of the wall thickness. File a pipe condition inspection report with and receive approval from the City Engineer prior to installation.

2. For CIPP rehabilitation, remove existing lateral taps that protrude into the existing pipeline prior to beginning cleaning.

504.03.B PIPE JOINING

1. For approval of butt fusion welds, submit three qualification samples for each size of pipe liner to be welded. Make samples using the same materials, equipment, and methods to be used on the Project. Construct the test welds in the presence of the City Engineer. Joint strength shall be equal to that of the adjacent pipe and the pipe bead (1/8-inch to 3/16-inch in height) and be uniform and continuous around the entire circumference of the pipe, both inside and outside.

2. Use only cotton or other non-synthetic cloths to clean the inside and outside of pipe liner ends before welding.

3. Join sections of HDPE pipe liner in continuous lengths on-site above ground. Use butt fusion methods according to ASTM D-2657, Section 8 and the recommendations of the pipe liner manufacturer. Follow the cold weather procedures at all times. Electrofusion may be used for field closures as necessary when appropriate fusion equipment can be utilized in a trench type environment. For end sections or tail pipe, utilize electrofusion couplings.

504.03.C PIPE CLEANING

1. Flush and clean all parts of the existing gravity pipe system to remove all debris and obstructions. In addition, for host pipes repaired by CIPP, remove all mineral deposits, encrustation and grease. Cleaning methods may include washing with high-pressure water, mechanical removal, sandblasting of the walls, entry with hand tools, or other methods as approved by the City Engineer. Do not use chemicals without written approval of the City Engineer.

2. Conduct work that prevents blockage and minimizes surcharging in the sewer manholes and connecting sewer pipelines. Promptly repair damage to existing facilities as a result of the Contractor's work at no additional cost to the City.

504.03.D PRE-INSTALLATION CCTV INSPECTION

1. After cleaning, inspect the existing gravity pipe by CCTV inspection according to Subsection 501.03.Q.9 using personnel trained in locating breaks, obstacles, and service connections by video inspection. Prepare printed inspection reports that show the location in relation to an adjacent manhole of each infiltration point observed during inspection. In addition, note other points of significance such as locations of gravity pipe service connections, unusual conditions, roots, storm gravity pipe connections, sags, collapsed pipe sections, and broken pipe.

2. Provide the video and inspection reports to the City Engineer for review at least seven (7) calendar days prior to beginning CIPP installation, pipe bursting, and slip lining operations. Some conditions noted in the inspection report may need to be corrected before continuing with the gravity pipe rehabilitation.

504.03.E RECEIVING PITS AND INSERTION PITS

1. Locate all pits to suit the specified pipe lining operation.

2. Use existing manholes where practical. Remove manhole inverts, benches, and channels to permit access for installation equipment. Enlarge the input and output pipe openings if required to accommodate the maximum outside diameter size of the insertion equipment. Do not put undue stress on existing structures. Reinstall inverts and reconstruct benches and channels after pipe liners have been installed.

3. In areas where new manholes are not being installed or existing manholes are not available, excavate and restore pits at no additional cost to the City. This may include providing a new manhole if an existing manhole is removed or damaged.

504.03.F PROPERTY OWNER NOTIFICATION

1. Notify all affected parties in writing forty-eight (48) hours prior to beginning pipe liner installation. When work has been stopped for at least seven (7) calendar days, notify all affected parties again twenty-four (24) hours prior to resuming work. Make personal contact with any party that cannot be reconnected within the time stated in the written notice. Before entering private property, obtain permission from the property owner.

2. When it is necessary to shut down a private service lateral to perform the rehabilitation work, notify all the affected parties one week prior to and again forty-eight (48) hours prior to the shutdown. Gravity pipe service shall not be out of service for more than eight (8) hours and not between 6:00 p.m. and 8:00 a.m.

504.03.G BYPASS PUMPING

1. Provide bypass pumping consisting of furnishing, installing, and maintaining all power, primary and standby pumps, appurtenances, and bypass piping required to maintain existing flows and services in accordance with Section 204.

504.03.H SAGS IN LINE REPAIR

1. If the pre-installation CCTV inspection reveals a sag in the existing gravity pipe greater than one-half the diameter of the existing pipe, install replacement pipe such that it has an acceptable grade without sags. Take necessary measures to eliminate these sags by replacing the pipe, or digging a sag elimination pit and bringing the bottom of the pipe to a uniform grade in line with the existing pipe invert, or by other measures that are acceptable to the City Engineer.

504.03.I POINT REPAIRS

1. Repair the pipe where point repairs are shown. If the pre-installation video inspection reveals an obstruction that cannot be removed by conventional gravity pipe cleaning, upon approval from the City Engineer, make a point repair to uncover and remove or repair the obstruction prior to lining. Point repairs not shown will be paid for as Extra Work when approved by the City Engineer.

504.03.J INSTALLATION

1. PIPE BURSTING

   a. Break existing pipe by utilizing a constant tension system with a hydraulic or pneumatic bursting device that breaks away the pipe. A static "cone cracking" method may be used, but only by advancing the mole bursting head with a "solid steel tow rod" pulled by a constant tension hydraulic pulling wrenching system. The advancement of the bursting mole head with a chain is not allowed.

   b. The void created by the bursting device shall be of sufficient size to accommodate the HDPE pipe. Install the HDPE pipe immediately after the void has been formed by bursting. Continue pipe bursting without interruption from one manhole to another manhole unless the City Engineer allows otherwise. Extend the HDPE pipe 12-inches into the manhole or concrete structure past the inside wall and allow a minimum of 4 hours or longer as recommended by manufacturer, for the pipe initial contraction/relaxation after installation.

2. SLIP LINING

a. Excavate, expose, and isolate all service line connections prior to replacing the existing gravity pipe. Connect a fabricated pulling head to the leading end of the HDPE pipe that is positioned on rollers. Connect a power winch cable to the pulling head so the HDPE pipe can be pulled into the existing gravity pipe. Extend the HDPE pipe 12-inches into the manhole or concrete structure past the inside wall and allow a minimum of 4 hours or longer as recommended by manufacturer, for the pipe initial contraction/relaxation after installation.

b. Where a Contractor performs a "pull-through" through a manhole for two or more consecutive lines, the Contractor will be responsible for restoring the invert in the manhole. The maximum pull-through shall be two segment lengths maximum. Finishing inside the manhole shall be accomplished using a quick-set, non-shrink grout to raise the invert to the grade of the liner pipe.

c. Prior to the introduction of grout and backfilling of re-established service connections, a dye water test will be performed on the liner pipe to test the bulkheads at each end for leaks. Grout shall be placed within 48 hours of slip lining. If grout access conduits are located within a street, they shall not be allowed to protrude from the pavement. As soon as the grout is placed the Contractor shall permanently restore the pavement. If any access conduits located in the street are to be exposed to traffic between the insertion of the liner pipe and placement of grout, the Contractor shall restore the street by placing temporary asphalt pavement over the conduit.

d. The slip liner pipe shall serve as the inside form for the grout placement. Bulkheads, where required, shall completely fill the annular space, and be of a material compatible with the type of grout and constructed to withstand the loads imposed by the grout during placement, curing and the pressure of groundwater without leakage. Bulkheads shall have appropriate venting to dewater the annular space, while sealing the space from sewer flow, thereby permitting the grout to set. The bulkheads shall be constructed to allow the air to escape as grout is introduced. Air vent pipe locations shall be determined by pipeline conditions. The vent pipes may also be used to monitor the grout level.

e. Placement of grout shall be by means of one or a combination of the following:

- ❖ Preset threaded grout access outlets in the slip liner pipe wall
- ❖ A set of top-side grout access ports through the crown of the existing host pipe
- ❖ Injection through access ports in the bulkheads

f. Where placement of grout is via an access port in the slip liner pipe wall, adequate air circulation shall be maintained to ensure safe working conditions and heat dissipation due to cement hydration. The access port shall also provide for a water source to make emergency clean-ups.

g. In constricted or small annular spaces, the installation of an air vent of 2-inch diameter PVC pipes shall be required to prevent air from creating large voids in the fill. The Contractor shall inject the theoretical volume of grout to fill the annular space and allow verification by the City Engineer to determine if additional grout is needed. The Contractor shall inject additional grout as directed by the City Engineer.

