CITY OF TOPPENISH
General Sewer Plan

G&O #15039
SEPTEMBER 2017

Gray & Osborne, Inc.

ENGINEERING REPORT REVIEW
ECOLOGY COMMENT RESPONSE FORM

SYSTEM NAME: **City of Toppenish** **SUBMITTAL DATE:** **October 4, 2017**

No.	Ecology Comment	System Response	Page Number of Response	Other System Comments
1	Engineers' seal and signature.	Ecology will receive signed and stamped final General Sewer Plan when completed.	Attached, Separate Cover	
2	Provide 2 copies of general sewer plan for ecology approval. *WAC 173-240-050 (1)*	Two copies of the final General Sewer Plan are included.	Attached, Separate Cover	
3	Line type for Natural Gas line in the legend appears wrong.	Figure 4-3 has been updated to reflect proper line type.	Figure 4-3	
4	Show the location of wells or other sources of water supply, water storage reservoirs and treatment plants, and water transmission facilities on the layout map. *WAC 173-240-050 (d-vii)*	Figure 3-1 has been updated to show water wells, reservoirs, and transmission facilities.	Figure 3-1	
5	Provide a discussion about any existing domestic or industrial wastewater facilities within twenty miles of the general plan area and within the same topographical drainage basin containing the general plan area. Provide statement if none exist. *WAC 173-240-050 (f)*	A discussion of existing wastewater treatment facilities within the same topographical drainage basin has been added to Chapter 5.	5-21	
6	Provide an estimated timetable of WWTF work. (i.e. Phosphorous Removal Study, Facility Plan Amendment / Plan to Maintain Adequate Capacity, and Financing plan update.) *WAC 173-240-050 (h)*	A timetable has been included with the future WWTF work.	7-4	

7	Provide a discussion of the location of all existing private and public wells, or other sources of water supply, and distribution structures as they are related to both existing and proposed domestic wastewater treatment facilities. Expand the discussion in section 3-6 to explain the proximity and interaction with the wastewater treatment facilities and collection system. *WAC 173-240-050 (j)*	A discussion of existing municipal and private wells and other domestic water facilities has been added.	3-6; Appendix K	
8	What is the reason behind assuming 25% trenchless and 75% open-cut? Provide explanation of this. *WAC 173-240-050 (k)*	An explanation regarding this assumption has been added.	6-30	
9	Provide O&M costs and descriptions of existing and proposed facilities. *WAC 173-240-050 (l)*	A cost and description of existing and proposed O&M expenses is presented in Chapter 6 and Chapter 8 (Capital Improvement and Financing Plan)	6-34/Chapter 8	
10	Average and max precipitation numbers seem to be off. Averages are higher than the max in some months.	An error occurred when reporting max precipitation data, which has been corrected.	Table 3-1, Page 3-3	
11	Include present worth cost analysis for improvements with multiple alternatives.	Present worth analysis, where applicable, has been added to the capital improvements listed in Chapter 6. For many capital improvement alternatives, the City assumes that the O&M costs will be similar due to in-kind replacement options.	Chapter 6	

CITY OF TOPPENISH

YAKIMA COUNTY **WASHINGTON**

GENERAL SEWER PLAN

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G&O #15039
SEPTEMBER 2017

Gray & Osborne, Inc.
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EXECUTIVE SUMMARY

This General Sewer Plan (Plan) for the City of Toppenish (City) addresses the City's planning needs for wastewater collection, transmission, treatment, and disposal for the 20-year planning period. This Plan was prepared in accordance with the pertinent requirements of the United States Environmental Protection Agency, the provisions of the Revised Code of Washington (RCW) Section 90.48, Water Pollution Control, Washington Administrative Code (WAC) Section 173-240-050, General Sewer Plan. Development of the Plan has been coordinated with the City of Toppenish 2008 Comprehensive Plan Update, the City of Toppenish 2010 Water System Plan and the City of Toppenish 2005 Wastewater Facility Plan.

The Plan provides proposed conceptual designs, cost estimates, schedules, and a financing plan for recommended major facility improvements. The projects described in the Plan are consistent with Federal and Washington State regulations relating to the prevention and control of discharge of pollutants into waters of the state, anti-degradation of existing and future beneficial uses of groundwater, and anti-degradation of surface water.

The City has recognized that flows to the wastewater treatment facility have increased significantly in the past 10 years. The increased flows are due to an increase in infiltration and inflow (I/I) during the summer months and an aging and deteriorating collection system. The analysis in this Plan demonstrates that the City has excessive infiltration by EPA standards. The analysis shows that on a maximum month and maximum day basis I/I is nearly 60 percent of the flow to the wastewater treatment facility (WWTF). The inclusion of relatively clean water with domestic wastewater flows can produce the following detrimental effects.

- WWTF impacts including hydraulic overloading, reduced treatment efficiency, and violations of the NPDES discharge permit.
- Additional costs for treating, transporting, and pumping the increased flow.
- Increased flows within the collection system, creating the need to construct additional sewer facilities or upgrade existing facilities.
- Surcharged manholes, sewage overflow, and bypasses to the environment in extreme cases.

PROJECTED FLOWS AND LOADINGS

The first step in the completion of the sewer system analysis was to analyze historical flows and loadings at the City's WWTF and utilizing future growth projections, project the future flows and loadings. Table ES-1 is a summary of the existing design criteria, current flows and loadings and future flows and loadings.

TABLE ES-1

Current and Projected Flows and Loadings

Parameter	Existing Design Criteria	Existing	Projected 2035	Year Exceeded
Annual Average Flow (mgd)	1.23	1.21	1.29	2020
Maximum Month Flow (mgd)	1.67	1.9	1.98	Currently Exceeded
Maximum Day Flow (mgd)	2.16	2.26	2.34	Currently Exceeded
Peak Hour Flow (mgd)	3.7	2.87	3.41	(1)
Maximum Month BOD	2,581	1,917	2,225	(1)
Maximum Month TSS	2,634	2,212	2,343	(1)
Maximum Month TKN	516	406	445	(1)

(1) It is not projected to be exceeded in the 20-year planning period.

As can be seen by the table above, the City has already been exceeding their rated capacity at the WWTF for maximum month and maximum day flow due to the excessive infiltration. The City is operating outside of their industry standard for capacity and as such by their NDPES permit they must complete a facility plan to analyze treatment needs.

In general, the City has met their NPDES effluent discharge requirements with the exception of one violation for zinc in 2015. However, the City realizes that the excessive infiltration is decreasing the treatment efficiency including a reduced performance of biological phosphorous removal. The City is concerned that future permits will require lower phosphorous limits to be met and the excessive infiltration hampers their ability to reliably meet lower limits. The City has committed additional resources to studying phosphorous removal at the WWTF and is committed to financing the capital improvements recommended in this Plan to reduce infiltration to the system thereby decreasing flows to the WWTF.

SYSTEM ANALYSIS

The collection system analysis included a hydraulic analysis (modeling) to evaluate the capacity of the system under existing and future conditions, a lift station assessment and a pipeline condition assessment.

Hydraulic Analysis

The projected flows shown in Table ES-1 were used to analyze the collection system for capacity. A hydraulic model was developed using InfoSewer (Version 7.6) software by Innovyze. The hydraulic model indicated that only a few improvements were required to meet the capacity needs of the collection system. Table ES-2 summarizes the recommended improvements to correct deficiencies found in the capacity of the collection system.

TABLE ES-2

Recommended Gravity Main Improvements

Project	Location	Modeling Location	Capacity Issue Identified in Hydraulic Model	Recommendation
1	Madison Ave & S Gardenia St	MH H-5 to H-9	Surcharges <0.5 ft Undersized 10-inch pipes	Upsize pipe to 12" from MH H-6 to I-1 (approximately 1,600 LF)
2	Goldendale Ave & Buena Way to Dayton Ave & N Date St	MH E-7 to E27	Surcharges <0.5 ft Undersized 8- and 10-inch pipes	Upsize to 12" from MH E-7 to EE-22 (approximately 1,450 LF) and 10" from MH E-22 to E-27 (approximately 800 LF)

Lift Station Analysis

In addition to a capacity analysis of the collection system, an assessment of each lift station was performed. The City owns and operates seven sewage lift stations and one storm sewer lift station. Each lift station was inspected and evaluated for capacity, compliance with the industry standards, electrical, mechanical and structural condition. Of the seven lift stations, three lift stations require complete reconstruction and one lift station requires a significant upgrade. Table ES-3 summarizes the recommended lift station improvements and the estimated costs.

TABLE ES-3

Recommended Lift Station Improvements

Priority	Lift Station	Cost Estimate
1	Penny	$360,000
2	South Beech	$460,000
3	Carlson	$813,000
4	Branding Iron	$259,000
5	Safeway Storm Sewer	$49,000
6	Del Monte	$47,000
7	Idaho	$11,000
Total Lift Station Improvements		**$1,999,000**

Collection System Condition Assessment

In 2015, the City purchased a sewer video camera system and began videotaping the collection system in order to help assess the condition of the existing sewers and identify sources of I/I. The City videotaped sewers that were known to have significant operations and maintenance issues or known to have significant infiltration and inflow

sources. To date the City has videotaped and assessed the condition of approximately 54,718 lineal feet of pipe. This assessment shows that approximately 54 percent of the pipe is in fair to poor condition and recommended for replacement. For purposes of this Plan, the results of the video investigation were extrapolated to the entire system and it was determined that approximately 122,906 lineal feet of pipe will require replacement due to deteriorating conditions. Prioritization of the pipe replacements takes into account a number of factors including hydraulic modeling results (capacity) age, condition, depth, operations and maintenance and the City's 6-year transportation improvement plan.

After review of these issues four major sewer replacement projects were recommended and are outlined in phases. Details of each phase are presented in the Plan, the phases are intended to be for planning purposes. The City will evaluate each phase dependent upon the priorities of the City when the funding is secured. For example the City may want to perform projects in the Phase II area first due to increasing O&M needs or transportation project needs. Alternatively the City may choose to prioritize projects in the Phase IV section of the City due to the large pipe diameters and the risk associated with this older larger pipe. Each phase of work will include a predesign report that will evaluate new City sewer videos and will help the City more specifically prioritize the replacements based on the current needs.

Table ES-4 summarizes the recommended sewer improvements and the estimated costs.

TABLE ES-4

Recommended Sewer Improvements

Phase	Current Sewer Project	Estimated Cost
I	2017 Collection System Improvements	$886,000
II	Pipe Replacement (Basins 10, 11, 15, 16 and 25)	$4,785,000
III	Pipe Replacement (Basins 3, 4, 5, 6, 8, 12, 13, 14, 19, 24, 26, and 27)	$8,816,000
IV	Pipe Replacement (Basins 1, 2, 7, 20, 21, 22, 23, and 28)	$4,989,000
Total Pipe Sewer Improvements		**$19,476,000**

CAPITAL IMPROVEMENT PLAN

The capital improvement plan developed from the analysis above is shown in Table ES-5. Included in the table is the City's plan for funding sources for the various projects.

TABLE ES-5

Capital Improvement Summary

Phase	Current Sewer Project	Estimated Cost	Funding Source
I	Penny Lane	$360,000	Ecology(1)
	2017 Collection System Improvements	$886,000	Ecology(1)
II	Pipe Replacement	$4,785,000	Public Financing
	Carlson Lift Station	$813,000	Public Financing
	South Beech Lift Station	$460,000	Public Financing
III	Pipe Replacement	$8,816,000	Public Financing
	Branding Iron Lift Station	$259,000	Public Financing
IV	Pipe Replacement	$4,989,000	Public Financing
V	Safeway Storm Sewer Lift Station	$49,000	General Fund
VI	Del Monte Lift Station	$47,000	Equipment Fund
VII	Idaho Lift Station	$11,000	Equipment Fund
General Facility Charge Study		$15,000	Capital Fund
Wastewater Treatment Facility Plan		$85,000	Capital Fund
Total Collection System Improvements		**$21,580,000**	**---**

(1) Funding already obtained from Ecology.

FINANCING PLAN

The City has already received financing for the Phase I 2017 Collection System Improvements Project through a grant and loan package with the Department of Ecology. It is expected that those improvements will be completed in 2017.

The City plans to fund the Phase II, Phase III and Phase IV sewer improvements through public financing programs such as Rural Development (RD), Ecology and Community Development Block Grant (CDBG). The remaining projects will be funded through the City's existing Equipment and Capital Improvements Funds. It should be noted that the Safeway Storm Sewer Lift Station is not a sewage lift station and therefore improvements to that lift station must be paid from the General Fund.

The total funding package that the City will seek from public funding programs is $20,122,000. A key strategy in the City's financing plan is to schedule the new debt to coincide with the retirement of the existing debts. The City has four existing loans that will come to term between the years of 2021 and 2025. This strategy will alleviate the impact of rate increases on the rate payers. Currently the base rate for a single family home is $63.90 which is 2.6 percent of the median household income for the City of Toppenish.

As a first step to securing project financing, the City will apply to Rural Development for Phases II, III, and IV. Subsequent to Rural Development the City will likely seek additional funding from the Ecology SRF program. It is most likely that a combination

funding package will be required. The City is committed to completing the projects in the next five years. Based on the analysis in this Plan, the impact to the rate payers could be very minimal due to the strategy of existing loans being retired when new loans are assumed and the fact that the City is eligible for significant grant through both the RD and Ecology programs. The financial analysis shows if the City increases rates 2 percent per year for the next 10 years financial obligations can be met if significant grant is obtained. The City may have to consider larger increases, up to 4 percent, if significant grant is not available. The net increase over time could be as much as $15 per month. The City is committed to keeping the rates reasonable for their ratepayers and will evaluate the best funding package available.

CHAPTER 1

INTRODUCTION

CHAPTER 1

INTRODUCTION

This General Sewer Plan (Plan) for the City of Toppenish (City) addresses the City's planning needs for wastewater collection, transmission, treatment, and disposal for the 20-year planning period. This Plan was prepared in accordance with the pertinent requirements of the United States Environmental Protection Agency, the provisions of the Revised Code of Washington (RCW) Section 90.48, Water Pollution Control, Washington Administrative Code (WAC) Section 173-240-050, General Sewer Plan. Development of the Plan has been coordinated with the City of Toppenish 2008 Comprehensive Plan Update, the City of Toppenish 2010 Water System Plan and the City of Toppenish 2005 Wastewater Facility Plan.

The Plan provides proposed conceptual designs, cost estimates, schedule, and financing plan for recommended major facility improvements. The projects described in the Plan are consistent with Federal and Washington State regulations relating to the prevention and control of discharge of pollutants into waters of the state, anti-degradation of existing and future beneficial uses of groundwater, and anti-degradation of surface water. A State Environmental Policy Act (SEPA) checklist is provided in Appendix A.

The City of Toppenish is located in Yakima County in central Washington State as shown on Figure 1-1. The City resides on deeded lands of the Yakama Indian Nation (YIN). As a result, the City of Toppenish Wastewater Treatment Facility (WWTF) is regulated at the federal level by the Environmental Protection Agency (EPA).

SCOPE OF WORK

The scope of work for the Plan includes the following items:

- Chapter 1 – Introduction
- Chapter 2 – Regulatory Requirements
- Chapter 3 – Land Use, Population Projections, and Service Area Characteristics
- Chapter 4 – Existing Facilities
- Chapter 5 – Wastewater Flow and Loading Projections and Design Criteria
- Chapter 6 – Collection System Analysis
- Chapter 7 – Wastewater Treatment Facility Summary
- Chapter 8 – Capital Improvement and Financing Plan

RELATED PLANNING DOCUMENTS

The following documents were consulted in the preparation of this General Sewer Plan.

GROWTH MANAGEMENT ACT (GMA) RELATED PLANS, POLICIES, AND DEVELOPMENT REGULATIONS

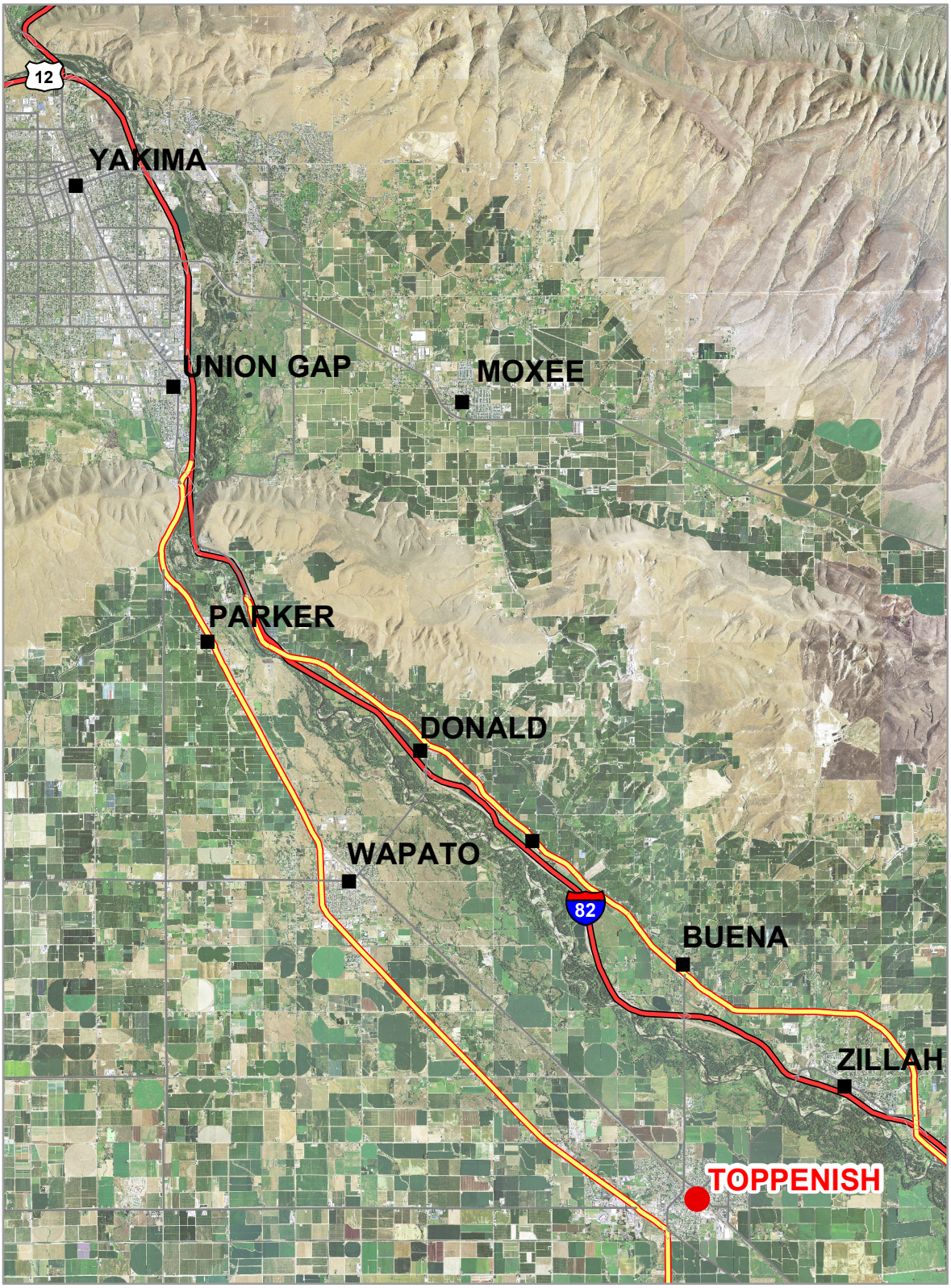
- City of Toppenish 2008 Comprehensive Plan Update, 2008.

WASTEWATER SYSTEM PLANNING

- City of Toppenish Sewer System Replacement Planning, Gray & Osborne, March 1999
- City of Toppenish Wastewater Facility Plan, Gray & Osborne, August 2005
- City of Toppenish Wastewater Facility Plan Amendment No. 1, Gray & Osborne, October 2015

WATER SYSTEM COMPREHENSIVE PLANS

- City of Toppenish Water System Plan, Huibregtse, Louman Associates, Inc., December 2010



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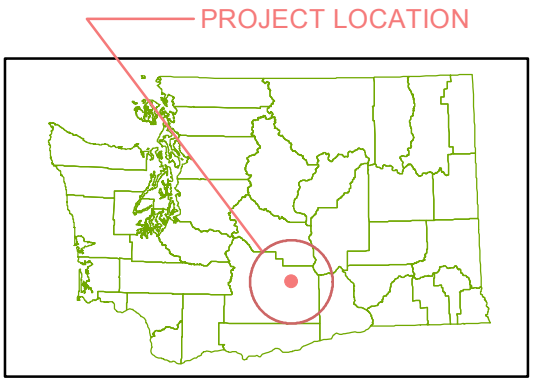

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CITY OF TOPPENISH

GENERAL SEWER PLAN
FIGURE 1-1
LOCATION MAP

Gray & Osborne, Inc.

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CHAPTER 2

REGULATORY REQUIREMENTS

CHAPTER 2

REGULATORY REQUIREMENTS

Federal and state regulatory requirements are used in developing the design criteria for the City of Toppenish wastewater collection, treatment, and disposal facilities. The purpose of this chapter is to identify and summarize the regulations that have the potential to affect the planning, design, and approval of improvements discussed in this Plan.

The City of Toppenish is located within the Yakama Reservation, which is governed by the Yakama Indian Nation (YIN). The YIN is a sovereign nation and is not subject to state regulations. However, federal and state regulations serve as useful guidelines for establishing treatment and effluent quality goals, and providing protection of the environment on and surrounding the reservation. In addition, if the City pursues funding from the federal or state government, they may be required to comply with federal and state regulations as the funding programs require.

This chapter does not describe each regulation in detail; rather, it addresses important facets of the regulations that affect the planning and design process. Subsequent sections of this report address technical requirements of the regulations at a level of detail appropriate for the evaluation provided by that section.

FEDERAL STATUTES, REGULATIONS, AND PERMITS

This section discusses some of the various federal laws that may affect wastewater system construction and operations, as well as other relevant permits, programs, and regulations.

CLEAN WATER ACT

The Federal Water Pollution Control Act is the principal law regulating the water quality of the nation's waterways. Originally enacted in 1948, it was significantly revised in 1972 and 1977, when it was given the common title of the "Clean Water Act" (CWA). The CWA has been amended several times since 1977. The 1987 amendments replaced the Construction Grants program with the Water Pollution Control State Revolving Fund (SRF) that provides low-cost financing for a range of water quality infrastructure projects, which is managed by the Department of Ecology in Washington State.

NPDES and State Waste Discharge Permits

The National Pollutant Discharge Elimination System (NPDES) program was established by Section 402 of the CWA and its subsequent amendments to regulate discharges to the surface waters of the United States. The U.S. Environmental Protection Agency (EPA)

administers NPDES permits to surface waters on all tribal land. Most NPDES permits have a 5-year term and place limits on the quantity and quality of pollutants that may be discharged to water bodies. The NPDES program covers wastewater, industrial discharge, and stormwater permits. The Toppenish WWTF has an NPDES Permit. There is also one State Waste Discharge Permit (SWDP) issued in the Toppenish area, as shown in Table 2-1. If considered significant, industrial discharges to municipal wastewater collection/treatment systems are typically issued SWDPs.

TABLE 2-1

NPDES and State Waste Discharge Permits Issued

Facility	Permit Number	Permit Type
Toppenish WWTF	WA0026123	NPDES
Del Monte Foods Plant 112 Toppenish	ST0009074	Industrial to ground SWDP IP

City of Toppenish WWTF NPDES Permit

The City of Toppenish's current wastewater treatment facility NPDES permit, number WA0026123 and fact sheet are attached as Appendix B. The City's NPDES permit was issued by EPA on May 23, 2013, became effective July 1, 2013, and expires June 30, 2018.

The City of Toppenish WWTF discharges treated effluent to the Toppenish Drain near the eastern terminus of Germantown Road near Toppenish, Washington. The Toppenish Drain is tributary to the East Toppenish Drain, which, in turn, is tributary to the Yakima River.

The City of Toppenish WWTF, the Toppenish Drain, and the East Toppenish Drain are all within the boundaries of the Yakama Nation in south central Washington. Waters of the State of Washington (i.e., the Yakima River) are downstream from the discharge. The State of Washington has EPA-approved Water Quality Standards (WQS); however, Washington does not have the authority to issue NPDES permits on tribal lands. Additionally, since Washington does not have Clean Water Act authority on tribal lands or in tribal waters, the Washington WQS are not directly applicable within the tribal reservation.

However, federal regulations prohibit the EPA from issuing a permit when the "imposition of conditions cannot ensure compliance with the applicable water quality requirements of all affected states," including downstream states (40 CFR 122.4(d)). Furthermore, federal regulations require that the EPA include permit requirements necessary to "conform to applicable water quality requirements under section 401(a)(2) of CWA when the discharge affects a State other than the certifying State."

The closest downstream waterbody that is waters of the State of Washington is the Yakima River, about 3 miles downstream of the discharge.

Because of the proximity of the discharge to waters of the State of Washington, and the low critical flows of the East Toppenish Drain and the Yakima River, the City of Toppenish discharge may affect the quality of waters of the State of Washington. Because Washington is an affected State, the EPA must condition the permit to ensure compliance with Washington's WQS (40 CFR 122.4(d), 122.44(d)(4)). Accordingly, the effluent limits for the City of Toppenish, which are presented in Chapter 4, have been conditioned to ensure that both Federal and State water quality standards are achieved at the discharge point and downstream of the discharge.

In addition to Washington State WQS, EPA must also give consideration to the Yakama Nation WQS. Presently the YIN does not have "treatment as a State" status. Therefore, the YIN does not have EPA approved WQS. However, in 1993, the EPA issued the Guidance on EPA's NPDES and sludge Management Permit Procedures on Federal Indian Reservations which set forth the EPA's position on NPDES permitting on tribal lands. This memo states that the EPA Regions should work with the Tribes that do not have EPA approved WQS to the extent practicable.

In summary, although the City's NPDES permit is issued by the EPA, the permit is written with consideration given to both the Washington State WQS and the YIN WQS.

Other NPDES and State Waste Discharge Permits Issued to Facilities in Toppenish

One other facility in Toppenish has a state waste discharge permit: Del Monte Foods Plant. Del Monte Foods has a State Waste Discharge Permit for industrial wastewater discharge to ground.

Industrial Pretreatment/Source Control

Section 307 of the CWA established the National Pretreatment Program; 40 CFR Part 403 lists the federal pretreatment requirements. This program is designed to protect publicly owned treatment works (POTW) from *pass-through* of pollutants or *interference* with the treatment process from industrial or other non-residential discharges that is not "domestic-equivalent" (similar in quality to domestic wastewater). *Pass-through* is defined as "a discharge that exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation). *Interference* is defined as a discharge that inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal.

While there are a number of commercial customers served by the sewer system discharging into the City's WWTF, there are no industrial customers, and hence the City does not have, or need, an industrial pretreatment program per se. However, all discharges, including commercial wastewater discharge into the sewer system are regulated by the City's sewer use ordinance (SUO), which prohibits certain types of wastes that could be harmful to the sewer system or the WWTF's biological treatment processes.

PROPOSED CAPACITY, MANAGEMENT, OPERATION AND MAINTENANCE REGULATIONS

In 2005, EPA adopted a new round of recommendations titled Capacity, Management, Operation and Maintenance (CMOM). Though the regulations are yet to be formally made into law by EPA, some municipalities are anticipating the adoption and have moved forward with implementation. In addition, EPA has used CMOM as de facto standards for collection system audits, including for some facilities in Washington State. CMOM focuses on implementing standards to prevent the failure of collection systems and suggests a program for long-term financing and repair. Under its authority granted by the federal Clean Water Act, EPA seeks to address sanitary sewer overflows (SSO) under the CMOM program.

In general, the CMOM guide can be summarized in the following elements:

1. General performance standards including collection system maps, information management, and odor control.

2. Program documentation including the goals, organization, and legal authority of the organization operating the collection system.

3. An overflow response plan that requires response in less than 1 hour and is demonstrated to have sufficient and adequate personnel and equipment, etc. Estimated volumes and duration of overflows must be accurately measured and reported to the regulatory agency.

4. System evaluation requires that the entire system be cleaned on a scheduled basis (for example, once every 5 years), be regularly television inspected, and that a program for short- and long-term rehabilitation replacement be generated. EPA has proposed, as a rule of thumb, a 1.5 to 2 percent system replacement rate, which implies that an entire collection system is replaced somewhere in the range of a 50- to 70-year time period.

5. A capacity assurance plan that will use flow meters to evaluate infiltration and inflow (I&I), ensure lift stations are properly operated and maintained, and ensure that source control is maintained.

6. A self-audit program to evaluate and adjust performance.

7. A communication program to communicate problems, costs, and improvements to the public and decision-makers.

EPA is considering some changes in design standards for collection systems including requiring that sanitary sewer overflows not occur except in extreme storms.

ENDANGERED SPECIES ACT

There are currently a total of seventeen salmon, steelhead, and trout Evolutionarily Significant Units (ESUs)/Distinct Population Segments (DPSs) in Washington State. Endangered Species Act (ESA) listings impact activities that affect salmon and trout habitat, such as water uses, land use, construction activities, and wastewater disposal. ESA-listed species present in the Yakima River include Mid-Columbia River steelhead and Columbia River bull trout. Impacts to the City of Toppenish may include longer timelines for permit applications and more stringent review and regulation of construction impacts on in-water work and riparian corridors. The presence of ESA-listed species and associated critical habitat in the Yakima River has the potential to impact future WWTF and outfall improvement projects.

Depending upon the funding the City receives for recommendations in this Plan, the City may or may not have to pursue a biological evaluation/ESA consultation as part of the compliance with the National Environmental Policy Act referenced below.

NATIONAL HISTORIC PRESERVATION ACT

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by ACHP.

It has been the City of Toppenish's standard practice to consult with the Yakama Nation Cultural Resources Program on any project that has ground disturbing activities regardless of the source of funding or the nature of the project. The purpose of this consultation is to meet the requirements of Section 106 and Washington State Executive Order 05/05 (discussed below). Typical consultations include a scope of work, and identification of the area of potential effect. At that point the Tribe decides what level of cultural study or what mitigation is required.

The City will consult with the Yakama Nation on the improvements recommended in this Plan regardless of the funding source.

NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) was established in 1969 and requires federal agencies to determine environmental impacts on all projects requiring federal permits or funding. Federally delegated activities such as NPDES permits or Section 401 certification are considered state actions and do not require NEPA compliance. If a project involves federal action (through, for example, an Army Corps of Engineers Section 404 permit), and is determined to be environmentally insignificant, a Categorical Exclusion from the NEPA process may be issued by the federal funding or permitting agency. Projects involving minor impacts to federally-protected resources require preparation of an Environmental Assessment and either a Finding of No Significant Impact (FONSI), if impacts can be successfully mitigated; otherwise, an Environmental Impact Statement (EIS) would be required. NEPA is not applicable to projects that do not include a federal component or nexus.

A NEPA environmental review is not included in this Plan. Depending upon the funding the City receives for recommendations in this Plan, the City may or may not have to complete a NEPA environmental review.

CLEAN AIR ACT

The Federal Clean Air Act requires all wastewater facilities to plan to meet the air quality limitations of the region. At this time the City does not obtain any permits related to the Federal Clean Air Act.

CONSTRUCTION STORMWATER PERMIT

Stormwater discharges from construction activities can significantly impact water quality. As stormwater flows over a construction site, it can pick up pollutants like sediment, debris, and chemicals and transport them to nearby storm sewer systems or directly into rivers, lakes, or coastal waters.

The NPDES stormwater program requires permits for discharges from construction activities that disturb one or more acres, and discharges from smaller sites that are part of a larger common plan of development or sale. Construction stormwater permits include effluent limits for erosion and sediment control, pollution prevention, and site stabilization from the Construction and Development Effluent Guidelines and Standards regulations.

Depending on the location of the construction site, either the state (if it has been authorized to implement the NPDES stormwater program) or EPA will administer the permit. In areas where EPA is the permitting authority, operators of regulated construction sites are generally permitted under EPA's 2017 Construction General Permit (CGP).

The EPA has stormwater permitting authority in the City of Toppenish. If the projects recommended in this Plan are over one acre of disturbance, the Contractor will be required to file a notice of intent for coverage under the EPA's 2017 CGP.

STATE STATUTES, REGULATIONS, AND PERMITS

STATE WATER POLLUTION CONTROL ACT

The intent of the State Water Pollution Control Act is to "maintain the highest possible control standards to ensure the purity of all waters of the state consistent with public health and the enjoyment…the propagation and protection of wildlife, birds, game, fish and other aquatic life, and the industrial development of the state." Under the Revised Code of Washington (RCW) 90.48 and the Washington Administrative Code (WAC) 173-240, Ecology issues permits for wastewater treatment facilities and wastewater land application facilities under WAC 246-271.

Submission of Plans and Reports for Construction of Wastewater Facilities, WAC 173-240

If state funding is provided for construction or modification of domestic wastewater facilities on tribal land, engineering reports, plans, and specifications must be submitted to and approved by Ecology prior to construction. This regulation outlines procedures and requirements for the development of an engineering report that thoroughly examines the engineering and administrative aspects of a domestic wastewater facility project. This state regulation defines a facility plan as an engineering report under federal regulations, 40 CFR Part 35.

Key provisions of WAC 173-240 are provided below:

- An engineering report for a wastewater facility project must contain everything required for a general sewer plan unless an up-to-date general sewer plan is on file with Ecology.
- An engineering report shall be sufficiently complete so that plans and specifications can be developed from it without substantial changes.
- A wastewater facility engineering report must be prepared under the supervision of a professional engineer.

Criteria for Sewage Works Design, Washington State Department of Ecology

Ecology has published design criteria for collection systems and wastewater treatment plants. While these criteria are not legally binding, their use is strongly encouraged by Ecology since the criteria are used by the agency to review engineering reports for

upgrading wastewater treatment systems. Commonly referred to as the "Orange Book," these design criteria primarily emphasize unit processes through secondary treatment, and also include criteria for planning and design of wastewater collection systems.

If expansion or modification of the City of Toppenish collection system and/or WWTF is funded by the Department of Ecology, the project will require conformance with Ecology criteria.

Certification of Operators of Wastewater Treatment Plants, WAC 173-230

Wastewater treatment plant operators are certified by the State Water and Wastewater Operators Certification Board. However, operators on tribal lands are not required to be certified, but can obtain training and certification through the State of Washington or Indian Health Service Environmental Health Support Center or other public or private training and certification agencies. Training and certification of operators is strongly encouraged by Indian Health Service.

Surface Water Quality Standards (WAC 173-201A)

WAC 173-201A establishes water quality standards within Washington State. The State adopted revised water quality standards in May 2011. The standards are based on two objectives: protection of public health and enjoyment, and protection of fish, shellfish, and wildlife. For each surface water body in the State, the standards assign specific uses, such as aquatic life, recreation, or water supply. Water quality standards have been developed for each use for parameters such as fecal coliform, dissolved oxygen, temperature, pH, turbidity, and toxic, radioactive, and deleterious substances. The surface water criteria include 29 toxic substances, including ammonia, residual chlorine, several heavy metals, polychlorinated biphenyls (PCBs), and pesticides.

It is the policy of the State of Washington to maintain existing beneficial uses of surface water by preventing degradation of existing water quality. However, certain allowances are made by Ecology for discharging treated wastewater into a surface water that enable a temporary or mitigated degradation to occur. These allowances are made by establishing mixing zones and determining the assimilative capacity of the receiving water.

As previously stated, Washington State surface water quality standards were considered when effluent limits for the City of Toppenish WWTF were established by EPA in the WWTF NPDES Permit.

RECLAIMED WATER STANDARDS

The State Water Reclamation and Reuse Standards (Reuse Standards) define the water quality standards for reclaimed water. The standards for the use of reclaimed water are outlined in RCW 90.46 and in a separate document published by the Washington State Departments of Health and Ecology entitled "Water Reclamation and Reuse Standards."

Reclaimed water is the effluent derived from a wastewater treatment system that has been adequately and reliably treated, such that it is no longer considered wastewater and is suitable for a beneficial use or a controlled use that would not otherwise occur. The legislature has declared that "the utilization of reclaimed water by local communities for domestic, agricultural, industrial, recreational, and fish and wildlife habitat creation and enhancement purposes (including wetland enhancement) will contribute to the peace, health, safety, and welfare of the people of the State of Washington."

Reclaimed water may be used to recharge groundwater by surface percolation or through direct injection, as long as the quality of the reclaimed water meets groundwater recharge criteria which are defined in the Reuse Standards. Groundwater recharge projects must also be in compliance with the State's groundwater regulations listed in WAC 173-200.

Discharge of reclaimed water for the purpose of stream flow augmentation, fish and wildlife habitat, irrigation supply, or water right replenishment or transfer must comply with WAC Chapter 173-201A. A beneficial use of the reclaimed water must be established for the project to be accepted as a stream flow augmentation project.

Washington State began a rulemaking process in 2006 to update and to convert the 1997 Water Reclamation and Reuse Standards (Washington State Department of Ecology, 1997) into a regulation, the Reclaimed Water Rule, Chapter 173-219 Washington Administrative Code (Washington State Department of Ecology, 2010). The rule is intended to provide a consistent and efficient regulatory process as well as to be sufficiently adaptable in order to govern reclaimed water production over a long time period. The date for final adoption of the Reclaimed Water Rule is uncertain due to State financial and policy issues.

The City of Toppenish WWTF does not generate reclaimed water. Reclaimed water was evaluated as part of the 2005 Wastewater Facility Plan, but it was determined that it was not feasible. Reclaimed water should be evaluated as part of any future WWTF planning effort.

STATE ENVIRONMENTAL POLICY ACT/STATE ENVIRONMENTAL REVIEW PROCESS

WAC 173-240-050 requires a statement in all wastewater comprehensive plans regarding proposed projects in compliance with the State Environmental Policy Act (SEPA), if applicable. The improvements proposed in this Plan will fall under SEPA regulations. A SEPA checklist is included in Appendix A of this Plan for use in the environmental review for the project. In most cases, a Determination of Non-Significance (DNS) is issued; however, if a project will have a probable significant adverse environmental impact, an Environmental Impact Statement (EIS) will be required.

The State Environmental Review Process (SERP) is a state environmental process similar to NEPA, but with less robust alternative review requirements. In order to qualify for Ecology's funding programs, completion of the SEPA checklist, completion of cost-effective analysis, and completion of a public meeting are required to be considered as a complete SERP.

When both federal and state licenses or permits are required, then both NEPA and SEPA requirements must be met. WAC 197-11-610 allows the use of NEPA documents to meet SEPA requirements.

It is anticipated that the City will pursue Ecology funding and therefore the SERP process has been completed and documentation has been included in Appendix A.

MINIMAL STANDARDS FOR SOLID WASTE HANDLING (WAC 173-304)

Grit and screenings are not subject to the sludge regulations in WAC 173-308, but their disposal is regulated under the State solid waste regulations, WAC 173-304. Waste placed in a municipal solid waste landfill must not contain free liquids, nor exhibit any of the criteria of a hazardous waste as defined by WAC 173-303. To be placed in a municipal solid waste landfill, grit, screenings, and incinerator ash must pass the paint filter test. This test determines the amount of free liquids associated within the solids and includes the toxic characteristic leachate procedure (TCLP) test, which determines if the waste has hazardous characteristics.

WAC 173-308 BIOSOLIDS MANAGEMENT

The State of Washington has adopted its own regulations governing the use or disposal of biosolids, WAC 173-308. These regulations became effective in March 1998 and are enforced by the State Department of Ecology (Ecology). The requirements in WAC 173 308 are very similar to the requirements of the federal 503 regulations.

There are three fundamental elements of the federal 503 and State 308 regulations that establish minimum criteria for beneficial use of biosolids:

1. Pollutant concentrations and application rates;
2. Pathogen reduction measures (Class A or B); and
3. Vector attraction reduction measures.

Management Practices

For biosolids that are Class "B" with respect to pathogens and have met the three criteria discussed above, the 503 and 308 regulations identify specific management practices that must be followed during land application of biosolids. The biosolids must be applied at a

rate that is equal to or less than the agronomic rate. The placement of biosolids on land cannot adversely affect a threatened or endangered species. Biosolids cannot be applied to ground in a manner that would cause it to enter wetlands or a surface water body (e.g., on frozen ground or snow-covered ground) nor can it be applied within 10 meters or less of a surface water. Class "B" biosolids may not be applied to lawns or gardens.

Monitoring Requirements

Monitoring frequencies are based on quantities of biosolids produced. (It is not generally necessary to verify that pathogen and vector attraction reduction measures are met for each individual load of biosolids that is land applied, per WAC 173-308-150(3).) The actual monitoring frequencies will depend on the frequency of applications.

Recordkeeping, Reporting, and Certifications

The 503 and 308 regulations have specific recordkeeping, reporting, and certification requirements for land application of biosolids. The general biosolids permit implements requirements for recordkeeping and reporting in accordance with WAC 173-308-290 and –295. Records must be kept for meeting all pathogen reduction and vector attraction reduction requirements for biosolids and domestic septage. For biosolids, records must be kept of analyses performed for meeting trace pollutant criteria. Ecology requires that all facilities, regardless of size, make annual reports to both Ecology's headquarters and the appropriate regional office, by March 1 of each year.

Permitting

WAC 173-308-310 lists permitting requirements for municipalities managing biosolids. The primary permit required for biosolids management activities is the State General Permit for Biosolids Management. When applying for coverage under the General Permit, the permittee must carry out public notice as required under WAC 173-308-310(11), and public hearings if required in accordance with WAC 173-308-310(12), and comply with requirements of the State Environmental Policy Act (SEPA) as stipulated under WAC 173-308-310(030). Public notice requirements for facilities subject to this permit vary depending on the purpose the notice is serving and the quality of biosolids being managed. Notification must be made to the general public, affected local health departments, and interested parties.

Because the City of Toppenish WWTF manages its biosolids by land application outside the Yakama Reservation, the biosolids treatment and management requirements outlined in WAC 173-308 will apply. The City has obtained coverage under the Statewide General Permit for Biosolids Management.

WETLANDS

Dredging and Filling Activities in Natural Wetlands (Section 404 of the Federal Water Pollution Control Act)

A U.S. Army Corps of Engineers permit is required when locating a structure, excavating, or discharging dredged or fill material in waters of the United States or transporting dredged material for the purpose of dumping it into ocean waters. Typical projects requiring these permits include the construction and maintenance of piers, wharves, dolphins, breakwaters, bulkheads, jetties, mooring buoys, outfalls, and boat ramps.

If wetland fill activities cannot be avoided, the negative impacts can be mitigated by creating new wetland habitat in upland areas or purchasing credits at a wetland bank. If other federal agencies agree, the Corps would generally issue a permit.

Wetlands Executive Order 11990

This order directs federal agencies to minimize degradation of wetlands and enhance and protect the natural and beneficial values of wetlands. This order could affect the siting of lift stations and sewer lines.

Based on the City's 2008 Comprehensive Plan, there are a few wetlands identified within the City's limits at the north end closer to the Yakima River. It is not anticipated that improvements recommended in this Plan will be near any wetlands.

SHORELINE MANAGEMENT ACT

The Shoreline Management Act of 1971 (RCW 90.58) establishes a broad policy giving preference to shoreline uses that protect water quality and the natural environment, depend on proximity to the water, and preserve or enhance public access to the water. The Shoreline Management Act jurisdiction extends to lakes or reservoirs of 20 acres or greater, streams with a mean annual flow of 20 cubic feet per second (cfs) or greater, marine waters, and an area inland 200 feet from the ordinary high-water mark. Projects are reviewed by local governments according to State guidelines. The City has limited lands subject to the Shoreline Management Act. These consist of about two acres near the northern City limits in the floodplain of the Yakima River. The City of Toppenish is covered under the Yakima County Shoreline Master Program.

It is not anticipated that improvements recommended in this Plan will be within the boundaries of the Shorelines Management Act jurisdiction.

FLOODPLAIN DEVELOPMENT PERMIT

Local governments that participate in the National Flood Insurance Program are required to review projects in a mapped floodplain and impose conditions to reduce potential flood damage from floodwater. A Floodplain Development Permit is required prior to construction, including projects involving wastewater collection facilities. The City of Toppenish participates in the National Flood Insurance Program.

It is anticipated that improvements recommended in this Plan will be required to obtain a floodplain development permit.

HYDRAULIC PROJECT APPROVAL

Under the Washington State Hydraulic Code (WAC 220-110), the WDFW requires a hydraulic project approval (HPA) for activities that will "use, divert, obstruct, or change the natural flow or bed" of any waters of the State. For some potential City activities, such as pipeline crossings of streams or WWTF outfall modifications, an HPA will be required. The HPA will include provisions necessary to minimize project-specific and cumulative impacts to fish. There are two watercourses in or around the City of Toppenish which may be subject to an HPA. These are the Wanity Slough, the East Toppenish Drain and Toppenish Drain. Development in or near these watercourses is also subject to Toppenish critical areas standards. These standards can be found in the City of Toppenish Municipal Code, Section 17.70.

It is not anticipated that improvements recommended in this Plan will require an HPA.

CITY SEWER ORDINANCES AND PLANNING POLICIES

The City of Toppenish has a Municipal Code that regulates sewer services. This chapter of the municipal code has been included in Appendix C. The sewer ordinances address such issues as requirements for connections to sewer system, permits for sewer installation by developers, rates for sewer service, development requirements for private sewer systems, conditions for sewer service extensions, and sewage pretreatment regulations.

REGULATORY REQUIREMENTS SUMMARY

FEDERAL REGULATIONS AND PERMITS		
Act/Regulation	**Requirement**	**Comments**
Clean Water Act	NPDES Permit	City has an active permit.
CMOM Regulations	None	Potential future requirement.

Endangered Species Act	Biological Assessment and Consultation with the Federal Agencies	May be required if the City pursues federal funds.
National Historic Preservation Act	Cultural Resources Consultation with the YIN	The City's standard practice is to consult with the YIN on all ground disturbing projects.
NEPA Environmental Review	Environmental Report including a biological assessment and cultural resources consultation report.	May be required if the City pursues federal funds
Clean Air Act	None	No permit is required at this time.
Construction Stormwater Permit	NPDES General Permit for Stormwater Discharges from Construction Activities	May be required depending upon the size of the project. Permit coverage granted by the EPA.
STATE STATUES, REGULATIONS AND PERMITS		
Act/Regulation	**Requirement**	**Comments**
Water Pollution Control Act	NPDES Permit	City has an active permit.
Reclaimed Water Standards	None	Evaluated in the future for WWTF planning.
SEPA Environmental Review	SEPA Checklist/SEPA Determination	Completed by the City's SEPA official. See Appendix A.
SERP Environmental Review	SEPA Checklist, Alternatives Review, Public Meeting	Required if the City seeks Ecology funding. See Appendix A.
Solids Waste Handling Standards	None	City is compliant.
Biosolids Management	Statewide General Permit for Biosolids Management	City has an active permit.
Wetlands	N/A	Construction activities will not occur in or near wetlands.
Shorelines Management Act	N/A	Construction activities will not occur in the shorelines.
Floodplain Development Permit	City Permit	Issued by the City of Toppenish.
Hydraulic Project Approval	N/A	Construction activities will not occur in or near waters of the State.

CITY SEWER ORDINANCES AND PLANNING POLICIES		
Act/Regulation	**Requirement**	**Comments**
Municipal Code	None	City code will be followed as applicable

CHAPTER 3

LAND USE, POPULATION PROJECTIONS, AND SERVICE AREA CHARACTERISTICS

CHAPTER 3

LAND USE, POPULATION PROJECTIONS, AND SERVICE AREA CHARACTERISTICS

The City of Toppenish is located in central Washington on deeded lands of the Yakama Indian Nation, about 20 miles southeast of the City of Yakima. The City lies between US Route 97 and the Yakima River.

SEWER SERVICE AREAS

The City of Toppenish has its own designated sewer service area. All wastewater is treated at the Toppenish Wastewater Treatment Facility (WWTF).

The City of Toppenish's existing collection system and WWTF serve the area within the existing City limits as well as a YIN Housing Authority residential park, the YIN Complex, and a few services for residences outside the City limits along Germantown Road. A map of the existing sewer service area is provided in Figure 3-1.

The City has been providing service to the YIN Housing Authority since 1990 for a residential park located north of the Idaho Lift Station, as shown on Figure 3-1. The City has ownership of the residential park's collection system, and therefore, provides operation and maintenance as part of the City's sewer utility. The ownership includes the sewer mains, lift stations, catch basins, and laterals. Based on City records, there are approximately 64 residential units in the residential park. The agreement related to the YIN Housing Authority is included in Appendix D.

Based on records from the City, there are also approximately 18 residential units outside the City limits that are served by the City's sewer system. Many of these are along Germantown Road, which is the main road along which the WWTF is located to the southeast of the City.

The City has been accepting wastewater from the YIN Complex since 1977. This complex consists primarily of the YIN's headquarters, cultural center, and Legend's Casino. Wastewater from the YIN pressurized sewer line was rerouted to the WWTF located at the Legends Casino within the last ten years, however, YIN still discharges wastewater to the City's sewer system during an emergency or for during maintenance events. The YIN maintains an agreement with the City of Toppenish for wastewater disposal. There has been no update to the 1977 agreement for the City to provide wastewater service for the Yakama Indian Nation (YIN). The City installed a new meter on the City side of US Route 97 to measure the YIN wastewater discharged to the City sewer system. The City charges based on the total YIN flow as a percentage of plant

flows and based on annual WWTF operations costs. YIN does not pay the City to reserve WWTF capacity.

NATURAL ENVIRONMENT

TOPOGRAPHY

The City of Toppenish is located in the central Yakima Valley. The land around the City is located on the flood plain of the Yakima River, at an altitude of 770 feet above sea level. The land consists of an essentially flat area of loamy and silty loam soils underlain by an alluvial sand and gravel substrate. Accompanying drainage flows to the east and northeast in the direction of the Yakima River. The Yakima River flows east to its mouth on the Columbia River 55 miles downstream at Richland. The lands surrounding the City are primarily irrigated agricultural lands. These lands are flood irrigated from a system of canals and ditches.

Figure 3-2 is a topographic map based on United States Geologic Survey (USGS) showing the varying elevations within the City's sewer service area.

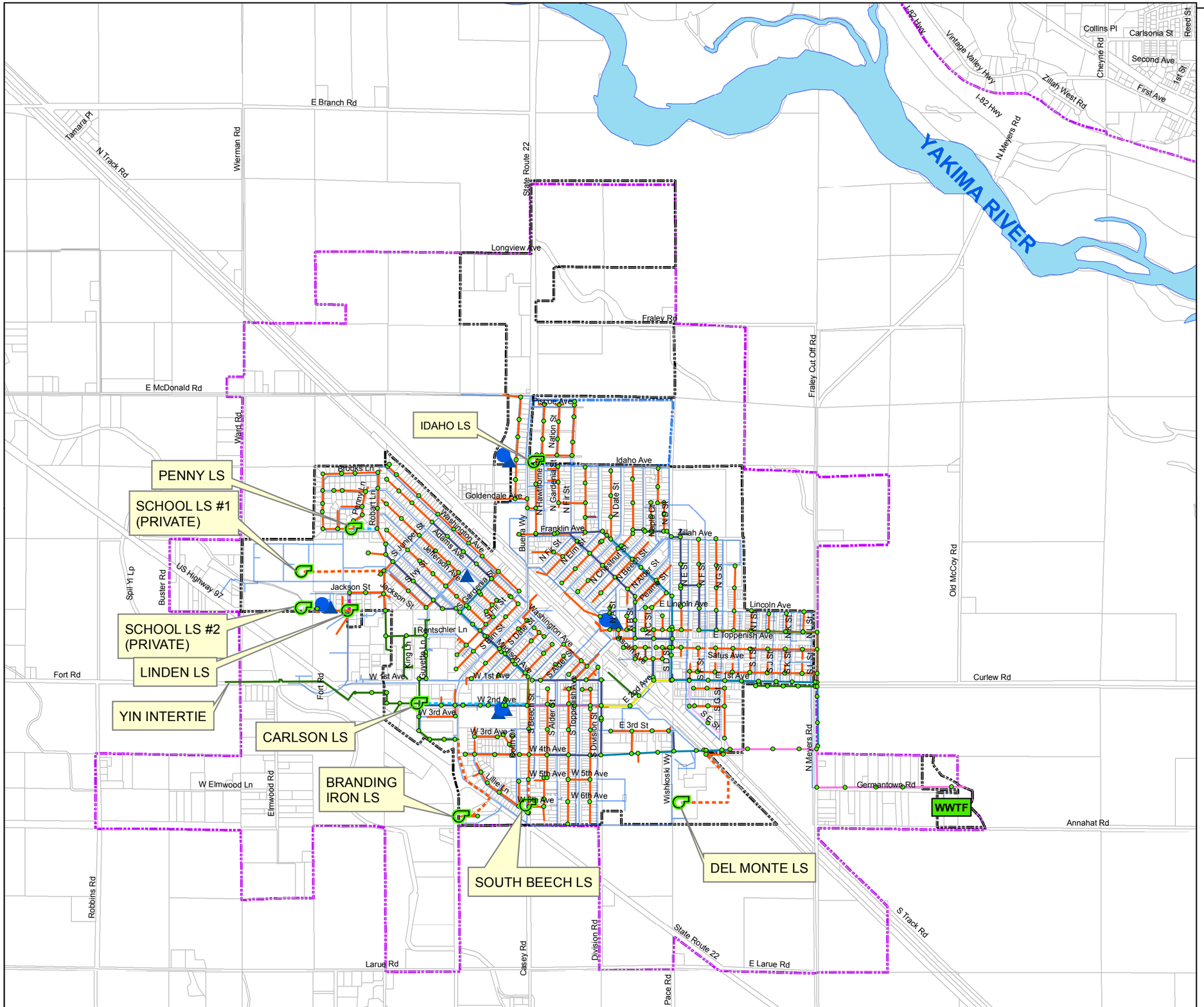
SOILS AND GEOLOGY

There are thirteen soil types found within the Toppenish area. The predominant soil is Naches Loam on which most of the City is located. This soil is a well-drained soil that formed in old alluvium. Included in the areas of Naches loam are small areas of Ashue, Toppenish, Track, and Weiram soils. Slopes range from 0 to 2 percent. Permeability of this soil is moderately slow in the surface layer, the subsoil, and the upper part of the substratum and very rapid in the lower part of the substratum.

The next predominant soil found in the Toppenish area is the Toppenish silt loam. This soil can be found mainly in the northern portion of the City and the urban growth area. This soil consists of deep, somewhat poorly drained soils that is formed in alluvium. The soil is on alluvial plains somewhat parallel to the lower Toppenish and Stus Creeks and the Yakima River. Included with the Toppenish soils are small areas of Fiander, Kittitas, Naches, and Track soils, a few areas of poorly drained soils and a few areas of saline-alkali soils. Slopes range from 0 to 2 percent, and in most places the slope is about 1 percent or less. Permeability of this soil is moderate.

Other soil types found scattered throughout the City include Ashue loams, Esquatzel silt loams, and Toppenish silty clay loams. These soils are well drained.

A more detailed definition of the types and locations of the soil classifications within the sewer service area is presented on Figure 3-3, based on an NRCS Soil Survey of Yakima County, Washington.



N

0 2,400 4,800 Feet

LEGEND:

- LIFT STATION
- MANHOLE
- WASTEWATER TREATMENT FACILITY
- WATER RESERVOIR
- WATER WELLS

FORCE MAIN DIAMETER

- 4
- 6"
- 8"
- UNKNOWN SIZE

GRAVITY MAIN DIAMETER

- 6"
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 27"
- 30"
- UNKNOWN SIZE
- WATER MAIN
- WATER
- PARCELS
- CITY LIMITS
- UGA
- YNHA RESIDENTIAL COMPLEX

CITY OF TOPPENISH

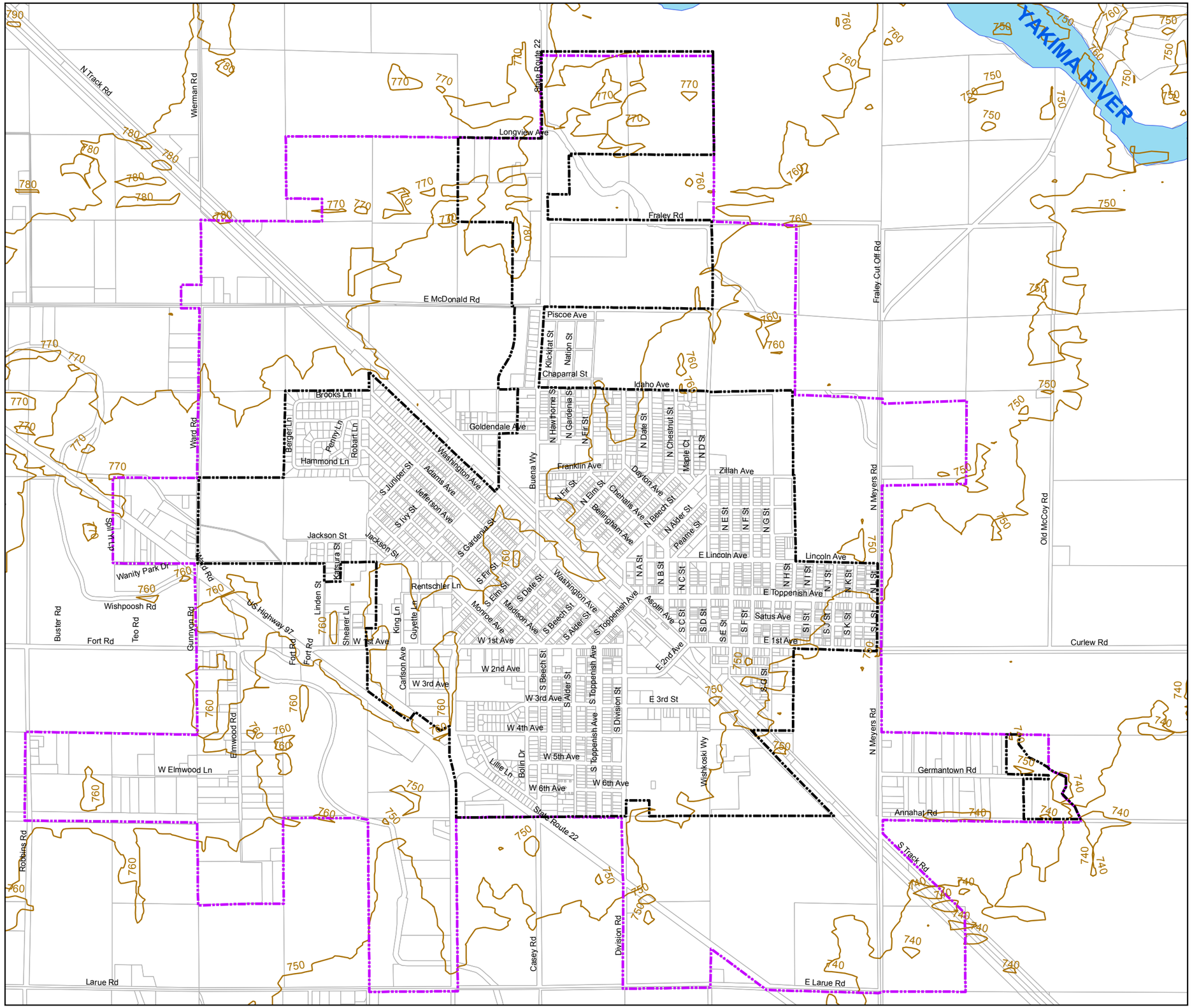
GENERAL SEWER PLAN

FIGURE 3-1

SEWER SYSTEM FACILITIES

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\Figure 3-1 Facilities with Water System.mxd



LEGEND:

- CITY LIMITS
- UGA
- 10' CONTOURS - USGS INTERPOLATED
- WATER
- STREAM
- PARCELS

SOURCE: U.S.G.S. LIDAR 2012

CITY OF TOPPENISH

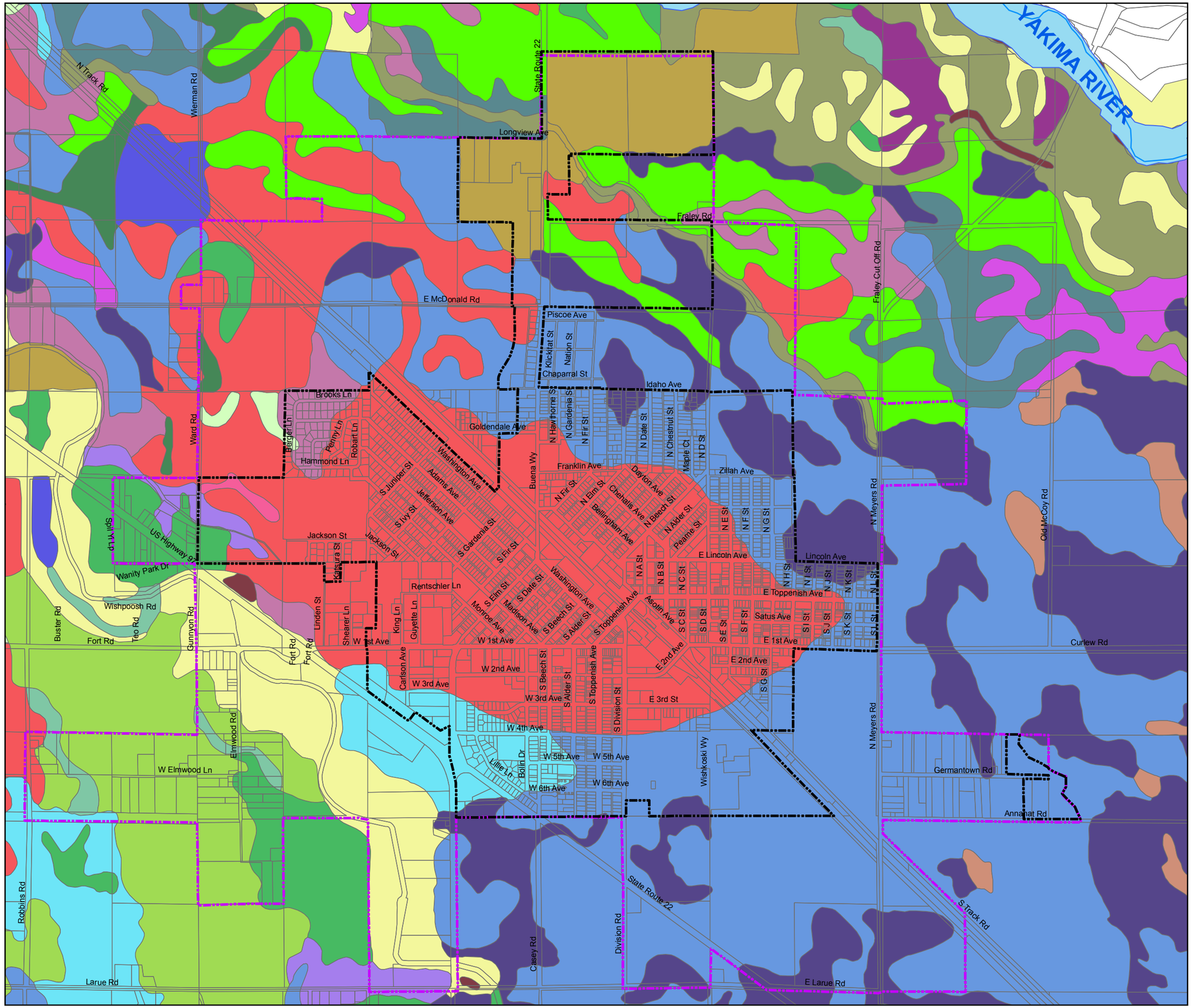
GENERAL SEWER PLAN

FIGURE 3-2

TOPOGRAPHIC MAP

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\Figure 3-2 Topo.mxd



Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\Figure 3-3 Soil.mxd

N

0 2,000 4,000 Feet

LEGEND:

- CITY LIMITS
- UGA
- STREAM
- WATER
- PARCELS

SOIL TYPE:

- ASHUE LOAM, 0 TO 2 PERCENT SLOPES
- ASHUE LOAM, 2 TO 5 PERCENT SLOPES
- DUMPS-PITS COMPLEX
- ESQUATZEL SILT LOAM
- PITS, GRAVEL
- NACHES LOAM, 0 TO 2 PERCENT SLOPES
- NACHES LOAM, 2 TO 5 PERCENT SLOPES
- TOPPENISH SILT LOAM, 0 TO 2 PERCENT SLOPES
- TOPPENISH SILT LOAM, 2 TO 5 PERCENT SLOPES
- TOPPENISH SILTY CLAY LOAM
- TRACK LOAM
- TRACK GRAVELLY LOAM
- TRACK SILTY CLAY LOAM
- UMAPINE SILT LOAM
- WATER
- WAHTUM LOAM
- WEIRMAN SANDY LOAM
- WEIRMAN GRAVELLY SANDY LOAM
- WEIRMAN FINE SANDY LOAM, 0 TO 2 PERCENT SLOPES
- WEIRMAN FINE SANDY LOAM, 2 TO 5 PERCENT SLOPES
- ZILLAH SILT LOAM
- ZILLAH SILT LOAM, CHANNELED

SOURCE: 2014 USDA

CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 3-3

SOIL SURVEY MAP

Gray & Osborne, Inc.

CLIMATE

The following climate data is a summary of weather records from 2010 to 2013 from a weather station in Wapato, approximately 7 miles northwest of the City of Toppenish. Data was not available for 2014 at this station. The average annual temperature is 52 degrees Fahrenheit. The average annual rainfall is 7 inches. December is on average the wettest month of the year, and August is the driest. Table 3-1 lists the average monthly temperature, maximum and minimum daily temperature, and total rainfall recorded from 2010-2013.

TABLE 3-1

Toppenish Area Climate Data 2010 through 2013

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Max. Temp.	42	52	59	67	73	80	90	91	84	66	50	41	91
Min. Temp.	23	23	32	34	43	50	57	56	50	37	25	20	20
Avg. Temp.	33	38	44	51	57	65	73	74	66	52	37	32	52
Max. Precip.	1.75	1.83	1.12	0.71	2.02	1.36	0.46	0.24	0.62	1.65	1.02	2.38	12.24
Min. Precip.	0.11	0.02	0.04	0.36	0.16	0.34	0.03	0.00	0.06	0.51	0.34	0.28	2.03
Avg. Precip.	0.74	0.62	0.70	0.47	1.36	0.86	0.30	0.08	0.34	0.95	0.68	1.64	6.99

(1) Climate Data from NCDC Wapato Station COOP 458959.

The precipitation data from the Wapato weather station is a reasonably accurate representation of the precipitation that Toppenish experiences, due to its close proximity to the City. The highest monthly total precipitation between 2010 and 2013 was 2.27 inches and occurred in December 2012. The lowest monthly total precipitation between 2010 and 2013 was 0.00 inches and occurred in August 2011 and 2012.

SITE SENSITIVE AREAS

The following section summarizes information regarding site-sensitive/critical areas presented in the City of Toppenish 2008 Comprehensive Plan Update. Critical areas within the sewer service area include those classified as streams and watercourses, wetlands, frequently flooded areas, critical aquifer recharge areas, geologically hazardous areas, and fish and wildlife habitat conservation areas. Chapter 1 Part III, Natural Lands and Critical Areas, of the City of Toppenish 2008 Comprehensive Plan Update addresses agricultural lands, forest lands, mineral lands, wetlands, critical aquifer recharge areas, fish and wildlife conservation areas, frequently flooded areas, and geologic hazard areas. Section IV of the comprehensive plan addresses goals and policies regarding critical areas.

City Ordinance 2001-6, Standards for the Protection of Critical Areas, added Chapter 17.70 to the City of Toppenish Municipal Code. The site-sensitive areas within the sewer service area are described further below.

Surface Water

The Yakima River basin drains approximately 6,150 square miles from the Cascade Range east to the ridges dividing the Yakima River system from the Columbia River. The Wenatchee Mountains form the northern limit of the basin and the Columbia River at the Tri-Cities is the southern limit. A 26.8-mile reach of the Yakima River forms the east side of the Toppenish Creek subbasin, from Yakima River mile (RM) 106.8 to 80.0. The Marion Drain, a return from the Wapato Irrigation Project enters the Yakima River at RM 82.4. Simcoe Creek, and its tributary Agency Creek are the major systems that contribute to the Toppenish Creek. Toppenish Creek flows 68.5 miles from its headwaters on Lost Horse Plateau to its mouth. Toppenish Creek is located south of the Marion Drain, well beyond the urban growth area of the City of Toppenish. The City's WWTF discharges into the Toppenish Drain. The Toppenish Drain is within the Wapato Irrigation Project and eventually empties to the Yakima River.

Two perennial creeks or streams, as identified in Yakima County's Critical Areas Ordinance, can be found within the UGA of the City of Toppenish, Wanity slough, and Marion Drain. Wanity Slough, located south of SR-22, is an irrigation return flow ditch which eventually drains into the Marion Drain.

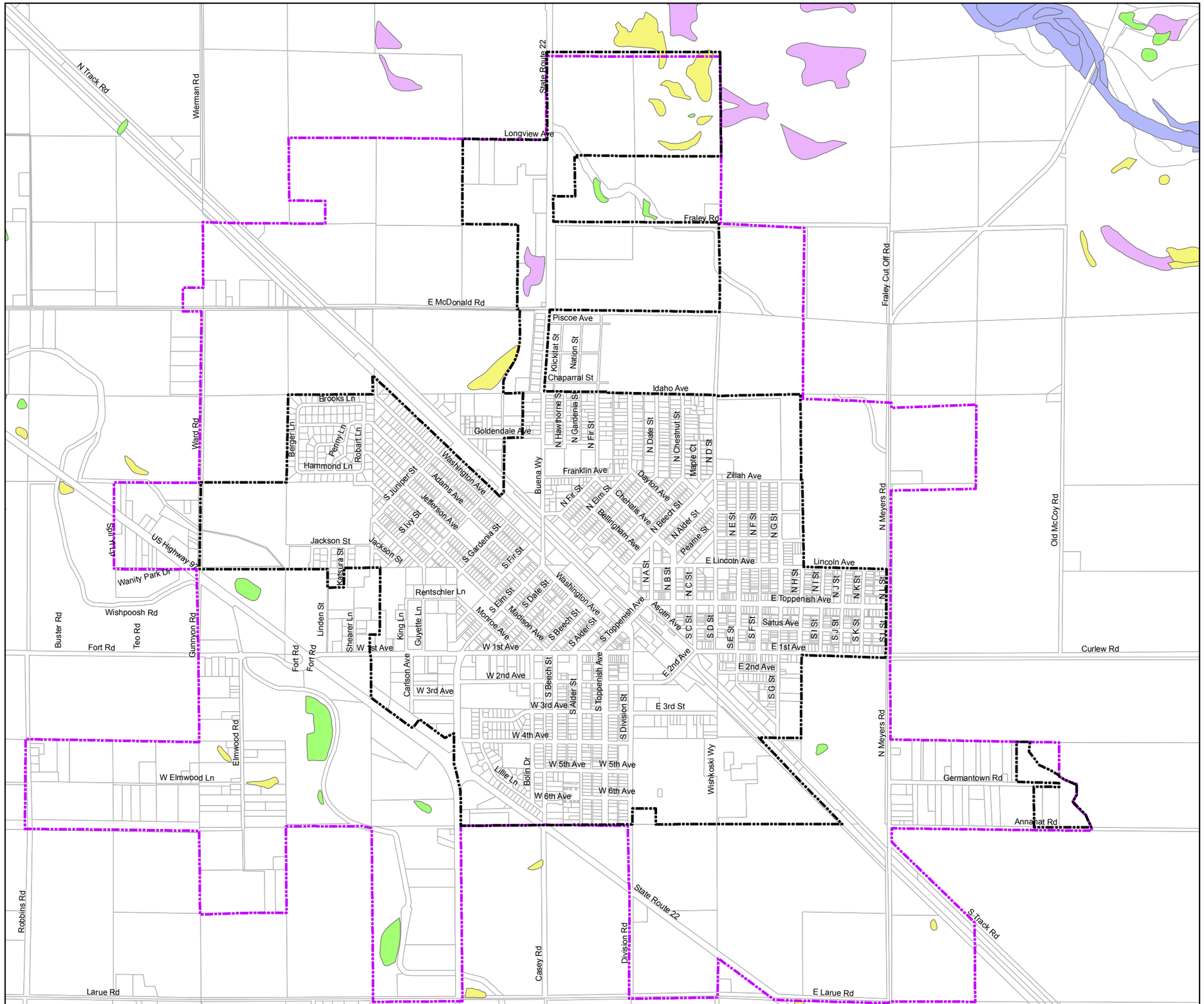
Groundwater

The Yakima Basin is divided into six independent groundwater basins. They are (from north to south): Roslyn, Kittitas, Upper Naches, Cold Creek, Upper Yakima, and Lower Yakima Basins. Toppenish is located in the Lower Yakima basin. The Yakima River Basin has three major aquifer systems: the shallow, unconfined aquifer near the surface; the post basalt aquifer, somewhat deeper; and the basalt aquifer, the deepest. One or more of these systems may be present in a given subbasin.

In the Toppenish area, there are a number of alternative sediment beds and basalt layers that contain groundwater. These are the Ellensburg aquifer, the Elephant Mountain Basalt aquifer, the Selah Interbed, the Umatilla Basalt aquifer, the Mabton Interbed and the Priest Rapids Basalt aquifer.

Wetlands

The Growth Management Act defines wetlands as areas that have surface or groundwater that supports vegetation typically adapted in saturated soil conditions. Wetlands support valuable and complex ecosystems and consequently, development is severely restricted if not prohibited in most wetlands and buffer areas around the wetland. There are approximately 19 acres within the City limits of Toppenish that are classified as wetlands. Toppenish Municipal Code Section 17.70.410 designates wetlands. Figure 3-4 also shows wetland areas in the Toppenish area.



N

0 2,000 4,000 Feet

LEGEND:

- CITY LIMITS
- UGA
- PARCELS

WETLAND TYPE:

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 3-4

WETLANDS MAP

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\Figure 3-4 Wetlands.mxd

Frequently Flooded Areas

Flood hazard areas are areas adjacent to lakes, rivers, and streams that are prone to flooding during peak runoff periods. Construction of buildings and other development in these areas is regulated in accordance with flood hazard zoning defined in the Toppenish Municipal Code Section 15.30. The Toppenish 100-year flood zones (land that has a 1 percent chance of flooding each year) are depicted on Figure 3-5.

Critical Aquifer Recharge Areas

Aquifer recharge areas are areas that have a critical effect on aquifers used for potable water as defined by WAC 365-190-030(2). The City of Toppenish draws all of its water from six active wells. Critical aquifer recharge areas are important areas to protect. According to the City's Critical Areas Ordinance, Section 17.70.700.B.1, the entire City of Toppenish is designated as a vulnerable groundwater recharge area.

Geologically Hazardous Areas

Seismic hazard areas are those with low-density soils that are more likely to experience greater damage due to seismic-induced subsidence, liquefaction, or landslides. Seismic hazard areas are regulated mainly with respect to public safety, and with the exception of a severe earthquake, these hazard areas do not impact wastewater facilities. The United States is divided into seismic hazard zones based upon historic documents. According to the United States Geologic Survey (USGS), the Toppenish area has a two percent probability having an earthquake with peak ground acceleration exceeding 0.3 times the acceleration of gravity in 50 years.

Fish and Wildlife Habitat Conservation Areas

Sensitive fish and wildlife habitat is defined as areas which meet the definition of a "Fish and Wildlife Habitat Critical Area" pursuant to WAC 365-190-080(5) and is essential for maintaining specifically listed species in suitable habitats. Any proposed activity within 300 feet of these areas, including construction related to wastewater collection systems, requires that a habitat assessment be prepared. Section 17.70.095 of the Toppenish Municipal Code designates habitats and species of local importance.

Table 3-2 summarizes the priority anadromous and resident fish species in the Toppenish area.

TABLE 3-2

Priority Anadromous and Resident Fish Species(1)

Species	Yakima River
Bull Trout	✓
Chinook	✓
Chum	
Coho	✓
Sockeye	
Steelhead	✓

Source: WDFW Salmonscape Database.
(1) Checkmark indicates species is present.

TOPPENISH WATER SYSTEM

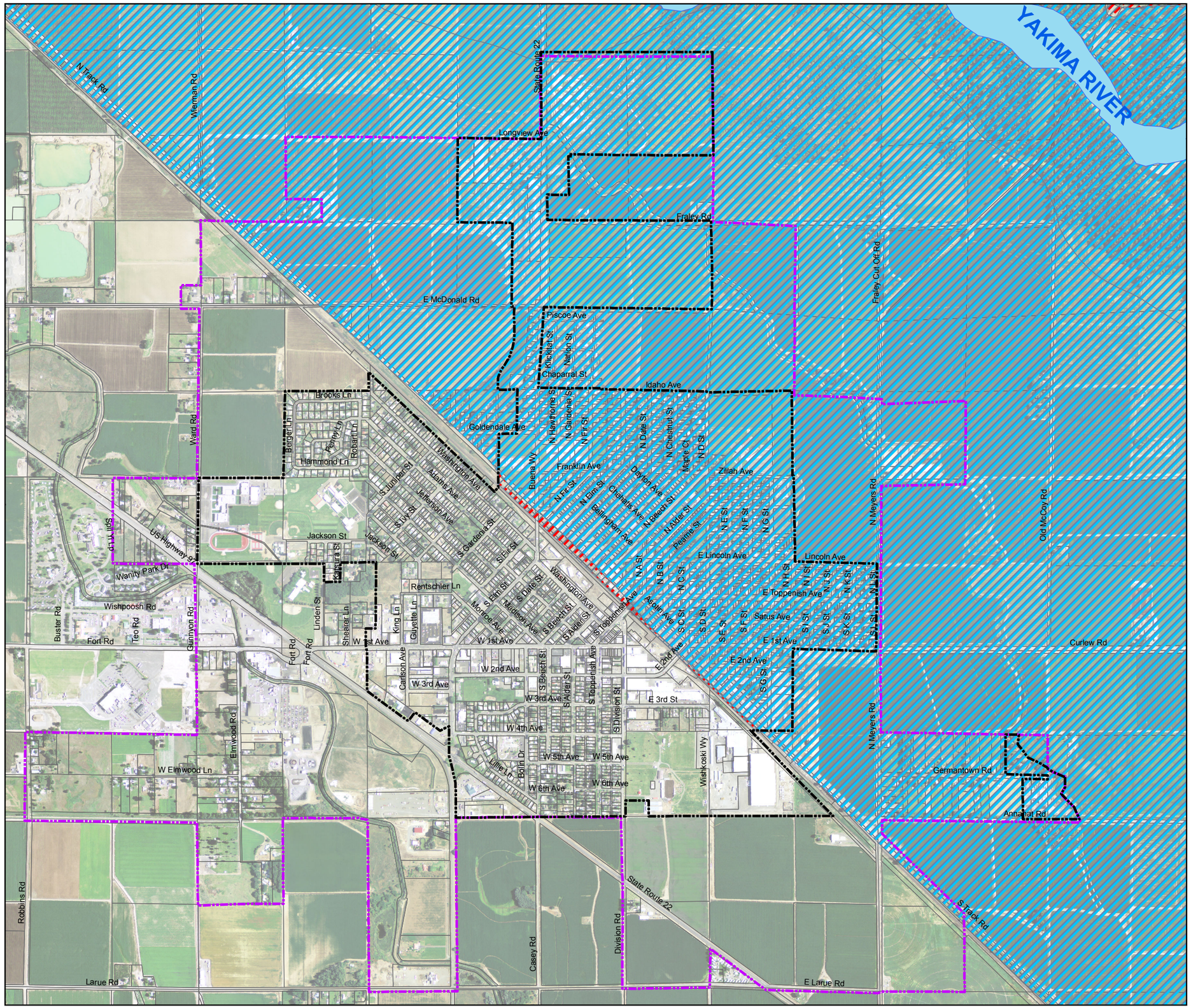
The City's drinking water supply has historically been provided from groundwater by a total of nine wells, of which only six are active. The City's wells have a combined pumping capacity of 4,875 gpm or 7,020,000 gpd. The well production typically remains constant throughout the year. The existing distribution system consists of 36 miles of pipe. The City operates four reservoirs. The City's total storage capacity is 3,400,000 gallons. Presently the City adds chlorine and fluoride to the water pumped from each of the City's five active wells. The locations of the City's active wells and reservoirs are shown on Figure 3-1. Irrigation water service is provided by the Bureau of Indian Affairs to three parcels within the Toppenish area.

As documented by the Department of Ecology, various private and industrial water wells exist in the vicinity of the City of Toppenish, as described in Appendix K. The proposed wastewater treatment facility and collection system improvements will be constructed in-kind and in the same or similar locations as the existing facilities, which will not adversely impact groundwater or surface water quality in the area. Improvements to the collection system and wastewater treatment facility will allow the City to produce effluent to a higher standard, thus improving surface and ground water quality.

The City's municipal water and sewer system provide service throughout the City limits of Toppenish, as shown in Figure 3-1. Interaction between the two systems is limited to their shared installation locations within City right-of-way. The nearest active well (Well No. 2) and reservoir (Reservoir No. 3) to the City's WWTF is located 1.3 miles to the northwest.

PLANNING PERIOD

In order to provide wastewater services for future growth, the wastewater system is in need of continuous evaluation and improvement. A planning period for the evaluation of



N

0 2,000 4,000 Feet

LEGEND:

- CITY LIMITS
- UGA
- WATER
- PARCELS
- FEMA 500 YEAR FLOODPLAIN
- FEMA 100 YEAR FLOODPLAIN

ORTHO PHOTO SOURCE: 2013 NAIP
SOURCE: FEMA

CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 3-5

FLOODPLAINS MAP

Gray & Osborne, Inc.

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the wastewater utility should be long enough to be useful for an extended period of time, but not so long as to be impractical. The planning period for this Plan is from 2015 through 2035, coinciding with a 20-year planning interval.

LAND USE, ZONING, AND POPULATION

Table 3-3 shows a summary of existing zoning in the City of Toppenish. Currently, residential zoning makes up about 33 percent of Toppenish's total land area. Approximately 25 percent of total land within the City limits is zoned for industrial use and approximately 21 percent is zoned for business. Figure 3-6 shows zoning in the area and Figure 3-7 shows the planned future land use from the Comprehensive Plan.

TABLE 3-3

Zoning within the City of Toppenish(1)

Zoning	Classification	Area (acres)	Percentage
B-1	Local Business	25.80	2%
B-2	General Business	85.24	8%
B-3	Professional Offices	4.87	0%
M-1	Light Industrial	89.66	8%
M-2	Heavy Industrial	277.96	25%
PD	Planned Development	7.44	1%
R-1	Residential- Single Family	328.19	30%
R-2	Residential- Multi Family	15.71	1%
SP	Public/Semi-Public	269.52	24%
Total			**100%**

(1) Existing zoning total from 2008 Comprehensive Plan Update.

CURRENT POPULATION

Table 3-4 provides a history of the population for Toppenish from 2000 to 2014, based on data from the Washington State Office of Financial Management (OFM).

TABLE 3-4

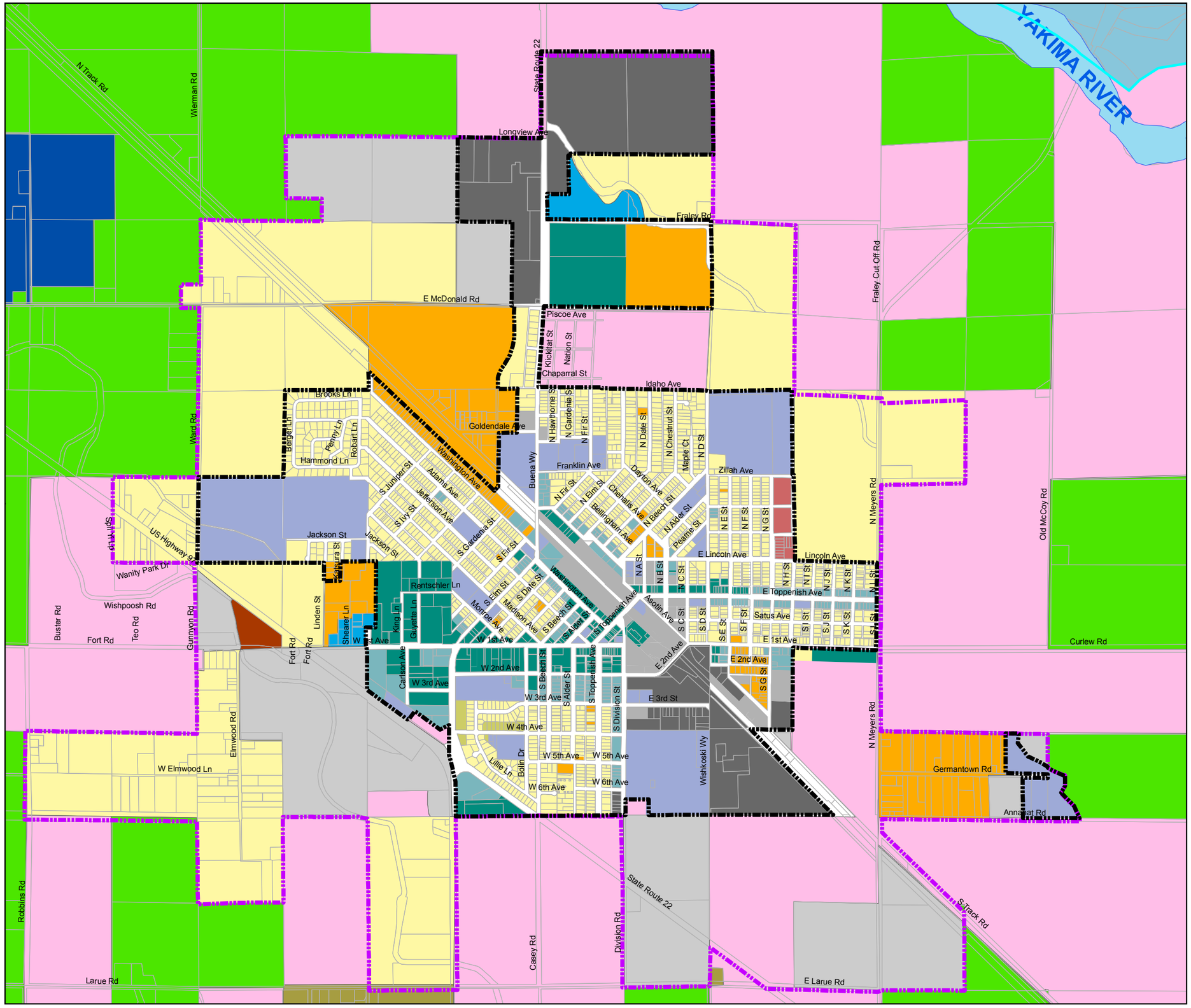
Historical Population 2000 to 2015

Year	Population	Growth
2000	8,946	-
2001	8,909	-0.41%
2002	8,947	0.43%
2003	8,921	-0.29%
2004	8,967	0.52%
2005	8,959	-0.09%
2006	8,951	-0.09%
2007	9,040	0.99%
2008	9,055	0.17%
2009	8,975	-0.88%
2010	8,949	-0.29%
2011	8,950	0.01%
2012	8,950	0.00%
2013	8,950	0.00%
2014	8,955	0.06%
2015	8,965	0.11%
Average		**0.02%**

Source: Washington State Office of Financial Management (OFM). Population estimated as of April 1 of each year.

PROJECTED FUTURE CITY POPULATION

The City is in the process of updating its comprehensive plan, which includes estimated population growth rate projections for future growth in the City. The County-Wide Planning Policy Committee provides population projections for each community within Yakima County for the years 2015 through 2040. Table 3-5 shows projected population totals for the 20-year planning period. The UGA is not expected to expand. The City evaluates water/sewer service to properties outside the UGA on a case-by-case basis, but in general does not serve new development outside the UGA.



N

0 2,000 4,000 Feet

LEGEND:

- CITY LIMITS
- UGA
- WATER
- PARCELS

CITY ZONING:

- Residential (R-1)
- Residential (R-2)
- Local Business (B-1)
- General Business (B-2)
- Professional Offices (B-3)
- Planned Development (PD)
- Light Industrial (M-1)
- Heavy Industrial (M-2)
- Public/Semi-Public (SP)

COUNTY ZONING:

- Agricultural (AG)
- Professional Offices (B-3)
- Commercial (C)
- Highway Commercial (HC)
- Light Industrial (M-1)
- Heavy Industrial (M-2)
- Mining (MIN)
- Single Family Residential (R-1)
- Multi-Family Residential (R-3)
- Rural Remote (RLDP)
- Rural/Transitional (RT)
- Tribal (TRIB)

CITY OF TOPPENISH

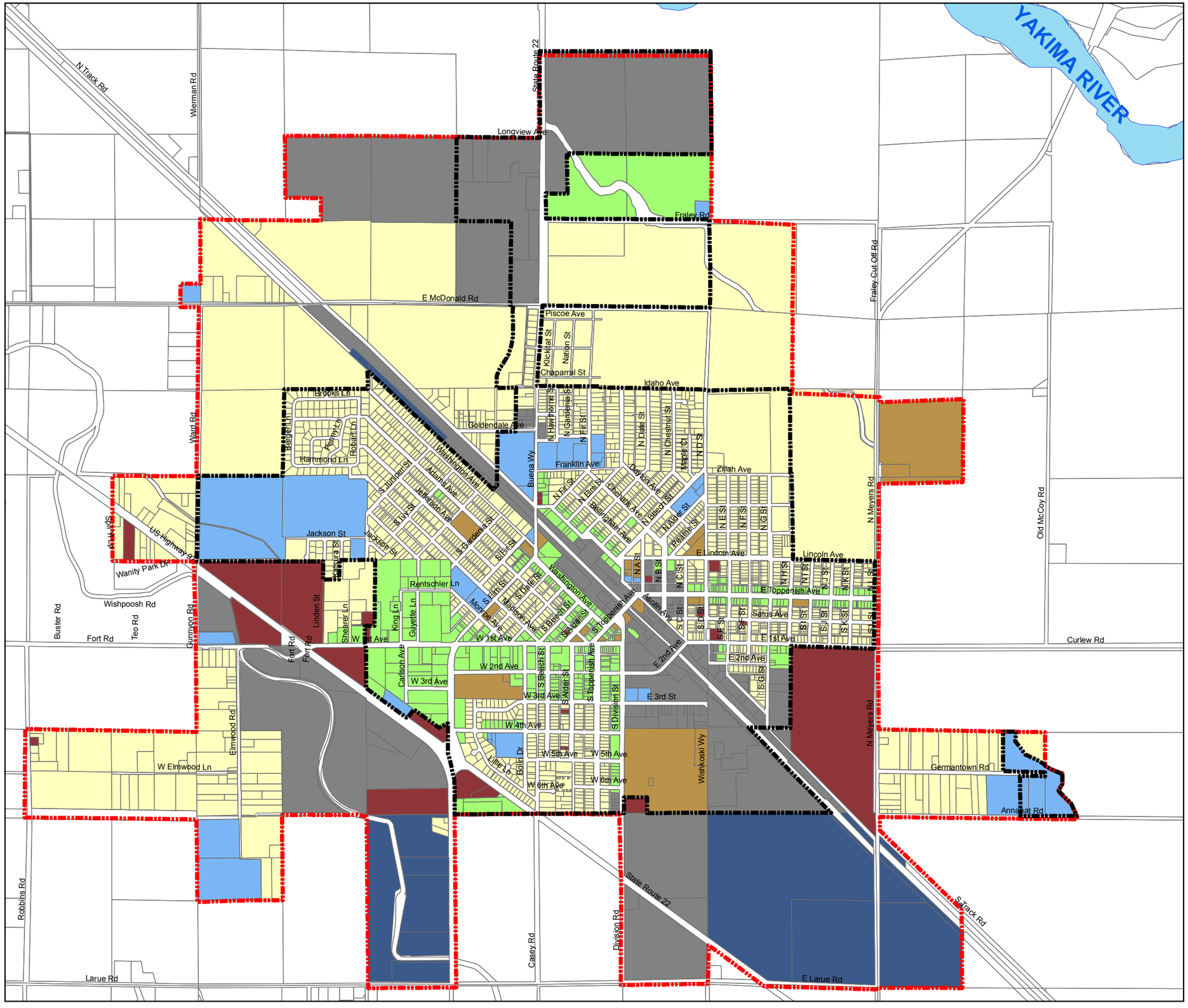
GENERAL SEWER PLAN

FIGURE 3-6

ZONING MAP

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\Figure 3-6 Zoning.mxd



N

0 2,000 4,000 Feet

LEGEND:

- CITY LIMITS
- UGA
- WATER
- STREAM
- PARCELS

LAND USE:

- Commercial
- Industrial/Manufacturing
- Public
- Recreational/Open Space
- Residential
- Transitional
- Tribal

CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 3-7

LAND USE MAP

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\Figure 3-7 Land Use.mxd

TABLE 3-5

Population Projections over the 20-Year Planning Period

Year	Population[(1)]
2016	9,004
2017	9,053
2018	9,101
2019	9,148
2020	9,195
2021	9,286
2022	9,330
2023	9,372
2024	9,414
2025	9,454
2026	9,494
2027	9,532
2028	9,570
2029	9,607
2030	9,642
2031	9,677
2032	9,711
2033	9,745
2034	9,778
2035	9,810

(1) Based on a growth rate of 0.9 percent per year.

SEWER CONNECTIONS

Table 3-6 provides an estimate of the average number of sewer connections in the City of Toppenish in 2015, based on billing data provided by the City.

TABLE 3-6

Sewer Service Connections by Customer Class for 2015

Customer Class	Inside	Outside
Single-Family Residential	1,884	82
Multi-Family Residential(1)	90	20
Commercial(2)	254	1
Industrial	1	1
Total	**2,229**	**86**

(1) Multi-family connections include apartments and duplexes.
(2) Commercial connections also include churches, schools, and municipal accounts.

INDUSTRIES IN THE SEWER SERVICE AREA

Del Monte Foods possesses the only industrial permit issued in Toppenish. Del Monte Foods discharges only domestic wastewater to the Toppenish sewer system, their industrial wastewater is treated onsite and applied to a sprayfield nearby. They are permitted by Ecology via a state waste discharge permit.

CHAPTER 4

EXISTING FACILITIES

CHAPTER 4

EXISTING FACILITIES

This chapter describes existing facilities within the City of Toppenish wastewater collection and treatment systems. These facilities include pressure and gravity sewers, lift stations, the wastewater treatment facility, and outfall.

WASTEWATER COLLECTION SYSTEM

LIFT STATIONS

The City of Toppenish operates seven sewage lift stations. Station locations and force main routes are shown on Figure 3-1. Six stations are located on the southwest side of the railroad tracks, and one lift station is located in the northwest part of the City. There are also two lift stations at the school, which are owned and operated by the school district, but pump into the City's sewer system. The YIN owns and operates a lift station and forcemain that interties with the City. This is further discussed in Chapter 3. A schematic showing how the lift stations are linked is shown on Figure 4-1.

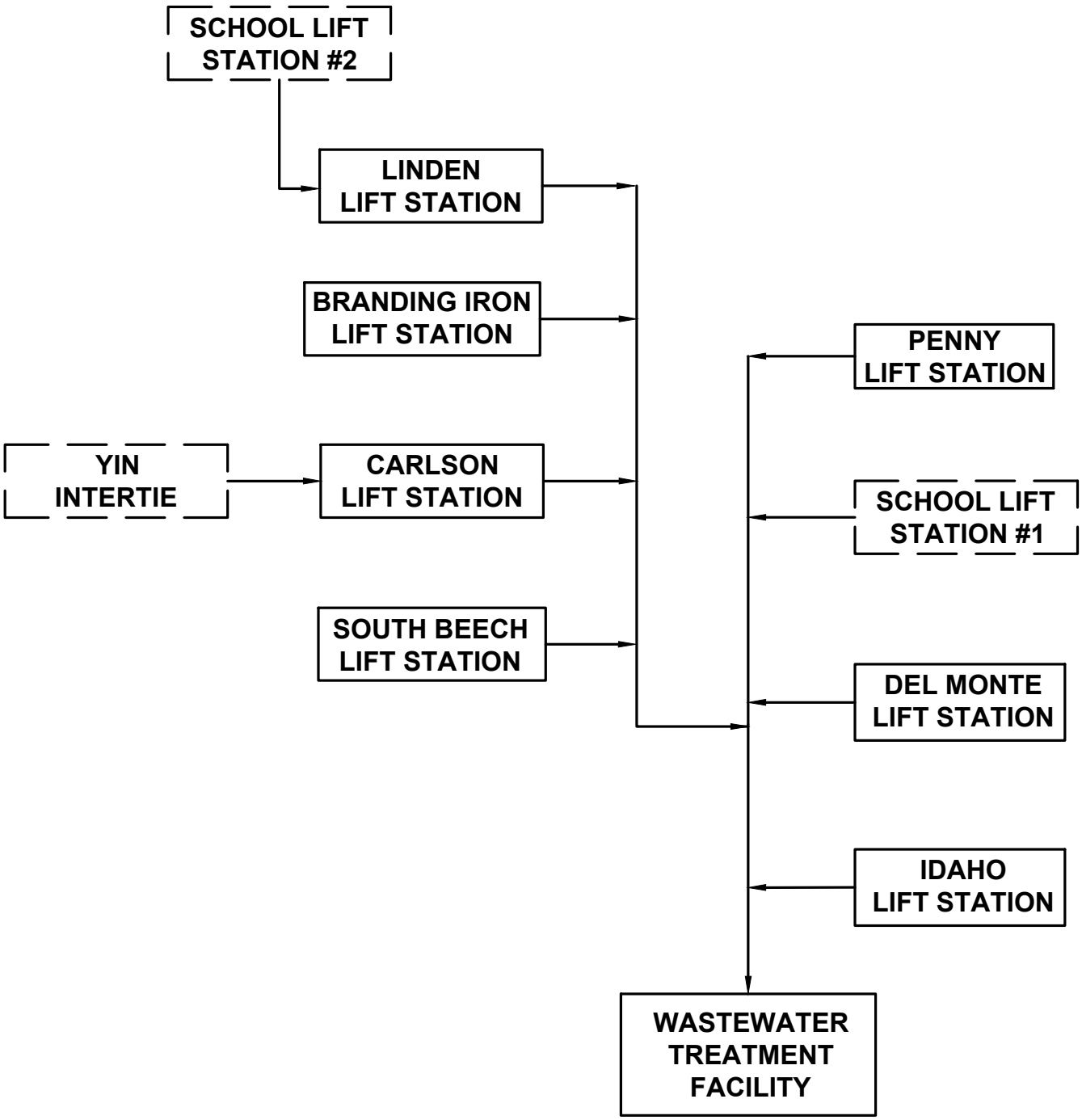
Basic information about the pumps and force mains is shown in Table 4-1. All of Toppenish's lift stations are duplex stations, except Penny and Branding Iron, which each have a single pump. All of the City's lift stations have submersible centrifugal pumps (Flygt), except for the South Beech Lift Station, which has dry pit centrifugal pumps (Gorman-Rupp).

