ORDINANCE NO. 733

AN ORDINANCE AMENDING STAYTON MUNICIPAL CODE SECTION 12.08.310, "STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION," AND DECLARING AN EMERGENCY.

WHEREAS, standard specifications for public works construction in the City of Stayton are necessary for the uniform development of sanitary sewers, storm drains, streets, and water distribution systems; and

WHEREAS, prior standards and specifications have been in place since 1974; and

WHEREAS, the city contracted with a private consultant to update the city's standard specifications, design standards, and drawings; and

WHEREAS, those standards and specifications have been prepared, are attached hereto as Exhibit A., and by this reference are incorporated herein;

NOW, THEREFORE, the Stayton City Council ordains as follows:

SECTION 1: Stayton Municipal Code Section 12.08.310 is hereby amended to read:

12.08.310 ADOPTED, CONFORMANCE REQUIRED, AMENDMENT

1. A certain set of documents entitled "Standard Specifications for Public Works Construction in the City of Stayton, Oregon" (September, 1994), prepared by the consulting engineer for the city, is adopted as the standard specifications for public works construction in the city. A copy of the specifications is available for inspection or purchase at Stayton City Hall.

2. All work done and materials used for public improvements shall conform to the city's standard specifications unless otherwise provided for in the particular specifications for work as approved by the public works director or city engineer.

3. Amendments in the standard specifications shall be recommended by the public works director and approved by the council by ordinance.

SECTION 2: EMERGENCY CLAUSE

It is hereby adjudged and declared that existing conditions are such that this ordinance amending the Stayton Municipal Code Sections related to standard public work specifications is necessary to serve the public health, safety, welfare, convenience, and environmental amenities of the City of Stayton and the inhabitants thereof, and this ordinance shall be in full force and effect when executed by the mayor.

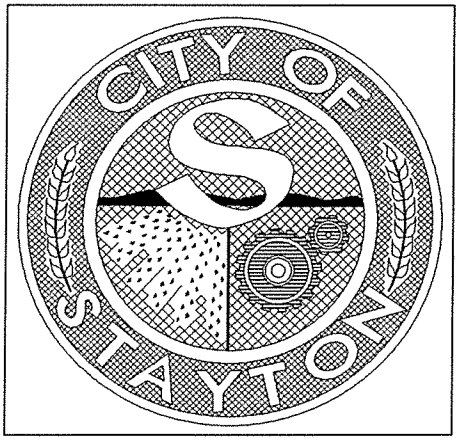
PASSED BY THE STAYTON CITY COUNCIL this 3rd day of OCTOBER, 1994.

Date: 10-6-94 BY: William VanVleet
WILLMER VAN VLEET, Mayor

Date: 10-04-94 ATTEST: David W. Kinney
DAVID W. KINNEY, City Administrator

APPROVED AS TO FORM

Date: SEP 19 1994 David A. Rhoten
DAVID A. RHOTEN, City Attorney



City of Stayton
Standard Specifications, Design Standards, and Drawings

Adopted by the Stayton City Council
Ordinance No. 733
September 1994

CITY OF STAYTON - DEPARTMENT OF PUBLIC WORKS
APPLICATION FOR CONSTRUCTION PLAN CHECK

When construction permit plans are submitted for plan check the following items must be included:

1) Four (4) sets of complete plans with civil engineer stamp on each sheet.

a. Title sheet - site plan, vicinity map, general notes, legend, and index.

b. Water plan and profile sheets - pipe, valves, hydrants, stationing, services, contours, backfill existing utilities, easements, horizontal and vertical control, crossing, conflicts, floodplain, soil series, wetland designation from National Wetland Inventory, details, specific notes.

c. Sanitary sewer plan and profile sheets - pipe, manholes, cleanouts, services, stationing, easements, existing utilities, horizontal and vertical control, grades, backfill, contours, crossings, conflicts, floodplain, soil series, wetland designation from National Wetland Inventory, details, specific notes.

d. Street and storm drain plan and profile sheets - curb and gutter, bikeways, sidewalks, pipe, manholes, catch basins, stationing, detention basins, contours, grades, easements, existing improvements and utilities, horizontal and vertical control, backfill, crossings, conflicts, floodplain, soil series, wetland designation from National Wetland Inventory, details, specific notes, storm drain and detention calculations.

e. Drainage plans

1) Existing - site plan, storm drain, contours, flow characteristics, floodplain, wetland designation from National Wetland Inventory, creeks, swales, ditches.

2) Proposed - site plan, finished grading, contour, storm drainage, specific notes.

2) Storm drain and detention calculations

3) Quantity cost estimates of proposed project by civil engineer

4) Pay plan check fee

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY

CONSTRUCTION CONTRACT SPECIFICATIONS

(EXECUTIVE ORDER 11246)

1. As used in these specifications:

a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

b. "Director" means Director, Office of the Federal Contract compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

d. "Minority" includes:

(i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(ii) Hispanic (all persons of Mexican, Purerto Rican, Cuban, Central or South American, or other Spanish Culture or origin, regardless of race);

(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North American and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade; it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which the contract resulted.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors and Subcontractors toward a goal in an approved Plan does not excuse and covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonable be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction Contractors performing construction work in geographical areas where they do not have a Federal or Federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs Office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress toward its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its efforts to achieve maximum results from its actions. The Contractor shall

document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.

c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority and female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the files with the reason therefore, along with whatever additional actions the Contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the contractor's efforts to meet its obligations.

e. Development on-the-job training opportunities and/or participate in training programs for the area which expressly includes minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources complied under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific

review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with on site supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, such matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female, and community organizations, to schools with minority and female students and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment sources, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a Contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CRF Part 60-3.

l. Conduct, at least annually, and inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the

Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to ensure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of the affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the Contractor actively participates in the group, make every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensure that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (e.g., even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

10. The Contractor shall not use the goals and timetables of affirmative action standards to discriminate against any person because of race, color, religion, sec, or national origin.

11. The Contractor shall not enter into any Subcontract with any person of firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions shall be in violation of these specifications and Executive Order 11246, as amended.

13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative actions steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

The City of Stayton is planning on using Oregon APWA Standard Specifications for Public Works Construction. The following few pages are items that will supersede the Standard APWA Specification. When a drawing is needed the Contractor or Engineer shall refer to the City of Stayton Standard Detail also enclosed.

Construction Plan Check List

APWA Amended Standard Specification for City of Stayton

100

CITY OF STAYTON

DEPARTMENT OF PUBLIC WORKS

SANITARY SEWER

DESIGN STANDARDS

1994

TABLE OF CONTENTS

SECTION I - GENERAL

1.00 Purpose

The purpose of these Sanitary Sewer Design Standards is to provide a consistent policy under which certain physical aspects of sanitary sewer design will be implemented. Most of the elements contained in this document are Public Works oriented and most are related to public improvements and City contract projects; however, it is intended they apply to both public and private work designated herein.

These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by design professionals. It is expected engineers will bring to each project the best of skills from their respective disciplines.

The Standards are also not intended to limit unreasonably any innovative or creative effort which could result in better quality, better cost savings, or both. Any proposed departure from the Standards will be judged, however, on the likelihood such variance will produce a compensating or comparable result, in every way adequate for the user and City resident.

Following from the above purpose, the standards have the objective of developing a sanitary sewer system which will:

a. be consistent with the adopted Sector Plan for the area or an adopted sewer master plan;

b. be of adequate design to carry the expected flow, within the design life, and at sufficient depth to service adjacent properties;

c. have sufficient grade to maintain a minimum velocity of two (2) feet per second when flowing half full;

d. have sufficient structural strength to withstand all external loads which may be imposed;

e. be of materials resistant to both corrosion and erosion with a minimum design life of 50 years;

f. be economical and safe to build and maintain; and

g. prevent infiltration or inflow of ground and surface waters.

Alternate materials and methods will be considered for approval on the basis of these objectives.

1.01 Revisions to These Standards

It is anticipated revisions to these Standards will be made from time to time. The date appearing on the title page is the date of the latest revision. Users should apply the latest published issue to the work contemplated.

1.02 Shortended Designation

These City of Stayton Sanitary Sewer Design Standards shall be cited routinely in the text as the "Standards."

1.03 Applicability

These Standards shall govern all construction and upgrading of all public and private Sanitary sewer facilities in the City of Stayton and applicable work within its service areas.

1.04 References

The Standards are intended to be consistent with the most currently adopted provisions of:

a. Stayton City Code and, more specifically, the following:

Adopting the Uniform Plumbing Code and the Oregon State Plumbing Specialty Code
Title 17 Land Use and Development
Title 13 Master Utility Plans

b. Stayton Area Comprehensive Plan

c. City of Stayton Urban Growth Management Plan

d. Stayton Area Water Quality Plan

e. Adopted Neighborhood Plan

f. Adopted Sector Plans

g. Oregon Statewide Planning Goals and Guidelines

h. Oregon Administrative Rules Chapter 340 Division 52

i. Council of American Building Officials (CABO) One and Two Family Dwellings Code

1.05 Standard Specifications

Except where the standards provide otherwise, design detail, workmanship and materials shall in accordance with the current edition of the "Standard Construction Specifications" prepared by the City of Stayton.

1.06 Definitions and Terms

As-built Plans - Plans signed and dated by the Project Engineer indicating the plans have been reviewed and revised, if necessary, to accurately show all as-built construction details.

Building Drain - The building drain is that part of the lowest piping of the drainage system which receives the discharge from waste and other drainage pipes inside the walls of the building and conveys it to the building sewer, which begins five feet outside the building wall (building foundation).

Building Sewer - That part of the horizontal piping of the drainage system which extends from the end of the building drain and which receives the discharge of the building drain and conveys its to a public sewer, private sewer, individual sewage disposal system, or other point of disposal.

City - means the City of Stayton, Oregon.

Collection Systems - means facilities maintained by the City of Stayton for the collecting, pumping, conveying and controlling of wastewater.

Commercial User - means any user of the sanitary sewer who is neither a residential nor industrial user.

Cooling Water - means water other than sewage or industrial waste which is used as medium for carrying away excess heat from any apparatus, appliance, mechanism or device in which, in the course of such cooling

process, is not mixed or co-mingled with any other substance or used as means of carrying off any other substance, in suspension or in solution, thereby exiting such cooling process in substantially the same condition, save for temperature, as when it entered.

Cut Sheets - means sheets of tabulated data, indicating stationings, structures, fittings, angle points, beginning of curve, points on curve, end of curves, sewer slope, staking offset, various elevations, offset cuts, and sewer depths.

Definition of Words - Wherever, in these Standards, the words "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 Director. Similarly, the words "approved," "acceptable," "satisfactory," shall mean approved by, acceptable to, or satisfactory to the Director.

Director - means the Director of Public Works of the City of Stayton or his/her authorized representative.

Domestic Sewage - means 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 sewer or by means of private sewage disposal system.

Drainage Waste - means stormwater, groundwater, surface drainage, subsurface drainage, spring water, well overflow, roof drainage, or other like drainage other than sewage or industrial waste.

Dwelling Unit - means a facility designed for permanent or semi-permanent occupancy and provided with minimum kitchen, sleeping, and sanitary facilities for one family.

Easement - Easements are areas along the line of all public sewers which are outside of the dedicated road rights-of-way, and shall be prepared on City forms granting rights along the line of the sewer to the City.

Fixture Unit Equivalents - The unit equivalent of pluming fixtures as tabulated in Chapter 4 of the Uniform Plumbing Code and the Oregon State Plumbing Specialty Code.

Flow - means the wastewater flow from an industry, institution or house connection (daily average).

Industrial Waste - means a water borne waste and wastewater from an industrial user.

Lateral Sewer - means any public sewer to which a building sewer connects or may connect (normally eight (8) inches in diameter).

Multiple Family Dwelling - means a building or portion designed thereof for occupancy by two or more families, living independently of each other.

Manufacturer's Name - Any manufacturer's name, specification, catalog number, or type used herein is specified by make and order to establish the standard requirements of the City. Other equivalent makes will be considered for approval, providing they are comparable with this established standard.

Owner - Means 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 he is purchasing a parcel of property under a written recorded or unrecorded land sale contract.

Person - means individual firm, corporation, association, agency, or other entity.

Plans - Construction plans, including system plans, sewer plans and profiles, cross sections, detailed drawings etc., or reproductions thereof, approved or to be approved by the City Engineer, which show the work to be done, in which constitute a supplement to these Standards.

Plumbing System - All plumbing fixtures and traps, or soil, waste, special waste, and vent pipes within a building and to a point five feet outside the building foundation thereof.

Preliminary Review - Plans stamped "Preliminary Review," dated, and signed by the City, indicates the plans have been reviewed and may now be submitted as a part of the requirements for approval for construction.

Private Collection System - A privately owned and maintained sewer system installed to serve multiunit structures on single ownership properties, which cannot legally be further divided, such as apartments, mobile home parks, and schools or installed in commercial or industrial subdivisions. A single family residence with an unattached garage or shop with Sanitary facilities is exempt from this definition.

Project Engineer - The engineer, including the City's engineer, licensed by the State of Oregon as a Civil Engineer under whose direction plans, profiles, and details for the work are prepared and submitted to the City for review and approval.

Public Sewer - means any sewer in public right-of-way or easement operated and maintained by the City.

Residential User - means the owner, lessee, or occupant of a single dwelling unit in one structure.

Right-of-way - All land or interest therein which by deed, conveyance, agreement, easement, dedication, usage, or process of law is reserved for or dedicated to the use of the general public for roadway purposes, within which the City shall have the right to install and maintain sewers.

Roadway - All of that portion of the right-of-way used or to be used, for vehicle movement which exists between the curbs or proposed curb lines.

Sewage - means the wastewater derived from human habitation and use of buildings for residential, institutional, or commercial purposes, excluding storm waters and industrial waste.

Single Family Dwelling - means any residential building designed to house one family.

Standard Plans - The drawings of structures or devices commonly used on City work and referred to on the plans (see standard construction specifications).

Streets or Roads - Any public highway, road, street avenue, alley way, easement, or right-of-way used or to be used for vehicle movement.

Structures - Those structures designated on the plans as manholes, siphons, junctions or diversion facilities, etc. Detailed drawings of structures or devices commonly used in City work and mentioned in these Standards are included in the standard construction specifications.

Trunk Sewer - A public sewer ten (10) inches or larger which has been or is being constructed to accommodate more than one main sewer or lateral sewer. It may, in some cases, serve as a lateral sewer.

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

Uniform Plumbing Code - The Uniform Plumbing Code adopted by the International Association of Plumbing and Mechanical Officials, current edition.

1.07 Engineering Policy

The engineering policy of the City of Stayton requires strict compliance with Oregon Revised Statute 672 for professional engineers.

All engineering plans, reports, or documents shall be prepared by a registered professional Civil Engineer, or by a subordinate employee under his/her direction, and shall be signed by him/her and stamped with his/her seal to indicate his/her responsibility for them. It shall be the project engineer's responsibility to review any proposed sewer system, extension, and/or existing system change with the City, prior to engineering or proposed design work, to determine any special requirements or whether the proposal is permissible. A "Preliminary Review" and/or a "Plans Approved for Construction" stamp of the City, on the plans, etc., for any job, does not in any way relieve the project engineer of his/her responsibility to meet all requirements of the City or obligation to protect the life, health, and property of the public. The plan for any project shall be revised or supplemented at any time it is determined the full requirements of the City have not been met. It will be the design engineer's responsibility to submit plans to the Oregon Department of Environmental Quality.

1.08 Approval of Alternate Materials or Methods

Any alternate material or method not explicitly approved herein will be considered for approval on the basis of the objectives set forth in 1.00 Purpose. Persons seeking such approvals shall make application in writing. Approval of any major deviation from these Standards will (normally) be in written form. Approval of minor matters will be made in writing if requested.

Any alternate must meet or exceed the minimum requirements set in these Standards.

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

Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the Director. When requested by the City, full design calculations

shall be submitted for review with the request for approval.

1.09 General Applicability

Permanent sanitary sewer facilities shall be provided to all property (legal lots of record created by a major or minor partitioning or subdivision of land as per Chapter 17.24 within the City of Stayton per these Standards.

1.10 Special Items

The design of the following are considered special items and are not covered in detail in these Standards:

a. Sewage Pump Stations
b. Force Mains
c. Siphons
d. Relining of Existing Sewers
e. Internal Sealing of Existing Sewers
f. Treatment Plants
g. Energy Dissipators
h. Regulating Devices
i. Flow Measurement Devices
j. Hydrogen sulfide and/or hazardous gases.
k. State System and Drainfield

Review and approval of the above special items by the Directors of Public Works shall be required. When requested by the City, full design calculations shall be submitted for review prior to approval.

SECTION II - DESIGN

2.00 General Design Considerations

Sanitary sewers shall be designed to remove the domestic sewage and industrial wastes from basements of houses, commercial or industrial buildings, and all public and private establishments where possible.

Storm water, including street, roof, or footing drainage, shall not be discharged into the sanitary sewer system but shall be removed by a system of storm drains or by some other method separate from the sanitary sewer system.

Unpolluted cooling waters shall not be discharged into sanitary sewers. The overflow drains and filter backwash lines of swimming pools and "hot tubs" shall drain into a sanitary sewer.

In general, sewer systems shall be designed to care for future loads and for ultimate development of the specific drainage area concerned.

As a condition of sewer service, all developments will be required to provide public sewers to serve adjacent upstream parcels in order to provide for an orderly development of the drainage area. This shall include the extension of sewer mains in easements across the property to adjoining properties and across the street frontage of the property to adjoining properties when the main is located in the street right-of-way. This shall include trunk sewers that are oversized to provide capacity for upstream development.

2.01 Sanitary Sewer System Capacity

Design flows shall be determined by using the factors of the specific Sector Plan in which the development is situated.

In the absence of Sector Plan and flow data or other reliable information, the following factors may be assumed:

Per Capita Peak Hourly Flows: 1)
400 gpcd (lateral sewers)

---

1) Per capita peak hourly flows are the sum of peaked average daily domestic flows and infiltration inflow. The peak capita hourly flows for trunk sewers must be computed for each case because of variable peaking factors.

It is recommended that design calculations include estimates of average maximum and minimum daily flows. The submission of design calculations will not ordinarily be required, but designers should be prepared to substantiate pipe sizes, layout, population estimates, land uses, or other design assumptions.

These factors may be used to estimate the peak daily flow which includes an allowance for infiltration.

Design capacity of main and trunk sewers shall be designated on the following basis:

a. Lateral sewers: Design capacity shall be based on sewers flowing one-half (1/2) full.

b. Trunk sewers: Design capacity shall be based on sewers flowing full, without head.

2.02 Sanitary Sewer Construction Plans

a. General

Complete plans and specifications for all proposed sanitary sewer improvements including any necessary dedications and easements shall be submitted to the Department of Public Works for approval and must receive the required approval prior to construction permit issuance and beginning of construction.

b. Plan Preparation

Construction plans and specifications shall be prepared by a professional civil engineer licensed in the State of Oregon in accordance with the following requirements:

1) Dimensions - Construction plans shall be clearly and legibly drawn on engineering tracing paper 22 by 34 inches with a 1-1/2 inch clear margin on the left edge and one-half inch margins on all other edges.

2) Scale - Horizontal scale shall be 1" = 50'; vertical scale shall be 1" = 5' or as approved by the City Engineer.

3) Form - Title Sheet, Plan and Profiles, Sanitary Sewer

Appurtenances, and Site Drainage Plan.

2.03 Title Sheet

a. Plan view (Site Plan of the entire project shall be required showing street right-of-way and/or subdivision layout to a scale of 1" = 100'. A smaller scale may be used on large projects upon approval of the City Engineer. A project is considered too large when a minimum dimension of two (2) inches cannot be maintained between the title, system site plan, and vicinity map, scale of 1" = 200' may be used in this case.

The site plan shall be a composite plan showing all complete properties to be served by the sanitary sewer improvements and properties adjacent to and within 250 feet of those served, existing natural or artificial streams, swales, and sanitary sewers, line sizes, designations, structures and their addresses, tract names and numbers, lot numbers or property owner's names, street names, total acreage including streets directly served, and units per acre density.

b. Index of Sheets.

c. Complete legend of symbols used.

d. Vicinity Map to a scale of not less than 1" = 800' showing the project location.

e. Title Block - located in lower right hand corner or right edge of paper with scale, north point, date, drawing number, the engineer's name, address and official stamp, and where applicable, the owner/developer's name and address.

f. Temporary and permanent bench marks including their descriptions.

g. General and special notes relating to construction methods.

h. A statement referencing the City of Stayton Standard Construction Specifications.

2.04 Plan and Profiles

a. Plan

Plan view of sanitary sewer lines shall be to a scale of 1" = 50' and shall contain the following information in addition to the above:

1) Adjacent street curbs and property lines, right-of-way and utility easements referenced to property corners, street intersections, or section lines. On construction permit projects adequate two (2) foot contour lines or property corner and curb elevations to help determine if existing basements or proposed daylight basements in new subdivisions can or should be served.

2) Location of each manhole and sewer appurtenance shall be numbered and stationed to facilitate checking the plans with the profiles. The stationing shall be tied to existing property corners or street monuments with the relationship of each manhole and cleanout shown to the property corners (minimum two directions). Each line with a separate designation (A 0+00, B 0+00, etc.) shall be stationed continuously upgrade from 0+00 at its point of connection to another line (0+00 represents the centerline of the existing manhole or existing plug or cleanout if a main extension). Also to be shown is each service tee stationed with the size and depth at property line indicated.

3) Location of water courses, stream and railroad crossings, culverts, and storm drains that cross the alignment within 500 feet of the proposed extension in order to prevent future grade conflicts. All water course crossings must show the 100-year flood plain. This information may be shown on the 1" = 200' site plan.

4) Location of wells, water main valves, pump stations, and blow-offs within a 100-foot radius of the proposed extension. All manholes, water mains, services, gas mains, underground power, and other utilities either crossing the alignment within 250 feet of the terminus of the proposed extension or adjacent to the proposed extension within the right-of-way or within ten (10) feet of the easement line. The intent is to prevent grade conflicts of all future extensions.

b. Profiles

Profiles for the individual sanitary sewer lines shall be to the same horizontal scale on the same sheet and drawn immediately below the corresponding plan view to a vertical scale of 1" = 5' (or as approved) reading from 0+00 left to right, and shall contain at least the following information in addition to the above:

1) Location of manholes and other appurtenances with each manhole numbered and stationed as in item (a) 2 above.

2) Profile of the existing and proposed ground and/or pavement surface and sewer invert.

3) Size, slope, length, and type of material of the line between consecutive manholes. Type of pipe may be designated by abbreviations listed under Section 2.08.

4) Elevation of original ground, finished grade, proposed rim elevation, and sewer inverts at each manhole (Mean Sea Level Datum, U.S.G.S.). The bench mark used as a basis for vertical control in the design shall be shown on the plans and referenced as in sewer plans (a) 2 above.

5) Railroad and culvert crossings, ditch, or stream crossings with elevations of the ditch or streambed and the 100-year flood elevation profile and casing details. See Section 2.12 (b) and 2.13 (c) for additional plan requirements.

6) Utility crossings that conflict with the proposed sewer installation.

7) All existing facilities upon which work is to be performed, i.e., installation, repair, or removal.

SPECIAL NOTE: The design engineer shall field locate and verify the alignment, depth, and inverts of all existing facilities shown on the plans that will be crossed by proposed facilities which might cause a grade or alignment change of the sewer and shall certify them with a note on the plans. City as-builts are only to be used as an aid to the design engineer when field verifying the existing facilities.

2.05 Sanitary Sewer Appurtenances

Detailed drawings shall be included for all sanitary sewer appurtenances including manholes, pump stations, siphons, stormwater diversion, etc. Appropriate references to City of Stayton Standard Plans may be used in lieu of details actually shown on the plans.

Detailed drawings shall be included for all sanitary sewer appurtenances including manholes, pump stations, siphons, stormwater diversion, etc. Appropriate references to City of Stayton Standard Plans may be used in lieu of details actually shown on the plans.

2.06 Plan Submittal

Four sets of construction plans, with materials and cost estimates shall be submitted for checking to ensure compliance with these Standards, City of Stayton Ordinances, and good engineering practice. Submitted plans shall include specifications, test data, a materials list, design recommendations, easement and right-of-way descriptions, and other material as requested by the City Engineer. Drainage calculations and a soils report may be required by the City Engineer. A plan check fee will be levied at the time plans are submitted.

2.07 Sanitary Sewer Requirements

Subsections 2.08 through 2.15 contain the physical design requirements for public sanitary sewer systems in the City. These design requirements may be used for private systems when plumbing code requirements cannot be met, provided the system is designed and appropriately certified by a professional civil engineer.

2.08 Pipe Materials

Pipe materials shall conform to Section 303.2.00 of the Standard Construction Specifications with the exception of concrete pipe.

Acceptable abbreviations for existing and proposed types of pipe are as follows:

CI - Cast Iron
DI - Ductile Iron
PVC - Poly-Vinyl Chloride
NRCP - Nonreinforced Concrete Pipe
RCP - Reinforced Concrete Pipe

2.09 Size

Lateral sewers shall not be less than eight (8) inches inside diameter and shall begin at a manhole and shall terminate at a manhole except as provided in Section 2.15(b).

2.10 Minimum Slope

a. All sanitary sewers shall be laid on a slope which will produce a mean velocity, when flowing half full of at least two (2) feet per second, which is based upon Manning's pipe friction formula, using a roughness coefficient, valued at not less than 0.013, or the pipe manufacturer's recommendations, whichever is greater. The minimum acceptable slope for various pipe sizes with an "n" value of 0.013 are listed below:

Inside Pipe Diameter (Inches)	Percent of Grade (feet per 100 feet)
(private sewers only) 6	0.60 to 0.75
8	0.4
10	0.3
12	0.22
15	0.15
18	0.12
21	0.1
24	0.09
27 (and larger)	0.08

In general, gradients greater than thcse shown above are desirable and are particularly recommended on the upper ends of lateral sewers.

In theory, new PVC sewers have a manufacturer's "n" value of 0.009; however, and grit as well as slime build-up on the pipe walls renders a true "n" value with time of 0.013; hence, an "n" value of less

than 0.013 will not be considered for approval.

Engineers are cautioned not to specify sewers of sizes which are obviously larger than is necessary for satisfactory carrying capacity but which are specified in order to meet grade requirements, i.e., a ten-inch pipe for an eight-inch pipe to acquire a decrease in slope.

b. Grades (slopes) shall be determine to the center of the manhole. The average between any inlet Slope (Si) and outlet Slope (So) in percent across the manhole shall not exceed 25 percent.

$$\frac{Si + So}{2} = \text{less than 25 percent (feet per 100 feet)}$$

The above formula will limit the difference between the inlet and outlet inverts measured at the manhole walls from exceeding one (1) foot for an average manhole diameter of four (4) feet. Application is to sewers with a slope in excess of 19 percent.

c. Generally, a vertical offset in grade exceeding twenty-five hundredths (0.25) of a foot will not be permitted. Exceptions will be the following:

1) When a smaller diameter connects to a larger diameter sewer.

2) When a grade conflict exists with an existing utility, the maximum vertical drop may be one (1) foot or as approved.

3) When a vertical drop greater than two (2) feet is approved, an outside drop must be installed as per Standard Plan No. 102.

The intent is to prevent the difference in pipe inverts at the manhole wall on steep sewers from exceeding one (1) foot, which with the offset permitted in (c) (2) above, renders it impossible to insert a TV camera into the outfall line if the average slope exceeds 25 percent.

2.11 Anchor Walls

Sewers on slopes 20 percent or more shall be secured by anchor walls in accordance with Standard Plan No. 113.

Where velocities greater than fifteen (15) feet per second are attained, the pipe material shall be ductile iron and special provision shall be made to protect manholes

against erosion and displacement by shock. This may be accomplished by installing one additional manhole to decrease the slope or to split a 90° horizontal direction change into two (2) 45° incremental changes.

2.12 Minimum Depth

All sanitary sewers shall be laid at a depth sufficient to drain building sewers, to protect against damage by frost or traffic, and to drain basement sewers where practical.

Sufficient depth shall mean the minimum cover from the top of the pipe to finish grade at the sewer alignment.

Under normal conditions, sanitary sewers in residential areas shall be placed in the street with the following minimum cover:

Lateral Sewer - Six (6) feet

Trunk Sewer:
in the roadway - Eight (8) feet
in easements - Eight (8) feet

Where the topography is relatively flat and existing sewers are shallow (five (5) feet or less), the minimum cover may be three (3) feet. Less than three (3) feet of cover will require the installation of ductile iron pipe. See Table 2.1 for class of pipe required.

In a new designated residential hillside subdivision, mainline and lateral sewers shall be placed in the street at a depth sufficient to drain building sewers on the low side of the street.

Deviation from the above standards will be considered on a case-by-case basis when one of the following circumstances exist and the required documentation is submitted:

a. Underlying rock strata - required: A request in writing to the Director together with a soils report including a plan and profile certifying bedrock exists three (3) feet below the undisturbed ground surface at all investigated alignments.

b. A ditch or stream must be crossed-required: A plan and profile; horizontal scale 1" = 20', vertical scale 1" = 2'.

TABLE NO. 2-1
PIPE CLASS REQUIREMENT
(SEWER LESS THAN 3' OF COVER

Pipe Size (Inc.)	Depth of Cover (Ft.)	In Fills Use D.I. Class	Standard Trench Use D.I. Class
4 (Service Lines)	0.5 1.0 1.5 2.0	51 51 51 51	51 51 51 51
6 (Service Lines)	0.5 1.0 1.5 2.0	53 51 50 50	50 50 50 50
8	0.5 1.0 1.5 2.0	54 52 50 50	50 50 50 50

2.13 Location

a. Relation to Water Lines and Other Utilities Sanitary sewers shall be separated from water pipes and sources of domestic water in accordance with OAR Chapter 333.

b. Sewers in Streets or Easements Unless approved by the Director, sewers shall be located in the street right-of-way within five (5) feet of the street centerline on the low side of the street. Sewers in easements will be allowed only after all reasonable attempts to place the mains in the right-of-way have been exhausted. All easement installations must be approved by the Director on a case-by-case basis. If streets have curved alignments, the center of the manhole shall not be less than six (6) feet from the curb face on the outside of the curve nor the sewer centerline less than six (6) feet from the curb face on the inside of the curve. The intent is to prevent a conflict with new storm drain lines while still providing for the least number of manholes required to traverse a curve.

When it is approved by the Director to locate sewers in easements, the sewer shall be centered in the easement and the conditions of the

easement shall be such that the easement shall not be used for any purpose which would interfere with the unrestricted use for sewer main purposes. Under no circumstances shall a building or structure, tree, or fence be placed over a sanitary sewer main or sewer easement. This shall include overhanging structures with footings located outside the easement. All manholes within easements and pipelines over 24-inch diameter regardless of location shall have lock down lids.

Easements for sewers less than 12 inches in diameter shall have a minimum width of ten (10) feet. Sewers 12 to 15 inches in diameter shall have a minimum easement width of 15 feet, and sewers greater than 15 inches in diameter, shall have a minimum easement width of 20 feet.

Easement locations for public sewer mains serving a PUD, apartment complex, or commercial/industrial development shall be in parking lots, private drives, or similar open areas which will permit an unobstructed vehicle access for maintenance by City forces.

Sewers with more than six (6) feet of cover/or inside diameters 24 inches or greater will require wider easements. A slope of one horizontal to one vertical from the sewer invert to ground surface will be used in determining easement width. Easement width shall vary from the ten (10) foot minimum by five (5) foot increments, i.e., 10, 15, 20 feet, etc.

Common placement in the easement of sewer and storm drain line may be allowed under certain conditions subject to approval by the Director.

Common placement will be reviewed on a case-by-case basis. Separation of utilities must meet Oregon State Department of Environmental Quality (DEQ) requirements.

All easements must be furnished to the City for review and approval prior to recording.

c. Relation to Streams and Drainage Channels

Generally, the top of all sanitary sewers entering or crossing streams shall be at a sufficient depth below the natural bottom of the streambed to protect the sewer line. One (1) foot of cover is required where the sewer is in rock, three (3) feet of cover is required in other materials. In paved channels, the top of the sewer line shall be placed at least six (6) inches below finish grade of the bottom of the channel, except

as provided above.

Sewer located along streams shall be located outside of the streambed and sufficiently removed therefrom to provide for future possible steam channel widening. All manhole covers shall be leakproof, Standard Plan No. 117, at or below the 100-year flood elevation.

Sewers crossing streams or drainage channels shall be designed to cross the stream as nearly perpendicular to the stream channel as possible and shall be free from change of grade.

Pipe material shall be ductile iron Class 50 with an 18-foot length of pipe centered on the stream or drainage channel centerline. The ductile iron pipe shall extend to a point where a one-to-one slope, that begins at the top of the bank and slopes down from the bank away from the channel centerline, intersects the top of the pipe.

Concrete encasement, Standard Plan No. 6, will be required when the above cover requirements cannot be met. Each deviation from the above requirements will be reviewed on a case-by-case basis.

2.14 Alignment

Sewer lines shall be laid on a straight alignment and uniform slope between consecutive manholes.

Horizontal and vertical curves in sanitary sewers are not permitted.

2.15 Manholes and Cleanouts

a. Details

	Standard Plan No.
Standard Manhole	101
Standard Drop Manhole	102
Manhole Details for Pipes 24" and under	103
Manhole Details for Pipe 24" and under	104
Standard Cleanout	105
Standard Sewer Service Installation	106
Standard Manhole Casting Details	107
Standard 45° Cleanout Frame and Lid	108

b. Cleanouts

Cleanouts will not be approved as substitutes for manholes, except at the upper end of lateral or main sewer that will be extended on the same grade and alignment during the next construction phase. All cleanouts will be considered on a case-by-case basis and approved by the Director of Public Works.

c. Manhole Taps

When an existing manhole is tapped to install a new sewer which will drain into the manhole, the new sewer shall enter the manhole with the invert a minimum 0.25 feet below the shelf elevation of the manhole and a channel shall be formed in the shelf of the manhole to the invert of the existing sewer.

d. Manhole Location

Manholes shall be placed at the following locations:

1) Every change in grade (grade break) or alignment of a sewer.

2) Every point where there is change in size or abrupt change in invert elevation (drop) change of a sewer.

3) Each intersection or junction of a sewer.

4) Upper end of all lateral sewers, except as provided in (b) below.

a) Adjacent to the radius point of a cul-de-sac which has three (3) or more parcels of land fronting on the cul-de-sac.

b) In front of the last property or lot being serviced, ten (10) feet past the common lot line of the adjoining parcel served.

5) Interval of 450 feet or less. (See also Section 2.13 b.) Deviation from this requirement shall be reviewed on a case-by-case basis for approval, considering whether or not flushing and cleaning equipment can adequately service the proposed sewer line.

6) At any point where a service or private sewer of 8 inches or larger intersects a sewer main.

Manholes shall not be located in the curb or in the gutter. Placement of manholes behind the curb shall be reviewed on a case-by-case basis for approval. Consideration shall be given to those sewer lines which already exist behind the curb.

Two (2) manholes shall be installed when the horizontal deflection angle between a lateral or main connection to an existing sewer is less than or equal to 75°. Spacing of such manholes shall be a minimum of ten (10) feet outside to outside. The intent is to prevent a new lateral sewer connection from discharging into an existing sewer opposing the existing flow.

Where practical, manholes shall be located at street intersections. All manholes from which future sewer line extensions are anticipated, shall have a pipe stub designed and installed at the grade and direction of the anticipated sewer main

extension. Pipe stubs shall be a minimum of eight (8) inches in size and shall protrude at least one (1) foot outside of the manhole base.

Risers shall be used to bring casting to grade. Combined riser sections shall not exceed six inches in height between cone and casting.

e. Drop Manholes

Outside drop assemblies shall be provided for pipe lines 12 inches in diameter and smaller when entering a manhole at a distance of more than 24 inches above the invert of the outlet line. The vertical displacement shall be measured at the inside manhole walls and not the manhole centerline. Larger pipe lines shall be introduced into the manhole at the manhole invert.

SPECIAL NOTE: Drop manholes shall only be used in extreme cases of slope difference between existing and proposed sewer lines or when very special conditions exist such as a conflict with existing facilities which cannot be relocated.

Approval of the Director of Public Works after review of the plans by appropriate design, construction, and maintenance sections is required to construct a drop manhole.

f. Drop Across the Structure

The drop across the structure shall normally be one-tenth (0.10) of a foot. Where there is to be more than 60° of horizontal deflection angle between any inlet and outlet line of a structure, the vertical drop from said inlet and outlet line of a structure shall be at least two-tenths (0.20) of a foot.

g. Metering Manhole

A metering manhole shall be installed on all systems meeting one of the following criteria (see Figure 1 in the Appendix):

1) A private sewer which contributes more than 10,000 gallons per day to the public sewer.

2) A private sewer which serves more than one structure on the

same premises, (private collection system).

3) Manhole and wet wells over 10 feet in depth or pipes over 36 inches in diameter shall have structurally sound grated working platforms (nonmetallic covered) for maintenance and fall protection, spaced not greater than 15 feet apart.

Pipelines 36 inches and larger in diameter shall have manhole openings of 30 inches in diameter.

Where manhole rims are 2 feet or greater above grade or finished ground, the manhole lids shall be made of aluminum with locking system.

2.16 Sewer Service Lines and Private Collection Systems

a. Sewer Service Lines

Sewer service lines are those portions of the sewage system between the public sewer and the structure being served, which are installed and maintained by property owners or agencies other than the City.

As a minimum criterion, construction of the house or building sewer service line shall be of the same quality and meet the same requirements as the public sewer with regard to materials, watertightness, and location. In addition, these sewers shall conform to the State and local plumbing codes and restrictions. No roof, surface, foundation, or stormwater drain lines shall be connected to the public sewers. See Standard Plan No. 106.

A cleanout shall be installed at the property line when the building sewer is connected to the sewer service line. For long sewer service lines in existing residential areas, a cleanout shall be installed at property line and at 100-foot intervals thereafter. Sewer service lines shall have at least four (4) feet of cover at the property line. Generally, the topography of the property will dictate how deep the service line must be.

Each individual building site shall be connected by a separate sewer service line connected to the public or private main sewer. Combined sewer service lines will be permitted only when the property cannot legally be further divided. An example of this is a residential lot with a house and unattached garage or shop with plumbing facilities.

The minimum inside diameter of a sewer service line shall be four (4) inches and shall be equal to or greater than the building plumbing stub (building drain) diameter. The minimum inside diameter of sewer service lines to serve multifamily dwellings or commercial buildings shall be six (6) inches. Fixture unit equivalents shall be determined in accordance with Chapter 4 of the Uniform Plumbing Code and the Oregon State Plumbing Specialty Code (Table 4-1).

Minimum sizes and slopes for sewer services, based on the fixture unit equivalents, shall be in accordance with the Uniform Plumbing Code Table 11-2.

Sewer service lines for townhouses and similar cluster housing developments shall be installed on a uniform slope from the main line sewer connection to a point five (5) feet from the end of the building drain conforming to the above requirements.

A backwater check valve shall be installed when the lowest floor level of a house to be connected to the public sewer is below a point which is 12 inches above the top of the nearest upstream manhole or cleanout structure. A gate valve in addition to the required backwater check valve is optional but should be considered for installation for additional protection should the backwater valve fail or become clogged with debris.

b. Private Collection System

Private collection system sewers shall be designed in conformance with main line standards specified in Section II-"Design" when plumbing code grade requirements of U.P.C. Section 1106 cannot be met. Subsection (a) of this section must be used for sewer service lines in the system with the following exceptions:

1) The minimum size sewer line upstream of the monitoring manhole structure shall be six (6) inches.

2) A manhole is required at the connection to the City main.

3) A monitoring manhole is required at the property line upstream from the manhole connection at the City main required by (2) above.

The monitoring manhole shall consist of a standard manhole with

the inlet pipeline invert placed 0.4 foot above the outlet invert. The inlet pipe shall extend one (1) foot past the manhole wall and shall be cut in half six inches from the outfall end and the top half of the pipe removed. The channel shall be formed from the outfall end to the outlet line in the usual manner.

The intent is to provide a half round section of pipe inside the manhole into which City personnel will place flow monitoring equipment. See Figure 1 - Appendix A.

c. Locating Building Sewers and Private Collection Systems

All sewer piping shall have an electrically conductive tracer wire, 18 gauge minimum size, insulated copper, and green sheeting, installed in the trench for the purpose of locating pipe in the future. The tracer wire shall run the full length of the installed pipe, with one end located around the mainline or lateral. The other end of the tracer wire shall be of sufficient length for an electrically conductive splice.

2.17 Sanitary Sewers for Floating Structures

a. Floating structure sanitary sewers shall consist of pressurized flexible main lines insulated against freezing and restrained against transverse movement which are connected to the public main through a monitoring manhole on shore.

b. Each dwelling containing plumbing facilities shall have a holding tank and grinder pump connected to the pressurized line. Said connection shall be by a detachable coupling with a gate valve and check valve installed downstream of the connection. The gate valve shall be on the pressure line side followed by the check valve before the detachable coupling. The detached coupling on the dwelling side of the connect shall also have a gate valve to prevent leakage or accidental discharge during repairs or moving the floating structure.

c. Details of the following must be submitted along with plan and profiles: mooring methods and devices, method of insulating pipeline against freeing, pipeline hangers, flexible connections and appurtenances, dock or walkway to which facilities are connected.

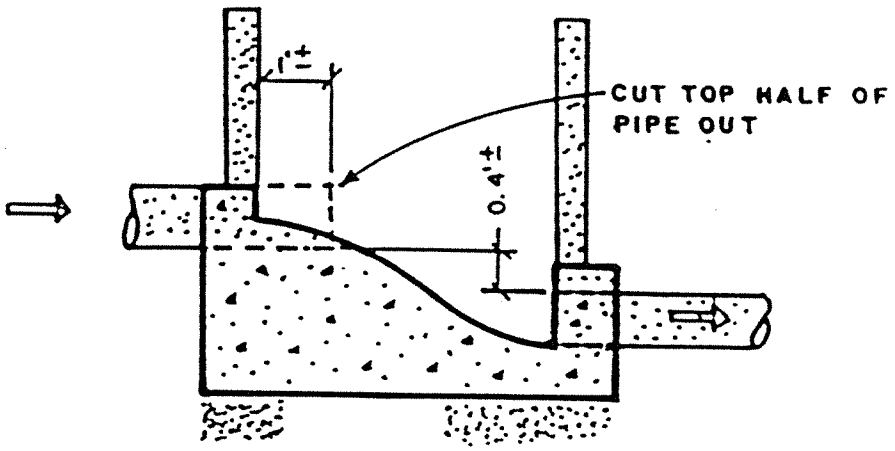
d. Profiles shall include not only the land-based sewer connection but also the high, low, and 100-year floodwater surface elevation with details

of how the pipeline system is to react to said water surface elevation changes.

FIGURE 1

TYPICAL MONITORING MANHOLE BASE DETAIL

NO SCALE



200

CITY OF STAYTON

DEPARTMENT OF PUBLIC WORKS

STORM DRAINS

DESIGN STANDARDS

1994

TABLE OF CONTENTS

Contents . . . . . Page

SECTION I - GENERAL

1.00 Purpose

The purpose of these Stormwater Management Design Standards is to provide a consistent policy under which certain physical aspects of stormwater management will be implemented. Most of the elements contained in this document are Public Works oriented and most are related to the development or platting process; however, it is intended that they apply to both public and private work designated herein.

These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by design professionals. It is expected that engineers will bring to each project the best skills from their respective disciplines.

The Standards are also not intended to limit unreasonably any innovative or creative effort which could result in better quality, better cost savings, or both. Any proposed departure from the Standards will be judged, however, on the likelihood that such variance will produce a compensating or comparable result, in every way adequate for the user and City resident.

Following from the above purpose, the standards have the objective of developing a stormwater management system which will:

a. be consistent with the Stayton Code and adopted Sector Plans;

b. be of adequate design to safely manage all volumes of water generated upstream and on the site to an approved point of disposal;

c. provide points of disposal for stormwater generated by future development upstream;

d. prevent the uncontrolled or irresponsible discharge of stormwater onto adjoining pubic or private property;

e. prevent the capacity of downstream channels and storm drainage facilities from being exceeded;

f. have sufficient structural strength to resist erosion and all external loads

which may be imposed;

g. maintain the runoff characteristics of the original undeveloped drainage basin, where feasible, as determined by the Director of Public Works;

h. maximize efficient use of Stayton's natural drainage system of streams and wetlands;

i. maintain Stayton's existing high level of overall water quality;

j. be designed in a manner to allow economical future maintenance; and

k. be designed using materials to insure a minimum practical design life of 50 years.

1.01 Shortened Designation

These City of Stayton's Stormwater Management Design Standards shall be cited routinely in the text as the "Standards."

1.02 Applicability

These Standards shall govern all construction and upgrading of all public and private drainage facilities in the City of Stayton and applicable work within its service areas.

1.03 References

The Standards are intended to be consistent with the most currently adopted provisions of:

a. Stayton Code.

b. Stayton Area Comprehensive Plan.

c. City of Stayton Urban Growth Management Plan.

d. Stayton Area Stormwater Management Plan.

e. Stayton Area Water Quality Plan

f. Oregon Statewide Planning Goals and Guidelines

1.04 Standard Specifications

Except where the standards provide otherwise, design detail, workmanship and materials shall be in accordance with the City of Stayton's current edition of the "Standard Construction Specifications."

1.05 Definitions and Terms

Building Storm Drain - A building storm drain is that part of the piping of a stormwater drainage system which begins at the connection to the building drain at a point five (5) feet outside the established line of the building or structure and conveys stormwater to the approved point of disposal.

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 which do not persist for more than 24 hours after cessation of one-half (1/2) inch of rainfall in a 24-hour period from October through March.

Cut Sheets - means sheets of tabulated data, indicating stationings, structures, fittings, angle points, beginning of curve, points on curve, end of curves, storm drain slope, staking offset, various elevations, offset cuts, and storm drain depths.

Definition of Words - Wherever in these standards the words 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 Director. Similarly, the words approved, acceptable, satisfactory, shall mean approved by, acceptable to, or satisfactory to the Director.

Detention - The holding of runoff for a short period of time and then releasing it to the natural water course where it returns to the hydrologic cycle.

Director - means the Director of Public Works of the City of Stayton or his/her authorized representative.

Drainage Facilities - Pipes, ditches, detention basins, creeks, culvert bridges, etc., used singularly or in combination with each other for the purpose of conveying or storing runoff.

Drainage Master Plan - A document prepared by CH²M that describes Stayton's

existing planned trunk drainage system.

Easement - Easements are areas along the line of all public storm drains which are outside of dedicated storm drain or road easements or rights-of-way, and shall be prepared on City forms granting rights along the line of the storm drain to the City.

French Drain or Leach Line - means a covered underground excavated trench filled with washed gravel that surrounds a perforated delivery pipe used to receive stormwater, wherein the sides and bottom of the trench are porous, permitting the stormwater to seep into the ground.

Impervious Areas - Impervious Surfaces. Those hard surface areas located upon real property which either prevent or retard saturation of water into the land surface, as existed under natural conditions pre-existent to development, and cause water to run off the land surface in greater quantities or at an increased rate of flow from that present under natural conditions pre-existent to development. 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 surfaces which similarly impact the natural saturation or runoff patterns which existed prior to development.

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

On-Site Detention - The storage of excess runoff on the development site prior to its entry into a public storm drain system and gradual release of the stored runoff after the peak of the runoff has passed.

Owner - Any individual, partnership, firm, or corporation by whom the project engineer has been retained or who, as a property owner, is making arrangements with the City.

Peak Discharge - The maximum water runoff rate (cfs) determined for the design storm.

Plans - Construction plans, including system site plans, storm drain plans and profiles, cross sections, detailed drawings, etc., or reproductions thereof, approved or to be approved by the Director, which show the location, character, dimensions, and details for the work to be done, in which constitute a

supplement to these standards.

Pre-Development - a site with natural vegetation on native soils.

Private Storm Drain - means a storm drain located on private property serving more than one structure on the same premises or parking lot catchbasins.

Project Engineer - The developer's consulting engineer including the City's engineer, licensed by the State of Oregon as a Civil Engineer under whose direction plans, profiles, and details for the work are prepared and submitted to the City for review and approval.

Public Storm Drain - means any storm drain in public right-of-way or easement operated and maintained by the City.

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

Release Rate - The controlled rate of release of drainage, storm, and runoff water from property, storage pond, runoff detention pond, or other facility during and following a storm event.

Right-of-Way - All land or interest therein which by deed, conveyance, agreement, easement, dedication, usage, or process of law is reserved for or dedicated to the use of the general public, within which the City shall have the right to install and maintain storm drains.

Retention Facilities - Facilities designed to or which do hold water for a considerable length of time and then consume it by evaporation, plant transpiration, or infiltration into the soil.

Sedimentation - Disposition of erosional debris-soil sediment displaced by erosion and transported by water from a high elevation to an area of lower gradient where sediments are deposited as a result of slack water.

Silt - Fine textured soil particles including clay and sand as differentiated from coarse particles of sand and gravel.

Siltation - Deposition of (silt) waterborne sediments - fine textured sedimentation - terms used to describe the smoothing or cementing effect of a blanket of silt deposited over sand and gravel areas used by migratory fish for spawning (including colloidal material when the transporting water evaporates).

Standard Plans - The drawings of structures or devices commonly used on City work and referred to on the plans (see standard construction specifications).

Streets or Roads - Any public highway, road, street, avenue, alley, way, easement, or right-of-way used or to be used for vehicle movement.

Structures - Those structures designated on the standard plans as catchbasins, manholes, etc. Detailed drawings of structures or devices commonly used in City work and mentioned in these Standards are included in the standard construction specifications.

Subdivision - means to divide an area or tract of land into four or more lots within a calendar year when such area or tract of land existed as a unit or contiguous units of land under a single ownership at the beginning of such year.

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

Trunk Drainage System - The trunk drainage system is that portion of the drainage system of the City which receives waters from an adjacent land area in excess of 20 acres. The trunk drainage system may consist of watercourses or man-made facilities such as pipes, ditches, and culverts.

Wetlands - Those lands adjacent to watercourses or isolated therefrom which may normally or periodically be inundated by the waters from the watercourse or the drainage waters from the drainage basin in which it is located. These include swamps, bogs, sinks, marshes, and lakes, all of which are considered to be part of the watercourse and drainage system of the City and shall include the headwater areas where the watercourse first surfaces. They may be, but are not necessarily, characterized by special soils such as peat, muck, and mud.

1.06 Engineering Policy

The engineering policy of the City of Stayton requires strict compliance with Oregon Revised Statute 672 for professional engineers.

All engineering plans, reports, or documents shall be prepared by a registered professional Civil Engineer, or by a subordinate employee under his/her direction, and shall be signed by the engineer and stamped with his/her seal to indicate his/her responsibility for them. It shall be the project engineer's responsibility to review any proposed storm drain system, extension, and/or existing system change with the City, prior to engineering or proposed design work, to determine any special requirements or whether the proposal is permissible. A "Preliminary Review" and/or a "Plans Approval

for Construction" stamp of the City, on the plans, and etc., for any job, does not in any way relieve the project engineer of his/her responsibility to meet all requirements of the City or obligation to protect the life, health, and property of the public. The Plan for any job shall be revised or supplemented at any time it is determined that the full requirements of the City have not been met.

1.07 Approval of Alternate Materials or Methods

Any alternate material or method not explicitly approved herein will be considered for approval on the basis of the objectives set forth in 1.00 PURPOSE. Persons seeking such approvals shall make application in writing. Approval of any major deviation from these Standards will (normally) be in written form. Approval of minor matters will be made in writing if requested.

Any alternate must meet or exceed the minimum requirements set in these Standards.

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

Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the Director. When requested by the City, full design calculations shall be submitted for review with the request for approval.

1.08 General Applicability

Permanent drainage facilities shall be provided on all property improvements within the City of Stayton per these Standards for the following types of development:

a. All major or minor partitions and subdivisions.

b. All commercial, industrial, and multifamily developments creating new impervious surfaces of greater than three thousand square feet in area within any twelve-month period. These standards are intended to fulfill the requirements of Section 1406, "Special Storm Sewers," of the Uniform Plumbing Code for private storm drains.

c. Developments entailing construction which would change the point of discharge of surface waters, the quantity of discharge, or discharge surface waters at a higher velocity than that of the preconstruction discharge rate, or add to pollution of surface waters.

d. Construction or reconstruction of public roadways and temporary detours.

e. Developments entailing construction in or adjacent to any existing stream or surface watercourse including intermittent streams.

f. Developments requiring construction in or adjacent to the 100 year floodplain of any stream.

SECTION II - DESIGN

2.00 General Design Considerations

Storm drainage design within a development area must include provisions to adequately control runoff from all public and private streets and the roof, footing, and area drains of residential, multifamily, commercial, or industrial buildings, and to insure future extension of the drainage system to the entire drainage basin in conformance with the adopted Stormwater Management Plan. These provisions are:

a. Surface or subsurface drainage, caused or affected by the changing of the natural grade of the existing ground or removal of natural ground cover or placement of impervious surfaces, shall not be allowed to flow over adjacent public or private property in a volume or location materially different from that which existed before development occurred, but shall be collected and conveyed in an approved manner to an approved point of disposal.

b. Surface water entering the subject property shall be received at the naturally occurring locations and surface water exiting the subject property shall be discharged at the natural locations with adequate energy dissipaters within the subject property to minimize downstream damage and with no diversion at any of these points.

c. The approved point of disposal for all stormwater may be a storm drain, existing open channel, creek, detention, or retention pond approved by the Director of Public Works. Acceptance of suggested systems will depend upon the prevailing site conditions, capacity of existing downstream facilities, and feasibility of the alternate design.

d. When private property must be crossed in order to reach an approved point of disposal, it shall be the developer's responsibility to acquire a recorded drainage easement (of dimensions in accordance with those included in Section 2.19 from the private property owner meeting the approval of the Director of Public Works. The drainage facility installed must be a closed conduit system. Temporary drainage ditch facilities, when approved, must be engineered to contain the stormwater without causing erosion or other adverse effects to the private property.

e. The design storm peak discharge from the subject property may not be

increased from conditions existing prior to the proposed development except where it can be satisfactorily demonstrated by the applicant that there is no adverse impact.

f. Retention/detention facilities must be provided in order to maintain surface water discharge rates at or below the existing design storm peak discharge except where it can be demonstrated by the applicant that no adverse impact will result from not providing said facilities.

g. Detention basins will be required so that release rates downstream of the development do not exceed the ten-year frequency design storm flows for existing land use conditions. These release rates cannot increase the flooding conditions downstream. The detention basins may be either off-line as a separate basin or in-line and designed as part of a swale system.

h. Minimum width of an access easement from an existing public road to a drainage facility shall be fifteen (15) feet.

i. Drainage from roofs, footings, and downspouts may drain directly to a street through the curb under the following circumstances:

1) The building pad ground elevation is at least two (2) feet above the existing street curb, and

2) The existing street is not a shed roof or tilt section that will permit runoff to flow across the street. This requirement will be waived if Type A curb and gutter is existing or installed.

j. Vegetation shall be established on areas disturbed by/or on areas of construction as necessary to minimize erosion, in accordance with Section III of these standards.

2.01 Runoff Calculations And System Capacity

a. Calculations

Design calculations shall be submitted for all drainage facilities, and shall be completed on City of Stayton standard forms or an approved facsimile.

Peak design discharges shall be computed using the rational formula, Q=CiA, only for basins under 1,000 acres. For larger basins, gauged flows or Soil Conservation Service or other approved methods shall be used.

1) Design Storm

The intensity-duration design frequency is based on the type area through which the facility (pipe or ditch) passes and the size of the drainage facility. The adopted criteria are listed in TABLE 2-1.

TABLE 2-1
DESIGN STORM FREQUENCY

Area	Frequency
Residential Areas	5-year storm
Commercial and High Value Districts	10-year storm
Trunk Lines (24" pipe and larger)	25-year storm
Minor Creeks and Drainage Ways (not shown as a flood plain on the flood Insurance Rate Map (FIRM)	50-year storm
Major Creeks (shown as a flood plain on the FIRM)	100-year storm

2) Rainfall Intensity-Duration Curve

The rainfall intensity-duration curve for City of Stayton is shown on Figure 1 in the Appendix.

3) Runoff Coefficients

The recommended coefficients of runoff (C) are listed in Table 2-2.

TABLE 2-2
RUNOFF COEFFICIENTS

Soil Cover	Flat Terrain S<2%	Rolling Terrain 2%<s<10%	Steep Terrain s>10%
Relatively high permeability (lawns, pasture, woods)	0.20	0.25	0.3
Moderate impermeability 1) Single-family residential in urban areas, except corner lots with duplex potential	0.40	0.45	0.50
2) Gravel parking lots	0.50	0.55	0.60
3) Mobile home parks	0.60	0.65	
4) Multi-family residential, zero-lot-line single-family residential and potential duplex lots in single-family residential	0.70	0.75	0.80
High impermeability (roofs and paved areas)	0.90	0.90	0.90

4) Time of Concentration

For land in a pre-development condition, the minimum time of concentration from the most remote point in the basin to the first defined channel (e.g. gutter, ditch or pipe) shall be 10 minutes. (Predevelopment is defined in Section 1.05.) Longer times using

the Soil Conservation Service (SCS) method or other approved methods shall be used where appropriate.

For developed residential and commercial/industrial property, the maximum time of concentration from the most remote point in the development to the closest inlet shall be 10 minutes, unless calculations by an acceptable method show the time to be longer.

b) Storm Water Detention Facilities

1) Where Required

Peak storm water runoff shall be controlled by detention facilities for all subdivisions, all commercial and industrial developments and all parking lots with a total developed acreage of 0.5 acres or more and all other developments where the City engineer determines control is needed to prevent flooding or damage downstream. This requirement may be waived if the applicant can show that it is not effective for the basin as a whole.

2) Allowable Runoff Rate (Outflow)

Peak runoff rate shall be limited to that which would occur in a 5-year frequency storm with predevelopment conditions (C=0.2). Predevelopment is defined in Section 1.05.

3) Required Storage Capacity

Detention facilities shall have storage capacities to detain the difference between a 5-year frequency storm with redevelopment conditions and a 10-year frequency storm with development conditions.

4) Design

a) The design shall be done in accordance with the Oregon Department of Transportation Publication 78-4, "Procedure Manual, Application of Detention Storage for Limiting Runoff", or other methods approved by the Director of Public Works.

(b) The orifice size and the hydraulic head shall be adjusted to produce the allowable outflow.

c) To prevent excessive plugging, the minimum orifice diameter shall be 1-1/2 inches.

d) Detention facilities shall be designed to protect public and private property.

(1) Freeboard

At maximum storage, the water surface elevation shall be a minimum of 0.5 feet below the top of the structure (curb, bank, berm, etc.) designed to contain the water.

(2) Overflow System

The detention facility shall have an overflow system with the capacity to pass a 50-year frequency storm. The overflow shall discharge into a public storm drain facility or the natural drainage course for the drainage basin where the development is located.

(e) Simplified design for sites between 0.5 acres and 5 acres.

For developments in this size range, the detention facility may be designed in accordance with Standard Drawing No. 2 in the Appendix. This method is based on the following conditions:

(1) The sites are small enough so that there is an insignificant difference between the times of concentration for the different site sizes. For calculating the allowable runoff rate, a uniform time of concentration of 10 minutes is applicable and, as a result, the allowable runoff rate is 0.3 cfs per acre.

(2) The sites, when developed, will have surfaces that are almost entirely impermeable

(buildings, pavement, etc.). For a site not conforming to this condition, the required storage capacity can be reduced by doing a detailed analysis instead of following the standard drawing.

(f) Calculating Effective Infiltration to Reduce Storage Requirements

Under certain conditions a gravel-filled trench or sump may be used to infiltrate water into the ground as an alternative to storing the water on the surface, on roofs, or in pipes. In such a case, the volume of the voids between the gravel is calculated as storage area, and the amount of water infiltrated is also calculated as effective storage since it reduces the required storage in the rest of the system. Infiltration may be used to eliminate the need for storage of runoff from pervious surfaces (if the rate is 0.55 inches/hour or greater no storage is needed for the pervious surfaces), and to reduce the storage for the impervious areas.

b. Drainage System Capacity

For design purposes, it is necessary to define the various parts of the storm drainage system and to specify the magnitude of flow that each part must be capable of carrying. In this regard, the drainage system is broken into the following elements:

1) CATCHBASIN, GUTTERS, CONNECTOR PIPES - this portion of drainage system is comprised of the curbed gutters of streets, the catchbasin inlets that collect the surface runoff, and ten inch diameter connector and/or outlet pipes. This part of the system is designed to collect and convey the five year frequency storm flow of the contributing area in its fully developed land use condition. At the downstream point at which the ten inch pipe system is no longer capable of conveying the flow in an unsurcharged state, the system becomes a "lateral."

2) LATERALS - this portion of the drainage system begins with

a 12 inch or larger diameter pipe at the discharge point of the "CATCHBASIN, GUTTERS, AND CONNECTOR PIPE SYSTEM." This portion of the system is designed to convey the ten year frequency flow of the entire contributing area in its fully developed land use condition. This system terminates at the subsequent downstream point at which it is no longer capable of conveying the flow in an unsurcharged state in an 18 inch diameter pipe, at which point the system becomes a "TRUNKLINE."

3) TRUNK LINES - this portion of the drainage system can be a pipe or an open channel. The trunk line system begins with an equivalent 21 inch diameter or larger pipe at the discharge point of the "LATERAL SYSTEM." The trunk system is designed to convey the ten year frequency storm flow of the entire contributing area in its fully developed land use condition. This assumes on site and/or regional detention is incorporated in the design. This system terminates at the subsequent downstream point at which it is no longer capable of conveying the flow in an unchanged state in a pipe diameter less than 36 inches.

4) CREEKS OR DRAINAGE WAYS NOT SHOWN WITH A FLOODPLAIN ON THE FEDERAL INSURANCE RATE MAPS (FIRM) AS PUBLISHED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) - this portion of the drainage system can be a covered facility (pipe, etc.) or an open channel. This portion of the drainage system begins with an equivalent 36 inch diameter or larger pipe at the discharge point of the "trunk system." This system is designed to convey the 10 year frequency storm flow of the entire contributing area in its fully developed state. This system terminates at the subsequent downstream point of discharge at which the system is clearly a creek whose floodplain is first designated on the FIRM or is determined to be an interim flood hazard area by the City Engineer.

5) WATERWAYS WITH FLOODPLAINS SHOWN ON THE FIRM - this portion of the drainage system is almost an open channel (except for culverts crossing streets, etc.) These reaches of the drainage system are located on the FIRM, or as otherwise located by the City Engineer, and are always designed for the 100 year frequency storm flow of the entire contributing area in its fully developed land use condition.

6) DETENTION FACILITIES - these are facilities which

hold (or detain) runoff for a short period of time and then release it to the natural water course where it returns to the hydrologic cycle. Detention facilities will be used in conjunction with any of the above parts of the drainage system, either on-site or regional, whereby the design release rate would control the sizing of the immediate downstream system rather than the contributing drainage area.

2.02 Storm Drain Construction Plans

a. General

Complete plans and specifications for all proposed drainage improvements including any necessary dedications and easements shall be submitted for approval and must receive the required approval prior to construction permit issuance and beginning of construction.

b. Plan Preparation

Construction plans and specifications shall be prepared by a professional civil engineer licensed in the State of Oregon in accordance with the following requirements:

1) Dimensions - Construction plans shall be clearly and legibly drawn on engineering tracing paper 22 by 34 inches with a 1-1/2 inch clear margin on the left edge and one inch margins on all other edges.

Plans from consultants for construction permit projects shall be blueline drawings meeting the above size (24 by 36 inch blueline prints are acceptable.)

2) Scale - Horizontal scale shall be 1" = 50'; vertical scale shall be 1" = 5' or as approved by the City Engineer.

3) Form - Title Sheet, Plan and Profiles, Storm Drain Appurtenances, and Site Drainage Plan.

2.03 Title Sheet

a. Plan view (Site Plan) of the entire project, showing street right-of-way and/or subdivision layout to a scale of 1" = 100'. A smaller scale may be used on large projects upon approval of the City Engineer. A project is too large when a minimum dimension of two (2) inches cannot

be maintained between the title, system site plan, and vicinity map. A scale of 1" = 200' may be used in this case.

The site plan shall be a composite plan showing all complete properties to be served by the storm drain improvements and properties adjacent to and within 250 feet of those served, existing and proposed natural or artificial streams, swales, and storm drains, line sizes, designations, structures and their numbers, tract names and numbers, lot numbers or property owners' names, street names, and total acreage including streets directly served.

b. Index of Sheets.

c. Complete legend of symbols used.

d. Vicinity Map to a scale of not less than 1" = 800' showing the project location and drainage basin used to size the system.

e. Title Block - located in lower right hand corner or right edge of paper with scale, north point, date, drawing number, the engineer's name, address and official stamp, and where applicable, the owner/developer's name and address.

f. Temporary and permanent bench marks including their descriptions.

g. General and special notes relating to construction methods.

Note: For projects showing five (5) lots or less, the title sheet and plan and profile sheet may be one and the same if approved by the City Engineer.

2.04 Plan and Profiles

a. Plan

Plan view of storm drain lines shall be to a scale of 1" = 50' and shall contain the following information in addition to the above:

1) Adjacent street curbs and property lines, right-of-way and utility easements referenced to property corners, street intersections, or section lines. Adequate two (2) foot contour lines or property corner and curb elevations to help determine the points

of disposal for building storm drains.

2) The location of each manhole and catchbasin shall be numbered and stationed to facilitate checking the plans with the profiles. The stationing shall be tied to existing property corners and/or street monuments with the relationship of each manhole and catch basin shown to the property corners (minimum two directions). Each line with a separate designation shall be stationed continuously up grade from Station 0+00 at its point of connection to another line.

3) Location of water courses, railroad crossings, culverts, and sanitary sewers that cross the alignment within 250 feet of the proposed extension. All water course channels must show the 100 year flood plain and floodway channel for the design storm as specified by Sections 2.01 and 2.28 of these Standards.

4) Location of water mains, valves, pump stations, blow-offs, services, gas mains, underground power, and other utilities that either cross the alignment within 250 feet of the terminus of the proposed extension or are adjacent to the proposed extension within the public right-of-way or within ten (10) feet of the easement line. The intent is to prevent grade conflicts of all future extensions.

5) The location and elevation of the bench mark used as the basis of vertical control in the design shall be shown on the plans and referenced to property corners and/or street monuments.

b. Profiles

Profiles for the individual storm drain lines and open channels shall be to the same horizontal scale on the same sheet and drawn immediately below the corresponding plan view to a vertical scale of 1" = 5' reading from 0+00 left to right (where conditions warrant, right to left may be approved as well as a smaller vertical scale), and shall contain at

least the following information in addition to the above:

1) Location of catchbasins, manholes, and other appurtenances with each manhole and catchbasin numbered and stationed as in item 2 of Plan above.

2) Profile of the existing and proposed ground/or pavement surface, storm drain invert, and backwater curve for the design storm.

3) Size, slope, length, and type of material of the line between consecutive catchbasins or manholes (type of pipe may be designated by abbreviations listed under Section 2.12), type of pipe bedding and backfill material.

4) Elevation of original ground, finished grade, proposed rim elevation, and storm drain inverts at each catchbasin or manhole (Mean Sea Level Datum, U.S.G.S.).

5) Railroad crossings, ditch, or creek channels with elevations of the ditch or creek bed and the 100-year flood elevation profile. See Section 2.20 for additional plan requirements.

6) Utility crossings that conflict with the proposed storm drain installation.

7) All existing facilities upon which work is to be performed, i.e., installation, repair, or removal.

SPECIAL NOTE: The design engineer shall field locate and verify the alignment, depth, and inverts of all existing facilities shown on the plans that will be crossed by proposed facilities and shall certify them with a note on the plans. City as-builts are only to be used as an aid to the design engineer when field verifying the exiting facilities.

2.05 Storm Drain Appurtenances

Detailed drawings shall be included for all storm drain appurtenances including manholes, catchbasins, culverts, head walls, orifice controls, detention diversion structures, etc. Appropriate references to City of Stayton Standard Drawings may be used in lieu of details actually shown on the plans.

2.06 Detailed Drainage Site Plan

Two site plans shall be submitted with the construction plans for a development as per Section 2.07 and 2.08, below.

2.07 Existing Drainage Plan

A topographical contour map clearly defining existing conditions:

a. Existing contours of the land at two (2) foot intervals or as approved by the City Engineer with the location of existing buildings, structures, and public and private utilities on the property. Location of any existing building or structure on adjacent property which is within fifteen (15) feet of a proposed public drainage facility;

b. All areas, within 250 feet of the site, improved or unimproved, lying upstream and draining to or through the proposed development;

c. Location of existing drainage facilities which transport surface water onto, across, or from the site, including natural watercourses, artificial channels, drain pipes, or culverts.

d. Locations of springs or other subsurface water outlets; and

e. Arrows indicating drainage direction in all public and private property and for all hydraulic conveyance systems.

2.08 Proposed Drainage Plan

A topographic contour plan clearly defining proposed conditions:

a. Proposed contours of the land after completion of the project at two (2) foot intervals or as approved by the City engineer. This shall include elevations, dimensions and location, extent, and slopes of all grading work proposed to be done.

b. Identify cut and fill areas, desilting facilities, interceptor ditches (channels), velocity check dams, soils, topography, vegetation, and areas of proposed reseeding.

c. Location of proposed drainage facilities which transport surface water across, or from the site, including natural watercourses, artificial channels, under drain pipes, and culverts.

d. Boundaries of all areas that will be paved or otherwise altered in a manner that will increase surface water runoff and boundaries of all areas to remain in an existing or natural condition.

Note: For projects showing five (5) lots or less, the existing drainage plan and proposed drainage plan may be shown on the same sheet if approved by the City Engineer.

2.09 Supporting Data and Calculations

a. Background computations for sizing drainage facilities to include:

1) Peak discharge and volume of surface water for a ten (10) year design storm currently entering and leaving the subject property due to the design storm or if the Director of Public Works determines that the property is in an interim flood hazard area then a 50-year storm shall be used.

Discharge volumes shall be computed for current land use conditions and total development of the tributary basin area.

2) For subsurface water entering property, indicate method of estimating quantity for design purposes (a reasonable effort to quantity should be made).

3) Peak discharge and rate of runoff which will be generated within the subject property due to the design storm after development occurs.

4) Peak discharge and rate of runoff that will be generated by the design storm at all naturally occurring points of discharge from the property (cubic feet per second, predevelopment, and post development).

b. The proposed methods of handling, storing, and discharging of peak loads:

1) Proposed improvement for handling the computed runoff, including the location and capacity of all natural or proposed drainage facilities and easements. The method of discharging stormwater offsite at the naturally occurring location and provisions needed to restrict the velocity and direction of the

discharge in order to minimize damage to other properties.

2) Drawings of proposed open channel and closed conduit system to be shown on construction drawings.

(a) Proposed cross-section of the channel with stable side slopes shown on the plan.

(b) The water surface elevation (backwater curve) of the flow for the design storm will be indicated on the cross-section.

2.10 Plan Submittal

Construction plans shall be submitted in duplicate to Public Works/Engineering through the Permit Application Center (PAC) for checking to ensure compliance with these Standards, City of Stayton Ordinances, and good engineering practice. Submitted plans shall include specifications, test data, a materials list, drainage calculations, a soils report and design recommendations, easement and right-of-way descriptions, tie to City of Stayton Bench Mark and Monument System, and other material as requested by the City Engineer. A plan check fee will be levied at the time plans are submitted to PAC.

Once the plans are approved and the construction permit issued, the consulting engineer shall be responsible for providing all surveying services necessary to stake the project and prepare the as-built drawings when the project is complete.

2.11 Storm Drainage Requirements

Subsections 2.12 through 2.20 contain the physical design requirements for public storm drains in the city. These design requirements may be used for private systems when plumbing code requirements cannot be met, provided the system is designed by a professional civil engineer.

2.12 Pipe Materials

Pipe materials for public storm drains shall be concrete pipe, ductile iron pipe, aluminum pipe, or polyvinyl chloride pipe conforming to Section 305.2 of the Standard Construction Specifications of the City of Stayton.

Acceptable abbreviations for existing and proposed types of pipe are as follows:

ABS - Acrylonitrile Butadiene Styrene
AC - Asbestos Cement
CI - Cast Iron
DI - Ductile Iron
PVC - Polyvinyl Chloride
CP - Concrete Pipe
CSP - Corrugated Steel Pipe
CAP - Corrugated Aluminum Pipe

Aluminum pipe may be used where water or soil pH is in the range of 4.5 to 10 and where the soil resistivity is greater than 1500 ohm-cm.

Private storm drain pipe materials shall conform to Section 1403 of the Uniform Plumbing Code.

Pipe load analysis calculations must be submitted when requested by the City Engineer. Instances for such a request will include shallow cover (less than the minimum specified in Section 2.17), excessive cover and for the most economical pipe class.

As a minimum, except when a pipe load analysis dictates otherwise, nonreinforced precast concrete pipe which is eighteen (18) inches or less in diameter shall be at least Class II (ASTM C-14) with rubber ring bell and spigot joints. Concrete pipe lines twenty-one (21) inches or greater in diameter which are laid transversed to traffic in the street section and which are subject to wheel loads shall be reinforced concrete rubber ringed Class III C-76.

Approval of alternate materials will be reviewed on a case-by-case basis for approval which shall include cast in-place pipe methods.

2.13 Size

Main line and lateral storm drains shall not be less than ten (10) inches diameter and shall begin at a structure and shall terminate at an approved point of disposal.

