# EXECUTIVE SUMMARY

In December 2002, the City of Stayton, Oregon contracted with Keller Associates, Inc. to complete wastewater system master planning. Separate detailed reports were completed for the wastewater collection system and the wastewater treatment plant. This executive summary summarizes the findings of these reports.

A Technical Review Committee (TRC) comprising of city staff and hired consultants were critical to the development and success of this master plan.

## 1 BACKGROUND

### 1.1 Study Area and Land Use

The study area includes all land located within the existing Stayton Urban Growth Boundary (UGB). Because the collection and treatment system also serves Sublimity, the study area also includes anticipated future growth in the Sublimity area.

Keller Associates worked closely with the TRC and city planner in projecting future wastewater flows for undeveloped land.

### 1.2 The City of Stayton Population Projections

Year 2000 census data and 2000-2004 building permit records were used to determine existing populations. Future populations were determined assuming a constant growth rate of approximately 3.35%. Build-out considerations were also evaluated. Table 1 below outlines the projected population for the Stayton wastewater service area.

### 1.3 The City of Stayton Wastewater Flows

Wastewater influent flow data from the Wastewater Treatment Plant (WWTP) were used to quantify wastewater flows. Table 1 below summarizes anticipated wastewater flows.

In addition to an analysis of WWTP flows, a detailed review of flows was completed for each lift station.

Table ES. 1
Wastewater Flow Projections

| | 2005 (MGD) | 2015 (MGD) | 2025 (MGD) | Build-out (MGD) |
|---|---|---|---|---|
| **Stayton/Sublimity Population** | 10,100 | 14,000 | 19,400 | 34,200 |
| **Average Day** | 2.0 | 2.8 | 3.9 | 6.9 |
| **Maximum Month** | 3.0 | 4.2 | 5.7 | 10.0 |
| **Peak Day** | 5.4 | 6.7 | 8.4 | 13.3 |
| **Peak Hour** | 6.4 | 8.0 | 10.1 | 16.1 |
| **Dry Weather (May-Oct)** | 1.3 | 1.9 | 2.7 | 4.9 |
| **Wet Weather (Nov-Apr)** | 2.6 | 3.6 | 5.0 | 8.9 |

# 2. COLLECTION SYSTEM EVALUATION & RECOMMENDATIONS

## 2.1 Overview

The existing collection system is illustrated in Figure 1 (located at the end of this executive summary). The Stayton collection system consists of approximately 33 miles of pipelines and five lift stations. Additional flow is conveyed to Stayton's collection system via a small private lift station (serves Oak Estates) and the Sublimity lift station. All of the flow from Sublimity is presently pumped to Stayton via the Sublimity lift station.

The computer model XP-SWMM was used to evaluate the flows, pumping capacities, and surcharge/flooding conditions. Daily pump run time data and WWTP flow data was used to ensure model accuracy.

TV monitoring logs were also reviewed in assessing pipeline conditions and needed pipeline repairs.

For detailed evaluations and recommendations, refer to the *Wastewater Collection Facilities Planning Study.*

## 2.2 The Existing Deficiencies

Existing deficiencies are summarized below:

- More than half of the flow at the WWTP during the wet weather months comes from groundwater infiltration. The

source of this infiltration are leaks in sewer pipelines, manholes, lift station wet wells, and sewer services.

- Approximately 49% of the City's collection system is comprised of concrete pipe which is susceptible to corrosion. An additional 13% of the pipelines are Asbestos Cement (AC). Refer to Figure 2. As the system continues to age, many of these pipeline sections will need to be rehabilitated or replaced within the next 20 years.
- TV records suggest that there are many areas in need of rehabilitation and repair (see Figure 3). Lack of an ongoing line rehabilitation/replacement program has resulted in a backlog of repair needs and increased infiltration.
- Many sections of pipeline are currently undersized, resulting in wastewater regularly backing up in the manholes creating a "surcharged" condition (see to Figure 4). This has been an ongoing condition that has not resulting in flooding in the past, but could pose a health risk in the future as continued growth occurs upstream of these corridors.
- The Wilco and Gardner pump stations currently do not have adequate pumping capacity.
- Staffing levels are inadequate to provide the necessary operations and maintenance for the wastewater collection and treatment system.

## 2.3 The Recommended Improvements

Recommended capital improvements are summarized according to priority. The collection system master plan is illustrated in Figure 5 and shows the priority and future improvements.

Priority 1 improvements include an active infiltration reduction program in the Garnder pump station service area and the completion of the Mill Creek lift station and pipelines.

The Mill Creek project, currently underway, will facilitate continued growth throughout Stayton. This project will displace the Sublimity lift station, diverting flow away from the Wilco lift station. The project will also eliminate the Santiam lift station. Within the next five years, it is anticipated that the Mill Creek lift station will also allow the displacement of the Fern Ridge and Gardner lift stations. Ultimately, it is possible that the Wilco lift station could also be displaced.

The Priority 3 (year 2015) interceptor improvements will remove the majority of surcharged conditions in Stayton. Additional future

improvements should be coordinated with street improvements and development. Future pipeline alignments follow transportation corridors outlined in the City's adopted transportation master plan. Three small lift stations are proposed along the Santiam River to serve low lying areas.

In addition to the capital improvements illustrated in Figure 5, Keller Associates recommends operations changes and implementation of programs, including:

- Updating city code and standards.
- Committing approximately 9.0 people to the wastewater system (this includes the WWTP and new tasks such as TV inspection, GIS, and pre-treatment). An additional 4.5 should be added over the next 5 years.
- Implementing replacement/rehabilitation programs for pipelines, manholes, and pump stations.

# 3. TREATMENT PLANT EVALUATION & RECOMMENDATIONS

## 3.1 Overview

The City of Stayton operates a Wastewater Treatment Plant (WWTP) to treat domestic wastewater from the Stayton-Sublimity area. Treated wastewater is discharged to the Santiam River. The plant is located along the Santiam River south of the City of Stayton and utilizes a sequencing batch reactor treatment process.