h. When the weight of the volume of grout displaced by the slip liner pipe is greater than the weight of the slip liner pipe, a net buoyancy force will exist and cause the liner pipe to float. The acceptable methods to negate the buoyancy potential are as follows:

- ❖ Use a grout that weighs less than the weight of the pipe divided by the displaced volume of the pipe.
- ❖ Increase the weight of the pipe by filling with water or other material and reduce the weight of the grout.
- ❖ Use annular bridging such as casing spacers or blocking to hold the liner pipe in the required position.
- ❖ Place the grout in stages or "lifts" with detailed methodology to determine when a stage is completed.

i. Prior to grouting the Contractor shall submit to the City Engineer a detailed plan that will anchor the liner in the invert for a period of time long enough to allow the grout to set where buoyancy factors exist.

j. The gauged pumping pressure shall not exceed 5 psi, which provides a 4:1 factor of safety against buckling the slip liner pipe. Pressure gauges shall indicate in 1-2 psi graduations, and be located in the grout transport line or very near the point of injection. Pumping equipment shall have sufficient capability to inject grout at velocities and pressure relative to the size of the annulus. Calculations must be made to determine if gravity flow will exert sufficient pressure to complete the required grouting operation.

k. The Contractor shall, every half hour, check and record the grout density at or close to the discharge point. These records, combined with records of cement and other materials delivered to the job site, as well as the volume of water used shall be submitted to the City Engineer to confirm the volume of grout placed.

3. CURED-IN-PLACE PIPE

a. GENERAL

1) Install CIPP according to ASTM F-1216 Section 7, ASTM F-1743 Section 6, and the manufacturer's recommendations.

2) Where practicable, liners may be installed in continuous runs through manholes where there are two of more continuous gravity pipe segments requiring lining, especially to connect several short segments with continuous lining.

3) Do not allow the temperature of water discharged from processing liners to exceed the level allowed by State or local requirements.

4) Furnish one additional operational robotic cutter assembly train and key spare components on-site on a continuous basis as a "stand-by" unit in the event of primary equipment breakdowns.

b. PIPE LINER END SEAL

1) Install a joint seal at the ends of the new pipe liner to the rehabilitated host pipe connection to prevent water movement between the two systems. Apply a cementitious grout at this joint if the pipe liner fails to provide a tight seal because of broken or misaligned pipe at the liner ends. The grout shall be compatible with the pipe liner material, provide a watertight seal and be subject to the approval of the Engineer. Perform sealing at no additional cost to the City.

504.03.K SERVICE LINE RECONNECTION

1. GENERAL

a. The exact location and number of service connections shall be determined from CCTV information and/or as determined in the field by the Contractor. It shall be the Contractor's responsibility to accurately field locate all existing service connections whether in service or not.

b. Reconnect all service line connections after the liner has been fully cured and pipe air tests have been performed and accepted. Reconnect all service connections to the liner pipe including those from unoccupied, abandoned or vacant lot, unless directed otherwise by the City. Each vacant lot shall also be provided with one service connection location, at an approved location.

c. The Contractor shall be responsible for restoring/correcting, without any delay, all missed or faulty reconnections, as well as for any damage caused to property owners for not reconnecting the services soon enough or for not giving notice to the owners.

d. Drilled coupons shall be retrieved and shall be delivered to the City if requested for inspection of the pipe or liner thickness. Coupons shall have the location (or stationing along the mainline) properly marked.

e. Services which are reconnected shall be shown on the "Record Drawings" with the exact distance from the nearest downstream manhole.

2. SERVICE CONNECTION BY EXCAVATION

a. GENERAL

1) All existing service connections shall be excavated at the exact location as exposed. They shall be disconnected at the joints. The existing sewer, now the carrier pipe for the liner, shall be carefully broken/removed to expose the liner to the extent necessary. The liner pipe shall not be damaged and shall be allowed to normalize to ambient temperature and cool down before a service connection hole is drilled out.

2) A service reconnection by excavation shall consist of the removal and replacement of any cracked, offset, or leaking existing service line up to a distance of four (4) feet from the center of the new liner measured horizontally. One or more services discharging into a common connection shall be considered as one service connection.

3) The service connections shall be tested by the Contractor and approved by the City before backfilling.

b. PIPE BURSTING AND SLIP LINING

1) Connect service lines to the HDPE pipe using electro-fusion saddle type fittings. The new stubout or lateral shall be connected to the existing service line by a rubber coupling with stainless steel bands, as manufactured by "Mission" or a City approved equal. The “Mission” coupling shall be secured to the existing service lateral and new stub with stainless steel bands.

c. CIPP

1) The cut out hole section in the liner shall be coated with approved resin/epoxy which will cure at the ambient temperature. A pre-fabricated polyethylene or PVC saddle, or approved equal fitting, shall be installed over the cut out. The saddle shall be a one-piece saddle equipped with a neoprene gasket so that a complete seal is accomplished when the strap-on saddle is tightened with two (2) stainless steel bands, one on each side. The stub-out attached to the saddle shall protrude into the liner a distance equal to the wall thickness of the liner. The new stubout or lateral shall be connected to the existing service line by a rubber coupling with stainless steel bands, as manufactured by "Mission" or a City approved equal. The “Mission” coupling shall be secured to the existing service lateral and new stub with stainless steel bands.

3. SERVICE CONNECTION BY REMOTE CUT FOR CIPP

a. Use an approved internal cutting device and television camera to restore service connections to the full diameter (100%) of the service. Remote cuts shall be made by experienced operators so that no blind attempts or holes are made in the liner pipe. Location shall be verified carefully with earlier tapes for accuracy, especially where dimples are not defined or clearly ascertained. The City reserves the right to require service connection by excavation at certain or all locations, at no additional cost to the City, if the quality, workmanship, and approval rating for remote cut is poor and not satisfactory.

b. The remote cut shall be brushed smooth and circular in nature as seen by a 360 degree CCTV camera. The hole shall be properly aligned and be concentric to the existing connection. The locations of all remote cuts shall be verified carefully to match earlier tapes for their exact locations. Excess wrong holes, or trial cuts will be considered unacceptable and shall be properly repaired at no additional cost to the City. Excess resin build up is unacceptable and shall be removed.

c. The City may verify the completed remote connections for the full diameter requirement by excavating the site, if necessary. Defective connections shall be properly repaired at no additional cost to the City.

504.03.L MANHOLE AND STRUCTURE CONNECTIONS

1. PIPE BURSTING AND SLIP LINING - After completing the HDPE pipe installation, allow a minimum of twelve (12) hours to elapse to allow the pipe to stabilize prior to making connections to manholes and structures. Install a water stop or flange adapter, at each connection, that is fused and seated perpendicular to the pipe liner axis around the pipe liner exterior, and grouted into the concrete structure or manhole wall to create a watertight seal.

2. CIPP – The CIPP shall make a tight seal at the manhole opening with no annular gaps. Seal all holes and voids in manhole and structure walls immediately surrounding the new liner with a hydrophilic rubber joint seal and chemical grout.

504.03.M FINISHING, CLEAN UP AND TESTING

1. After completing each manhole to manhole section and prior to connecting service lines, flush and clean all parts of the system by removing all accumulated construction debris, rocks, gravel, sand, silt, and other foreign material from the pipe. Conduct air tests according to Subsection 501.03.Q.

2. Plug the ends with gasketed caps or plugs securely fastened or blocked to withstand test procedures. If the tested section is acceptable, reconnect service lines using electrofusion saddle type fittings.

504.03.N POST-INSTALLATION CCTV INSPECTION

1. After completing each manhole to manhole section of pipe liner installation, service reconnections, finish work, and final cleaning, perform a CCTV inspection of the pipe and make a written report according to Subsection 501.03.Q.9. Provide printed reports and the original DVD to the City Engineer.

2. Notify the City Engineer at least forty-eight (48) hours in advance of post-installation CCTV inspection. The City Engineer may observe the inspection. Inspect all completed work, including detailed inspection of all service line reconnections, and as directed.