Proposed exceptions to the above will be reviewed and considered for approval on a case-by-case basis by the Director of Public Works.

When two (2) parallel pipes are installed in lieu of a box culvert, the minimum separation between the pipes shall be one (1) foot or one-third the diameter, whichever is greater. This requirement may be waived if the void between the pipes below the

spring line is filled by grouting or other approved method/substance.

2.14 Minimum Grade

All storm drains shall be laid on a grade which will produce a mean velocity (when flowing full) of at least two and one-half (2-1/2) feet per second, based upon Manning's pipe friction formula using a roughness coefficient valued at not less than 0.013, or the pipe manufacturer's recommendations, whichever is greater. The minimum acceptable grade for various pipe sizes with an "n" value of 0.013 are listed below:

TABLE 2-3
MINIMUM PIPE GRADE

Inside Pipe Diameter (inches)	2.5 ft./sec. Grade (feet per 100 feet)	2.0 ft./sec. Grade (feet per 100 feet)
4	1.31	0.84
6	0.77	0.49
8	0.52	0.33
10	0.39	0.25
12	0.3	0.19
15	0.23	0.14
18	0.18	0.11
21	0.14	0.09
24	0.12	0.08
27	0.1	0.07
30 (or larger)	0.09	0.06

The minimum grade may be reduced from the above table to produce an absolute minimum velocity of 2.0 fps upon approval of the Director. Other cases requiring a flatter grade than permitted above shall also be reviewed on a case-by-case basis for approval by the Director.

In theory, new PVC pipe has a manufacturer's "n" value of 0.009; however, sand and grit as well as slime build-up on the pipe walls render a true "n" value with time of 0.013; hence, an "n" value of less than 0.013 will not be considered for approval.

The use of corrugated aluminum pipe will require approximately one larger pipe size for any given flow, due to a Manning "n" value of 0.24 +/- depending upon corrugation patterns, use of coatings, etc. All use of corrugated aluminum pipe shall be supported by size calculations in accordance with the manufacturer's recommendations.

NOTE: Engineers are cautioned not to specify storm drains of sizes which are obviously larger than is necessary for satisfactory carrying capacity but which are specified in order to meet grade requirements, i.e., a twelve-inch pipe for a ten-inch pipe to acquire a decrease in slope.

2.15 Alignment

Generally, storm drains shall be laid on a straight alignment between catch basins and between manholes; however, lines 12 inch diameter and smaller may be laid on horizontal curves conforming to the street curvature, but not less than a radius of 200 feet. PVC and aluminum pipe shall be laid on straight alignment only.

Variance for horizontal curves on larger size pipes shall be reviewed on a case by case basis for approval by the City Engineer.

2.16 Anchor Walls

Storm drains laid on slopes of twenty (20) percent or greater shall be secured by anchor walls in accordance with Standard Plan No. 113.

Where velocities greater than fifteen (15) per second are attained, special provision shall be made to protect structures against erosion and displacement by shock.

2.17 Cover Requirements

All storm drains shall be laid at a depth sufficient to protect against damage by traffic and to drain building footings where practical. Sufficient depth shall mean the minimum cover from the top of the pipe to finish grade at the storm drain alignment.

Under normal conditions minimum cover shall be twenty-four (24) inches above the top of the pipe in paved areas and thirty (30) inches at all other locations. For PVC pipe, minimum cover shall be thirty-six (36) inches.

In areas of relatively flat terrain, the design engineer must show that sufficient depth is provided at the boundary of the development to properly drain the remainder of the upstream basin area tributary to the site.

2.18 Location

Where storm drains are being designed for installation parallel to other utility pipe or conduit lines, the vertical location shall e in such a manner that will permit future side connections of main or lateral storm drains and avoid conflicts with parallel utilities without abrupt changes in vertical grade of main or lateral storm drains.

2.19 Storm Drains in Streets or Easements

a. Under normal conditions, storm drains shall be located in the street right-of-way within two (2) feet of the curbline and preferably on the low side of the street, except when catch basin location warrants otherwise. All exceptions shall be reviewed on a case-by-case basis for approval.

b. When it is necessary to locate storm drains in easements, the storm drain shall be centered in the easement. Exception: When the storm drain is 12 inches or less in diameter and the easement is centered on a property line, the storm drain shall be offset eighteen (18) inches from property line (distances being measured property line to center line of pipe). All storm drain easements shall be exclusive and shall not be used for any purpose which would interfere with the unrestricted use of the storm drain line. Exception to this requirement will be reviewed on a case by case basis, such as a utility corridor in a new subdivision.

c. Easements for storm drain lines fifteen (15) inches or less in diameter shall have a minimum width of ten (10) feet. Pipe line eighteen (18) to thirty-six (36) inches in diameter shall have a minimum width of fifteen (15) feet. All pipe lines greater than thirty-six (36) inches in diameter, shall have a minimum width of twenty (20) feet.

d. Open channels shall have easements sufficient in width to cover the 100-year Floodplain Line when a 100-year design storm is required or fifteen (15) feet from the waterway centerline or ten (10) feet from the top of the recognized bank, whichever is greater. A fifteen (15) foot wide access easement shall be provided on both sides of the channel for channel widths greater than fourteen (14) feet at the top of the recognized bank.

e. Easement locations for public storm drains serving a PUD, apartment

complex, or commercial/industrial development shall be in parking lots, private drives, or similar open areas which will permit an unobstructed vehicle access for maintenance by City forces.

f. All easements must be furnished to the City for review and approval prior to recording.

2.20 Relation to Creeks and Drainage Channels

Storm drain lines shall enter a creek or drainage channel at 90° or less to the direction of flow. The outlet shall have a head wall and scour pad or riprap to prevent erosion of the existing bank or channel bottom. The size of pipe or channel being entered will govern which protective measures are required. All protective measures must conform to the requirements of Section III of these Standards.

2.21 Slope Intercept Drainage

Slope intercept drains shall be provided at the following locations and shall be designed with the requirements of Section III of these Standards with respect to erosion control:

a. along the upper boundaries of a development where the natural ground slope exceeds ten (10) percent to intercept drainage from the tributary area above the site.

b. along the lower boundary of a development where the natural ground slope exceeds ten (10) percent to prevent drainage onto a lower tributary area other than by means of an approved point of disposal.

c. along the top of all cuts which exceed four (4) feet with cut slopes which exceed 2:1 where the tributary drainage area above the cut slopes towards the hinge point of the cut and has a drainage path greater than forty (40) feet measured horizontally.

2.22 Subsurface Drainage

Subsurface drains (underdrains) shall be provided at the following locations:

a. on all cut and fill slopes in excess of four (4) feet for stability except when a soils report submitted by a registered professional engineer experienced in soils certifies they are not required.

b. for all existing springs or springs intercepted during construction activity for other facilities, i.e., sewer, water mains, or street excavations.

c. where high ground water exists or when it is necessary to reduce the pieometric surface to an acceptable level to prevent land slippage or underfloor flooding of buildings.

The drainage line installed shall begin at a cleanout and terminate at an approved point of disposal. Open jointed storm drain lines will not be considered as an acceptable solution.

2.23 Catchbasins, Cleanouts, Manholes, and Curb and Gutter

In general, storm drains shall be designed to have access for cleaning no further than 400 feet apart with junctions made at manholes, cleanouts, or catchbasins.

2.24 Cleanouts and Catchbasins

a. Catchbasins and cleanouts may be used for the junction of pipes fifteen (15) inches or less in diameter, and where the depth from rim to invert is less than four (4.0) feet. Pipe lines eighteen (18) inches in diameter may be connected to the larger dimension of the structure (catchbasin/cleanout) when the structure is formed and poured around the pipe during new construction.

Variance from the four (4) foot maximum depth will be reviewed on a case by case basis for approval on fifteen (15) and eighteen (18) inch diameter pipes.

b. The maximum length of curb and gutter which may be drained by a catchbasin is five hundred (500) feet. Catchbasins shall be installed where the improvement ends on all streets terminating on a descending grade, and piped to an approved point of disposal.

c. On new main line and lateral construction, catchbasin laterals of thirty (30) feet or less and ten (10) inches in diameter may tie into the main line with a shop fabricated 90° "T", provided said connection is located not more than one hundred (100) feet from a manhole or cleanout on said main line being fifteen (15) inches or larger in diameter.

d. The width of gutter flow on residential street shall not go past the shoulder and one travel lane or top the curb for a five (5) year design storm at any point

along the street.

e. Catchbasins shall be designed to completely intercept the five (5) year design storm gutter flow.

f. Type 1 catchbasins, Standard Drawings No. 203, shall be used at all locations where other construction (e.g., driveways, pedestrian ramps, etc.) or facilities do not prohibit. Exceptions will be considered on a case-by-case basis.

g. Type "A" grates shall be used in street sags; Type "B" grates shall be used on construction grades.

2.25 Manholes

a. Manholes shall be installed at all pipe junctions where the depth from rim to invert exceeds four (4) feet or where the pipe is eighteen (18) inches in diameter or greater except as provided for in section 2.24 (a). Exceptions will be reviewed on a case by case basis for approval.

b. Manholes for pipes twenty-four (24) inches or greater in diameter shall conform to Standard Plan No. 104.

c. Where the pipe size decreases upstream through the manhole, the upstream invert must be set above the downstream invert a distance equal to the difference in the two diameters (the crowns kept at the same elevation).

2.26 Curb and Gutter - Types and Application See Standard Plan No. 303

In general, curb and gutter shall be installed on all new street construction or reconstruction to control drainage from sheet flowing across the street, to preserve curb exposure during subsequent overlays, and to eliminate cracking new curbs during the street paving operation.

a. Type "A" curb and gutter shall be utilized for all street with slope less than 0.5 ft. per 100 feet.

The minimum gutter grade permitted shall be 0.25 feet per 100 feet (0.25 percent grade).

b. Rolled Curb may be used in urban developments on private streets only.

c. Type "C" curb may be used with slopes down to a minimum 0.50 feet per 100 feet (.50% grade).

2.27 Surface Drainage

For purposes of these Standards, surface routes will be classified according to two general categories: artificial watercourses and natural creeks.

a. Plan requirements for surface drainage courses shall include the requirements previously specified in section 2.02 through 2.09 and the following supporting data and calculations:

1. Plan drawn to a scale of not less than 1" = 100' with north arrow and vicinity map. Topography with two (2) foot contours. If in a floodplain shown on the F.I.R.M. show the 100-year floodway contour.

2. Profile of the channel showing the existing flowline and top of bank, proposed flowline and top of bank and design stormwater surface profile (backwater curve).

3. A minimum of three (3) cross sections of the existing channel adjoining or crossing the property taken at the upstream, midsection, and downstream boundaries of the property. More section may be required depending on the length of the reach and existing channel alignment.

4. Calculations for arriving at the design flow rate. The city will furnish the flow rate when records are available. Analyze the proposed system and show that the channel cross section after improvement will pass the design storm with one (1) foot of freeboard to the top of bank. For channels shown on the F.I.R.M. maps, show that the channel cross section after improvement will pass the base flood at or below the 100-year flood elevation shown on the F.I.R.M.

2.28 Artificial Water Source Requirements

a. Artificial watercourses shall be designed with a "natural" curved alignment with a variable side slope not to exceed four to one, except that in tight spots created by existing natural features (e.g., boulders, large trees, etc.) where the slope can be three to one until the natural feature is bypassed or where steeper slopes are needed and do not impair the hydraulic efficiency of the waterway. The watercourse shall include a low flow channel as described in "e" below and will be reviewed on a case-by-case basis for approval.

The bank shall be designed with one (1) foot of free board above the design storm with a minimum top of bank width of six (6) feet. A larger width shall be provided when required by the City Engineer for maintenance purposes. The backslope of the bank shall not exceed two (2) horizontal to one (1) vertical. The existing ground adjacent to the toe of the bank backslope shall be graded to slope away at 2 percent to prevent water ponding at the backslope toe.

b. Design shall be curvilinear with a 100 foot minimum radius. Tighter curves may be used if the Director determines that sufficient erosion control has been incorporated into the design to maintain stable conditions following development.

c. A low flow channel shall be designed to carry a two year design storm or the normal low water flow of a year-round creek, whichever is greater. Low flow channel slopes shall not exceed two to one and shall be stabilized to the satisfaction of the Director. In general, bank stabilization will be required in any channel with a design flow velocity in excess of three feet per second. The invert shall be paved with concrete if the velocity is less than three (3) feet per second and to prevent local ponding for mosquito abatement purposes.

d. New roadside ditch construction adjacent to public streets by new developments will not be permitted. Exception to this requirement will be reviewed on a case-by-case basis.

e. Capacity of channels shall be determined by the Manning Formula. The value for "n" shall be 0.033 for maintained grass-lines swales. The value for "n" shall be 0.35 for channels with rock-lined bottoms.

f. Existing ditches approved for the point of disposal for storm drains and culverts shall be provided with rock-lined bottoms and side slopes at the discharge point of storm drain or culvert. The rock shall extend for a minimum distance of eight feet downstream from the end of the storm drain or culvert. These requirements are in addition to those required by Section 2.20.

g. All channel sides and bottoms shall be seeded, sodded, or rock-lined immediately following construction. Bank stabilization measures shall be consistent with Section III of these Standards unless the Director determines other proposed methods provide equal or greater erosion control.

h. Points of discharge from culverts and storm drains into ditches and swales 15 percent or greater in grade shall be rock-lined with boulders with one face a minimum of 24" in dimension. Said rock lining shall extend for a distance of ten

feet minimum from the point of culvert or storm drain discharge and shall have a width three feet in excess of the diameter of the culvert or storm drain. Special energy dissipaters may be substituted for boulders at the discretion of the Direction.

2.29 Natural Creeks

a. Creek Classification - Creeks in Stayton shall be classified as salmon-producing creeks or other creeks. No in-stream work will be allowed in salmon producing creeks during the months of September or October. The intent is to minimize sediment production in these creeks during critical salmon spawning season. The following creeks shall be included in the salmon-producing classification:

Mill Creek
Salem Ditch

A permit must be obtained from the Division of State Lands and the Department of Fish and Wildlife for all work between the creek banks.

2.30 Salmon-Producing Creek Requirements

The following requirements must be met in salmon-producing creeks. These are not in replacement of the requirements in 2.29 for natural creeks, but in addition to them.

a. Creek bed alterations shall provide diversified habitats for a variety of creek organisms and a pleasing appearance. Creek bed alternations may be approved by the Director on a case-by-case basis with approval to consider provision of:

1) Sufficient water depth to support fish and other aquatic life during low flows.

2) Diversity of water velocities through the use of pools and riffles.

3) A meandering channel to facilitate a. and b. above.

4) Sufficient creek bed gradient to provide adequate flow velocities.

b. Creek bed gravel shall be well rounded rock in the following gradations (with larger rock in sufficient quantity to provide adequate riffling) or as approved by the Director:

Mill Creek	Approx. 15%	6"-3"

c. Creek banks and sides shall be designed and constructed so as to provide stability, adequate shading, and cover for fish and other aquatic life, to the approval of the director of Public Works. Shading shall be provided by plantings of appropriate types and sufficient quantities per Section III of these Standards. Creek bank designs and vegetation restoration plans may be approved by the Director on a case-by-case basis.

Vertical creek banks (walls) should be avoided whenever possible as such a creek channel configuration decreases the creek carrying capacity and increases in-creek velocities during high flows.

d. All creek work and channel design shall include a construction sequence list designed primarily to control erosion (per Section III of these Standards) and also to facilitate the planned construction. The construction sequence may be modified by the Director during the construction as field conditions warrant. Such modifications may include more or less erosion control and construction shut down.

2.31 Other Natural Creek Requirements

a. Natural creeks shall be preserved and all work in and adjacent to creeks shall incorporate both temporary and permanent erosion control measures in accordance with Section III of these Standards. No alteration will be permitted that reduces the overall creek capacity.

c. Creek construction, relocation, and/or reconstruction may be approved if the Director determines that such a proposal will result in an overall benefit to or maintenance of a surface water system of equal quality in terms of water quantity and quality control.

d. Any and all stream work shall be consistent with the floodplain management policies and regulations.

e. Any and all stream work shall be consistent with the Stormwater Management Plan.

SECTION III

EROSION AND SEDIMENT CONTROL

3.00 Temporary Erosion/Sedimentation Control Plan (TESCP)

The applicability of this section shall be limited to that area within the banks of a creek or waterway channel, or the width of the easement, whichever is the greater.

a. Proposed measures for controlling runoff during all three phases of construction:

1) Prior to excavation or construction.

2) During excavation and construction.

3) After construction until the site is stabilized.

b. For subdivision plats this shall include temporary erosion control measures to be utilized by the applicant during installation of plant improvement and by subsequent builders during construction of dwellings and other lot improvements.

c. Prior to the initial clearing and grading of any land development, provisions shall be made for the interception of all potential silt-laden runoff that could result from said clearing and grading. Said interception shall preclude any silt-laden runoff from discharging from the proposed land development to downstream properties unless previously approved by the Director. Said interception shall cause all silt-laden runoff to be conveyed by open ditch or other means to whatever temporary facility is necessary to remove silt prior to discharge to downstream properties.

d. Prior to initial clearing and grading of construction site, an evaluation of the following factors must be carried out:

1) Soil Erodibility - Soil erodibility should be identified using Soil Conservation Service erodibility ratings. Erosion control techniques shall be designed accordingly.

2) Slope and Runoff - Cleared areas will require protection from erosion.

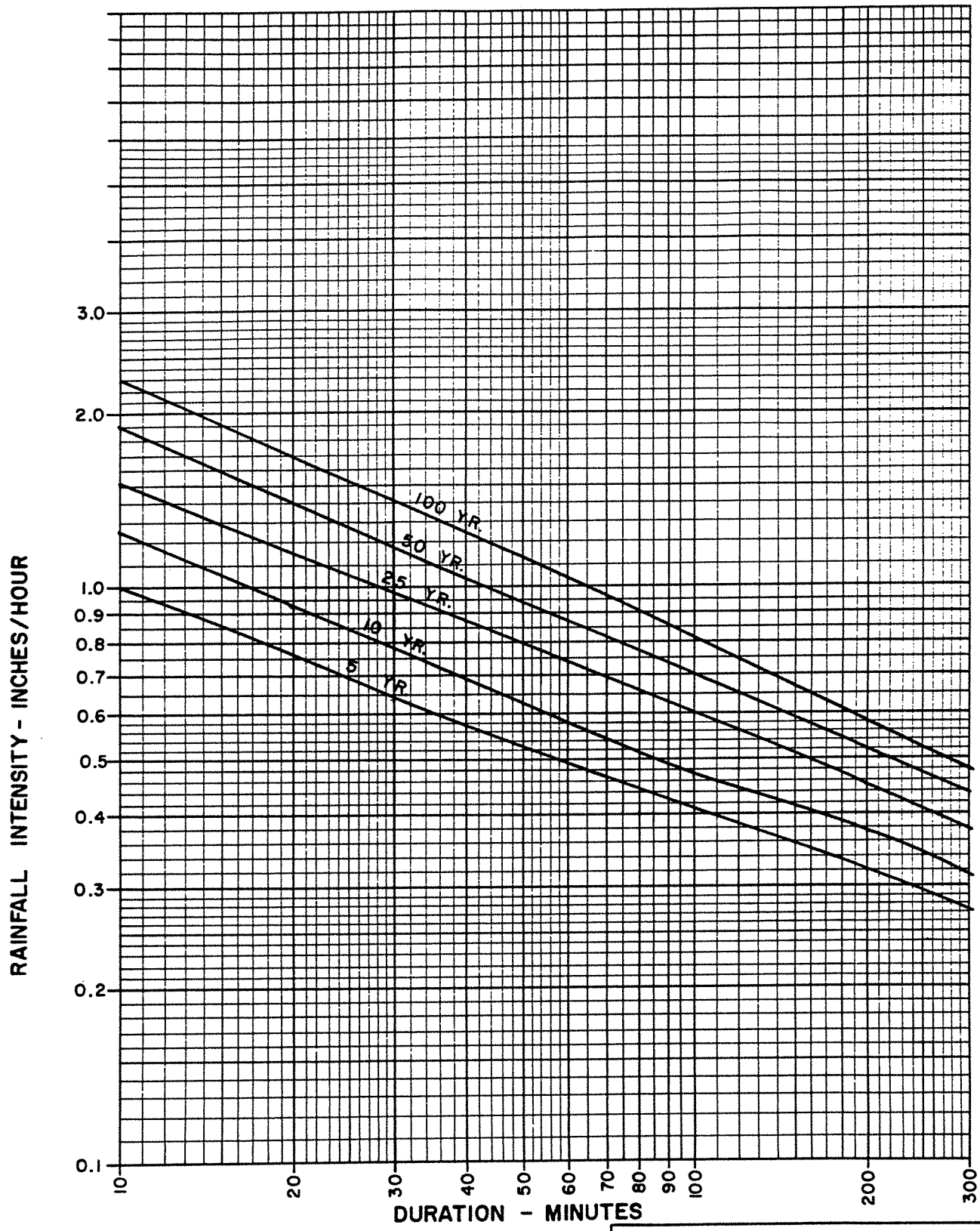
3) Cover - Erosion protection will be required for all disturbed areas.

e. Temporary/permanent hyroseeding or acceptable seeding and mulching must be provided whenever perennial cover cannot be established on sites which will be exposed for 60 days or more.

APPENDIX

TO

STORM WATER DESIGN



CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

RAINFALL INTENSITY - DURATION
FREQUENCY CURVE

DATE: 1992

FIGURE 1

Same as Marion County

DETERMINATION OF REQUIRED DETENTION STORAGE

1 TIME (MINUTES)	2 C x A (ACRES)	3 RAIN INTENSITY (INCHES/HOUR)	4 INFLOW RATE (C.F.S.)	5 INFLOW VOLUME (CU. FT.)	6 OUTFLOW RATE (C.F.S.)	7 OUTFLOW VOLUME (CU.FT.)	8 REQ. STORAGE (CU.FT.)

FIGURE 2

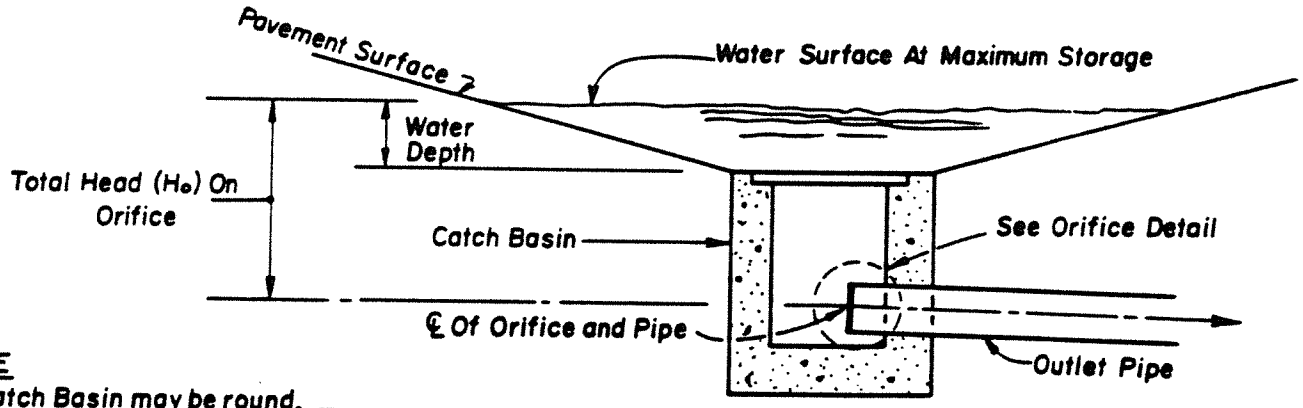
Area of Developed Site (acres) ①	Allowable Outflow (cubic feet per second)	Orifice Diameter (inches) ②	Volume of Water to Be Stored (cubic feet)	Water Depth Over Inlet Grate (feet) ③	Water Storage Area (square feet) ③
0.5	0.10	1-11/16	780	0.5	4,690
1.0	0.20	2-3/8	1,560	"	9,380
1.5	0.30	2-7/8	2,350	"	14,070
2.0	0.40	3-5/16	3,130	"	18,760
2.5	0.50	3-11/16	3,910	"	23,450
3.0	0.60	4	4,690	"	28,150
3.5	0.70	4-3/8	5,470	"	32,830
4.0	0.80	4-11/16	6,250	"	37,520
4.5	0.90	4-15/16	7,040	"	42,220
5.0	1.00	5-3/16	7,820	"	46,910

① For areas less than 0.5 acre, detention is not required. For areas greater than 5.0 acres, the detention system must be designed on a site-specific basis with an allowable outflow based on a 5-year storm with a runoff factor of 0.20 and storage for a 10-year storm with a runoff factor of 0.90.

② Orifice diameter (D_o) is based on the allowable flow (Q_o) and an assumed total head (H_o) on the orifice of 2.00 feet (see typical details). If the total head is different, the diameter must be determined from the graph on Sheet 2.

③ If site conditions necessitate the use of a different water storage area, the water depth must be calculated and an orifice diameter determined per Note 2 above. In most cases, the following formula can be used for calculating the depth:

Water Depth = 3 x Volume of Stored Water Divided By Water Storage Area

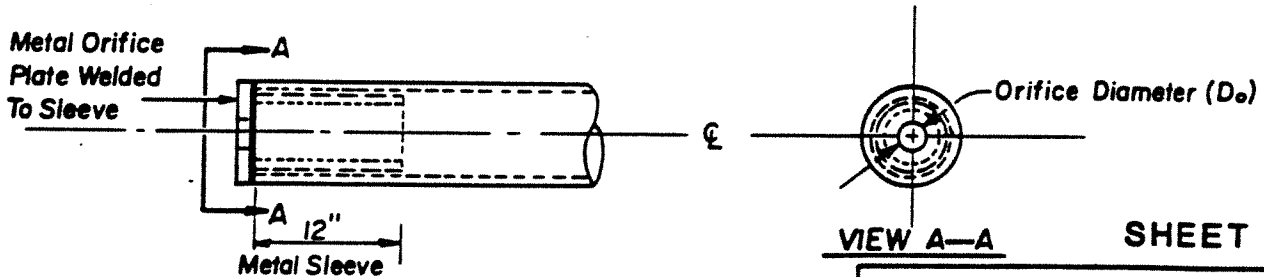


NOTE

Catch Basin may be round, square, or rectangular. But of a size large enough to remove orifice plate for maintenance

TYPICAL CATCH BASIN DETAIL

NO SCALE



TYPICAL ORIFICE DETAIL

NO SCALE

SHEET 1 OF 2

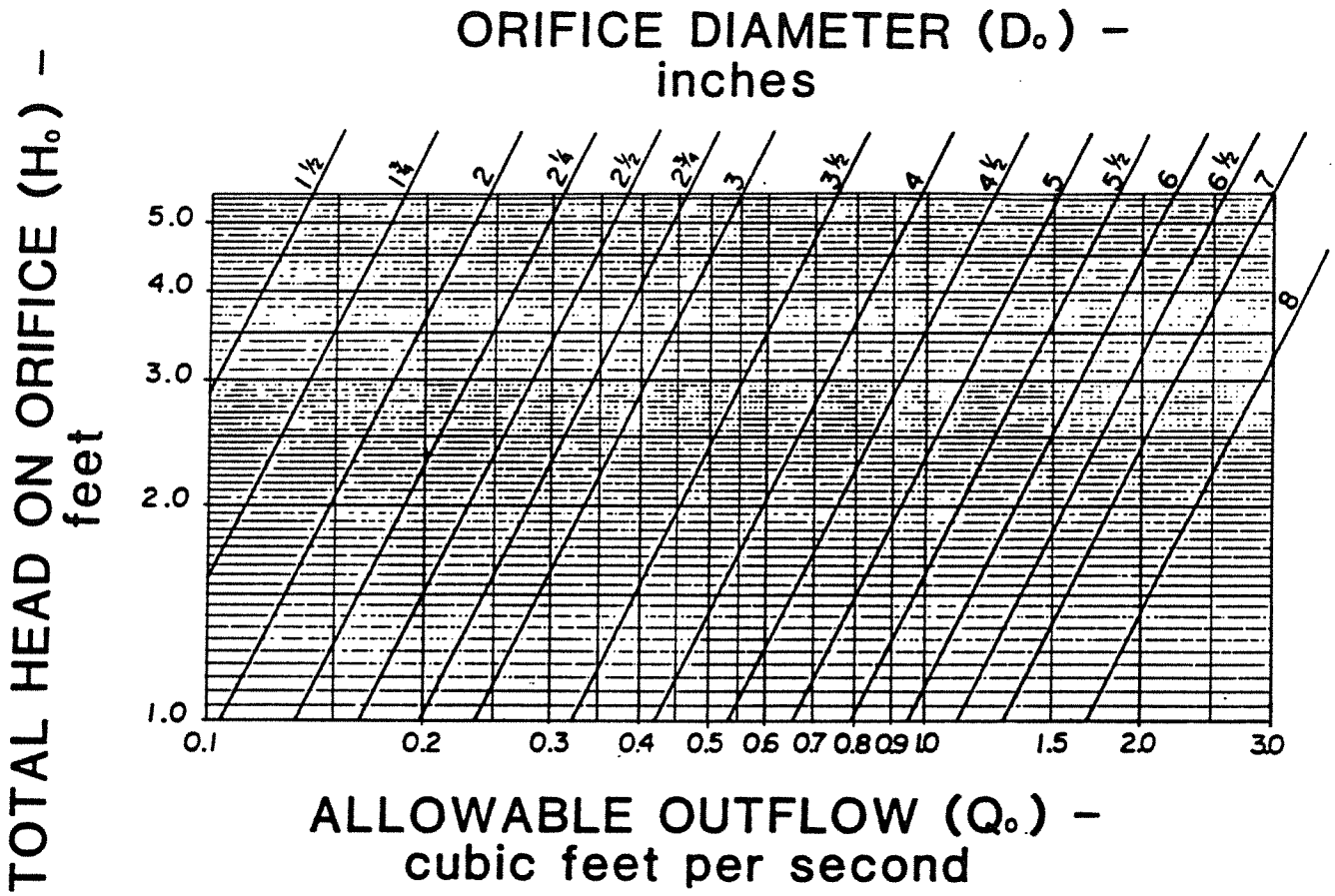
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STORM WATER DETENTION

FOR SITES OF 5 ACRES OR LESS

DATE: 1992

FIGURE 3



CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STORM WATER DETENTION FOR SITES OF 5 ACRES OR LESS	
	DATE: 1992
	FIGURE 4

300

CITY OF STAYTON

DEPARTMENT OF PUBLIC WORKS

STREET DESIGN STANDARDS

1994

TABLE OF CONTENTS

SECTION I - GENERAL

1.00 Purpose

The purpose of these Street Design Standards is to provide a consistent policy under which certain physical aspects of street design will be implemented. Most of the elements contained in this document are Public Works oriented and most are related to the development or platting process; however, it is intended that they apply to both public and private work designated herein.

These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by design professionals. It is expected that engineers will bring to each project the best of skills from their respective disciplines.

The Standards are also not intended to limit unreasonably any innovative or creative effort which could result in better quality, better cost savings, or both. Any proposed departure from the Standards will be judged, however, on the likelihood that such variance will produce a compensating or comparable result, in every way adequate for the user and City resident.

The objectives is to develop a Street Design Standard which will:

a. be consistent with the Stayton City Code, if there is a conflict the Stayton City Code will prevail;

b. be of adequate design to handle the traffic needs of the City of Stayton;

c. provide design guidance criteria to the private sector for the design of streets within the City of Stayton;

d. establish right-of-way widths, improvement requirements, and construction and design standards for the City of Stayton street classification;

e. be designed in a manner to allow economical future maintenance; and

f. require the use of materials to ensure a minimum practical street design life of 20 years.

1.01 Shortened Designation

These City of Stayton Street Design Standards shall be cited routinely in the text as the "Standards."

1.02 Applicability

These Standards shall govern all construction and improvements of all public and private (only if they may become public in the future) streets in the City of Stayton and applicable work within its service areas.

1.03 References

The Standards are intended to be consistent with the most currently adopted provisions of:

a. Stayton City Code
b. Stayton Area Comprehensive Plan
c. City of Stayton Urban Growth Management Plan
d. Adopted Sector Plans

1.04 Standard Specifications

Except where the Standards provide otherwise, design detail, workmanship, and materials shall be in accordance with the current edition of the "Standard Construction Specifications" prepared by the City of Stayton.

1.05 Definitions and Terms

Alley - means a public easement or right-of-way not more than 20 feet and not less than 20 feet in width, which intersects with a public street.

Arterial Street - means a major facilities for moving large volumes of intra-area traffic to and from the freeway/expressway system.

As-Built Plans - plans signed and dated by the project engineering indicating that the plans have been reviewed and revised, if necessary, to accurately show all as-built construction details.

Bike Lanes - means a designated travel-way for bicyclists which is established within the roadway directly adjacent to the outside vehicular lane or on the shoulder.

Bike Path - means a designed travel-way for bicyclists which is completely separated from the vehicular travel lanes and is within independent right-of-ways.

Bike Route - means a designated travel-way for bicyclists which is shared with vehicular traffic. The roadway is designed with signs for bicycling (no pavement markings for the bike route or delineation of parking spaces used).

City - means the City of Stayton, Oregon.

Collector Street - means a facility that allows traffic within an area or neighborhood to connect to the arterial system.

Cul-de-sac - means a dead-end street having a turnaround area at the dead-end.

Curb Line - means the line indicating the edge of the vehicular roadway within the overall right-of-way.

Dead-end Street - means a street which terminates without a turnaround area and is intended to continue through at some future time.

Definition of Words - Whenever, in these Standards, the words "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 Director. Similarly, the words "approved," "acceptable," or "satisfactory," shall mean approved by, acceptable to, or satisfactory to the Director.

Designated Arterial or Collector Street - means a street designated as an arterial or collector on the comprehensive plan or on a sector plan.

Director - means the Director of Public Works of the City of Stayton or the authorized representative.

Downstream Intersection - means the nearest intersection from a driveway located in the direction of traffic flow of the nearest lane of the abutting street.

Expansion Joint - a joint to control cracking in the pavement structure and filled with preformed expansion joint filler.

Grade - means the degree of inclination of a road or slope.

Half-street - means a 50 percent 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 developed.

Hillside Lot - means a lot having an average cross slope of 5 percent or more, and zoned or developed for one or two family residential use.

Limited Collector Street - means a facility which serves much the same purpose as a collector, but which serves an area limited to 90 acres (+/- 20 percent) in size, which area cannot later be enlarged, and when there is no external traffic feeding through the area onto the limited collector.

Local or Residential Street - means a facility not designated on one of the higher systems. It serves primarily to provide direct access to abutting land and offers the lowest level of traffic mobility. Through traffic movement is deliberately discouraged.

Longitudinal Joint - a joint which follows a course approximately parallel to the centerline of the roadway.

Major Partitioning - means a partition which includes the creation of a road or street.

Major Street - means any arterial or collector street identified as such in the Stayton Area Transportation Study.

Manufacturer's Name - Any manufacturer's name, specification, catalog number, or type used herein is specified by make in order to establish the standard requirements of the City. Other equivalent makes will be considered for approval, providing they are comparable with this estimated standard.

Minor Partition - means a partition which does not include the creation of a road or street.

Natural Grade - means the grade with the land in an undisturbed state.

One-Way Driveway - means a driveway of either ingress or egress, but not both.

Owner - means the owner of record of real property as shown on the latest tax rolls or deed records of that county, and includes a person who furnishes evidence that he is purchasing a parcel of property under a written recorded or unrecorded land sale contract.

Parking - means the temporary storage of a vehicle where the owner or person entitled to its use intends that its storage be for a time and in a place where it may be conveniently recovered ready for continued use as means of transportation.

Parking Space - means a designated space in a parking area for the parking of one motor vehicle.

Partition - means to divide an area or tract of land into two or three parcels within a calendar year when such area or tract of land exists as a unit or contiguous units of land under single ownership at the beginning of such year.

Person - means individual firm, corporation, association, agency, or other entity.

Plans - Construction plans, including system plans, sewer plans, and profiles, cross sections, detailed drawings, etc., or reproductions thereof, approved or to be approved by the City Engineer, which show the location, character, dimensions, and details for the work to be done, in which constitute a supplement to these standards.

Preliminary Review - Plans stamped "Preliminary Review," dated, and signed by the City, indicates that the plans have been preliminarily approved and may not be submitted as a part of the requirements for approval for construction.

Project Engineer - The engineer, including the City's engineer, licensed by the State of Oregon as a Civil Engineer under whose direction plans, profiles, and details for the work are prepared and submitted to the City for review and approval, or who is in charge of and responsible for construction of the improvement.

Right-of-way - All land or interest therein which by deed, conveyance, agreement, easement, dedication, usage, or process of law is reserved for or dedicated to the use of the general public for roadway purposes, which the City has sole responsibility to maintain.

Roadway - All of that portion of the right-of-way used or to be used for vehicle movement which exists between the curbs or proposed curb lines.

Sidewalk - means a right-of-way deeded, dedicated, and designated for the use of non motorized vehicles and pedestrians.

Standard Plans - The drawings of structures or devices commonly used on City work and referred to on the plans (see standard construction specifications).

Streets or Roads - Any public highway, road, street, avenue, alley, way, easement, or right-of-way used or to be used for vehicle movement.

Structures - Those structures designated on the standard plans as catchbasins, manholes, etc. Detailed drawings of structures or devices commonly used in the City work and mentioned in these Standards are included in the standard construction specifications.

Subdivision - means to divide an area or tract of land into four or more lots within a calendar year when such area or tract of land existed as a unit or contiguous units of land under a single ownership at the beginning of such year.

Superelevation - means the vertical distance between the heights of the inner and outer edges of highway pavement.

Transition and Taper - Taper for acceleration or deceleration of turning vehicles is provided on high speed roads in order to improve traffic flow conditions. Tapers are so designed that an entering vehicle can accelerate to the speed of through traffic before it begins the actual merging maneuver, and that a diverging vehicle need not begin to decelerate until it has completely left the through lane.

Transverse Joint - a joint which 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 and auxiliary lanes.

Turnaround Area - means a paved area of a sufficient size and configuration that a motor vehicle having a curb-to-curb turning radius of 30 feet or less may maneuver around to head in the opposite direction without having to move in reverse more than once.

Turnpike Street - Any public street, road, or right-of-way which has been paved for vehicular movement and doesn't have one or more of the following: curbs, sidewalks, or storm drainage facilities.

Two-Way Driveway - means a driveway functioning as both an exit and entrance.

Upstream Intersection - means the nearest intersection from a driveway located in the direction opposite the traffic flow of the nearest land of the abutting street.

1.06 Engineering Policy

The engineering policy of the City of Stayton requires strict compliance with the Oregon Revised Statute 672 for professional engineers.

All engineering plans, reports, or documents shall be prepared by a registered professional Civil Engineer, or by a subordinate employee under their direction. Such plans shall be signed by them and stamped with their seal to indicate responsibility for them. It shall be the project engineer's responsibility to review any proposed street improvement, widening, and/or extensions within the City, prior to engineering or proposed design work, to determine any special requirements or whether the proposal is permissible. A "Preliminary Review" and/or a "Plan Approved for Construction" stamp of the City, on the plans, and etc., for any job, does not in any way relieve the project engineer of his/her responsibility to meet all requirements of the City or obligation to protect the life, health, and property of the public. The plans for any job shall be revised or supplemented at any time it is determined that the full requirements of the City have not been met or when new information is discovered that detracts from the purpose or intent of the original design.

An engineer having submitted to the City false or inaccurate information of a material nature will be warned of his conduct, and the Oregon State Board of Engineering Examiners will also be advised.

1.07 Approval of Alternate Materials or Methods

Any alternate material or method not explicitly approved herein will be considered for approval on the basis of the objectives set forth in 1.00 PURPOSE. Persons seeking such approvals shall make application in writing.

Approval of any major deviation from these Standards will be in written form. Approval of minor matters will be made in writing if requested.

Any alternate must meet or exceed the minimum requirements set in these Standards.

The written application is to include, but is not limited to, the manufacturers specifications and testing results, design drawings, calculations, and other pertinent information.

Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the Director. When requested by the City, full design calculations shall be submitted for review with the request for approval.

1.08 General Applicability

Street improvements, including curbs, sidewalks and storm drainage, shall be provided on all property developed within the City of Stayton according to these standards for the following types of development:

a. All major partitions and subdivisions.

b. All minor partitions.

c. Any developments where City will become the owner (Planned Unit Development, Mobile Home Development).

SECTION II - DESIGN

2.00 Local Street Design

The following elements should be incorporated in the design of the local residential street system to discourage and minimize both the volume and impact of through traffic within residential neighborhoods or subdivisions:

a. Use of T-intersections
b. Use of cul-de-sacs
c. Use of loop streets
d. Curvilinear street pattern

Employment of the above design elements will provide some degree of travel discontinuity, thus discouraging the use of the residential street system as through routes. In addition, excessive speed within the neighborhood may also be minimized.

For the above design alternatives to work properly in minimizing neighborhood infiltration, it is necessary to plan for and provide the collector and arterial network by which through traffic can travel. Care should be taken in the design of the local street network to ensure that connections with the collector and arterial streets are adequate.

2.01 Street Construction Plans

a. General

Complete plans and specifications for all proposed street improvements including all necessary dedications and easements shall be submitted to the Department of Public Works for approval and must receive the required approval prior to construction permit issuance and beginning of construction.

b. Plan Preparation

Construction plans and specifications shall be prepared by professional engineer licensed in the State of Oregon in accordance with the following requirements:

1. Dimensions - Construction plans shall be clearly and legibly drawn

on engineering tracing paper 22 x 34 inches with a 1-1/2 inch clear margin on the left edges.

Plans from consultants for construction permit projects shall be blueline drawings meeting the above size. (24 by 36 inch blueline prints are acceptable.)

2. Scale - Horizontal scale shall be 1" = 20' on all street improvement plans except subdivisions. In this case 1" = 50' horizontal scale will be allowed. Vertical scale shall be 1" = 5'. Any deviation from this standard shall be approved by the plans approval engineer.

3. Form - Title Sheet, Plan and Profiles, Storm Drain Appurtenances, and Site Drainage Plan.

2.02 Title Sheet

The title sheet shall include the following:

a. Plan View (Site Plan) of the entire project, showing street right-of-way and/or subdivision layout to a scale of 1" = 100'. A smaller scale may be used on large projects upon approval of the Public Works Director. A project is considered too large when a minimum dimension of two (2) inches cannot be maintained between the title, system site plan, and vicinity map. A scale of 1" = 200' may be used in this case.

This site plan shall be a composite plan showing all complete properties to be served by the street improvements and properties adjacent to and within 250 feet of those served, existing natural or artificial streams, swales, soil series, wetland designations from National Wetland Inventory, subdivision names, surrounding streets, shaded area of proposed street improvement, tract names and numbers, and lot numbers.

b. Index of Sheets.

c. Complete legend of symbols used.

d. Vicinity Map to a scale of not less than 1" = 800' showing the project location.

e. Title Block - located in lower right hand corner or right edge or paper with scale, north point, date, drawing number, the engineer' name, address

and official stamp, and where applicable, the owner/developer's name and address.

f. Temporary and permanent bench marks including their descriptions.

g. General and special notes relating to construction methods.

h. A statement referencing the City of Stayton Standard Construction Specifications.

2.03 Plans and Profiles

a. Plan

Plan view of the street improvement shall be to a scale of 1" = 20' or 1" = 50' on new subdivisions and shall contain the following information in addition to the above:

1. Adjacent street curbs, driveways, and property lines, right-of-way, and utility easements referenced to property corners, street intersections, or section lines. On construction permit projects, 50-foot minimum cross sections and curb elevations shall be required to determine if finish grade design meets existing ground line, and to determine if curb line or property line walks will be required. Also, curb and gutter elevations for beginning and end of project, and curb elevations at existing side street intersections shall be required to show how new curbs will join existing curbs.

2. Catch points and limits of slope easements or all cuts and fills over four (4) feet.

3. Location of water courses, stream and railroad crossings, water mains, culverts, sanitary sewers, and storm sewers within 250 feet of the proposed project. Use arrows on both existing water courses and storm drains, and on proposed storm drains, indicating direction of flow.

4. Location of wells, gas mains, underground power, and other utility within 100 feet of the proposed project.

5. On horizontal curves, show stationing of the point of tangency and the point of curvature. Show the length of tangent, length of centerline curve, the delta angle, radius point, and

centerline radius distance.

6. On half street improvements show existing centerline, edge of pavement, and the extent of the proposed widening.

7. Show all bicycle and wheelchair ramps of each curb radii.

8. The location of each manhole, catch basin, beginning and end of radius, point of curvature, and point of tangent shall be stationed to facilitate checking the plans with the profiles. The stationing shall be tied to existing property corners, centerline, centerline of intersections, and/or street monuments.

Side streets shall be stationed either from north to south, or east to west, with the centerline, centerline stations shown in each direction.

b. Profiles

Profiles for the individual street shall be to the same horizontal scale on the same sheet and drawn immediately below the corresponding plan view to a vertical scale of 1" = 5' reading from 0+00 left to right (where conditions warrant, right to left may be approved as well as a different vertical scale), and shall contain at least the following information in addition to the above:

1. Location of catchbasins, manholes, and other appurtenances with each numbered and stationed.

2. Profile of existing and finished ground line at property line and/or pavement, left and right curb line, and proposed centerline.

3. Percent of all street grades.

4. Beginning of all vertical curves, points of vertical intersection, end of vertical cure, and low point of vertical curve if a sag curve and length of vertical curve.

5. Design speed used and "K" value applied.

6. On half street improvements slow elevations of the centerline, edge of pavement and proposed top of curb 250 feet each side of the improvement.

7. Profiles on stub streets shall be shown 250 feet past the terminus of the street.

SPECIAL NOTE: The design engineer shall field locate and verify the alignment, depth, and inverts of all existing facilities shown on the plans that will be crossed by proposed facilities and shall certify them with a note on the plans. City as-builts are only to be used as an aid to the design engineer when field verifying the existing facilities.

2.04 Location of Utilities Within Right-of-Way

a. The City of Stayton, Department of Public Works Standard, Construction Specifications Standard Drawing No. 4 indicates the required location for each utility within the public right-of-way.

b. For sanitary sewer/water well separation and sewer and water line crossings refer to the City of Stayton, Department of Public Works, Sanitary Design Standards 2.13, Location.

c. For water main and utility spacing other than sanitary sewer refer to the City of Stayton, Department of Public Works, Water Distribution System Design Standards 2.12, Location.

2.05 Plan Submittal

Four sets of construction plans shall be submitted to the City of Stayton for checking to ensure compliance with these Standards, City of Stayton Ordinances, and good engineering practice. Submitted plans shall include City specifications, test data, a quantity list, drainage calculations, a soils report as required, design recommendations, easement and right-of-way descriptions, ties to City of Stayton Bench Mark and Monument System, and other material as requested by the City Engineer. A plan check fee will be levied at the time plans are submitted.

Once the plans are approved and the construction permit issued, the project engineer shall be responsible for providing all surveying services necessary to stake the project and prepare the as-built drawings when the project is complete.

2.06 Miscellaneous Detail Standards

a. Cul-de-sac Turnarounds

Cul-de-sac turnarounds on residential streets in subdivisions, or on

hillside streets shall be designed and constructed according to the following specifications.

SUBDIVISION
38 foot paved radius
45 foot right-of-way radius

HILLSIDE STREETS OVER 400 FEET
30 foot paved radius
35 foot right-of-way radius

Cul-de-sacs in industrial developments shall provide adequate turnarounds for the type of vehicles served by the streets.

b. Private Streets

All private street cross-sections shall be designed according to City of Stayton street standards except where approved by the Director of Public Works.

c. Catch Basins

Catch basins shall be designed according to City of Stayton Storm Drainage Standards (reference 2.23 and 2.24).

d. Manhole Cover and Water Valve Adjustments

Manhole covers and water valves shall be adjusted to finish grade of the improved street.

e. Street Reconstruction

Whenever a street is reconstructed on a new grade or alignment such that the new street section is built over the existing street, the existing pavement shall be broken up and removed. Alternatively, if any of the existing pavement is to be used within the base of the new street section, it shall be broken up, reprocessed, and compacted such that it is comparable in gradation to the aggregate required for the new base rock.

2.07 Street Right-of-Way and Curb-to-Curb Widths

The street right-of-way in or along the boundary of a subdivision shall have the following minimum width, except a boundary street may be half such width where it is apparent that the other half will be dedicated from adjacent properties:

	Right-of-Way Width	Curb to Curb Width
Major streets or arterials	100 feet	40 feet
Minor streets	60 feet	34 feet
Collector streets	80 feet	40 feet
Cul-de-sac:		
200 to 450 feet in length	50 feet	30 feet
Less than 200 feet	50 feet	30 feet
Turn-arounds	45 feet radius	38 feet radius

2.08 Design Speeds

The minimum design speeds for classified streets shall be as follows:

a. Residential Streets	30 mph
b. Collectors	35 mph
c. Arterials	45 mph
d. Arterials (CBD)	35 mph

Design considerations for all street geometrics shall reflect these design speeds. Variance from these design speeds shall be approved by the Director of Public Works.

2.09 Horizontal, Vertical Curves, and Superelevation

Horizontal and vertical curves for a given street shall reflect the design speed of the particular classification of the street.

The 1984 ASSHTO Policy on Geometric Design of Highway and Streets shall serve as the guideline for the design of horizontal and vertical curves on City streets. The maximum superelevation rate permitted on City streets shall be six percent for arterials and four percent for collectors.

Sharper horizontal curvature should not be introduced at or near the top of a pronounced crest vertical curve. Similarly, sharp horizontal curvature should not be introduced at or near the low point of a pronounced sag vertical curve.

Minimum stopping sight distance shall be provided on all vertical curves.

Vertical curves shall be parabolic and of a minimum length computed from the formula

$$L = KA$$

where

L = length of vertical curve in feet
K = design constant (rate of vertical curvature)
A = algebraic difference in grades, percent

K is a constant for each design speed; its selection for crest vertical curves is based on sight distance requirements and, for sag vertical curves, on headlight sight distance. K values to be used for the design of vertical curves are as follows:

Vertical Curves K VALUES

Design Speed mph	Crest V.C. S.S.D. Minimum	Crest V.C. S.S.D. Desirable	Sag V.C. S.S.D. Minimum	Sag V.C. S.S.D. Desirable
20	10		20	
25	20		25	
30	30	30	35	35
35	40	50	45	50
40	60	80	55	70
45	80	120	70	90
50	110	160	85	110
60	190	310	120	160

2.10 Grades

Maximum grade on streets shall be as follows:

a. Arterials	.06 ft/ft	(6%)
b. Collectors	.08 ft/ft	(8%)
c. Residential	.12 ft/ft	(12%)

No street grade shall exceed (8%) without a variance unless the Commission finds that because of the size and shape of the property or topographic conditions a steeper grade is necessary.

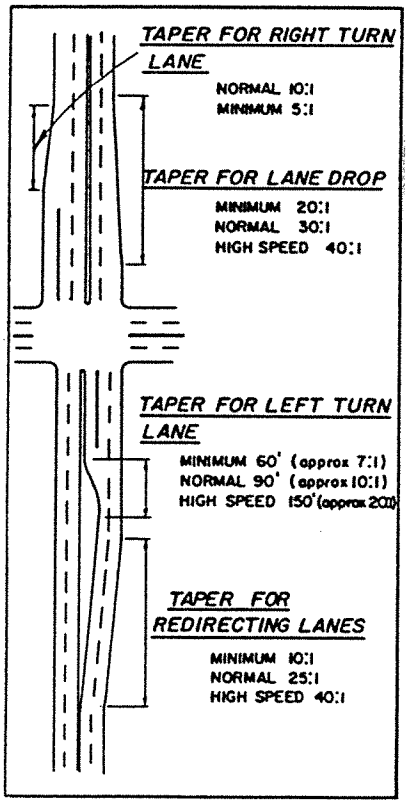
Maximum grade for local or residential streets in hillside areas shall not exceed .15 ft/ft (15%).

The minimum gutter grade permitted shall be 0.25 feet per 100 feet (0.25 percent grade).

On curve radii of 30 feet or less, a minimum grade of 0.5 percent shall be required.

For cross-slope design standards see City of Stayton Drawing No. 313.

2.11 Tapers and Transitions



The taper lengths/lane transitions shall be as shown in the diagram to the left. "High speed" tapers shall apply to all streets whose design speed is 40 mph or greater.

2.12 Portland Cement Concrete Street Design and Construction

a. In general, Portland Cement Concrete design and construction shall

conform to Portland Cement Association (PCA) specifications.

b. Subgrade - should be compacted and meet same basic requirements asphalt construction.

c. Base rock - if subgrade is stable and can carry construction traffic, minimal or no base rock should be needed. One to three inches of 3/4-0 seems to be standard.

d. Depth of concrete should be based on design criteria. Some examples: 5" residential, 6-7 commercial, 7+ heavy industrial.

e. Strength of concrete 3500 - 4000 PSI. Don't specify cement content. Maximum aggregate size 1". If crushed rock is to be in mix, keep % below 60%.

f. Slump range 4" + 1". Extrusion, of course, would be less, 2" + 1. Don't overfinish!

g. Jointing detail and examples should be given by contractor to the engineer. Tooling or sawing of transverse joints is acceptable. Longitudinal joints should be sawed or a construction joint.

h. No dowels or tie - bars. On slabs six inches thick or more a key way is suggested.

i. A good skid resistant finish is required. Heavy transverse brooming or drag finish.

j. Heavy application of curing compound is a must. White pigmentation is not necessary in most instances. However, rate of application should be checked.

k. Light vehicles could be turned on concrete in 3 - 7 days, all traffic in 7 - 14 days.

2.13 Asphaltic Concrete Street Construction

City of Stayton (Flexible pavement Structure Design)

Pavement structure design shall be per Oregon State Highway Division flexible pavement design procedure as modified by the City of Stayton. (See Appendix "A")

Engineer to provide City Engineer all laboratory test results as specified in above

O.S.H.D. procedure. Also provide traffic coefficient derivation.

In lieu of above design procedure, engineer may use values from the City of Stayton Department of Public Works Standard Drawing No. 312. The shed roof design of Standard Drawing No. 313 or No. 314, if a hillside development, may also be used.

The engineer may be required to submit pavement structure design data for any street for which the City Engineer has reason to suspect unsuitable soil conditions, high percentage of trucks or any other conditions that may significantly affect the pavement structure design.

FOR STREET CLASSIFICATION (LOCAL, COLLECTOR, ARTERIAL) SEE STAYTON AREA TRANSPORTATION STUDY (S.A.T.S.)

2.14 Alley Construction

a. Alley width and improvement requirement shall comply with the City of Stayton, Standard Construction Specifications Standard Drawing No. 304.

b. All alleys shall be constructed of Portland Concrete Cement.

c. All alley improvements shall require a one-foot clearance strip between the edge of alley and right-of-way line except for alleys ten-feet wide or less. In this the case the clearance strip shall be six-inches in width.

2.15 Portland Cement Concrete Curbs - Type and Application
(See Standard Drawing No. 303)

a. Type "A" curb and gutter shall be utilized for all street with slopes less than 0.5 feet per 100 feet (0.5 percent grade).

The minimum gutter grade permitted shall be 0.25 feet per 100 feet (0.25 percent grade).

1. Rolled Curb may be used in urban developments as approved by P.W.D.

2. Type "C" curb may be used where the minimum gutter grade is .50 feet per 100 feet and is being consistent with existing improvements.

b. A six (6) inch curb exposure is normally required on residential streets. A seven (7) inch curb exposure is required on all major streets.

c. Two curb weeps, three (3) inches in diameter, shall be provided for each lot.

d. Materials, construction, measurement, and payment for concrete curbs shall conform to Division 2, Section 213, City of Stayton Standard Construction Specifications.

e. Minimum curb radii required at intersection shall be as follows:

Intersection	Radius
1. Residential to Residential -	20 feet
2. Residential to Collector or Arterial -	25 feet
3. Collector to Collector or Arterial -	30 feet
4. Arterial to Arterial -	30 feet

2.16 Sidewalk Construction and Location (See Standard Drawing No. 306)

a. A standard sidewalk shall be constructed on all streets having 60 feet of right-of-way or more. A standard sidewalk shall be parallel to, and one foot from, the right-of-way line.

On streets having 50 feet of right-of-way or less, the sidewalk shall be constructed parallel to, and abutting upon the curb.

In hillside areas, where cross slopes exceed 15 percent, one curbline sidewalk four feet wide (4.5 feet including curb) shall be provided, and preferably on the uphill side of the street and shall be located so as to avoid trees wherever possible. Under special conditions, the P.W.D. may approve alternate locations.

Curbline sidewalks may be permitted by P.W.D. in residential areas except at the following locations:

1. Along major roads.

2. On existing streets where standard sidewalks have been established on either side within the same block.

3. On existing streets where trees and utilities have been installed in the location of curbline sidewalks.

Midblock walks that are required on subdivisions are nondeferrable and shall be constructed as part of the subdivision development. Midblock walks shall be eight feet in width on a ten foot easement.

b. Sidewalks shall be constructed of Portland Cement Concrete, capable of meeting a compressive strength of 3,000 PSI after 28 days.

c. When sidewalks are to be constructed they shall be of a minimum width of four feet. Sidewalks within the CBD shall be constructed in the full width of right-of-way between the property line and the curb and gutter.

The above shall not apply to mini-subdivisions or to subdivisions where hillside standards apply.

d. Materials and construction for sidewalks shall conform to Division 2, Section 213, City of Stayton Standard Construction Specifications.

2.17 Bicycle and Wheelchair Ramps

a. Under Chapter 31, Handicap Access, of the Uniform Building Code of the State of Oregon it is required that access be available to the handicapped for use of public facilities. It is the City's intent that wheel-chair ramps be provided at all intersections.

b. The City of Stayton, Department of Public Works Standard Construction Specifications Standard Drawing No. 307 indicates various conditions for ramp requirements within the City.

c. Ramps shall be located so as to avoid conflict with storm drain catchbasins and/or any other existing utility.

d. For construction that requires the partial curb removal at intersection areas without any existing ramps, it shall be the Contractor's responsibility to construct said ramps according to Standard Drawing No. 307.

2.18 Portland Cement Concrete Driveways (See Standard Drawing No. 305)

a. Materials, construction, measurement, and payment for driveways shall conform to Division 2, Section 214, City of Stayton Standard Construction Specifications.

2.19 Bikeways

a. Width and Clearance

1. Bike Routes

Since bike routes share the roadway with vehicular traffic, a bike route shall be incorporated on that roadway only when the

paved shoulder has minimum width of four (4) feet or the curb lane has a minimum width of fifteen (15) feet and the on-street parking spaces are not delineated.

2. Bike Lanes

The width of one-way bike lanes shall be designed according to that particular classification of street.

Street Classification	Minimum Bike Lane Width
Residential/Local	Six (6) feet
Basic and Limited Collector	Six (6) feet
Phased Arterial	Six (6) feet
Basic Arterial	Six (6) feet
High Volume Arterial	Eight (8) feet
Beltline Arterial	Eight (8) feet

3. Bike Paths

The minimum width for a bike path shall be ten (10) feet. This width may be varied to a minimum of eight feet if all the following conditions prevail:

1) bicycle volume is expected to be low,
2) pedestrian use of the bike facility is limited,
3) horizontal and vertical alignment is adequate to provide for good sight distance, and
4) the bike facility will not be subject to vehicular traffic use.

The bike patch shall be twelve (12) feet wide only if the following conditions prevail:

1) the facility is shared also by pedestrians and joggers,
2) the facility has a high bike traffic volume,
3) the facility will be used by maintenance vehicles,
4) the facility has steep grades, and
5) the facility is where bicyclists will tend to ride two abreast.

On turnpike streets a minimum two (2) foot wide graded area shall be maintained on both sides of the bike path or adjacent to the bike route and bike lane. A minimum three (3) foot wide graded area shall be maintained near trees poles, walls,

fences, guard rails, and other stationary obstructions.

To maintain adequate vertical clearance to obstructions for bicyclists, there shall be a minimum of eight (8) feet difference between the bikeway surface and the height of the physical object.

b. Design Speed of Bike Paths

The minimum design speed shall be 20 mph except when the grade exceeds 4 percent. When this condition occurs, the minimum design speed shall be 30 mph.

c. Horizontal Alignment and Superelevation of Bike Paths

The minimum design radius of the curvature can be derived from the following equation:

$$R = \frac{V^2}{15\,(e + f)}$$

Where R = Minimum radius of curvature (ft),
V = Design speed (mpH),
e = Rate of superelevation,
f = Coefficient of friction.

The superelevation will vary from 2 percent (minimum to obtain adequate drainage) and 5 percent. Two (2) percent superelevation rate (minimum) will be adequate for most conditions.

The minimum radii of curvature based upon the design speed and superelevation shall be obtained from the following:

DESIGN RADII FOR PAVED BICYCLE PATHS

Design Speed - V (mph) (1 mph = 1.6 km/hr)	(e = 2 percent) Friction Factor - f	Design Radius - R (feet) (1 feet = 0.3m)
20	0.27	95
25	0.25	155
30	0.22	250
35	0.19	390
40	0.17	565

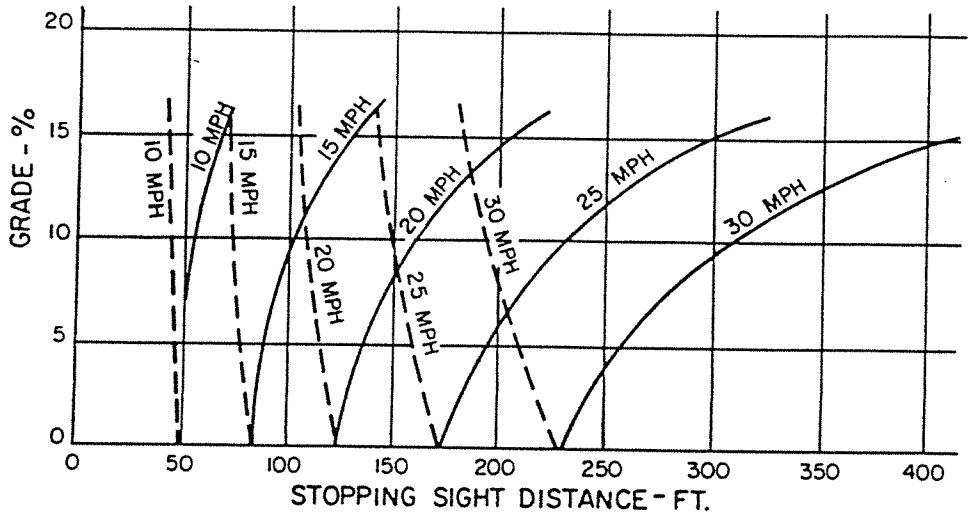
When substandard radius curves are unobtainable due to right-of-way, topographical considerations, standard curve warning signs and supplemental pavement markings should be installed in accordance with the Manual on Uniform Traffic Control Devices (MUTCD). The negative effects of substandard cures can also be partially offset by widening the pavement through the curves.

d. Grades

Grades shall be maintained to a maximum of 5 percent. Where topography dictates the design, grades over 5 percent are acceptable for a minimum of 500 feet when a higher design speed is used and additional width is provided.

e. Stopping Sight Distance

The following formulas and charts shall designate the minimum stopping sight distances, sight distances for crest vertical curves and lateral clearances on horizontal curves:



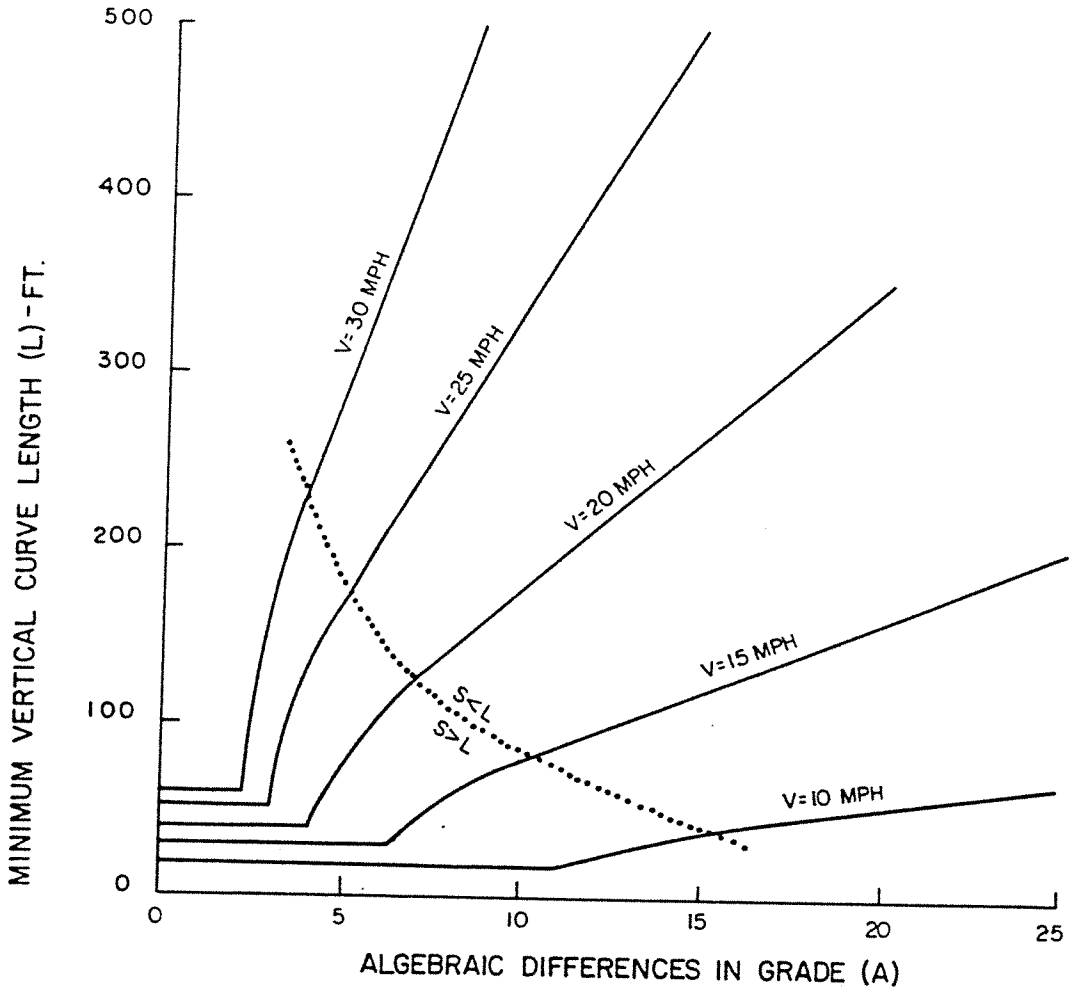
$$S = \frac{V^2}{30(f \pm G)} + 3.67V$$

Descend (-G) ——————
Ascend (+G) — — —

Where: S = Stopping Sight Distance, Ft.
V = Velocity, mph
f = Coefficient of Friction (use 0.25)
G = Grade Ft./Ft. (rise/run)

(metric conversion: 1 ft. = 0.3m, 1 mph = 1.6 km/h)

STOPPING SIGHT DISTANCES FOR BICYCLES

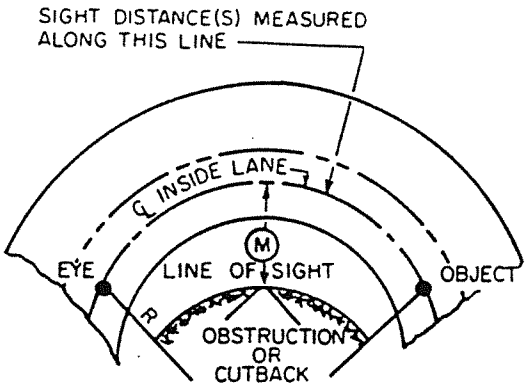


$$L = 2S - \frac{200\ (\sqrt{h_1} + \sqrt{h_2})^2}{A} \quad \text{When } S > L$$

$$L = \frac{AS^2}{100\ (\sqrt{2h_1} + \sqrt{2h_2})^2} \quad \text{When } S < L$$

S = Stopping Site Distance (Ft.)
A = Algebraic Difference in Grade
h_1 = Eye Height of Bicyclist (4.5 Feet)
h_2 = Height of Object (0 Feet)
L = Minimum Vertical Curve Length (Ft.)

SIGHT DISTANCES FOR CREST VERTICAL CURVES FOR BICYCLES



LINE OF SIGHT IS 2.0' ABOVE ℄ INSIDE LANE AT POINT OF OBSTRUCTION

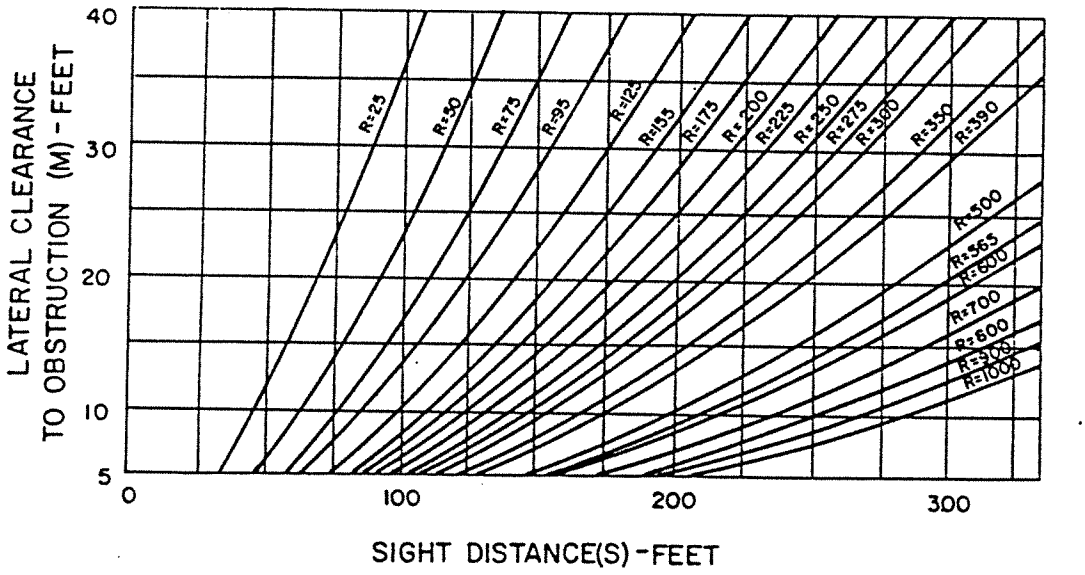
S = Sight Distance in Feet
R = Radius of ℄ Inside Lane in Feet
M = Distance from ℄ Inside Lane in Feet
V = Design Speed for S in MPH

Angle is expressed in degrees

$$M = R\left[\text{vers}\left(\frac{28.65S}{R}\right)\right]$$

$$S = \frac{R}{28.65}\left[\cos^{-1}\left(\frac{R-M}{R}\right)\right]$$

Formula applies only when S is equal to or less than length of curve.



(Metric conversion: 1 ft. = 0.3m.

LATERAL CLEARANCES ON HORIZONTAL CURVES FOR BICYCLES

f. Bikeway Construction

Bike paths designed for limited maintenance vehicles use shall have a minimum two (2) inches of class "B" asphalt concrete and four (4) inches of crushed aggregate. Bike paths where used heavily by maintenance vehicles shall have a minimum two and one-half (2-1/2) inches of class "B" asphalt concrete and nine (9) inches of crushed aggregate.

The minimum pavement cross slope to provide for drainage shall be 2 percent. Sloping shall be in one direction instead of crowning. The surface shall be smooth to prevent water ponding and ice formation. Where a bike path is constructed on a hillside or a bike lane/route is designated on an existing unimproved hillside roadway, a ditch of suitable dimensions shall be placed on the uphill side to intercept the hillside runoff. This ditch shall be a minimum of five (5) feet from the edge of pavement. Where possible, catchbasins carry it under the bike patch, bike lane, or bike route. Drainage grates and manholes shall be located outside the travel way of the bicyclists. The slits in the drainage grates shall be placed perpendicular to the roadway. Where possible, natural ground cover should be included in the design plans to prevent erosion.

After excavation has been completed, the subgrade shall be treated with an approved soil Sterilant to prevent the growth of vegetation.

g. Lighting

Lighting should be included in the bikeway design when nighttime security could be a problem and a high nighttime use is expected (i.e., paths serving college students, commuters). The horizontal illumination levels shall be 0.5 foot candle (5 lux) to 2 foot candles (22 lux) except when security problems exist. Higher illumination levels should be considered at these locations. The placement of the light standards (poles) shall meet the vertical and horizontal clearances.

h. Deterring Motor Vehicle Use

Bike paths intersecting with roadways often require physical barriers to deter unauthorized motor vehicle use of the facility. A lockable, removable post may be used to discourage such use and still permit authorized vehicles to access the facility. The post shall be brightly colored and permanently reflectorized. If more than one post is used, the spacing shall be five (5) feet apart.

An alternate to deterring the motor vehicles is to design two five (5) foot lanes separated by low landscaping at the intersection.

2.20 Shoulders on Turnpike Streets and Ditch Slopes

a. SHOULDER CROSS SLOPES FOR PHASED ARTERIALS

Shoulder cross slopes used under normal conditions are sloped to drain away from the travel lanes and are shown in the chart below. However, occasionally the condition arises on superelevated sections where the shoulders are sloped towards the roadway in order not to exceed the maximum algebraic difference in the shoulder and pavement grade of 7 percent between the shoulder and pavement cross slopes.