TABLE 4-1

Sewer Lift Stations and Force Mains

Pump Station	Location	Basin	Qty. of Pumps	Force Main Size (in)	Pump Mfr.	Pump Motor Size (hp)	Pump Capacity Each (gpm)	TDH (ft)
South Beech	South Beech Street and West 6th Avenue	4	1 1	6	Gorman-Rupp Gorman-Rupp	(1)	223 130	40 18
Branding Iron	61311 US-97	12	1	6	Flygt	7.5	220	33.5
Carlson	Carlson Avenue, just north of West 3rd Avenue	13	2	8	Flygt	7.5	400	34
Linden	Linden Street, just south of Jackson Street	15	2	4	Flygt	3	150	19
Penny	Penny Lane and Hammond Lane	11	1	8	Flygt	5	300	13
Idaho	Idaho Street and Buena Way	16	2		Flygt	5	100	17
Del Monte	South end of Wishoski Way	19	2	6	Flygt	7.5	420	23.5

(1) Unknown motor size.



LEGEND:

CITY OWNED

PRIVATELY OWNED

CITY OF TOPPENISH

GENERAL SEWER PLAN
FIGURE 4-1
LIFT STATION FLOW SCHEMATIC

Gray & Osborne, Inc
CONSULTING ENGINEERS

COLLECTION SYSTEM

Gravity sewer lines in downtown Toppenish were constructed in two major periods of construction; 1) prior to 1920 and 2) prior to 1952. The initial construction provided sewers for the central, northeast, and southwest portions of the City and consisted of vitrified clay pipe with mortar joints. The larger sewer mains were provided with underdrains constructed of open joint clay pipe bedded in gravel below the sanitary sewers to remove groundwater from the area of the sanitary sewers and provide storm drainage. The underdrain and the WWTF effluent discharge into a drainage ditch southeast of the City. There are some areas where the storm drains are connected to the sanitary sewer. In 1952, another major sewer construction project was completed which provided sanitary sewer to areas within the City that were not previously served. This construction consisted of concrete pipe with bituminous calked joints, underlain by open joint concrete underdrains. In 1992, a major rehabilitation was completed to eliminate combined underdrain and sanitary sewer manholes, and the potential groundwater and freshwater contamination which could occur during a sanitary sewer overflow.

In 2002 the Phase I Sewer System replacement project was completed. This project consisted of 9,840 feet of sewer mains. These replacements were located throughout the City and were considered some of the oldest and most deteriorated pipes in the system. In 2003 the Phase II Sewer System replacement project was completed. This project consisted of 29,685 feet of sewer mains. The majority of this project was completed using trenchless technologies.

Figure 3-1 shows the existing sewer system, including lift stations and force mains. Wastewater is discharged to the City's wastewater treatment facility (WWTF). The sewer system service area is generally flat and gradually slopes toward the southeast, where the treatment facility is located. Most of the collection system consists of gravity sewers, which drain to pump stations, and force mains. The current system consists of 6-inch to 30-inch-diameter pipe, the majority of which is 8-inch.

A summary of the various pipe diameters within the City's gravity sewer system are provided in Table 4-2. This summary is an estimate based on review of as-built drawings, previous survey, and information provided by the City.

TABLE 4-2

Sewer Pipe Summary

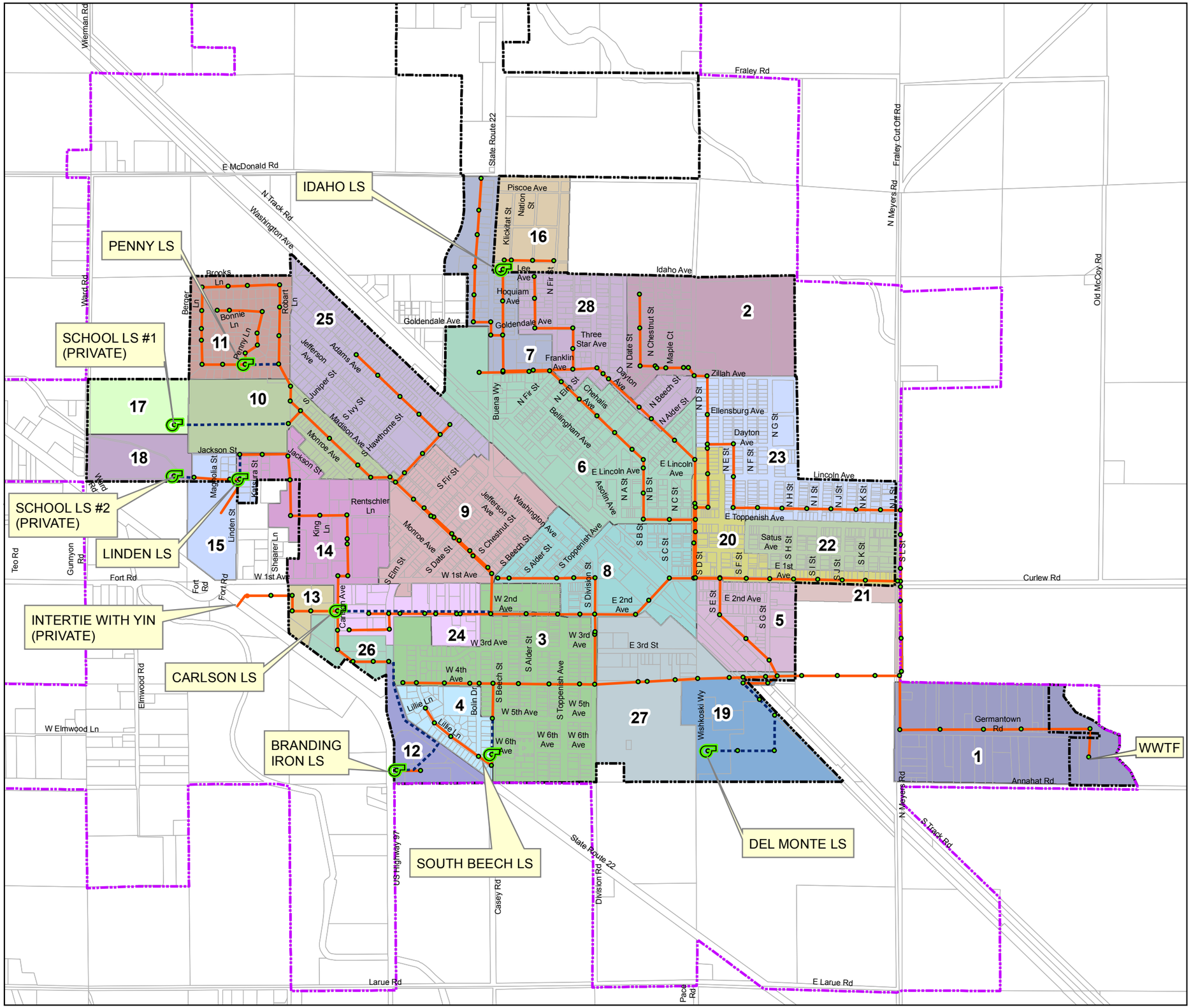
Pipe Diameter and Type	Length (feet)
4-Inch Force Main	325
6-Inch Force Main	5,886
8-Inch Force Main	2,448
Unknown Diameter Force Main	304
6-Inch Gravity	487
8-Inch Gravity	98,329
10-Inch Gravity	20,079
12-Inch Gravity	12,230
15-Inch Gravity	3,391
18-Inch Gravity	1,367
21-Inch Gravity	1,500
27-Inch Gravity	1,591
30-Inch Gravity	5,022
Unknown Diameter Gravity	12,071
Total	**162,431**

The Toppenish sanitary sewer system contains a total of approximately 423 manholes. These manholes vary in construction material from all-brick to the newer precast concrete manholes. The older, all-brick and concrete block manholes present a greater opportunity for infiltration to occur, due to the mortar joints between the bricks or concrete blocks, than newer precast concrete manholes.

COLLECTION AREAS

For the purposes of this Plan, the existing developed Toppenish collection system area is divided into a total of 28 collection areas, or drainage basins. These collection areas predominantly follow the natural drainage patterns of the service area and some drain to a pump station. The 28 existing basins are shown on Figure 4-2. The basin boundaries reflect developments and flow routing.

The following section describes the boundaries and land use designations of each basin.



N

0 1,700 3,400 Feet

LEGEND:

- CITY LIMITS
- UGA
- LIFT STATION
- MANHOLES
- FORCE MAIN
- GRAVITY MAIN
- WATER
- PARCELS

CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 4-2

EXISTING SEWER COLLECTION BASINS

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\FIGURE 4-2 Sewer Basins Existing.mxd

Basin 1

Basin 1 consists of an area of about 81 acres east of the City near the WWTF. Basin 1 includes areas designated as public and residential land uses. Wastewater from this area flows by gravity to the WWTF. Basins 3 and 21 drain directly into Basin 1.

Basin 2

Basin 2 is located in the northeast corner of the City limits and consists of about 68 acres. Basin 2 is primarily designated for residential land use. Wastewater from this basin flows into Basin 23.

Basin 3

Basin 3 consists of an area of about 100 acres and encompasses most of downtown Toppenish. Basin 3 is a mixture of residential and business zones with some industrial and public lands as well. Wastewater from this basin flows by gravity into Basin 1. Basins 4, 5, and 19 drain through Basin 3.

Basin 4

Basin 4 is located in the southwest corner of Basin 3 and consists of an area of about 21 acres. Basin 4 includes areas primarily designated for residential with one large parcel in the northeast corner designated as public land for the Toppenish Community Hospital and some small areas of commercial use. Wastewater from this area flows by gravity to the southeast into the South Beech Lift Station, which conveys the wastewater to Basin 3 through approximately 470 feet of force main.

Basin 5

Basin 5 consists of an area of about 33 acres northeast of Basin 3. Basin 5 includes areas designated for residential, commercial, and industrial land use. Wastewater from this area flows into Basin 3. Flows from Basins 7 and 8 drain into Basin 5.

Basin 6

Basin 6 consists of an area of about 110 acres in the center of the City north of the railroad tracks. Basin 6 has varied zoning; it includes areas designated for residential, industrial, commercial, and public use, as well as small areas designated as recreational/open space and tribal land. Wastewater from this area flows by gravity to Basin 20.

Basin 7

Basin 7 consists of an area of about 85 acres and is located north of Basin 6. Basin 7 includes areas primarily designated for residential use with some public and industrial lands. Wastewater from this area flows through Basin 20 into Basin 5. Basin 16 drains into Basin 7.

Basin 8

Basin 8 consists of an area of about 62 acres in central Toppenish. Basin 8 is primarily designated for industrial use, but also includes some commercial, residential, public, open space, and tribal areas. Wastewater from this area flows by gravity into Basin 5. Basins 9, 10, 13, and 24 drain into Basin 8.

Basin 9

Basin 9 consists of an area of about 68 acres in central Toppenish, south of the railroad tracks. Basin 9 is a mixture of residential, industrial, and commercial use, with some small areas of recreational/open space and tribal land. Wastewater from this area flows into Basin 8. A transmission main from Basin 10 flows through Basin 9, but does not discharge into any Basin 8 sewer mains.

Basin 10

Basin 10 consists of an area of about 121 acres in northwest Toppenish. Basin 10 is primarily designated as residential, with some small areas of commercial and recreational/open space. Wastewater from this area flows through Basin 9 into Basin 8. Basins 11 and 17 drain into Basin 10.

Basin 11

Basin 11 consists of an area of about 41 acres in the northwest corner of Toppenish. Basin 11 includes areas designated for residential use only. Wastewater from this area flows by gravity to the Penny Lift Station, which conveys the wastewater into Basin10 via 437 feet of force main. No other basins drain into Basin 11.

Basin 12

Basin 12 consists of an area of about 17 acres in the southwest corner of the City. Basin 12 includes commercial and tribal lands. Wastewater from this area flows by gravity to the Branding Iron Lift Station, which conveys the wastewater into Basin 13 via 2,072 feet of force main. No other basins drain into Basin 12.

Basin 13

Basin 13 consists of an area of about 20 acres northwest of Basin 12. Basin 13 includes areas designated for commercial and public land use. Wastewater from this area flows into the Carlson Lift Station and is pumped through approximately 2,011 feet of force main through Basin 24 into Basin 8. Basins 12 and 14 drain into Basin 13. The force main from the Yakama Nation facility also flows into Basin 13.

Basin 14

Basin 14 consists of an area of about 53 acres to the north of Basin 13. Basin 14 includes areas primarily designated for commercial use with some areas of residential land. Wastewater from this area flows by gravity to the Carlson Lift Station in Basin 13. Basin 15 drains into Basin 14.

Basin 15

Basin 15 consists of an area of about 25 acres to the west of Basin 14. Basin 15 includes areas primarily designated for residential and tribal use. Wastewater from this area flows by gravity into the Linden Lift Station, which pumps the wastewater into Basin 14 via approximately 325 feet of force main. The privately owned School Lift Station #2 discharges wastewater from Basin 18 into Basin 15.

Basin 16

Basin 16 consists of an area of about 27 acres on the north side of the City. Basin 16 contains the Yakama Nation Housing Authority residential complex. Wastewater from this area flows by gravity to the Idaho Lift Station, which is pumped into Basin 7 via approximately 42 feet of force main. No other basins flow into Basin 16.

Basin 17

Basin 17 consists of an area of about 22 acres on the far west side of the City. Basin 17 is designated as public land, which houses Toppenish High School. Wastewater from this area flows by gravity to the privately owned School Lift Station #1 and is pumped via approximately 1,486 feet of force main. No other basins flow into Basin 17.

Basin 18

Basin 18 consists of an area of about 19 acres on the far west side of the City, directly south of Basin 17. Basin 18 is designated as residential land, and houses the athletic fields for Toppenish High School. Wastewater from this area flows by gravity to the School Lift Station #2 and is pumped via a 261-foot force main into Basin 15. No other basins flow into Basin 18.

Basin 19

Basin 19 consists of an area of about 42 acres east of Basin 3. Basin 19 is designated as industrial/manufacturing and houses Del Monte Foods. Wastewater from this area flows by gravity to the Del Monte Lift Station and is pumped through approximately 1,918 feet of force main into Basin 3. No other basins drain into Basin 19.

Basin 20

Basin 20 consists of an area of about 30 acres to the north of Basin 5. Basin 20 includes areas primarily designated for residential use with some areas of commercial and tribal land. Wastewater from this area flows into Basin 21. Basin 6 drains into Basin 20. A transmission main from Basin 7 flows through Basin 20 but does not connect to any of the main lines in Basin 20.

Basin 21

Basin 21 consists of an area of about 10 acres just to the southeast of Basin 20. Basin 21 is designated as residential land. Wastewater from this basin flows into Basin 1. Basins 20 and 22 drain into Basin 21.

Basin 22

Basin 22 consists of an area of about 29 acres to the north and east of Basin 20. Basin 22 is approximately half residential and half commercial. Wastewater from Basin 22 flows into Basin 21. Basin 23 drains into Basin 22.

Basin 23

Basin 23 consists of an area of about 66 acres to the north of Basin 22. Basin 23 consists entirely of residential land. Wastewater from Basin 23 flows by gravity into Basin 22. Basin 2 flows into Basin 23.

Basin 24

Basin 24 consists of an area of about 28 acres to the northwest of Basin 3. Basin 24 is primarily designated for commercial use with some recreational/open space. Wastewater from this basin flows into Basin 3. The force main from the Carlson Lift Station flows through Basin 24, but no other basins drain into Basin 24.

Basin 25

Basin 25 consists of an area of about 74 acres and encompasses part of the northwest region of Toppenish. Basin 25 is mostly residential with some commercial mixed in. Wastewater from this area flows into Basin 10 followed by Basin 9.

Basin 26

Basin 26 consists of an area of about 12 acres and is part of the southwest region of Toppenish. Basin 26 is mostly commercial with some residential mixed in. Wastewater from this area comes from the Branding Iron LS and flows into the Carlson LS.

Basin 27

Basin 27 consists of an area of about 63 acres and encompasses part of downtown Toppenish. Basin 27 is mostly commercial and has some residential areas. Wastewater from this area comes from Basin 3 and then flows into Basin 1.

Basin 28

Basin 28 consists of an area of about 49 acres and encompasses part of downtown Toppenish. Basin 28 is mostly residential and has some commercial areas mixed in. Wastewater from this area flows into Basin 20.

WASTEWATER TREATMENT FACILITY

HISTORY

The original wastewater treatment facility was first constructed in 1953. Major upgrades took place in 1979, 1995, and 2008. The treatment facilities include grit removal, screening, influent pump station, primary clarifiers, aeration basins, secondary clarifiers, UV channel, and an outfall to the Toppenish Drain. The solids treatment facilities include a primary and secondary anaerobic digester, screw press, rotary drum thickener, and sludge drying beds.

CURRENT OPERATION

The following provides a brief summary of the WWTF and its current operation. Figure 4-3 shows a process flow schematic of the major components of the WWTF. Figure 4-4 shows a site plan of the WWTF.

The City of Toppenish Wastewater Treatment Facility consists primarily of four basic liquid treatment processes. These processes are as follows:

1. **Preliminary Treatment** – This portion of the treatment process consists of influent screening to remove rags, plastics, cans, and fibrous materials from the influent wastewater stream so they do not adversely affect downstream equipment. Once removed from the influent wastewater, the screenings are washed, returning any entrained fecal matter to the influent flow stream, while the screenings are dewatered and compacted prior to being discharged to a dumpster. Following the initial screening, influent is channeled through a grit chamber where grit and other heavy inorganics are removed in a grit removal settling chamber, then wastewater enters the influent pump station.

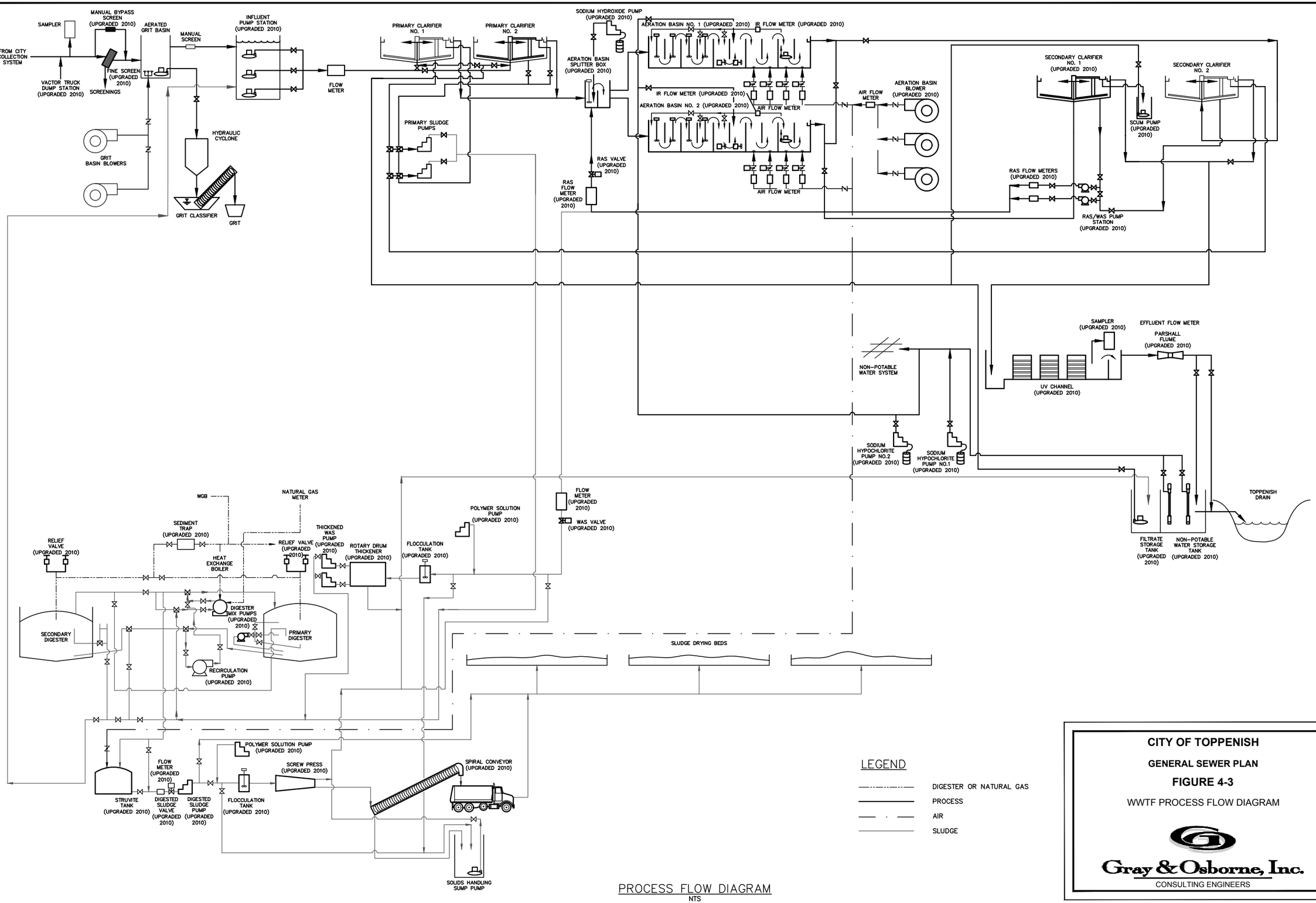
2. **Primary Treatment** – To reduce the organic load on the secondary treatment process, the heavier organic and inorganic solids are removed from the screened influent wastewater through primary sedimentation in the primary clarifiers. Quiescent conditions in the primary clarifiers allow the heavier organic and inorganic (including grit) solids to settle to the bottom of the clarifiers, and subsequently be removed from the liquid treatment process and pumped to the solids treatment system.

3. **Secondary Treatment** – The secondary treatment system is comprised of four main elements: the aeration basins, secondary clarifiers, return activated sludge pumping system, and aeration system. This portion of the treatment system utilizes concentrated populations of microorganisms to biologically oxidize organic matter and remove nitrogen from the influent wastewater.

4. **Effluent Disinfection –** The effluent disinfection system consists of a single open channel, containing three banks of horizontal lamps that emit ultraviolet light at a wavelength of 253.7 nanometers. This ultraviolet disinfection system inactivates pathogenic microorganisms in the secondary effluent by causing a rearrangement of the pathogen's genetic material, thereby inhibiting the pathogen's ability to properly replicate.

The solids treatment process for the Toppenish WWTF is described below.

- **Grit Removal** – Grit removal at this facility is accomplished by using an aerated grit chamber. The grit is then separated from the influent wastewater by pumping through a hydrocyclone. In the hydrocyclone, the heavier grit collects on the sides and bottom of the cyclone due to the induced centrifugal forces, while the liquid is removed from the center through the top of the cyclone. The grit then exits the bottom of the



PROCESS FLOW DIAGRAM
NTS

CITY OF TOPPENISH

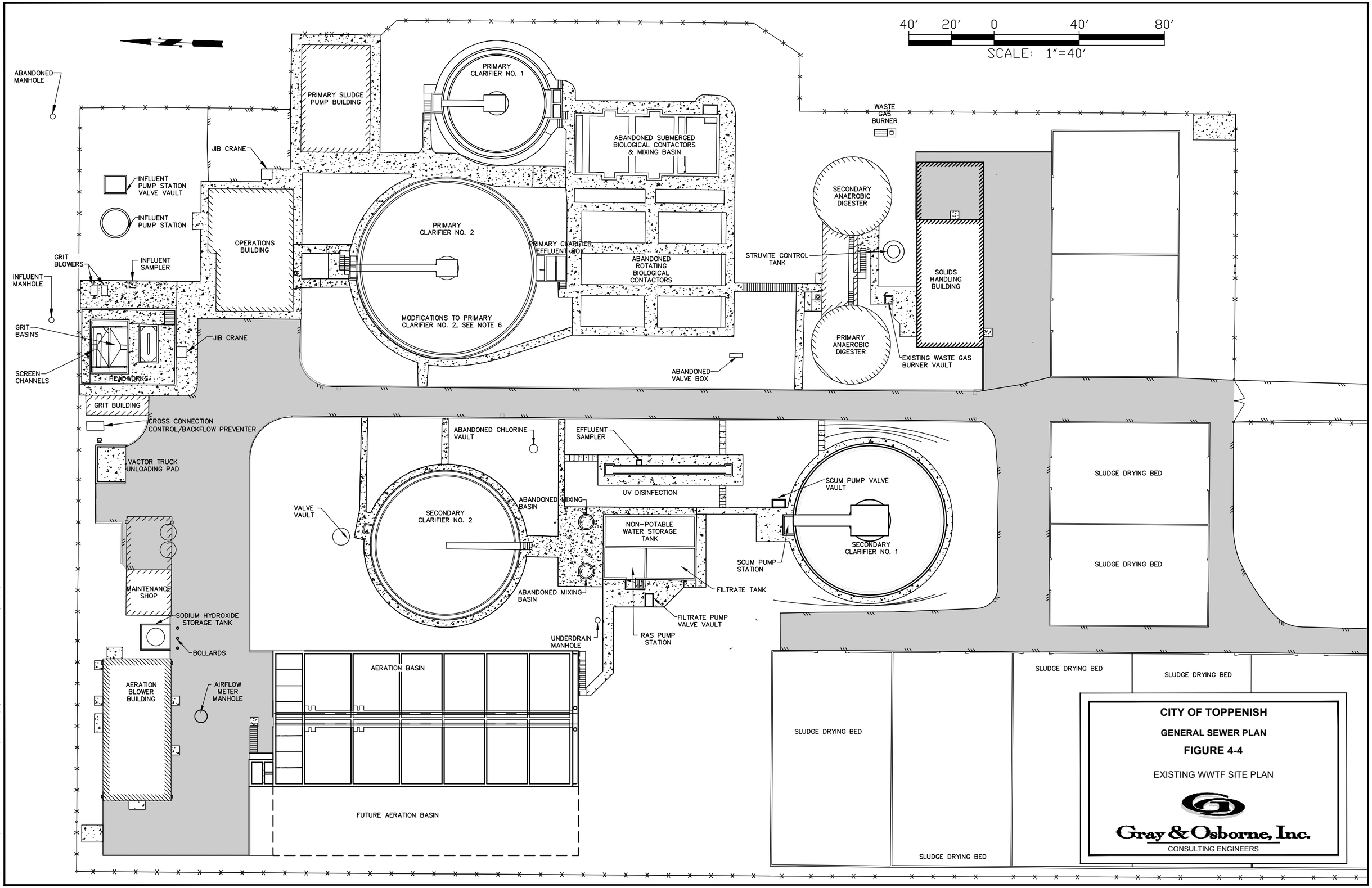
GENERAL SEWER PLAN

FIGURE 4-3

WWTF PROCESS FLOW DIAGRAM

Gray & Osborne, Inc.
CONSULTING ENGINEERS

M:\TOPPENISH\15039 General Sewer Plan\FIGURES\Figure 4-3 Process Flow Schematic.dwg, 9/6/2017 10:46 AM, MICHAEL WOODKEY



M:\TOPPENISH\15039 General Sewer Plan\FIGURES\Figure 4-4 WWTF Site Plan.dwg, 3/7/2017 3:12 PM, ABBEY MCDONALD

hydrocyclone and drops into a classifier with a small amount of carrier water. The grit classifier consists of a tank with an inclined trough and auger on one side. The grit settles in the tank of the classifier and is conveyed up the inclined trough by rake, which allows excess water to drain prior to discharging the grit to a dumpster for disposal at a municipal solid waste landfill.

- **Scum Removal** – Scum is removed from the liquid flow stream at both the primary and secondary clarifiers. Skimmer arms extending from the clarifier feed wells to the clarifier perimeter rotate slowly with the clarifier mechanism both collecting floating material and transporting it to the perimeter of the tank. With each rotation of the skimmer arm a portion of the collected scum is removed from the clarifiers as the skimmer blade passes over the scum beach and hopper. The scum along with some carrier water collects in the adjacent scum box and is periodically pumped to the digesters for treatment and disposal.

- **Sludge Thickening** – In order to reduce the required digester volume and improve digester performance, waste activated sludge is thickened prior to being pumped to the anaerobic digesters for treatment. The waste sludge is mixed with a polymer and conveyed to a rotary drum thickener. The liquid removed from the sludge during the thickening processes is returned to the plant via the filtrate tank. Primary sludge is pumped directly to the anaerobic digesters from the primary clarifier.

- **Anaerobic Digestion** – Waste solids are digested anaerobically in a two-stage process consisting of a heated, continuously mixed, and fed primary stage followed by an unheated and unmixed secondary stage. The majority of the volatile solids destruction and sludge stabilization will occur in the primary anaerobic digester, with the secondary anaerobic digester serving primarily as a sludge storage tank. The anaerobic digesters are designed to produce biosolids meeting the minimum stabilization criteria for pathogen reduction and vector attraction reduction to allow land application for beneficial use (Class B biosolids).

- **Sludge Dewatering** –The digested sludge is mixed with polymer and conveyed to the screw press where the liquid is separated from the solids; the liquid returns to the plant via the filtrate tank. The digested solids are dewatered so that the City does not have to rely on the limited drying bed space to reduce the digested sludge volumes and disposal fees for the City.

Table 4-3 summarizes the capacity of the WWTF.

TABLE 4-3

Design Data for Toppenish Wastewater Treatment Facility

Facility	Capacity
Average Annual Flow (AAF)	1.23 mgd
Maximum Monthly Flow (MMF)	1.67 mgd
Maximum Day Flow (MDF)	2.16 mgd
Peak Hour Flow (PHF)	3.70 mgd
Max Month BOD Loading	2,581 lbs/day
Max Month TSS Loading	2,634 lbs/day
Max Month TKN Loading	516 lbs/day

NPDES PERMIT

NPDES effluent limits for the Toppenish WWTF are presented in Table 4-4. The NPDES permit was issued on July 1, 2013, and expires on June 1, 2018.

TABLE 4-4

NPDES Permit Effluent Limits for Toppenish WWTF
Permit WA0026123

Parameter	Average Monthly Limit	Average Weekly Limit	Daily Maximum Limit
Flow	Report	-	Report
BOD_5	30 mg/L, 418 lb/d 85% removal	45 mg/L, 627 lb/d	N/A
TSS	30 mg/L, 418 lb/d 85% removal	45 mg/L, 627 lb/d	N/A
Fecal Coliform(1)	100/100 ml	N/A	200/100 ml
Total Ammonia as N(1) (October – April)	1.35 mg/L, 21.5 lb/d	N/A	6.22 mg/L, 86.6 lb/d
Total Ammonia as N(1) (May – September)	1.35 mg/L, 21.5 lb/d	N/A	5.23 mg/L, 72.8 lb/d
pH (October – April)	Not less than 6.5 standard units, nor greater than 8.8 standard units		
pH (May – September)	Not less than 6.5 standard units, nor greater than 9.0 standard units		
Nitrate + Nitrite as N	10.5 mg/L, 146 lb/d	17.3 mg/L, 241 lb/d	N/A
Total Phosphorus(2) (March – October)	48 lb/d	82 lb/d	N/A
Total Phosphorus(2) (November – February)	Report	N/A	Report
Copper(1) (October – April)	9.40 µg/L, 0.13 lb/d	N/A	15.8 µg /L, 0.22 lb/d
Copper(1) (May – September)	9.71 µg /L, 0.14 lb/d	N/A	16.3 µg /L, 0.23 lb/d
Lead(1)(2) (May – September)	3.81 µg /L, 0.0531 lb/d	N/A	10.3 µg /L, 0.143 lb/d
Lead(1)(2) (October – April)	2.28 µg /L, 0.0317 lb/d	N/A	6.18 µg /L, 0.0861 lb/d
Selenium(1) (May – September)	7.08 µg /L, 0.0986 lb/d	N/A	19.2 µg /L, 0.267 lb/d
Selenium(1) (October – April)	4.24 µg /L, 0.0591 lb/d	N/A	11.5 µg /L, 0.160 lb/d
Zinc(1) (October – April)	50.49 µg /L, 0.803 lb/d	N/A	106 µg /L, 1.48 lb/d
Zinc(1) (May – September)	57.4 µg /L, 0.803 lb/d	N/A	112 µg /L, 1.56 lb/d

(1) Reporting required within 24 hours of a maximum daily limit violation. See Parts I.B.2 and III.G. of the NPDES permit.

(2) Effluent limits for total phosphorus and the October-April limits for lead are subject to a compliance schedule. See II.D. of NPDES permit.

CHAPTER 5

EXISTING AND PROJECTED WASTEWATER FLOWS AND CHARACTERISTICS

CHAPTER 5

EXISTING AND PROJECTED WASTEWATER FLOWS AND CHARACTERISTICS

INTRODUCTION

Appropriate design of wastewater treatment and conveyance facilities requires the determination of the current and future quantity and quality of wastewater generated from each of the contributing sources. Typically, wastewater is predominantly domestic in origin with lesser amounts contributed by commercial businesses and by public use facilities such as schools, parks, hospitals, and municipal functions. Additionally, infiltration and inflow (I/I) contributions result from groundwater and surface water entering the sewer system during periods of high groundwater levels and rainfall, respectively, as occurs in many other communities in Washington.

DEFINITIONS OF TERMS

The terms and abbreviations used in the analysis are described below, listed in alphabetical order.

AVERAGE ANNUAL FLOW

Average annual flow is the average daily flow over a calendar year. This flow parameter is used to estimate annual operation and maintenance costs for treatment and lift station facilities.

BASE FLOW

Base flow is wastewater flow during periods when the groundwater table is low and there is no precipitation. This is the sanitary sewer flow without any inflow or infiltration (defined below). Base flow is determined from the average influent flow during the months with the lowest influent flows.

BIOCHEMICAL OXYGEN DEMAND (BOD_5)

Biochemical oxygen demand (BOD) is a measure of the oxygen required by microorganisms in the biochemical oxidation (digestion) of organic matter. BOD is an indicator of the organic strength of the wastewater. If significant quantities are discharged untreated to the environment, biodegradable organics will deplete natural oxygen resources and result in the development of septic (anaerobic) conditions. BOD data together with other parameters are used in the sizing of the treatment facilities and provide a measurement for determining the effectiveness of the treatment process. BOD

is expressed as a concentration in terms of milligrams per liter (mg/L) and as a load in terms of pounds per day (lb/d). The term BOD typically refers to a 5-day BOD, often written BOD_5, since the BOD test protocol requires 5 days for completion. BOD_5 of a wastewater is composed of two components – a carbonaceous oxygen demand ($CBOD_5$) and a nitrogenous oxygen demand ($NBOD_5$). The use of $CBOD_5$ as a parameter for evaluating wastewater strength removes the influence of nitrogenous components, including ammonia and organic nitrogen.

CONTAMINANTS OF CONCERN

Contaminants of concern in wastewater, in addition to chlorine, BOD, and TSS (discussed elsewhere in this section), include nutrients, priority pollutants, heavy metals, and dissolved organics.

Nutrients, such as nitrogen and phosphorus (along with carbon), are essential requirements for growth. When discharged to the aquatic environment, these nutrients can lead to the growth of undesirable aquatic life. When discharged in excessive amounts on land, they can also lead to the pollution of groundwater. Additionally, in too high a concentration, nutrients, particularly ammonia, can be toxic to aquatic life.

Priority pollutants are organic and inorganic compounds selected on the basis of their known or suspected carcinogenicity, mutagenicity, teratogenicity, or high acute toxicity. Many of these compounds are found in wastewater. Inorganic constituents, including heavy metals, are often present in wastewater due to commercial and industrial activities and may have to be removed if the presence of the metals will adversely affect the receiving water, or if the wastewater is to be reused. Some heavy metals (most notably copper) can be present in wastewater due to leaching from drinking water pipes.

DOMESTIC WASTEWATER

Domestic wastewater is wastewater generated from single- and multi-family residences, permanent mobile home courts, and group housing facilities such as nursing homes. Domestic wastewater flow is generally expressed as a unit flow based on the average contribution from each person per day. The unit quantity is expressed in terms of gallons per capita per day (gpcd).

EQUIVALENT RESIDENTIAL UNIT (ERU)

An equivalent residential unit (ERU) is a baseline wastewater generator that represents the average single-family residential household. An ERU can also express the average annual flow contributed by a single-family household, in units of gallons per day, or an annual average loading (of 5-day biochemical oxygen demand or total suspended solids) contributed by a single-family household, in units of pounds per day. Since customer class data was not available from the City, flows and loadings for this Plan are projected based on population as opposed to ERUs.

INFILTRATION

Infiltration is groundwater entering a sewer system by means of defective pipes, pipe joints, or manhole walls. Infiltration quantities exhibit seasonal variation in response to groundwater levels. Storm events or irrigation trigger a rise in the groundwater levels and increase infiltration. The greatest infiltration is typically observed following significant storm events or prolonged periods of precipitation. However, in Toppenish high groundwater is typically associated with irrigation in the summer months. Since infiltration is related to the total amount of piping and appurtenances in the ground and not to any specific water use component, it is often expressed in terms of the total land area being served. The unit quantity generally used is gallons per acre per day (gpad) or gallons per capita per day (gcpd).

INFLOW

Inflow is surface water entering the sewer system from yard, roof and footing drains, from cross connections with storm drains, and through holes in manhole covers. Peak inflow occurs during heavy storm events when storm sewer systems are taxed beyond their capacity, resulting in hydraulic backups and local ponding. Inflow, like infiltration, can be expressed in terms of gallons per capita day or gallons per acre per day.

WWTF flow records are utilized to characterize combined infiltration and inflow (I/I) in the Toppenish system in terms of peak hour, maximum day, maximum month, and average annual I/I.

MAXIMUM DAY FLOW

Maximum day flow is the highest daily flow during a calendar year. Maximum day flow is typically determined from treatment facility flow records and projected future flows.

MAXIMUM MONTH FLOW (TREATMENT DESIGN FLOW)

Maximum month flow is the highest monthly flow during a calendar year. The maximum month flow in Toppenish normally occurs in the summer due to the presence of I/I. This summer flow is composed of the normal domestic, commercial, and public use flows with significant contributions from inflow and infiltration. The predicted maximum month flow at the end of the design period is used as the design flow for sizing treatment processes and selecting treatment equipment.

NON-RESIDENTIAL WASTEWATER

Non-residential wastewater is wastewater generated from commercial activities, such as restaurants, retail and wholesale stores, service stations, and office buildings, and industrial flow (process wastewater, rinse water, and other industrial activities).

Non-residential wastewater quantities for commercial and industrial wastewater are expressed in this Plan in terms of use per capita.

PEAK HOUR FLOW

Peak hour flow is the highest hourly flow during a calendar year. Peak hour flows are used in sizing the hydraulic capacity of wastewater collection, treatment, and pumping components. Peak hour flow is typically determined from treatment facility flow records and projected future flows.

SUSPENDED SOLIDS

Suspended solids is the solid matter carried in the waste stream. The total suspended solids (TSS) in a wastewater sample are determined by filtering a known volume of the sample, drying the filter paper, and measuring the increase in weight of the filter paper. TSS is expressed in the same terms as BOD: milligrams per liter for concentration and pounds per day for mass load. The amount of TSS in the wastewater is used in the sizing of treatment facilities and provides another measure of the treatment effectiveness. The concentration of TSS in wastewater affects the treatment facility biosolids production rate, treatment and storage requirements, and ultimate disposal requirements.

WASTEWATER

Wastewater is water-carried waste from residential, commercial, industrial, and public use facilities, together with quantities of groundwater and surface water that enter the sewer system through defective piping and direct surface water inlets. The total wastewater flow is quantitatively expressed in millions of gallons per day (mgd).

EXISTING WASTEWATER FLOWS AND LOADING

WWTF records for the 4-year period from 2011 through 2015 were reviewed and analyzed to determine current wastewater characteristics and influent loadings. Current wastewater flows and loadings were then used in conjunction with projected population data to determine projected future wastewater flows and loadings.

WASTEWATER FLOWS AT CITY OF TOPPENISH WWTF

Table 5-1 summarizes reported WWTF influent flows for the 4-year period, from 2011 to 2015, in millions of gallons per day (mgd). The monthly average influent WWTF flows ranged from 0.79 mgd to 2.32 mgd.

Base flow (sanitary flow without infiltration and inflow) is estimated to be the minimum monthly average for each year. The 2011 to 2015 average base flow is 0.83 mgd.

The WWTF monitors influent (the flow entering the WWTF) and effluent flow (the flow upstream of the outfall).

TABLE 5-1

Historical WWTF Influent Flows (2011 to 2015)

Flow Type (mgd)	2011	2012	2013	2014	2015	Average
Base Sanitary Flow(1)	0.86	0.83	0.79	0.81	0.87	0.83
Annual Average Flow	1.17	1.25	1.17	1.32	1.13	1.21
Maximum Monthly Flow	1.80	1.96	1.95	2.32	1.46	1.90
Minimum Day Flow	0.82	0.72	0.76	0.75	0.81	0.77
Maximum Day Flow	2.22	2.31	2.25	2.76	1.77	2.26
Peak Hour Flow	(2)	(2)	2.98(3)	3.02(3)	2.59(3)	2.87(4)

(1) Equal to the sanitary flow without inflow and infiltration, estimated using minimum monthly average influent flow.
(2) Peak hour flow data for 2011 and 2012 was not available.
(3) Peak hour flow for 2013 through 2015 was estimated from historical influent flow charts from the WWTF.
(4) Average of 2013-2015 observed values.

In Table 5-1, peak hour flow was estimated from historical influent flow charts from the WWTF. Historic peak hourly flow data was not available for 2011 or 2012.

Monthly Discharge Monitoring Report (DMR) data for this period are provided in Appendix E and summarized in Table 5-2. Graphical representations of WWTF influent flows, influent BOD_5 loadings, and influent TSS loadings for the period from January 2011 through December 2015 are shown in Figures 5-1, 5-2, and 5-3, respectively.

TABLE 5-2

Summary of WWTF Discharge Monitoring Reports (DMRs)

Date	Precip-itation	Influent								Effluent						
					Max Concentration							Max Concentration			Total Coliform	
	Total (in)	ADF (mgd)	MDF (mgd)	Avg. pH	BOD_5 (mg/L)	TSS (mg/L)	TKN (mg/L)	Avg. Dissolved Oxygen (mg/L)	Max Settable Solids (mg/L)	Avg. pH	Avg. Dissolved Oxygen (mg/L)	BOD_5 (mg/L)	TSS (mg/L)	NH3 Max (mg/L)	Daily Fecal Max	Monthly Max of Daily Averages
Jan-11	0.61	0.932	1.022	6.8	222.5	265.7	-	2.07	9	7.3	8.7	3.63	9.5	0.12	10.0	5.6
Feb-11	0.29	0.886	0.916	7.2	230.0	187.1	-	1.79	12	7.1	8.8	7.75	15.0	0.08	90.0	71.1
Mar-11	1.11	0.859	0.891	7.2	237.5	236.6	-	1.96	18	7.0	8.1	15.25	35.0	0.27	30.0	17.8
Apr-11	0.32	0.899	1.011	7.3	242.5	236.5	-	1.79	12	7.0	8.2	15.25	35.0	0.53	33.3	31.1
May-11	2.55	1.108	1.449	7.2	302.5	334.3	-	1.69	10	7.1	8.2	2.88	10.0	0.21	10.0	6.7
Jun-11	0.21	1.309	1.463	7.1	186.3	270.4	-	2.22	8	7.1	7.8	5.19	2.5	0.12	0.0	0.0
Jul-11	0.46	1.474	1.719	6.8	237.5	243.7	-	2.33	10	7.2	7.3	5.13	4.5	0.22	0.0	0.0
Aug-11	0.00	1.803	2.219	6.7	162.3	223.8	-	2.35	6	7.1	7.1	2.99	5.5	0.19	6.7	3.3
Sep-11	0.07	1.539	1.717	6.8	208.8	236.2	-	1.77	12	7.2	7.3	3.99	9.5	0.14	4.0	1.3
Oct-11	0.90	1.324	1.525	6.8	220.3	259.8	-	1.59	9	7.2	7.5	6.60	30.0	0.15	12.0	6.7
Nov-11	0.45	1.039	1.122	6.7	255.3	285.3	-	1.61	10	7.2	8.4	5.90	5.5	0.19	3.3	2.2
Dec-11	0.34	0.919	0.947	6.8	266.0	306.0	-	1.95	12	7.2	8.7	4.23	6.5	0.14	0.0	0.0
Average	**0.61**	**1.174**		**7.0**				**1.9**		**7.1**	**8.0**					
Max		**1.803**	**2.219**		**302.5**	**334.3**	**-**		**18**			**15.25**	**35.0**	**0.53**	**90.0**	**71.1**
Jan-12	1.36	0.890	1.174	6.7	260.5	256.8	-	2.20	10	7.2	8.8	3.01	4.0	0.21	0.0	0.0
Feb-12	0.78	0.847	0.875	6.8	400.8	235.1	-	2.00	18	7.1	8.7	6.96	13.0	0.31	2.0	1.3
Mar-12	1.44	0.833	0.895	6.8	245.3	308.1	-	1.78	18	7.1	8.5	5.58	9.0	0.29	13.3	6.7
Apr-12	0.80	0.851	1.045	6.8	349.0	314.5	-	1.86	14	7.2	8.4	1.35	3.5	0.16	3.3	1.1
May-12	0.16	1.203	1.291	6.7	198.5	233.1	-	1.78	20	7.2	8.2	3.66	14.5	0.19	0.0	0.0
Jun-12	0.85	1.519	1.748	6.5	154.0	187.1	-	2.38	9	7.1	7.7	2.92	3.5	0.20	3.3	1.1
Jul-12	0.04	1.709	1.830	6.4	199.8	146.9	-	2.54	7	7.2	7.3	2.85	2.5	0.58	3.3	1.1
Aug-12	0.00	1.963	2.309	6.4	190.3	216.8	-	2.29	5	7.1	7.1	1.82	4.0	0.61	3.3	1.1
Sep-12	0.04	1.826	2.068	6.4	176.0	276.9	-	1.97	10	7.1	7.2	1.98	3.5	0.29	3.3	1.1
Oct-12	0.78	1.379	1.653	6.9	164.5	242.1	-	1.79	11	7.2	7.7	2.40	3.5	0.15	3.3	1.1
Nov-12	0.66	1.018	1.146	7.1	217.3	174.6	-	1.79	16	7.0	8.2	2.04	8.0	0.05	3.3	1.1

TABLE 5-2 – (continued)

Summary of WWTF Discharge Monitoring Reports (DMRs)

Date	Precip-itation	Influent								Effluent						
					Max Concentration							Max Concentration		NH3	Total Coliform	
	Total (in)	ADF (mgd)	MDF (mgd)	Avg. pH	BOD_5 (mg/L)	TSS (mg/L)	TKN (mg/L)	Avg. Dissolved Oxygen (mg/L)	Max Settable Solids (mg/L)	Avg. pH	Avg. Dissolved Oxygen (mg/L)	BOD_5 (mg/L)	TSS (mg/L)	Max (mg/L)	Daily Fecal Max	Monthly Max of Daily Averages
Dec-12	2.04	0.920	1.063	7.1	279.5	281.9	-	2.13	10	7.0	8.6	0.93	3.0	0.06	6.7	2.2
Average	**0.75**	**1.246**		**6.7**				**2.04**		**7.1**	**8.1**					
Max		**1.936**	**2.309**		**400.8**	**314.5**	-		**20**			**6.96**	**14.5**	**0.61**	**13.3**	**6.7**
Jan-13	0.10	0.871	0.931	7.2	326.3	351.3	-	2.28	14	7.1	9.0	3.25	5.0	0.05	13.3	5.6
Feb-13	0.03	0.827	0.893	7.2	248.0	230.2	-	2.10	16	7.0	8.8	1.65	3.5	0.08	0.0	0.0
Mar-13	0.77	0.788	0.830	7.3	322.3	244.3	-	1.75	12	7.0	8.7	2.55	7.5	0.05	13.3	6.7
Apr-13	0.40	0.820	0.895	7.3	232.8	195.8	-	1.42	15	7.0	8.4	8.71	15.0	0.06	6.7	2.2
May-13	2.48	1.004	1.501	7.2	333.8	211.2	-	1.93	13	6.9	8.2	1.68	10.0	0.14	0.0	0.0
Jun-13	0.39	1.349	1.850	7.0	181.0	156.0	-	1.88	14	6.9	7.4	3.63	11.5	0.07	23.3	13.3
Jul-13	0.00	1.677	1.890	7.1	117.3	155.4	-	2.59	4	7.0	7.0	2.76	6.5	0.07	6.7	2.2
Aug-13	0.19	1.949	2.250	6.9	117.0	101.6	-	-	-	6.9	7.6	1.33	4.0	0.05	16.7	5.6
Sep-13	0.30	1.540	1.800	7.0	114.0	112.5	-	1.48	-	6.8	7.1	2.23	2.5	0.04	3.3	1.1
Oct-13	0.13	1.321	1.520	6.9	201.0	210.4	-	1.00	-	6.8	7.6	2.09	3.5	0.04	40.0	30.0
Nov-13	0.38	1.022	1.110	7.1	182.5	123.7	-	1.15	-	6.8	8.2	7.36	4.0	0.03	13.3	6.7
Dec-13	0.32	0.920	0.980	7.1	186.0	149.3	-	1.93	-	6.7	8.6	2.83	6.0	0.05	0.0	0.0
Average	**0.46**	**1.174**		**7.1**				**1.77**		**6.9**	**8.0**					
Max		**1.949**	**2.250**		**333.8**	**351.3**	-		**16**			**8.71**	**15.0**	**0.14**	**40.0**	**30.0**
Jan14	0.30	0.855	0.910	7.3	234.8	206.6	-	1.65	-	6.8	8.9	6.55	6.5	0.22	0.0	0.0
Feb-14	1.43	0.852	0.970	7.1	278.8	195.0	-	2.05	-	6.7	8.8	12.09	5.0	0.17	3.3	1.1
Mar-14	0.60	0.815	0.900	7.2	259.5	195.1	-	1.61	-	6.8	8.7	7.58	3.5	0.13	3.3	2.2
Apr-14	0.46	0.848	1.060	-	281.8	199.3	-	-	-	6.8	-	6.28	5.0	0.24	10.0	4.4
May-14	0.13	1.201	1.300	7.1	227.3	133.8	-	-	-	6.8	8.3	2.53	2.5	0.04	0.0	0.0
Jun-14	0.08	1.583	1.770	7.1	179.5	136.0	-	-	-	7.0	7.9	3.43	3.5	0.10	3.3	2.2
Jul-14	0.06	1.865	2.070	-	131.5	221.1	-	-	-	7.1	7.4	4.15	17.0	0.07	0.0	0.0
Aug-14	0.90	2.316	2.760	-	96.8	53.9	-	-	-	7.1	6.7	1.53	7.5	0.06	6.7	5.6

TABLE 5-2 – (continued)

Summary of WWTF Discharge Monitoring Reports (DMRs)

		Influent								Effluent						
	Precip-itation				Max Concentration							Max Concentration		NH3	Total Coliform	
Date	Total (in)	ADF (mgd)	MDF (mgd)	Avg. pH	BOD_5 (mg/L)	TSS (mg/L)	TKN (mg/L)	Avg. Dissolved Oxygen (mg/L)	Max Settable Solids (mg/L)	Avg. pH	Avg. Dissolved Oxygen (mg/L)	BOD_5 (mg/L)	TSS (mg/L)	Max (mg/L)	Daily Fecal Max	Monthly Max of Daily Averages
Sep-14	0.46	1.974	2.450	-	67.5	72.3	-	-	-	7.1	7.0	0.55	6.5	0.03	3.3	1.1
Oct-14	0.86	1.515	1.850	-	273.3	137.4	-	-	-	7.1	7.3	2.50	10.5	0.06	3.3	1.1
Nov-14	0.32	1.087	1.220	-	173.6	311.4	-	-	-	7.0	7.8	5.23	7.5	0.05	6.7	3.3
Dec-14	0.92	0.959	0.990	-	93.8	142.1	-	-	-	7.0	8.0	2.13	3.5	0.02	10.0	4.4
Average	**0.54**	**1.322**		**7.1**				**14.9**		**6.9**	**7.9**					
Max		**2.316**	**2.760**		**281.8**	**311.4**	**-**		-			**12.09**	**17.0**	**0.24**	**10.0**	**5.6**
Jan-15	0.70	0.883	1.060	-	162.3	93.9	-	8.900	-	7.0	8.9	6.60	9.0	0.11	10.0	7.8
Feb-15	0.99	0.866	0.890	-	178.3	278.6	33.6	-	-	7.0	0.0	6.78	12.5	0.02	13.3	4.4
Mar-15	0.73	0.870	0.900	-	204.0	162.5	-	-	-	7.0	8.3	4.90	12.0	0.02	6.7	3.3
Apr-15	0.00	0.974	1.110	7.1	264.0	223.7	-	-	-	6.9	0.0	3.80	5.5	0.03	6.7	3.3
May-15	1.57	1.172	1.310	-	252.3	329.6	-	-	-	6.9	0.0	8.70	9.5	0.03	13.3	4.4
Jun-15	0.01	1.197	1.310	-	164.5	192.7	-	-	-	7.0	7.4	2.25	6.0	0.03	6.7	4.4
Jul-15	0.06	1.138	1.270	-	170.8	131.3	-	-	-	7.0	7.5	2.53	6.5	0.05	6.7	3.3
Aug-15	0.01	1.190	1.510	-	157.3	227.7	-	-	-	7.0	0.0	2.50	8.0	0.05	13.3	4.4
Sep-15	0.01	1.459	1.770	-	127.0	131.4	-	-	-	6.9	6.7	5.18	16.0	0.07	3.3	1.1
Oct-15	0.54	1.411	1.700	-	169.1	136.4	-	-	-	7.0	0.0	1.43	4.0	0.01	3.3	1.1
Nov-15	0.66	1.220	1.300	-	186.3	122.8	-	-	-	7.0	7.7	2.50	2.0	0.01	20.0	6.7
Dec-15	3.47	1.208	1.450	-	184.1	153.6	-	-	-	6.9	8.1	2.25	6.5	0.00	3.3	1.1
Average	**0.73**	**1.132**		**7.1**				**8.900**		**7.0**	**4.6**					
Max		**1.459**	**1.770**		**264.0**	**329.6**	**33.6**		**-**			**8.70**	**16.0**	**0.11**	**20.0**	**7.8**

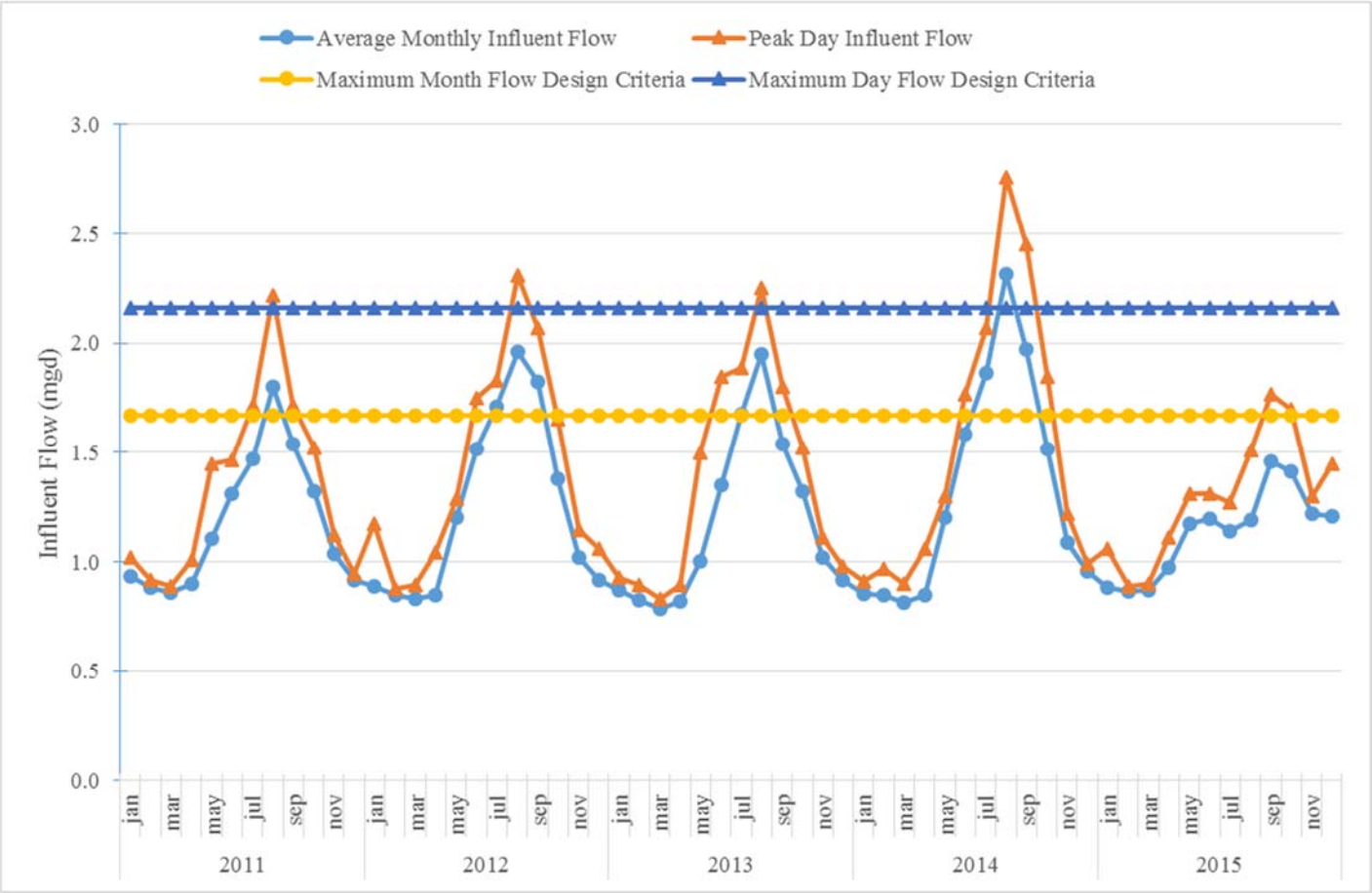


FIGURE 5-1

Historical Influent Flows January 2011 through December 2015

As shown on Figure 5-1, the design maximum month flow of 1.67 mgd has been exceeded nine times in the last 5 years. The highest monthly average influent flow over the period of 2011 to 2015 was 2.32 mgd and it occurred in August 2014. The data also indicate that the maximum day design flow of 2.16 mgd has been exceeded five times over the same period. The maximum day flow over the period between 2011 and 2015 was 2.76 mgd. It should be noted that 2015 was a drought year. Irrigation in the area curtailed thus flows at the WWTF were significantly less in the summer of 2015 than previous years.

HISTORICAL INFLUENT LOADING AT WWTF

The annual average and maximum month BOD_5 and TSS loadings for 2011 through 2015 are listed in Table 5-3.

TABLE 5-3

WWTF Influent Loadings

	Average Influent Flow (mgd)	Average BOD_5 (lb/day)	Max Month BOD_5 (lb/day)	Average TSS (lb/day)	Max Month TSS (lb/day)
2011	1.17	2,208	2,919	2,503	3,364
2012	1.25	2,284	4,216	2,411	4,216
2013	1.17	1,902	2,795	1,700	2,551
2014	1.32	1,905	3,453	1,674	3,440
2015	1.13	1,723	2,466	1,696	3,221
Average	**1.21**	**2,005**	**-**	**1,997**	**-**
Maximum	**-**	**-**	**4,216**	**-**	**4,216**

The average influent flow rate has remained relatively constant since 2011. Annual average BOD_5 and TSS influent loadings have both generally decreased since 2011. TKN data was only available for February 2015.

Appendix F shows the effluent BOD_5 and TSS figures from 2011 to 2015. The effluent TSS and BOD_5 never exceeded the NPDES permit weekly limit of 45 mg/L and were well below the monthly limit of 30 mg/L.

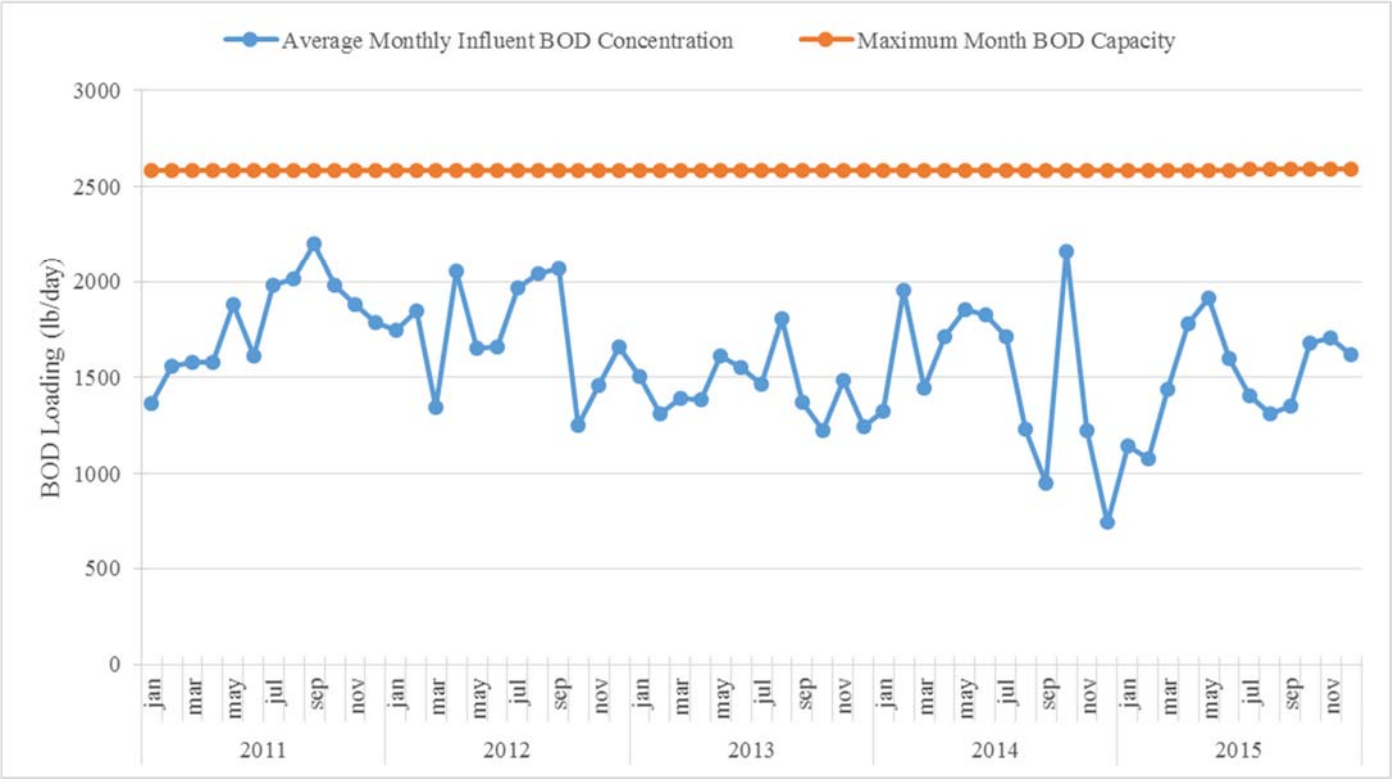


FIGURE 5-2

Influent BOD_5 Loading January 2011 through December 2015

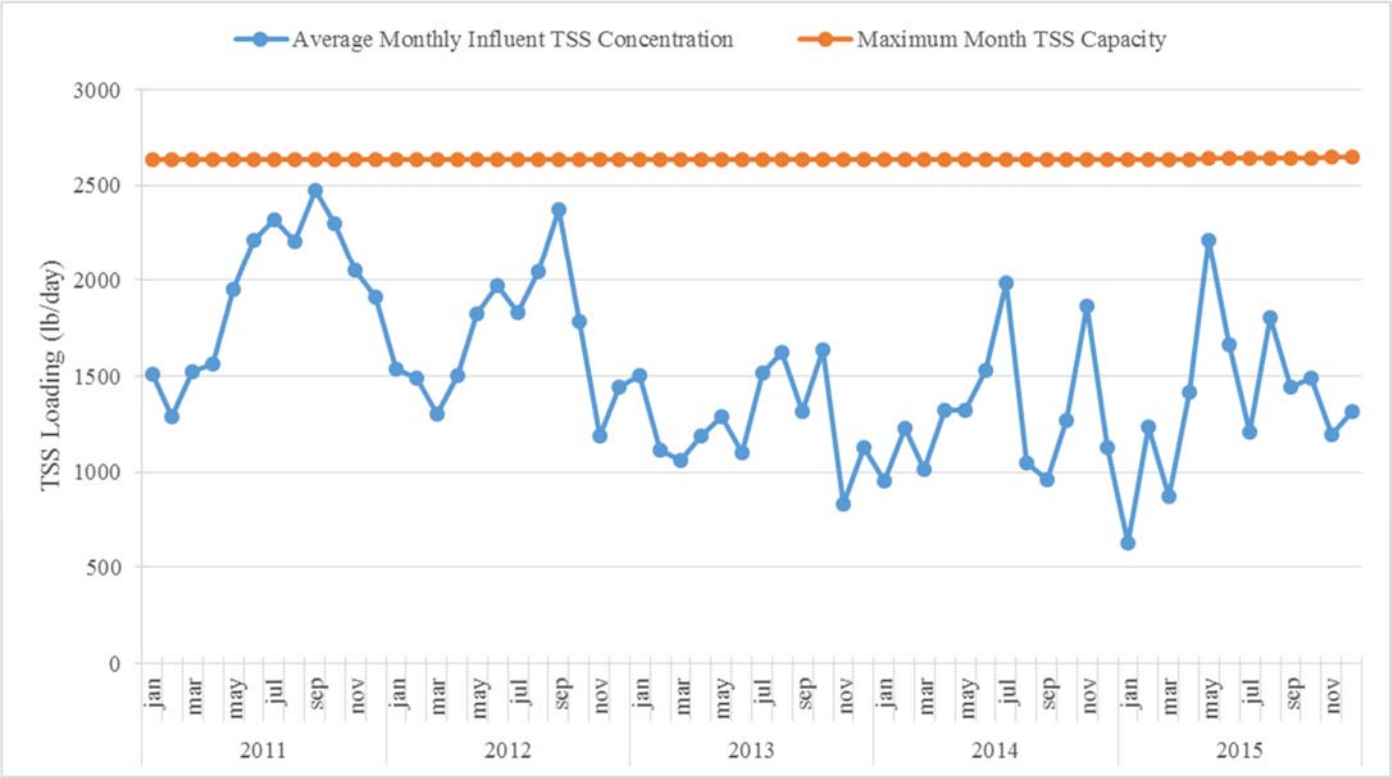


FIGURE 5-3

Influent TSS Loading January 2011 through December 2015

SEWER CONNECTIONS

Table 3-6 provided the average number of sewer service connections in 2015 by customer class. The majority of the sewer service connections are in the single-family residential customer class. The total number of sewer connections for the City in 2015 was 2,315.

WINTER WATER CONSUMPTION

Winter water use is used to estimate wastewater volumes entering the collection system because the amount of winter water consumption is typically equal to wastewater base flow except for a minor amount of water that does not enter the sewer system (such as winter irrigation flows, spills, and evaporation).

Winter water consumption records for the period of 2009 through 2015 were provided by the City. Winter months used to calculate averages are December, January and February. The consumption records do not accurately represent customer classes within the City, so only total consumption is shown. Table 5-4 presents the winter water consumption in million gallons per day (mgd) obtained from the City. A more detailed summary of winter water consumption records is provided in Appendix G.

TABLE 5-4

Winter Water Use by Year

Winter	Average Winter Water Use (mgd)	Average Winter Water Use (gpcd)
2011-2012(1)	0.756	84
2012-2013	0.755	84
2013-2014	0.703	78
2014-2015	0.641	72

(1) February 2012 water consumption was unusually high and was excluded from the winter 2011-2012 average water use.

In Toppenish, the water service area and the sewer service area are very similar in size. For the purposes of this plan, it is assumed that 90 percent of winter water use in the City of Toppenish is discharged into the wastewater system. Table 5-5 compares the winter water use to the winter influent flows seen at the WWTF from 2011 to 2015.

TABLE 5-5

Total Winter Water Use and Winter WWTF Influent Flows

Flow Type (gpd)	2011-2012	2012-2013	2013-2014	2014-2015	Average
Average Winter Influent Flow(1)	885,000	873,000	876,000	903,000	884,000
Base Flow(2)	846,000	811,000	802,000	840,000	825,000
Winter Water Consumption(3)	756,000	755,000	703,000	641,000	714,000

(1) Average of December to February flows from Table 5-2.
(2) Average of consecutive years' base flows from Table 5-1.
(3) From Table 5-4.

Typically a wastewater Equivalent Residential Unit (ERU) value is calculated based on winter water use per single family residence (in order to exclude water used for irrigation). However, due to the nature of the City's available water consumption data, single-family residential water use could not be differentiated from total water consumption. For this Plan, projections will be made based on total per capita base flow. Table 5-5 shows that base flow is comparable to winter water use and is a reasonable estimate of base flow.

INFILTRATION AND INFLOW

The amount of infiltration and inflow (I/I) can be estimated on an annual average, maximum month, and maximum day basis by subtracting the base flow at the WWTF from the annual average, maximum month, and maximum day flows at the WWTF. For this report, infiltration and inflow is expressed in units of gallons per acre per day (gpad). The total developed sewer service area in Toppenish is estimated at 822 acres.

Table 5-6 summarizes the existing infiltration/inflow analysis. The data contained in this table is useful as a baseline for evaluating changes in infiltration and inflow in the future. This data is also used to estimate future flows.

TABLE 5-6

Estimated Existing Inflow/Infiltration for Wastewater Flows

Flow Type	Influent Flow at WWTF(1) (mgd)	Base Flow(2) (mgd)	I/I(3) (mgd)	Service Area(4) (acre)	I/I(5) (gpad)
Annual Average	1.21	0.83	0.38	822	460
Maximum Month	1.90	0.83	1.07	822	1,297
Maximum Day	2.26	0.83	1.43	822	1,739
Peak Hour	2.87	1.28(6)	1.58	822	1,927

(1) From Table 5-1 averages, WWTF influent flow charts.
(2) From Table 5-1, Average Base Sanitary Flow.
(3) Equals "Influent Flow at WWTF" minus "Base Flow."
(4) Developed areas only in the sewer service area.
(5) Equals "I/I" divided by "Service Area."
(6) Based on influent flow charts from 2013-2015.

Infiltration and Inflow Analysis Using EPA Criteria

Another analysis of infiltration and inflow was performed to compare estimates of per capita I/I to EPA criteria.

The U.S. EPA manual entitled *I/I Analysis and Project Certification* provides recommended guidelines for determining if infiltration and/or inflow is excessive.

1. To determine if excessive *infiltration* is occurring, a threshold value of 120 gallons per capita per day (gpcd) is used. This infiltration value is based on an average daily flow over a seven to fourteen day non-rainfall period during seasonal high groundwater conditions.

2. To determine if excessive *inflow* is present in a collection system, the U.S. EPA uses a threshold value of 275 gpcd. If the average daily flow (excluding major commercial and industrial flows greater than 50,000 gpd each) during periods of significant rainfall exceeds 275 gpcd, the amount of inflow is considered excessive.

Infiltration

The weather station closest to the City of Toppenish with available rainfall records is in the City of Yakima. Rainfall records from the Yakima weather station were analyzed and for each year from 2011 to 2015, a 7-day-period was chosen during which no rainfall was measured. In eastern Washington, the groundwater level is typically higher in the summer due to irrigation of crops. For each year, the 7-days without rainfall were chosen from August, July, or September, when irrigation is at its peak. The average daily flow recorded during these time periods ranged from 1.19 to 2.64 mgd. The intent of the EPA

criteria is to only include domestic flows, however since reliable customer class data was not available total influent flow at the treatment plant was used. Therefore, this will be a conservative estimate. Total influent flow at the treatment plant was divided by total population of sewer users for each period and an average was taken to estimate the "EPA I/I Infiltration Value" for Toppenish of 208 gpcd. This value is higher than the EPA limit, and therefore the system is designated as having excessive infiltration during the summer time. Table 5-7 shows how the infiltration value was calculated.

TABLE 5-7

Infiltration Calculation

Year	7 Consecutive Days with No Precipitation During High Water Table Months	Average Influent Flow at WWTF (mgd)	Infiltration(1) (gpcd)
2011	Aug 16-22	1.81	202
2012	Aug 11-17	1.87	209
2013	July 2-8	1.80	201
2014	Aug 25-31	2.64	295
2015	Aug 12-18	1.19	132
Average			**208**

(1) Equals Average Influent Flow at WWTF divided by 2015 population of 8,965.

Inflow

The maximum day influent flow at the WWTF for each year from 2011 to 2015 is shown in Table 5-1. Again, the intent of the EPA criteria is to only include domestic (residential) flows, however this was not possible with the available data from the City. The EPA criteria is also based on periods with significant rainfall, however in Toppenish high groundwater is not associated with rainfall, rather it is associated with irrigation in the summer months. For this analysis the maximum day influent for each year was divided by the population for that year, and an average was taken. The average "EPA I/I Inflow Value" for Toppenish is estimated at 253 gpcd. Since this value is less than the EPA guideline of 275 gpcd, the sewer collection system is not considered to have excessive inflow by EPA criteria. Table 5-8 shows how the inflow value was calculated.

TABLE 5-8

Inflow Calculation

Year	Max Day Influent Flow (gpd)		Inflow (gpcd)
	mgd	gpcd	
2011	2.22	248	248
2012	2.31	258	258
2013	2.25	251	251
2014	2.76	308	308
2015	1.77	197	197
Average			253

These infiltration and inflow rates are summarized and compared to EPA criteria in Table 5-9.

TABLE 5-9

Per Capita Infiltration and Inflow Compared to EPA Criteria

Parameter	EPA Criteria for Excessive I/I (gpcd)	Estimated Toppenish I/I Value (gpcd)
Infiltration Criteria	120	208(1)
Inflow Criteria	275	253(2)

(1) Infiltration is calculated as an average from 2011-2015 of the average influent flow at the treatment plant during a 7 day dry period divided by the population.

(2) Inflow is calculated as an average from 2011-2015 of the maximum day influent flow at the treatment plant divided by the population.

INDUSTRIAL FLOWS

Industrial flows are often significantly different than residential and commercial flows and often at higher or lower strength. Industrial flows usually contain constituents that are not present in municipal wastewater or present in higher concentrations. The only industrial water user in Toppenish is Del Monte Foods. However Del Monte Foods only discharges domestic waste to the Toppenish sewer system. Therefore there are no industrial dischargers within Toppenish.

PROJECTED SEWER SERVICE AREA POPULATION AND FLOWS

As discussed in Chapter 3, the estimated 2015 population of the City of Toppenish was 8,965. Projections in Table 5-10 are based on an average annual growth of 0.9 percent (from Table 3-5).

The current and projected 10-year and 20-year population and flows (without consideration of further expansion of the Urban Growth Area) are summarized in Table 5-10. The 2015 values are based on existing data developed in this chapter and influent flow charts from the WWTF. The projected flows and population are based on use of the growth assumptions applied to all customer classes.

I/I is assumed to be constant throughout the period within the existing system. In other words, increases in I/I due to the addition of new pipes and deterioration of old pipes are assumed to be equal to decreases in I/I due to ongoing I/I reduction efforts. I/I in the future sewer basins is assumed to be slightly less, at 300 gpad.

Future WWTF flows are projected based on an existing base flow of 93 gpcd (total existing base flow of 0.83 mgd divided by existing population of 8,965). To estimate future annual average, maximum month, and maximum day flows, the I/I flow rates were added to the base level wastewater flows derived from the population projections to obtain the respective future WWTF influent flow rates. Peak hour flows were projected by adding a reduced peak hour I/I of 300 gpad, to projected future peak hour base flow (peak hour sanitary flow). Projected future peak hour base flow was calculated by multiplying the future base flow by the current estimated peaking factor (1.5) and adding I/I. I/I in existing areas was assumed to remain constant at 1,927 gpad. I/I in newly developed areas is assumed to be 300 gpad.

TABLE 5-10

Current and Projected Population and Flows

Population		**Existing(1)**	**2025**	**2035**
Total Projected Population		8,965	9,454	9,810
Projected Flows	**Design Criteria**	**Existing(1)**	**2025**	**2035**
Total Base Flow(2) (mgd)	N/A	0.83	0.88	0.91
Average Annual Flow (mgd)	1.23	1.21	1.26(3)	1.29(3)
Maximum Month (mgd)	1.67	1.90	1.94(3)	1.98(3)
Maximum Day (mgd)	2.16	2.26	2.31(3)	2.34(3)
Peak Hour (mgd)	3.70	2.87	2.83(4)	2.99(4)

(1) From Table 5-1 averages.
(2) Equals 93 gpcd multiplied by total population from above.
(3) Equals base flow plus corresponding I/I value from Table 5-6.
(4) Assumes a base flow peaking factor of 1.5 and that I/I in existing developed areas remains constant at 1,927 gpad, but I/I in newly developed areas will be 300 gpad.

As shown in Table 5-10, the maximum month and maximum day flows have already exceeded the design capacity of the plant. The existing average annual flows are very close to the plant capacity and are projected to exceed the plant capacity in the next 10 years. The peak hour design flow is not projected to be exceeded in the 20 year period.

EXISTING WASTEWATER LOADINGS

Monthly average influent BOD_5 loadings ranged from 743 lb/d to 2,203 lb/d for the 5-year period of analysis as shown on Figure 5-2. The monthly average influent BOD_5 loading design criteria of 2,581 lb/d at the WWTF was never exceeded during the 5-year period of analysis. The average influent BOD_5 concentration for the 5-year period is 211 mg/L, which would be considered medium strength domestic wastewater. The average BOD_5 loading for the 5 years was 1,596 lb/d. TKN data was only available for February of 2015 and is therefore not considered representative data and not included in this analysis.

Table 5-11 shows average annual and maximum monthly average loadings at the wastewater treatment facility from 2011 through 2015.

TABLE 5-11

Current WWTF Loadings

Existing Loadings	2011	2012	2013	2014	2015	Average
Average BOD Loading (lb/d)	1,785	1,730	1,448	1,512	1,504	1,596
Average BOD Loading (lb/cap/d)	0.199	0.193	0.162	0.169	0.168	0.178
Max Month BOD Loading (lb/d)	2,203	20,67	1,806	2,162	1,917	2,031
Max Month BOD Loading (lb/cap/d)	0.246	0.231	0.202	0.241	0.214	0.227
Max Month/Average Day BOD Ratio	**1.23**	**1.19**	**1.25**	**1.43**	**1.27**	**1.28**
Average TSS Loading (lb/d)	1,943	1,692	1,277	1,302	1,375	1,518
Average TSS Loading (lb/cap/d)	0.217	0.189	0.143	0.145	0.153	0.169
Max Month TSS Loading (lb/d)	2,476	2,377	1,640	1,987	2,212	2,138
Max Month TSS Loading (lb/cap/d)	0.277	0.266	0.183	0.222	0.247	0.239
Max Month/Average Day TSS Ratio	**1.27**	**1.40**	**1.28**	**1.53**	**1.61**	**1.42**

The 2011-2015 annual average BOD_5 loading was 0.178 lb/cap/d. This value is below the Department of Ecology Criteria for Sewage Works Design Manual recommended value of 0.2 lb/cap/d. The 2011 annual average BOD_5 loading was 0.199 lb/cap/d, but has since decreased and remained below the 0.2 lb/cap/d recommendation.

The average of the maximum month per capita BOD_5 loadings for 2011-2015 was 0.227 lb/cap/d. The average ratio, for 2011-2015, of the maximum month BOD_5 loading to the annual average BOD_5 loading is 1.28:1. This ratio is used in the development of future loadings to the WWTF later in the chapter.

Monthly average TSS loadings ranged from 628 lb/d to 2,476 lb/d. The monthly average influent TSS loading design criteria of 2,634 lb/d was never exceeded during the 5-year period of analysis. The annual average TSS loading for 2011-2015 is 0.169 lb/cap/d.

The average for 2011-2015 of the maximum month per capita TSS loadings is 0.239 lb/cap/d. The average ratio, for 2011-2015, of the maximum month TSS loading to the annual average TSS loading is 1.42:1. This ratio is used in the development of future loadings to the WWTF later in the chapter.

TKN data was only available for February 2015. The monthly average influent TKN loading design criteria of 516 lb/d was not exceeded during the given month. For future loadings, TKN will be estimated using a BOD_5:TKN ration of 5:1. This is typical value for domestic wastewaters and was used in the 2005 Wastewater Facility Plan.

PROJECTED FUTURE WASTEWATER LOADINGS

Future WWTF maximum month BOD_5, TSS, and TKN loadings are estimated by multiplying the projected population by the respective per capita loadings. Future population-based annual average BOD_5, TSS, and TKN loadings are estimated using the ratio of the maximum month to annual average loadings of these parameters. The current maximum month BOD_5, TSS, and TKN loadings are 0.227 lb BOD_5/cap/d, 0.239 lb TSS/cap/d, and 0.019 lb TKN/cap/d. The ratio of the maximum month to annual average BOD_5 is 1.28:1. The ratio of the maximum month to annual average TSS is 1.42:1. The ratio BOD_5:TKN of 5:1 was used to calculate TKN loadings because only one month of TKN data was available. Table 5-12 provides a summary of projected future WWTF influent loadings.

TABLE 5-12

Current and Projected WWTF Loadings

Population and Loadings	Existing	2025	2035
Total Population	8,965	9,454	9,810
Annual Average BOD_5, (lb/d)	1,504	1,685	1,646
Maximum Month BOD_5, (lb/d)	1,917	2,144	2,225
Annual Average TSS, (lb/d)	1,375	1,602	1,663
Maximum Month TSS, (lb/d)	2,212	2,258	2,343
Annual Average TKN, (lb/d)	319	337	329
Maximum Month TKN, (lb/d)(1)	406	429	445

(1) Based on a BOD_5:TKN ratio of 5:1.

Table 5-13 shows the projected 20 year flows and loadings in comparison with the design criteria of the WWTF and what year the capacity is projected to be exceeded.

TABLE 5-13

Projected WWTF Flows and Loadings

Parameter	Existing Design Criteria	Existing(2)	Projected 2025 Loading(3)	Projected 2035 Loading(3)	Year Exceeded
Annual Average Flow (mgd)	1.23	1.21	1.26	1.29	2020
Maximum Month Flow (mgd)	1.67	1.90	1.94	1.98	Currently Exceeded
Maximum Day Flow (mgd)	2.16	2.26	2.31	2.34	Currently Exceeded
Peak Hour Flow (mgd)	3.70	2.87	3.34	3.41	(1)
BOD Loading for Max Month (lb/d)	2,581	1,917	2,144	2,225	(1)
TSS Loading for Max Month (lb/d)	2,634	2,212	2,258	2,343	(1)
TKN Loading for Max Month (lb/d)	516	406	429	445	(1)

(1) Is not projected to be exceeded in the 20-year planning period.
(2) From influent flow records at the WWTF.
(3) From Table 5-10 and 5-12.

NEIGHBORING WASTEWATER FACILITIES

Five municipal wastewater treatment facilities lie within a 20-miles radius of the City of Toppenish. Of these, only the City of Wapato and City of Mabton wastewater treatment facilities are located within the same topographical drainage basin (south of the Yakima River) and are located 8 and 19 miles away, respectively. Due to the fact that Toppenish owns and operates a functioning municipal wastewater treatment facility, it has been determined to be more cost effective to improve the existing WWTF in order to provide greater treatment capacity rather than construct improvements to regionalize wastewater treatment with neighboring facilities.

CHAPTER 6

COLLECTION SYSTEM EVALUATION

CHAPTER 6

COLLECTION SYSTEM EVALUATION

INTRODUCTION

This chapter presents the results of the City of Toppenish collection system evaluation. The evaluation includes a hydraulic analysis (modeling) to evaluate the capacity of the collection system under existing and future conditions, a lift station assessment, and a pipeline condition assessment.

A comprehensive list of deficiencies is developed in each section and a list of capital improvement projects is created to address the deficiencies.

HYDRAULIC MODEL

Existing and future population, land use, and wastewater flows presented in Chapters 3 and 5 of this Plan were utilized to develop data for use in the hydraulic model. Total land use area and wastewater flows were allocated to individual subareas, or basins, to identify current and future deficiencies in the collection system.

The hydraulic modeling program, InfoSewer, developed by Innovyze, has been used to analyze the major gravity lines within the collection system for the system's capacity to accommodate current conditions (2015), and future conditions (2035). For the capacity analysis of the force mains and sewage lift stations, peak flows for 2035 conditions were estimated and compared to existing pump capacities.

The output from the hydraulic model is used to evaluate the capacity of the existing collection system and to identify improvements that will be required to accommodate existing and future wastewater flows. The model can be updated and maintained for use as a tool to aid in future planning and design.

The software modeling program was designed for steady-state and dynamic analysis of gravity flow and pressure flow pipe networks and is capable of modeling up to 6,000 nodes and integrating with GIS mapping. This version of InfoSewer has the capability of extended period simulation (EPS) modeling, which was used for this analysis. Extended period simulation allows flow attenuation to occur as flow travels downstream, whereas steady state models carry a plug of flow throughout the model to the most downstream point without attenuation.

MODEL LAYERS

The hydraulic model consists of numerous layers, each of which mimics a shapefile (or layer) utilized in GIS. Although the layers are not specific .shp files, they can be exported as a .shp file which can be utilized in a GIS system. The layers consist of manholes, outlets, wet wells, pipes, force mains, and pumps. In the model, each of the lift stations are included as a fixed capacity that discharges to downstream manholes with the exception of School Lift Station #1, School Lift Station #2, and Del Monte Lift Station flows were added as a point flow into the gravity system within Basins 10, 15, and 19, respectively. The School Lift Stations are privately owned and operated, therefore only the flows discharged to the gravity system were included in this Plan. The Del Monte Lift Station serves only the domestic flow from the Del Monte Foods facility, since there is no other flow in this basin, the pumping capacity of the lift station was input into the model at the force main discharge point. Flows within each of the basins were calculated separately in an Excel spreadsheet (based on land use area, ERUs, and infiltration and inflow) and then input into the model at specific designated manholes.

Approximately 46 percent of the pipes within the collection system were modeled. The sections of the collection system that were modeled include all major sewer trunk lines and manholes that are expected to convey the majority of flows through the collection system. A schematic of the skeletonized system is shown in Figure 6-1, along with the existing and future basin boundaries and the input locations for the flows in each basin. Information required to construct the model was obtained from the City's basemap, County LIDAR data, existing GIS data, and linear interpolation between known inverts. Use of each item is described below.

Basemap and Existing GIS Data

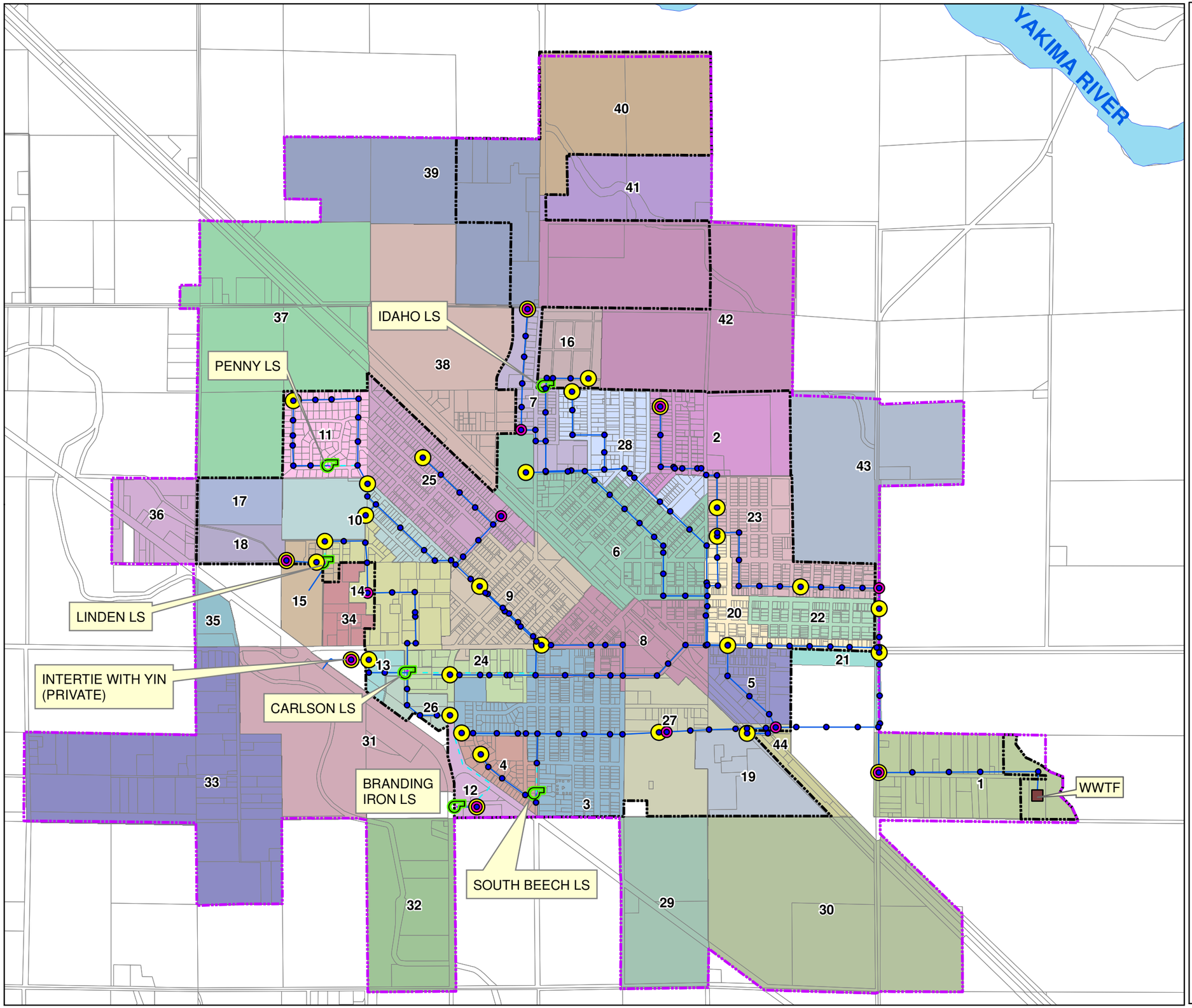
Existing GIS data was used to create a basemap of the City for the model.

Yakima County LIDAR

Rim elevations for each manhole were determined from the most recent Yakima County LIDAR survey. Pipe invert elevations were then calculated by subtracting the measure down depth, provided by the City, from the rim elevation.

Interpolated Manholes

After collecting all the information available from the City's existing records, there were still significant gaps in the information necessary for a functional model. Assuming a constant slope, linear interpolation was used between known manholes to determine any missing inverts.



N

0 2,000 4,000 Feet

LEGEND:

- MANHOLE
- FUTURE FLOW INPUT NODE
- EXISTING FLOW INPUT NODE
- MODELED LIFT STATION
- UGA
- CITY LIMITS
- MODELED FORCE MAIN
- MODELED GRAVITY MAIN
- WATER
- PARCELS

EXISTING BASINS

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28

FUTURE BASINS

29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44

CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 6-1

MODELED SEWER SYSTEM

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Lift Stations

For simplicity, the lift stations are modeled as constant discharge pumps that pump at the lift station capacity, so that the lift stations produce a constant discharge regardless of head conditions. A future refinement of the model may include the pump curves for all of the lift stations and/or the results from drawdown tests for each lift station. Measurements and elevations for each lift station were determined from drawings provided by the City. Penny Lift Station and Idaho Lift Station drawings were not available. However a Facility Plan Amendment was approved in October 2015 which included a design for an upgraded Penny Lift Station. Measurements and capacities from the improvement drawings along with drawdown tests completed by the City were used in the model for Penny Lift Station. The Del Monte Lift Station was not included in the model since it serves only the Del Monte Foods facility. Instead, the flow from this lift station was input at the force main discharge point (at MH 12-B).

BASINS

The existing collection system is organized into 28 sewer basins. These basins are described in Chapter 4 and are shown in Figure 4-2.

The model inputs for InfoSewer originated from tables set up in an Excel spreadsheet (see Appendix H). The flows applied to the model are peak day sanitary flow and peak hour I/I flow. The peak day sanitary flow is then peaked further within the model by diurnal curves which correspond to the land use in the basin.

HYDRAULIC MODELING ANALYSIS

Once basin data was collected, hydraulic models were developed for both the existing and twenty-year conditions utilizing the major trunk lines of the existing sewer collection system. This approach was used to identify pipeline deficiencies including full pipes and surcharging manholes.

After inputting the manholes and pipes into the system, the profile views and data showed that there were many deficiencies in the pipes due to reverse flow (uphill pipes). This is most likely an error caused by inaccurate ground elevation or measure down data and not an accurate portrayal of the existing system. An “ideal” model was set up, in which all uphill pipes were corrected to point downward using straight line interpolation between logical existing points. The results of this “ideal” model are more likely to reflect reality and, therefore, will be the primary method of analysis for this Plan.

There are a total of 212 nodes, or manholes, in the InfoSewer model. Approximately 66,678 lineal feet (or 12.6 miles) of pipe is included for the hydraulic model.

To support the development of the hydraulic model, an overall map was prepared to show the pipe and manhole identification numbers of the modeled system. This map is

included in Appendix H. Basin data for existing and future conditions and modeling results are also presented in Appendix H.

EXISTING CONDITION HYDRAULIC MODELING ANALYSIS

Land use data and the collection area basins from Figure 4-2 were used to distribute the wastewater flows from Table 5-12 into the hydraulic model (see Appendix H for the results of the distribution). For existing land use, County GIS parcel data and aerial/street view photography were used to determine the land use within these basins. Each parcel within the basins was assigned a land use category (single family residential, apartment/duplex, commercial, hospital, school, industrial, small retail/office, etc).

Flows were distributed within each basin corresponding to the land use within the basin. To determine domestic flows for each basin, the total number of Equivalent Residential Units (ERUs) was multiplied by the average annual flow value of 319 gpd/ERU (93 gpcd per Table 5-10 multiplied by 3.43 people per household). In addition to the domestic flows, peak hour I/I was added. I/I is assumed to be constant throughout the sewer service area and all sewered acreage was multiplied by the existing I/I value of 1,927 gpad (per Table 5-6). These flows were then entered into the furthest upstream manhole for each basin.

Peak hour flows are used for design purposes in the hydraulic model. To obtain the peak hour flows, the maximum day value of 2.26 mgd for 2015 was disbursed throughout the basins and then peaked within the model with diurnal curves relating to the typical basin land use distribution (i.e., 20 percent commercial/80 percent residential, 40 percent commercial/60 percent residential, or 100 percent commercial). The diurnal curves scale the estimated flow by a factor of 0.89. This represents the scaling factor necessary to mimic the peak hour flows seen at the WWTF of 2.87. Appendix H displays the diurnal curves and detailed spreadsheets of the flow calculations.

YEAR 2035 HYDRAULIC MODELING ANALYSIS

Once the data was developed to represent existing conditions, it was revised to represent twenty-year projections. The overall flow projections from Table 5-12 and County future land use GIS data were the basis for these future estimates. From Table 5-12, it is anticipated that an additional 0.71 mgd of peak hour flow will occur in 2035. This additional flow was disbursed to areas of new or redeveloped growth based on the future land use shown in Figure 3-7.

For the hydraulic model, the infiltration/inflow flow rate of 1,927 gpad was applied to the existing sewered acreage and the future buildout basins were given an I/I flow rate of 300 gpad.

MODELING RESULTS WITHOUT IMPROVEMENTS

Deficiencies in the collection system are defined as follows:

- Manholes are shown as deficient when InfoSewer reports that the manhole is full and surcharged to the manhole rim during peak hour flow conditions. In this case, the manhole itself is not the actual deficiency but it alludes to a problem downstream due to either a pipe or a certain hydraulic restriction.
- Pipe segments are considered deficient with respect to capacity when InfoSewer reports that the depth at the peak hour flow through the pipe is equal to or exceeds the maximum depth of pipe (i.e., the diameter). Essentially, this means that the pipe is running full at the modeled flows and that flow is surcharging within the manholes. This may be due to a lack of capacity in the pipe itself or a downstream hydraulic condition.

Figure 6-2 shows the modeling results for the existing flows. The report (included in Appendix H) identifies results for each pipeline segment and manhole. The only section of concern is near the intersection of Madison Ave and Gardenia Street. The modeling results show the pipes to be undersized in this area. The manholes along this section of pipe showed surcharging under 0.5 feet. Some pipe deficiencies may be due to the fact that the entire flow for each basin is input into the model via the most upstream manhole, which may cause an apparent backup of flow in larger basins or immediately downstream of a force main, which may not be representative of what is actually seen in the field. These artificial deficiencies are not shown on Figures 6-2 through 6-4.

Per Table 5-12, the projected peak hour flow at the WWTF for 2035 is 2.99 mgd. The 2035 peak hour influent flows at the WWTF predicted by InfoSewer is 2,588 gpm, or 3.73 mgd, slightly higher than the projected flow for 2035. This shows that the modeled flows are a reasonable and slightly conservative estimate of the real system.

Figures 6-3 through 6-4 present the modeling results for 2035 conditions. The 2035 modeling shows 15 manholes surcharging less than 0.5 feet and 14 pipeline segments with capacity deficiencies. Again, some of these deficiencies are caused by the ways flows were input into the model. These deficiencies are not shown on Figures 6-3 through 6-4. Table 6-1 lists the deficiencies per basin. These deficiencies are also shown graphically in Figures 6-3 through 6-4. Future growth projections are fairly low overall, collection system capacity issues appear to be due to future growth being concentrated in specific areas.