504.03.O REPAIRS

1. For CIPP, repair leaks and remove and repair wrinkles, blisters, dry spots in resins, and other defects in the finish pipe as directed and at no additional cost to the City.

504.03.P WARRANTY

1. Furnish a Warranty according to Subsection 108.21.

2. For purposes of the Warranty, the CIPP will be deemed to have failed when:
   - ❖ Leakage through the liner or between liner and pipe is detected
   - ❖ Reduction of the liner thickness is more than 10 percent
   - ❖ There is any separation of the liner from the existing pipe

3. The Warranty shall recite that, upon written notification by the City that the CIPP or portions of the CIPP have failed, the Contractor shall repair and replace the liner or portions of the liner within 2 months of the City's written notification.

4. Provide materials and use procedures to repair and replace failed liners that meet the specifications in effect at the time of original installation, or if no longer available, use current CIPP specifications.

504.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

504.04.A CIPP

1. Measurement and payment for installation of CIPP will be measured on the length basis within the limits shown in the Contract Documents for the actual footage of CIPP installed. The length will be measured, with no deduction for structures or fittings, along the pipe flow line from center to center of manholes, inlets, structures, special sections, or the ends of pipe, whichever is applicable.

2. Payment for this item will be full compensation for sewer flow control, public notification, traffic control, any required excavation and restoration, uncovering buried manhole covers, sewer pipe cleaning, root removal, installation of the liner, inspection, pre- and post-construction CCTV inspection, equipment retrieval, coupon retrieval, testing, and clean-up in accordance with the Contract Documents and all else incidental thereto for which separate payment is not provided under any other Bid item.

504.04.B PIPE BURSTING

1. Measurement and payment for installation of pipe bursting will be measured on the length basis within the limits shown in the Contract Documents for the actual footage of pipe bursting installed. The length will be measured, with no deduction for structures or fittings, along the pipe flow line from center to center of manholes, inlets, structures, special sections, or the ends of pipe, whichever is applicable.

2. Payment for this Item will be full compensation for pre and post CCTV inspection, bypass pumping, pipe, fusable fittings and restraints, preparation of the host pipe to receive the new pipe, bedding, backfill material, lubrication, sealing material, coupon retrieval, equipment retrieval, all insertion or access pits (and all associated surface restoration), cleaning, testing, traffic control, fencing, miscellaneous work and cleanup, any necessary material, labor, equipment, or technique necessary to deal with any and all manner of difficulty encountered, (e.g., water, access arrangements, erosion control, reinstatement of disturbed property, suppression of noise and air pollution, etc.), and all else incidental for which a separate payment is not provided under other Items in the Contract Documents.

504.04.C SLIP LINING

1. Measurement and payment for installation of slip lining will be measured on the length basis within the limits shown in the Contract Documents for the actual footage of slip lining installed. The length will be measured, with no deduction for structures or fittings, along the pipe flow line from center to center of manholes, inlets, structures, special sections, or the ends of pipe, whichever is applicable.

2. Payment for this Item will be full compensation for pre and post CCTV inspection slip line pipe, fittings, insertion pits, bulkheads, pipe cleaning, plugging, bypass pumping, traffic control, sealing at manholes, locating, excavating, disconnecting, and backfilling service lateral connections, and testing, in accordance with the Contract Documents and all else incidental thereto for which separate payment is not provided under other Bid Items.

504.04.D GROUT

1. Measurement and payment for installation of grout will be measured on the length basis within the limits shown in the Contract Documents for the actual cubic foot or cubic yard of grout installed. Payment for this Item will be full compensation for all equipment, labor, materials required to grout the annular space between the liner pipe and the host pipe, and all else incidental thereto for which separate payment is not provided under other Bid items.

504.04.E SAG REPAIR

1. Measurement and payment for installation of sag repairs will be on the length basis, to the nearest to within the limits shown in the Contract Documents. Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

504.04.F POINT REPAIRS AND SERVICE LINE RECONNECTIONS

1. Measurement and payment for installation of point repairs and service line reconnections will be measured on the unit basis, regardless of size. Payment will be payment in full for furnishing and placing all materials, and for furnishing all equipment, labor, and incidentals necessary to complete the work as specified.

504.04.G INCIDENTALS

1. Other materials, labor, and equipment required to complete the pipe rehabilitation work in conformance with the Contract Documents and not listed as separate pay items in the Bid will be considered incidental to other items of work and no separate payment will be made.

END OF DIVISION

DIVISION 6 – STORMWATER MANAGEMENT

DIVISION 6

STORMWATER MANAGEMENT

601 STORM DRAIN PIPE AND FITTINGS

601.01 DESCRIPTION

601.01.A This work consists of furnishing and installing gravity storm drain pipe and fittings, culverts, and perforated underdrains typically associated with storm drain systems.

601.01.B The Contractor shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to completing the Work as shown on the Plans and in complete accordance with the Specifications.

601.01.C Supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation, whether or not shown on the Plans or addressed in the Specifications, shall be provided and installed as part of the Work.

601.01.D CERTIFICATION OF MATERIALS

1. The Contractor shall furnish manufacturers certification for construction materials when such information is requested by the City Engineer. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. All information and cut sheets shall be originals, copies will not be accepted. A minimum of 5 original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

601.02 MATERIALS

601.02.A GENERAL

1. Use storm drain pipe and fittings of the size, strength, material, and joint type specified on the drawings and/or in the Contract Documents. Use jointing material as hereinafter specified for each pipe material. Each piece of pipe shall be clearly identified as to strength, class, and date of manufacture. The manufacturer or fabricator shall furnish appropriate certification, based on manufacturer's routine quality control tests, that the materials in the pipe and fittings meet the requirements specified herein. Strength, permeability, hydrostatic tests, and pipe joints will be used as the basis of acceptance as described under Subsection 601.03.R. Minimum length of pipe shall be 3 1/2-feet.

2. It is not intended that materials listed herein are to be considered equal or to be generally interchangeable for all applications. The type, class, and size of pipe as applicable, will be specified in the Contract Documents for all City improvement projects. The City Engineer shall determine the materials suitable for the project and so specify.

3. Use pipe and fittings for service branches of one type of material throughout; no interchanging of pipe and fittings will be allowed.

4. Do not coat pipes for storm drains, internally or externally, with any substance of any type in an attempt to improve its performance when air or hydrostatically tested.

5. The Contractor shall furnish Materials and shall perform Work in Close Conformance to the Plans and Specifications. See Section 106.07 for acceptability of Materials and Work.

601.02.B NON-REINFORECED CONCRETE PIPE

1. Non-reinforced concrete pipe shall conform to ASTM C-14 Class III or as shown or specified and the following additional requirements:

   a. Cement shall be Type II conforming to ASTM C-150

   b. The minimum Portland Cement content shall be five-hundred and sixty-four (564) pounds per cubic yard

   c. The water/cement ratio shall not exceed 0.49.

   d. The Contractor shall provide the City Engineer with a Certificate of Compliance from the pipe manufacturer that the pipe and concrete mix conform in all respects to these specifications and other non-conflicting requirements of the referenced ASTM Specifications.

   e. Use rubber gaskets for bell and spigot pipe conforming to ASTM C-443.

601.02.C REINFORCED CONCRETE PIPE (RCP)

1. Reinforced concrete pipe shall conform to ASTM C-76 Class III or as shown or specified with Wall B design and the following additional requirements:

   a. Cement shall be Type II or Type III conforming to ASTM C-150.

   b. The minimum Portland Cement content shall be 564 pounds per cubic yard.

   c. The water/cement ratio shall not exceed 0.49.

   d. The pipe shall have circular reinforcement. Elliptical reinforcement is not permitted.

   e. The Contractor shall provide the City Engineer with a Certificate of Compliance from the pipe manufacturer that the pipe and concrete mix conforms in all respects to these specifications and other non-conflicting requirements of the referenced ASTM specifications.