The existing treatment plant is illustrated in Figure 6. Treatment processes include headworks with screening, two sequencing batch reactors for biological treatment, and UV disinfection. Solids handling processes include aeration, dewatering with a belt filter press, and lime stabilization. Solids are stored and land applied.

The existing plant was scheduled for expansion in 2006, including addition of filters and SBR basin. The last plant NPDES permit renewal included more restrictive discharge provisions and DEQ TMDL (total mass daily load) studies suggest even higher quality effluent will be required in the future.

For detailed evaluations and recommendations relative to the WWTP, refer to the *Wastewater Treatment Plant Evaluation* report.

## 3.2 Existing Deficiencies

Existing deficiencies at the WWTP include the following:

- Current wastewater loads are approaching BOD mass load limits, necessitating filtration for continued City growth.
- Solids disposal is becoming increasingly more difficult with regulatory permit requirements, lack of onsite storage facilities, and willing land owners.
- Presence of filamentous bacteria and long “sludge age” makes it difficult to settle solids in the SBRs.
- Operational issues including lack of storage/maintenance facilities, outdated components, inefficient sludge pumping.
- Lack of adequate back-up controls and equipment.

## 3.3 Recommended Improvements

Improvements are organized by priority and are outlined in the capital improvement plan. As flows increase, additional future improvements are recommended. Figures 7 and 8 illustrates recommended improvements at the WWTP. Some of the major future improvements include:

- Additional of filtration to lower mass loadings to the river. This filtration will also allow the City to take an SBR basin off-line for a short period of time for routine maintenance.
- An influent batching reactor will minimize growth of filamentous bacteria currently preventing fast settling times in the SBRs.
- Addition of a Class A sludge heat drying system will substantially reduce the volume of solids for disposal and will provide a quality sludge that isn’t subject to current DEQ Class B land disposal site restrictions.
- Construct a parallel Membrane BioReactor (MBR) in about 2010. This MBR will allow for continued growth, while meeting restrictive mass loading requirements.
- Beyond 2025, the SBRs can be retrofitted to be MBRs. This will allow the existing WWTP site to treat build-out flows without violating existing BOD mass load limits.

# 4 CAPITAL IMPROVEMENT PLAN

## 4.1 Summary of Costs

Table 2 illustrates the capital improvements recommended for the collection system and wastewater treatment plant. More detailed descriptions and timing information are provided in the Capital Improvement sections of the wastewater collection and wastewater treatment plant reports.

# Table ES.2
# Summary of Probable Costs

| Item | Project Costs | | | |
|---|---|---|---|---|
| | Priority 1 2005 | Priority 2 2010 | Priority 3 2015 | Future 2025+ |
| ***Priority 1 -- Collection*** | | | | |
| Mill Creek Project* | $4,482,000 | | | |
| Wilco Electrical Upgrades | 80,000 | | | |
| Gardner Sewer Shed -- I/I Reduction | 250,000 | | | |
| Upgrades to Industrial LS | 55,000 | | | |
| City Hall -- 11% of Total Cost | 409,200 | | | |
| Total Priority 1 -- Collection | $5,276,200 | | | |
| ***Priority 1 -- Treatment**** | | | | |
| UV Upgrades -- Phase 1 (3.4 MGD) | $200,000 | | | |
| New Filter | 750,000 | | | |
| Solids handling Upgrades | 350,000 | | | |
| Headworks -- Backup Level Controls | 10,000 | | | |
| Batch Fill Basin | 850,000 | | | |
| Batch Reactor upgrades | 290,000 | | | |
| EQ Basin Improvements | 140,000 | | | |
| Plant Utility Water System | 100,000 | | | |
| Maintenance and Storage Building | 350,000 | | | |
| Maintenance Management Program | 200,000 | | | |
| Storage | 250,000 | | | |
| Replace Liquid Sludge Transfer Pump | 50,000 | | | |
| Spare Parts for Stabilization / Dewatering System | 65,000 | | | |
| Sludge Thickener | 830,000 | | | |
| Rehab Aerated Storage Tank | 100,000 | | | |
| Sewer Debris Cleaning Area Upgrade | 30,000 | | | |
| Extend River Outfall** | 500,000 | | | |
| Total Priority 1 -- Treatment | $5,065,000 | | | |
| **TOTAL PRIORITY 1** | **$10,341,200** | | | |
| ***Priority 2 -- Collection*** | | | | |
| Gardner Road Interceptor | | $692,000 | | |
| Fern Ridge Interceptor | | 127,000 | | |
| 24-inch Force Main Extension*** | | 535,000 | | |
| Purchase T.V. Equipment | | 400,000 | | |
| Add 3rd Pump to Mill Creek LS*** | | 100,000 | | |
| PW Facility -- 50% of Cost | | 552,800 | | |
| Total Priority 2 -- Collection | | $2,406,800 | | |
| ***Priority 2 -- Treatment**** | | | | |
| New Headworks Screens | | $270,000 | | |
| Parallel 2.0 MGD MBR Plant | | 5,900,000 | | |
| EQ Basin Upgrades | | 120,000 | | |
| Cover Existing UV Structure | | 100,000 | | |
| UV Upgrades -- Phase 2 (3.4 MGD) | | 200,000 | | |
| Purchase of 80 acres for Land Disposal | | 560,000 | | |
| Land Buffer around WWTP | | 200,000 | | |
| Total Priority 2 -- Treatment | | $7,350,000 | | |
| **TOTAL PRIORITY 2** | | **$9,756,800** | | |