Shoulder Cross Slopes

Type of Surface	Shoulder Cross Slope (%)
Concrete/bituminous	2-6
Gravel/crushed stone	4-8
Turf	8

b. Ditch Slopes

All ditch slopes must be maintained at or below the maximum 2:1 ratio.

Invert of ditches shall be below the street subgrade.

2.21 Street Lighting

Street lighting shall be provided as part of the street design process. Design illumination levels shall be in accordance with the recommendations of the Illuminating Engineering Society and are summarized in the following table.

Recommendations for Roadway Average Maintained Horizontal Illumination

Roadway Classification	Commercial Footcandles	Urban Intermediate Footcandles	Residential Footcandles
Expressway	1.4	1.2	1
Arterial	2	1.4	1
Collector	1.2	0.9	0.6
Residential	0.9	0.6	0.4

The average-to-minimum uniformity ratios for roadways in commercial and intermediate areas shall be 4:1 or better. In residential areas this uniformity ratio shall be 6:1 or better.

The street lighting system shall be provided using high pressure sodium vapor luminaries. The design average horizontal illumination and uniformity ratio shall be obtained by considering together the factors of lamp wattage, pole support spacing, maintaining height and luminaires arm overhand. When feasible, every effort should be made in the spacing of the street lights to locate poles at lot line extensions and not in the middle of a lot.

2.22 Private Driveways and Parking Lots

a. Surfacing and Construction

Driveways in this section will refer to that area between the property line and parking area.

All private driveways and parking lots shall be paved with asphalt or concrete. The type and quantity of materials for construction is based upon the type of vehicular use and is shown below:

1. Residential, Light Commercial/Retail (majority passenger vehicles)

Initial Construction

Asphalt concrete and crushed aggregate

Asphalt concrete (class "B")	2-1/2 inch
1 inch crushed aggregate base	8 inch

2. Heavy Commercial/Retail (high volume of larger and heavy delivery vehicles)

Initial Construction

Asphalt concrete and crushed aggregate

Asphalt concrete (class "B")	2-1/2 inch
1 inch crushed aggregate base	10 inch

3. Heavy Industrial

Initial Construction

Asphalt concrete and crushed aggregate will be designed on a case by case situation.

Bumper guards or wheel barriers shall be installed so that no portion of a vehicle projects into the right-of-way or over the adjoining property. The area between the wheel barriers or bumper guards shall be paved or covered with evergreen ground cover.

Driveways shall maintain adequate drainage facilities to prevent water ponding and ice formation. Permanent drainage facilities shall be provided for parking lots in all commercial, industrial, and multifamily developments creating new impervious surfaces of greater than 3,000 square feet in an area within any 12 month period. These standards are intended to fulfill the requirements of Section 1406, "Special Storm Sewer," of the Uniform Plumbing Code for private storm drains.

b. Driveway Widths (area between property line and parking area)

1. The minimum driveway widths are reflected in the type of use and parking served by that particular driveway as shown below:

MINIMUM DRIVEWAY WIDTHS

Type of Use and Parking Served	Minimum Width
Dwellings:	
One parking space	10 feet
Two parking spaces	16 feet
Three parking spaces	22 feet
All other uses:	
One-way driveway, no parking in driveway	12 feet
Two-way driveway, no parking in driveway	22 feet
Additional width for any side of any driveway where parking is allowed	8 feet

2. The maximum driveway widths are reflected in the type of use served by that particular driveway as shown below:

MAXIMUM DRIVE WIDTHS

Maximum Width	
Residential Driveways	
Type of Use	
Single parking space	15 feet
Two parking spaces	24 feet
Three or more parking spaces	36 feet
Commercial Driveways	
One way traffic	20 feet
Two way traffic	40 feet

c. Driveway Location

1. Driveway Locations in General

a) One-way driveways shall be no closer than 75 feet between their nearest edges.

b) Corner properties of less than 75 feet frontage on a

major street shall have no driveway located on a major street.

c) All proposed commercial businesses shall be limited to one two-way driveway or two one-way driveways per roadway frontage.

d) Any variations from these standards shall be approved by the Director of Public Works.

d. Turnarounds

Should the length of a residential driveway be greater than 50 feet in length and the driveway has only one access to the street or does not loop to the street, a turnaround shall be provided. The minimum inside radius of that turnaround shall be 15 feet and the width at that point (turnaround) shall be 30 feet for maneuvering.

e. Driveway Grades

Driveway grades shall not exceed 12 percent (curbline to parking area) unless the developed parcel is classified as a hillside lot. The Director of Public Works may permit a driveway slope to 20 percent providing no slope exceeds 25 percent between any two points in the driveway.

f. Parking Dimensions and Layout

The following dimensions shall be used for the design of parking facilities:

Parking Angle (Degree)	Stall Width	Stall to Curb (19' Long Stall)	Aisle Width	Curb Length	Center to Center Width of Two-Row Bin With Access Road Between Overlap Front of Stall to Front of Stall	Center to Center Width of Two-Row Bin With Access Road Between Overlap Front of Stall to Front of Stall
a	b	c	d	e	f[1]	f[2]
0°	8'0"	8.0	12.0	22.0	28.0	--
20°	*8'6" 9'6" 10'0"	14.5 15.5 15.9	12.0 12.0 12.0	24.9 27.8 29.2	40.0 42.0 42.8	32.0 33.1 37.4
30°	*8'6" 9'0" 9'6" 9'6"	16.9 17.3 17.8 17.8	12.0 12.0 12.0 12.0	17.0 18.0 19.0 19.0	44.8 45.6 46.5 46.6	37.4 37.8 38.4 38.4
40°	*8'6" 9'0" 9'6" 10'0"	18.7 19.1 19.5 19.9	12.0 12.0 12.0 12.0	13.2 14.0 14.8 15.6	49.4 50.2 51.0 51.8	42.9 43.3 43.7 44.1
45°	*8'6" 9'0" 9'6" 10'0"	19.4 19.8 20.1 20.5	13.5 13.0 13.0 13.0	12.0 12.7 13.4 14.1	52.3 52.6 53.2 54.0	46.3 46.2 46.5 46.9
50°	*8'6" 9'0" 9'6" 9'6"	20.0 20.4 20.7 21.0	15.5 15.0 15.0 15.0	11.1 11.7 12.4 13.1	55.5 55.8 56.4 57.0	50.0 50.0 50.3 50.6
60°	*8'6" 9'0" 9'6" 10'0"	20.7 21.0 21.2 21.5	18.5 18.0 18.0 18.0	9.8 10.4 11.0 11.5	59.9 60.0 60.4 61.0	55.6 55.7 55.6 56.0
70°	*8'6" 9'0" 9'6" 10'0"	20.8 21.0 21.2 21.2	19.5 19.0 18.5 18.0	9.0 9.6 10.1 10.6	61.1 61.0 60.9 60.4	58.2 57.9 57.7 57.0
80°	9'0" 9'6" 10'0"	20.3 20.4 20.5	24.0 24.0 24.0	9.1 9.6 10.2	64.3 64.4 65.0	62.7 62.7 63.3
90°	9'0" 9'6" 10'0"	19.0 19.0 19.0	24.0 24.0 24.0	9.0 9.5 10.0	62.0 62.0 62.0	- - -

For two-way circulation the minimum aisle shall be 20 feet, adequate ingress, egress, and turnaround space shall be provided.

No portion of a parking space or aisle shall be located in a required landscaped yard.

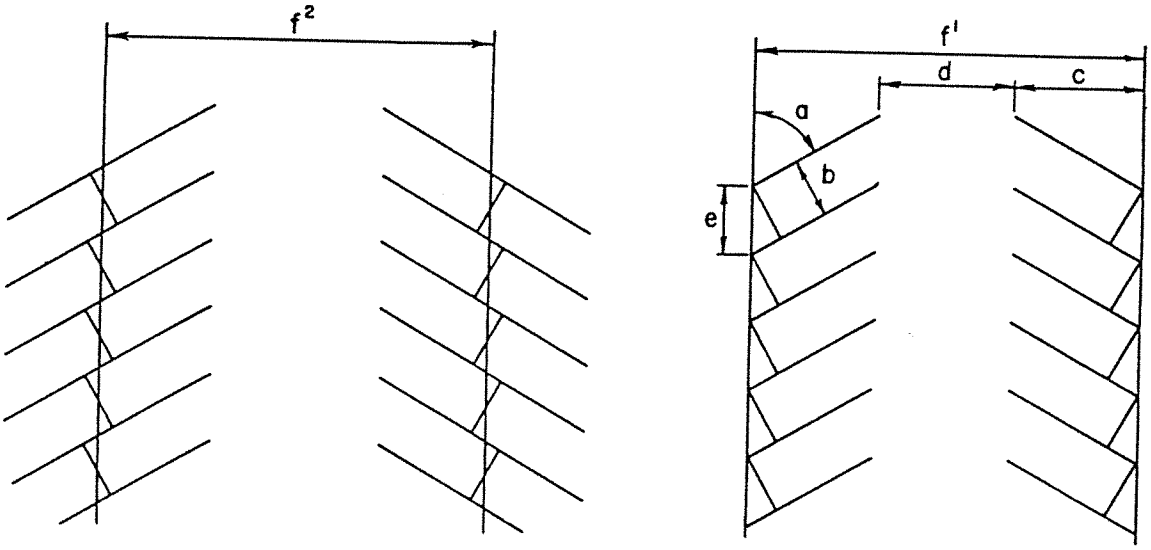
*8'6" stall width shall apply only within parking structures of two or more stories.

Standard size parking stall shall be 9 feet by 18 feet. Up to 50% of the required parking spaces may be 9 feet by 16 feet provided they are clearly marked as compact car spaces.

Curves and corners within the parking facilities shall have a minimum inside radius of 15 feet.

Should landscaping, fences, or walls be incorporated into the parking lot design or adjacent to the driveway, vegetation, or physical obstructions shall not restrict the sight distance of the motorists within the parking facility or at the driveway (a ten foot by ten foot vision clearance triangle shall be maintained).

Parking spaces for handicapped/disabled persons shall be at least 9 feet by 18 feet, and shall have an abutting access aisle of at least six (6) feet in width.



APPENDIX A

APPENDIX A

MODIFIED FLEXIBLE PAVEMENT

DESIGN PROCEDURE

a. The City of Stayton's flexible pavement design shall follow Oregon State Highway Division's procedure, with the following modifications:

1. The Design R-valve shall be the 90th percentile of the various samples tested.

2. Traffic volumes, existing and future (20 years), and percentage of trucks are to be obtained from such sources as may be approved by the City Traffic Division, such as: Oregon State Highway Division, Marion County Public Works, etc.

3. When truck volume data by axle is not available, calculate traffic coefficient by Form C.

4. Minimum asphaltic concrete thickness for pavement structures of asphaltic concrete over crushed aggregate shall be 2-1/2 inches.

5. Maximum 3/4 inch - 0 inch leveling course thickness shall be 1-1/2 inches.

6. When subgrade R-value and/or traffic coefficient are not available, use the table on City of Stayton Standard Drawing for typical flexible pavement structure.

b. OREGON STATE HIGHWAY DIVISION (FLEXIBLE PAVEMENT DESIGN PROCEDURE)

The Oregon State Highway Division's method of determining the structural thickness of a roadway is based on a soil strength-traffic relationship, and has been in use since 1951. The system is essentially that of the California Division of Highways, with modifications for Oregon's soil conditions, traffic, and climate. The method described hereafter is based on empirical relationships developed from test roads and from pavement performance of various sections under traffic throughout the State.

Modifications of the present procedure are anticipated as test methods are revised and service records of existing roadways obtained and analyzed.

Soils are tested for expansion pressure and resistance value by the AASHO T 190 66 I. Stabilometer R-value specimens are fabricated and tested to bracket both 300 psi exudation and saturation at 9 percent compaction. A 300 psi exudation design R-value is applied for thickness design for soils containing less than 90 percent passing the #4 sieve. The design R-value for other soils is selected at 9 percent compaction saturation moisture content; that is more realistic for Oregon, as it approaches the natural moisture contents that have been encountered under existing pavements. Additionally, when pumice, cinders, or silts are encountered special tests (resilience) are made.

The average 18 kip Equivalent Axle Load constant is calculated by the method outlined by Hveem and Sherman in Highway Research Record Number 13, publication 1110. Equivalent Axle Load constants are calculated annually from loadmeter data, and further augmented by a check of weights from 60 plus Truck Scale Sites located at strategic stations throughout the State. One month's weighing is selected for this check of weight constants. To obtain the design traffic coefficient for a particular project, the mean TADT is expanded to an average annual 18 kip EAL from the project average daily truck traffic and an expansion factor, then further expanded to the design period required, through the formula TC = 9.0 [(Total 18 kip EAL's) 10] 0.119. The average daily truck traffic and expansion factor for each project is provided by the Planning Section.

The required total structural thickness for a roadway section is shown in terms of the standard specification crushed aggregate base. This thickness is referred to as Crushed Base Equivalent inches (CBE). The total structural thickness requirement is obtained through the formula CBE = 0.03546 (TC0 (100-R). Substitutions in the required CBE thickness are made to include treated bases, wearing surfaces, subbases, and treated subgrade materials.

An outline of required laboratory tests, quality requirements, and equivalencies for various materials that satisfy the OSHD Standard Specifications, "Flexible Pavement Structure Design Chart (18 kip EAL to TC0," and "Traffic Analysis Sheets" for 18 kip EAL's are included on the following pages.

1. Abbreviations

CBE - Crushed Base Equivalent (Equal to 1.0" Aggregate Base)

AC (FS) - Asphaltic Concrete (Final Stage)

AC (I) - Asphaltic Concrete (Immediate)

ACB - Asphaltic Concrete Base

PMBB - Plant Mix Bituminous Base

CTB - Cement Treated Base

ETWS - Emulsion Treated Wearing Surface

ETB - Emulsion Treated Base

CTERM - Cement Treated Existing Roadway Materials

AL - Aggregate Level

AB - Aggregate Base

CRASB - Crusher Run Aggregate Subbase

GRASB - Grid Rolled Aggregate Subbase

LTS - Lime Treated Subgrade

CTS - Cement Treated Subgrade

WS - Wearing Surface

CRPCC - Continuously Reinforced Portland Cement Concrete

TB - Treated Base (Either Bituminous of Cement)

R Value - A coefficient representing the shearing resistance to plastic deformation of a saturated soil at given density

EAL - 18,000# Equivalent Axle Load

Traffic Coefficient (TC) - A numerical value obtained from converting the magnitude and number of all axle loads into an equivalent number of 18,000 pound axle loads.

2. Flexible Pavement Design

a) Design for Frost

The requirement for frost protection has been a part of the OSHD's surfacing thickness design since at least 1951. Normally, where plus 8 percent of the subgrade material passes the #200 sieve, the total thickness recommended would be equal to one-half the depth of known frost penetration. The depth of frost is based on a survey made in 1953-54, plus a report by the Regional Geologist for each project. This criteria, as nearly as can be determined, is a minimal requirement in surfacing designs where frost is a problem, and has been established through years of experience and field observation. In certain areas in the state, the need for an even thicker section may be required, and in these instances we use the Corps of Engineers' criteria, which could range from two-thirds to full depth of frost penetration.

b) Minimum Thickness for Traffic Coefficient

In any design procedure it is necessary to consider construction and maintenance problems, if under-design is to be avoided. For these reasons, the OSHD has used minimum thicknesses for various traffic classifications since 1951. The criteria used to establish the various minimum thicknesses is a result of experience and field observations during the past years. The chart used at present is merely an extension of the original (1956) minimums and so far has proven valid.

c) Determination of "R" Value

For fine-grained soils the OSHD uses a method of selecting the design moisture content at 95 percent of the maximum density toward saturation, this more nearly duplicates the natural moistures found under the existing pavements. This method has been in use intermittently since about 1956 and as an integral part of the design methods since 1964. At that time (1964), an extensive program of natural moisture sampling was instigated on a statewide basis. Results from over 1,000 tests indicate that with OSHD's compaction requirements (T-99), the method being used is more comparable to the condition of the soil during field compaction than is the more rigid compaction requirement of 300 exudation pressure as applied in the laboratory, which would more or less compare to T-180.

3. Outline of Pavement Structure Design and Quality Requirements

I. Subgrade

A. Sample of Native Soil

1. Frequency

a. One each 1/4 mile minimum

b. Changes in soil as evidenced by test or visual examination

2. Depth

a. Three to five feet below expected subgrade elevation

B. Laboratory Tests

1. Mechanical Analysis	Method - AASHO - T88
2. Liquid Limit	Method - AASHO - T89
3. Plasticity Index	Method - AASHO - T90
4. Specific Gravity	Method - Modified AASHO - T100
5. Moisutre Density Relation	Method - AASHO - T99 or Miniature Harvard Method
6. Compaction for Stability	Method - AASHO - T190
7. Expansion Pressure	Method - AASHO - T190
8. Resistance to Deformation	Method - AASHO - T190

9. Natural Moisture. Dried to constant wt. at 220° F.

C. Required Cover Thickness - Inches of Crushed Rock or Crushed Base Equivalent (CBE)

1. CBE = (0.03546) (TC) (100-R)

a. TC = Traffic Coefficient

1) Determine as indicated in form A

b. R = Resistance Value as determined in I-B-8

1) Fine Soils - 90 to 100% pass #4

a) R Value at moisture content indicated at 95% max. density as determined in I-B-5.

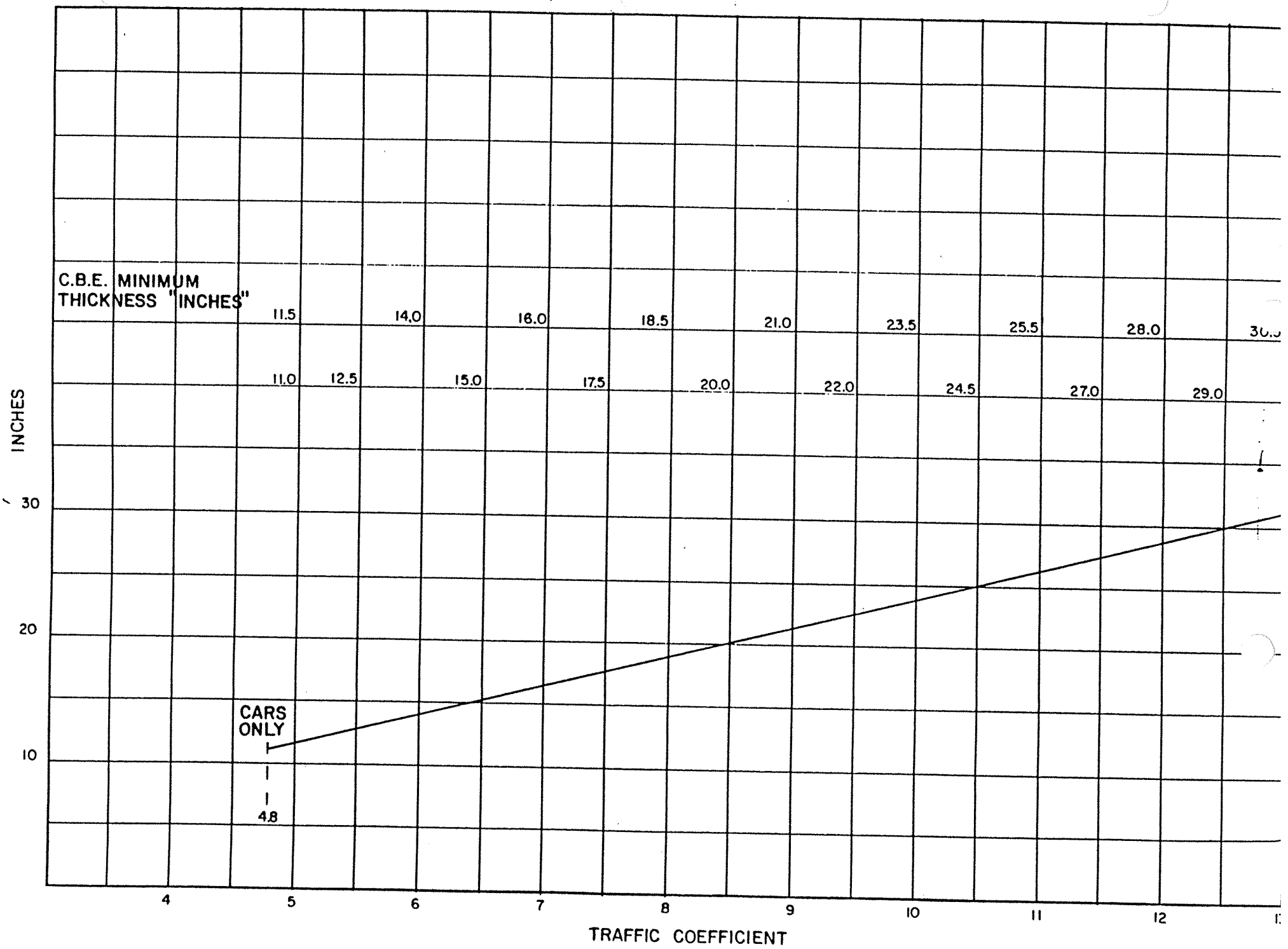
2) Soils less than 90% pass #4

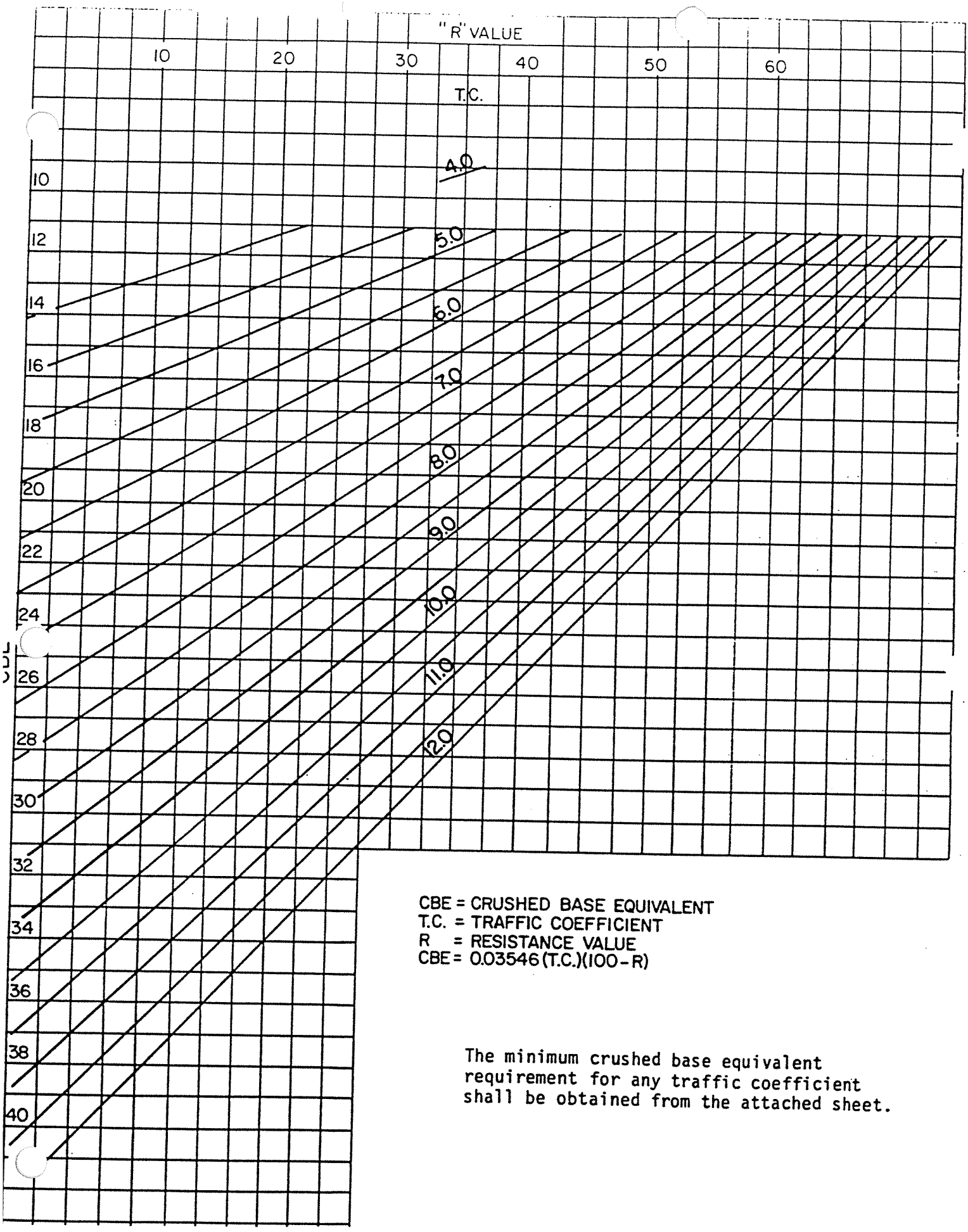
a) R Value at moisture content indicated at 300 psi exudation pressure.

II. Crushed Base Requirements. Quarry Rock or Gravel

A. Specified limits and method test

1. Percent Crushed - one face fracture on particles larger than 1/4 inch - percent by weight


C.B.E. MINIMUM
THICKNESS "INCHES"
11.5
14.0
16.0
18.5
21.0
23.5
25.5
28.0
11.0
12.5
15.0
17.5
20.0
22.0
24.5
27.0
29.0
CARS
ONLY
4.8
INCHES
10
20
30
4
5
6
7
8
9
10
11
12
TRAFFIC COEFFICIENT



CBE = CRUSHED BASE EQUIVALENT
T.C. = TRAFFIC COEFFICIENT
R = RESISTANCE VALUE
CBE = 0.03546 (T.C.)(100 - R)

The minimum crushed base equivalent requirement for any traffic coefficient shall be obtained from the attached sheet.

"CBE REQUIREMENT"

"MINIMUM THICKNESS"

"ALL ROADS"

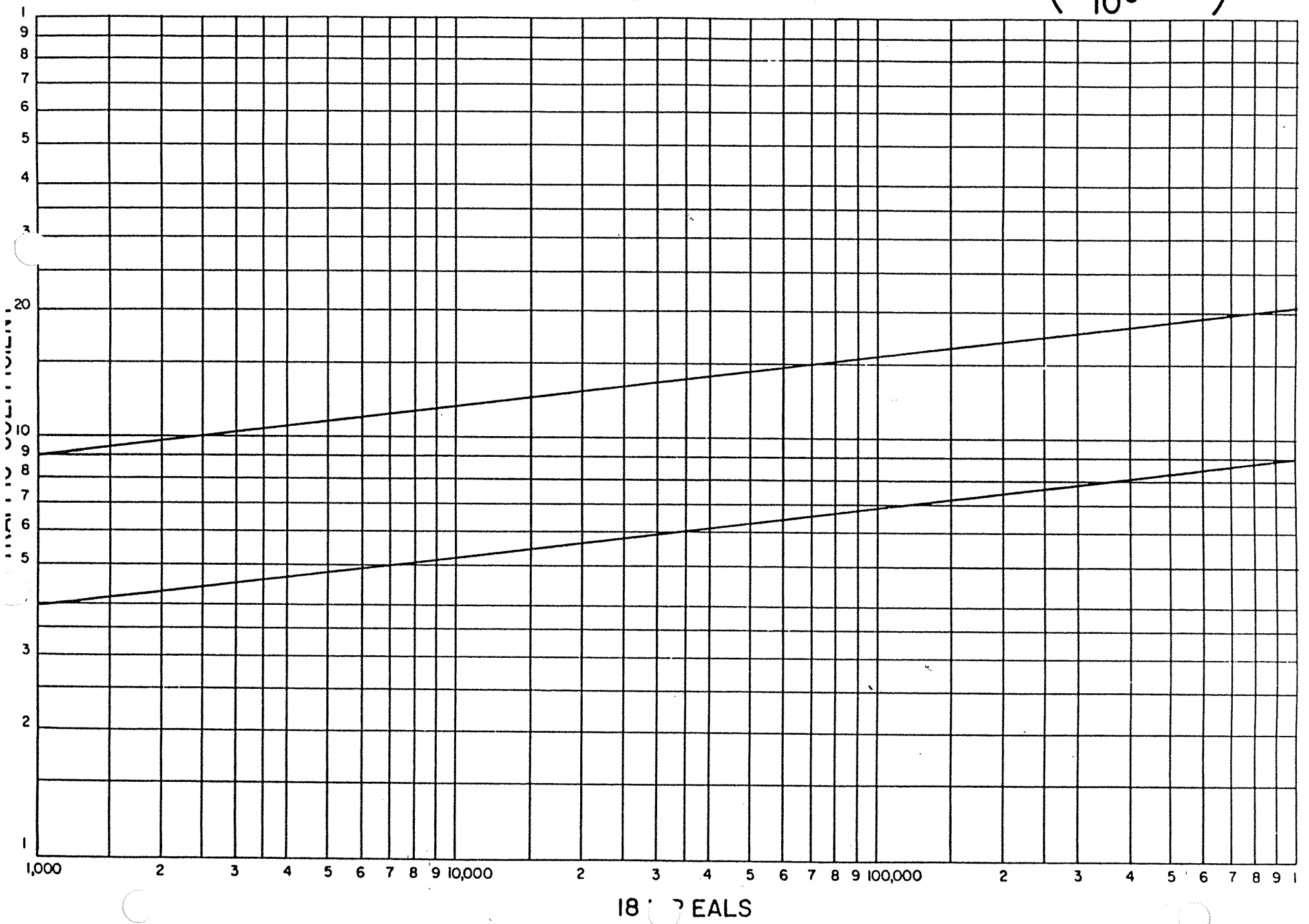
Traffic Coefficient	18 kip EAL per day	AC Wearing Surface	PMBB or CTB	Aggregate Level	Aggregate Base	Minimum "CBD" Requirement	Actual Thickness
12.0-13.0	1440-2882	4.0"	8.0"	----	7.0"	29.5"	19.0"
11.0-12.0	693-1440	4.0"	8.0"	----	4.5"	27.0"	16.5"
10.0-11.0	311-693	4.0"	6.0"	----	5.5"	24.5"	15.5"
9.0-10.0	128-311	4.0"	5.0"	----	5.0"	22.0"	14.0"
8.0-9.0	48-128	3.5"	4.0"	----	6.0"	20.0"	13.5"
7.0-8.0	16-48	3.5"	3.0"	-----	5.0"	17.5"	11.5"
6.0-7.0	4-16	3.0"	--	2.0"	7.0"	15.0"	12.0"
4.8-6.0	1-4	2.0"	---	2.0"	6.5"	12.5"	10.5"
Below 4.8 Cars Only		2.0"	---	2.0"	5.0"	11.0"	9.0"

Where untreated material is used the minimum aggregate base on any project is 4.0".

Crushed Base Equivalent Factors for various matrials that comply with the Standard Specifications and Special Provisions.

1.0"	Asphaltic Concrete Wearing Surface & Base	= 2.0"Aggregate Base
1.0"	Cement Treated Base	= 1.8"Aggregate Base
1.0"	Plant Mix Bituminous Base	= 1.8"Aggregate Base
1.0"	Emulsion Treated Wearing Surface and Base	= 1.8"Aggregate Base
1.0"	Oil Mat	= 1.8"Aggregate Base
1.0"	Cement Treated Existing Roadway Material	= 1.5"Aggregate Base
1.0"	Lime or Cement Treated Subgrade	= 1.0"Aggregate Base
1.0"	Aggregate Subbase	= 0.8"Aggregate Base

$$T.C. = 9.0\left(\frac{18\ KIP\ EALS}{10^6}\right)^{0.119}$$



TRAFFIC ANALYSIS

SECTION: _____

HIGHWAY: _____

COUNTY: _____

_____ Present ADT (19)

_____ Percent Trucks

AXLES	TWO WAY TRUCK ADT	EXPANSION FACTOR	TOTAL TADT	MEAN TADT	ANNUAL ONE WAY 18 KIP EAL	AVERAGE ANNUAL 18 KIP EAL
2					36.5	
3					119.5	
4					157.0	
5					296.0	
6					325	

_____ TOTAL

18 kip EAL/day _____

TOTAL AVERAGE ANNUAL 18 kip EAL _____

TWENTY YEAR 18 kip EAL _____

TRAFFIC COEFFICIENT _____

a. Maximum size - 1-1/2 inch and greater - 50% crushed

b. Maximum size 1 inch and less - 70% crushed

2. Abrasion. Method - AASHO - T96

    a. 35% maximum

3. Liquid Limit and Plasticity Index. Method - AASHO - T89 and T90

    a. Limits vary with quantity passing the #40 screen.

4. Sand Equivalent. Method - AASHO - T176

    a. 35 minimum

5. Size and Gradation. Method - AASHO - T27

    a. 3/4"-0

        1) 0-10% retained on 3/4"

        2) 20-40% pass 3/4" and retained on 3/8"

        3) 40-60% pass 1/4, % of 1/4"-0 retained on No. 10, 40-60

    b. 1"-0

        1) 0-10% retained on 1"

        2) 20-40% pass 1" and retained on 1/2"

        3) 40-55% pass 1/4, % of 1/4"-0 retained on No. 10, 40-60

    c. 1-1/2"-0

1) 0-5% retained on 1-1/2"

2) 20-40% pass 1-1/2" and retained on 3/4"

3) 35-50% pass 1/4", % of 1/4"-0 retained on #10 = 40-60

d. 2"-0

1) 0-5% retained on 2"

2) 20-40% pass 2" and retained on 1"

3) 30-45% pass 1/4", % of 1/4"-0 retained on #10 = 40-60

e. 2-1/2"-0

1) 0-5% retained on 2-1/2"

2) 20-40% pass 2-1/2" and retained on #10 = 40-60

3) 30-45% pass 1/4", % of 1/4"-0 retained on #10 = 40-60

6. Degradation. Method - Oregon Highway Department

a. Materials shown to degrade are required to be upgraded equal to specified crushed rock by means of asphalt, cement, or other treatment.

7. "R" Value. 80 Plus.

III. Crushed Base Equivalents

A. Stone subbase

1. Minimum Requirements

a. Abrasion - 45% maximum

b. Percent pass #200 - 8% maximum

c. Sand equivalent - 25 minimum

d. Maximum size - 75% compacted thickness, maximum

e. Gradation - 10 to 50% pass 1/4

2. CBE

a. "R" Value 70 to 80. CBE = 0.8

b. "R" Value 60 to 70. CBE = 0.5

c. "R" Value below 60. CBE not applied

B. Plant Mix Bituminous Base

1. Minimum Requirements

a. One inch maximum size meeting crushed base requirements

b. Bituminous mixture laboratory designed

1) "S" Value minimum 35. Method - ASTM - D1560

2) "C" Value minimum 200. Method - ASTM - D1560

3) 70% Min. Index of Retained Strength. Method - AASHO - T165

2. CBE 1.8

C. Cement Treated Base

1. Minimum Requirements

a. One inch maximum size meeting crushed base requirements

b. Cement content is laboratory determined on basis of 1000 psi in seven days

D. Asphaltic Concrete

1. Minimum Requirements

    a. Aggregate

        1) Crushed base quality graded to maximum density curve

    b. Mixture. Laboratory designed.

        1) "S" Value minimum 35. ASTM - D1560

        2) "C" Value minimum 200. ASTM - D1560

        3) 70% min. Index of Retained strength test Method - AASHO - T165

        4) Proportioned to 3 to 5% void content

    c. Production. Inspector controlled.

2. CBE 2.0

OREGON STATE HIGHWAY DIVISION

OVERLAY THICKNESS DESIGN

The present system of determining overlay requirements is by deflection measurements. The deflection method used is essentially that of the California Division of Highways, with modifications for Oregon's traffic and Crushed Base Equivalencies. The same test procedure was published by AASHTO in July, 1978. The deflection data is further augmented by test pits from which each component of the roadbed structure is sampled and laboratory tested.

Deflection measurements provide a method of nondestructive testing of the strength of the roadway under a given load; this closely duplicates the actual load-carrying capacity of the inplace materials.

Following is a brief description of the equipment required and the test procedure:

The Benkelman Beam, and a truck with 11.00 x 22.5 tires, 70 psi pressure, loaded to a single axle weight of 18,000 pounds.

Several sections varying from 700 to 1000+ feet per centerline mile are selected as representative of the area. The deflection measurements are made at 50-foot intervals throughout the test sections. Generally test sections are selected every half mile in alternating directions.

After testing is completed, the following procedure is used to obtain the required overlay thickness:

Truck Traffic is obtained from the Traffic Section and converted to a Traffic Coefficient for the proposed design period.

The deflection measurements are evaluated and statistically (temperature corrected if necessary, Figure 1) and reported as the average (mean), the standard deviation, and 80th percentile deflection values. The 80th percentile deflection is equal to the average deflection plus 0.84 times the standard deviation of the deflections.

After the evaluated 80th percentile deflection is calculated, enter Figure 2 with

the Traffic Coefficient and follow this value vertically to the curve corresponding to the deflection (80th percentile) obtained and read the thickness of A.C. overlay required of the vertical scale.

NOTE: FOR A.C. PAVEMENTS GREATER THAN 6 INCHES THICK, OR A.C. PAVEMENTS WITH BITUMINOUS OR PORTLAND CEMENT TREATED BASES, NO CORRECTION FACTOR IS NEEDED.

FIGURE 1
TEMPERATURE CORRECTION FACTORS
(OSHD 1980)

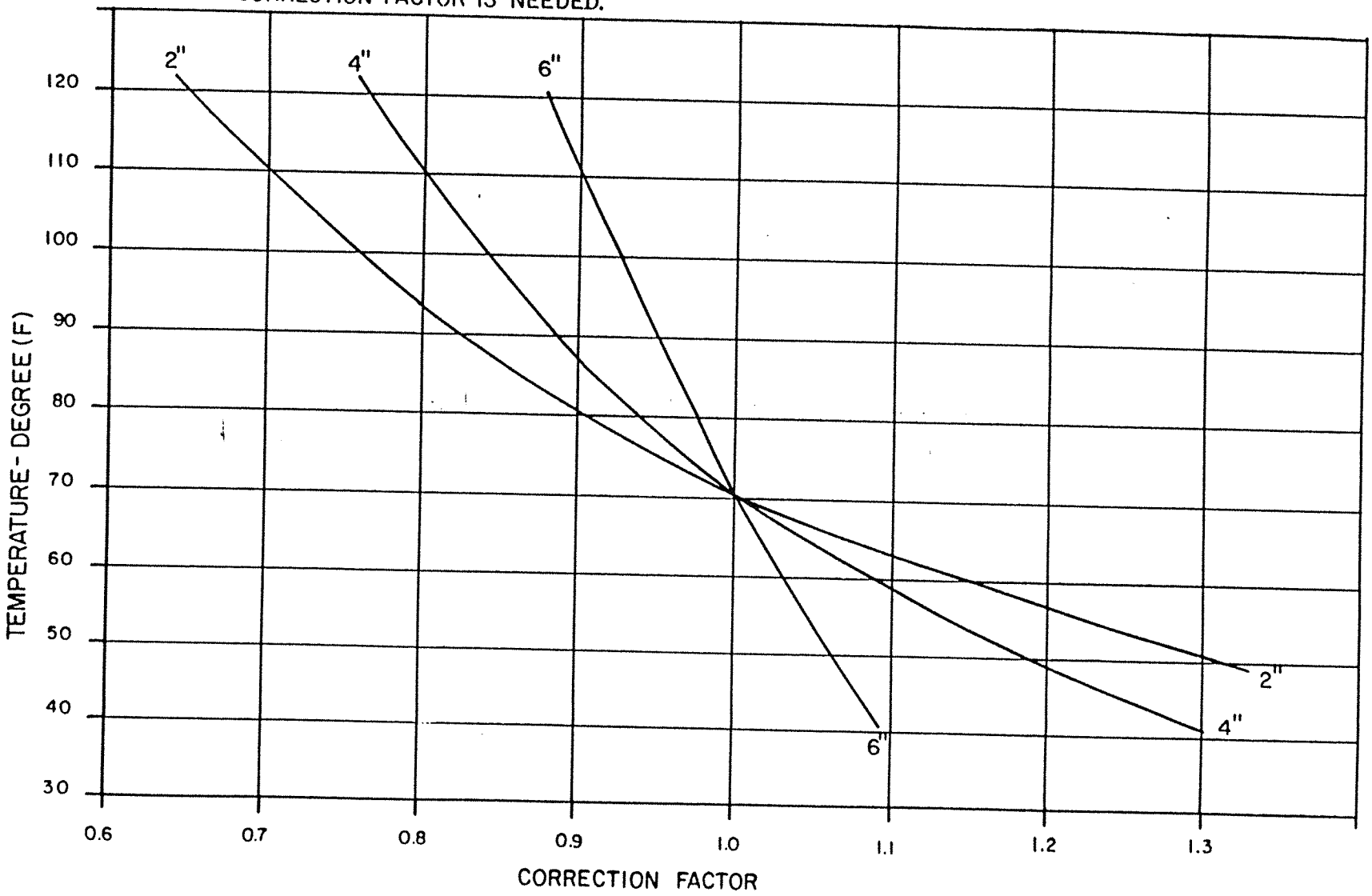
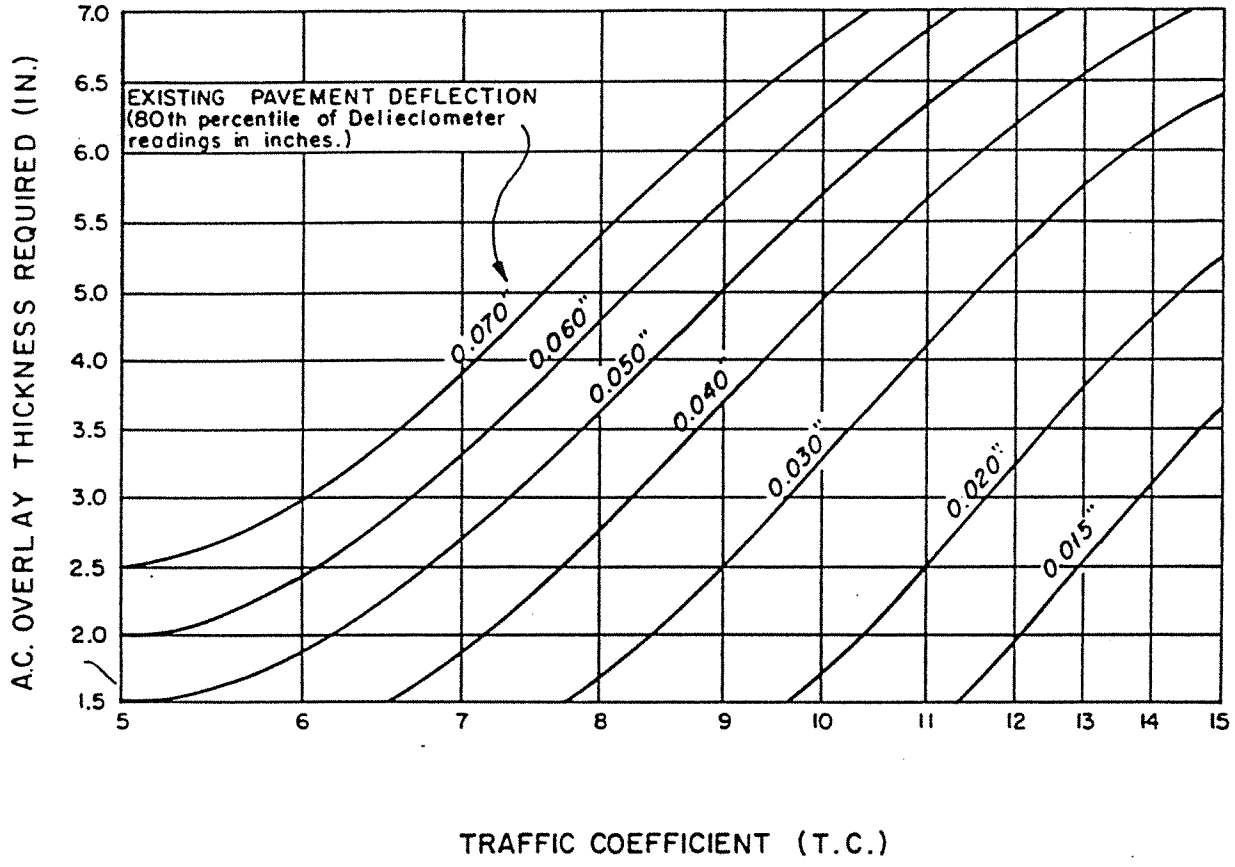


FIGURE 2

ASPHALT CONCRETE OVERLAY DESIGN GUIDE



TERMS

Cracks - approximately vertical cleavage due to natural causes or traffic action.

Longitudinal Crack - a crack which follows a course approximately parallel to the centerline.

Transverse Crack - a crack which follows a course approximately at right angles to the centerline.

Block Cracking - interconnected cracks forming a series of large blocks.

Hairline Cracking - a crack barely visible to the eye when pavement is dry, easily seen when pavement is damp.

Raveling - the progressive disintegration from the surface downward or edges inward by dislogement of aggregate particles.

Spalling - the breaking away of the pavement along cracks, joint, or edges.

Rutting - the formation of longitudinal depressions in the wheel tracks.

Pumping - displacement and ejection of water and suspended fine particles at joints, cracks, and edges.

Pot Holes - bowl-shaped holes or crater-like depressions of varying sizes in the pavement.

Distortion - any deviation of pavement surface from original shape.

Erosion or Scaling - displacement of particles of aggregate from pavement due to traffic action.

Frost Heave - differential upward displacement due to frost.

Bird Bath - a depression in the pavement surface that temporarily ponds water.

Disintegration - deterioration into small fragments or particles due to any cause.

Patching - the correction of pavement defects by maintenance forces, usually the application of bituminous mix.

AC

Alligator cracking - interconnected cracks forming a series of small polygons which resemble an alligator's skin.

Stripping - loss of adhesion between binder and aggregate.

Washboarding or Corrugations - Regular transverse undulations in the surface of the pavement consisting of alternate valleys and crests.

Waves - as above, but with a greater distance between valleys and crests.

Flushing or Bleeding - upward migration of the bituminous material resulting in a film of free asphalt on the pavement surface.

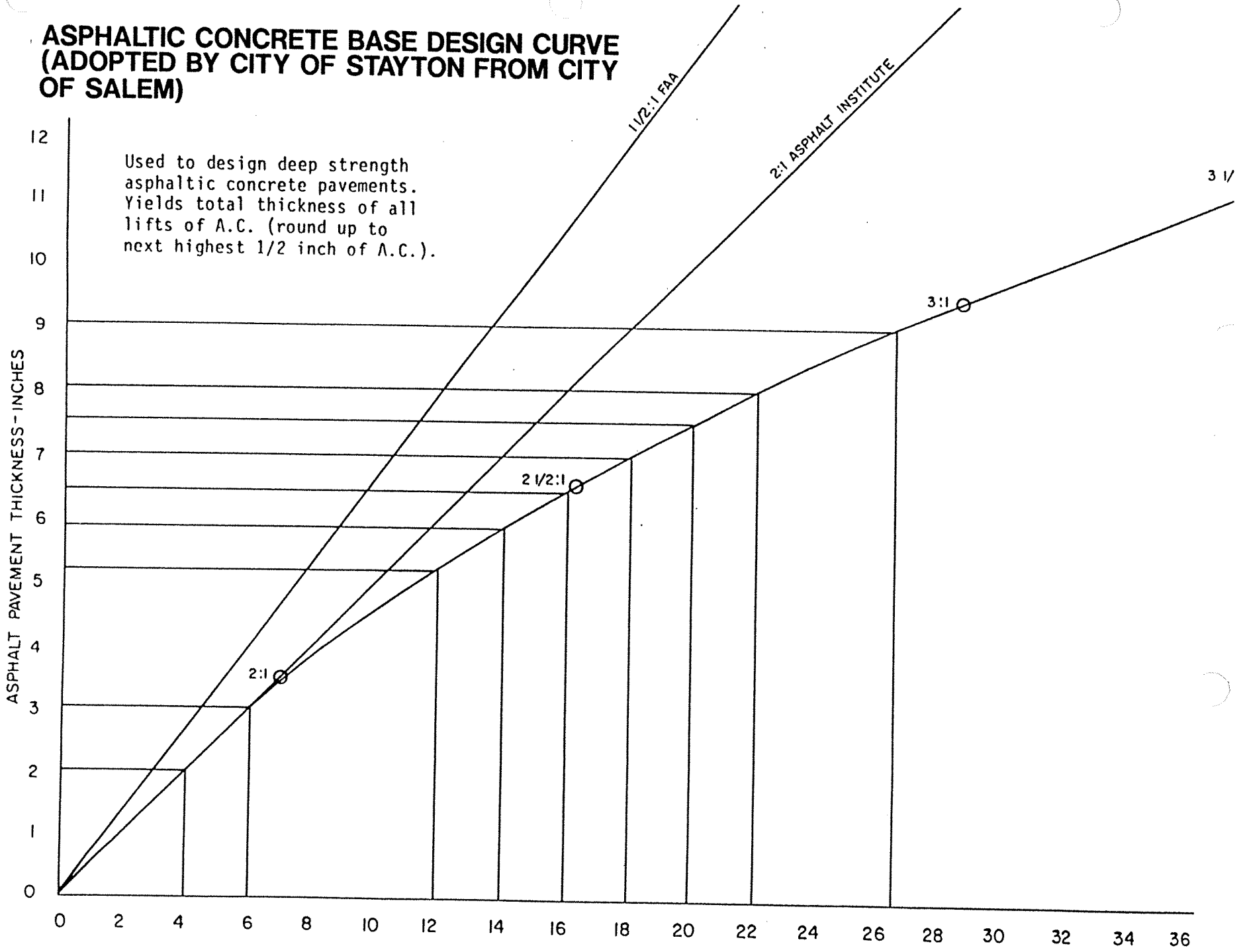
PCC

Blow-up - localized buckling or shattering, usually at the transverse crack or joint, due to excessive longitudinal pressure.

Faulting - differential vertical displacement of the slabs adjacent to a crack of joint.

Warping - a deviation of the pavement surface from its original slope, caused by temperature and moisture differentials within the slab.

ASPHALTIC CONCRETE BASE DESIGN CURVE (ADOPTED BY CITY OF STAYTON FROM CITY OF SALEM)



SECTION: _____

HIGHWAY: _____

COUNTY: _____

Traffic Analysis:

Calculation for Traffic Coefficient

Loadometer Study for Year _____

A. Present ADT _____ (Total)

B. Future ADT _____ (Total)

C. Mean ADT _____ $\frac{(A + B)}{2}$

D. Design Period _____ Years

E. No. of Lanes _____

F. Percent Trucks _____ (ADT Basis)

G. Trucks (one direction) $\frac{F}{2}$ = _____ x (C) _____ = _____

H. Percent Trucks in Design Lane _____%

I. Trucks in Design Lane (G) _____ X (H) _____ = _____

Traffic Coef. = $K(I)^{0.119}$, where K = 4.669

TC = _____

Design Data: R (Subgrade) = _____

TC = _____

Crushed Base Equiv. (CBE) = _____

CONVERSION FACTORS FOR MATERIAL QUANTITIES

FACTORS FOR CONVERTING VOLUME OF ROCK OR GRAVEL MATERILS TO TONS

Specific Gravity	2.55	2.60	2.65	2.70	2.75	2.80	2.85	2.90	2.95
Tons/Cubic Yard	1.78	1.81	1.85	1.89	1.92	1.96	2.00	2.03	2.07

The above factors include 30% for compaction. Add 5% for Plant-Mix Stone Base and Treated Base (incl. water).

DECIMALS OF A FOOT PER EACH QUARTER OF AN INCH

	¼	½	¾
	.021	.042	.063
1" .083	.104	.125	.146
2" .167	.188	.208	.229
3" .250	.271	.292	.313
4" .333	.354	.375	.396
5" .417	.438	.458	.479
6" .500	.521	.542	.563
7" .583	.604	.625	.646
8" .667	.688	.708	.729
9" .750	.771	.792	.813
10" .833	.854	.875	.896
11" .917	.938	.958	.979

FACTORS FOR COMPUTING ASPHALT IN PRIME COAT

Type of Bit. Cement	Gals/Ton at Normal Applic. Temp.	Tons Per Sq. Ft.
RC-250	260	0.000150
RC-800	259	0.000150
MC-250	260	0.000150
MC-800	259	0.000150
120-150	258	0.000151
200-300	259	0.000150
RS-1	244	0.000159
RS-2	246	0.000158
RS-2K	244	0.000159

FACTORS FOR COMPUTING ASPHALT CONCRETE PAVEMENT AND PLANT-MIX BITUMINOUS BASE

Specific Gravity of Aggregates	Tons/Sq.Ft. 1" Thick
2.50	0.00573
2.55	0.00582
2.60	0.00591
2.65	0.00601
2.70	0.00611
2.75	0.00621
2.80	0.00631
2.85	0.00642
2.90	0.00654
2.95	0.00666

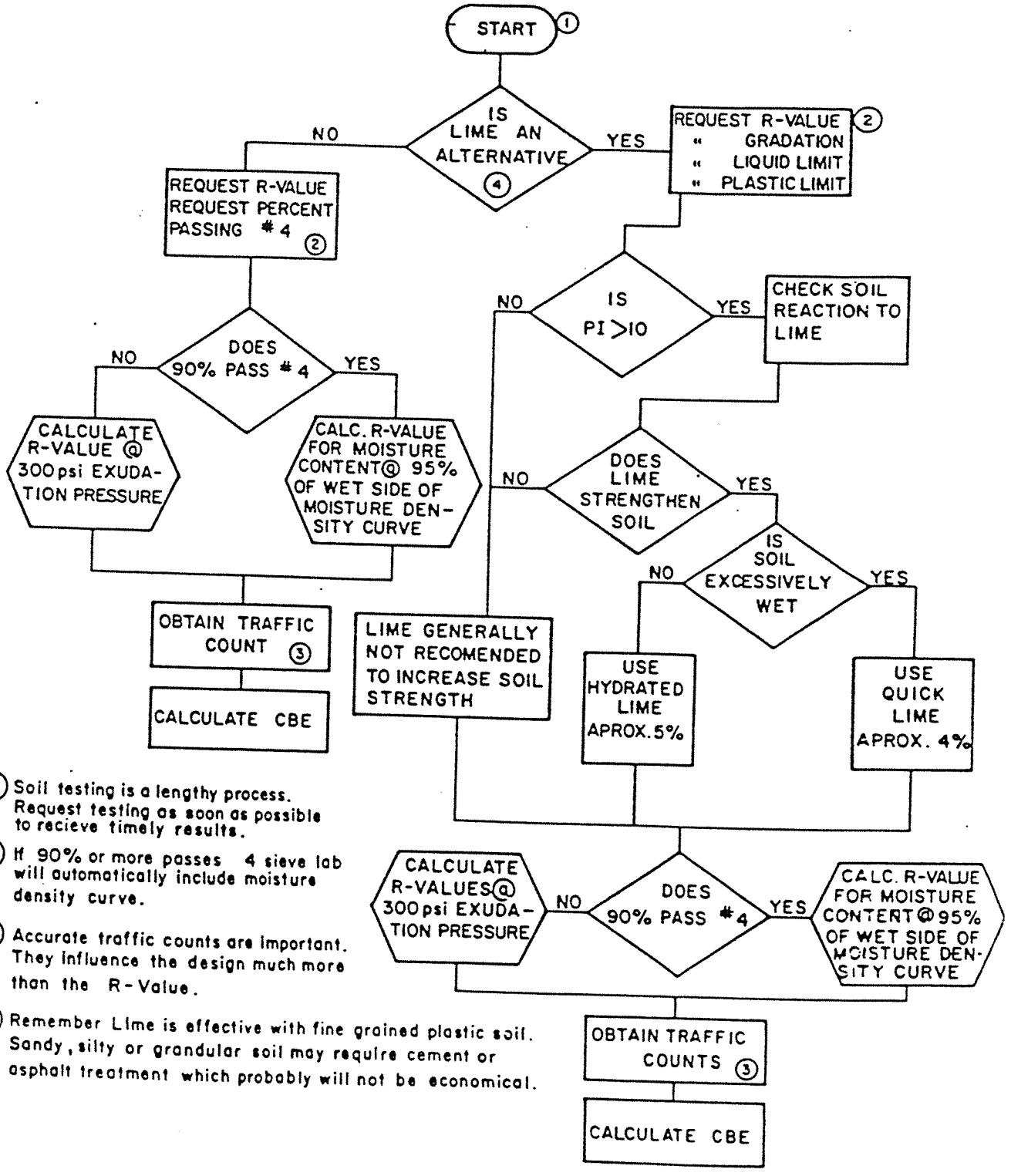
FACTORS FOR COMPUTING QUANTITIES IN ASPHALT PENETRATION MACADAM SURFACES

Penetration Asphalt	(120-150 (200-300	.000181 .00180	.000194 .000193	.000409 .000408	.000151 .000150	.000172 .000172		.000151 .000150	.000108 .000107
Emulsified Aggregate			.000114	.000114			.000091		
1¼"-¾" Aggregates				.00244					
¾"-½" Aggregates		0.0012	.00144	.001	.00089	.001			
½"-¼" Aggregates		0.0009	.00067	.001	.00044	.00078		.00089	.00089
¼"-No. 10 Aggregates		0.0002	.001	.001	.00033	.00022	.00056	.00039	.00022

Use 200-300 Asphalt only in coastal area and on east and west slopes of the Coast Range. Use 120-150 Asphalt in all other areas. The above factors are based on the standard average rates of spread; Asphalt in tons and Aggregates in cubic yards.

FLEXIBLE PAVEMENTS
THE FUNCTION OF SOIL TESTS IN THICKNESS DESIGN FOR CITY STREETS

The purpose of the following flow chart is to illustrate the function of various soil tests in Oregon State Highway Department thickness design procedures. This flow chart does not include all the information and decisions involved in a thickness design and should not be used for this purpose.



(1.) Soil testing is a lengthy process. Request testing as soon as possible to recieve timely results.

(2.) If 90% or more passes 4 sieve lab will automatically include moisture density curve.

(3.) Accurate traffic counts are important. They influence the design much more than the R-Value.

(4.) Remember Lime is effective with fine grained plastic soil. Sandy, silty or grandular soil may require cement or asphalt treatment which probably will not be economical.

400

CITY OF STAYTON

DEPARTMENT OF PUBLIC WORKS

WATER DISTRIBUTION SYSTEM

DESIGN STANDARDS

1994

TABLE OF CONTENTS

SECTION I - GENERAL

1.00 Purpose

The purpose of these Water Distribution System Design Standards is to provide a consistent policy under which certain physical aspects of water distribution design will be implemented. Most of the elements contained in this document are Public Works oriented and most are related to public improvements and City contract projects; however, it is intended that they apply to both public and private work designated herein.

These Standards cannot provide for all situations. They are intended to assist but not to substitute for competent work by design professionals by providing basic information. It is expected that engineers will bring to each project the best of skills from their respective disciplines.

The Standards are also not intended to limit unreasonably any innovative or creative effort which could result in better quality, better cost savings, or both. Any proposed departure from the Standards will be judged, however, on the likelihood that such variance will produce a long-term compensating or comparable result, in every way adequate for the user and City resident.

Following from the above purpose, the standards have the objective of developing a water distribution system which will:

a. be consistent with the adopted water master plan;

b. provide sufficient capacity to maintain pressure during periods of maximum use and to provide volumes of water at adequate pressures to provide the expected average daily consumption plus fire flows at a minimum energy loss;

c. be of materials strong enough to resist all expected loads, both internal and external, and able to preserve the potability of the water supply; and

d. be economical and safe to build and maintain.

Alternate materials and methods will be considered for approval on the basis of these objectives.

1.01 Revisions to These Standards

It is anticipated that revisions to these Standards will be made from time to time. The date appearing on the title page is the date of the latest revision. Users should apply the latest published issue to the work contemplated.

1.02 Shortended Designation

These City of Stayton Water System Design Standards shall be cited routinely in the text as the "Standards."

1.03 Applicability

These Standards shall govern all construction and upgrading of all public and private water system facilities in the City of Stayton and applicable work within its service areas.

1.04 References

The Standards are intended to be consistent with the most currently adopted provisions of:

a. Stayton City Code and, more specifically, the following:

The Uniform Plumbing Code and the Oregon State Plumbing Specialty Code
Subdivision Ordinance
Utilities General
Water System Code

b. Stayton Area Comprehensive Plan

c. City of Stayton Urban Growth Management Plan

d. Master Utilities Plan, 1980

e. Oregon Statewide Planning Goals and Guidelines

f. Oregon Administrative Rules Chapter 333.

1.05 Standard Specifications

Except where the standards provide otherwise, design detail, workmanship and materials shall be in accordance with the current edition of the "Standard Construction Specifications" prepared by the City of Stayton.

1.06 Definitions and Terms

Air Gap Separation means a physical vertical separation between the free-flowing discharge end of a potable water supply pipeline and the rim of an open, nonpressurized receiving vessel.

Approved Backflow Prevention Assembly means an assembly that has been investigated and approved by the State of Oregon Department of Human Resources Health Division for preventing backflow.

As-Built Plans - Plans prepared by the Project Engineer, signed and dated by the City representative indicating that the plans have been reviewed and revised, if necessary, to accurately show all as-built construction details.

Backflow - Backflow is the flow of water or other fluids in a direction opposite to the normal flow. (See Back-siphonage.)

Back-siphonage - Back-siphonage is the flowing back of used, contaminated, or polluted water from a plumbing fixture or vessel into a water pipe due to a negative or reduced pressure in such pipe.

Building Supply - The building supply is the pipe carrying potable water from the water meter or other source of water supply to a building or other point of use or distribution on the lot. Building supply shall also mean customer line.

City - means the City of Stayton, Oregon.

Cross Connection - A cross connection is any connection or arrangement, physical or otherwise, between a potable water supply system and any plumbing fixture or any tank, receptacle, equipment or device, through which it may be possible for nonpotable, used, unclean, polluted and contaminated water, or other substances, to enter into a part of such potable water system under any condition.

Cut Sheets - means sheets of tabulated data, indicating stationings, structures, fittings, angle points, beginning of curve, points on curve, end of curves, staking offset, various elevations, and offset sewer cuts.

Definition of Words - Wherever, in these Standards, the words 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 Director. Similarly, the words approved, acceptable, satisfactory, shall mean approved by, acceptable to, or satisfactory to the Director.

Director - means the Director of Public Works of the City of Stayton or his/her authorized representative.

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

Double Check Valve Assembly means an assembly composed of two single, independently acting, check valves, including tightly closing shut-off valves located at each end of the assembly and fitted with properly located test ports.

Double Detector Check Valve Assembly - means a line-sized approved double check valve assembly with a parallel meter-sized approved double check valve assembly. The purpose of this assembly is to provide double valve protection for the distribution system and at the same time provide partial metering of the system showing any system leakage or unauthorized use of water up to 3.0 gpm flow.

Dwelling Unit - means a facility designed for permanent or semi-permanent occupancy and provided with minimum kitchen, sleeping, and sanitary facilities for one family.

Easement - Easements are areas along the line of all public water mains which are outside of dedicated road or rights-of-way, and shall be prepared on City forms granting rights along the water line to the City.

Fire Protection Service means a connection to the public water main intended only for the extinguishment of fires and the flushing necessary for its proper maintenance. All fire services shall have a detector check.

Fixture Unit Equivalents - The unit flow or demand equivalent of plumbing fixtures as tabulated in the uniform plumbing code.

Hydrant Lead means the line connecting the fire hydrant assembly to the City main or private fire line with an auxiliary valve.

Irrigation Service means a metered connection intended for seasonal use and delivering water which is not discharged to the sanitary sewer.

ISO - Insurance Service Office.

Multiple Family Dwelling - means a building or portion designed thereof for occupy by two or more families, living independently of each other.

Manufacturer's Name - Any manufacturer's name, specification, catalog number, or type used herein is specified by make in order to establish the standard requirements of the City. Other equivalent makes will be considered for approval, providing they are comparable with this established standard.

Owner - Any individual, partnership, firm, or corporation by whom the project engineer has been retained or who, as a property owner, is making arrangements with the City.

Person - means individual, firm, corporation, association, agency, or other entity.

Plans - Construction plans, including system site plans, water system plans, and (when required) profiles, cross sections, detailed drawings, etc., or reproductions thereof, approved or to be approved by the City Engineer, which show the location, character, dimensions, and details for the work to be done.

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

Preliminary Review - Plans stamped "Preliminary Review," dated, and signed by the City, indicate that the plans have been reviewed and may now be submitted as a part of the requirements or approval for construction.

Private Distribution System - A privately owned and maintained water distribution system serving an industrial or commercial subdivision or a multibuilding development on a single lot served through a master meter installed at the approved location.

Project Engineer - The engineer, including the City's engineer, licensed by the State of Oregon as a Civil Engineer under whose direction plans, profiles, and details for the work are prepared and submitted to the City for review and approval.

Residential User - means the owner, lessee, or occupant of a single dwelling unit in one structure.

Right-of-Way - All land or interest therein which by deed, conveyance, agreement, easement, dedication, usage, or process of law is reserved for or dedicated to the use of the general public, within which the City shall have the right to install and maintain water mains.

Roadway - All of that portion of the right-of-way used, or to be used, for vehicle movement, which exists between the curbs or proposed curb lines.

Service Line means the line or pipe connecting from the City water main to the water meter.

Single Family Dwelling - means any residential building designed to house one family.

Standard Plans - The drawings of structures or devices commonly used on City work and referred to on the plans (see standard construction specifications).

Streets or Roads - Any portion of the roadway for the movement of vehicles, exclusive of shoulder and auxiliary lanes.

Uniform Plumbing Code - The Uniform Plumbing Code adopted by the International Association of Plumbing and Mechanical Officials, current edition as revised by the State of Oregon, called the "Oregon State Plumbing Speciality Code."

Water Main - The water main (street main) is a water-supply pipe for public or community use.

Water Supply System - The water supply system of a building or premises consists of the building supply pipe, the water-distributing pipes, and the necessary connecting pipes, fittings, control valves, and all appurtenances carrying or supplying potable water in or adjacent to the building premises.

1.07 Engineering Policy

The engineering policy of the City of Stayton requires strict compliance with Oregon Revised Statute 672 for professional engineers.

All engineering plans, reports, or documents shall be prepared by a registered professional Civil Engineer, or by a subordinate employee under his/her direction, shall

be signed by him/her and stamped with his/her seal to indicate responsibility for them. It shall be the project engineer's responsibility to review any proposed water distribution system, extension, and/or existing system change with the City, prior to engineering or proposed design work, to determine any special requirements or whether the proposal is permissible. A "Preliminary Review" and/or a "Plans Approved for Construction" stamp of the City, on the plans, and etc., for any job, does not in any relieve the project engineer of his/her responsibility to meet all requirements of the City or obligation to protect the life, health, and property of the public. The plan for any project shall be revised or supplemented at any time it is determined that the full requirements of the City have not been met. It will be the design engineer's responsibility to submit plans to the Oregon Department of Human Resources Health Division.

An Engineer having submitted to the City false or inaccurate information of a material nature, will be warned of their conduct and the Oregon State Board of Engineering Examiners will also be advised.

1.08 Approval of Alternate Materials of Methods

Any alternate material or method not explicitly approved herein will be considered for approval on the basis of the objectives set forth in 1.00 Purpose. Persons seeking such approvals shall make application in writing. Approval of any major deviation from these Standards will be in written form. Approval of minor matters will be made in writing, if requested.

Any alternate must meet or exceed the minimum requirements set in these Standards.

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

Any deviations or special problems shall be reviewed on a case-by-case basis and approved by the Director. When requested by the City, full design calculations shall be submitted for review with the request for approval.

1.09 General Applicability

Permanent water distribution facilities shall be provided to all properties (legal lots of record created by a major or minor partitioning or subdivision of land within the City of Stayton per these Standards.

1.10 Special Problems

The design of the following are considered special problems are not covered in detail in these Standards:

a. Water Distribution Pump Station
b. Reservoirs
c. Relining of Existing Water Mains
d. Treatment Plants
e. Pressure Regulating Devices
f. Flow Measurement Devices

Review and approval of the above special problems by the Director of Public Works shall be required. When requested by the City, full design calculations shall be submitted for review prior to approval. Item a, b, and d also require approval by the Health Division of the Oregon Department of Human Resources.

SECTION II - DESIGN

2.00 General Design Considerations

The system shall have sufficient capacity to maintain 40 psi at the building entrance for one and two family dwellings. For other development provide minimum pressure of 35 PSI at the building side of the meter during periods of maximum use, and to provide sufficient volumes of water at adequate pressures to satisfy the expected daily consumption plus fire flows. Normal working pressure in the distribution system should be approximately 60 PSI with a range of 40 PSI to 100 PSI.

In general, water distribution systems should be designed to care for maximum development of the service area with recognition of possible urban renewal, industrial expansion, etc.

As a condition of water service, all developments will be required to provide public water mains of sufficient size for fire protection to adjacent parcels. This shall include the extension of water mains in easements across the property to adjoining properties and across the street frontage of the property to adjoining properties when the main is located in the street right-of-way.

Head loss shall be determined by the Hazen-Williams equation.

Value Table

Pipe Diameter	C Value
8 Inches and Less	100
10 to 12 inches	110
Greater than 12 Inches	120

Velocities in mains shall normally range from three to six feet per second for average demand to a maximum velocity of ten (10)* feet per second for the combined average demand plus fire flow. A 20-PSI residual pressure under fire flow conditions shall be maintained in the distribution system where the existing static pressure is less than 40 PSI (upper service level regions). Generally, a maximum velocity of ten (10) feet per second will govern for sizing mains at all other locations of the service level.

* Private systems shall limit velocities as required by the Oregon State Plumbing Speciality Code, Installation Standards.

2.01 Water System Capacity

Design capacities shall be determined by the consideration of the following factors and assumptions:

a) Area to be served, both immediate and adjacent.

b) Current and projected population within the areas to be served.

c) Current and projected land use within the areas to be served.

d. Commercial, industrial, or institutional users to be served.

e) Changes in any of the above factors which are likely to occur within a foreseeable time period.

In the absence of consumption data or other reliable information, the following factors are assumptions:

a) Peak hour demands are as follows:

0.75 gpm per person for single family residential
0.25 gpm per person for multiple family residential
5,000 gal/ac/day for commercial development
10,000 gal/ac/day for industrial development

b) Demand for unique commercial installations, industrial users, PUD's, multiple, and institutional concerns will be calculated on an individual basis.

c) Fire Flows are to be as follows:

Land Use	Fire Flows (GPM)	Duration (Hr.)
Industrial	5500	4
Downtown	5000	4
Commercial	4000	3
Multiple Family	3500	2
Residential	2000	2
All Others	1000	2

2.02 Main Classification

a. Supply Mains (Transmission Mains)

Mains which are used for transporting water from the source of supply and storage reservoirs to the centralized point of distribution and distribution reservoir.

b. Feeder Mains

Mains which transport water from centralized points of distribution and distribution reservoirs, to the various points of interconnection with the grid system of mains and centralized points of consumption. There are two types of feeder mains:

1) Primary - Those feeder mains not supplying individual consumers, but their sole purpose being to transport water from centralized points of distribution to various points of interconnection with the grid system and centralized points of consumption.

2) Secondary - Those feeder mains which serve the same purpose as any other feeder mains except that individual consumers are served by this group, due either to the fact that no other main is available or that the required supply to the consumer demands a large main.

c. Distribution Mains

All mains which are used for supplying the individual consumer. As a general rule these are the small mains in the water supply system.

2.03 Water System Construction Plans

a. General

Complete plans and specifications for all proposed water system improvements, including any necessary dedications and easements shall be submitted to the Department of Public Works for approval and must receive the

required approval prior to construction permit issuance and beginning of construction.

b. Plan Preparation

Construction plans and specifications for public water main systems in the public right-of-way and easements shall be prepared by a professional civil engineer licensed in the State of Oregon in accordance with the following requirements:

1) Dimensions - Construction plans shall be clearly and legibly drawn on engineering tracing paper 22 by 34 inches with a 1-1/2 inch clear margin on the left edge and one-half inch margins on all other edges.

Plans from consultants for construction permit projects shall be blueline drawings meeting the above size. (24 by 36 inch blueline prints are acceptable.)

2) Scale - Horizontal scale shall be 1" = 50'; vertical scale shall be 1" = 5' or as approved by the City Engineer.

3) Form - Title Sheet, Plan and Profiles and Water Main Appurtenances.

2.04 Title Sheet

One title sheet may be used when constructing more than one facility (sewer, storm drain, etc.), however, all requirements for title sheet must be met.

a. Plan view (Site Plan) of the entire project, showing street right-of-way and/or subdivision layout to a scale of 1" = 100'. A smaller scale may be used on large projects upon approval of the Civil Engineer. A project is too large when a minimum dimension of two (2) inches cannot be maintained between the title, system site plan, and vicinity map. A scale of 1" = 200' may be used in such cases.

The site plan shall be a composite plan showing all complete properties to be served by the water system improvements and properties adjacent to and within 250 feet of those served, existing and proposed water lines, line sizes, designations, tract names and numbers, lot numbers or property owners' names, street names, and number of units to be served by the improvements.

b. Index of Sheets.

c. Complete legend of symbols used.

d. Vicinity Map to a scale of not less than 1" = 800' showing the project location.

e. Title Block - located in lower right hand corner or right edge of paper with scale, north point, date, drawing number, the engineer's name, address and official stamp, and, where applicable, the owner/developer's name and address.

f. Temporary and permanent bench marks including their descriptions.

g. General and special notes relating to construction methods.

h. A statement referencing the City of Stayton Standard Construction Specifications.

2.05 Plans and Profiles

a. Plan

Plan view of water system lines shall be to scale of 1" = 50' and shall contain the following information in addition to the above:

1) Adjacent street curbs and property lines, right-of-way and utility easements referenced to property corners, street intersections, or section lines. On construction permit projects, adequate two (2) foot contour lines or property corner and curb elevations to help determine service levels and whether existing or proposed lots in new subdivisions can be served. All existing franchise utilities shall be shown on the plan view of water plans.