TABLE 6-1

2035 Gravity Main Pipe Deficiencies

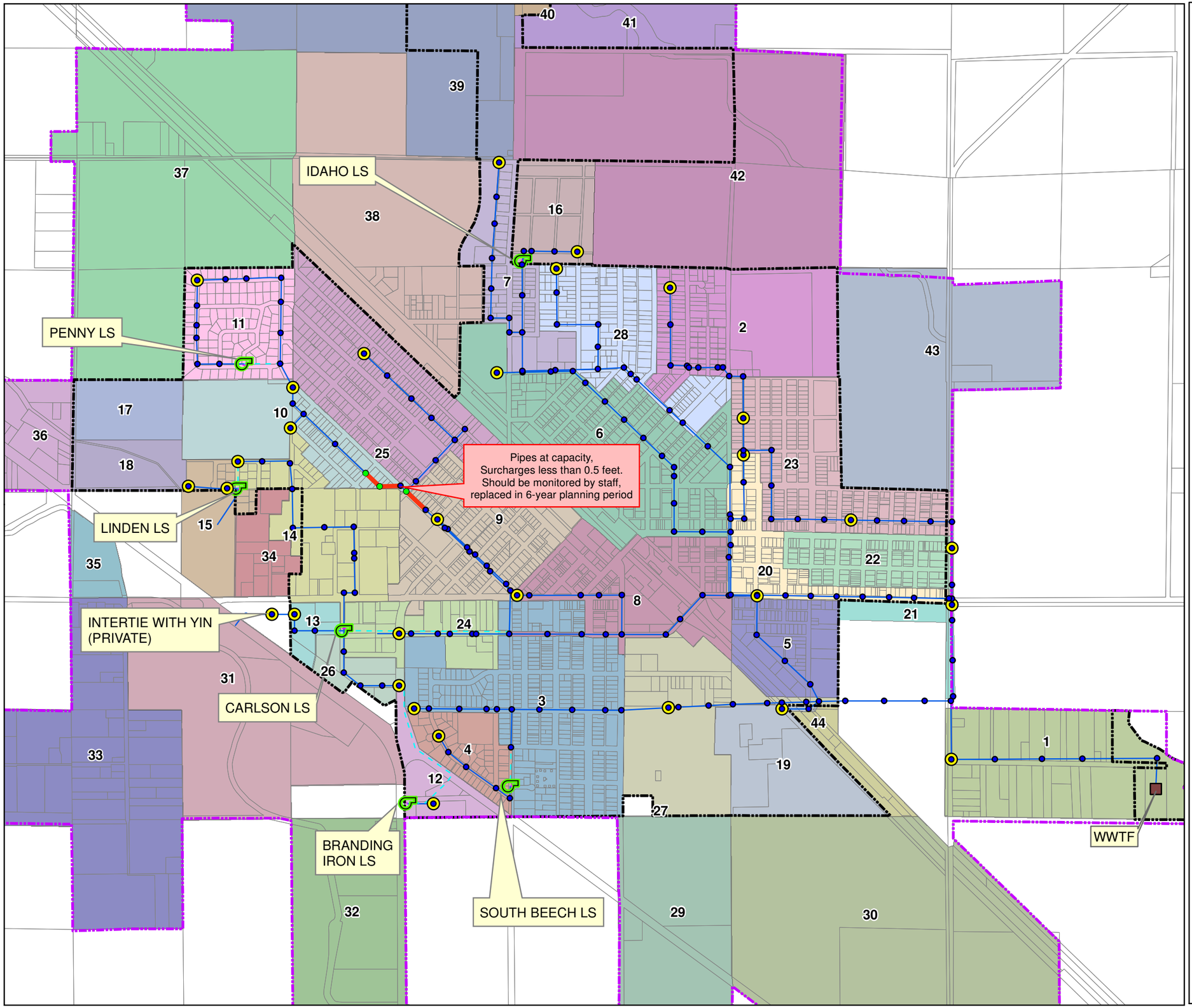
Basin	Location	Modeling Location	Capacity Issue Identified in Hydraulic Model(1)
9 & 10	Madison Ave & S Gardenia St	MH H-5 to H-9	Surcharges <0.5 ft Undersized 10-inch pipes
7 & 28	Goldendale Ave & Buena Way to Dayton Ave & N Date St	MH E-7 to E27	Surcharges <0.5 ft Undersized 8- and 10-inch pipes

(1) Surcharges noted under the 2035 flow scenario.

The model output shows that about 71 percent of the modeled pipeline segments are characterized by low velocity (less than 2.0 feet per second) under existing estimated flows. It is likely that additional pipe segments have low velocity during low flows. The 2035 model output shows about 62 percent of the modeled pipeline segments being characterized by low velocity. It should be noted that many pipe inverts within the model were adjusted and assumed to have downhill slopes, yet in reality they may vary slightly from what is shown in the model. These pipelines should be monitored by the City as part of its ongoing operations and maintenance to identify potential solids deposits in the pipelines.

YEAR 2015 AND 2035 MODELING RESULTS WITH IMPROVEMENTS

Although there were several deficiencies shown in the 2035 model, the main deficiencies can be addressed through two improvement projects. Table 6-2 and Figure 6-5 show the recommended improvements to correct these deficiencies. With the recommended improvements listed below, a revised model showed no deficiencies for the areas listed other than the artificial deficiencies created by flow input locations. It should be emphasized that the model was based on the limited available survey information and the previously discussed assumptions; thus it is recommended that implementation of all projects related to this capacity assessment be further evaluated prior to design and construction.



N

0 1,500 3,000 Feet

LEGEND:

- SURCHARGE <0.5 FT, ACCEPTABLE
- PIPES AT CAPACITY
- MANHOLE
- EXISTING FLOW INPUT NODE
- MODELED LIFT STATION
- MODELED FORCE MAIN
- MODELED GRAVITY MAIN
- WATER
- PARCELS
- UGA
- CITY LIMITS

EXISTING BASINS

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28

FUTURE BASINS

29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44

CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 6-2

EXISTING MODELING RESULTS

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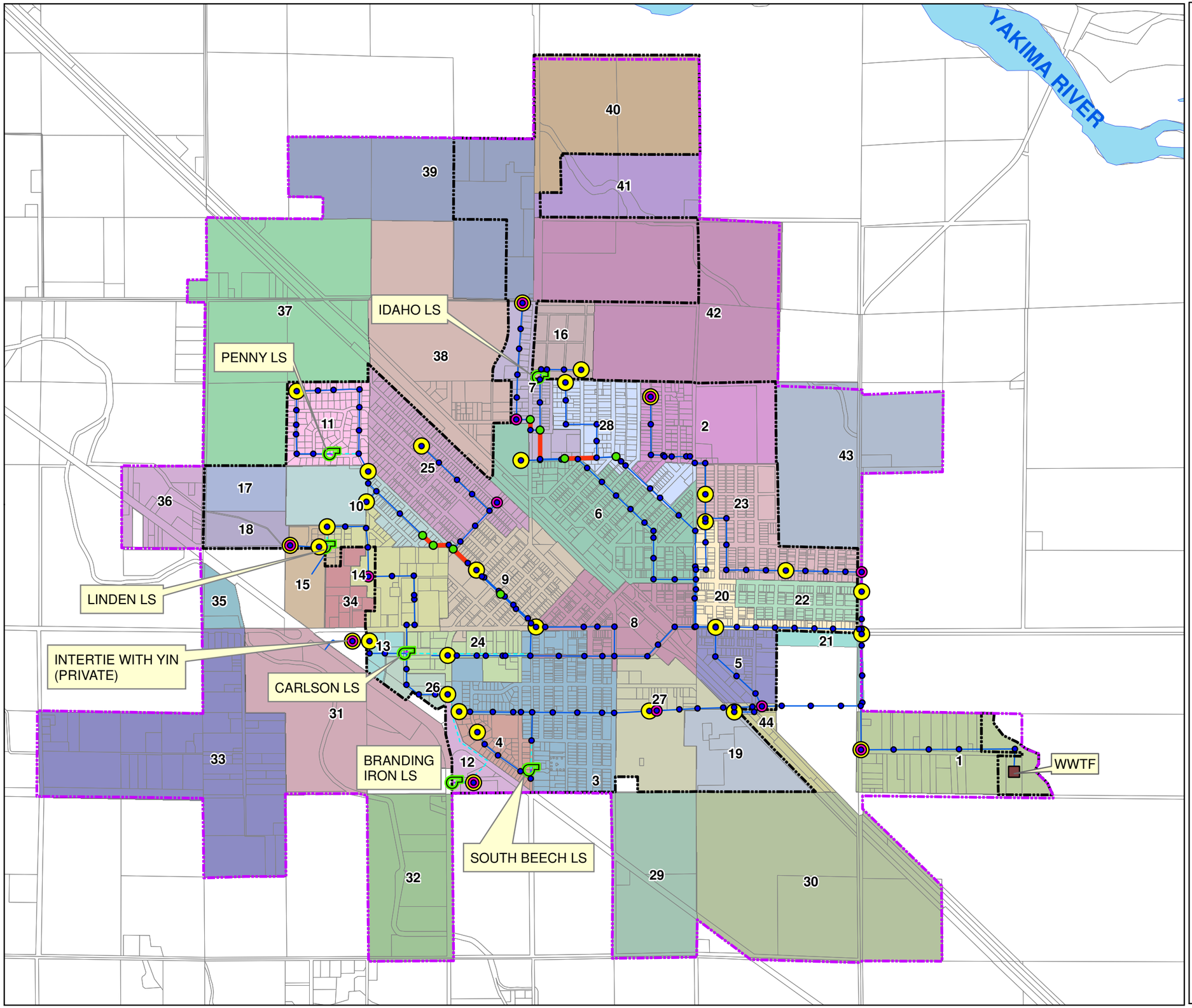

N

0 2,100 4,200 Feet

LEGEND:

- SURCHARGING < 0.5 FT
- NO SURCHARGE
- PIPE AT CAPACITY
- MODELED FORCE MAIN
- PIPES WITH ADEQUATE CAPACITY
- FUTURE FLOW INPUT NODE
- EXISTING FLOW INPUT NODE
- MODELED LIFT STATION
- WATER
- PARCELS
- UGA
- CITY LIMITS

EXISTING BASINS

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28

FUTURE BASINS

29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44

CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 6-3

2035 MODELING RESULTS

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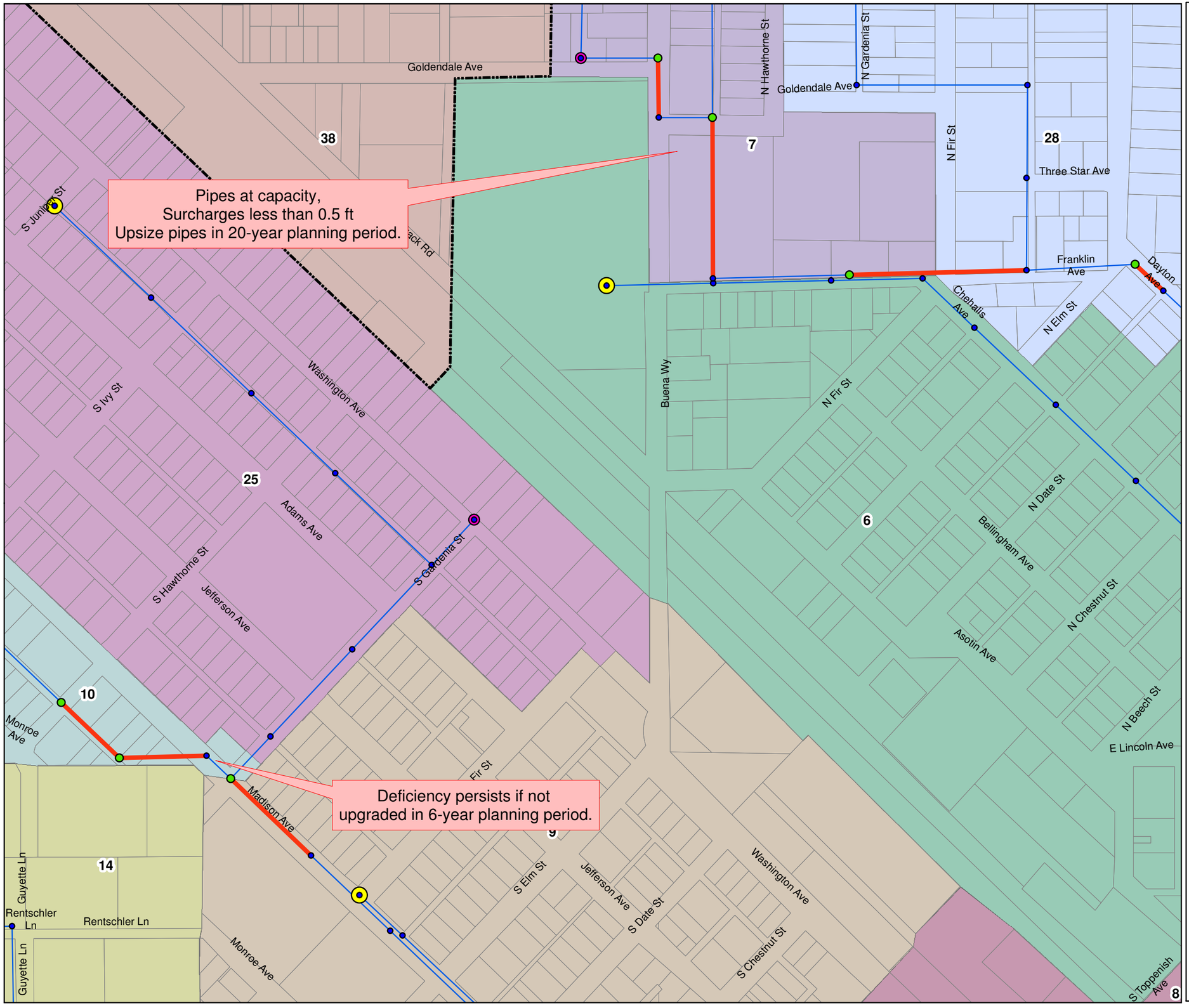

N

0 380 760 Feet

LEGEND:

- SURCHARGING < 0.5 FT
- PIPE AT CAPACITY
- FUTURE FLOW INPUT NODE
- EXISTING FLOW INPUT NODE
- MODELED LIFT STATION
- NO SURCHARGE
- MODELED FORCE MAIN
- PIPES WITH ADEQUATE CAPACITY
- WATER
- PARCELS
- UGA
- CITY LIMITS

EXISTING BASINS

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

FUTURE BASINS

29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44

CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 6-4

2035 MODELING RESULTS
BASINS 7, 9, AND 10

Gray & Osborne, Inc.

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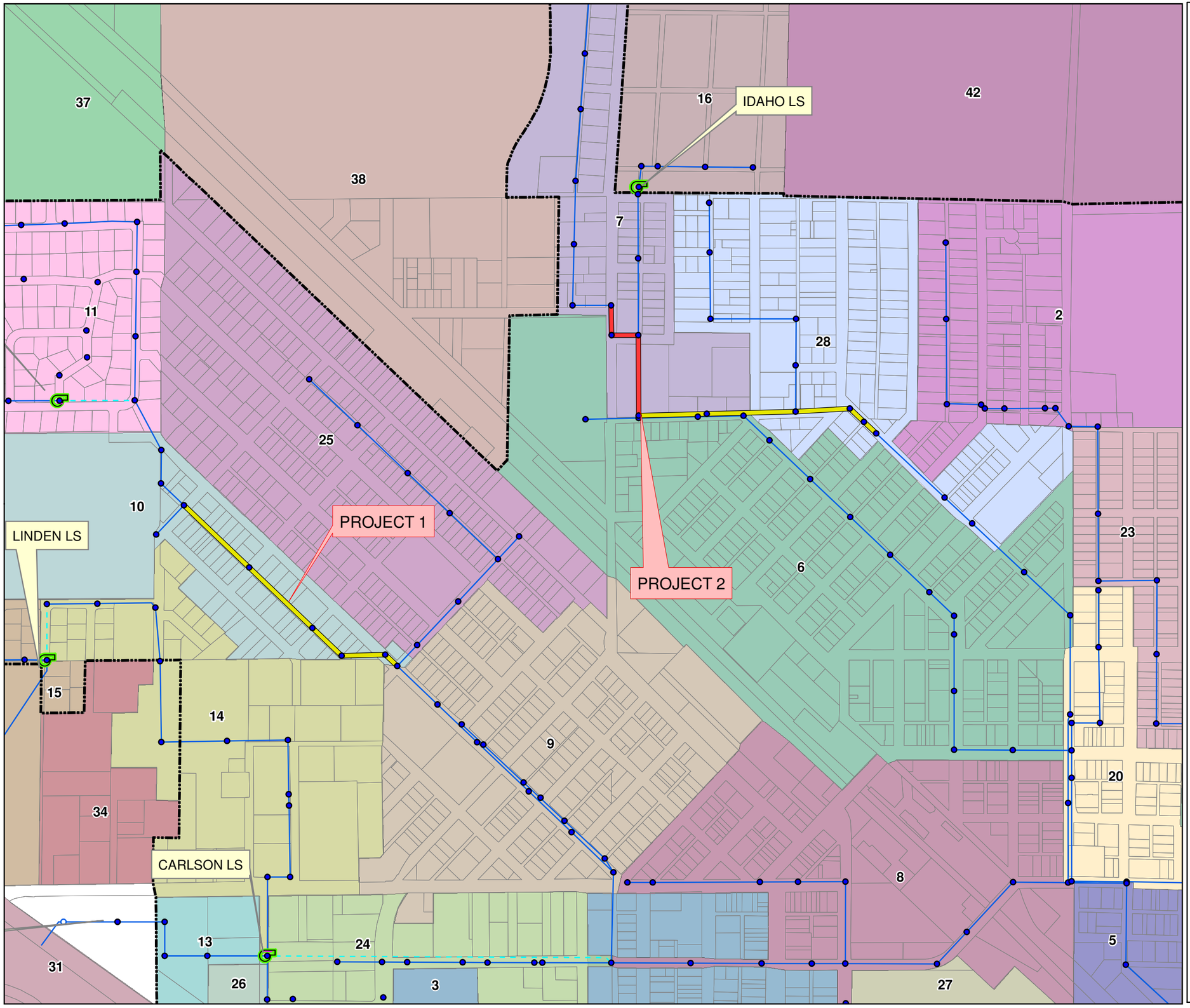

N

0 770 1,540 Feet

LEGEND:

- UPSIZE TO 10"
- UPSIZE TO 12"
- MODELED MANHOLES
- MODELED LIFT STATION
- MODELED FORCE MAIN
- MODELED GRAVITY MAIN
- WATER
- PARCELS
- UGA
- CITY LIMITS

EXISTING BASINS

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28

FUTURE BASINS

29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44

CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 6-5

COLLECTION SYSTEM CAPITAL IMPROVEMENT PROJECTS RECOMMENDED AS A RESULT OF MODELING

Gray & Osborne, Inc.

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TABLE 6-2

Recommended Gravity Main Improvements

Project	Location	Modeling Location	Capacity Issue Identified in Hydraulic Model(1)	Recommendation
1	Madison Ave & S Gardenia St	MH H-5 to H-9	Surcharges <0.5 ft Undersized 10-inch pipes	Upsize pipe to 12" from MH H-6 to I-1 (approximately 1,600 LF)
2	Goldendale Ave & Buena Way to Dayton Ave & N Date St	MH E-7 to E27	Surcharges <0.5 ft Undersized 8- and 10-inch pipes	Upsize to 12" from MH E-7 to EE-22 (approximately 1,450 LF) and 10 from MH E-22 to E-27 (approximately 800 LF)

(1) Verification of inverts for these areas should be done prior to design or construction to confirm capacity issues.

The City has a desire to more specifically study future outlying Basins 33, 37, 39, and 42, as shown in Figure 6-1. The specific development needs and estimate of costs are included at the end of this chapter and are not considered part of the City's capital improvement plan as they are considered beyond the 20-year planning period.

LIFT STATION CAPACITY ANALYSIS

The City of Toppenish operates and maintains seven lift stations. Table 6-3 shows the capacity analysis for each of the lift stations.

For Toppenish's lift stations, the peak hour flows previously developed for the 2015 and 2035 scenarios are compared to each of the lift stations' existing capacities in Table 6-3. For the 2035 scenario, capacity surplus or deficiency is determined.

TABLE 6-3

2035 Lift Station Capacity Analysis

Lift Station	Total 2015 Peak Flow (gpm)	Total 2035 Peak Flow(1) (gpm)	Lift Station Capacity (gpm)	2035 Surplus/ (Deficit) (gpm)
Branding Iron	7	16	220	204
Carlson	436	512	300(1)	(212)
Del Monte	72	68	420	355
Idaho	21	21	100	79
Linden	59	64	150	86
Penny	44	44	300(2)	256
South Beech	34	34	130(3)	95

(1) Recent drawdown tests indicate this lift station is only pumping 300 gpm.
(2) Based on proposed upgrades.
(3) Based on the smaller pump installed.

The lift station analysis presented in Table 6-3 shows that with the exception of the Carlson Lift Station, all of Toppenish's lift stations have adequate capacity for flows projected through 2035. The estimated existing flows already exceed the capacity of the Carlson Lift Station with a single pump running (300 gpm) causing a deficit in both the existing and future scenarios. City records indicate the pumps should be 400 gpm; however, recent drawdown tests indicate a capacity of 300 gpm. According to Department of Ecology (Ecology) design standards, this station is considered undersized based on operating the system with one pump out of service. In reality, both pumps may run simultaneously to accommodate peak flows, but it is recommended that this station be upgraded to meet Ecology design standards.

LIFT STATION ASSESSMENT

A survey of the City's lift stations by Gray & Osborne and City staff was completed on September 2, 2015. The following is a condition and operations assessment and a recommended capital improvement plan for each lift station. The location of each of the lift stations is shown in Figure 4-2.

PENNY LIFT STATION

The Penny Lift Station is located at the intersection of Penny Lane and Hammond Lane in the northwest section of the City. The Penny Lift Station consists of a 4-foot diameter brick manhole with a single submersible centrifugal pump located in the middle of the intersection of Penny and Hammond Lane. The electrical service and control panel are located approximately 140 feet east of the manhole at the edge of the right-of-way. The lift station has not been significantly upgraded since its original construction. The lift station has been observed to operate 18 hours per day in the summer and as little as 2 hours per day in the winter. It is believe that the brick manhole is a significant source of infiltration. It is unknown when the original lift station was constructed.

Table 6-4 shows the design criteria for the existing Penny Lift Station.

TABLE 6-4

Penny Lift Station Existing Design Criteria

Parameter	**Capacity**
Wet Well Size	4-foot diameter, 13-feet deep
Number of Pumps	1
Type of Pumps	Submersible centrifugal
Pump Size	300 gpm, 14 feet TDH
Power	5 hp, 240V, 3-phase
Control/telemetry	Float switches/no telemetry
Emergency Power	No

Capacity - Based on Table 6-3 the lift station has sufficient capacity for the 20-year planning period. However, there are a number of other deficiencies that need to be addressed including the fact that a single pump does not meet Ecology's redundancy requirements. In general, the lift station does not meet many of the standards that are recommended in the Department of Ecology's Criteria for Sewage works (the Orange Book) and it presents a number of safety hazards for the City's operations and maintenance staff.

Access – The pump station wet well is currently located in the middle of the intersection of Penny Lane and Hammond Lane. All maintenance must be done by the City staff in the travel lane. In addition, in order to service the pumps, the City Staff must enter the wet well, which is a confined space. The City views this as an unsafe work environment that requires traffic control and confined space entry procedures each time the lift station is inspected. This is not acceptable to the City and does not follow the recommendations of the Orange Book.

Fire Protection – The current pump station does not meet the requirements of NFPA 820, which is the fire protection standard for wastewater collection and treatment systems and is recommended by the Orange Book. The pump station's electrical wiring is not suitable for a Class 1, Division I environment to prevent explosive hazards.

Emergency Power/Bypass or Overflow – The current pump station is not equipped with any means for emergency power, the ability to bypass flows, or any provisions for an overflow vault, as recommended in the Orange Book.

Alarms/Telemetry – The current pump station is not equipped with any telemetry system. The City relies on daily checks of the lift station to determine if it is operating correctly. This is not acceptable to the City and is not as recommended in the Orange Book.

Structural Condition – The current wet well appears to be a brick manhole that was converted into a wet well for pumping. The brick manhole is believed to be a significant source of infiltration and needs to be replaced.

Electrical Condition – The electrical service and control panel at this lift station are extremely deteriorated and do not comply with current code.

Penny Lift Station Recommended Improvements

Facility Plan Amendment No. 1 recommended replacing this lift station entirely. The replacement of this lift station is part of an ongoing project that will be constructed in the spring of 2017. It should be noted that the City evaluated the elimination of the Penny Lift Station, but it was determined that this was not feasible due to the slopes required in the existing downstream system.

The construction will include the installation of a new 5-foot diameter precast concrete wet well equipped with two submersible centrifugal pumps. The lift station will be located at the edge of the right-of-way outside of the travel lane. The new lift station will include a new power service and control panel and will be equipped with the City's standard SCADA monitoring system. The collection sewer and force main will need to be modified to accommodate the new location. The new lift station will be designed to meet the Orange Book design criteria and other current codes and standards.

Alternatives Considered – Facility Plan Amendment No. 1 considered three alternatives to replacing the Penny Lift Station; do nothing, replace in-kind and a complete new lift station. The analysis of both monetary and non-monetary benefits resulted in the selection of a new lift station as described above.

Table 6-5 shows the design criteria for the new Penny Lift Station.

TABLE 6-5

New Penny Lift Station Design Criteria

Parameter	Capacity
Wet Well Size	5-foot diameter, 15-feet deep
Number of Pumps	2
Type of Pumps	Submersible centrifugal
Pump Size	300 gpm, 16 feet TDH
Power	3 hp, 240V, 3-phase
Control/telemetry	Float switches/Omni Dialer
Emergency Power	Yes, generator receptacle

The cost estimate for the new lift station is included in Facility Plan Amendment No. 1. The estimated cost is $360,000 and includes contingency, sales tax, TERO, engineering design and construction administration.

Penny Lane Lift Station Present Worth Analysis

The following is a 50-year present worth analysis as required to satisfy Ecology's State Environmental Review Process. The City has assumed that the operations and maintenance costs will be the same no matter which alternative is chosen and therefore the present worth analysis is not a useful decision making tool. The savings presented in the capital cost analysis are the same as presented in the 50 year net present worth ($390,049 - $308,049 = $82,000).

	Alternative No. 1	**Alternative No. 2**
Capital Costs	$278,000	$360,000
Annual O&M	$15,093	$15,093
25 Year Investment	$30,000	$30,000
Net Present Worth 50 Years	$308,049	$390,049

LINDEN LIFT STATION

The Linden Lift Station is located on Linden Street approximately 340 feet south of Jackson Street near the Yakama Nation Tribal School. The lift station consists of a 5-foot precast manhole with dual submersible centrifugal pumps located in the east travel lane of Linden Street. The check valves and isolation valves are located in a vault adjacent to the wet well. The electrical service and control panel are located on the west side of Linden Street. The Linden Lift Station was completely reconstructed in 2009.

Table 6-6 shows the design criteria for the existing Linden Lift Station.

TABLE 6-6

Existing Linden Lift Station Design Criteria

Parameter	**Capacity**
Wet Well Size	5-foot diameter, 14-feet deep
Number of Pumps	2
Type of Pumps	Submersible centrifugal
Pump Size	150 gpm, 20 feet TDH
Power	5 hp, 240V, 3-phase
Control/telemetry	Float switches/Rhombus Dialer
Emergency Power	Yes, generator receptacle

Capacity - Based on Table 6-3, the lift station has sufficient capacity for the 20-year planning period.

At this time, there are no significant deficiencies identified at the Linden Lift Station. The lift station is located in the travel lane, which can be a safety issue. The City explored moving the lift station during the upgrades but additional property could not be obtained. The City has noted that they would like to make the Omni telemetry system the City standard in the future. The City may want to consider changing the dialer if an opportunity presents itself.

Linden Lift Station Recommended Improvements

At this time, there are no recommended improvements for the Linden Lift Station.

CARLSON LIFT STATION

The Carlson Lift Station is located on Carlson Avenue approximately 440 feet south of 1st Avenue. The Carlson Lift Station consists of an 8-foot diameter precast manhole with dual submersible centrifugal pumps located in the west travel lane of Carlson Avenue. The check valves are located inside the wet well and the isolation valves are buried valves exterior to the wet well. The electrical service and control panel are located on the east side of Carlson Avenue. The lift station was originally constructed around 1979. The electrical service and controls were upgraded in 1999, but the wet well and equipment were not upgraded at that time.

Table 6-7 shows the design criteria for the existing Carlson Lift Station.

TABLE 6-7

Existing Carlson Lift Station Design Criteria

Parameter	Capacity
Wet Well Size	8-foot diameter, 19-feet deep
Number of Pumps	2
Type of Pumps	Submersible centrifugal
Pump Size	400 gpm, 34 feet TDH
Power	5 hp, 480V, 3-phase
Control/telemetry	Float switches/Omni telemetry
Emergency Power	Yes, generator receptacle

Capacity - Based on Table 6-3, the lift station has insufficient capacity for the current and 20-year planning period. In addition, there are a number of other deficiencies that need to be addressed as well. According to City staff, recent drawdown tests have shown that the pumps are only pumping about 300 gpm due to pump inefficiency and leaking gaskets. Table 6-3 shows that the pump station is undersized for the current demand even though it appears it can keep up. It is likely that the planning numbers are more conservative, and therefore show the pump station being slightly undersized. Due to the

age and inefficiency of the existing pumps, it is recommended that they be replaced. In addition there may be peak times when the lift station is surcharging upstream manholes and the City is not aware of the situation.

In addition to serving the west part of the City, the lift station also serves the YIN Complex on the south side of Highway 97 when the Tribe bypasses the WWTF at the casino and discharges to the City. The City must maintain capacity for the tribal service because the service agreement is still in place.

The City should consider an upgrade of the pump capacity when the station is replaced. In addition to the YIN Complex, the City will want to consider the future development of Basin 33, the Elmwood Road area. The development of this area is further discussed at the end of this Chapter. The existing pumps are beyond their useful life and operators have requested that they be replaced. One approach may be to design the electrical and mechanical components for larger pumps, but install smaller pumps until it is necessary to upgrade the capacity. This concept could be further studied as part of a predesign report.

In general, the lift station does not meet many of the standards are that are recommended in the Orange Book, and it presents a number of safety hazards for the City's operations and maintenance staff.

Access – The pump station wet well is currently located in the west travel lane of Carlson Avenue. All maintenance must be done by the City staff in the travel lane. The City views this as an unsafe work environment that requires traffic control procedures each time the lift station is inspected. This is not acceptable to the City and does not follow the recommendations of the Orange Book. In addition the check valves are located in the wet well which makes them difficult to access and maintain.

Structural Condition – The structure has been observed to have significant aggregate degradation on the manhole structure. The pump guiderails and pipe supports are severely corroded.

Electrical Condition – The electrical service and control panel at this lift station are in good working order, but the panel is nearly 20-years old. An increase in capacity will likely require a new panel and service.

Carlson Lift Station Recommended Improvements

Alternatives Considered

There are three alternatives to consider with regard to the upgrades of the Carlson Lift Station.

1. Do Nothing
2. Rehabilitate/Re-equip
3. Relocated new lift station

Alternative No. 1 - Do Nothing
As required the City must consider a "do nothing option". If the City does nothing the pump station will continue to deteriorate. Furthermore, the pump station will continue to be an unsafe work environment that does not meet many of the Orange Book standards. For these reasons, this is not an alternative that the City would like to further pursue.

Alternative No. 2 - Rehabilitate/Re-equip
The City could consider rehabilitating and re-equipping the lift station in its current location with the current structure. This would involve rehabilitating the concrete wet well to ensure its structural integrity is maintained and the installation of all new pumps, valve box and appurtenances.

The advantages to this alternative are that the influent sewers and discharge force main would not have to be realigned or moved and the City would not have to purchase property. This could potentially save the City approximately $25,000.

The disadvantages of this alternative is that the City staff would continue to perform maintenance in the traffic lane. In addition, although difficult to value, the wear and tear on the below grade structure is more significant when the lift station is located in the traffic lane. The rehabilitation of the lift station would require a significant temporary bypass pumping operation. It is estimated that four weeks of bypass pumping would be over $30,000.

Finally, the City operations staff and engineer are uncertain as to whether the concrete could be coated and made structurally sound. City Staff have reported significant aggregate degradation upon pump down.

Due to the continued safety risk, the wear on the structure due to constant traffic, the significant bypass pumping operation, and the uncertainty of a viable coating/structural upgrade, the City has removed this alternative from further consideration.

Alternative No. 3 - Relocated New Lift Station
This alternative includes the construction of a new lift station, relocating it out of the street.

The advantages to this alternative include increased worker safety, increased security and the limited amount of bypass pumping required during construction. The installation of a new wet well structure will ensure structural integrity for the next 20 years. In general moving the lift station structure out of the traffic lane will decrease the overall wear and tear on the structure and equipment.

The disadvantages to this alternative include the purchase of additional land and the costs associated with a new wet well excavation, installation and the reroute of the gravity sewers and force main.

After consideration of both the monetary and nonmonetary benefits of the alternatives the City has chosen Alternative No. 3 primarily for the added safety and the added certainty that a new wet well will serve the City for at least 20 years.

New Carlson Lift Station

It is recommended that the Carlson Lift Station be completely rebuilt as a submersible centrifugal lift station relocated out of the street. There are a few options for relocating the wet well out of the street. The first option would be to relocate the wet well on the east side of Carlson Avenue near the existing control panel. An easement would have to be obtained or property purchased from the landowner. The advantages of this option are the ability to retain the existing control panel and power service. However, the disadvantage to this site is that it is small and it is unlikely that it could be fenced for security.

The second option is to locate the lift station on the west side of Carlson Avenue. There is a nursing and rehab center and a church on the west side that would appear to have enough property to adequately site a new lift station. The advantage to this site is that the area could be fenced out of the travel and parking lane. The disadvantage of this area is that the control panel and electrical service would have to be moved. However, given that the control panel is 18 years old and may not be adequate if the pump capacity is increased in the future, the location of the control panel may not be an issue.

For purposes of this Plan, it is assumed that a new wet well will be constructed on a new site on the west side of Carlson Avenue. The construction would include a new 8-foot precast manhole, a new electrical service, and a new control panel. The collection sewer and force main will need to be modified to accommodate the new location. The new lift station would be designed to meet the Orange Book design criteria and other current codes and standards.

It is recommended that the final location and size of the new lift station be studied as part of the predesign report.

Table 6-8 shows the design criteria for the new Carlson Lift Station.

TABLE 6-8

New Carlson Lift Station Design Criteria

Parameter	Capacity
Wet Well Size	8-foot diameter, 19-feet deep
Number of Pumps	2
Type of Pumps	Submersible centrifugal
Pump Size	750 gpm, 34 feet TDH
Power	10 hp, 480V, 3-phase
Control/telemetry	Float switches/Omni telemetry
Emergency Power	Yes, Generator Receptacle

(1) The TDH will need to be re-evaluated during the predesign phase after completion of the 2017 Sewer Improvements Project that will shorten the force main.

A present worth analysis is required to satisfy the Department of Ecology State Environmental Review Process. The City assumes that the operations and maintenance costs will be the same no matter which alternative is chosen for the upgrade therefore a present worth analysis is not a useful decision making tool. The City chose Alternative No. 3 based largely on non-monetary benefits of increase safety and structural integrity.

The cost estimate for the new lift station is included in Appendix I. The estimate is $813,000 and includes contingency, TERO, sales tax, engineering design and construction administration.

SOUTH BEECH LIFT STATION

The South Beech Lift Station is located on South Beech Street near the intersection of Lillie Avenue in the southwest portion of the City. The lift station is located in the east parking lane. The South Beech Lift Station is the City's only wet well/dry well configuration. The wet well is a 5-foot precast manhole approximately 12-feet deep. The drywell is 8 feet by 6 feet and 8-feet deep. The drywell contains two dry-pit centrifugal pumps. The lift station was originally constructed around 1979. The lift station has not been significantly upgraded since its original construction; although the City did purchase a used replacement pump approximately two years ago.

Table 6-9 shows the design criteria for the existing South Beech Lift Station.

TABLE 6-9

Existing South Beech Lift Station Design Criteria

Parameter	**Capacity**
Wet Well Size	5-foot diameter, 12-feet deep
Dry Well Number of Pumps	2
Type of Pumps	Dry-pit centrifugal
Pump Size	130 gpm, 13 feet TDH
Power	5 hp, single phase
Control/telemetry	Float switches/no telemetry
Emergency Power	No

Capacity - Based on Table 6-3, the lift station has sufficient capacity for the 20-year planning period. The existing pumps are beyond their useful life and their efficiency is very low. As a result, the City operates both pumps to meet the current demand. It is recommended that the pumps be replaced. The City staff do not believe that the pumps are operating at their rated capacity. A draw down test was not performed for this lift station.

There are a number of other deficiencies that need to be addressed. In general, the lift station does not meet many of the standards are that are recommended in the Orange Book and it presents a number of safety hazards for the City's operations and maintenance staff.

Access – The pump station dry well is a confined space and thus confined space entry procedures and traffic control must be utilized each time the lift station is inspected. This is not acceptable to the City and does not follow the recommendations of the Orange Book.

Fire Protection – The current pump station does not meet the requirements of NFPA 820, which is the fire protection standard for wastewater collection and treatment systems and is recommended by the Orange Book. The pump station's electrical wiring is not suitable for a Class 1, Division I environment to prevent explosive hazards.

Emergency Power/Bypass or Overflow – The current pump station is not equipped with any means for emergency power, the ability to bypass flows, or any provisions for an overflow vault, as recommended in the Orange Book.

Alarms/Telemetry – The current pump station is not equipped with any telemetry system. The City relies on daily checks of the lift station to determine if it is operating correctly. This is not acceptable to the City and is not as recommended in the Orange Book.

Structural Condition – The wet well structure is connected to the drywell via a drain. When the lift station is disabled, the dry well fills with sewage, which causes damage to the pumps.

Electrical Condition – The electrical service and control panel at this lift station are extremely deteriorated. City staff has noted that the lift station is very difficult to trouble-shoot and is in very poor condition.

South Beech Lift Station Recommended Improvements

Alternatives Considered
Similar to the Carlson Lift station there are three alternatives to consider with regard to the upgrades of the South Beech Lift Station.

1. Do Nothing
2. Rehabilitate/Re-equip
3. Relocated new lift station

Alternative No. 1 - Do Nothing
As required the City must consider a "do nothing option". If the City does nothing the pump station will continue to deteriorate. Furthermore, the pump station will continue to be an unsafe work environment that does not meet many of the Orange Book standards. For these reasons, this is not an alternative that the City would like to further pursue.

Alternative No. 2 - Rehabilitate/Re-equip
The City could consider rehabilitating and re-equipping the lift station in its current location with the current structure. This would involve rehabilitating the concrete wet well to ensure its structural integrity and the installation of all new pumps and converting the dry well to a valve vault.

The advantages and disadvantages to this option are very similar in nature to the Carlson Lift station. In summary, due to the continued safety risk, the wear on the structure due to constant traffic, the significant bypass pumping operation, and the uncertainty of a viable coating/structural upgrade, the City has removed this alternative from further consideration.

Alternative No. 3 - Relocated New Lift Station
This alternative includes the construction a new lift station, relocating it out of the street.

The advantages and disadvantages to this option are very similar in nature to the Carlson Lift station. After consideration of both the monetary and nonmonetary benefits of the alternatives the City has chosen Alternative No. 3 primarily for the added safety and the added certainty that a new wet well will serve the City for at least 20 years.

New South Beech Lift Station
It is recommended that the South Beech Lift Station be completely rebuilt and equipped as a submersible centrifugal lift station similar to the City's other lift stations. For purposes of this Plan, it is assumed that the installation will include a new 6-foot diameter precast concrete wet well equipped with two submersible centrifugal pumps. The lift station would be located at the edge of the right-of-way outside of the travel lane. The new lift station will include a new power service and control panel and will be equipped with the City's standard SCADA monitoring system. The collection sewer and force main will need to be modified to accommodate the new location. The new lift station will be designed to meet the Orange Book design criteria and other current codes and standards.

Table 6-10 shows the design criteria for the new South Beech Lift Station.

TABLE 6-10

New South Beech Lift Station Design Criteria

Parameter	Capacity
Wet Well Size	6-foot diameter, 12-feet deep
Number of Pumps	2
Type of Pumps	Submersible centrifugal
Pump Size	150 gpm, 14 feet TDH
Power	5 hp, 240V, 3-phase
Control/telemetry	Float switches/Omni Dialer
Emergency Power	Yes, generator receptacle

A present worth analysis is required to satisfy the Department of Ecology State Environmental Review Process. Similar to the Carlson Lift Station, the City assumes that the operations and maintenance costs will be the same no matter which alternative is chosen for the upgrade therefore a present worth analysis is not a useful decision making tool. As in the Carlson Lift Station, the City chose Alternative No. 3 based largely on non-monetary benefits of increase safety and structural integrity.

The cost estimate for the new lift station is included in Appendix I. The estimated cost is $460,000 and includes contingency, TERO, sales tax, engineering design and construction administration.

BRANDING IRON LIFT STATION

The Branding Iron Lift Station is located in the northwest corner of the parking lot of the Branding Iron Restaurant on the south end of the City. The Branding Iron Lift Station consists of a 6-foot precast manhole with a single submersible centrifugal pump. The check valves are located in the wet well and the isolation valves are buried outside the wet well. The electrical service and control panel are located directly adjacent to the wet

well. The lift station was originally constructed around 1978. The lift station has not been significantly upgraded since its original construction. The lift station was originally equipped with two centrifugal submersible pumps; however, one of the pumps has been removed and repurposed.

Table 6-11 shows the design criteria for the existing Branding Iron Lift Station.

TABLE 6-11

Existing Branding Iron Lift Station Design Criteria

Parameter	Capacity
Wet Well Size	6-foot diameter, 16-feet deep
Number of Pumps	1 (can be equipped with 2)
Type of Pumps	Submersible centrifugal
Pump Size	220 gpm, 26 feet TDH
Power	5 hp, 240V, 3-phase
Control/telemetry	Float switches/no telemetry
Emergency Power	No

Based on Table 6-3, the lift station has sufficient capacity for the 20-year planning period. The lift station was originally equipped with two pumps; however, it currently only has one pump. The existing pump needs to be replaced and it is recommended that a second pump be installed for reliability and redundancy. The lift station currently only serves the restaurant and operates less than one hour per day. The original intention of the lift station was to serve the area south of Highway 97. It was noted by the City staff that the restaurant is not equipped with a grease interceptor. Municipal code states that grease interceptors are required when the Public Works Director deems they are necessary. It is recommended that the City work with the restaurant to install a grease interceptor.

There are a number of other deficiencies that need to be addressed. In general, the lift station does not meet many of the standards are that are recommended in the Orange Book and it presents a number of safety hazards for the City's operations and maintenance staff.

Access – The pump station check valves are located inside the wet well. If they have to be serviced, operators have to enter the wet well. This is not acceptable to the City and does not follow the recommendations of the Orange Book.

Fire Protection – The current pump station does not meet the requirements of NFPA 820, which is the fire protection standard for wastewater collection and treatment systems and is recommended by the Orange Book. The pump station's electrical wiring is not suitable for a Class 1, Division I environment to prevent explosive hazards.

Emergency Power/Bypass or Overflow – The current pump station is not equipped with any means for emergency power, the ability to bypass flows, or any provisions for an overflow vault, as recommended in the Orange Book.

Alarms/Telemetry – The current pump station is not equipped with any telemetry system. The City relies on daily checks of the lift station to determine if it is operating correctly. This is not acceptable to the City and is not as recommended in the Orange Book.

Electrical Condition – The electrical service and control panel at this lift station are extremely deteriorated. City staff has noted that the lift station is very difficult to trouble-shoot and is in very poor condition.

Branding Iron Lift Station Recommended Improvements

The Branding Iron Lift station requires some improvements in order to improve the reliability and redundancy of the lift station, meet the Orange Book standards, and to comply with electrical code, and meet fire protection standards.

Alternatives Considered – There are two alternatives to consider with regard to the upgrades of the Branding Iron Lift Station.

1. Do Nothing
2. Upgrade equipment

Alternative No. 1 - Do Nothing
As required the City must consider a "do nothing option". If the City does nothing the pump station will continue to deteriorate. Furthermore, the pump station will continue to be unreliable and be an unsafe work environment that does not meet many of the Orange Book standards. For these reasons, this is not an alternative that the City would like to further pursue.

Alternative No. 2 – Upgrade Equipment
The only viable alternative for the City to consider is the upgrade of the existing equipment. While the lift station has many deficiencies the structure and location are good and therefore there is no reason to consider a new lift station. The most cost effective alternative is to upgrade the equipment as described below.

It is recommended that two new submersible centrifugal pumps be installed to increase the reliability and redundancy. The pumps should be the same size as the original pumps and a new check valve and isolation valve vault should be installed next to the wet well. In addition to new pumps, the lift station should be equipped with new floats and a new control panel that includes a generator receptacle and a telemetry system (Omni). The new equipment and electrical design should be in compliance with NFPA 820.

It is also recommended that the lift station area be fenced to control vandalism.

City staff would like to explore the idea of discharging the Branding Iron Lift Station into the gravity sewer main along Lillie Avenue and then flow to the South Beech Lift station. This would significantly decrease the length of the force main. However, one disadvantage to this option is that the South Beech Lift station is not as large as the Carlson Lift Station, and therefore, future growth in the area may be limited. It is possible to increase the size of the South Beech Lift Station when it is rebuilt. At this time, it is not recommended to change the discharge location of the Branding Iron Lift Station. However, it is recommended that the City consider this as part of the predesign report for the South Beech Lift Station based on current development in the Branding Iron area.

The design criteria for the Branding Iron Lift Station would remain the same as the existing design criteria in Table 6-12.

A present worth analysis was not performed for this lift station analysis. The cost estimate for the new lift station is included in Appendix I. The estimated cost is $259,000 and includes contingency, TERO, sales tax, engineering design and construction administration.

DEL MONTE LIFT STATION

The Del Monte Lift Station is located on Wishkoski Way at the entrance of the Del Monte Warehouse. The lift station currently serves the domestic waste from Del Monte Foods; no industrial waste is discharged to this lift station. The lift station consists of an 8-foot precast manhole with dual submersible centrifugal pumps. The electrical service and control panel are located directly adjacent to the manhole, all of which is fenced. The lift station was constructed in 1996 and has not been significantly upgraded since its original construction.

Table 6-12 shows the design criteria for the existing Del Monte Lift Station.

TABLE 6-12

Existing Del Monte Lift Station Design Criteria

Parameter	Capacity
Wet Well Size	8-foot diameter, 20-feet
Number of Pumps	2
Type of Pumps	Submersible centrifugal
Pump Size	420 gpm, 35 feet TDH
Power	5 hp, 240V, 3-phase
Control/telemetry	Float switches/Autodialer

Based on Table 6-3, the lift station has sufficient capacity for the 20-year planning period. There were no significant deficiencies noted with this pump station with the

exception that the pumps are over 20-years old and need to be replaced. The City may want to consider changing the autodialer to the Omni system if the opportunity presents itself (i.e., if the dialer were to fail).

Del Monte Lift Station Recommended Improvements

The only recommended improvement for the Del Monte Lift Station is to replace the existing pumps. The pumps would be replaced in-kind with the City's standard which is Flygt submersible centrifugal pumps. The total estimated cost for the pump replacement is $47,000. This includes the assistance of an electrician, contingency, and sales tax. It is assumed that the City would replace the pumps themselves as this work would be considered O&M and a public bid process would not be required. Therefore the cost estimate does not include engineering design, construction administration, or TERO.

IDAHO LIFT STATION

The Idaho Lift Station is located on Idaho Street between State Route 22 and North Hawthorn Street. The Idaho Lift Station consists of a 5-foot precast manhole with dual submersible centrifugal pumps. The check valves and isolation valves are in a manhole near the wet well. The electrical service and control panel are located directly adjacent to the wet well. The lift station was originally constructed around 1990 and the City recently replaced both submersible pumps. This lift station serves a YIN Housing Authority housing complex. The original collection system and lift station were construction by the YIN Housing Authority, but are now owned and operated by the City.

Table 6-13 shows the design criteria for the existing Idaho Lift Station.

TABLE 6-13

Existing Idaho Lift Station Design Criteria

Parameter	Capacity
Wet Well Size	5-foot diameter, 18-feet deep
Number of Pumps	2
Type of Pumps	Submersible centrifugal
Pump Size	100 gpm, 17 feet TDH
Power	2 hp, 240V, 3-phase
Control/telemetry	Float switches/no telemetry
Emergency Power	Yes, generator receptacle

Based on Table 6-3, the lift station has sufficient capacity for the 20-year planning period. In general the lift station appears to be in good working condition and would appear to comply with the Ecology Orange Book Standards and requirements. The City would like to fence the lift station to prevent vandalism and dumping at the site. The

only other improvement that the City may want to consider is the addition of a telemetry system if an opportunity to install the Omni system presents itself.

Idaho Lift Station Recommended Improvements

It is recommended that the City fence the lift station to prevent vandalism and dumping at the site. The total estimated cost for the fence is $11,000. This includes the contingency and sales tax. It is assumed that the City would seek small works roster bids from three local vendors and would not go through a public bid process. Therefore, the cost estimate does not include engineering design, construction administration, or TERO.

SAFEWAY STORM SEWER LIFT STATION

The Safeway Storm Sewer Lift Station is located on Rentschler Lane near the intersection of Monroe Avenue. This lift station is not a sewage lift station and is not further discussed in this planning document. The City wants to include upgrades to this lift station in the capital improvement plan, but recognizes that it is part of the storm sewer system and is not a part of the sanitary sewer system. This lift station is a submersible centrifugal lift station that is operated similar to the City's sanitary sewer lift stations.

No capacity or condition assessment was performed on this lift station. It was noted by the operators that the station needs new submersible lift pumps. The pumps would be replaced in-kind with the City's standard pump type, which is Flygt submersible centrifugal pumps. The total estimated cost for the pump replacement is $49,000. This includes the assistance of an electrician, contingency, and sales tax. It is assumed that the City would replace the pumps themselves as this work would be considered O&M and a public bid process would not be required. Therefore, the cost estimate does not include engineering design, construction administration, or TERO.

SUMMARY OF RECOMMENDED LIFT STATION IMPROVMENTS

Table 6-14 is a summary of the recommended lift station improvements in the order of priority. Priority is typically based on regulatory requirements, reliability and redundancy needs, operations and maintenance considerations and City preference.

TABLE 6-14

Recommended Lift Station Improvements

Priority	Lift Station	Cost Estimate(1)
1	Penny	$360,000
2	South Beech	$460,000
3	Carlson	$813,000
4	Branding Iron	$259,000
5	Safeway Storm Sewer	$49,000
6	Del Monte	$47,000
7	Idaho	$11,000
Total Lift Station Improvements		**$1,999,000**

(1) Costs are in 2017 dollars.

COLLECTION SYSTEM CONDITION ASSESSMENT

SEWER VIDEOS

In 2015, the City purchased a sewer video camera system and began videotaping the collection system in order to assess the condition of the existing sewers and identify sources of I/I. The City videotaped sewers that were known to have significant operations and maintenance issues or known to have significant infiltration and inflow sources. The City's camera system does have limitations, as noted below:

- Depending on the pipe size, the drive can be equipped with different tire sizes. As the tire size increases, the power of the drive is decreased and the drive cannot pull the cable as far down the pipe.
- If there is too much water in the pipe, such as I/I, the camera is not operable. Due to the location of some of the pipes and the I/I, some pipes will always have too much water in them to video unless bypass pumping is provided.
- If the joints between the concrete pipe sections are offset too much or are too deteriorated, the drive cannot maneuver through to the next pipe section. Some of the older concrete pipe is comprised of 3-foot sections and therefore maneuvering the drive through these pipes can be very difficult.
- If there is too much exposed aggregate and too much debris, the drive has trouble navigating. The City attempted to jet some pipes, but jetting the pipes did not help the situation and created more debris due to the loose aggregate.
- If the sewers are too deep, it can sometimes be difficult to lower the camera and drive into the manhole and get it started (this was considered a minor issue by the City staff).

The total amount of sewer pipe that was videotaped was approximately 29,991 LF. These videos were then evaluated by the City's Engineer and classified as great, good, fair and poor. Definitions of the four conditions are provided below:

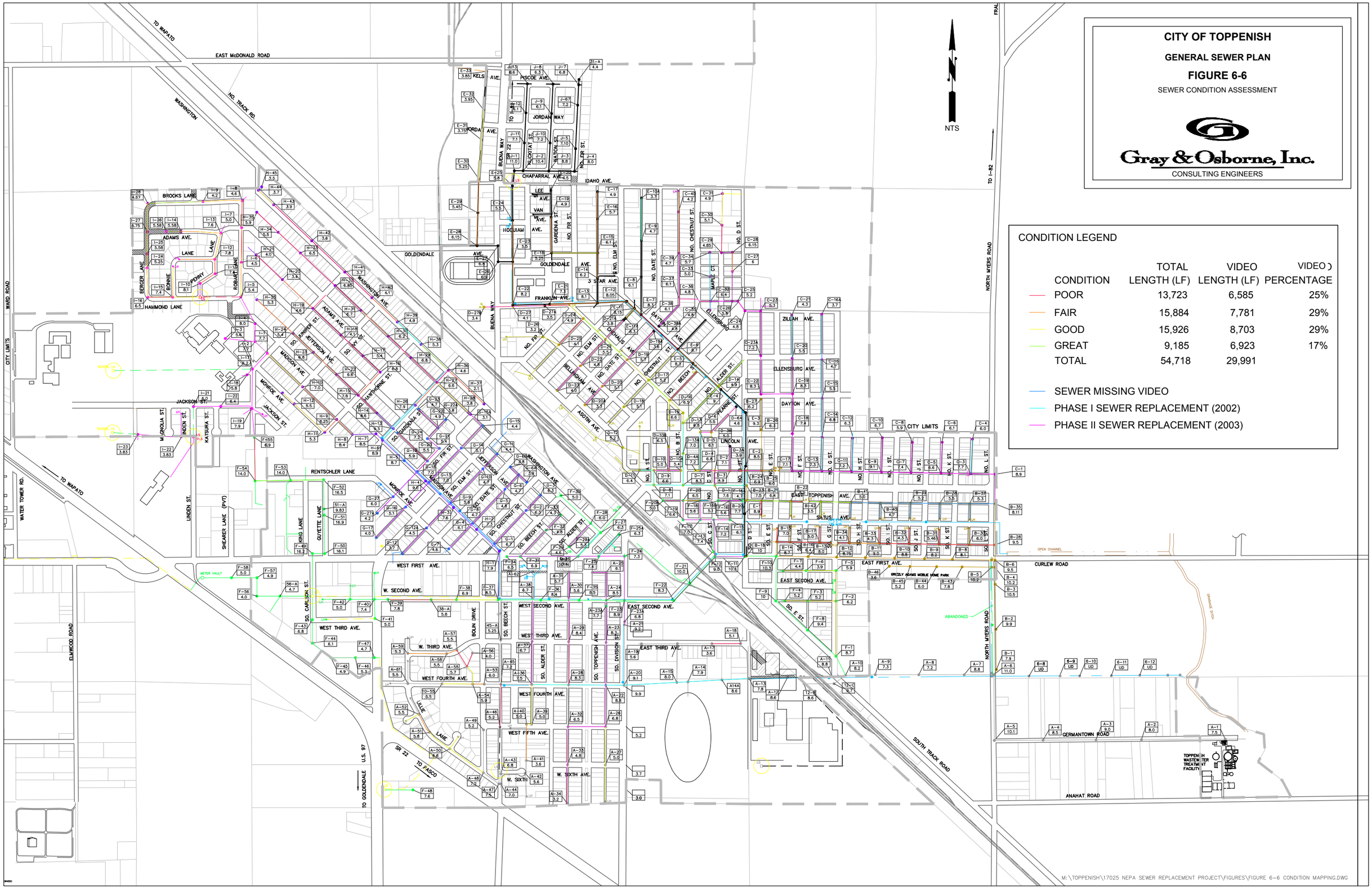
- Great – pipe segment is new and/or has very minor defects (failure unlikely in the foreseeable future); pipe exhibits little or no pipe deterioration, joint leakage (including at side sewers) or offsets, or differing hydraulic conditions (bellies).
- Good – pipe segment exhibits minor defects (failure unlikely within the next 20 years); pipe exhibits minor deterioration, minimal joint leakage (including at side sewers) and/or offsets, and minor pipe bellies (less than 1 inch).
- Fair – Pipe segment has moderate to severe defects (risk of failure within the next 5-20 years); pipe exhibits moderate to severe pipe deterioration, joint leakage (including at side sewers) and/or offsets, moderate to severe side sewer pipe bellies (1 inch to half pipe diameter).
- Poor – Pipe segment has failed or will likely fail within the next five years; pipe exhibits severe pipe deterioration (including sections of missing pipe or holes), numerous locations where infiltration/exfiltration could occur (pipe joints, side sewer and manhole connections, etc.), and severe pipe bellies (one-half to full pipe diameter).

Lengths of pipe that were only partially videotaped were evaluated based on what could be seen. For example, if the camera only captured the first 100 feet of a 400-foot sewer section, but could not go any further, then the condition of the 400-foot sewer section was based on the first 100 feet of observations. As a result, although 29,991lineal feet of sewer pipe were videotaped, observations were obtained for a total of 54,718 lineal feet of pipe. This is approximately 34 percent of the entire sewer system. As stated in Chapter 4, the entire sewer system is approximately 162,431 lineal feet.
Figure 6-6 shows is a graphical representation of the sewer system based on the video condition assessment and the condition legend listed. Table 6-15 is a summary of the video assessment findings.

TABLE 6-15

Sewer System Video Assessment

Condition	Total Length Assessed	Video Length (ft)	Percentage of Assessed System
Great	9,185	6,923	17%
Good	15,926	8,702	29%
Fair	15,884	7,781	29%
Poor	13,723	6,585	25%
Total	**54,718**	**29,991**	**100%**


CITY OF TOPPENISH
GENERAL SEWER PLAN
FIGURE 6-6
SEWER CONDITION ASSESSMENT
Gray & Osborne, Inc.
CONSULTING ENGINEERS
NTS
CONDITION LEGEND
CONDITION | TOTAL LENGTH (LF) | VIDEO LENGTH (LF) | VIDEO PERCENTAGE
POOR | 13,723 | 6,585 | 25%
FAIR | 15,884 | 7,781 | 29%
GOOD | 15,926 | 8,703 | 29%
GREAT | 9,185 | 6,923 | 17%
TOTAL | 54,718 | 29,991
SEWER MISSING VIDEO
PHASE I SEWER REPLACEMENT (2002)
PHASE II SEWER REPLACEMENT (2003)
EAST McDONALD ROAD
TO WAPATO
WASHINGTON
NO. TRACK RD.
WARD ROAD
CITY LIMITS
WATER TOWER RD.
ELMWOOD ROAD
LINDEN ST.
SHEARER LANE (PVT)
TO I-82
NORTH MYERS ROAD
SOUTH TRACK ROAD
CURLEW ROAD
GERMANTOWN ROAD
ANAHAT ROAD
OPEN CHANNEL
GRANGER DITCH
TOPPENISH WASTEWATER TREATMENT FACILITY
U.S. 97
TO GOLDENDALE
SR 22
TO PASCO
GOLDENDALE
BROOKS LANE
ADAMS AVE.
HAMMOND LANE
RENTSCHLER LANE
JACKSON ST.
MADISON AVE.
MONROE AVE.
WASHINGTON AVE.
JEFFERSON AVE.
HAWTHORNE ST.
SO. ELM ST.
SO. DATE ST.
SO. CHESTNUT ST.
SO. ALDER ST.
SO. BECCA ST.
SO. CARLSON ST.
BOLIN DRIVE
LILLIE LANE
WEST FIRST AVE.
W. SECOND AVE.
WEST SECOND AVE.
WEST THIRD AVE.
W. THIRD AVE.
WEST FOURTH AVE.
WEST FIFTH AVE.
W. SIXTH AVE.
EAST SECOND AVE.
EAST THIRD AVE.
SO. TOPPENISH AVE.
SO. DIVISION ST.
SO. E ST.
EAST FIRST AVE.
EAST TOPPENISH AVE.
SATUS AVE.
GRIZZLY ADAMS MOBILE HOME PARK
ABANDONED
METER VAULT
PISCOE AVE.
JORDAN WAY
CHAPARRAL AVE.
IDAHO AVE.
LEE AVE.
VAN AVE.
HOGUIAM AVE.
GOLDENDALE AVE.
J STAR AVE.
FRANKLIN AVE.
NO. FIR ST.
NO. ELM ST.
NO. DATE ST.
NO. CHESTNUT ST.
NO. D ST.
MAPLE CT.
ELLENSBURG
ZILLAH AVE.
ELLENSBURG AVE.
DAYTON AVE.
LINCOLN AVE.
CITY LIMITS
M:\TOPPENISH\17025 NEPA SEWER REPLACEMENT PROJECT\FIGURES\FIGURE 6-6 CONDITION MAPPING.DWG

For the most part, the City did not video the sewers that were replaced in the Phase I and Phase II sewer projects in 2002 and 2003. There were a couple areas where those sewers were videotaped and received a great condition rating. For purposes of this Plan it is assumed that all of the sewers that were installed in 2002 and 2003 have a rating of great. The total length of Phase I and Phase II project was 39,525 lineal feet, or 24 percent of the entire sewer system.

The condition of the sewers that have been videotaped can be extrapolated to the remaining system that has not been videotaped, based on the percentages shown in Table 6-15. Table 6-16 shows the extrapolation of the entire system. The extrapolation does not include the sewers that were replaced in the Phase I and Phase II project.

TABLE 6-16

Sewer System Video Assessment Extrapolated

Condition	Length (feet)	Percentage of Extrapolated System
Great	20,631	17%
Good	35,773	29%
Fair	35,678	29%
Poor	30,824	25%
Total	**122,906(1)**	**100%**

(1) The total length does not include sewers that were replaced in the Phase I and Phase II project. 161,431 LF – 39,525 LF = 122,906 LF

In general approximately 54 percent of the existing sewers, or 66,502 lineal feet are estimated to be in fair to poor condition and recommended for replacement. It is recommended that the City continue to videotape sewers to compile a more complete list of conditions. The City may want to employ the services of a contractor to video some of the larger mains that require bypass pumping.

SEWER REPLACEMENT PRIORITIZATION

For purposes of this Plan, the City would like to prioritize replacement based on modeled hydraulic capacity, age, condition, depth, known operations and maintenance issues, the City's 6-year transportation improvement plan (TIP) and the City's desires. The City receives a large part of their transportation funding from the Washington State Transportation Improvement (TIB) Board. In recent years it has become a priority for TIB to only fund those projects in which the underground utilities have been or will be improved in the near future. The goal is to avoid paving streets that have poor utilities, or delaying projects where the condition of the utilities is unknown.

Sewer Pipe Age

As stated in Chapter 4, most of the Toppenish collection system was constructed in two phases prior to 1920 and prior to 1952. The pipes installed in these periods were largely vitrified clay pipe (VCP) and concrete pipe. The Phase I and Phase II projects targeted the oldest concrete pipe and VCP, most of which was installed in between 1916 and the 1920s.

It is assumed that most of the system that has an unknown age was either installed in the 1916-1920 era or was installed in the 1950's. These pipes were all either concrete or VCP or are over 60 years old, and are recommended for replacement. There may be small sections that have been repaired or replaced as emergencies have required. These specific locations will be determined during the predesign phase and will be taken into consideration during the predesign phase to determine the extent of the replacement necessary in those areas.

Sewer Condition

As discussed previously, the City has spent considerable time and effort videotaping sewers to assess the condition. Figure 6-7 shows where video assessment has been completed and are pipes considered in fair or poor condition. It recommended that all sewers that have been videotaped and rated in fair or poor condition be replaced. As recommended earlier, the City should continue to video sewers to determine the system condition. Those videos would not only help to continue to compile a more complete list of conditions, but also the most suitable method for replacement. With each phase of replacement it is recommended that the City work with the engineer to develop a predesign report based on the most up to date videos available.

Sewer Depth

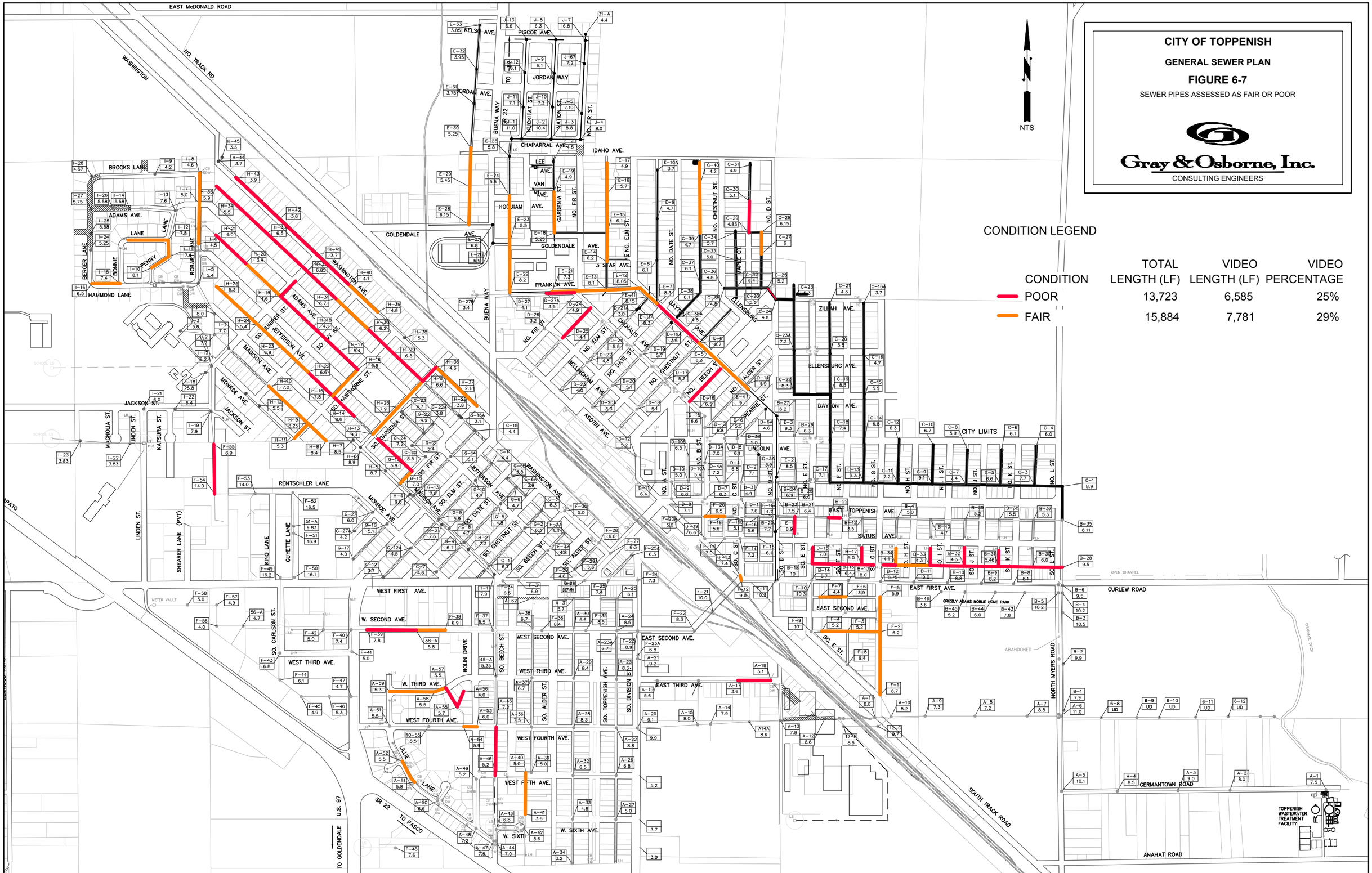
Due to the excessive I/I the City would like to consider replacement of the older sewers in areas over 5-feet in depth. It is believed that this is the average groundwater depth during the summer months. Figure 6-8 shows all of the sewers that are over 5-feet in depth.

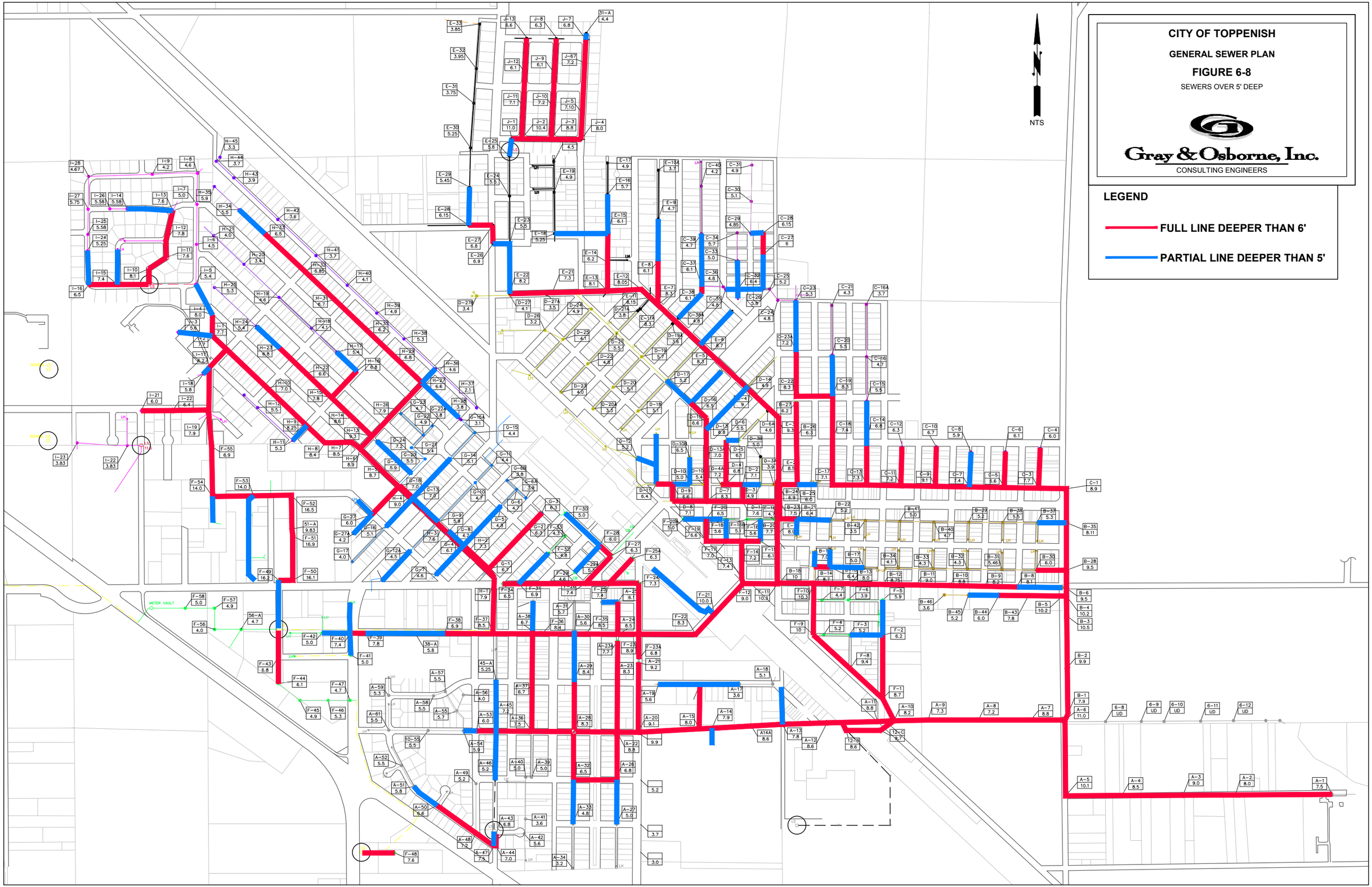
Operations and Maintenance

The City inspects 35 manholes each Friday. These manholes have been identified over the years as areas where there are potential backups. Figure 6-9 shows the location of these manholes. According to City staff most of the problems are believed to be due to flat lines where debris accumulates and causes backups.

6-Year TIP

Figure 6-10 shows the City's current 6-year TIP. The City's TIP is a living document that is modified and updated each June. With each phase of sewer work, the City should


CITY OF TOPPENISH
GENERAL SEWER PLAN
FIGURE 6-7
SEWER PIPES ASSESSED AS FAIR OR POOR
Gray & Osborne, Inc.
CONSULTING ENGINEERS
NTS
CONDITION LEGEND
CONDITION | TOTAL LENGTH (LF) | VIDEO LENGTH (LF) | VIDEO PERCENTAGE
POOR | 13,723 | 6,585 | 25%
FAIR | 15,884 | 7,781 | 29%
EAST McDONALD ROAD
WASHINGTON
NO. TRACK RD.
KELSO AVE.
PISCOE AVE.
JORDAN WAY
JORDAN AVE.
BUENA WAY
SR 22
KLOKITAT ST.
NATION ST.
NO. FIR ST.
CHAPARRAL AVE.
IDAHO AVE.
LEE AVE.
VAN AVE.
HOOJIAM AVE.
GARDENIA ST.
GOLDENDALE AVE.
3 STAR AVE.
FRANKLIN AVE.
NO. ELM ST.
NO. DATE ST.
NO. CHESTNUT ST.
NO. D ST.
MAPLE CT.
ELLENSBURG
DAYTON AVE.
BEECH ST.
ALDER ST.
PEARNE ST.
CHEHALIS AVE.
BELLINGHAM AVE.
ASOTIN AVE.
LINCOLN AVE.
ZILLAH AVE.
ELLENSBURG AVE.
CITY LIMITS
EAST TOPPENISH AVE.
SATUS AVE.
BROCKS LANE
ADAMS AVE.
LANE
PENNY LANE
BERGER LANE
BONNIE
ROBART LANE
HAMMOND LANE
GOLDENDALE
WASHINGTON AVE.
ADAMS AVE.
LINDER ST.
JEFFERSON AVE.
SO. 1ST ST.
MADISON AVE.
MONROE AVE.
JACKSON ST.
SO. HAWTHORNE ST.
SO. GARDENIA ST.
SO. FIR ST.
SO. ELM ST.
SO. DATE ST.
SO. CHESTNUT ST.
SO. BEECH ST.
SO. ALDER ST.
MAGNOLIA ST.
LINDEN ST.
KATSURA ST.
RENTSCHLER LANE
SHEARER LANE (PVT)
KING LANE
GUYETTE LANE
SO. CARLSON ST.
METER VAULT
WEST FIRST AVE.
W. SECOND AVE.
WEST SECOND AVE.
EAST SECOND AVE.
WEST THIRD AVE.
W. THIRD AVE.
EAST THIRD AVE.
WEST FOURTH AVE.
WEST FIFTH AVE.
W. SIXTH
W. SIXTH AVE.
BOLIN DRIVE
SO. TOPPENISH AVE.
SO. DIVISION ST.
LILLIE LANE
SR 22
TO PASCO
TO GOLDENDALE
U.S. 97
SO. E ST.
EAST FIRST AVE.
GRIZZLY ADAMS MOBILE HOME PARK
ABANDONED
CURLEW ROAD
NORTH MYERS ROAD
OPEN CHANNEL
DRAINAGE DITCH
SOUTH TRACK ROAD
GERMANTOWN ROAD
ANAHAT ROAD
TOPPENISH WASTEWATER TREATMENT FACILITY
M:\TOPPENISH\T0025\NEPA SEWER REPLACEMENT PROJECT\FIGURES\FIGURE 6-7 CONDITION MAPPING ONLY FAIR AND POOR.DWG



CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 6-8

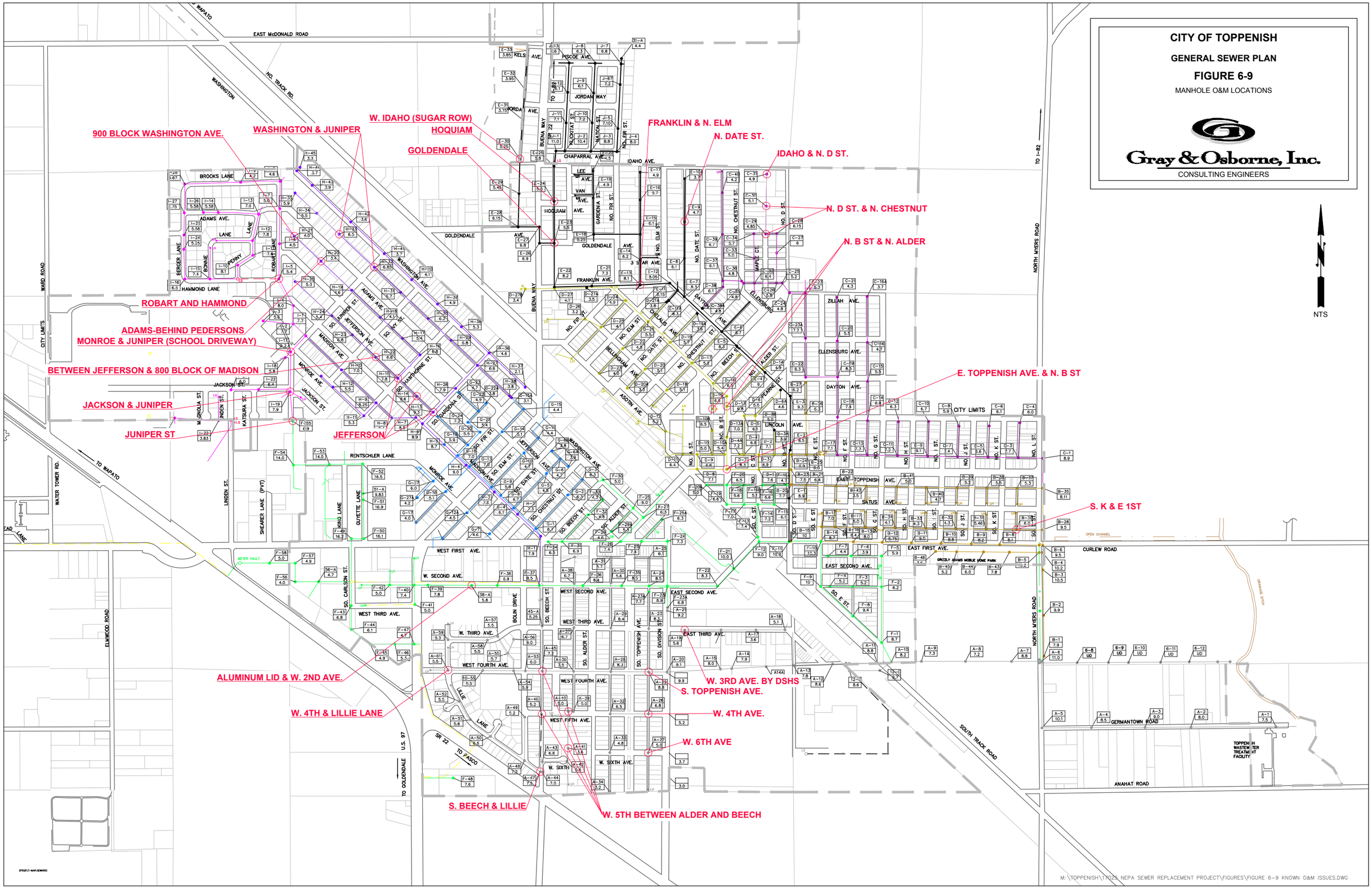
SEWERS OVER 5' DEEP

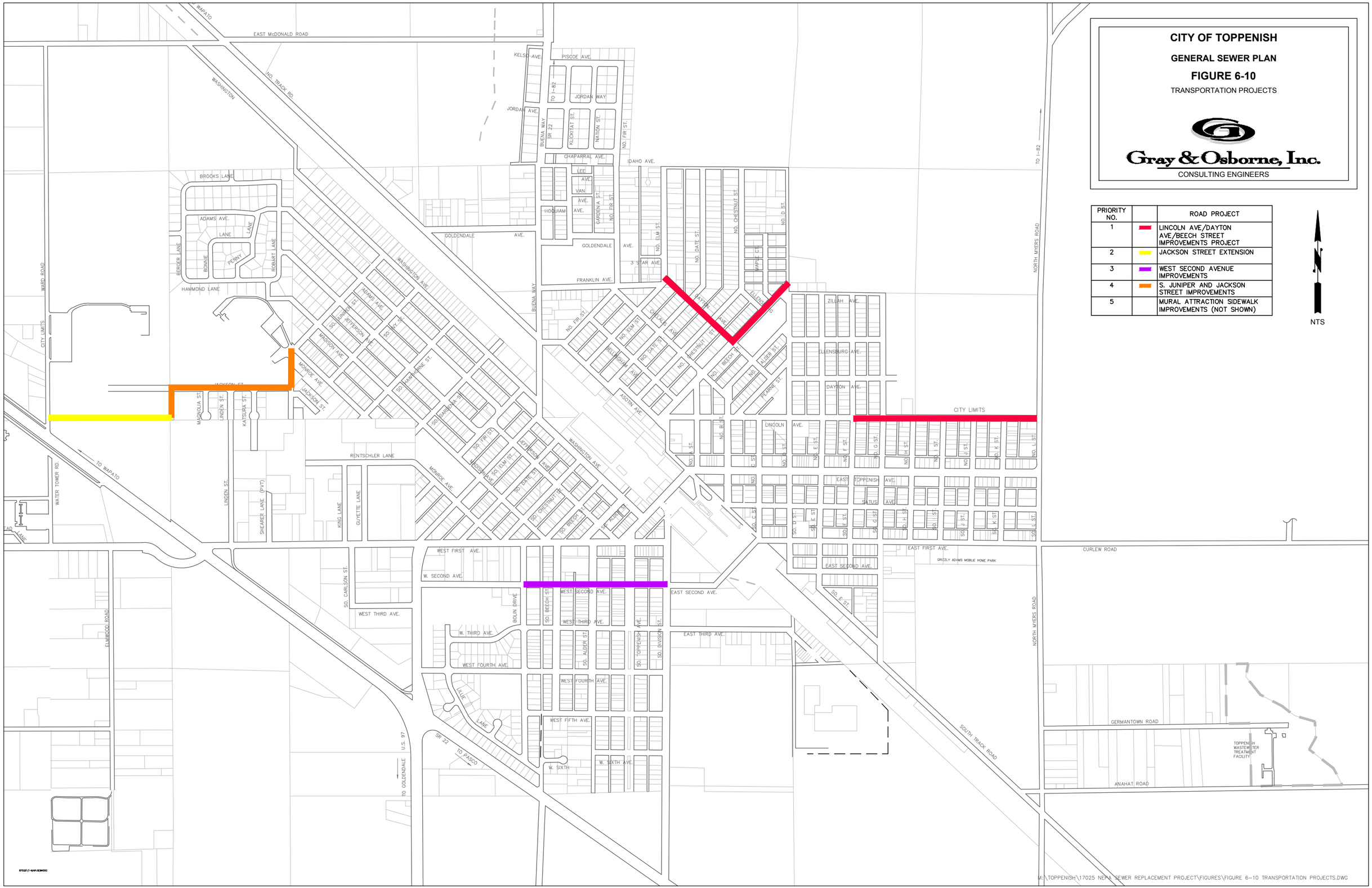
Gray & Osborne, Inc.
CONSULTING ENGINEERS

LEGEND

- FULL LINE DEEPER THAN 6'
- PARTIAL LINE DEEPER THAN 5'

M:\TOPPENISH\17025 NEPA SEWER REPLACEMENT PROJECT\FIGURES\FIGURE 6-8 PIPE DEPTHS.DWG


CITY OF TOPPENISH
GENERAL SEWER PLAN
FIGURE 6-9
MANHOLE O&M LOCATIONS
Gray & Osborne, Inc.
CONSULTING ENGINEERS
NTS
900 BLOCK WASHINGTON AVE.
WASHINGTON & JUNIPER
W. IDAHO (SUGAR ROW)
HOQUIAM
GOLDENDALE
FRANKLIN & N. ELM
N. DATE ST.
IDAHO & N. D ST.
N. D ST. & N. CHESTNUT
N. B ST & N. ALDER
ROBART AND HAMMOND
ADAMS-BEHIND PEDERSONS
MONROE & JUNIPER (SCHOOL DRIVEWAY)
BETWEEN JEFFERSON & 800 BLOCK OF MADISON
JACKSON & JUNIPER
JUNIPER ST
JEFFERSON
E. TOPPENISH AVE. & N. B ST
S. K & E 1ST
ALUMINUM LID & W. 2ND AVE.
W. 4TH & LILLIE LANE
W. 3RD AVE. BY DSHS
S. TOPPENISH AVE.
W. 4TH AVE.
W. 6TH AVE
S. BEECH & LILLIE
W. 5TH BETWEEN ALDER AND BEECH
EAST McDONALD ROAD
WASHINGTON
NO. TRACK RD.
TO WAPATO
WARD ROAD
CITY LIMITS
WATER TOWER RD.
LINDEN ST.
SHEARER LANE (PVT)
ELMWOOD ROAD
TO GOLDENDALE
U.S. 97
SR 22
TO PASCO
SOUTH TRACK ROAD
NORTH MYERS ROAD
TO I-82
CURLEW ROAD
GERMANTOWN ROAD
ANAHAT ROAD
TOPPENISH WASTEWATER TREATMENT FACILITY
GRIZZLY ADAMS MOBILE HOME PARK
OPEN CHANNEL
DRAINAGE DITCH
M:\TOPPENISH\17025 NEPA SEWER REPLACEMENT PROJECT\FIGURES\FIGURE 6-9 KNOWN O&M ISSUES.DWG



CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 6-10

TRANSPORTATION PROJECTS

Gray & Osborne, Inc.

CONSULTING ENGINEERS

PRIORITY NO.		ROAD PROJECT
1		LINCOLN AVE/DAYTON AVE/BEECH STREET IMPROVEMENTS PROJECT
2		JACKSON STREET EXTENSION
3		WEST SECOND AVENUE IMPROVEMENTS
4		S. JUNIPER AND JACKSON STREET IMPROVEMENTS
5		MURAL ATTRACTION SIDEWALK IMPROVEMENTS (NOT SHOWN)

N

NTS

compare the TIP to the sewer work to ensure that the priority transportation projects are coordinated with the sewer projects. For example, West 2nd Avenue between Bolin and Division will be reconstructed in 2018, the City will want to prioritize the replacement of sewers in this area.

SEWER REPLACEMENT SUMMARY

After review of the issues discussed in the previous section, four major sewer projects are recommended and are outlined in phases. The phases were prioritized based on the hydraulic modeling analysis (capacity issues), age, sewer condition, depth, O&M, and the City's 6-year TIP. Details of each phase are presented below and in Figure 6-11. The Phases are intended to be for planning purposes. The City will evaluate each phase dependent upon the priorities of the City when the funding is secured. For example the City may want to perform projects in the Phase II area first due to increasing O&M needs or transportation project needs. Alternatively the City may choose to perform projects in the Phase IV section of the City due to the large pipe diameters and the risk associated with this older larger pipe.

The City reserves the right to move projects up in priority depending on the current needs. Each phase of the project has a predesign phase which will help to determine the most current needs and priorities.

Phase I

Phase I was developed as the City's Facility Plan Amendment No. 1. Phase I includes the reconstruction of the Penny Lift Station, and sewers on west end of West 2nd Avenue, sewers in the Beech Street/Chestnut Street Ally and sewers along 3rd Avenue/Wishkoski Way. This project is expected to be constructed in 2017. The total cost of this project is $1,286,000 and is being funded by a grant and loan through the Department of Ecology.

Phase II

Phase II includes Basins 10, 11, 15, 16 and 25, which is primarily located in the northwest section of the City (see Figure 6-11). It is recommended that this section of sewer be completed as part of Phase II including two of the major lift station upgrades, Carlson Lift Station and South Beech Lift Station.

This area of the City was targeted for the Phase II improvements largely due to the age of the system, the known condition of the system and the O&M required. Although not confirmed, it is believed that most of the system in these basins was constructed in the 1916-1920s and the 1950s and is comprised of VCP and concrete pipe.

The City has videotaped 68 percent of the pipes in the area, and 61 percent of those pipes that were videotaped were in poor to fair condition, lending them to replacement. Finally, nearly 30 percent of the manholes inspected each week are in these basins which further substantiates the need for replacement.

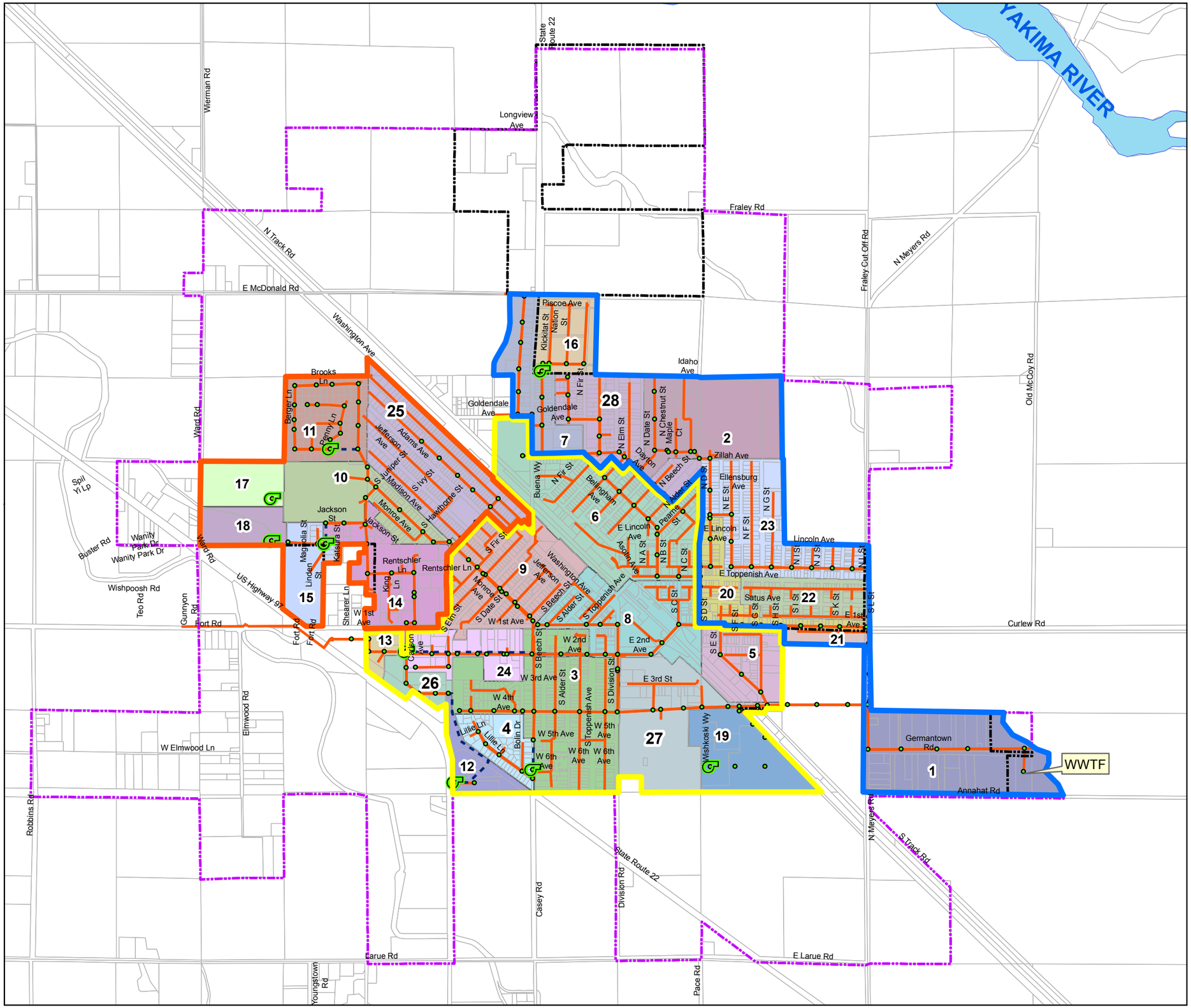
As previously stated, the City will want to evaluate the 6-year TIP to ensure that the utility and transportation needs are being met. For example, the City may include West 2nd Avenue improvements in Phase II improvements to ensure that the transportation needs are also being met.

Table 6-18 is an estimate of costs for sewer replacement and includes the construction of the Carlson and South Beech Lift station improvements. The detailed lift station and pipe replacement cost estimates can be found in Appendix I. The following assumptions were included.

- Sewers that would serve the future development north of the school and west of Penny Lift Station would be increased in size to account for future developments. The development of Basin 33, is further discussed at the end of this chapter.
- The remaining system would be replaced with existing pipe sizes.
- Sixty-five percent of the system in these basins would require replacement based on the analysis above.
- Seventy-five percent of the pipe replacement would utilize the open cut method of pipe installation and twenty-five percent of the replacement would utilize trenchless methods. This assumption is due to the age and condition of the existing sewers, and known operation and maintenance issues within the City. The use of trenchless technologies for pipe replacement does not allow realignment or upsizing (beyond one pipe size) of existing sewers. Thus, any gravity sewers lacking adequate slope or capacity, or that have deteriorated beyond the point at which trenchless replacement is effective, will require replacement by open excavation.
- A predesign report would be developed to evaluate additional sewer videos and assist in determining the final method of construction (i.e., trenchless versus open-cut). The predesign report would also assess the required flow rate at the Carlson Lift Station based on development in the area.
- A Cultural Resource Survey would be required and coordinated with the YIN.
- A 25 percent contingency, 3 percent TERO and 7.9 percent sales tax are included in the cost estimate.

Phase III

Phase III includes Basins 3, 4, 5, 6, 8, 12, 13, 14, 19, 24, 26, and 27, which is primarily located in the southwest section of the City (see Figure 6-11). It is recommended that this section of sewer be completed as part of Phase III, including upgrades to the Branding Iron Lift Station.



N

0 2,100 4,200 Feet

LEGEND:

PHASE
- II

PHASE
- III

PHASE
- IV

- LIFT STATION
- MANHOLES
- UGA
- CITY LIMITS
- FORCE MAIN
- GRAVITY MAIN
- WATER
- PARCELS

CITY OF TOPPENISH

GENERAL SEWER PLAN

FIGURE 6-11

SEWER REPLACEMENT PHASES

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\17025 NEPA Sewer Replacement Project\FIGURES\GIS\Figure 6-11 Sewer Replacement Phases.mxd

This area of the City was targeted for the Phase III improvements largely due to the age of the system and the O&M required. Although not confirmed, it is believed that most of the system in these basins was constructed in the 1916-1920s and the 1950s and is comprised of VCP and concrete pipe. Not as much is known about the existing condition of the sewer pipes in this area, and it is recommended that the City continue to video these sewer lines. A large portion of the pipes in Basin 3, 8, and 9 were replaced as part of the 2002 and 2003 sewer rehabilitation project. By replacing sewers in this area, the I/I will be reduced thereby reducing the load on the newly reconstructed Carlson Lift Station and increasing the capacity for development in Basin 33 and Basin 37. The development of these basins is more specifically discussed at the end of this Chapter.

The City has videotaped 25 percent of the pipes in the area, and 33 percent of those pipes that were videotaped were in poor to fair condition, lending them to replacement. Finally, nearly 30 percent of the manholes inspected each week are in these basins, which further substantiates the need for replacement.

Table 6-18 is an estimate of costs for sewer replacement and the construction of Branding Iron Lift station improvements. The detailed lift station and pipe replacement cost estimates can be found in Appendix I. The following assumptions were included.

- The system would be replaced with existing pipe sizes.
- Forty percent of the system in these basins would require replacement based on the analysis above.
- Seventy-five percent of the pipe replacement would utilize the open-cut method of pipe installation.
- Twenty-five percent of the pipe replacement would utilize a trenchless technology.
- A predesign report would be developed to evaluate additional sewer videos and assist in determining the final method of construction (i.e., trenchless versus open-cut). The predesign report would also assess the required flow rate at the Branding Iron Lift Station based on development in the area.
- It is assumed that the Branding Iron Lift Station improvements can be delayed five or more years.
- A Cultural Resource Survey would be required and coordinated with the YIN.
- A 25 percent contingency, 3 percent TERO and 7.9 percent sales tax are included in the cost estimate.

Phase IV

Phase IV includes Basins 1, 2, 7, 20, 21, 22, 23, and 28, which is primarily located east of the railroad tracks (see Figure 6-11). It is recommended that this section of sewer be completed as part of Phase IV, including any upgrades related to the development of

Basin 39 and Basin 42. The development of these basins is more specifically discussed at the end of this Chapter.

Phase IV would be the last area improved. This area would include some of the deepest and largest of the City's sewer pipes and some of the most difficult to replace. Those sewers include those that are closest to the WWTF.

The City has videotaped 31 percent of the pipes in the area, and 61 percent of those pipes that were videotaped were in poor to fair condition, lending them to replacement.

Table 6-18 is an estimate of costs for sewer replacement. The detailed pipe replacement costs can be found in Appendix I. The following assumptions were made.

- Sewers that would serve the future development of Basin 33 and Basin 37 would be upsized to accommodate development. The development of these basins is further discussed at the end of this chapter.
- The remaining system would be replaced with existing pipe sizes.
- Sixty-five percent of the system in these basins would require replacement based on the analysis above.
- Seventy-five percent of the pipe replacement would utilize the open-cut method of pipe installation.
- Twenty-five percent of the pipe replacement would utilize a trenchless technology.
- A predesign report would be developed to evaluate additional sewer videos and assist in determining the final method of construction (i.e., trenchless vs. open-cut).
- A Cultural Resource Survey would be required and coordinated with the YIN.
- A 25 percent contingency, 3 percent TERO and 7.9 percent sales tax are included in the cost estimate.

COLLECTION SYSTEM ALTERNATIVES CONSIDERED

Three alternatives were considered for these collection system improvements:

1. Do Nothing
2. Open Trench Replacement
3. Trenchless Technologies

Do Nothing Alternative

For planning purposes the City must consider a do nothing alternative to the proposed improvements described for the collection system. If the City were to do nothing the pipes and pump stations would continue to deteriorate. Pump stations would become more unreliable and risk failure resulting in sewer backups or overflows. The collection

system would deteriorate to the point that sewer collapse could occur resulting in sewer backups or overflows. These failures could have severe environmental impacts.

It is not in the City's best interest to further consider a do nothing alternative due to the environmental impact a sewage spill could have and the additional stress this type of failure could have on the City's resources and capital funds. The City is dedicated to being proactive and therefore the do nothing alternative is not further considered.

Open Trench and Trenchless Technologies Alternative
Both open trench and trenchless technologies were considered as part of the capital improvement plan. There are advantages and disadvantages to both options. For planning purposes it is assumed that approximately 25 percent of the collection system improvements will be completed using trenchless technologies and 75 percent will be completed by using the open trench method. As described previously, a predesign report will be issued with each phase of work that further details the exact replacement method based on the City's sewer video work that will continue in the next year. This will provide the City with the most cost effective approach.

A present worth analysis on the collection system upgrade alternatives does not apply due to the fact that the operations and maintenance costs are the same regardless of the method of installation.

COLLECTION SYSTEM IMPROVEMENT SUMMARY

A summary of the recommended improvements to the collection system based on capacity (model results), lift station capacity and condition assessment and pipeline assessment are listed in Table 6-17.