| | | | | |
|---|---|---|---|---|
| ***Priority 3 -- Collection*** | | | | |
| Ida-Evergreen Interceptor | | | $1,455,000 | |
| Total Priority 3 -- Collection | | | $1,455,000 | |
| ***Priority 3 -- Treatment**** | | | | |
| UV Upgrades -- Phase 3 (3.4 MGD) | | | $200,000 | |
| Class A Solids Heat Drying System | | | 2,035,000 | |
| Total Priority 3 -- Treatment | | | $2,235,000 | |
| **TOTAL PRIORITY 3** | | | **$3,690,000** | |
| ***Future -- Collection*** | | | | |
| E. Burnett St. Interceptor | | | | $14,000 |
| Industrial Area Interceptor | | | | 1,322,000 |
| Golf Club Road Interceptor*** | | | | 294,000 |
| Ida Road Interceptor | | | | 1,123,000 |
| Marion Street Interceptor | | | | 579,000 |
| Evergreen-Douglas-Locust Interceptor | | | | 787,000 |
| Parallel 18-inch Force Main *** | | | | 1,387,000 |
| Upgrades to Mill Creek LS*** | | | | 780,000 |
| **Total Future -- Collection** | | | | 6,286,000 |
| **TOTAL FUTURE** | | | | **$6,286,000** |
| **TOTAL (rounded)** | **$10,341,200** | **$9,756,800** | **$3,690,000** | **$6,286,000** |

*Above project currently under construction
** Projects may or may not be needed, depending on results of mixing zone study
*** Projects mutually benefit Stayton and Sublimity

## 4.2 Budget and Rate Impacts

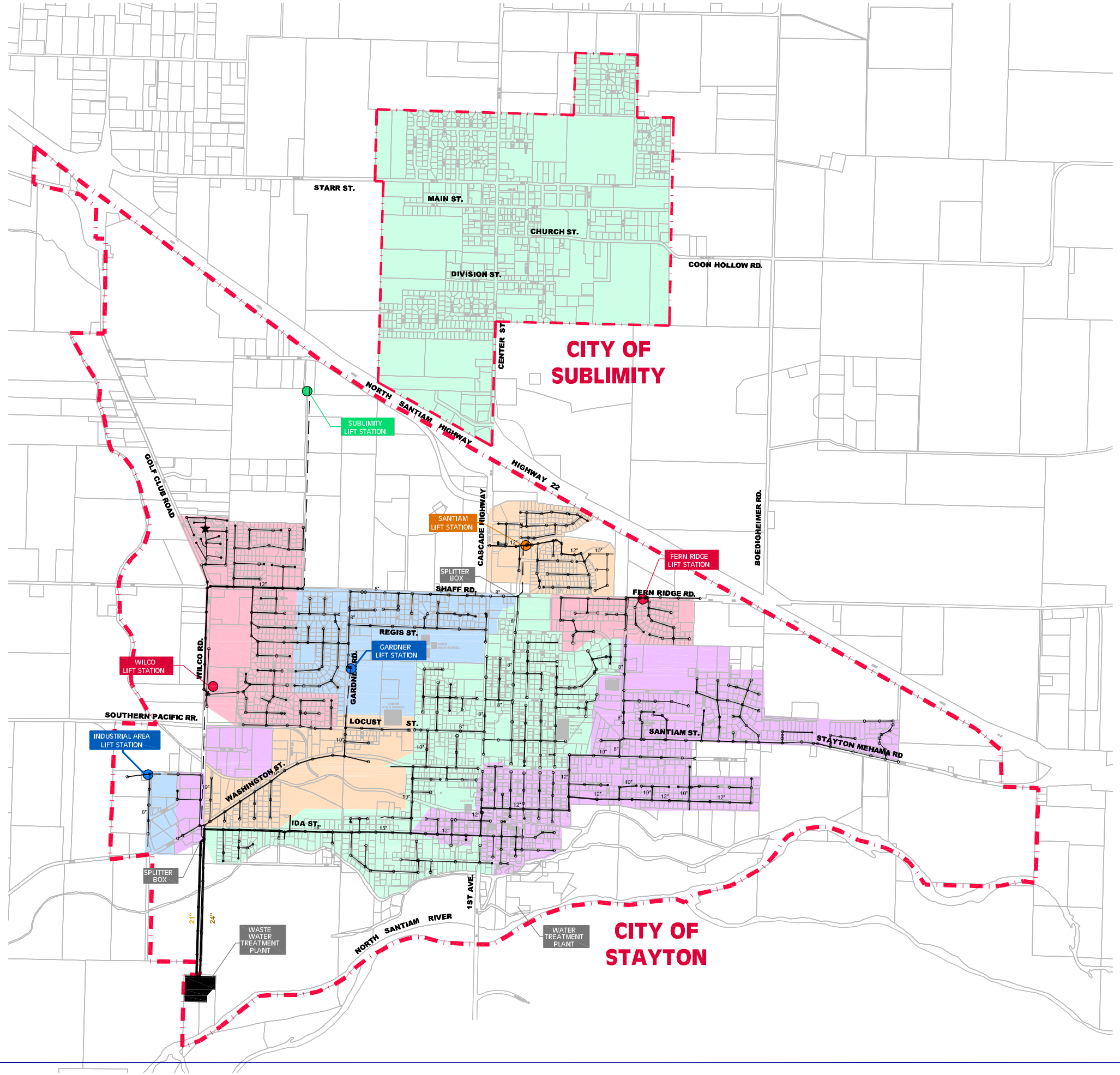
An evaluation of budget and rate impacts of the proposed wastewater collection and treatment capital improvement plans was completed by Economic and Financial Analysis. As part of this evaluation, priority capital improvements and replacement programs were phased over the course of the next 10 years to minimize initial rate impacts. A detailed evaluation can be found in Appendix of the wastewater distribution facilities planning study. Recommended rate increases are presented in the table below:

Table ES.3
Phase Water Rate Increase

| Year | 2006 | 2006 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|---|---|
| **% Increase** (per year) | 5% | 7.5% | 5% | 7.5% | 7.5% | 7.5% | 7.5% | 7.5% |

## 4.3 System Development Charges

Keller Associates evaluated each improvement to determine which improvements where growth related and which ones were not. Where correcting existing deficiencies also benefits future growth, a portion of the improvement costs have been assessed growth. A detailed evaluation of SDCs is being completed by Economic and Financial Analysis and will be bound separately.