2) Location of water mains, service lines, meter boxes, thrust blocks, and appurtenances with each fitting and branch line stationed to facilitate coordination in locating appurtenances. A detail will be required at all locations where three (3) or more fittings are used. The stationing shall be tied to existing property corners or street monuments with the relationship of each valve and fitting shown to the property corners (minimum two directions). Each line with a separate designation shall be

stationed continuously from 0+00 at its point of connection to another line and each service line stationed.

3) Size, length, service level, type of material, and class of pipe between fittings. All private water lines connected to the City system shall be shown and so designated as private on the plans.

4) Location of water courses, stream and railroad crossings, gas mains, culverts, sanitary and storm drains, underground power and other utilities, that either cross the alignment within 250 feet of the terminus of the proposed extension or are adjacent to the proposed extension within the right-of-way or within ten (10) feet of the easement line, and existing hydrants within 500 feet of the proposed extension. The intent is to prevent grade conflicts of all future extensions and fire hydrant requirements. All water course crossings must show the 100-year floodplains and soil series wetland designation from National Wetland Inventory.

b. Profiles

Profiles for the individual water lines shall be to the same horizontal scale on the same sheet and drawn immediately below the corresponding plan view reading from 0+00 left to right, and shall be required in the following instances:

1) Railroad and culvert crossings, ditch or stream crossings with elevations of the ditch or stream bed and the 100-year flood elevation profile and casing details. Horizontal scale 1" = 20', vertical scale "1" = 2'."

2) Utility crossings that conflict with the proposed water line installation. Same horizontal and vertical scale as (1) above.

3) Mains installed in easements across private property. Horizontal scale 1" = 50', vertical scale 1" = 5'.

SPECIAL NOTE: The design engineer shall field locate and verify the alignment, depth, and inverts of all existing facilities shown on the plans that will be crossed by proposed facilities and shall certify them with a note on the plans.

City as-builts are only to be used as an aid to the design engineer when field verifying the existing facilities.

2.06 Water System Appurtenances

Detailed drawings shall be included for all water system appurtenances including fire hydrants, thrust blocks, valve boxes, blow offs, service installations, etc. Appropriate references to City of Stayton Standard Plans may be used in lieu of details actually shown on the plans.

2.07 Plan Submittal

Four (4) sets of construction plans with quantity and cost estimates prepared by consulting engineers for developers shall be submitted for checking to ensure compliance with these Standards, City of Stayton Ordinances, and good engineering practice. Submitted plans shall include specifications, test data, a materials list, and design recommendations, easement and right-of-way descriptions, tie to City of Stayton Bench Mark and Monument System or street right-of-way or property line, and other material as requested by the City Engineer. A plan check fee will be levied at the time plans are submitted. In certain cases soils report data may be required by the City.

Once the plans are approved and the construction permit issued, the consulting engineer shall be responsible for providing all surveying services necessary to stake the project and prepare the as-built drawings when the project is complete.

2.08 Water System Requirements

Subsections 2.12 through 2.20 contain the physical design requirements for public water main systems in the city. These design requirements may be used for private systems, provided the system is designed by a professional civil engineer.

2.09 Pipe Materials

All water mains and services shall be designed for a cold water test pressure of 150 PSI (refer to AWWA C 150 (76) and CIPRA Technical Bulletin "Designing for Ductile Iron Pipe.") Fittings and valves shall be specified to have a test pressure of 250 PSI.

Six-inch (6) through thirty-inch (30) - Pipe shall be DUCTILE IRON PIPE conforming to ANSI A21.51 (AWWA C151), thickness Class 50 Ductile Iron Pipe (four-inch shall be Class 51) and shall be standard thickness cement lined conforming to ANSI A21.10 (AWWA C110). Joints shall be rubber gasket of either the push-on or mechanical joint type conforming to ANSI A21.11 (AWWWA C111). Higher thickness class may be required where analysis indicates abnormal loading condition (see AWWA H-3).

Acceptable abbreviations for showing types of existing pipe materials on the plans are as follows:

CI - Cast Iron
DI - Ductile Iron

2.10 Main Size

a. Grid System

The distribution system mains shall be looped at all possible locations. The installation of permanent dead-end mains upon which fire protection depends and areas of large demands on single mains will not be permitted.

b. Size of Pipe

2 - inch	shall not be used as part of the distribution system, but for services only.
3 - inch & 4 - inch	shall not be used as part of the distribution system but for services only downstream of the meter.
6 - inch	minimum size residential subdivision distribution water main for the grid (looped) system, not to exceed an unsupported length of 600 feet and shall not be permanently dead-ended. Looping of the distribution grid shall be at least every 600+ feet.
8 - inch	minimum size for permanently dead-ended mains supplying fire hydrants with a fire flow less than 2,000 gpm and for secondary feeder mains in residential subdivisions.
12 - inch	and larger as required for primary feeder mains and mains in industrial subdivisions.

All dead-end mains shall terminate with a blow-off assembly. Permanent dead-ends shall have a blow-off assembly as per Standard Plan No. 407. Mains which can conceivably be extended at some later date shall have a blow-off assembly as per Standard Plan No. 405. Where curbs exist, the blow-off shall be located behind the

curb at least five (5) feet from the curb face.

2.11 Minimum Depth

The standard minimum cover over buried water mains within the street right-of-way except the paved area shall be thirty-six (36) inches from finish grade referenced from the existing top of curb or proposed top of curb elevation. The paved area of the street right-of-way shall have a minimum cover of thirty (30) inches.

The minimum cover for mains in easements across private property shall be thirty-six (36) inches.

Finish grade shall normally mean the existing or proposed top of curb elevation. Where the main is located in the cut or fill side slope or where mains are located in easements, finish grade shall mean at the water main alignment. The intent is to provide a minimum cover over the pipe of 30 inches in the street right-of-way and 36 inches in easements.

2.12 Location

a. Relation to Sewer Lines and Other Utilities

Water lines shall be separated from other utilities in accordance with OAR 333.

b. Water Mains Within Street Right-of-Way

The standard location for water mains with public right-of-way shall be as shown on Standard Plan No. 4 and preferably on the south and west sides of the street. Exceptions to these requirements may be made in order to avoid conflicts with other existing underground facilities, and to permit sanitary sewers to be installed on the low sides of streets.

Mains shall not be installed in alleys. As nearly as practical, mains shall be installed on a particular street with the distance from the curb line of the street varied as little as possible. On curved streets, mains may be laid on a curve concentric with the street centerline with deflections no greater than the manufacturer's specifications, or mains may be laid in straight lines along the tangent between selected angle points to avoid conflicts with other utilities. The angle point and tangent section shall not be less than three (3) feet in front of the curb face.

c. Within Easements

Mains laid in easements along property line, with the easements centered on property line, shall be offset 18 inches from the property line. The installation of mains within easements across privately owned property is to be done only when absolutely necessary, such as the avoidance of dead-end conditions. Such easements, when required, shall be exclusive and a minimum of ten (10) feet in width except that the minimum width shall be twenty (20) feet or more for transmission water mains and the conditions of the easement shall be such that the easement shall not be used for any purpose which would interfere with the unrestricted use for water main purposes. Under no circumstances shall a building or structure be placed over a water main or water main easement. This includes overhanging structures with footings located outside the easement. The intent is to provide an unobstructed area above the easement in which to operate repair equipment.

Easement locations for public mains serving a PUD, apartment complex, or commercial/industrial development shall be in parking lots, private drives, or similar open areas which will permit an unobstructed vehicle access for maintenance by City forces.

Easement widths shall vary from the ten (10) foot minimum by five (5) foot increments, i.e., 10, 15, 20 feet, etc. Easements must be from the property owner to the City of Stayton prior to construction.

Common placement in the easement of water, sewer, and storm drain line may be allowed under certain conditions.

Common easements will be reviewed on a case-by-case basis. Separation of utilities must meet State of Oregon Department of Environmental Quality and Health Division requirements.

All easements must be furnished to the City for review and approval prior to recording.

2.13 Surface Water Crossing

Surface water crossings of mains shall be in accordance with OAR 333 and the following:

a) Mains crossing stream or drainage channels shall be designed to cross as nearly perpendicular to the channel as possible.

b) The following water surface crossings will be treated on a case-by-case basis:

1) Stream or drainage channel crossing for pipes of twelve (12) inch inside diameter and greater.

2) River or creek crossings required special approval from the Division of State Lands.

c) The minimum cover from the bottom of the stream bed or drainage channel to the top of pipe shall be thirty-six (36) inches.

d) A scour pad centered on the water line will be required for mains less than twelve (12) inch inside diameter when the cover from the top of the pipe to the bottom of the stream bed or drainage channel is thirty (30) inches or less. The scour pad shall be six (6) inches thick and six (6) feet wide reinforced with number four bars twelve (12) inches on centers both ways and shall extend to a point where a one-to-one slope, that begins at the top of the bank and slopes down from the bank away from the channel center line intersects the top of the pipe.

2.14 Valves

a) Sizes

In general, valves shall be the same size as the mains in which they are installed. Valve types and materials shall conform to Section 402 of the Standard Construction Specifications.

b) Location

Distribution system valves shall be located at the tee or cross fitting as nearly as possible. Wherever a conflict exists with curbs, etc., the valve shall be located at the intersection of the main with a property line. There shall be a sufficient number of valves so located that not more than four (4) and preferably three (3) valves must be operated to effect any one particular shutdown. The spacing of valve shall be such that the length of any one shutdown in high value areas shall not exceed 500 feet nor 800 feet in other areas.

In general, a tee-intersection shall be valved in two branches and a cross-intersection shall be valves in three branches. Transmission water mains shall have valves at not more than 2,000 foot spacings and preferably 1,300 foot spacings. Hazardous crossings, such as creek, railroad, and freeway crossings,

shall be valved on each side.

Distribution taps on transmission mains shall not be spaced less than 1,300 feet apart where practical and shall be valved and plugged.

c. Phased Construction

Water mains installed by phased construction, which will be extended in the future, shall terminate with a valve and blow off as per Standard Plan No. 405.

A plug and blow off termination, Standard Plan No. 407, may be used if the main is less than 120 feet in length and service taps are not provided to the properties fronting the line. Future service connections will not be allowed until a valve is installed or a main is extended.

All developments will be required to extend mains across existing or proposed streets for future extensions by the City of other developments. All terminations shall be planned and located such that new or existing pavement will not have to be cut in the future when the main is extended.

2.15 Backflow Prevention

a. General

An approved backflow prevention assembly(s) with an approved metering system shall be required for each use in the following instances:

1) When a private line must be looped between two (2) or more City mains in order to obtain the required flow and the resultant loop will not benefit the City grid system.

2) On all private fire lines attached to the City's distribution system.

3) On all private water lines or distribution systems attached to the City grid system at the master meter on the detector check assembly.

4) When an auxiliary water supply exists on the property being served. When a probable cross connection to a aux water supply exist.

The assembly must meet the City-approved assembly standards; which standards are taken from the current approved list of assemblies obtained from the Oregon State Department of Human Resources Health Division.

b. Location

The approved backflow prevention assembly shall be installed on the property being served in a place accessible for City inspection and testing and located as follows:

1) Before any branch, immediately downstream of the meter; or

2) If no meter, at the property line; or

3) If in the building, before the first branch or hazard being controlled; or

4) If installed outside the building being served, it shall be placed at the property line in an approved vault or structure.

a) Double check assemblies up to two inches may be installed in standard meter boxes, Brooks #66 or equal.

b) Reduce pressure and 2-1/2 inch and larger double check assemblies larger than 2 inches must be installed in vaults.

c) Vaults shall conform to Standard Plan Nos. 414, 415.

d) Must have a sump and be water tight, or have positive drainage as per Pacific Northwest Section of American Water Works Committee.

2.16 Fire Hydrants

a. Coverage

Distribution of hydrants shall be based upon the required fire flow and the average area served not to exceed that given in Table 2 as reproduced herein from the Insurance Services Offices (ISO). Preferred coverage shall result in

hydrant spacing of 500 feet in residential areas, 300 feet in high-value districts including industrial subdivisions and no further than 250 feet from any dwelling, business, garage, or building. Hydrant stubs will be required for installation in areas of currently minimum development.

b. Location

No fire hydrant shall be installed on a main of less than eight inch inside diameter unless it is in a looped system of six inch mains. The hydrant lead shall be a minimum six (6) inch inside diameter.

Hydrants shall be located as nearly as possible to the corner of street intersections and at least 200 feet from any cul-de-sac radius point.

No hydrant shall be installed less than five (5) feet from an existing utility pole or guy wire nor shall a utility pole or guy wire be placed less than five (5) feet from an existing hydrant.

Approved hydrant types and installation shall conform to Section 404 of the Standard Construction Specifications.

See 2.20 Mobile Home Parks and 2.21 Planned Unit Developments for locations under special conditions.

c. Hydrant Valves

Each fire hydrant shall have an hydrant valve and valve box at the main line tee which will permit repair of the hydrant without shutting down the main supplying the hydrant. Such hydrant valves shall be resilient wedge gate valves conforming to Section 403 of the Standard Construction Specifications. The hydrant valve shall have mechanical joint-flange joint ends. The valve shall be connected directly to the water main using a mechanical joint or flange joint tee. When the water main is located behind the curb and property line walks exist, a length of pipe (hydrant lead) shall be installed between the tee and auxiliary valve when the hydrant cannot be installed next to the main. Such cases are when the main is located in the pavement under curb line walks or the street is widened. Said hydrant tee to have no thrust blocking. Refer to Standard Plan No. 401 for illustration.

2.17 Air-Release Valves

An air release valve shall be permanently installed at high points on all water mains ten (10) inch inside diameter and greater where air can accumulate. An automatic air release valve shall be installed in a manhole off the street where flooding of the manhole or chamber will not occur. In all cases the air outlet or inlet shall be piped to a point of free discharge not causing a cross-connection.

Mains less than ten (10) inches in diameter may make use of a service line system for release of air during construction.

a. Air Release Valve Piping

The open end of an air release pipe from automatic valves shall extend to the top of the manhole to at least twelve (12) inches above grade and provided with a screened, downward facing elbow. Grade shall mean the existing ground elevation adjoining the manhole. An opening twice the size of the vent pipe shall exist at grade to prevent flooding of the vault.

b. Chamber Drainage

Chambers or manholes containing valves, blow-offs, meters, or other such appurtenances to a distribution system shall not be connected directly to any storm drain or sanitary sewer. Such chambers shall be drained to the surface of the ground where they are not subject to flooding by surface water. Standard Plan No. 414.

2.18 Service Lines

The term "service line" is meant to be used only for the water line extending from the distribution main to the using meter, backflow prevention device, or private fire system double check valve.

a. Sizes

The sizes of service lines which may be used are 3/4", 1", 1-1/2", 2", 4", 6", 8", 10", and 12". Service lines will be reviewed for effects on the distribution system and shall not be greater in size than the distribution main.

Service piping shall be equal to or greater than the meter size, however, three (3) inch meters require a four (4) inch tap and four (4) inch minimum piping and fittings.

For three (3) inch and greater services, a design drawing must be submitted showing the vault and fitting requirements (see Section 2.19), with the expected flow requirements and proposed usage.

b. Location

1) Domestic

The service lines shall normally extend from the main to behind the curb with the curb stop and meter box being located at the termination of the service connection (Standard Plan No. 410). In general, individual service connections shall terminate in front of the property to be served and shall be located two (2) feet each side of a common side property line. The domestic service shall not be connected to fire protection service. A backflow prevent assembly shall be placed on domestic service lines as required by Section 2.15.

2) Fire Service

The service line shall normally extend from the main to the meter.

A backflow prevention assembly shall be placed on fire service lines as required by section 2.15. Exceptions for flow through potable systems will be reviewed on a case-by-case basis.

Plans for fire service lines shall meet the requirements of sections 2.03(b), 2.05(a), 2.06 and 2.07. The plans must be stamped by a Civil Engineer.

Plans for fire services shall include a vicinity map, adjoining street name, width, curb and property line, location of existing water line referenced to property line, existing hydrant locations, and the distance to property pins where the service crosses the property line. An example is included in the Appendix.

SPECIAL NOTE: A pump shall not be used on a service line to provide adequate pressure to a subdivision lot or property located above the pressure level of the supply main.

c. Materials

Pipe materials shall be designated on the plans and shall conform to Section 402.2.00 of the Standard Construction Specifications.

Galvanized pipe is not an approved material for underground service.

2.19 Meters

All water meters scheduled for services inside the City of Stayton will be furnished and installed by City forces at the request and expense of the customer. Exception: The service line and meter box must be placed with water mains installed by the developer (See Standard Plan No. 410.) and installed as part of a dector backflow prevention assembly. All meters shall read in detector feet.

a. Meter Boxes

Unless otherwise approved, all meter boxes must be as shown:

5/8" x 3/4"	Brooks Style #37
1"	Brooks Style #38
1-1/2"	Brooks Style #66
2"	Brooks Style #66

3" and above Vault built to City of Stayton requirements, Standard Plan No. 505.

b. Location

The meter, with approval by the City, may be located in the same vault with a backflow prevention device, provided a completed dimensioned design is submitted with a request for variance.

Meters shall be located at the termination of the City or District service line.

1) 3/4" through 2" meters

Installed in the right-of-way in a location that allows for easy reading and maintenance, and is not in the sidewalk area, preferably 18 inches (but may vary) behind the curb, Standard Plan No. 410.

2) 3" and larger

Near the curb or in the public right-of-way to allow easy reading and maintenance without entering private property. It must be accessible with a crane truck to within ten (10) feet of the installation with a ten (10) foot vertical clearance.

The meter, vault, and piping are to be protected from freezing, vandals, and vehicles. The area around the vault must be sloped in such a manner to prevent storm water from ponding over or running into the vault.

A minimum three (3) foot clear space must be provided around the vault to provide ample working space for maintenance.

2.20 Mobile Home Parks

All public water mains within mobile home parks shall be in public right-of-way or exclusive easements to the City of Stayton and shall conform to these design standards.

Each connection of the mobile home park private water system to the City system shall be through a backflow prevention assembly and meter. See sections 2.15 and 2.18.

2.21 Planned Unit Developments (PUD)

General design consideration shall conform to requirements set forth by the State Department of Human Resources, Health Division, by the Oregon State Plumbing Specialty Code (Ch. 10), and these design standards.

Previously introduced requirements for capacity, materials, grid, valves, fire protection, service lines, and meters shall also be applicable to design within PUD areas.

STANDARD PLANS

1 - 99	Miscellaneous
100-199	Sewers
200-299	Storm Drains
300-399	Streets
400-499	Water
500-599	Structures
600-699	Earthwork
700-799	Street Lighting and Traffic Signals
800-899	Landscape and Irrigation

STANDARD PLAN NO.	TITLE
3	Standard Legend
6	Standard Pipe Encasement
101	
102	Standard Drop Manhole
103	Manhole Details for Pipes 24" and over
104	Manhole Details for Pipes 24" and over
105	Standard Cleanout
106	Standard Sewer Service Connections
107	Standard Manhole Casting Details
108	Standard 45° Cleanout Frame and Lid
109	Standard Plugs for New Sanitary Sewers
110	Standard Plugs for Abandoning Sanitary Sewers
111	Standard Inside Drop Manhole
112	Standard Casing Detail
113	Standard Anchor Block Details for Sanitary Sewers
114	Standard Chimney for Deep Services
115	Standard Sewer Service Reconnection
116	Trailer Dump Station
117	Water and Sewer, Tamper Proof Manhole Frame and Cover
119	Manhole Detail for Cul-De-Sac Termination

STORM DRAINS

201	Standard Precast Manhole
202	Standard Catchbasin Details (Type 1C.B.)
203	Standard Catchbasin Details (Type 2C.B. side inlet)
204	Catchbasin Frame and Grates Tpes A and B

STANDARD PLAN NO.	TITLE
205	Standard Manhole Casting Details
206	Type 3 Catchbasin Frame and Grate
207	Monument Box Installation Detail
208	Monument Box Casting Details
209	Sand and Grease Trap
210	Grease Trap
211	Shallow Precast Manhole
212A	Standard Trash Trap and Leach Line Plan
212B	Standard Trash Trap and Leach Line Details

STREETS

301	Parabolic Crown Tilt Section (City Streets)
302	Parabolic Crown for City Streets
303	Standard P.C.C. Curb and Gutter Sections
304	Standard Alley Details
305	Standard Driveway Details
306	Standard Sidewalk Details
307	Standard Bicycle and Wheelchair Ramps
308	Mid-block Walk Entrance Traffic Control
309	Pavement Patching
310	Standard for Permanent Barricade
311	Asphaltic Concrete City Street
312	Typical Flexible Pavement Structure
313	Standard Street Sections Shed Roof Design
314	Standard Street Section Hillside Development Areas Shed Roof Alt.
315	Typical P.C. Concrete Street Structure

WATER

401	Standard Fire Hydrant Installation
402	Standard Valve Box
403	Standard Thurst Blocking Details
404	Tie Rod Requirements
405	Standard Blowoff With in-line Valve
406	Standard Blowoff for 10" Dia. Pipe or Larger
407	Standard Blowoff with Plugged End
408	Standard Vertical Bend Anchor Block Detail
409	Standard Fittings
410	Standard 1" Service Installation
410A	Standard Service Installation for Service Replacement

STANDARD PLAN NO.	TITLE
411	Standard for Main Line Chlorination
412	Standard 2" Blow-off Plug
413	Tamper Proof Manhole Frame and Cover for Storm Drain and Water Main Blow-off
414	Standard Manhole and 1" Diameter Air Release and Vacuum Valve Installation
415	Standard Backflow Prevention Device Installation
417	3", 4" and 6" Air Release and Vacuum Valve Installation for 10" Pipe and Larger

STRUCTURES

501	Standard Retaining Wall (H = 2'0" or less)
502	Standard Retaining Wall (H = 2'0" to 4'0" Max)
506	Meter and Vault Size Specifications

EARTHWORK

601	Standard Sewer Trench Detail
602	Standard Water Trench Detail
604	Standard Trench Detail
605	Pipe Bedding

LANDSCAPE AND IRRIGATION

801	Irrigation System Backflow Protection
802	Swing Joint Riser Assembly

ITEM	TO BE BUILT	EXISTING
SANITARY SEWER	8"SAN	8"SAN
STORM DRAIN	12" S.D.	12"SD
WATER	6"W	6"W
N.W. NATURAL	4"G	
TELEPHONE	T	T 2 DUCT
ELECTRICITY	E	E 6 DUCT
TELEVISION	TV	TV
CURB DRIVEWAY, P.C.C. SIDEWALK		
FENCE		
BARRICADE		
FIRE HYDRANT & VALVE		

ITEM	
STREET OR ALLEY RIGHT OF WAY	R/W
PLATTED LOT LINE	
PLATTED LOT LINE (ABANDONED)	
OWNERSHIP LINE	
EASEMENT OR TEMPORARY RIGHT OF WAY	
IMPROVEMENT DISTRICT BOUNDARY	
PROJECT CENTERLINE AND STATIONING	1 2 3
CITY LIMITS LINE	

ITEM	
MAILBOX, TELEPHONE CLOSURE BOX	(3 MAILBOX)
POWER POLE & ANCHOR OR LIGHT	
WATER VALVE, WATER METER	
RAILROAD	OR
SIGN POST, LIGHT STANDARD	
FLOW LINE OR SHORELINE	
HEDGE OR BRUSH	
TREES	3-10"MAPLE 15"WALNUT BROADLEAF; 24"CEDAR 3-6" PINE EVERGREEN

ITEM		SYMBOL
CONSTRUCT TYPE A B C & D CURB		A B C D
OBJECT TO BE RELOCATED	— BY CONTRACTOR — BY CITY — BY OTHERS	L
OBJECT TO BE REMOVED	— BY CONTRACTOR — BY CITY — BY OTHERS	R
TO BE ABANDONED	— BY CONTRACTOR — BY CITY — BY OTHERS	A
REMOVE & REPLACE	— BY CONTRACTOR — BY CITY — BY OTHERS	RP
TREES OR SHRUBS TO BE TRIMMED	— BY CONTRACTOR — BY CITY — BY OTHERS	T
TUNNELING LOCATION		T
BORING LOCATION (R.R., CREEK, HWY, ETC.)		B
MONUMENT OR OTHER HORIZONTAL CONTROL		◎
BENCH MARK (VERTICAL CONTROL)		△
BEGINNING OF CURB RADIUS		BR
END OF CURB RADIUS		ER
RADIUS		R
LENGTH OF CURVE ALONG CIRCULAR ARC.		L.
POINT OF CURVATURE		P.C.
POINT OF INTERSECTION OF BACK TANGENT AND FORWARD TANGENT		P.I.
POINT OF TANGENCY		P.T.
POINT OF REVERSE CURVE		P.R.C.
VERTICAL CURVE		V.C.
POINT OF INTERSECTION OF BACK GRADE AND FORWARD GRADE.		P.I.V.C.
INSTALL 3" DIAMETER DRAIN IN CURB, EXACT LOCATION TO BE DETERMINED IN FIELD		
HOUSE NUMBER NOTE: NUMBERS TO BE POSITIONED PARALLEL TO THE STREET THE HOUSE IS NUMBERED TO.		XXXX

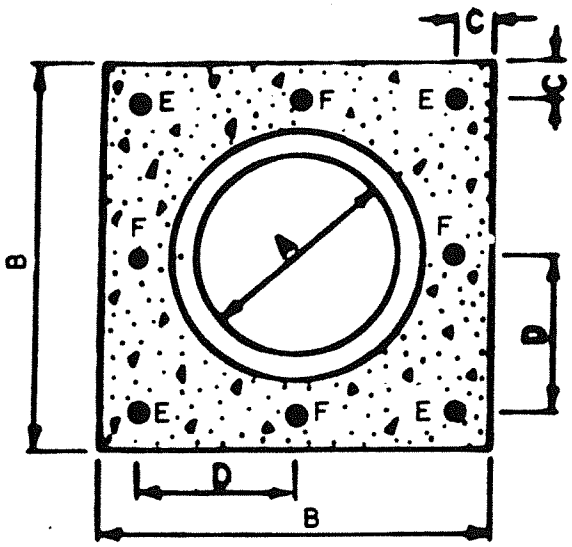
1. SYMBOLS SHALL NORMALLY BE DRAWN TO SCALE BUT NOT SMALLER THAN SIZES SHOWN.
2. MANHOLE MAY BE ASSUMED 4'FT. IN DIAMETER, POWER POLES 18", CATCH BASINS 24"x36" IF ACTUAL DIMENSIONS ARE NOT KNOWN.
3. LEGEND SYMBOLS AND NOTES ON PROJECT PLAN WILL TAKE PRECEDENCE OVER THIS STANDARD LEGEND IN CASE OF CONFLICT.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD LEGEND

DATE: 1992

NO. 3



NOTE :

CONCRETE SHALL BE 3000 P.S.I. 2" TO 4" SLUMP.

ALL REINFORCING STEEL SHALL BE NO. 5 DEFORMED BARS WITH 18" LAP SPLICES AND 2" CLEAR COVER.

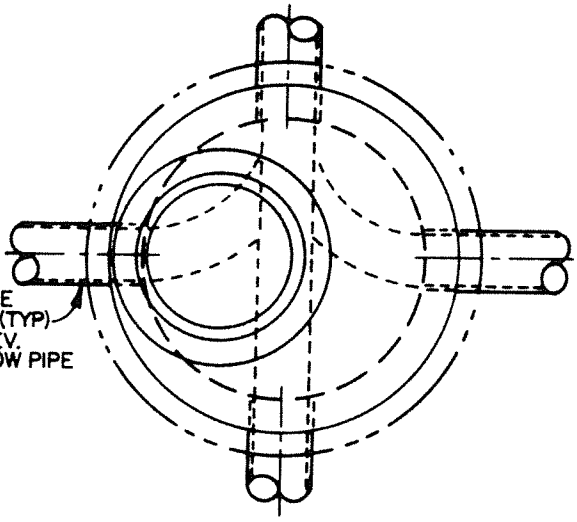
	DIMENSIONS (INCHES)				BARS REQ'D	C.Y. CONC. PER LIN. FT.	LBS. STEEL PER LIN. FT.
	A	B	C	D			
BELL & SPIGOT AND TONGUE & GROOVE ST'D STRENGTH	6	16	3½	–	E	0.005	4.17
	8	18	3½	–	E	0.07	4.17
	10	20	3½	–	E	0.08	4.17
	12	22½	3½	–	E	0.09	4.17
	15	26	3½	–	E	0.10	4.17
	18	30	3½	–	E	0.14	4.17
BELL & SPIGOT ST'D STRENGTH	21	38	3½	15 /	E,F	0.25	8.34
	24	42	3½	17½	E,F	0.26	8.34
	27	50	3½	21½	E,F	0.40	8.34
TONGUE & GROOVE ST'D STRENGTH	21	36	3½	14½	E,F	0.19	8.34
	24	41	3½	17½	E,F	0.25	8.34
	27	46	3½	19½	E,F	0.32	8.34

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

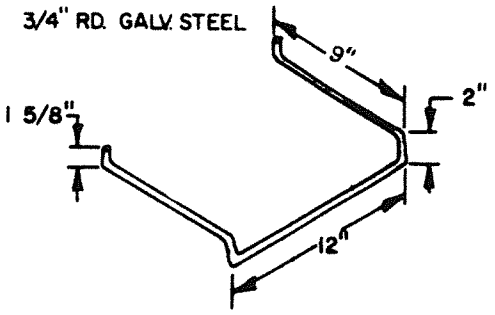
STANDARD PIPE ENCASEMENT

DATE : 1992

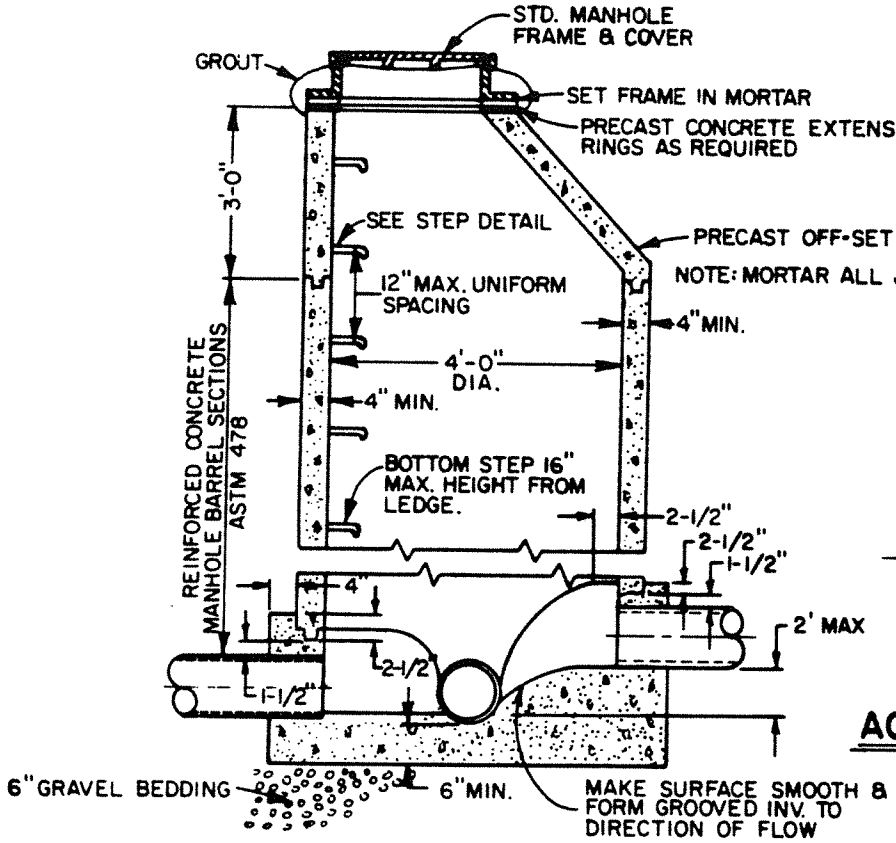
No. 6

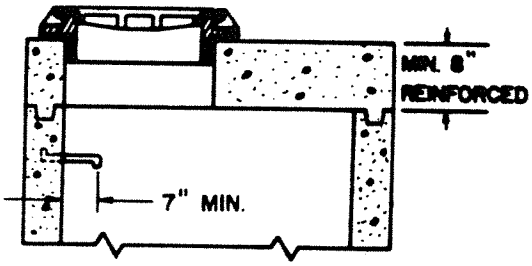


MANHOLE DETAILS FOR PIPE 21" & SMALLER



STEP DETAIL





FLAT-TOP MANHOLE
ACCEPTABLE ALTERNATE

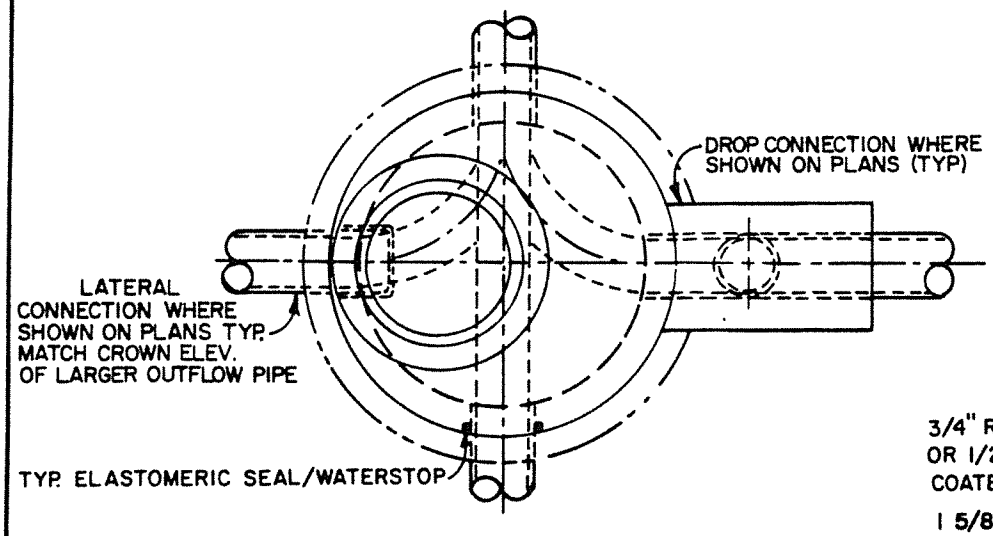
NOTE: PLYWOOD FORM ALL MANHOLE BASES.
ALL PIPE TO MANHOLE CONNECTORS TO
BE KON-N-SEAL OR APPROVED EQUAL

CITY OF STAYTON
DEPT. OF PUBLIC WORKS

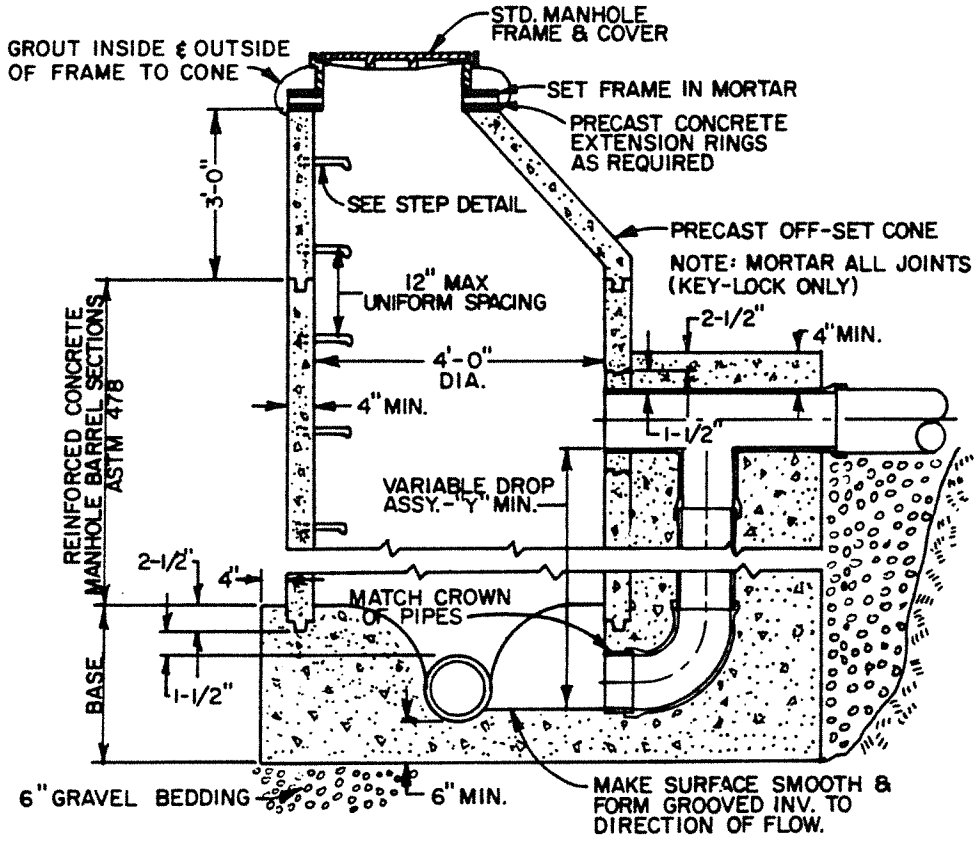
STANDARD MANHOLE

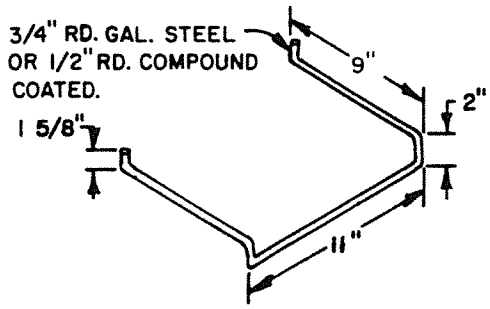
DATE: 1992

No. 101



MANHOLE DETAILS FOR PIPE 21" & SMALLER





STEP DETAILS

"D"	"Y" MIN.
6"	2'
8"	2'
10"-15"	4'-4"

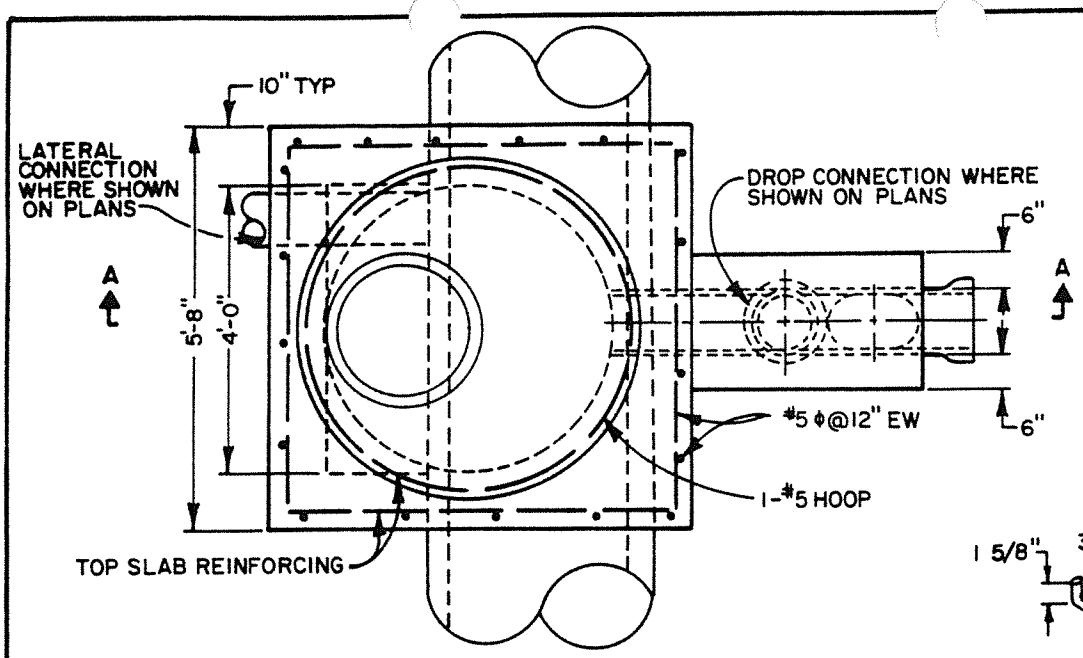
NOTE: PLYWOOD FORM ALL MANHOLE BASES
ALL PIPE TO MANHOLE CONNECTORS TO BE KON-N-SEAL OR APPROVED EQUAL

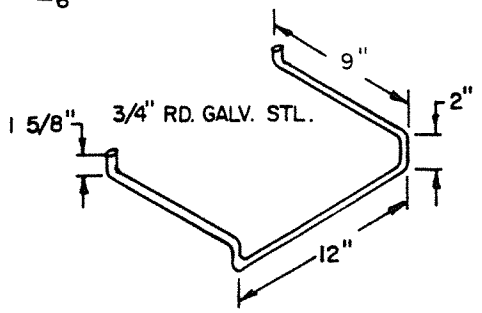
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD DROP MANHOLE FOR 2'-0" OR MORE FALL

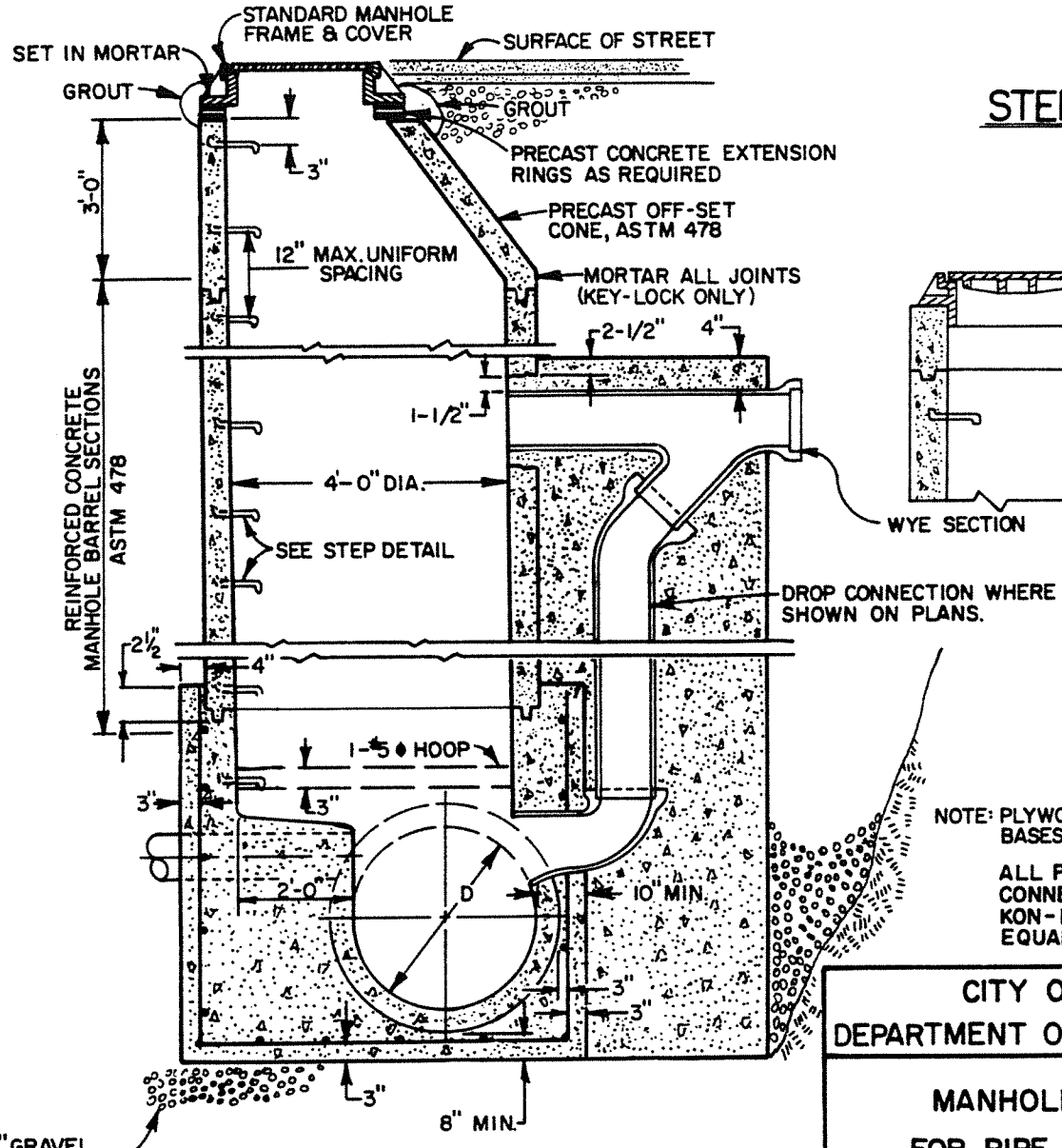
DATE: 1992

NO. 102

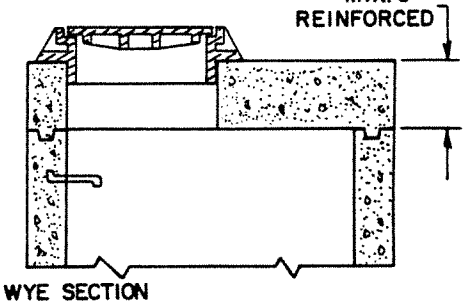




STEP DETAILS



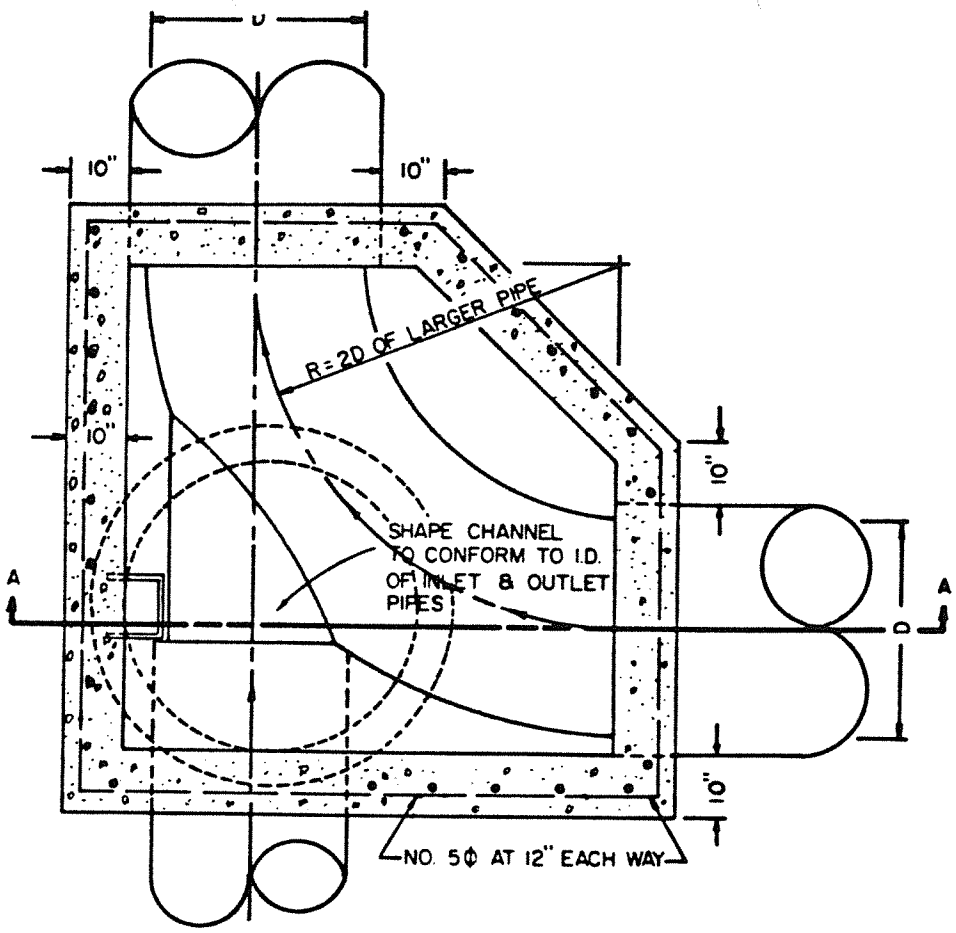
SECTION AA



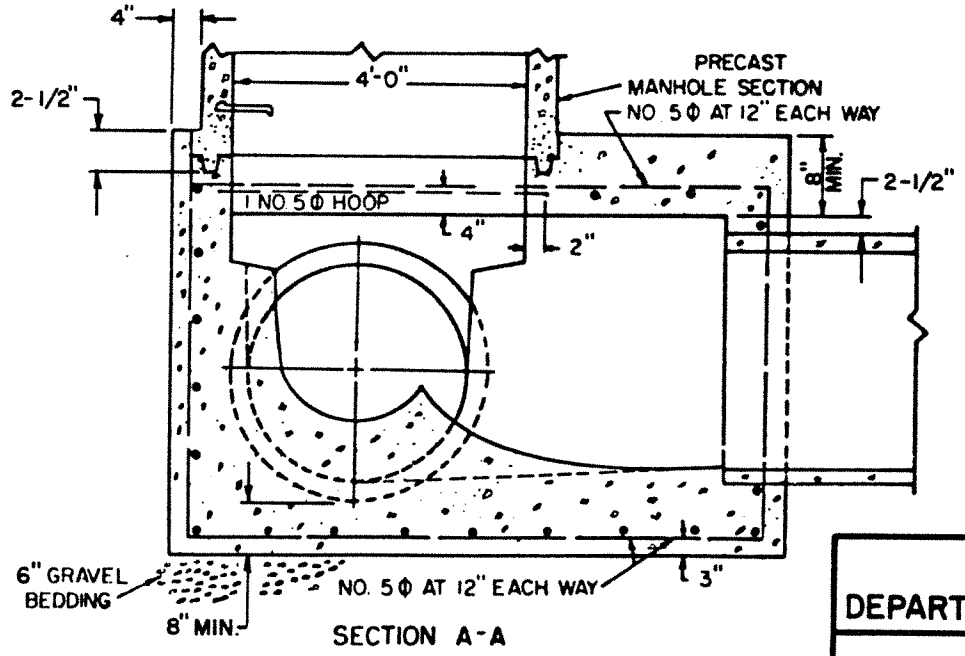
NOTE: PLYWOOD FORM ALL MANHOLE BASES.

ALL PIPE TO MANHOLE CONNECTORS TO BE KON-N-SEAL OR APPROVED EQUAL

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
MANHOLE DETAILS FOR PIPE 24" & OVER	
	DATE: 1992
	NO. 103



SPECIAL BASE FOR MANHOLES
AT ANGLE POINT IN LINE



SECTION A-A

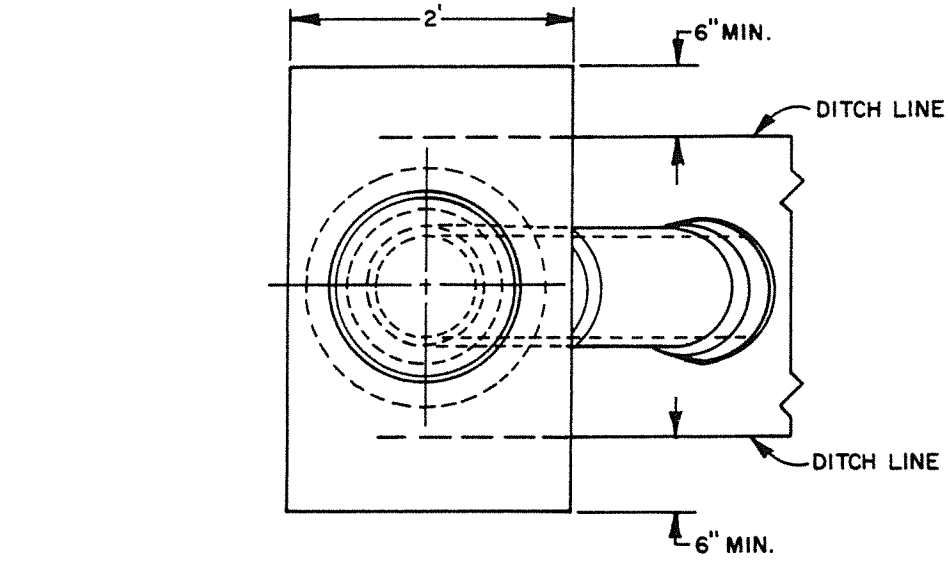
NOTE: PLYWOOD FORM ALL MANHOLE BASES

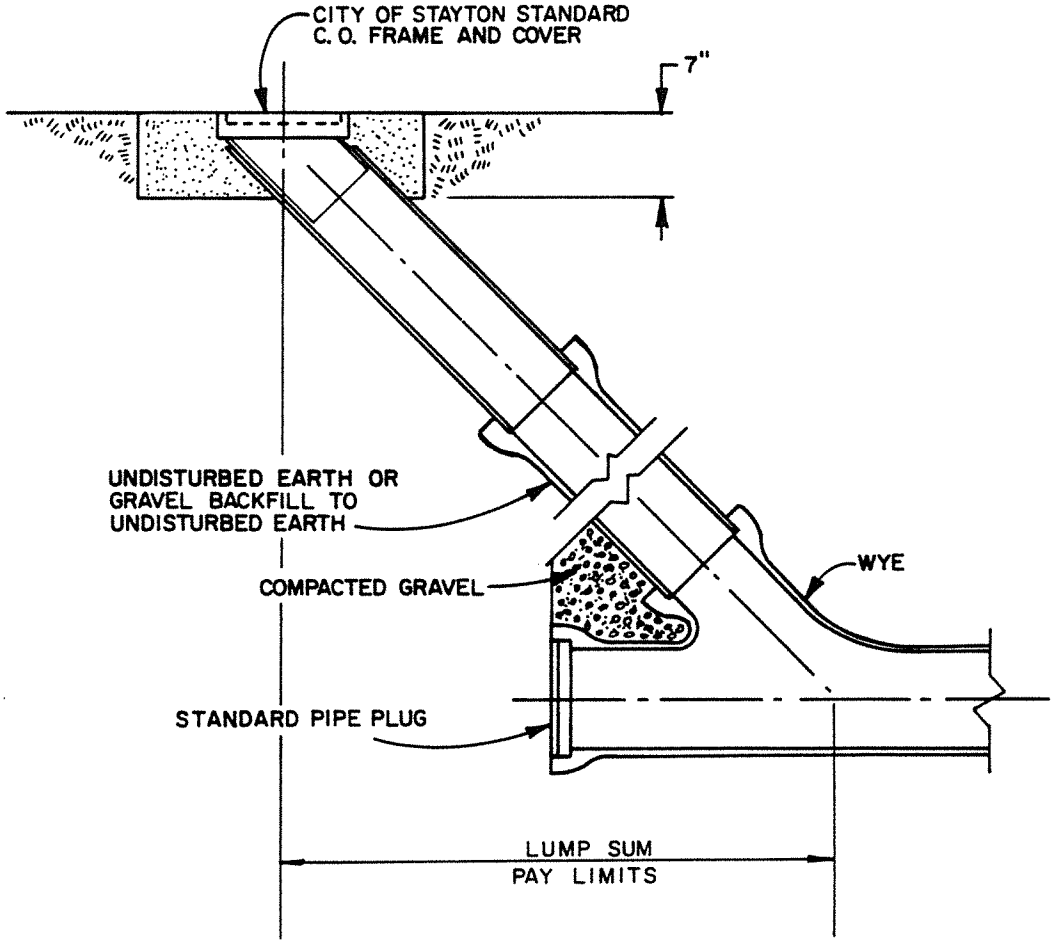
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

MANHOLE DETAILS
FOR PIPE 24" & OVER

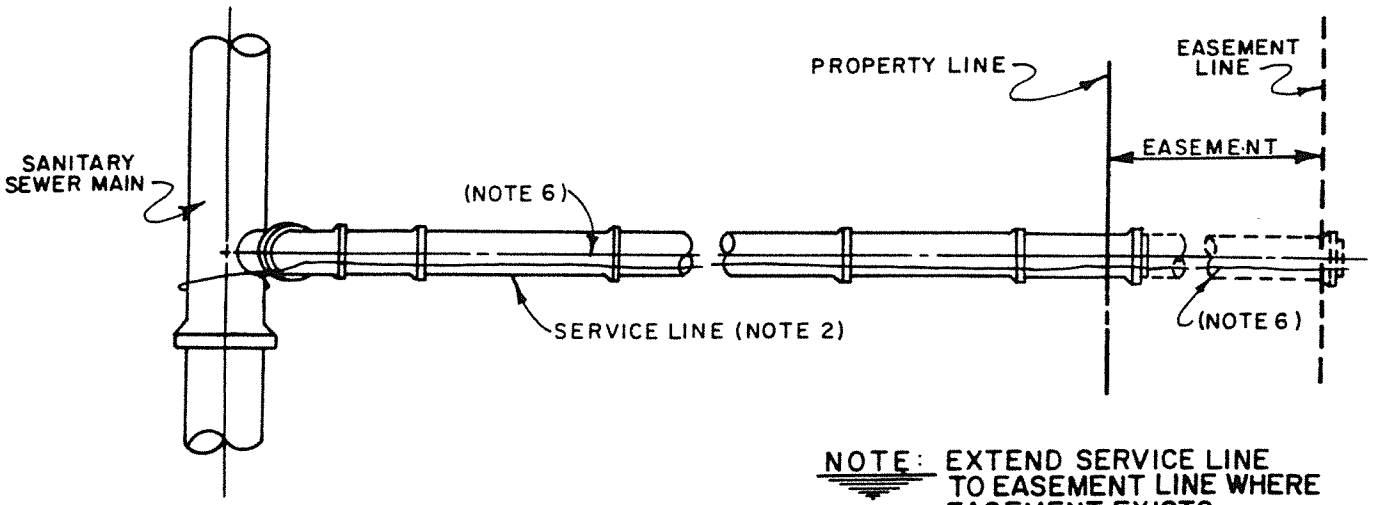
DATE: 1992

NO. 104



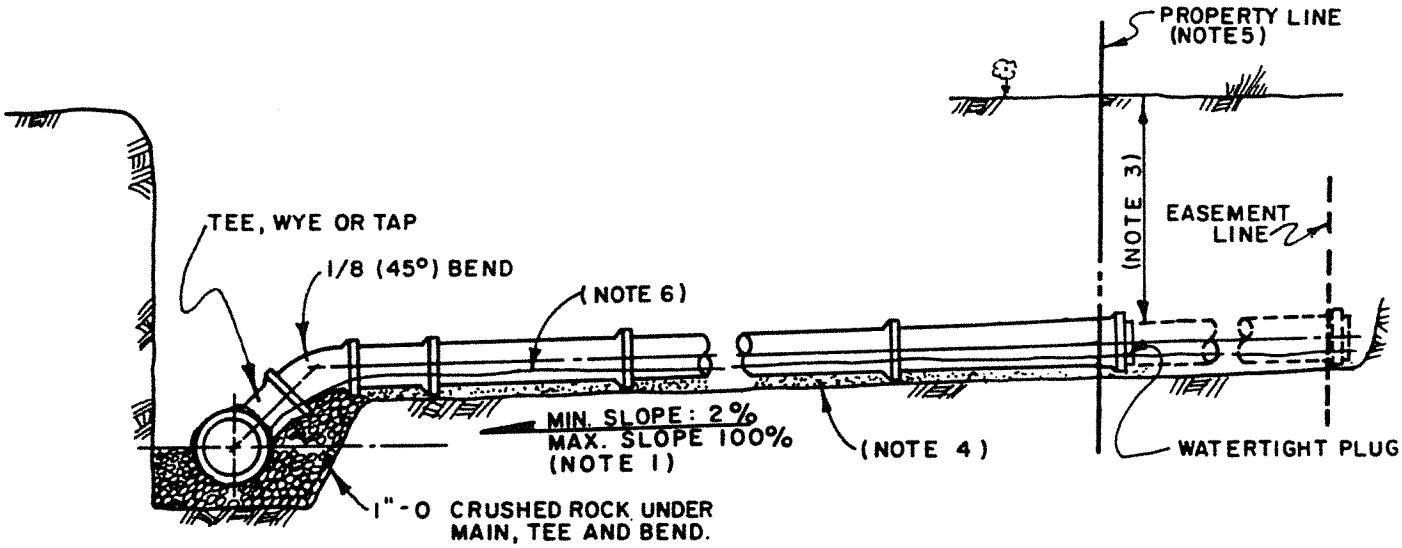


CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD CLEANOUT	
	DATE: 1992
	NO. 105



NOTE: EXTEND SERVICE LINE TO EASEMENT LINE WHERE EASEMENT EXISTS.

PLAN (n.t.s.)



SECTION (n.t.s.)

NOTES:

1.) WHEN SLOPE EXCEEDS 20%, USE ANCHOR BLOCKS (SEE STD. PLAN 113). WHEN SLOPE EXCEEDS 100%, USE CHIMNEY (SEE STD. PLAN 114).
2.) FOR APPROVED MATERIALS SEE SPECIFICATIONS.
3.) MINIMUM DEPTH AT PROPERTY LINE 3 FEET.
4.) BEDDING MATERIAL FOR SERVICE LINES SHALL BE ¾"-0 CRUSHED ROCK.
5.) MARK END OF SERVICE WITH 2"x4" STAKE, DRIVEN 2 FEET INTO GROUND AND WIRED TO SERVICE LINE.
6.) INSTALL A CONTINUOUS 12 GAUGE, GREEN, INSULATED COPPER TRACER WIRE ADJACENT TO BUILDING SEWER BETWEEN THE SEWER MAIN AND CLEANOUT AT BUILDING.

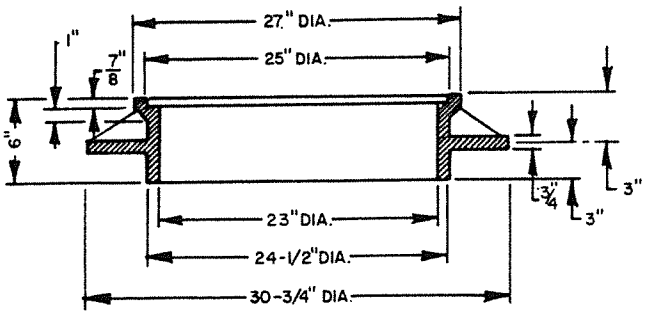
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD SEWER SERVICE INSTALLATION

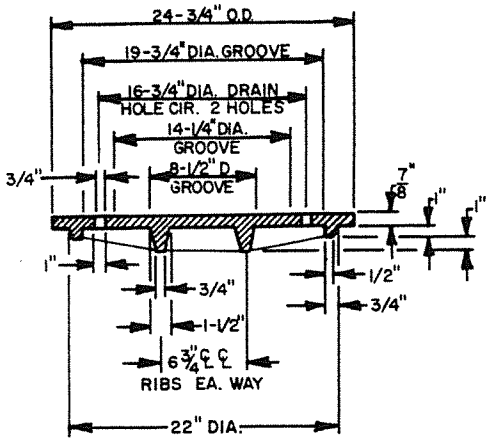
DATE: 1992

NO. 106

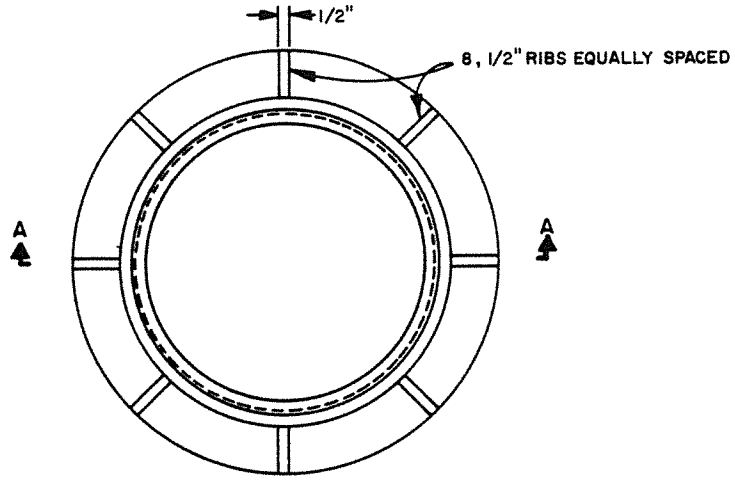
COVER & FRAME TO BE
MACHINED FOR TRUE BEARING



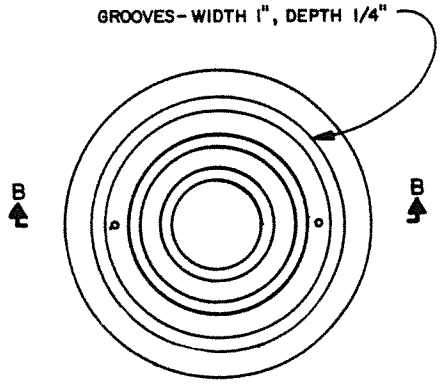
SECTION A-A



SECTION B-B



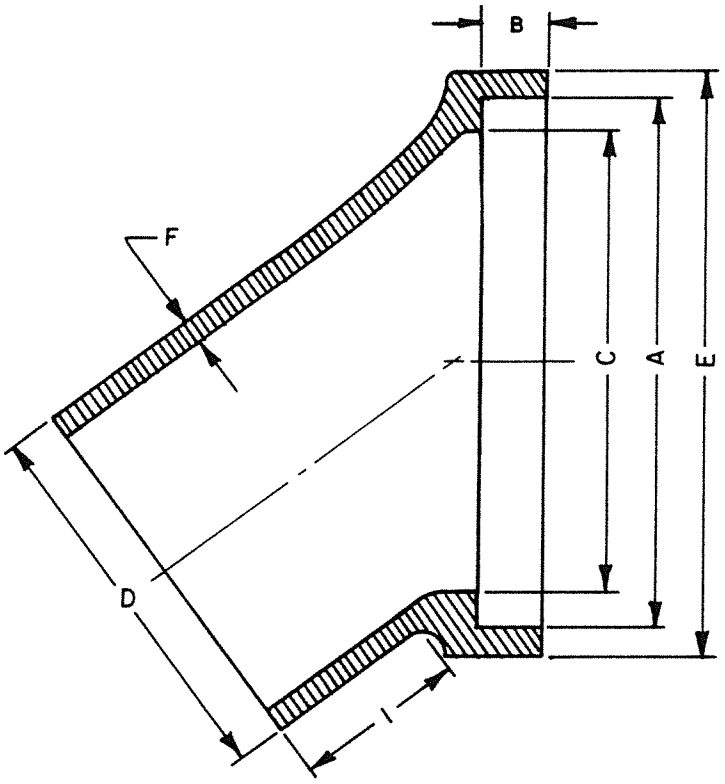
MANHOLE FRAME



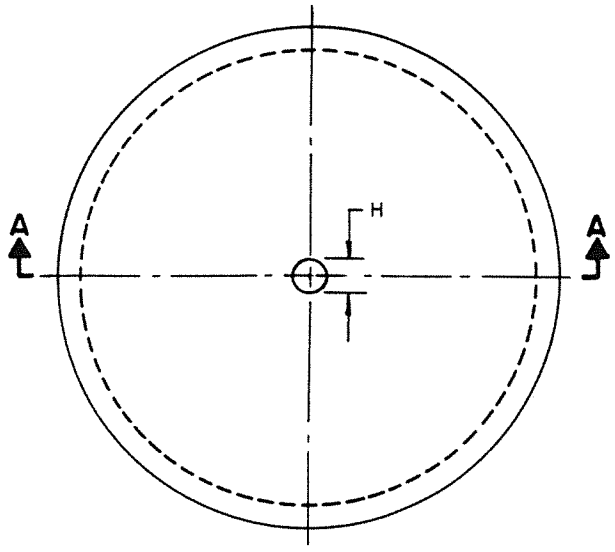
MANHOLE COVER

MATERIAL: ASTM A-48 CLASS 30 CAST IRON.

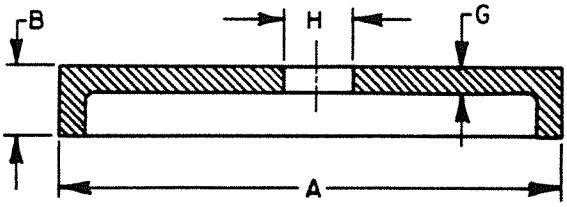
CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD MANHOLE CASTING DETAILS	
	DATE: 1992
	NO. 107



FRAME



LID



SECTION A-A

LID DIMENSIONS				
SIZE	A	B	G	H
6"	$8\frac{9}{16}$"	$1\frac{1}{2}$"	$\frac{1}{2}$"	$\frac{3}{4}$"
8"	$10\frac{11}{16}$"	$1\frac{1}{2}$"	$\frac{1}{2}$"	$\frac{3}{4}$"

FRAME DIMENSIONS							
SIZE	A	B	C	D	E	F	I
6"	$8\frac{3}{4}$"	$1\frac{1}{2}$"	8"	$5\frac{7}{8}$"	$9\frac{5}{8}$"	$\frac{5}{16}$"	$3\frac{1}{4}$"
8"	$10\frac{7}{8}$"	$1\frac{1}{2}$"	$9\frac{5}{8}$"	$7\frac{7}{8}$"	$11\frac{3}{4}$"	$\frac{5}{16}$"	$3\frac{1}{4}$"

MATERIAL: ASTM A-48 CLASS30 CAST IRON.

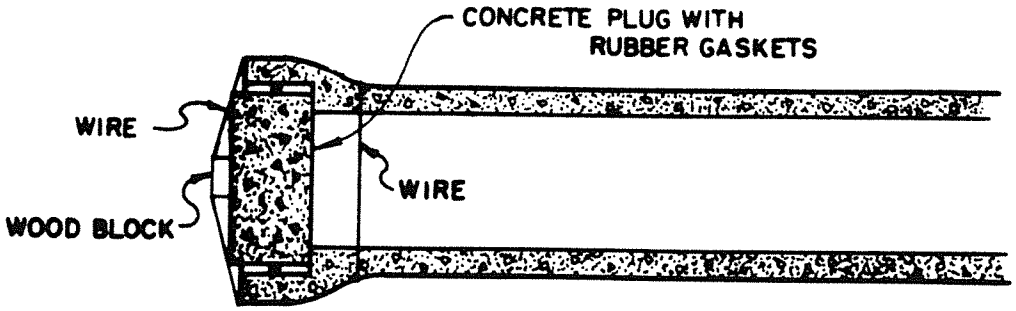
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD 45° CLEANOUT FRAME & LID

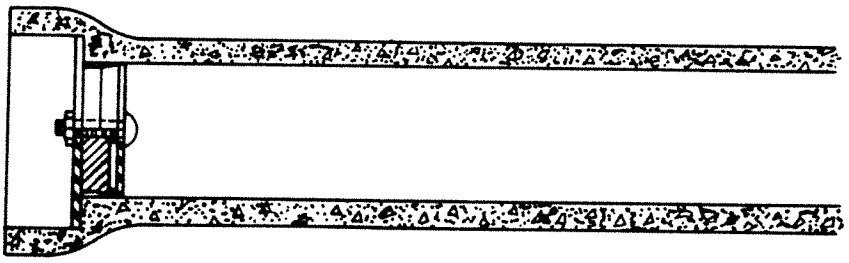
DATE: 1992

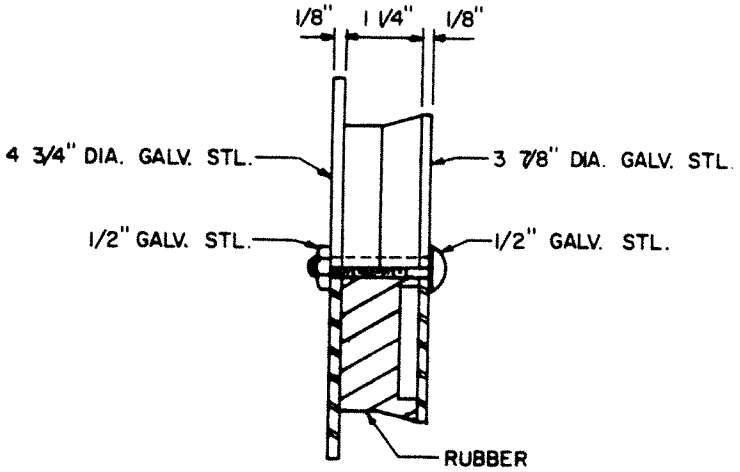
NO. 108

WIRED ON PLUG



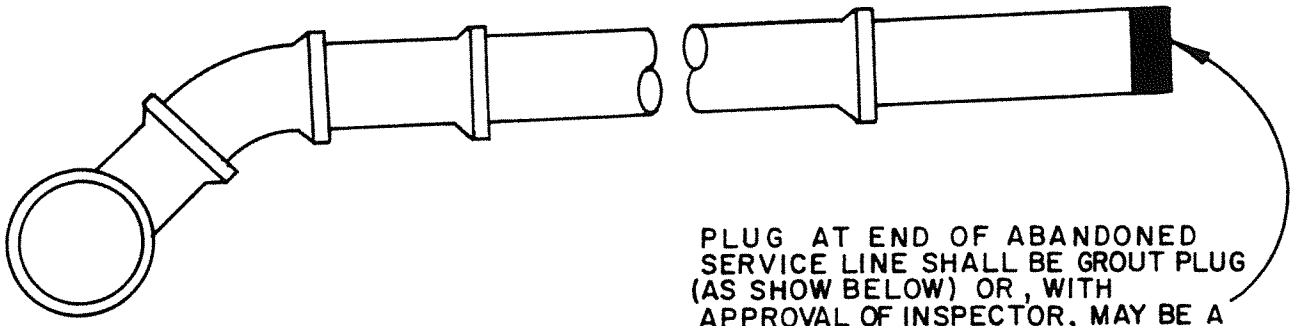
MECHANICAL RUBBER PLUG



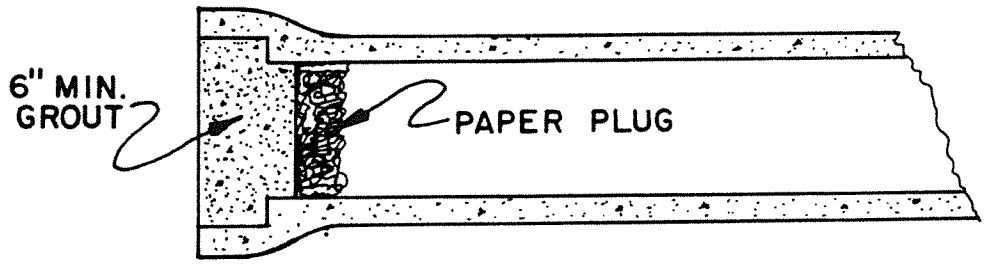


STANDARD PLUG DETAIL FOR 4" PIPE

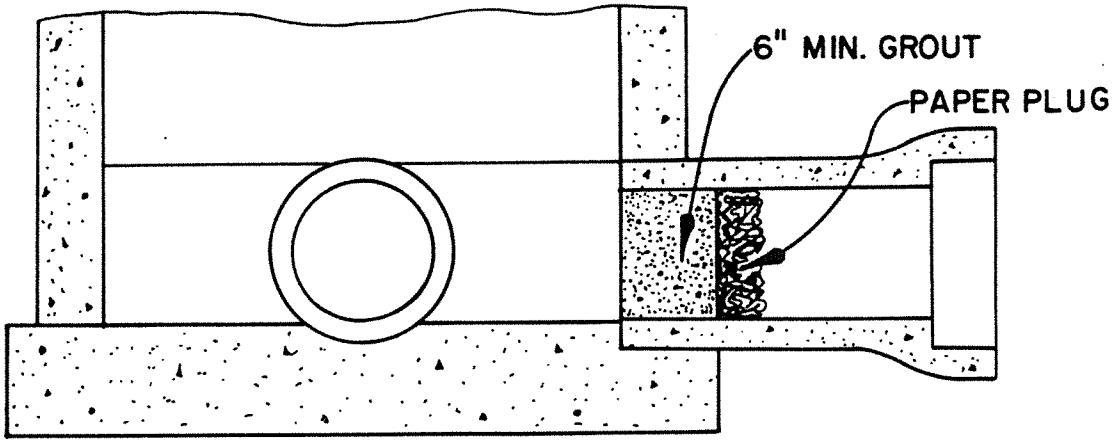
CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD PLUGS FOR NEW SANITARY SEWERS	
	DATE: 1992
	NO. 109



PLUG AT END OF ABANDONED SERVICE LINE SHALL BE GROUT PLUG (AS SHOW BELOW) OR, WITH APPROVAL OF INSPECTOR, MAY BE A MECHANICAL RUBBER PLUG AS PER STD. DRAWING No.109. ALL PLUGS AT OTHER LOCATIONS SHALL BE GROUT PLUGS-AS BELOW.