TABLE 6-17

Capital Improvement Summary

Phase	Current Sewer Project	Estimated Cost
I	Penny Lane	$360,000
	2017 Collection System Improvements	$886,000
II	Pipe Replacement	$4,785,000
	Carlson Lift Station	$813,000
	South Beech Lift Station	$460,000
III	Pipe Replacement	$8,816,000
	Branding Iron Lift Station	$259,000
IV	Pipe Replacement	$4,989,000
V	Safeway Storm Sewer Lift Station	$49,000
VI	Del Monte Lift Station	$47,000
VII	Idaho Lift Station	$11,000
Total Collection System Improvements		**$21,475,000**

*These costs do not include the General Facility Charge Study and the Facility Plan that are recommended in future chapters for a total project cost of $21,580,000.

As previously stated Phase I improvements are already being designed and will be constructed in 2017. The remaining projects are expected to be completed over the next 5-10 years depending on funding availability. A schedule and funding are presented in Chapter 8.

WATER AND ENERGY CONSERVATION

When evaluating the collection system improvements recommended above, water and energy conservation must be considered to ensure that the City is taking into consideration compliance with its own Green House Gas Reduction Emission Policy Resolution (No. 2010-19) and its commitment to water use efficiency as detailed in the City's Water System Plan.

Pipe replacement projects do not have a water and energy conservation evaluation associated with them; however, improvements at each lift station should consider both water and energy conservation. The lift station improvements recommended as a part of this Plan do not include the use of water; therefore water conservation is not considered. All of the lift stations will include the replacement of existing pumps with the exception of the Linden Street and Idaho Lift Stations. The pumps that are recommended at Penny, Carlson, South Beech, Branding Iron, Del Monte and Safeway will all be the City's standard submersible centrifugal Flygt pump. The pumps will be specified with N-style impeller which is promoted to be a self-cleaning impeller thereby resulting in a high efficiency pump that keeps energy costs low. In addition, where applicable the City will specify premium efficiency motors (IE3). The City is committed to energy conservation through specifying N-style impellers and premium efficiency motors.

OPERATIONS AND MAINTENANCE COSTS

Operations and maintenance (O&M) costs should be evaluated for any capital improvement plan. Chapter 8 describes the City's operating funds in detail. The City's 2016 sewer operating fund expenditures were $1,469,707.40. This includes operations and maintenance for both the collection and treatment systems. This also includes the City's utility tax which is collected with the sewer revenue and transferred to the General Fund as an expense.

The City does not anticipate a significant change in the operations and maintenance costs related to the improvements recommended in this Plan. There may be some energy savings with the installation of higher efficiency pumps. In addition if enough I/I is eliminated from the system, energy costs may decrease due to shorter pump run times. However, to be conservative the City is assuming that the energy usage will remain the same. There may also be some savings in operations and maintenance costs related to correcting some of the more deteriorated pipes in the system. For example, the City inspects over 30 manholes each Friday to check for sewer backups. The City hopes to decrease the amount of manhole inspections and focus that time elsewhere. At this time it is unknown what savings could be achieved by improving the system.

In summary, to be conservative, the City is assuming that the O&M costs will remain the same and have assumed that costs will increase at 3 percent per year to account for inflation. There are no other increases in O&M costs anticipated for these improvements.

The City recognizes the importance of planning ahead for the replacement and repair of equipment and establishing a reserve account is required by some funding programs (Rural Development). Appendix J includes a list of short-lived assets that the City may consider in funding a future reserve account.

FUTURE SERVICE AREAS

There are areas of the UGA that the City has further studied to determine the anticipated service requirements. These areas were chosen based on the development potential known to City officials. These basins are shown on Figure 6-4 and are further described below.

BASIN 33 (ELMWOOD ROAD/LANE)

Basin 33 serves the West Elmwood Lane area south of the YIN Casino and west of the Branding Iron Lift Station. The area's future land use is residential. As explained in the modeling effort, assumptions for future flows were based on land use and future I/I. The assumed peak hour flow for Basin 33 is estimated to be 118 gpm. All collection system facilities in this area are assumed to be sized for 118 gpm.

There are two potential pathways for sewer to flow in this basin. The first pathway considered was to flow sewers to the east toward the Branding Iron Lift Station (Basin 12). The second pathway considered was to flow sewers to the north toward the Carlson Lift Station (Basin 13). After reviewing the topography in the area, it was determined that a lift station in the Elmwood Area would be required. It is not possible to reach Basin 12 or 13 using gravity sewers. A small lift station similar to the Linden or the Penny Lift Station would be constructed along Elmwood Road and all sewers in Basin 33 would be directed to this lift station.

The force main discharge would be directed north towards Basin 13, towards the Carlson Lift Station. There are two distinct advantages to this pathway. The first advantage is that there is an existing force main from the YIN complex that crosses Highway 97. The second is that an irrigation canal crossing would not be required. It would be advantageous to tie into this existing force main near the intersection of Elmwood Road and Fort Road. Additional capacity analysis would have to be performed based on the future capacity requirements of the YIN Complex to ensure that this force main is sufficient for the future. It is considerably longer distance to discharge to the Branding Iron Lift Station, and would require a canal crossing as well as a new crossing at Highway 97. This configuration also requires additional pumping at the Branding Iron Lift Station which would increase operational costs because it would not only be pumped at the Branding Iron Lift station, but also the Carlson Lift Station.

BASIN 37 (PENNY LANE/HIGH SCHOOL)

Basin 37 serves the northwest corner of the City, north of Toppenish High School and west of the Penny Lane area. The area's future land use is residential, and it is currently undeveloped farmland. The City believes that there is potential for development in this area and would like to look more specifically at how this area will be served. For planning purposes, it is assumed that all of this area will be residential based on future land use, but it is likely that the School District would expand to the north. It is more conservative to assume that this area will be residential because that will result in greater flows.

As explained in the modeling effort, assumptions for future flows were based on land use and future I/I. The assumed peak hour flow for Basin 37 is estimated to be 136 gpm. All collection system facilities in this area are assumed to be sized for 136 gpm.

BASIN 39 (SUGAR BEET FACTORY)

Basin 39 is located in the northwest portion of the City, and is generally termed the "Sugar Beet Factory." This area is the former location of a sugar beet factory that was shut down in the late 1970's. The area has changed ownership a number of times; however, in recent years there has been renewed interest in redeveloping this area, which has a future land use of industrial/manufacturing. As explained in the modeling effort, assumptions for future flows were based on land use and future I/I. The assumed peak

hour flow for basin 39 is estimated to be 196 gpm. All collection system facilities in this area are assumed to be sized for 196 gpm.

The topography in this area is very flat, and it is likely not feasible to serve this area with gravity sewers. In addition there is a canal along East McDonald road that will require either a bridge crossing or a boring underneath the canal. In anticipation of future service in this area the City installed a casing pipe under the canal oriented north/south. The City also installed a casing pipe across SR22, north of McDonald Road oriented in the east/west direction. This pipe is anticipated to serve Basin 42 discussed below.

It is assumed that flows within the basin could be directed to the intersection of State Route 22 and Fraley Road where a lift station would be installed. The lift station would pump flows along State Route 22 to the existing casing pipe under the canal

BASIN 42 (NORTH & WEST YIN HOUSING PARK)

Basin 42 is located in the northeast corner of the City, north of Idaho Street and on the north and east side of the YIN Housing Park. The area's future land use is residential, and it is currently undeveloped farmland. The City believes that there is potential for development in this area and would like to look more specifically at how this area will be served. There is approximately 47 acres of land directly to the east of the YIN Housing Park; it is assumed that eventually the YIN will develop this area into an additional housing park. The remaining 152 acres would be developed into residential use.

As explained in the modeling effort, assumptions for future flows were based on land use and future I/I. The assumed peak hour flow for Basin 39 is estimated to be 309 gpm. All collection system facilities in this area are assumed to be sized for 309 gpm.

This basin could potentially be divided into two or three smaller basins depending on what areas are developed first and the sequence of construction. The 47 acres directly east of the YIN Housing Park would likely flow towards the YIN Housing Park collection system and the Idaho Lift Station if it is developed into YIN Housing. If it is not developed into YIN Housing, it would be likely that this flow would be directed east toward North D Street and would flow into Basin 2, bypassing the lift station. The remaining area east of the YIN Housing Park would flow east toward North D Street and then flow into Basin 2.

The area north of the canal will require a lift station to pump across the canal. Flows would be directed east from SR 22 towards North D Street where a lift station would be constructed across the canal toward the lower Basin 42 or Basin 2. Dependent upon the timing of the development the City may want to consider directing this flow towards Basin 39, the Sugar Beet Factory to take advantage of a future lift station in this area and canal crossing. Flowing this direction would be at an adverse grade, but the area is very flat and an adverse grade may be feasible. As previously stated there is already a casing pipe under SR 22 in anticipation of this service.

FUNDING FUTURE SERVICE AREAS

It is assumed that the majority of the costs for developing the Basins 37, 39, and 42 would be borne by a developer. Basin 33 already has significant development, so these areas could potentially be a combination of public and private funding.

FUNDING BASIN 37, 39, AND 42

As a result of these areas being developer driven, many of the funding programs that the City is eligible for to complete public works projects are not likely good matches for development work. It is assumed that the additional operation and maintenance costs associated with these improvements will be financed entirely through sewer service rates, and the City will continue to examine its rate structure on an ongoing basis to ensure that new connections pay their fair share of costs.

General Facility Charges

It is likely that the primary funding source for financing the capital improvements described herein is through the City's general facility charges, as described in Toppenish Municipal Code 13.46.020. The City's current connection charge for a single connection to the City's main is $2,000 plus the costs of materials and repairs to infrastructure. This fee is low when compared to neighboring municipalities.

The general facility charge (GFC) is intended to provide reserves for the City to use in financing improvements required because of growth. The current GFC charge is on a per connection basis and it is recommended that it be reevaluated on a per ERU basis to ensure that commercial/industrial users pay their fair share. It is recommended that the City develop an additional general facility charge specifically for new connections in these areas. This would allow the City to better identify future costs to develop the area and ensure that adequate funding is available. The cost of a General Facility Charge Study to determine costs on an ERU basis and specific ERU development costs is estimated to be $20,000.

Yakima County Supporting Investments in Economic Development (SIED)

In 1999, the Legislature passed RCW 82.14.370 for the purpose of financing public facilities in the State of Washington serving economic development purposes. Obtaining funding from this source is dependent upon the City's ability to promote economic development, encourage local revitalization, align with regional goals and plans, the degree of public benefit, demonstration of need, construction readiness, local funding match, and the number of jobs created or retained. This funding source would primarily be used for funding improvements associated with the Basin 39, the Sugar Beet Factory, or any connection related to Washington Beef.

Community Economic Revitalization Board (CERB)

This low interest loan and grant program is sponsored by the Department of Trade and Economic Development. Funding is available for infrastructure that supports projects that will result in specific private developments or expansions in manufacturing, and businesses that support the trading of goods and services outside the state border. Funding is not available to support retail shopping developments or acquisition of real property. The projects must create or retain jobs, and the average funding amount available is $3,000 per job created or retained. The interest rate for CERB funding fluctuates with the state bond rate. It is highly likely that industrial development in Basin 39 or Washington Beef would qualify for CERB funding, thereby serving as an excellent funding source for the industrial growth, but the capital improvements required for serving residential growth would not be eligible.

FUNDING BASIN 33

Basin 33 has some opportunities for both economic development, private housing development, and connections for existing homes. Therefore, there are a variety of funding options that would be available depending on the connections desired.

Connections related to existing residential, commercial, or industrial connections located in Basin 33 would all be required to pay a General Facility Charge. Similar to Basins 37, 39 and 42, the City should develop a specific connection charge for this area. This would allow the City to better identify future costs to develop the area and ensure that adequate funding is available.

Any connection or development of the Washington Beef site would be eligible for the same economic development funding mentioned above, Yakima County SIED and CERB. The expansion and or retention of jobs at the Washington Beef facility is vital to the economic health of the City of Toppenish, and therefore these programs would be key to the sewer connection for Washington Beef.

Public Funding Opportunities

The connection of existing homes in Basin 33 could potentially be funded through a variety of public financing opportunities depending on the reason for connection (such as failing septics), the level of low-to-moderate income residents, and desire of the residents to connect. The following programs are public financing opportunities that the City could use to connection existing homes in Basin 33:

- **Community Development Block Grant (CDBG).** A primary requirement of the CDBG program is that the project must principally benefit areas with at least 51 percent low-to-moderate income (LMI) residents. The General Purpose program provides grant funds for the design, construction, or reconstruction of water and sewer systems up to the amount of $750,000.

- **Utility Local Improvement District.** Another potential source of funds for capital projects in Basin 33 can be obtained through the formation of Utility Local Improvement Districts (ULIDs) involving a special assessment made against properties benefiting by the project.
- **General Obligation Bonds.** The City, by special election, may issue general obligation bonds to finance almost any project of general benefit to the City. By the nature of the improvements described herein, bonds may not be a reasonable option for the City. However, it is worthwhile to understand how a bond could be used, in case a scenario occurs wherein bond financing is preferable.
- **USDA Rural Development**. USDA Rural Development (RD) has a loan program that, under certain conditions, includes a limited grant program. RD has a loan program for needy communities that cannot obtain funding by commercial means through the sale of revenue bonds. The loan program provides long-term, 30- to 40-year loans at an interest rate that is based on federal rates and varies with the commercial market.
- **State Revolving Fund/Centennial Clean Water Fund.** In 1986, the Washington State Legislature established the Centennial Clean Water Fund (CCWF) and State Revolving Fund (SRF). The Legislature directed that the CCWF and SRF be used to finance the planning, design, acquisition, construction, and improvement of water pollution control facilities and activities.

FUNDING SOURCE SUMMARY

Table 6-18 summarizes which funding sources are the most likely for funding capital improvements in each service area.

TABLE 6-18

Service Area Funding Sources

Sewer Service Area	Funding Source
Basin 33	General Facility Charges Yakima County SIED (Washington Beef) CERB (Washington Beef) ULID Ecology SRF CDBG
Basin 37	General Facility Charges
Basin 39	General Facility Charges Yakima County SIED CERB
Basin 42	General Facility Charges

CHAPTER 7

WASTEWATER TREATMENT FACILITY SUMMARY

CHAPTER 7

WASTEWATER TREATMENT FACILITY SUMMARY

INTRODUCTION

This chapter presents a summary of the operations of the City's WWTF and discussions on the future planning and improvements that may be required for the City to comply with its NPDES permit requirements. It is not within the scope of this General Sewer Plan to assess capacity and develop a capital improvement plan for the WWTF, but it is recognized that the future of the WWTF will need to be considered in future planning efforts and financial plans.

The original wastewater treatment facility was first constructed in 1953. Major upgrades took place in 1979, 1995, and 2008. The treatment facilities include screening, grit removal, influent pump station, primary clarifiers, aeration basins, secondary clarifiers, UV channel, and an outfall to the Toppenish Drain. The solids treatment facilities include a primary and secondary anaerobic digester, screw press, rotary drum thickener, and sludge drying beds. The facility produces Class B biosolids for disposal at a local farm facility. Figure 4-3 shows a process flow schematic of the major components of the WWTF. Figure 4-4 shows a site plan of the WWTF.

EXISTING WWTF PERMIT

As discussed in Chapter 2 of this Plan, the City's WWTF is regulated directly by the EPA due to the fact that it is located within the bounds of the Yakama Nation Reservation. The facility operates under NPDES Permit No. WA0026123 which was issued on July 1, 2013 and expires on June 30, 2018. The permit is located in Appendix B of this Plan. The City will be applying for a renewal of the permit in January 2018. The effluent limits are shown in Table 4-4. In general the City has met the requirements of their permit with the exception of some items noted below.

The City received a notice of violation (NOV) in July of 2016 related to a 2015 on-site inspection performed by EPA staff. The NOV was largely focused on the development and submittal of the City's Quality Assurance Plan for all monitoring required by the permit. The City worked diligently to reassess their QAP to conform to the requirements of the EPA and have since resubmitted the QAP without issue to the EPA.

The City has been meeting the current effluent permit requirements with the exception of one effluent violation for zinc in February 2015. The City believes that this violation was a result of a sampling error as it was a single sample that caused the violation. All other samples were well within the effluent limit.

The City is struggling to operate within the design flow of the WWTF during the summer months due to the excessive I/I. The stated design flow of the WWTF is 1.67 mgd on a

maximum month basis. As shown in Table 5-3, the City is currently exceeding the rated maximum month flow and maximum day flow. As a result the City is operating outside of its regulatory standard for influent flow to the WWTF.

The City's NPDES permit requires the City to compute an annual average value for flow based on the previous twelve months of data. The annual average flow must be calculated as the sum of all the daily flow measurements taken during the previous twelve months divided by the number of daily flow measurements taken during the previous twelve months. When the annual average of the daily flow exceeds 1.42 mgd, which is 85% of the facility design flow of 1.67 mgd, the permittee must develop a facility plan and schedule within one year from the date of the first exceedance. The plan must include the permittee's strategy for continuing to maintain compliance with effluent limits and must be made available to the EPA Director or authorized representative upon request.

The City has exceeded the 1.42 mgd threshold and therefore should complete a facility plan. The facility plan should amend the original facility plan and should address the City's plan to maintain adequate capacity. The capital improvements listed in this General Sewer Plan are targeted to reduce I/I which in turn will reduce flows to the WWTF, increasing the available capacity.

The estimated cost of a facility plan amendment is approximately $85,000.

FUTURE PERMITTING

As stated above the City will be applying for a renewal of their NPDES permit in January 2018. A new permit will be issued by July 2018 or alternatively the EPA will administratively extend the existing permit.

At this time the City does not know the future of their permit. The City has concerns with continuing to meet the limits set forth for metals (copper, lead, selenium, and zinc). The current limits are very low, in the past EPA had wanted to increase the frequency of testing to once per week in lieu of once per month. The City was able to get the EPA to agree to once per month sampling as once per week would be very costly and is very time consuming.

In addition to concerns regarding the metals limits, the City is also concerned with the limits set forth for total phosphorous which is currently a seasonal limit (March – October) of 48 lbs/day on an average monthly basis, and 82 lbs/day on an average weekly basis. The City has been able to meet the limits in the permit; however due to the excessive I/I and issues with quality of the influent (a low BOD_5 to P ratio) the City may not be able to reliably meet lower limits for phosphorous. The City has been studying their phosphorous removal through the assistance of a study funded by the South Central Washington Resource Conservation and Development Council. The study resulted in a report Providing Support to Wastewater Treatment Plants in the Yakima Basin: Implementing Sustainable Strategies for Reducing Nutrient Discharge in Rural and Low Income Communities. The report was authored by two of the leading wastewater

engineers in the industry Dr. H. David Stensel and Dr. James L. Barnard. The WWTF operators worked with Drs. Stensel and Barnard over the course of a year to collect data and modify operations in hopes of optimizing phosphorous removal. The WWTF operators were able to improve biological phosphorous removal. However, the issues with I/I and quality of influent continue to decrease the performance of the biological phosphorous removal.

Additional studies are currently underway to determine the best course of action for the City to more reliably meet future phosphorous limits taking into account the excessive I/I and low quality influent. This study will result in a recommended plan to specifically improve phosphorous removal at the WWTF.

IDENTIFIED OPERATIONS AND MAINTENANCE NEEDS

The City has identified a number of existing and future operational and maintenance needs. Table 7-1 is a list of projects that the City staff has identified to be included in a future facility planning effort

TABLE 7-1

City Staff Identified Maintenance/Equipment Needs

Process	Maintenance/Equipment Needs
Headworks	Screen Chain/Bearings Maintenance
Influent Pump Station	Pump Replacement or Addition
	Level Transducer Replacement
Primary Clarifier No. 1	Scum Pump Replacement
	Clarifier Drive Motor Replacement
Primary Clarifier No. 2	Pipe Replacement (leak detection testing)
	Concrete Tank Coating
Primary Sludge Building	Remove/Salvage Blowers
Aeration Basin	Internal Recycle Pump Replacement
	Anoxic Mixer Maintenance
Blower Building	Rebuild Blowers
RAS/WAS Pump Station	Pump Replacement
Filtrate Tank	Level Transducer Replacement
	Pump Replacement
Solids Handling	Digester Recirculation Pump Maintenance
	Mix Pump Maintenance
	Digester Building Roof Replacement
	Heat Exchanger Replacement
NPW Pump Station	Pump Rebuild
Operations Building	Remove/Salvage Old Generator
	Lab Equipment Update
	Building Roof Replacement
	SCADA Software Update

*Note that the staff also expressed the need for aeration basin and secondary clarifier expansion for capacity. Those expansions will be specifically addressed in the Facility Plan Amendment.

SUMMARY WWTF ISSUES

The City's existing WWTF has been in operation for nearly 10 years. The WWTF has successfully met the effluent limit requirements of its NPDES permit with the exception of one violation for zinc in February 2015. The City is struggling with excessive infiltration which contributes to a reduced performance at the WWTF. The City is operating above its rated capacity of 1.67 MGD on a maximum month basis due to the excessive infiltration. Table 7-2 shows an estimated time table for the WWTF Improvements.

TABLE 7-2

Estimate Timetable for WWTF Improvements

Task	Estimate Date of Completion
Apply for renewal of the NPDES permit	January 2018
Complete the General Sewer Plan embarking on a five year project to reduce I/I thereby reducing load at WWTF	General Sewer Plan - September 2017; I/I Reduction Project – December 2022
Complete the Phosphorus Removal Study that will recommend capital improvement related specifically to improving phosphorus removal at the WWTF	Phosphorus Removal Study - December 2017; WWTF Improvements – TBD by study
Complete a Facility Plan Amendment to address a plan to maintain adequate capacity, address maintenance issues (including but not limited to those identified in Table 7-1) and include recommendations determined by the Phosphorus Removal Study	Facility Plan Amendment – December 2019 WWTF Improvement – TBD by Facility Plan Amendment
Update the City's 20-year financing plan to include WWTF upgrades	Upon completion of Facility Plan Amendment.

It was not within the scope of this Plan to study the WWTF and develop a capital improvement plan. The City recognizes that any recommended improvements to the WWTF will need to be included in the 20-year financial plan in the future and will update that plan as necessary.

CHAPTER 8

CAPITAL IMPROVEMENT AND FINANCING PLAN

CHAPTER 8

CAPITAL IMPROVEMENT AND FINANCING PLAN

INTRODUCTION

This chapter presents a plan for financing the capital improvements recommended in the previous chapters in the Plan. This chapter includes a review of the City's current financial status, available revenue sources, allocation of revenues, and the impact of the recommended capital improvement plan on sewer rates.

EXISTING SERVICE RATES AND CONNECTION CHARGES

The City collects revenue through connection charges and service rates that are annually, or more often if necessary, established by ordinance. The last ordinance, 2014-11 was adopted in January of 2014. Service rates are based on the designated class of user. The base monthly rate per single residential unity is $63.90. Each commercial service (that uses over 2,000 cubic feet of water) is charged a base charge of $42.07 per month plus a usage charge of $2.61 for each 100 cubic feet of potable water usage.

The City's current connection charge for a single connection to the City's main is $2,000.00 plus the costs of materials and repairs to infrastructure.

HISTORICAL OPERATIONS

Sewer utility revenues, expenditures, and the resulting effects on water utility cash and investments for the years 2012-2016 are summarized in Table 8-1.

TABLE 8-1

Historical Revenues and Expenditures

Sewer Revenues	2012	2013	2014	2015	2016
Unreserved Fund Balance	**$1,264,896.47**	**$1,041,937.56**	**$1,101,723.44**	**$1,260,046.78**	**$1,351,087.38**
Sewer Sales	$1,953,086.55	$2,062,804.43	$2,079,813.33	$2,734,506.74	$2,772,613.67
Other	$2,618.37	$3,345.45	$11,187.82	$30,086.07	$50,201.25
Investment Interest	$2,834.83	$2,867.10	$5,465.30	$6,223.54	$8,364.18
Total Revenue	**$1,958,539.75**	**$2,069,016.98**	**$2,096,466.45**	**$2,770,816.35**	**$2,831,179.10**
Fund Total	**$3,223,436.22**	**$3,110,954.54**	**$3,198,189.89**	**$4,030,863.13**	**$4,182,266.48**
Expenditures					
Sewer Operation	$1,155,791.99	$975,783.92	$907,450.93	$1,605,428.82	$1,469,707.40
Loan Repayment	$849,921.33	$849,043.13	$848,944.94	$846,016.69	$845,748.60
Sewer Capital Fund (other funds)	$122,452.01	$134,404.05	$125,167.50	$123,622.53	$124,233.97
Capital Purchase - Equipment	$0.00	$0.00	$6,579.74	$54,707.71	$39,232.93
Vehicle Replacement Program	$53,333.33	$50,000.00	$50,000.00	$50,000.00	$50,000.00
Total Expenditures	**$2,181,498.66**	**$2,009,231.10**	**$1,938,143.11**	**$2,679,775.75**	**$2,528,922.90**
Net Revenues					
Yearly Net Revenues	**($222,958.91)**	**$59,785.88**	**$158,323.34**	**$91,040.60**	**$302,256.20**
Ending Fund Balance	**$1,041,937.56**	**$1,101,723.44**	**$1,260,046.78**	**$1,351,087.38**	**$1,653,343.58**

Sewer Revenue

Following is a short description of the sewer revenues shown above:

- **Unreserved Fund Balance -** is the operating fund budget forwarded from the previous year.
- **Sewer Sales -** are all sewer sales (residential, commercial, etc.) including connection fees and service assistance fees.
- **Other** – are revenue from the sale of surplus items, scrap metal, etc. For planning purposes it will be assumed that the City will collect $10,000 per year in the future.
- **Investment Interest** – are funds generated from banking investments related to the sewer fund. For planning purposes it will be assumed that the City will collect $6,200 per year in the future.

Sewer Expenditures

Following is a short description of the sewer expenditures shown above:

- **Sewer Operation** - are the annual cost of operating the collection and treatment system, including operator and administration salary and benefits, office supplies, utility costs, insurance, vehicle maintenance, permits and fees, and other miscellaneous costs.
- **Loan Repayment** – covers the annual repayment of five existing sewer system loans. The total payment at this time is $850,000. Following is a description of the loans and when the loan term expires.

    - Public Works Trust Fund Loan No. 4 (2021)
    - Public Works Trust Fund Loan No. 5 (2022)
    - Public Works Trust Fund Loan No. 7 (2025)
    - Ecology Loan, Centennial (2021)
    - Ecology Loan, SRF (2030)

- **Sewer Capital Fund** – are expenses related to capital projects. Presently the City contributes approximately 1 percent of the unreserved fund balance to this fund. For planning purposes it will be assumed that the City will transfer approximately $124,000 per year to this fund in the future.
- **Capital Purchase – Equipment –** these are expenses related specifically to equipment purchase. For planning purposes it will be assumed that the City will transfer approximately $55,000 per year to this fund in the future.
- **Vehicle Replacement Program –** The City designates approximately $50,000 to a vehicle replacement program for the sewer department. The City plans to continue to program for the 20-year planning period.

In general the sewer revenues have increased over the past five years. The City collects a utility tax on sewer charges. This tax is typically transferred to the General Fund and has the same revenue and expense on the City's sewer budget. The City started including this tax in the sewer revenue and operating expenses in 2015 and therefore a large increase in sewer revenue is shown in 2015 and 2016. This increase is balanced by a large increase in sewer operations in 2015 and 2016 when the funds are transferred to the General Fund.

The City did have a deficit of revenue versus expenses in 2011 and 2012. 2011 was the first year that the City made a payment on the recent WWTF upgrade loans and therefore for two years the City had a net revenue deficit. By the year 2013 the revenues exceeded expenses and have continued to exceed expenses since that time.

CAPITAL IMPROVEMENT PROGRAM

This section provides a schedule and financing plan for the collection system needs that have been identified in previous chapters of this report. Table 8-2 summarizes the projects and the estimated costs.

TABLE 8-2

Capital Improvement Summary

Phase	Current Sewer Project	Estimated Cost	Funding Source
I	Penny Lane	$360,000	Ecology(1)
	2017 Collection System Improvements	$886,000	Ecology(1)
II	Pipe Replacement	$4,785,000	Public Financing
	Carlson Lift Station	$813,000	Public Financing
	South Beech Lift Station	$460,000	Public Financing
III	Pipe Replacement	$8,816,000	Public Financing
	Branding Iron Lift Station	$259,000	Public Financing
IV	Pipe Replacement	$4,989,000	Public Financing
V	Safeway Storm Sewer Lift Station	$49,000	General Fund
VI	Del Monte Lift Station	$47,000	Equipment Fund
VII	Idaho Lift Station	$11,000	Equipment Fund
General Facility Charge Study		$20,000	Capital Fund
WWTF Facility Plan Amendment		$85,000	Capital Fund(2)
Total Collection System Improvements		**$21,580,000**	**---**

(1) Funding for this project has already been secured.
(2) The Facility Plan is eligible for Ecology funding if funding is available.

As noted previously in this Plan, the Phase I of the Sewer Improvements has already been funded by an Ecology grant and loan package. Phase II, III and IV will have to seek public financing from sources such as Rural Development, Ecology, etc., these programs are further explained below. It is anticipated that the City will include some match money from their sewer funds in any project financing plan to demonstrate their own investment and commitment to the project. The total funding sought from public financing programs is $20,122,000.

Because the Safeway Storm Sewer Lift Station is a storm lift station and not a sewer lift station, improvements for this lift station will need to be funded from the General Fund.

The City has committed to paying for the improvements to the Del Monte Lift Station and the Idaho Lift Station from the Capital Purchase – Equipment Fund and will not be seeking financing for these smaller projects from outside funding sources.

The City will be financing the General Facility Charge Study and the Facility Plan Amendment from the operating funds. The Facility Plan Amendment may be eligible for planning money from the Department of Ecology; however at this time it is assumed to come from the Sewer Capital Fund.

PUBLIC FINANCING SOURCES

The following section describes several financing sources available to the City. Each funding source has different eligibility dependent upon the programs goals and mission. In addition each funding source has different requirements for how they may calculate the City's grant and loan eligibility. Some programs rely on a City's median household income statistics while other programs look at the City's low-to-moderate income status. Following is a description of each program.

DEPARTMENT OF COMMERCE CDBG GENERAL PURPOSE GRANT

The Department of Commerce administers the Community Development Block Grant (CDBG) General Purpose Grant Program. This program makes funds available annually through a competitive application process to assist Washington cities, towns, and communities. Eligible activities include "public facilities such as water, wastewater, and streets." A main emphasis of this program is to provide services to low- and moderate-income (LMI) persons. To be eligible for the program a city must be over 51 percent LMI. According to the most recent CDBG data, the City of Toppenish is 73 percent LMI and is therefore eligible for the program. The maximum grant available is $750,000, the applications are typically due in June of each year.

DEPARTMENT OF ECOLOGY STATE REVOLVING FUND

Ecology administers the State Revolving Fund (SRF) program, which makes no- and low-interest loans available to communities with qualifying projects. Application for these funds is through Ecology's annual funding cycle in the fall. SRF loans are available for planning, design, and construction projects. Loans are available for terms up to 20 years at interest rates that are calculated at 60 percent of the average municipal bond interest rate. For qualifying low-income communities, zero percent loans can be made available.

Grant and loan eligibility is based on what Ecology terms as hardship. Hardship is when a City's monthly rate exceeds 2 percent of the median household income (MHI). According to the most recent Ecology funding handbook, the City of Toppenish's MHI is $29,135. The City's current monthly rate is $63.90 which is approximately 2.6 percent of the MHI, per Ecology's funding guidelines the City is currently at moderate hardship. Ecology has four levels of hardship as shown in Table 8-3.

TABLE 8-3

Ecology Hardship Funding

Sewer Fee / MHI	**<2%**	**>/=2%but<3%**	**>/=3% but <5%**	**>/=5%**
Hardship Designation	Non-hardship	Moderate hardship	Elevated hardship	Severe hardship
20-Year Loan Rates	1.5%	1.0%	0.5%	0.0%
Grant Eligibility	Not Eligible	50% up to $5M	75% up to $5M	100% up to $5M

The City has benefited from Ecology funding in the past receiving significant grant and loan for the 2010 Wastewater Treatment Facility Upgrades, the funding of this General Sewer Plan and the funding of the Phase I Sewer Systems upgrades (Penny Lane Lift Station and Collection Sewers).

USDA-RURAL DEVELOPMENT

The USDA Rural Development agency (RD) has a loan program which, under certain conditions, includes a limited grant program. Grants may be awarded when the average user rate exceeds 1.5 percent of the median household income. Loans are offered at interest rates of around 2.0 to 3.0 percent at terms up to 40 years. Because RD is a federal funding program, an environmental report meeting the requirements of NEPA is required.

REVENUE BONDS

Another source of funds for construction of major utility improvements is the sale of revenue bonds. The City would issue the tax-free bonds. The major source of funds for debt service on these revenue bonds is from sewer service rates. In order to qualify to sell revenue bonds, the City must show that its net operating income (gross income less expenses) is equal to or greater than a debt coverage factor times the annual principal and interest payments due for all outstanding bonded indebtedness. The debt coverage factor is applicable to revenue bonds sold on the commercial market. The City's bond writer will set the debt coverage factor and it may vary from 1.2 to 1.4.

GENERAL OBLIGATION BONDS

The City, by special election, may issue general obligation bonds to finance almost any project of general benefit to the City. Assessments levied against all privately owned properties within the City will pay for the bonds. This includes vacant property that otherwise would not contribute to the cost of such general improvements. This type of bond issue is usually reserved for municipal improvements that are of general benefit to the public, such as arterial streets, bridges, lighting, municipal buildings, firefighting

equipment, parks, and water and wastewater facilities. Because the money is raised by assessment levied on property values, the business community also provides a fair share of funds to pay off such bonds.

General obligation bonds have the best market value and carry the lowest interest rate of all types of bonds available to the City.

Disadvantages of general obligation bonds include the following:

- Voter approval is required which may be time-consuming, with no guarantee of successful approval of the bond.
- The City would have a practical or legal limit for the total amount of general obligation debt. Financing large capital improvements through general obligation debt reduces the ability of the utility to issue future debt for projects such as parks and community facilities that cannot be directly funded through enterprise funds.

UTILITY LOCAL IMPROVEMENT DISTRICTS

Another potential source of funds for improvements comes through the formation of Utility Local Improvement Districts (ULIDs) involving an assessment made against properties benefited by the improvements. ULID bonds are further guaranteed by revenues and are financed by issuance of revenue bonds. ULID financing is frequently applied to sewer system extensions into previously unserved areas. Typically, ULIDs are formed by the municipality at the written request (by petition) of the property owners within a specific area of the municipality. Upon receipt of a sufficient number of signatures on petitions, the local improvement area is defined, and a sewer system is designed for that particular area in accordance with the municipality's general comprehensive plan. Each separate property in the ULID is assessed in accordance with the special benefits the property receives from the sewer system improvements.

DEVELOPER FINANCING

Developers may fund the construction of extensions to the sewer system to property within new plats. The developer extensions are turned over to the City for operation and maintenance when completed.

It may be necessary, in some cases, to require the developer to construct more facilities than those required by the development in order to provide either extensions beyond the plat and/or larger pipelines for the ultimate development of the sewer system. The City may, by policy, reimburse the developer through direct outlay, latecomer charges, or reimbursement agreements for the additional cost of facilities, including increased size of pipelines over those required to serve the property under development. Construction of any pipe in commercial or industrial areas that is larger than the size required to serve the development should also be considered as an oversized line possibly eligible for compensation.

COMMUNITY ECONOMIC REVITALIZATION BOARD (CERB)

CERB is administered through the Department of Commerce and provides funding to local governments for public infrastructure which supports private business growth and expansion. Eligible projects for CERB funding include domestic and industrial water, storm water, wastewater, public buildings, telecommunications and port facilities, among others. CERB can provide funding for the following opportunities:

- Committed Private Partner Program: A private business or development is ready to occur and is contingent on approval of CERB funds. The project will create a significant number of permanent jobs or generate significant private capital investment. The median hourly wage of private sector jobs created after the project is completed must exceed the countywide median wage. Up to $300,000, or 50 percent of the total award, whichever is less, may be awarded as grant, with a 20 percent cash match required.
- Planning Projects: Limited funds are available to fund studies which evaluate high priority economic development projects. Priority is given to applications which could ultimately result in a type of project eligible for CERB construction funds. Up to $50,000 may be awarded as grant and a 25 percent cash match is required.
- Prospective Development Construction Program: Rural communities may receive loans and grants for public infrastructure to enable future business development. The City would be eligible for this program if an economic feasibility study demonstrated that private business development is likely to occur as a result of the public improvements. As with the Committed Private Partner Program, the development would need to lead to significant job creation, and it must be demonstrated that the applicant has no other feasible funding alternative. Up to $300,000, or 50 percent of the total award may be awarded as grant, with a 50 percent cash match required.

GENERAL FACILITY CHARGE

A General Facility Charge (GFC) is a charge to connect to and purchase capacity in the sanitary sewer system and to address the added demand placed upon the system. A GFC is intended to cover the cost of developing the necessary capital facilities to support the expanded capacity. A GFC is typically charged when a new development connects to a City's system or expansions of a development necessitates additional capacity. A GFC study can be performed to evaluate recommended GFC charges for expansions to the system.

SUMMARY FUNDING STRATEGY

Many of the funding programs described above, such as the CERB program, are specific to a City's particular needs. The most likely funding programs for the capital improvements necessary in Table 8-2 are Ecology Centennial/SRF Program, Rural

Development and CDBG. A key strategy in the City's financing plan is to schedule the new debt to coincide with the payoff of the existing debts. The City has four existing loans that will be retired between the years of 2021 and 2025. This strategy will alleviate the impact on the rate payers. As previously stated the City will be seeking $20,122,000 in project financing for this project.

As a first step to securing project financing, the City plans to apply to Rural Development for Phases II, III and IV of the capital improvements program. Due to the City's status of "operating outside of the regulatory standards" the City is eligible for up to 75 percent grant. The City is committed to investing approximately $125,000 from their reserves as part of this project.

RD requires loans exceeding $500,000 to use interim financing. There are additional costs related the interim financing that must be included in the budget. At this time it is estimated that interim financing would be approximately $250,000. Table 8-4 summarizes this type of RD funding package.

TABLE 8-4

RD Funding Summary

Source	**Amount**
RD – Grant	$15,279,000
RD – Loan	$4,968,000
City Match Funds	$125,000
Total Funding Package	**$20,372,000(1)**

(1) Includes an estimate of costs related to interim financing.

This funding package would result in a rate increase of approximately $4.26 per month (based on a 40 year term at 2.3 percent interest). The projects would be completed over a five year period starting in the year 2018 concluding in the year 2023. In summary this would result in very little if any rate impact to the citizens due to the loan retirements that are scheduled in in the years 2021 and 2022.

The City realizes that this is an aggressive funding package and a 75 percent grant package may not be feasible. As a result the City would also consider an Ecology funding package. If the City were to apply to Ecology for a loan of $20,122,000 the resulting rates would be $91 per month which results in a hardship status of 3.7 percent (based on a 20 year term at 2.3 percent interest). This would qualify the City for

"elevated" hardship resulting in 75 percent grant up to $5 million and 20 year loan rate of 0.5 percent. Table 8-5 summarizes this type of Ecology funding package.

TABLE 8-5

Ecology Funding Summary

Source	Amount
Ecology – Grant	$5,000,000
Ecology – Loan	$14,997,000
City Share Funds	$125,000
Total Funding Package	**$20,122,000**

The projects would be completed over a five year period starting in the year 2019 concluding in the year 2024 with the first loan payment due in the year 2025. As previously stated, by the year 2025 many of the City's older loans will be retired and be paid off resulting in some debt capacity. The net rate impact to the citizens would be approximately $15 per month per rate payer.

The City realizes that both of these funding packages are very aggressive and a combination of funding may be required. Alternatively the City may have to split the project out to be completed over more than five years. However, it is the City's preference to complete the projects in the next five years given the age of the system. The lift stations that require major rehabilitation are all nearly 40 years old and most of the collection system is nearing 70 years old with much of it being over 100 years old. The City is committed to completing the projects in the most cost effective manner possible while also keeping the rates reasonable for their citizens.

In summary the rate impact to the citizens will be between $0-$15 per month depending on the funding package secured and the ability to schedule the new loan repayments to coincide with the retirement of the existing debt.

Tables 8-6 and 8-7 are 10-year financing plans based on a RD funding package (Table 8-6) and an Ecology funding package (Table 8-7). For both tables the City's operating fund outlines projected revenues and expenditures, existing and projected debt service, and the amount of additional revenues required to meet projected debt service.

Table 8-6, the RD package, sewer sales have been adjusted to increase approximately 2 percent per year until the year 2022 when the City's existing debt service is significantly decreased due to a loan retirement. At that time the City can consider a 1 percent rate increase to offer some relief to the financial burden of the rate payers. It has been the City's practice in recent years to increase the base rate 2 percent yearly to match the increased cost of operations. To be conservative the projections do not include growth.

The sewer operating expenses have been adjusted to increase at approximately 3 percent per year to account for inflation.

Table 8-6 shows an increasing ending fund balance in the future, but the City is cautious that this financing plan does not include improvements to the City's Wastewater Treatment Facility. As stated in Chapter 7 there are a number of capital improvements that may need to be considered in the future due to aging equipment and the unknown status of the City's future permit requirements. As the Plan recommends, the City should complete a wastewater treatment facility plan in the near future to further evaluate the treatment needs and update this financing plan. A major upgrade to the WWTF to meet capacity or permitting needs could easily cost several million dollars which would significantly impact the sewer fund.

Table 8-7, the Ecology package, shows that net revenues will be negative for several years after the first loan payments are due. The City may choose to raise rates at more than 2 percent (the table reflects a 4 percent increase after the year 2024) at that time to ensure revenues are meeting expenses as stated previously the overall rate increase would have to be approximately $15. It should be noted that the ending fund balance is still healthy for the City despite expenses exceeding revenue in those years. Similar to Table 8-7, the City is cautious that although the ending fund balance is increasing overall, the financing plan doesn't include upgrades to the WWTF.

COMMERCIAL FINANCING

Many of the funding programs require the City to seek commercial financing in advance of applying to their program. The City will investigate to commercial financing as required. If the City were to apply for commercial financing it is likely that the rates would be a minimum of 4-5 percent with a 20-year term. This results in a rate increase of $33-34 per month. At that point the City would not be able to complete the project as it would be cost prohibitive to its citizens.

TABLE 8-6
Projected Revenues Expenses
Rural Development Funding Package[1]
2017-2026

Revenues	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Unreserved Fund Balance	**$1,653,343.58**	**$1,905,610.90**	**$2,163,350.12**	**$2,385,005.51**	**$2,617,327.63**	**$2,860,048.01**	**$3,338,766.48**	**$3,603,255.73**	**$3,844,745.54**	**$4,061,921.38**
Sewer Sales	$2,828,065.94	$2,884,627.26	$2,942,319.81	$3,001,166.20	$3,061,189.53	$3,091,801.42	$3,122,719.44	$3,153,946.63	$3,185,486.10	$3,217,340.96
Other	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00
Investment Interest	$7,000.00	$6,224.54	$6,224.54	$6,224.54	$6,224.54	$6,224.54	$6,224.54	$6,224.54	$6,224.54	$6,224.54
Total Revenue	**$2,845,065.94**	**$2,900,851.80**	**$2,958,544.35**	**$3,017,390.74**	**$3,077,414.07**	**$3,108,025.96**	**$3,138,943.98**	**$3,170,171.17**	**$3,201,710.64**	**$3,233,565.50**
Fund Total	**$4,498,409.52**	**$4,806,462.70**	**$5,121,894.47**	**$5,402,396.26**	**$5,694,741.70**	**$5,968,073.97**	**$6,477,710.46**	**$6,773,426.91**	**$7,046,456.18**	**$7,295,486.88**
Expenditures										
Sewer Operation	$1,513,798.62	$1,559,212.58	$1,605,988.96	$1,654,168.63	$1,703,793.69	$1,754,907.50	$1,807,554.72	$1,861,781.36	$1,917,634.80	$1,975,163.85
Loan Repayment (Pre 2017)	$850,000.00	$850,000.00	$850,000.00	$850,000.00	$850,000.00	$593,500.00	$593,500.00	$593,500.00	$593,500.00	$552,000.00
Phase I Loan			$47,000.00	$47,000.00	$47,000.00	$47,000.00	$47,000.00	$47,000.00	$47,000.00	$47,000.00
General Sewer Plan Loan		$4,900.00	$4,900.00	$4,900.00	$4,900.00	$4,900.00	$4,900.00	$4,900.00	$4,900.00	$4,900.00
Phase II-IV RD Loan							$192,500.00	$192,500.00	$192,500.00	$192,500.00
Sewer Capital Fund (other funds)	$124,000.00	$124,000.00	$124,000.00	$124,000.00	$124,000.00	$124,000.00	$124,000.00	$124,000.00	$124,000.00	$124,000.00
Capital Purchase - Equipment	$55,000.00	$55,000.00	$55,000.00	$55,000.00	$55,000.00	$55,000.00	$55,000.00	$55,000.00	$55,000.00	$55,000.00
Vehicle Replacement Program	$50,000.00	$50,000.00	$50,000.00	$50,000.00	$50,000.00	$50,000.00	$50,000.00	$50,000.00	$50,000.00	$50,000.00
Total Expenditures	**$2,592,798.62**	**$2,643,112.58**	**$2,736,888.96**	**$2,785,068.63**	**$2,834,693.69**	**$2,629,307.50**	**$2,874,454.72**	**$2,928,681.36**	**$2,984,534.80**	**$3,000,563.85**
Net Revenues										
Yearly Net Revenues	**$252,267.32**	**$257,739.22**	**$221,655.39**	**$232,322.12**	**$242,720.38**	**$478,718.47**	**$264,489.26**	**$241,489.81**	**$217,175.83**	**$233,001.65**
Ending Fund Balance	**$1,905,610.90**	**$2,163,350.12**	**$2,385,005.51**	**$2,617,327.63**	**$2,860,048.01**	**$3,338,766.48**	**$3,603,255.73**	**$3,844,745.54**	**$4,061,921.38**	**$4,294,923.03**
Approximate Monthly Rate	**$63.90**	**$65.18**	**$66.48**	**$67.81**	**$69.17**	**$69.86**	**$70.56**	**$71.26**	**$71.98**	**$72.70**
Rate Increase	**---**	**2%**	**2%**	**2%**	**2%**	**1%**	**1%**	**1%**	**1%**	**1%**

(1) The projected revenues and expenses does not include significant upgrades at the City's WWTF.

TABLE 8-7
Projected Revenues Expenses
Ecology Funding Package[1]
2017-2026

Revenues	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Unreserved Fund Balance	**$1,653,343.58**	**$1,905,610.90**	**$2,163,350.12**	**$2,385,005.51**	**$2,617,327.63**	**$2,860,048.01**	**$3,369,378.37**	**$3,888,509.78**	**$3,688,309.00**	**$3,564,745.03**
Sewer Sales	$2,828,065.94	$2,884,627.26	$2,942,319.81	$3,001,166.20	$3,061,189.53	$3,122,413.32	$3,184,861.58	$3,312,256.05	$3,444,746.29	$3,582,536.14
Other	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00
Investment Interest	$7,000.00	$6,224.54	$6,224.54	$6,224.54	$6,224.54	$6,224.54	$6,224.54	$6,224.54	$6,224.54	$6,224.54
Total Revenue	**$2,845,065.94**	**$2,900,851.80**	**$2,958,544.35**	**$3,017,390.74**	**$3,077,414.07**	**$3,138,637.86**	**$3,201,086.12**	**$3,328,480.59**	**$3,460,970.83**	**$3,598,760.68**
Fund Total	**$4,498,409.52**	**$4,806,462.70**	**$5,121,894.47**	**$5,402,396.26**	**$5,694,741.70**	**$5,998,685.87**	**$6,570,464.50**	**$7,216,990.37**	**$7,149,279.83**	**$7,163,505.71**
Expenditures										
Sewer Operation	$1,513,798.62	$1,559,212.58	$1,605,988.96	$1,654,168.63	$1,703,793.69	$1,754,907.50	$1,807,554.72	$1,861,781.36	$1,917,634.80	$1,975,163.85
Loan Repayment (Pre 2019)	$850,000.00	$850,000.00	$850,000.00	$850,000.00	$850,000.00	$593,500.00	$593,500.00	$593,500.00	$593,500.00	$552,000.00
Phase I Loan			$47,000.00	$47,000.00	$47,000.00	$47,000.00	$47,000.00	$47,000.00	$47,000.00	$47,000.00
General Sewer Plan Loan		$4,900.00	$4,900.00	$4,900.00	$4,900.00	$4,900.00	$4,900.00	$4,900.00	$4,900.00	$4,900.00
Phase II-IV Ecology Loan								$792,500.00	$792,500.00	$792,500.00
Sewer Capital Fund (other funds)	$124,000.00	$124,000.00	$124,000.00	$124,000.00	$124,000.00	$124,000.00	$124,000.00	$124,000.00	$124,000.00	$124,000.00
Capital Purchase - Equipment	$55,000.00	$55,000.00	$55,000.00	$55,000.00	$55,000.00	$55,000.00	$55,000.00	$55,000.00	$55,000.00	$55,000.00
Vehicle Replacement Program	$50,000.00	$50,000.00	$50,000.00	$50,000.00	$50,000.00	$50,000.00	$50,000.00	$50,000.00	$50,000.00	$50,000.00
Total Expenditures	**$2,592,798.62**	**$2,643,112.58**	**$2,736,888.96**	**$2,785,068.63**	**$2,834,693.69**	**$2,629,307.50**	**$2,681,954.72**	**$3,528,681.36**	**$3,584,534.80**	**$3,600,563.85**
Net Revenues										
Yearly Net Revenues	**$252,267.32**	**$257,739.22**	**$221,655.39**	**$232,322.12**	**$242,720.38**	**$509,330.36**	**$519,131.40**	**($200,200.77)**	**($123,563.97)**	**($1,803.17)**
Ending Fund Balance	**$1,905,610.90**	**$2,163,350.12**	**$2,385,005.51**	**$2,617,327.63**	**$2,860,048.01**	**$3,369,378.37**	**$3,888,509.78**	**$3,688,309.00**	**$3,564,745.03**	**$3,562,941.86**
Approximate Monthly Rate	**$63.90**	**$65.18**	**$66.48**	**$67.81**	**$69.17**	**$70.55**	**$71.96**	**$74.84**	**$77.09**	**$79.40**
Rate Increase	**---**	**2%**	**2%**	**2%**	**2%**	**2%**	**2%**	**4%**	**4%**	**4%**

(1) The projected revenues and expenses does not include significant upgrades at the City's WWTF.

APPENDIX A

SEPA CHECKLIST

SERP and SEPA Documentation

1. SEPA Checklist
2. DNS
3. Affidavit of DNS Publication
4. Public Meeting Handout
5. Public Meeting Minutes
6. Affidavit of Publication English
7. Affidavit of Publication Spanish

Application Fee:	$100.00
File No.:	
Date Submitted:	

CITY OF TOPPENISH

21 West First Avenue
Toppenish, WA 98948
"Where the West Still Lives"

SEPA ENVIRONMENTAL CHECKLIST WITH NON-PROJECT SUPPLEMENT

Purpose of checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

***Instructions for applicants*:**

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

A. background

1. Name of proposed project, if applicable:
City of Toppenish General Sewer Plan

2. Name of applicant:
City of Toppenish

3. Address and phone number of applicant and contact person:
21 W First Ave, Toppenish, WA 98948
(509) 865-6319
Mr. Lance Hoyt

4. Date checklist prepared:
May 31, 2017

5. Agency requesting checklist:
City of Toppenish

6. Proposed timing or schedule (including phasing, if applicable):
The General Sewer Plan is complete and will be submitted to the applicable regulatory agencies in June 2018.

7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.
The current project is a General Sewer Plan. The future projects will include the following:

Phase	Project
I	Penny Lane and 2017 Collection System Improvements
II	Pipe Replacement, Carlson Lift Station, and South Beech Lift Station
III	Pipe Replacement and Branding Iron Lift Station
IV	Pipe Replacement
V	Safeway Storm Sewer Lift Station
VI	Del Monte Lift Station
VII	Idaho Lift Station

The projects are described in further detail in the General Sewer Plan. In addition to the projects listed above the General Sewer Plan recommends a General Facility Charge Study and a Wastewater Treatment Facility Plan Amendment be completed.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.
An Environmental Record meeting the requirements of NEPA is being prepared for the Rural Development (RD) program.

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.
No other applications pending governmental approval are known to directly affect the property covered by this proposal.

10. List any government approvals or permits that will be needed for your proposal, if known.
The General Sewer Plan will be submitted to the Washington State Department of Ecology for approval, in addition it will be submitted to USDA RD as a Preliminary Engineering Report for approval.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You include additional specific information on project description.) do not need to repeat those answers on this page. (Lead agencies may modify this form to
The City of Toppenish General Sewer Plan is a document describing the location and type of actions and policies needed to provide collection and treatment of municipal wastewater for the 20-year planning period.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you

are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The project location includes the entire collection system for the City of Toppenish, located in Sections 2, 3, 4, 5, 8, 9, 10, and 11 of Township 10N, Range 20E W.M. in Yakima County, Washington. The City's Urban Growth Area also extends into Sections 32, 33, and 34 of Township 11N, Range 20E W.M. A vicinity map showing the location is included within the General Sewer Plan.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site
(circle one) Flat, rolling, hilly, steep slopes, mountainous,
other _____

b. What is the steepest slope on the site (approximate percent slope)?

The City is relatively flat, generally sloping from the northwest to the southeast. The land slopes from an elevation of approximately 770 feet near McDonald Road and North Track Road in the northwest corner to 740 feet near the Wastewater Treatment Facility (WWTF) near the Southeast corner over a total distance of 14,000 feet. This corresponds to an average slope of approximately 0.2%. Site slopes at specific projects will vary but are generally anticipated to be flat.

c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

Soils are primarily Toppenish silt loam at 0-2 percent slopes, Naches loam at 0-2 percent slopes, and other types of loam. Soils in the area are noted as prime farmland if irrigated. Irrigation canals are located near the City. The proposed projects will not remove any commercially significant farmland from use.

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

The City is not aware of any indications of or history of unstable soils in the immediate vicinity.

e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill.

This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

2. Air

a. What types of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

3. **Water**

a. Surface Water:

1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.
The Yakima River is approximately 1.5 miles north of the City and will not be affected.

2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.
No.

3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.
Not Applicable.

4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.
No.

5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

Yes, the portion of the City to the north of the railroad is located within a 100-year floodplain. Planning related to the 100-year floodplain is addressed as part of the General Sewer Plan.

6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.
The City's WWTF discharges an average of 1.2 million gallons per day (MGD) of treated wastewater to surface water. The projects identified in the General Sewer Plan will help to reduce the amount of groundwater and stormwater which enters the City's WWTF. This will help to reduce total quantities discharged to surface water and improve the treatment process at the WWTF.

b. Ground Water:

1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.
No, there are no withdrawals of groundwater or discharge to groundwaters.

2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.
Not Applicable.

c. Water runoff (including stormwater):

1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

2) Could waste materials enter ground or surface waters? If so, generally describe.
No.

3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.
No.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, if any:
None necessary.

4. **Plants**

a. Check the types of vegetation found on the site:

__x__deciduous tree: alder, maple, aspen, other
_____evergreen tree: fir, cedar, pine, other
__x_ shrubs
__x_ grass
_____pasture
_____crop or grain
_____ Orchards, vineyards or other permanent crops.
_____ wet soil plants: cattail, buttercup, bullrush, skunk cabbage, other
_____water plants: water lily, eelgrass, milfoil, other
_____other types of vegetation

b. What kind and amount of vegetation will be removed or altered?
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

c. List threatened and endangered species known to be on or near the site.
No threatened or endangered species are known to be within the project site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:
None necessary.

e. List all noxious weeds and invasive species known to be on or near the site.
None known.

5. **Animals**

a. List any birds and other animals which have been observed on or near the site or are known to be on or near the site. Examples include:

birds: hawk, heron, eagle, songbirds, other:
mammals: deer, bear, elk, beaver, other:
fish: bass, salmon, trout, herring, shellfish, other _____

b. List any threatened and endangered species known to be on or near the site.
According to the U.S. Fish and Wildlife Service Endangered and Threatened Species list for Yakima County and the Washington Department of Fish and Wildlife Priority and Habitat Species maps, the following endangered or threatened species are potentially located in Toppenish:

- **Gray Wolf (Canis lupus): Not likely at site**
- **North American Wolverine (Gulo gulo luscus): Not likely at site**
- **Marbled Murrelet (Brachyramphus marmoratus): Not likely at site**
- **Yellow-billed Cuckoo (Coccyzus americanus): Not likely at site**
- **Bull Trout (Salvelinus confluentus): Not likely at site**
- **Steelhead (Oncorhynchus mykiss): Not likely at site**

The gray wolf can be found in "temperate forests, mountains, tundra, taiga, and grasslands of northeastern Washington State." The developed project area in the City of Toppenish and the surrounding area is not a suitable habitat. Further, no gray wolves have been reported in the area in recent times.

The wolverine is about 20-40 pounds and resembles a small bear with a bushy tail. Wolverines tend to reside in areas that are cold and receive enough winter precipitation to reliably maintain deep persistent snow late into the warm season (April 15 to May 14). Thus, at lower latitudes they typically only reside at higher altitudes (above 4,000 feet in Washington). The City of Toppenish does not meet these criteria.

The marbled murrelet is a seabird but it has been mapped as occurring within Yakima County. However, the critical habitats for this species are primarily located on the west side of the Cascade Mountains within 60 miles of saltwater feeding areas. This bird nests in old growth forests and is not expected to be encountered in Toppenish.

The FWS website indicates that migratory individuals of yellow-billed cuckoo species, considered to be extirpated since the 1930s, could still be found anywhere within the state of Washington. It is a robin-sized bird which breeds in willow and cottonwood forests along rivers. The project area is not considered to be near enough to suitable habitat for yellow-billed cuckoos to cause any impact.

Bull trout need cold water (less than 59 to 64 degrees F) and stable stream channels. According to FWS, bull trout could be found in the Yakima River. The proposed project will not impact the Yakima River, or designated critical habitat for bull trout.

Steelhead are noted as possibly being located within the project area. Because the proposed project will not impact rivers and streams, steelhead will not be impacted.

c. Is the site part of a migration route? If so, explain.
There are migratory birds listed within the area. The project is not anticipated to impact any migratory birds because it will be replacing infrastructure within previously developed areas.

d. Proposed measures to preserve or enhance wildlife, if any:
None.

e. List any invasive animal species known to be on or near the site.
None known.

6. **Energy and natural resources**

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
No.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

The collection system and WWTF use gravity flow to the greatest extent possible to limit pumping requirements. An evaluation of energy conservation was included in the General Sewer Plan.

7. **Environmental health**

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

1) Describe any known or possible contamination at the site from present or past uses.

This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

None known.

3) Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

4) Describe special emergency services that might be required.

None.

5) Proposed measures to reduce or control environmental health hazards, if any:

This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

b. **Noise**

1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

3) Proposed measures to reduce or control noise impacts, if any:
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

8. **Land and shoreline use**

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:
No.

c. Describe any structures on the site.
There are several buildings and structures at the WWTF and there are also precast concrete manholes located at each lift station.

d. Will any structures be demolished? If so, what?
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

e. What is the current zoning classification of the site?
Figure 3-6 of the General Sewer Plan shows the zoning classifications within the City.

f. What is the current comprehensive plan designation of the site?
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

g. If applicable, what is the current shoreline master program designation of the site?
The City has limited lands subject to the Shoreline Management Act. These consist of about two acres near the northern City limits in the floodplain of the Yakima River. The City of Toppenish is covered under the Yakima County Shoreline Master Program. It is not anticipated that improvements recommended in the General Sewer Plan will be within the boundaries of the Shoreline Management Act jurisdiction.

h. Has any part of the site been classified as a critical area by the city or county? If so, specify.
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

i. Approximately how many people would reside or work in the completed project?
The population of the City of Toppenish is approximately 8,965.

j. Approximately how many people would the completed project displace?
None.

k. Proposed measures to avoid or reduce displacement impacts, if any:
None.

L. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
Not applicable.

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:
Not applicable.

9. **Housing**

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.
None.

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.
None.

c. Proposed measures to reduce or control housing impacts, if any:
Not applicable.

10. **Aesthetics**

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

b. What views in the immediate vicinity would be altered or obstructed?
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

c. Proposed measures to reduce or control aesthetic impacts, if any:

This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

11. **Light and glare**

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
None.

b. Could light or glare from the finished project be a safety hazard or interfere with views?
No.

c. What existing off-site sources of light or glare may affect your proposal?
None.

d. Proposed measures to reduce or control light and glare impacts, if any:
None.

12. **Recreation**

a. What designated and informal recreational opportunities are in the immediate vicinity?
The City's 2008 Comprehensive Plan Update describes recreational opportunities in the vicinity:

"Toppenish has about 60 acres or 2.3% of its total acreage devoted to recreational lands, not including school district recreational facilities. Toppenish's recreational lands consist of 9 parks, 9 "Urban Beautification Areas", a swimming pool with a bathhouse, the rodeo grounds, 18 hole golf course, karate studios, and a health studio and nautilus exercise center. The city is also in close proximity to the Toppenish Wildlife Refuge, and a 40-acre private park leased by the Fraternal Order of the Eagles. "

b. Would the proposed project displace any existing recreational uses? If so, describe.
No.

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
None.

13. **Historic and cultural preservation**

a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe.
The US Post Office and the Yakima Indian Agency Building are listed within the National Register of Historic Places. These have been identified in the Area of Potential Effects memorandum for the project.

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.
The City is located adjacent to the Yakama Indian Reservation.

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.
The Area of Potential Effects memorandum has been sent to Rural Development to be distributed to any affected Indian tribes and the Department of Archaeology and Historic Preservation.

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

14. **Transportation**

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.
City streets are shown with the collection system in Figure 3-1 of the General Sewer Plan.

b. Is the site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

c. How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?
No change anticipated.

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).
No.

e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.
No.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?
None.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, generally describe.
No.

h. Proposed measures to reduce or control transportation impacts, if any:
None.

15. **Public services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.
No.

b. Proposed measures to reduce or control direct impacts on public services, if any.
None.

16. **Utilities**

a. Underline utilities currently available at the site:
electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other _____

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.
This is a planning document and therefore no construction activities are anticipated until the projects are funded in the future. A discussion of those impacts will come later when those projects are evaluated.

C. Signature

I certify under penalty of perjury that the above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: Nancy Welch
Name of signee Nancy Welch, P.E
Position and Agency/Organization Gray and Osborne, Inc.
Date Submitted: 5/31/17

D. supplemental sheet for nonproject actions

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment. When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

The proposal is not likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise.

Proposed measures to avoid or reduce such increases are:

The projects identified in the General Sewer Plan may reduce this number by decreasing the amount of inflow and infiltration into the system.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

It is unlikely that the proposal will affect plants, animals, fish, or marine life because most of the areas identified have been previously disturbed and are within City right-of-way.

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

None.

3. How would the proposal be likely to deplete energy or natural resources?

It is not anticipated that the proposal would deplete energy or natural resources.

Proposed measures to protect or conserve energy and natural resources are:

Improvements to the lift stations may reduce energy consumption. Reduced inflow, infiltration, and exfiltration will help to preserve water quality.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

The proposal is not likely to affect any of these areas.

Proposed measures to protect such resources or to avoid or reduce impacts are:

None.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

The proposal is not likely to affect land and shoreline use.

Proposed measures to avoid or reduce shoreline and land use impacts are:

None.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

It is not likely to increase demands on transportation or public services and utilities.

Proposed measures to reduce or respond to such demand(s) are:
The collection system improvements may result in reduced demands on the wastewater utility system.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

It is not anticipated that the proposal will conflict with local, state, or federal laws requiring protection of the environment.

CITY OF TOPPENISH

21 West First Avenue
Toppenish, WA 98948

"Where the West Still Lives"

To: SEPA Reviewing Agencies

From: William Rathbone, Community Development Director
SEPA Responsible Official

Subject: File No. EC-02-2017, City of Toppenish, General Sewer Plan

Date: June 7, 2017

Notice is hereby given that the City of Toppenish pursuant to WAC 197-11-050 of the State Environmental Policy Act (SEPA) is established as the lead agency for the following proposal:

Project Description: Adoption of the City of Toppenish General Sewer Plan. The plan addresses the City's planning needs for the collection, transmission, treatment, and disposal of wastewater for a 20-year planning period. The plan provides proposed conceptual designs, cost estimates, scheduling, and a financing plan for recommended major facility improvements.

Proponent: City of Toppenish, Department of Public Works
21 West First Avenue
Toppenish, WA 98948

Project Location: The plan is applicable to lands within the city limits and urban growth boundary of Toppenish.

Determination: The city has issued a Determination of Non-Significance on the proposal effective June 8, 2017. This determination is subject to a comment period ending June 22, 2017. Comments may be sent to William Rathbone, Community Development Director, City of Toppenish, 21 West First Avenue, Toppenish, WA 98948. Comments may be submitted by mail, by fax to (509) 865-1950, or by E-Mail to William.Rathbone@cityoftoppenish.us. If you have any questions regarding this determination, please contact me at (509) 865-7318.

A draft copy of the plan together with a copy of the environmental checklist and complete case file are available for public viewing at Toppenish City Hall during normal business hours. A complete copy of the plan and other information is posted on the Public Documents page of the City of Toppenish website at www.cityoftoppenish.us.

DETERMINATION OF NONSIGNIFICANCE

Project Description: Adoption of the City of Toppenish General Sewer Plan. The plan addresses the City's planning needs for the collection, transmission, treatment, and disposal of wastewater for a 20-year planning period. The plan provides proposed conceptual designs, cost estimates, scheduling, and a financing plan for recommended major facility improvements.

Proponent: City of Toppenish, Department of Public Works
21 West First Avenue
Toppenish, WA 98948

Project Location: The plan is applicable to lands within the city limits and urban growth boundary of Toppenish.

Lead Agency: City of Toppenish
21 West First Avenue
Toppenish, WA 98948

File No: EC- 2-2017. A draft copy of the plan together with a copy of the environmental checklist and complete case file are available for public viewing at Toppenish City Hall during normal business hours. The plan and other information is posted on the Public Documents page of the City of Toppenish website at www.cityoftoppenish.us.

Determination: The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030 (2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request.

☐ There is no comment period for this DNS.

☒ This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted by Thursday June 22, 2017.

Responsible official: William Rathbone

Position/title: Community Development Director /SEPA Responsible Official

Address: 21 West First Avenue
Toppenish, WA 98948

Phone: (509) 865-7318 **Fax**: (509) 865-1950 **Email:** William.Rathbone@cityoftoppenish.us

Signature:_____

Effective Date: June 8, 2017

AFFIDAVIT
of Publication

STATE OF WASHINGTON)
) SS
County of Yakima)

I, Tammy Mitzel, being first duly sworn, on oath say: I am the **Bookkeeper** of the REVIEW - INDEPENDENT, a weekly newspaper published at Toppenish, Yakima County, State of Washington, official newspaper of said towns, and of general circulation in said town, county and state and that the City of Toppenish Notice Of Environmental Determination SEPA - File No. EC-02-2017 copy of which is hereto attached, was published for One consecutive weeks in the regular edition of said paper, and not a supplement thereof; the first publication of which was made on the 8 day of June, 2017, and the last publication on the 8 day of June, 2017, and that the said newspaper has been established, published and circulated continuously as a weekly newspaper in said town, county and state for more than six months prior to the date of the first publication herein referred to, and that said newspaper during said time has been and now is printed in the English language, and that the fees for said publication amount to $85.00, and have been paid in full.

Tammy Mitzel

DAVID FLINK
COMMISSION EXPIRES
NOTARY PUBLIC
01/01/2021
STATE OF WASHINGTON

Subscribed and sworn to me before this 9 day of June, 2017.

Notary Public for Washington, residing at Yakima, Washington.
My commission expires:
01-01-21

CITY OF TOPPENISH
Notice Of Environmental Determination State Environmental Policy Act

File Number: **EC-02-2017**
Proponent: City of Toppenish, Department of Public Works
Lead Agency: City of Toppenish

Notice of Environmental Determination: Notice is hereby given that the city of Toppenish SEPA Responsible Official issued a Threshold Determination of Non-Significance (DNS) for the following proposal.

Proposal: Adoption of the City of Toppenish General Sewer Plan. The plan addresses the City's planning needs for the collection, transmission, treatment, and disposal of wastewater for a 20-year planning period. The plan provides proposed conceptual designs, cost estimates, scheduling, and a financing plan for recommended major facility improvements. The plan is applicable to lands within the city limits and urban growth boundary of Toppenish. A draft copy of the plan together with a copy of SEPA Environmental Checklist and complete case file are available for public viewing at Toppenish City Hall during normal business hours. In addition, the plan is posted in the Public Documents section of the City of Toppenish Website, www.cityoftoppenish.us. The draft plan is subject to change.

Opportunity for Comment: This Determination was issued in accordance with the State Environmental Policy Act (SEPA) effective June 8, 2017 and is subject to a 14-day comment period. Comments regarding the potential environmental effects of the proposal may be submitted to William Rathbone, Community Development Director, SEPA Responsible Official at the address listed below. Comments may also be submitted by fax or E-Mail. All comments received on or before June 22, 2017 will be considered. After the comment period has elapsed, the Responsible Official will consider any comments received and retain, modify, or withdraw the determination in accordance with SEPA regulations.

Responsible Official: William Rathbone, Community Development Director, SEPA Responsible Official, 21 West First Avenue, Toppenish, WA 98948
Project Contact: William Rathbone
Project Information: Phone: (509) 865-7318; Fax (509) 865-1950
Email: William.Rathbone@cityoftoppenish.us
Dated this 5th day of June, 2017.
/s/William Rathbone, Community Development Director, SEPA Responsible Official
Legal #1269
Published: Review-Independent: June 8, 2017.

City of Toppenish

Mayor: Clara Jimenez
Manager: Lance Hoyt
Finance Director/City Clerk: Debbie Zabell
Public Works Superintendent: Rocky Wallace
Engineer: Gray & Osborne, Inc., Yakima

Project Description

The purpose the General Sewer Plan is to provide the City a road map for the future of the collection system. The General Sewer Plan includes an evaluation of the existing and future service areas, provides a service area population projection, and evaluates all collection facilities including the assessment of over 50,000 LF of sewers and 6 lift stations. Finally, the Plan includes a capital improvement plan and financing plan.

Regulatory Requirements

The City is not currently under a regulatory order to complete the plan. However, the City has recognized that infiltration and inflow (I/I) is a contributing factor to the poor performance of the WWTF and the City's ability to efficiently operate its WWTF to biologically remove phosphorous. A review of the City's influent wastewater flow data reveals excessive I/I. It is estimated that as much as 65% of the influent flow to the WWTF is a result of I/I during summer storm events. The inclusion of relatively clean water with the domestic wastewater flows can produce the following detrimental effects:

- WWTF impacts including hydraulic overloading, reduced treatment efficiency, and violations of the NPDES discharge permit.
- Additional costs for treating, transporting, and pumping the increased flow.
- Increased flows within the collection system, creating the need to construct additional sewer facilities or upgrade existing facilities.
- Surcharged manholes, sewage overflow, and bypasses to the environment in extreme cases.

General Sewer Plan Conclusions

Collection Capacity Analysis:
The collection system was analyzed utilizing a sewer modeling software called InfoSewer. The modeling utilized existing flow data and future growth projections to determine the capacity of the existing trunk sewers. The conclusion of this analysis resulted in some minimal pipe size upgrades. However, most of these pipes are old and will require replacement based on the condition assessment. When they are replaced they will be increased in size to accommodate growth in the City.

Collection System Condition Analysis:
The total collection system in Toppenish is comprised of 162,000 LF of gravity pipe. The City videotaped approximately 29,000 LF of sewer lines. Gray & Osborne analyzed these videos and were able to provide an assessment of approximately 54,000 LF of sewers. Sewers were classified as Great, Good, Fair and Poor. Of the sewers analyzed approximately 54% were in the Fair/Poor Condition.

It should be noted that approximately 39,000 LF of sewers were replaced in 2002/2003 and are considered to be in "Great" condition and therefore were not further considered as part of the replacement.

The overall analysis indicates that approximately 67,000 LF of sewers require replacement.

Pump Station Analysis:
The City owns and operates seven sewer lift station. Each lift station was evaluated for capacity, condition and conformance to regulatory standards. One lift station (Penny) is currently being designed and will be rebuilt in 2017. Three other lift stations (Carlson, South Beech, and Branding Iron) require significant upgrades. These three lift stations are over 38 years old and have not been significantly upgraded since the original installation. Carlson did have some electrical upgrades performed in the late 1990's. The remaining stations (Linden, Del Monte and Idaho) are in good condition and require minimal upgrades.

Other Projects:

The Plan included a number of projects that the City may choose to fund from their current reserves, including fencing/security projects and simple pump replacements.

The Plan includes a recommendation for a future WWTF Facility Plan and a recommendation for a future General Facility Charge Study.

Environmental Impacts
It is anticipated that a SEPA will be processed in May/June and a Determination of Nonsignificance (DNS) will be issued. Any comments of significance will be addressed.

A federal environmental review to satisfy the National Environmental Policy Act (NEPA) is being completed at this time. This review includes an Endangered Species Act (ESA) Consultation and a Cultural Resource Review (Section 106, EO 05/05).

At this time it is believed that there will be no long term environmental impacts due to the projects recommended in the Plan. There will be some temporary disruption due to noise, dust and traffic control etc.; however the Contractor will be required to provide adequate BMPs during construction.

Alternatives/Cost Effectiveness

Three alternatives were considered for these improvements:

1. Do Nothing – not further considered as it is not a cost effective approach.

2. Open Trench Replacement – it is estimated at this time that approximately 75% of the system will be replaced using the open trench method.

3. Trenchless Technologies – it is estimate at this time that approximately 25% of the system will be replaced using a trenchless technology.

As described in the Plan, a predesign report will be issued with each phase of work that further details the exact replacement method based on the City's sewer video work that will continue in the next year. This will provide the City with the most cost effective approach. A life cycle analysis on the collection system upgrades does not apply.

The selected alternatives have minimal impact on water and energy usage. The goal is to maximize water and energy conservation. Examples include the following:

1. High efficiency pumps at the lift stations.
2. Premium duty motors at the lift station.
3. The reduction in I/I will reduce pump run times at the lift stations.

It should be noted that the Plan did consider the elimination of the Penny Lift station by installing new gravity sewers. This was not a cost effective approach as it resulted in a significant rebuild of the collection system in the northwest portion of the City's collection system.

Rate Impacts

The goal of the financing plan is to seek the most optimal funding package that minimizes impacts to the citizens. The total funding package sought including the collection system work, the major pump station work and the future studies/plans is $20,227,000. The City will likely commit up to $75,000-$100,000 in match money depending on the final funding offers.

Typical funding programs:
Rural Development (RD) – Grant and Loan. Loan Terms = 40 year, 2.3% (estimated)
Ecology – Grant and Loan. Loan Terms = 20 year, 1.6% (estimated)
CDBG General Purpose – Grant, maximum $750,000

A funding strategy was presented at Council that describes various options for providing the City a financing package that has minimal rate impacts. This is largely due to the fact that the City has a number of older loans that will be paid off over the next 5-6 years.

RD – The City is eligible for up to 75% grant from RD due to the fact that the City is "operating outside of is statuary guidelines". The City will be applying for the maximum grant allowable.

If 75% grant is obtained the rate impact would be approximately $4-5 per month per household. However, due to the loans that will be expiring, it is feasible that there will be minimal if any rate impact.

Ecology – Historically the City has received 35% grant from Ecology. If the City were to receive a similar package from Ecology (35% grant), the rate impact would be approximately $17-$18 per month. Due to the significant rate impact, the City would likely split this into several projects phased over many years.

Ecology's funding program is largely based on the City's Median Household Income which was estimated in the last funding cycle to be $29,135. Ecology considers hardship to be over 2% of the MHI spent on the utility. The City'hardship rate is $49 per month per Ecology's standards. The City's current rate is $63.90, well above the hardship rate.

Summary – It is likely that the City will seek an RD and Ecology combination funding package for the improvements. The first step will be to apply to RD and evaluate the package offered prior to the Ecology funding deadline. The overall goal will be to minimize the rate impacts and to schedule the impacts to coincide with loans that will expire in the next 5-6 years.

TOPPENISH CITY COUNCIL
Regular Meeting Minutes
May 8, 2017

Mayor C. Jiménez called the meeting to order at 7:00 p.m.

ROLL CALL

Present:	Mayor Clara Jiménez and Councilmembers J. Eligio Jiménez, Mark Oaks, Derald Ortloff, Gabriel Piñon, Blaine Thorington and Angelica Walle.
Staff Present:	City Manager Lance Hoyt (CM Hoyt), Public Works Superintendent Rocky Wallace, City Interpreter Juven Garcia, MidValley Television Manager Judy Devall and Executive Assistant/Deputy City Clerk Heidi Riojas.

PROCLAMATION
MAY 21, 2017-MAY 27, 2017, NATIONAL PUBLIC WORKS WEEK

Mayor C. Jiménez recited the Proclamation proclaiming May 21, 2017 through May 27, 2017 as National Public Works Week and to encourage the all citizens to acquaint themselves with the issues involved in providing our public works.

PUBLIC COMMENT

Diane Sampson, 512 South Alder Street, Toppenish, of Community Safety Network (CSN) updated Council on the success of the April 29, 2017 CSN's Spring Clean-up, Graffiti Paint Out, and the Tire Amnesty programs. The students and volunteers collected 128 55-gallon garbage bags, painted 2, 132 square feet of graffiti and collected 433 tires of which 87 included wheels.

CONSENT AGENDA

Councilmember Oaks moved, seconded by Councilmember Walle to approve Consent Agenda items a through d:

a. Approve Minutes of the April 24, 2017 Regular Council Meeting.
b. Approve Minutes of the May 1, 2017 Study Session.
c. Approve Payroll Checks Number 33790 through 33806 and EFTPR869 through EFTPR875 in the total amount of $164,865.15 dated May 5, 2017.
d. Approve Claims Checks Number 85877 through 85965 and EFTAP170 in the total amount of $141,654.86 dated May 8, 2017 and Void Check Number 85878.

Motion carried unanimously.

PUBLIC HEARING

Public Hearing Regarding Rural Development and Ecology Funding Applications. Presentation by Nancy Wetch, Professional Engineer with Gray & Osborne, Inc.

Mayor C. Jiménez opened the public hearing at 7:09 p.m.

Nancy Wetch, P.E. with Gray & Osborne, Inc. updated Council on the recently completed its General Sewer Plan that includes an evaluation of the existing and future service areas, provides a projection of the service area population, evaluates all collection facilities and includes the assessment of sewer lines and the seven lift stations. In addition, the Plan provides for capital improvements and financing for make the recommended improvements to the collection system, which will address the infiltration and inflow into the wastewater treatment facility. Ms. Wetch provided detail regarding the Project's purpose, recommendations, environmental impacts, alternatives/cost effectiveness and the rate impacts for the project.

The Project's Purpose is to address the infiltration and inflow (I/I) into the City's Wastewater Treatment Facility (WWTF) that is contributing to the poor performance and the City's ability to efficiently operate the WWTF to biologically remove phosphorous. Engineer Wetch noted that a review of the City's influent wastewater flow data revealed excessive I/I. It is estimated that as much as 65% of the influent flow to the WWTF is a result of the I/I during summer and storm events.

The Project Recommendations are to replace 67,000 linear feet of sewer lines, significant upgrades to three lift stations (Carlson, South Beech and Branding Iron) that are over 38 years old, and minimal upgrades for three lift stations (Linden, Del Monte and Idaho) that are estimated to cost $21.565 million.

There are no long term environmental impacts due to the projects recommended in the Plan. Engineer Wetch noted that the National Environmental Policy Act and the State Environmental Policy Act are in the process of being completed, with an anticipated Determination of Nonsignificance being issued in May or June. Engineer Wetch further noted here will be temporary disruption due to noise, dust and traffic control; however, the Contractor is required to provide adequate Construction Site Best Management Practices during construction.

There were three Alternatives/Cost Effectiveness for the project recommendations which include: Option 1 – do nothing; Option 2 – open trench replacement estimated to require the replacement of 75% of the system using the open trench method; and Option 3 – trenchless technologies estimated to require the replacement of 25% of the system using a trenchless technology method. The goal of the selected alternatives is to maximize water and energy conservation based on the following examples: 1) high efficiency pumps at the lift stations; 2) premium duty motors at the lift station; and 3) the reduction in I/I will reduce pump run times at the lift stations. Engineer Wetch reported that the elimination of one lift station was considered; however, it was determined to not be cost effective.

Engineer Wetch summarized the goal of the financing plan is to obtain the optimal funding package that minimizes impacts to the rate payers. The total funding package sought including the collection system work, the major pump station work and the future studies/plans is $20,227,000. Engineer Wetch noted that the City will likely commit up to $75,000-$100,000 in match money depending on the final funding offers. A funding strategy presented to Council describes various options for providing the City a financing package that has minimal rate impacts, which is possible with the City having several older loans that will be paid off over the next 5-6 years. Engineer Wetch stated that the City is eligible for up to 75% grant from Rural Development because the City's WWTF is operating outside of its statutory guidelines detailed on the National Pollutant Discharge Elimination System Permit. The rate impact with a 75% grant would be approximately $4-$5 per month per household; however, with the other loans expiring it is feasible that there will be minimal rate impact. Engineer Wetch stated that in the past the City has received a 35% grant from Ecology. The rate impact with a 35% grant would be approximately $17-$18 per month per household. Engineer Wetch noted that due to the significant rate impact, the City would likely split the project into several phases over many years. It is likely the City will seek a Rural Development and Ecology combination funding package for the recommended improvements. The first step is to apply to Rural Development and evaluate the funding package offered prior to the funding deadline for Ecology. Engineer Wetch noted that the overall goal is to minimize the rate impacts and to schedule impacts to coincide with loans that will be expire in the next 5-6 years.

There being no comments from the public, Mayor C. Jiménez closed the public hearing at 7:22 p.m.

NEW BUSINESS

Brief Update on the Sewer Collection System Improvements.

CM Hoyt noted that a public hearing will be conducted on May 8, 2017 for the City's USDA Rural Development funding application for the sewer collection system improvements.

Councilmember Thorington moved, seconded by Councilmember Oaks to authorize staff to proceed with submitting the funding application to Rural Development.

Set May 22, 2017 as the Date for a Public Hearing Regarding Adopting the Six-Year Comprehensive Transportation (Streets) Improvement Program for the Years 2018 Through 2023.

Councilmember Walle moved, seconded by Councilmember Piñon to set May 22, 2017 as the date for a Public Hearing regarding Adopting the Six-Year Comprehensive Transportation (Streets) Improvement Program for the Years 2018 Through 2023. Motion carried unanimously.

Set Agenda for June 5, 2017 Study Session.

It was the consensus of Council to discuss business and rental license fees during the June 5, 2017 Study Session.

COUNCIL MEETING REPORTS/COMMUNITY ANNOUNCEMENTS

Councilmember Oaks reported that the Toppenish Rodeo would like to thank the Community Safety Network and the students for cleaning up the entrance area to the grounds on April 29, 2017.

Councilmember Thorington noted that the Council Selection Committee met to discuss filling the vacancy on the Planning Commission.

Councilmember Thorington moved, second by Councilmember Piñon to appoint Al Hubert to serve on the Planning Commission. Motion carried unanimously.

Councilmember Piñon reported that he attended the Heritage University graduation and Cinco de Mayo celebrations.

Councilmember J. Jiménez noted that CSN is working on gathering partners for the National Night Out to be back in the community and announced the Stem Show Case on May 24, 2017 at the Toppenish High School.

Mayor C. Jiménez reported that she attended the Short Course on Local Planning and on Open Government Laws on April 26, 2017, participated in CSN Community Clean Up on April 29, 2017 and attended the opening ceremony for the Central Washington Junior Livestock Show on April 30, 2017. In addition, the Mayor reminded Councilmembers that the Yakima County Candidate Filing period will be from May 15, 2017 to May 19, 2017; however, mail-in filings are accepted now.

CITY MANAGER REPORTS

CM Hoyt updated Council on the following:

- Treaty Days Parade on Thursday, June 8, 2017. Councilmember Oaks agreed to the be driver for the Treaty Days Parade.

- Chamber Wild West Parade on Saturday, July 1, 2017. Councilmember Thorington agreed to be the driver for the Chamber Wild West Parade.
- Arms Service Day will be on May 20, 2017 at Davis High School Cafeteria.

ADJOURNMENT

There being no further business to come before the Council, the meeting adjourned at 7:42 p.m.

CLARA R. JIMÉNEZ, MAYOR

HEIDI RIOJAS, CMC
EXECUTIVE ASSISTANT/DEPUTY CITY CLERK

AFFIDAVIT
of Publication

STATE OF WASHINGTON)
) SS
County of Yakima)

I, Tammy Mitzel, being first duly sworn, on oath say: I am the **Bookkeeper** of the REVIEW - INDEPENDENT, a weekly newspaper published at Toppenish, Yakima County, State of Washington, official newspaper of said towns, and of general circulation in said town, county and state and that the City of Toppenish Notice of City Council Public Meeting May 8, 2017

copy of which is hereto attached, was published for two consecutive weeks in the regular edition of said paper, and not a supplement thereof; the first publication of which was made on the 27 day of April, 2017, and the last publication on the 4 day of May, 2017, and that the said newspaper has been established, published and circulated continuously as a weekly newspaper in said town, county and state for more than six months prior to the date of the first publication herein referred to, and that said newspaper during said time has been and now is printed in the English language, and that the fees for said publication amount to $110.50, and have been paid in full.

Tammy Mitzel

DAVID FLINK
COMMISSION EXPIRES
NOTARY PUBLIC
01/01/2021
STATE OF WASHINGTON

Subscribed and sworn to me before this 5 day of May, 2017.

Notary Public for Washington, residing at Yakima, Washington.
My commission expires:
01-01-21

CITY OF TOPPENISH
Notice Of City Council Public Hearing

NOTICE IS HEREBY GIVEN that on Monday, May 8, 2017, commencing at 7:00 p.m. or as soon thereafter as reasonably possible the Toppenish City Council will conduct a public hearing. The hearing will be conducted in the council chambers of Toppenish City Hall located at 21 West First Avenue, Toppenish, Washington 98948. All persons wishing to offer comment are encouraged to attend. All written comments received on or before the day of the hearing will be considered.

The purpose of the public hearing is to receive public comment on the City of Toppenish filing an application for funding with the U. S. Department of Agriculture, Rural Development, Rural Utilities Service and the Washington State Department of Ecology for funding of improvements to the City's wastewater collection and treatment system. Anyone requesting information or offering comments on this project should attend this meeting.

A Spanish language interpreter will be available. The Toppenish council chambers are handicap accessible. Additional arrangements to reasonably accommodate persons with special needs will be made upon receiving twenty-four (24) hours advanced notice. To request accommodation of special needs contact Finance Director Debbie Zabell at (509) 865-1632 or at Toppenish City Hall during normal business hours.

/s/Debbie Zabell, CMC, Finance Director/City Clerk
Legal #1221
Published: Review-Independent on April 27, 2017 & May 4, 2017.

AFFIDAVIT
of Publication

STATE OF WASHINGTON)
) SS
County of Yakima)

I, Tammy Mitzel, being first duly sworn, on oath say: I am the **Bookkeeper** of the REVIEW - INDEPENDENT, a weekly newspaper published at Toppenish, Yakima County, State of Washington, official newspaper of said towns, and of general circulation in said town, county and state and that the Ciudad De Toppenish Aviso Del Ayuntamiento Audiencia Publica copy of which is hereto attached, was published for two consecutive weeks in the regular edition of said paper, and not a supplement thereof; the first publication of which was made on the 27 day of April, 2017, and the last publication on the 4 day of May, 2017, and that the said newspaper has been established, published and circulated continuously as a weekly newspaper in said town, county and state for more than six months prior to the date of the first publication herein referred to, and that said newspaper during said time has been and now is printed in the English language, and that the fees for said publication amount to $ 119.00, and have been paid in full.

Tammy Mitzel

Subscribed and sworn to me before this 5 day of May, 2017.

Notary Public for Washington, residing at Yakima, Washington.
My commission expires:
01-01-21

DAVID FLINK
COMMISSION EXPIRES
NOTARY PUBLIC
01/01/2021
STATE OF WASHINGTON

CIUDAD DE TOPPENISH
Aviso Del Ayuntamiento
Audiencia Publica

Por este medio se da aviso que el lunes, 08 de mayo de 2017, comenzando a las 7:00 de la tarde o después de eso tan pronto como sea razonablemente posible, el consejo de la ciudad de Toppenish realizara una audiencia pública. La audiencia se llevará a cabo en la cámara del concilio del pasillo de ciudad de Toppenish, Ubicada en 21 W 1St Ave, Toppenish, Washington 98948. Todas las personas que deseen ofrecer sus comentarios los animamos a asistir. Se Considerarán todos los comentarios escritos recibidos en o antes del día de la audiencia.

El propósito de la audiencia pública es recibir comentarios del público en la ciudad de Toppenish, acerca de una presentación de una solicitud de financiación con el U.S. Departamento de agricultura. Desarrollo Rural, Rural Servicio de utilidades y el departamento de ecología del estado de Washington para la financiación de mejorías en la ciudad de la recolección y tratamiento de aguas residuales.

Un intérprete en español estará disponible. La cámara del concilio de Toppenish tienen acceso para discapacitados. Arreglos necesarios para atender adecuadamente a las personas con necesidades especiales se realizarán al recibir 24 horas de aviso avanzado. Para solicitar alojamiento de necesidades especiales pónganse en contacto con la directora de finanzas Debbie Zabell al (509)865-1632 o en el ayuntamiento de Toppenish durante el horario comercial normal.

/s/Debbie Zabell, CMC, Secretaria de finanzas/directora municipal

Legal #1222

Publicado: revisión independiente el 27 de abril de 2017 y 04 de mayo de 2017.

APPENDIX B

WWTF NPDES PERMIT

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue Suite 900
Seattle, Washington 98101-3140

Authorization to Discharge Under the National Pollutant Discharge Elimination System

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 *et seq*., as amended by the Water Quality Act of 1987, P.L. 100-4, the "Act",

City of Toppenish
501 Annahat Road
Toppenish, WA 98948

is authorized to discharge from the wastewater treatment plant located in Toppenish, WA, at the following location(s):

Outfall	**Receiving Water**	**Latitude**	**Longitude**
001	Toppenish Drain	46° 22' 7"	120° 16' 59"

in accordance with discharge point(s), effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective July 1, 2013.

This permit and the authorization to discharge shall expire at midnight, June 30, 2018.

The permittee shall reapply for a permit reissuance on or before January 1, 2018 if the permittee intends to continue operations and discharges at the facility beyond the term of this permit.

Signed this 23rd day of May, 2013.

/s/ Christine Psyk for
Daniel D. Opalksi, Director
Office of Water and Watersheds

Schedule of Submissions

The following is a summary of some of the items the permittee must complete and/or submit to EPA during the term of this permit:

Item	Due Date
1. Discharge Monitoring Reports (DMR)	DMRs are due monthly and must be postmarked on or before the 20th day of the month following the monitoring month.
2. Quality Assurance Plan (QAP)	The permittee must provide EPA, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration with written notification that the Plan has been developed and implemented by December 31, 2013 (see II.B). The Plan must be kept on site and made available to EPA and the Yakama Nation Environmental Protection Program upon request.
3. Operation and Maintenance (O&M) Plan	The permittee must provide EPA, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration with written notification that the Plan has been developed and implemented by December 31, 2013 (see II.A). The Plan must be kept on site and made available to EPA and the Yakama Nation Environmental Protection Program upon request.
4. NPDES Application Renewal	The application must be submitted by January 1, 2013 (see V.B).
5. Surface Water Monitoring Report	The Report must be submitted annually, with the December discharge monitoring report (see I.D.8).
6. Compliance Schedule	Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date (see II.D and III.K).
7. Twenty-Four Hour Notice of Noncompliance Reporting	The permittee must report certain occurrences of noncompliance by telephone within 24 hours from the time the permittee becomes aware of the circumstances. (See III.G and I.B.2).
8. Emergency Response and Public Notification Plan	The permittee must develop and implement an overflow emergency response and public notification plan. The permittee must submit written notice to EPA, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration that the plan has been developed and implemented by December 31, 2013 (see II.F).

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I. Limitations and Monitoring Requirements

A. Discharge Authorization

During the effective period of this permit, the permittee is authorized to discharge pollutants from the outfalls specified herein to the Toppenish Drain, within the limits and subject to the conditions set forth herein. This permit authorizes the discharge of only those pollutants resulting from facility processes, waste streams, and operations that have been clearly identified in the permit application process.

B. Effluent Limitations and Monitoring

1. The permittee must limit and monitor discharges from outfall 001 as specified in Table 1, below. All figures represent maximum effluent limits unless otherwise indicated. The permittee must comply with the effluent limits in the tables at all times unless otherwise indicated, regardless of the frequency of monitoring or reporting required by other provisions of this permit.

Table 1: Effluent Limitations and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Sample Location	Sample Frequency	Sample Type
Flow	mgd	Report	—	Report	Effluent	Daily	Measure
Biochemical Oxygen Demand (BOD_5)	mg/L	30	45	—	Influent and Effluent	1/2 weeks	24-Hour Composite
	lb/day	418	627	—			Calculation
	% Removal	85 % (minimum)	—	—		1/month	Calculation
Total Suspended Solids (TSS)	mg/L	30	45	—	Influent and Effluent	1/2 weeks	24-Hour Composite
	lb/day	418	627	—			Calculation
	% Removal	85% (minimum)	—	—		1/month	Calculation
pH (October – April)	s.u.	6.5 – 8.8 at all times			Effluent	5/week	Grab
pH (May – September)	s.u.	6.5 – 9.0 at all times			Effluent	5/week	Grab
Fecal Coliform[1]	#/100 ml	100 (geometric mean)	—	200	Effluent	1/week	Grab
Total Ammonia as N[1] (October – April)	mg/L	1.35	—	6.22	Effluent	1/2 weeks	24-Hour Composite
	lb/day	21.5	—	86.6			Calculation
Total Ammonia as N[1] (May – September)	mg/L	1.35	—	5.23	Effluent	1/2 weeks	24-Hour Composite
	lb/day	21.5	—	72.8			Calculation
Nitrate + Nitrite as N	mg/L	10.5	17.3	—	Effluent	1/2 weeks	24-Hour Composite
	lb/day	146	241	—			Calculation
Total Phosphorus as P[4] (March – October, Interim, Until July 1, 2015)	lb/day	82	149	—	Effluent	1/month	24-Hour Composite

Table 1: Effluent Limitations and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Sample Location	Sample Frequency	Sample Type
Total Phosphorus as P[4] (March – October, Final)	lb/day	48	82	—	Effluent	1/week	24-Hour Composite
Total Phosphorus as P (November – February)	mg/L	Report	—	Report	Effluent	1/month	24-Hour Composite
Copper, Total Recoverable[1] (October – April)	µg/L	9.40	—	15.8	Effluent	1/month	24-Hour Composite
	lb/day	0.13	—	0.22			Calculation
Copper, Total Recoverable[1] (May – September)	µg/L	9.71	—	16.3	Effluent	1/month	24-Hour Composite
	lb/day	0.14	—	0.23			Calculation
Lead, Total Recoverable[1] (May – September)	µg/L	3.81	—	10.3	Effluent	1/month	24-Hour Composite
	lb/day	0.0531	—	0.143			Calculation
Lead, Total Recoverable[1,4] (October – April, Interim, Until May 31, 2018)	µg/L	4.42	—	8.27	Effluent	1/month	24-Hour Composite
	lb/day	0.0616	—	0.115			Calculation
Lead, Total Recoverable[1,4] (October – April, Final)	µg/L	2.28	—	6.18	Effluent	1/month	24-Hour Composite
	lb/day	0.0317	—	0.0861			Calculation
Selenium[1] (May – September)	µg/L	7.08	—	19.2	Effluent	1/month	24-Hour Composite
	lb/day	0.0986	—	0.267			Calculation
Selenium[1] (October – April)	µg/L	4.24	—	11.5	Effluent	1/month	24-Hour Composite
	lb/day	0.0591	—	0.160			Calculation
Zinc, Total Recoverable[1] (October – April)	µg/L	50.49	—	106	Effluent	1/month	24-Hour Composite
	lb/day	0.803	—	1.48			Calculation
Zinc, Total Recoverable[1] (May – September)	µg/L	57.4	—	112	Effluent	1/month	24-Hour Composite
	lb/day	0.803	—	1.56			Calculation
Temperature	ºC	Report	—	Report	Effluent	2/week	Grab
Dissolved Oxygen	mg/L	Report minimum and monthly average effluent DO			Effluent	1/month	Grab
Hardness	mg/L as $CaCO_3$	Report	—	Report	Effluent	1/quarter[2]	24-Hour Composite
Alkalinity	mg/L as $CaCO_3$	Report	—	Report	Effluent	1/quarter[2]	24-Hour Composite
Arsenic, Total Recoverable	µg/L	Report	—	Report	Effluent	Semi-annually[3]	24-Hour Composite
Silver, Total Recoverable	µg/L	Report	—	Report	Effluent	Semi-annually[3]	24-Hour Composite
Oil and Grease	mg/L	Report	—	Report	Effluent	1/quarter[2]	Grab
Total Dissolved Solids	mg/L	Report	—	Report	Effluent	1/quarter[2]	24-Hour Composite
Total Kjeldahl Nitrogen	mg/L	Report	—	Report	Effluent	1/quarter[2]	24-Hour Composite

Table 1: Effluent Limitations and Monitoring Requirements

Parameter	Units	Effluent Limitations			Monitoring Requirements		
		Average Monthly Limit	Average Weekly Limit	Maximum Daily Limit	Sample Location	Sample Frequency	Sample Type
NPDES Application Form 2A Expanded Effluent Testing	mg/L	Report	—	—	Effluent	3x/5 years	—
Chronic Whole Effluent Toxicity	mg/L	Report	—	—	Effluent	See I.C.2.	24-Hour Composite

Notes:
1. Reporting is required within 24 hours of a maximum daily limit violation. See Parts I.B.2 and III.G.
2. Quarters are defined as January – March, April through June, July – September, and October – December. Monitoring results for pollutants with a sample frequency of quarterly must be reported on the March, June, September and December DMRs.
3. Sampling to be performed semi-annually must be performed at least once from January – June and at least once from July – December. Monitoring results for pollutants with a sample frequency of semi-annually must be reported on the June and December DMRs.
4. Effluent limits for total phosphorus and the October – April limits for lead are subject to a compliance schedule. See II.D.

2. The permittee must report within 24 hours any violation of the maximum daily limits for the following pollutants: E. coli, total ammonia as N, copper, lead, selenium, and zinc. Violations of all other effluent limits are to be reported at the time that discharge monitoring reports are submitted (See III.B and III.H).