LEGEND

URBAN GROWTH BOUNDARY

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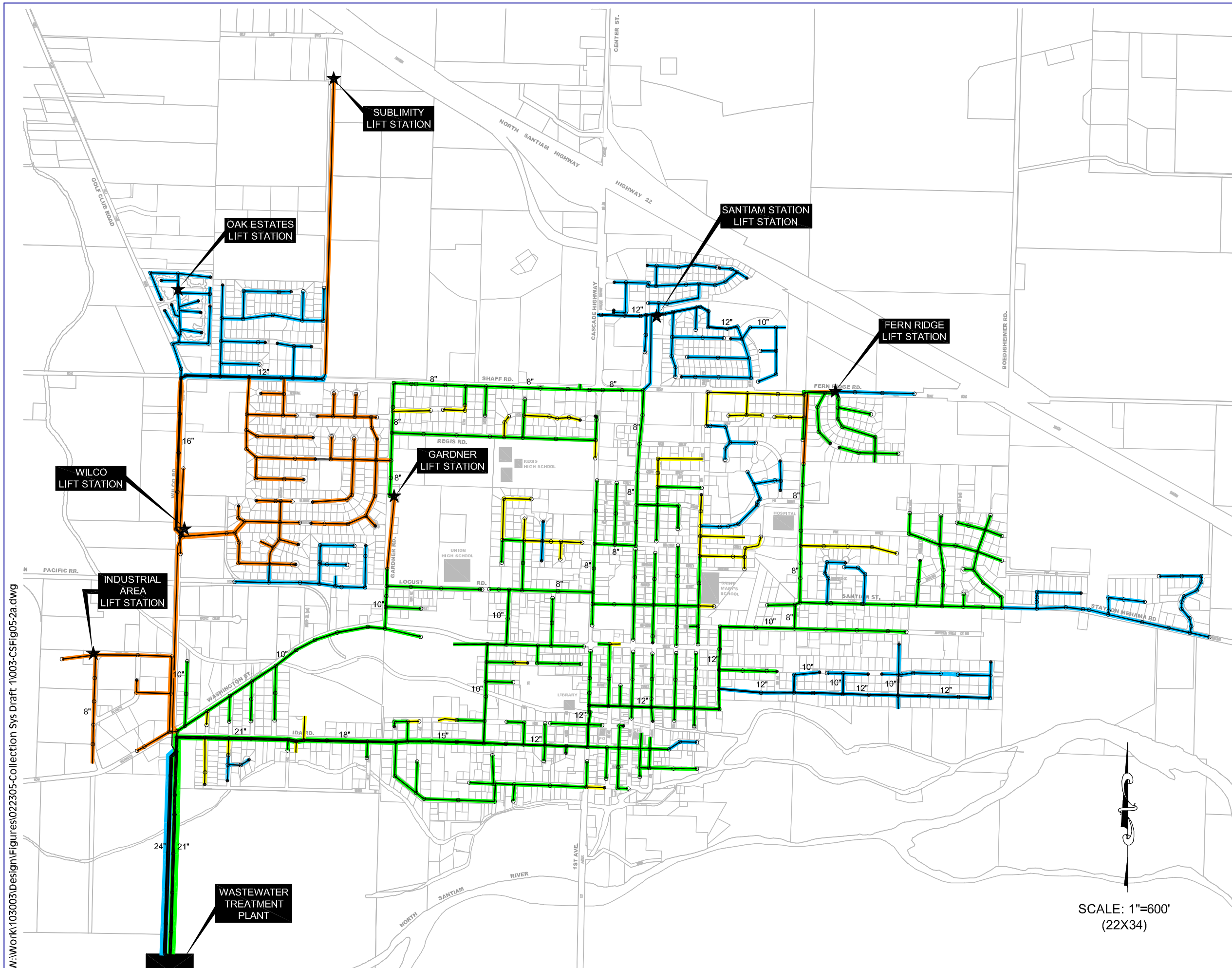
Wastewater Master Plan
Executive Summary

Existing Sewer Sheds

FIGURE
1




# LEGEND

- CONCRETE (49 %)
- ASBESTOS CEMENT (13 %)
- PVC (30%)
- UNKNOWN (LIKELY CONC) (8 %)

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**Wastewater Master Plan**
Executive Summary