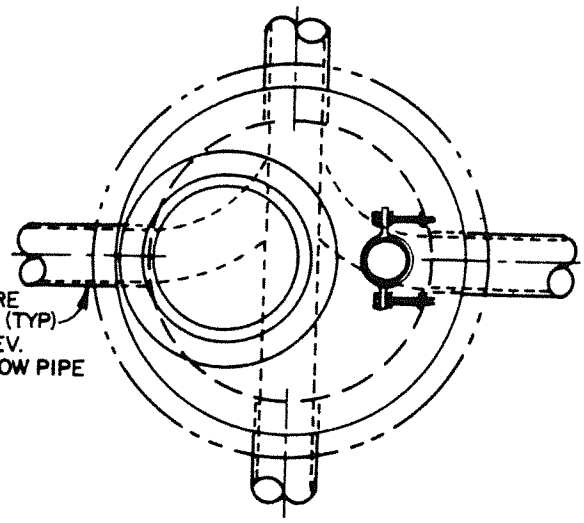


PLUGS AT PIPE ENDS (n.t.s.)

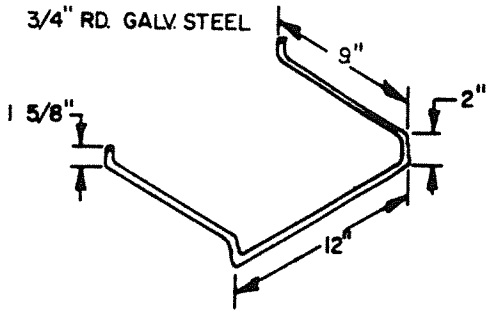


PLUGS AT MANHOLES (n.t.s.)

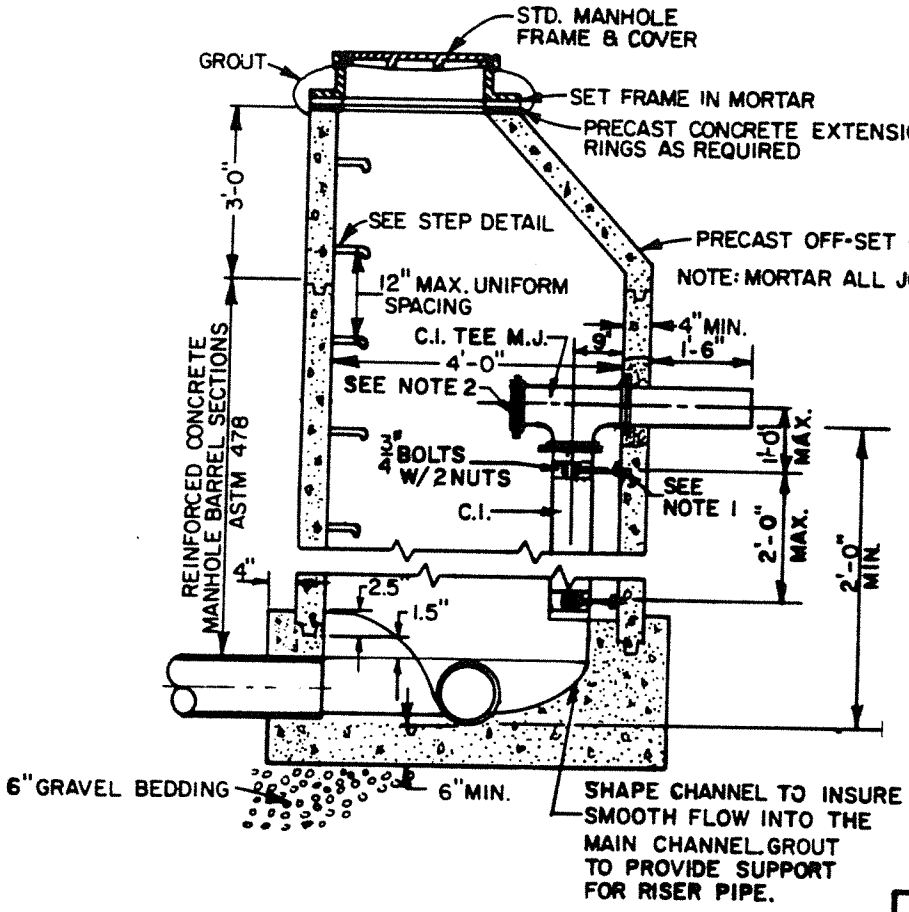
CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD PLUGS FOR ABANDONING SEWERS	
	DATE: 1992
	NO.: 110

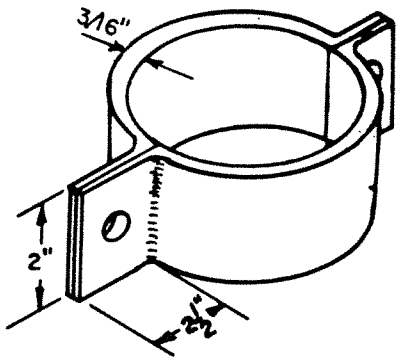


MANHOLE DETAILS FOR PIPE 21" & SMALLER



STEP DETAILS



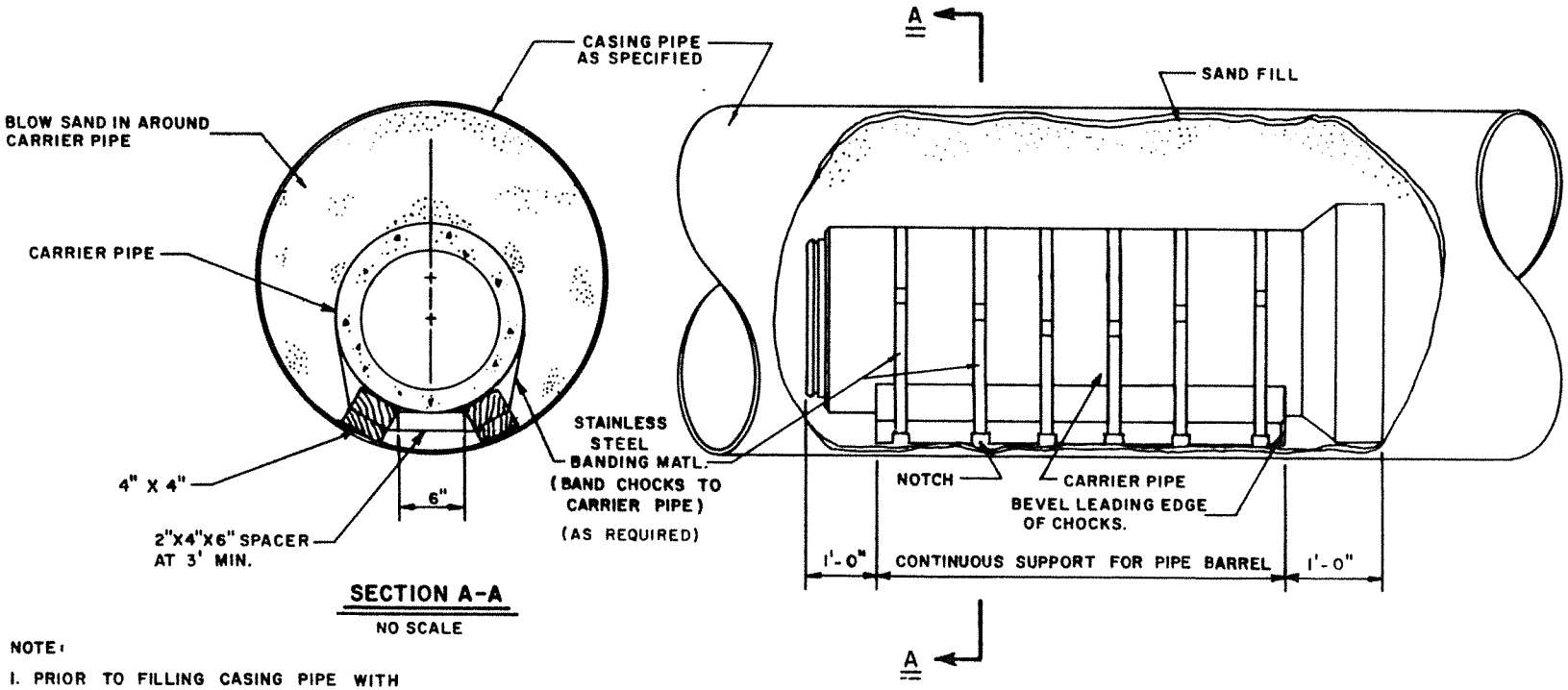


ALUMINUM COUPLING DETAIL

NOTE:

1. 3/4" BOLT GROUTED INTO MANHOLE WALL BUT SHALL NOT PENETRATE THROUGH.
2. INSERT 1/2" MARINE PLYWOOD DAM (1/3 D) INSIDE RETAINER GLAND.
3. USE OF INSIDE DROP MANHOLE IS RESTRICTED TO SPECIAL SITUATIONS IN WHICH THE STANDARD DROP MANHOLE IS NOT FEASABLE.
4. USE RUBBER COUPLER TO CONNECT C.I. PIPE TO CONCRETE.
5. PLYWOOD FORM ALL MANHOLE BASES.

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD INSIDE DROP MANHOLE	
	DATE: 1992
	NO. III



SECTION A-A

NO SCALE

NOTE:

1. PRIOR TO FILLING CASING PIPE WITH SAND, FILL CARRIER PIPE WITH WATER TO PREVENT FLOATING.
2. STAINLESS STEEL BANDING MATERIAL SHALL BE A MINIMUM OF 20 GAGE 1/2" WIDE.
3. BLOCKING TO BE TREATED WOOD.

CASING DETAILS

NO SCALE

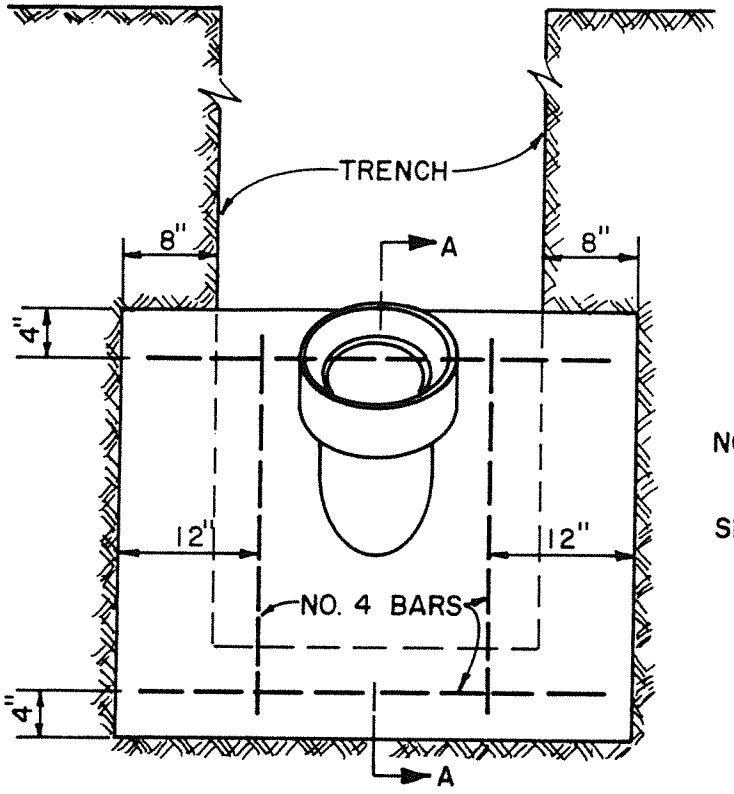
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD CASING DETAIL

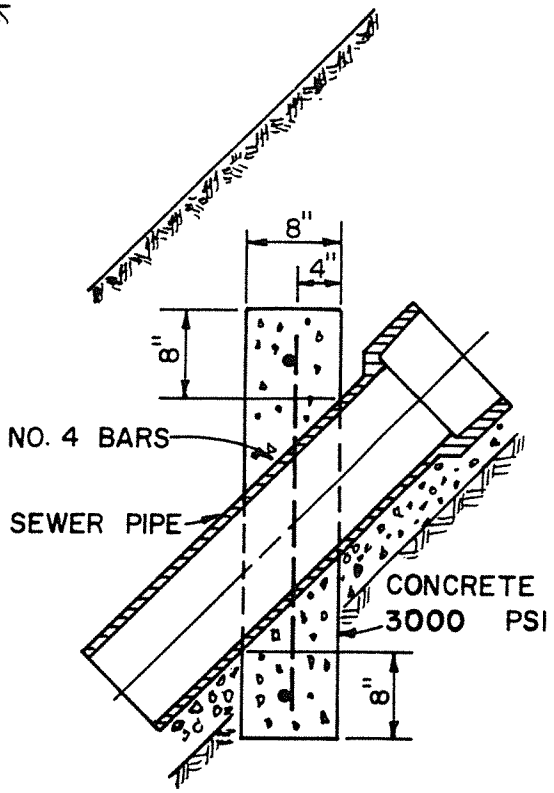
DATE: 1992

NO. 112

FOR SEWER PIPE 8"–12" DIAMETER



ELEVATION



SECTION A-A

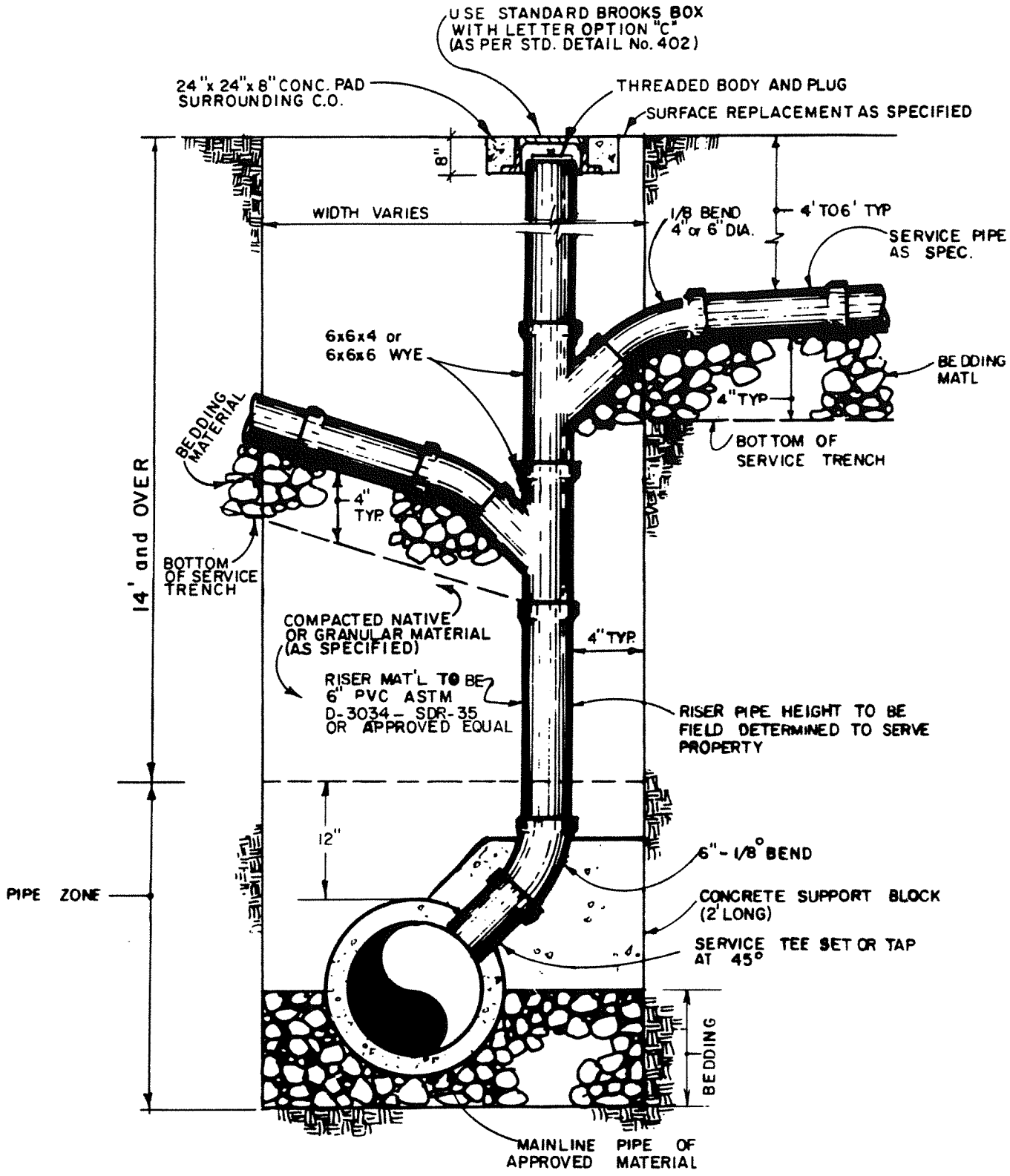
SPACING FOR ANCHOR BLOCK FOR ALL SIZES

SLOPE %	MINIMUM SPACING (FT)
0 – 19.99	NO ANCHOR REQUIRED
20 – 34.99	35
35 – 50.99	25
51 – MORE	15' OR SPECIAL DESIGN

NOTE:

1. FOR 4" SEWER PIPE ANCHOR BLOCK IS REQUIRED AS SHOWN EXCEPT NO REINFORCEMENT IS REQUIRED.
2. FOR PIPE LARGER THAN 12" ANCHOR BLOCK SHALL BE OF SPECIAL DESIGN.
3. ANCHOR BLOCK SHALL ALWAYS BE LOCATED AT THE BARREL SECTION OF THE PIPE AND NOT AT THE JOINT.

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD ANCHOR BLOCK DETAILS FOR SANITARY SEWER	
	DATE: 1992
	NO. 113



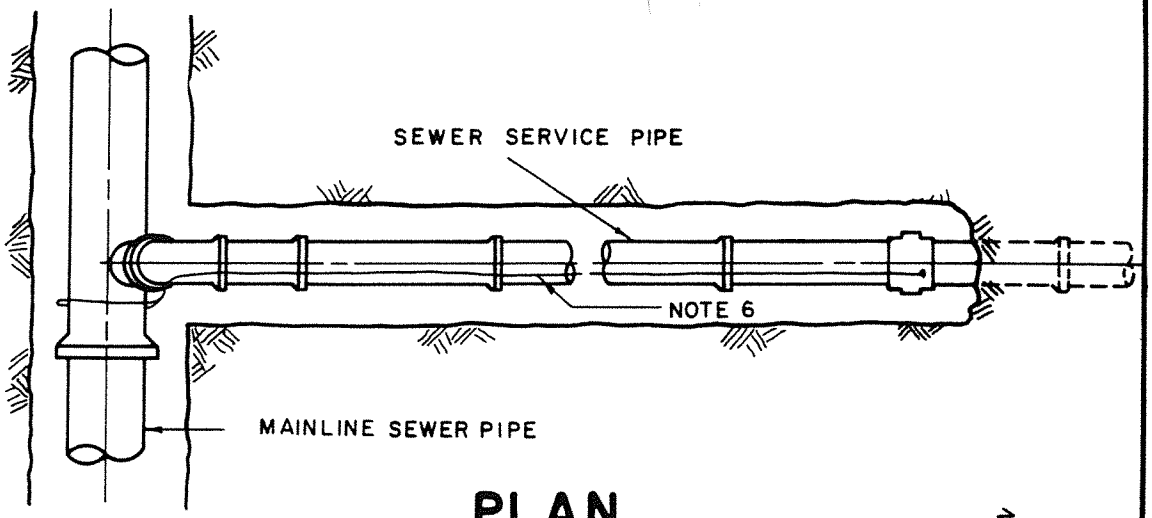
NOTE

1. FOR MORE THAN ONE SERVICE USE 6" RISER W/ 6x6x4 or 6x6x6 WYE, MAX. 4 SERVICES.
2. CONCRETE 28 DAY STRENGTH 3000 PSI. SLUMP 2"-4" 1½" MAX. COARSE AGG.

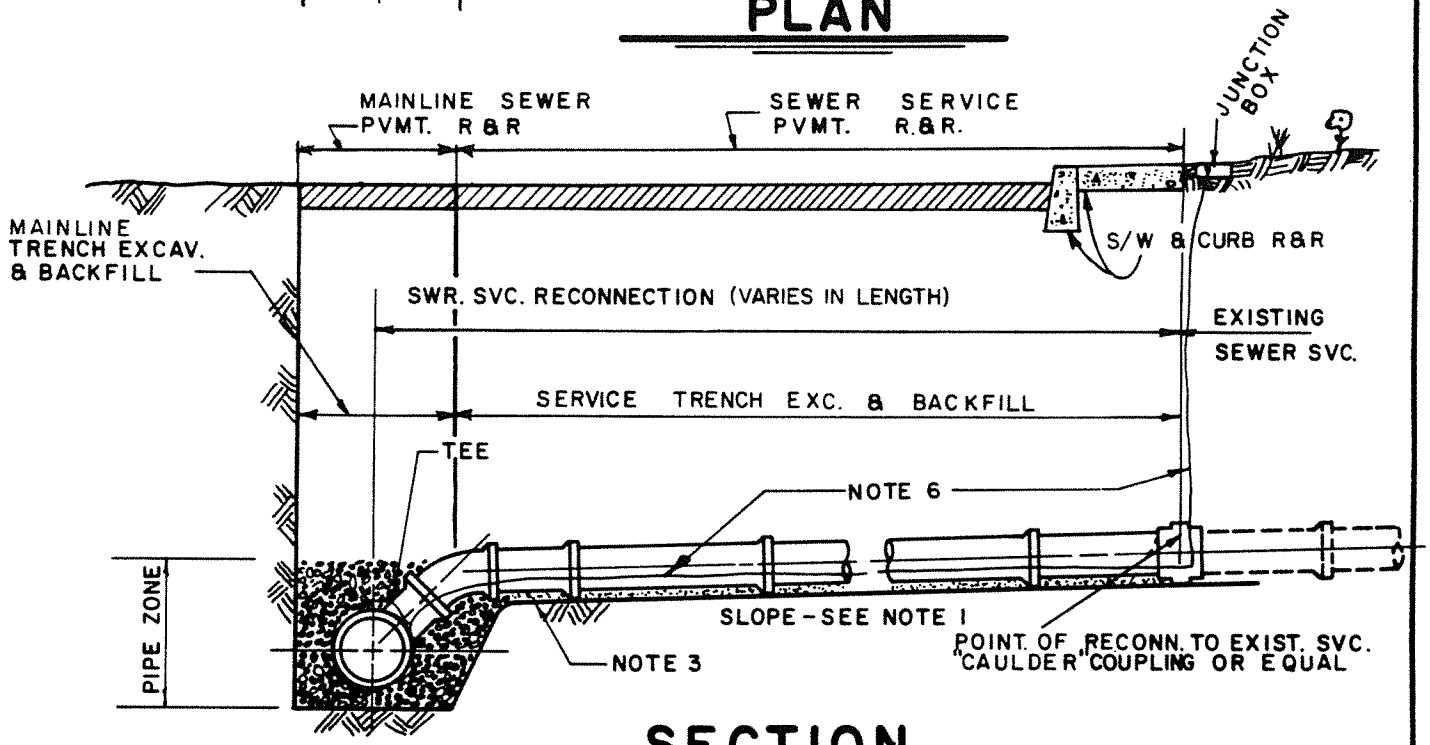
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

DEEP CONNECTION RISER (CHIMNEY)

DATE: 1992
NO: 114



PLAN



SECTION

NOTES:

1.) WHEN SLOPE EXCEEDS 20%, USE ANCHOR BLOCKS, SEE STD. DWG. 113. IF SLOPE EXCEEDS 100%, USE CHIMNEY, SEE STD. DWG. 114.

2.) FOR APPROVED MATERIALS SEE SPECIFICATIONS / PLANS.

3.) BEDDING MATERIAL FOR SERVICE LINES SHALL BE 1"-0 CRUSHED ROCK.

4.) IN ADDITION TO OTHER DETAIL SHOWN THIS DRAWING IS INTENDED TO SHOW THE LIMITS OF MEASUREMENT FOR PAY ITEMS INCLUDED IN CONSTRUCTION CONTRACTS.

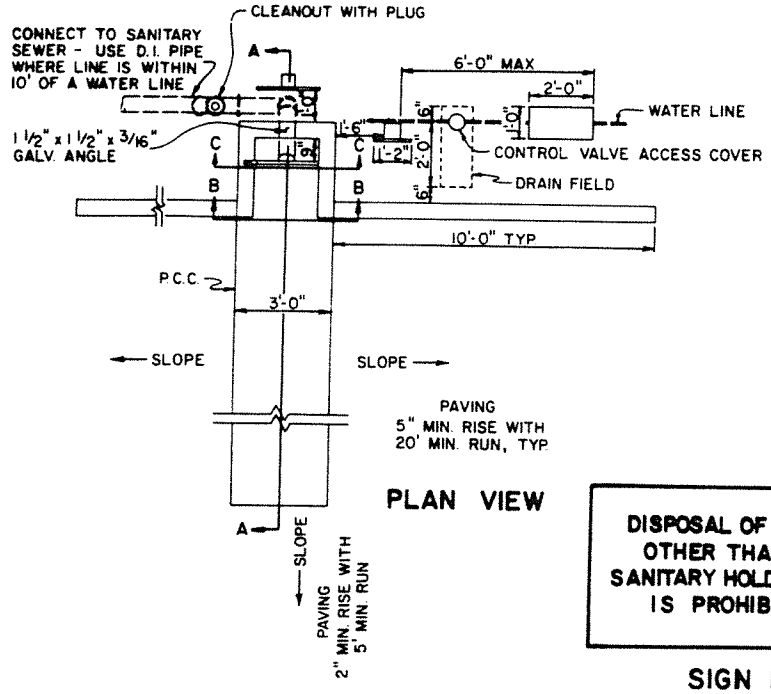
5.) TAPPING OF SEWER MAINS, IF NECESSARY, TO BE BY CONTRACTOR.

6.) INSTALL A CONTINUOUS 12 GAUGE, GREEN, INSULATED COPPER TRACER WIRE ADJACENT TO BUILDING SEWER BETWEEN THE SEWER MAIN AND CONNECTION POINT AND BROUGHT TO GRADE.

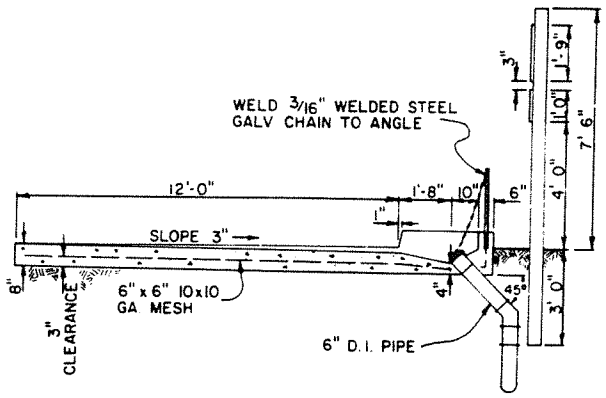
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD SEWER SERVICE RECONNECTIONS

	DATE: 1992
	NO. 115



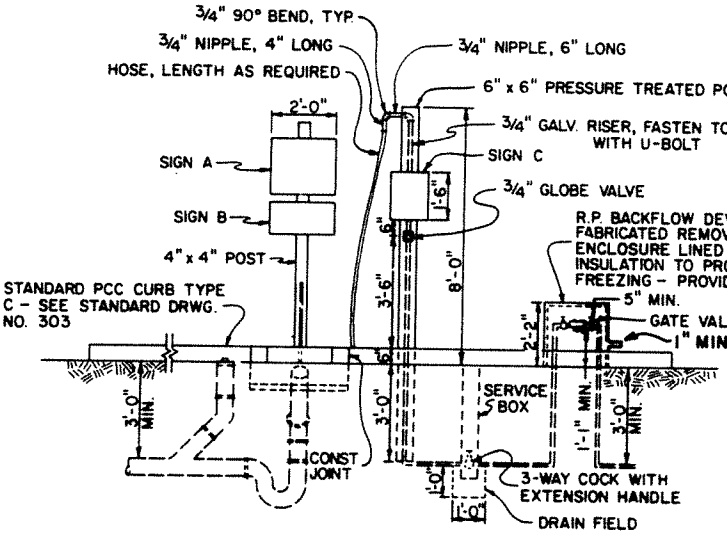
PLAN VIEW



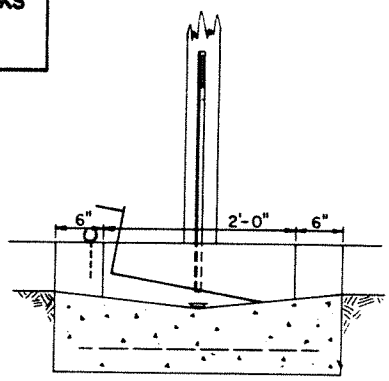
SECTION A-A

DISPOSAL OF MATERIAL OTHER THAN FROM SANITARY HOLDING TANKS IS PROHIBITED

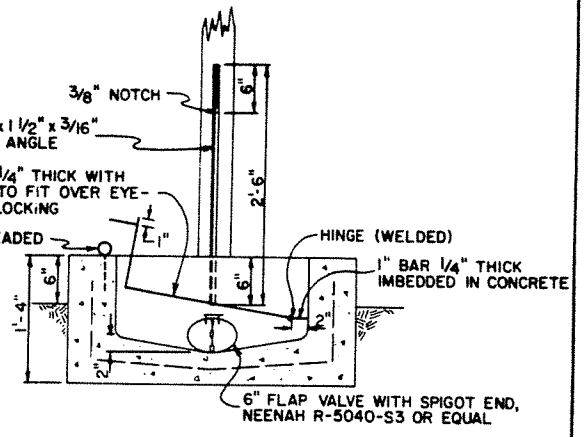
SIGN B



FRONT ELEVATION



SECTION B-B



SECTION C-C

② DEVICE SHALL BE TYPE APPROVED BY OREGON STATE HEALTH DEPARTMENT.

① CENTER OF SLAB SHOULD BE LEFT OPEN TO ALLOW GROUND HEAT TO ENTER BOX.

HOLDING TANK DISPOSAL INSTRUCTIONS

- CONNECT YOUR HOSE TO HOLDING TANK
- PLACE END SECURELY IN DRAIN OPENING AFTER LIFTING COVER
- OPEN TRAILER TANK DRAIN VALVE
- FLUSH AWAY ANY SPILLAGE ON CONCRETE INTO DRAIN
- CLOSE COVER

SIGN A

DANGER

NON-POTABLE WATER

UNSAFE TO DRINK

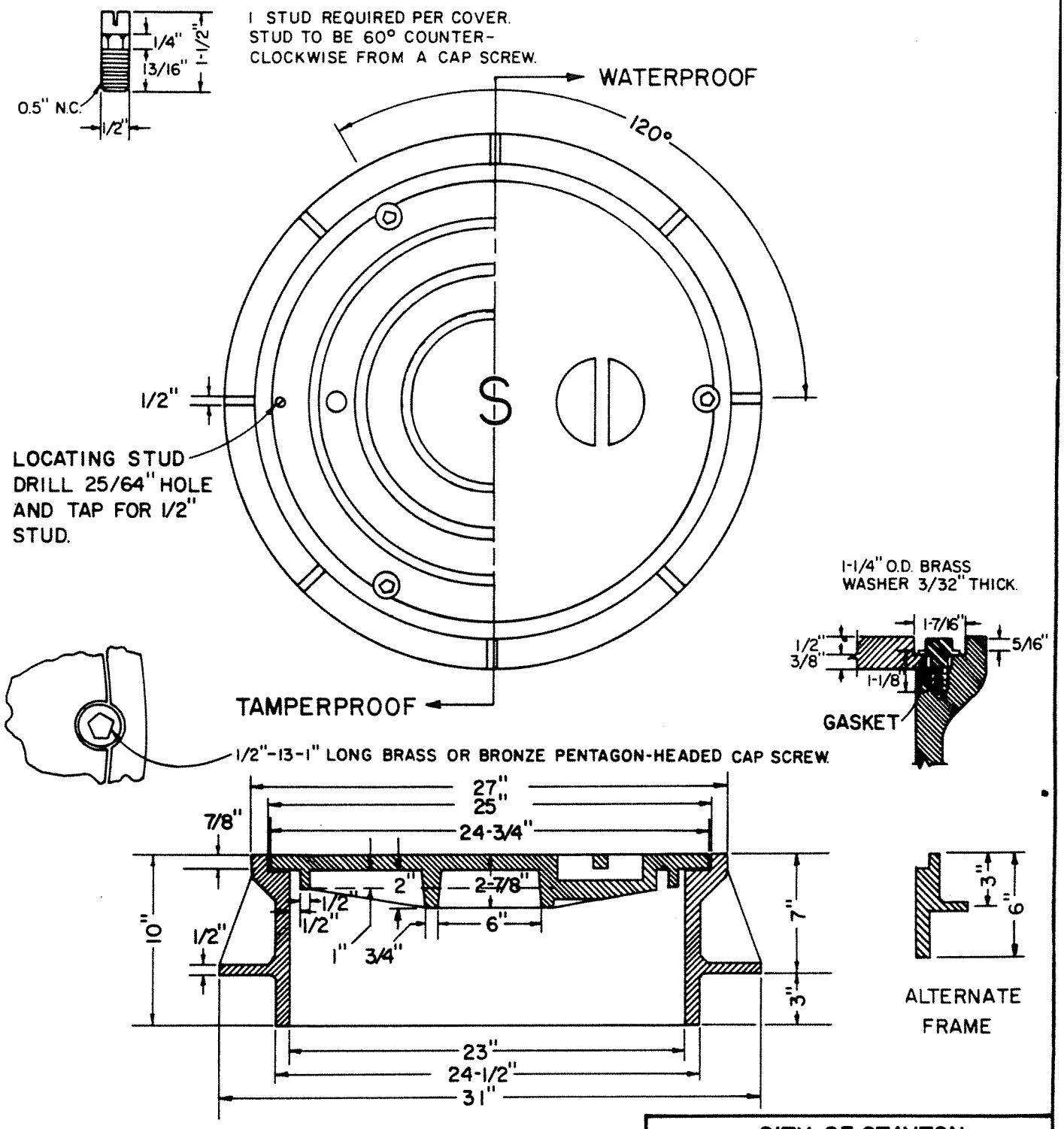
SIGN C

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

TRAILER DUMP STATION

DATE: 1992

NO. 116

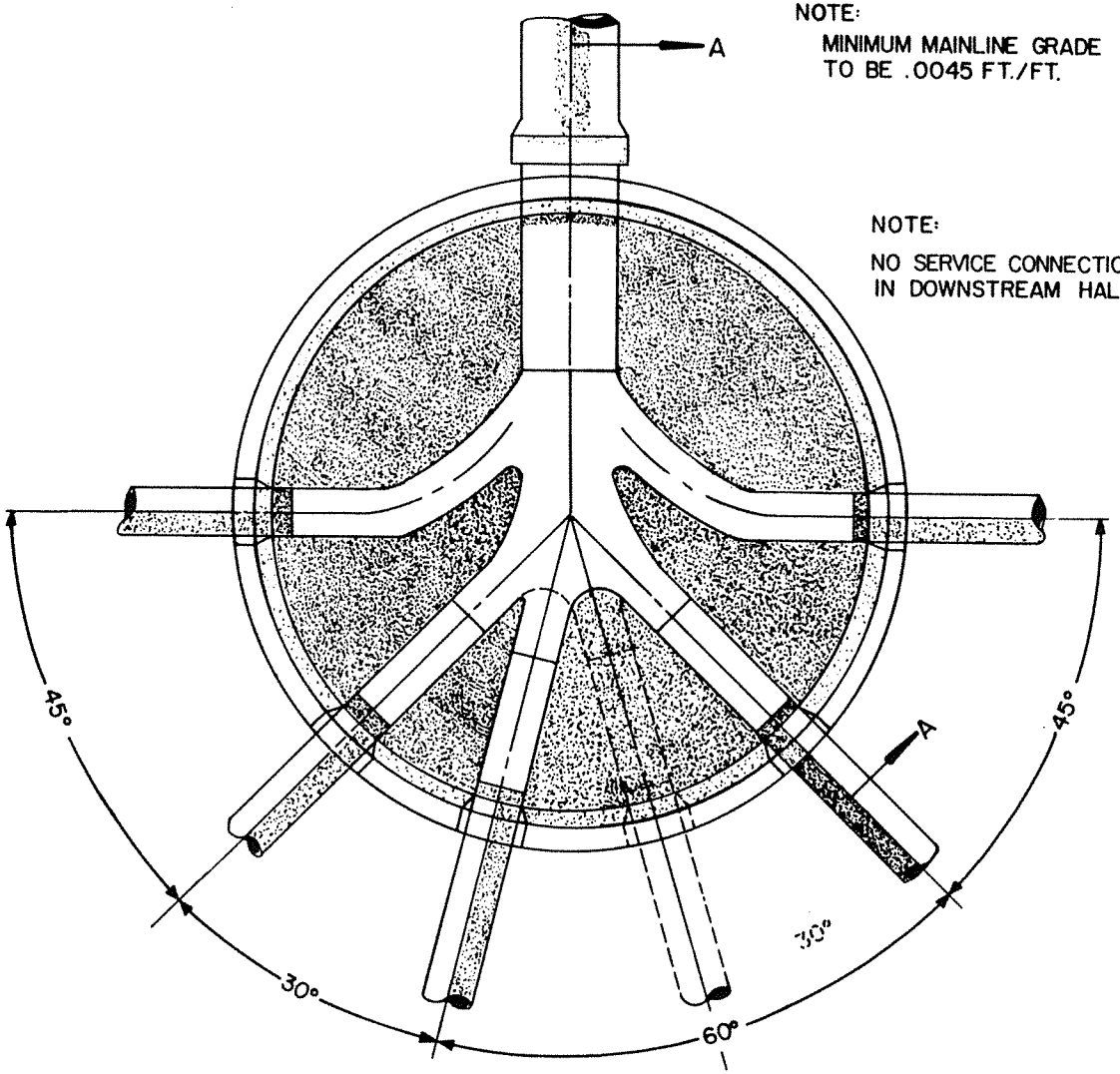


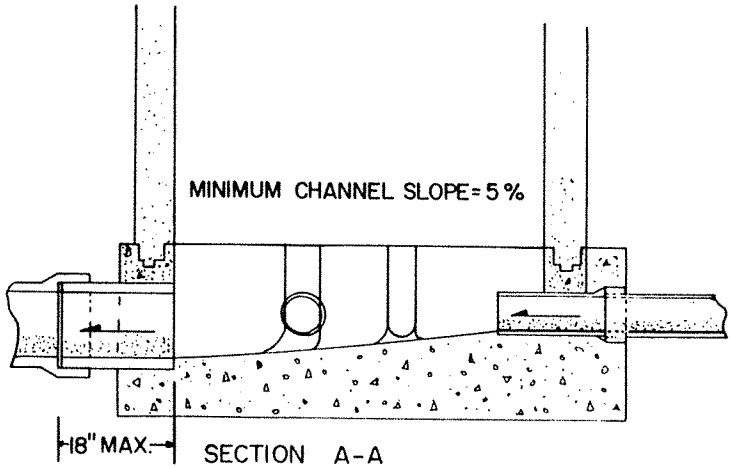
NOTE: BEARING SURFACES TO BE MACHINED.

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
WATER AND TAMPER- PROOF MANHOLE FRAME AND COVER	
	DATE: 1992
	FILE: 117

NOTE:
MINIMUM MAINLINE GRADE
TO BE .0045 FT./FT.

NOTE:
NO SERVICE CONNECTIONS TO BE MADE
IN DOWNSTREAM HALF OF MANHOLE





NOTE:
TOPS OF SERVICES SHALL MATCH
TOP OF OUTLET PIPE

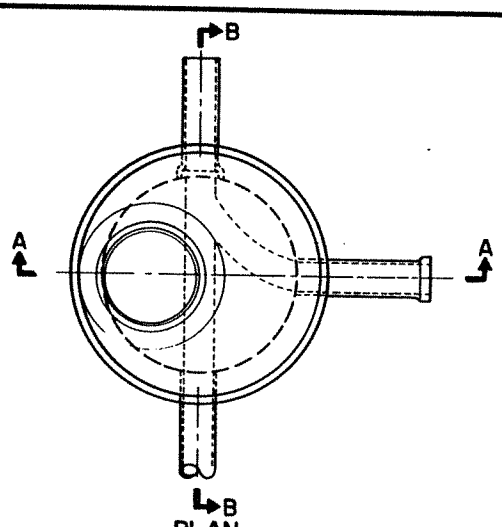
NOTE:
1. MAXIMUM NUMBER OF
SERVICES ALLOWED=5
2. AVOID SERVICE CONNECTION IN
DIRECT LINE WITH MAIN LINE

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

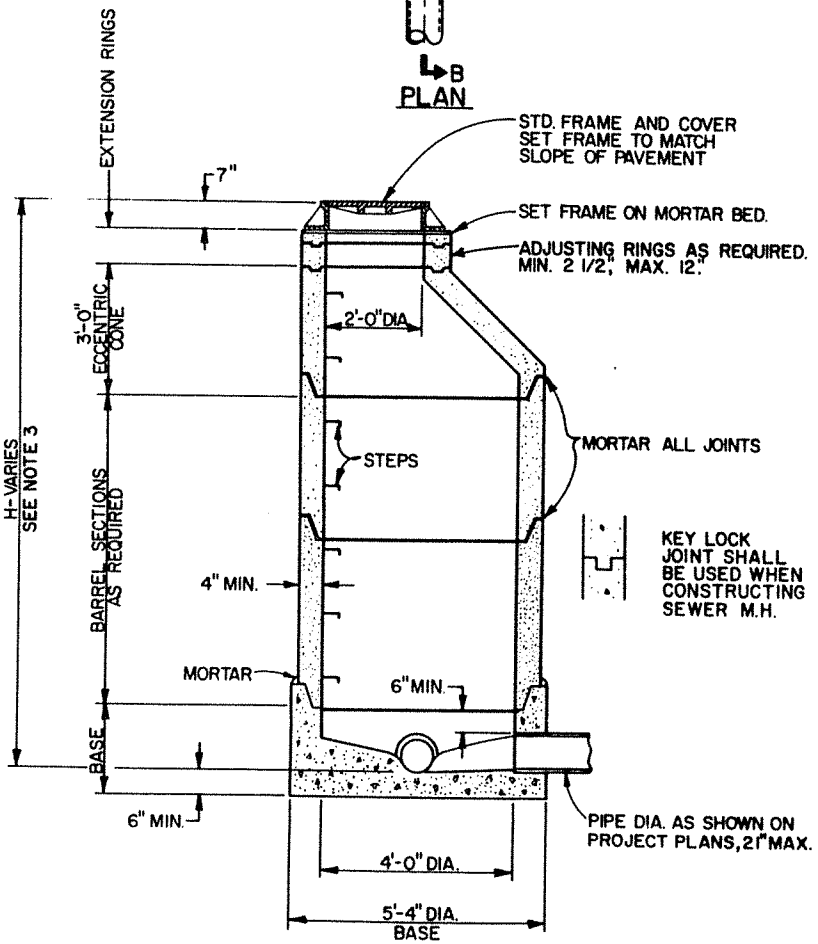
MANHOLE BASE DETAIL FOR CUL-DE-SAC TERMINATION

DATE: 1992

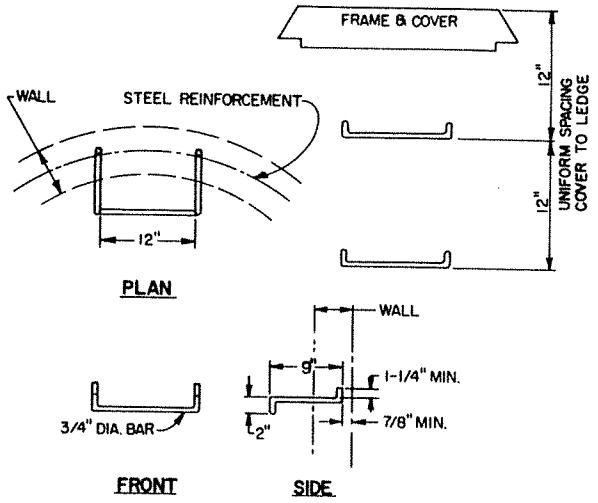
NO. 119



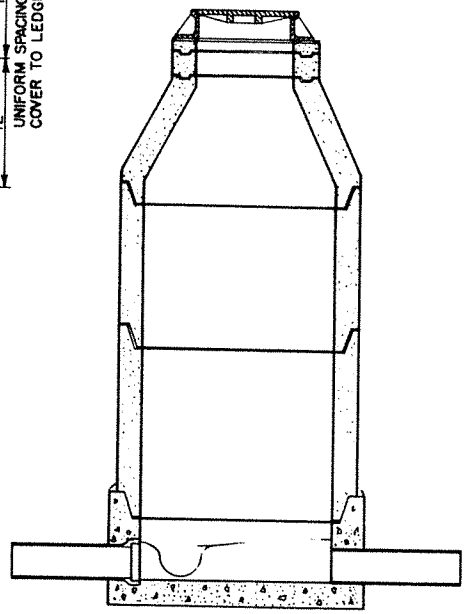
PLAN



SECTION A-A



STEP DETAIL
(GALVANIZED)



SECTION B-B

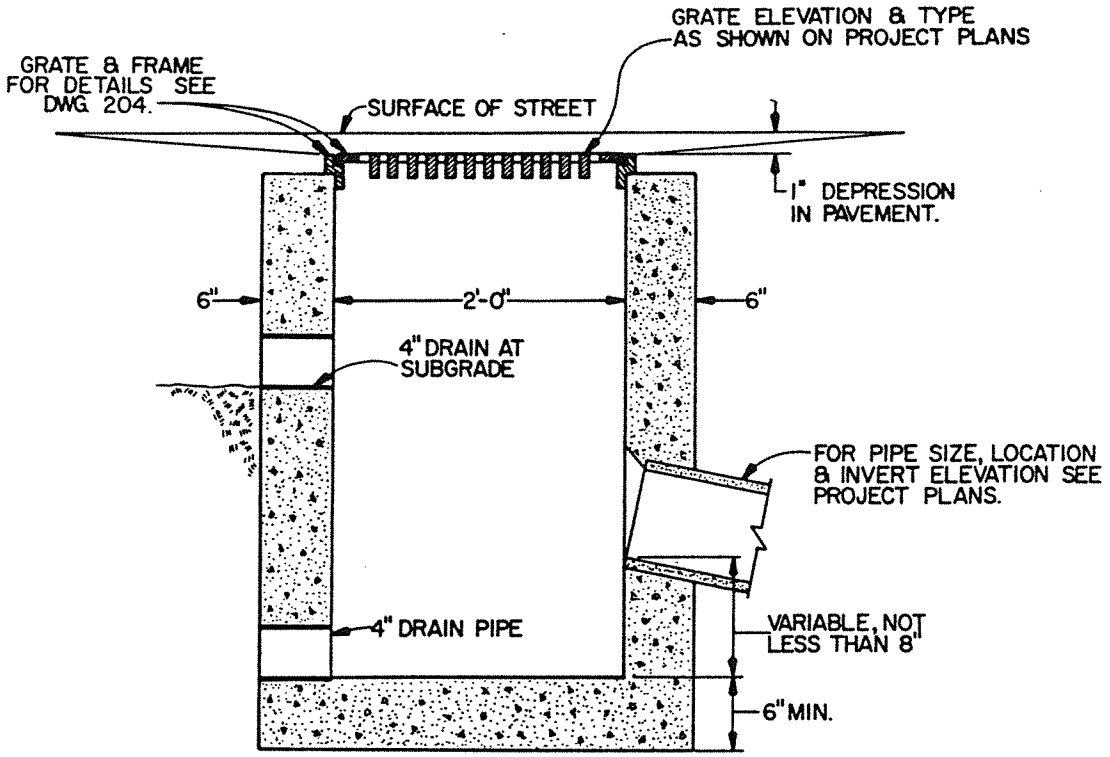
NOTES

1. PRECAST BARREL, CONE, AND EXTENSION RINGS SHALL BE REINFORCED CONCRETE MANHOLE SECTIONS CONFORMING TO ASTM C 478, (AASHO M 199).
2. FOR STANDARD MANHOLE FRAME & COVER DETAILS SEE DWG. 107 OR 205.
3. FOR MANHOLE WITH "H" LESS THAN 4'-0" SEE PROJECT PLANS AND/OR DWG. 211.
4. CONCRETE FOR MANHOLE BASE SHALL BE CLASS 3000 P.S.I.
5. INSIDE JOINTS SHALL NOT EXCEED 3/8" IN THICKNESS.
6. FORM CHANNELS IN MANHOLE BASE AS SHOWN.

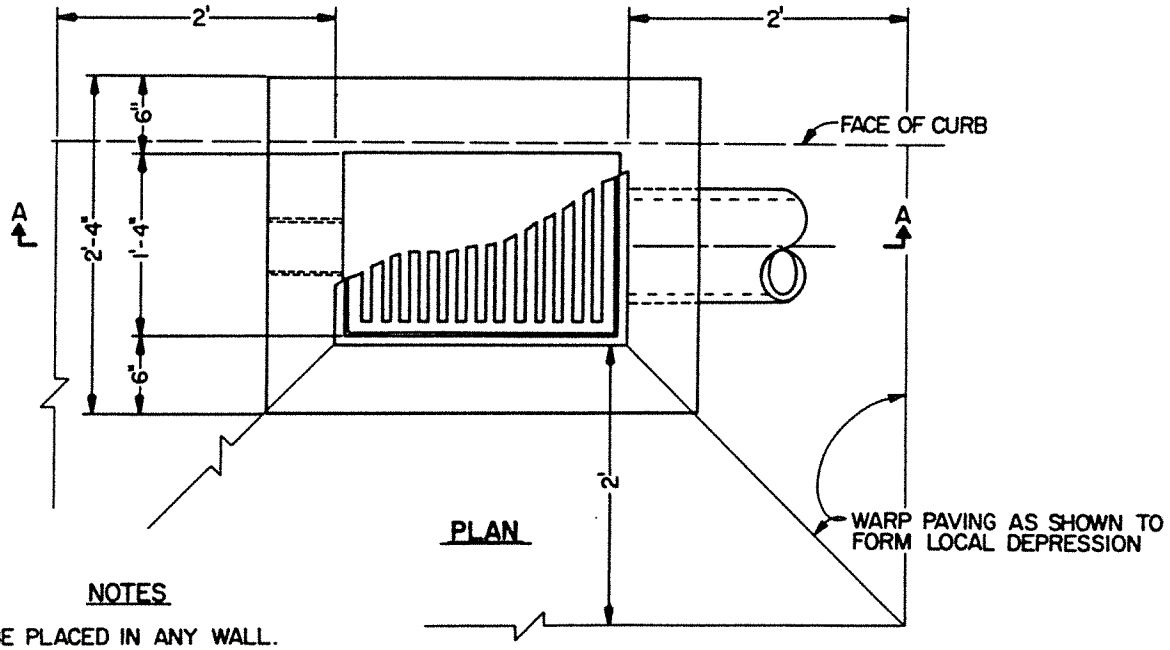
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STORM DRAIN
STANDARD PRECAST MANHOLE

	DATE: 1992
	NO. 201



SECTION A-A



NOTES

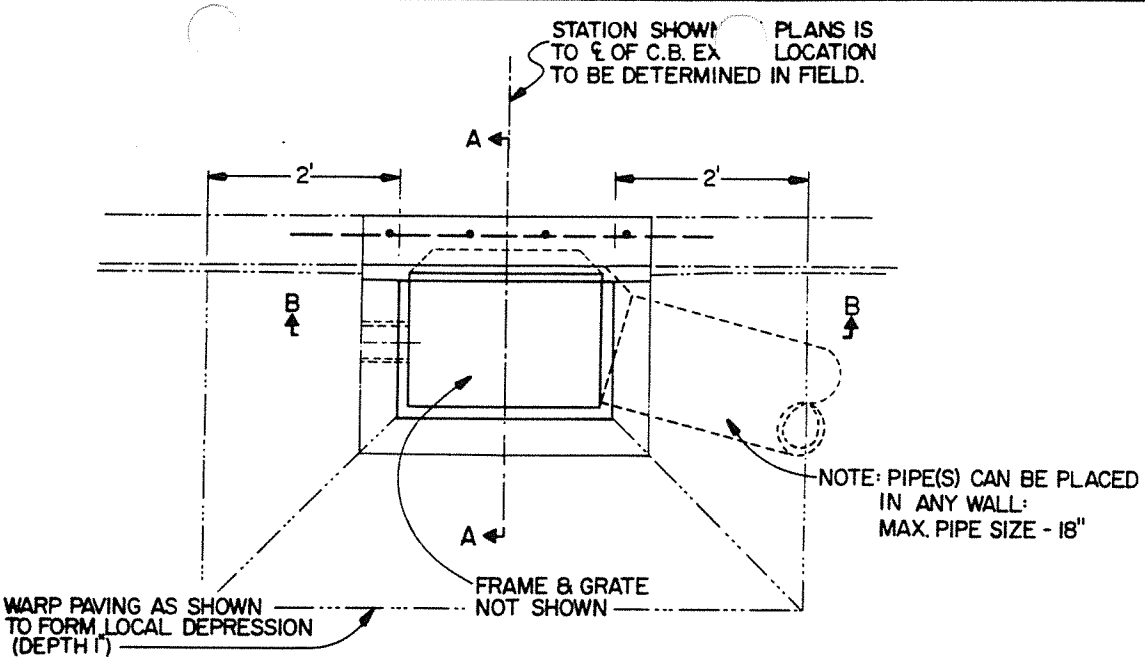
1. PIPE(S) CAN BE PLACED IN ANY WALL.
2. STATION SHOWN ON PROJECT PLANS IS TO CENTERLINE OF C.B.
3. ALL CONCRETE SHALL BE CLASS A/3300 PSI.
4. DRAINS SHALL BE 4" INCH CONC. DRAIN TILE.
5. TO CONSTRUCT CLEANOUT REPLACE GRATE WITH 1'-3½" X 1'-11½" STEEL PLATE ¾" THICK. DRILL ONE, 1" DIA. LIFT HOLE NEAR ONE END OF PLATE.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

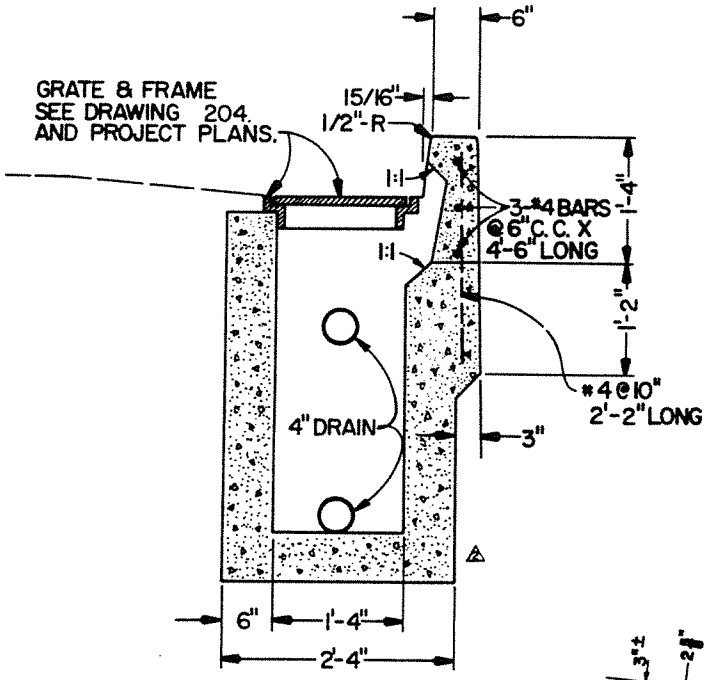
STANDARD CATCHBASIN DETAILS

TYPE I CATCH BASIN
(AND CLEANOUT)

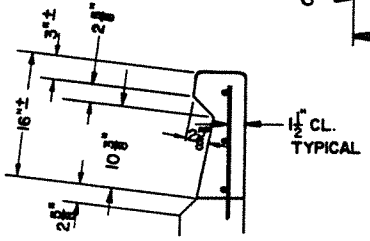
NO. 202



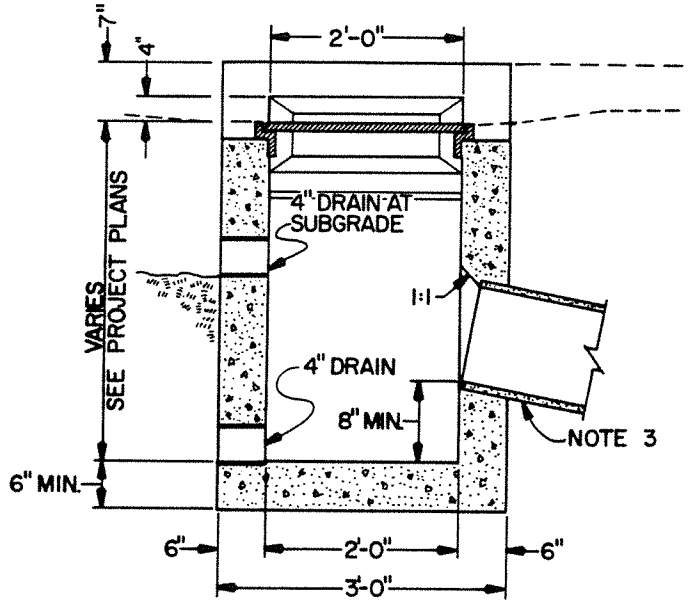
PLAN



SECTION A-A



CURB OPENING DETAIL



SECTION B-B

NOTES

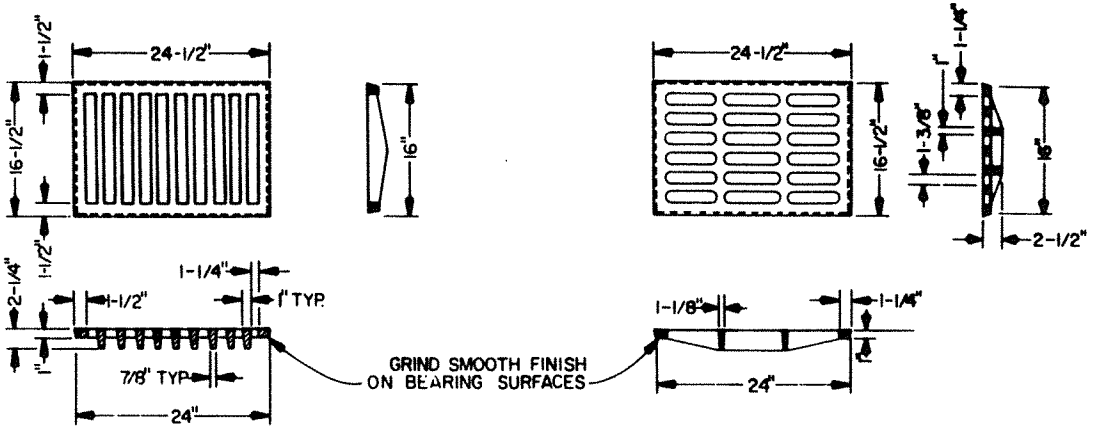
1. ALL CONCRETE SHALL BE CLASS 3000PSI.
2. DRAINS SHALL BE 4-INCH CONC. DRAIN TILE.
3. FOR OUTLET PIPE SIZE, LOCATION, AND INVERT ELEVATION SEE PROJECT PLANS.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD CATCHBASIN DETAILS

TYPE 2 (SIDE INLET) CATCH BASIN

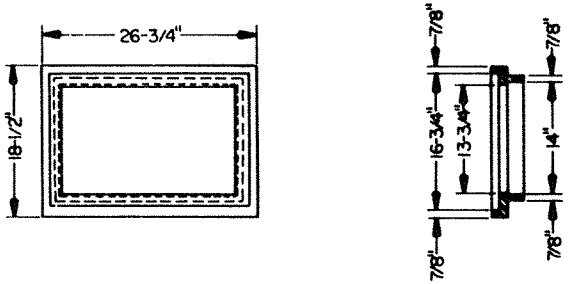
	DATE: 1992
	NO. 203

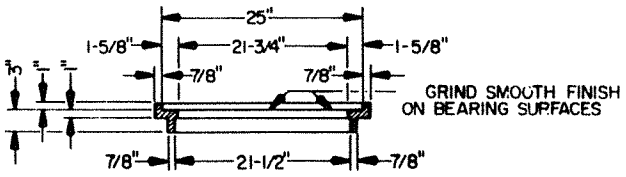


TYPE A GRATE
1-1/4" CLEAR SPACING

TYPE B GRATE
1-3/8" CLEAR SPACING

GRATE DETAILS
(CAST IRON OR CAST STEEL)





GRATE FRAME DETAILS
(CAST IRON OR CAST STEEL)

NOTES

1. ALL CASTINGS SHALL CONFORM TO ASTM A 48 (AASHO M 105) FOR GRAY IRON CASTINGS, CLASS 30, OR (AASHO M 192 (CLASS 70) FOR CAST STEEL.
2. ROUNDS, FILLETS, TAPERS AND OTHER MINOR MODIFICATIONS TO THE DIMENSIONS SHOWN FOR CASTINGS MAY BE MADE TO CONFORM TO COMMON SHOP PRACTICES.

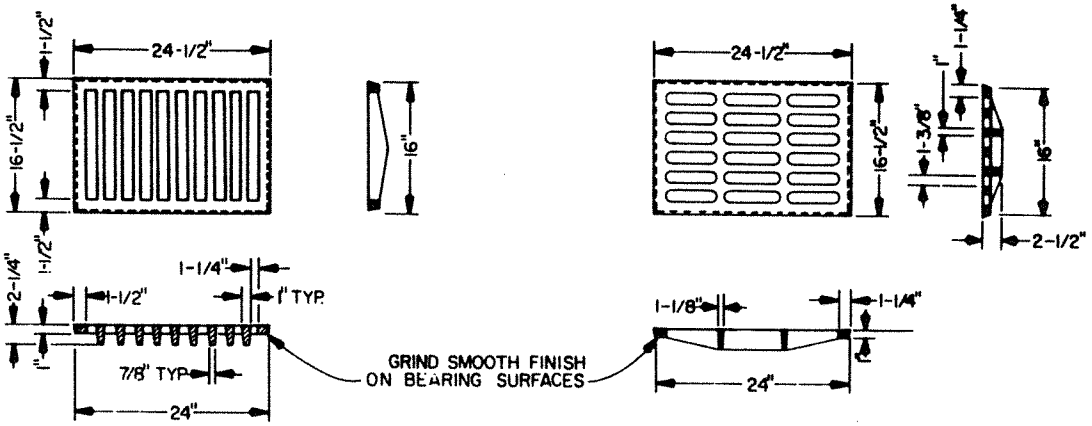
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

CATCH BASIN FRAMES AND GRATES

TYPES A AND B

DATE: 1992

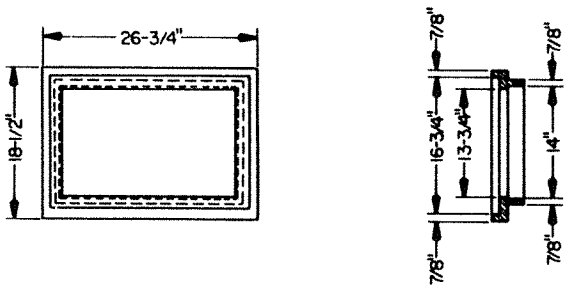
NO. 204

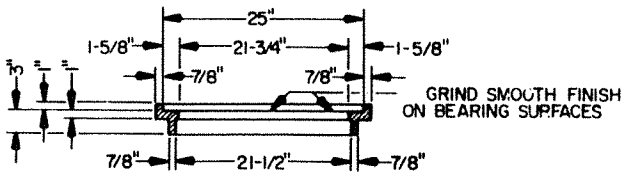


TYPE A GRATE
1-1/4" CLEAR SPACING

TYPE B GRATE
1-3/8" CLEAR SPACING

GRATE DETAILS
(CAST IRON OR CAST STEEL)





GRATE FRAME DETAILS
(CAST IRON OR CAST STEEL)

NOTES

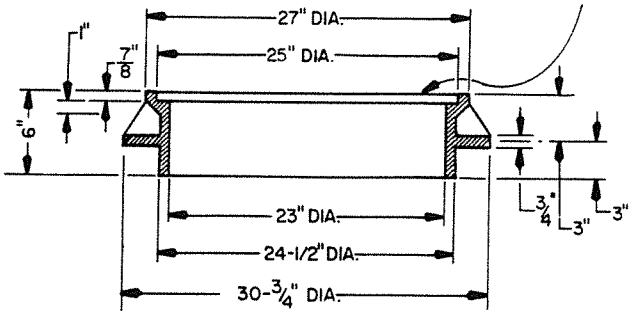
1. ALL CASTINGS SHALL CONFORM TO ASTM A 48 (AASHO M 105) FOR GRAY IRON CASTINGS, CLASS 30, OR (AASHO M 192) (CLASS 70) FOR CAST STEEL.
2. ROUNDS, FILLETS, TAPERS AND OTHER MINOR MODIFICATIONS TO THE DIMENSIONS SHOWN FOR CASTINGS MAY BE MADE TO CONFORM TO COMMON SHOP PRACTICES.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

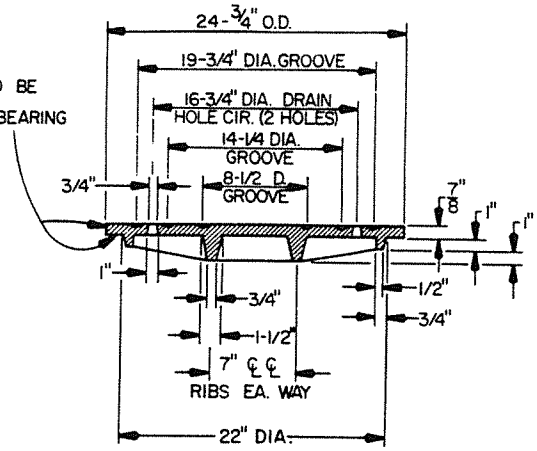
CATCH BASIN FRAMES AND GRATES

TYPES A AND B

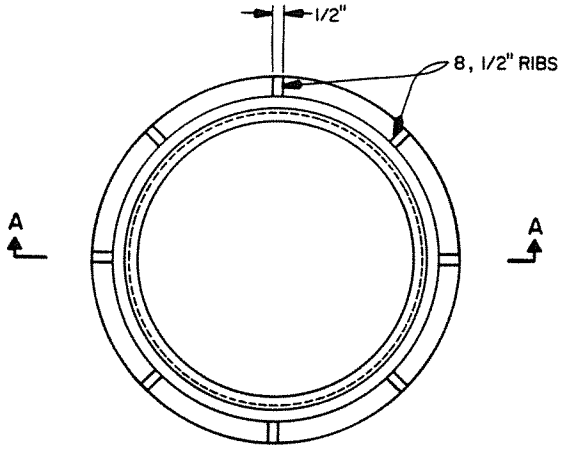
	DATE: 1992
	NO. 204



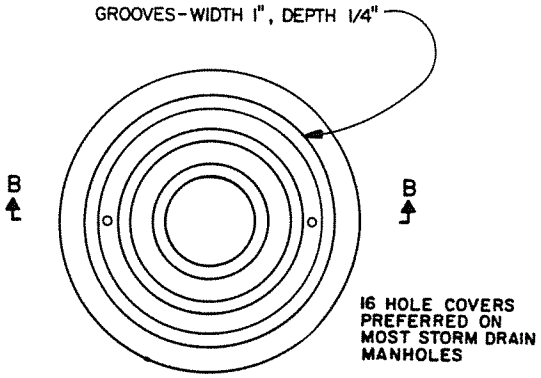
SECTION A-A



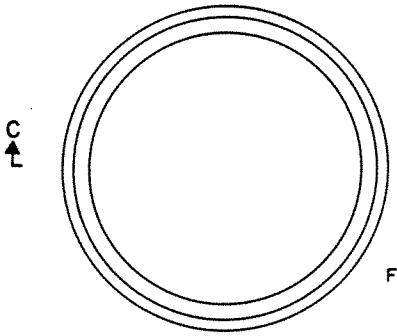
SECTION B-B

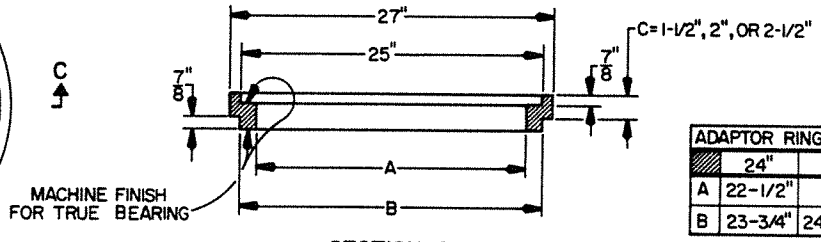


MANHOLE FRAME



MANHOLE COVER





SECTION C-C

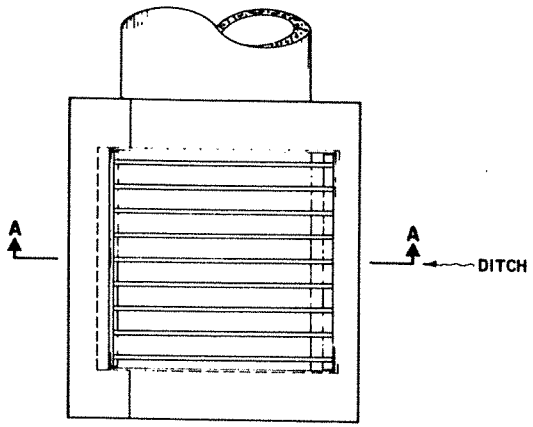
ADAPTOR RING SIZES		
	24"	25"
A	22-1/2"	23"
B	23-3/4"	24-3/4"

ADAPTOR RING

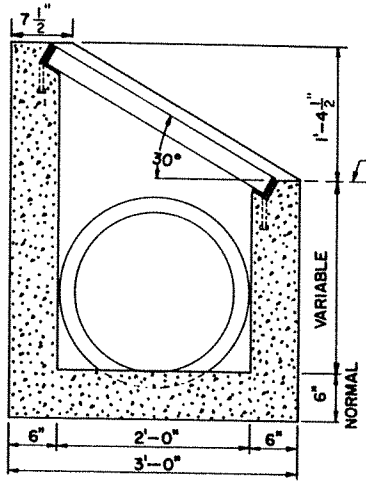
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD MANHOLE
CASTING DETAILS

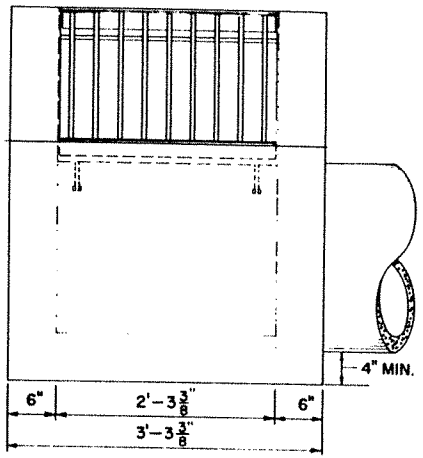
DATE: 1992
NO. 205



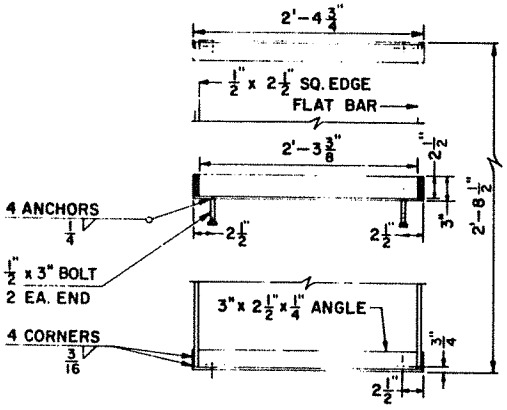
PLAN



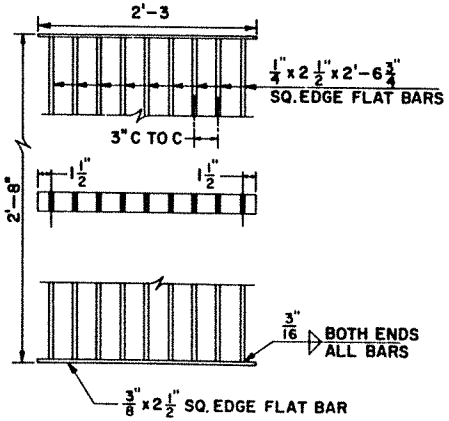
SECTION A–A



ELEVATION



FRAME



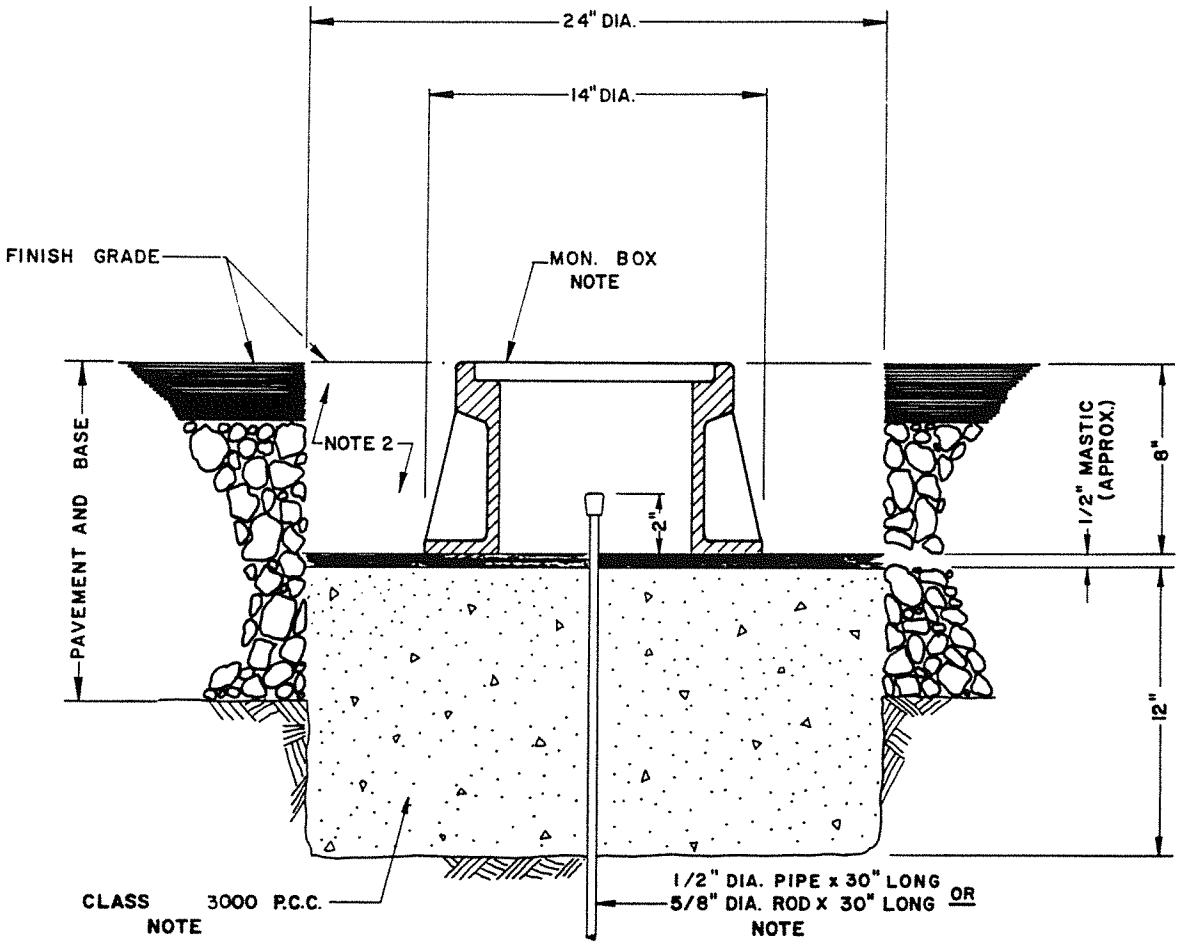
GRATE

1. FOR PIPE SIZE, INVERT ELEVATION AND LOCATION SEE PROJECT PLANS.
2. ALL CONCRETE SHALL BE MIXED AND PLACED IN ACCORDANCE WITH THE SPECIFICATIONS FOR 3000 P.S.I., 1 1/2" MAX. SIZE COARSE AGGREGATE.
3. CATCH BASIN MAY BE BUILT WITH OR WITHOUT A SUMP AS THE ENGINEER MAY DIRECT.
4. FRAME AND GRATE MATERIAL SHALL BE STEEL (A.S.T.M. A-36) AND BE GALVANIZED IN ACCORDANCE WITH (A.S.T.M. A-123).