2. JOINTS FOR REINFORCED CONCRETE PIPE (RCP)

a. Use rubber gaskets for bell and spigot pipe conforming to ASTM C-443 except as modified herein.

b. Use captive gasket in groove design for pipe 24-inches diameter and larger. Mortar for tongue and groove pipe shall conform to Section 208.

c. Use only lubricants for jointing materials approved by the manufacturer.

d. Furnish in duplicate a certified statement from the manufacturer of the gaskets, setting forth the basic polymer used in the gaskets and results of the tests of the physical properties of the compound. Gaskets shall be shipped in containers with identification of the batch from which the gaskets were fabricated

e. The following specification is for concrete storm drain pipes with a nominal inside diameter equal to or greater than 24-inches:

1) GENERAL

a) The joint assemblies shall be so formed and manufactured that when the pipe is drawn together in the trenches, the pipe shall form a continuous watertight conduit with a smooth and uniform interior surface, and shall provide for slight movements of any pipe in the pipeline due to expansion, contraction, settlement, or lateral displacement. The rubber gasket shall be the sole element of the joint depended upon to provide water tightness. The ends of the pipe shall be in planes at right angles to the longitudinal centerline of the pipe, except where bevel-end pipe for deflections up to 5 degrees is specified or indicated for bends. Joint faces shall be finished to regular, smooth surface and shall have all surface points within 1/4-inches of a theoretical plane taken normal to the pipe axis.

2) DESIGN

a) The shape and dimensions of the joint shall be such as to provide the following minimum requirements:

1) The rubber gaskets shall be solid gaskets of circular cross section.

2) The gasket shall be confined in a groove in the spigot end of the pipe so that movement of the pipe or hydrostatic pressure cannot displace the gasket. When the joint is assembled, the gasket shall be compressed to form a watertight seal.

3) The volume of the annular space provided for the gasket, with the engaged joint a normal joint closure in concentric position, shall not be less than the design volume of the gasket. The cross-sectional area of the annular space calculated for minimum bell diameter, maximum spigot diameter, minimum width of groove at surface of spigot, and minimum depth of groove. The volume of the annular space shall be calculated considering the centroid of the cross-sectional area to be at the midpoint between the inside bell surface and the surface of the groove on which the gasket is seated at the centerline of the groove.

4) Each gasket shall be manufactured to provide the design volume of rubber required by the joint design used and within a tolerance of ±3 percent for gaskets up to and including 1/2-inch diameter and ±1 percent for gaskets of 1-inch diameter and larger. The allowable percent tolerance shall vary linearly between ± 3 percent and ±1 percent for gasket diameters between 1/2-inch and 1-inch.

5) The tolerances permitted in the construction of the joint shall be those stated for joint design.

6) The taper on all surfaces on the bells and/or spigots on which the rubber gaskets may bear during closure of the joint and at any degree of partial closure, except within the gasket groove, shall not exceed 2 degrees.

3) The City Engineer will utilize the joint data to review acceptable joint gap for the particular joint design submitted. The gap will be established by subtracting the settlement allowance, from the Table below, from the total distance over which the joint may be pulled while meeting the provisions of this specification, or shall be equal to 1 1/2-inches, whichever is smaller.

SETTLEMENT ALLOWANCE	
Pipe Inside Diameter (Inches)	**Settlement Allowance (Inches)**
30 or less	3/8
36	1/2
42	1/2
48	5/8
54	5/8
60	3/4
66	3/4
72	7/8
84 or more	1

4) The surfaces of the bell and spigot in contact with the gasket and adjacent surfaces that may come in contact with the gasket within the specified joint movement range, shall be free from defects.

a) The inside surface of the bell adjacent to the bell face shall be flared to facilitate joining the pipe sections without damaging or displacing the gasket.

b) In pipes 36-inches or more in diameter, the bell and the spigot of the joint shall contain both circumferential and longitudinal reinforcement. For double-cage pipe, the reinforcement shall be at least equal in area to that of the outside cage or line for bells and the inside cage of line for spigots. For single-cage pipe, the reinforcement shall be at least equal in area to that of the cage for the bell and the spigot. The location of reinforcement shall be subject, however, to the permissible variations in dimensions given in the "position of reinforcement" sections in the appropriate ASTM Standard Specification (C-76, C-655, etc.)

5) APPROVAL OF JOINTS

a) A detail showing exact dimensions of the joint and diameter of rubber gaskets, including tolerances, and details of the spigot groove, and other required data shall be submitted to the City Engineer for approval.

1) Any fabrication or procurement of material performed prior to approval of details shall be at the Contractor's risk. Approval of the pipe details by the City shall not relieve the Contractor of any of his responsibility to meet all the requirements of these specifications or of the responsibility for the correctness of the pipe details.

2) No visible leakage will be permitted.

3) Contractor shall be responsible for checking pipe dimensions and any problems that may arise.

6) MATERIAL FOR RUBBER GASKETS

a) Material for rubber gaskets shall conform to ASTM C-443.

601.02.D PERFORATED CONCRETE PIPE

1. Perforated concrete pipe and fittings shall conform to ASTM C-444 and applicable requirements of ASTM C14 and C76 as modified herein, class and end type as specified.

601.02.E DUCTILE IRON PIPE

1. Ductile iron pipe shall conform to requirements of Subsection 501.02.B.

601.02.F POLYVINYL CHLORIDE (PVC) PIPE

1. PVC pipe shall conform to requirements of Subsection 501.02.C and Subsection 501.02.D.

601.02.G PERFORATED PVC PIPE

1. Perforated PVC pipe shall conform to ASTM D-1785, Schedule 40. The perforations shall consist of two rows of 2-inch slots. The slots shall be transverse to the axis of the pipe. Two rows of slots shall be 120 degree on centers. Slot size shall be 0.4-inches.

601.02.H HIGH DENSITY POLYETHYLENE PIPE (HDPE)

1. Smooth interior, corrugated exterior HDPE pipe and associated HDPE fittings shall be watertight and shall conform to AASHTO M-252 and AASHTO M-294. All smooth interior corrugated exterior pipes shall be bell and spigot type pipe.

2. Solid wall HDPE pipe shall conform to the requirements of Subsection 501.02.E.

601.02.I FLARED END SECTIONS

1. Precast concrete flared-end sections shall conform to the requirements for Reinforced Concrete Pipe herein specified. The area of steel reinforcement per linear foot of flared-end section shall be at least equal to the minimum steel requirements for circular reinforcement in circular pipe for the internal diameter of the circular portion of the flared-end section. Submit all details of construction to the City Engineer.

601.02.J JOINTING MATERIALS (GASKETS)

1. GENERAL

   a. Only lubricants for jointing materials approved by the manufacturer shall be used.

   b. Furnish to the City Engineer a certified statement from the manufacturer of the gaskets, setting forth the basic polymer used in the gaskets, and results of the tests of the physical properties of the compound. Gaskets shall be shipped in containers with identification of the batch from which the gaskets were fabricated.

2. CONCRETE PIPE

   a. Rubber gaskets for bell and spigot pipe shall conform to ASTM C-443.

3. DUCTILE IRON PIPE

   a. Rubber gaskets shall conform to ANSI A21.11/AWWA C111.

4. POLYVINYL CHLORIDE (PVC) PIPE

   a. Rubber gaskets for PVC pipe shall conform to ASTM F-477.

5. HDPE PIPE

   a. Rubber gaskets for HDPE pipe shall conform to ASTM D-3212.

601.02.K FITTINGS

1. At locations where approved by City Engineer, provide tee fittings in the storm drain main for inlet connections. Manufactured tees for service branch storm drains shall be a minimum of 6-inches nominal diameter, unless otherwise specified. All fittings shall be of sufficient strength to withstand all handling and load stresses encountered, including pressure testing that will be encountered in the work. All fittings shall be of the same materials as the pipe unless otherwise specified. Material joining the fittings to the pipe shall be free from cracks and shall adhere tightly to each joining surface. Use the same type of joints on all fittings that are used on the main storm drain pipe. Tee fittings shall not be closer than 18-inches to any joint or bell of main line storm drain.

2. Fittings shall conform to the requirements of Subsection 501.02.G, except for those shown below.

3. CONCRETE FITTINGS

   a. Use only shop fabricated fittings on concrete pipes.

   b. Submit fabrication details to the City Engineer for shop-fabricated fittings for review prior to delivery of fittings to the job site.

   c. Concrete fittings shall have the same strength classification as the concrete pipe on which the fittings are being used.