Existing Collection System Pipe Types

FIGURE 2

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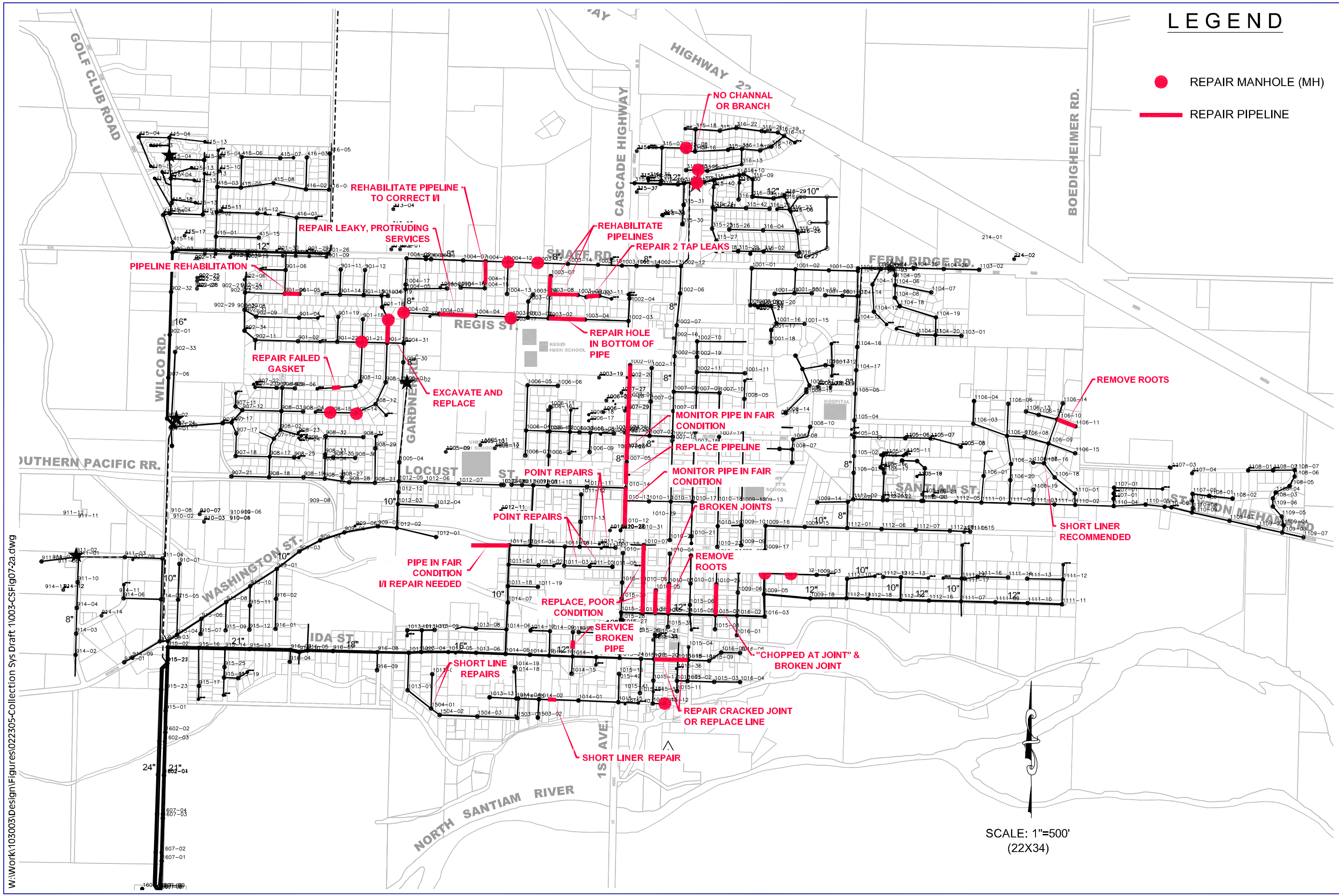


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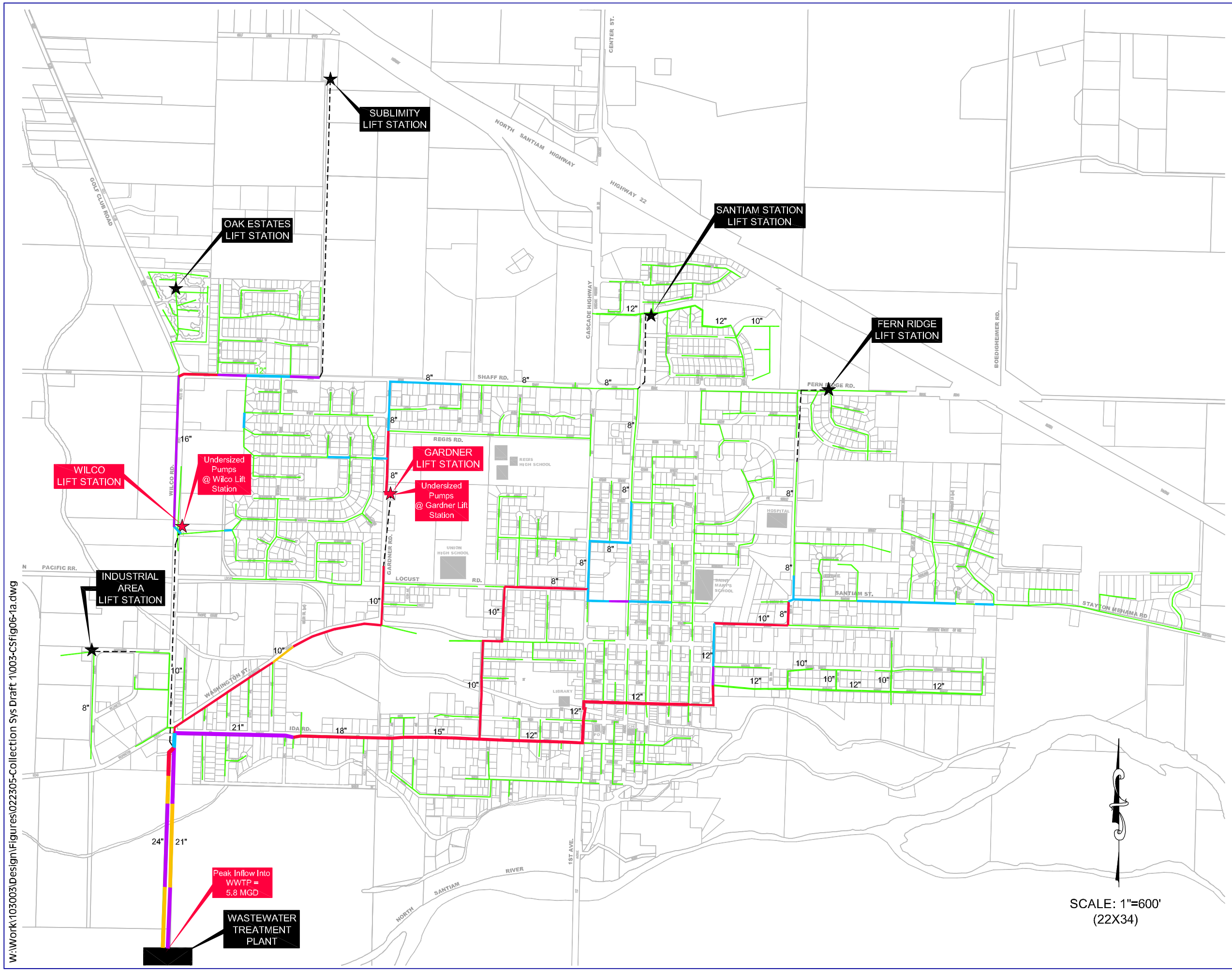
Wastewater Master Plan
Executive Summary