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

TYPE 3 CATCHBASIN, FRAME & GRATE

	DATE: 1992
	NO 206



SECTION

NOTES;

1. THE CONTRACTOR SHALL BE REQUIRED TO EMPLOY A PROFESSIONAL LAND SURVEYOR, REGISTERED IN THE STATE OF OREGON, TO DRIVE AND SET CAP ON PIPE OR ROD IN P.C.C. BASE.

2. THE CONTRACTOR WILL BE REQUIRED TO PROVIDE THE FOLLOWING: CAST IRON MONUMENT BOX AND COVER, EXCAVATION, INCLUDING EXCAVATION BELOW NORMAL ROADWAY EXCAVATION PAYLINE, PLACING 1/2" MASTIC, SETTING AND ADJUSTING MONUMENT BOX TO FINISH GRADE, BACKFILLING AND PAVING. BACKFILL MAY CONSIST OF BASE ROCK AND PAVEMENT OF THE DEPTHS SHOWN ON THE PROJECT PLANS OR IT MAY BE COMPOSED ENTIRELY OF PAVEMENT AT THE CONTRACTORS OPTION.

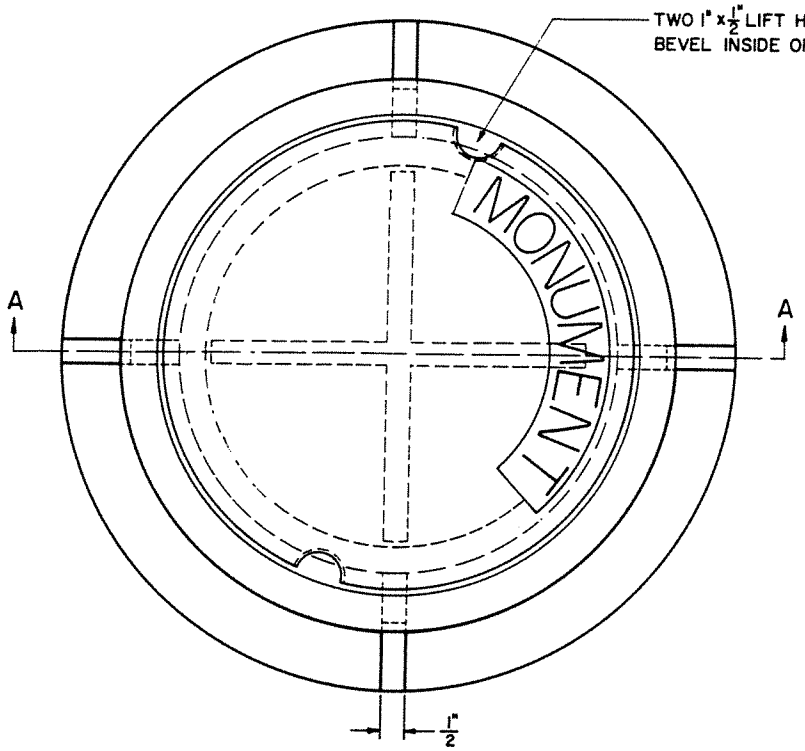
3. LOCATIONS OF MONUMENTS SHOWN ON THE PROJECT PLANS ARE APPROXIMATE ONLY. EXACT LOCATION WILL BE DETERMINED AT THE TIME OF CONSTRUCTION.

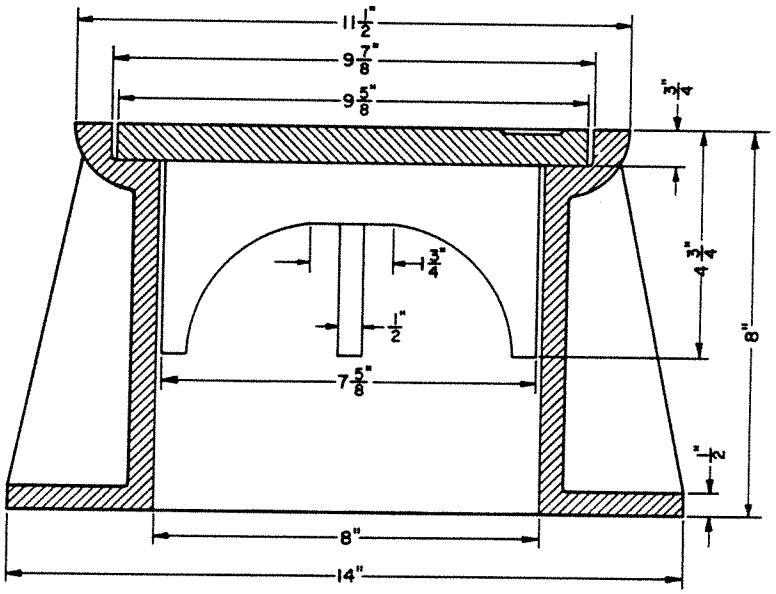
4. CITY OF STAYTON WILL DETERMINE AT TIME OF PLANS REVIEW WHICH MONUMENTS WILL REQUIRE BOXES.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

MONUMENT BOX
INSTALLATION DETAIL

	DATE : 1992
	NO. 207



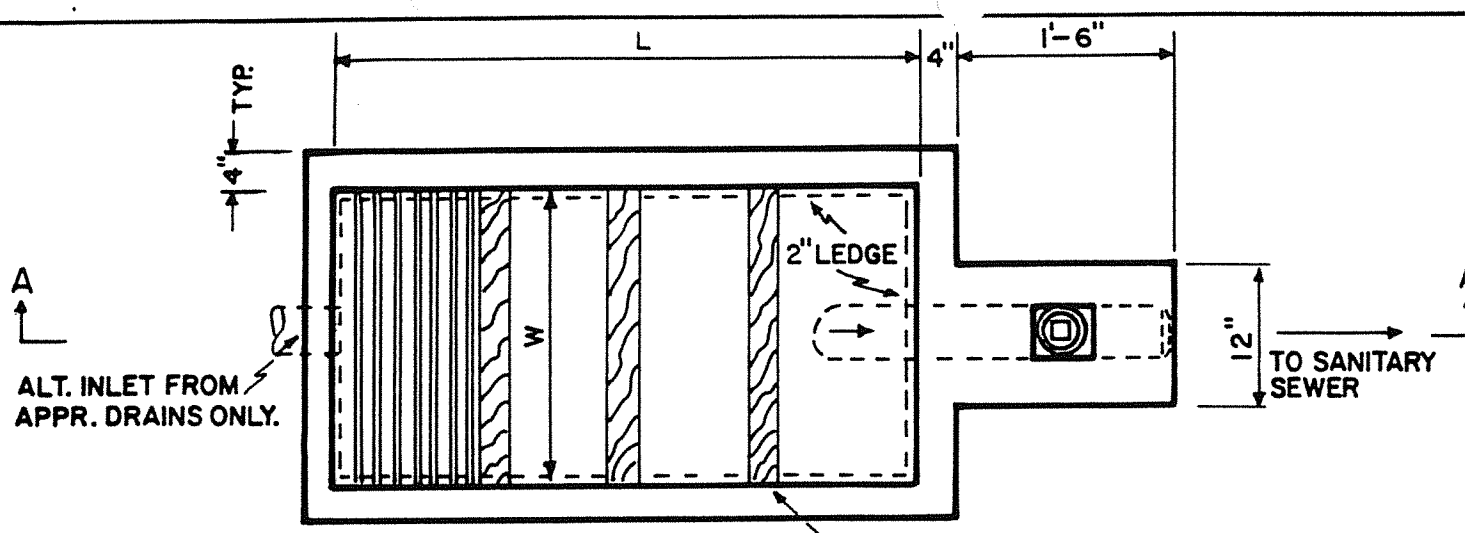


SECTION A–A

NOTES:

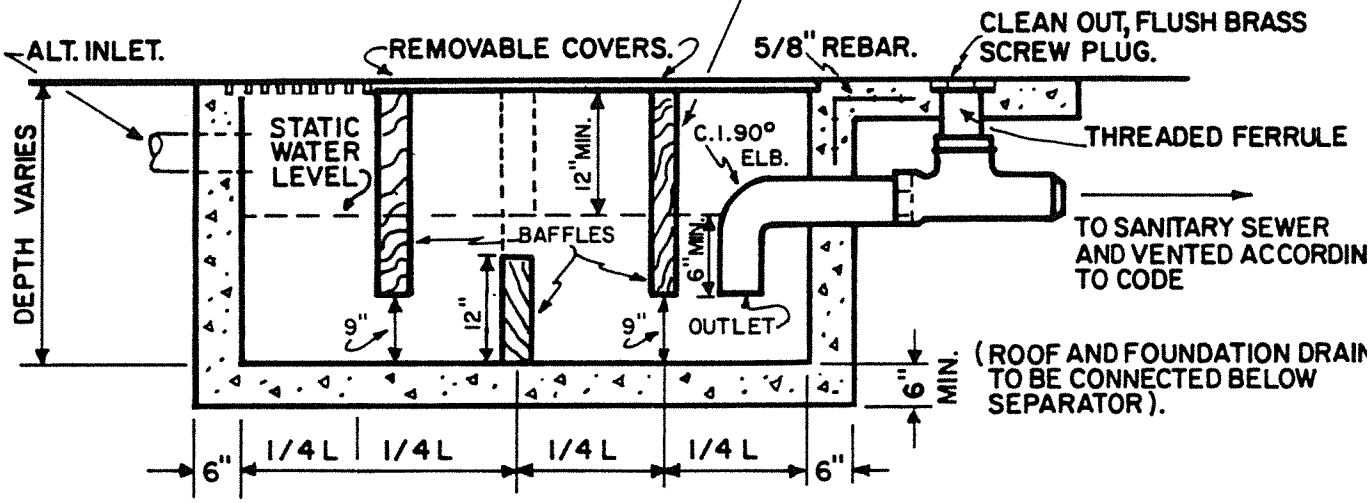
1. MATERIAL SHALL BE A.S.T.M. A–48 GRAY CAST IRON, CLASS 30.
2. APPROX. WEIGHTS: FRAME 56 LBS., COVER 20 LBS.

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
MONUMENT BOX CASTING DETAILS	
	DATE: 1992
	NO. 208



PLAN

2" SLOTS CAST IN CONCRETE MAX. 1" INTO WALL.



SECTION A-A

TANK SIZE FOR DIFFERENT INFLOWS (GALLONS / DAY)

GPD	L	W	GRATE	SOLID COVER
400	4'	2'	12" x 24"	24" x 36"
600	5'	2'-6"	15" x 30"	30" x 45"
800	6'	3'	18" x 36"	36" x 54"

NOTES:

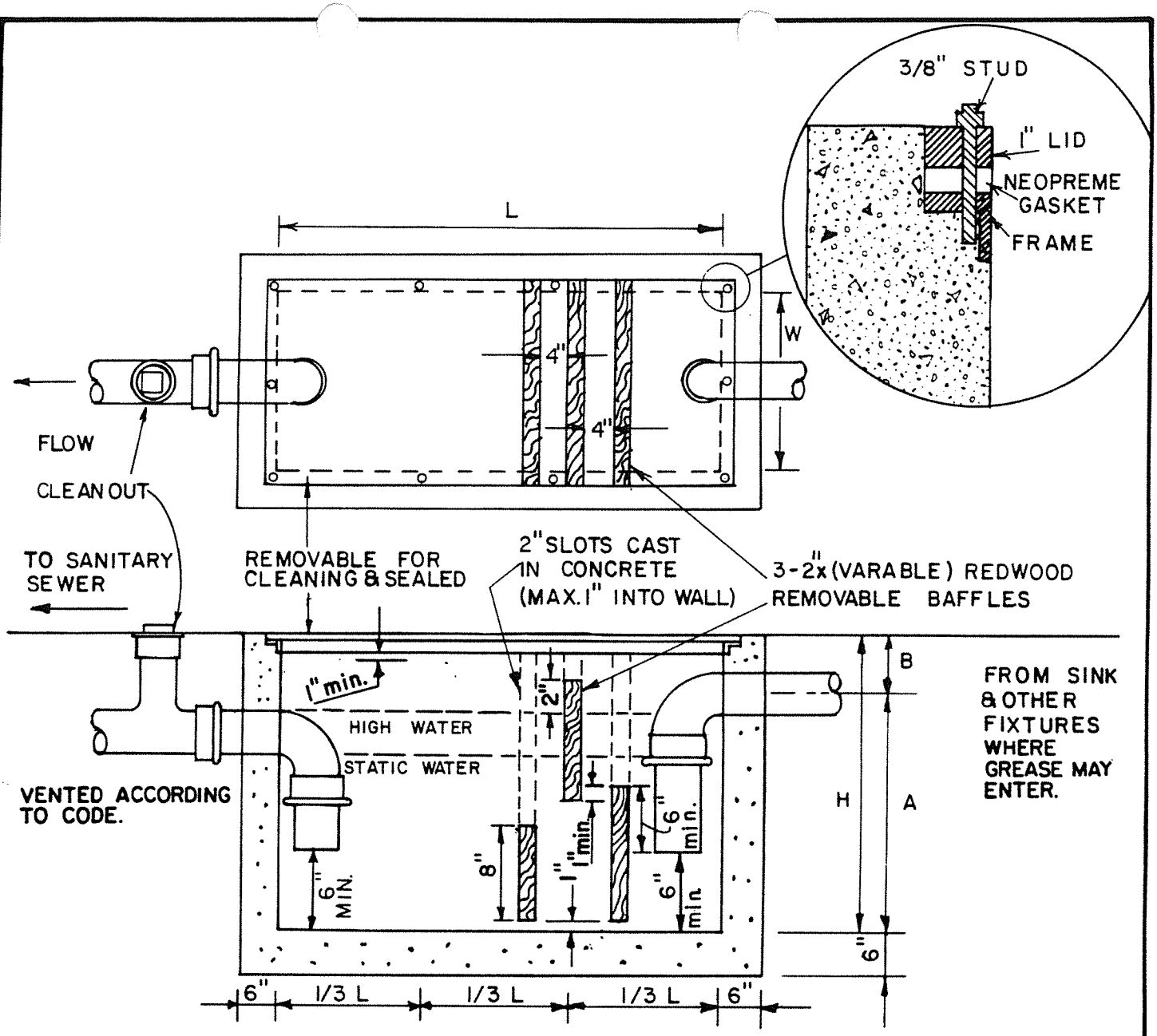
1. FOR USE OUTSIDE OF BLDG. ONLY.
2. ALL BAFFLES SHALL BE 2" x 12" REDWOOD.
3. MIN. 2'x2' OPENING FOR CLEANING.
4. MIN. 1' DEPTH UNDER INVERT OF OUTLET PIPE.
5. INLET AND OUTLET PIPE SHALL BE SAME SIZE, 3" MIN.
6. FOR MORE DETAILS SEE PLUMBING CODE
7. ORDER NEENAH FOUNDRY COMPANY OR EQUAL GRATES. COVERS SHALL BE 1" THICK, A-36 STEEL.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

SAND AND OIL SEPARATOR

DATE: 1992

NO. 209



NOTES:

1. ALL EXPOSED STEEL TO BE GALVANIZED AFTER FABRICATION.
2. COVER DIMENSIONS ARE (L+4") x (W+4") x 1" THICK.
3. INLET & OUTLET PIPE SHALL BE SAME SIZE, (3" MIN.)
4. FOR MORE DETAILS SEE CODE 708, 711. (PLUMBING)
5. COVER MUST BE REMOVEABLE FOR CLEANING & WATER SEALED.

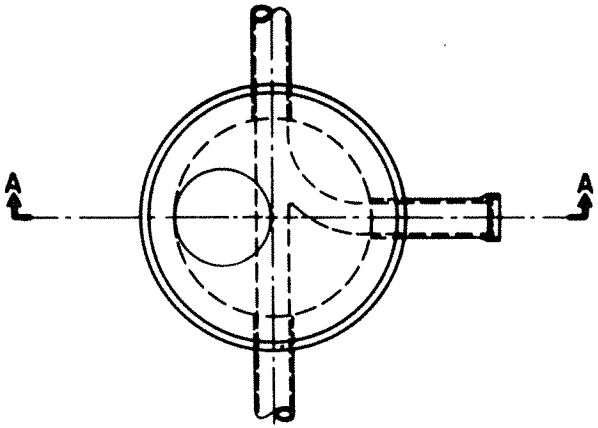
TOTAL NUMBER OF FIXTURES CONNECTED	MAX. CAPACITY OF FIXTURES CONNECTED, GAL.	REQUIRED RATE OF FLOW PER. MIN, GAL.	GREASE RETENTION CAPACITY, LBS.	INSIDE DIMENSIONS L	W	H	A	B
1	50	20	40	28 1/4	16 1/2	17 1/4	13 1/4	4
2	65	25	50	30	17 3/4	19 3/4	15 1/4	4 1/2
3	90	35	70	32 1/2	19 1/2	21 1/4	16 1/4	5
4	125	50	100	35 1/2	21 1/4	24 1/4	17 1/2	6 3/4

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

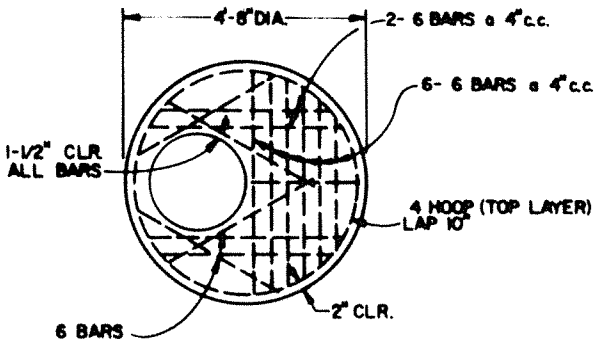
GREASE INTERCEPTOR

DATE: 1992

NO: 210



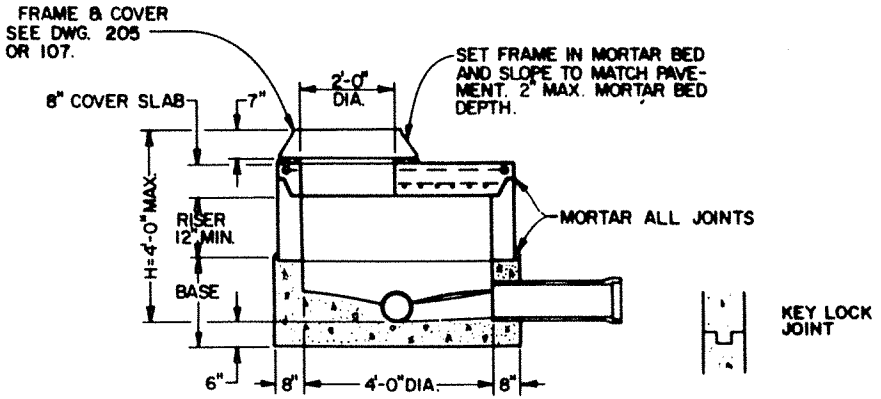
PLAN
(FRAME & COVER NOT SHOWN)



COVER SLAB REINFORCEMENT

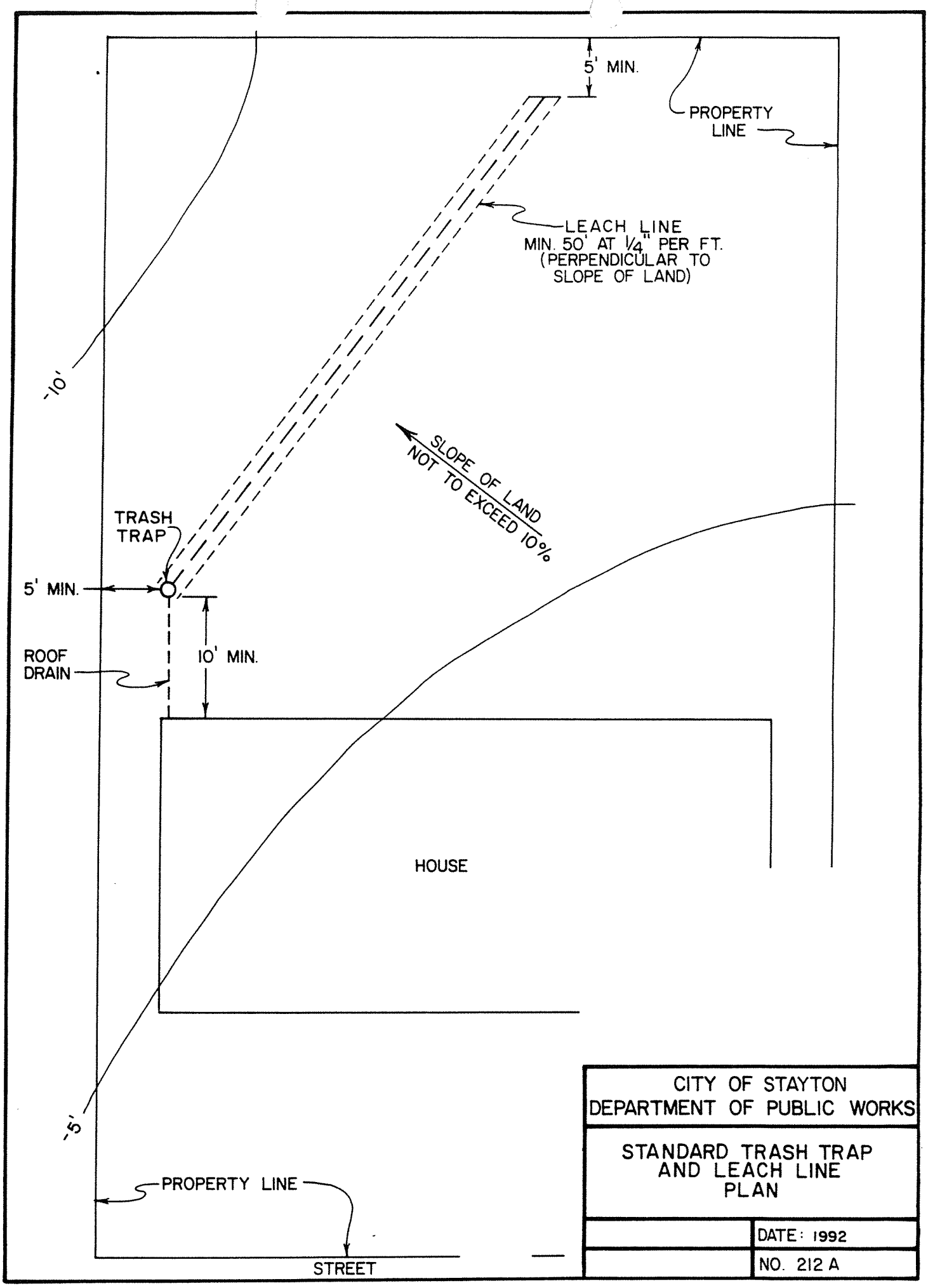
NOTES

1. SEWER MANHOLES SHALL USE KEY LOCK JOINTS ONLY.
2. ALL PIPE TO MANHOLE CONNECTORS TO BE KON-N-SEAL OR APPROVED EQUAL



SECTION A-A

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
SHALLOW PRECAST MANHOLE (H LESS THAN 4'-0")	
	DATE: 1992
	NO. 211

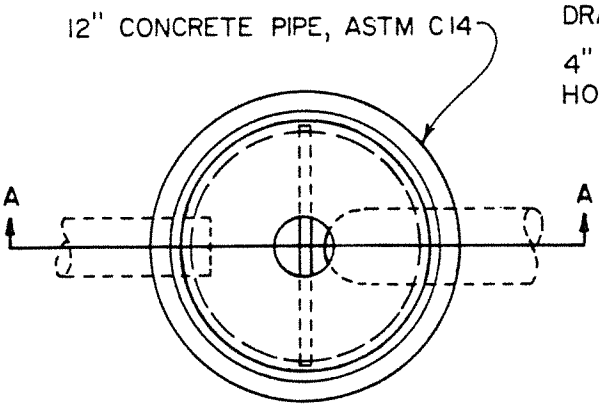


CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD TRASH TRAP
AND LEACH LINE
PLAN

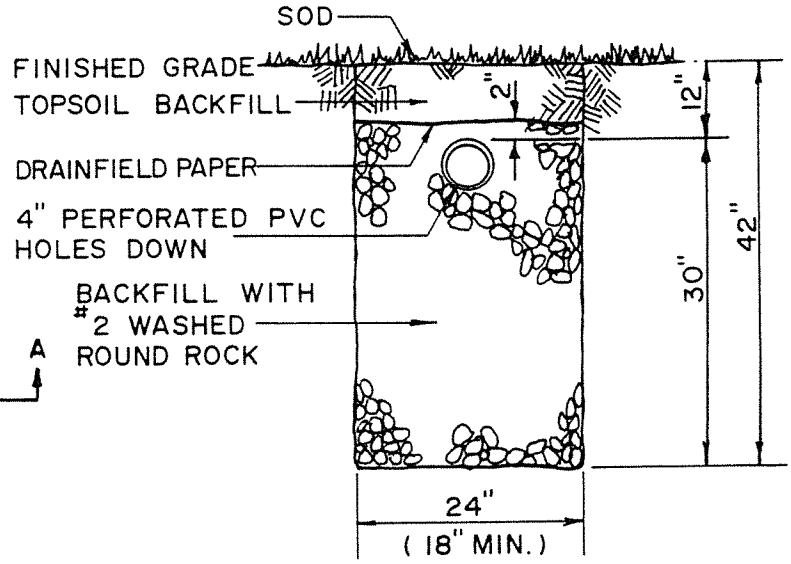
DATE: 1992

NO. 212 A



TRASH TRAP

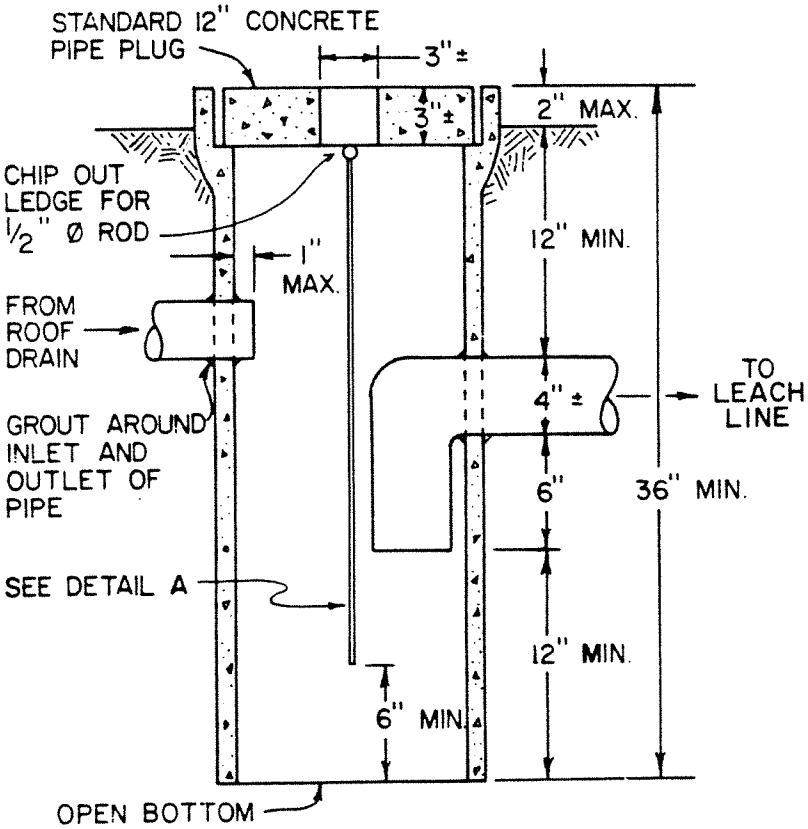
SECTION A-A

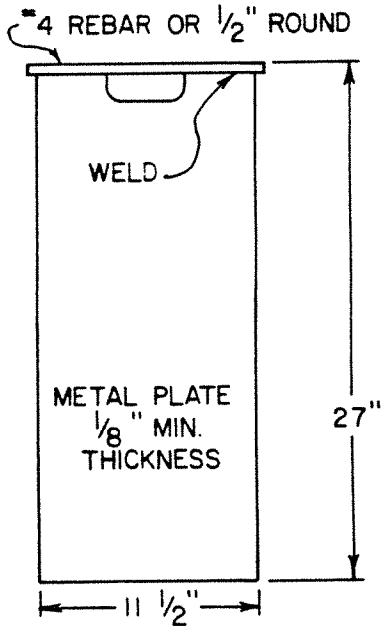


TYPICAL SECTION LEACH LINE

NOTES:

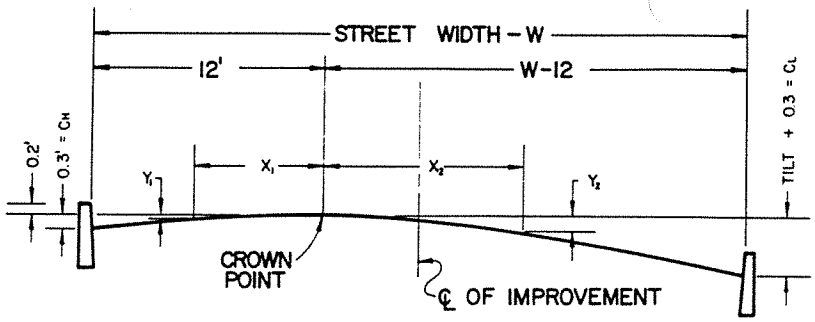
1. PLASTIC MAY BE USED AS AN ALTERNATE FOR METAL PLATE.





DETAIL A

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD TRASH TRAP AND LEACH LINE DETAILS	
	DATE: 1992
	NO. 212 B



TYPICAL SECTION FOR TILTED STREET

	HIGHSIDE	L O W S I D E			
STREET WIDTH		34'	40'		
TILT		0.9'	1.2'		
[P (VALUE)]	0.00208	0.00248	0.00191		
X (FT.)	Y_1 (FT.)	Y_2 (FT.)	Y_2 (FT.)		
1.000	0.002	0.002	0.002		
2.000	0.008	0.009	0.008		
3.000	0.019	0.022	0.017		
4.000	0.033	0.039	0.031		
5.000	0.052	0.062	0.048		
6.000	0.075	0.089	0.069		
7.000	0.102	0.121	0.094		
8.000	0.133	0.159	0.122		
9.000	0.169	0.200	0.155		
10.000	0.208	0.247	0.191		
11.000	0.252	0.300	0.232		
12.000	0.300	0.357	0.276		
13.000		0.419	0.323		
14.000		0.486	0.375		
15.000		0.558	0.430		
16.000		0.635	0.490		
17.000		0.717	0.553		
18.000		0.803	0.620		
19.000		0.895	0.691		
20.000		0.992	0.765		
21.000		1.093	0.844		
22.000		1.200	0.926		
23.000			1.012		
24.000			1.102		
25.000			1.196		
26.000			1.293		
27.000			1.395		
28.000			1.500		
29.000					
30.000					
31.000					
32.000					
33.000					
34.000					
35.000					

1. FOR STREET WIDTHS AND CROWNS NOT SHOWN SEE PROJECT PLANS.
2. Y_1 VALUE FOR HIGHSIDE OF STREET SAME FOR ALL STREET WIDTHS.
3. IF W, C_H, C_L, T, ARE KNOWN, Y MAY BE CALCULATED USING THE FOLLOWING FORMULAS:

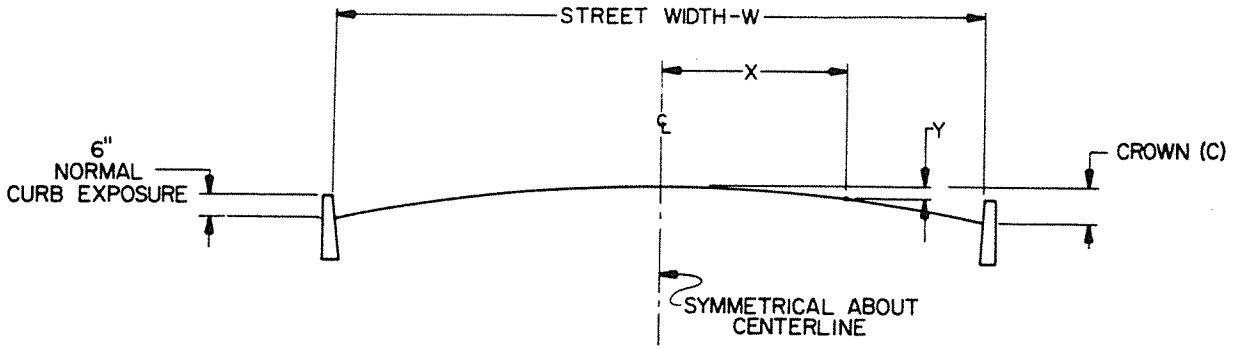
HIGHSIDE: $P_1 = \frac{C_H}{(12)^2} = \frac{3}{(12)^2} = 0.00208$ AND $Y_1 = P_1 X_1^2$

LOWSIDE: $P_2 = \frac{C_L}{(W-12)^2}$ AND $Y_2 = P_2 X_2^2$

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

PARABOLIC CROWN
TILT SECTION
FOR CITY STREETS

DATE: 1992
NO. 301



TYPICAL SECTION FOR NON-SUPERELEVATED, SYMMETRICAL STREET

STREET WIDTH-W	30'	34'	40'	47'	
CROWN (C)	6" = 0.500'	7" = 0.583'	8" = 0.667'	9-3/8" = 0.781'	
X (FT.)	Y (FT.)	Y (FT.)	Y (FT.)	Y (FT.)	Y (FT.)
1.000	0.002	0.002	0.001	0.001	
2.000	0.009	0.008	0.007	0.006	
3.000	0.020	0.018	0.015	0.013	
4.000	0.036	0.032	0.027	0.023	
5.000	0.056	0.050	0.042	0.035	
6.000	0.080	0.072	0.060	0.051	
7.000	0.109	0.098	0.082	0.069	
8.000	0.142	0.128	0.107	0.090	
9.000	0.179	0.162	0.135	0.114	
10.000	0.222	0.200	0.167	0.141	
11.000	0.269	0.242	0.202	0.171	
12.000	0.320	0.290	0.240	0.203	
13.000	0.375	0.340	0.282	0.239	
14.000	0.435	0.392	0.327	0.277	
15.000	0.500	0.450	0.375	0.318	
16.000		0.520	0.427	0.362	
17.000		0.580	0.482	0.408	
18.000			0.540	0.458	
19.000			0.602	0.510	
20.000			0.667	0.565	
21.000				0.623	
22.000				0.684	
23.000				0.747	

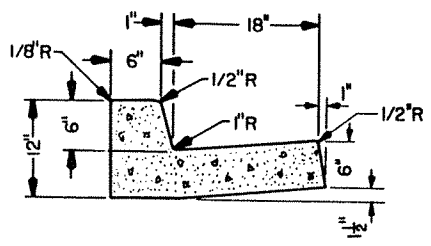
1. FOR STREET WIDTHS AND CROWNS NOT SHOWN SEE PROJECT PLANS
2. IF BOTH W & C ARE KNOWN, Y MAY BE CALCULATED FROM THE FORMULAS: $Y = \frac{4CX^2}{W^2}$ OR $Y = PX^2$ WHERE, $P = \frac{4C}{W^2}$

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

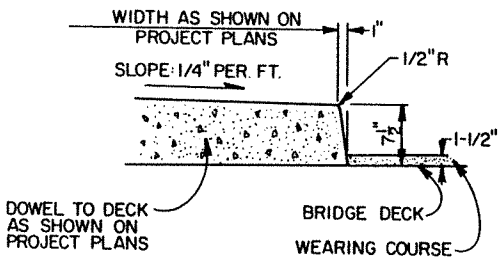
PARABOLIC CROWN
FOR
CITY STREETS

DATE: 1992

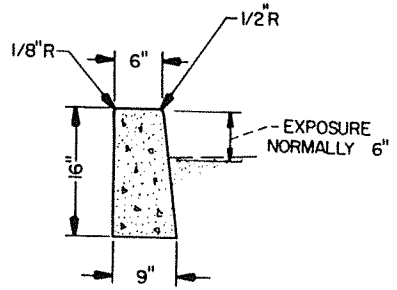
NO. 302



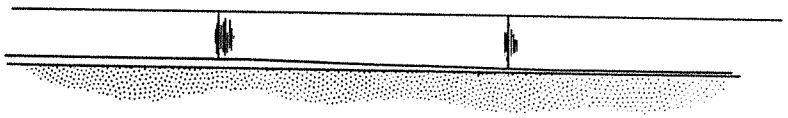
TYPE-A-CURB AND GUTTER



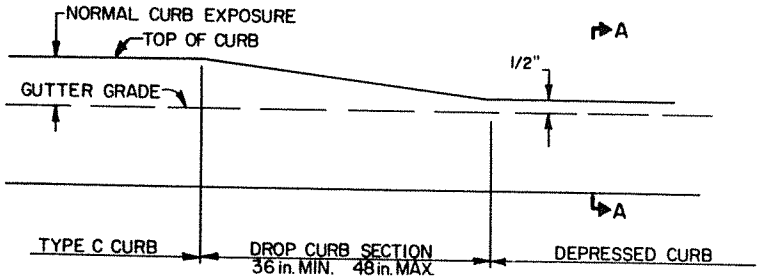
TYPE D
ON BRIDGES



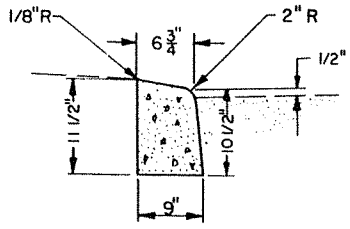
TYPE-C-CURB



PLAN



ELEVATION



SECTION A-A

NOTES

1. CURBS AND GUTTERS SHOWN MAY BE USED WITH EITHER A.C. OR P.C.C. PAVEMENTS.
2. TRANSITIONS FROM ONE TYPE CURB TO ANOTHER WILL BE DETAILED ON PROJECT PLANS AS NECESSARY.
3. "TEE BAR" CONTRACTION JOINT TO BE INSTALLED EVERY 15'.
4. 6" CURB EXPOSURE ON RESIDENTIAL STREETS & 7" CURB EXPOSURE ON MAJOR STREETS.

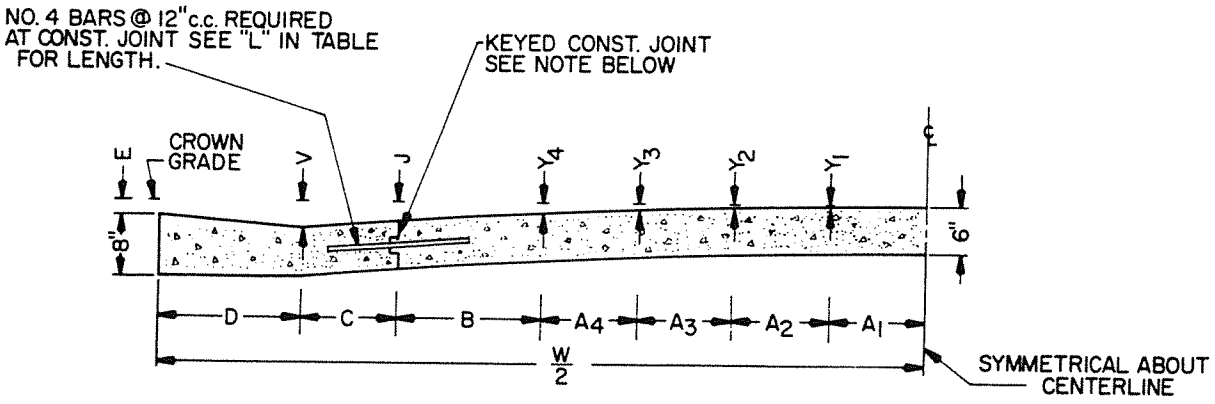
TYPICAL DRIVEWAY TRANSITION

CURB QUANTITIES CU. YD. PER LIN. FT.	
TYPE	QUANTITY
A	0.04942
~~B~~	~~0.05604~~
C	0.03085

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD P.C.C. CURB AND GUTTER SECTIONS

DATE: 1993
NO. 303



HALF-SECTION OF P.C.C. ALLEY

ALLEY WIDTH - W	DIMENSIONS																		
	A_1	A_2	A_3	A_4	A_5	A_6	B	C	D	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	J	V	E	L
9'	1'-0"	1'-0"					1'-0"	8"	10"	0.012'	0.047'					0.107'	0.160'	0.007'	12"
12'	1'-0"	1'-0"	1'-0"				1'-6"	8"	10"	0.006'	0.024'	0.053'				0.122'	0.16'	0.08'	12"
14'	1'-0"	1'-0"	1'-0"	1'-0"			1'-6"	8"	10"	0.005'	0.021'	0.048'	0.085'			0.160'	0.20'	0.12'	12"
16'	1'-0"	1'-0"	1'-0"	1'-0"			1'-6"	1'-0"	1'-6"	0.006'	0.024'	0.053'	0.094'			0.180'	0.25'	0.08'	16"
20'	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6"	1'-0"	1'-6"	0.004'	0.018'	0.040'	0.071'	0.111'	0.160'	0.250'	0.320'	0.150'	16"

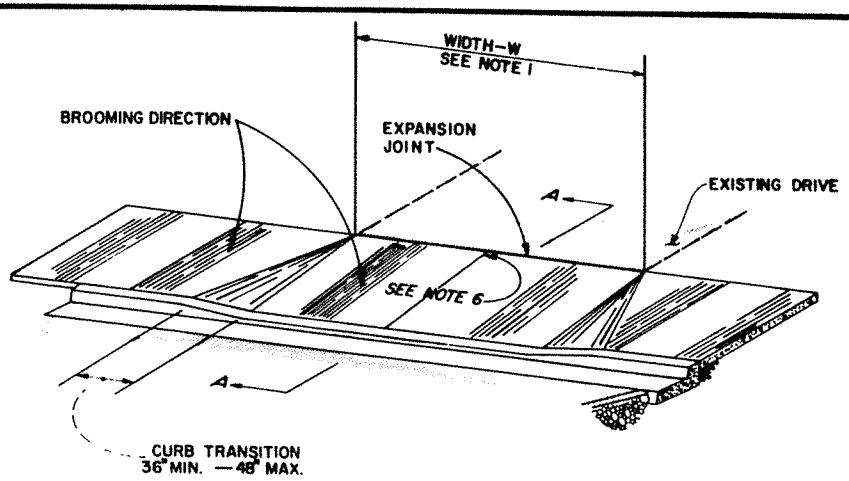
NOTES:

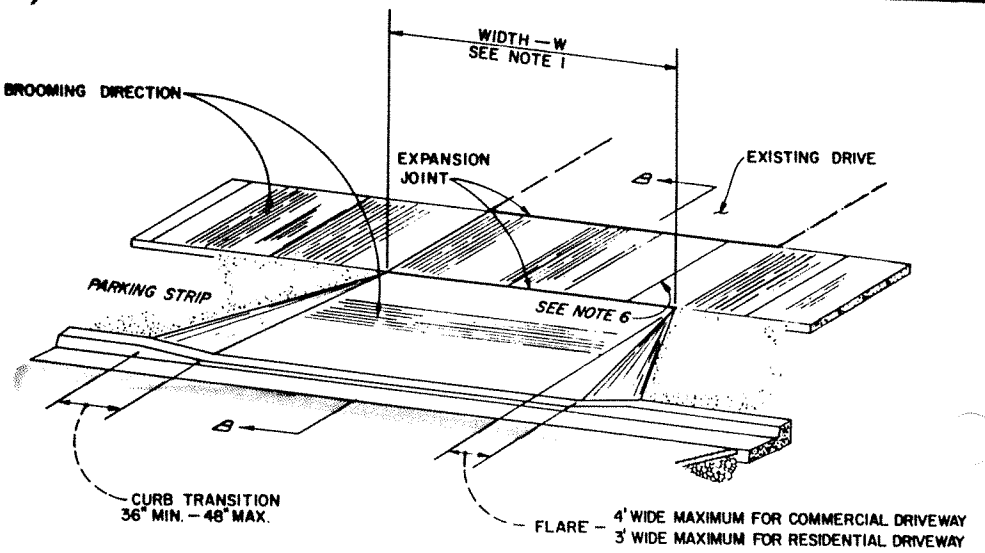
1. ALL CONC. SHALL BE CLASS 4000 PSI. MAXIMUM SLUMP 3" UNLESS OTHERWISE SPECIFIED BY THE ENGINEER.
2. FOR FINISH, CURING, AND OTHER REQUIREMENTS SEE SPECIFICATIONS.
3. ALLEY MAY BE POURED MONOLITHICLY OR GUTTER SECTIONS MAY BE PLACED SEPARATELY AS SHOWN. IF THE SECTIONS ARE PLACED SEPARATELY THE CONSTRUCTION JOINT SHALL BE KEYED AND DOWELED.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

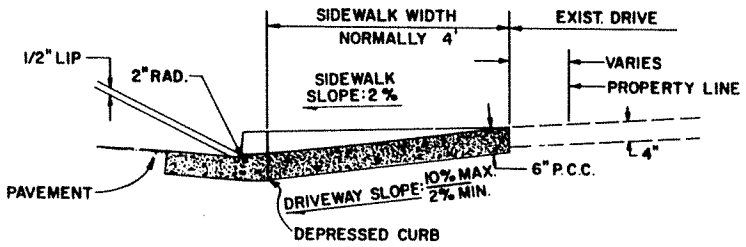
STANDARD ALLEY DETAILS
PORTLAND CEMENT CONCRETE

DATE: 1992
NO. 304



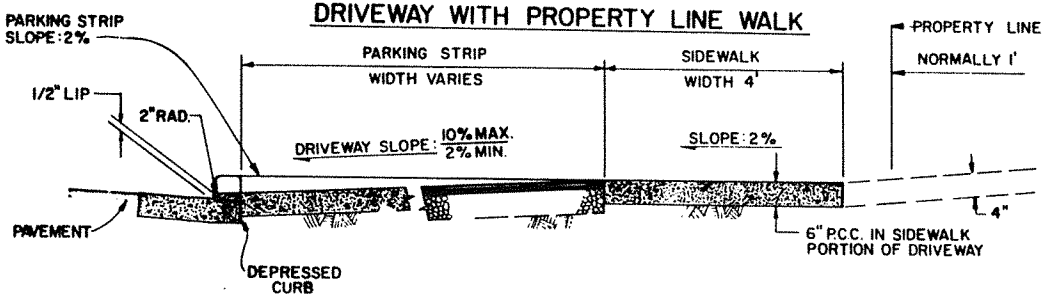


DRIVEWAY WITH CURB LINE WALK



SECTION A—A
NOT TO SCALE

DRIVEWAY WITH PROPERTY LINE WALK



SECTION B—B
NOT TO SCALE

CONSTRUCTION SEQUENCE:

1. Obtain permit from Dept. of Public Works.
2. Excavate — protect vehicles and pedestrians.
3. Fine grade subgrade.
4. Place forms — call inspector.
5. Place and finish pavement.
6. Cure P.C.C. five to seven days.
7. Strip forms, clean up, backfill and landscape.
8. Call City for Final Inspection.

NOTES:

1. Driveway width — W will normally be shown on Project Plans. When not shown, width shall be as directed by the Engineer. In either case, the driveway width shall not exceed 24' unless approved by the City of Stayton.
2. For Curb and Gutter details see Std. Dwg. 303.
3. Sidewalks, including that portion crossing the driveway shall be scored and edged transversely at 5' intervals.
4. When existing driveway cannot be matched to new driveway within slope limitations shown, adjust existing driveway — not curb or sidewalk grade.
5. Expansion joints 1/2" x 3 1/2" Premolded joint filler material at locations shown.
6. Concrete strength shall be 3000 P.S.I. in 28 days.
7. Sidewalk scoring and edging continues across driveway as shown.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD DRIVEWAY DETAILS

DATE: 1992

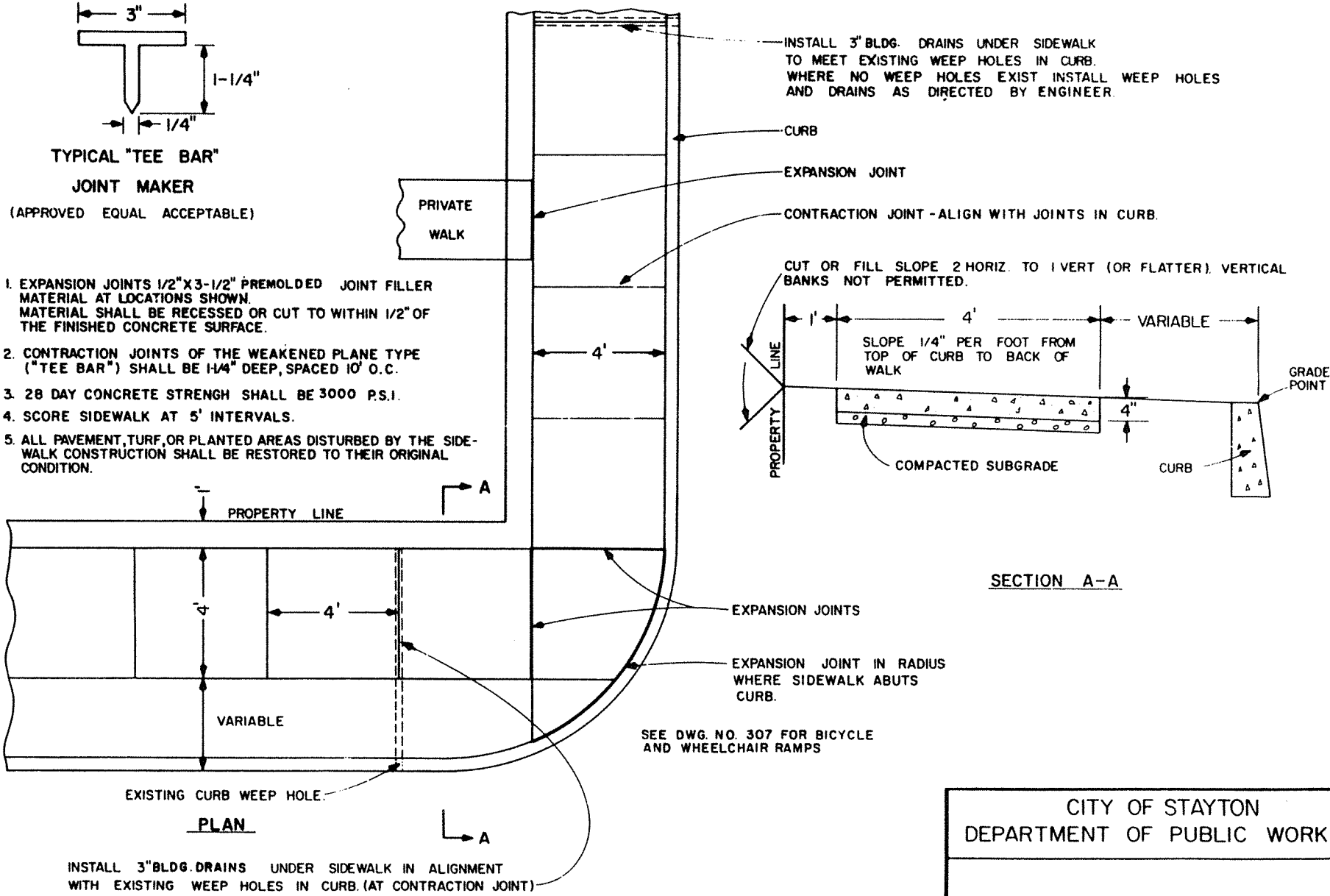
NO. 305

TYPICAL "TEE BAR"

JOINT MAKER

(APPROVED EQUAL ACCEPTABLE)

NOTES:
1. EXPANSION JOINTS 1/2"X3-1/2" PREMOLDED JOINT FILLER MATERIAL AT LOCATIONS SHOWN. MATERIAL SHALL BE RECESSED OR CUT TO WITHIN 1/2" OF THE FINISHED CONCRETE SURFACE.
2. CONTRACTION JOINTS OF THE WEAKENED PLANE TYPE ("TEE BAR") SHALL BE 1-1/4" DEEP, SPACED 10' O.C.
3. 28 DAY CONCRETE STRENGH SHALL BE 3000 P.S.I.
4. SCORE SIDEWALK AT 5' INTERVALS.
5. ALL PAVEMENT, TURF, OR PLANTED AREAS DISTURBED BY THE SIDEWALK CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.



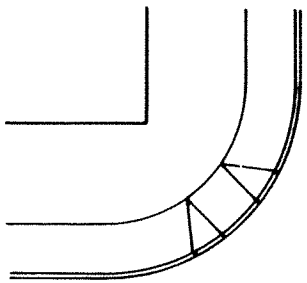
SECTION A-A

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

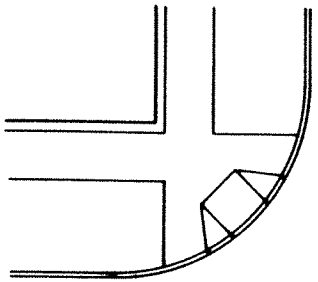
STANDARD SIDEWALK DETAILS

DATE: 1992

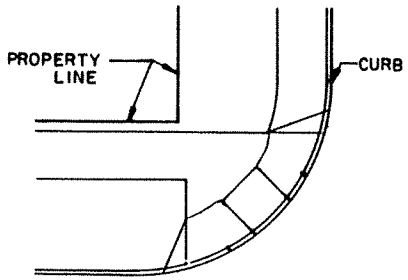
NO. 306



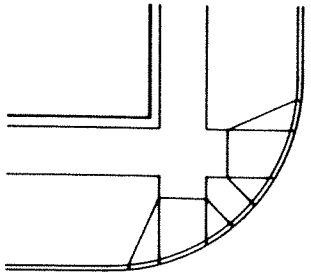
CENTER RAMP
(CURB LINE WALKS)



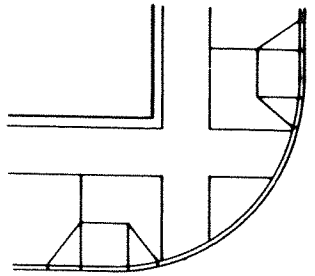
CENTER RAMP
(PROPERTY LINE WALKS)
- SPECIAL CASE ONLY -



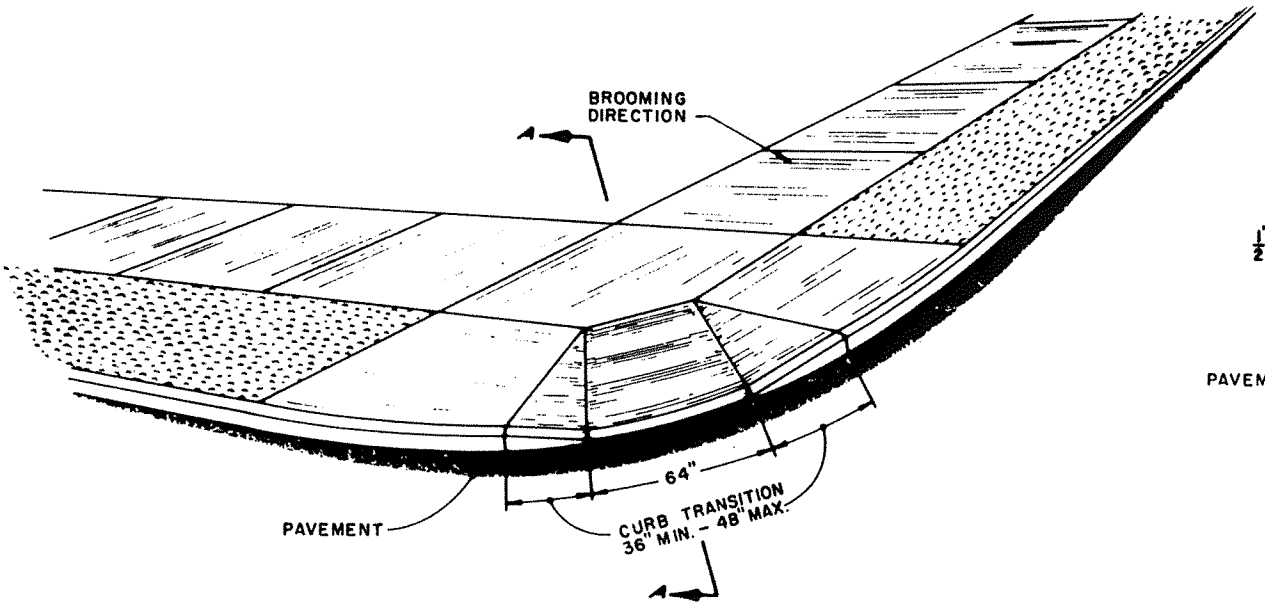
CENTER RAMP
(PROPERTY & CURB LINE WALK)

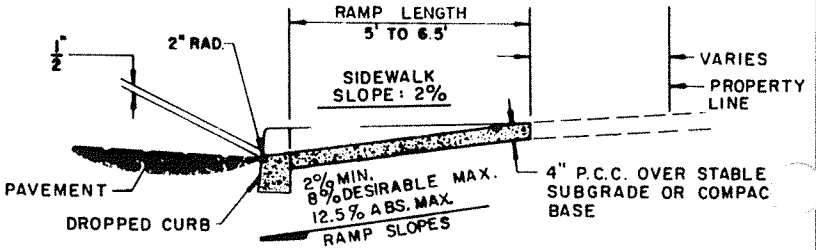


END RAMPS
(PROPERTY LINE WALKS)



SIDE RAMPS
(PROPERTY LINE WALKS)





SECTION A-A
NOT TO SCALE

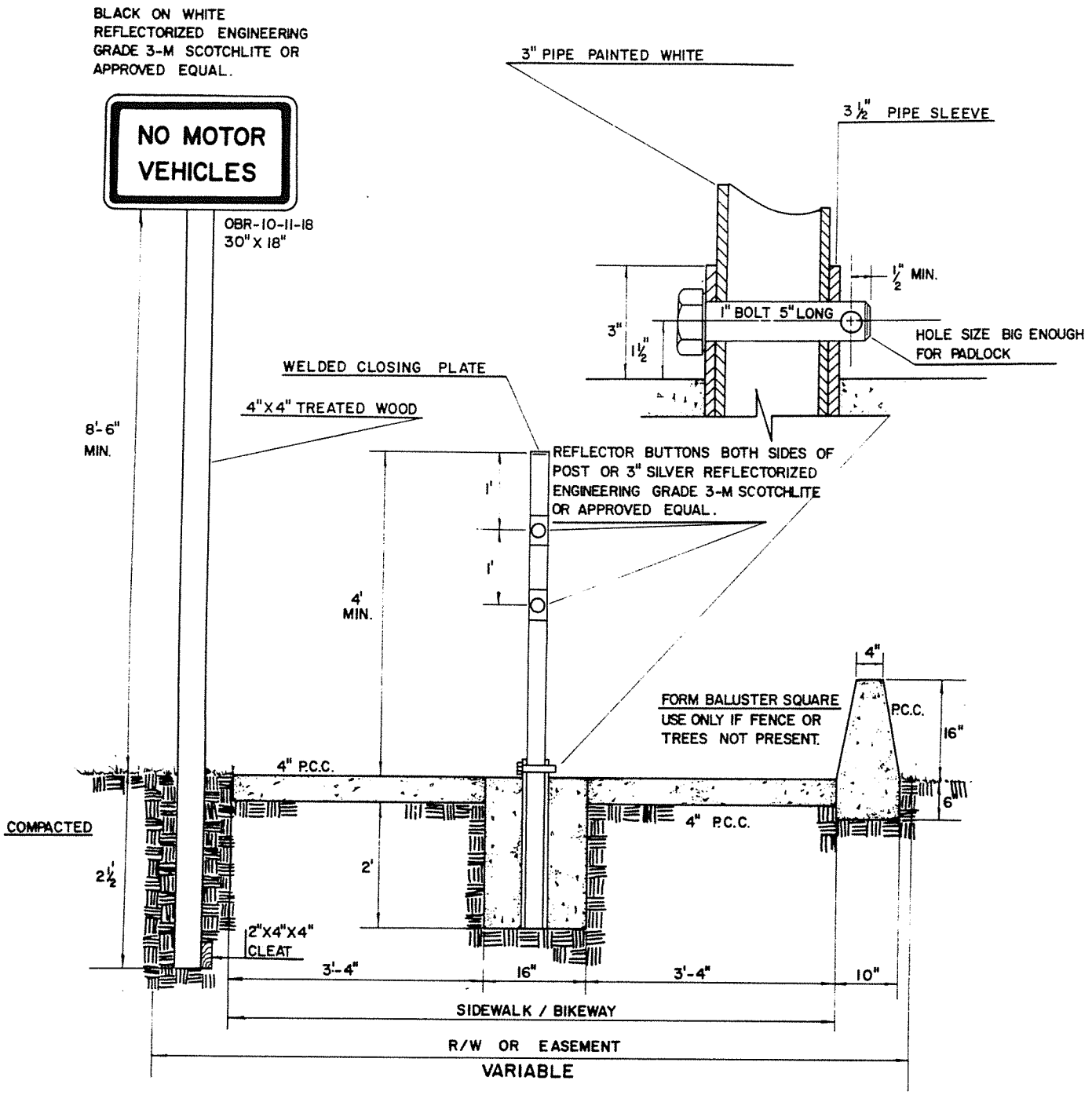
NOTES

1. FOR SIDEWALK DETAILS, SEE STD. DWG. 306.
2. FOR CURB AND GUTTER DETAILS, SEE STD. DWG. 303
3. RAMP WIDTH WILL BE AS SHOWN ABOVE UNLESS INDICATED OTHERWISE ON THE PROJECT PLANS OR BY THE ENGINEER.

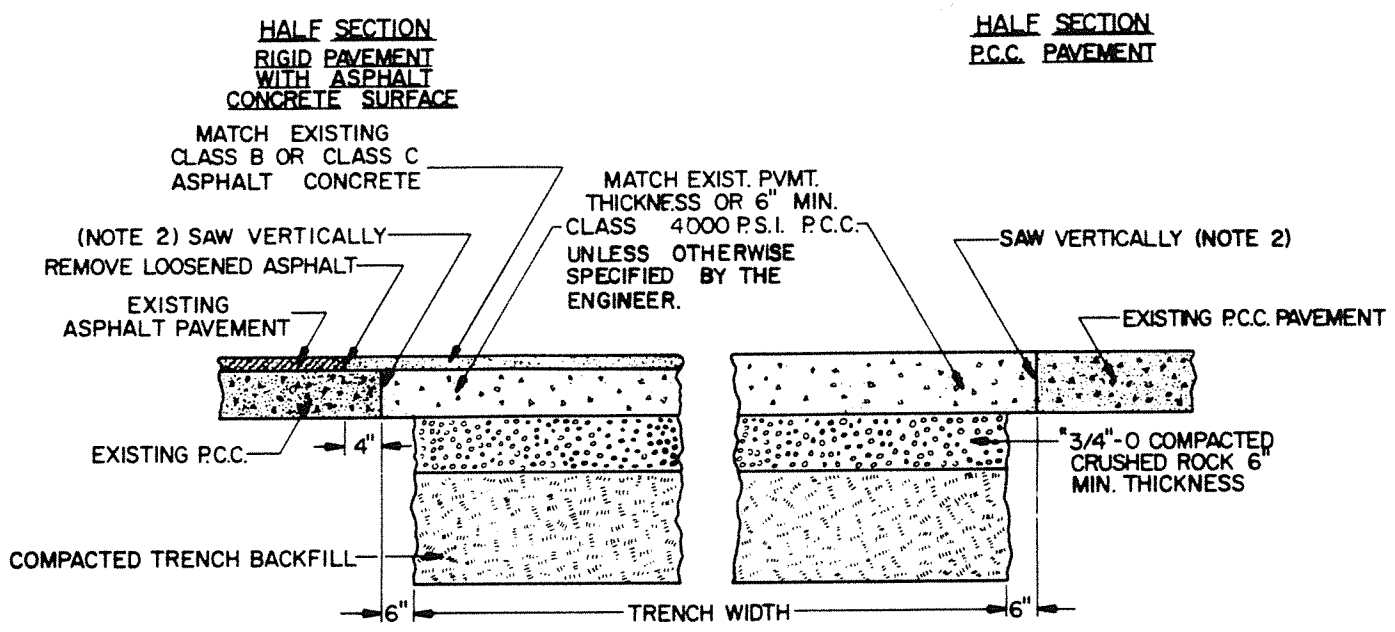
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD BICYCLE AND WHEELCHAIR RAMPS

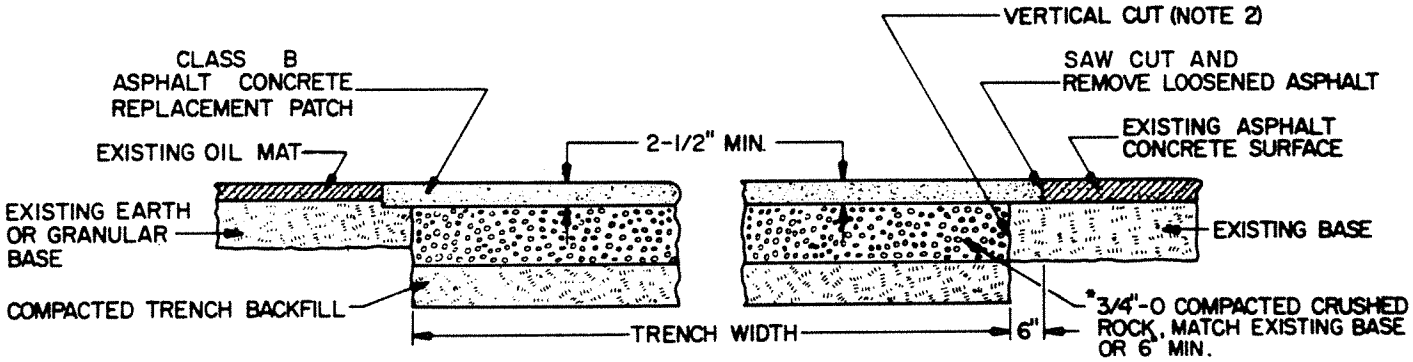
	DATE: 1992
	NO. 307



CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
MID-BLOCK WALK ENTRANCE TRAFFIC CONTROL	
	DATE: 1992
	NO. 308



TYPICAL PATCH FOR RIGID PAVEMENT



TYPICAL PATCH FOR FLEXIBLE PAVEMENT

NOTES

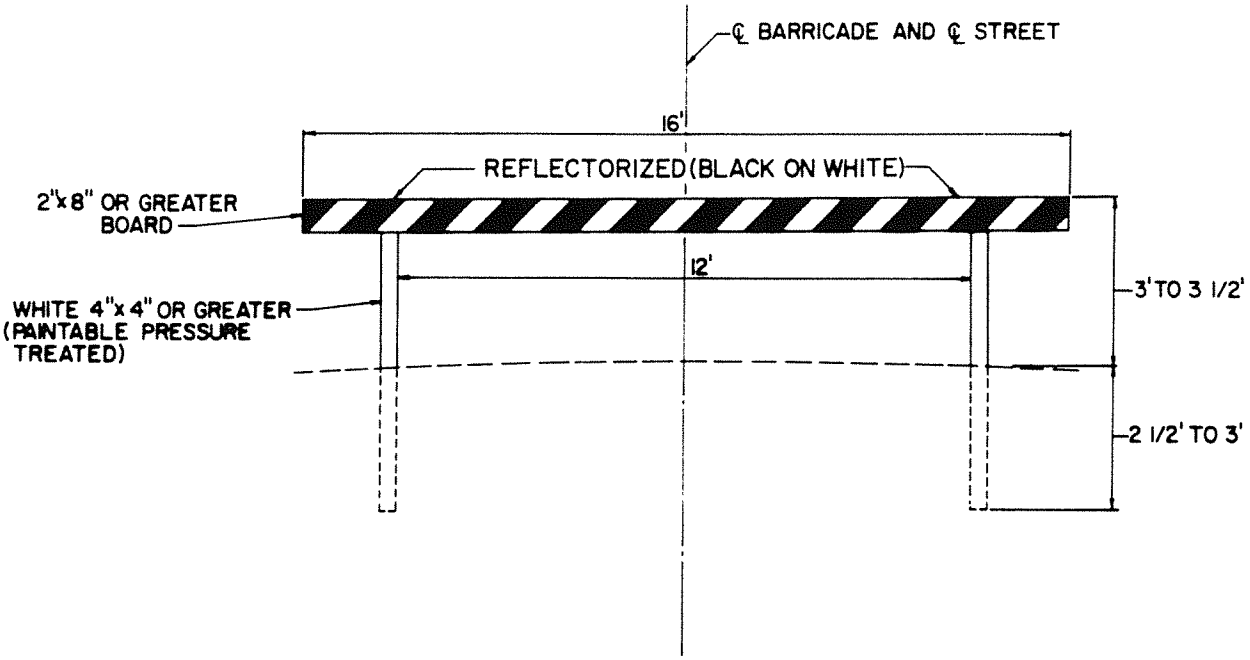
1. CUTS IN A.C. PAVEMENT SHALL BE MADE WITH CONCRETE SAW OR OTHER APPROVED METHOD.
2. CUTS IN P.C.C. PAVEMENT SHALL BE MADE WITH A CONCRETE SAW.
3. 1"-0 CRUSHED AGGREGATE MAY BE SUBSTITUTED FOR 3/4"-0.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

PAVEMENT PATCHING

DATE: 1992

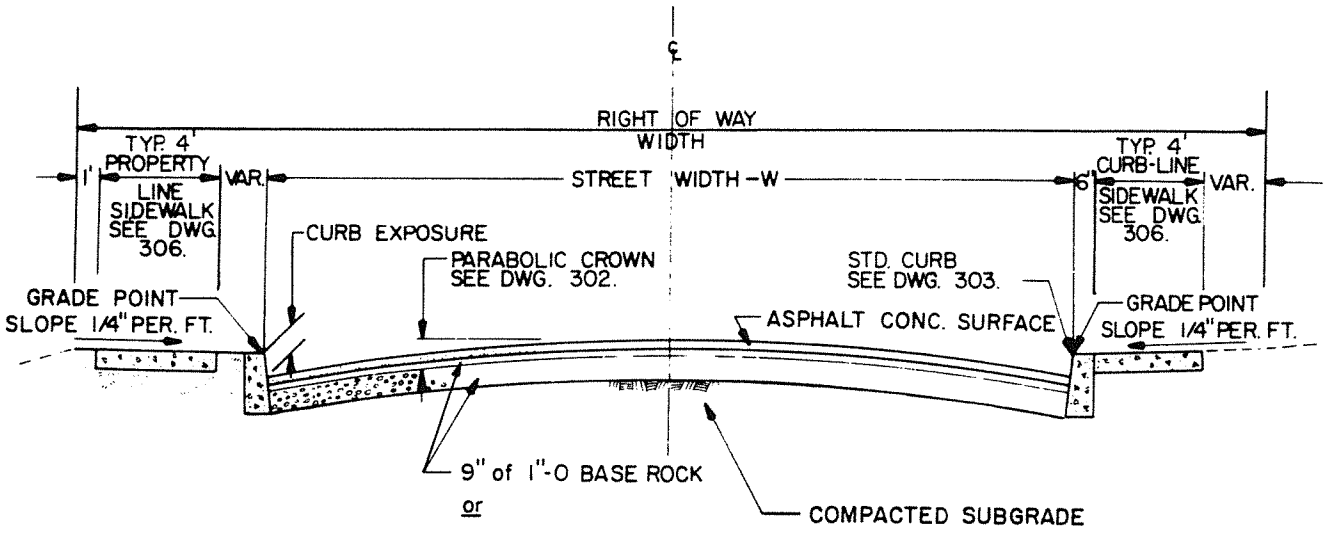
NO. 309



NOTES:

1. REFLECTORIZED SHEETING SHALL BE ENGINEERING GRADE REFLECTIVE SHEETING CONFORMING TO THE OREGON STATE H'GHWAY DIVISION'S "STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION" SECTION 761.