3. The permittee must not discharge any floating solids, visible foam in other than trace amounts, or oily wastes that produce a sheen on the surface of the receiving water.

4. The permittee must not use chlorine for disinfection or elsewhere in the treatment process.

5. The permittee must collect effluent samples from the effluent stream after the last treatment unit prior to discharge into the receiving waters.

6. Minimum Levels. For all effluent monitoring, the permittee must use methods that can achieve a minimum level (ML) less than the concentration effluent limitation. For parameters that do not have concentration effluent limitations, the permittee must use methods that can achieve MLs less than or equal to those specified in Table 3 in Part I.D. For purposes of reporting on the DMR for a single sample, if a value is less than the MDL, the permittee must report “less than {numeric value of the MDL}” and if a value is less than the ML, the permittee must report “less than {numeric value of the ML}.”

7. For purposes of calculating monthly averages, except for fecal coliform, zero may be assigned for values less than the MDL, and the {numeric value of the MDL} may be assigned for values between the MDL and the ML. If the average value is less than the MDL, the permittee must report “less than {numeric value of the MDL}” and if the average value is less than the ML, the permittee must report “less than {numeric value of the ML}.” If a value is equal to or greater than the ML, the permittee must report and use the actual value. The resulting average

value must be compared to the compliance level, the ML, in assessing compliance.

C. Whole Effluent Toxicity Testing Requirements

The permittee must conduct chronic toxicity tests on effluent samples from outfall 001. Testing must be conducted in accordance with subsections 1 through 7, below.

1. Toxicity testing must be conducted on 24-hour composite samples of effluent. In addition, a split of each sample collected must be analyzed for the following chemical and physical parameters: BOD_5, TSS, pH, total ammonia as N, nitrate + nitrite as N, total phosphorus as P, total recoverable copper, total recoverable lead, selenium, total recoverable zinc, temperature, hardness, alkalinity, total dissolved solids, and total Kjeldahl nitrogen. For parameters for which grab samples are required in Part I.B, grab samples must be taken during the same 24-hour period as the 24-hour composite sample used for the toxicity tests. When the timing of sample collection coincides with that of the sampling required in Part I.B, analysis of the split sample will fulfill the requirements of Part I.B as well.

2. Chronic Test Species and Methods

   a) For outfall 001, chronic tests must be conducted twice per year, once between January 1st and June 30th and once between July 1st and December 31st.

   b) The permittee must conduct the following two chronic toxicity tests on each sample, using the species and protocols in Table 2:

Table 2: Toxicity Test Species and Protocols

Freshwater Acute Toxicity Tests	Species	Method
Fathead minnow larval survival and growth test (method 1000.0)	*Pimephales promelas*	EPA-821-R-02-013
Daphnid survival and reproduction test (method 1002.0)	*Ceriodaphnia dubia*	EPA-821-R-02-013

   c) The presence of chronic toxicity must be determined as specified in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, EPA/821-R-02-013, October 2002.

   d) Results must be reported in TU_c (chronic toxic units), which is defined as follows:

      (i) For survival endpoints, $TU_c = 100/NOEC$.

      (ii) For all other test endpoints, $TU_c = 100/IC_{25}$.

      (iii) IC_{25} means "25% inhibition concentration." The IC_{25} is a point estimate of the toxicant concentration, expressed in percent effluent, that causes a 25% reduction in a non-quantal biological measurement (e.g., reproduction or growth) calculated from a continuous model (e.g., Interpolation Method).

      (iv) NOEC means "no observed effect concentration." The NOEC is the highest concentration of toxicant, expressed in percent effluent, to

which organisms are exposed in a chronic toxicity test [full life-cycle or partial life-cycle (short term) test], that causes no observable adverse effects on the test organisms (i.e., the highest concentration of effluent in which the values for the observed responses are not statistically significantly different from the controls).

3. Quality Assurance

   a) The toxicity testing on each organism must include a series of five test dilutions and a control. The dilution series must include the receiving water concentration (RWC), which is the dilution associated with the chronic toxicity trigger, two dilutions above the RWC, and two dilutions below the RWC. The RWC is 80.6% effluent.

   b) All quality assurance criteria and statistical analyses used for chronic tests and reference toxicant tests must be in accordance with *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition, EPA/821-R-02-013, October 2002, and individual test protocols.

   c) In addition to those quality assurance measures specified in the methodology, the following quality assurance procedures must be followed:

      (i) If organisms are not cultured in-house, concurrent testing with reference toxicants must be conducted. If organisms are cultured in-house, monthly reference toxicant testing is sufficient. Reference toxicant tests must be conducted using the same test conditions as the effluent toxicity tests.

      (ii) If either of the reference toxicant tests or the effluent tests do not meet all test acceptability criteria as specified in the test methods manual, the permittee must re-sample and re-test within 14 days of receipt of the test results.

      (iii) Control and dilution water must be receiving water or lab water, as appropriate, as described in the manual. If the dilution water used is different from the culture water, a second control, using culture water, must also be used. Receiving water may be used as control and dilution water upon notification of EPA and IDEQ. In no case shall water that has not met test acceptability criteria be used for either dilution or control.

4. Reporting

   a) The permittee must submit the results of the toxicity tests with the discharge monitoring reports (DMRs). Toxicity tests taken from January 1st through June 30th must be reported on the August DMR. Toxicity tests taken from June 1st through December 31st must be reported on the DMR for the following February.

   b) The report of toxicity test results must include all relevant information outlined in Section 10, Report Preparation, of *Short-Term Methods for*

Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, EPA/821-R-02-013, October 2002. In addition to toxicity test results, the permittee must report: dates of sample collection and initiation of each test; flow rate at the time of sample collection; and the results of the monitoring for the following chemical and physical parameters: BOD_5, TSS, pH, total ammonia as N, nitrate + nitrite as N, total phosphorus as P, total recoverable copper, total recoverable lead, selenium, total recoverable zinc, temperature, hardness, alkalinity, total dissolved solids, and total Kjeldahl nitrogen.

5. Preparation of initial investigation toxicity reduction evaluation (TRE) workplan: Prior to initiation of the toxicity testing required by this permit, the permittee must submit to EPA a copy of the permittee's initial investigation TRE workplan. This plan shall describe the steps the permittee intends to follow in the event that chronic toxicity is detected above 1.24 TU_c, and must include at a minimum:

   a) A description of the investigation and evaluation techniques that would be used to identify potential causes/sources of toxicity, effluent variability, treatment system efficiency;

   b) A description of the facility's method of maximizing in-house treatment efficiency, good housekeeping practices, and a list of all chemicals used in operation of the facility; and

   c) If a toxicity identification evaluation (TIE) is necessary, who will conduct it (i.e., in-house or other).

   d) The initial investigation TRE workplan must be sent to the following address:

      US EPA Region 10
      Attn: NPDES WET Coordinator
      1200 Sixth Avenue
      Suite 900 OWW-130
      Seattle, WA 98101-3140

6. Accelerated testing: If chronic toxicity is detected above 1.24 TU_c, the permittee must comply with the following:

   a) The permittee must implement the initial investigation TRE workplan within 48-hours of the permittee's receipt of the toxicity results demonstrating the exceedance.

   b) The permittee must conduct six more bi-weekly (every two weeks) chronic toxicity tests, over a 12-week period. This accelerated testing shall be initiated within 15 calendar days of receipt of the test results indicating the initial exceedance.

   c) The permittee must notify EPA of the exceedance in writing at the address in Part I.C.5.d, above, within 5 calendar days of receipt of the test results indicating the exceedance. The notification must include the following information:

(i) A status report on any actions required by the permit, with a schedule for actions not yet completed.

(ii) A description of any additional actions the permittee has taken or will take to investigate and correct the cause(s) of the toxicity.

(iii) Where no actions have been taken, a discussion of the reasons for not taking action.

d) If implementation of the initial investigation workplan clearly identifies the source of toxicity to the satisfaction of EPA (e.g., a temporary plant upset), and none of the six accelerated chronic toxicity tests required under Part I.C.6.b are above 1.24 TU_c, the permittee may return to the regular chronic toxicity testing cycle specified in Part I.C.2.a.

7. Toxicity Reduction Evaluation (TRE)

a) If implementation of the initial investigation workplan does not clearly identify the source of toxicity to the satisfaction of EPA, or any of the six accelerated chronic toxicity tests indicate toxicity above 1.23 TUc, then the permittee must begin implementation of the toxicity reduction evaluation (TRE) requirements below. Implementation of the TRE requirements shall begin within 10 calendar days of receipt of the accelerated chronic toxicity testing results demonstrating the exceedance.

b) In accordance with the permittee's initial investigation workplan and EPA manual EPA 833-B-99-002 (*Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants*), the permittee must develop as expeditiously as possible a more detailed TRE workplan, which includes:

(i) Further actions to investigate and identify the cause of toxicity;

(ii) Actions the permittee will take to mitigate the impact of the discharge and to prevent the recurrence of toxicity; and

(iii) A schedule for these actions.

c) The permittee may initiate a TIE as part of the overall TRE process described in the EPA acute and chronic TIE manuals EPA/600/6-91/005F (Phase I), EPA/600/R-92/080 (Phase II), and EPA-600/R-92/081 (Phase III).

d) If a TIE is initiated prior to completion of the accelerated testing, the accelerated testing schedule may be terminated, or used as necessary in performing the TIE.

D. Surface Water Monitoring

The permittee must conduct surface water monitoring. Surface water monitoring must start by September 30, 2013 and continue for as long as the permit remains in effect. The program must meet the following requirements:

1. Monitoring stations must be established in the Toppenish Drain at the following locations:

a) Above the influence of the facility's discharge, and

b) Below the facility's discharge, at a point where the effluent and the Toppenish Drain are completely mixed.

2. The permittee must seek approval of the surface water monitoring stations from the Yakama Nation Environmental Protection Program.

3. A failure to obtain the Yakama Nation Environmental Protection Program approval of surface water monitoring stations does not relieve the permittee of the surface water monitoring requirements of this permit.

4. To the extent practicable, surface water sample collection must occur on the same day as effluent sample collection.

5. The flow rate must be measured as near as practicable to the time that other ambient parameters are sampled.

6. Samples must be analyzed for the parameters listed in Table 3, and must achieve method detection limits (MDLs) that are equivalent to or less than those listed in Table 3. The permittee may request different MDLs. The request must be in writing and must be approved by the Director of the Office of Water and Watersheds.

Table 3: Receiving Water Monitoring Requirements

Parameter and Units	Locations	Sample Frequency	Sample Type	Maximum MDL
Flow (mgd)	Upstream	1/month	Measure	—
Total phosphorus as P (µg/L)	Upstream and downstream	1/quarter[2]	Grab	50
Total nitrogen as N (mg/L)	Upstream and downstream	1/quarter[2]	Grab	0.1
Temperature (°C)	Upstream and downstream	1/month[1]	Grab	—
pH (s.u.)	Upstream and downstream	1/quarter[2]	Grab	—
Hardness (mg/L as $CaCO_3$)	Downstream	1/quarter[2]	Grab	—

Notes:
1. Temperature monitoring must occur once per month during June, July, August, and September.
2. Quarters are defined as January – March, April – June, July – September, and October – December.

7. Quality assurance/quality control plans for all the monitoring must be documented in the Quality Assurance Plan required under Part II.B., "Quality Assurance Plan".

8. Surface water monitoring results must be submitted to EPA, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration on the discharge monitoring reports. Receiving water monitoring with a frequency of once per month must be reported on the DMR for the month in which data were collected. Receiving water monitoring with a frequency of quarterly must be reported on the DMR for the last month of the quarter in which data were collected. In addition to reporting on the DMR, the permittee must submit an annual surface water monitoring report to EPA, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration. At a minimum, the annual surface water monitoring report must include the following:

a) Dates of sample collection and analyses.

b) Results of sample analysis.

c) Relevant quality assurance/quality control (QA/QC) information.

II. Special Conditions

A. Operation and Maintenance Plan

In addition to the requirements specified in Section IV.E. of this permit (Proper Operation and Maintenance), by December 31, 2013, the permittee must provide written notice to EPA, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration that an operations and maintenance (O&M) plan for the current wastewater treatment facility has been developed and implemented by December 31, 2013. The plan shall be retained on site and made available on request to EPA and the Yakama Nation Environmental Protection Program. Any changes occurring in the operation of the plant shall be reflected within the O&M plan.

B. Quality Assurance Plan (QAP)

The permittee must develop and implement a quality assurance plan (QAP) for all monitoring required by this permit. The permittee must submit written notice to EPA, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration that the Plan has been developed and implemented by December 31, 2013. Any existing QAPs may be modified for compliance with this section.

1. The QAP must be designed to assist in planning for the collection and analysis of effluent and receiving water samples in support of the permit and in explaining data anomalies when they occur.

2. Throughout all sample collection and analysis activities, the permittee must use the EPA-approved QA/QC and chain-of-custody procedures described in *EPA Requirements for Quality Assurance Project Plans* (EPA/QA/R-5) and *Guidance for Quality Assurance Project Plans* (EPA/QA/G-5). The QAP must be prepared in the format that is specified in these documents.

3. At a minimum, the QAP must include the following:

   a) Details on the number of samples, type of sample containers, preservation of samples, holding times, analytical methods, analytical detection and quantitation limits for each target compound, type and number of quality assurance field samples, precision and accuracy requirements, sample preparation requirements, sample shipping methods, and laboratory data delivery requirements.

   b) Map(s) indicating the location of each sampling point.

   c) Qualification and training of personnel.

   d) Name(s), address(es) and telephone number(s) of the laboratories used by or proposed to be used by the permittee.

4. The permittee must amend the QAP whenever there is a modification in sample collection, sample analysis, or other procedure addressed by the QAP.
5. Copies of the QAP must be kept on site and made available to EPA, the Yakama Nation Environmental Protection Program, and/or the Yakama Nation Water Code Administration upon request.

C. Facility Planning Requirement

Each month, the permittee must compute an annual average value for flow based on the previous twelve months data. The annual average flow must be calculated as the sum of all the daily flow measurements taken during the previous twelve months divided by the number of daily flow measurements taken during the previous twelve months.

When the annual average of the daily flow exceeds 1.42 mgd, which is 85% of the facility design flow of 1.67 mgd, the permittee must develop a facility plan and schedule within one year from the date of the first exceedence. The plan must include the permittee's strategy for continuing to maintain compliance with effluent limits and must be made available to the Director or authorized representative upon request.

D. Schedules of Compliance

1. The permittee must comply with all effluent limitations and monitoring requirements in Part I.B of this permit immediately upon the effective date of this permit except the final effluent limitations for total phosphorus as P and the final effluent limits for total recoverable lead in effect from October – April.
2. The permittee must achieve compliance with the final effluent limits for total phosphorus as P no later than July 1, 2015.
3. The permittee must achieve compliance with the final effluent limits for total recoverable lead for October – April no later than May 31, 2018.
4. The permittee must submit an Annual Report of Progress which outlines the progress made towards reaching the compliance date for the total phosphorus and the October – April total recoverable lead effluent limitations. The first report is due July 1, 2014 and annually thereafter, until compliance with the October – April total recoverable lead effluent limits is achieved. See also Part III.J., "Compliance Schedules". At a minimum, the annual report must include:
   a) An assessment of the previous year of effluent data and comparison to the final effluent limitations.
   b) Actions taken during the past year to achieve compliance with the effluent limits.
   c) Further actions and milestones targeted for the upcoming year.

E. Control of Undesirable Pollutants and Industrial Users

1. The permittee must require any industrial user discharging to its treatment works to comply with any applicable requirements of 40 CFR 403 through 471.

2. The permittee must not allow introduction of the following pollutants into the POTW:

   a) Pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, wastestreams with a closed cup flashpoint of less than 140 degrees Fahrenheit (°F) or 60 degrees Centigrade (°C) using the test methods specified in 40 CFR 261.21.

   b) Pollutants which will cause corrosive structural damage to the POTW, but in no case Discharges with pH lower than 5.0, unless the works is specifically designed to accommodate such Discharges.

   c) Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW resulting in Interference.

   d) Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a Discharge at a flow rate and/or pollutant concentration which will cause Interference with the POTW.

   e) Heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the POTW Treatment Plant exceeds 40 ºC (104 ºF) unless the Director of the Office of Water and Watersheds, upon request of the POTW, approves alternate temperature limits.

   f) Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or pass through.

   g) Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quantity that may cause acute worker health and safety problems.

   h) Any trucked or hauled pollutants, except at discharge points designated by the POTW.

   i) Any pollutant which causes Pass Through or Interference.

F. Emergency Response and Public Notification Plan

1. The permittee must develop and implement an overflow emergency response and public notification plan that identifies measures to protect public health from overflows that may endanger health and unanticipated bypasses or upsets that exceed any effluent limitation in the permit. At a minimum, the plan must include mechanisms to:

   a) Ensure that the permittee is aware (to the greatest extent possible) of all overflows from portions of the collection system over which the permittee has ownership or operational control and unanticipated bypass or upset that exceed any effluent limitation in the permit;

   b) Ensure appropriate responses including assurance that reports of an overflow or of an unanticipated bypass or upset that exceed any effluent limitation in the permit are immediately dispatched to appropriate personnel for investigation and response;

c) Ensure immediate notification to the public, health agencies, and other affected public entities (including public water systems). The overflow response plan must identify the public health and other officials who will receive immediate notification;

d) Ensure that appropriate personnel are aware of and follow the plan and are appropriately trained; and

e) Provide emergency operations.

2. The permittee must submit written notice to EPA, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration that the plan has been developed and implemented by December 31, 2013. Any existing emergency response and public notification plan may be modified for compliance with this section.

III. Monitoring, Recording and Reporting Requirements

A. Representative Sampling (Routine and Non-Routine Discharges)

Samples and measurements must be representative of the volume and nature of the monitored discharge.

In order to ensure that the effluent limits set forth in this permit are not violated at times other than when routine samples are taken, the permittee must collect additional samples at the appropriate outfall whenever any discharge occurs that may reasonably be expected to cause or contribute to a violation that is unlikely to be detected by a routine sample. The permittee must analyze the additional samples for those parameters limited in Part I.B of this permit that are likely to be affected by the discharge.

The permittee must collect such additional samples as soon as the spill, discharge, or bypassed effluent reaches the outfall. The samples must be analyzed in accordance with paragraph III.C ("Monitoring Procedures"). The permittee must report all additional monitoring in accordance with paragraph III.D ("Additional Monitoring by Permittee").

B. Reporting of Monitoring Results

The permittee must either submit monitoring data and other reports in paper form, or must report electronically using NetDMR, a web-based tool that allows permittees to electronically submit DMRs and other required reports via a secure internet connection. Specific requirements regarding submittal of data and reports in paper form and submittal using NetDMR are described below.

1. Paper Copy Submissions.

a) Monitoring data must be submitted using the DMR form (EPA No. 3320-1) or equivalent and must be postmarked by the 20th day of the month following the completed reporting period. The permittee must sign and certify all DMRs, and all other reports, in accordance with the requirements of Part V.E. of this permit ("Signatory Requirements"). The permittee must submit the legible

originals of these documents to the Director, Office of Compliance and Enforcement, with copies to the Yakama Nation Environmental Protection Program and the Yakama Nation Water Code Administration at the following addresses:

US EPA Region 10
Attn: ICIS Data Entry Team
1200 Sixth Avenue, Suite 900
OCE-133
Seattle, Washington 98101-3140

Yakama Nation Environmental Protection Program
Department of Natural Resources
P.O. Box 151
Toppenish, WA 98948

Yakama Nation Water Code Administration
Attn: Wayne Wiltse
P.O. Box 151
Toppenish, WA 98948

2. Electronic Copy Submissions

a) Monitoring data must be submitted electronically to EPA no later than the 20th of the month following the completed reporting period. All reports required under this permit must be submitted to EPA as a legible electronic attachment to the DMR. The permittee must sign and certify all DMRs, and all other reports, in accordance with the requirements of Part V.E. of this permit ("Signatory Requirements"). Once a permittee begins submitting reports using NetDMR, it will no longer be required to submit paper copies of DMRs or other reports to EPA, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration.

b) The permittee may use NetDMR after requesting and receiving permission from US EPA Region 10. NetDMR is accessed from http://www.epa.gov/netdmr.

C. Monitoring Procedures

Monitoring must be conducted according to test procedures approved under 40 CFR 136, unless another method is required under 40 CFR subchapters N or O, or other test procedures have been specified in this permit or approved by EPA as an alternate test procedure under 40 CFR 136.5.

D. Additional Monitoring by Permittee

If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the permittee must include the results of this monitoring in the calculation and reporting of the data submitted in the DMR.

Upon request by EPA, the permittee must submit results of any other sampling, regardless of the test method used.

E. Records Contents

Records of monitoring information must include:

1. the date, exact place, and time of sampling or measurements;
2. the name(s) of the individual(s) who performed the sampling or measurements;
3. the date(s) analyses were performed;
4. the names of the individual(s) who performed the analyses;
5. the analytical techniques or methods used; and
6. the results of such analyses.

F. Retention of Records

The permittee must retain records of all monitoring information, including, all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, copies of DMRs, a copy of the NPDES permit, and records of all data used to complete the application for this permit, for a period of at least five years from the date of the sample, measurement, report or application. This period may be extended by request of EPA, the Yakama Nation Environmental Protection Program or the Yakama Nation Water Code Administration at any time.

G. Twenty-four Hour Notice of Noncompliance Reporting

1. The permittee must report the following occurrences of noncompliance by telephone within 24 hours from the time the permittee becomes aware of the circumstances:
   a) any noncompliance that may endanger health or the environment;
   b) any unanticipated bypass that exceeds any effluent limitation in the permit (See Part IV.F., “Bypass of Treatment Facilities”);
   c) any upset that exceeds any effluent limitation in the permit (See Part IV.G., “Upset Conditions”); or
   d) any violation of a maximum daily discharge limitation for applicable pollutants identified by Part I.B.2.
   e) any overflow prior to the treatment works over which the permittee has ownership or has operational control. An overflow is any spill, release or diversion of municipal sewage including:
      (i) an overflow that results in a discharge to waters of the United States; and
      (ii) an overflow of wastewater, including a wastewater backup into a building (other than a backup caused solely by a blockage or other

malfunction in a privately owned sewer or building lateral) that does not reach waters of the United States.

2. The permittee must also provide a written submission within five days of the time that the permittee becomes aware of any event required to be reported under subpart 1 above. The written submission must contain:
   a) a description of the noncompliance and its cause;
   b) the period of noncompliance, including exact dates and times;
   c) the estimated time noncompliance is expected to continue if it has not been corrected; and
   d) steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
   e) if the noncompliance involves an overflow, the written submission must contain:
      (i) The location of the overflow;
      (ii) The receiving water (if there is one);
      (iii) An estimate of the volume of the overflow;
      (iv) A description of the sewer system component from which the release occurred (e.g., manhole, constructed overflow pipe, crack in pipe);
      (v) The estimated date and time when the overflow began and stopped or will be stopped;
      (vi) The cause or suspected cause of the overflow;
      (vii) Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
      (viii) An estimate of the number of persons who came into contact with wastewater from the overflow; and
      (ix) Steps taken or planned to mitigate the impact(s) of the overflow and a schedule of major milestones for those steps.
3. The Director of the Office of Compliance and Enforcement may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the NPDES Compliance Hotline in Seattle, Washington, by telephone, (206) 553-1846.
4. Reports must be submitted to the addresses in Part III.B ("Reporting of Monitoring Results").

H. Other Noncompliance Reporting

The permittee must report all instances of noncompliance, not required to be reported within 24 hours, at the time that monitoring reports for Part III.B ("Reporting of Monitoring Results") are submitted. The reports must contain the information listed

in Part III.G.2 of this permit ("Twenty-four Hour Notice of Noncompliance Reporting").

I. Public Notification

The permittee must immediately notify the public, health agencies and other affected entities (e.g., public water systems) of any overflow which the permittee owns or has operational control; or any unanticipated bypass or upset that exceeds any effluent limitation in the permit in accordance with the notification procedures developed in accordance with Part II.G.

J. Notice of New Introduction of Toxic Pollutants

The permittee must notify the Director of the Office of Water and Watersheds, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration in writing of:

1. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to Sections 301 or 306 of the Act if it were directly discharging those pollutants; and
2. Any substantial change in the volume or character of pollutants being introduced into the POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
3. For the purposes of this section, adequate notice must include information on:
   a) The quality and quantity of effluent to be introduced into the POTW, and
   b) Any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.
4. The permittee must notify the Director of the Office of Water and Watersheds at the following address:

   US EPA Region 10
   Attn: NPDES Permits Unit Manager
   1200 6th Avenue
   Suite 900 OWW-130
   Seattle, WA 98101-3140

K. Compliance Schedules

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than 14 days following each schedule date.

IV. Compliance Responsibilities

A. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for enforcement

action, for permit termination, revocation and reissuance, or modification, or for denial of a permit renewal application.

B. Penalties for Violations of Permit Conditions

1. Civil and Administrative Penalties. Pursuant to 40 CFR Part 19 and the Act, any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed the maximum amounts authorized by Section 309(d) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. § 2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. § 3701 note) (currently $37,500 per day for each violation).

2. Administrative Penalties. Any person may be assessed an administrative penalty by the Administrator for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Pursuant to 40 CFR 19 and the Act, administrative penalties for Class I violations are not to exceed the maximum amounts authorized by Section 309(g)(2)(A) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. § 2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. § 3701 note) (currently $16,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $37,500). Pursuant to 40 CFR 19 and the Act, penalties for Class II violations are not to exceed the maximum amounts authorized by Section 309(g)(2)(B) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. § 2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. § 3701 note) (currently $16,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $177,500).

3. Criminal Penalties:

   a) Negligent Violations. The Act provides that any person who negligently violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of $2,500 to $25,000 per day of violation, or imprisonment of not more than 1 year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than $50,000 per day of violation, or by imprisonment of not more than 2 years, or both.

   b) Knowing Violations. Any person who knowingly violates such sections, or such conditions or limitations is subject to criminal penalties of $5,000 to $50,000 per day of violation, or imprisonment for not more than 3 years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than

$100,000 per day of violation, or imprisonment of not more than 6 years, or both.

c) Knowing Endangerment. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than $250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than $500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the Act, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than $1,000,000 and can be fined up to $2,000,000 for second or subsequent convictions.

d) False Statements. The Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both. The Act further provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 6 months per violation, or by both.

C. Need To Halt or Reduce Activity not a Defense

It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with this permit.

D. Duty to Mitigate

The permittee must take all reasonable steps to minimize or prevent any discharge in violation of this permit that has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance

The permittee must at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and

appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by the permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

F. Bypass of Treatment Facilities

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur that does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2 and 3 of this Part.

2. Notice.

   a) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it must submit prior written notice, if possible at least 10 days before the date of the bypass.

   b) Unanticipated bypass. The permittee must submit notice of an unanticipated bypass as required under Part III.G ("Twenty-four Hour Notice of Noncompliance Reporting").

3. Prohibition of bypass.

   a) Bypass is prohibited, and the Director of the Office of Compliance and Enforcement may take enforcement action against the permittee for a bypass, unless:

      (i) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

      (ii) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass that occurred during normal periods of equipment downtime or preventive maintenance; and

      (iii) The permittee submitted notices as required under paragraph 2 of this Part.

   b) The Director of the Office of Compliance and Enforcement may approve an anticipated bypass, after considering its adverse effects, if the Director determines that it will meet the three conditions listed above in paragraph 3.a. of this Part.

G. Upset Conditions

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the permittee meets the requirements of paragraph 2 of this Part. No determination made during administrative review of claims that noncompliance

was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

2. Conditions necessary for a demonstration of upset. To establish the affirmative defense of upset, the permittee must demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

   a) An upset occurred and that the permittee can identify the cause(s) of the upset;

   b) The permitted facility was at the time being properly operated;

   c) The permittee submitted notice of the upset as required under Part III.G, "Twenty-four Hour Notice of Noncompliance Reporting;" and

   d) The permittee complied with any remedial measures required under Part IV.D, "Duty to Mitigate."

3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

H. Toxic Pollutants

The permittee must comply with effluent standards or prohibitions established under Section 307(a) of the Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if the permit has not yet been modified to incorporate the requirement.

I. Planned Changes

The permittee must give written notice to the Director of the Office of Water and Watersheds as specified in part III.J.4, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration as soon as possible of any planned physical alterations or additions to the permitted facility whenever:

1. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source as determined in 40 CFR 122.29(b); or

2. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants that are not subject to effluent limitations in this permit.

3. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application site.

J. Anticipated Noncompliance

The permittee must give written advance notice to the Director of the Office of Compliance and Enforcement, the Yakama Nation Environmental Protection

Program, and the Yakama Nation Water Code Administration of any planned changes in the permitted facility or activity that may result in noncompliance with this permit.

K. Reopener

This permit may be reopened to include any applicable standard for sewage sludge use or disposal promulgated under section 405(d) of the Act. The Director may modify or revoke and reissue the permit if the standard for sewage sludge use or disposal is more stringent than any requirements for sludge use or disposal in the permit, or controls a pollutant or practice not limited in the permit.

V. General Provisions

A. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause as specified in 40 CFR 122.62, 122.64, or 124.5. The filing of a request by the permittee for a permit modification, revocation and reissuance, termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

B. Duty to Reapply

If the permittee intends to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. In accordance with 40 CFR 122.21(d), and unless permission for the application to be submitted at a later date has been granted by the Regional Administrator, the permittee must submit a new application by January 1, 2018.

C. Duty to Provide Information

The permittee must furnish to EPA, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration, within the time specified in the request, any information that EPA, the Yakama Nation Environmental Protection Program, or the Yakama Nation Water Code Administration may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee must also furnish to EPA, the Yakama Nation Environmental Protection Program or the Yakama Nation Water Code Administration, upon request, copies of records required to be kept by this permit.

D. Other Information

When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or that it submitted incorrect information in a permit application or any report to EPA, the Yakama Nation Environmental Protection Program, or the Yakama Nation Water Code Administration, it must promptly submit the omitted facts or corrected information in writing.

E. Signatory Requirements

All applications, reports or information submitted to EPA, the Yakama Nation Environmental Protection Program, or the Yakama Nation Water Code Administration must be signed and certified as follows.

1. All permit applications must be signed as follows:
   a) For a corporation: by a responsible corporate officer.
   b) For a partnership or sole proprietorship: by a general partner or the proprietor, respectively.
   c) For a municipality, state, federal, Indian tribe, or other public agency: by either a principal executive officer or ranking elected official.
2. All reports required by the permit and other information requested by EPA, the Yakama Nation Environmental Protection Program, or the Yakama Nation Water Code Administration must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
   a) The authorization is made in writing by a person described above;
   b) The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company; and
   c) The written authorization is submitted to the Director of the Office of Compliance and Enforcement and the Yakama Nation Environmental Protection Program.
3. Changes to authorization. If an authorization under Part V.E.2 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part V.E.2. must be submitted to the Director of the Office of Compliance and Enforcement, the Yakama Nation Environmental Protection Program, and the Yakama Nation Water Code Administration prior to or together with any reports, information, or applications to be signed by an authorized representative.
4. Certification. Any person signing a document under this Part must make the following certification:

   > "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there

are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

F. Availability of Reports

In accordance with 40 CFR 2, information submitted to EPA pursuant to this permit may be claimed as confidential by the permittee. In accordance with the Act, permit applications, permits and effluent data are not considered confidential. Any confidentiality claim must be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice to the permittee. If a claim is asserted, the information will be treated in accordance with the procedures in 40 CFR 2, Subpart B (Public Information) and 41 Fed. Reg. 36902 through 36924 (September 1, 1976), as amended.

G. Inspection and Entry

The permittee must allow the Director of the Office of Compliance and Enforcement, EPA Region 10; the Yakama Nation Environmental Protection Program; the Yakama Nation Water Code Administration; or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

H. Property Rights

The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to persons or property or invasion of other private rights, nor any infringement of federal, tribal, state or local laws or regulations.

I. Transfers

This permit is not transferable to any person except after written notice to the Director of the Office of Water and Watersheds as specified in part III.J.4. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the

Act. (See 40 CFR 122.61; in some cases, modification or revocation and reissuance is mandatory).

J. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by Section 510 of the Act.

VI. Definitions

1. "Act" means the Clean Water Act.
2. "Administrator" means the Administrator of the EPA, or an authorized representative.
3. "Average monthly discharge limitation" means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.
4. "Average weekly discharge limitation" means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week.
5. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility.
6. "Composite" - see "24-hour composite".
7. "Daily discharge" means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the day.
8. "Director of the Office of Compliance and Enforcement" means the Director of the Office of Compliance and Enforcement, EPA Region 10, or an authorized representative.
9. "Director of the Office of Water and Watersheds" means the Director of the Office of Water and Watersheds, EPA Region 10, or an authorized representative.
10. "DMR" means discharge monitoring report.
11. "EPA" means the United States Environmental Protection Agency.
12. "Geometric Mean" means the nth root of a product of n factors, or the antilogarithm of the arithmetic mean of the logarithms of the individual sample values.

13. “Grab” sample is an individual sample collected over a period of time not exceeding 15 minutes.
14. “Inhibition concentration”, IC, is a point estimate of the toxicant concentration that causes a given percent reduction (p) in a non-quantal biological measurement (e.g., reproduction or growth) calculated from a continuous model (e.g., Interpolation Method).
15. “Interference” is defined in 40 CFR 403.3.
16. “Maximum daily discharge limitation” means the highest allowable “daily discharge.”
17. “Method Detection Limit (MDL)” means the minimum concentration of a substance (analyte) that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix containing the analyte.
18. “Minimum Level (ML)” means the concentration at which the entire analytical system must give a recognizable signal and an acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method-specified sample weights, volumes and processing steps have been followed.
19. “NOEC” means no observed effect concentration. The NOEC is the highest concentration of toxicant (e.g., effluent) to which organisms are exposed in a chronic toxicity test [full life-cycle or partial life-cycle (short term) test], that causes no observable adverse effects on the test organisms (i.e., the highest concentration of effluent in which the values for the observed responses are not statistically significantly different from the controls).
20. “NPDES” means National Pollutant Discharge Elimination System, the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits . . . under sections 307, 402, 318, and 405 of the CWA.
21. “Pass Through” means a Discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).
22. “QA/QC” means quality assurance/quality control.
23. “Regional Administrator” means the Regional Administrator of Region 10 of the EPA, or the authorized representative of the Regional Administrator.
24. “Severe property damage” means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

25. “Upset” means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

26. “24-hour composite” sample means a combination of at least 8 discrete sample aliquots of at least 100 milliliters, collected over periodic intervals from the same location, during the operating hours of a facility over a 24 hour period. The composite must be flow proportional. The sample aliquots must be collected and stored in accordance with procedures prescribed in the most recent edition of Standard Methods for the Examination of Water and Wastewater.

APPENDIX C

MUNICIPAL CODE SEWER ORDINANCES

Title 13
WATER AND SEWERS

Chapters:

13.02 Water Supply Regulations

13.04 Water – Installation of Service

13.08 Water – Service Regulations

13.12 Water – Meters

13.16 Water – Rates and Charges

13.20 Water – Fire Protection Systems

13.22 Sewers – Definitions

13.24 Sewer Permits

13.28 Public Sewers – Required Use

13.30 Private Sewage Disposal

13.32 Sewers – Construction Regulations

13.34 Building Sewers and Connections

13.36 Sewers – Inspection

13.40 Public Sewers – Use Regulations

13.42 Sewers – Protection from Damage

13.44 Sewers – Rates and Charges

13.46 Sewer Connection Charges

13.48 Powers and Authority of Inspectors – Penalty

13.52 Water and Sewer Services Outside the Corporate Limits

13.56 Utility Rate Discount for Low-Income Senior or Disabled Persons

13.60 Storm and Sewer Surface Water Utility

Chapter 13.02
WATER SUPPLY REGULATIONS

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13.02.010 Definitions.

Except where specifically designated herein, all words used in this chapter shall carry their customary meanings. Words used in the present tense include the future and plural words include the singular. The word “shall” is always mandatory, and the word “may” denotes a use of discretion in making a decision. Any definition not found in this section will take its meaning from the WAC (Chapter 246-290 WAC), or as amended, or in the most recent edition of the Manual of Cross-Connection Control published by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California.

1. “Air gap” means a physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or non-pressure-receiving vessel. To be an “approved air gap,” the separation must be at least twice the diameter of the inlet piping (supply pipe) measured vertically, and never be less than one inch.

2. “Approved backflow prevention assembly” or “backflow assembly” or “assembly” means an assembly to counteract backpressures or prevent

backsiphonage. This assembly must appear on the list of approved assemblies issued by the Washington State Department of Health. The assembly must be purchased and installed as a complete unit including two shutoff valves and test cocks.

3. “Auxiliary supply” means any water source or system other than the city of Toppenish’s water.

4. “Backflow” means the flow of water or other liquids, gases or solids from any source back into the distribution system. The flow of water in the opposite direction of its intended flow.

5. “Backflow assembly tester” means a person holding a valid BAT certificate issued in accordance with WAC 246-290-490 and Chapters 18.106, 18.27 and 70.119 RCW.

6. “Backpressure” shall mean backflow due to water pressure on the downstream side of the meter which exceeds the operating pressure of the public potable water supply.

7. “Backsiphonage” shall mean backflow due to a negative or reduced pressure within the public potable water supply.

8. “Building inspector” shall mean the building inspector for the city of Toppenish.

9. “City” shall mean the city of Toppenish.

10. “Closed system” means any water system or portion of a water system in which water is closed to atmosphere.

11. “Contamination” means the entry into or presence in a public water supply system of any substance which may be harmful to health and/or quality of the water.

12. “Cross-connection” means any physical arrangement where a public water system is connected, directly or indirectly (actual or potential), with any other nondrinkable water system or auxiliary system, wells, sewer, drain conduit, swimming pool, storage reservoir, plumbing fixture, swamp coolers, or any other device which contains, or may contain, contaminated or polluted water, sewage, used water, or other liquid of unknown or unsafe quality which may be capable of imparting contamination or pollution to the public water system as a result of backflow. Bypass arrangements, jumper connections, removable sections, swivel or changeover devices, or other temporary or permanent devices through which, or because of which, backflow may occur are considered to be cross-connections.

13. “Cross-connection specialist” or “CCS” shall mean a person holding a valid CCS certificate issued in accordance with the Washington Administrative Code.

14. “Degree of hazard” means the low or high hazard classification that shall be attached to all actual or potential cross-connections.

15. “Director” shall mean the public works director or their designee.

16. “DOH” means Washington Department of Health.

17. “Double check valve backflow prevention assembly” or “double check assembly” or “double check” or “DCVA” or “DC” means an assembly which consists of two independently operating check valves which are spring-loaded or weighted. The assembly comes complete with a shutoff valve on each side of the checks, as well as test cocks.

18. “Health hazard” means an actual or potential threat of contamination of a physical, toxic or biological nature that would be a danger to health.

19. “High hazard” means the classification assigned to an actual or potential cross-connection that potentially could allow a substance that may cause illness or death to backflow into the potable water supply.

20. “In-premises protection” means a method of protecting the health of consumers served by the customer’s plumbing system (i.e., located within the property lines of the customer’s premises) by the installation of an approved air gap, backflow prevention assembly or device at the point of hazard.

21. “Inspector,” “surveyor” or “specialist” shall mean a person holding a valid CCS certificate issued in accordance with the Washington Administrative Code, who meets the stipulations in this chapter and the most recent edition of the city’s standard operating procedures manual.

22. “Local administrative authority” means the local official, board, department or agency authorized to administer and enforce the provisions of the Uniform Plumbing Code and all other plumbing codes recognized by the state of Washington.

23. “Low hazard” means the classification assigned to an actual or potential cross-connection that could allow a substance that may be objectionable, but not hazardous to one’s health, to backflow into the potable water supply.

24. “Mobile unit” shall mean units connecting to the water system through a hydrant, hose bibb, or other appurtenance of a permanent nature that is part of the city water system or a permanent water service to a premises. Examples can include but are not limited to the following: water trucks, pesticide applicator vehicles, chemical mixing units or tanks, waste or septage hauler trucks or units, sewer cleaning equipment, carpet or steam cleaning equipment, rock quarry or asphalt/concrete batch plants, or any other mobile equipment or vessel. Uses that are excluded from this definition are recreational vehicles at assigned sites or parked in accordance with other city ordinances pertaining to recreational vehicles, and homeowner devices that are used by the property owner in accordance with other provisions of this, or other, city of Toppenish ordinances pertaining to provision of water service to a premises.

25. “Person” means a natural person (individual), corporation, company, association, partnership, firm, limited liability company, joint venture company or association, and other such entity.

26. “Plumbing hazard” means an internal or plumbing-type cross-connection in a consumer’s potable water system that may be either a pollutional or a contamination-type hazard. This includes, but is not limited to, cross-connections to toilets, sinks, lavatories, wash trays, domestic washing machines and lawn sprinkling systems. Plumbing-type cross-connections can be located in all types of structures including but not limited to homes, manufactured homes, apartment houses, hotels and commercial or industrial establishments.

27. “Point-of-use isolation” shall mean the same as “in-premises protection.”

28. “Pollutional hazard” means an actual or potential threat to the physical properties of the water system or the potability of the public or the

consumer's potable water system but which would not constitute a health or system hazard, as defined. The maximum degree of intensity of pollution to which the potable water system could be degraded under this definition would cause a nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances.

29. "Potable water supply" means any system of water supply intended or used for human consumption or other domestic use and meets all requirements established by the Safe Drinking Water Act and the DOH regulations.

30. "Premises" means any piece of property to which water is provided including, but not limited to, all improvements, mobile structures and structures located on it.

31. "Premises isolation" means a method of protecting a public water system by installation of an approved air gap or approved backflow prevention assembly at the point of service (end of purveyor's service pipe) to separate the customer's plumbing system from the purveyor's distribution system.

32. "Reduced pressure principle backflow prevention assembly" or "reduced pressure principle assembly" or "RP assembly" shall mean an assembly containing two independently acting approved check valves together with a hydraulically operated, mechanically independent pressure differential relief valve located between the check valves. The assembly shall include properly located test cocks and tightly closing shutoff valves at each end of the assembly.

33. "SOP" means the most recent edition of the city of Toppenish's standard operating procedure manual.

34. "Thermal expansion" means the pressure created by the expansion of heated water.

35. "Used water" means any water supplied by the city to a customer's property after it has passed through the service connection and is no longer under the control of the city.

36. "WAC" means the most recent edition of the Washington Administrative Code. (Ord. 2015-05 § 2, 2015).

13.02.020 Purpose.
The purpose of this chapter is to protect the water system of the city of Toppenish from contamination or pollution due to any existing or potential cross-connections as defined in WAC 246-290-010, or as amended, and this chapter. (Ord. 2015-05 § 2, 2015).

13.02.030 Cross-connections regulated.
A. No cross-connections shall be created, installed, used or maintained within the territory served by the city, except in accordance with this chapter.

B. The CCS for the city shall carry out or cause inspections to be carried out to determine if any actual or potential cross-connections exist. If found necessary, an assembly commensurate with the degree of hazard will be required to be installed at the service connection.

C. Every owner, occupant and/or person in control of any concerned premises is responsible for compliance with the terms and provisions contained herein. (Ord. 2015-05 § 2, 2015).

13.02.040 Application and responsibilities.

This chapter applies throughout the city and to every premises and property served by the city water system. It applies to any premises, public or private, regardless of date of connection to the city water. Every owner, occupant and/or person in control of any concerned premises is responsible for compliance with the terms and provisions contained herein. (Ord. 2015-05 § 2, 2015).

13.02.050 Backflow prevention assembly requirements.

A CCS employed by or under contract with the city shall determine the type of backflow assembly to be installed within the area served by the city. All assemblies shall be installed at the service connection unless it is determined by the CCS to install the assembly at an alternate location. The cross-connection shall be eliminated or an assembly shall be required to be installed in each of the following circumstances, but the CCS is in no way limited to the following circumstances:

A. The nature and extent of any activity on the premises, or the materials used in connection with any activity on the premises, or materials stored on the premises, could contaminate or pollute the potable water supply.

B. Premises having any one or more cross-connections or potential cross-connections as that term is defined in this chapter and the WAC.

C. When a cross-connection survey report form is required by the city to be filled out and returned and it has not been received.

D. Internal cross-connections are present that are not correctable.

E. Intricate plumbing arrangements exist or plumbing subject to frequent changes is present that makes it impractical to ascertain whether or not cross-connections exist.

F. There is a repeated history of cross-connections being established or reestablished.

G. There is unduly restricted entry so that inspections for cross-connections cannot be made with sufficient frequency to assure that cross-connections do not exist.

H. Materials, chemicals or any substance or apparatus is being used that if backflow occurred contamination would result.

I. Installation of an approved backflow prevention assembly is deemed to be necessary in the judgment of the CCS to accomplish the purpose of these regulations.

J. Any premises having an auxiliary water supply.

K. In the event a point-of-use assembly has not been tested or repaired as required by the WAC 246-290-490, or as amended, and this chapter.

L. If it is determined that additions or rearrangements have been made to the plumbing system without obtaining proper permits as required by the city code enforcement division.

M. All high health hazard premises which are defined in Table 9 of WAC 246-290-490, or as amended, are required to have premises isolation by

installing a reduced pressure principle assembly in accordance with this chapter.

N. When a garden hose attachment is connected to the premises plumbing, including but not limited to fertilizer applicators, pesticide applicators and radiator flush kits.

O. Where reclaimed or reused water systems are installed. (Ord. 2015-05 § 2, 2015).

13.02.060 Irrigation systems.
All irrigation systems shall be protected in accordance with the plumbing code regulations. In the event any system is equipped with an injector system, or has submerged heads, a reduced pressure principle assembly will be required. (Ord. 2015-05 § 2, 2015).

13.02.070 Fire systems.
An approved double check detector backflow prevention assembly shall be the minimum protection on all new fire sprinkler systems using piping material that is not approved for potable water use, and/or that does not provide for periodic flow-through. A reduced pressure principle detector backflow prevention assembly must be installed, if any solution other than the potable water can be introduced into the sprinkler system. Retrofitting on fire sprinkler systems will be required in each of the following circumstances:

A. Where improper maintenance has occurred;

B. On all high hazard systems;

C. Wherever an inspector deems necessary; and

D. Wherever required by the WAC. (Ord. 2015-05 § 2, 2015).

13.02.080 Temporary meters and hydrant valves.
Backflow protection will be required on all temporary meters and hydrant valves. The type of assembly will be commensurate with the degree of hazard. The degree of hazard will be determined on a case-by-case basis by the city's CCS. (Ord. 2015-05 § 2, 2015).

13.02.090 Mobile units.
Any mobile unit or apparatus as defined in TMC 13.02.010(24) which uses the city's water from any premises, or piping within the distribution system, shall first obtain a permit from the city. The mobile unit will be inspected to assure appropriate backflow protection is installed in accordance with the city's most recent edition of the SOP manual. (Ord. 2015-05 § 2, 2015).

13.02.100 Right-of-way encroachment.
No person shall install or maintain a backflow prevention assembly upon or within any city right-of-way except as provided in this section and all other city rules and regulations regarding right-of-way encroachment. (Ord. 2015-05 § 2, 2015).

13.02.110 Plumbing code.
As a condition of water service, customers shall install, maintain, and operate their piping and plumbing systems in accordance with all Washington

State Plumbing Codes. (Ord. 2015-05 § 2, 2015).

13.02.120 Access to premises.
Authorized employees of the city, with proper identification, shall have access during the hours of 8:00 a.m. to 5:00 p.m. to all parts of a premises and within the building to which water is supplied. If access to the premises or to the interior of a structure during these hours is denied, a reduced pressure principle assembly shall be required to be installed at the service connection to that premises. (Ord. 2015-05 § 2, 2015).

13.02.130 Testing and repairs.
Backflow prevention assemblies shall be tested and repaired in accordance with the requirements set out in the WAC, this chapter and the most recent edition of the city's SOP manual. (Ord. 2015-05 § 2, 2015).

13.02.140 Responsibilities of backflow prevention assembly testers.
All backflow assembly testers operating within the city shall be certified in accordance with all applicable regulations and shall comply with all stipulations in this chapter and the most recent edition of the city's SOP manual. (Ord. 2015-05 § 2, 2015).

13.02.150 Maintenance of assemblies.
Backflow prevention assemblies shall be maintained in accordance with the requirements set out in the WAC, or as amended, and the most recent edition of the city's SOP manual. (Ord. 2015-05 § 2, 2015).

13.02.160 Installation requirements and specifications.
Backflow prevention assemblies shall be installed in accordance with the requirements set out in the WAC and the most recent edition of the city's SOP manual.

In the event the CCS allows a premises isolation assembly to be installed at an alternate location, there shall be no connections between the meter and the premises isolation assembly. (Ord. 2015-05 § 2, 2015).

13.02.170 Thermal expansion.
If a closed system has been created by the installation of a backflow prevention assembly, it is the responsibility of the property owner to eliminate the possibility of thermal expansion. (Ord. 2015-05 § 2, 2015).

13.02.180 Pressure loss.
Any reduction in water pressure caused by the installation of a backflow assembly is not the responsibility of the city. The city will give reasonable assistance to the owner regarding information on adequate sizing of assemblies and proper plumbing practices to provide for required pressure and flows for fire protection. (Ord. 2015-05 § 2, 2015).

13.02.190 Parallel installation.
Premises where noninterruption of water supply is critical shall have installed two assemblies of the same type in parallel. They shall be sized in such a manner that either assembly will provide the minimum water requirements while the two together will provide the maximum water requirements. (Ord. 2015-05 § 2, 2015).

13.02.200 New construction.

A. In all new nonresidential construction, an approved backflow assembly shall be installed at the service connection. The type of the assembly will be commensurate with the degree of hazard as determined by an inspector.

B. When a building is constructed on commercial premises, and the end use of the building is not determined or could change, a reduced pressure principle backflow prevention assembly shall be installed at the service connection to provide protection of the public water supply in the event of the most hazardous use of the building. (Ord. 2015-05 § 2, 2015).

13.02.210 Residential service connections.

Any residential property which has been determined to have an actual or potential cross-connection and/or has violated the plumbing code or this chapter in any way, shall be required to install an approved backflow prevention assembly in accordance with this chapter. (Ord. 2015-05 § 2, 2015).

13.02.220 Rental properties.

Property owners are responsible for the installation, testing and repair of all backflow assemblies on their property. When the tenants change, or, if the plumbing is altered in any way, it is the responsibility of the owner to notify the city. (Ord. 2015-05 § 2, 2015).

13.02.230 Retrofitting.

Retrofitting shall be required on all service connections where an actual or potential cross-connection exists, and wherever else the city deems retrofitting necessary. (Ord. 2015-05 § 2, 2015).

13.02.240 Costs of compliance.

All costs associated with the purchase, installation, inspections, testing, replacement, maintenance, parts, and repairs of the backflow assembly are the financial responsibility of the property owner. All cost associated with any disconnect fees associated with the enforcement of this chapter are the sole responsibility of the user. (Ord. 2015-05 § 2, 2015).

13.02.250 Recovery of costs.

Any water customer violating any of the provisions of this chapter and who causes damage to or impairs the city's water system, including, but not limited to, allowing contamination, pollution, any other solution or used water to enter the city's water system, shall be liable to the city for any expense, loss or damage caused by such violation. The city shall collect from the violator for the cost incurred by the city for any cleaning, purifying, repair or replacement work or any other expenses caused by the violation. Refusal to pay the assessed costs shall constitute a violation of this chapter and shall result in the termination of service. (Ord. 2015-05 § 2, 2015).

13.02.260 Termination of service.

Failure on the part of any property owner, renter, agent or personal representative to discontinue the use of all cross-connections, to physically separate cross-connections or to abide by all the conditions of this chapter is sufficient cause for the immediate discontinuance of water service by the city to the premises. (Ord. 2015-05 § 2, 2015).

13.02.270 Emergency suspension of service.

The city manager or his designee may, without prior notice, suspend water service to any premises when such suspension is necessary to stop the

imminent threat of any actual or potential cross-connection as defined in this chapter and the most recent edition of the city's SOP manual. (Ord. 2015-05 § 2, 2015).

13.02.280 Nonemergency suspension of service.
The city manager or his designee may suspend, with 24 hours' notice, the water supply to any premises where the conditions of this chapter or the most recent edition of the city's SOP manual have been violated. (Ord. 2015-05 § 2, 2015).

13.02.290 Penalties.
Any person, property owner, firm, corporation or business entity violating (A) this chapter or (B) any regulation, rule or permit of the city issued pursuant to this chapter, shall be liable to the city for civil penalty. The amount of such civil penalty shall be a maximum of $2,000 per violation. Each continuing day's violation under this chapter shall constitute a separate offense. The penal provisions imposed under this chapter shall not preclude the city from filing suit to enjoin the violation. The city of Toppenish retains all legal rights and remedies available to it pursuant to local, state and federal law. (Ord. 2015-05 § 2, 2015).

13.02.300 Falsifying information.
Any person who knowingly makes any false statement, representation, record, report or other document filed or required to be maintained pursuant to this chapter, or who falsifies, tampers with, or knowingly renders inaccurate any backflow assembly, device or method required under this chapter shall (in addition to civil and/or criminal penalties provided by state law) be guilty of a misdemeanor subject to the general penalty clause of the Toppenish Municipal Code. (Ord. 2015-05 § 2, 2015).

13.02.310 Constitutionality and saving clause.
If any provision, section, sentence, clause or phrase of this chapter or the application of same to any person or set of circumstances is for any reason held to be unconstitutional, void, invalid, or for any reason unenforceable, the validity of the remaining portions of this chapter or its application to other persons or circumstances shall not be affected thereby, it being the intent of the city council of the city of Toppenish in adopting and the mayor in approving the ordinance codified in this chapter that no portion hereof or provision or regulation contained herein shall become inoperative or fail by reason of any unconstitutionality or invalidity of any other portion, provision, or regulation. (Ord. 2015-05 § 2, 2015).

13.02.320 Effective date.
The ordinance codified in this chapter shall become effective five days after publication of a summary thereof. (Ord. 2015-05 § 2, 2015).

Chapter 13.04
WATER – INSTALLATION OF SERVICE*

Sections:

13.04.010 Connection to water main required when – Notice.

13.04.020 Service of notice – Determination of assessment – Collection.

13.04.030 City engineer supervision authority.

13.04.040 Installation by city water department – Liability for costs.

13.04.050 Equipment included.

13.04.060 Fees designated.

13.04.070 Single pipe to supply two properties when.

13.04.080 Ownership of equipment vested in city.

13.04.090 General facilities charge.

*For statutory provisions authorizing all cities to establish, construct and regulate a water system, see RCW 35.21.210 and 35.92.010; for the provisions authorizing a lien for utility services, see RCW 35.21.290 and 35.21.300; for the provisions authorizing extension of the water system outside city limits, see RCW 35.92.170.

13.04.010 Connection to water main required when – Notice.

Whenever the public health of the city in the opinion of the city health officer requires property to be connected with the water mains of the city, such officer is hereby empowered to order the same to be connected; provided, however, that he shall serve notice upon the owner, tenant, or agent of the owner in writing to make such connection. (Ord. 217 § 1, 1912).

13.04.020 Service of notice – Determination of assessment – Collection.

Notice may be served upon any of the parties named in TMC 13.04.010 by placing the same in the mail addressed to the owner, tenant or agent, and such notice shall be mailed at least five days prior to the time set therein for making such connection, and in case such connection is not made within the time limited in such notice, the city may make such connection and assess the same against the property benefited thereby and such assessment shall be paid and collected in the manner described by law for the collection of general taxes of the city. (Ord. 217 § 1, 1912).

13.04.030 City engineer supervision authority.

Such connections shall be made under the direction of the city engineer who is ordered and directed to prepare and file in the office of the city clerk-treasurer general specifications therefor; provided further, that nothing in this chapter shall be construed as repealing any ordinance of the city governing the use of the present mains thereof, but shall be construed in connection therewith and as an addition thereto. (Ord. 217 § 3, 1912).

13.04.040 Installation by city water department – Liability for costs.

All services shall be installed by the city water department, at the expense of the property owner, in the amount stated in TMC 13.04.060. (Ord. A-95 § 5(a), 1930).

13.04.050 Equipment included.

Each service shall consist of a tap and corporation cock or connection with the water main, a length of service pipe extending to the curbline in front of the property, a curb cock and water meter placed inside of the curbline and a meter box and fittings used in making connections of any size between the water main and the property served. (Ord. A-95 § 5(b), 1930).

13.04.060 Fees designated.

A. Any property owner applying for connection to the city water system shall pay service charges as follows:

For each 5/8-inch or 3/4-inch connection	$ 1,300.00
For each 1-inch connection	1,600.00
For each 1-1/2-inch connection	2,200.00
For each 2-inch connection	2,900.00

For each connection larger than two inches, arrangements shall be made between the person, firm or corporation seeking the connection and the city council and charges for such connection shall be then determined by the city council.

B. The rates specified in subsection A of this section shall apply for installation on unpaved streets. An additional charge of $6.00 per square foot per installation shall be made on all paved or oiled streets to compensate the city for the cost of breaking such paving or oiling and replacing the same.

C. Applicable state sales tax shall be charged in addition to the service charges set forth in subsection A of this section.

D. The charges set forth in this section shall apply only in cases where the installation of water service does not require more than 40 feet of pipe and/or trench. In case any additional pipe and/or trench is required, the individual desiring service shall pay the actual cost, including labor charges, of such additional pipe and/or trench in addition to the charge set forth in this section.

E. In addition to the foregoing charges, there is imposed upon the owners of Lots 2 through 12, Block 4; Lots 1 through 4, Block 5; Lots 17 through 20, Block 5; and Lots 5 through 8, Block 6 of Berger Addition, who seek to provide water services to their property by connecting to the city's water system, a special connection charge of $1,365.54. The connection charge is payable in full on or before the date of connection, together with interest from the date of construction (July 27, 1992) until the connection at the rate of 10 percent per year; provided, that the aggregate amount of said interest to be paid by the property owner shall not exceed the amount of the special connection charge; and provided further, that the property owner may elect to defer payment of the connection charge and accrued interest thereon in equal annual installments not to exceed 10 years from the date of connection; with interest on the unpaid balance at the rate of eight percent per year from the date of construction until paid in full. (Ord. 2006-24, 2006; Ord. 92-12 § 3, 1992; Ord. 88-15 § 3, 1988; Ord. B-189, 1981).

13.04.070 Single pipe to supply two properties when.
The water department shall have the right to install a single service pipe from the main to the curbline of sufficient size to supply two separate properties connecting two branches in the parking leading to the right and left, with individual curb cocks and meters for the separate property. (Ord. A-95 § 5(d), 1930).

13.04.080 Ownership of equipment vested in city.
The ownership of all main connection, service pipes, meters and appurtenant equipment maintained by the water department shall be vested in the city, and in no case shall the owner of any premises have the right to claim or reclaim any part thereof. (Ord. 88-15 § 4, 1988; Ord. A-95 § 5(e), 1930).

13.04.090 General facilities charge.

Except as hereinafter provided, no property owner shall have the right to connect to the city's water system without having first fully paid a general facilities charge, which is the charge that is deemed a reasonable amount to be paid in order that such property owner shall bear his or her equitable share of the cost of such system. The amount to be paid shall be $1,000 for any such connection made in the year 2008. Thereafter, over the next five years beginning in the year 2009, said amount shall be increased annually by $200.00, effective January 1st of each succeeding year, until the general facilities charge shall have been increased to $2,000. Said payments shall be deposited into the city's water capital fund. (Ord. 2007-15, 2007).

Chapter 13.08
WATER – SERVICE REGULATIONS*

Sections:

13.08.010 Use of municipal water system required.

13.08.020 Connection to municipal sewer system required.

13.08.030 Water service equipment installation and connection – Application – Fees.

13.08.040 Change in service – Applicant liable for cost.

13.08.050 Stop or valve required – Installation.

13.08.060 Owner responsible for leakage.

13.08.070 Persons debarred from doing plumbing work when.

13.08.080 Tampering with curb cock prohibited – Penalty.

13.08.090 Water department employees – Right of entry for inspection.

13.08.095 Interference with meter or meter reading prohibited.

13.08.100 Water shutoff permitted when.

13.08.110 Water use restricted when – Notice.

13.08.120 Violation of council order – Penalty.

13.08.130 Improper connection – Denial of water service – Penalty fee.

13.08.140 Irrigation during fire prohibited.

*For statutory provisions authorizing cities to cut off utility service to force payment of delinquent bills, see RCW 35.21.300; for provisions authorizing cities to regulate water

systems, see RCW 35.21.210.

13.08.010 Use of municipal water system required.
From and after April 30, 1953, it is unlawful to use, or to provide for use, water for domestic purposes within the corporate limits of the city by any means other than the municipal water system of the city. (Ord. A-401 § 1, 1953).

13.08.020 Connection to municipal sewer system required.
From and after May 22, 1958, no water for domestic purposes shall be provided within the corporate limits of the city by the municipal water system of the city to any lands, buildings or premises which have not been connected to the municipal sewer system as required by the applicable ordinances of the city. (Ord. A-488 § 1, 1958).

13.08.030 Water service equipment installation and connection – Application – Fees.
A. All applications for service installation and for water service shall be made at the office of the water department on printed forms, containing the name of the owner, a description of the lot, block, and addition, the name of the street and official street number assigned to the premises as shown by the records in the office of the city clerk-treasurer, and the signature of the applicant agreeing to conform to the rules and regulations, and any modifications thereof which may be established from time to time as a condition for the use of the water.

B. All applications for service installation shall be made by the owner of the property to be served, or by his duly authorized agent, and shall state the size of the service connection required. The applicant shall at the time of making application pay to the city clerk-treasurer the amount of the fees or deposit required for the installation of the service connection as hereinafter provided. When service connections have been installed application for water service may be made, either by the owner or his duly authorized agent, or by the tenants or occupants of the premises, but no water shall be furnished to any premises unless and until the street number, set forth in the application, shall be placed upon the property. The applicant shall, at the time of making application for water service, pay the city clerk-treasurer the amount of deposit required to secure the payment of charges for water service as hereinafter provided. (Ord. A-95 § 1, 1930).

13.08.040 Change in service – Applicant liable for cost.
Any change made in a service installation at the request of the property owner or water user after such installation has once been made, whether such a change shall involve a change in the size of the pipe or meter, or both, or a change in the location thereof, shall be made solely at the expense of the applicant who shall pay the entire cost thereof. (Ord. A-95 § 6, 1930).

13.08.050 Stop or valve required – Installation.
On each service connection installed after June 27, 1930, a special stop or valve shall be placed on the pipe leading from the meter to the property to be served. No branch pipe, bib or fixture of any kind shall be connected between this stop or valve and the city main. This stop or valve shall be provided with a suitable box and key and shall be for the use of the property owner in making extensions or repairs of the plumbing upon the property. In case it is necessary for the property owner to have water shut off from any service heretofore installed, and not provided with such a special stop or valve, he shall make arrangements to install such stop or valve, and then make application at the office of the water department to have the water shut off and the water shall not be turned on again until such stop or valve has been installed. (Ord. 88-15 § 5, 1988; Ord. A-95 § 7, 1930).

13.08.060 Owner responsible for leakage.

Owners of service are responsible for all leaks or damages on account of leaks from the service pipes leading from the city's meter to the premises served. (Ord. A-95 § 8, 1930).

13.08.070 Persons debarred from doing plumbing work when.
Plumbers or other persons failing to perform their work according to established rules and regulations or executing it unskillfully or to the damage of the water department may be debarred temporarily or permanently from making connections or doing any work on fixtures or pipes leading from the city's mains. (Ord. A-95 § 9, 1930).

13.08.080 Tampering with curb cock prohibited – Penalty.
Each curb cock placed on the curb side of the meter may be turned off and on only under authority of the water department and should it be desired to have the water turned off or turned on again a written order by the owner or his authorized agent must be given to the water department. Should any unauthorized person turn on water, or allow or cause it to be turned on after it has been shut off by the superintendent or his deputy, the pipes will be disconnected from the water system and a charge or penalty of $2.50 made for the expense of removing and replacing the connection. (Ord. A-95 § 10, 1930).

13.08.090 Water department employees – Right of entry for inspection.
Employees of the water department, properly identified, shall have free access at proper hours of the day to all parts of buildings to which water may be delivered from the city mains, for the purpose of inspecting the condition of the pipes and fixtures and the manner in which the water is used. (Ord. A-95 § 12, 1930).

13.08.095 Interference with meter or meter reading prohibited.
It is unlawful for any person to interfere with a water meter, or the reading thereof by city personnel, in any manner. (Ord. 88-15 § 6, 1988).

13.08.100 Water shutoff permitted when.
The water may at any time be shut off from the water main, without notice, for repairs, extensions or any necessary work, nonpayment of water utility charges or any other purpose, and the city shall not be responsible for any damages, including but not limited to bursting of boilers supplied by direct pressure or the breaking of any pipe or fixture, stoppage or interruption of water supply to any hydraulically operated or other appliance or cooling device resulting from the shutting off of the water. (Ord. B-32 § 1(a), 1974; Ord. A-95 § 11, 1930).

13.08.110 Water use restricted when – Notice.
The city council may by resolution cause a public notice to be published once in the legal newspaper of the city, with an order forbidding or limiting the use of water for irrigation, sprinkling or sluicing, upon such times, limits or conditions as the council may see fit and appropriate. (Ord. B-32 § 1(b), 1974; Ord. A-95 § 11, 1930).

13.08.120 Violation of council order – Penalty.
Any person violating the order of the council from and after publication of the order once in the legal newspaper of the city shall be guilty of a misdemeanor, and shall be punishable as set forth in Chapter 1.24 TMC. (Ord. B-32 § 1(c), 1974; Ord. A-95 § 11, 1930).

13.08.130 Improper connection – Denial of water service – Penalty fee.

Any person, firm or corporation who shall make any connection either directly or indirectly to the water system of the city other than in the manner provided by TMC 5.36.050, 13.04.040 through 13.04.080, 13.08.030 through 13.08.120 and 13.08.140, and Chapters 13.12 and 13.16 TMC, shall be subject to immediate denial of water service until such improper connection shall have been discontinued and said connection shall have been made in the manner provided by the applicable ordinances of the city and a fee of $10.00, in addition to any other charges for water service or water hookup, shall have been paid. (Ord. A-385 § 1, 1952).

13.08.140 Irrigation during fire prohibited.

No person shall use any water for irrigation during the progress of any fire in the city, and all irrigation and sprinkling shall be immediately stopped when the alarm of fire is sounded, and shall not be begun again until the fire is extinguished. For any violation of this rule a penalty of $2.00 for each offense shall be imposed and taxed against the person supplied and the water shall be turned off therefor. In no case shall water be turned on to the same premises until such penalty has been paid. (Ord. A-95 § 13, 1930).

Chapter 13.12
WATER – METERS*

Sections:

13.12.010 Faulty meter – Rereading and inspection when.

13.12.020 Faulty meter – Testing – Deposit required.

13.12.030 Faulty meter – Correction of charges.

13.12.040 Faulty meter – Repair – Consumer liable for cost when – Payment required.

*For statutory prohibitions against damaging water meters, see RCW 9.61.020.

13.12.010 Faulty meter – Rereading and inspection when.

When any consumer whose water service is metered shall make a complaint that the bill for any past month has been excessive, the water department shall, upon written request, have such meter reread and the service inspected for leaks, but such adjustment shall not extend back more than three months from the date of the written request. (Ord. A-95 § 15, 1930).

13.12.020 Faulty meter – Testing – Deposit required.

Should a consumer desire that the meter be tested, such consumer shall then make a deposit of $20.00 with the city clerk-treasurer. The consumer shall have the privilege if he or she so desires to be present when such test is made. In case a test should show an error of over five percent of water consumed, in favor of the water department, the deposit will be refunded to the consumer, a correctly registering meter will be installed and the bill will be adjusted accordingly. If the test of such meter should show an accurate measurement of water or should show an error in favor of the consumer, the amount deposited will be retained by the water department to cover part of the expense of making such test. (Ord. 88-15 § 8, 1988; Ord. A-95 § 14, 1930).

13.12.030 Faulty meter – Correction of charges.

In the event of a meter getting out of order or failing to register properly, the consumer shall be charged at the average monthly consumption as shown by the meter reading during the last three months that the same was in good order, or for the corresponding month or months of the year preceding. (Ord. A-95 § 14, 1930).

13.12.040 Faulty meter – Repair – Consumer liable for cost when – Payment required.
In all cases where meters are lost, injured or broken by the carelessness or negligence of the owner or occupants of premises, they shall be repaired or replaced by the water department and a charge for such repair or replacement shall be made against the owner or occupant of the premises for the actual cost of labor and material used in making such repairs or replacement. In case of nonpayment the water shall be shut off and in no case turned on again until all charges have been paid. (Ord. A-95 § 14, 1930).

Chapter 13.16
WATER – RATES AND CHARGES*

Sections:

13.16.010 Separate water service and meter required when – Exceptions.

13.16.020 Refusal to provide separate service – City action when – Liability for costs.

13.16.030 Deposit required when – Amount designated.

13.16.040 Meter rates designated – Sale at bulk rates.

13.16.050 Multiple-unit dwelling – Computation of bill – Additional charge when.

13.16.060 Payment due when – Billing.

13.16.070 Delinquent payments – Water shut off when – Charge.

13.16.080 Recordkeeping.

13.16.090 Responsibility for water service charges.

13.16.100 Overpayment or underpayment of bill – Three-year limitation.

13.16.110 After hours nonemergency turn-on/turn-off fee.

13.16.120 Application of utility account payments.

*For statutory provisions authorizing cities to make charges for connecting to the water system, see RCW 35.92.025.

13.16.010 Separate water service and meter required when – Exceptions.
A. Each separate building or each separate room or part of a building or structure that is intended for separate occupancy shall be served by a separate

water service and water meter provided that separate occupancies within an existing building or structure served by a single water service and water meter shall be charged as separate service accounts.

B. This section does not include duplex dwelling units, apartment houses, or other multiple-unit dwellings, court-type apartments, hotels, office rooms in an office building, or commingled separate businesses within a single building, such as booths or defined areas within a mini-mall. (Ord. 93-16 § 1, 1993; Ord. 88-15 § 9, 1988; Ord. A-351 § 1, 1950; Ord. A-194 § 1(A), 1939; Ord. A-95 § 4(A), 1930).

13.16.020 Refusal to provide separate service – City action when – Liability for costs.
If the owner fails, refuses or neglects to provide separate water service for each separate building or separate occupancy as provided by TMC 13.16.010, the city may refuse water service to such property until such time as the owner shall comply with said section or if the owner fails, refuses or neglects for a period of 30 days after notice to cause the service to be made, then the city may cause the same to be made and collect the cost thereof from such owner. (Ord. A-194 § 1(B), 1939; Ord. A-95 § 4(B), 1930).

13.16.030 Deposit required when – Amount designated.
Before a utility (water or sewer) is connected, the applicant therefor shall pay to the finance director/city clerk a deposit, which deposit shall not bear interest, to secure the payment of utility (water or sewer) for each service connected as follows:

A. For domestic use, $100.00;

B. For business or commercial purposes, a sum equal to twice the average monthly bill of similar lines of business as determined by the finance director/city clerk.

Said deposit shall be retained by the city until the applicant's account is closed. (Ord. 2008-1, 2008; Ord. 95-6 § 1, 1995; Ord. 88-15 § 10, 1988; Ord. B-296 § 1, 1984; Ord. B-132 § 1, 1979; Ord. A-95 § 16, 1930).

13.16.040 Meter rates designated – Sale at bulk rates.
Water shall be furnished and measured by meter, and shall be charged and paid for at meter rates, and until otherwise changed by the city council, said rates shall be as follows:

A. Minimum up to 600 cubic feet:

	2% Increase	5% Increase	5% Increase
Meter Size	**Rate Effective January 1, 2015**	**Rate Effective January 1, 2016**	**Rate Effective January 1, 2017**
3/4"	$28.54	$29.97	$31.47
1"	$48.51	$50.94	$53.49
1 1/2"	$94.18	$98.89	$103.83
2"	$94.18	$98.89	$103.83

3"	$151.24	$158.80	$166.74
4"	$151.24	$158.80	$166.74
6"	$305.33	$320.60	$336.63
8"	$476.52	$500.35	$525.37
B. Next 400 cubic feet per 100 cubic feet	$1.22	$1.28	$1.34
C. Next 1,000 cubic feet per 100 cubic feet	$0.82	$0.86	$0.90
D. All over 2,000 cubic feet per 100 cubic feet	$0.64	$0.67	$0.70
E. Use of water may be furnished and measured by meter, and sold at bulk rates per 1,000 gallons, plus a setup charge of $23.00	$8.50	$8.93	$9.38

(Ord. 2014-10, 2014; Ord. 2013-23, 2013; Ord. 2011-17, 2011).

13.16.050 Multiple-unit dwelling – Computation of bill – Additional charge when.

A. Any premises occupied as a duplex, apartment house or other multiple-unit dwelling, or occupied for residential purposes in conjunction with a store or other building and served from one connection shall pay a minimum charge as set forth in TMC 13.16.040, or as the same may from time to time be changed by resolution of the city council, for each apartment or service unit, and the bill shall be computed as though there were a separate meter service for each apartment or service unit and each used an equal quantity of the water consumed, and there shall be no deductions for vacant premises. The owner of such duplex, apartment house or other multiple-unit dwelling shall be responsible for all charges. The provisions of this section shall apply to cabins, cabin courts and court-type apartments but shall not apply to hotels.

B. An additional charge of 25 percent shall be made for all water supplied outside of the city limits. (Ord. A-391 § 1, 1952; Ord. A-95 § 3, 1930).

13.16.060 Payment due when – Billing.

All charges for water service shall be due and payable at the finance department on the first day of each month, for the previous month. In case fees or charges for water are not paid by 6:00 p.m. on the fifteenth day of the month in which due, a collection fee of $10.00 shall be added and collected by the finance department, and a like fee of $10.00 shall be added for each succeeding month or portion thereof during which the fees and charges shall remain delinquent, and such additional fees shall be collected by the finance department. Water bills shall cover service charges for a period of one month, and said bills shall be issued and mailed on or before the first day of each month. (Ord. 2010-1, 2010; Ord. 2006-10, 2006; Ord. 2005-11 § 1, 2005; Ord. 95-6 § 2, 1995; Ord. 88-15 § 12, 1988; Ord. 85-17 § 1, 1985; Ord. B-296 § 2, 1984; Ord. A-510 § 1, 1959; Ord. A-95 § 4, 1930).

13.16.070 Delinquent payments – Water shut off when – Charge.

In case of nonpayment of fees and charges for water within seven days after the date of such fees and charges become delinquent and after compliance with the city's notice procedures, the water shall be shut off and a charge of $20.00 shall be added to cover administrative, clerical and other employee or employee-related expenses, and the water shall be shut off unless the account is paid in full. In the event that the water has been so shut off and is turned back on by anyone other than personnel of the water department, and the account has not been paid in full, then the water shall

again be shut off, the water service locked in a shut off position, and a charge of $40.00 in addition to the $20.00 charged as above set forth shall be added to cover administrative, clerical and other employee or employee-related expenses; provided further, however, that in the event that the water is once again turned back on by anyone other than personnel of the water department, and the account has not been paid in full, then the water shall again be shut off, the water meter removed, and a charge of $60.00 in addition to the $40.00 charged as above set forth, shall be added to cover administrative, clerical and other employee or employee-related expenses and the expense of removing and replacing the water meter. (Ord. 95-6 § 3, 1995; Ord. 90-12 § 1, 1990; Ord. 88-15 § 13, 1988; Ord. 88-1 § 1, 1988; Ord. B-296 § 3, 1984; Ord. A-723 § 2, 1972; Ord. A-510 § 1, 1959; Ord. A-95 § 4, 1930).

13.16.080 Recordkeeping.

All accounts shall be kept on the books of the water department by house and street number, and under the name of the person signing the application for service. All bills and notices set out by the water department shall be sent to the house and street number of the property. (Ord. A-95 § 2, 1930).

13.16.090 Responsibility for water service charges.

A. The owner of the property being served shall be responsible for the payment of the charges for water service to such property, including delinquent fees and administrative, clerical and other employee or employee-related expenses as may be required by TMC 13.16.070.

B. All accounts for water service shall be kept in the name of the owner of the property and shall be billed to the owner and sent to the owner at such address as the owner shall provide to the city.

C. The deposit required under TMC 13.16.030 shall not be required when the account is in the name of the owner of the property. For those accounts where a deposit has already been paid pursuant to TMC 13.16.030, the deposit shall be refunded when the account has been established in the owner's name.

D. The city clerk may rely upon the land records of Yakima County for the purpose of determining the name of the owner of the property, as posted on the website of the Yakima County assessor, or such other documentation as may be provided to the city clerk that verifies such ownership. For purposes of this section, a contract purchaser shall be deemed to be the owner of the property if the contract has been recorded in the office of the Yakima County auditor.

E. Discontinuance of water service for any cause shall not release the owner from the obligation for payment of unpaid charges, including delinquent fees.

F. Each utility account that is in the name of and/or billed to anyone other than the property owner shall be put in the name of and billed to the property owner at such time as a change of occupancy or a change of ownership of the property occurs, or on January 1, 2013, whichever first occurs. (Ord. 2011-12 § 1, 2011; Ord. B-297 § 1, 1984).

13.16.100 Overpayment or underpayment of bill – Three-year limitation.

The city finance director is authorized to credit accounts for any amounts paid for water service that are found to be erroneous overpayments, and is authorized to charge accounts for any amounts found to be erroneous underpayments; provided, however, that there shall be no such credit or charge for any overpayment or underpayment made more than three years prior to the date the customer has notified the city of the error, or more than three

years prior to the discovery of the error by the city. (Ord. 2013-2, 2013).

13.16.110 After hours nonemergency turn-on/turn-off fee.
The city shall charge $110.00 for turning water on or turning water off after hours upon request of the owner of the property in the event of a nonemergency. Said request shall be in writing and signed by the owner. The charge shall be added to the utility bill. For purposes of this section, after hours shall include Monday through Friday between 4:45 p.m. and 8:00 a.m., and weekends and holidays. (Ord. 2013-5, 2013).

13.16.120 Application of utility account payments.
A. If a billing statement contains charges for more than one utility, the city will apply the monies received in payment in the following order: (1) delinquent administrative fees such as penalties and turn-on/turn-off charges; (2) delinquent utility taxes; (3) delinquent solid waste collection charges; (4) delinquent sewer charges; (5) delinquent water charges; (6) current administrative fees such as penalties and turn-on/off charges; (7) current utility taxes; (8) current solid waste charges; (9) current sewer charges; (10) current water charges.

B. If a billing statement contains charges for only one utility, the city will apply the monies received in payment in the following order: (1) delinquent administrative fees such as penalties and turn-on/turn-off charges; (2) delinquent utility taxes; (3) delinquent utility charges; (4) current administrative fees such as penalties and turn-on/turn-off charges; (5) current utility taxes; (6) current utility charges. (Ord. 2013-6, 2013).

Chapter 13.20
WATER – FIRE PROTECTION SYSTEMS

Sections:

13.20.010 Installation – Liability for costs.

13.20.020 Application for service – Filing of plans – Requirements.

13.20.030 Installation – Determination of charge – Payment required when.

13.20.040 Combining fire protection and commercial service connections prohibited.

13.20.050 Monthly charge – Inside city limits.

13.20.060 Monthly charge – Outside city limits – City council approval required.

13.20.070 Applicability of charges.

13.20.080 Monthly charge – Billing and payment.

13.20.090 Improper use of nonmetered water – Notice – Procedure.

13.20.100 City not responsible for damage.

13.20.010 Installation – Liability for costs.
All fire service connections between water mains and property lines shall be installed and maintained by the water department at the expense of the owner or occupant of the premises served, and shall be the property of the city. (Ord. A-611 § 1, 1967).

13.20.020 Application for service – Filing of plans – Requirements.
At the time of making application for such service, the applicant shall file with the water department detailed plans showing all piping installed or to be installed for fire protection, all fire gates, automatic sprinklers, and all other outlets, gates or appurtenances. Each fire service connection shall have a gate valve with an adequate valve box installed between the main and the property line of the premises served. No fire service connection larger than six inches in diameter shall be installed without special permission from the city council. (Ord. A-611 § 2(a), 1967).

13.20.030 Installation – Determination of charge – Payment required when.
Upon receipt of such application the director of the water department shall fix the charge to be made for the installation of such service, taking into consideration length and size of pipe, condition of street and sidewalk, labor required and other factors relative to the character of the service to be installed, and such charge shall be paid by the applicant before such installation shall be made. (Ord. 88-15 § 14, 1988; Ord. A-611 § 2(b), 1967).

13.20.040 Combining fire protection and commercial service connections prohibited.
Fire service connections shall not be used for combined fire protection and commercial purposes. In no case shall any tap be made upon, or any tank connected with, any pipe used for fire protection service unless a meter shall be installed thereon. The use of water through a fire service connection for any purpose other than the extinguishing of fire on the premises is prohibited unless a meter is installed to measure all water so used. The city council may require that a suitable detector check or meter be installed in standby fire protection service connections. (Ord. A-611 § 3, 1969).

13.20.050 Monthly charge – Inside city limits.
The monthly charge for standby fire service connections inside the city limits shall be:

A. For a 1-1/2-inch service, $1.00;

B. For a 2-inch service. $1.50;

C. For a 3-inch service. $2.25;

D. For a 4-inch service, $3.00;

E. For a 6-inch service, $4.00;

F. For an 8-inch service, $6.00.

(Ord. A-611 § 4(a), 1967).

13.20.060 Monthly charge – Outside city limits – City council approval required.
A. Upon approval of the city council, standby fire protection service outside the city limits may be provided.

B. The monthly charge for standby fire service connections outside the city limits, not otherwise established by specific contractual agreements, shall be:

1. For a 1-1/2-inch service, $2.00;

2. For a 2-inch service, $3.00;

3. For a 3-inch service, $4.50;

4. For a 4-inch service, $6.00;

5. For a 6-inch service, $8.00;

6. For an 8-inch service, $12.00.

C. If any fire protection service is installed outside the city limits the same may, in the absence of specific contractual agreements to the contrary, be discontinued at the will of the city council, and the connection with the main removed at the expense of the owner or occupant of the property served. (Ord. A-611 § 4(b), 1967).

13.20.070 Applicability of charges.
The charges set forth in TMC 13.20.050 and 13.20.060 shall apply in all cases where automatic sprinklers are installed and where fire gates or other outlets are sealed. No charge shall be made for water used in extinguishing fire. (Ord. A-611 § 4(c), 1967).

13.20.080 Monthly charge – Billing and payment.
The monthly charge for standby fire service connections shall be billed and shall be payable as other water service charges are billed and payable. The provisions of TMC 13.16.050 and 13.16.060 shall pertain to such monthly charge, and the remedies therein provided shall be in addition to those provided by TMC 13.20.090. (Ord. A-611 § 4(d), 1967).

13.20.090 Improper use of nonmetered water – Notice – Procedure.
Should the water department find that water not metered is used through a fire connection for any purpose other than the extinguishing of fire upon the premises for which such service is provided, an estimate of the amount used shall be computed by the water department, and the owner and occupant shall be required to pay for the water used as so computed at the regular rates charged by the city for water service other than for standby fire protection service, including the minimum charge based on the size of the service connection. Further, the owner and occupant shall be notified by mail of such charge and of such improper use, and if the charge so made for the water used as so computed is not paid, and in addition thereto such improper use is not corrected within 10 days after the date of mailing such notice, the water will be shut off and will not be turned on until such charge has been paid and such improper use remedied. (Ord. A-611 § 5, 1967).

13.20.100 City not responsible for damage.
In providing standby fire protection service, the city assumes no responsibility for loss or damage because of lack of water or pressure, but merely agrees to furnish such quantities and pressures as are available at the time of use in its general distribution system, and the provision of such service is

subject to shutdowns and variations required by the operation of the municipal water system of the city. (Ord. A-611 § 6, 1967).

Chapter 13.22
SEWERS – DEFINITIONS

Sections:

13.22.010 Definitions.

13.22.010 Definitions.

Unless the context specifically indicates otherwise, the meaning of terms used in Chapters 13.24 through 13.48 TMC shall be as follows:

A. “BOD” (denoting biochemical oxygen demand) means the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five days at 20 degrees centigrade, expressed in milligrams per liter.

B. “Building drain” means that part of the lowest horizontal piping of a drainage system which receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the building sewer, beginning five feet outside the inner face of the building wall.

C. “Building sewer” means the extension from the building drain to the public sewer or other place of disposal.

D. “Combined sewer” means a sewer receiving both surface runoff and sewage.

E. “Garbage” means solid wastes from the domestic and commercial preparation, cooking, and dispensing of food, and from the handling, storage, and sale of produce.

F. “Industrial wastes” means the liquid wastes from industrial manufacturing processes, trade, or business as distinct from sanitary sewage.

G. “Natural outlet” means any outlet into a watercourse, pond, ditch, lake, or other body of surface or groundwater.

H. “Person” means any individual, firm, company, association, society, corporation, or group.

I. “pH” means the logarithm of the reciprocal of the weight of hydrogen ions in grams per liter of solution.

J. “Properly shredded garbage” means the wastes from the preparation, cooking, and dispensing of food that have been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particle greater than one-half inch in any dimension.

K. “Public sewer” means a sewer in which all owners of abutting properties have equal rights, and is controlled by public authority.

L. “Public works director” means the public works director of the city, or his authorized deputy, agent or representative.

M. “Sanitary sewer” means a sewer which carries sewage and to which storm, surface, and groundwaters are not intentionally admitted.

N. “Sewage” means a combination of the water-carried wastes from residences, business buildings, institutions, and industrial establishments, together with such ground, surface, and storm waters as may be present.

O. “Sewage treatment plant” means any arrangement of devices and structures used for treating sewage.

P. “Sewage works” means all facilities for collecting, pumping, treating and disposing of sewage.

Q. “Sewer” means a pipe or conduit for carrying sewage.

R. “Shall” is mandatory; “may” is permissive.

S. “Slug” means any discharge of water, sewage, or industrial waste which in concentration of any given constituent or in quantity of flow exceeds for any period of duration longer than 15 minutes more than five times the average 24-hour concentration or flows during normal operation.

T. “Storm drain” (sometimes termed “storm sewer”) means a sewer which carries storm and surface waters and drainage, but excludes sewage and industrial wastes, other than unpolluted cooling water.

U. “Suspended solids” means solids that either float on the surface of, or are in suspension in water, sewage, or other liquids, and which are removable by laboratory filtering.

V. “Watercourse” means a channel in which a flow of water occurs, either continuously or intermittently. (Ord. B-102 Art. 1 §§ 1 – 22, 1978).

Chapter 13.24
SEWER PERMITS*

Sections:

13.24.040 Sewer contractor’s license – Revocation – Notice – Procedure.

*For statutory provisions authorizing cities to regulate systems of sewerage, see RCW 35.92.020.

13.24.040 Sewer contractor’s license – Revocation – Notice – Procedure.

A. For any violation of any of the provisions of TMC 5.36.020, 5.36.030, 5.36.040 and Chapters 13.32 and 13.36 TMC, on the part of any licensed sewer contractor, the council shall, in addition to the penalty hereinbefore provided, revoke any license granted under the provisions of TMC 5.36.020, 5.36.030, 5.36.040 and Chapters 13.32 and 13.36 TMC. Before such revocation the person holding the license must be notified at least five days before action thereon that the city council has under consideration the revocation of his license, giving the number thereof, and if the holder of such license so desires, he shall be heard in opposition to said revocation before said license is declared revoked. The revocation of any license as provided herein by the city council shall be by ordinance, and upon the passage and approval of such ordinance, the city clerk-treasurer shall notify in writing the person whose license has been revoked of such fact, and after such notification the privileges granted under such license shall be at an end, and no license shall issue to any person whose license has been revoked for the same purpose until the expiration of the term for which his former license was granted, or within three months from the date of such revocation.

B. Each license issued under the provisions of this chapter shall express on its face that it is issued subject to revocation by the city council. (Ord. 197 § 23, 1912).

Chapter 13.28
PUBLIC SEWERS – REQUIRED USE

Sections:

13.28.010 Waste deposits prohibited.

13.28.020 Sewage discharges.

13.28.030 Construction standards.

13.28.040 Connection to public sewers.

13.28.050 No connections in floodplain.

13.28.010 Waste deposits prohibited.
It is unlawful for any person to place, deposit, or permit to be deposited in any unsanitary manner on public or private property within the city, any human or animal excrement, garbage, or other objectionable waste. (Ord. B-102 Art. 2 § 1, 1978).

13.28.020 Sewage discharges.
It is unlawful to discharge to any natural outlet within the city or in any area under the jurisdiction of the city, any sewage or other polluted waters, except where suitable treatment has been provided in accordance with Chapters 13.30 through 13.48 TMC. (Ord. B-102 Art. 2 § 2, 1978).

13.28.030 Construction standards.
Except as provided in Chapters 13.30 through 13.48 TMC, it is unlawful to construct or maintain any privy, privy vault, septic tank, cesspool, or other facility intended or used for the disposal of sewage. (Ord. B-102 Art. 2 § 3, 1978).

13.28.040 Connection to public sewers.
The owner of all houses, buildings, or properties used for human occupancy, employment, recreation, or other purposes, situated within the city is required, at his expense, to install suitable toilet facilities therein, and to connect such facilities directly with the proper public sewer in accordance with the provisions of this title, within 90 days after date of official notice to do so, except as hereinafter provided. (Ord. B-102 Art. 2 § 4, 1978).

13.28.050 No connections in floodplain.
New construction connections to the city's sewer system along that portion of Myers Road and Germantown Road lying within the 100-year floodplain are prohibited. For purposes of this section, the location of the 100-year floodplain shall be determined by the floodplain map provided by the Federal Emergency Management Agency. (Ord. 94-28 § 1, 1994).

Chapter 13.30
PRIVATE SEWAGE DISPOSAL

Sections:

13.30.010 Private sewage disposal – Use permit.

13.30.020 Additional requirements.

13.30.030 Existing septic tanks.

13.30.040 Connection time.

13.30.050 Inspection.

13.30.010 Private sewage disposal – Use permit.

Where connection to public sewers is required as specified in Chapter 13.28 TMC, but public sewers are more than 400 feet away from a property line and private sewage disposal is desired by the property owner, said property owner may request a “special private sewage disposal use permit” from the city council. Application for said permit shall be accompanied by proof of compliance of all county health district rules and regulations and approval of State Department of Ecology. The city may require the installation of a public sewer for future use as a condition of issuance of a special private sewage disposal use permit. A permit and inspection fee of $5.00 shall be paid to the city at the time the application is filed. (Ord. B-102 Art. 3 § 1, 1978).

13.30.020 Additional requirements.

No statement contained in this chapter shall be construed to interfere with any additional requirements that may be imposed by the health officer. (Ord. B-102 Art. 3 § 2, 1978).

13.30.030 Existing septic tanks.

Existing septic tanks may be utilized by property owners providing they are properly maintained and providing there is not a public sewer within 100 feet of the property line. (Ord. B-102 Art. 3 § 3, 1978).

13.30.040 Connection time.

When a public sewer becomes available, the building sewer shall be connected to said sewer within 60 days. (Ord. B-102 Art. 3 § 4, 1978).

13.30.050 Inspection.

A permit for a private sewage disposal system shall not become effective until the installation is completed to the satisfaction of the public works director or his duly authorized representative. He shall be allowed to inspect the work at any stage of construction and, in any event, the applicant for the permit shall notify the public works director when the work is ready for final inspection, and before any underground portions are covered. The inspection shall be made within two working days, if possible, of the receipt of notice by the public works director. (Ord. B-102 Art. 3 § 5, 1978).

Chapter 13.32
SEWERS – CONSTRUCTION REGULATIONS*

Sections:

13.32.010 Excavation requirements.

13.32.030 Drain requirements.

13.32.040 Protection of excavations required – Contractor responsibility.

13.32.050 Restoration of street by city when – Costs.

13.32.060 City to complete work when – Costs.

13.32.070 Authorized persons only to perform work – Permit required.

*For statutory provisions authorizing third class cities to cause sewage connections to be made and assess against the property served thereby the costs and expenses thereof, see RCW 35.24.290(4).

13.32.010 Excavation requirements.

All connections with public sewers or drains shall be made in a workmanlike manner, even with the inside surface of the sewer where a connecting Y has not been left, or in case the city engineer may deem best, the person making such connection shall remove a joint of the sewer pipe and insert in its place a Y properly placed and securely cemented before making connection therewith, and when a Y has been left the connection shall be made without damaging or breaking the same. The street or public place must be opened and the paving or planking and earth deposited in such a manner as will occasion the least inconvenience to the public, and so as to permit free passage for water along the gutters. One-half of the street must be kept clear for the passage of vehicles and bridgeways must be provided on sidewalks for foot passengers. In refilling the trench the earth must be deposited in layers of not more than six inches in depth and be well tamped to prevent aftersettlement. As soon as any such sewer or drains are completed, the paving or planking and sidewalking must be restored to as good a condition as it was previous to the excavation and all rubbish and surplus material shall be immediately removed. (Ord. 197 § 9, 1912).

13.32.030 Drain requirements.

All drains which enter into any public sewer or drain in any street, alley, avenue or public place shall be built of such size and material and in such direction and with such grades and in such manner as the city engineer shall direct. (Ord. 197 § 10, 1912).

13.32.040 Protection of excavations required – Contractor responsibility.

All excavations made by any licensed sewer contractor within the limits of any street, alley, avenue or other public place shall be protected and guarded by said contractor, both by night and by day, by the display of proper signals and lights, and the contractor shall be liable upon his bond for all accidents caused by negligence in this respect. (Ord. 197 § 12, 1912).

13.32.050 Restoration of street by city when – Costs.

All work within the limits of any street or public place must be prosecuted to completion with due diligence, and if in the judgment of the city engineer any excavation is left open beyond a reasonable time, he shall cause the same to be refilled and the street restored forthwith and any cost incurred in such work shall be charged to the sewer contractor in charge of such work and must be paid before he shall receive any future permit from the city engineer. (Ord. 197 § 13, 1912).

13.32.060 City to complete work when – Costs.

If any work done in pursuance of a permit granted as prescribed in Chapter 13.24 TMC is not constructed and completed in accordance with the plans and specifications as approved by the city engineer and to his satisfaction and acceptance, and the contractor for such work shall refuse to properly construct and complete such work, notice thereof shall be given to the owner of the property for whom said work is being done, and the city engineer shall cause said work to be completed and said sewer connected in the proper manner, and the full cost of such work and any materials necessary therefor shall be charged and become a lien against said property, and shall be collected in the manner prescribed herein. (Ord. 197 § 14, 1912).

13.32.070 Authorized persons only to perform work – Permit required.

It shall be the duty of the police, the superintendent of streets and of all employees of the engineering department, in case they shall find any person engaged in the work of breaking ground for the purpose of making connections with any public sewer or drain, to ascertain if such person is a duly licensed sewer contractor and if he has a permit from the city engineer to make such sewer connections, and in the event that such person is not a licensed sewer contractor or has no permit for making such connections, it shall be the duty of such officer or employee to order them to desist under penalty of arrest for violation of the provisions of this chapter and to immediately report the fact to the city engineer. (Ord. 197 § 19, 1912).

Chapter 13.34
BUILDING SEWERS AND CONNECTIONS

Sections:

13.34.010 Connection permit required.

13.34.020 Separate connections.

13.34.030 Inspection.

13.34.040 Side sewer construction.

13.34.050 Side sewer pipe materials.

13.34.060 Testing.

13.34.070 Registration of side sewer contractors.

13.34.010 Connection permit required.

A. It is unlawful to construct, extend, relay, repair, or to make connection to any public or side sewer without obtaining a permit from the public works director as provided in Chapter 13.30 TMC. The public works director may issue such permit to the owner or occupant of any property to construct, extend, relay, repair, or make connections to any side sewer, however, such owner or occupant shall comply with the applicable provisions of this chapter, except that he need not employ a registered side sewer contractor to do the work if he makes the installation himself.

B. Application for the permit required by TMC 13.34.010 shall be filed in the department of public works office, stating the name of the owner, the correct address and proper legal description of the property to be served, dimensions and locations of any buildings on the property, the whole course of the side sewer from the public sewer to its connection with the building or property to be served, and other such plans and information as may be

required. The public works director may change or modify the plan and designate the manner and place in which such side sewers shall be connected with the public sewer.

C. Upon approval of the application and issuance of the permit, it is unlawful to alter said permit or to perform any work other than is provided for in said permit.

D. It is unlawful to disconnect any side sewer or remove any portion of a side sewer without securing a permit to do so. The disconnected service shall be plugged at the property line to the satisfaction of the public works director.

E. No permit issued under the ordinance codified in this chapter shall be valid for a period longer than 90 days unless extended or renewed prior to the expiration of same.

F. The permit required by the ordinance codified in this chapter must, at all times during the performance of the work and until the completion thereof, be posted in some conspicuous place at or near the work and must be readily and safely accessible to the public works director.

G. No side sewer contractor shall break, alter, or tamper with any public sewer, except that he may connect a wye or tee, which exists for that purpose under the supervision of the public works director. (Ord. B-102 Art. 4 § 1, 1978).

13.34.020 Separate connections.

A. In making all connections with the public sewer system, each property capable of title transfer and each residence or business located on any one property and not joined with other property thereon inseparable shall be considered as an individual consumer and each individual consumer shall be supplied through a separate service connection; provided, however, that in case of duplexes or businesses or apartments not being capable of separate title transfer, the owner thereof may nevertheless by arrangement with the public works director provide for the property multiple service connections to serve each of the various units located thereon. All buildings, although joined together by party wall or similar attachment, if capable of separate title transfer, shall have, for each divisible part thereof, separate service connections.

B. However, where more than one such building is located on a lot or parcel of land not larger than 50 feet in width and 150 feet in depth and all such buildings may be served by one sewer connection, only one connection for such building need be made.

C. If a building sewer is to serve more than one property by joint agreement of the owners, an approved document insuring that all properties involved shall have perpetual use of the side sewer, and having provisions for maintenance and for access for repair purposes, shall be signed by the recorded owner. This document shall be notarized and recorded with the public works director and shall be referred to as an “easement”. (Ord. B-102 Art. 4 § 2, 1978).

13.34.030 Inspection.

A. Any person performing work under permit pursuant to the provisions of the ordinance codified in this chapter shall notify the public works director when the work will be ready for inspection. The public works director shall inspect all connections, including piping, valves, and other appurtenances connected thereto, and the premises served thereby, within 48 hours, if possible, excluding Saturdays, Sundays, and holidays, and/or at regular intervals and as often as necessary.

B. No side sewer trench shall be filled or any sewer covered until the work has been inspected and approved by the public works director.