Recommendations from 2003 & 2004 TV Monitoring

FIGURE 3




# LEGEND

## CAPACITIES

- 00% TO 50%
- 50% to 75%
- 75% TO 90%
- 90% TO 100%
- EXCEEDS CAPACITY (Surcharges)
- FORCE MAIN

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**Wastewater Master Plan**
Executive Summary

Existing Pipeline Capacities at Peak Flow

FIGURE 4

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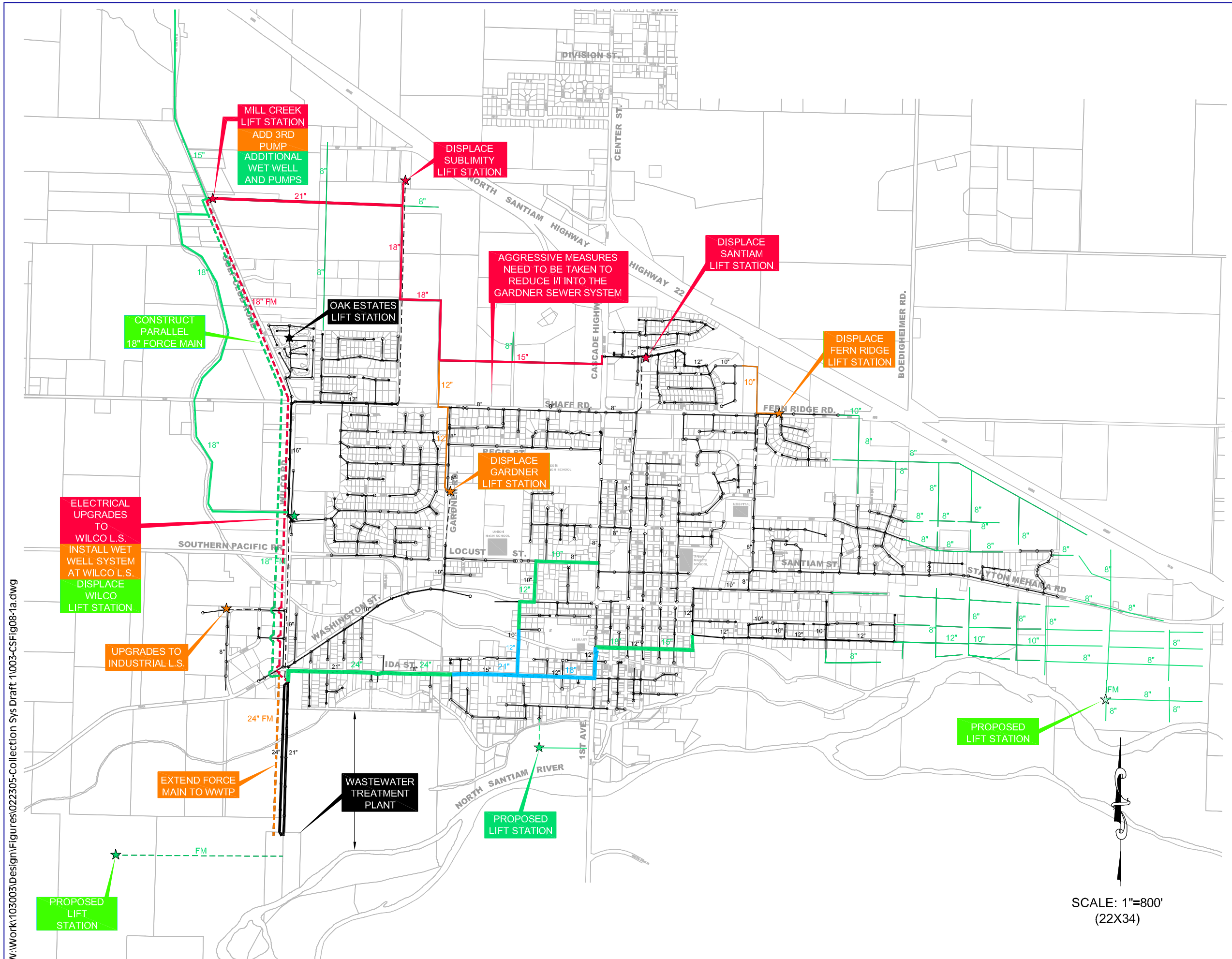


# LEGEND

- EXISTING FORCE MAIN
- PRIORITY 1 IMPROVEMENTS (2005)
- PRIORITY 2 IMPROVEMENTS (2010)
- PRIORITY 3 IMPROVEMENTS (2015)
- FUTURE IMPROVEMENTS

## OTHER PRIORITY IMPROVEMENTS:

- ESTABLISH PIPELINE AND MANHOLE REHABILITATION PROGRAM.
- ESTABLISH FLOW AND TV MONITORING PROGRAM.
- PURCHASE T.V. INSPECTION EQUIPMENT

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Wastewater Master Plan
Executive Summary