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD FOR PERMANENT BARRICADE	
	DATE: 1992
	NO. 310

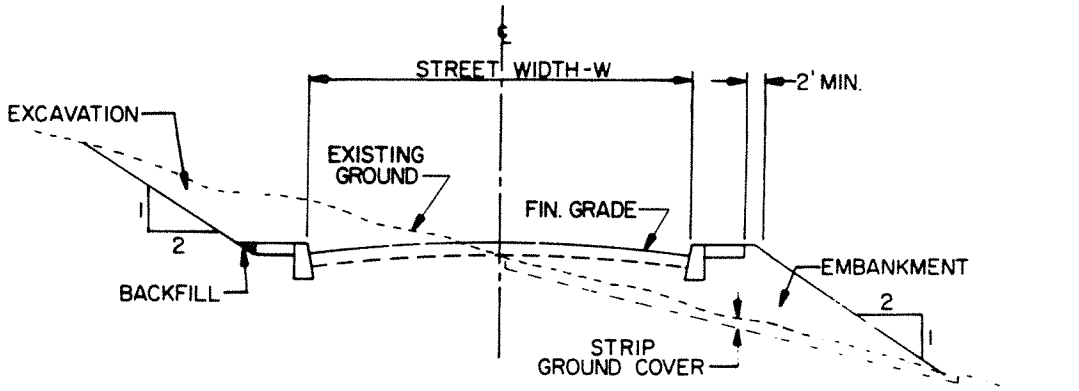


NORMAL CROWN TABLE

W	CROWN
24'	5" = .417'
26'	5-1/4" = .437'
28'	5-1/2" = .458'
30'	6" = .500'
32'	6-1/2" = .542'
34'	7" = .583'
36'	7-1/4" = .604'
38'	7-1/2" = .625'
40'	8" = .667'
42'	8-1/2" = .708'
44'	9" = .750'
46'	9-1/4" = .771'
47'	9-3/8" = .780'

TYPICAL STREET SECTION

NOT TO SCALE



SIDE HILL CONSTRUCTION - TYPICAL STREET SECTION

NOT TO SCALE

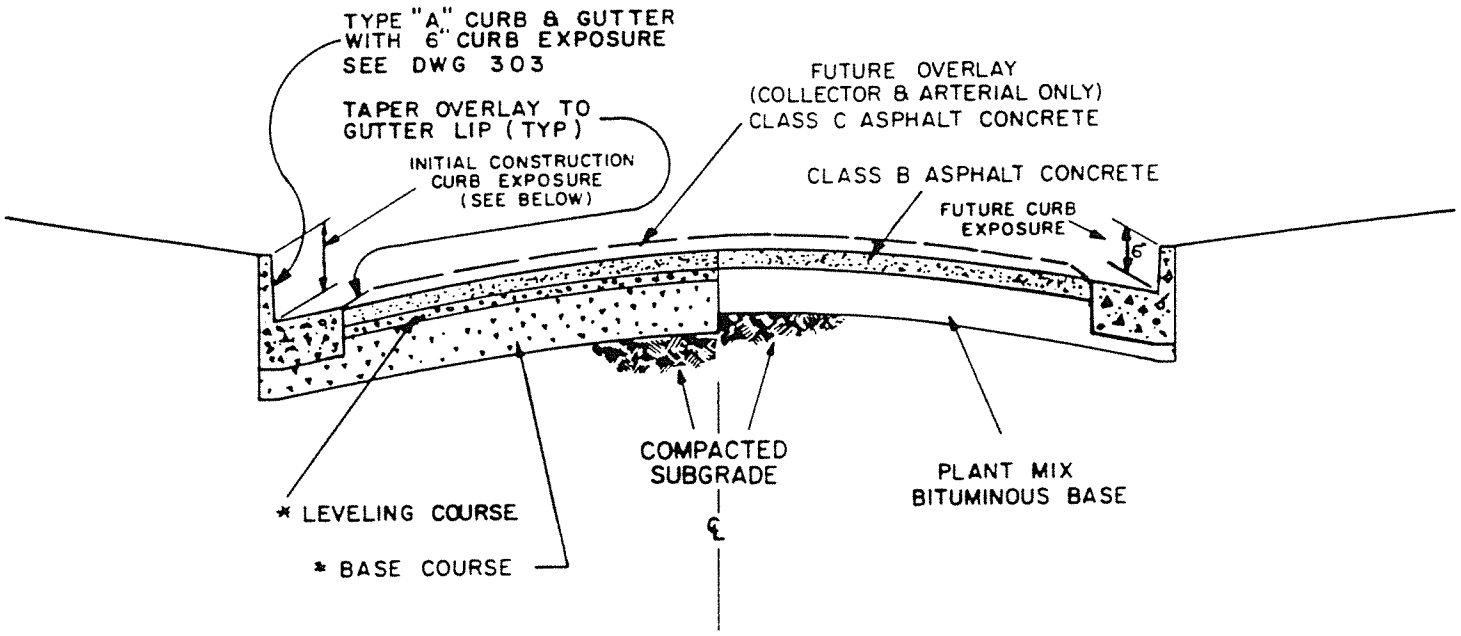
NOTES

1. PAVEMENT & ROCK BASE DIMENSIONS SHOWN ARE MINIMUM ONLY. GREATER THICKNESSES MAY BE REQUIRED BY PROJECT PLANS.
2. FOR STANDARD DRIVEWAY DETAILS SEE DWG. NO. 305

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

ASPHALTIC CONCRETE
CITY STREET

DATE: 1992
NO 311



ASPHALT CONCRETE AND CRUSHED AGGREGATE ALTERNATE

FULL DEPTH ASPHALT CONCRETE ALTERNATE

ENGINEER MAY USE VALUES FROM THE FOLLOWING TABLE:

	STREET CLASSIFICATION					
	CUL-DE-SAC	LOCAL	COLLECTOR		ARTERIAL (MINOR & MAJOR) (INDUSTRIAL)	
			LIMITED	MAJOR		
CRUSHED BASE EQUIVALENT	11"	14"	19 1/2"	21 1/2"	26 1/2"	
FUTURE OVERLAY(S)	0	0	1 1/2"	1 1/2"	2 1/2"	CLASS "C" ASPHALT CONCRETE
INITIAL CONSTRUCTION ASPHALT CONCRETE AND CRUSHED AGGREGATE ALTERNATE	2 1/2"	2 1/2"	2 1/2"	2 1/2"	2 1/2"	CLASS "B" ASPHALT CONCRETE
	1 1/2"	1 1/2"	1 1/2"	1 1/2"	1 1/2"	3/4"-0 CRUSHED AGGREGATE LEVELING COURSE
	4 1/2"	7 1/2"	10"	12"	15"	1 1/2"-0 CRUSHED AGGREGATE BASE COURSE
INITIAL CONSTRUCTION FULL DEPTH ASPHALT CONCRETE ALTERNATE	2"	2"	2"	2"	2"	CLASS "B" ASPHALT CONCRETE
	3"	4"	7 1/2"	8"	9"	PLANT MIX BITUMINOUS BASE
CURB EXPOSURE AT INITIAL CONSTRUCTION	6"	6"	7"	7"	7"	

ENGINEER MAY BE REQIRED TO SUBMIT ABOVE PAVEMENT STRUCTURE DESIGN DATA FOR ANY STREET CITY ENGINEER HAS REASON TO SUSPECT UNSUITABLE SOIL CONDITIONS, HIGH PERCENTAGE OF TRUCKS OR ANY OTHER CONDITION THAT MAY SIGNIFICANTLY AFFECT THE PAVEMENT STRUCTURE DESIGN.

FOR STREET CLASSIFICATION (LOCAL, COLLECTOR, ARTERIAL) SEE STAYTON AREA TRANSPORTATION STUDY (S.A.T.S.)

1"-0 CRUSHED AGGREGATE MAY BE SUBSTITUTED FOR 1 1/2"-0 CRUSHED AGGREGATES WITH 3/4"-0 LEVELING COURSE

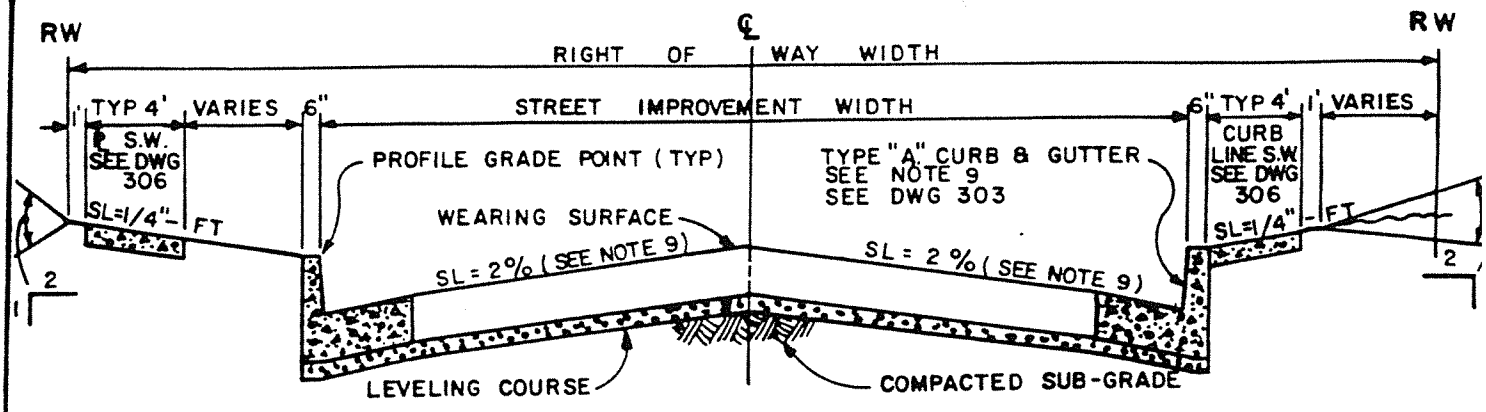
CITY OF STAYTON

DEPARTMENT OF PUBLIC WORKS

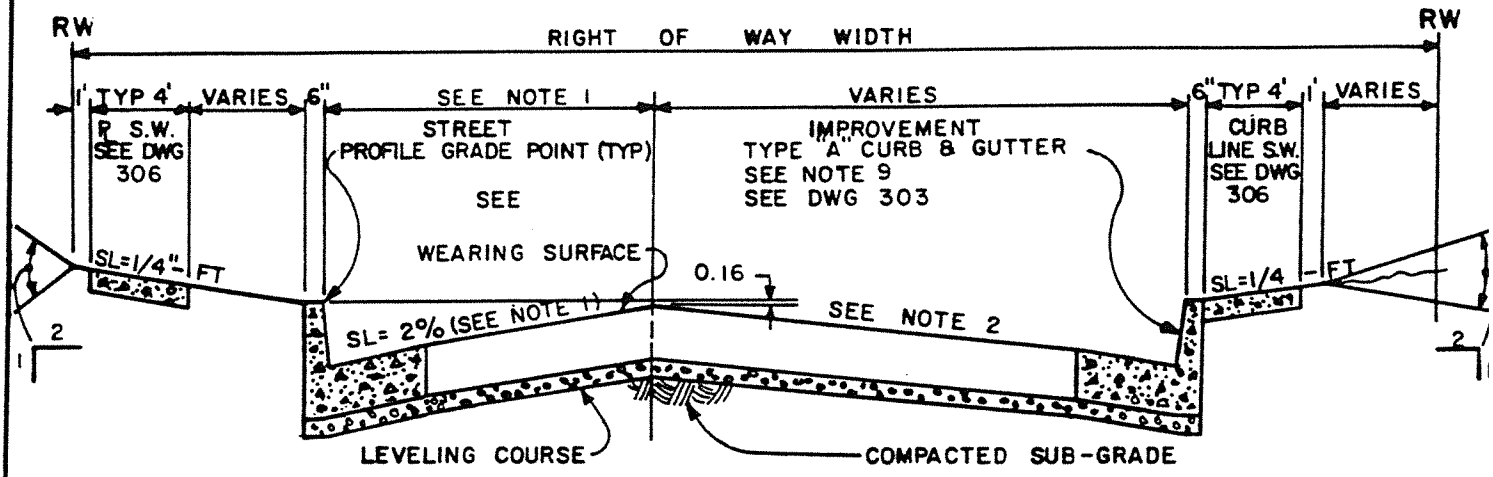
TYPICAL FLEXIBLE PAVEMENT STRUCTURE

DATE: 1992

NO. 312



TYPICAL STREET SECTION
SHED ROOF
℄ CROWN



TYPICAL STREET SECTION
SHED ROOF
TILT SECTION

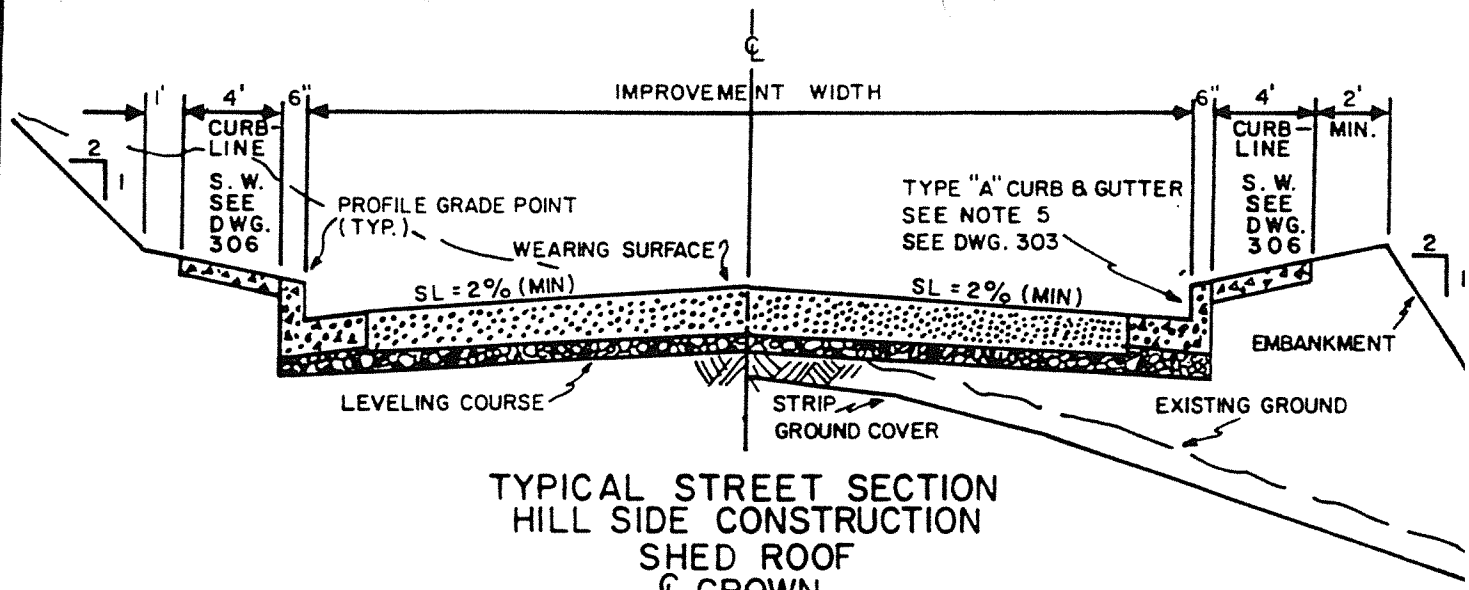
NOTES:

1. 0 TO 0.3' TILT HAS A ℄ CROWN. 0.3' TO 1' TILT AS DRAWN IS 0.16' BELOW & 12' FROM HIGH CURE
2. MAXIMUM SLOPE: RESIDENTIAL STREETS = 6%, COLLECTOR & ARTERIAL = 4%
3. ALTERNATE DESIGNS TO BE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.
4. FOR STANDARD DRIVEWAY DETAILS SEE DWG. NO. 305.
5. FOR DESIGN THICKNESS OF SURFACE, LEVELING & BASE COURSES, SEE DWG. NO's. 312 & 315.
6. PROPERTY LINE SIDEWALK WILL NORMALLY BE CONSTRUCTED. ANY VARIATION WILL BE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.
7. FOR HIGH SPEED ARTERIAL & COLLECTOR STREETS, DESIGN CROWN TO CORRESPOND WITH LANE CONFIGURATION.
8. FOR STREET CLASSIFICATION (LOCAL, COLLECTOR, ARTERIAL) SEE STAYTON AREA TRANSPORTATION STUDY (S.A.T.S.).
9. STREET CURB EXPOSURE: 6" ON RESIDENTIAL, 7" ON COLLECTOR & ARTERIAL.
10. FOR STREET WIDTH IN EXCESS 34', CROSS SLOPE SHALL BE A MINIMUM OF 3%.

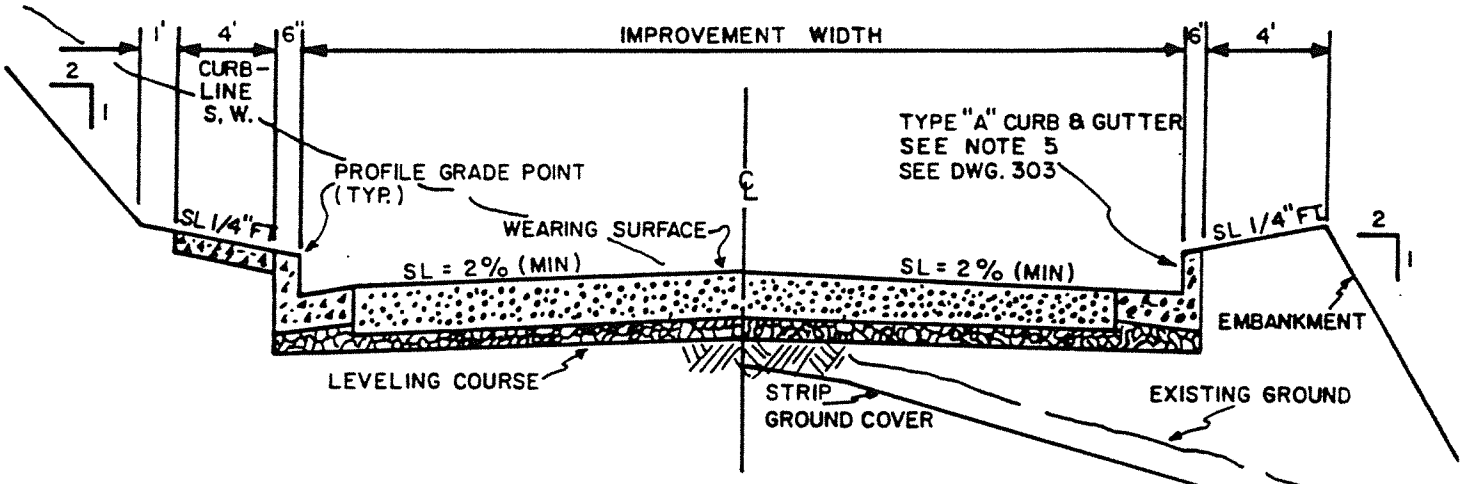
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD STREET SECTIONS SHED ROOF DESIGN

DATE: 1992
NO. 313



TYPICAL STREET SECTION
HILL SIDE CONSTRUCTION
SHED ROOF
℄ CROWN

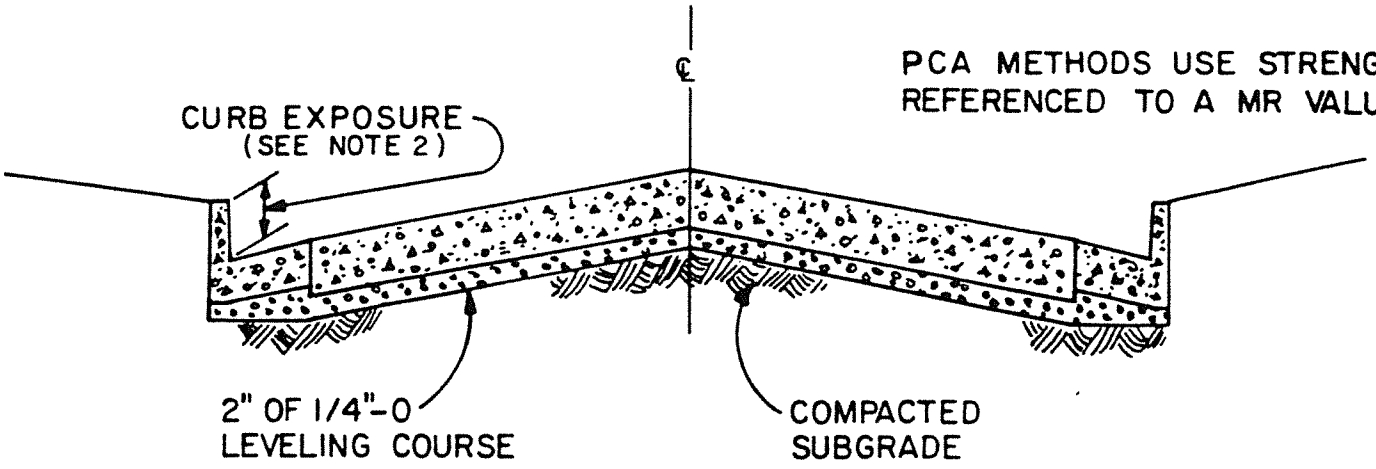


TYPICAL STREET SECTION
HILL SIDE CONSTRUCTION
SIDE SLOPE OF 15 % AND MORE
SHED ROOF

NOTES:

1. ALTERNATE DESIGNS TO BE APPROVED BY THE DIRECTOR OF PUBLIC WORKS.
2. FOR STANDARD DRIVEWAY DETAIL SEE DWG. NO. 305.
3. FOR THICKNESS OF PAVEMENT SURFACES & LEVELING COURSES, SEE DWG. NO. 312 & NO. 315.
4. TILT SECTION IN HILLSIDE DEVELOPMENT AREA WILL BE DESIGNED AS SHOWN ON DWG. NO. 313.
5. 6" CURB EXPOSURE ON RESIDENTIAL STREET & 7" CURB EXPOSURE ON COLLECTOR AND ARTERIAL STREETS.

CITY OF STAYTON	
DEPARTMENT OF PUBLIC WORKS	
STANDARD STREET SECTION HILLSIDE DEVELOPMENT AREAS SHED ROOF ALTERNATIVE	
	DATE: 1992
	NO: 314



PCA METHODS USE STRENGTH REFERENCED TO A MR VALUE.

PAVEMENT STRUCTURE DESIGN SHALL BE PER PORTLAND CEMENT ASSOCIATION OR APPROVED EQUAL BY THE CITY OF STAYTON, DIRECTOR OF PUBLIC WORKS.

ENGINEER TO PRESENT CITY ENGINEER ALL LABORATORY TEST RESULTS AS SPECIFIED IN ABOVE P.C.A. PROCEDURE.

IN LIEU OF ABOVE DESIGN PROCEDURE, ENGINEER MAY USE VALUES FROM THE FOLLOWING TABLE: HOWEVER THE ENGINEER MAY BE REQUIRED TO SUBMIT PAVEMENT STRUCTURE DESIGN DATA FOR ANY STREET THE CITY ENGINEER HAS REASON TO SUSPECT UNSUITABLE SOIL CONDITIONS. HIGH PERCENTAGE OF TRUCKS OR ANY OTHER CONDITIONS THAT MAY SIGNIFICANTY AFFECT THE PAVEMENT STRUCTURE DESIGN.

	STREET CLASSIFICATION					
	CUL-DE-SAC	LOCAL	COLLECTOR		ARTERIAL (MINOR & MAJOR) (INDUSTRIAL)	
			LIMITED	MAJOR		
CONCRETE THICKNESS	6"	6"	7"	7"	8"	USE 4000 PSI CONC.
LEVELING COURSE	2"	2"	2"	2"	2"	

NOTES:

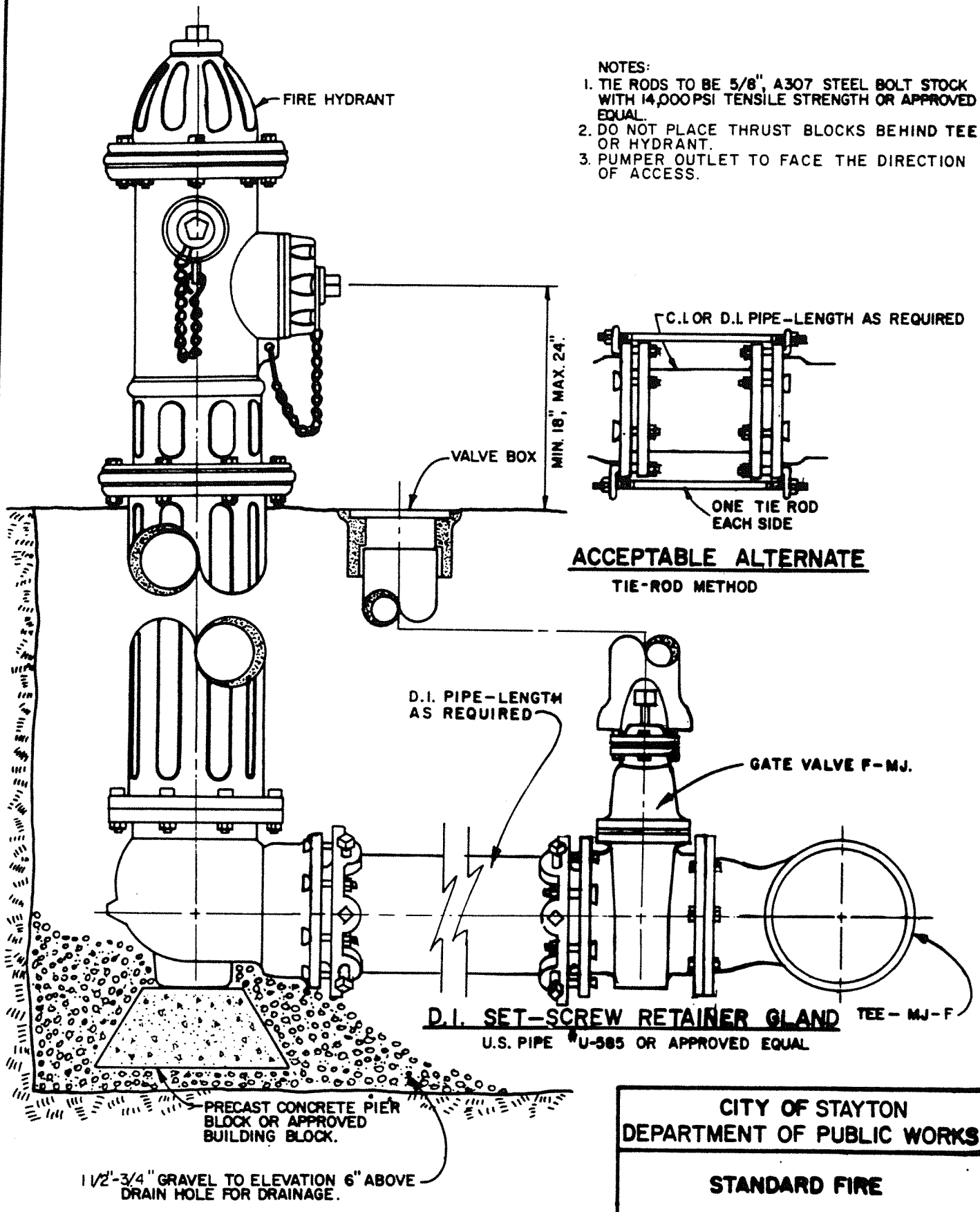
1. FOR STREET CLASSIFICATION (LOCAL, COLLECTOR, ARTERIAL.) SEE STAYTON AREA TRANSTATION STUDY (S.A.T.S.) OR ADOPTED SECTOR PLANS.
2. 6" CURB EXPOSURE ON RESIDENTIAL STREETS & 7" CURB EXPOSURE ON COLLECTOR AND ARTERIAL STREETS.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

TYPICAL P.C. CONCRETE STREET STRUCTURE

DATE: 1992
NO: 315

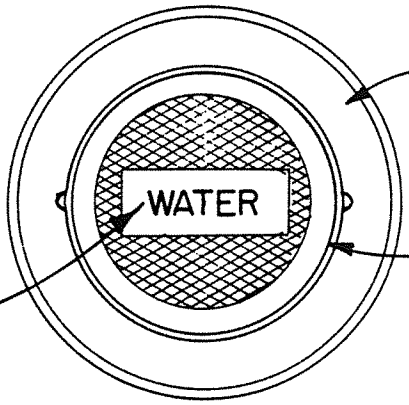
NOTES:
1. TIE RODS TO BE 5/8", A307 STEEL BOLT STOCK WITH 14,000 PSI TENSILE STRENGTH OR APPROVED EQUAL.
2. DO NOT PLACE THRUST BLOCKS BEHIND TEE OR HYDRANT.
3. PUMPER OUTLET TO FACE THE DIRECTION OF ACCESS.



ACCEPTABLE ALTERNATE
TIE-ROD METHOD

D.I. SET-SCREW RETAINER GLAND
U.S. PIPE #U-585 OR APPROVED EQUAL

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD FIRE HYDRANT INSTALLATION	
	DATE: 1992
	NO. 401

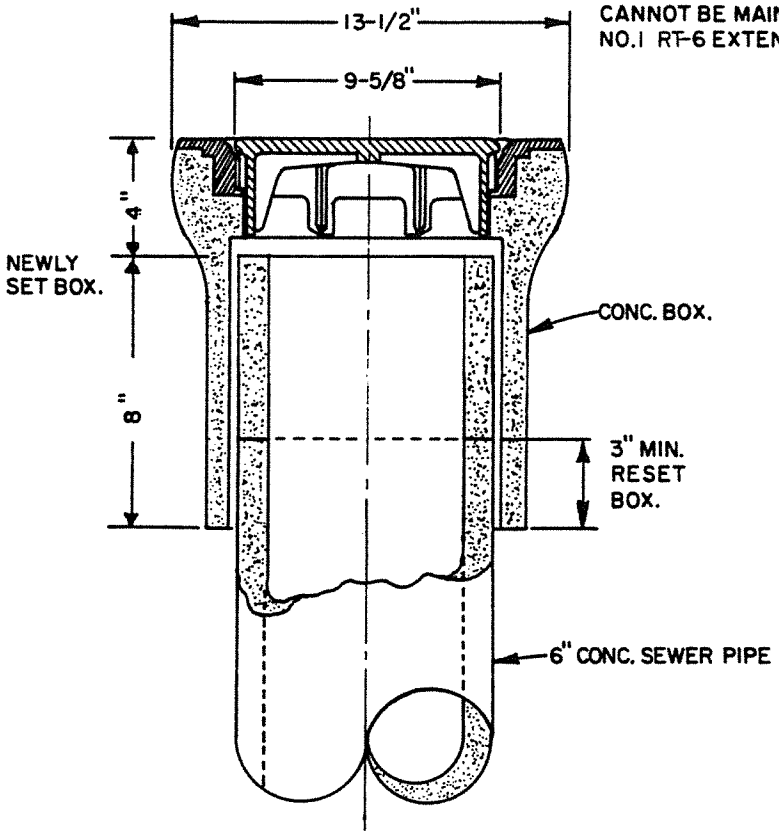


C.I. FRAME

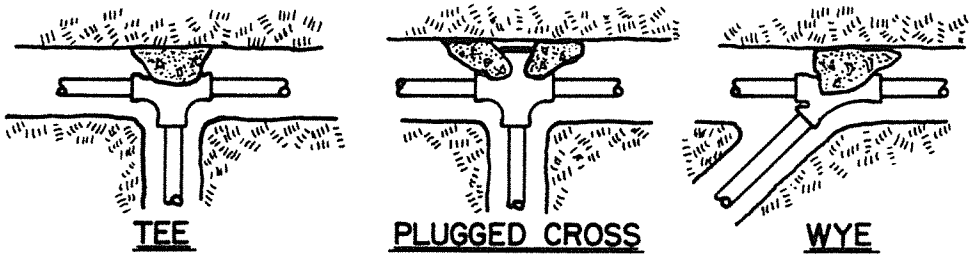
C.I. COVER WITH ONE INCH RAISED LETTERS AS MANUFACTURED BY BROOKS PRODUCTS, PORTLAND, OREGON OR APPROVED EQUAL.

USE LETTER OPTIONS CONSISTANT WITH APPLICATION-AS FOLLOWS:
(A) WATER (as shown)
(B) SEWER
(C) C.O. (cleanout)

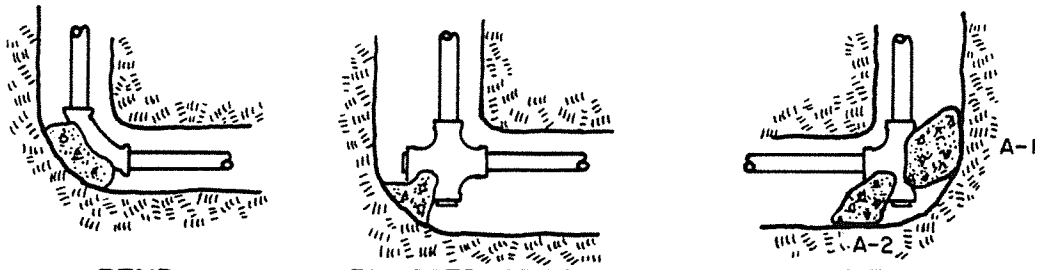
ALL ADJUSTMENTS SHALL BE MADE BY RAISING THE BOX. IF THE 3" MINIMUM CANNOT BE MAINTAINED, ADD A BROOKS NO.1 RT-6 EXTENSION, OR APPROVED EQUAL.



CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD VALVE BOX	
	DATE: 1992
	NO. 402



TEE PLUGGED CROSS WYE



BEND PLUGGED CROSS TEE

NOTES:

1. Concrete thrust blocking to be poured against undisturbed earth.
2. Keep concrete clear of joint and accessories.
3. The required thrust bearing areas for special connections are shown encircled on the plans: e.g. (15) indicates 15 square feet bearing area required.
4. If not shown on plans required bearing areas at fitting shall be as indicated below, adjusted if necessary, to conform to the test pressure(s) and allowable soil bearing stress(es) stated in the special specifications.
5. Bearing areas and special blocking details shown on plans take precedence over bearing areas and blocking details shown on this standard detail.

BEARING AREA OF THRUST BLOCKS IN SQ. FT.

Fitting Size	Tee, Wye	90° Bend Plugged Cross	Tee Plugged on Run		45° Bend	22-1/2° Bend	11-1/4° Bend
			A_1	A_2			
4	1.0	1.4	1.9	1.4	1.0	--	--
6	2.1	3.0	4.3	3.0	1.6	1.0	--
8	3.8	5.3	7.6	5.4	2.9	1.5	1.0
10	5.9	8.4	11.8	8.4	4.6	2.4	1.2
12	8.5	12.0	17.0	12.0	6.6	3.4	1.7
14	11.5	16.3	23.0	16.3	8.9	4.6	2.3
16	15.0	21.3	30.0	21.3	11.6	6.0	3.0
18	19.0	27.0	38.0	27.0	14.6	7.6	3.8
20	23.5	33.3	47.0	33.3	18.1	9.4	4.7
24	34.0	48.0	68.0	48.0	26.2	13.6	6.8

NOTE: Above bearing areas based on test pressure of 150 p.s.i. and an allowable soil bearing stress of 2,000 pounds per square foot. To compute bearing areas for different test pressures and soil bearing stresses, use the following equation: Bearing area = (Test Pressure/150)x(2000/Soil Bearing Stress)x(Table Value).

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD THRUST BLOCKING DETAILS

DATE: 1992

NO. 403

Design for 150 psi with 1.5 safety factor = 225 psi.

5/8" rods - Thru bolt holes, ductile iron lugs, Starr tie bolts, steel plates.
3/4" rods - Thru bolt holes, Starr tie bolts, steel plates.
1" rods - Connect to steel plate, straps or "ears".

Size	Area, in^2	Thrust at		No. of Full Dia. Bars Welded to plates			No. of Threaded Bars		
		150 psi	225 psi	5/8 in	3/4 in	1 in	5/8 in	3/4 in	1 in
2	3.1416	300	450	2	Warning Duc-		2	Warning - No	
4	12.566	1 885	2 827	2	Lugs will		2	Duc-Lugs	
6	28.274	4 241	6 362	2	not hold		3	2	2
8	50.265	7 540	11 310	3	2	2	4	3	2
10	78.540	11 781	17 672	5	3	2	6	4	2
12	113.10	16 965	25 448	6	5	3	8	6	3
14	153.94	23 091	34 636	9	6	4	11	8	4
16	201.06	30 159	45 238	11	8	5	15	10	6
18	254.47	38 170	57 256	14	10	6	19	13	7
20	314.16	47 124	70 686	17	12	7	23	16	9
24	452.39	67 858	101 788	24	17	10	33	22	12
30	706.86	106 029	159 044	38	26	15	51	34	19
36	1017.9	152 685	229 028	54	38	21	73	49	27

A307 Bolt Stock
@ 14,000 psi

FULL DIAMETER BARS

Size	Area	Strength
5/8	.3068	4 295 lbs.
3/4	.4414	6 185
1	.7854	10 996

THREADED BARS

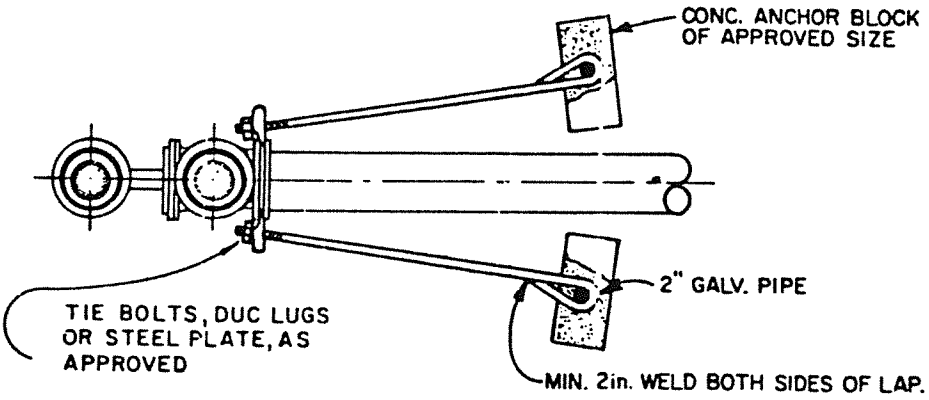
Size	Tensile Area	Strength
5/8	.2256	3 158 lb.
3/4	.3340	4 676
1	.6051	8 471

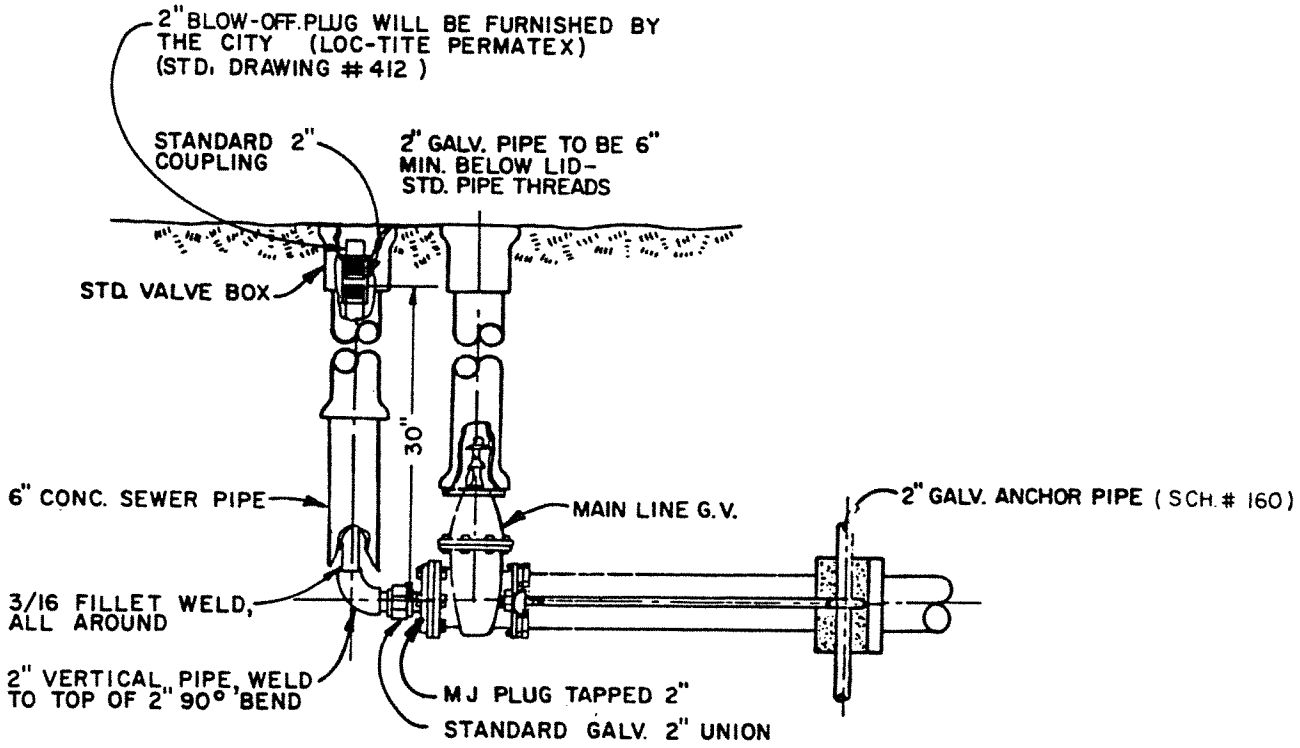
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

TIE ROD REQUIREMENTS

DATE: 1992

NO. 404

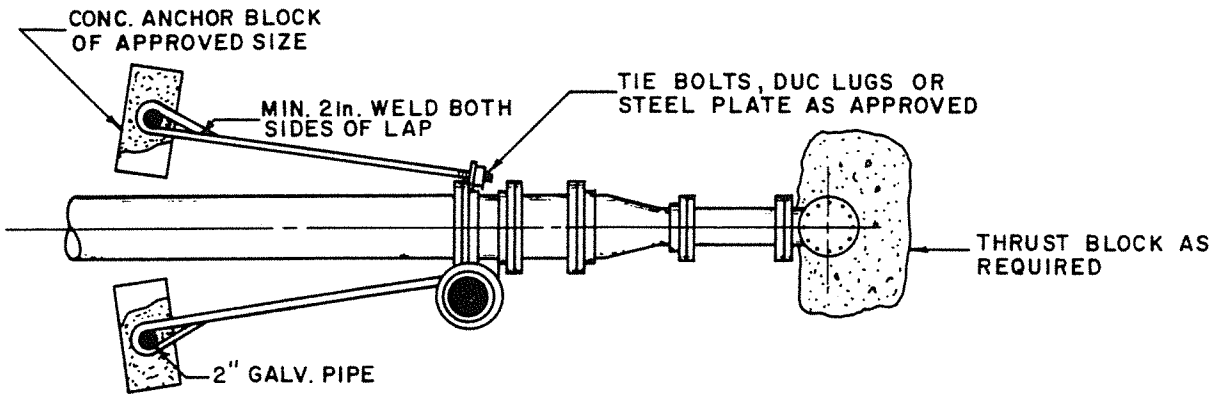


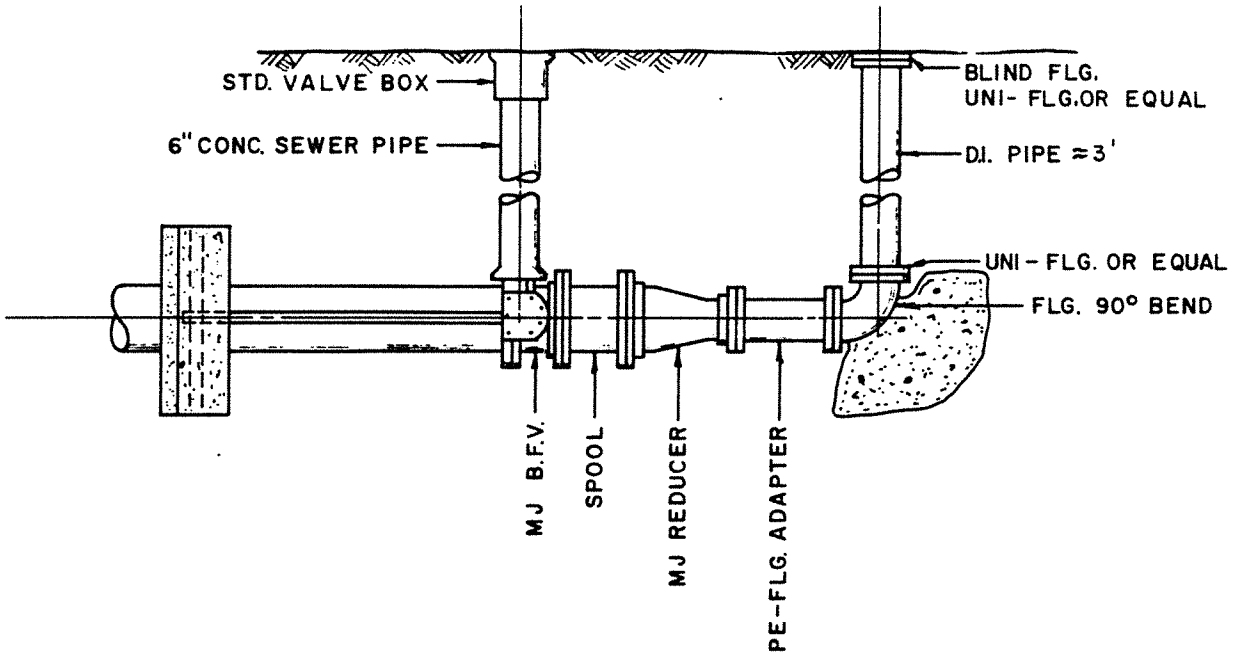


NOTES:

1. ANCHOR BLOCK SIZE TO BE SPECIFIED OR APPROVED BY THE ENGINEER.
2. TIE RODS TO BE A307 STEEL BOLT STOCK WITH 14,000 psi TENSILE STRENGTH OR APPROVED EQUAL, NUMBER OF RODS AND SIZE TO BE APPROVED BY THE ENGINEER

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD BLOWOFF WITH IN-LINE VALVE	
	DATE: 1992
	NO. 405





B.F.V.	RED.	B.O. FTG. & PIPE SIZE
10"	10" X 4"	4"
12" & 14"	X 6"	6"
16" & 18"	X 8"	8"
20"	20" X 10"	10"
24"	24" X 12"	12"

NOTE:

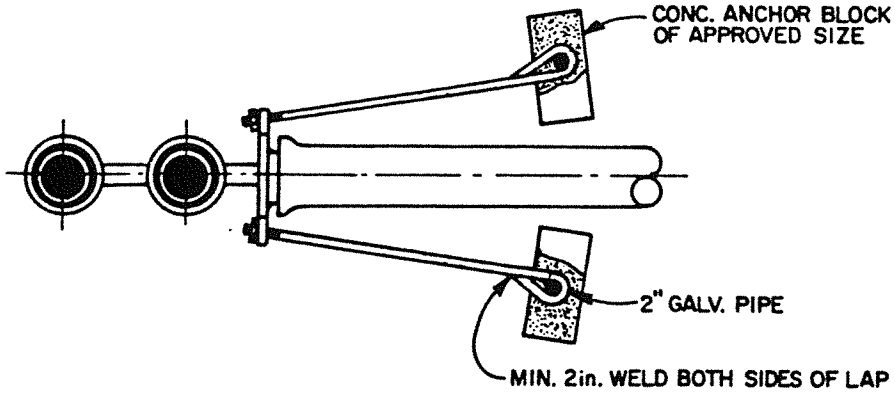
1. ANCHOR BLOCK SIZE TO BE SPECIFIED OR APPROVED BY THE ENGINEER.
2. TIE RODS TO BE A307 STEEL BOLT STOCK WITH 14,000psi TENSILE STRENGTH OR APPROVED EQUAL, NUMBER OF RODS AND SIZE TO BE APPROVED BY THE ENGINEER.
3. FITTINGS MAY BE SUBSTITUTED AS APPROVED BY ENGINEER.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

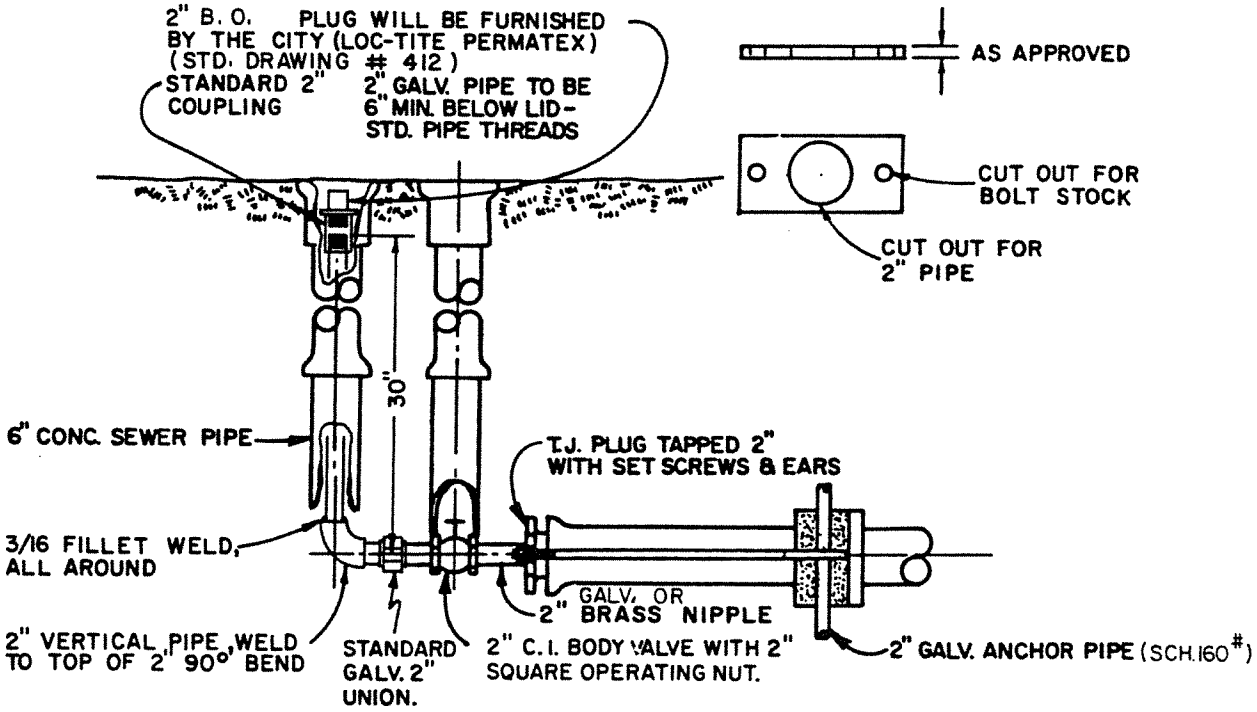
STANDARD BLOWOFF WITH IN LINE VALVE FOR 10" DIA. PIPE & LARGER

DATE: 1992

NO. 406



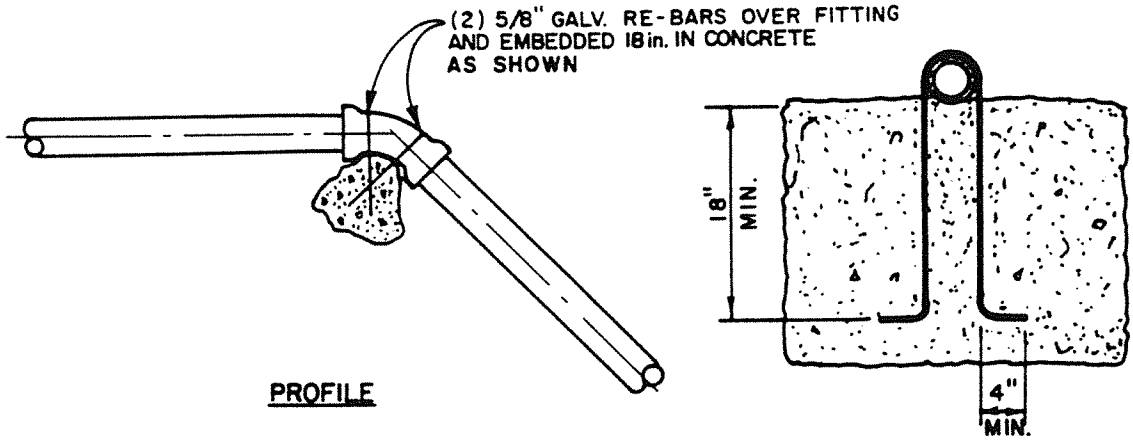
STEEL PLATE ALTERNATE FOR T.J. PLUG WITHOUT EARS



NOTES:

1. ANCHOR BLOCK SIZE TO BE SPECIFIED OR APPROVED BY THE ENGINEER.
2. TIE RODS TO BE A307 STEEL BOLT STOCK WITH 14,000psi TENSILE STRENGTH OR APPROVED EQUAL, NUMBER OF RODS AND SIZE TO BE APPROVED BY THE ENGINEER.

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD BLOWOFF WITH PLUGGED END	
	DATE : 1992
	NO. 407



PROFILE

1. Keep concrete clear of joint and joint accessories.

2. The required thrust block volumes for special connections are shown encircled on the plan; e.g. 6 indicates 6 cubic yards of concrete are required.

3. If not shown on plans, required volumes at fittings shall be as indicated below, adjusted if necessary, to conform to the test pressure (s) stated in the special specifications.

4. Volumes and special blocking details shown on plans take precedence over volumes and the blocking detail shown on this standard detail.

5. Thrust blocks for vertical up - bends shall be the same as for horizontal bends.

FITTING SIZE	VOLUME OF THRUST BLOCK IN CU. YD.			
	90° BEND	45° BEND	22½° BEND	11¼° BEND
4	—	—	—	—
6	1.3	—	—	—
8	2.3	1.1	—	—
10	3.7	1.8	—	—
12	5.5	2.8	1.2	—
14	7.6	3.9	1.7	—
16	9.9	5.1	2.3	0.9

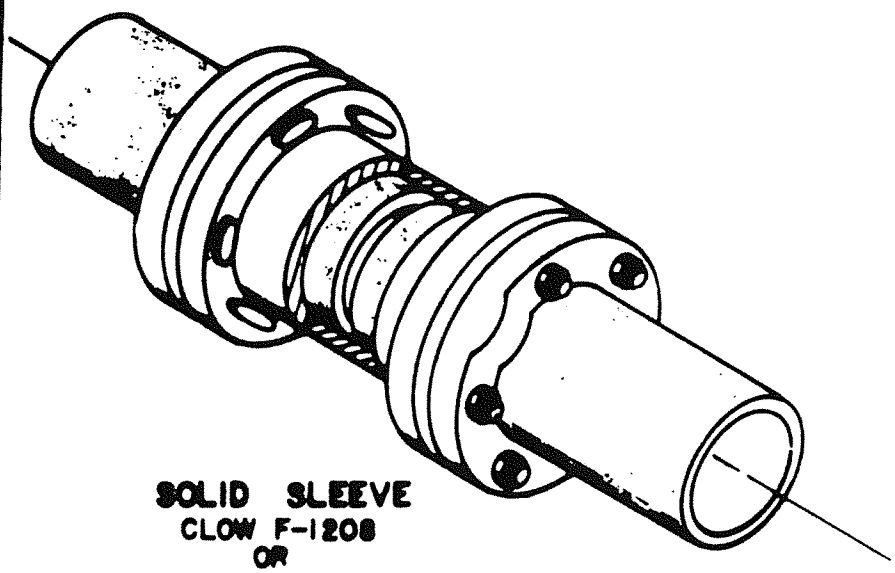
NOTE:

Above volumes based on test pressure of 150 psi and the weight of concrete = 4050 lbs/cu. yd.
To compute volumes for different test pressures, use the following equation:
Volume = (test pressure/150)(table value).

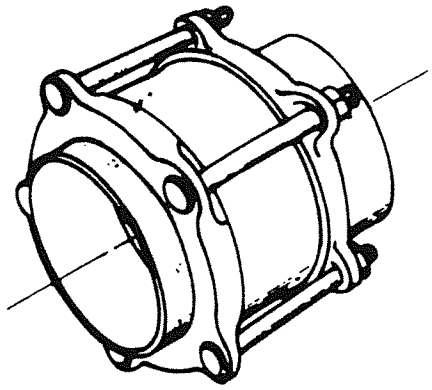
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD VERTICAL BEND ANCHOR BLOCK DETAIL

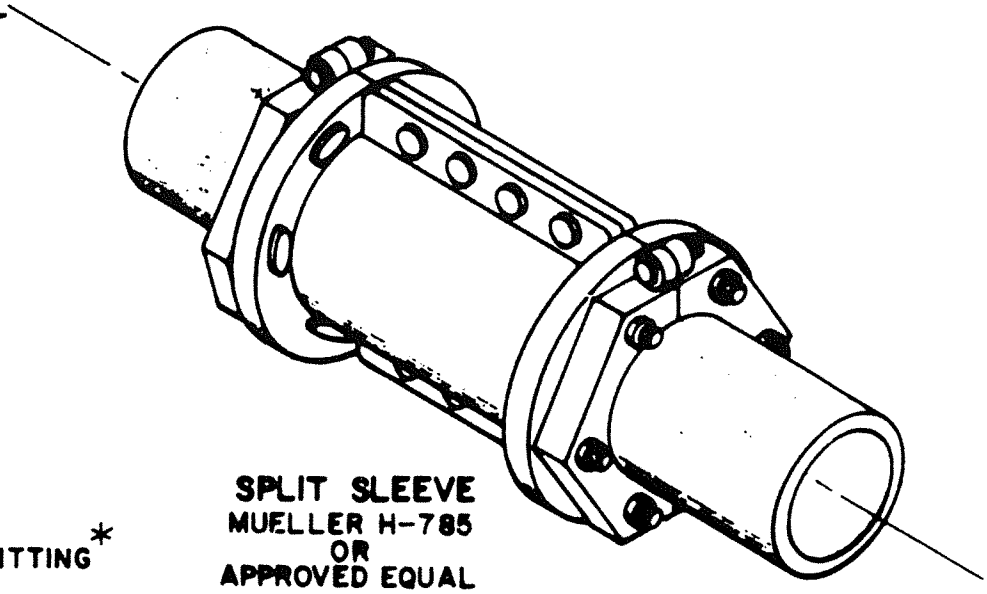
	DATE: 1992
	NO. 408



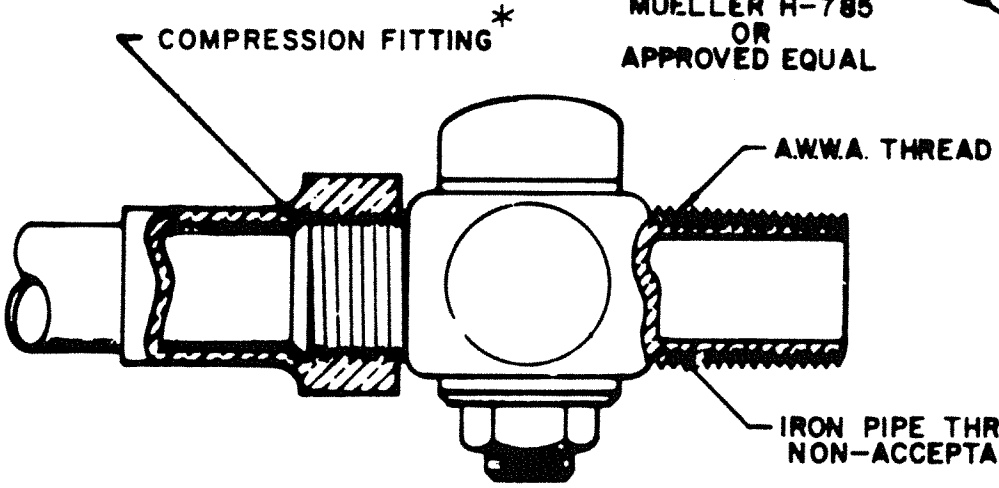
SOLID SLEEVE
CLOW F-1208
OR
APPROVED EQUAL



DRESSER TYPE COUPLING
ALL DUCTILE OR CAST IRON



SPLIT SLEEVE
MUELLER H-785
OR
APPROVED EQUAL



1"-1 1/2"-2"
CORPORATION STOP
MUELLER H-15000
FORD F-600 OR
APPROVED EQUAL

* SEE 501, 207 BRASS STOPS.