601.02.L PIPE COUPLING ADAPTERS

1. Pipe coupling adapters shall conform to the requirements of Subsection 501.02.H.

601.02.M CLEANOUTS

1. Pipe for cleanouts shall be of the same material as the main line. Cleanouts shall be of the same size as the line it is serving or shall be 8-inch nominal diameter, whichever is smaller.

601.02.N LOCATING WIRE

1. Locating wire shall be a minimum of 12 AWG, UF solid copper wire with green colored insulation. The use of THHN wire will not be acceptable. Splices shall only be used when necessary. At splices, the connecting ends of the wires shall be stripped, overlapped, and tied. Splice shall made waterproof with an approved waterproof silicone splice kit. Contractor shall ensure splices have a waterproof electrical connection at all times.

601.02.O SERVICE CONNECTION MARKERS

1. Service connection markers shall be 2-inch x 4-inch pressure treated random length lumber. Markers shall be continuous and extended at least 2-feet above the ground surface.

601.03 CONSTRUCTION

601.03.A EXCAVATION AND BACKFILL

1. Conform to the requirements of Subsection 501.03.A.

601.03.B LINE AND GRADE FOR GRAVITY STORM DRAINS

1. Do not deviate from the line or grade, as established by the City Engineer, more than 1/2-inch for line and 1/4-inch for grade, provided that such variation does not result in a level or reverse sloping invert. Measure for grade at the pipe invert, not at the top of the pipe, because of permissible variation in pipe wall thickness.

2. Line and grade for pipe shall be established and maintained by the use of pipe lasers. The Contractor shall check the line and cut from the offset stakes at maximum intervals of 50-feet.

3. Any pipe or run of pipe that has not been installed within the allowable tolerance for line and grade shall be removed and reinstalled or replaced as necessary to bring the work into compliance with the specified requirements

601.03.C PIPE DISTRIBUTION AND HANDLING

1. Pipe distribution and handling shall conform to Subsection 501.03.C.

601.03.D PIPE LAYING AND JOINTING OF PIPE AND FITTINGS

1. Pipe laying and jointing of pipe and fittings shall conform to Subsection 501.03.D, except for those shown below.

2. Provide all concrete pipes, 36-inches or smaller in diameter, entering or leaving manholes or other structures, with flexible joints within 18-inches of the exterior wall. Concrete pipes larger than 36-inches in diameter shall have this flexible joint within a distance from the exterior wall equal to one-half the nominal pipe diameter.

3. CONCRETE PIPE

   a. Use rubber ring gasket joints.

   b. Bell ends of pipe with bell and spigot joints shall be cleaned of rock and other debris prior to assembly of the joint. Spigot ends of pipe with a confined-gasket design shall be cleaned and the gasket lubricated prior to assembly of the joint

4. LAYING AND JOINTING PERFORATED PIPE

   a. Securely fasten together perforated pipe with couplings, fittings, or bands as specified by the manufacturer for the type of the pipe used. Close upgrade ends of all subsurface drain pipe with approved plugs to prevent entry of soil materials.

b. Begin pipe laying normally at the outlet end of the pipe line. The lower segment of pipe shall be in contact with the shaped bedding throughout its full length. Bell or groove ends of rigid pipe and outside circumferential laps of flexible pipe shall be placed facing the upgrade end.

c. Lay all perforated pipe, except perforated PVC pipe, with perforations facing down, unless otherwise specified or directed. Place perforated PVC pipe with slots facing up.

d. Inspect all pipes prior to lowering into the trench and clean off any material tending to plug the perforations of the pipe. Carefully lower all pipe and fittings into the trench to avoid any contamination of the pipe bedding material.

601.03.E PIPE COUPLING ADAPTERS

1. Prior to installing mechanical couplers and adapters, pipe ends shall be sawcut as necessary to produce an edge that is free of cracks or other irregularities. Pipe ends shall be cut perpendicular to the length of the pipe.

2. After installation of the coupler or adaptor, pipe zone materials shall be thoroughly compacted to maintain proper alignment of the flow line and to prevent any movement of the pipe ends.

601.03.F INSTALLATION OF SERVICE LINES, TEES, AND WYES

1. Service lines shall be constructed in accordance with the Plans, Standard Drawings, Standard Construction Specifications, and applicable provisions of the Oregon Plumbing Specialty Code.

2. Existing service shall not be interrupted without the approval of the City Engineer and service owner and/or user. The Contractor shall obtain all necessary permits required to construct service lines on both public and private property.

3. Connection of service lines to new or existing gravity main lines shall be as per the Plans and shall be inspected and accepted by the City Engineer prior to backfilling. All service connections shall be watertight utilizing appropriate tees, wyes, and approved taps or service saddles. An approved tee or wye manufactured fitting shall be used when new mains are being constructed. All holes and taps into an existing main shall be cut using an approved tapping machine in the presence of the City Engineer.

4. The minimum slope of service lines shall be 1/4-inch per foot unless otherwise approved by the City Engineer. The pipe size of service lines shall be a minimum 4-inch diameter unless otherwise specified. Maximum vertical deflection permissible with any one fitting shall not exceed 45 degrees, unless otherwise approved. No horizontal deflection is allowed. Ends of service lines shall be at the location and elevation shown on the Plans.

5. Install continuous 12 gauge green locating wire from mainline wire up to the ground surface at the property line cleanout, then loop back down to the end of the service, and then up along the service connection marker, as shown in the Standard Drawings.

6. Provide pipe-bedding material, compacted to a minimum of 90 percent of maximum density as determined by AASHTO T-180, under tees, wyes, and service branch fittings extending to the springline of the fittings. Place pipe bedding material on undisturbed native material or compacted foundation stabilization material.

7. Provide ends of service lines and fittings with approved watertight plugs or caps suitably secured and braced to prevent blow-off during internal air testing. Such plugs or caps shall be removable and their removal shall provide a socket suitable for making a flexible joint service connection or extension.

601.03.G LOCATING WIRE

1. A continuous looped solid copper tracer or locating wire shall be taped along the top of all mainlines and service lines. These wires shall be secured to the top of the pipe at maximum 10-foot intervals using 6-inch strips of 2-inch wide duct tape. All splices shall be tied, electrically continuous, and made waterproof. Access to terminal ends of the locating wire shall be made at all manholes, service line cleanouts, and as shown on the Plans. The result of this installation shall be a continuous wire circuit electrically isolated from the ground.

2. The Contractor shall be responsible for testing continuity and for testing isolation from the ground in the wire after all work has been completed on the test section. The Contractor is advised to do intermediate testing after backfilling operations and prior to surface restoration work to be sure continuity is maintained. If there is a break or defect in the wire, it shall be the Contractor's responsibility to locate and repair the defect. The continuity of the location wire shall be tested from one test load point to the next by use of a temporary wire laid between test points in-line with an ohmmeter.

601.03.H SERVICE CONNECTION MARKERS

1. In new subdivisions, undeveloped areas, and where connections will not be made after the service is installed, block the capped or plugged end and install a continuous 2-inch x 4-inch pressure treated marker. Extend markers at least 2-feet above the ground surface.

2. The top portion of the marker shall be painted after its installation with first-quality white, quick-drying enamel. After the paint has dried, use black, quick-drying enamel and neatly indicate the distance from the natural ground surface to the top of the service pipe in feet and inches. If curbs are present or to be poured as part of the project, stamp the top of the curb and gutter pan with an "SD" over the service crossing.

3. Markers shall be in one continuous piece. Splicing of lumber used for markers is only permitted in situations where the depth of the pipe is in excess of standard lumber lengths. Markers shall be installed in a vertical position with the bottom end of the marker against the end of the pipe. Markers that are broken, too short, or are not installed vertically in the ground shall be replaced by removing the backfill and replacing and/or repositioning the marker. In areas where it is not practical to extend markers above the ground surface, as approved by the City Engineer, the tops of the markers shall be installed flush with the ground surface.

601.03.I CLOSURE COLLARS

1. The use of concrete closure collars in lieu of mechanical-type couplers or other specified or approved connection materials and procedures is not permitted unless approved by the City Engineer. Where approved by the City Engineer, closure collars shall conform to Subsection 501.03.I.