Stayton Interceptor System Master Plan

FIGURE 5

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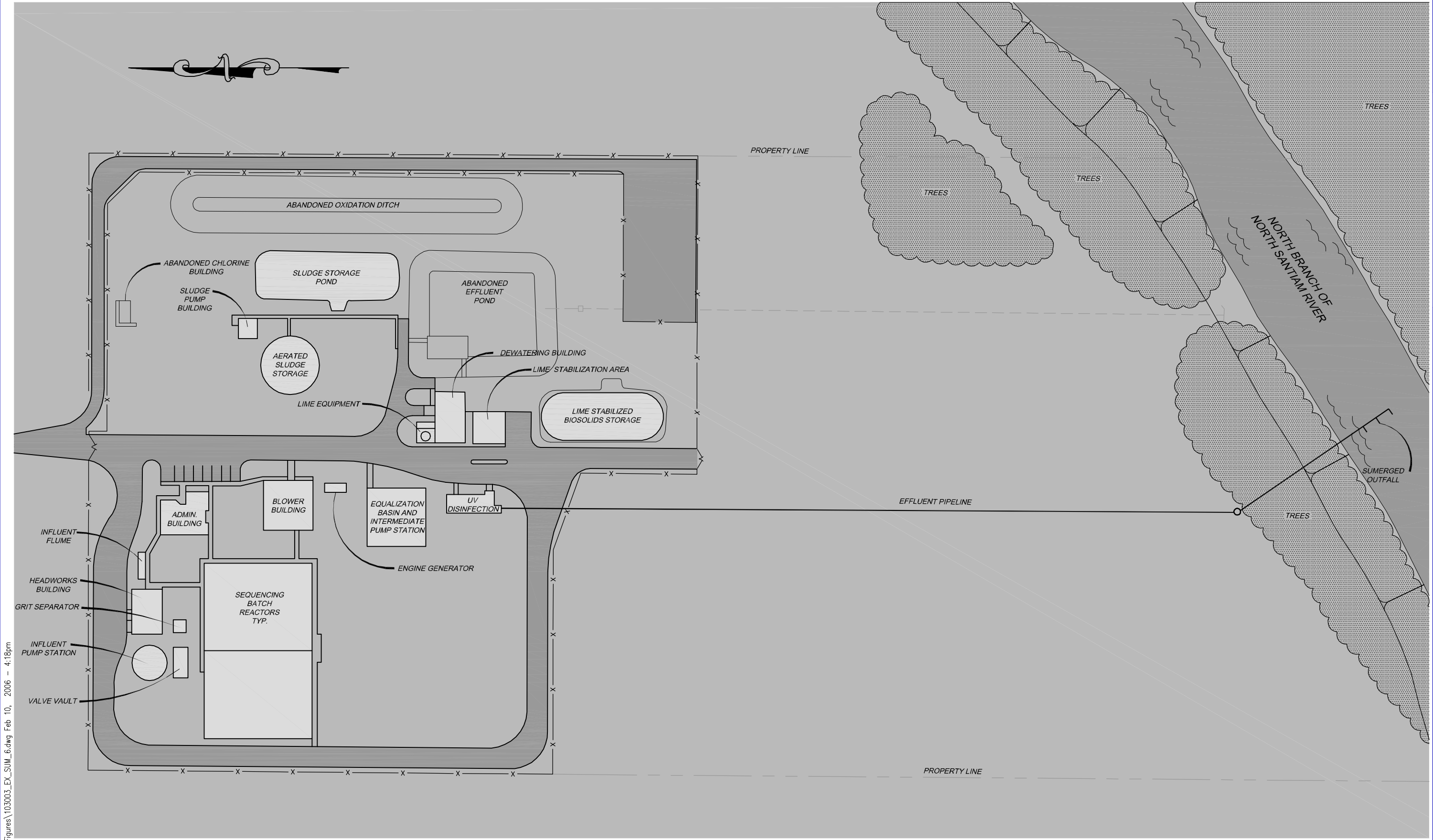


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CITY OF SALEM

**Wastewater Master Plan**
Executive Summary

Wastewater Treatment Master Plan

FIGURE
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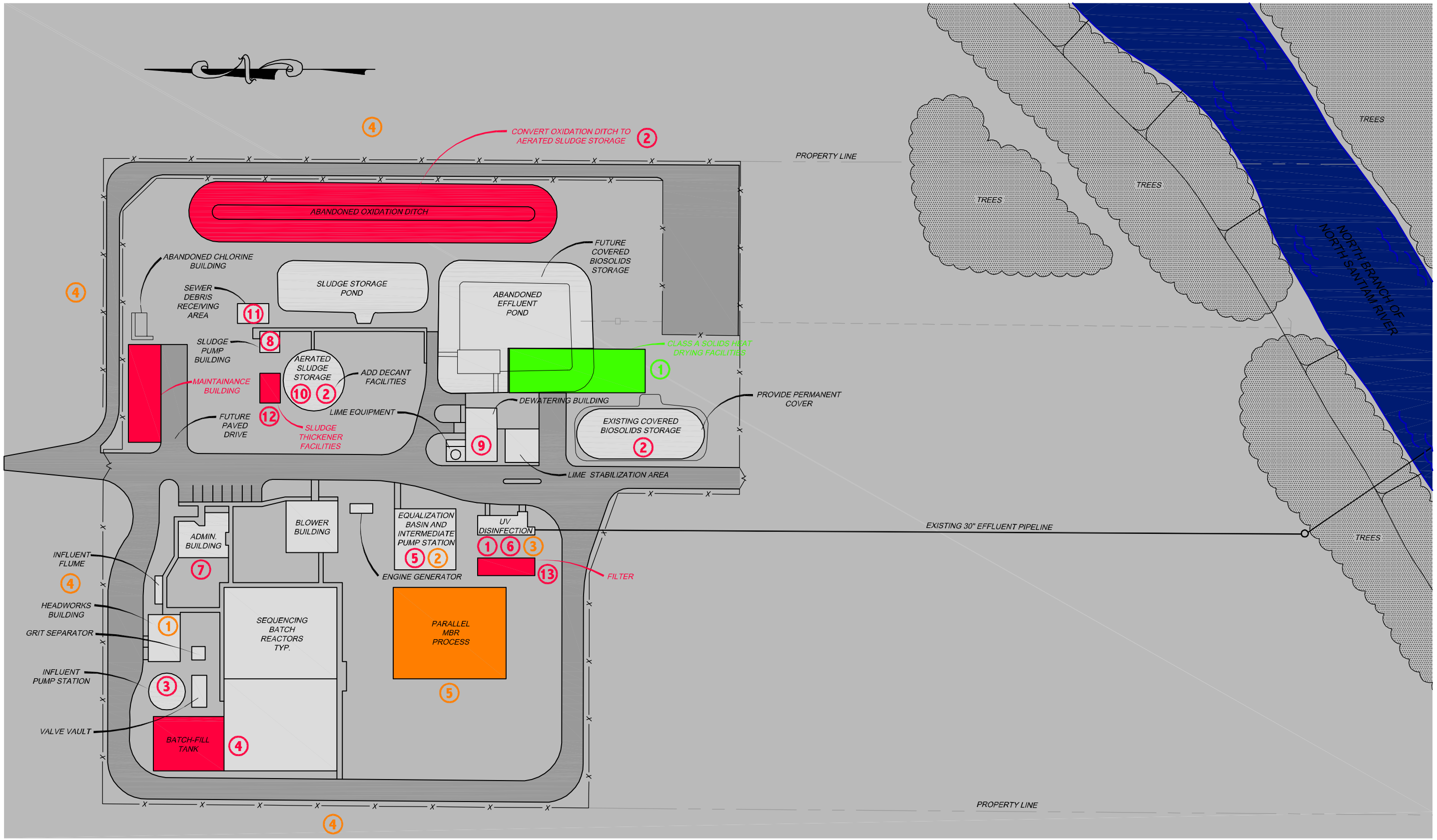