C. If the public works director finds the work or materials used are not in accordance with previous approval or permit, the public works director shall notify the person doing the work and/or the owner or occupant of the premises by letter and posting of notice on the property.

D. If any work done under a permit granted as provided herein is not done in accordance with the provisions of the ordinance codified in this chapter and the plans and specifications as approved by the public works director, or when any side sewer is constructed, laid, connected, or repaired and does not comply with the provisions of the ordinance codified in this chapter, or where it is determined by the public works director that a side sewer is obstructed, broken or inadequate and is a menace to health, or is liable to cause damage to the sewer system, or subsection C of this section is violated, and then, after notice by the public works director, the contractor, owner, or person doing the work refuses to properly construct, repair, or complete such work within the time specified in such notice, the public works director may perform such work as may be necessary to comply with the ordinance codified in this chapter and the cost of such work so done shall be charged to the property owner, occupant, or contractor as the case may be, and shall become immediately payable to the city, upon written notice of such amount being delivered to such owner, occupant, or contractor. (Ord. B-102 Art. 4 § 3, 1978).

13.34.040 Side sewer construction.

A. All side sewers shall be laid on a minimum grade one-fourth inch per foot (two percent) for four-inch pipe and one-eighth inch per foot (one percent) for six-inch pipe or greater, and shall have a minimum of six inches of fall as measured to the crown (top) of the public sewer to the building drain.

B. The permittee shall be responsible for determining the available grade between building drain and public sewer.

C. In any case where the house or building drain is too low to permit gravity flow to the public sewer, the same shall be lifted by artificial means and discharged into the public sewer.

D. The requirements of subsection A of this section may be waived by the public works director, but in such cases the following requirements will be adhered to:

1. A backwater valve shall be installed on all side sewers below grade, as above prescribed, unless the requirement is waived by the public works director.

2. The effective operation of any backwater valve shall be the responsibility of the owner of the side sewer.

3. No installation of any side sewer below grade, as above described, nor any installation of any backwater valve shall be approved by the public works director until a “grade release” agreeing to hold the city harmless from all damage resulting therefrom, has been delivered to the public works director.

E. Side sewers shall be laid out not less than 30 inches from any foundation wall, outer lines of any footings, pilings, or building supports.

F. Minimum cover for side sewers shall be three and one-half feet in outside parking strip, two feet in inside parking strip, two and one-half feet in a public alley at the property, two and one-half feet where side sewer crosses under a ditch, and 24 inches on private property.

G. All connections shall be made to the tee or stub out assigned at the time the permit is issued.

H. All side sewers servicing a single house shall be of four-inch pipe or larger. All side sewers servicing multiple dwellings, commercial establishments, schools, or any building other than single-family residences shall be of six-inch pipe or larger.

I. Any connections to a septic tank, cesspool, or privy vault shall be removed and direct connection made to the house or building drain; provided, however, that connection may be made through existing septic tanks or cesspools, but in such event cast iron pipe shall be used through such cesspool or septic tank. In all such cases, cesspool or septic tank shall be filled with suitable material.

J. In cases where a new or converted building or new installation replaces an old one, the use of any existing side sewer may be permitted by the public works director provided it conforms to all the requirements as set forth in the ordinance codified in this chapter. The public works director may require excavation for examination and testing.

K. No side sewer connection shall be made to the public sewer until that section of public sewer has been approved by the public works director for side sewer connections.

L. The side sewer contractor or other persons doing the work shall prevent any damage to the public sewer tee or stub out, and shall so conduct his trenching operations as to prevent the possibility of damage occurring.

M. In the event there is no suitable tee or stub out, a tap to the main will be permitted. All work of making the tap will be made in the presence of the public works director.

N. The bottom of the trench must be smooth and free of large rocks which may injure the side sewer pipe. Where unsuitable bedding is found as determined by the public works director, the side sewer contractor, or other persons doing the work, shall overexcavate and prepare a bedding as follows:

1. Soft Foundation. Overexcavate as directed by the public works director and install two and one-half inch maximum size rock or gravel, to a point three inches below the pipe. From this point to the pipe, install three-fourths inch maximum size rock or gravel and sand.

2. Hard Foundation. Overexcavate a minimum of three inches and install a bedding of three-fourths inch maximum size rock and gravel or sand.

O. Any unauthorized overexcavation below the pipe grade shall be filled with bedding material.

P. The side sewer contractor or other persons doing the work shall carefully remove the plug from stub and shall prevent the entrance of all foreign material into the public sewer pipe. The type of joint to be used for connecting the side sewer pipe to the stub shall be that for which the stub was designed. Rubber or plastic joint adapters shall be used as required to connect pipes of different materials or joint designs. Selected bedding material shall be hand tamped in a moist condition under and around the pipe and connection to the pipe or stub made so as to prevent any pressure on the stub. All sewers shall be laid true to grade with the bells upgrade. Pipe shall be firmly bedded for the full length of the barrel in the prepared trench bottom. Pipe shall be carefully centered prior to the joining. Joints shall be installed in strict compliance with the manufacturer’s recommendations. Spigot and bell ends shall be thoroughly cleaned before jointing. After the section being laid has been carefully aligned, the joining shall be completed.

Q. The connection to the cast iron pipe at the building shall be suitable rubber gasket sleeve or adapter. Cement grout joints will not be allowed.

R. Backfill of the trench shall be done in a manner which will prevent damage to the pipe.

S. Parallel water and sewer lines shall be laid at least 10 feet apart horizontally. Wherever it is necessary for sewer and water lines to cross each other, the crossing shall be made at an angle of approximately 90 degrees and the sewer shall be located with 18-inch clearance below the water line.

T. All excavations for building sewer installation shall be adequately guarded with barricades and lights so as to protect the public from hazard. Streets, sidewalks, parkways, and other public property disturbed in the course of the work shall be restored in a manner satisfactory to the city. (Ord. B-102 Art. 4 § 4, 1978).

13.34.050 Side sewer pipe materials.
The following side sewer pipe materials may be used:

A. PVC pipe, ASTM Specification D-3034, SDR-35;

B. Asbestos-cement pipe, ASTM Specification C-644 Class 24000, Type II;

C. All pipe joints shall be rubber ring gasket or coupling except PVC pipe which may be rubber ring or solvent welded joint. (Ord. B-219 § 1, 1982; Ord. B-102 Art. 4 § 5, 1978).

13.34.060 Testing.
All side sewers shall be tested for leakage in the presence of the public works director. Leakage shall not exceed five-tenths gallons per hour per 100 feet. (Ord. B-102 Art. 4 § 6, 1978).

13.34.070 Registration of side sewer contractors.
As a condition precedent to entering into contracts with the property owners in a public sewer service area for the installation of side sewers connecting with the public sewers and of soliciting said work, the contractors shall be registered with the public works director. Before registration will be granted, the side sewer contractor shall satisfy the following conditions:

A. The side sewer contractor shall be registered with the State Department of Labor and Industries under the requirements of the Specialty Contractor or General Contractor Registration Act.

B. If a registered side sewer contractor violates any provisions of the ordinance codified in this chapter, registration of said side sewer contractor with the public works director shall be suspended immediately and shall be reinstated only by a review of the case by the city manager. Suspension of registration shall not exempt the side sewer contractor from any other penalties provided elsewhere in the ordinance codified in this chapter.

C. In addition to the foregoing provisions, the side sewer contractor shall comply with all applicable laws, ordinances, and regulations of the local, state, or federal government. (Ord. B-102 Art. 4 § 7, 1978).

Chapter 13.36

SEWERS – INSPECTION*

Sections:

13.36.010 City engineer – Approval of all work required – Forfeit of license when.

13.36.020 Compliance with provisions required.

13.36.030 Right of entry for inspection – Time limit for compliance.

*For statutory provisions authorizing cities to acquire and operate sewerage and garbage systems, see RCW 35.92.020.

13.36.010 City engineer – Approval of all work required – Forfeit of license when.
All work done in pursuance of any permit granted as prescribed in Chapter 13.24 TMC shall be under the inspection and subject to the approval and acceptance of the city engineer, or his duly appointed deputy. The grade, materials and manner of construction of any sewer or drain built under permit from the city engineer shall be subject to his approval or rejection, and any licensed sewer contractor who refuses to modify, remove, replace or complete any portion of the work when so instructed by said engineer, or his duly appointed deputy, shall by such refusal forfeit his license for constructing or connecting sewer or drain in the city. (Ord. 197 § 11, 1912).

13.36.020 Compliance with provisions required.
No trench shall be refilled or any connecting sewer constructed under the provisions of TMC 5.36.020, 5.36.030, 5.36.040 and Chapters 13.24 and 13.32 TMC, and this chapter, until the same has been inspected and approved by or under the direction of the city engineer from the point where the same connects with the public sewer to the point where it connects with the iron pipe or other plumbing of the building or premises to be connected, or until the same has been made in all respects to conform to the provisions of this title. (Ord. 197 § 15, 1912).

13.36.030 Right of entry for inspection – Time limit for compliance.
The city engineer and public health officer of the city or their authorized representatives shall have the right to enter upon any premises required by this title to be connected with the public sewer, at all reasonable times, to ascertain whether the public health requires that the same should be connected with the public sewer, or whether the provisions of this title in regard to connection have been or are being complied with, and if they shall find that such premises or connections do not conform to the provisions of this title, to notify the owner of such premises or his agent of the fact, and it shall thereupon be the duty of such owner or agent to cause such premises to be connected with the public sewer, or such connections to be so altered, repaired or reconstructed as to make them conform to the requirements of this title, within 15 days from the time of receiving such notice. (Ord. 197 § 16, 1912).

Chapter 13.40
PUBLIC SEWERS – USE REGULATIONS

Sections:

13.40.010 Sanitary sewers – Prohibited discharges.

13.40.020 Combined and storm sewers – Natural outlets.

13.40.030 Public sewers – Prohibited waters or wastes.

13.40.040 Decision of public works director.

13.40.050 Discharge of prohibited substances – Subsequent procedures.

13.40.060 Interceptors required when.

13.40.070 Preliminary treatment or flow-equalizing facilities.

13.40.080 Industrial wastes – Control manholes.

13.40.090 Characteristics of water and wastes – Samples.

13.40.100 Industrial wastes – Special agreements.

13.40.010 Sanitary sewers – Prohibited discharges.
No person shall discharge or cause to be discharged any storm water, surface water, groundwater, roof runoff, subsurface drainage, uncontaminated cooling water, or unpolluted industrial process waters to any sanitary sewer. (Ord. B-102 Art. 5 § 1, 1978).

13.40.020 Combined and storm sewers – Natural outlets.
Storm water and all other unpolluted drainage shall be discharged to such sewers as are specifically designated as combined sewers or storm sewers, or to a natural outlet approved by the public works director. Industrial cooling water or unpolluted process waters may be discharged on approval of the public works director to a storm sewer, combined sewer, or natural outlet. (Ord. B-102 Art. 5 § 2, 1978).

13.40.030 Public sewers – Prohibited waters or wastes.*
No person shall discharge or cause to be discharged any of the following described waters or wastes to any public sewers:

A. Any gasoline, benzene, naphtha, fuel oil, or other flammable or explosive liquid, solid, or gas;

B. Any waters or wastes containing toxic or poisonous solids, liquids, or gases in sufficient quantity, either singly or by interaction with other wastes to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, create a public nuisance, or create any hazard in the receiving waters of the sewage treatment plant, including but not limited to cyanides in excess of two mg/l as CN in the wastes as discharged to the public sewer;

C. Any waters or wastes having a pH lower than 5.5, or having any other corrosive property capable of causing damage or hazard to structures, equipment, and personnel of the sewage works;

D. Solid or viscous substances in quantities of such size capable of causing obstruction to the flow in sewers, or other interference with the proper operation of the sewage works, such as, but not limited to, ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, unground garbage, whole blood, paunch manure, hair and flashings, entrails and paper dishes, cups, milk containers, etc., either whole or ground by

garbage grinders. (Ord. B-102 Art. 5 § 3, 1978).

*Prior ordinance history: Ord. 197 § 18, 1912.

13.40.040 Decision of public works director.

No person shall discharge or cause to be discharged the following described substances, materials, waters, or wastes if it appears likely in the opinion of the public works director that such wastes can harm either the sewers, sewage treatment process, or equipment, have an adverse effect on the receiving stream, or can otherwise endanger life, limb, public property, or constitute a nuisance. In forming his opinion as to the acceptability of these wastes, the public works director will give consideration to such factors as to quantities of subject wastes in relation to flows and velocities in the sewers, materials of construction of the sewers, nature of the sewage treatment process, capacity of the sewage treatment plant, degree of treatablilty of wastes in the sewage treatment plant, and other pertinent factors. The substances prohibited are:

A. Any liquid or vapor having a temperature higher than 150 degrees Fahrenheit;

B. Any water or waste containing fats, grease, or oils, whether emulsified or not, in excess of 100 mg/l or containing substances which may solidify or become viscous at temperatures between 32 and 150 degrees Fahrenheit;

C. Any garbage that has not been properly shredded. The installation and operation of any garbage grinder equipped with a motor of three-fourths horsepower or greater shall be subject to the review and approval of the public works director;

D. Any waters or wastes containing strong acid iron pickling wastes, or concentrated plating solutions whether neutralized or not;

E. Any waters or wastes containing iron, chromium, copper, zinc, and similar objectionable or toxic substances; or wastes exerting an excessive chlorine requirement, to such degree that any such material received in the composite sewage at the sewage treatment works exceeds the limits established by the public works director for such materials;

F. Any waters or wastes containing phenols or other taste-producing or odor-producing substances, in such concentrations exceeding limits which may be established by the public works director as necessary, after treatment of the composite sewage, to meet the requirements of the state, federal, or other public agencies of jurisdiction for such discharge to the receiving waters;

G. Any radioactive wastes or isotopes of such half life or concentration as may exceed limits established by the public works director in compliance with applicable state or federal regulations;

H. Any waters or wastes having a pH in excess of 9.5;

I. Materials which exert or cause:

1. Unusual concentrations of inert suspended solids (such as, but not limited to, fuller’s earth, lime slurries, and lime residues) or of dissolved solids (such as, but not limited to, sodium chloride and sodium sulfate),

2. Excessive discoloration (such as, but not limited to, dye wastes and vegetable tanning solutions),

3. Unusual BOD, chemical oxygen demand, or chlorine requirements in such quantities as to constitute a significant load on the sewage treatment works,

4. Unusual volume of flow or concentration of wastes constituting “slugs” as defined in TMC 13.22.010;

J. Waters or wastes containing substances which are not amenable to treatment or reduction by the sewage treatment processes employed, or are amenable to treatment only to such degree that the sewage treatment plant effluent cannot meet the requirements of other agencies having jurisdiction over discharge to the receiving waters. (Ord. B-102 Art. 5 § 4, 1978).

13.40.050 Discharge of prohibited substances – Subsequent procedures.

A. If any waters or wastes are discharged, or are proposed to be discharged to the public sewers, which waters contain the substances or possess the characteristics enumerated in TMC 13.40.040, and which in the judgment of the public works director may have a deleterious effect upon the sewage works, processes, equipment, or receiving waters, or which otherwise create a hazard to life or constitute a public nuisance, the public works director may:

1. Reject the wastes;

2. Require pretreatment to an acceptable condition for discharge to the public sewers;

3. Require control over the quantities and rates of discharge; and/or

4. Require payment to cover the added cost of handling and treating the wastes not covered by existing taxes or sewer charges under the provisions of TMC 13.40.100.

B. If the public works director permits the pretreatment or equalization of waste flows, the design and installation of the plants and equipment shall be subject to the review and approval of the public works director, and subject to the requirements of all applicable codes. (Ord. B-102 Art. 5 § 5, 1978).

13.40.060 Interceptors required when.

Grease, oil, and sand interceptors shall be provided when, in the opinion of the public works director, they are necessary for the proper handling of liquid wastes containing grease in excessive amounts, or any flammable wastes, sand, or other harmful ingredients; except that such interceptors shall not be required for private living quarters or dwelling units. All interceptors shall be of a type and capacity approved by the public works director, and shall be located as to be readily and easily accessible for cleaning and inspection. (Ord. B-102 Art. 5 § 6, 1978).

13.40.070 Preliminary treatment or flow-equalizing facilities.

Where preliminary treatment or flow-equalizing facilities are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the owner at his expense. (Ord. B-102 Art. 5 § 7, 1978).

13.40.080 Industrial wastes – Control manholes.

When required by the public works director, the owner of any property serviced by a building sewer carrying industrial wastes shall install a suitable control manhole together with such necessary meters and other appurtenances in the building sewer to facilitate observation, sampling, and measurement of the wastes. Such manhole, when required, shall be accessibly and safely located, and shall be constructed in accordance with plans approved by the public works director. The manhole shall be maintained by the owner at his expense, and shall be maintained by him so as to be safe and accessible at all times. (Ord. B-102 Art. 5 § 8, 1978).

13.40.090 Characteristics of water and wastes – Samples.

All measurements, tests, and analyses of the characteristics of waters and wastes to which reference is made in the ordinance codified in this chapter shall be determined in accordance with the latest edition of “Standard Methods for the Examination of Water and Wastewater,” published by the American Public Health Association, and shall be determined at the control manhole provided, or upon suitable samples taken at said control manhole. In the event that no special manhole has been required, the control manhole shall be considered to be the nearest downstream manhole in the public sewer to the point at which the building sewer is connected. Sampling shall be carried out by customarily accepted methods to reflect the effect of constituents upon the sewage works and to determine the existence of hazards to life, limb, and property. (The particular analyses involved will determine whether a 24-hour composite of all outfalls of a premises is appropriate or whether a grab sample or samples should be taken. Normally, but not always, BOD and suspended solids analyses are obtained from 24-hour composites of all outfalls whereas pHs are determined from periodic grab samples.) (Ord. B-102 Art. 5 § 9, 1978).

13.40.100 Industrial wastes – Special agreements.

No statement contained in this chapter shall be construed as preventing any special agreement or arrangement between the city and any industrial concern whereby an industrial waste of unusual strength or character may be accepted by the city for treatment, subject to payment therefor, by the industrial concern. (Ord. B-102 Art. 5 § 10, 1978).

Chapter 13.42
SEWERS – PROTECTION FROM DAMAGE

Sections:

13.42.010 Sewage works – Destruction or tampering prohibited.

13.42.010 Sewage works – Destruction or tampering prohibited.*

No unauthorized person shall maliciously, wilfully, or negligently break, damage, destroy, uncover, deface, or tamper with any structure, appurtenance, or equipment which is a part of the sewage works. Any person violating this provision shall be subject to immediate arrest under charge of disorderly conduct. (Ord. B-102 Art. 6 § 1, 1978).

*Prior ordinance history: Ord. 197 § 17, 1912.

Chapter 13.44
SEWERS – RATES AND CHARGES*

Sections:

13.44.010 Definitions.

13.44.020 Monthly rates and charges established – Payment required.

13.44.025 Fixed rates.

13.44.030 Consumption less than 2,000 cubic feet per month per unit.

13.44.040 Consumption of 2,000 cubic feet or more per month per unit.

13.44.045 Determination of consumption by other methods.

13.44.050 Monthly charges – When due – Penalties.

13.44.055 Delinquent payments – When shut off – Charges.

13.44.060 Lien against property when.

13.44.070 Disposition of collected charges.

13.44.080 Responsibility for sewer service charges.

13.44.090 Surcharge for outside users.

13.44.100 Rate adjustments for enrolled members of federally recognized American Indian tribes.

13.44.110 Overpayment or underpayment of bill – Three-year limitation.

*For statutory provisions authorizing cities to make charges for connecting to sewage system, see RCW 35.92.020 and 35.92.025.

13.44.010 Definitions.

The following definitions shall be used in interpreting this chapter:

A. “Apartment” means a building occupied for residence purposes by three or more families or having apartments which are rented or utilized by more than the family. The number of units shall be defined as the number of apartments.

B. “Duplex” means a building occupied by two families (two units).

C. “Hotel, motel or roominghouse” means a building in which individual rooms whether with or without bath are rented for dwelling purposes by the day, week, month or other period.

D. “Residence” means a dwelling house occupied by one family.

E. “Restaurant” means any establishment or place of business where meals or other food are prepared, served and sold to the public in the general

course of business.

F. “Service station” means premises where gasoline is sold to retail customers. This classification shall include garages where mechanical repairs are made to vehicles. It shall not include premises where coin-operated car washing equipment is located or where outmoded car washing equipment is utilized.

G. “Small users” includes all premises where sewer use is not otherwise defined and where water consumption in the six winter months average less than 2,000 cubic feet per month. (Ord. B-115 § 1, 1978; Ord. A-390 § 1, 1952).

13.44.020 Monthly rates and charges established – Payment required.
There is established and there shall be charged and collected by the city clerk-treasurer the monthly rates and charges set forth in TMC 13.44.025 through 13.44.045 for the use of and furnishing of the services of the sanitary sewerage systems of the city, all of which rates and charges shall be made and paid on a monthly basis. (Ord. 2007-18 § 1, 2007; Ord. 2006-20 § 1, 2006; Ord. 2006-12, 2006; Ord. 2005-13 § 1, 2005; Ord. 99-1 § 1, 1999; Ord. B-115 § 2, 1978; Ord. A-390 § 2, 1952).

13.44.025 Fixed rates.
The rates to be charged for residential premises, including single-family units, duplexes and apartments, shall be as follows:

	0% Increase	**3% Increase**	**3% Increase**
	Rate Effective January 1, 2015	**Rate Effective January 1, 2016**	**Rate Effective January 1, 2017**
Residences, Duplexes (per unit)	$60.23	$62.04	$63.90
Apartments (per unit)	$54.38	$56.01	$57.69

(Ord. 2014-11, 2014; Ord. 2013-24, 2013; Ord. 2011-18, 2011).

13.44.030 Consumption less than 2,000 cubic feet per month per unit.
For sewer service to commercial premises where water consumption in the six winter months (November through April) averages less than 2,000 cubic feet per month per unit:

	Rate Effective January 1, 2015	**Rate Effective January 1, 2016**	**Rate Effective January 1, 2017**
Small Users	$69.18	$71.26	$73.40

(Ord. 2014-11, 2014; Ord. 2013-24, 2013; Ord. 2011-18, 2011).

13.44.040 Consumption of 2,000 cubic feet or more per month per unit.
For sewer service to commercial premises where water consumption in the six winter months (November through April) averages 2,000 cubic feet or more per month per unit, the rate of charge shall be as determined by taking the average water consumption for the previous six winter months to

establish the rate of charge for the following 12 months and using the rate listed below. This shall only be applied where water consumption can be measured and this consumption is a reasonable means of determining sewer use.

	Rate Effective January 1, 2015	**Rate Effective January 1, 2016**	**Rate Effective January 1, 2017**
Base Rate	$39.65	$40.84	$42.07
Plus rate per 100 cubic feet of consumption	$2.46	$2.53	$2.61

(Ord. 2014-11, 2014; Ord. 2013-24, 2013; Ord. 2011-18, 2011).

13.44.045 Determination of consumption by other methods.

For sewer service to premises where water consumption cannot be measured, or where the measure of water consumption will not provide a reasonable measure of sewer use, then the director of public works shall make a determination of use based upon EPA 625/1-77-009 Process Design Manual or other reasonably accurate methods. If no reasonably accurate method can be determined and if the use is estimated to be more than 15,000 gallons per day (2,005 cubic feet per day), metering of sewage may be required as determined by the director of public works. The following methods of determining sewer use shall be utilized for the following classes of users:

A. Schools. Use shall be determined by measuring water consumption during the six winter months (November through April). The average of this use shall be multiplied by 0.867. The monthly charge for each of the 12 months per year shall be as listed below:

	Rate Effective January 1, 2015	**Rate Effective January 1, 2016**	**Rate Effective January 1, 2017**
Base Rate	$31.78	$32.73	$33.71
Plus rate per 100 cubic feet of consumption as adjusted by 0.867	$2.00	$2.06	$2.12

B. Processing Plants Where Separate Waste Treatment Is Being Provided. Charges for sewer service shall be determined by multiplying the average number of workers employed in the preceding year times the base rate listed below to determine the monthly charge.

	Rate Effective January 1, 2015	**Rate Effective January 1, 2016**	**Rate Effective January 1, 2017**
Base Rate per Employee	$7.17	$7.39	$7.61

(Ord. 2014-11, 2014; Ord. 2013-24, 2013; Ord. 2011-18, 2011).

13.44.050 Monthly charges – When due – Penalties.

All of the charges for sewer service shall be due and payable at the finance department on or before the first day of each month, for the previous month. If fees or charges for sewer are not paid by 6:00 p.m. on the fifteenth day of the month in which due, a collection fee of $10.00 shall be added and collected by the finance department, and a like fee of $10.00 shall be added for each succeeding month or portion thereof during which the fees and charges shall remain delinquent. Sewer bills shall cover service charges for a period of one month, and said bills shall be issued and mailed on or before the first day of each month. (Ord. 2010-2, 2010; Ord. 91-4 § 1, 1991; Ord. 88-2 § 1, 1988; Ord. A-390 § 4, 1952).

13.44.055 Delinquent payments – When shut off – Charges.

A. The city provides sewer service to some locations that do not use the city's water service because they have their own domestic water supply. In case of nonpayment of fees and charges for sewer service by any of said users within seven days after the date such fees and charges become delinquent, and after the city has complied with notice requirements hereinafter set forth, the sewer service shall be shut off and a charge of $20.00 shall be added to cover administrative and clerical-related expenses. In addition to said charges, the customer shall reimburse the city for its actual expenditures for wages and benefits paid to public works personnel for the required labor to implement the shut-off, plus hourly equipment costs, plus materials, in such amounts as shall be determined by the public works director at the time to have been actually spent or incurred by the city. The sewer service shall remain shut off until the account is paid in full. The city will apply the monies received in payment in the following order:

1. Delinquent utility taxes;

2. Delinquent utility charges;

3. Current utility taxes;

4. Current utility charges;

5. The $20.00 charge for administrative fees and clerical-related expenses;

6. Reimbursement of the city's expenditures as above set forth.

B. Before shutting off the service the city must give at least 30 days' written notice to the property owner. Said notice must specify the delinquent charges and all other monies that must be paid before the service will be reinstated, and the date on which the sewer will be shut off if all of the amounts due have not been fully paid on or before the date and time stated in the notice. Said notice shall also set forth in detail a good-faith estimate of the total public works costs to be reimbursed if the service must be shut off for nonpayment of the charges itemized in subsections (A)(1) through (5) of this section. (Ord. 2014-4, 2014).

13.44.060 Lien against property when.

All charges provided for in this chapter, together with interest thereon, and all costs and fees of collecting or foreclosing the same, shall be a lien upon the property with which the connection for such service is made, or such service is rendered. Such liens shall be enforced and foreclosed in the manner provided by law. (Ord. A-390 § 5, 1952).

13.44.070 Disposition of collected charges.
All charges collected by the city clerk-treasurer shall be paid by the clerk-treasurer into the existing water fund of the city. The city clerk-treasurer shall pay such sums from the water revenue fund into any water and/or sewer revenue fund heretofore or hereafter created by ordinance of the city, as required by said ordinance. (Ord. A-390 § 6, 1952).

13.44.080 Responsibility for sewer service charges.
A. The owner of the property being served shall be responsible for the payment of the charges for sewer service to such property, including delinquent fees and administrative, clerical and other employee or employee-related expenses as may be required by TMC 13.44.050.

B. All accounts for sewer service shall be kept in the name of the owner of the property and shall be billed to the owner and sent to the owner at such address as the owner shall provide to the city.

C. The city clerk may rely upon the land records of Yakima County for the purpose of determining the name of the owner of the property, as posted on the website of the Yakima County assessor, or such other documentation as may be provided to the city clerk that verifies such ownership. For purposes of this section, a contract purchaser shall be deemed to be the owner of the property if the contract has been recorded in the office of the Yakima County auditor.

D. Discontinuance of sewer service for any cause shall not release the owner from the obligation for payment of unpaid charges, including delinquent fees.

E. Each utility account that is in the name of and/or billed to anyone other than the property owner shall be put in the name of and billed to the property owner at such time as a change of occupancy or a change of ownership of the property occurs, or on January 1, 2013, whichever first occurs. (Ord. 2011-13 § 1, 2011; Ord. B-297 § 2, 1984).

13.44.090 Surcharge for outside users.
An additional charge of 25 percent shall be made for all sewer services provided outside of the city limits. (Ord. 95-24 § 1, 1995).

13.44.100 Rate adjustments for enrolled members of federally recognized American Indian tribes.
A. The Indian Health Service, an agency of the U.S. Department of Health and Human Services, has agreed to contribute $4,900 per eligible person up to a total maximum contribution of $500,000 towards the costs of the upgrades to the city wastewater treatment facility (WWTF) that were mandated by the U.S. Environmental Protection Agency, for which the City borrowed up to $11,644,444. In consideration for the IHS contribution, there shall be an allocation of that amount to be credited in equal portions thereof to the accounts of the individual residential property owners who are enrolled members of federally recognized American Indian tribes, prorated monthly over a 20-year period. Only individuals verified by the Indian Health Service and/or the Yakama Nation to be members of federally recognized American Indian tribes who are homeowners, who occupy the residence, who are the responsible parties on the sewer utility accounts for those homes, and have had a financial contribution made on their behalf by the Indian Health Service under terms of IHS Project PO-10-L15 shall be eligible for the above described monthly credits. No person shall be eligible except those persons who have been identified by name, address and utility account number on file with the city clerk/finance director. There shall be no adjustments to the amount contributed by IHS on account of the death or relocation outside the service area of any of the persons on that list. If any of said persons

shall relocate to a different address within the city's sewer service area, owned by that person, the monthly credit shall be transferred to a new account at the new address. If any of said persons shall relocate to a different address outside the city's sewer service area, the monthly credit shall be immediately discontinued, the monthly credit for that person's account shall not be assignable or transferable, and the city shall have no liability for any reimbursement to IHS for any portion of the IHS contribution attributable to that person. The monthly credit to a utility account is not transferable by any eligible individual to another person without prior verification and approval of eligibility of the transferee by the Yakama Nation and the IHS.

B. The IHS contribution is for WWTF construction costs only. Those persons who will be credited on their monthly billing statement as above set forth shall continue to pay all regularly billed amounts for maintenance and operation of the WWTF system, including any increases in rates that are attributable to those maintenance and operation costs. Their user fees shall be the same as those assessed to other residential property users of the city's sewer services. (Ord. 2010-7, 2010).

13.44.110 Overpayment or underpayment of bill – Three-year limitation.
The city finance director is authorized to credit accounts for any amounts paid for sewer service that are found to be erroneous overpayments, and is authorized to charge accounts for any amounts found to be erroneous underpayments; provided, however, that there shall be no such credit or charge for any overpayment or underpayment made more than three years prior to the date the customer shall notify the city of the error, or more than three years prior to the discovery of the error by the city. (Ord. 2013-3, 2013).

Chapter 13.46
SEWER CONNECTION CHARGES

Sections:

13.46.010 Connection by city public works department – Liability for costs.

13.46.020 General facilities charge and other fees.

13.46.010 Connection by city public works department – Liability for costs.
Whenever connection to a public sewer is required pursuant to the provisions of Chapter 13.28 TMC, all connection work shall be done by the property owner, at the expense of the property owner, and be approved upon inspection by the city public works department. (Ord. 92-13 § 3, 1992).

13.46.020 General facilities charge and other fees.
A. Except as hereinafter provided, no property owner shall have the right to connect to the city's sewer system without having first fully paid a general facilities charge, which is the charge that is deemed a reasonable amount to be paid in order that such property owner shall bear his or her equitable share of the cost of such system. The amount to be paid shall be $1,000 for any such connection made in the year 2008. Thereafter, over the next five years beginning in the year 2009, said amount shall be increased annually by $200.00, effective January 1st of each succeeding year, until the general facilities charge, shall have been increased to $2,000. Said payments shall be deposited into the city's sewer capital fund.

B. In addition to the foregoing inspection charge, there is imposed upon the owners of Lots 2 through 12, Block 4; Lots 1 through 4, Block 5; Lots 17 through 20, Block 5; Lots 5 through 8, Block 6; and Lot 1, Block 3 of Berger Addition, who seek to provide sanitary sewer services to their property by connecting to the city's sanitary sewer system, a special connection charge of $1,807.17. The connection charge is payable in full on or before the date

of connection together with interest from the date of construction (July 27, 1992) until the connection at the rate of 10 percent per year; provided, that the aggregate amount of said interest to be paid by the property owner shall not exceed the amount of the special connection charge; and provided further, that the property owner may elect to defer payment of the connection charge and accrued interest thereon in equal annual installments not to exceed 10 years from the date of connection; with interest on the unpaid balance at the rate of eight percent per year from the date of construction until paid in full. (Ord. 2007-16, 2007; Ord. 94-4 § 1, 1994; Ord. 92-13 § 3, 1992).

Chapter 13.48
POWERS AND AUTHORITY OF INSPECTORS – PENALTY

Sections:

13.48.010 Entrance onto properties – Extent of inquiry.

13.48.020 Observance of safety rules – Indemnification for loss.

13.48.030 Entrance onto private properties containing easements.

13.48.040 Violation – Time for correction.

13.48.050 Continuing violation – Penalty.

13.48.060 Liability for loss by city.

13.48.010 Entrance onto properties – Extent of inquiry.

The public works director and other duly authorized employees of the city bearing proper credentials and identification shall be permitted to enter all properties for the purposes of inspection, observation, measurement, sampling, and testing in accordance with the provisions of the ordinance codified in this chapter. The public works director or his representatives shall have no authority to inquire into any processes including metallurgical, chemical, oil, refining, ceramic, paper, or other industries beyond that point having a direct bearing on the kind and source of discharge to the sewers or waterways or facilities for waste treatment. (Ord. B-102 Art. 7 § 1, 1978).

13.48.020 Observance of safety rules – Indemnification for loss.

While performing the necessary work on private properties referred to in TMC 13.48.010, the public works director or duly authorized employees of the city shall observe all safety rules applicable to the premises established by the company and the company shall be held harmless for injury or death to the city employees and the city shall indemnify the company against loss and damage to its property by city employees and against liability claims and demands for personal injury or property damage asserted against the company and growing out of the gauging and sampling operation, except as such may be caused by negligence or failure of the company to maintain safe conditions as required in TMC 13.40.080. (Ord. B-102 Art. 7 § 2, 1978).

13.48.030 Entrance onto private properties containing easements.

The public works director and other duly authorized employees of the city bearing proper credentials and identification shall be permitted to enter all private properties through which the city holds a duly negotiated easement for the purposes of, but not limited to, inspection, observation, measurement, sampling, repair and maintenance of any portion of the sewage works living within said easement. All entry and subsequent work, if any,

on said easement shall be done in full accordance with the terms of the duly negotiated easement pertaining to the private property involved. (Ord. B-102 Art. 7 § 3, 1978).

13.48.040 Violation – Time for correction.

Any person found to be violating any provision of the ordinance codified in this chapter except Chapter 13.42 TMC shall be served by the city with written notice stating the nature of the violation and providing a five-calendar-day time limit for the satisfactory correction thereof. The offender shall, within the period of time stated in such notice, permanently cease all violations. (Ord. B-102 Art. 8 § 1, 1978).

13.48.050 Continuing violation – Penalty.

Any person who continues any violation beyond the time limit provided for in TMC 13.48.040 shall be guilty of a misdemeanor, and on conviction thereof shall be fined in the amount not exceeding $300.00 for each violation. Each day in which any violation continues shall be deemed a separate offense. (Ord. B-102 Art. 8 § 2, 1978).

13.48.060 Liability for loss by city.

Any person violating any of the provisions of the ordinance codified in this chapter shall become liable to the city for any expense, loss, or damage occasioned by the city by reason of such violation. (Ord. B-102 Art. 8 § 3, 1978).

Chapter 13.52
WATER AND SEWER SERVICES OUTSIDE THE CORPORATE LIMITS

Sections:

13.52.010 Adoption of policy.

13.52.020 Annexation required when.

13.52.030 Property unable to be annexed.

13.52.040 Application procedure.

13.52.050 Conformity to codes and regulations.

13.52.060 Filing of application prior to construction.

13.52.070 Existence of utility service lines.

13.52.080 Application review by city council and planning commission.

13.52.090 Interpretation of policy statement.

13.52.010 Adoption of policy.

The statement of policy set forth in TMC 13.52.020 through 13.52.090 regarding the extension of city water and sewer services to property outside the

corporate limits of the city, as such extensions are related to the annexation of such property to the city, is adopted. (Ord. B-99 § 1, 1977).

13.52.020 Annexation required when.
When city water and sewage service is sought for property contiguous to existing city limits, and the size of the property is sufficiently large to merit its annexation, in the opinion of the city manager, the annexation of that property to the city shall be a condition of its receiving such service. (Ord. B-99 § 1(1), 1977).

13.52.030 Property unable to be annexed.
An application for such service to property outside and adjacent, but not contiguous, to existing city limits will be granted only after it has been determined that it is impractical or not feasible to annex that property to the city within the near future, and only under circumstances which will allow the development of that property to be controlled by city codes, regulations and policies, all as if such property were within the city. (Ord. B-99 § 1(2), 1977).

13.52.040 Application procedure.
A. Applications for such service shall be made to the department of public works. If the director of that department determines that such service should be afforded, he shall so recommend and report his findings to the city manager. Applications for utility services to property whose use and/or development has significant effect upon community development shall additionally be referred to the planning commission for their review and recommendations. Each application shall be granted only upon resolution of the city council.

B. In the event the city council decides that any such application should be granted, the city council may attach conditions to the granting of such application as the city council deems advisable under the circumstances surrounding that application, which conditions shall include the execution by the owners and occupants of the property of an outside utility agreement, a copy of which is made a part of the ordinance codified in this chapter.

C. The alterations, improvements or repairs referred to in paragraph 2 of the outside utility agreement are required to order that structures served outside the city in anticipation of future annexations will reasonably conform to applicable construction and zoning codes. The requirements, restrictions and other provisions referred to in paragraph 4 of the outside utility agreement may include, but need not be limited to, references to subdivision plat maps, site plans, utility maps and other similar development plans which, together with other obligations specified in that agreement, will constitute conditions of the granting by the city of the application. (Ord. B-99 § 1(3), 1977).

13.52.050 Conformity to codes and regulations.
If the property for which such service is sought is developed and improved at the time of application, conformity to the city's general plan, and conformity with building, zoning and other codes, regulations and policies of the city with regard to that development, will be considered as a persuasive factor for granting such application. (Ord. B-99 § 1(4), 1977).

13.52.060 Filing of application prior to construction.
The filing of an application for such service prior to constructing any buildings, structures or other improvements thereon, or any other development thereof, will be considered as a persuasive factor for granting such application. (Ord. B-99 § 1(5), 1977).

13.52.070 Existence of utility service lines.
The existence of a city utility service line adjacent to developed property for which such service is sought will be considered as a persuasive factor for

granting an application; however, property situated where no such utility service line exists adjacent to it will normally be required to constitute a local improvement district, or part of the area of a local improvement district which must be created to finance the extension of a utility line to serve an area of an appropriate size and shape for annexation to the city, and the commencement of proceedings to annex that area will normally be a condition of the granting of an application for such service. (Ord. B-99 § 1(6), 1977).

13.52.080 Application review by city council and planning commission.

A. Inasmuch as utility service will be extended to property outside the city limits only when such property is subject to city codes, regulations and policies, all as if that property were within the city, an application for such service will be submitted by the director of public works to the city manager of the city for its review and recommendation to the city council in the case of subdivision plat approval and in case of land use differing from that contemplated by the city's general plan.

B. While subdivision plat maps for property outside the city must be approved by the county by law, nevertheless, any such preliminary plat map must be reviewed and approved by the city planning commission before final approval by the county, if the property in that subdivision is to be served by city utilities. The approval by the city planning commission of the plat map may be subject to requirements, restrictions and provisions as conditions of the granting by the city of the application for such services. (Ord. B-99 § 1(7), 1977).

13.52.090 Interpretation of policy statement.

The statement of policy set forth in TMC 13.52.010 through 13.52.080 is intended to be general in scope and advisory only, and is not intended to be a limitation on the exercise of discretion and judgment by the city council on any occasion when an application for city water or sewer is made. (Ord. B-99 § 2, 1977).

Chapter 13.56
UTILITY RATE DISCOUNT FOR LOW-INCOME SENIOR OR DISABLED PERSONS

Sections:

13.56.010 Program for discounts established.

13.56.020 Low-income senior citizen qualifications.

13.56.030 Disabled citizen qualifications.

13.56.040 Discount applies to water, sewer and garbage utility services.

13.56.050 Discount rate.

13.56.060 Definition of disabled persons.

13.56.010 Program for discounts established.

A program for discounts to the billings for solid waste utility services for certain low-income senior or disabled citizens is established in order to provide necessary support for the disadvantaged. Such reductions are intended to offset rate increases. The city manager is authorized and directed to

administer said program and in such connection may promulgate administrative regulations to carry out the intent and purpose of the ordinance codified in this chapter. (Ord. 2003-14 § 2, 2003).

13.56.020 Low-income senior citizen qualifications.
To implement the program provided for in TMC 13.56.010, a low-income senior citizen shall show satisfactory proof that he or she:

A. Is 65 years of age or older; and

B. Has a maximum annual household income at or below 125 percent of federal poverty guidelines; and

C. Is a single occupant or the head of a household or the spouse of the head of the household; and

D. Resides in the dwelling unit served by the solid waste, sewer, and water utility; and

E. Is billed or is the spouse of a person billed by the garbage, sewer and water utility.

Applicants shall verify such information and shall provide such other data as is deemed appropriate upon forms prepared, and in the manner determined by the city. (Ord. 2003-14 § 2, 2003).

13.56.030 Disabled citizen qualifications.
To implement the program provided for in TMC 13.56.010, a disabled citizen shall show satisfactory proof that he or she:

A. Is disabled; and

B. Has a maximum annual household income at or below 125 percent of federal poverty guidelines; and

C. Is a single occupant or the head of a household or the spouse of the head of the household; and

D. Resides in the dwelling unit served by the solid waste, sewer, and water utility; and

E. Is billed or is the spouse of a person billed by the garbage, sewer and water utility.

Applicants shall verify such information and shall provide such other data as is deemed appropriate upon forms prepared, and in the manner determined by the city. (Ord. 2003-14 § 2, 2003).

13.56.040 Discount applies to water, sewer and garbage utility services.
Persons qualified by the city as eligible recipients of a low-income senior or disabled citizen discount provided for in this chapter shall be granted a discount against the charges assessed for water, sewer, and garbage utility services under Chapter 8.12 TMC, Garbage; Chapter 13.16 TMC, Water – Rates and Charges; and Chapter 13.44 TMC, Sewers – Rates and Charges. (Ord. 2003-14 § 2, 2003).

13.56.050 Discount rate.

The city clerk-treasurer is authorized to discount the total amount of charges made for water, sewer, and garbage utility services to qualified low-income senior or disabled citizens by 25 percent. (Ord. 2003-14 § 2, 2003).

13.56.060 Definition of disabled persons.
For purposes of this chapter, the following persons are defined as disabled:

A. A person who has qualified and received special parking privileges under RCW 46.16.381(1)(a) through 46.16.381(1)(g).

B. A blind person as defined in RCW 74.18.020(4).

C. A person who has a developmental disability as defined in RCW 71A.10.020(3).

D. A person who is gravely disabled as a result of a mental disorder as defined in RCW 71.050.020(14).

E. A person who has qualified and receives supplemental social security benefits due to disability. (Ord. 2003-14 § 2, 2003).

Chapter 13.60
STORM AND SEWER SURFACE WATER UTILITY

Sections:

13.60.010 Definitions.

13.60.020 System of charges.

13.60.030 Billing and collection.

13.60.040 Connection fees.

13.60.050 Developer contributions.

13.60.010 Definitions.
A. “Developed parcel” means any parcel which has been altered by grading or filling of the ground surface, or by construction of any improvement or other impervious surface area which affects the hydraulic properties of the parcel.

B. “Impervious surface” means that hard surface area which causes water to run off the surface in greater quantities or at an increased rate of flow from that present under natural conditions preexistent to development. Common impervious surfaces include, but are not limited to, rooftops, concrete or asphalt paving, walkways, patios, driveways, parking lots or storage areas, and oiled, macadam or other surfaces which similarly impede the natural infiltration of surface water.

C. “Parcel” means a separately segregated unit or plot of land having an identified owner and specified boundaries.

D. “Undeveloped parcel” means any parcel which has not been altered by grading or filling of the ground surface, or by construction of any

improvements or other impervious surface areas which affect the hydraulic properties of the parcel. (Ord. 91-1 § 1, 1991).

13.60.020 System of charges.

There is imposed a system of charges on each parcel of real property within the area of the city as shown on the map thereof on file in the office of the city clerk-treasurer, hereinafter called “the defined area,” to operate a storm water drainage utility. The charges are deemed reasonable and necessary to fund administration, planning, design, construction, operation, maintenance, repair, improvement and replacement of all existing and future storm and surface water facilities, including the accumulation of reserves and the retirement of any associated debt.

The following charges are hereby established for all parcels of real property located within the defined area:

A. Undeveloped Parcels. Undeveloped parcels shall not be charged.

B. Other Parcels.

1. The charge for all other parcels except residential parcels and undeveloped parcels shall be based upon the total amount of impervious surface as measured by the public works department.

2. The charge for all such parcels shall be $1.00 per month for each 2,000 square feet of impervious surface.

3. The charge for all such parcels, the owners of which contributed to the cost of acquisition and construction of the existing stormdrain and lift station facilities, shall be 50 percent of the rate set forth in subsection (B)(2) of this section. (Ord. 91-1 § 2, 1991).

13.60.030 Billing and collection.

Storm and surface water charges for each parcel of real property within the defined area shall be computed on a monthly basis. The amount billed shall be included on the utility bill. (Ord. 91-1 § 3, 1991).

13.60.040 Connection fees.

Connection fees shall be assessed against an owner of real property when any on-site storm or surface water drainage structure or facilities are attached to the city’s system of drainage facilities, or when any additional surface or storm water runoff is generated and delivered or transported through either natural or manmade watercourses to the city’s system of storm and surface water facilities. Connection fees shall represent a fair and equitable share of the historic cost of the city’s storm and surface water system of drainage structures and facilities. Such fees and amendments thereto shall be established by the director of public works and approved by the city council. (Ord. 91-1 § 4, 1991).

13.60.050 Developer contributions.

The city public works department is hereby authorized to assess developers of real property within the defined area a fair and equitable pro rata portion of specific off-site storm and surface water drainage improvements necessitated by new developments on parcels owned by said developers. These assessments shall be made in addition to any other requirements of the city for on-site improvements. All developer contributions shall be placed in a separate revenue account and earmarked for specific projects or improvements, and utilized solely for such purposes. (Ord. 91-1 § 5, 1991).

APPENDIX D

YAKAMA NATION HOUSING AUTHORITY SEWER SERVICE AGREEMENT

AGREEMENT FOR CITY SERVICES

THIS AGREEMENT is made and entered into this 28th day of February, 1990, by and between the City of Toppenish, a municipal corporation, hereinafter referred to as the "City" and the Yakima Nation Housing Authority, hereinafter referred to as the "Housing Authority".

WHEREAS, the Housing Authority is interested in developing and operating a housing park development with housing units to become individually owned, on property adjacent to the jurisdictional and corporate limits of the City, on real property legally described as follows:

> That portion of the Northwest Quarter of the Northwest Quarter of Section 3, Township 10 North, Range 20 East, W.M. described as follows:
> Beginning at the Northwest Corner of said subdivision; thence N 88° 50' 40" E along the North line of said subdivision 985.11 feet; thence S 2° 14' 50" W parallel with the West line of said subdivision 1289.40 feet to the South line of said subdivision; thence S 89° 06' 48" W along said South line 984.84 feet to the West line of said subdivision; thence N 2° 14' 50" E 1284.77 feet to the point of beginning.
>
> SUBJECT TO easements, restrictions and other servitudes over, along and across said premises, if in fact any portion thereof is burdened thereby.

WHEREAS, the Housing Authority on its behalf and for the benefit of the future residents of the housing park desires to obtain from the City the use and benefit of City facilities and services; and

WHEREAS, the Housing Authority recognizes that the City must be compensated for the use of City facilities and services; and,

WHEREAS, the City and the Housing Authority have reached an agreement whereby the City shall provide to the Housing Authority and residents of the housing park certain services and the Housing Authority shall compensate the City for said services; and,

WHEREAS, the City and the Housing Authority desire to set forth in writing the terms and conditions of said agreement.

NOW, THEREFORE, the Housing Authority and the City hereby agree as follows:

I

CITY SERVICES

The City agrees to provide to the Housing Authority and to the future residents of the housing park the following City services: utility services (water, sanitary and storm sewers, and garbage collection). These services shall be provided in accordance with and subject to the terms and conditions set forth in the remainder of this Agreement.

II

COMPENSATION FOR SERVICES

The Housing Authority agrees to compensate the City in a timely manner for any and all services provided to the Housing Authority and the residents of the housing park in accordance with the terms and conditions set forth in the other provisions of this Agreement.

III

UTILITY SERVICES: WATER

A. Water Service. The City shall furnish water from the City water utility to the Housing Authority for the use and benefit of the individual residences within the Housing Park. Such water shall be made available by the City to such individual residences in accordance with the provisions of the City's ordinances relating to and regulating the operation of the City water utility.

B. Water System Construction. The Housing Authority shall perform all construction in accordance with standards of Department of Social and Health Services, State Environmental Policy Act and the City. Final design plans and specifications, including bid and contract documents, particularly Section 01400-2, Quality Control, shall be submitted for review by the City and the Department of Social and Health Services prior to construction. Housing

Authority construction shall include connection to the existing water main within the City's city limits, and all water services from the main serving the housing authority to each meter. The City shall provide meters and services installation for the Housing Authority, and the charge for said meters and services shall be consistent with the ordinance fixing the cost of water meters and service in effect at the time of their installation. Meters shall be placed within the dedicated road right-of-way and/or easement for utility purposes within the platted subdivision.

Construction of water facilities shall be inspected by an engineer licensed by the State of Washington and approved by the City to ensure compliance with DSHS and City standards. The Housing Authority shall pay all fees related to plan review and construction inspection, pursuant to the provisions of Article XIII set forth below.

The Housing Authority hereby grants permission for the City, its representatives and employees, to enter upon or across Housing Authority property to carry out necessary inspections and testing to ensure compliance with City standards.

C. Water System Ownership. Once construction has been completed to the satisfaction of the City, and as-built plans submitted to the City, the City shall assume ownership of the water system and be responsible for its operation and maintenance as part of the City water utility. The ownership and responsibility of the City shall be limited to the water service from and including the water meter back to the main, and the main and related valves on the main. Any repair or maintenance performed on the water system in the right-of-way or easement area shall be the sole responsibility of the City.

The Housing Authority and/or individual residents shall not construct and/or repair or otherwise tamper with the City's water meters, service lines,

mains or valves. The Housing Authority and each individual resident shall be responsible for operation and maintenance of the water line from the meter into the housing unit.

In the event this agreement is terminated and a new agreement is not established between the Housing Authority and the City, ownership of water facilities including mains, meters, services, hydrants, and related appurtenances shall revert to the Housing Authority.

IV

UTILITY SERVICES: SANITARY AND STORM SEWERS

A. Sanitary Sewer Service. The City shall permit the Housing Authority to construct sanitary sewer facilities to each individual residence within the Housing Park in accordance with the Department of Ecology and City standards. Service for such sewer facilities shall be made available by the City to such individual residences in accordance with the provisions of the City's ordinances relating to and regulating the operation of the City sewer utility.

B. Sanitary and Storm Sewer Construction. Construction of sanitary and storm sewer facilities shall be in accordance with Washington State Department of Ecology and City standards. The Housing Authority shall submit final design plans and specifications, including bid and contract documents, particularly Section 01400-2, Quality Control, to the Department of Ecology and the City for review and approval prior to construction to ensure compliance with State and City requirements. After approval by the City and DOE, the Housing Authority shall commence construction of sanitary sewer facilities. All construction shall be subject to inspection by a licensed Washington State engineer approved by the City to ensure compliance with DOE and City standards to ensure that all interests are protected. The Housing Authority shall pay all fees related to plan review and construction inspection, pursuant

to the provisions of Article XIII set forth below.

The Housing Authority hereby grants permission for the City, its representatives and employees, to enter upon or across Housing Authority property to carry out necessary inspections and testing to ensure compliance with City standards.

C. Sanitary and Storm Sewer Ownership. Once construction has been completed to the satisfaction of the City, and as-built plans submitted to the City, the City shall assume ownership of the sewer facilities and be responsible for operation and maintenance as part of the City sewer utility. The ownership and responsibility of the City shall be limited to sewer mains, lift stations, catch basins, laterals, and related appurtenances located within the right-of-way or utility easement. Any repair or maintenance performed on the sanitary and/or storm sewer system in this area shall be the sole responsibility of the City.

The Housing Authority and individual residents shall not construct and/or repair or otherwise tamper with the City's sewer and storm mains, lift station and/or related appurtenances. The Housing Authority and each individual resident shall be responsible for the sewer lateral from the sewer main to, and including, the housing or other unit.

In the event this agreement is terminated and a new agreement is not established between the Housing Authority and the City, ownership of sanitary and storm sewer facilities including mains, lift stations, catch basins, laterals, and related appurtenances located within the right-of-way or utility easement shall revert to the Housing Authority.

V

UTILITY SERVICES: GARBAGE COLLECTION

A. Garbage Collection Services. The City will provide garbage collection services within the housing park in accordance with City ordinances relating

thereto. The Housing Authority and each individual resident shall permit only the City's garbage utility to service the housing park. Said garbage collection service shall be subject to procedures established by the City and as it may determine from time to time.

B. Containers Ownership: The Housing Authority shall require that all owners of residences and other units within the housing park use proper containers as set forth by City ordinance and provided by the City. The City shall own all containers it provides.

C. Access. The City shall have the right to enter upon the housing park land site with any of its trucks and/or equipment necessary to provide garbage collection services.

VI

UTILITY SERVICES: BILLINGS

A. Billings For Service. Each single family housing unit and each other water service shall have a water meter to determine the charges for the water provided. Each meter shall be billed as an individual account and the City shall prepare bills for water, sewer, and garbage collection services for each housing unit or other facility served. The services shall be charged in an amount equal to 125% of the service rates for water, sewer and garbage collection established from time to time by ordinance for users within the corporate limits of the City at the time of billing. Such bills shall include an amount equal to any City levy or tax on its utilities at the same rate charged users within the City limits, as established by ordinance.

The Housing Authority shall act as owner/landlord and be responsible for payment of all utility bills, fees, and charges, provided:

1. An individual bill shall be sent by first class mail monthly to each housing unit or facility for services received;

2. A master list itemizing all individual bills shall be sent by first class mail monthly to the Housing Authority, along with any bills for other facilities served;

3. All policies and procedures established by ordinance regarding late fees, deposits, checks returned unpaid, and turnoffs shall apply for all service to each housing unit;

4. The occupant, lessee and/or purchaser of each housing unit or other facility shall pay directly to the City any and all utility bills, fees, and charges, including deposits;

5. The Housing Authority shall promptly pay any account thirty days past due.

The Housing Authority shall pay a "hydrant rental" fee annually on or before December 1 in an amount equal to 125% of the rate established for hydrants within the City.

VII

UTILITY SERVICES: EASEMENTS

A. Utility Easement. The Housing Authority shall grant a perpetual utility easement over the entirety of the dedicated road right-of-way for purposes of operation and maintenance of water, storm and sanitary sewer utilities. Said easement shall be identified in a plat of the housing park which shall be an exhibit to this Agreement.

B. Other Improvements. Any other improvements within the right-of-way, and/or utility easements granted for the purpose of operation and maintenance of water, storm and sanitary sewer utilities shall be the sole responsibility of the Housing Authority and/or its homebuyers/tenants. These improvements shall include, but shall not be limited to, streets, curbs, gutters, sidewalk, shrubbery, lawn, mailboxes, street signs, fences, etc.

Any replacement or repairs of streets, curbs, and gutters disturbed by the City in the normal operation and maintenance of the water and sewer utilities within the utility easement area shall be the responsibility of the City. The City shall refill and replace earth moved by excavation by the City for water, strom and sanitary sewer construction or maintenance within the utility easement area. Such repair or replacement will be to

the state of repair prior to the City beginning work.

Any replacement or repair of any other improvements (i.e. sidewalks, shrubbery, lawns, mailboxes, street signs, fences, etc.) existing in the utility easement area which might be disturbed by the City's normal operation and maintenance of the water and sewer utilities shall be the responsibility of the Housing Authority and/or its homebuyers/tenants.

C. Utility System Maintenance and Construction. The City shall have the right to repair, replace, enlarge, extend or relocate the water, storm and sanitary sewer lines and facilities within the road easements or utility easements. The City shall first notify the Housing Authority of such activities. Once the facilities are accepted by the City, any and all connections to said facilities shall be subject to City approval and shall conform to City ordinances governing such connections.

D. Future Easements. The parties both understand and agree that the need for additional easements is a strong probability as other projects develop. In the event that additional easements for any utility purposes become necessary, the Housing Authority and the City shall immediately meet to agree upon additional easements that are necessary for utility purposes. This provision shall not modify or alter the responsibility of the Housing Authority to construct additional and/or different water, storm and sanitary sewer facilities consistent with State, Indian Health Service (IHS), and City standards and subject to the State, IHS and City approval providing the City has the capacity to do so.

VIII

FAILURE TO PAY - LATE PAYMENT PENALTY

A. If the Housing Authority fails to pay the monies due the City within the thirty (30) day time period for any or all of the services provided by the City in accordance with City ordinances and/or policies, then and in

that event, the City shall have the right to discontinue the service billed for and/or all services until such time as payment is made. A late payment of 1% monthly (12% per annum) shall be charged for payments thirty (30) days past due.

IX

JURISDICTION AND VENUE

A. In the event of any claims, demands, lawsuits, complaints and/or causes of action involving the terms and conditions of this Agreement, jurisdiction and venue shall lie in the Superior Court of Yakima County.

B. In the event of a Court decision which declares a certain provision in this Agreement invalid or unenforceable or alters the intent of the parties in establishing such a provision, the remaining provisions shall remain in effect. The provision which has been found to be invalid or unenforceable or is contrary to the intent of the parties shall be renegotiated in a manner which is mutually acceptable to the parties.

X

RECORDING

A. The Housing Authority shall record this Agreement in the Yakima County Auditor's Office and in the appropriate agency of the Indian Nation so that this Agreement shall be a matter of record for all purchasers of houses within this housing park.

XI

STATUTORY COMPLIANCE

A. The Housing Authority shall comply with any and all applicable Federal, State, County, City and/or Yakima Indian Nation statutes, ordinances, rules and/or regulations, and policies applicable to this housing project. This is inclusive of zoning, land use, building and housing codes, taxation, and health and safety provisions.

XII

MAINTENANCE OF ROAD RIGHT-OF-WAYS AND UTILITY EASEMENTS

A. The Housing Authority shall be solely and totally responsible for ensuring the establishment and maintenance of the dedicated road right-of-ways and utility easements as set forth in the dedicated plat.

XIII

PROFESSIONAL SERVICES AND FEES

A. The Housing Authority shall pay for all professional services and fees provided by the City's consulting engineers involved with the development of this Agreement and the carrying out of the terms and conditions of this Agreement. These services and fees shall include the fees of the City's consulting engineers regarding the development and carrying out of the terms and conditions of this Agreement inclusive of review of plans, inspections, etc. Said professional service fees shall be paid prior to the commencement of construction for those costs incurred prior to construction and within (30) days after billing for those professional services which are ongoing during the construction of the project such as inspections, conferences, etc. Fees for professional services noted above shall not exceed $5,000 without prior approval of the Housing Authority.

XIV

MODIFICATION

This Agreement may be modified only by way of mutual consent of the parties in writing; Provided, however, the parties understand and agree that the City may from time to time amend its ordinances with regard to the various services and fees therefor. The City agrees to notify the Housing Authority sixty (60) days prior to the effective date of any change in any applicable ordinance. The Housing Authority and individual residents are hereby bound to honor and pay such changes in charges for various services.

XV

TERM OF AGREEMENT

This Agreement shall remain in full force and effect for a period of ten (10) years from the date hereof, and the parties agree and understand that this Agreement shall be automatically extended for successive ten (10) year periods unless one of the parties hereto notifies the other in writing at least one hundred and twenty (120) days prior to the end of the period indicating that said party wishes to re-negotiate a specific provision or paragraph of this Agreement.

During the period of re-negotiation the current Agreement language shall be binding on both parties.

XVI

BINDING EFFECT

The parties understand and agree that the terms and conditions of this Agreement are binding on the parties hereto, the representatives, successors in interest and assigns, and individual residence owners and/or lessees, and said terms and conditions shall remain in full force and effect in accordance with the provisions of this Agreement.

IN WITNESS WHEREOF, the City and the Housing Authority have executed this Agreement on the date first above written.

YAKIMA NATION HOUSING AUTHORITY

By _____

having been duly authorized to enter into this agreement on behalf of the Authority, as evidenced by the attached resolution made by the Authority.

CITY OF TOPPENISH

By _____

having been duly authorized to enter into this agreement on behalf of the City, as evidenced by the attached resolution made by the Toppenish City Council.

ATTEST:

_____
Deputy City Clerk-Treasurer

APPROVED AS TO FORM:

_____
City Attorney

CONCURRENCE, U.S. Department of Housing and Urban Development

By _____

Director, Housing
Development Division,
Office of Indian Programs

APPENDIX E

DMRs

BOD Discharged

	2011											
BOD discharged (lbs)	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
1				109.63347								17.83509
2						4.8372					12.510938	
3		24.28608	36.185175									
4												
5					24.84069			41.659134				
6	8.03976									79.26336		
7				32.05062			60.440814					
8									20.793497			11.041639
9						7.337115						
10		12.58089	39.562875								14.738031	
11								40.006042				
12					26.117336					9.463815		
13	26.816228											
14				64.64751			58.258028					
15						26.086478			25.892364			11.3841
16		20.94174										
17			44.288528								49.993296	
18								26.901504				
19					2.391495							
20	19.03605									29.651515		
21			41.283	69.481583			64.429628					
22									20.923392			32.488053
23						62.689174					9.742788	
24		57.460515										
25								10.113084				
26					4.030722							
27	26.50452									14.365859		
28				17.15538			50.4153					
29									47.356188			
30						11.306121						9.931001
31			109.50629					41.74587				
Average	20.1	28.8	54.2	58.6	14.3	22.5	58.4	32.1	28.7	33.2	21.7	16.5
Max	26.816228	57.460515	109.50629	109.63347	26.117336	62.689174	64.429628	41.74587	47.356188	79.26336	49.993296	32.488053
Min	8.03976	12.58089	36.185175	17.15538	2.391495	4.8372	50.4153	10.113084	20.793497	9.463815	9.742788	9.931001
Permit limit	418	418	418	418	418	418	418	418	418	418	418	418

Effluent Flow

	2011											
Flow (MG)	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
1	1.022	0.886	0.891	0.862	1.024	1.16	1.377	1.6	1.717	1.349	1.101	0.94
2	0.908	0.896	0.89	0.846	1.022	1.105	1.389	1.664	1.687	1.411	1.113	0.941
3	1.014	0.906	0.86	0.907	1.022	1.126	1.445	1.616	1.592	1.471	1.115	0.926
4	0.976	0.887	0.86	0.875	1.036	1.128	1.437	1.672	1.652	1.465	1.11	
5	0.964	0.864	0.831	0.86	1.042	1.163	1.423	1.693	1.631	1.44	1.091	0.937
6	0.956	0.903	0.866	0.854	1.058	1.177	1.428	1.696	1.674	1.426	1.122	0.945
7	0.916	0.916	0.863	0.854	1.112	1.176	1.417	1.655	1.583	1.404	1.098	0.921
8	0.927	0.904	0.856	0.863	1.118	1.173	1.396	1.632	1.551	1.422	1.084	0.932
9	0.919	0.862	0.825	0.845	1.082	1.203	1.382	1.661	1.565	1.492	1.071	0.931
10	0.926	0.878	0.873	0.882	1.088	1.263	1.381	1.647	1.499	1.525	1.059	0.908
11	0.899	0.885	0.847	0.876	1.094	1.291	1.445	1.731	1.532	1.513	1.045	0.922
12	0.887	0.874	0.828	0.869	1.085	1.313	1.402	1.772	1.594	1.41	1.041	0.947
13	0.906	0.877	0.844	0.838	1.077	1.296	1.363	1.835	1.492	1.398	1.061	0.92
14	0.966	0.894	0.869	0.817	1.084	1.317	1.393	1.8	1.444	1.356	1.061	0.91
15	0.908	0.837	0.847	0.829	1.449	1.343	1.403	1.821	1.428	1.35	1.026	0.925
16	1.002	0.891	0.867	0.868	1.342	1.32	1.44	1.794	1.436	1.375	1.016	0.938
17	0.929	0.87	0.855	0.893	1.169	1.349	1.427	1.792	1.44	1.375	1.037	0.905
18	0.96	0.884	0.854	0.919	1.147	1.375	1.415	1.757	1.519	1.314	1.044	0.939
19	0.913	0.88	0.879	0.909	1.141	1.386	1.431	1.768	1.602	1.287	1.012	0.922
20	0.91	0.89	0.88	0.913	1.117	1.412	1.526	1.825	1.574	1.262	1.034	0.92
21	0.923	0.874	0.885	0.917	1.154	1.415	1.474	1.884	1.568	1.228	1.077	0.922
22	0.92	0.914	0.846	0.926	1.141	1.449	1.482	1.852	1.552	1.203	0.944	0.905
23	0.912	0.889	0.868	0.928	1.151	1.421	1.542	2.219	1.535	1.208	0.989	0.915
24	0.936	0.872	0.871	0.956	1.075	1.42	1.55	2.021	1.524	1.226	1.007	0.92
25	0.922	0.886	0.836	0.957	1.074	1.384	1.617	1.964	1.55	1.198	0.999	0.918
26	0.908	0.881	0.844	0.991	1.039	1.401	1.719	1.963	1.536	1.158	0.971	0.834
27	0.902	0.909	0.866	0.968	1.056	1.444	1.612	1.962	1.495	1.175	0.966	0.906
28	0.896	0.891	0.867	0.968	1.072	1.463	1.575	1.985	1.424	1.157	0.96	0.912
29	0.889		0.86	0.956	1.09	1.427	1.577	1.946	1.404	1.13	0.957	0.897
30	0.952		0.861	1.011	1.072	1.38	1.591	1.88	1.38	1.167	0.946	0.902
31	0.925		0.836		1.113		1.623	1.776		1.157		0.903
Average	0.9	0.9	0.9	0.9	1.1	1.3	1.5	1.8	1.5	1.3	1.0	0.9
Max	1.022	0.916	0.891	1.011	1.449	1.463	1.719	2.219	1.717	1.525	1.122	0.947
Min	0.887	0.837	0.825	0.817	1.022	1.105	1.363	1.6	1.38	1.13	0.944	0.834

Effluent NH3 Load

	2011											
NH3 N (lbs/day)	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
1												1.02
2						0.58						
3		0.52	0.22								1.76	
4												
5				3.87	1.81			2.65				
6	0.96									1.56		
7							2.62					
8									1.45			0.61
9						0.78						
10		0.43	0.28								0.89	
11								1.51				
12					1.64							
13	0.59									1.06		
14				0.63			1.14					
15									0.96			1.06
16						0.45						
17		0.59	1.16								1.02	
18								1.64				
19					0.86							
20	0.46									0.64		
21			0.59	0.53			1.65					
22									0.92			0.62
23						1.45					1.26	
24		0.59										
25								1.69				
26					0.72							
27	0.38									1.45		
28				0.40			2.15					
29									1.66			
30						0.48						0.97
31			1.94					2.82				
Average	0.60	0.54	0.84	1.36	1.26	0.75	1.89	2.06	1.25	1.18	1.23	0.86
Max	0.96	0.59	1.94	3.87	1.81	1.45	2.62	2.82	1.66	1.56	1.76	1.06
Min	0.38	0.43	0.22	0.40	0.72	0.45	1.14	1.51	0.92	0.64	0.89	0.61

Influent BOD Load

	2011															
BOD (lb/d)	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr
1				1563.62								2085.33				
2						1198.04					1596.58			2770.73		
3		1662.33	1470.34													
4																
5					1455.62			1613.17					1525.01			2028.12
6	1315.55									2619.40						
7				1727.17			1288.14									
8									1982.34			1381.63			1060.80	
9						1454.79								1758.75		
10		1684.18	1656.39								2002.67					
11								2046.38								
12					1959.09					1725.69			1996.59			1325.47
13	1171.19															
14				1430.89			1423.16									
15						1596.09			2486.11			2005.77			1707.90	
16		1467.61												1039.21		
17			1693.54								1816.20					
18								1644.84								
19					2878.57								1575.82			2072.59
20	1290.20									1826.10						
21			1549.99	1701.63			2092.91									
22									2155.12			1881.26			1491.80	
23						1668.05					2105.37			1758.41		
24		1436.31														
25								2657.62								
26					1236.97								1891.57			2794.23
27	1673.80									1763.91						
28				1473.34			3119.68									
29									2186.72					1911.59	1117.34	
30						2143.59						1581.64				
31			1516.46					2106.98								
Average	1362.68	1562.61	1577.34	1579.33	1882.56	1612.11	1980.97	2013.80	2202.57	1983.78	1880.20	1787.13	1747.25	1847.74	1344.46	2055.10
Max	1673.80	1684.18	1693.54	1727.17	2878.57	2143.59	3119.68	2657.62	2486.11	2619.40	2105.37	2085.33	1996.59	2770.73	1707.90	2794.23
Min	1171.19	1436.31	1470.34	1430.89	1236.97	1198.04	1288.14	1613.17	1982.34	1725.69	1596.58	1381.63	1525.01	1039.21	1060.80	1325.47

Influent BOD Load

	2012								2013							
BOD (lb/d)	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug
1																
2				2912.71									2371.52		1710.24	
3	1766.41								617.46							
4						1558.37						1288.32				
5			1423.54													
6					1914.51			1463.64						1585.02		
7										1178.34	1012.37					
8		1733.89					1391.27									1834.47
9				1595.88									1642.73			
10	2024.39								1713.86						1642.81	
11			1789.28			1107.19						1521.85				
12																
13					2042.77			1664.50						1728.88		
14		1804.98								1671.20	651.35					
15							1288.78									
16				1931.72									1083.36			
17	1352.16								1358.74			1575.25				
18						393.01									1040.96	
19			1666.20													
20					1914.54			1415.32						1369.09		
21		1497.55					1744.83			999.90	2077.49					
22																1777.67
23				2175.76									1286.55			
24	1667.39								1522.13							
25						1671.02						1169.53				
26			2990.32													
27		1615.67			2395.51			2107.25						1516.59		
28										1406.10	1832.68					
29							1417.93									
30				1580.49									1697.86			
31	1444.09					1536.56			2329.11							
Average	1650.89	1663.02	1967.33	2039.31	2066.83	1253.23	1460.70	1662.68	1508.26	1313.89	1393.47	1388.74	1616.40	1549.90	1464.67	1806.07
Max	2024.39	1804.98	2990.32	2912.71	2395.51	1671.02	1744.83	2107.25	2329.11	1671.20	2077.49	1575.25	2371.52	1728.88	1710.24	1834.47
Min	1352.16	1497.55	1423.54	1580.49	1914.51	393.01	1288.78	1415.32	617.46	999.90	651.35	1169.53	1083.36	1369.09	1040.96	1777.67

Influent BOD Load

					2014											
BOD (lb/d)	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
1																
2					1367.76											
3		916.36									1317.51					
4				1489.19												742.78
5	1352.58									2065.90						
6															896.76	
7			1613.37													
8									2217.46							
9														1224.15		
10								1809.34								
11													1125.90			
12																
13						2255.03	1753.03					1791.31				
14								1947.56								
15																
16					968.27											
17		901.35									1545.11					
18																
19	1388.11			1005.80						1585.18					1548.73	
20																
21			1362.34													
22									1490.78							
23														3099.31		
24								1382.98								
25													772.20			
26																
27						1657.87	1142.58									
28												674.12				
29																
30					1644.56											
31		1860.74									2270.19					
Average	1370.35	1226.15	1487.86	1247.50	1326.87	1956.45	1447.80	1713.29	1854.12	1825.54	1710.94	1232.71	949.05	2161.73	1222.74	742.78
Max	1388.11	1860.74	1613.37	1489.19	1644.56	2255.03	1753.03	1947.56	2217.46	2065.90	2270.19	1791.31	1125.90	3099.31	1548.73	742.78
Min	1352.58	901.35	1362.34	1005.80	968.27	1657.87	1142.58	1382.98	1490.78	1585.18	1317.51	674.12	772.20	1224.15	896.76	742.78

Influent BOD Load

	2015											
BOD (lb/d)	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
1												
2							1003.97					
3									1376.93			
4						1523.72						
5												
6								1092.87				
7					2314.14							
8												
9				1915.53								
10												
11												
12		892.96	1418.34								1895.57	
13												
14	1100.40											1918.72
15										1491.59		
16							1554.08					
17									1334.19			
18						1673.75						
19								1534.41				
20					1520.47							
21												
22												
23				1643.65								
24												
25											1517.83	
26		1263.61	1463.17									
27												
28												
29	1190.79									1875.14		
30							1651.90					1326.36
31												
Average	1145.59	1078.29	1440.76	1779.59	1917.30	1598.74	1403.32	1313.64	1355.56	1683.36	1706.70	1622.54
Max	1190.79	1263.61	1463.17	1915.53	2314.14	1673.75	1651.90	1534.41	1376.93	1875.14	1895.57	1918.72
Min	1100.40	892.96	1418.34	1643.65	1520.47	1523.72	1003.97	1092.87	1334.19	1491.59	1517.83	1326.36

Influent Flow

	2011												2012							
flow (MG)	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug
1	1.022	0.886	0.891	0.862	1.024	1.16	1.377	1.6	1.717	1.349	1.101	0.94	0.928	0.852	0.875	0.869	1.023	1.275	1.635	1.805
2	0.908	0.896	0.89	0.846	1.022	1.105	1.389	1.664	1.687	1.411	1.113	0.941	0.842	0.829	0.845	0.801	1.063	1.254	1.621	1.835
3	1.014	0.906	0.86	0.907	1.022	1.126	1.445	1.616	1.592	1.471	1.115	0.926	0.945	0.827	0.828	0.794	1.067	1.227	1.594	1.905
4	0.976	0.887	0.86	0.875	1.036	1.128	1.437	1.672	1.652	1.465	1.11		0.891	0.831	0.84	0.79	1.118	1.257	1.571	1.977
5	0.964	0.864	0.831	0.86	1.042	1.163	1.423	1.693	1.631	1.44	1.091	0.937	0.877	0.851	0.849	0.772	1.114	1.451	1.524	1.955
6	0.956	0.903	0.866	0.854	1.058	1.177	1.428	1.696	1.674	1.426	1.122	0.945	0.877	0.857	0.89	0.78	1.117	1.354	1.58	1.949
7	0.916	0.916	0.863	0.854	1.112	1.176	1.417	1.655	1.583	1.404	1.098	0.921	0.861	0.855	0.895	0.797	1.209	1.33	1.6	1.919
8	0.927	0.904	0.856	0.863	1.118	1.173	1.396	1.632	1.551	1.422	1.084	0.932	0.885	0.861	0.731	0.805	1.203	1.35	1.645	1.912
9	0.919	0.862	0.825	0.845	1.082	1.203	1.382	1.661	1.565	1.492	1.071	0.931	0.884	0.841	0.823	0.801	1.275	1.366	1.654	1.876
10	0.926	0.878	0.873	0.882	1.088	1.263	1.381	1.647	1.499	1.525	1.059	0.908	0.896	0.856	0.819	0.825	1.286	1.398	1.658	1.85
11	0.899	0.885	0.847	0.876	1.094	1.291	1.445	1.731	1.532	1.513	1.045	0.922	0.872	0.875	0.831	0.722	1.227	1.487	1.644	1.873
12	0.887	0.874	0.828	0.869	1.085	1.313	1.402	1.772	1.594	1.41	1.041	0.947	0.919	0.823	0.845	0.765	1.224	1.464	1.634	1.821
13	0.906	0.877	0.844	0.838	1.077	1.296	1.363	1.835	1.492	1.398	1.061	0.92	1.174	0.862	0.834	0.777	1.228	1.513	1.657	1.91
14	0.966	0.894	0.869	0.817	1.084	1.317	1.393	1.8	1.444	1.356	1.061	0.91	0.871	0.846	0.855	0.773	1.251	1.574	1.703	1.915
15	0.908	0.837	0.847	0.829	1.449	1.343	1.403	1.821	1.428	1.35	1.026	0.925	0.896	0.83	0.835	0.804	1.273	1.628	1.695	1.885
16	1.002	0.891	0.867	0.868	1.342	1.32	1.44	1.794	1.436	1.375	1.016	0.938	0.874	0.852	0.821	0.815	1.257	1.633	1.725	1.831
17	0.929	0.87	0.855	0.893	1.169	1.349	1.427	1.792	1.44	1.375	1.037	0.905	0.887	0.841	0.851	0.81	1.24	1.635	1.786	1.848
18	0.96	0.884	0.854	0.919	1.147	1.375	1.415	1.757	1.519	1.314	1.044	0.939	0.861	0.828	0.858	0.838	1.226	1.711	1.791	1.871
19	0.913	0.88	0.879	0.909	1.141	1.386	1.431	1.768	1.602	1.287	1.012	0.922	0.854	0.861	0.803	0.846	1.159	1.726	1.768	1.849
20	0.91	0.89	0.88	0.913	1.117	1.412	1.526	1.825	1.574	1.262	1.034	0.92	0.843	0.846	0.83	0.851	1.213	1.664	1.758	1.881
21	0.923	0.874	0.885	0.917	1.154	1.415	1.474	1.884	1.568	1.228	1.077	0.922	0.841	0.874	0.809	0.875	1.212	1.69	1.758	1.955
22	0.92	0.914	0.846	0.926	1.141	1.449	1.482	1.852	1.552	1.203	0.944	0.905	0.886	0.839	0.831	0.909	1.214	1.748	1.765	1.907
23	0.912	0.889	0.868	0.928	1.151	1.421	1.542	2.219	1.535	1.208	0.989	0.915	0.864	0.84	0.826	0.931	1.211	1.664	1.767	2.165
24	0.936	0.872	0.871	0.956	1.075	1.42	1.55	2.021	1.524	1.226	1.007	0.92	0.881	0.846	0.82	0.93	1.183	1.634	1.764	2.111
25	0.922	0.886	0.836	0.957	1.074	1.384	1.617	1.964	1.55	1.198	0.999	0.918	0.874	0.823	0.811	0.928	1.185	1.624	1.78	2.013
26	0.908	0.881	0.844	0.991	1.039	1.401	1.719	1.963	1.536	1.158	0.971	0.834	0.958	0.857	0.825	0.96	1.178	1.592	1.795	2.119
27	0.902	0.909	0.866	0.968	1.056	1.444	1.612	1.962	1.495	1.175	0.966	0.906	0.896	0.873	0.814	0.967	1.221	1.575	1.823	2.261
28	0.896	0.891	0.867	0.968	1.072	1.463	1.575	1.985	1.424	1.157	0.96	0.912	0.834	0.853	0.823	0.953	1.274	1.618	1.825	2.309
29	0.889		0.86	0.956	1.09	1.427	1.577	1.946	1.404	1.13	0.957	0.897	0.862	0.835	0.827	1.005	1.291	1.545	1.821	2.226
30	0.952		0.861	1.011	1.072	1.38	1.591	1.88	1.38	1.167	0.946	0.902	0.9		0.815	1.045	1.291	1.573	1.802	2.094
31	0.925		0.836		1.113		1.623	1.776		1.157		0.903	0.866		0.854		1.257		1.83	2.011
Average	0.932	0.886	0.859	0.899	1.108	1.309	1.474	1.803	1.539	1.324	1.039	0.919	0.890	0.847	0.833	0.851	1.203	1.519	1.709	1.963
Total	28.893	24.8	26.625	26.957	34.346	39.28	45.682	55.883	46.18	41.052	31.157	27.563	27.599	24.564	25.813	25.538	37.29	45.56	52.973	60.838
Max	1.022	0.916	0.891	1.011	1.449	1.463	1.719	2.219	1.717	1.525	1.122	0.947	1.174	0.875	0.895	1.045	1.291	1.748	1.83	2.309
Min	0.887	0.837	0.825	0.817	1.022	1.105	1.363	1.6	1.38	1.13	0.944	0.834	0.834	0.823	0.731	0.722	1.023	1.227	1.524	1.805
Avg Annual Flow Limit	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23
Max Month Flow Limit	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
Max Day Flow Limit	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16

Influent Flow

					2013															
flow (MG)	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr
1	2.009	1.653	1.146	0.946	0.931	0.866	0.778	0.758	0.846	1	1.87	1.62	1.8	1.52	1.07	0.95	0.91	0.82	0.8	0.77
2	1.98	1.624	1.127	1.06	0.867	0.843	0.789	0.785	0.852	1.04	1.89	1.62	1.74	1.52	1.07	0.97	0.82	0.85	0.84	0.75
3	1.998	1.551	1.095	0.987	0.892	0.869	0.808	0.77	0.874	1.09	1.85	1.62	1.69	1.5	1.11	0.96	0.87	0.86	0.86	0.75
4	2.068	1.513	1.145	1.024	0.886	0.893	0.82	0.857	0.935	1.05	1.81	1.65	1.63	1.48	1.09	0.96	0.87	0.86	0.86	0.76
5	2.034	1.533	1.119	0.947	0.875	0.858	0.816	0.786	0.934	1.03	1.8	1.75	1.59	1.45	1.08	0.94	0.85	0.85	0.82	0.76
6	2.027	1.485	1.083	0.941	0.898	0.853	0.814	0.771	0.967	1.05	1.78	1.84	1.63	1.46	1.08	0.94	0.88	0.85	0.9	0.77
7	1.993	1.499	1.083	0.926	0.893	0.841	0.83	0.824	0.97	1.07	1.72	1.87	1.58	1.51	1.06	0.94	0.86	0.85	0.82	0.81
8	1.953	1.513	1.085	0.903	0.872	0.851	0.779	0.814	0.964	1.03	1.72	1.88	1.56	1.44	1.05	0.94	0.86	0.83	0.81	0.78
9	1.97	1.465	1.071	0.919	0.879	0.815	0.767	0.878	0.962	1.05	1.7	1.88	1.59	1.44	1.05	0.98	0.86	0.85	0.82	0.77
10	2.006	1.438	1.039	0.916	0.868	0.837	0.776	0.767	0.959	1.09	1.68	1.88	1.56	1.45	1.05	0.95	0.84	0.87	0.83	0.77
11	1.865	1.443	1.061	0.915	0.868	0.855	0.794	0.784	0.949	1.09	1.64	1.88	1.54	1.41	1.02	0.95	0.85	0.84	0.83	0.77
12	1.785	1.417	1.037	0.913	0.866	0.838	0.793	0.785	0.961	1.13	1.65	1.95	1.52	1.41	1.04	0.95	0.86	0.84	0.83	0.75
13	1.801	1.46	1.082	0.898	0.89	0.827	0.774	0.765	0.989	1.2	1.64	1.99	1.53	1.41	1.02	0.93	0.89	0.97	0.81	0.77
14	1.797	1.476	1.039	0.894	0.885	0.808	0.781	0.798	0.962	1.28	1.67	2.02	1.52	1.41	1.01	0.91	0.86	0.91	0.81	0.84
15	1.764	1.506	1.01	0.884	0.863	0.801	0.773	0.812	0.958	1.36	1.69	2.02	1.52	1.37	1.01	0.91	0.86	0.84	0.78	0.84
16	1.747	1.53	0.997	0.919	0.868	0.795	0.764	0.81	0.964	1.39	1.69	2.02	1.52	1.34	1	0.95	0.86	0.92	0.81	0.83
17	1.788	1.424	0.977	1.063	0.862	0.819	0.791	0.823	0.975	1.44	1.63	2.04	1.49	1.31	1.01	0.93	0.86	0.86	0.83	0.83
18	1.777	1.309	1.005	0.94	0.878	0.805	0.803	0.8	0.955	1.5	1.59	2.01	1.49	1.29	1.02	0.92	0.86	0.88	0.8	0.85
19	1.797	1.287	0.984	0.922	0.86	0.84	0.78	0.817	0.987	1.5	1.58	2	1.46	1.26	0.99	0.9	0.86	0.84	0.8	0.83
20	1.783	1.26	0.957	0.892	0.88	0.814	0.798	0.794	1.037	1.52	1.58	2.01	1.44	1.26	0.99	0.9	0.84	0.84	0.8	0.87
21	1.747	1.259	0.963	0.878	0.84	0.806	0.773	0.855	1.013	1.56	1.58	1.96	1.42	1.26	0.99	0.87	0.87	0.83	0.79	0.89
22	1.708	1.273	0.957	0.871	0.858	0.798	0.784	0.858	1.501	1.64	1.65	1.96	1.42	1.23	0.99	0.89	0.83	0.81	0.79	1.06
23	1.748	1.29	0.942	0.884	0.867	0.797	0.777	0.858	1.126	1.65	1.66	2.08	1.49	1.19	0.99	0.89	0.83	0.85	0.79	0.9
24	1.744	1.222	0.795	0.906	0.843	0.809	0.792	0.856	1.1	1.64	1.62	2.17	1.49	1.16	0.99	0.89	0.83	0.85	0.82	0.9
25	1.705	1.233	0.973	0.901	0.846	0.83	0.796	0.859	1.07	1.61	1.58	2.2	1.49	1.14	0.99	0.91	0.83	0.83	0.79	0.94
26	1.645	1.177	0.985	0.826	0.833	0.813	0.792	0.857	1.05	1.66	1.58	2.25	1.48	1.11	0.97	0.85	0.85	0.81	0.79	0.91
27	1.632	1.157	0.86	0.904	0.847	0.798	0.78	0.86	1.05	1.62	1.6	2.16	1.46	1.11	0.96	0.91	0.86	0.83	0.8	0.96
28	1.638	1.272	0.989	0.882	0.855	0.786	0.767	0.864	1.1	1.65	1.6	2.14	1.46	1.17	0.98	0.88	0.85	0.81	0.8	0.99
29	1.624	1.196	0.966	0.878	0.888		0.775	0.895	1.04	1.67	1.66	2.09	1.52	1.11	0.96	0.9	0.87		0.78	0.99
30	1.651	1.157	0.97	0.896	0.875		0.773	0.845	1.04	1.85	1.66	2.01	1.56	1.11		0.88	0.84		0.82	1.02
31		1.12		0.89	0.856		0.806		1.04		1.62	1.86		1.11		0.88	0.82		0.82	
Average	1.826	1.379	1.018	0.920	0.871	0.827	0.788	0.820	1.004	1.349	1.677	1.949	1.540	1.321	1.022	0.920	0.855	0.852	0.815	0.848
Total	54.784	42.742	30.542	28.525	26.989	23.165	24.443	24.605	31.13	40.46	51.99	60.43	46.19	40.94	29.64	28.53	26.5	23.85	25.25	25.43
Max	2.068	1.653	1.146	1.063	0.931	0.893	0.83	0.895	1.501	1.85	1.89	2.25	1.8	1.52	1.11	0.98	0.91	0.97	0.9	1.06
Min	1.624	1.12	0.795	0.826	0.833	0.786	0.764	0.758	0.846	1	1.58	1.62	1.42	1.11	0.96	0.85	0.82	0.81	0.78	0.75
Avg Annual Flow Limit	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23
Max Month Flow Limit	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
Max Day Flow Limit	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16

Influent Flow

	2014								2015											
flow (MG)	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
1	1.04	1.33	1.79	2.08	2.45	1.85	1.18	0.99	0.9	0.88	0.88	0.81	1.11	1.26	1.03	1.16	1.26	1.7	1.3	1.19
2	1.04	1.39	1.8	2.02	2.45	1.83	1.21	0.98	0.84	0.88	0.89	0.83		1.24	1.04	1.14	1.27	1.68	1.3	1.19
3	1.04	1.39	1.78	2.01	2.4	1.78	1.22	0.97	0.84	0.88	0.87	0.83	1.11	1.21		1.16	1.3	1.59	1.27	1.2
4	1.09	1.38	1.8	2.06	2.24	1.72	1.2	0.95	0.87	0.88	0.87	0.84	1.14	1.2		1.18	1.31	1.56	1.25	1.22
5	1.12	1.38	1.83	2.07	2.19	1.74	1.15	0.97	0.87	0.89	0.87	0.84	1.11			1.18		1.55	1.25	
6	1.12	1.36	1.8	2.07	2.16	1.78	1.15	0.97	0.84	0.86	0.86	0.88	1.11	1.23		1.17		1.51	1.25	
7	1.12	1.39	1.85	2.05	2.16	1.71	1.15	0.95	0.87	0.86		0.86	1.1	1.25			1.4	1.49	1.22	1.31
8	1.17	1.47	1.87	2.03	2.16	1.67	1.13	0.98	0.87	0.88		0.87	1.08	1.3		1.13	1.47	1.46	1.26	1.45
9	1.19	1.54	1.9	2.03	2.01	1.64	1.13	0.95	0.91	0.88	0.88	0.87	1.08	1.27	1.19	1.13	1.49	1.44	1.26	1.23
10	1.18	1.58	1.97	2.07	2.01	1.61	1.13	0.94	0.88	0.88	0.87	0.87	1.06	1.26		1.16	1.49	1.41	1.22	1.31
11	1.19	1.56	1.89	2.19	2	1.55	1.09	0.95	0.9	0.87	0.87	0.88	1.06	1.26		1.21		1.41	1.19	
12	1.24	1.56	1.89	2.19	1.97	1.57	1.1	0.97	0.9	0.86	0.86	0.95	1.09	1.24		1.19		1.45	1.22	
13	1.22	1.58	1.83	2.22	1.9	1.57	1.11	0.92	0.89	0.84	0.86	0.99	1.26		1.27	1.19		1.41	1.2	1.23
14	1.23	1.59	1.83	2.13	1.9	1.55	1.11	0.94	0.89	0.85		0.98	1.27		1.27	1.19			1.18	1.25
15	1.26	1.65	1.79	2.19	1.9	1.52	1.08		0.89	0.87		1.01		1.31	1.21			1.38	1.19	1.19
16	1.27	1.65	1.76	2.24	1.82	1.5	1.05		0.89	0.85	0.9	1		1.28	1.21			1.36	1.19	1.17
17	1.24	1.62	1.79	2.3	1.79	1.51	1.08		0.87	0.88	0.87	1.02		1.23		1.16	1.62		1.19	1.17
18	1.25	1.62	1.84	2.36	1.79	1.42	1.08		1.06	0.86	0.87	1.03	1.24	1.22		1.2		1.32	1.19	1.19
19	1.3	1.66	1.81	2.4	1.78	1.45	1.07		0.89	0.86	0.87	1.05	1.31	1.21		1.17		1.34	1.22	
20	1.25	1.67	1.81	2.72	1.73	1.46	1.05		0.91	0.86	0.86	1.07	1.18	1.16	1.06	1.18		1.31		
21	1.25	1.68	1.85	2.52	1.77	1.41	1.03		0.87	0.85		1.05	1.12	1.14	1.06	1.15		1.23		1.17
22	1.25	1.68	1.87	2.42	1.83	1.4	1.05		0.86	0.86		1.04	1.19	1.15	1.04	1.16		1.27	1.19	1.19
23	1.22	1.7	1.87	2.46	1.78	1.36	1.05		0.86	0.88	0.89	1.04	1.23	1.13	1.09	1.18		1.25	1.17	1.17
24	1.2	1.7	1.82	2.5	1.77	1.36	1.05		0.86	0.85	0.89	1.1		1.1	1.12	1.2		1.34	1.17	1.17
25	1.22	1.7	1.85	2.55	1.88	1.33	1.02		0.88	0.85	0.89	1.09	1.23	1.08		1.21		1.4	1.17	1.19
26	1.22	1.68	1.91	2.62	1.88	1.33	1		0.87	0.85	0.86	1.02	1.27			1.51				1.12
27	1.26	1.71	1.91	2.67	1.82	1.33	1.02		0.89	0.86	0.86	1.1	1.27	1.13	1.14	1		1.39		1.17
28	1.24	1.74	1.97	2.74	1.88	1.28	0.97		0.87	0.89	0.83	1.1	1.24	1.11	1.14	1.24		1.35		
29	1.26	1.77	2.02	2.76	1.92	1.28	0.95		0.88		0.88	1.1	1.23	1.09	1.16	1.22	1.67	1.33		1.17
30	1.26	1.77	2.05	2.62	1.89	1.23	0.99				0.87	1.11	1.21	1.05	1.16	1.27	1.77	1.32	1.23	1.16
31	1.28		2.07	2.52		1.23					0.82				1.16	1.29		1.27		1.17
Average	1.201	1.583	1.865	2.316	1.974	1.515	1.087	0.959	0.883	0.866	0.870	0.974	1.172	1.197	1.138	1.190	1.459	1.411	1.220	1.208
Total	37.22	47.5	57.82	71.81	59.23	46.97	32.6	13.43	25.62	24.26	21.74	29.23	29.3	31.11	19.35	33.33	16.05	39.52	29.28	28.98
Max	1.3	1.77	2.07	2.76	2.45	1.85	1.22	0.99	1.06	0.89	0.9	1.11	1.31	1.31	1.27	1.51	1.77	1.7	1.3	1.45
Min	1.04	1.33	1.76	2.01	1.73	1.23	0.95	0.92	0.84	0.84	0.82	0.81	1.06	1.05	1.03	1	1.26	1.23	1.17	1.12
Avg Annual Flow Limit	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23	1.23
Max Month Flow Limit	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67	1.67
Max Day Flow Limit	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16	2.16

Influent TSS Load

	2011															
TSS (lb/day)	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr
1				1461.78												
2						2067.29						2215.57		1561.38		
3		1384.71	1420.64								1646.38					
4								1165.36								
5					1661.12			2285.60					1218.73			2024.98
6	2118.23									3089.39						
7				1402.89			1850.46									
8									2621.21			1348.59			944.62	
9						2713.23								1649.06		
10		1065.53	1602.49								1867.68					
11								3230.30								
12					3025.40								1552.54			1107.81
13	1118.88									2193.41						
14				1558.65			1416.24									
15									2062.51			2000.45			1041.94	
16						2049.41								1178.15		
17		1357.87	1687.10								2334.09					
18								2387.28								
19					1917.83								1327.97			1171.85
20	1285.40									2246.70						
21			1488.91	1808.80			2996.05									
22									3057.45			2309.60			1097.80	
23						2405.08					2353.18			1472.17		
24		1341.57														
25								2077.58								
26					1214.45								2051.91			1710.12
27	1510.62									1664.66						
28				1601.17			3016.41									
29									2164.46					1587.11	2125.05	
30						1819.09						1681.79				
31			1417.69					2078.40								
Average	1508.28	1287.42	1523.36	1566.66	1954.70	2210.82	2319.79	2204.09	2476.41	2298.54	2050.33	1911.20	1537.79	1489.57	1302.35	1503.69
Max	2118.23	1384.71	1687.10	1808.80	3025.40	2713.23	3016.41	3230.30	3057.45	3089.39	2353.18	2309.60	2051.91	1649.06	2125.05	2024.98
Min	1118.88	1065.53	1417.69	1402.89	1214.45	1819.09	1416.24	1165.36	2062.51	1664.66	1646.38	1348.59	1218.73	1178.15	944.62	1107.81
Max Month Capacity	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634

Influent TSS Load

	2012								2013							
TSS (lb/day)	may	jun	jul	aug	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug
1																
2				1734.78									1500.61			
3	2074.40								1095.82						1330.75	
4						1265.89						1231.13				
5			1866.69													
6					1949.07			1181.75						884.40		
7										823.11	678.91					
8		2106.46					907.99									1592.52
9				1426.53									1348.85			
10	2331.55								1641.04						2177.71	
11						2913.38						1254.52				
12			1456.28													
13					1971.04			1323.71						1561.48		
14		2406.65								1551.52	1591.34					
15							1293.24									
16				1651.59									960.94			
17	988.68								565.73			1344.16				
18						2620.09									1035.98	
19			1962.21													
20					1818.43			1153.57						804.88		
21		1543.60					1402.45			720.73	936.50					
22																1659.66
23				3913.89									1078.61			
24	2188.49								1698.94							
25						1109.73						924.92				
26			2048.44													
27					3768.20			2125.61						1159.43		
28		1831.34								1363.69	1038.25					
29							1144.86									
30				1510.53									1546.31			
31	1534.65					999.37			2508.18							
Average	1823.55	1972.01	1833.40	2047.46	2376.68	1781.69	1187.14	1446.16	1501.94	1114.76	1061.25	1188.68	1287.06	1102.55	1514.82	1626.09
Max	2331.55	2406.65	2048.44	3913.89	3768.20	2913.38	1402.45	2125.61	2508.18	1551.52	1591.34	1344.16	1546.31	1561.48	2177.71	1659.66
Min	988.68	1543.60	1456.28	1426.53	1818.43	999.37	907.99	1153.57	565.73	720.73	678.91	924.92	960.94	804.88	1035.98	1592.52
Max Month Capacity	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634

Influent TSS Load

					2014											
TSS (lb/day)	sep	oct	nov	dec	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
1																
2					1033.68											
3		1887.63									2113.49					
4				1142.39												1125.57
5	1492.23									1565.07						
6															2987.05	
7			648.30													
8									1252.04							
9														983.08		
10								1151.69								
11													1205.70			
12																
13						1110.90	1317.67					998.16				
14																
15																
16					378.84											
17		1083.75									1490.03					
18																
19	1143.71			1120.54						1492.69					742.28	
20																
21			1021.71													
22									1394.90							
23														1558.09		
24								1495.58			525.42					
25													713.03			
26																
27						1349.83	710.58									
28												1092.90				
29																
30					1447.21											
31		1947.46									3817.86					
Average	1317.97	1639.61	835.00	1131.46	953.24	1230.37	1014.13	1323.64	1323.47	1528.88	1986.70	1045.53	959.36	1270.58	1864.67	1125.57
Max	1492.23	1947.46	1021.71	1142.39	1447.21	1349.83	1317.67	1495.58	1394.90	1565.07	3817.86	1092.90	1205.70	1558.09	2987.05	1125.57
Min	1143.71	1083.75	648.30	1120.54	378.84	1110.90	710.58	1151.69	1252.04	1492.69	525.42	998.16	713.03	983.08	742.28	1125.57
Max Month Capacity	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634	2634