601.03.J FLARED END SECTIONS

1. Construct flared end sections for culverts in accordance with the details and dimensions shown, except that minor variations may be accepted to permit the use of the manufacturer's standard prefabricated sections and methods of fabrication. Conform the excavation, bedding and backfill to applicable requirements herein for the adjacent pipe or drain to be joined.

601.03.K REPAIR OF EXISTING UTILITIES

1. Existing utilities that are damaged as a result of the Contractor's operations shall be repaired immediately at the Contractor's expense.

601.03.L UTILITY CROSSINGS

1. Minimum allowable clearance between pipes at crossings shall be 6-inches, unless otherwise approved by City Engineer.

601.03.M CONCRETE PIPE ENCASEMENT

1. Where required or approved by the City Engineer, the installation of concrete encasement shall conform to applicable requirements in Section 209.03.O.2.

601.03.N FIELD FABRICATED CONNECTIONS

1. The use of field fabricated connections is not permitted unless approved by the City Engineer. "Insert-a-tees" or approved equal shall be used in lieu of field fabricated connections. See Standard Drawings.

601.03.O CLEANOUTS

1. Cleanouts will be constructed per the Standard Drawings. The cleanout will stand vertical and the Contractor will bring compacted bedding material up around the vertical portion of the top. Frames and covers shall comply with requirements of Subsection 502.02.G.

601.03.P CULVERTS

1. Remove and replace culverts in conformance to all applicable requirements of this section and Section 209.

601.03.Q SURFACE RESTORATION

1. Surface restoration shall be in conformance with applicable requirements of Section 212, Section 213, and Section 215.

601.03.R TESTING STORM DRAINS

1. GENERAL

    a. Storm drain systems shall be thoroughly jetted and cleaned by the Contractor, at the Contractor's expense, prior to paving operations. After jet cleaning, the Contractor shall deflection test all flexible pipes in accordance with Subsection 501.03.Q.6.

b. After the Contractor has jetted and cleaned the pipe, the City will, at no additional expense to the Contractor, make a televised inspection of the storm drain pipe after the Contractor has completed the installation of the pipe, including backfill, deflection tests, and other tests as required by the Contract Documents. The City inspection shall be scheduled by the Contractor with the City. Any defects in material or workmanship shall be satisfactorily corrected by the Contractor at no expense to the City. The Contractor shall re-CCTV, at the Contractor's expense, the pipe after any corrections, in accordance with Subsection 501.03.Q.9 and supply the CCTV video and the report to the City Engineer for review and approval. This process will repeat until the pipe complies with the specifications. City acceptance is required prior to any paving operations.

2. CLEANING PRIOR TO TESTING AND ACCEPTANCE

a. Cleaning shall conform to the applicable portion of Subsection 501.03.Q.3.

3. REPAIRS

a. Repair or replace, in accordance with Subsection 601.03.D and in a manner satisfactory to the City Engineer, any section of pipe not meeting the air test requirements, deflection test requirements, joint testing requirements, alignment requirements, or that has leakage. Re-rounding of flexible pipe will only be allowed if approved by the City Engineer.

601.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

601.04.A STORM DRAIN PIPE

1. Measurement and payment for installation of storm drain pipe, including culverts, will be made on a lineal foot basis for the various classes, types, and sizes of pipe listed in the Contract Documents and as actually installed.

2. Pipe will be measured horizontally from center-to-center of manholes or to the ends of the pipe, whichever is applicable. No deductions will be made for fittings or for structures, unless specifically called out in the Contract Documents or elsewhere in these Standards Specifications.

3. Payment for pipe installation shall constitute full compensation for labor; equipment; materials; clearing and grubbing; trench excavation; provision and installation of pipe bedding, pipe zone material, and backfill; compaction operations; flushing and cleaning; testing; fittings, spools, and mechanical couplings required to complete the pipeline as designed; connection to and abandonment of existing pipe systems; installation of markers; toning wire and marking tape; surface restoration, unless included in the Contract Documents as a separate pay item; and any other incidental expenses necessary to construct the pipeline in conformance with the Contract Documents.

601.04.B PERFORATED PIPE UNDERDRAINS

1. Measurement and payment for perforated drain pipe will be made on a lineal foot basis for the type and size of pipe installed as shown in the Contract Documents. Length will be measured as total length of pipe installed, including fittings measured along the pipe centerline. Payment shall constitute full compensation for trench excavation, special filter material for pipe bedding and trench backfill, and all other work specified to complete the installation of the perforated drain pipe complete in place.

601.04.C FLARED END SECTIONS

1. Measurement and payment for flared end sections will be made on a unit price basis for each type and size actually installed as shown in the Contract Documents. Payment shall include full compensation for the flared end section complete in place including concrete cutoff walls and toe plates, when required.

601.04.D INCIDENTALS

1. Other materials, labor, and equipment required to complete the storm drain pipe and fittings work in conformance with the contract documents and not listed as separate pay items in the proposal will be considered incidental to other items of work and no separate payment will be made.

602 MANHOLES, INLETS, AND CONCRETE STRUCTURES

602.01 DESCRIPTION

602.01.A This work consists of furnishing and installing manholes, inlets and catch basins, sumps, special concrete structures, concrete encasements, anchor walls, and other concrete structures typically associated with storm drain systems.

602.01.B The Contractor shall provide all materials, labor, equipment, tools, etc., and perform all required work and services necessary for and incidental to completing the Work as shown on the Plans and in complete accordance with the Specifications.

602.01.C Supplementary or miscellaneous items, equipment, appurtenances, or devices necessary for or incidental to a complete and functional installation, whether or not shown on the Plans or addressed in the Specifications, shall be provided and installed as part of the Work.

602.01.D CERTIFICATION OF MATERIALS

1. The Contractor shall furnish manufacturers certification for construction materials when such information is requested by the City Engineer. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. All information and cut sheets shall be originals, copies will not be accepted. A minimum of 5 original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

602.02 MATERIALS

602.02.A GENERAL

1. It is not intended that materials listed herein are to be considered equal or to be generally interchangeable for all applications. The type, class, and size as applicable, will be specified in the Contract Documents. The City Engineer shall determine the materials suitable for the project and so specify.

602.02.B BASE ROCK

1. Use 3/4"-0" or 1"-0" granular base rock as approved, conforming to the requirements for aggregate base material in Subsection 208.02.D.

602.02.C FORMS

1. Forms for exposed surfaces shall be steel or plywood. Other surfaces shall be formed by means of matched boards, plywood, or other approved material. Form all vertical surfaces. Trench walls, large rock, and earth shall not be used as form material.

602.02.D CONCRETE AND REINFORCED STEEL

1. Concrete and reinforcing steel shall conform to Section 208.

602.02.E PORTLAND CEMENT CONCRETE AND MORTAR

1. When specified for use, cement mortar shall conform to Section 208. Consistency of mortar shall be such that it will readily adhere to the pipe. Mortar mixed for longer than 30 minutes shall not be used.

602.02.F MANHOLES

1. Conform to requirements of Subsection 502.02.F.

602.02.G MANHOLE FRAMES AND COVERS

1. Manhole frames and cover requirements shall be in accordance with Subsection 502.02.G.

602.02.H STEPS FOR PRECAST MANHOLES

1. Manhole frames and cover requirements shall be in accordance with Subsection 502.02.H.

602.02.I NON-SHRINK GROUT

1. Conform to requirements of Subsection 208.02.G.3.

602.02.J PIPE AND FITTINGS

1. Conform to requirements of Section 601.

602.02.K SEDIMENTATION MANHOLE AND STORM SUMP SYSTEMS (where approved)

1. Where approved, the precast sections shall comply with Subsection 502.02.F. The frame and cover shall comply with Subsection 502.02.G and shall be tamper-proof when the system is located outside the right-of-way. The steps shall comply with Subsection 502.02.H.

602.02.L STORM DRAIN INLETS AND CATCH BASINS

1. GENERAL

   a. All catch basins shall be precast or cast-in-place, as shown in the Standard Drawings.