**PRIORITY 1 IMPROVEMENTS (2005-2009)**

1. UV Upgrade
2. Solids Handling Upgrades
3. Pump Station-Backup Level Controls
4. Batch Fill Tank Addition
5. EQ Basin Improvements
6. Plant Utility Water System
7. Maintenance Management Program
8. Replace Liquid Sludge Transfer Pump
9. Spare Parts For Stabilization/Dewatering System
10. Rehab Aerated Storage Tank
11. Sewer Debris Receiving Area Upgrade
12. Sludge Thickener Facilities
13. Filter Addition

**PRIORITY 2 IMPROVEMENTS (2010-2014)**

1. New Headworks Screen
2. EQ Basin Upgrade
3. Cover UV Sructure & UV Expansion
4. Purchase Land Disposal Site & Buffer Around Plant
5. MBR Process Addition

**PRIORITY 3 IMPROVEMENTS (2015+)**

1. Add Class A Heat Drying

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Wastewater Master Plan
Executive Summary

Wastewater Treatment Master Plan

FIGURE 7

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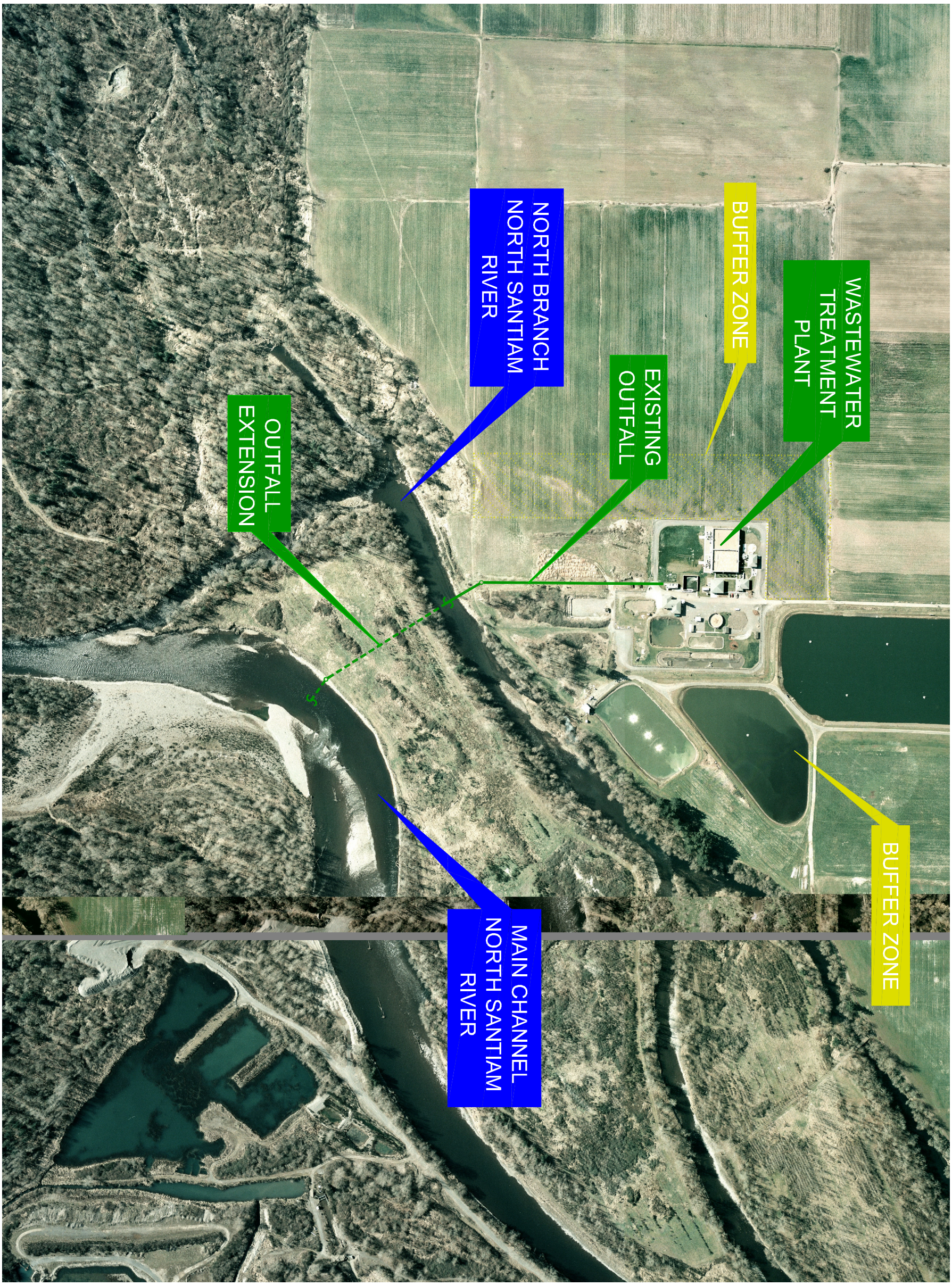


FIGURE 8

Proposed Outfall Extension

**Wastewater Master Plan**

Executive Summary

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