Influent TSS Load

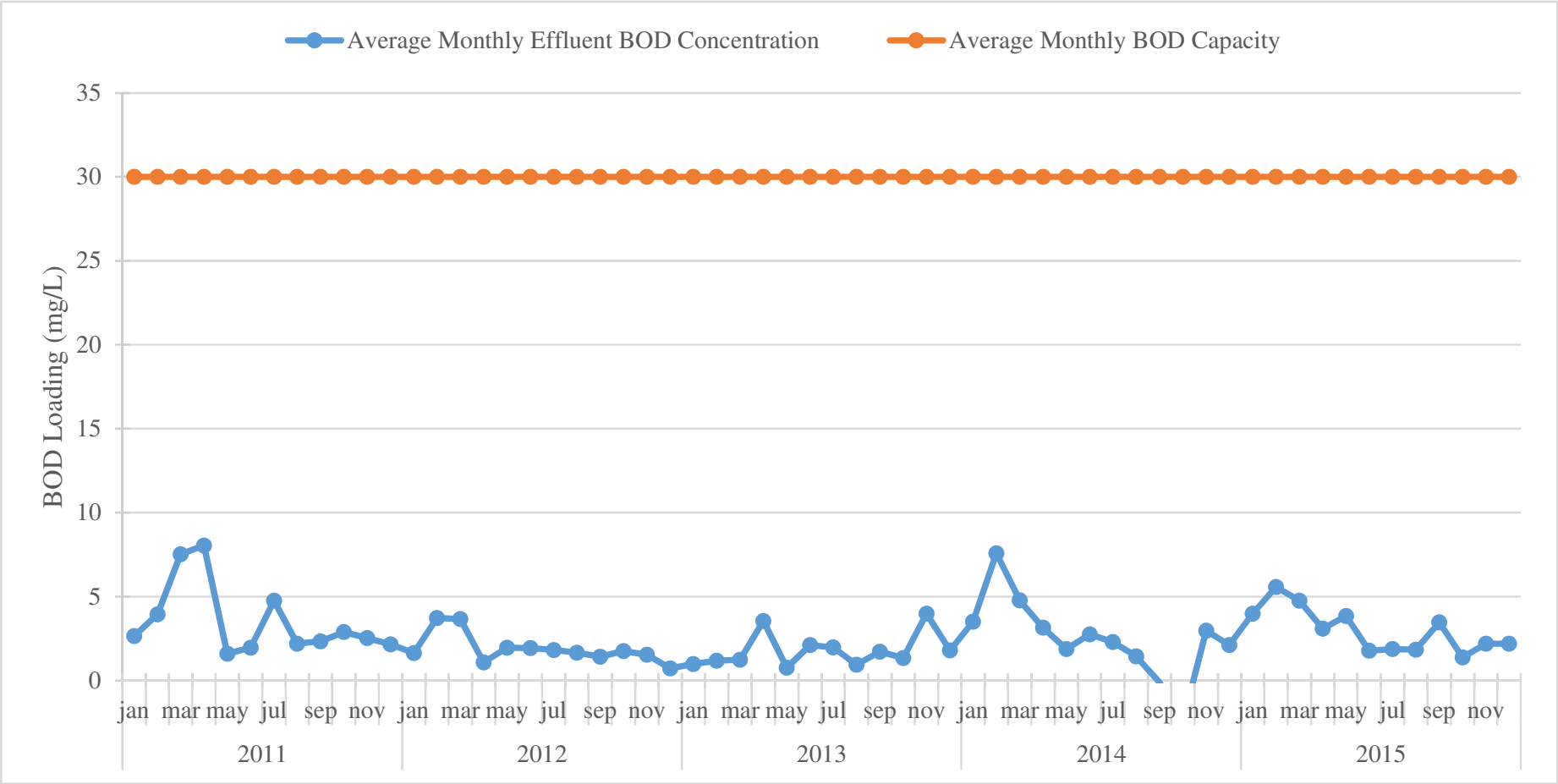
	2015											
TSS (lb/day)	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
1												
2							1073.71					
3									1424.32			
4						1370.21						
5			716.51									
6								2221.57				
7					3023.45							
8												
9				1622.80								
10												
11												
12		1998.54	1165.19								1198.22	
13												
14												1601.25
15	696.92									1470.62		
16							1283.05					
17									1463.67			
18						1960.77						
19								1393.97				
20					1401.20							
21												
22												
23				1206.09								
24												
25											1197.83	
26		472.60	739.65									
27												
28												
29	559.36									1512.78		
30							1270.21					1028.91
31												
Average	628.14	1235.57	873.78	1414.44	2212.32	1665.49	1208.99	1807.77	1444.00	1491.70	1198.02	1315.08
Max	696.92	1998.54	1165.19	1622.80	3023.45	1960.77	1283.05	2221.57	1463.67	1512.78	1198.22	1601.25
Min	559.36	472.60	716.51	1206.09	1401.20	1370.21	1073.71	1393.97	1424.32	1470.62	1197.83	1028.91
Max Month Capacity	2635	2636	2637	2638	2639	2640	2641	2642	2643	2644	2645	2646

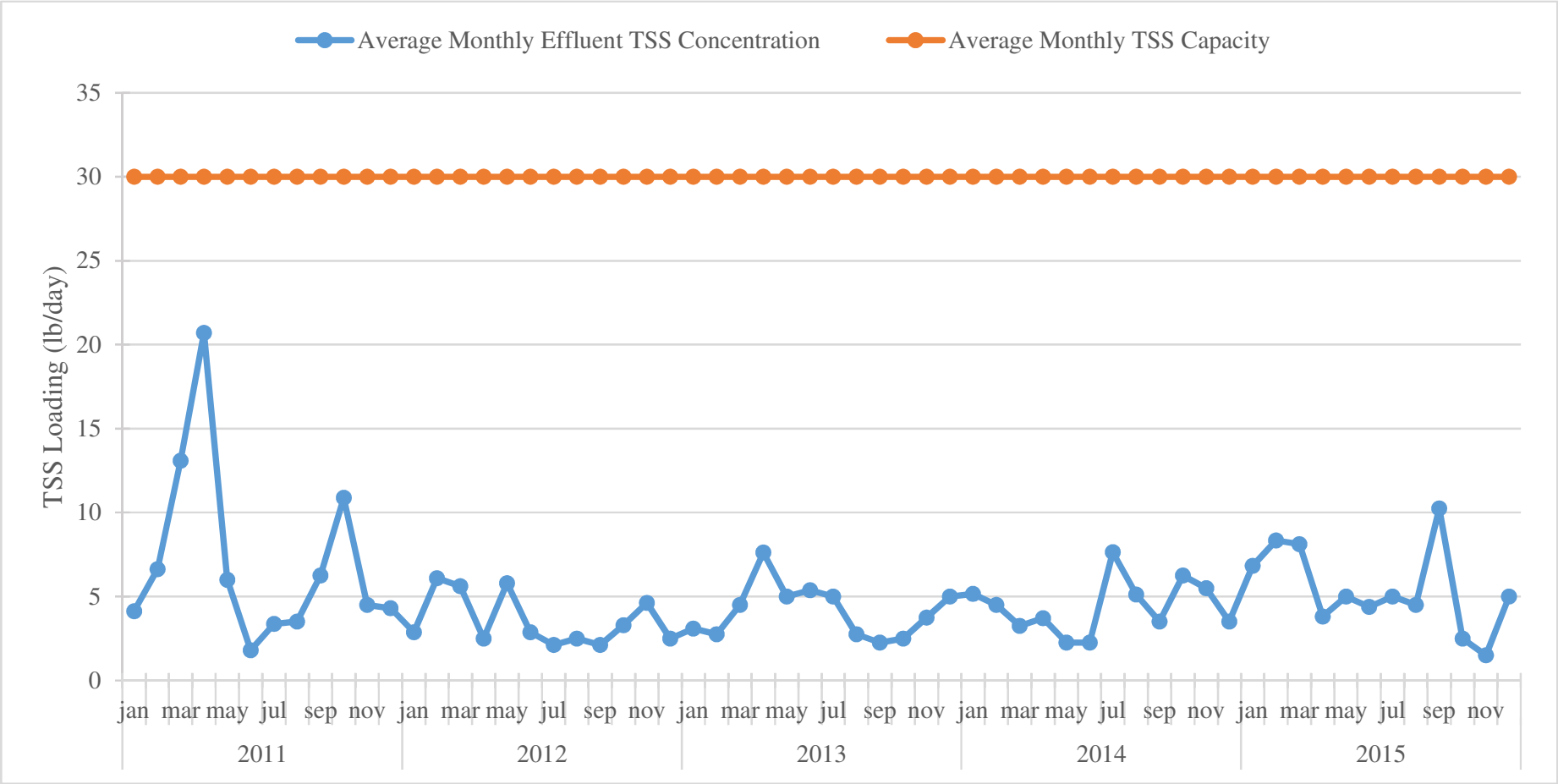
TSS Discharged

	2011											
TSS discharged (lbs)	jan	feb	mar	apr	may	jun	jul	aug	sep	oct	nov	dec
1				251.6178								
2						19.3488						50.9574
3		22.41792	118.7616								51.05331	
4								53.90976				
5					60.48168			34.8612				
6	16.07952									360.288		
7				106.8354			53.59284					
8									79.21332			38.4057
9						24.45705						
10		39.53994	41.283								44.6607	
11								75.54789				
12					91.2396							
13	14.79516									58.797		
14				185.20638			22.73484					
15									60.2148			22.7682
16						11.20062						
17		22.29282	28.92312								16.94688	
18								44.83584				
19					47.8299							
20	22.84326									21.46716		
21			33.0264	182.74608			57.27078					
22									58.84704			30.75792
23						30.21165					43.30128	
24		111.2139										
25								58.99299				
26					17.91432							
27	71.94084									62.77518		
28				24.21936			33.6102					
29									112.82352			
30						11.90118						22.44294
31			251.3259					39.198				
Average	31.4	48.9	94.7	150.1	54.4	19.4	41.8	51.2	77.8	125.8	39.0	33.1
Max	71.94084	111.2139	251.3259	251.6178	91.2396	30.21165	57.27078	75.54789	112.82352	360.288	51.05331	50.9574
Min	14.79516	22.29282	28.92312	24.21936	17.91432	11.20062	22.73484	34.8612	58.84704	21.46716	16.94688	22.44294

APPENDIX F

WWTF EFFLUENT FIGURES


Average Monthly Effluent BOD Concentration
Average Monthly BOD Capacity
BOD Loading (mg/L)
35
30
25
20
15
10
5
0
jan mar may jul sep nov jan mar may jul sep nov jan mar may jul sep nov jan mar may jul sep nov jan mar may jul sep nov
2011
2012
2013
2014
2015


Average Monthly Effluent TSS Concentration
Average Monthly TSS Capacity
TSS Loading (lb/day)
35
30
25
20
15
10
5
0
jan mar may jul sep nov jan mar may jul sep nov jan mar may jul sep nov jan mar may jul sep nov jan mar may jul sep nov
2011
2012
2013
2014
2015

APPENDIX G

WINTER WATER CONSUMPTION RECORDS

	Consumption (cubic feet)												
year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2009	2,923,054	2,531,762	2,330,826	3,737,585	4,933,297	8,645,978	10,099,404	10,032,758	8,231,944	6,795,830	2,800,341	2,697,628	65,760,407
2010	3,232,295	2,672,189	2,652,719	3,882,303	5,117,022	5,885,007	8,668,228	9,785,127	9,776,193	4,341,524	2,613,461	3,042,716	61,668,784
2011	2,188,308	2,948,986	2,134,387	3,568,214	4,791,821	6,023,241	9,358,217	8,910,876	10,182,665	13,009,848	3,743,881	3,473,271	70,333,715
2012	2,792,352	403,293,022	203,829,154	3,076,854	5,170,928	7,925,804	8,375,051	11,372,890	8,171,409	6,435,261	3,511,171	3,334,133	667,287,929
2013	2,525,427	3,189,945	2,465,112	3,301,376	6,992,894	6,661,604	8,014,218	10,978,471	7,136,374	5,268,021	4,073,793	2,529,799	63,137,034
2014	3,357,972	2,571,512	2,417,038	3,613,699	5,590,952	7,596,025	8,960,401	10,204,014	7,554,340	6,019,279	2,896,404	2,561,449	63,343,085
2015	2,716,855	2,431,983	2,367,277	3,795,568	5,758,844	9,562,039	9,249,999	8,565,533	8,072,083	5,314,482	3,915,333	2,563,822	64,313,818

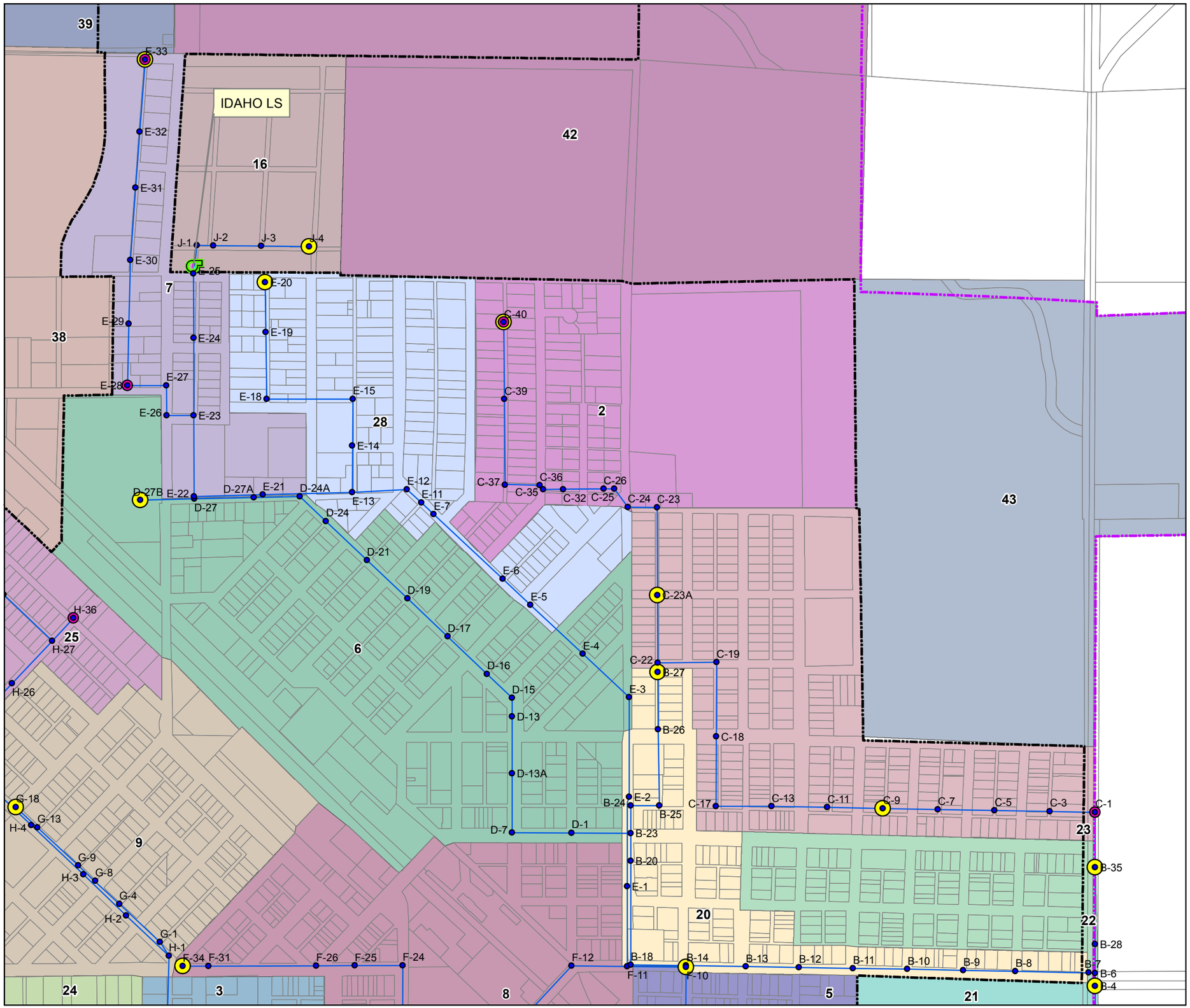
	Consumption (millions of gallons)												
year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2009	21.86	18.94	17.43	27.96	36.90	64.67	75.54	75.05	61.57	50.83	20.95	20.18	491.89
2010	24.18	19.99	19.84	29.04	38.28	44.02	64.84	73.19	73.13	32.47	19.55	22.76	461.28
2011	16.37	22.06	15.97	26.69	35.84	45.05	70.00	66.65	76.17	97.31	28.00	25.98	526.10
2012	20.89	3,016.63	1,524.64	23.01	38.68	59.29	62.65	85.07	61.12	48.14	26.26	24.94	4,991.31
2013	18.89	23.86	18.44	24.69	52.31	49.83	59.95	82.12	53.38	39.40	30.47	18.92	472.27
2014	25.12	19.23	18.08	27.03	41.82	56.82	67.02	76.33	56.51	45.02	21.67	19.16	473.81
2015	20.32	18.19	17.71	28.39	43.08	71.52	69.19	64.07	60.38	39.75	29.29	19.18	481.07

	Consumption (millions gallons per day)												
year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
2009	0.71	0.68	0.56	0.93	1.19	2.16	2.44	2.42	2.05	1.64	0.70	0.65	1.35
2010	0.78	0.71	0.64	0.97	1.23	1.47	2.09	2.36	2.44	1.05	0.65	0.73	1.26
2011	0.53	0.79	0.52	0.89	1.16	1.50	2.26	2.15	2.54	3.14	0.93	0.84	1.44
2012	0.67	104.02	49.18	0.77	1.25	1.98	2.02	2.74	2.04	1.55	0.88	0.80	13.64
2013	0.61	0.85	0.59	0.82	1.69	1.66	1.93	2.65	1.78	1.27	1.02	0.61	1.29
2014	0.81	0.69	0.58	0.90	1.35	1.89	2.16	2.46	1.88	1.45	0.72	0.62	1.30
2015	0.66	0.65	0.57	0.95	1.39	2.38	2.23	2.07	2.01	1.28	0.98	0.62	1.32

	Consumption (gallons per capita per day)												
year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
2009	78.59	75.36	62.66	103.83	132.63	240.19	271.52	269.73	228.69	182.70	77.80	72.52	150.15
2010	87.15	79.77	71.52	108.17	137.97	163.97	233.72	263.83	272.38	117.06	72.82	82.04	141.22
2011	59.00	88.02	57.54	99.40	129.19	167.80	252.30	240.24	283.67	350.74	104.30	93.64	161.05
2012	75.28	11,622.55	5,495.20	85.72	139.41	220.80	225.79	306.61	227.64	173.49	97.82	89.89	1,523.74
2013	68.09	95.21	66.46	91.97	188.53	185.58	216.06	295.98	198.81	142.02	113.49	68.20	144.57
2014	90.48	76.71	65.13	100.62	150.65	211.50	241.44	274.94	210.33	162.19	80.64	69.02	144.96
2015	73.12	72.47	63.71	105.56	155.00	265.94	248.96	230.54	224.50	143.04	108.89	69.00	147.02

APPENDIX H

INFOSEWER MODELING DATA



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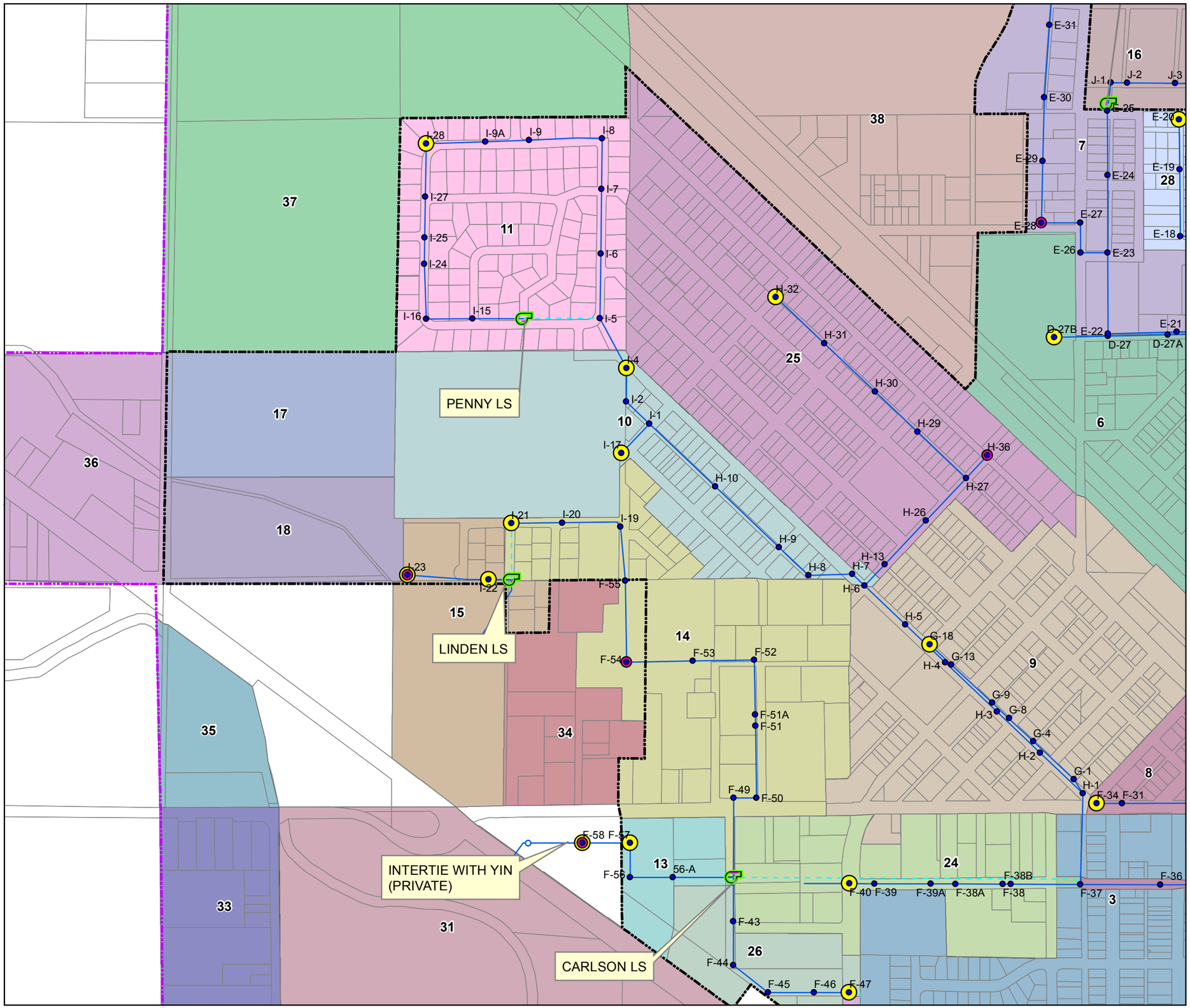


N

0 760 1,520 Feet

LEGEND:

- MANHOLE
- FUTURE FLOW INPUT NODE
- EXISTING FLOW INPUT NODE
- MODELED LIFT STATION
- UGA
- CITY LIMITS
- MODELED FORCE MAIN
- MODELED GRAVITY MAIN
- WATER
- PARCELS

EXISTING BASINS

1 6 11 16 21 26
2 7 12 17 22 27
3 8 13 18 23 28
4 9 14 19 24
5 10 15 20 25

FUTURE BASINS

29 32 35 38 41 44
30 33 36 39 42
31 34 37 40 43

CITY OF TOPPENISH

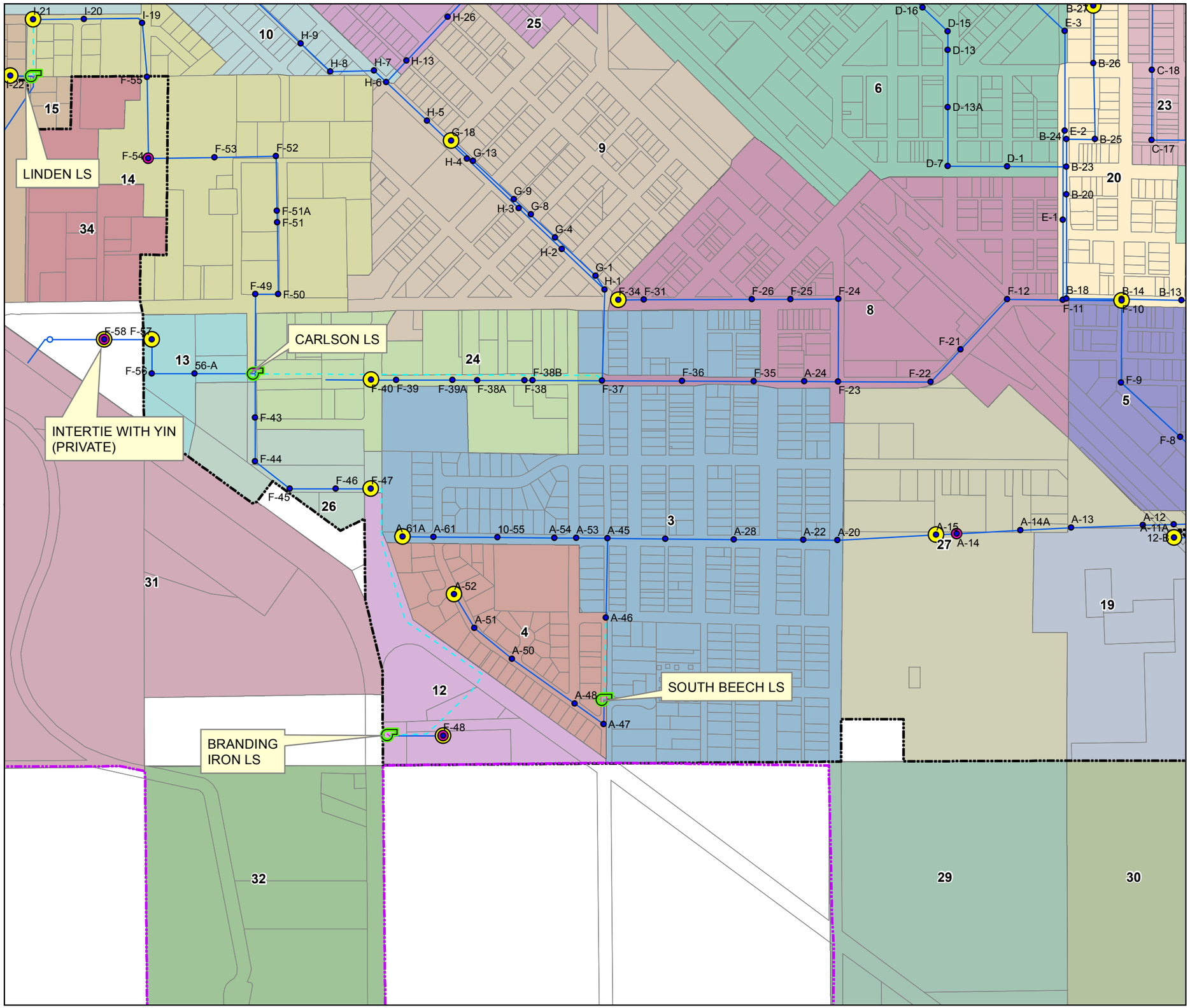
GENERAL SEWER PLAN

APPENDIX H

FIGURE 1B
MODEL NODE ID MAP (NORTHWEST)

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\APP I- FIG 1B NODE ID NORTHWEST.mxd



N

0 760 1,520 Feet

LEGEND:

- MANHOLE
- FUTURE FLOW INPUT NODE
- EXISTING FLOW INPUT NODE
- MODELED LIFT STATION
- UGA
- CITY LIMITS
- MODELED FORCE MAIN
- MODELED GRAVITY MAIN
- WATER
- PARCELS

EXISTING BASINS

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28

FUTURE BASINS

29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44

CITY OF TOPPENISH

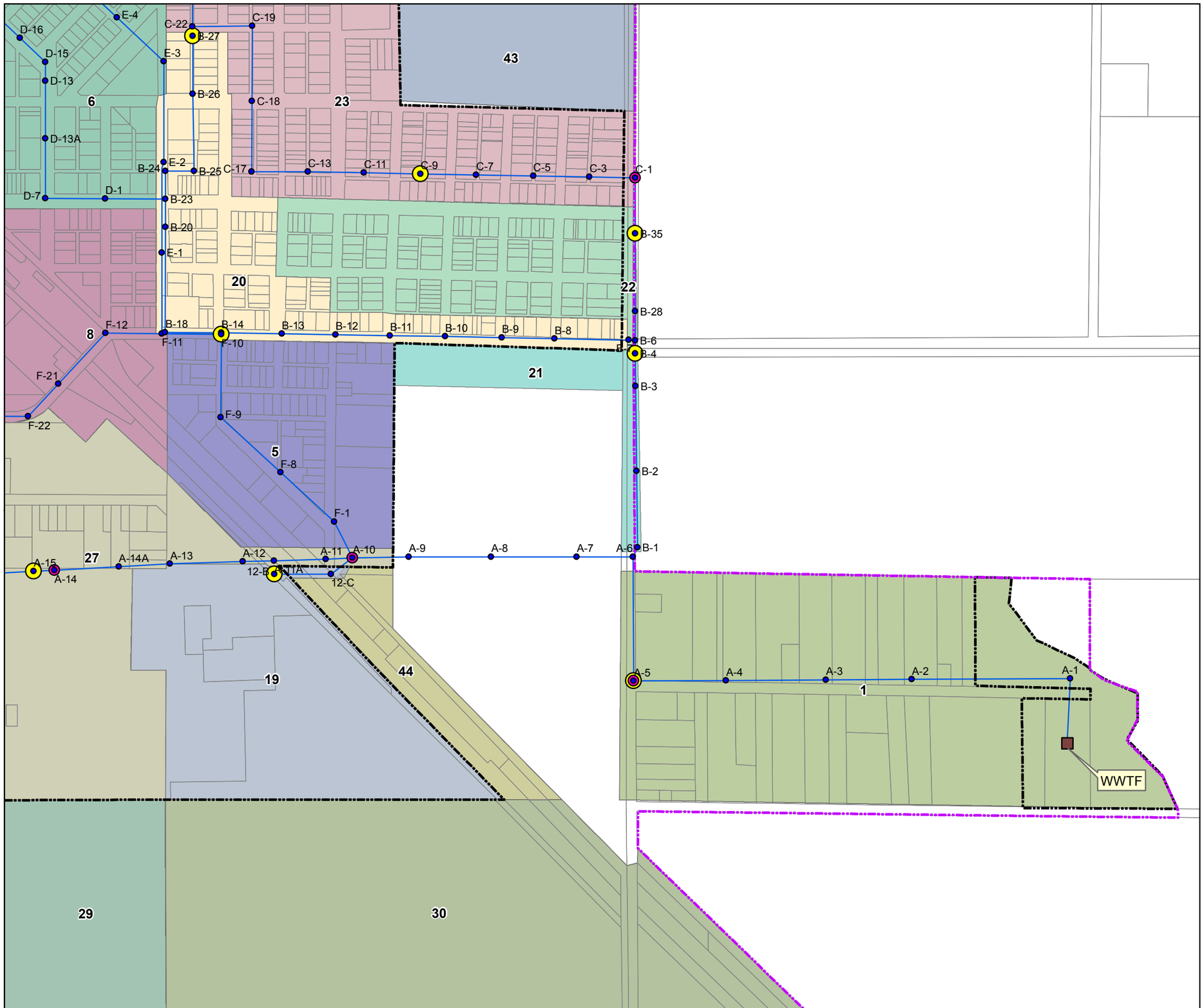
GENERAL SEWER PLAN

APPENDIX H

FIGURE 1C
MODEL NODE ID MAP (SOUTHWEST)

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\APP I- FIG 1C NODE ID SOUTHWEST.mxd



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LEGEND:

- MANHOLE
- FUTURE FLOW INPUT NODE
- EXISTING FLOW INPUT NODE
- MODELED LIFT STATION
- UGA
- CITY LIMITS
- MODELED FORCE MAIN
- MODELED GRAVITY MAIN
- WATER
- PARCELS

EXISTING BASINS

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28

FUTURE BASINS

29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44

CITY OF TOPPENISH

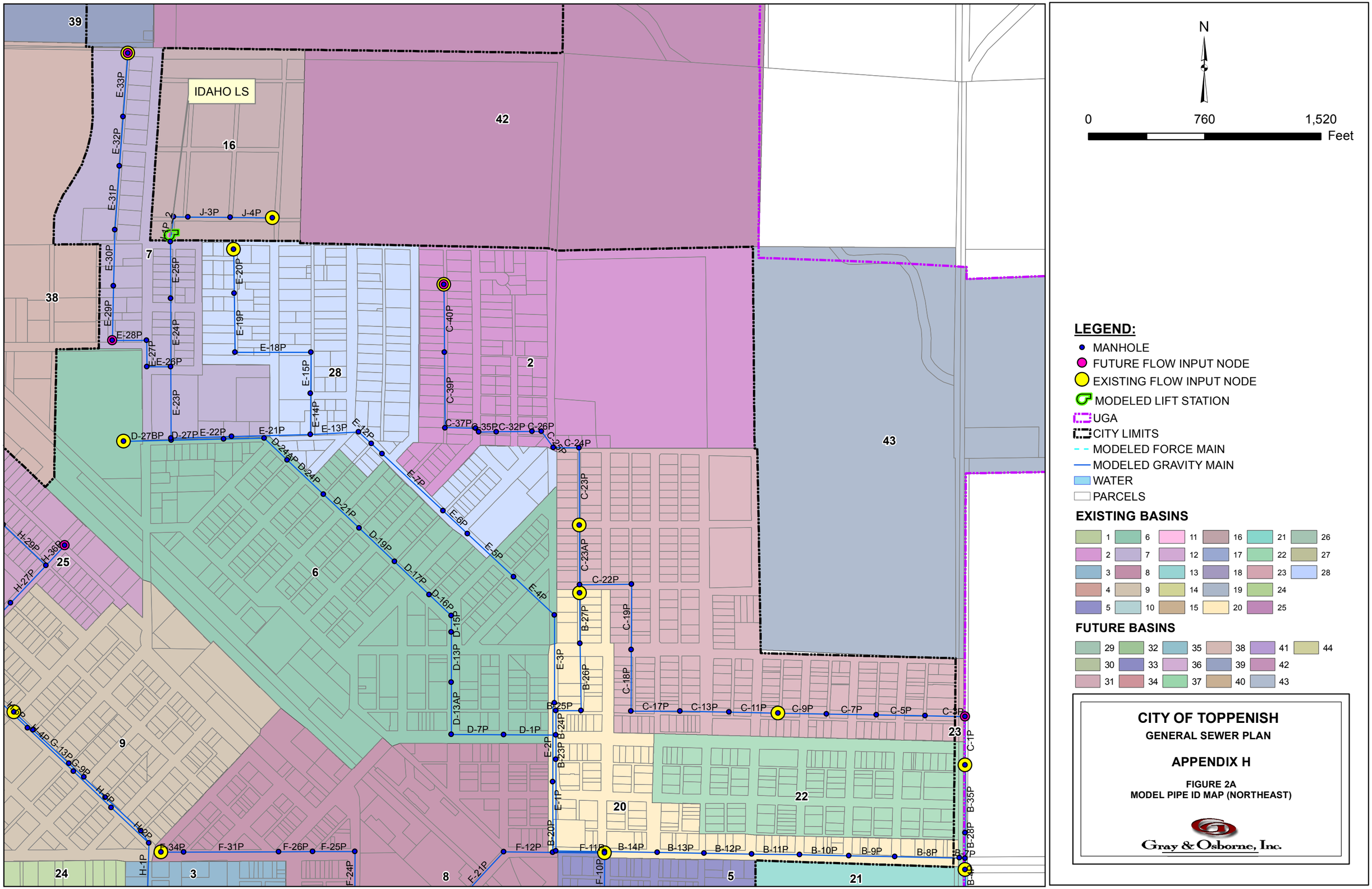
GENERAL SEWER PLAN

APPENDIX H

FIGURE 1D
MODEL NODE ID MAP (SOUTHEAST)

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\APP I- FIG 1D NODE ID SOUTHEAST.mxd


IDAHO LS
N
0
760
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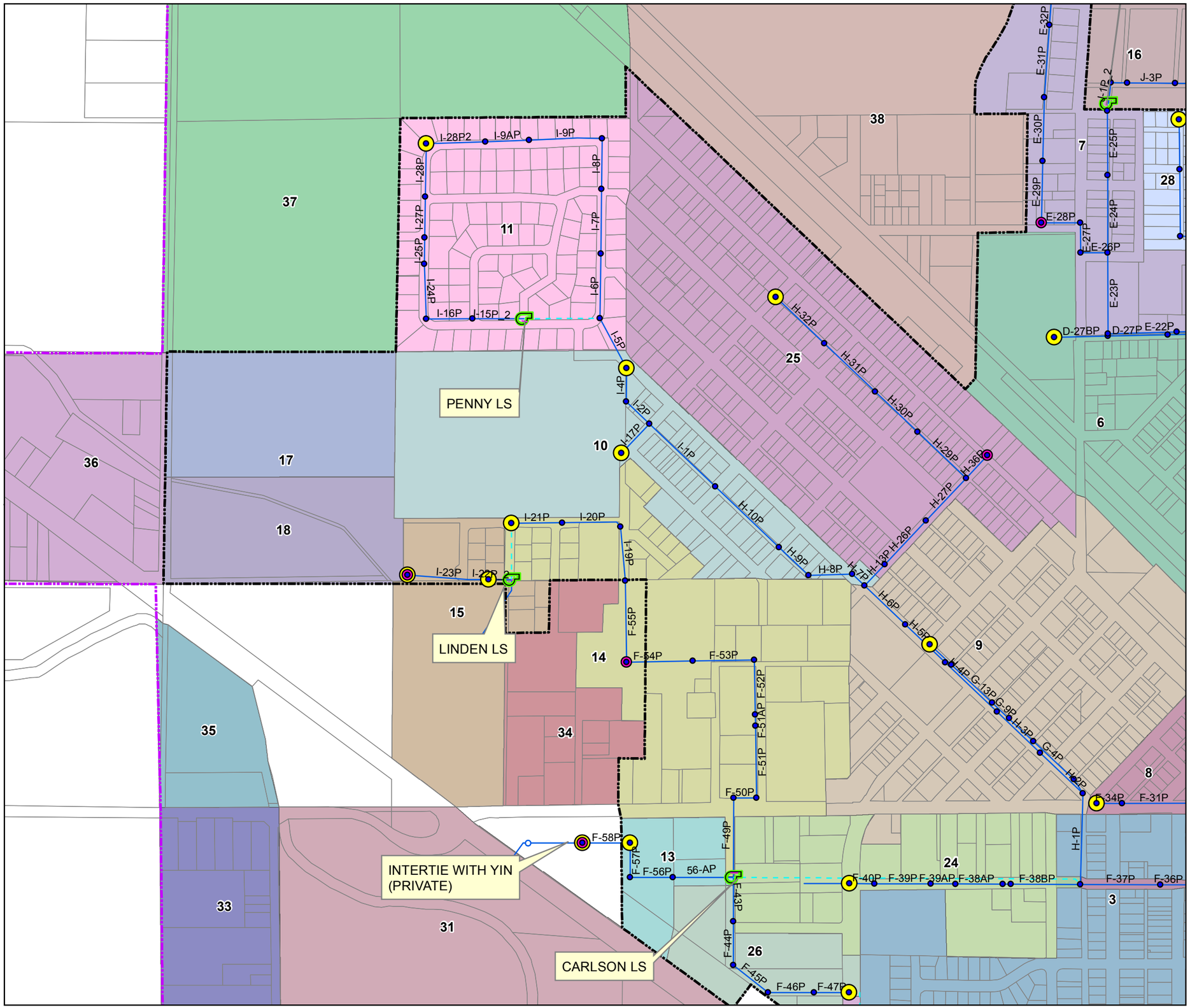
Feet
LEGEND:
MANHOLE
FUTURE FLOW INPUT NODE
EXISTING FLOW INPUT NODE
MODELED LIFT STATION
UGA
CITY LIMITS
MODELED FORCE MAIN
MODELED GRAVITY MAIN
WATER
PARCELS
EXISTING BASINS
FUTURE BASINS
CITY OF TOPPENISH
GENERAL SEWER PLAN
APPENDIX H
FIGURE 2A
MODEL PIPE ID MAP (NORTHEAST)
Gray & Osborne, Inc.
Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\APP I- FIG 2A PIPE ID NORTHEAST.mxd



N

0 760 1,520 Feet

LEGEND:

- MANHOLE
- FUTURE FLOW INPUT NODE
- EXISTING FLOW INPUT NODE
- MODELED LIFT STATION
- UGA
- CITY LIMITS
- MODELED FORCE MAIN
- MODELED GRAVITY MAIN
- WATER
- PARCELS

EXISTING BASINS

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28

FUTURE BASINS

29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44

CITY OF TOPPENISH

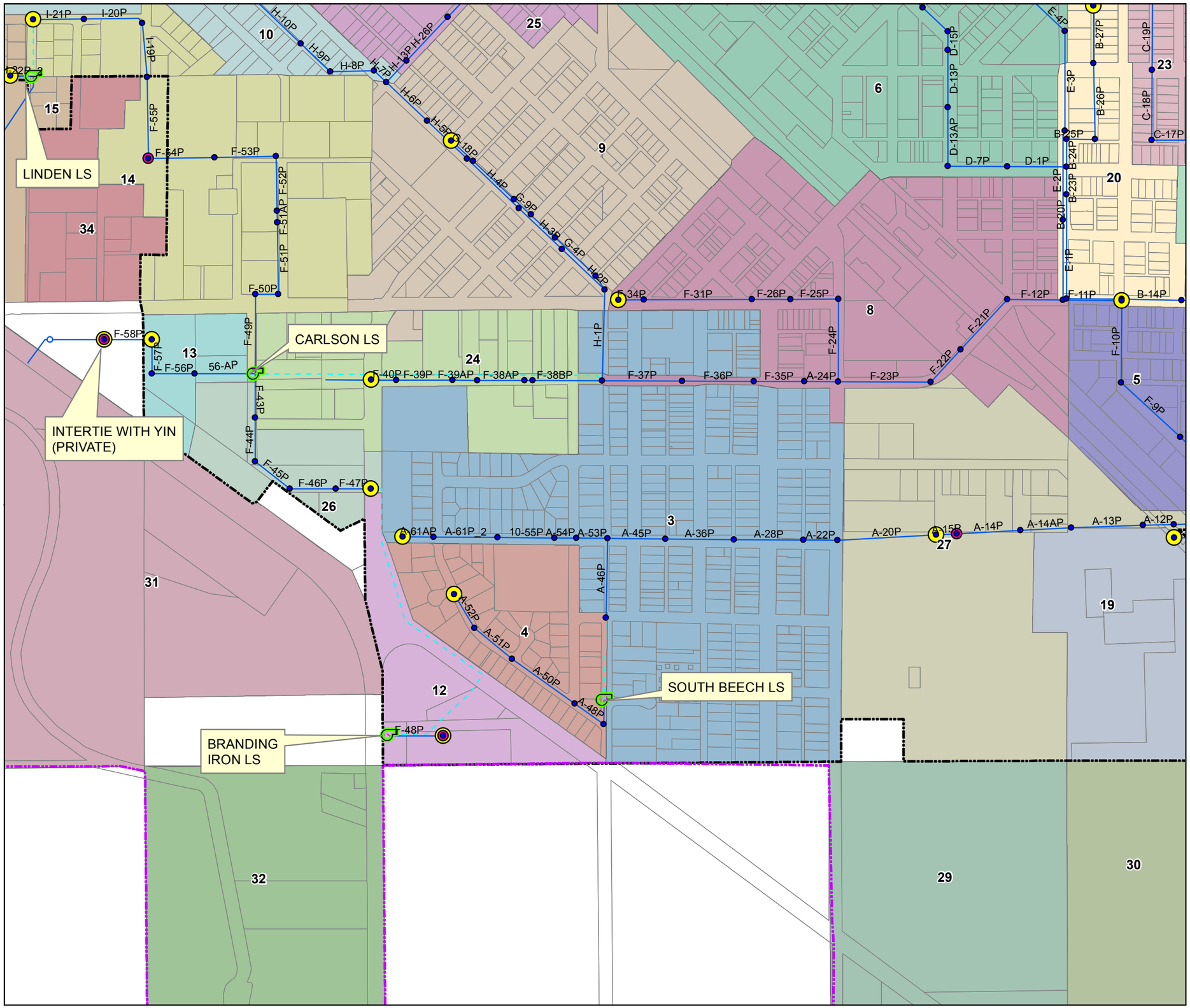
GENERAL SEWER PLAN

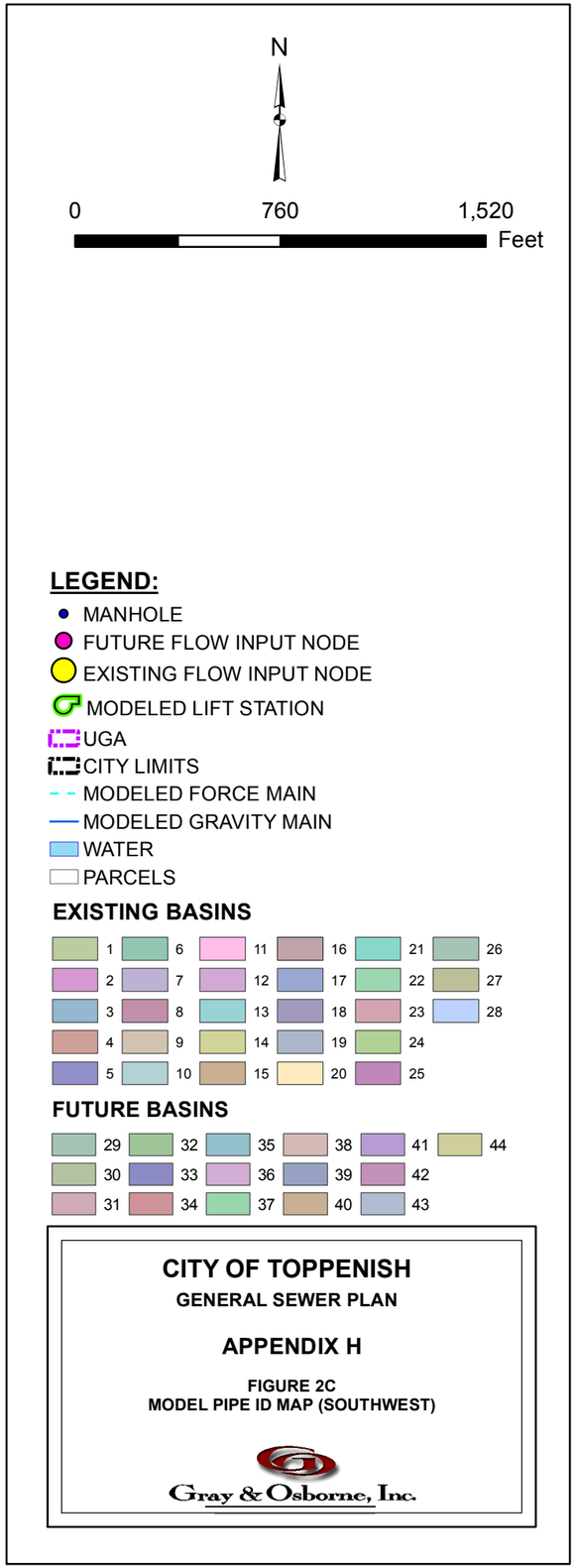
APPENDIX H

FIGURE 2B
MODEL PIPE ID MAP (NORTHWEST)

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\APP I- FIG 2B PIPE ID NORTHWEST.mxd





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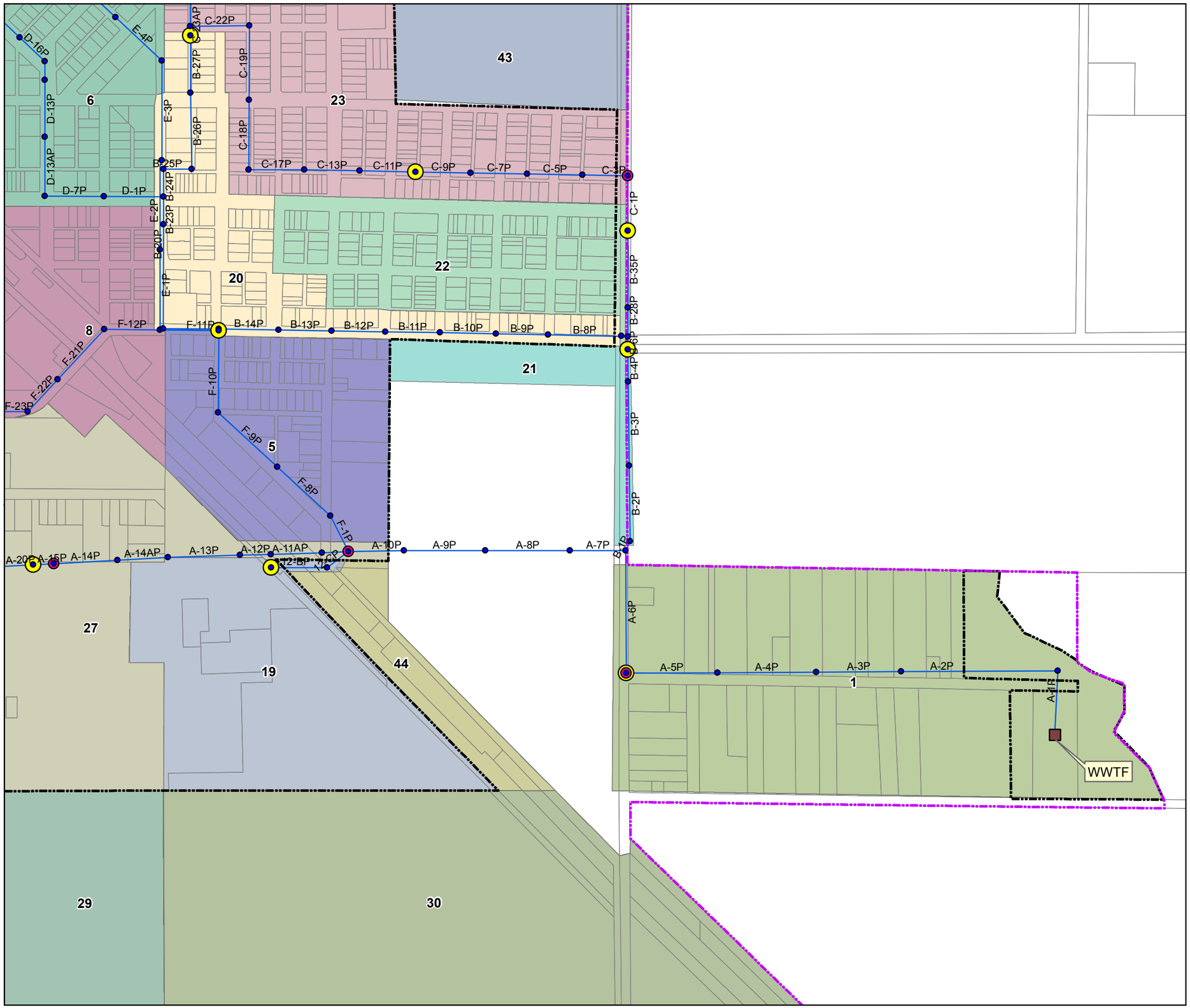


N

0 760 1,520 Feet

LEGEND:

- MANHOLE
- FUTURE FLOW INPUT NODE
- EXISTING FLOW INPUT NODE
- MODELED LIFT STATION
- UGA
- CITY LIMITS
- MODELED FORCE MAIN
- MODELED GRAVITY MAIN
- WATER
- PARCELS

EXISTING BASINS

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28

FUTURE BASINS

29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44

CITY OF TOPPENISH

GENERAL SEWER PLAN

APPENDIX H

FIGURE 2D
MODEL PIPE ID MAP (SOUTHEAST)

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\APP I- FIG 2D PIPE ID SOUTHEAST.mxd

Existing Flows

BASIN	USE_CODE_D	Count	Building Area (sq ft)	Parcel Area (Developed Parcels only) (sq ft)	Parcel Acres	ERUs	Total Basin ERUs	Total Subbasin Domestic Unpeaked Flow (gpd)	Total Subbasin Domestic Peaked Flow (gpm)	Total Basin Acres	Total Subbasin Peak I/I (gpd)	Total Subbasin Peak I/I (gpm)	Total Flow	Total peaked Basin Flow	% Res	% Comm
1																
	AGRICULTURAL	2		407245	9.35	0										
	WWTF	1		1	0.00	1										
	SINGLE FAMILY RES	31		1847072	42.40	31										
	Total:						**32**	10,208	6	51.8	99,513	69	75		100%	0%
2																
	AGRICULTURAL	1			10.70	0										
	SCHOOL	1	40783		26.10	9										
	SINGLE FAMILY RES	113			24.10	113										
	Total:						**122**	38,917	24	60.9	117,108	81	105		93%	7%
3																
	APARTMENTS/DUPLEX	4	29457		2.13	40										
	AUTO REPAIR/SALES/JUNKYARD	3	7819		0.97	2										
	BUSINESS PARK	2	6390		0.54	3										
	CHURCH	1			0.77	1										
	CLINIC	2	15521		1.56	8										
	COMMERCIAL	1	23760		1.99	5										
	HOSPITAL	1	15783		1.83	4										
	MEETING HALL	1			1.22	1										
	RESTAURANTS	3	11345		0.41	6										
	SINGLE FAMILY RES	280			49.55	280										
	SMALL RETAIL/OFFICE	16			3.21	16										
	Total:						**366**	116,750	72	64.2	123,415	86	158		87%	13%
4																
	BUSINESS PARK	2	6390		0.54	3										
	CLINIC	1	5600		0.45	3										
	HOSPITAL	1	85145	1067622	3.77	18										
	SINGLE FAMILY RES	51			11.80	51										
	Total:						**75**	23,924	15	16.6	31,844	22	37		68%	32%
5																
	APARTMENT	2			0.58	7										
	AUTO REPAIR/SALES/JUNKYARD	4	30106		5.60	7										
	CHURCH	2			0.38	2										
	COMMERCIAL	3	35520		7.00	8										
	SINGLE FAMILY RES	47			7.95	47										
	Total:						**71**	22,648	14	21.5	41,363	29	43		76%	24%
6																
	AGRICULTURAL	1			1.91											
	APARTMENTS/DUPLEX	6			2.07	55										
	AUTO REPAIR/SALES/JUNKYARD	5	37320		2.54	8										
	CAR WASH	1	1400		0.28	2										
	CHURCH	6			2.52	6										
	FIRE STATION	1			0.74	2										
	POOL	1	10206		0.76	2										
	RESTAURANTS	1	5765		0.14	3										
	SCHOOL	1	15726		9.86	4										
	SINGLE FAMILY RES	202			28.40	202										
	Total:						**284**	90,593	56	49.2	94,648	66	122		90%	10%
7																
	CHURCH	2			0.15	2										
	SCHOOL	1	134194		8.04	27										
	SINGLE FAMILY RES	43			10.45	43										
	SMALL RETAIL/OFFICE	1	1584		0.29	1										
	Total:						**73**	23,286	14	18.9	36,401	25	40		59%	41%

Existing Flows

BASIN	USE_CODE_D	Count	Building Area (sq ft)	Parcel Area (Developed Parcels only) (sq ft)	Parcel Acres	ERUs	Total Basin ERUs	Total Subbasin Domestic Unpeaked Flow (gpd)	Total Subbasin Domestic Peaked Flow (gpm)	Total Basin Acres	Total Subbasin Peak I/I (gpd)	Total Subbasin Peak I/I (gpm)	Total Flow	Total peaked Basin Flow	% Res	% Comm
8																
	APARTMENTS/DUPLEX	1			0.35	3										
	AUTO REPAIR/SALES/JUNKYARD	6	32289		3.19	7										
	CAR WASH	1	2372		0.20	3										
	CHURCH	2			0.71	2										
	COMMERCIAL	7	42456		1.06	9										
	GAS STATION	1			0.53	1										
	INDUSTRIAL PARK	2	111031		4.04	23										
	MEETING HALL	1			0.07	1										
	POLICE STATION	1			0.25	1										
	RESTAURANT	4	9282		0.83	5										
	SINGLE FAMILY RES	29			3.72	29										
	SMALL RETAIL/OFFICE	40			5.76	40									26%	74%
	Total:						**124**	39,555	24	20.7	39,824	28	52			
9																
	APARTMENTS/DUPLEX	3			1.41	11										
	AUTO REPAIR/SALES/JUNKYARD	2	4455		0.37	1										
	COMMERCIAL	3	21435		1.99	5										
	GAS STATION/CONVENIENCE STORE	3	9046		1.54	3										
	INDUSTRIAL PARK	1	16495		2.71	4										
	PUBLIC WORKS	1			1.92	2										
	RESTAURANTS	4	12398		0.54	7										
	SCHOOL	1	33880		4.97	7										
	SINGLE FAMILY RES	156			24.30	156										
	SMALL RETAIL/OFFICE	4			1.27	4										
	Total:						**200**	63,798	39	41.0	78,879	55	94		83.5%	16.5%
10																
	SCHOOL	1	70735		28.66	15										
	SINGLE FAMILY RES	50			10.75	50									77%	23%
	Total:						**65**	20,734	13	39.4	75,784	53	65			
11																
	SINGLE FAMILY RES	111			31.91	111										
	Total:						**111**	35,408	22	31.9	61,361	43	64		100%	0%
12																
	COMMERCIAL	1	15335		3.62	4										
	RESTAURANTS	1	4870		0.79	3										
	Total:						**7**	2,233	1	4.4	8,480	6	7		0%	100%
13																
	COMMERCIAL	1	22650		1.66	5										
	CHURCH	1			1.05	1										
	GAS STATION	1			3.63	1										
	HOTEL	1			4.44	9										
	Total:						**16**	5,104	3	10.8	20,729	14	18		0%	100%
14																
	APARTMENTS/DUPLEX	7			7.17	58										
	CHURCH	1			1.76	1										
	COMMERCIAL	3	86035		7.64	18										
	LAUNDROMAT	1	5100		0.82											
	RESTAURANTS	1	9185		0.99	5										
	SINGLE FAMILY RES	18			5.43	18										
	Small Retail/Office	4	10975		1.31	4										
	Total:						**104**	33,175	21	25.1	48,305	34	54		73%	27%

Existing Flows

BASIN	USE_CODE_D	Count	Building Area (sq ft)	Parcel Area (Developed Parcels only) (sq ft)	Parcel Acres	ERUs	Total Basin ERUs	Total Subbasin Domestic Unpeaked Flow (gpd)	Total Subbasin Domestic Peaked Flow (gpm)	Total Basin Acres	Total Subbasin Peak I/I (gpd)	Total Subbasin Peak I/I (gpm)	Total Flow	Total peaked Basin Flow	% Res	% Comm
15																
	APARTMENTS/DUPLEX	2			0.59	11										
	SCHOOL	1	39000		17.81	8										
	SINGLE FAMILY RES	9			2.53	9										
	Total:						**28**	8,932	6	20.9	40,247	28	33		71%	29%
16																
	SINGLE FAMILY RES	60		148861	6.13	60										
	Total:						**60**	19,139	12	6.1	11,783	8	20		100%	0%
17																
	SCHOOL	1	153000		22.00	31										
	Total:						**31**	9,889	6	22.0	42,305	29	35		0%	100%
18																
	SCHOOL	1	26300		19.00	6										
	Total:						**6**	1,914	1	19.0	36,536	25	27		0%	100%
19																
	INDUSTRIAL PARK	1	455225		42.00	92										
	Total:						**92**	29,347	18	42.0	80,764	56	74		0%	100%
20																
	APARTMENTS/DUPLEX	2			0.55	11										
	AUTO REPAIR/SALES/JUNKYARD	2	6045		1.00	2										
	CHURCH	1	4385		0.36	1										
	SINGLE FAMILY RES	80			12.67	80										
	Total:						**94**	29,985	19	14.6	28,037	19	38		97%	3%
21																
	INDUSTRIAL	1	13045	303000	6.96	3										
	Total:						**3**	957	1	7.0	13,376	9	10		0%	100%
22																
	COMMERCIAL	1	2310		0.32	1										
	SINGLE FAMILY RES	96			14.01	96										
	Total:						**97**	30,942	19	14.3	27,556	19	38		99%	1%
23																
	APARTMENTS/DUPLEX	2			2.92	27										
	SINGLE FAMILY RES	222			34.26	222										
	Total:						**249**	79,429	49	37.2	71,495	50	99		100%	0%
24																
	APARTMENTS/DUPLEX	1			1.45	27										
	AUTO REPAIR/SALES/JUNKYARD	1	6700		0.66	2										
	CAR WASH	1	3530		1.09	4										
	COMMERCIAL	7	41397		5.08	9										
	FIRE STATION	1			1.22	2										
	GAS STATION	1			0.60	1										
	HOSPITAL	2	45360		2.91	10										
	PARK	1			0.31	1										
	RESTAURANTS	3	13545		2.55	7										
	SCHOOL	1	35755		2.11	8										
	SINGLE FAMILY RES	2			0.75	2										
	Total:						**73**	23,286	14	18.7	36,017	25	39		40%	60%
25																
	APARTMENTS/DUPLEX	5			2.71	26										
	CHURCH	2			0.85	2										

Existing Flows

BASIN	USE_CODE_D	Count	Building Area (sq ft)	Parcel Area (Developed Parcels only) (sq ft)	Parcel Acres	ERUs	Total Basin ERUs	Total Subbasin Domestic Unpeaked Flow (gpd)	Total Subbasin Domestic Peaked Flow (gpm)	Total Basin Acres	Total Subbasin Peak I/I (gpd)	Total Subbasin Peak I/I (gpm)	Total Flow	Total peaked Basin Flow	% Res	% Comm
	PARK	1			2.89	1										
	SINGLE FAMILY RES	244			46.81	244										
	Total:						**273**	87,084	54	53.3	102,416	71	125		99%	1%
26																
	CHURCH	1			2.03	1										
	HOSPITAL	1	32042		2.41	7										
	HOTEL	2			4.44	35										
	Small Retail/Office	1			2.90	1										
	Total:						**44**	14,036	9	11.8	22,652	16	24		2%	98%
27																
	AUTO REPAIR/SALES/JUNKYARD	1	2248		2.13	1										
	INDUSTRIAL PARK	2	284145	622482	14.29	57										
	SINGLE FAMILY RES	11			49.55	11										
	Small Retail/Office	1			1.34	1										
	Total:						**70**	22,329	14	67.3	129,434	90	104		16%	84%
28																
	APARTMENTS/DUPLEX	1			0.45	5										
	CHURCH	1			0.36	1										
	SCHOOL	1	35104		2.25	8										
	SINGLE FAMILY RES	127			28.00	127										
	Total:						**141**	44,978	28	31.1	59,727	41	69		94%	6%
	YIN Intertie (0.08MGD)							80000	49							

Sum:	Should be 1,354 ac per Table 5-7>	822	2911			623.36	822	1097.22	1671.14	0	Total Flow (gpm)
Flow per Acre or ERU:	If you can't get 1,354 ac, adjust	1,923	319	gpad / gpd	<From Ch. 5						
Flows:		1,580,000	928,580	gpd		0.90					
	Aiming for 1.58 mgd>	1.58	0.93	mgd	<Tweak down below to get 0.83 mgd						
Peaking Factor			0.89	<Tweak until you get blue cell below to meet peak day flow of 0.83 mgd(Takes flows from annual avg. to peak day)							
	Aiming for 1.58 mgd>	1.58	0.83	Total =	2.41	[Need 2.41 MGD to meet Peak Day = 0.83 domestic + 1.58 I/I]					
		1,097	574	gpm	1,671.14	gpm					

From Chapter 5:

Existing Flows

Subbasin Name	Model Node	Peaked Domestic Flow* (gpm)	I/I Peaked Flow (gpm)	% RES	%COMM
1	A-5	6.31	69.11	100%	0%
2	C-40	24.05	81.32	93%	7%
3	A-61A	72.16	85.70	87%	13%
4	A-52	14.79	22.11	68%	32%
5	F-10	14.00	28.72	76%	24%
6	D-27B	55.99	65.73	90%	10%
7	E-33	14.39	25.28	59%	41%
8	F-34	24.45	27.66	26%	74%
9	G-18	39.43	54.78	84%	17%
10	I-4	12.81	52.63	77%	23%
11	I-28	21.88	42.61	100%	0%
12	F-48	1.38	5.89	0%	100%
13	F-57	3.15	14.40	0%	100%
14	I-21	20.50	33.54	73%	27%
15	I-22	5.52	27.95	71%	29%
16	J-4	11.83	8.18	100%	0%
17	I-17	6.11	29.38	0%	100%
18	I-23	1.18	25.37	0%	100%
19	12-B	240.00	0.00	0%	100%
20	B-27	18.53	19.47	97%	3%
21	B-4	0.59	9.29	0%	100%
22	B-35	19.12	19.14	99%	1%
23	C-23A	49.09	49.65	100%	0%
24	F-40	14.39	25.01	40%	60%
25	H-32	53.82	71.12	99%	1%
26	F-47	8.67	15.73	2%	98%
27	A-15	13.80	89.88	16%	84%
28	E-20	27.80	41.48	94%	6%
YIN Intertie	F-58	49.44	0	20%	80%

*W/in model, add diurnal

Buidlout Flows

Basin	USE_CODE_D	Number of Parcels	BUILDING AREA	Sum_Shape_ Area	Acres	ERUs	Total Subbasin ERUs	Total Subbasin Domestic Unpeaked Flow (gpd)	Total Subbasin Domestic Unpeaked Flow (gpm)	Total Subbasin Acres	Total Subbasin Acres in 2014	Total Subbasin Peak I/I (gpd)	Total Subbasin Peak I/I (gpm)	Total Buildout Flow	% Res	% Comm	20 yr Dommestic Unpeaked Flow (gpm)	20 yr Peak I/I (gpm)
1																		
	AGRICULTURAL	2		407245	9.35	0												
	WWTF	1		1	0.00	1												
	SINGLE FAMILY RES	31		1847072	42.40	31												
	Total:						**32**	10,208	6	51.8		99,513	69	**75**	100%	0%	6	69
2																		
	AGRICULTURAL	1			10.70	0												
	SCHOOL	1	40783		26.10	9												
	SINGLE FAMILY RES	113			24.10	113												
	Total:						**122**	38,917	24	60.9		117,108	81	**105**	93%	7%	24	81
3																		
	APARTMENTS/DUPLEX	4	29457		2.13	40												
	AUTO REPAIR/SALES/JUNKYARD	3	7819		0.97	2												
	BUSINESS PARK	2	6390		0.54	3												
	CHURCH	1			0.77	1												
	CLINIC	2	15521		1.56	8												
	COMMERCIAL	1	23760		1.99	5												
	HOSPITAL	1	15783		1.83	4												
	MEETING HALL	1			1.22	1												
	RESTAURANTS	3	11345		0.41	6												
	SINGLE FAMILY RES	280			49.55	280												
	SMALL RETAIL/OFFICE	16			3.21	16												
	Total:						**366**	116,750	72	64.2		123,415	86	**158**	87%	13%	72	86
4																		
	BUSINESS PARK	2	6390		0.54	3												
	CLINIC	1	5600		0.45	3												
	HOSPITAL	1	85145	1067622	3.77	18												
	SINGLE FAMILY RES	51			11.80	51												
	Total:						**75**	23,924	15	16.6		31,844	22	**37**	68%	32%	15	22
5																		
	APARTMENT	2			0.58	7												
	AUTO REPAIR/SALES/JUNKYARD	4	30106		5.60	7												
	CHURCH	2			0.38	2												
	COMMERCIAL	3	35520		7.00	8												
	SINGLE FAMILY RES	47			7.95	47												
	Total:						**71**	22,648	14	21.5		41,363	29	**43**	76%	24%	14	29
6																		
	AGRICULTURAL	1			1.91													
	APARTMENTS/DUPLEX	6			2.07	55												
	AUTO REPAIR/SALES/JUNKYARD	5	37320		2.54	8												
	CAR WASH	1	1400		0.28	2												
	CHURCH	6			2.52	6												
	FIRE STATION	1			0.74	2												
	POOL	1	10206		0.76	2												
	RESTAURANTS	1	5765		0.14	3												
	SCHOOL	1	15726		9.86	4												
	SINGLE FAMILY RES	202			28.40	202												
	Total:						**284**	90,593	56	49.2		94,648	66	**122**	90%	10%	56	66
7																		
	CHURCH	2			0.15	2												

Buidlout Flows

Basin	USE_CODE_D	Number of Parcels	BUILDING AREA	Sum_Shape_ Area	Acres	ERUs	Total Subbasin ERUs	Total Subbasin Domestic Unpeaked Flow (gpd)	Total Subbasin Domestic Unpeaked Flow (gpm)	Total Subbasin Acres	Total Subbasin Acres in 2014	Total Subbasin Peak I/I (gpd)	Total Subbasin Peak I/I (gpm)	Total Buildout Flow	% Res	% Comm	20 yr Dommestic Unpeaked Flow (gpm)	20 yr Peak I/I (gpm)
	SCHOOL	1	134194		8.04	27												
	SINGLE FAMILY RES	43			10.45	43												
	SMALL RETAIL/OFFICE	1	1584		0.29	1												
	Total:						**73**	23,286	14	18.9		36,401	25	**40**	59%	41%	14	25
8																		
	APARTMENTS/DUPLEX	1			0.35	3												
	AUTO REPAIR/SALES/JUNKYARD	6	32289		3.19	7												
	CAR WASH	1	2372		0.20	3												
	CHURCH	2			0.71	2												
	COMMERCIAL	7	42456		1.06	9												
	GAS STATION	1			0.53	1												
	INDUSTRIAL PARK	2	111031		4.04	23												
	MEETING HALL	1			0.07	1												
	POLICE STATION	1			0.25	1												
	RESTAURANT	4	9282		0.83	5												
	SINGLE FAMILY RES	29			3.72	29												
	SMALL RETAIL/OFFICE	40			5.76	40									26%	74%		
	Total:						**124**	39,555	24	20.7		39,824	28	**52**			24	28
9																		
	APARTMENTS/DUPLEX	3			1.41	11												
	AUTO REPAIR/SALES/JUNKYARD	2	4455		0.37	1												
	COMMERCIAL	3	21435		1.99	5												
	GAS STATION/CONVENIENCE STORE	3	9046		1.54	3												
	INDUSTRIAL PARK	1	16495		2.71	4												
	PUBLIC WORKS	1			1.92	2												
	RESTAURANTS	4	12398		0.54	7												
	SCHOOL	1	33880		4.97	7												
	SINGLE FAMILY RES	156			24.30	156												
	SMALL RETAIL/OFFICE	4			1.27	4												
	Total:						**200**	63,798	39	41.0		78,879	55	**94**	83.5%	16.5%	39	55
10																		
	SCHOOL	1	70735		28.66	15												
	SINGLE FAMILY RES	50			10.75	50									77%	23%		
	Total:						**65**	20,734	13	39.4		75,784	53	**65**			13	53
11																		
	SINGLE FAMILY RES	111			31.91	111												
	Total:						**111**	35,408	22	31.9		61,361	43	**64**	100%	0%	22	43
12																		
	COMMERCIAL	1	15335		3.62	4												
	RESTAURANTS	1	4870		0.79	3												
	Total:						**7**	2,233	1	4.4		8,480	6	**7**	0%	100%	1	6
13																		
	COMMERCIAL	1	22650		1.66	5												
	CHURCH	1			1.05	1												
	GAS STATION	1			3.63	1												
	HOTEL	1			4.44	9												
	Total:						**16**	5,104	3	10.8		20,729	14	**18**	0%	100%	3	14
14																		

Buidlout Flows

Basin	USE_CODE_D	Number of Parcels	BUILDING AREA	Sum_Shape_ Area	Acres	ERUs	Total Subbasin ERUs	Total Subbasin Domestic Unpeaked Flow (gpd)	Total Subbasin Domestic Unpeaked Flow (gpm)	Total Subbasin Acres	Total Subbasin Acres in 2014	Total Subbasin Peak I/I (gpd)	Total Subbasin Peak I/I (gpm)	Total Buildout Flow	% Res	% Comm	20 yr Dommestic Unpeaked Flow (gpm)	20 yr Peak I/I (gpm)
	APARTMENTS/DUPLEX	7			7.17	58												
	CHURCH	1			1.76	1												
	COMMERCIAL	3	86035		7.64	18												
	LAUNDROMAT	1	5100		0.82													
	RESTAURANTS	1	9185		0.99	5												
	SINGLE FAMILY RES	18			5.43	18												
	Small Retail/Office	4	10975		1.31	4												
	Total:						**104**	33,175	21	25.1		48,305	34	**54**	73%	27%	21	34
15																		
	APARTMENTS/DUPLEX	2			0.59	11												
	SCHOOL	1	39000		17.81	8												
	SINGLE FAMILY RES	9			2.53	9												
	Total:						**28**	8,932	6	20.9		40,247	28	**33**	71%	29%	6	28
16																		
	SINGLE FAMILY RES	60		148861	6.13	60												
	Total:						**60**	19,139	12	6.1		11,783	8	**20**	100%	0%	12	8
17																		
	SCHOOL	1	153000		22.00	31												
	Total:						**31**	9,889	6	22.0		42,305	29	**35**	0%	100%	6	29
18																		
	SCHOOL	1	26300		19.00	6												
	Total:						**6**	1,914	1	19.0		36,536	25	**27**	0%	100%	1	25
19																		
	INDUSTRIAL PARK	1	455225		42.00	92												
	Total:						**92**	29,347	18	42.0		80,764	56	**74**	0%	100%	18	56
20																		
	APARTMENTS/DUPLEX	2			0.55	11												
	AUTO REPAIR/SALES/JUNKYARD	2	6045		1.00	2												
	CHURCH	1	4385		0.36	1												
	SINGLE FAMILY RES	80			12.67	80												
	Total:						**94**	29,985	19	14.6		28,037	19	**38**	97%	3%	19	19
21																		
	INDUSTRIAL	1	13045	303000	6.96	3												
	Total:						**3**	957	1	7.0		13,376	9	**10**	0%	100%	1	9
22																		
	COMMERCIAL	1	2310		0.32	1												
	SINGLE FAMILY RES	96			14.01	96												
	Total:						**97**	30,942	19	14.3		27,556	19	**38**	99%	1%	19	19
23																		
	APARTMENTS/DUPLEX	2			2.92	27												
	SINGLE FAMILY RES	222			34.26	222												
	Total:						**249**	79,429	49	37.2		71,495	50	**99**	100%	0%	49	50
24																		
	APARTMENTS/DUPLEX	1			1.45	27												
	AUTO REPAIR/SALES/JUNKYARD	1	6700		0.66	2												
	CAR WASH	1	3530		1.09	4												
	COMMERCIAL	7	41397		5.08	9												
	FIRE STATION	1			1.22	2												
	GAS STATION	1			0.60	1												

Buidlout Flows

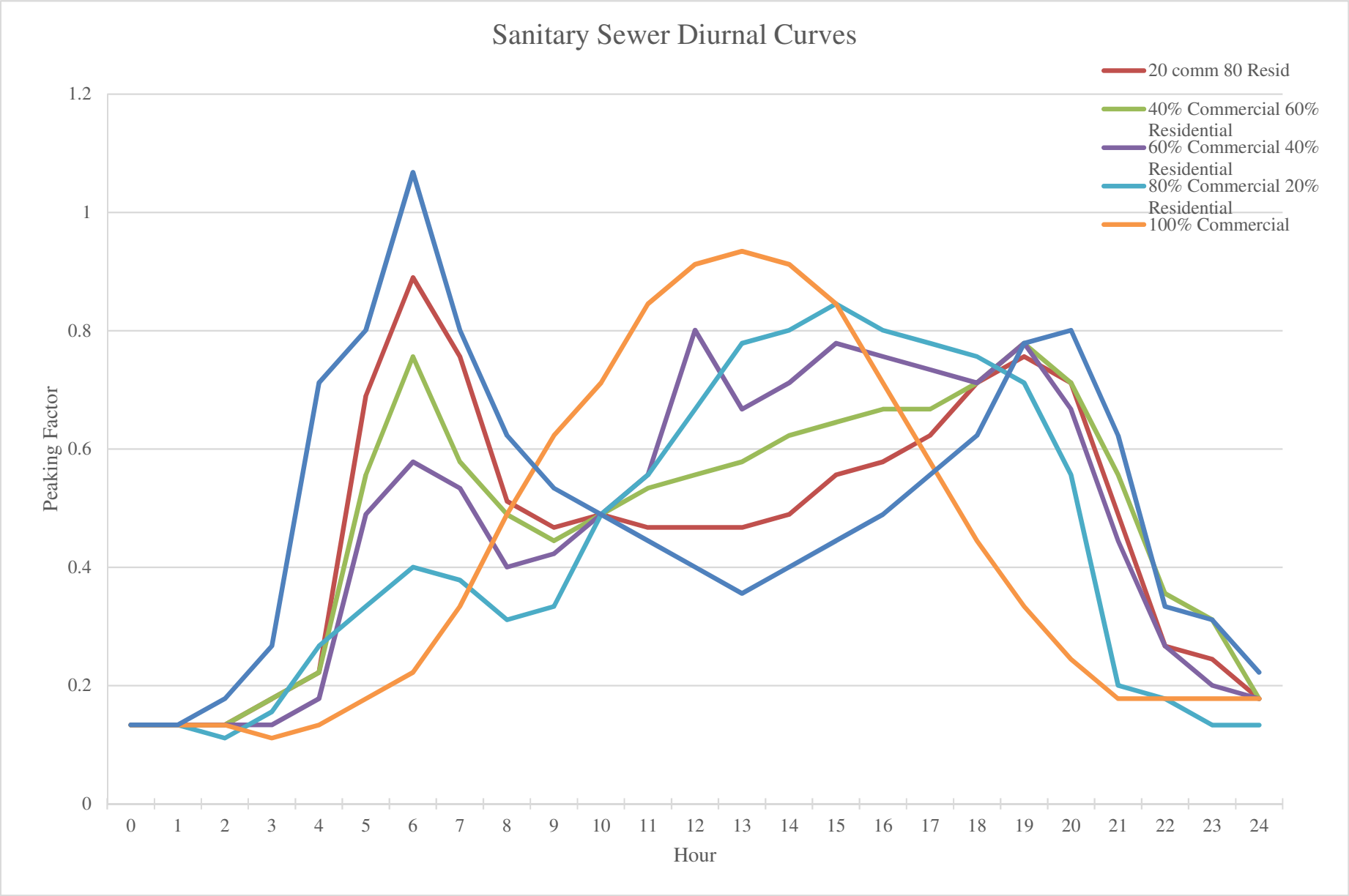
Basin	USE_CODE_D	Number of Parcels	BUILDING AREA	Sum_Shape_ Area	Acres	ERUs	Total Subbasin ERUs	Total Subbasin Domestic Unpeaked Flow (gpd)	Total Subbasin Domestic Unpeaked Flow (gpm)	Total Subbasin Acres	Total Subbasin Acres in 2014	Total Subbasin Peak I/I (gpd)	Total Subbasin Peak I/I (gpm)	Total Buildout Flow	% Res	% Comm	20 yr Dommestic Unpeaked Flow (gpm)	20 yr Peak I/I (gpm)
	HOSPITAL	2	45360		2.91	10												
	PARK	1			0.31	1												
	RESTAURANTS	3	13545		2.55	7												
	SCHOOL	1	35755		2.11	8												
	SINGLE FAMILY RES	2			0.75	2												
	Total:						**73**	23,286	14	18.7		36,017	25	**39**	40%	60%	14	25
25																		
	APARTMENTS/DUPLEX	5			2.71	26												
	CHURCH	2			0.85	2												
	PARK	1			2.89	1												
	SINGLE FAMILY RES	244			46.81	244												
	Total:						**273**	87,084	54	53.3		102,416	71	**125**	99%	1%	54	71
26																		
	CHURCH	1			2.03	1												
	HOSPITAL	1	32042		2.41	7												
	HOTEL	2			4.44	35												
	Small Retail/Office	1			2.90	1												
	Total:						**44**	14,036	9	11.8		22,652	16	**24**	2%	98%	9	16
27																		
	AUTO REPAIR/SALES/JUNKYARD	1	2248		2.13	1												
	INDUSTRIAL PARK	2	284145	622482	14.29	57												
	SINGLE FAMILY RES	11			49.55	11												
	Small Retail/Office	1			1.34	1												
	Total:						**70**	22,329	14	67.3		129,434	90	**104**	16%	84%	14	90
28																		
	APARTMENTS/DUPLEX	1			0.45	5												
	CHURCH	1			0.36	1												
	SCHOOL	1	35104		2.25	8												
	SINGLE FAMILY RES	127			28.00	127												
	Total:						**141**	44,978	28	31.1		59,727	41	**69**	94%	6%	28	41
29																		
	INDUSTRIAL/MANUFACTURING			3212910.94	73.76													
	Total:						**0**	100,726	62	73.8		22,127	15	**78**	0%	100%	16	4
30																		
	RESIDENTIAL			9255305.8	212.47	420												
	Total:						**420**	133,976	83	212.5		63,742	44	**127**	100%	0%	22	12
31																		
	INDUSTRIAL/MANUFACTURING			4948675.12	113.61													
	Total:						**0**	155,143	96	113.6		34,082	24	**120**	0%	100%	25	6
32																		
	INDUSTRIAL/MANUFACTURING			504657.3	11.59													
	RESIDENTIAL			2018176.23	46.33	90												
	Total:						**90**	44,530	28	57.9		17,375	12	**40**	80%	20%	7	3
33																		
	RESIDENTIAL	2		6259022.28	143.69	290												
	PUBLIC			1046287.82	24.02													
	Total:						**290**	92,519	57	167.7		50,312	35	**92**	86%	14%	15	9
34																		
	COMMERCIAL	3		124898.09	2.87													
	RESIDENTIAL	9		578495.15	13.28	30												
	Total:						**30**	13,485	8	16.1		4,844	3	**12**	82%	18%	2	1

Buidlout Flows

Basin	USE_CODE_D	Number of Parcels	BUILDING AREA	Sum_Shape_ Area	Acres	ERUs	Total Subbasin ERUs	Total Subbasin Domestic Unpeaked Flow (gpd)	Total Subbasin Domestic Unpeaked Flow (gpm)	Total Subbasin Acres	Total Subbasin Acres in 2014	Total Subbasin Peak I/I (gpd)	Total Subbasin Peak I/I (gpm)	Total Buildout Flow	% Res	% Comm	20 yr Dommestic Unpeaked Flow (gpm)	20 yr Peak I/I (gpm)
35																		
	INDUSTRIAL/MANUFACTURING	1		491611.53	11.29													
	Total:						**0**	15,412	10	11.3		3,386	2	**12**	0%	100%	2	1
36																		
	RESIDENTIAL			1470069.29	33.75	70												
	Total:						**70**	22,329	14	33.7		10,124	7	**21**	100%	0%	4	2
37																		
	INDUSTRIAL/MANUFACTURING			232014.72	5.33													
	PUBLIC	1		87618.55	2.01													
	RESIDENTIAL			7573085.31	173.85	350												
	Total:						**350**	118,921	73	181.2		54,358	38	**111**	96%	4%	19	10
38																		
	INDUSTRIAL/MANUFACTURING			512808.47	11.77													
	RESIDENTIAL			5243280.54	120.37	240												
	Total:						**590**	204,281	126	132.1		39,642	28	**154**	91%	9%	33	7
39																		
	INDUSTRIAL/MANUFACTURING			6651107.19	152.69													
	Total:						**240**	208,515	129	152.7		45,807	32	**161**	0%	100%	34	8
40																		
	INDUSTRIAL/MANUFACTURING			4276371.73	98.17													
	Total:						**0**	134,066	83	98.2		29,452	20	**103**	0%	100%	22	5
41																		
	COMMERCIAL			2075473.01	47.65													
	PUBLIC			71284.84	1.64													
	Total:						**0**	65,068	40	49.3		14,785	10	**50**	0%	100%	11	3
42																		
	RESIDENTIAL			8497737.7	195.08	390												
	Total:						**390**	390,814	242	195.1		58,524	41	**282**	100%	0%	63	11
43																		
	RECREATIONAL/OPEN SPACE			1663592.28	38.19													
	RESIDENTIAL			3365726.46	77.27	150												
	Total:						**150**	100,003	62	115.5		34,637	24	**86**	67%	33%	16	6
44																		
	INDUSTRIAL/MANUFACTURING			229617.95	5.27													
	Total:						**0**	7,199	4	5.3		1,581	1	**6**	0%	100%	1	0
	YIN Intertie							105,000	65									
					74786111	2438	5531	2840568		2438	0		555	1776			866	1185

Sum:							1434	-	866 gpd
Flow per Acre or ERU:	1923	319 gpad / gpd	gpad / gpd	#VALUE!				-	0.00 mgd
Future Flow per Acre or ERU:	300								
Flows:		866 -	gpd					1453 gpm	
		0.00 -	mgd from I/I or ERUs					2.09 mgd	
					School	0.5 eru/acre			
					comm	1365.625 gpad			
Peaking Factor	0.89	<Tweak until peaking factor			res	2 eru/acre			
	0.00	#VALUE!	Total =	#VALUE!	[Need ? MGD]				
	1	#VALUE!	gpm	#VALUE!	gpm				
					Buildout res. Eru	4051.02			
Future Commercial Flow	#DIV/0!	gpad			Total Res ERU	4293			
Future Industrial Flow	#DIV/0!	gpad							
% of buildout (as determined in GIS) applied to determine buildout flows:	90%				Buildout %	26%			

Subbasin Name	Model Node	20 yr Peaked Domestic Flow* (gpm)	20 yr I/I Peaked Flow (gpm)	% RES	% COMM
1	A-5	6.31	69.11	100%	0%
2	C-40	24.05	81.32	93%	7%
3	A-61A	72.16	85.70	87%	13%
4	A-52	14.79	22.11	68%	32%
5	F-10	14.00	28.72	76%	24%
6	D-27B	55.99	65.73	90%	10%
7	E-33	14.39	25.28	59%	41%
8	F-34	24.45	27.66	26%	74%
9	G-18	39.43	54.78	84%	17%
10	I-4	12.81	52.63	77%	23%
11	I-28	21.88	42.61	100%	0%
12	F-48	1.38	5.89	0%	100%
13	F-57	3.15	14.40	0%	100%
14	I-21	20.50	33.54	73%	27%
15	I-22	5.52	27.95	71%	29%
16	J-4	11.83	8.18	100%	0%
17	I-17	6.11	29.38	0%	100%
18	I-23	1.18	25.37	0%	100%
19	12-B	240.00	0.00	0%	100%
20	B-27	18.53	19.47	97%	3%
21	B-4	0.59	9.29	0%	100%
22	B-35	19.12	19.14	99%	1%
23	C-23A	49.09	49.65	100%	0%
24	F-40	14.39	25.01	40%	60%
25	H-32	53.82	71.12	99%	1%
26	F-47	8.67	15.73	2%	98%
27	A-15	13.80	89.88	16%	84%
28	E-20	27.80	41.48	94%	6%
29	A-14	16.30	4.02	0%	100%
30	A-5	21.68	11.59	100%	0%
31	F-58	25.11	6.20	0%	100%
32	F-48	7.21	3.16	80%	20%
33	F-58	14.97	9.15	86%	14%
34	F-54	2.18	0.88	82%	18%
35	F-58	2.49	0.62	0%	100%
36	I-23	3.61	1.84	100%	0%
37	H-36	19.25	9.88	96%	4%
38	E-28	33.06	7.21	91%	9%
39	E-33	33.75	8.33	0%	100%
40	E-33	21.70	5.36	0%	100%
41	E-33	10.53	2.69	0%	100%
42	C-40	63.25	10.64	100%	0%
43	C-1	16.18	6.30	67%	33%
44	A-10	1.17	0.29	0%	100%
YIN Intertie	F-58	64.90	0	20%	80%


Sanitary Sewer Diurnal Curves
20 comm 80 Resid
40% Commercial 60% Residential
60% Commercial 40% Residential
80% Commercial 20% Residential
100% Commercial
Peaking Factor
1.2
1
0.8
0.6
0.4
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0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Hour

Existing Manhole Results							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
I-5	762.28	05:00 hr	0	Not Full	1.017	0.35	4.383
A-45	751.604	20:00 hr	0	Not Full	0.903	0.236	6.297
H-9	758.135	21:00 hr	0	Not Full	1.025	0.192	7.225
12-B	746.297	01:00 hr	240	Not Full	0.797	0.13	7.369
H-3	754.435	21:00 hr	0	Not Full	1.053	0.053	6.547
I-20	759.887	20:00 hr	0	Not Full	0.687	0.02	5.713
H-32	761.297	06:00 hr	128.6	Not Full	0.85	0.017	6
H-6	756.387	03:00 hr	0	Not Full	1.009	0.009	7.891
H-8	757.855	08:00 hr	0	Not Full	0.84	0.006	7.56
C-22	751.816	06:00 hr	0	Not Full	0.836	0.003	7.464
B-1	740.565	07:00 hr	0	Not Full	0.952	-0.048	9.791
F-47	759.036	15:00 hr	23.06	Not Full	0.5	-0.167	4.2
A-46	752.864	03:00 hr	0	Not Full	0.5	-0.167	4.7
F-51A	747.102	08:00 hr	0	Not Full	0.43	-0.237	15.989
I-21	760.484	19:00 hr	49.048	Not Full	0.398	-0.269	5.602
F-53	749.506	19:00 hr	0	Not Full	0.396	-0.271	13.604
I-4	761.036	10:00 hr	58.9	Not Full	0.556	-0.277	6.537
I-1	760.132	15:00 hr	0	Not Full	0.552	-0.282	7.732
A-61	754.431	06:00 hr	0	Not Full	0.374	-0.295	5.126
F-51	746.885	06:00 hr	0	Not Full	0.365	-0.302	15.955
E-12	753.481	08:00 hr	0	Not Full	0.527	-0.306	7.523
F-50	745.236	06:00 hr	0	Not Full	0.36	-0.307	16.981
H-10	758.854	07:00 hr	0	Not Full	0.526	-0.307	8.229
F-52	748.38	08:00 hr	0	Not Full	0.352	-0.314	16.148
12-C	745.352	01:00 hr	0	Not Full	0.352	-0.315	7.997
I-19	759.099	06:00 hr	0	Not Full	0.344	-0.322	7.556
D-27	760.602	06:00 hr	0	Not Full	0.339	-0.328	3.761
F-49	744.693	07:00 hr	0	Not Full	0.339	-0.328	18.339
Oct-55	753.624	06:00 hr	0	Not Full	0.338	-0.329	5.162
A-13	746.589	17:00 hr	0	Not Full	0.661	-0.339	7.139
A-61A	754.959	06:00 hr	149.922	Not Full	0.327	-0.34	5.545
F-54	751.662	07:00 hr	0	Not Full	0.326	-0.341	11.344
C-32	754.014	06:00 hr	0	Not Full	0.487	-0.346	5.913
C-39	756.37	06:00 hr	0	Not Full	0.319	-0.347	4.381
A-12	746.307	17:00 hr	0	Not Full	0.645	-0.355	8.477
C-18	750.552	06:00 hr	0	Not Full	0.476	-0.358	6.924
A-53	751.746	06:00 hr	0	Not Full	0.302	-0.365	5.698
E-23	758.05	10:00 hr	0	Not Full	0.3	-0.367	5.824
A-36	750.751	16:00 hr	0	Not Full	0.445	-0.388	7.055
A-28	750.096	15:00 hr	0	Not Full	0.444	-0.39	7.856
F-58	758.736	15:00 hr	41.802	Not Full	0.273	-0.393	4.727
D-27B	761.695	06:00 hr	115.561	Not Full	0.27	-0.396	3.13

Existing Manhole Results							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
F-55	757.482	18:00 hr	0	Not Full	0.261	-0.406	6.639
A-22	749.324	09:00 hr	0	Not Full	0.426	-0.407	7.488
A-54	752.614	06:00 hr	0	Not Full	0.259	-0.408	5.641
E-25	761.282	11:00 hr	0	Not Full	2.035	-0.42	3.765
E-24	759.796	01:00 hr	0	Not Full	0.245	-0.421	5.255
E-19	758.65	06:00 hr	0	Not Full	0.245	-0.422	4.655
E-18	757.869	06:00 hr	0	Not Full	0.244	-0.423	5.913
C-19	751.245	06:00 hr	0	Not Full	0.409	-0.425	7.891
F-43	752.277	21:00 hr	0	Not Full	0.236	-0.431	9.139
I-2	760.422	09:00 hr	0	Not Full	0.402	-0.431	7.198
F-46	757.175	01:00 hr	0	Not Full	0.229	-0.437	5.071
B-3	743.036	07:00 hr	0	Not Full	0.562	-0.438	9.938
C-40	758.941	06:00 hr	107.005	Not Full	0.228	-0.438	3.972
E-14	755.932	06:00 hr	0	Not Full	0.227	-0.44	5.973
D-16	754.47	07:00 hr	0	Not Full	0.392	-0.441	6.108
D-27A	759.914	06:00 hr	0	Not Full	0.224	-0.443	3.276
E-15	756.833	06:00 hr	0	Not Full	0.212	-0.454	5.888
B-23	749.797	07:00 hr	0	Not Full	0.374	-0.459	7.126
E-32	763.407	19:00 hr	0	Not Full	0.207	-0.46	3.743
E-21	755.938	18:00 hr	0	Not Full	0.369	-0.464	6.931
H-5	755.747	18:00 hr	0	Not Full	0.535	-0.465	8.165
H-31	760.756	06:00 hr	0	Not Full	0.358	-0.476	6.342
E-11	753.234	08:00 hr	0	Not Full	0.357	-0.477	7.793
I-9A	766.186	06:00 hr	0	Not Full	0.179	-0.488	4.451
E-20	760.576	06:00 hr	71.17	Not Full	0.178	-0.488	4.322
B-4	743.417	07:00 hr	9.487	Not Full	0.509	-0.491	9.691
E-30	760.926	19:00 hr	0	Not Full	0.176	-0.491	8.954
E-22	756.505	06:00 hr	0	Not Full	0.342	-0.491	7.858
C-23A	752.685	06:00 hr	102.078	Not Full	0.342	-0.492	6.858
C-24	753.311	06:00 hr	0	Not Full	0.341	-0.493	4.459
I-25	764.071	06:00 hr	0	Not Full	0.172	-0.494	5.408
C-23	753.153	06:00 hr	0	Not Full	0.339	-0.495	5.145
A-52	753.031	19:00 hr	33.628	Not Full	0.171	-0.496	5.329
E-27	758.68	19:00 hr	0	Not Full	0.171	-0.496	6.629
E-29	760.21	19:00 hr	0	Not Full	0.167	-0.5	5.283
F-56	757.206	15:00 hr	0	Not Full	0.165	-0.502	7.133
F-57	758.498	15:00 hr	17.063	Not Full	0.165	-0.502	4.735
I-9	766.003	06:00 hr	0	Not Full	0.165	-0.502	4.747
56-A	755.594	15:00 hr	0	Not Full	0.164	-0.502	7.779
I-8	765.615	06:00 hr	0	Not Full	0.164	-0.502	5.26
E-26	758.307	19:00 hr	0	Not Full	0.164	-0.503	6.736
B-20	749.542	07:00 hr	0	Not Full	0.33	-0.503	7.37

Existing Manhole Results							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
H-2	753.769	08:00 hr	0	Not Full	0.492	-0.508	6.808
B-7	743.606	07:00 hr	0	Not Full	0.49	-0.51	8.894
H-4	755.076	20:00 hr	0	Not Full	0.49	-0.51	8.51
E-28	759.361	19:00 hr	0	Not Full	0.155	-0.511	5.995
I-27	765.103	06:00 hr	0	Not Full	0.155	-0.511	5.595
I-22	761.866	06:00 hr	32.863	Not Full	0.154	-0.513	3.677
I-16	761.778	06:00 hr	0	Not Full	0.152	-0.515	6.348
I-28	766.599	06:00 hr	65.978	Not Full	0.152	-0.515	4.518
A-50	750.918	19:00 hr	0	Not Full	0.152	-0.515	6.448
B-26	753.013	06:00 hr	0	Not Full	0.15	-0.517	6.15
I-24	763.596	06:00 hr	0	Not Full	0.145	-0.522	5.105
F-45	755.966	01:00 hr	0	Not Full	0.143	-0.524	6.47
A-47	748.676	19:00 hr	0	Not Full	0.143	-0.524	7.358
B-25	751.189	06:00 hr	0	Not Full	0.142	-0.524	5.858
E-31	763.007	19:00 hr	0	Not Full	0.138	-0.529	3.612
A-48	749.602	19:00 hr	0	Not Full	0.136	-0.531	7.064
H-7	757.044	08:00 hr	0	Not Full	0.3	-0.533	8.2
A-14	747.697	19:00 hr	0	Not Full	0.467	-0.533	7.769
A-15	747.923	06:00 hr	95.407	Not Full	0.467	-0.533	7.578
I-15	760.489	06:00 hr	0	Not Full	0.129	-0.538	7.271
I-23	763.569	13:00 hr	26.473	Not Full	0.128	-0.539	3.702
A-51	752.571	19:00 hr	0	Not Full	0.127	-0.54	5.673
D-19	755.669	06:00 hr	0	Not Full	0.293	-0.54	5.407
I-17	761.895	13:00 hr	35.09	Not Full	0.126	-0.541	6.074
E-33	766.649	19:00 hr	36.486	Not Full	0.124	-0.543	3.726
F-44	754.894	21:00 hr	0	Not Full	0.123	-0.544	5.977
D-1	750.384	07:00 hr	0	Not Full	0.289	-0.544	7.311
A-14A	746.994	18:00 hr	0	Not Full	0.456	-0.544	8.144
D-7	751.056	07:00 hr	0	Not Full	0.288	-0.545	8.012
G-13	756.873	06:00 hr	0	Not Full	0.286	-0.547	6.714
I-7	765.302	06:00 hr	0	Not Full	0.117	-0.549	4.883
J-3	754.876	06:00 hr	0	Not Full	0.115	-0.552	8.685
A-11	745.312	20:00 hr	0	Not Full	0.448	-0.552	8.352
H-29	759.022	06:00 hr	0	Not Full	0.28	-0.553	6.52
E-13	755.286	07:00 hr	0	Not Full	0.28	-0.554	7.82
J-2	753.922	06:00 hr	0	Not Full	0.113	-0.554	10.287
J-1	753.571	06:00 hr	0	Not Full	0.112	-0.555	10.888
D-21	756.376	06:00 hr	0	Not Full	0.278	-0.555	5.222
D-17	755.072	07:00 hr	0	Not Full	0.275	-0.558	4.925
J-4	756.157	06:00 hr	20.814	Not Full	0.107	-0.56	7.893
A-11A	745.987	16:00 hr	0	Not Full	0.438	-0.562	8.237
D-24	757.189	06:00 hr	0	Not Full	0.271	-0.562	4.629