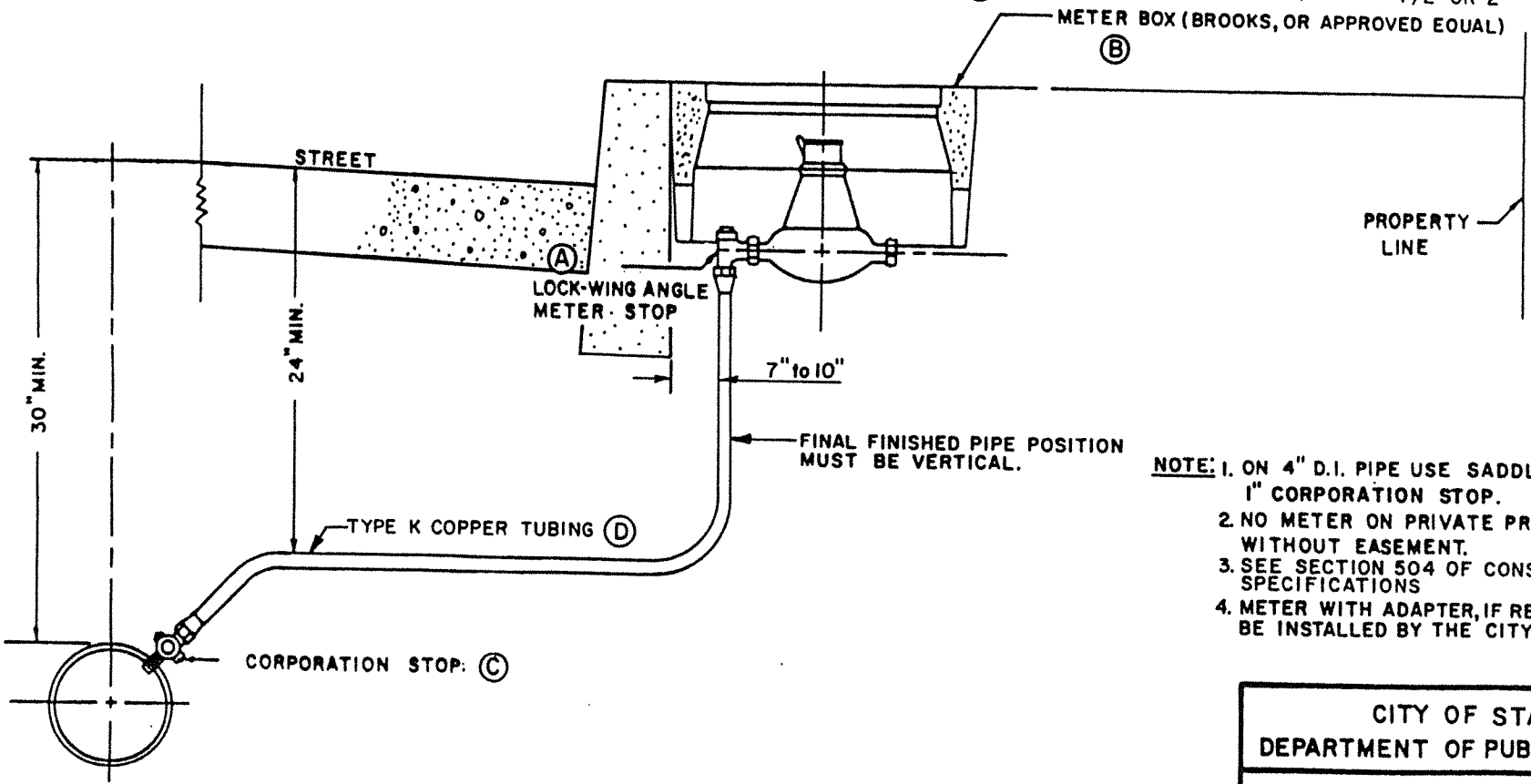
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD FITTINGS

DATE : 1992

No. 409

	3/4" X 5/8" METER	1" METER	1 1/2" – 2" METER
(A)	1" X 3/4"	1"	1 1/2" OR 2"
(B)	# 38	#38	# 66
(C)	1"	1"	1 1/2" OR 2"
(D)	1"	1"	1 1/2" OR 2"

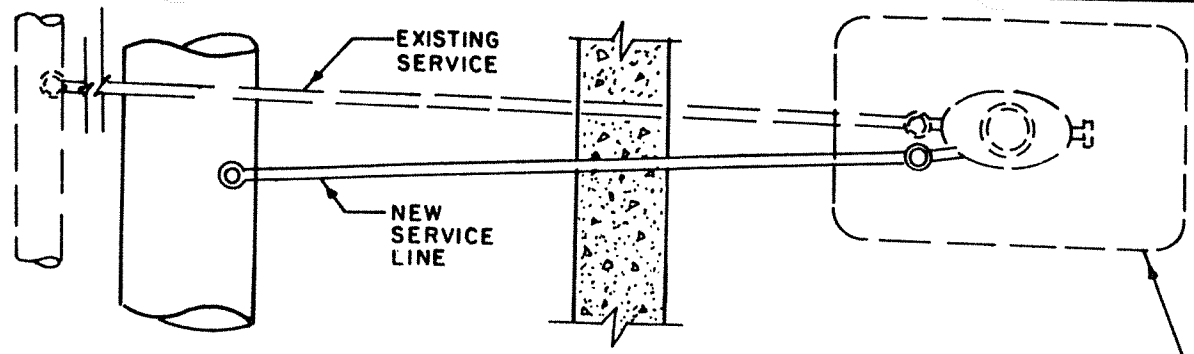


NOTE:
1. ON 4" D.I. PIPE USE SADDLE AND 1" CORPORATION STOP.
2. NO METER ON PRIVATE PROPERTY WITHOUT EASEMENT.
3. SEE SECTION 504 OF CONSTRUCTION SPECIFICATIONS
4. METER WITH ADAPTER, IF REQUIRED, TO BE INSTALLED BY THE CITY.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

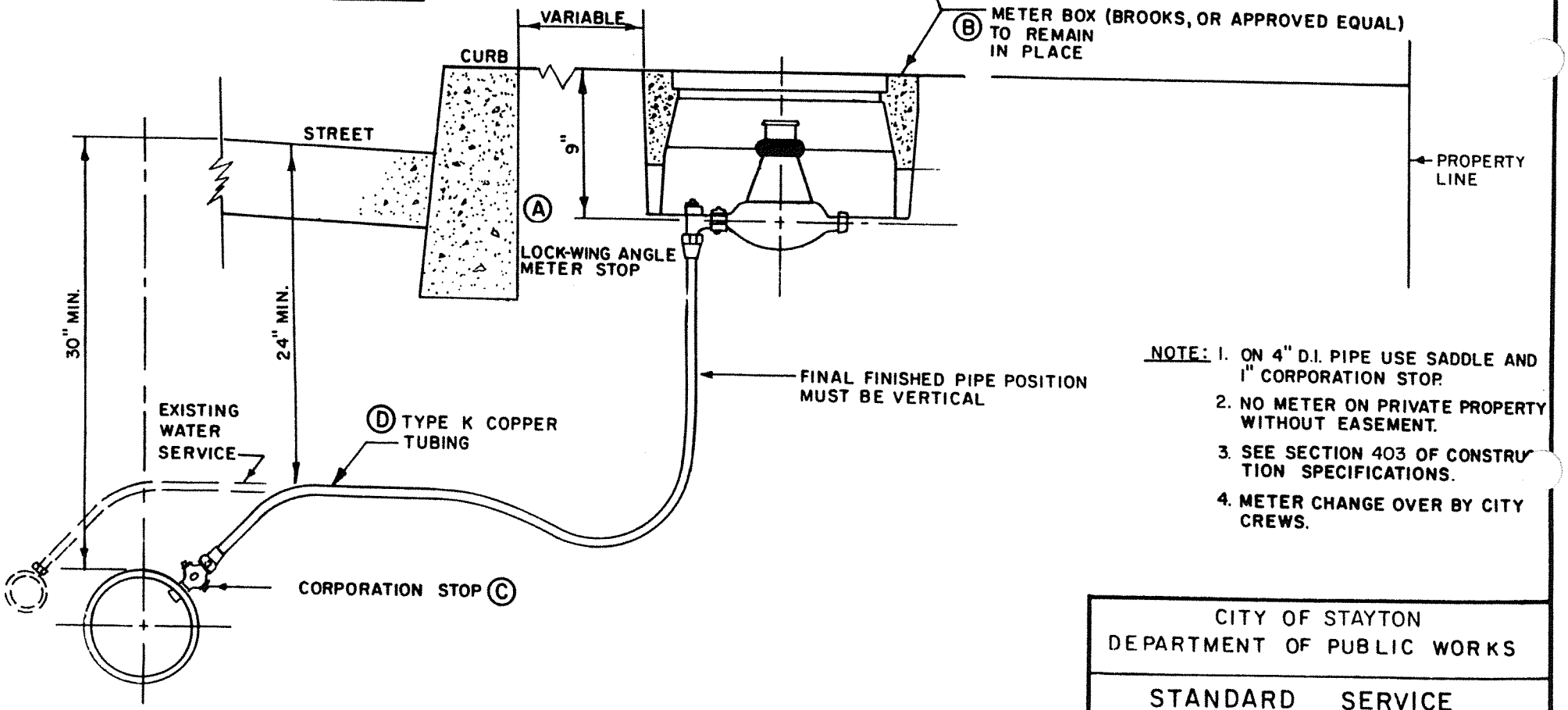
STANDARD SERVICE INSTALLATION

NO. 410



PLAN

	3/4" X 5/8" METER	1" METER	1 1/2"–2" METER
(A)	1" X 3/4"	1"	1 1/2" OR 2"
(B)	# 38	# 38	# 66
(C)	1"	1"	1 1/2" OR 2"
(D)	1"	1"	1 1/2" OR 2"



PROFILE

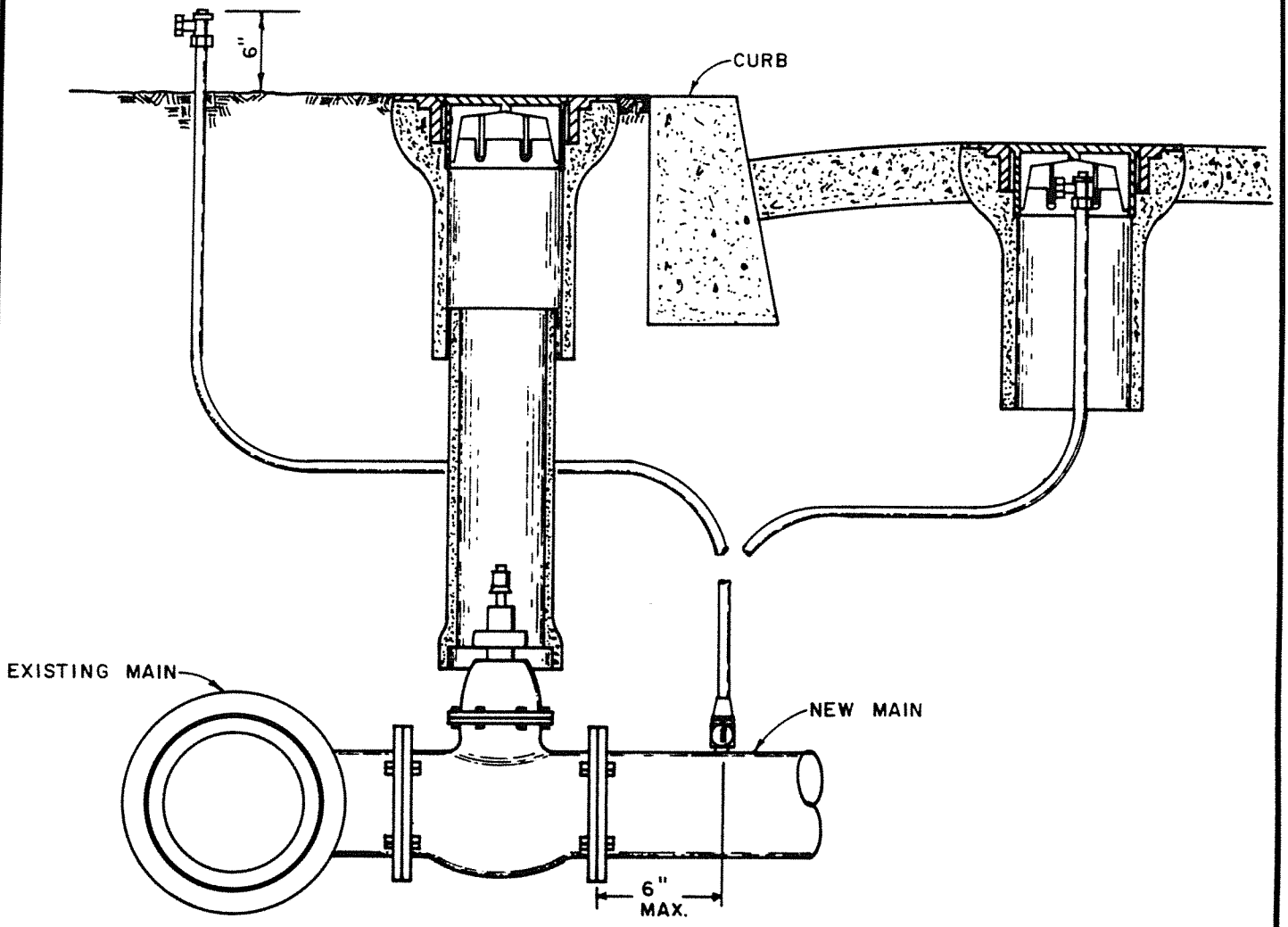
NOTE:
1. ON 4" D.I. PIPE USE SADDLE AND 1" CORPORATION STOP.
2. NO METER ON PRIVATE PROPERTY WITHOUT EASEMENT.
3. SEE SECTION 403 OF CONSTRUCTION SPECIFICATIONS.
4. METER CHANGE OVER BY CITY CREWS.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD SERVICE INSTALLATION FOR SERVICE REPLACEMENT

DATE: 1992

NO: 410 A

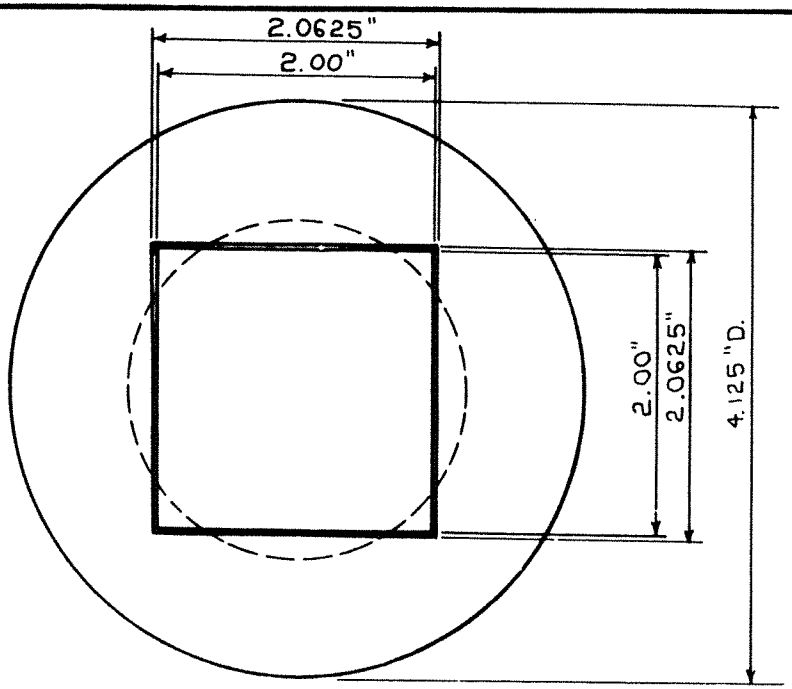


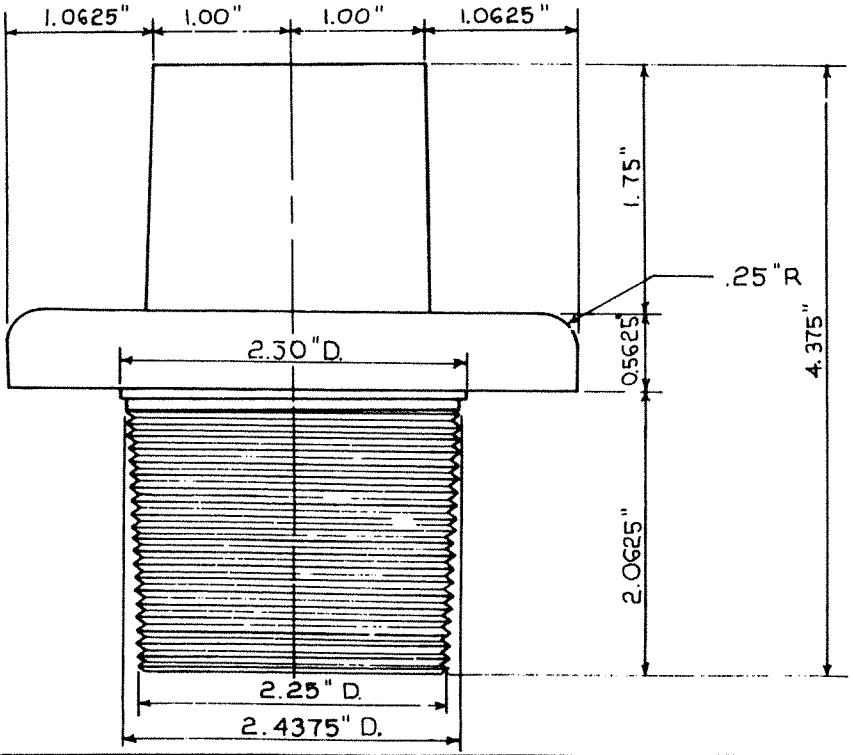
1. VALVE BOX OVER 3/4" CHLORINE LINE DOES NOT NEED TO BE INSTALLED IF CHLORINE LINE IS BEHIND THE CURB. VALVE BOX IS TO BE INSTALLED ONLY WHEN CHLORINE LINE IS IN AREA COVERED BY TRAFFIC.
2. CHLORINE LINE PLACED IN AN AREA NOT COVERED BY TRAFFIC WILL BE 6" ABOVE NATURAL GROUND LEVEL, WITH ANGLE CURB STOP WITH METER COUPLING FOR 5/8" METER.
3. DISTANCE FROM GATE VALVE TO CHLORINE TAP WILL NOT BE MORE THAN 6".
4. OWNER WILL REMOVE CHLORINE LINE AND VALVE BOX AFTER RECEIVING NOTICE OF NEGATIVE BACTERIOLOGICAL TEST AND PRIOR TO PAVING, CONTRACTOR TO PROVIDE EXCAVATION.
5. ACTUAL CHLORINATION PROCESS WILL BE SUPERVISED BY CITY FORCES, IN ACCORDANCE WITH APPROVED SPECIFICATIONS.

CITY OF STAYTON DEPT. OF PUBLIC WORKS

STANDARD FOR MAIN LINE CHLORINATION

	DATE : 1992
	NO. 411





NOTES:

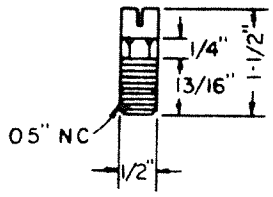
1. MATERIAL SHALL BE A.S.T.M. A-48 GRAY CAST IRON, CLASS 30.
2. APPROX. WEIGHT 5 LBS. 15 OZ.
3. THREADS SHALL BE STANDARD PIPE THREAD TO MATCH 2" I.D. COUPLING.
4. REFER TO STD. DRAWING NOS. 405 AND 407 FOR LOCATION OF PLUG IN BLOW-OFF.

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

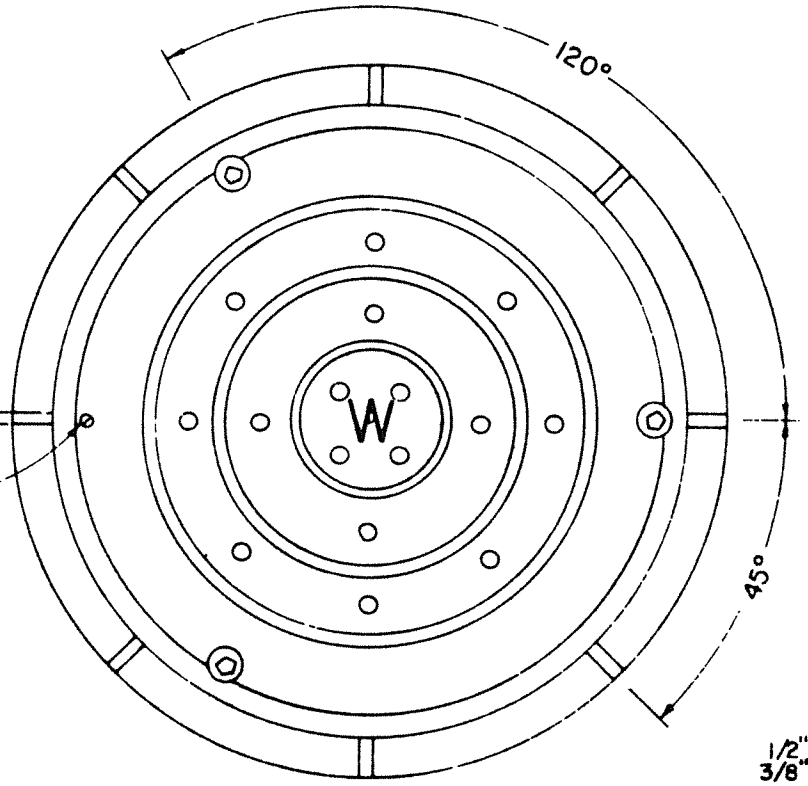
STANDARD 2" BLOW-OFF PLUG

DATE. 1992
FILE. 412

HEX FOR WRENCH OR SLOT
TOP FOR SCREWDRIVER



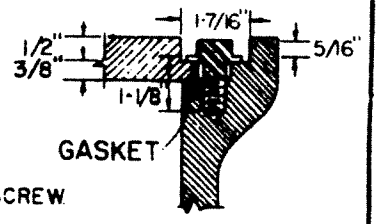
1 STUD REQUIRED PER COVER.
STUD TO BE 60° COUNTER-
CLOCKWISE FROM A CAP SCREW

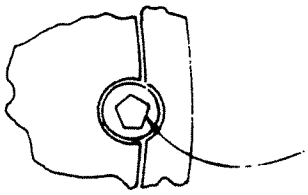


1/2"

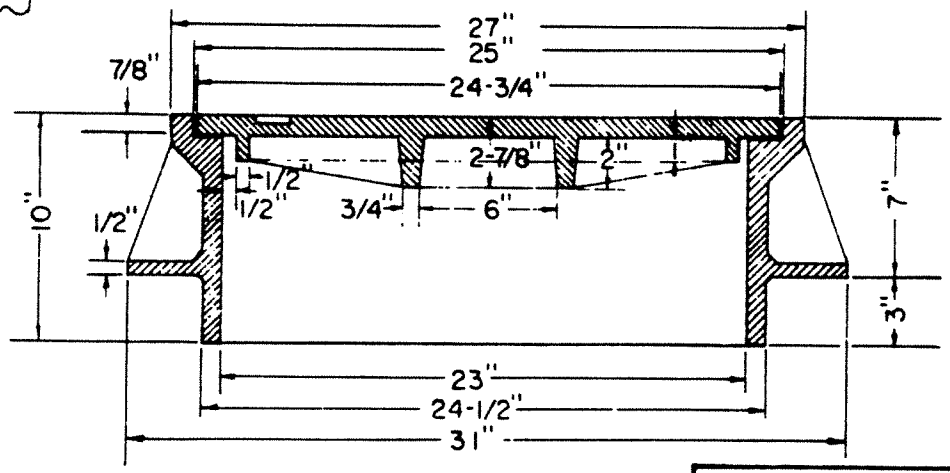
LOCATING STUD
DRILL 25/64" HOLE
AND TAP FOR 1/2"
STUD

1-1/4" O.D. BRASS
WASHER 3/32" THICK.



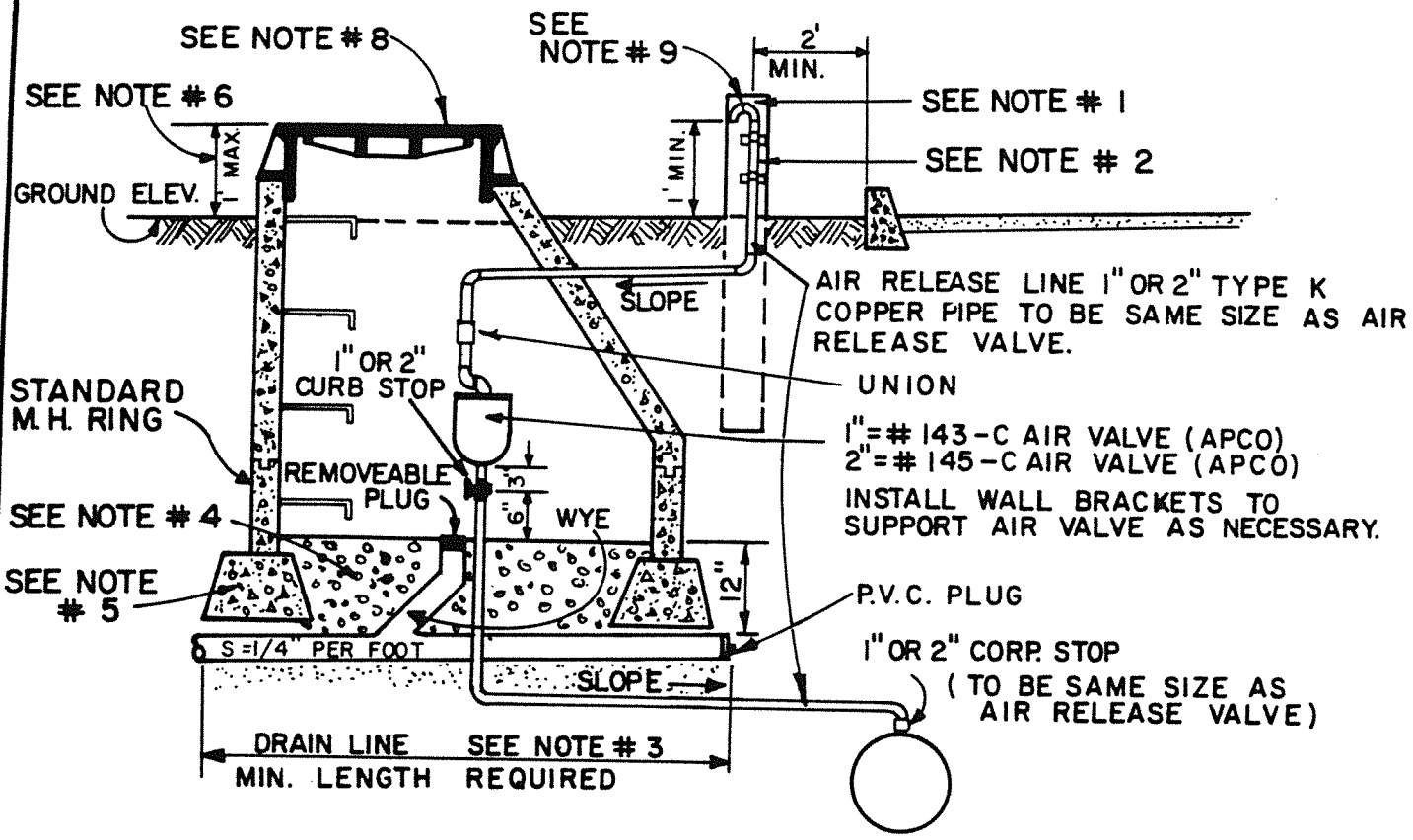


1/2"-13-1" LONG BRASS OR BRONZE PENTAGON-HEADED CAP SCREW



NOTE: BEARING SURFACES TO BE MACHINED

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
TAMPER PROOF MANHOLE FRAME AND COVER FOR WATER MAIN BLOWOFF	
	DATE: 1992
	FILE: 413

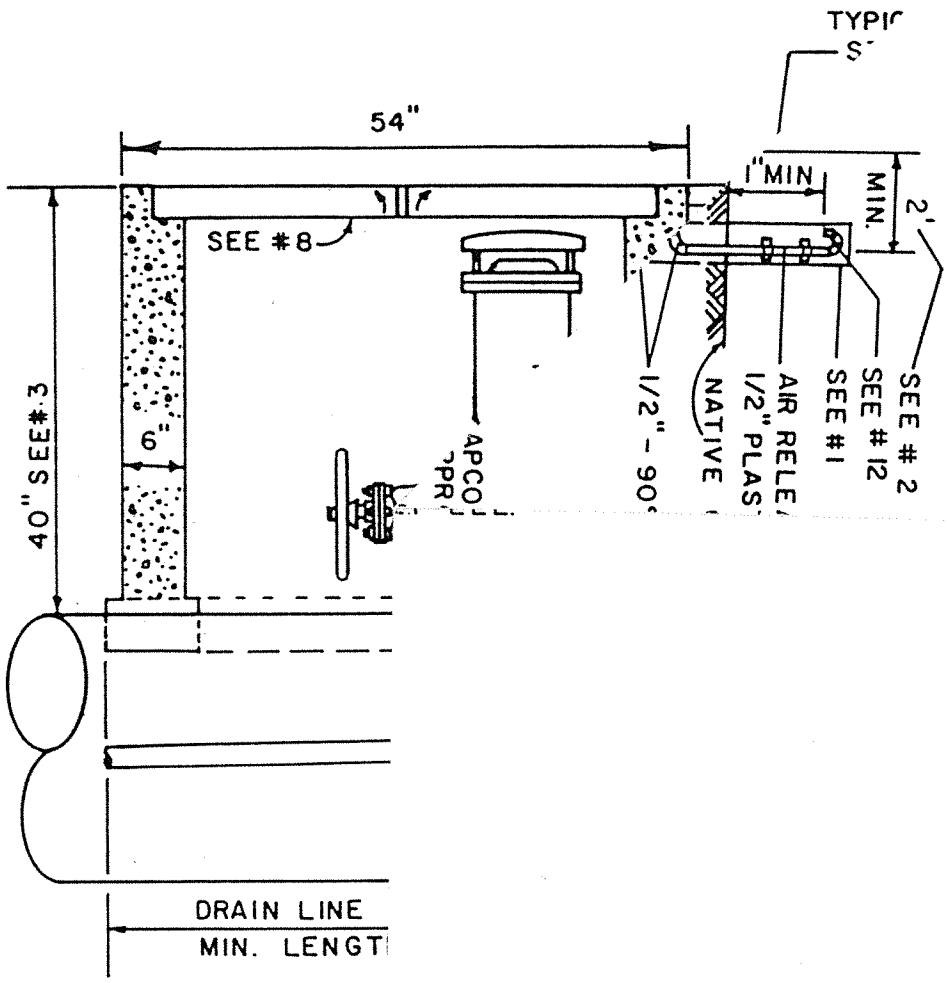


NOTES:

1. USE TWO 4"X4"X3' NO. 2 DOUGLAS FIR PRESSURE TREATED POST. POSITION ONE TOWARD TRAFFIC FLOW FOR PROTECTION OF THE ABOVE GROUND AIR RELEASE LINE.
2. AIR RELEASE LINE MUST BE A MINIMUN OF 1' ABOVE GROUND & 2' BEHIND CURB LINE, AGAINST POST WITH STAINLESS STEEL CLAMPS.
3. FOR MANHOLE DRAIN LINE USE 3" DIAMETER P.V.C. TO DAYLIGHT OR TO GRAVEL DRAIN FIELD. IF DRAIN FIELD IS USED IT SHALL BEGIN NOT CLOSER THAN 10' FROM THE MANHOLE AND CONSIST OF PERFORATED PIPE, BACKFILLED WITH UNIFORMLY GRADED (POROUS) ROCK OVER THE LAST 10', UNLESS OTHERWISE SPECIFIED.
4. USE 1"-0 CRUSHED ROCK AT 90% COMPACTION UNDER MANHOLE CONE & FLOOR.
5. SET MANHOLE ON 5 PCC PIER BLOCKS.
6. ENTIRE STRUCTURE MUST BE BEHIND CURB EITHER FLUSH WITH EXISTING GROUND OR A MAXIMUM OF 1 FOOT ABOVE.
7. SIZING OF AIR RELEASE VALVE IS TO BE SPECIFIED BY EACH PROJECT & PROJECT ENGINEER.
8. STANDARD MANHOLE CONE WITH TAMPER PROOF COVER & FRAME SEE STANDARD DWG # 413.
9. PROVIDE A SCREENED, DOWNWARD FACING ELBOW.

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
TYPICAL 1"&2" AIR RELEASE VALVE INSTALLATION FOR 8" PIPE & SMALLER	
	DATE: 1992
	NO: 414

SIDE VIEW



NOTES:

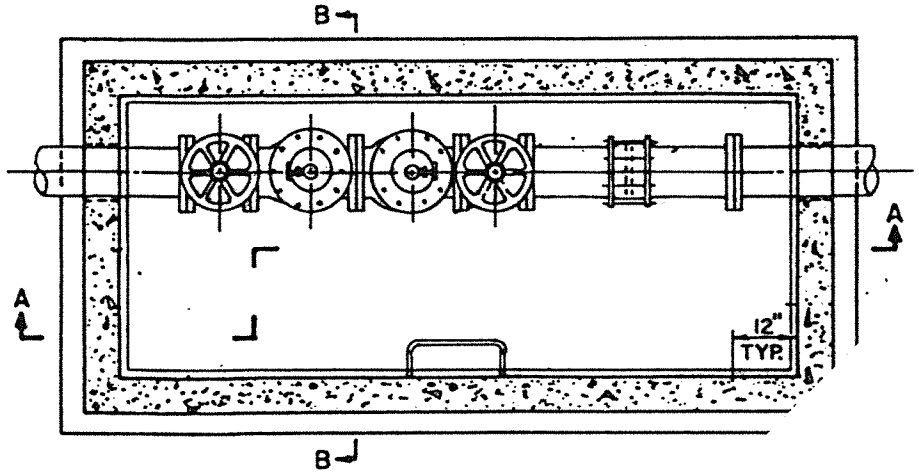
1. USE TWO 4"X4"X3' NO. 2 DOUGLAS VE GROUND AIR RELEASE LINE.
2. AIR RELEASE LINE MUST BE A MIN. OF
3. 40" MIN. COVER UNDER STREETS; 3
4. FOR VAULT DRAIN LINE USE 3" DIAM SER THAN 10' FROM VAULT AND CONSIST OF PERFORATE SE SPECIFIED.
5. REFER TO STANDARD DRAWING N
6. USE 1"-0 CRUSHED ROCK AT 90%
7. MAINLINE TEE OR TAP MAY BE A
8. USE CAST D.I. GRATE & STEEL FR
9. PROVIDE 2" SPACE, FILLED WITH KENT
10. WHEN USING A 3" AIR RELEASE USE A NOTE: #55- 1/2" AIR RELEASE IS NOT
11. SIZING OF AIR RELEASE/ VACUUM V
12. PROVIDE A SCREENED, DOWNWARD

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

3", 4" & 6" AIR RELEASE & VACUUM VALVE INSTALLATION FOR 10" PIPE & LARGER.

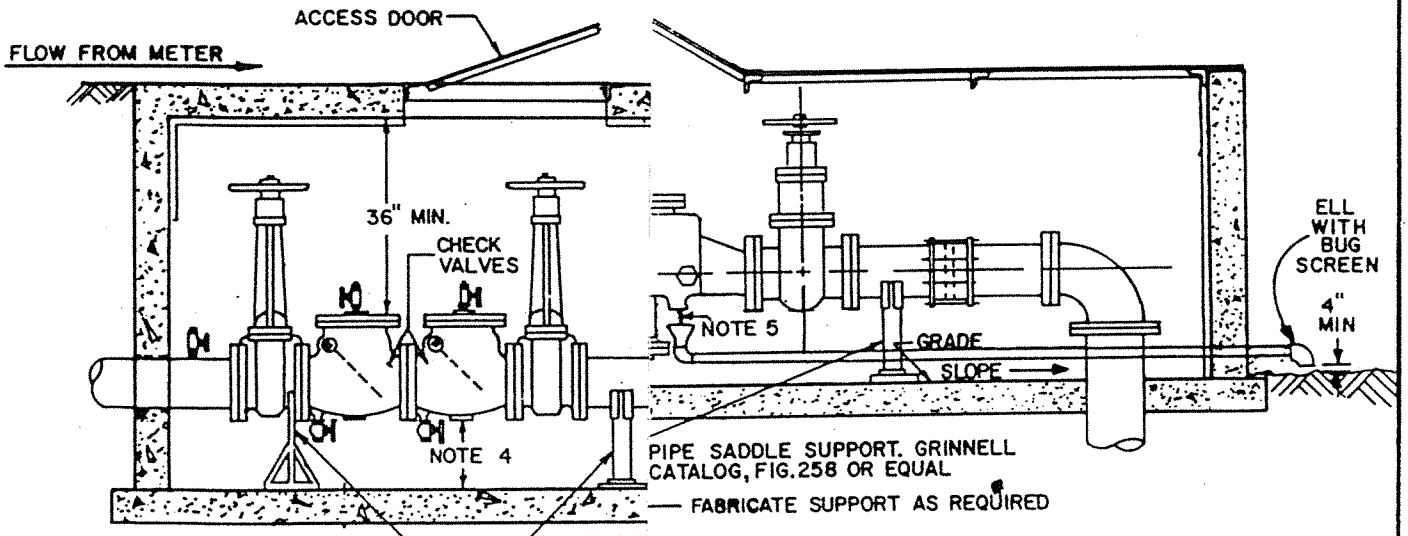
DATE: 1992

NO: 417



PLAN
(TOP SLAB NOT SHOWN)

ILAR TO STYLE 38 DRESSER
6" & 10" SERVICES OR
AREA OR PROTECTION SUCH
MUST BE FURNISHED
FLOOR SHALL BE A

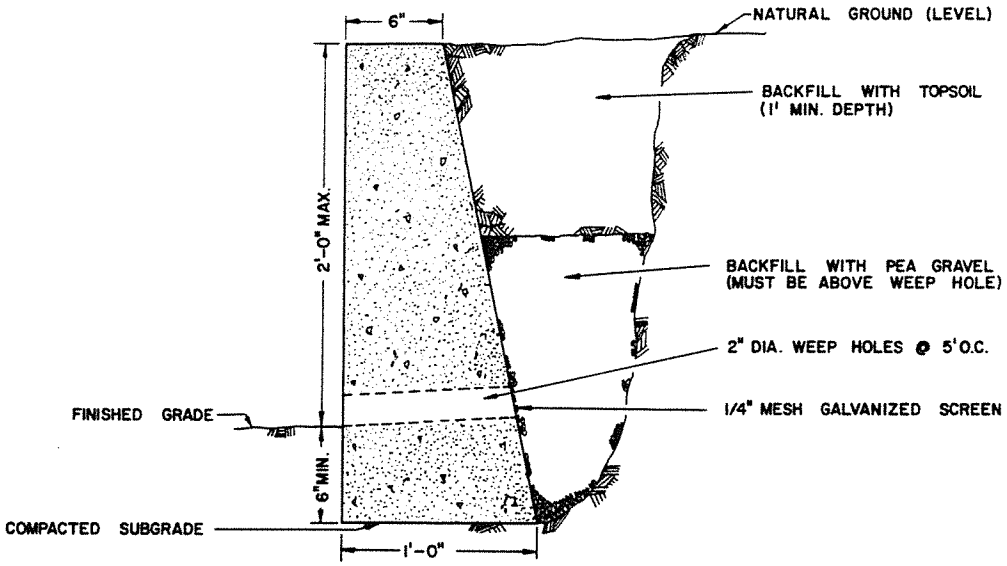


SECTION A-A

LEVATION

OW PREVENTER
T INSTALLATION

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD BACKFLOW PREVENTION DEVICE INSTALLATIONS	
	DATE: 1992
	NO. 415



DESIGN NOTES

LEVEL BACKFILL
γ = 100 P.C.F.
Kγ = E.F.W = 40 P.C.F.
f'c = 3000 P.S.I CONC.

CONSTRUCTION NOTES

1. CONTRACTION JOINT: SCORE A 3/4" DEEP "V" NOTCHED GROOVE THE FULL HEIGHT OF THE EXPOSED FACE, ACROSS THE TOP, AND 6" DOWN THE BACK OF THE WALL. INSTALL "TEE BAR" CONTRACTION JOINTS TO SEPARATE THE LARGE AGGREGATE IN THE TOP 6" OF THE WALL AT THE "V" NOTCHED GROOVE. JOINTS SHALL BE UNIFORMLY SPACED AT 10' TO 15' CENTERS.

2. CONSTRUCTION JOINT: IF WALL IS TO BE POURED IN SECTIONS, USE 2-24", NO. 4 REINFORCING BARS EXTENDED 12" INTO EACH SECTION.

3. WHEN EXPOSED WALL HEIGHT IS LESS THAN 2 FEET, MAINTAIN 6" TOP DIMENSION AND REDUCE BASE DIMENSION TO MAINTAIN 1:5 BATTER ON BACK OF WALL.

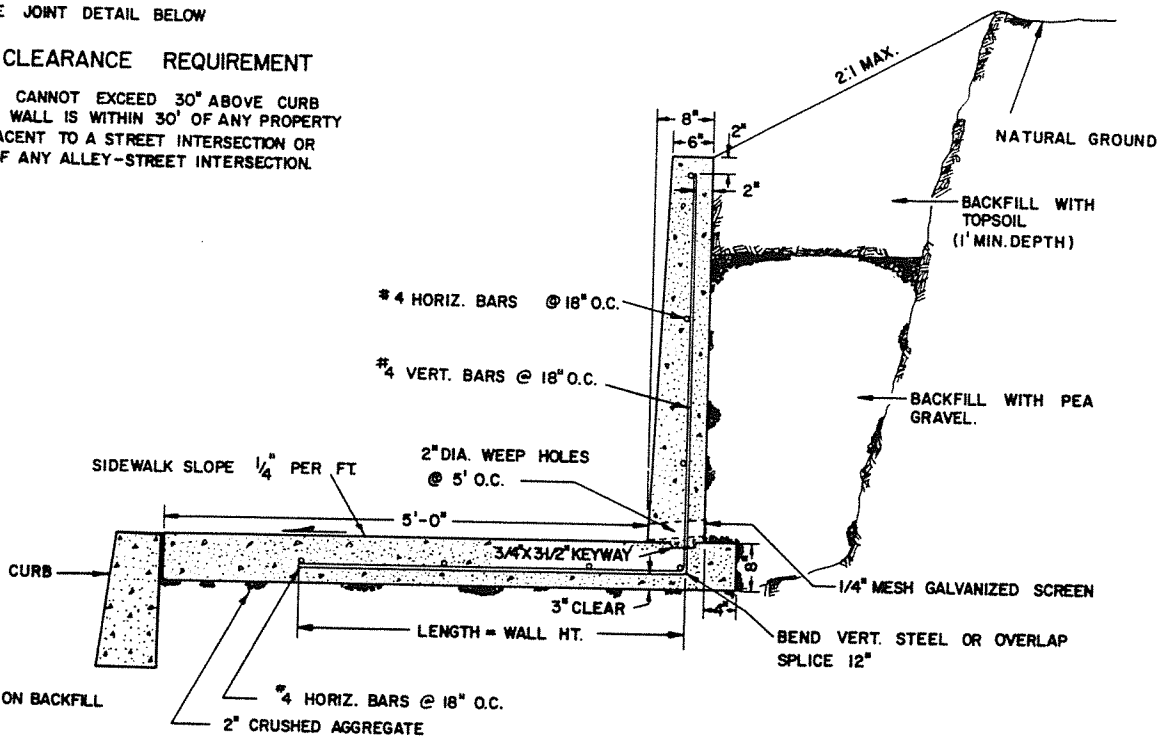
CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD RETAINING WALL HEIGHT OF WALL 2'-0" or LESS	
	DATE: 1992
	NO. 501

CONSTRUCTION NOTES

1. OVERLAP ALL BAR SPLICES 12"
2. SEE JOINT DETAIL BELOW

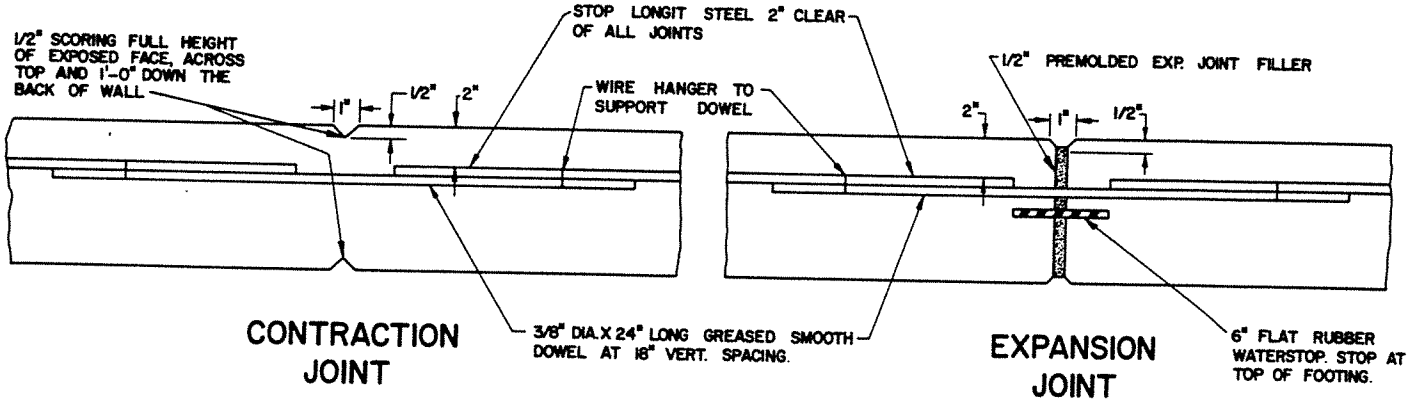
VISION CLEARANCE REQUIREMENT

WALL HEIGHT CANNOT EXCEED 30" ABOVE CURB GRADE WHEN WALL IS WITHIN 30' OF ANY PROPERTY CORNER ADJACENT TO A STREET INTERSECTION OR WITHIN 10' OF ANY ALLEY-STREET INTERSECTION.



DESIGN NOTES

2:1 MAX. SURCHARGE ON BACKFILL
γ = 100 P.C.F.
Kγ = E.F.W = 40 P.C.F.
f'_c = 3,000 P.S.I. CONC.
f_s = 40,000 P.S.I.



CONTRACTION JOINT

EXPANSION JOINT

JOINT DETAIL

NOTE: PLACE EXPANSION JOINTS AT APPROXIMATELY 90' CENTERS THROUGH WALL AND SIDEWALK PORTION OF WALL, AND CONTRACTION JOINTS AT APPOXIMATELY 30' CENTERS IN WALL ONLY.

CITY OF STAYTON DEPARTMENT OF PUBLIC WORKS	
STANDARD RETAINING WALL HEIGHT OF WALL 2'-0" to 4'-0" MAX.	
	DATE : 1992
	NO. 502

NOTE:

FOR KEY LOCATION REQUIRMENTS
SEE POLICIES AND PROCEDURE WW-1-2.

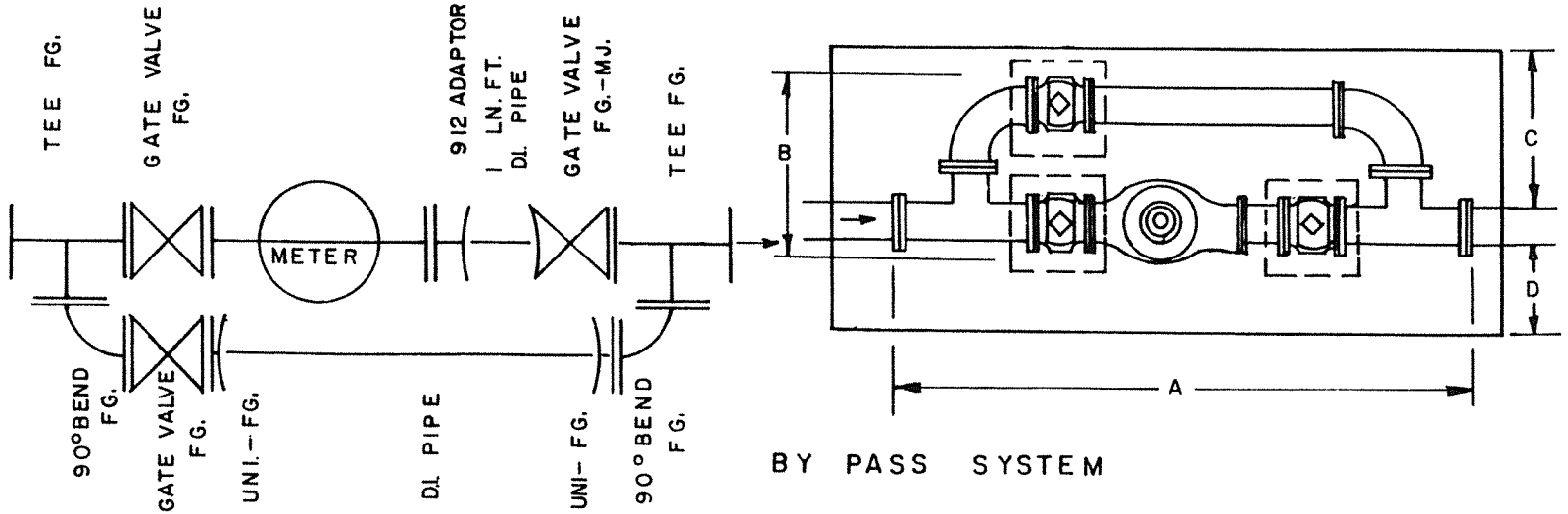
METER SIZE	BY PASS SIZE	METER DIMENSION A	METER DIMENSION B	METER CLEARANCE C	METER CLEARANCE D	INSIDE DIMENSIONS (MIN) VAULT SIZE L	INSIDE DIMENSIONS (MIN) VAULT SIZE W	INSIDE DIMENSIONS (MIN) VAULT SIZE H	MINIMUM VAULT ACCESS SIZE UTILITY VAULT-BILCO E	MINIMUM VAULT ACCESS SIZE UTILITY VAULT-BILCO F	MINIMUM VAULT ACCESS SIZE UTILITY VAULT-BILCO E	MINIMUM VAULT ACCESS SIZE UTILITY VAULT-BILCO F	WATER TEST FLOWS GPM
3" M C T	4"	6' 2"	1' 8"	2' 4"	2' 10"	7'	5' 6"	6'	3'	3'	3'	3'	350
3" FM - CT	4"	6' 11"	3'	3' 1"	4' 7"	10'	8'	6'	3'	3'	3'	3'	350
4" M C T	4"	7' 1"	2'	2' 8"	3'	8'	6'	6'	3'	3'	3'	3'	550
4" FM-CT	4"	7' 5"	3' 4"	3'	4' 4"	10'	8'	6'	3'	3'	3'	3'	550
6" M C T	6"	8' 6"	2' 6"	3' 4"	4'	10'	8'	7'	3'	6'	4'	4'	750
6" FM-CT	6"	9' 2"	4'	3'	4' 6"	14'	8'	7'	3'	6'	4'	5'	750
8" FM - CT	8"	10' 4"	4' 10"	3' 4'	4'	14'	8'	7'	3'	6'	4'	5'	900

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

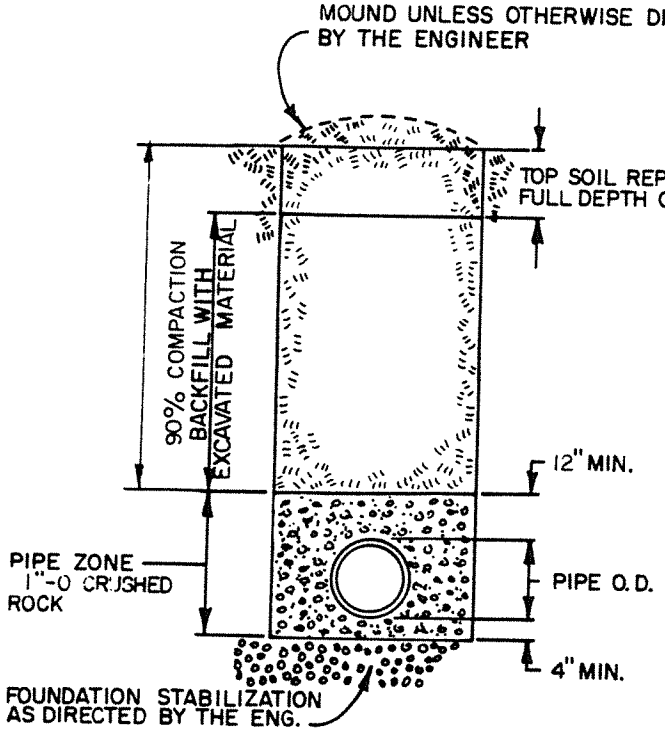
METER & VAULT
SIZE SPECIFICATIONS

DATE: 1992

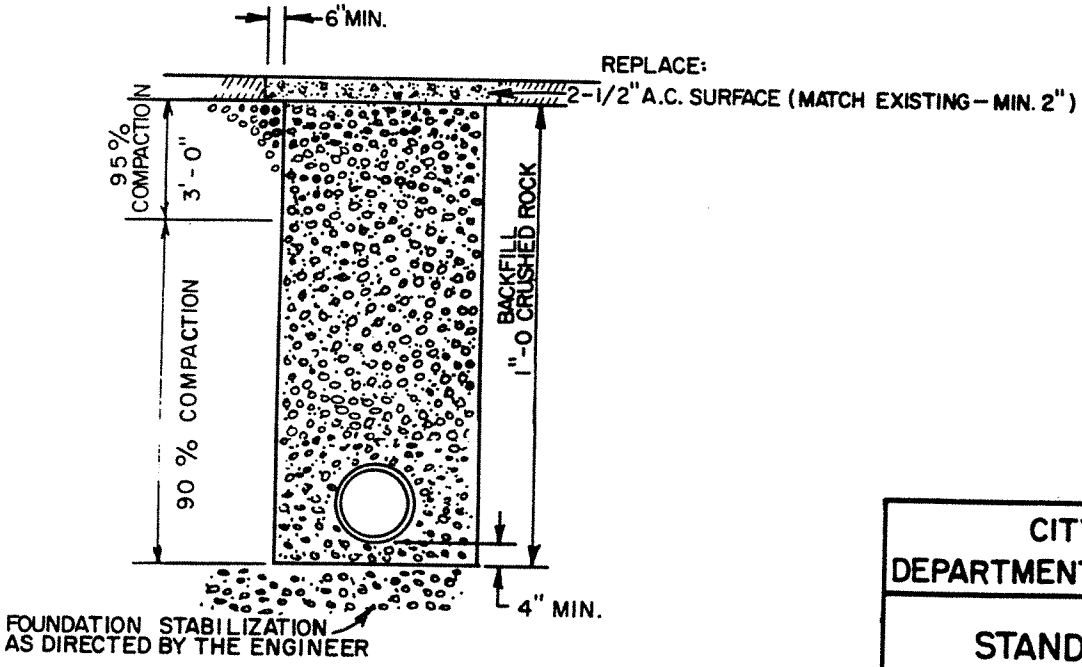
NO. 506



BY PASS SYSTEM



SIZE OF PIPE	PAY WIDTH OF TRENCH
6" thru 8"	2.5 FT.
10" thru 24"	OUTSIDE DIAMETER PLUS 18"
27" thru 36"	OUTSIDE DIAMETER PLUS 24"
42" AND LARGER	OUTSIDE DIAMETER PLUS 30"

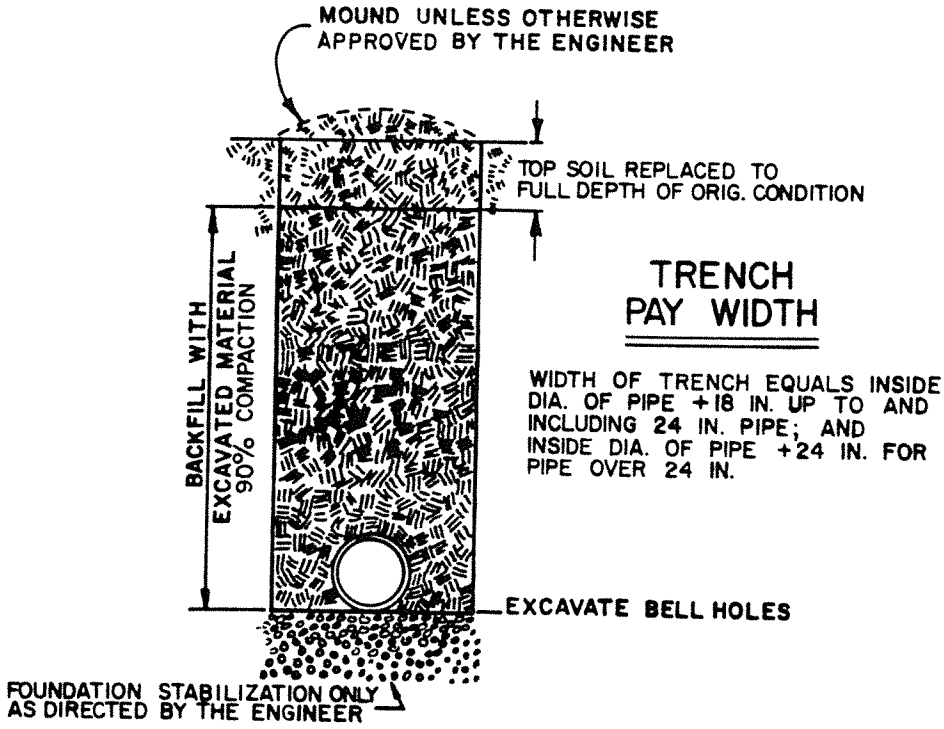


CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

STANDARD SEWER TRENCH DETAIL

DATE: 1992

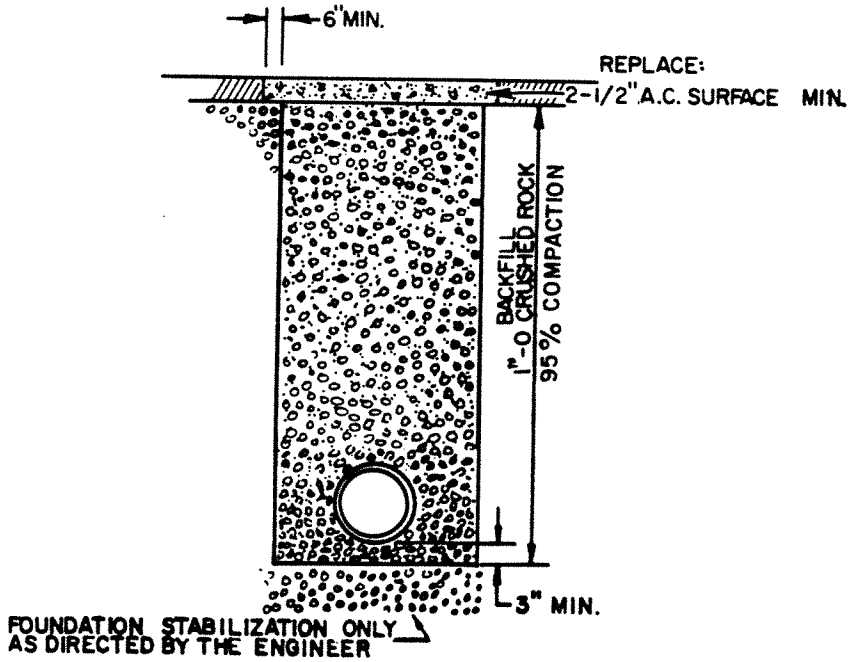
NO. 601



TRENCH PAY WIDTH

WIDTH OF TRENCH EQUALS INSIDE DIA. OF PIPE +18 IN. UP TO AND INCLUDING 24 IN. PIPE; AND INSIDE DIA. OF PIPE +24 IN. FOR PIPE OVER 24 IN.

COMMON BACKFILL



1"-0" CRUSHED ROCK BACKFILL

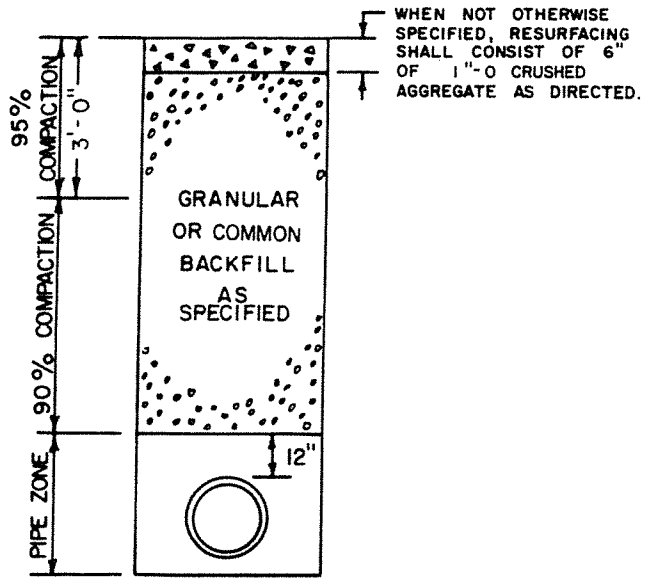
(FOR C.I. OR D.I. PIPE ONLY)

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

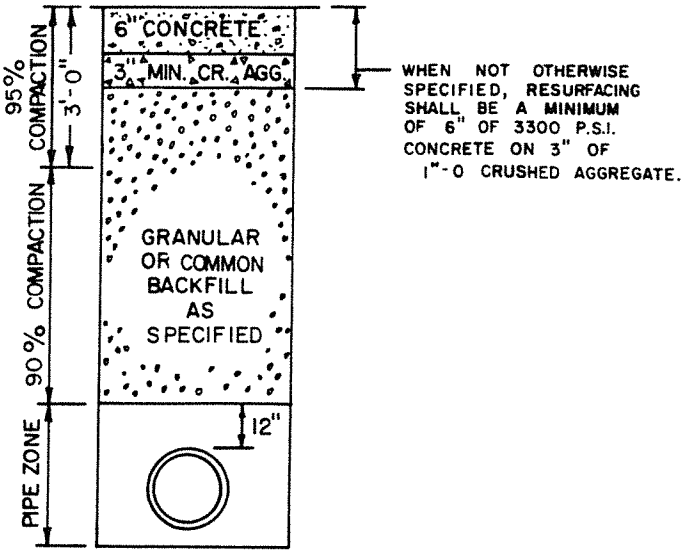
STANDARD WATER TRENCH DETAIL

DATE: 1992

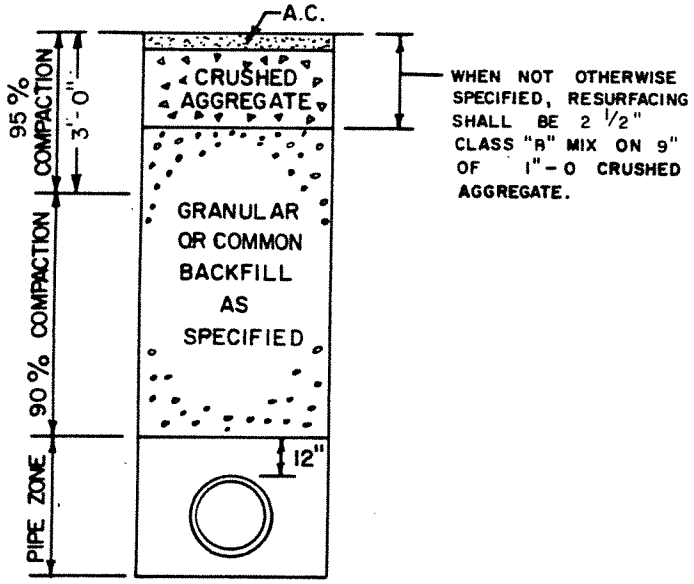
NO. 602



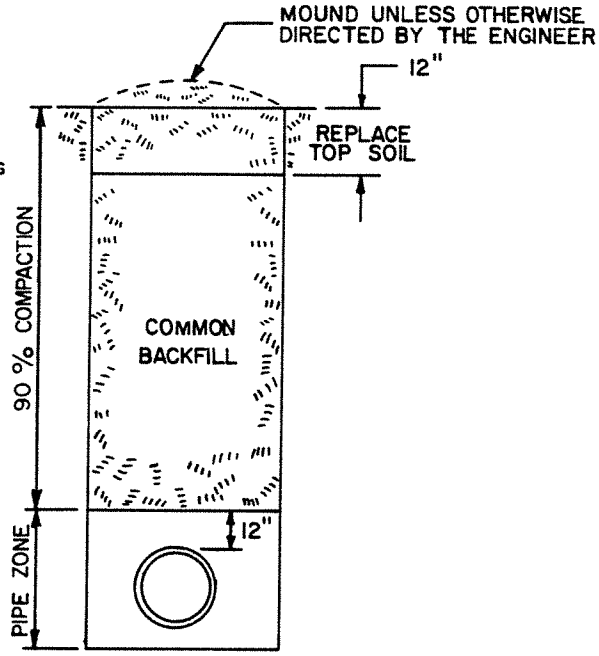
TRAVELED UNIMPROVED STREET



HARD SURFACE (CONCRETE)



OIL GRAVEL OR ASPHALTIC CONCRETE SURFACE

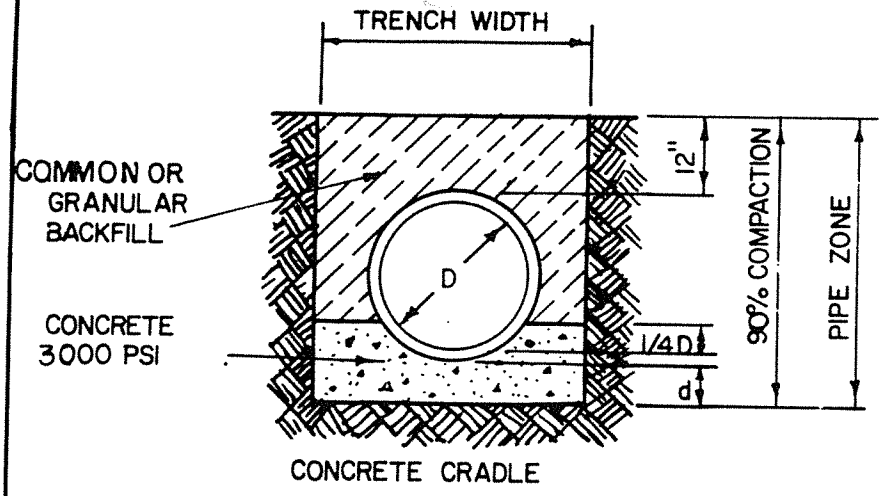


UNTRAVELED SURFACE

NOTE:

1. FOR PIPE ZONE BEDDING, BACKFILL AND COMPACTION REQUIREMENTS, SEE STANDARD PLAN NO. 605.
2. THE TRENCH WIDTH IS 30" WHEN THE PIPE SIZE IS FROM 6" TO 15".
3. THE TRENCH WIDTH IS 18" PLUS THE OUTSIDE DIAMETER OF THE PIPE WHEN INSTALLING 18" TO 24" PIPE AND 24" PLUS THE OUTSIDE DIAMETER OF THE PIPE FOR PIPE OVER 24", AND 30" PLUS THE OUTSIDE DIAMETER OF THE PIPE FOR PIPE 42" DIA. AND LARGER.

CITY OF STAYTON DEPT. OF PUBLIC WORKS	
SEWER AND STORM DRAIN STANDARD TRENCH DETAIL (SURFACE)	
	DATE: 1992
	NO. 604



CLASS A

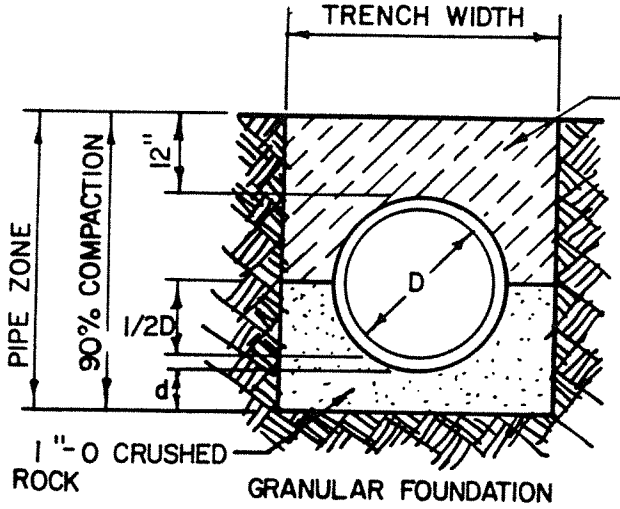
$L_f = 2.8$

LEGEND:

D = OUTSIDE DIAMETER

d = DEPTH OF BEDDING MATERIAL BELOW PIPE.

DEPTH OF BEDDING MATERIAL BELOW PIPE	
D	d (min.)
12" & SMALLER	6"
15" to 36"	8"
42" & LARGER	10"



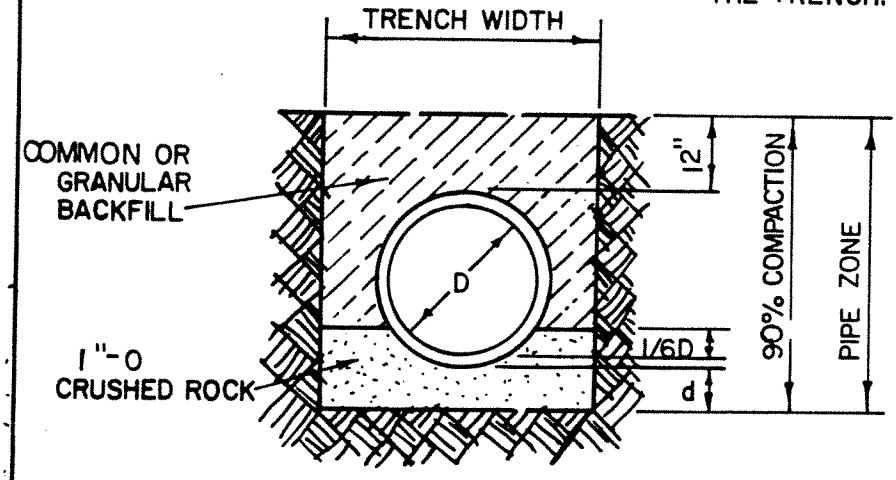
CLASS B

$L_f = 1.9$

NOTE:
WHERE DIRECTED BY THE ENGINEER GRANULAR TRENCH STABILIZATION SHALL BE PLACED PRIOR TO PLACEMENT OF THE BEDDING. SIZE AND DEPTH ARE DEPENDENT ON SOIL CONDITIONS.

FOR ROCK OR OTHER INCOMPRESSIBLE MATERIALS, THE TRENCH SHALL BE OVEREXCAVATED A MINIMUM OF 6" AND REFILLED WITH GRANULAR MATERIAL AS DIRECTED BY THE ENGINEER.

BEDDING AND BACKFILL MATERIALS IN THE PIPE ZONE SHALL BE COMPACTED AS SPECIFIED PRIOR TO BACKFILLING THE REMAINDER OF THE TRENCH.



CLASS C

$L_f = 1.5$

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

SEWER & STORM DRAIN

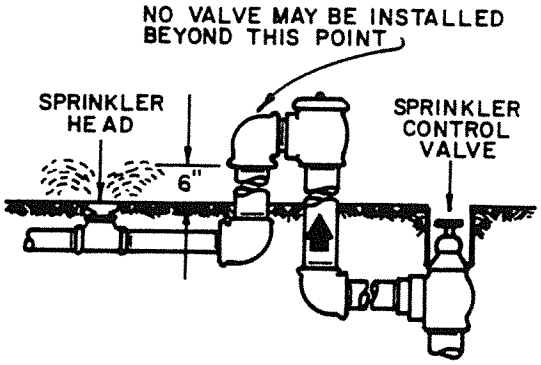
PIPE BEDDING

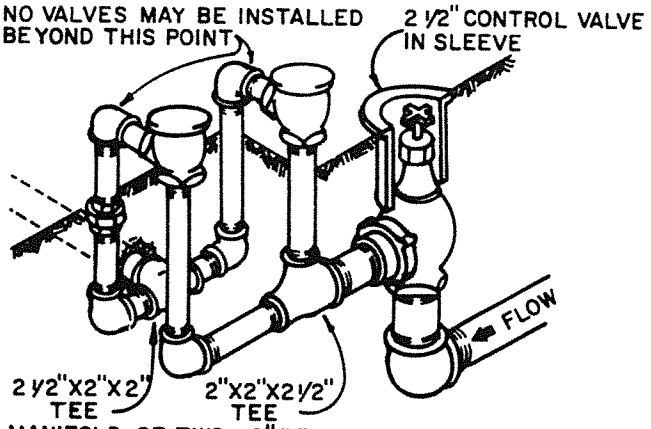
DATE 1992

605

ATMOSPHERIC VACUUM BREAKER TYPICAL INSTALLATIONS

(PROTECTION ON EACH SEPERATE ZONE)





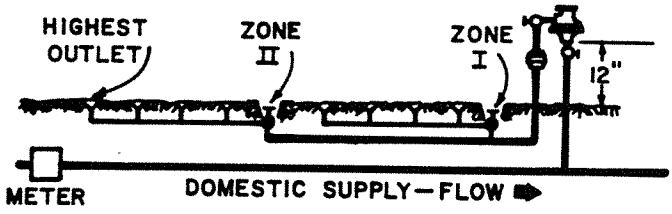
MANIFOLD OF TWO – 2" REQUIRED TO SUPPLY 2 1/2" LAWN SPRINKLER LINE.

PRESSURE TYPE VACUUM BREAKER TYPICAL INSTALLATIONS

(ONE PRESSURE TYPE VACUUM BREAKER USED TO PROTECT A MULTIPLE ZONE SYSTEM)
DEVICE MUST BE TESTED BY A STATE CERTIFIED TESTER EVERY 12 MONTHS WHEN INSTALLED OR REPAIRED.

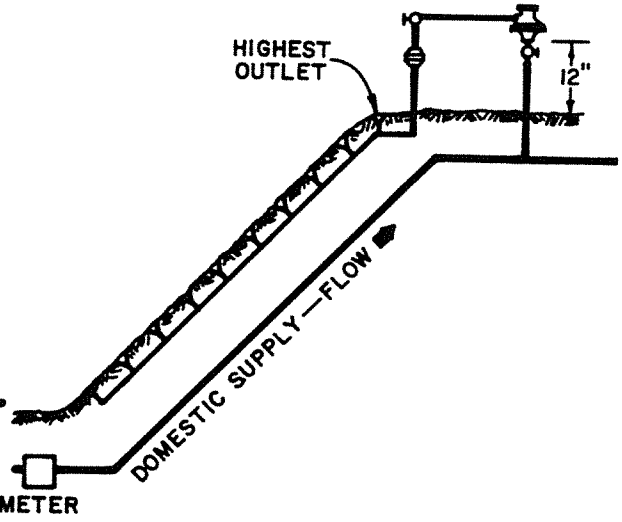
PROTECTING DOMESTIC SYSTEM FROM POSSIBLE BACKFLOW

FLAT TERRAIN



PROTECTING DOMESTIC SYSTEM FROM POSSIBLE BACKFLOW

HILLY TERRAIN



IMPORTANT

DEVICE MUST BE TYPE APPROVED BY THE OREGON STATE HEALTH DEPT.

BOTH ATMOSPHERIC AND PRESSURE TYPE VACUUM BREAKERS MUST BE INSTALLED IN A POSITION ABOVE THE HIGHEST OUTLET BEING SERVED IN ORDER TO PREVENT BACK SYPHONAGE. BREAKERS SHOULD NOT BE INSTALLED IN A PIT OR VAULT WHERE THEY MAY BECOME FLOODED. APPROVED TYPE REDUCED PRESSURE PRINCIPLE OR DOUBLE CHECK ASSEMBLIES MAY BE USED UNDER CERTAIN CONDITIONS WHERE IT IS NOT POSSIBLE TO INSTALL VACUUM BREAKERS ABOVE THE POINT OF HIGHEST USE.

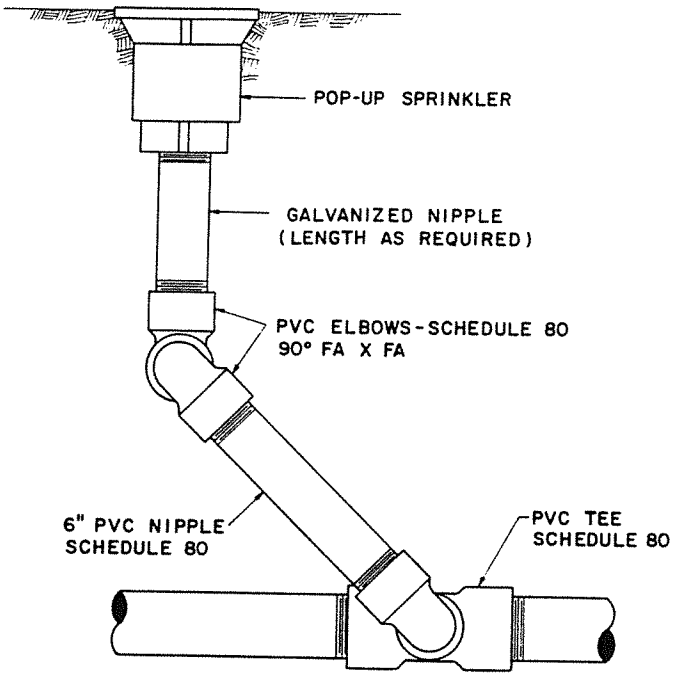
THESE DEVICES (VACUUM BREAKERS) ARE NOT APPROVED FOR SYSTEMS USING CHEMICAL OR PRODUCT INJECTION OR MIXING SYSTEMS.

CONTACT CITY UTILITY INSPECTOR, P.W. WATER DEPT. FOR ADDITIONAL INFORMATION OR APPROVAL OF INSTALLATIONS.

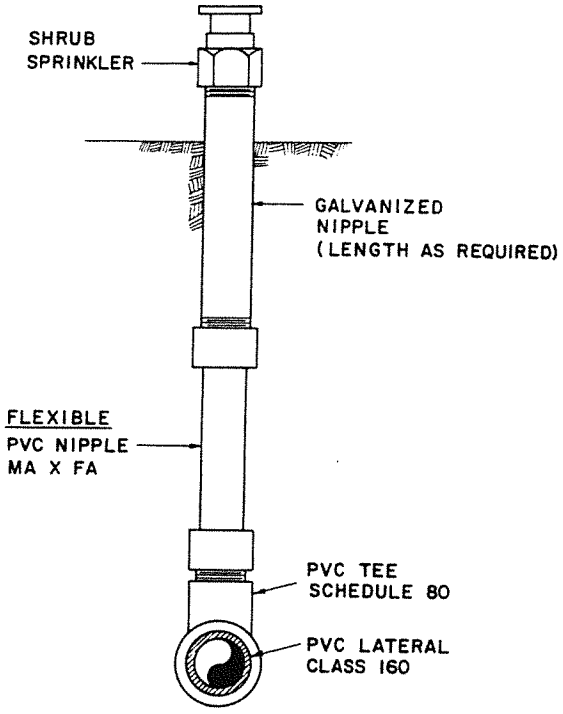
CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

IRRIGATION SYSTEM BACK FLOW PROTECTION

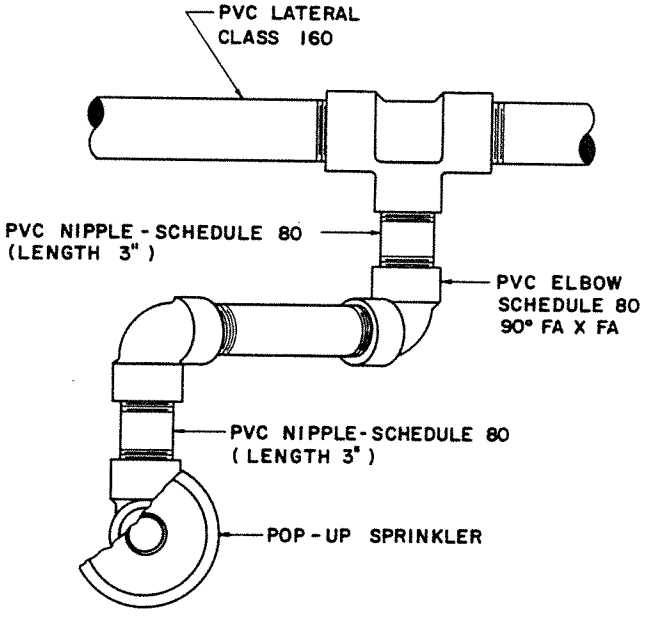
	DATE: 1992
	NO. 801



SIDE VIEW



END VIEW

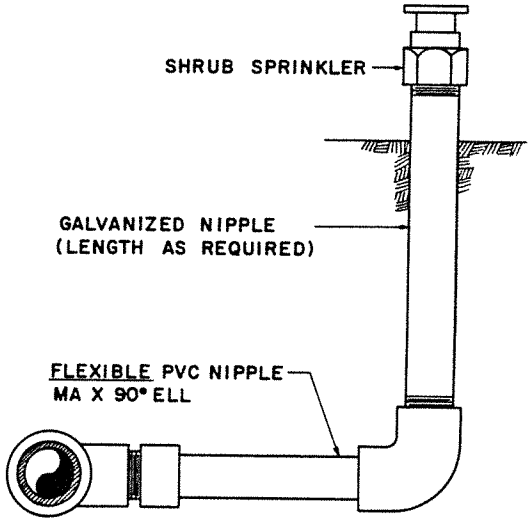


TOP VIEW

SWING JOINT ASSEMBLY

NOTES

1. ALL PVC NIPPLES SHALL BE THREADED TYPE.
2. USE TEFLON TAPE ON ALL THREADED CONNECTIONS.
3. ON SOME APPLICATIONS NIPPLE WITH ELBOW ARRANGEMENT MAY BE REPLACED WITH PVC ELBOW HAVING MA X FA THREADS.



END VIEW

FLEXIBLE NIPPLE ASSEMBLY

TO BE USED IN PLACE OF A SWING JOINT ASSEMBLY WHEN SPECIFIED

CITY OF STAYTON
DEPARTMENT OF PUBLIC WORKS

SWING JOINT RISER ASSEMBLY

	DATE: 1992
	NO. 802