2. PRECAST INLETS AND CATCH BASINS

   a. Precast, reinforced concrete storm drain inlet and catch basin bases, extension rings, and tops (for curb inlets) shall conform to ASTM C-913. The top section, including curb, gutter, and frame, shall be cast-in-place in accordance with applicable portions of Section 208, unless otherwise approved by City Engineer. Precast concrete risers for base extensions shall be a minimum of 4-inches in height and shall have the same wall thickness as the base section.

3. FRAME AND GRATE ASSEMBLIES FOR INLETS AND CATCH BASINS

   a. Frame and grate assemblies for inlets and catch basins shall be fabricated of steel conforming to ASTM A-36 and A-373 in accordance with the specifications shown on the Standard Drawings.

   b. All connections shall be welded. Welding shall conform to applicable requirements of the American Welding Society.

   c. The grate shall fit in the frame without binding and shall bear evenly on the seat without rocking.

602.03 CONSTRUCTION

602.03.A GENERAL

1. EXCAVATION AND BACKFILL

   a. Conform to applicable provisions in Section 207 and Section 209. Backfill around manholes, inlets, catch basins, and other appurtenances shall be of the same type as the trench backfill immediately adjacent.

2. BASE ROCK

   a. Place crushed granular base rock and thoroughly compact with compaction equipment of suitable type to obtain the specified compaction and density requirements.

3. FOUNDATION STABILIZATION

   a. If material in bottom of excavation is unsuitable for supporting manholes and other storm drain appurtenances, excavate below subgrade as directed and backfill to required grade with rock conforming to Foundation Stabilization in Subsection 209.03.H.

602.03.B MANHOLES

1. Manhole requirements shall conform to Subsection 502.03.B.

602.03.C PIPE STUB-OUTS FROM MANHOLES

1. Pipe stub-outs from manholes shall be installed in accordance with Subsection 502.03.C.

602.03.D MANHOLE GRADE RINGS

1. Manhole grade rings shall be installed in accordance with Subsection 502.03.D.

602.03.E MANHOLE FRAMES AND COVERS

1. Manhole frames and covers shall be installed in accordance with Subsection 502.03.E.

602.03.F MANHOLE STEPS

1. Steps shall comply with requirements of Subsection 502.03.F.

602.03.G LEAKAGE TESTING OF MANHOLES

1. When required by the Contract Documents, manholes shall be required to pass tests as specified in Subsection 502.03.G.

602.03.H PIPE ANCHOR BLOCKS

1. See Standard Drawings. Do not over-excavate in the areas where the anchor blocks are to be poured. Construct suitable forms that will allow the downhill wall face to have a full-bearing surface against undisturbed earth.

602.03.I SPECIAL CONCRETE STRUCTURES

1. Conform to the details shown in Contract Documents.

602.03.J CONSTRUCTION OF INLETS AND CATCH BASINS

1. GENERAL

   a. Install inlets and catch basins at the locations shown in the Contract Documents. Construct inlets and catch basins as shown on the Standard Drawings.

b. Base rock shall be graded and thoroughly compacted before placing the base. For precast bases, the base section shall be set such that the tops of the base section, riser sections, and extensions are level and plumb.

c. The curb and gutter top section over catch basins shall be cast-in-place. Frames shall be cast in the concrete when forming the top section. Frame anchors shall be firmly embedded in the concrete. Frame-bearing surfaces shall be clean and provide for uniform contact with the grate.

d. Any surrounding structures (e.g., pavement, curbs, gutters, sidewalks, driveways) and landscaping damaged during installation of inlets or catch basins shall be restored in accordance with the Construction Standard Specifications at no expense to the City.

2. PIPE CONNECTIONS TO INLETS AND CATCH BASINS

a. Openings for pipe connections to precast structures shall be core-drilled. Openings for stubouts shall be the minimum size necessary to accept the pipe. Pipe connections shall be made to the sides of base section.

b. Pipes shall be installed flush with the inner wall of the structure. Pipe to structure connections shall be sealed with non-shrinking grout.

3. INLET AND CATCH BASIN EXTENSIONS

a. The number of precast extensions necessary to adjust the structure to the specified grade shall be kept to a practicable minimum. The use of several shorter extensions where a fewer number of taller extensions could be used is not permitted.

b. Extensions shall be set in mortar with sides plumb and tops to grade. The interior and exterior of the mortared joints shall be troweled smooth.

c. Extensions shall be watertight.

602.03.K SEDIMENTATION MANHOLE AND STORM SUMP SYSTEMS (where approved)

1. Precast sedimentation manhole and storm sump systems shall be used, unless approved otherwise. Maximum depth of storm sumps shall not exceed 30-feet as measured from the manhole rim and shall not be less than 20-feet unless approved by the City Engineer.

2. Precast perforated sump sections encased with HDPE netting shall have the HDPE netting overlap a minimum of 1-foot. Netting shall be banded in 3 locations per manhole section with 3/4-inch steel bands. The first band shall be located above the weephole openings; the second shall be located at mid-section; and the third shall be located below the weep hole openings.

602.03.L CLEANING

1. Upon completion of the work, structures shall be cleaned of silt, rock, and other debris.

2. Where possible, such materials shall be removed through the top of the structure. When flushing is required to completely remove the materials, appropriate precautions shall be taken to trap the debris at the nearest downstream structure.

3. Final cleaning shall comply with requirements of Section 215.

602.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

602.04.A MANHOLES

1. Measurement and payment for manholes will be made on a unit price basis for each type shown in the Contract Documents for concrete manholes 0 to 8-feet deep, plus the unit price per foot shown in the Contract Documents for extra depth of manholes over 8-feet. No deduction will be made for depths less than 8-feet. Measurement of manhole depth will be from the top of the manhole frame and cover to the manhole invert at the center of the manhole to the nearest 1/10-foot.

2. Measurement and payment for manhole steps shall be made as part of the installation or modification of manholes. No separate payment shall be made for manhole steps.

3. Payment shall include full compensation for materials, labor, and equipment necessary for excavation and disposal of excess materials; preparation of aggregate base; construction of the manhole including installation of the channel, pipe connections, and installation of the frame and cover assembly to finish grade; and acceptance testing.

602.04.B PIPE STUBOUTS FROM MANHOLES

1. Measurement and payment for pipe stubouts from manholes shall be made at the unit price per Subsection 601.04.A for pipe of equal size. Unit price will include all required materials, fittings (including end plug), and work to install the stubout.

602.04.C TAMPERPROOF AND WATERTIGHT MANHOLE FRAMES AND COVERS

1. Measurement and payment for tamperproof manhole frame and covers shall be considered incidental to the construction of manholes and no separate payment shall be made.

602.04.D PIPE ANCHOR BLOCKS

1. Measurement and payment for anchor blocks shall be made on a unit price basis for each unit installed. Payment shall include full compensation for all materials, equipment, and labor necessary to construct the work complete-in-place.

602.04.E SPECIAL CONCRETE STRUCTURES

1. Measurement and payment for special concrete structures will be made on a lump sum each basis. Payment shall constitute full compensation for materials, equipment and labor required to construct the work complete in place.

602.04.F INLETS AND CATCH BASINS

1. Measurement and payment for catch basins and inlets will be made on a unit-price basis.

2. Payment shall include full compensation for materials, equipment, and labor necessary for excavation and disposal of excess materials; preparation of aggregate base; and construction of the catch basin or inlet including installation of the pipe connections and the frame and grate assembly to finish grade.

602.04.G SEDIMENTATION MANHOLE AND STORM SUMP SYSTEMS

1. Measurement and payment for precast sedimentation manhole and storm sump systems will be made on a unit price basis per each system constructed. Payment shall include full compensation for all materials, equipment, and labor required to construct the work complete in-place, including the replacement of any surrounding structures damaged during construction.

602.04.H INCIDENTALS

1. Other materials, labor, and equipment required to complete the manholes, inlets, and concrete structures work in conformance with the contract documents and not listed as separate pay items in the proposal will be considered incidental to other items of work and no separate payment will be made.

603 WORK ON EXISTING STORM DRAINS

603.01 DESCRIPTION

603.01.A This section covers the work necessary to join new work to existing, the abandoning of storm drains and structures, and adjusting existing utility structures to finished grades, and shall included the requirements of Sections 601 and 602 unless otherwise modified herein.

603.01.B MANUFACTURER'S CERTIFICATION

1. The Contractor shall furnish manufacturers certification for construction materials when such information is requested by the City Engineer. Certification submitted to the City Engineer shall be sufficient to show the materials meet the specified requirements. Information and cut sheets shall be originals, copies will not be accepted. A minimum of 5 original certification documents shall be provided. Costs associated with providing certification, including materials and testing, shall be borne by the Contractor.

603.02 MATERIALS

603.02.A GENERAL

1. Conform to requirements of Section 601, 602, and 208, the Contract Documents, and additional requirements contained herein. .

603.03 CONSTRUCTION

603.03.A EXCAVATION AND BACKFILL

1. Conform to requirements of Section 209.

2. Backfill around manholes, inlets, catch basins, and other appurtenances shall be the same type as the adjacent trench backfill.

603.03.B MANHOLES OVER EXISTING STORM DRAINS

1. Manholes over existing storm drains shall conform to the applicable requirements of Subsection 503.03.B.

603.03.C CONNECTION TO EXISTING STRUCTURES

1. Connections to existing structures shall conform to the applicable requirements of Subsection 503.03.C.

603.03.D REMOVAL OF EXISTING STRUCTURES

1. Removal of existing pipes, manholes, inlets and catch basins, and appurtenances shall conform to the requirements of Subsection 503.03.D.

603.03.E ABANDONED OF MANHOLES, INLETS, CATCH BASINS, AND STORM SUMPS

1. Abandoment of manholes, inlets, and catch basins and similar structures shall conform to the requirements of Subsection 503.03.E.

603.03.F EXISTING MANHOLE FRAMES AND COVERS

1. Requirements for existing manhole frames and covers shall be according to Subsection 503.03.F.

603.03.G PERMANENT PLUGS

1. Requirements for permanent plugs shall be according to Subsection 503.03.G.

603.03.H ADJUSTING EXISTING STRUCTURES TO GRADE

1. Existing manholes, inlets, catch basins, and similar structures shall be brought to the specified finished grade by methods of construction as required in Section 310.

603.03.I RECONSTRUCT MANHOLE BASE

1. Reconstruct manhole bases in accordance with requirements of Subsection 503.03.I.

603.03.J CONNECTIONS TO EXISTING STORM DRAIN PIPES

1. GENERAL

   a. The methods and materials used in tapping existing storm drain pipes shall conform to requirements specified in the Contract Documents and to applicable requirements specified herein.

   b. Tap connections shall not protrude beyond the interior wall surface of the existing pipe.

2. STORM DRAIN TAPS (WHERE APPROVED)

   a. Connections to storm drain pipes shall be made with approved fittings and materials that are compatible with the size and type of pipe being tapped.

   b. Connections to aluminum or steel pipe shall be made by sawcutting a hole in the pipe and installing a prefabricated tapping saddle over the opening in accordance with the manufacturer's recommendations.

   c. Stainless steel nuts and bolts shall be used for the installation of these saddles. Bolts shall be installed through the pipe from the inside to avoid unnecessary protrusions on the interior wall of the pipe.

   d. Concrete storm drain pipe shall be sawcut and the pipe wall removed only to the extent necessary to tap the pipe. After the tap is set to specified grade and alignment, grout shall be used the fill the annular space between the pipe and the tap.

   e. Mechanical taps, saddles, or tees shall be used to tap PVC storm drain pipe.

603.03.K CONNECT PIPE TO EXISTING INLETS AND CATCH BASINS

1. Conform to applicable requirements of Section 502. Sawcut opening in inlet with a concrete saw and grout in a watertight seal between the new pipe and inlet wall. Plaster mortar smooth inside pipe opening. Alignment, slope of pipe, and other construction details shall be as specified.

603.03.L STORM SUMP PROTECTION

1. When a storm sump is encountered, the Contractor will take all precautions to protect the structure and replace all disturbed structures and materials to their original condition. Notify the City Engineer immediately.

603.03.M SEDIMENTATION MANHOLE AND STORM SUMP SYSTEM RETROFITS

1. Where approved, conform to applicable requirements of Sections 502, 209, and 208. Precast sedimentation manhole and storm sump systems shall be constructed in conformance with the applicable requirements for Sedimentation Manhole and Storm Sump Systems of Sections 602 and 603 herein.

603.04 MEASUREMENT AND PAYMENT

(Not applicable to privately financed public improvements)

603.04.A MANHOLES OVER EXISTING STORM DRAINS

1. Measurement and payment for manholes constructed over existing storm drain pipe will be made in conformance with Subsection 503.04.A.

2. Payment shall also include full compensation for materials, labor, and equipment necessary for maintaining flow through the existing pipe and for removal, replacement, or reconstruction of the existing pipe during construction of the manhole.

603.04.B REMOVAL OF EXISTING PIPES, MANHOLES, AND APPURTENANCES

1. Payment for removal and disposal of existing pipes, manholes, and appurtenances will be considered as incidental to the work and included in the bid item for excavation and backfill as specified in Section 209.04.

603.04.C CONNECTION TO EXISTING MANHOLES, INLETS, AND CATCH BASINS.

1. Measurement and payment for connection to existing manholes, inlets, and catch basins will be made on a unit price each basis if shown in the Contract Documents. If no bid item is included in the Contract Documents for "connection to existing manholes", all costs will be considered incidental work for which no separate payment will be made.

2. Payment shall include full compensation for materials, labor, and equipment necessary for excavation and disposal of excess materials; core drilling and/or sawcutting of the existing structure as specified; preparation of aggregate base; construction of a grout seal or installation of flexible mechanical connectors where required; and installation of the stubout.

3. Taps, tees, and similar connections to storm drain pipes will be considered incidental to other appropriate bid items and no separate payment will be made.

603.04.D ABANDONMENT OF MANHOLES, INLETS, CATCH BASINS, AND STORM SUMPS

1. Measurement and payment for abandonment of manholes, inlets, catch basins and storm sumps and other similar structures will be made on a unit price each basis if shown in the Contract Documents. If no item is included in the Contract Documents for "abandonment of existing manholes", all costs will be considered incidental work for which no separate payment will be made.

603.04.E ADJUSTING EXISTING STRUCTURES TO GRADE

1. Measurement and payment for adjusting existing manholes, catch basins, inlets, and similar structures will be made on a unit-price-each basis for the type shown in the Contract Documents. If no item is included in the Contract Documents for "adjust existing structures to grade", all costs will be considered incidental work for which no separate payment will be made.

603.04.F RECONSTRUCT MANHOLE BASE

1. Measurement and payment for reconstructing manhole base will be made on a unit-price-each basis if shown in the Contract Documents. If no item is included in the Contract Documents for "reconstruct manhole base", all costs will be considered incidental work for which no separate payment will be made.

603.04.G CONNECT TO EXISTING INLET OR CATCH BASIN

1. Measurement and payment for connecting new pipe to existing catch basins will be made on a unit-price-each basis if shown in the Contract Documents. If no item is included in the Contract Documents for "connect to existing catch basin", all costs will be considered incidental work for which no separate payment will be made.

603.04.H STORM SUMP PROTECTION

1. Measurement and payment for storm sump protection will be made on a unit-price-each basis if shown in the Contract Documents. Compensation will be for all materials, labor, and equipment necessary to bring the structure equal to its original undisturbed condition.

2. If no item is included in the Contract Documents for "storm sump protection", all costs will be considered incidental work for which no separate payment will be made.

603.04.I SEDIMENTATION MANHOLE AND STORM SUMP SYSTEM RETROFITS

1. Measurement and payment for retrofit of sedimentation manhole and storm sump systems will be made on a unit price basis per each line item in the Contract Documents. Payment shall include full compensation for all materials, equipment, and labor required to construct the work complete and in-place, including the replacement of any surrounding structures damaged during construction.

603.04.J INCIDENTALS

1. Other materials, labor, and equipment required to complete the work on existing storm drains in conformance with the Contract Documents and not listed as separate pay items in the proposal will be considered incidental to other items of work and no separate payment will be made.

END OF DIVISION