Existing Manhole Results							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
I-6	763.959	06:00 hr	0	Not Full	0.099	-0.568	5.301
D-13	753.912	07:00 hr	0	Not Full	0.262	-0.571	7.536
D-15	754.215	07:00 hr	0	Not Full	0.262	-0.572	6.338
H-30	760.206	06:00 hr	0	Not Full	0.261	-0.572	5.939
C-26	753.722	06:00 hr	0	Not Full	0.26	-0.574	5.54
C-25	753.565	06:00 hr	0	Not Full	0.26	-0.574	5.299
B-2	742.071	07:00 hr	0	Not Full	0.418	-0.582	9.482
D-24A	757.957	06:00 hr	0	Not Full	0.244	-0.59	4.043
F-38	753.156	12:00 hr	0	Not Full	0.235	-0.598	6.665
H-26	756.608	06:00 hr	0	Not Full	0.395	-0.605	7.505
E-7	753.022	14:00 hr	0	Not Full	0.391	-0.609	7.909
C-36	754.445	06:00 hr	0	Not Full	0.222	-0.611	5.967
C-37	755.405	06:00 hr	0	Not Full	0.222	-0.612	5.878
C-35	754.296	06:00 hr	0	Not Full	0.222	-0.612	6.117
E-2	749.071	15:00 hr	0	Not Full	0.388	-0.612	8.112
G-9	756.399	06:00 hr	0	Not Full	0.222	-0.612	5.678
G-8	755.95	06:00 hr	0	Not Full	0.221	-0.612	5.107
B-12	746.614	07:00 hr	0	Not Full	0.387	-0.613	8.363
D-13A	752.951	07:00 hr	0	Not Full	0.218	-0.615	6.782
A-20	748.911	18:00 hr	0	Not Full	0.384	-0.616	7.561
E-5	751.909	11:00 hr	0	Not Full	0.383	-0.617	7.917
F-48	749.977	13:00 hr	7.18	Not Full	0.049	-0.617	7.551
G-18	757.484	06:00 hr	89.873	Not Full	0.213	-0.62	5.901
G-4	755.281	06:00 hr	0	Not Full	0.212	-0.622	5.888
H-13	756.392	03:00 hr	0	Not Full	0.369	-0.631	8.931
B-10	745.439	07:00 hr	0	Not Full	0.368	-0.632	8.432
F-26	753.037	15:00 hr	0	Not Full	0.189	-0.644	7.211
F-39A	754.751	12:00 hr	0	Not Full	0.189	-0.645	6.228
F-34	754.989	15:00 hr	48.332	Not Full	0.179	-0.654	6.321
B-14	747.628	07:00 hr	0	Not Full	0.345	-0.655	8.355
F-31	754.64	15:00 hr	0	Not Full	0.174	-0.659	6.726
H-36	759.281	00:00 hr	0	Not Full	0	-0.667	4.6
G-1	753.942	06:00 hr	0	Not Full	0.16	-0.674	6.54
F-24	751.39	15:00 hr	0	Not Full	0.158	-0.675	7.142
E-6	752.325	23:00 hr	0	Not Full	0.325	-0.675	8.868
E-4	751.348	06:00 hr	0	Not Full	0.323	-0.677	8.677
E-3	750.474	20:00 hr	0	Not Full	0.321	-0.679	8.979
F-25	752.589	15:00 hr	0	Not Full	0.153	-0.68	7.247
B-27	753.973	06:00 hr	39.26	Not Full	0.153	-0.68	6.047
C-17	749.951	06:00 hr	0	Not Full	0.319	-0.681	6.781
B-13	747.133	07:00 hr	0	Not Full	0.315	-0.685	7.685
F-39	755.633	12:00 hr	0	Not Full	0.148	-0.685	7.652

Existing Manhole Results							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
F-38B	753.046	15:00 hr	0	Not Full	0.145	-0.688	6.921
B-8	744.271	07:00 hr	0	Not Full	0.311	-0.689	7.789
B-18	748.261	07:00 hr	0	Not Full	0.307	-0.693	7.762
B-24	750.362	06:00 hr	0	Not Full	0.132	-0.701	6.768
F-38A	754.535	12:00 hr	0	Not Full	0.126	-0.707	5.674
B-9	745.019	07:00 hr	0	Not Full	0.293	-0.707	7.907
B-11	746.235	07:00 hr	0	Not Full	0.287	-0.713	8.713
F-40	756.974	12:00 hr	36.536	Not Full	0.111	-0.722	7.289
F-37	752.447	15:00 hr	0	Not Full	0.768	-0.732	7.732
E-1	748.386	08:00 hr	0	Not Full	0.267	-0.733	8.633
H-1	753.103	06:00 hr	0	Not Full	0.506	-0.744	7.394
H-27	757.929	06:00 hr	0	Not Full	0.231	-0.769	6.369
F-35	751.396	14:00 hr	0	Not Full	0.719	-0.781	7.781
F-36	751.89	17:00 hr	0	Not Full	0.687	-0.813	7.713
A-4	740.471	07:00 hr	0	Not Full	1.68	-0.82	8.148
F-23	750.343	11:00 hr	0	Not Full	0.92	-0.83	7.98
B-6	743.603	07:00 hr	0	Not Full	0.603	-0.861	9.111
C-11	748.535	07:00 hr	0	Not Full	0.367	-0.883	7.588
C-13	748.965	06:00 hr	0	Not Full	0.366	-0.884	6.934
B-28	743.758	07:00 hr	0	Not Full	0.344	-0.906	8.23
B-35	744.862	07:00 hr	34.455	Not Full	0.344	-0.906	8.235
C-5	746.892	07:00 hr	0	Not Full	0.341	-0.909	7.528
C-7	747.491	07:00 hr	0	Not Full	0.34	-0.91	7.587
C-9	748.075	07:00 hr	0	Not Full	0.34	-0.91	8.76
C-1	745.628	07:00 hr	0	Not Full	0.317	-0.933	7.816
C-3	746.278	07:00 hr	0	Not Full	0.317	-0.933	7.383
A-24	750.813	14:00 hr	0	Not Full	0.493	-1.007	8.007
A-5	740.513	07:00 hr	74.164	Not Full	1.465	-1.035	8.635
F-1	745.285	20:00 hr	0	Not Full	1.16	-1.09	7.54
F-11	747.031	20:00 hr	0	Not Full	0.583	-1.167	8.992
F-12	747.749	06:00 hr	0	Not Full	0.582	-1.168	9.45
F-21	748.613	17:00 hr	0	Not Full	0.557	-1.193	9.443
A-10	745.276	20:00 hr	0	Not Full	1.276	-1.224	8.073
F-22	749.649	18:00 hr	0	Not Full	0.459	-1.291	7.841
A-6	740.528	07:00 hr	0	Not Full	1.195	-1.305	9.805
A-3	739.841	22:00 hr	0	Not Full	1.138	-1.362	7.862
F-8	745.295	20:00 hr	0	Not Full	0.865	-1.385	8.847
F-9	745.465	13:00 hr	0	Not Full	0.73	-1.52	9.27
A-2	739.397	21:00 hr	0	Not Full	0.945	-1.555	7.055
F-10	746.231	15:00 hr	36.507	Not Full	0.548	-1.702	9.752
A-9	744.672	21:00 hr	0	Not Full	0.767	-1.733	6.533
A-1	738.241	07:00 hr	0	Not Full	0.741	-1.759	6.759

Existing Manhole Results							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
A-8	743.911	21:00 hr	0	Not Full	0.635	-1.865	6.565
A-7	742.42	21:00 hr	0	Not Full	0.476	-2.024	8.324

Existing Pipe Results														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
H-9P	H-9	H-8	350.043	07:01 hr	1.43	0.833	0.272	1	151.595	0.833	1	1.408	1.764	0.39
H-3P	H-3	H-2	424.32	07:19 hr	1.204	1	0.215	1	144.185	1	1	0.973	1.515	0.408
A-45P	A-45	A-36	279.12	06:19 hr	1.782	0.667	0.409	1	92.688	0.667	1	1.502	1.497	0.371
H-6P	H-6	H-5	447.173	07:08 hr	1.269	1	0.29	1	83.591	1	1	1.174	1.23	0.419
I-5P	I-5	I-4	322.233	06:27 hr	2.057	0.667	0.603	1	55.627	0.667	1	2.043	1.209	0.4
H-32P	H-32	H-31	128.6	06:03 hr	0.525	0.833	0.13	1	18.153	0.833	1	0.522	1.164	0.232
12-BP	12-B	12-C	240	00:03 hr	1.532	0.667	0.331	1	25.87	0.667	1	1.532	1.121	0.343
H-8P	H-8	H-7	350.018	07:04 hr	1.43	0.833	0.421	1	27.422	0.833	1	1.48	1.085	0.39
I-20P	I-20	I-19	201.534	06:11 hr	1.286	0.667	0.447	1	7.301	0.667	1	1.413	1.038	0.313
C-22P	C-22	C-19	206.59	06:07 hr	0.844	0.833	0.24	1	3.587	0.833	1	0.944	1.018	0.296
A-4P	A-4	A-3	2,076.71	20:25 hr	1.179	1.864	0.194	0.746	-216.172	1.864	0.746	1.154	0.906	0.709
F-37P	F-37	F-36	1,308.21	19:39 hr	2.152	1.074	0.459	0.716	-208.963	1.074	0.716	1.932	0.862	0.649
A-13P	A-13	A-12	331.227	19:33 hr	1.283	0.687	0.327	0.687	-74.382	0.687	0.687	1.271	0.817	0.359
I-4P	I-4	I-2	385.67	06:12 hr	2.182	0.565	0.632	0.678	-94.758	0.565	0.678	2.173	0.803	0.41
A-12P	A-12	A-11A	324.13	19:43 hr	1.276	0.677	0.326	0.677	-80.554	0.677	0.677	1.259	0.801	0.355
I-2P	I-2	I-1	384.373	06:48 hr	2.189	0.562	0.635	0.674	-98.333	0.562	0.674	1.942	0.796	0.41
E-12P	E-12	E-11	204.039	06:35 hr	1.17	0.559	0.338	0.67	-54.284	0.559	0.67	1.151	0.79	0.294
I-1P	I-1	H-10	378.168	06:53 hr	2.181	0.556	0.635	0.667	-104.006	0.556	0.667	2.176	0.784	0.406
H-10P	H-10	H-9	378.143	06:59 hr	2.182	0.555	0.635	0.667	-104.345	0.699	0.838	1.43	0.784	0.406
F-51AP	F-51A	F-51	201.42	06:31 hr	1.843	0.438	0.602	0.658	-60.46	0.438	0.658	1.833	0.769	0.313
F-36P	F-36	F-35	1,224.83	19:23 hr	2.321	0.947	0.511	0.631	-463.535	0.947	0.631	2.047	0.725	0.627
F-23P	F-23	F-22	1,067.74	19:32 hr	1.502	1.095	0.307	0.626	-424.23	1.095	0.626	1.411	0.716	0.557
F-46P	F-46	F-45	243.775	12:46 hr	2.44	0.406	0.815	0.609	-110.892	0.406	0.609	1.891	0.687	0.346
I-21P	I-21	I-20	201.557	06:07 hr	2.047	0.401	0.687	0.602	-97.253	0.531	0.796	2.042	0.675	0.313
A-36P	A-36	A-28	270.34	07:17 hr	1.762	0.5	0.529	0.6	-131.93	0.5	0.6	1.688	0.672	0.341
F-53P	F-53	F-52	201.466	06:26 hr	2.057	0.399	0.691	0.599	-99.175	0.399	0.599	2.051	0.67	0.313
C-32P	C-32	C-26	106.915	06:13 hr	0.712	0.491	0.205	0.589	-56.607	0.491	0.589	0.71	0.654	0.211
C-18P	C-18	C-17	206.54	06:16 hr	1.403	0.483	0.414	0.58	-117.428	0.483	0.58	1.395	0.638	0.296
F-35P	F-35	A-24	1,039.31	19:26 hr	2.205	0.862	0.501	0.574	-616.22	0.862	0.574	2.049	0.628	0.575
H-5P	H-5	H-4	439.115	07:11 hr	2.125	0.568	0.593	0.568	-272.839	0.568	0.568	2.077	0.617	0.415
B-3P	B-3	B-2	401.306	06:55 hr	1.964	0.563	0.551	0.563	-259.112	0.563	0.563	1.964	0.608	0.396
A-61P_2	A-61	Oct-55	149.842	06:05 hr	1.661	0.373	0.561	0.56	-98.902	0.373	0.56	1.658	0.602	0.268
A-28P	A-28	A-22	254.183	07:21 hr	1.823	0.462	0.563	0.555	-173.83	0.462	0.555	1.794	0.594	0.33
A-22P	A-22	A-20	254.08	07:23 hr	1.824	0.462	0.563	0.554	-174.183	0.462	0.554	1.766	0.593	0.33
F-45P	F-45	F-44	207.11	12:49 hr	2.327	0.369	0.796	0.554	-142.707	0.369	0.554	1.431	0.592	0.317
F-50P	F-50	F-49	200.248	06:37 hr	2.27	0.366	0.787	0.55	-142.073	0.366	0.55	2.255	0.585	0.312
F-51P	F-51	F-50	200.271	06:35 hr	2.271	0.366	0.788	0.549	-142.249	0.366	0.549	2.267	0.585	0.312
H-2P	H-2	H-1	417.583	07:23 hr	2.117	0.547	0.6	0.547	-301.968	0.547	0.547	2.027	0.58	0.404
F-52P	F-52	F-51A	201.443	06:30 hr	2.346	0.358	0.82	0.538	-155.407	0.391	0.587	1.251	0.565	0.313
12-CP	12-C	A-10	240	00:05 hr	2.86	0.352	0.951	0.528	-198.059	0.667	1	1.532	0.548	0.343

Existing Pipe Results														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
A-6P	A-6	A-5	2,024.40	20:14 hr	1.719	1.318	0.31	0.527	-1,680.94	1.33	0.532	0.778	0.546	0.699
I-19P	I-19	F-55	201.511	06:15 hr	2.465	0.345	0.875	0.517	-179.388	0.345	0.517	2.464	0.529	0.313
A-10P	A-10	A-9	1,666.56	20:00 hr	1.463	1.283	0.269	0.513	-1,522.64	1.283	0.513	1.46	0.523	0.633
F-49P	F-49	CARLSON_WW	200.248	06:41 hr	2.477	0.342	0.883	0.513	-183.898	0.342	0.513	2.469	0.521	0.312
D-27P	D-27	D-27A	115.50	06:07 hr	1.432	0.341	0.505	0.512	-106.76	0.341	0.512	1.429	0.52	0.234
10-55P	Oct-55	A-54	149.82	06:08 hr	1.864	0.34	0.658	0.51	-139.68	0.34	0.51	1.858	0.518	0.268
B-4P	B-4	B-3	401.323	06:50 hr	2.223	0.51	0.647	0.51	-376.048	0.536	0.536	1.136	0.516	0.396
A-5P	A-5	A-4	2,088.74	20:20 hr	1.864	1.267	0.342	0.507	-1,994.22	1.573	0.629	0.821	0.512	0.711
F-47P	F-47	F-46	243.777	12:44 hr	3.08	0.336	1.065	0.504	-237.042	0.364	0.547	3.068	0.507	0.346
H-4P	H-4	H-3	430.767	07:16 hr	2.452	0.499	0.722	0.499	-434.292	0.728	0.728	1.184	0.498	0.411
A-3P	A-3	A-2	2,067.63	20:30 hr	1.893	1.242	0.351	0.497	-2,114.62	1.242	0.497	1.821	0.494	0.707
C-19P	C-19	C-18	206.54	06:11 hr	1.707	0.413	0.545	0.496	-212.89	0.442	0.531	0.829	0.492	0.296
A-15P	A-15	A-14	340.37	19:23 hr	1.964	0.493	0.579	0.493	-355.85	0.493	0.493	1.916	0.489	0.364
A-14P	A-14	A-14A	340.368	19:26 hr	1.964	0.493	0.579	0.493	-356.057	0.493	0.493	1.917	0.489	0.364
F-54P	F-54	F-53	201.49	06:22 hr	2.631	0.327	0.955	0.491	-213.87	0.349	0.523	2.625	0.485	0.313
A-61AP	A-61A	A-61	149.92	06:01 hr	1.958	0.327	0.705	0.491	-159.28	0.35	0.525	0.955	0.485	0.268
C-39P	C-39	C-37	106.95	06:08 hr	1.433	0.321	0.515	0.482	-121.21	0.321	0.482	1.43	0.469	0.225
D-16P	D-16	D-15	115.395	06:26 hr	0.993	0.4	0.323	0.48	-131.932	0.4	0.48	0.984	0.467	0.219
A-14AP	A-14A	A-13	331.245	19:37 hr	2.026	0.472	0.609	0.472	-401.214	0.523	0.523	0.884	0.452	0.359
E-23P	E-23	E-22	136.446	19:25 hr	1.948	0.306	0.728	0.458	-180.592	0.306	0.458	1.931	0.43	0.255
A-53P	A-53	A-45	149.792	06:11 hr	2.144	0.305	0.8	0.457	-199.597	0.597	0.895	0.94	0.429	0.268
B-23P	B-23	B-20	152.218	06:40 hr	1.404	0.379	0.47	0.455	-206.174	0.379	0.455	1.395	0.425	0.253
E-21P	E-21	E-13	136.43	19:33 hr	1.271	0.376	0.428	0.451	-189.219	0.376	0.451	1.261	0.419	0.239
A-11AP	A-11A	A-11	324.118	19:37 hr	2.098	0.451	0.644	0.451	-449.533	0.451	0.451	2.068	0.419	0.355
E-11P	E-11	E-7	203.48	06:36 hr	1.918	0.373	0.649	0.448	-289.699	0.373	0.448	1.878	0.413	0.294
H-1P	H-1	F-37	495.022	07:28 hr	2.094	0.555	0.581	0.444	-720.688	0.59	0.472	0.761	0.407	0.413
A-46P	A-46	A-45	130	00:27 hr	1.971	0.292	0.753	0.438	-197.676	0.667	1	0.83	0.397	0.249
H-31P	H-31	H-30	128.48	06:07 hr	1.266	0.361	0.435	0.433	-202.341	0.361	0.433	1.261	0.388	0.232
E-7P	E-7	E-6	201.955	06:41 hr	1.433	0.421	0.456	0.421	-344.408	0.421	0.421	1.382	0.37	0.278
E-2P	E-2	E-1	195.813	07:03 hr	1.39	0.421	0.442	0.421	-334.079	0.421	0.421	1.336	0.37	0.273
B-1P	B-1	A-6	401.305	06:58 hr	2.872	0.418	0.914	0.418	-696.722	1	1	1.138	0.365	0.396
B-2P	B-2	B-1	401.305	06:58 hr	2.872	0.418	0.915	0.418	-696.727	0.685	0.685	1.138	0.365	0.396
E-22P	E-22	E-21	136.438	19:28 hr	1.429	0.344	0.502	0.413	-245.086	0.344	0.413	1.424	0.358	0.239
E-5P	E-5	E-4	199.416	06:48 hr	1.452	0.413	0.466	0.413	-359.09	0.413	0.413	1.398	0.357	0.276
C-24P	C-24	C-23	106.893	06:17 hr	1.123	0.344	0.393	0.412	-193.235	0.344	0.412	1.118	0.356	0.211
C-23P	C-23	C-23A	106.885	06:22 hr	1.126	0.343	0.394	0.411	-194.339	0.343	0.411	1.114	0.355	0.211
C-23AP	C-23A	C-22	206.65	06:03 hr	2.179	0.343	0.767	0.411	-376.77	0.589	0.706	0.84	0.354	0.296
F-58P	F-58	F-57	41.802	15:02 hr	0.691	0.274	0.272	0.41	-76.627	0.274	0.41	0.69	0.353	0.139
F-1P	F-1	A-10	1,140.84	19:56 hr	1.658	0.922	0.356	0.41	-2,100.93	1.218	0.541	0.507	0.352	0.537
A-20P	A-20	A-15	241.987	07:28 hr	1.796	0.407	0.581	0.407	-453.815	0.412	0.412	0.616	0.348	0.305

Existing Pipe Results														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
D-27BP	D-27B	D-27	115.561	06:03 hr	1.932	0.271	0.765	0.407	-217.295	0.305	0.457	0.733	0.347	0.234
A-2P	A-2	A-1	2,057.88	20:39 hr	2.468	1.01	0.506	0.404	-3,939.76	1.01	0.404	2.387	0.343	0.705
H-26P	H-26	H-13	128.39	06:20 hr	0.965	0.403	0.313	0.403	-247.127	0.403	0.403	0.955	0.342	0.22
F-11P	F-11	F-10	1,152.91	19:42 hr	2.836	0.704	0.697	0.402	-2,230.90	0.704	0.402	2.575	0.341	0.58
B-20P	B-20	B-18	152.206	06:45 hr	1.664	0.333	0.594	0.4	-299.432	0.333	0.4	1.657	0.337	0.253
F-44P	F-44	F-43	188.78	12:50 hr	3.246	0.265	1.273	0.398	-376.19	0.265	0.398	1.786	0.334	0.302
F-55P	F-55	F-54	201.488	06:19 hr	3.495	0.264	1.403	0.396	-408.926	0.285	0.428	3.463	0.33	0.313
F-9P	F-9	F-8	1,167.53	19:49 hr	1.792	0.885	0.393	0.393	-2,408.31	0.885	0.393	1.623	0.327	0.543
A-54P	A-54	A-53	149.792	06:10 hr	2.64	0.261	1.066	0.391	-313.983	0.28	0.42	0.942	0.323	0.268
A-24P	A-24	F-23	1,023.28	19:27 hr	3.59	0.583	0.97	0.389	-2,179.14	0.684	0.456	0.943	0.32	0.571
B-12P	B-12	B-11	152.179	06:59 hr	1.209	0.387	0.401	0.387	-328.262	0.387	0.387	1.209	0.317	0.24
F-43P	F-43	CARLSON_WW	176.55	12:52 hr	3.187	0.256	1.298	0.384	-388.37	0.256	0.384	3.058	0.313	0.292
F-8P	F-8	F-1	1,163.38	19:54 hr	1.863	0.857	0.415	0.381	-2,614.00	1.012	0.45	0.478	0.308	0.542
F-21P	F-21	F-12	1,010.64	19:37 hr	2.736	0.656	0.697	0.375	-2,371.39	0.656	0.375	2.511	0.299	0.542
F-12P	F-12	F-11	988.632	19:40 hr	2.72	0.648	0.697	0.37	-2,394.70	0.648	0.37	2.572	0.292	0.536
E-18P	E-18	E-15	71.109	06:10 hr	1.353	0.246	0.562	0.369	-173.409	0.246	0.369	1.346	0.291	0.182
E-25P	E-25	E-24	100	00:54 hr	1.902	0.246	0.786	0.369	-243.928	0.246	0.369	1.902	0.291	0.217
E-19P	E-19	E-18	71.109	06:05 hr	1.354	0.246	0.563	0.369	-173.657	0.246	0.369	1.35	0.291	0.182
B-10P	B-10	B-9	152.166	07:06 hr	1.288	0.369	0.438	0.369	-372.126	0.369	0.369	1.287	0.29	0.24
E-24P	E-24	E-23	100	00:59 hr	1.91	0.245	0.795	0.368	-245.886	0.245	0.368	1.91	0.289	0.217
H-7P	H-7	H-6	328.949	07:04 hr	4.106	0.302	1.541	0.363	-842.052	0.588	0.706	1.33	0.281	0.378
D-19P	D-19	D-17	115.417	06:21 hr	1.464	0.299	0.553	0.358	-304.39	0.299	0.358	1.45	0.275	0.219
E-6P	E-6	E-5	201.136	06:44 hr	1.793	0.355	0.621	0.355	-543.154	0.355	0.355	1.711	0.27	0.277
A-11P	A-11	A-10	318.413	19:39 hr	2.881	0.351	1.004	0.351	-884.149	0.862	0.862	0.886	0.265	0.351
D-1P	D-1	B-23	115.355	06:40 hr	1.507	0.292	0.576	0.351	-321.919	0.331	0.398	0.462	0.264	0.219
D-7P	D-7	D-1	115.369	06:36 hr	1.507	0.292	0.576	0.351	-322.024	0.292	0.351	1.483	0.264	0.219
E-13P	E-13	E-12	205.055	06:34 hr	2.723	0.289	1.046	0.346	-589.693	0.398	0.478	0.788	0.258	0.295
B-14P	B-14	B-13	152.192	06:52 hr	1.403	0.346	0.492	0.346	-437.705	0.346	0.346	1.4	0.258	0.24
E-14P	E-14	E-13	71.078	06:15 hr	1.483	0.23	0.638	0.345	-206.489	0.25	0.375	1.472	0.256	0.182
G-13P	G-13	G-9	89.829	06:05 hr	1.201	0.287	0.463	0.345	-261.714	0.287	0.345	1.199	0.256	0.193
E-4P	E-4	E-3	198.499	06:52 hr	1.852	0.344	0.652	0.344	-583.36	0.344	0.344	1.792	0.254	0.275
C-40P	C-40	C-39	107.005	06:04 hr	2.246	0.229	0.969	0.344	-314.567	0.274	0.411	0.68	0.254	0.225
H-29P	H-29	H-27	128.42	06:14 hr	1.741	0.284	0.675	0.341	-384.079	0.284	0.341	1.728	0.251	0.232
D-21P	D-21	D-19	115.436	06:17 hr	1.583	0.282	0.616	0.338	-352.439	0.286	0.343	0.459	0.247	0.219
D-27AP	D-27A	D-24A	115.483	06:08 hr	2.477	0.225	1.078	0.338	-353.331	0.234	0.351	0.727	0.246	0.234
A-9P	A-9	A-8	1,651.90	20:03 hr	2.534	0.842	0.571	0.337	-5,107.03	0.842	0.337	2.41	0.244	0.63
D-17P	D-17	D-16	115.409	06:24 hr	1.594	0.281	0.622	0.337	-357.011	0.333	0.4	0.454	0.244	0.219
E-3P	E-3	E-2	196.747	06:57 hr	1.897	0.335	0.677	0.335	-614.432	0.337	0.337	1.852	0.243	0.274
D-24P	D-24	D-21	115.443	06:14 hr	1.647	0.274	0.651	0.329	-379.095	0.274	0.329	0.462	0.233	0.219
C-17P	C-17	C-13	206.51	06:19 hr	2.091	0.324	0.761	0.324	-705.178	0.343	0.343	0.569	0.227	0.281

Existing Pipe Results														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
E-15P	E-15	E-14	71.078	06:12 hr	1.631	0.215	0.729	0.322	-245.829	0.22	0.329	0.444	0.224	0.182
D-13P	D-13	D-13A	115.386	06:30 hr	1.711	0.266	0.686	0.32	-405.831	0.266	0.32	1.696	0.221	0.219
D-15P	D-15	D-13	115.39	06:27 hr	1.711	0.266	0.686	0.32	-406.14	0.266	0.32	1.691	0.221	0.219
H-30P	H-30	H-29	128.48	06:11 hr	1.926	0.264	0.776	0.317	-460.943	0.271	0.325	0.514	0.218	0.232
B-13P	B-13	B-12	152.19	06:56 hr	1.595	0.316	0.588	0.316	-552.32	0.351	0.351	1.369	0.216	0.24
F-22P	F-22	F-21	1,030.18	19:34 hr	3.526	0.552	0.981	0.316	-3,740.12	0.552	0.316	3.175	0.216	0.547
C-25P	C-25	C-24	106.902	06:15 hr	1.625	0.262	0.658	0.314	-392.999	0.3	0.36	0.43	0.214	0.211
C-26P	C-26	C-25	106.912	06:14 hr	1.626	0.262	0.658	0.314	-393.281	0.262	0.314	1.62	0.214	0.211
A-1P	A-1	WWTF	2,049.08	20:42 hr	3.462	0.785	0.81	0.314	-7,537.90	0.785	0.314	3.356	0.214	0.704
B-8P	B-8	B-7	152.154	07:14 hr	1.615	0.313	0.598	0.313	-565.032	0.401	0.401	0.428	0.212	0.24
B-6P	B-6	B-4	391.85	06:49 hr	2.678	0.389	0.89	0.311	-1,470.45	0.449	0.359	0.71	0.21	0.366
E-32P	E-32	E-31	36.49	19:06 hr	0.879	0.207	0.4	0.311	-137.58	0.207	0.311	0.878	0.21	0.13
B-18P	B-18	B-14	152.20	06:49 hr	1.643	0.309	0.613	0.309	-582.09	0.326	0.326	0.427	0.207	0.24
E-1P	E-1	F-11	194.106	07:07 hr	2.141	0.304	0.804	0.304	-770.947	0.405	0.405	0.426	0.201	0.272
C-11P	C-11	C-9	206.478	06:26 hr	1.497	0.373	0.509	0.298	-859.134	0.373	0.298	1.484	0.194	0.264
C-13P	C-13	C-11	206.502	06:22 hr	1.498	0.373	0.509	0.298	-859.861	0.373	0.298	1.483	0.194	0.264
D-24AP	D-24A	D-24	115.47	06:10 hr	1.916	0.246	0.803	0.295	-494.87	0.257	0.309	0.464	0.189	0.219
B-9P	B-9	B-8	152.16	07:10 hr	1.763	0.294	0.676	0.294	-658.31	0.302	0.302	0.429	0.188	0.24
F-10P	F-10	F-9	1,167.53	19:45 hr	2.679	0.659	0.683	0.293	-5,074.16	0.659	0.293	0.455	0.187	0.543
B-11P	B-11	B-10	152.173	07:03 hr	1.819	0.287	0.706	0.287	-694.63	0.328	0.328	0.431	0.18	0.24
F-38P	F-38	F-38B	36.506	12:08 hr	0.639	0.236	0.274	0.284	-171.56	0.236	0.284	0.637	0.175	0.122
B-7P	B-7	B-6	152.146	07:15 hr	1.88	0.28	0.739	0.28	-734.31	0.546	0.546	0.428	0.172	0.24
A-8P	A-8	A-7	1,651.90	20:06 hr	3.268	0.7	0.811	0.28	-7,983.07	0.7	0.28	3.091	0.171	0.63
B-35P	B-35	B-28	242.457	06:45 hr	1.954	0.346	0.693	0.277	-1,208.47	0.346	0.277	1.929	0.167	0.286
B-28P	B-28	B-6	242.438	06:46 hr	1.955	0.345	0.693	0.276	-1,209.73	0.473	0.379	0.436	0.167	0.286
C-9P	C-9	C-7	206.47	06:29 hr	1.676	0.344	0.596	0.275	-1,041.67	0.344	0.275	1.654	0.165	0.264
C-7P	C-7	C-5	206.455	06:33 hr	1.677	0.344	0.596	0.275	-1,042.25	0.344	0.275	1.652	0.165	0.264
C-5P	C-5	C-3	206.441	06:36 hr	1.677	0.344	0.596	0.275	-1,042.34	0.344	0.275	1.67	0.165	0.264
I-9AP	I-9A	I-9	22.349	06:05 hr	0.656	0.18	0.323	0.27	-118.193	0.18	0.27	0.655	0.159	0.101
E-20P	E-20	E-19	71.17	06:02 hr	2.106	0.179	1.039	0.268	-381.267	0.212	0.317	0.452	0.157	0.182
C-36P	C-36	C-35	106.925	06:10 hr	2.031	0.223	0.897	0.268	-575.777	0.223	0.268	2.025	0.157	0.211
C-37P	C-37	C-36	106.952	06:10 hr	2.032	0.223	0.898	0.267	-576.431	0.223	0.267	0.433	0.157	0.211
C-35P	C-35	C-32	106.925	06:11 hr	2.032	0.223	0.898	0.267	-576.342	0.354	0.425	0.432	0.156	0.211
G-9P	G-9	G-8	89.818	06:06 hr	1.711	0.223	0.757	0.267	-485.879	0.223	0.267	1.707	0.156	0.193
G-8P	G-8	G-4	89.82	06:07 hr	1.711	0.222	0.757	0.267	-486.27	0.222	0.267	1.706	0.156	0.193
D-13AP	D-13A	D-7	115.38	06:33 hr	2.218	0.221	0.984	0.265	-633.66	0.253	0.304	0.458	0.154	0.219
E-30P	E-30	E-29	36.478	19:14 hr	1.102	0.176	0.548	0.264	-202.192	0.176	0.264	1.1	0.153	0.129
I-25P	I-25	I-24	43.58	06:07 hr	1.348	0.173	0.677	0.26	-251.426	0.173	0.26	1.344	0.148	0.142
E-27P	E-27	E-26	36.471	19:21 hr	1.14	0.172	0.575	0.258	-213.934	0.172	0.258	1.137	0.146	0.129
A-52P	A-52	A-51	33.628	19:02 hr	1.057	0.171	0.534	0.257	-198.97	0.171	0.257	1.056	0.145	0.124

Existing Pipe Results														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
G-18P	G-18	G-13	89.873	06:01 hr	1.811	0.214	0.819	0.256	-533.77	0.25	0.3	0.366	0.144	0.193
G-4P	G-4	G-1	89.801	06:11 hr	1.814	0.213	0.821	0.256	-535.276	0.213	0.256	1.806	0.144	0.193
C-3P	C-3	C-1	206.433	06:39 hr	1.866	0.319	0.691	0.255	-1,244.66	0.319	0.255	1.834	0.142	0.264
C-1P	C-1	B-35	206.415	06:41 hr	1.867	0.318	0.692	0.255	-1,245.27	0.33	0.264	0.371	0.142	0.264
E-29P	E-29	E-28	36.474	19:17 hr	1.184	0.167	0.605	0.251	-227.608	0.167	0.251	1.181	0.138	0.129
I-8P	I-8	I-7	22.34	06:12 hr	0.735	0.166	0.377	0.249	-142.365	0.166	0.249	0.731	0.136	0.101
I-9P	I-9	I-8	22.349	06:10 hr	0.735	0.166	0.378	0.249	-142.524	0.166	0.249	0.732	0.136	0.101
F-56P	F-56	56-A	58.829	15:05 hr	1.95	0.165	1.006	0.247	-380.007	0.165	0.247	1.949	0.134	0.165
56-AP	56-A	CARLSON_WW	58.821	15:08 hr	1.95	0.165	1.006	0.247	-380.052	0.165	0.247	1.948	0.134	0.165
F-57P	F-57	F-56	58.832	15:03 hr	1.952	0.165	1.007	0.247	-380.501	0.165	0.247	1.919	0.134	0.165
E-26P	E-26	E-23	36.471	19:23 hr	1.213	0.164	0.626	0.247	-236.858	0.227	0.341	1.21	0.133	0.129
H-13P	H-13	H-6	128.375	06:22 hr	1.94	0.243	0.824	0.243	-863.962	0.689	0.689	0.35	0.129	0.22
H-27P	H-27	H-26	128.42	06:17 hr	2.039	0.235	0.883	0.235	-935.98	0.313	0.313	0.353	0.121	0.22
E-28P	E-28	E-27	36.474	19:20 hr	1.306	0.156	0.693	0.234	-266.625	0.163	0.245	0.231	0.12	0.129
I-27P	I-27	I-25	43.58	06:05 hr	1.561	0.156	0.829	0.234	-319.012	0.164	0.246	0.276	0.12	0.142
I-22P_2	I-22	LINDEN_WW	58.491	06:05 hr	2.141	0.154	1.146	0.231	-443.132	0.154	0.231	2.14	0.117	0.165
I-16P	I-16	I-15	43.564	06:12 hr	1.599	0.153	0.856	0.23	-331.326	0.153	0.23	1.59	0.116	0.142
I-28P	I-28	I-27	43.613	06:03 hr	1.616	0.152	0.869	0.229	-336.975	0.154	0.231	0.277	0.115	0.142
I-28P2	I-28	I-9A	22.365	06:03 hr	0.829	0.152	0.446	0.229	-172.805	0.166	0.248	0.142	0.115	0.101
A-50P	A-50	A-48	33.619	19:09 hr	1.249	0.152	0.672	0.228	-260.75	0.152	0.228	1.247	0.114	0.124
F-26P	F-26	F-25	48.32	15:10 hr	1.153	0.19	0.556	0.228	-376.90	0.19	0.228	1.152	0.114	0.141
F-39AP	F-39A	F-38A	36.512	12:06 hr	0.872	0.19	0.421	0.227	-285.323	0.19	0.227	0.87	0.113	0.122
B-26P	B-26	B-25	39.219	06:07 hr	1.477	0.151	0.799	0.226	-310.75	0.151	0.226	1.47	0.112	0.134
I-24P	I-24	I-16	43.564	06:09 hr	1.713	0.146	0.942	0.219	-369.862	0.149	0.223	0.274	0.105	0.142
B-25P	B-25	B-24	39.219	06:09 hr	1.578	0.144	0.875	0.216	-345.226	0.144	0.216	1.569	0.102	0.134
F-34P	F-34	F-31	48.332	15:01 hr	1.249	0.179	0.62	0.215	-427.795	0.179	0.215	1.249	0.102	0.141
A-47P_2	A-47	SOUTH_BEECH_WW	33.615	19:12 hr	1.361	0.143	0.756	0.215	-298.742	0.143	0.215	1.359	0.101	0.124
A-7P	A-7	A-6	1,651.90	20:07 hr	4.832	0.531	1.385	0.212	-15,051.80	0.83	0.332	0.602	0.099	0.63
F-31P	F-31	F-26	48.323	15:07 hr	1.298	0.174	0.654	0.209	-454.589	0.182	0.218	0.197	0.096	0.141
E-31P	E-31	E-30	36.478	19:10 hr	1.553	0.138	0.88	0.207	-350.843	0.157	0.235	0.232	0.094	0.129
A-48P	A-48	A-47	33.62	19:10 hr	1.459	0.136	0.832	0.205	-333.14	0.139	0.209	0.213	0.092	0.124
I-15P_2	I-15	PENNY_WW	43.556	06:13 hr	2.027	0.13	1.186	0.195	-480.917	0.13	0.195	2.015	0.083	0.142
G-1P	G-1	H-1	89.79	06:11 hr	2.708	0.161	1.423	0.193	-1,010.62	0.333	0.4	0.361	0.082	0.193
I-23P	I-23	I-22	26.473	13:04 hr	1.263	0.128	0.746	0.191	-303.822	0.14	0.21	0.169	0.08	0.11
A-51P	A-51	A-50	33.619	19:04 hr	1.611	0.127	0.953	0.191	-388.167	0.139	0.209	0.214	0.08	0.124
F-24P	F-24	F-23	48.319	15:17 hr	1.485	0.159	0.786	0.191	-559.992	0.533	0.64	0.196	0.079	0.141
I-17P	I-17	I-1	35.09	13:01 hr	1.71	0.126	1.018	0.189	-415.832	0.126	0.189	1.71	0.078	0.127
E-33P	E-33	E-32	36.486	19:03 hr	1.822	0.124	1.094	0.186	-448.849	0.165	0.248	0.233	0.075	0.13
F-25P	F-25	F-24	48.319	15:12 hr	1.557	0.154	0.839	0.184	-602.338	0.156	0.187	0.196	0.074	0.141
B-27P	B-27	B-26	39.26	06:03 hr	1.268	0.153	0.684	0.184	-491.008	0.153	0.184	1.265	0.074	0.126

Existing Pipe Results														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
F-39P	F-39	F-39A	36.528	12:04 hr	1.236	0.149	0.678	0.178	-490.605	0.168	0.202	0.148	0.069	0.122
I-7P	I-7	I-6	22.34	06:16 hr	1.185	0.119	0.727	0.178	-301.559	0.119	0.178	1.177	0.069	0.101
F-38BP	F-38B	F-37	36.501	12:12 hr	1.265	0.146	0.7	0.175	-508.315	0.457	0.548	0.147	0.067	0.122
J-3P	J-3	J-2	20.788	06:04 hr	1.149	0.115	0.715	0.173	-298.473	0.115	0.173	1.145	0.065	0.097
J-2P	J-2	J-1	20.788	06:05 hr	1.179	0.113	0.741	0.17	-310.409	0.113	0.17	1.175	0.063	0.097
J-1P_2	J-1	IDAHO_WW	20.775	06:06 hr	1.186	0.113	0.748	0.169	-313.617	0.113	0.169	1.181	0.062	0.097
J-4P	J-4	J-3	20.814	06:02 hr	1.277	0.107	0.826	0.161	-350.177	0.111	0.166	0.132	0.056	0.097
B-24P	B-24	B-23	39.198	06:10 hr	1.544	0.134	0.894	0.16	-662.715	0.251	0.302	0.157	0.056	0.126
F-38AP	F-38A	F-38	36.511	12:07 hr	1.552	0.127	0.924	0.152	-692.336	0.181	0.217	0.147	0.05	0.122
I-6P	I-6	I-5	22.334	06:19 hr	1.504	0.101	1.005	0.151	-431.986	0.556	0.834	0.139	0.049	0.101
F-40P	F-40	F-39	36.536	12:00 hr	1.881	0.111	1.2	0.133	-921.386	0.13	0.156	0.149	0.038	0.122
F-48P	F-48	BRANDING_IRON_WW	7.18	13:01 hr	1.376	0.049	1.328	0.074	-645.042	0.049	0.074	1.376	0.011	0.057
H-36P	H-36	H-27	0	00:00 hr	0	0	0	0	-509.794	0.115	0.173	0	0	0

2035 Manhole Results							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
12-B	747.597	01:00 hr	420	Not Full	2.097	1.43	6.069
B-1	741.551	08:00 hr	0	Not Full	1.938	0.938	8.805
I-5	762.28	05:00 hr	0	Not Full	1.017	0.35	4.383
A-45	751.604	20:00 hr	0	Not Full	0.903	0.236	6.297
H-9	758.135	21:00 hr	0	Not Full	1.025	0.192	7.225
C-22	751.934	06:00 hr	0	Not Full	0.953	0.12	7.347
E-23	758.523	05:00 hr	0	Not Full	0.773	0.107	5.351
E-12	753.883	08:00 hr	0	Not Full	0.929	0.096	7.121
H-3	754.457	21:00 hr	0	Not Full	1.075	0.075	6.525
E-27	759.235	06:00 hr	0	Not Full	0.726	0.059	6.074
E-21	756.429	07:00 hr	0	Not Full	0.861	0.027	6.439
I-20	759.892	07:00 hr	0	Not Full	0.692	0.025	5.708
H-6	756.401	03:00 hr	0	Not Full	1.024	0.024	7.876
A-4	741.313	08:00 hr	0	Not Full	2.522	0.022	7.306
H-32	761.297	06:00 hr	128.6	Not Full	0.85	0.017	6
C-32	754.374	06:00 hr	0	Not Full	0.847	0.014	5.553
H-8	757.855	08:00 hr	0	Not Full	0.84	0.006	7.56
E-26	758.679	06:00 hr	0	Not Full	0.536	-0.131	6.364
A-5	741.406	08:00 hr	98.138	Not Full	2.358	-0.142	7.742
12-C	745.523	01:00 hr	0	Not Full	0.523	-0.143	7.826
F-47	759.036	07:00 hr	18.624	Not Full	0.5	-0.167	4.2
A-46	752.864	03:00 hr	0	Not Full	0.5	-0.167	4.7
E-28	759.697	06:00 hr	206.754	Not Full	0.491	-0.176	5.659
E-22	756.812	06:00 hr	0	Not Full	0.649	-0.184	7.551
F-58	758.942	15:00 hr	102.506	Not Full	0.479	-0.188	4.521
C-39	756.5	06:00 hr	0	Not Full	0.45	-0.217	4.25
F-51A	747.117	09:00 hr	0	Not Full	0.445	-0.222	15.974
C-18	750.656	07:00 hr	0	Not Full	0.58	-0.253	6.82
F-53	749.523	18:00 hr	0	Not Full	0.413	-0.254	13.587
I-21	760.488	06:00 hr	51.785	Not Full	0.401	-0.266	5.599
I-4	761.036	10:00 hr	58.9	Not Full	0.556	-0.277	6.537
E-11	753.432	08:00 hr	0	Not Full	0.555	-0.278	7.595
E-32	763.587	13:00 hr	0	Not Full	0.388	-0.279	3.562
I-1	760.132	15:00 hr	0	Not Full	0.552	-0.282	7.732
F-50	745.252	17:00 hr	0	Not Full	0.376	-0.291	16.965
F-51	746.896	17:00 hr	0	Not Full	0.376	-0.291	15.944
A-61	754.431	06:00 hr	0	Not Full	0.374	-0.295	5.126
F-52	748.391	09:00 hr	0	Not Full	0.363	-0.304	16.137
H-10	758.854	07:00 hr	0	Not Full	0.526	-0.307	8.229
F-49	744.706	20:00 hr	0	Not Full	0.352	-0.315	18.327
A-13	746.61	17:00 hr	0	Not Full	0.682	-0.318	7.118
F-45	756.17	10:00 hr	0	Not Full	0.347	-0.32	6.267

2035 Manhole Results							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
I-19	759.097	07:00 hr	0	Not Full	0.343	-0.324	7.557
F-54	751.678	06:00 hr	16.047	Not Full	0.342	-0.325	11.328
D-27	760.602	06:00 hr	0	Not Full	0.339	-0.328	3.761
Oct-55	753.624	06:00 hr	0	Not Full	0.338	-0.329	5.162
A-6	741.502	08:00 hr	0	Not Full	2.169	-0.331	8.831
A-12	746.328	17:00 hr	0	Not Full	0.666	-0.334	8.456
A-61A	754.959	06:00 hr	149.922	Not Full	0.327	-0.34	5.545
C-19	751.324	06:00 hr	0	Not Full	0.488	-0.345	7.812
E-30	761.07	13:00 hr	0	Not Full	0.32	-0.347	4.93
B-3	743.116	07:00 hr	0	Not Full	0.642	-0.358	9.858
C-40	759.02	06:00 hr	185.196	Not Full	0.308	-0.359	3.892
A-53	751.746	06:00 hr	0	Not Full	0.302	-0.365	5.698
E-29	760.345	13:00 hr	0	Not Full	0.302	-0.365	5.148
C-24	753.433	06:00 hr	0	Not Full	0.463	-0.371	4.337
E-2	749.31	07:00 hr	0	Not Full	0.627	-0.373	7.873
C-23	753.272	06:00 hr	0	Not Full	0.458	-0.375	5.025
A-36	750.751	16:00 hr	0	Not Full	0.445	-0.388	7.055
A-28	750.096	15:00 hr	0	Not Full	0.444	-0.39	7.856
D-27B	761.695	06:00 hr	115.561	Not Full	0.27	-0.396	3.13
E-7	753.233	14:00 hr	0	Not Full	0.602	-0.398	7.698
F-55	757.481	17:00 hr	0	Not Full	0.26	-0.407	6.64
A-22	749.324	09:00 hr	0	Not Full	0.426	-0.407	7.488
A-54	752.614	06:00 hr	0	Not Full	0.259	-0.408	5.641
E-13	755.431	07:00 hr	0	Not Full	0.425	-0.409	7.675
E-5	752.116	11:00 hr	0	Not Full	0.589	-0.411	7.711
E-25	761.282	11:00 hr	0	Not Full	2.035	-0.42	3.765
E-24	759.796	01:00 hr	0	Not Full	0.245	-0.421	5.255
E-19	758.65	06:00 hr	0	Not Full	0.245	-0.422	4.655
E-31	763.114	13:00 hr	0	Not Full	0.245	-0.422	3.505
E-18	757.869	06:00 hr	0	Not Full	0.244	-0.423	5.913
B-4	743.485	07:00 hr	9.487	Not Full	0.577	-0.423	9.623
F-43	752.282	15:00 hr	0	Not Full	0.241	-0.426	9.134
F-56	757.279	15:00 hr	0	Not Full	0.238	-0.429	7.06
F-57	758.571	15:00 hr	17.063	Not Full	0.238	-0.429	4.662
56-A	755.667	15:00 hr	0	Not Full	0.237	-0.429	7.706
C-23A	752.747	06:00 hr	102.078	Not Full	0.404	-0.43	6.796
I-2	760.422	09:00 hr	0	Not Full	0.402	-0.431	7.198
E-14	755.932	06:00 hr	0	Not Full	0.227	-0.44	5.973
D-16	754.47	07:00 hr	0	Not Full	0.392	-0.441	6.108
D-27A	759.914	06:00 hr	0	Not Full	0.224	-0.443	3.276
H-5	755.765	18:00 hr	0	Not Full	0.553	-0.447	8.147
A-11	745.417	21:00 hr	0	Not Full	0.553	-0.447	8.247

2035 Manhole Results							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
E-33	766.743	13:00 hr	111.643	Not Full	0.217	-0.449	3.633
E-15	756.833	06:00 hr	0	Not Full	0.212	-0.454	5.888
B-23	749.797	07:00 hr	0	Not Full	0.374	-0.459	7.126
B-7	743.651	07:00 hr	0	Not Full	0.535	-0.465	8.849
H-31	760.756	06:00 hr	0	Not Full	0.358	-0.476	6.342
I-9A	766.186	06:00 hr	0	Not Full	0.179	-0.488	4.451
C-26	753.808	06:00 hr	0	Not Full	0.345	-0.488	5.455
E-20	760.576	06:00 hr	71.181	Not Full	0.178	-0.488	4.322
C-25	753.65	06:00 hr	0	Not Full	0.345	-0.489	5.214
H-2	753.788	08:00 hr	0	Not Full	0.511	-0.489	6.789
H-4	755.093	20:00 hr	0	Not Full	0.507	-0.493	8.493
I-25	764.071	06:00 hr	0	Not Full	0.172	-0.494	5.408
C-35	754.413	06:00 hr	0	Not Full	0.339	-0.495	6
A-52	753.031	19:00 hr	33.628	Not Full	0.171	-0.496	5.329
E-4	751.523	06:00 hr	0	Not Full	0.498	-0.502	8.502
I-9	766.003	06:00 hr	0	Not Full	0.165	-0.502	4.747
I-8	765.615	06:00 hr	0	Not Full	0.164	-0.502	5.26
B-20	749.542	07:00 hr	0	Not Full	0.33	-0.503	7.37
E-3	750.65	07:00 hr	0	Not Full	0.497	-0.503	8.803
I-22	761.873	06:00 hr	32.863	Not Full	0.161	-0.506	3.67
I-27	765.103	06:00 hr	0	Not Full	0.155	-0.511	5.595
F-44	754.924	10:00 hr	0	Not Full	0.152	-0.514	5.948
I-16	761.778	06:00 hr	0	Not Full	0.152	-0.515	6.348
I-28	766.599	06:00 hr	65.978	Not Full	0.152	-0.515	4.518
A-50	750.918	19:00 hr	0	Not Full	0.152	-0.515	6.448
B-26	753.013	06:00 hr	0	Not Full	0.15	-0.517	6.15
I-24	763.596	06:00 hr	0	Not Full	0.145	-0.522	5.105
A-47	748.676	19:00 hr	0	Not Full	0.143	-0.524	7.358
B-25	751.189	06:00 hr	0	Not Full	0.142	-0.524	5.858
A-14	747.705	19:00 hr	9.46	Not Full	0.475	-0.525	7.761
I-23	763.58	06:00 hr	31.328	Not Full	0.139	-0.528	3.691
A-48	749.602	19:00 hr	0	Not Full	0.136	-0.531	7.064
B-2	742.121	07:00 hr	0	Not Full	0.468	-0.532	9.432
H-7	757.044	08:00 hr	0	Not Full	0.3	-0.533	8.2
A-15	747.923	06:00 hr	95.407	Not Full	0.467	-0.533	7.578
A-14A	747.004	18:00 hr	0	Not Full	0.465	-0.535	8.135
E-6	752.462	07:00 hr	0	Not Full	0.462	-0.538	8.73
I-15	760.489	06:00 hr	0	Not Full	0.129	-0.538	7.271
A-51	752.571	19:00 hr	0	Not Full	0.127	-0.54	5.673
D-19	755.669	06:00 hr	0	Not Full	0.293	-0.54	5.407
C-36	754.516	06:00 hr	0	Not Full	0.293	-0.54	5.896
C-37	755.476	06:00 hr	0	Not Full	0.293	-0.54	5.807

2035 Manhole Results							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
I-17	761.895	13:00 hr	35.09	Not Full	0.126	-0.541	6.074
D-1	750.384	07:00 hr	0	Not Full	0.289	-0.544	7.311
D-7	751.056	07:00 hr	0	Not Full	0.288	-0.545	8.012
G-13	756.873	06:00 hr	0	Not Full	0.286	-0.547	6.714
A-11A	746	16:00 hr	0	Not Full	0.451	-0.549	8.224
I-7	765.302	06:00 hr	0	Not Full	0.117	-0.549	4.883
F-46	757.063	13:00 hr	0	Not Full	0.117	-0.55	5.183
J-3	754.876	06:00 hr	0	Not Full	0.115	-0.552	8.685
H-29	759.022	06:00 hr	0	Not Full	0.28	-0.553	6.52
J-2	753.922	06:00 hr	0	Not Full	0.113	-0.554	10.287
H-26	756.659	06:00 hr	0	Not Full	0.445	-0.555	7.455
J-1	753.571	06:00 hr	0	Not Full	0.112	-0.555	10.888
D-21	756.376	06:00 hr	0	Not Full	0.278	-0.555	5.222
H-36	759.392	06:00 hr	30.439	Not Full	0.11	-0.556	4.49
D-17	755.072	07:00 hr	0	Not Full	0.275	-0.558	4.925
J-4	756.157	06:00 hr	20.814	Not Full	0.107	-0.56	7.893
D-24	757.189	06:00 hr	0	Not Full	0.271	-0.562	4.629
I-6	763.959	06:00 hr	0	Not Full	0.099	-0.568	5.301
D-13	753.912	07:00 hr	0	Not Full	0.262	-0.571	7.536
D-15	754.215	07:00 hr	0	Not Full	0.262	-0.572	6.338
H-30	760.206	06:00 hr	0	Not Full	0.261	-0.572	5.939
E-1	748.54	08:00 hr	0	Not Full	0.421	-0.579	8.479
D-24A	757.957	06:00 hr	0	Not Full	0.244	-0.59	4.043
F-48	749.999	06:00 hr	15.774	Not Full	0.071	-0.595	7.529
F-38	753.156	12:00 hr	0	Not Full	0.235	-0.598	6.665
G-9	756.399	06:00 hr	0	Not Full	0.222	-0.612	5.678
G-8	755.95	06:00 hr	0	Not Full	0.221	-0.612	5.107
B-12	746.614	07:00 hr	0	Not Full	0.387	-0.613	8.363
H-13	756.408	03:00 hr	0	Not Full	0.385	-0.615	8.915
D-13A	752.951	07:00 hr	0	Not Full	0.218	-0.615	6.782
A-20	748.911	18:00 hr	0	Not Full	0.384	-0.616	7.561
G-18	757.484	06:00 hr	89.873	Not Full	0.213	-0.62	5.901
G-4	755.281	06:00 hr	0	Not Full	0.212	-0.622	5.888
C-17	750.006	07:00 hr	0	Not Full	0.374	-0.626	6.726
F-23	750.544	06:00 hr	0	Not Full	1.122	-0.628	7.778
B-10	745.439	07:00 hr	0	Not Full	0.368	-0.632	8.432
F-26	753.037	15:00 hr	0	Not Full	0.189	-0.644	7.211
F-39A	754.751	12:00 hr	0	Not Full	0.189	-0.645	6.228
F-34	754.989	15:00 hr	48.332	Not Full	0.179	-0.654	6.321
B-14	747.628	07:00 hr	0	Not Full	0.345	-0.655	8.355
F-36	752.048	07:00 hr	0	Not Full	0.844	-0.656	7.556
F-31	754.64	15:00 hr	0	Not Full	0.174	-0.659	6.726

2035 Manhole Results							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
F-35	751.516	07:00 hr	0	Not Full	0.839	-0.661	7.661
F-37	752.514	16:00 hr	0	Not Full	0.836	-0.664	7.664
G-1	753.942	06:00 hr	0	Not Full	0.16	-0.674	6.54
F-24	751.39	15:00 hr	0	Not Full	0.158	-0.675	7.142
F-25	752.589	15:00 hr	0	Not Full	0.153	-0.68	7.247
B-27	753.973	06:00 hr	39.26	Not Full	0.153	-0.68	6.047
B-13	747.133	07:00 hr	0	Not Full	0.315	-0.685	7.685
F-39	755.633	12:00 hr	0	Not Full	0.148	-0.685	7.652
F-38B	753.046	15:00 hr	0	Not Full	0.145	-0.688	6.921
B-8	744.271	07:00 hr	0	Not Full	0.311	-0.689	7.789
B-18	748.261	07:00 hr	0	Not Full	0.307	-0.693	7.762
B-24	750.362	06:00 hr	0	Not Full	0.132	-0.701	6.768
F-38A	754.535	12:00 hr	0	Not Full	0.126	-0.707	5.674
B-9	745.019	07:00 hr	0	Not Full	0.293	-0.707	7.907
B-11	746.235	07:00 hr	0	Not Full	0.287	-0.713	8.713
F-40	756.974	12:00 hr	36.536	Not Full	0.111	-0.722	7.289
H-1	753.121	06:00 hr	0	Not Full	0.524	-0.726	7.376
H-27	757.955	06:00 hr	0	Not Full	0.258	-0.742	6.342
B-6	743.648	07:00 hr	0	Not Full	0.648	-0.816	9.066
C-11	748.601	07:00 hr	0	Not Full	0.433	-0.817	7.522
C-13	749.03	07:00 hr	0	Not Full	0.431	-0.819	6.869
B-35	744.924	07:00 hr	34.455	Not Full	0.406	-0.844	8.172
B-28	743.82	07:00 hr	0	Not Full	0.406	-0.844	8.167
C-5	746.954	07:00 hr	0	Not Full	0.403	-0.847	7.466
C-7	747.553	07:00 hr	0	Not Full	0.402	-0.848	7.526
C-9	748.136	07:00 hr	0	Not Full	0.4	-0.85	8.7
C-1	745.695	07:00 hr	15.66	Not Full	0.384	-0.866	7.749
C-3	746.335	07:00 hr	0	Not Full	0.373	-0.877	7.327
A-24	750.836	08:00 hr	0	Not Full	0.516	-0.984	7.984
F-1	745.381	21:00 hr	0	Not Full	1.256	-0.994	7.444
F-11	747.182	19:00 hr	0	Not Full	0.734	-1.016	8.841
A-3	740.088	07:00 hr	0	Not Full	1.385	-1.115	7.615
F-12	747.791	19:00 hr	0	Not Full	0.624	-1.126	9.408
A-10	745.368	21:00 hr	0.498	Not Full	1.368	-1.132	7.981
F-21	748.64	18:00 hr	0	Not Full	0.584	-1.166	9.416
F-22	749.716	06:00 hr	0	Not Full	0.526	-1.224	7.774
F-8	745.402	20:00 hr	0	Not Full	0.972	-1.278	8.74
F-9	745.692	06:00 hr	0	Not Full	0.956	-1.294	9.044
A-2	739.562	08:00 hr	0	Not Full	1.109	-1.391	6.891
A-9	744.853	08:00 hr	0	Not Full	0.948	-1.552	6.352
F-10	746.372	15:00 hr	36.507	Not Full	0.689	-1.561	9.611
A-1	738.368	20:00 hr	0	Not Full	0.868	-1.632	6.632

2035 Manhole Results							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
A-8	744.031	18:00 hr	0	Not Full	0.754	-1.746	6.446
A-7	742.523	18:00 hr	0	Not Full	0.579	-1.921	8.221

2035 Pipe Results														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
12-BP	12-B	12-C	420	00:03 hr	2.681	0.667	0.579	1	205.87	0.667	1	2.681	1.961	0.459
H-9P	H-9	H-8	350.043	07:01 hr	1.43	0.833	0.272	1	151.595	0.833	1	1.408	1.764	0.39
E-12P	E-12	E-11	434.08	06:35 hr	1.773	0.833	0.305	1	175.757	0.833	1	1.577	1.68	0.436
H-3P	H-3	H-2	449.905	07:19 hr	1.276	1	0.212	1	169.77	1	1	1.039	1.606	0.42
A-45P	A-45	A-36	279.12	06:19 hr	1.782	0.667	0.409	1	92.688	0.667	1	1.502	1.497	0.371
C-22P	C-22	C-19	281.95	06:28 hr	1.152	0.833	0.23	1	78.944	0.833	1	1.12	1.389	0.348
H-6P	H-6	H-5	472.715	07:08 hr	1.341	1	0.288	1	109.133	1	1	1.158	1.3	0.431
I-5P	I-5	I-4	322.233	06:27 hr	2.057	0.667	0.603	1	55.627	0.667	1	2.043	1.209	0.4
H-32P	H-32	H-31	128.6	06:03 hr	0.525	0.833	0.13	1	18.153	0.833	1	0.522	1.164	0.232
E-23P	E-23	E-22	366.521	06:21 hr	2.339	0.667	0.709	1	49.483	0.667	1	2.279	1.156	0.428
A-4P	A-4	A-3	2,612.94	06:53 hr	1.186	2.5	0.192	1	320.055	2.5	1	1.186	1.14	0.798
C-32P	C-32	C-26	184.869	06:13 hr	0.755	0.833	0.198	1	21.347	0.833	1	0.761	1.131	0.28
E-21P	E-21	E-13	366.024	06:31 hr	1.495	0.833	0.418	1	40.375	0.833	1	1.516	1.124	0.399
E-27P	E-27	E-26	271.987	06:04 hr	1.736	0.667	0.545	1	21.581	0.667	1	1.821	1.086	0.366
H-8P	H-8	H-7	350.018	07:04 hr	1.43	0.833	0.421	1	27.422	0.833	1	1.48	1.085	0.39
I-20P	I-20	I-19	201.76	06:06 hr	1.288	0.667	0.447	1	7.529	0.667	1	1.413	1.039	0.313
E-26P	E-26	E-23	271.94	06:05 hr	1.989	0.543	0.602	0.815	-1.391	0.62	0.93	1.973	0.995	0.366
E-22P	E-22	E-21	366.273	06:25 hr	1.775	0.655	0.495	0.786	-15.251	0.675	0.81	1.774	0.96	0.399
12-CP	12-C	A-10	420.00	00:05 hr	3.184	0.523	0.766	0.785	-18.059	0.667	1	2.681	0.959	0.459
E-28P	E-28	E-27	272.235	06:02 hr	2.189	0.494	0.675	0.74	-30.864	0.608	0.913	1.727	0.898	0.366
F-37P	F-37	F-36	1,343.21	05:47 hr	2.16	1.097	0.459	0.732	-173.96	1.097	0.732	1.998	0.885	0.658
E-11P	E-11	E-7	433.249	06:36 hr	2.272	0.606	0.638	0.727	-59.93	0.606	0.727	2.229	0.878	0.436
C-18P	C-18	C-17	281.914	06:37 hr	1.491	0.601	0.408	0.721	-42.052	0.601	0.721	1.48	0.87	0.348
F-58P	F-58	F-57	102.506	15:02 hr	0.851	0.479	0.272	0.718	-15.923	0.479	0.718	0.851	0.866	0.22
A-13P	A-13	A-12	340.189	19:24 hr	1.289	0.701	0.325	0.701	-65.419	0.701	0.701	1.281	0.839	0.364
F-51AP	F-51A	F-51	217.522	06:23 hr	1.869	0.464	0.602	0.696	-44.358	0.464	0.696	1.851	0.831	0.326
A-12P	A-12	A-11A	333.083	19:25 hr	1.282	0.691	0.324	0.691	-71.601	0.691	0.691	1.27	0.823	0.36
C-39P	C-39	C-37	185.002	06:08 hr	1.622	0.456	0.507	0.683	-43.161	0.456	0.683	1.617	0.811	0.299
E-2P	E-2	E-1	425.583	07:03 hr	1.671	0.679	0.441	0.679	-104.309	0.679	0.679	1.635	0.803	0.408
I-4P	I-4	I-2	385.67	06:12 hr	2.182	0.565	0.632	0.678	-94.758	0.565	0.678	2.173	0.803	0.41
I-2P	I-2	I-1	384.373	06:48 hr	2.189	0.562	0.635	0.674	-98.333	0.562	0.674	1.942	0.796	0.41
F-36P	F-36	F-35	1,338.42	05:51 hr	2.361	1.008	0.511	0.672	-349.943	1.008	0.672	2.232	0.793	0.656
E-7P	E-7	E-6	432.00	06:41 hr	1.718	0.671	0.451	0.671	-114.366	0.671	0.671	1.664	0.791	0.412
I-1P	I-1	H-10	378.17	06:53 hr	2.181	0.556	0.635	0.667	-104.006	0.556	0.667	2.176	0.784	0.406
H-10P	H-10	H-9	378.143	06:59 hr	2.182	0.555	0.635	0.667	-104.345	0.699	0.838	1.43	0.784	0.406
F-23P	F-23	F-22	1,166.75	06:00 hr	1.529	1.165	0.307	0.666	-325.225	1.165	0.666	1.513	0.782	0.584
E-5P	E-5	E-4	429.458	06:48 hr	1.747	0.658	0.461	0.658	-129.048	0.658	0.658	1.689	0.769	0.41
B-3P	B-3	B-2	492.85	07:13 hr	2.054	0.644	0.551	0.644	-167.568	0.644	0.644	2.052	0.746	0.441
F-53P	F-53	F-52	217.53	06:19 hr	2.091	0.42	0.691	0.63	-83.107	0.42	0.63	2.079	0.724	0.326
F-46P	F-46	F-45	243.791	12:51 hr	2.44	0.406	0.796	0.609	-110.876	0.406	0.609	0.152	0.687	0.346

2035 Pipe Results														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
F-35P	F-35	A-24	1,134.04	05:54 hr	2.248	0.911	0.501	0.608	-521.481	0.911	0.608	2.183	0.685	0.602
A-6P	A-6	A-5	2,527.21	06:42 hr	1.81	1.515	0.313	0.606	-1,178.13	2.263	0.905	1.065	0.682	0.784
I-21P	I-21	I-20	201.79	06:02 hr	2.048	0.401	0.687	0.602	-97.025	0.533	0.8	2.047	0.675	0.313
C-19P	C-19	C-18	281.918	06:32 hr	1.838	0.5	0.541	0.6	-137.508	0.534	0.64	1.109	0.672	0.348
A-36P	A-36	A-28	270.34	07:17 hr	1.762	0.5	0.529	0.6	-131.93	0.5	0.6	1.688	0.672	0.341
H-5P	H-5	H-4	464.7	07:11 hr	2.152	0.589	0.592	0.589	-247.254	0.589	0.589	2.103	0.653	0.428
A-10P	A-10	A-9	2,071.67	06:27 hr	1.541	1.468	0.269	0.587	-1,117.53	1.468	0.587	1.502	0.65	0.708
A-5P	A-5	A-4	2,626.21	06:47 hr	1.968	1.458	0.344	0.583	-1,456.76	2.44	0.976	1.108	0.643	0.8
E-32P	E-32	E-31	111.64	13:06 hr	1.179	0.388	0.397	0.582	-62.425	0.388	0.582	1.179	0.641	0.23
B-4P	B-4	B-3	492.87	07:09 hr	2.334	0.578	0.648	0.578	-284.505	0.61	0.61	1.395	0.634	0.441
F-50P	F-50	F-49	216.34	06:29 hr	2.312	0.385	0.787	0.577	-125.979	0.385	0.577	2.293	0.632	0.325
F-51P	F-51	F-50	216.346	06:27 hr	2.312	0.384	0.788	0.577	-126.174	0.384	0.577	2.273	0.632	0.325
A-3P	A-3	A-2	2,605.68	06:57 hr	2.001	1.429	0.353	0.572	-1,576.56	1.429	0.572	1.978	0.623	0.797
H-2P	H-2	H-1	443.13	07:23 hr	2.147	0.567	0.599	0.567	-276.427	0.567	0.567	2.06	0.616	0.417
C-24P	C-24	C-23	184.788	06:17 hr	1.289	0.473	0.39	0.567	-115.34	0.473	0.567	1.279	0.616	0.28
C-23P	C-23	C-23A	184.76	06:22 hr	1.293	0.472	0.391	0.566	-116.46	0.472	0.566	1.279	0.613	0.28
F-52P	F-52	F-51A	217.53	06:22 hr	2.389	0.376	0.821	0.564	-139.32	0.404	0.606	1.313	0.61	0.326
A-61P_2	A-61	Oct-55	149.842	06:05 hr	1.661	0.373	0.561	0.56	-98.902	0.373	0.56	1.658	0.602	0.268
A-28P	A-28	A-22	254.18	07:21 hr	1.823	0.462	0.563	0.555	-173.83	0.462	0.555	1.794	0.594	0.33
A-22P	A-22	A-20	254.08	07:23 hr	1.824	0.462	0.563	0.554	-174.183	0.462	0.554	1.766	0.593	0.33
F-45P	F-45	F-44	207.13	12:54 hr	2.326	0.369	0.802	0.554	-142.69	0.369	0.554	2.269	0.592	0.317
E-6P	E-6	E-5	430.91	06:44 hr	2.188	0.546	0.62	0.546	-313.39	0.546	0.546	1.967	0.579	0.411
F-49P	F-49	CARLSON_WW	216.34	06:33 hr	2.525	0.358	0.883	0.537	-167.81	0.358	0.537	2.506	0.563	0.325
E-4P	E-4	E-3	428.269	06:52 hr	2.268	0.528	0.652	0.528	-353.591	0.528	0.528	2.214	0.548	0.41
E-13P	E-13	E-12	434.915	06:34 hr	3.32	0.44	1.045	0.528	-359.833	0.672	0.806	1.676	0.547	0.437
I-19P	I-19	F-55	201.76	06:09 hr	2.466	0.345	0.875	0.517	-179.143	0.345	0.517	2.459	0.53	0.313
H-4P	H-4	H-3	456.31	07:16 hr	2.487	0.516	0.721	0.516	-408.75	0.749	0.749	1.255	0.527	0.424
E-3P	E-3	E-2	426.79	06:57 hr	2.33	0.515	0.676	0.515	-384.39	0.562	0.562	1.138	0.526	0.409
F-54P	F-54	F-53	217.537	06:15 hr	2.682	0.343	0.955	0.514	-197.823	0.371	0.556	2.652	0.524	0.326
D-27P	D-27	D-27A	115.499	06:07 hr	1.432	0.341	0.505	0.512	-106.761	0.341	0.512	1.429	0.52	0.234
10-55P	Oct-55	A-54	149.822	06:08 hr	1.864	0.34	0.658	0.51	-139.681	0.34	0.51	1.858	0.518	0.268
F-47P	F-47	F-46	243.793	12:49 hr	3.08	0.336	1.106	0.504	-237.026	0.336	0.504	2.806	0.507	0.346
A-14P	A-14	A-14A	349.33	19:17 hr	1.977	0.501	0.578	0.501	-347.095	0.501	0.501	1.932	0.502	0.369
A-15P	A-15	A-14	340.368	19:23 hr	1.964	0.493	0.579	0.493	-355.845	0.493	0.493	1.916	0.489	0.364
A-61AP	A-61A	A-61	149.922	06:01 hr	1.958	0.327	0.705	0.491	-159.276	0.35	0.525	0.955	0.485	0.268
C-23AP	C-23A	C-22	281.956	06:25 hr	2.363	0.408	0.765	0.49	-301.459	0.678	0.814	1.129	0.483	0.348
E-30P	E-30	E-29	111.632	13:14 hr	1.498	0.321	0.549	0.481	-127.038	0.321	0.481	1.497	0.468	0.23
D-16P	D-16	D-15	115.395	06:26 hr	0.993	0.4	0.323	0.48	-131.932	0.4	0.48	0.984	0.467	0.219
A-14AP	A-14A	A-13	340.193	19:19 hr	2.039	0.479	0.609	0.479	-392.267	0.54	0.54	0.917	0.464	0.364
B-1P	B-1	A-6	492.84	07:17 hr	3.031	0.47	0.913	0.47	-605.18	1	1	1.392	0.449	0.441

2035 Pipe Results														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
B-2P	B-2	B-1	492.844	07:17 hr	3.031	0.47	0.913	0.47	-605.187	1	1	1.392	0.449	0.441
E-1P	E-1	F-11	424.148	07:07 hr	2.649	0.464	0.805	0.464	-540.905	0.555	0.555	1.01	0.44	0.408
C-40P	C-40	C-39	185.196	06:04 hr	2.604	0.309	0.967	0.464	-236.376	0.379	0.568	1.171	0.439	0.299
A-2P	A-2	A-1	2,596.04	07:07 hr	2.624	1.15	0.506	0.46	-3,401.60	1.15	0.46	2.582	0.433	0.795
A-11AP	A-11A	A-11	333.08	19:28 hr	2.113	0.459	0.644	0.459	-440.57	0.491	0.491	1.955	0.431	0.36
A-53P	A-53	A-45	149.79	06:11 hr	2.144	0.305	0.8	0.457	-199.60	0.597	0.895	0.94	0.429	0.268
H-1P	H-1	F-37	520.607	07:28 hr	2.122	0.571	0.581	0.457	-695.103	0.653	0.522	0.811	0.428	0.424
F-1P	F-1	A-10	1,382.20	07:53 hr	1.744	1.026	0.356	0.456	-1,859.58	1.312	0.583	0.683	0.426	0.592
B-23P	B-23	B-20	152.22	06:40 hr	1.404	0.379	0.47	0.455	-206.17	0.379	0.455	1.395	0.425	0.253
E-29P	E-29	E-28	111.631	13:18 hr	1.615	0.303	0.607	0.454	-152.451	0.367	0.551	0.709	0.423	0.23
H-26P	H-26	H-13	157.66	06:20 hr	1.019	0.452	0.313	0.452	-217.86	0.452	0.452	1.012	0.42	0.245
F-11P	F-11	F-10	1,385.20	07:39 hr	2.978	0.78	0.697	0.446	-1,998.62	0.78	0.446	2.893	0.409	0.638
A-46P	A-46	A-45	130.00	00:27 hr	1.971	0.292	0.753	0.438	-197.68	0.667	1	0.83	0.397	0.249
F-9P	F-9	F-8	1,409.29	07:46 hr	1.885	0.981	0.393	0.436	-2,166.56	0.981	0.436	1.862	0.394	0.598
H-31P	H-31	H-30	128.48	06:07 hr	1.266	0.361	0.435	0.433	-202.34	0.361	0.433	1.261	0.388	0.232
C-25P	C-25	C-24	184.82	06:15 hr	1.889	0.351	0.658	0.421	-315.08	0.404	0.484	0.732	0.37	0.28
C-26P	C-26	C-25	184.86	06:14 hr	1.89	0.351	0.658	0.421	-315.34	0.351	0.421	1.876	0.37	0.28
F-8P	F-8	F-1	1,390.05	18:37 hr	1.955	0.945	0.415	0.42	-2,387.32	1.114	0.495	0.668	0.368	0.594
A-24P	A-24	F-23	1,129.91	05:55 hr	3.688	0.615	0.97	0.41	-2,072.51	0.759	0.506	1.029	0.353	0.601
A-20P	A-20	A-15	241.99	07:28 hr	1.796	0.407	0.581	0.407	-453.82	0.412	0.412	0.616	0.348	0.305
D-27BP	D-27B	D-27	115.561	06:03 hr	1.932	0.271	0.765	0.407	-217.295	0.305	0.457	0.733	0.347	0.234
B-20P	B-20	B-18	152.206	06:45 hr	1.664	0.333	0.594	0.4	-299.432	0.333	0.4	1.657	0.337	0.253
F-44P	F-44	F-43	188.791	12:55 hr	3.246	0.265	1.29	0.398	-376.173	0.265	0.398	2.398	0.334	0.302
F-55P	F-55	F-54	201.748	06:13 hr	3.497	0.264	1.404	0.396	-408.667	0.291	0.437	3.47	0.331	0.313
A-54P	A-54	A-53	149.79	06:10 hr	2.64	0.261	1.066	0.391	-313.98	0.28	0.42	0.942	0.323	0.268
F-21P	F-21	F-12	1,076.90	18:19 hr	2.783	0.679	0.697	0.388	-2,305.13	0.679	0.388	2.575	0.318	0.56
F-12P	F-12	F-11	1,073.33	06:07 hr	2.782	0.677	0.697	0.387	-2,310.00	0.679	0.388	1.952	0.317	0.559
B-12P	B-12	B-11	152.18	06:59 hr	1.209	0.387	0.401	0.387	-328.26	0.387	0.387	1.209	0.317	0.24
F-43P	F-43	CARLSON_WW	176.57	12:57 hr	3.187	0.256	1.295	0.384	-388.35	0.256	0.384	3.09	0.313	0.292
C-17P	C-17	C-13	281.891	06:39 hr	2.279	0.382	0.761	0.382	-629.797	0.402	0.402	0.768	0.309	0.33
A-9P	A-9	A-8	2,064.55	08:00 hr	2.695	0.948	0.571	0.379	-4,694.38	0.948	0.379	2.695	0.305	0.706
E-18P	E-18	E-15	71.12	06:10 hr	1.353	0.246	0.562	0.369	-173.40	0.246	0.369	1.346	0.291	0.182
E-25P	E-25	E-24	100	00:54 hr	1.902	0.246	0.786	0.369	-243.928	0.246	0.369	1.902	0.291	0.217
E-19P	E-19	E-18	71.119	06:05 hr	1.354	0.246	0.563	0.369	-173.646	0.246	0.369	1.35	0.291	0.182
B-10P	B-10	B-9	152.17	07:06 hr	1.288	0.369	0.438	0.369	-372.13	0.369	0.369	1.287	0.29	0.24
E-24P	E-24	E-23	100.00	00:59 hr	1.91	0.245	0.795	0.368	-245.89	0.387	0.58	0.638	0.289	0.217
E-31P	E-31	E-30	111.636	13:11 hr	2.137	0.245	0.891	0.368	-275.685	0.282	0.423	0.71	0.288	0.23
H-7P	H-7	H-6	328.949	07:04 hr	4.106	0.302	1.541	0.363	-842.052	0.596	0.715	1.33	0.281	0.378
D-19P	D-19	D-17	115.42	06:21 hr	1.464	0.299	0.553	0.358	-304.39	0.299	0.358	1.45	0.275	0.219
F-56P	F-56	56-A	119.52	15:04 hr	2.384	0.238	1.009	0.357	-319.31	0.238	0.357	2.384	0.272	0.238

2035 Pipe Results														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
56-AP	56-A	CARLSON_WW	119.522	15:08 hr	2.384	0.238	1.009	0.357	-319.351	0.238	0.357	2.383	0.272	0.238
A-11P	A-11	A-10	327.37	19:29 hr	2.904	0.357	1.004	0.357	-875.193	0.96	0.96	0.919	0.272	0.356
F-57P	F-57	F-56	119.538	15:03 hr	2.386	0.238	1.01	0.356	-319.795	0.238	0.356	2.367	0.272	0.238
C-36P	C-36	C-35	184.905	06:10 hr	2.37	0.296	0.899	0.356	-497.797	0.316	0.379	2.283	0.271	0.28
C-37P	C-37	C-36	185.002	06:10 hr	2.372	0.296	0.9	0.355	-498.381	0.296	0.355	0.74	0.271	0.28
C-35P	C-35	C-32	184.905	06:11 hr	2.372	0.296	0.899	0.355	-498.36	0.593	0.711	0.738	0.271	0.28
A-1P	A-1	WWTF	2,588.19	07:09 hr	3.695	0.887	0.81	0.355	-6,998.78	0.887	0.355	3.654	0.27	0.794
C-11P	C-11	C-9	281.869	06:46 hr	1.634	0.439	0.509	0.351	-783.743	0.439	0.351	1.623	0.265	0.309
C-13P	C-13	C-11	281.88	06:43 hr	1.634	0.439	0.509	0.351	-784.49	0.439	0.351	1.607	0.264	0.309
D-1P	D-1	B-23	115.355	06:40 hr	1.507	0.292	0.576	0.351	-321.919	0.331	0.398	0.462	0.264	0.219
D-7P	D-7	D-1	115.369	06:36 hr	1.507	0.292	0.576	0.351	-322.024	0.292	0.351	1.483	0.264	0.219
B-6P	B-6	B-4	483.37	07:08 hr	2.84	0.434	0.89	0.348	-1,378.92	0.506	0.404	0.876	0.26	0.408
B-14P	B-14	B-13	152.19	06:52 hr	1.403	0.346	0.492	0.346	-437.71	0.346	0.346	1.4	0.258	0.24
E-14P	E-14	E-13	71.09	06:15 hr	1.483	0.23	0.638	0.345	-206.48	0.323	0.484	0.442	0.256	0.182
G-13P	G-13	G-9	89.829	06:05 hr	1.201	0.287	0.463	0.345	-261.714	0.287	0.345	1.199	0.256	0.193
H-29P	H-29	H-27	128.42	06:14 hr	1.741	0.284	0.675	0.341	-384.08	0.284	0.341	1.728	0.251	0.232
D-21P	D-21	D-19	115.436	06:17 hr	1.583	0.282	0.616	0.338	-352.44	0.286	0.343	0.459	0.247	0.219
D-27AP	D-27A	D-24A	115.483	06:08 hr	2.477	0.225	1.078	0.338	-353.33	0.234	0.351	0.727	0.246	0.234
D-17P	D-17	D-16	115.41	06:24 hr	1.594	0.281	0.622	0.337	-357.01	0.333	0.4	0.454	0.244	0.219
D-24P	D-24	D-21	115.44	06:14 hr	1.647	0.274	0.651	0.329	-379.10	0.274	0.329	0.462	0.233	0.219
F-22P	F-22	F-21	1,105.77	06:01 hr	3.596	0.573	0.983	0.328	-3,664.53	0.573	0.328	3.435	0.232	0.568
E-33P	E-33	E-32	111.643	13:03 hr	2.516	0.217	1.116	0.326	-373.69	0.303	0.454	0.712	0.23	0.23
B-35P	B-35	B-28	331.90	07:04 hr	2.136	0.407	0.693	0.325	-1,119.02	0.407	0.325	2.136	0.229	0.336
B-28P	B-28	B-6	331.902	07:05 hr	2.137	0.406	0.694	0.325	-1,120.26	0.527	0.422	0.602	0.229	0.336
C-9P	C-9	C-7	281.84	06:50 hr	1.831	0.404	0.596	0.323	-966.30	0.404	0.323	1.792	0.226	0.309
F-10P	F-10	F-9	1,409.29	07:42 hr	2.826	0.727	0.686	0.323	-4,832.41	0.806	0.358	1.889	0.226	0.598
C-7P	C-7	C-5	281.84	06:53 hr	1.831	0.404	0.596	0.323	-966.867	0.404	0.323	1.788	0.226	0.309
C-5P	C-5	C-3	281.816	06:56 hr	1.831	0.404	0.597	0.323	-966.962	0.404	0.323	1.83	0.226	0.309
E-15P	E-15	E-14	71.09	06:12 hr	1.631	0.215	0.729	0.322	-245.82	0.22	0.329	0.444	0.224	0.182
D-13P	D-13	D-13A	115.39	06:30 hr	1.711	0.266	0.686	0.32	-405.83	0.266	0.32	1.696	0.221	0.219
D-15P	D-15	D-13	115.386	06:27 hr	1.711	0.266	0.686	0.32	-406.14	0.266	0.32	1.691	0.221	0.219
H-30P	H-30	H-29	128.48	06:11 hr	1.926	0.264	0.776	0.317	-460.94	0.271	0.325	0.514	0.218	0.232
B-13P	B-13	B-12	152.187	06:56 hr	1.595	0.316	0.588	0.316	-552.32	0.351	0.351	1.369	0.216	0.24
A-8P	A-8	A-7	2,064.55	08:03 hr	3.482	0.786	0.814	0.314	-7,570.42	0.786	0.314	3.405	0.214	0.706
B-8P	B-8	B-7	152.154	07:14 hr	1.615	0.313	0.598	0.313	-565.03	0.423	0.423	0.428	0.212	0.24
B-18P	B-18	B-14	152.202	06:49 hr	1.643	0.309	0.613	0.309	-582.09	0.326	0.326	0.427	0.207	0.24
C-1P	C-1	B-35	297.501	07:01 hr	2.072	0.384	0.693	0.307	-1,154.18	0.395	0.316	0.54	0.205	0.318
C-3P	C-3	C-1	281.812	06:59 hr	2.04	0.373	0.693	0.299	-1,169.28	0.379	0.303	1.456	0.194	0.309
D-24AP	D-24A	D-24	115.47	06:10 hr	1.916	0.246	0.803	0.295	-494.87	0.257	0.309	0.464	0.189	0.219
B-9P	B-9	B-8	152.16	07:10 hr	1.763	0.294	0.676	0.294	-658.31	0.302	0.302	0.429	0.188	0.24

2035 Pipe Results														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
B-11P	B-11	B-10	152.173	07:03 hr	1.819	0.287	0.706	0.287	-694.63	0.328	0.328	0.431	0.18	0.24
F-38P	F-38	F-38B	36.506	12:08 hr	0.639	0.236	0.274	0.284	-171.556	0.236	0.284	0.637	0.175	0.122
B-7P	B-7	B-6	152.146	07:15 hr	1.88	0.28	0.739	0.28	-734.307	0.592	0.592	0.428	0.172	0.24
I-9AP	I-9A	I-9	22.349	06:05 hr	0.656	0.18	0.323	0.27	-118.193	0.18	0.27	0.655	0.159	0.101
H-13P	H-13	H-6	157.636	06:21 hr	2.058	0.269	0.827	0.269	-834.7	0.704	0.704	0.434	0.159	0.244
E-20P	E-20	E-19	71.181	06:02 hr	2.106	0.179	1.039	0.268	-381.256	0.212	0.317	0.452	0.157	0.182
G-9P	G-9	G-8	89.818	06:06 hr	1.711	0.223	0.757	0.267	-485.879	0.223	0.267	1.707	0.156	0.193
G-8P	G-8	G-4	89.818	06:07 hr	1.711	0.222	0.757	0.267	-486.273	0.222	0.267	1.706	0.156	0.193
D-13AP	D-13A	D-7	115.376	06:33 hr	2.218	0.221	0.984	0.265	-633.661	0.253	0.304	0.458	0.154	0.219
H-27P	H-27	H-26	157.66	06:17 hr	2.164	0.26	0.886	0.26	-906.74	0.351	0.351	0.439	0.148	0.245
I-25P	I-25	I-24	43.58	06:07 hr	1.348	0.173	0.677	0.26	-251.426	0.173	0.26	1.344	0.148	0.142
A-52P	A-52	A-51	33.628	19:02 hr	1.057	0.171	0.534	0.257	-198.965	0.171	0.257	1.056	0.145	0.124
G-18P	G-18	G-13	89.873	06:01 hr	1.811	0.214	0.819	0.256	-533.77	0.25	0.3	0.366	0.144	0.193
G-4P	G-4	G-1	89.801	06:11 hr	1.814	0.213	0.821	0.256	-535.276	0.213	0.256	1.806	0.144	0.193
I-8P	I-8	I-7	22.34	06:12 hr	0.735	0.166	0.377	0.249	-142.365	0.166	0.249	0.731	0.136	0.101
I-9P	I-9	I-8	22.349	06:10 hr	0.735	0.166	0.378	0.249	-142.524	0.166	0.249	0.732	0.136	0.101
I-22P_2	I-22	LINDEN_WW	64.13	06:09 hr	2.199	0.161	1.148	0.241	-437.49	0.161	0.241	2.197	0.128	0.173
A-7P	A-7	A-6	2,064.55	08:04 hr	5.156	0.593	1.402	0.237	-14,639.15	1.362	0.545	0.892	0.124	0.706
I-27P	I-27	I-25	43.58	06:05 hr	1.561	0.156	0.829	0.234	-319.012	0.164	0.246	0.276	0.12	0.142
I-16P	I-16	I-15	43.564	06:12 hr	1.599	0.153	0.856	0.23	-331.326	0.153	0.23	1.59	0.116	0.142
I-28P	I-28	I-27	43.613	06:03 hr	1.616	0.152	0.869	0.229	-336.975	0.154	0.231	0.277	0.115	0.142
I-28P2	I-28	I-9A	22.365	06:03 hr	0.829	0.152	0.446	0.229	-172.805	0.166	0.248	0.142	0.115	0.101
A-50P	A-50	A-48	33.619	19:09 hr	1.249	0.152	0.672	0.228	-260.75	0.152	0.228	1.247	0.114	0.124
F-26P	F-26	F-25	48.323	15:10 hr	1.153	0.19	0.556	0.228	-376.899	0.19	0.228	1.152	0.114	0.141
F-39AP	F-39A	F-38A	36.512	12:06 hr	0.872	0.19	0.421	0.227	-285.323	0.19	0.227	0.87	0.113	0.122
B-26P	B-26	B-25	39.219	06:07 hr	1.477	0.151	0.799	0.226	-310.753	0.151	0.226	1.47	0.112	0.134
I-24P	I-24	I-16	43.56	06:09 hr	1.713	0.146	0.942	0.219	-369.86	0.149	0.223	0.274	0.105	0.142
B-25P	B-25	B-24	39.219	06:09 hr	1.578	0.144	0.875	0.216	-345.226	0.144	0.216	1.569	0.102	0.134
F-34P	F-34	F-31	48.332	15:01 hr	1.249	0.179	0.62	0.215	-427.795	0.179	0.215	1.249	0.102	0.141
A-47P_2	A-47	SOUTH_BEECH_WW	33.62	19:12 hr	1.361	0.143	0.756	0.215	-298.74	0.143	0.215	1.359	0.101	0.124
F-31P	F-31	F-26	48.323	15:07 hr	1.298	0.174	0.654	0.209	-454.589	0.182	0.218	0.197	0.096	0.141
I-23P	I-23	I-22	31.328	06:04 hr	1.327	0.139	0.75	0.208	-298.966	0.15	0.224	0.199	0.095	0.12
A-48P	A-48	A-47	33.615	19:10 hr	1.459	0.136	0.832	0.205	-333.139	0.139	0.209	0.213	0.092	0.124
I-15P_2	I-15	PENNY_WW	43.556	06:13 hr	2.027	0.13	1.186	0.195	-480.917	0.13	0.195	2.015	0.083	0.142
G-1P	G-1	H-1	89.79	06:11 hr	2.708	0.161	1.423	0.193	-1,010.62	0.342	0.411	0.361	0.082	0.193
A-51P	A-51	A-50	33.619	19:04 hr	1.611	0.127	0.953	0.191	-388.17	0.139	0.209	0.214	0.08	0.124
F-24P	F-24	F-23	48.319	15:17 hr	1.485	0.159	0.786	0.191	-559.992	0.63	0.757	0.196	0.079	0.141
I-17P	I-17	I-1	35.09	13:01 hr	1.71	0.126	1.018	0.189	-415.832	0.126	0.189	1.71	0.078	0.127
F-25P	F-25	F-24	48.319	15:12 hr	1.557	0.154	0.839	0.184	-602.338	0.156	0.187	0.196	0.074	0.141
B-27P	B-27	B-26	39.26	06:03 hr	1.268	0.153	0.684	0.184	-491.008	0.153	0.184	1.265	0.074	0.126

2035 Pipe Results														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
F-39P	F-39	F-39A	36.528	12:04 hr	1.236	0.149	0.678	0.178	-490.605	0.168	0.202	0.148	0.069	0.122
I-7P	I-7	I-6	22.34	06:16 hr	1.185	0.119	0.727	0.178	-301.559	0.119	0.178	1.177	0.069	0.101
F-38BP	F-38B	F-37	36.501	12:12 hr	1.265	0.146	0.7	0.175	-508.315	0.49	0.589	0.147	0.067	0.122
J-3P	J-3	J-2	20.788	06:04 hr	1.149	0.115	0.715	0.173	-298.473	0.115	0.173	1.145	0.065	0.097
J-2P	J-2	J-1	20.788	06:05 hr	1.179	0.113	0.741	0.17	-310.409	0.113	0.17	1.175	0.063	0.097
J-1P_2	J-1	IDAHO_WW	20.775	06:06 hr	1.186	0.113	0.748	0.169	-313.617	0.113	0.169	1.181	0.062	0.097
H-36P	H-36	H-27	30.439	06:01 hr	1.788	0.111	1.139	0.166	-479.355	0.184	0.276	0.194	0.06	0.118
J-4P	J-4	J-3	20.814	06:02 hr	1.277	0.107	0.826	0.161	-350.177	0.111	0.166	0.132	0.056	0.097
B-24P	B-24	B-23	39.198	06:10 hr	1.544	0.134	0.894	0.16	-662.715	0.251	0.302	0.157	0.056	0.126
F-38AP	F-38A	F-38	36.511	12:07 hr	1.552	0.127	0.924	0.152	-692.336	0.181	0.217	0.147	0.05	0.122
I-6P	I-6	I-5	22.334	06:19 hr	1.504	0.101	1.005	0.151	-431.986	0.556	0.834	0.139	0.049	0.101
F-40P	F-40	F-39	36.536	12:00 hr	1.881	0.111	1.2	0.133	-921.386	0.13	0.156	0.149	0.038	0.122
F-48P	F-48	BRANDING_IRON_WW	15.774	06:01 hr	1.746	0.072	1.392	0.107	-636.448	0.072	0.107	1.744	0.024	0.085

2035 Manhole Results with CIPs							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
12-B	747.597	01:00 hr	420	Not Full	2.097	1.43	6.069
B-1	741.551	08:00 hr	0	Not Full	1.938	0.938	8.805
I-5	762.28	05:00 hr	0	Not Full	1.017	0.35	4.383
A-45	751.604	20:00 hr	0	Not Full	0.903	0.236	6.297
C-22	751.934	06:00 hr	0	Not Full	0.953	0.12	7.347
H-3	754.457	21:00 hr	0	Not Full	1.075	0.08	6.525
I-20	759.892	07:00 hr	0	Not Full	0.692	0.025	5.708
H-6	756.401	03:00 hr	0	Not Full	1.024	0.024	7.876
A-4	741.313	08:00 hr	0	Not Full	2.522	0.022	7.306
H-32	761.297	06:00 hr	128.6	Not Full	0.85	0.017	6
C-32	754.374	06:00 hr	0	Not Full	0.847	0.014	5.553
H-9	758.124	21:00 hr	0	Not Full	1.014	0.014	7.236
A-5	741.406	08:00 hr	98.138	Not Full	2.358	-0.142	7.742
12-C	745.523	01:00 hr	0	Not Full	0.523	-0.143	7.826
F-47	759.036	07:00 hr	18.624	Not Full	0.5	-0.17	4.2
A-46	752.864	03:00 hr	0	Not Full	0.5	-0.17	4.7
E-28	759.697	06:00 hr	206.754	Not Full	0.491	-0.18	5.659
F-58	758.942	15:00 hr	102.506	Not Full	0.479	-0.19	4.521
C-39	756.5	06:00 hr	0	Not Full	0.45	-0.217	4.25
F-51A	747.117	09:00 hr	0	Not Full	0.445	-0.22	15.974
E-12	753.709	08:00 hr	0	Not Full	0.755	-0.25	7.295
C-18	750.656	07:00 hr	0	Not Full	0.58	-0.253	6.82
F-53	749.523	18:00 hr	0	Not Full	0.413	-0.254	13.587
I-21	760.488	06:00 hr	51.785	Not Full	0.401	-0.27	5.599
I-4	761.036	10:00 hr	58.9	Not Full	0.556	-0.277	6.537
E-32	763.587	13:00 hr	0	Not Full	0.388	-0.279	3.562
F-50	745.252	17:00 hr	0	Not Full	0.376	-0.291	16.965
F-51	746.896	17:00 hr	0	Not Full	0.376	-0.291	15.944
A-61	754.431	06:00 hr	0	Not Full	0.374	-0.295	5.126
F-52	748.391	09:00 hr	0	Not Full	0.363	-0.304	16.137
F-49	744.706	20:00 hr	0	Not Full	0.352	-0.315	18.327
A-13	746.61	17:00 hr	0	Not Full	0.682	-0.318	7.118
F-45	756.17	10:00 hr	0	Not Full	0.347	-0.32	6.267
I-19	759.097	07:00 hr	0	Not Full	0.343	-0.324	7.557
F-54	751.678	06:00 hr	16.047	Not Full	0.342	-0.33	11.328
D-27	760.602	06:00 hr	0	Not Full	0.339	-0.328	3.761
Oct-55	753.624	06:00 hr	0	Not Full	0.338	-0.329	5.162
A-6	741.502	08:00 hr	0	Not Full	2.169	-0.331	8.831
A-12	746.328	17:00 hr	0	Not Full	0.666	-0.334	8.456
A-61A	754.959	06:00 hr	149.922	Not Full	0.327	-0.34	5.545
C-19	751.324	06:00 hr	0	Not Full	0.488	-0.345	7.812
E-30	761.07	13:00 hr	0	Not Full	0.32	-0.347	4.93

2035 Manhole Results with CIPs							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
B-3	743.116	07:00 hr	0	Not Full	0.642	-0.358	9.858
C-40	759.02	06:00 hr	185.196	Not Full	0.308	-0.359	3.892
A-53	751.746	06:00 hr	0	Not Full	0.302	-0.365	5.698
E-29	760.345	13:00 hr	0	Not Full	0.302	-0.365	5.148
C-24	753.433	06:00 hr	0	Not Full	0.463	-0.371	4.337
E-27	758.971	06:00 hr	0	Not Full	0.462	-0.371	6.338
E-2	749.31	07:00 hr	0	Not Full	0.627	-0.373	7.873
C-23	753.272	06:00 hr	0	Not Full	0.458	-0.375	5.025
E-23	758.2	05:00 hr	0	Not Full	0.45	-0.383	5.674
A-36	750.751	16:00 hr	0	Not Full	0.445	-0.388	7.055
A-28	750.096	15:00 hr	0	Not Full	0.444	-0.39	7.856
E-26	758.58	06:00 hr	0	Not Full	0.437	-0.396	6.463
D-27B	761.695	06:00 hr	115.561	Not Full	0.27	-0.396	3.13
E-7	753.233	14:00 hr	0	Not Full	0.602	-0.398	7.698
F-55	757.481	17:00 hr	0	Not Full	0.26	-0.41	6.64
A-22	749.324	09:00 hr	0	Not Full	0.426	-0.407	7.488
A-54	752.614	06:00 hr	0	Not Full	Jan-00	-0.408	5.641
E-5	752.116	11:00 hr	0	Not Full	0.589	-0.411	7.711
E-25	761.282	11:00 hr	0	Not Full	2.035	-0.42	3.765
E-24	759.796	01:00 hr	0	Not Full	0.245	-0.421	5.255
E-19	758.65	06:00 hr	0	Not Full	0.245	-0.422	4.655
E-31	763.114	13:00 hr	0	Not Full	0.245	-0.42	3.505
E-18	757.869	06:00 hr	0	Not Full	0.244	-0.423	5.913
B-4	743.485	07:00 hr	9.487	Not Full	0.577	-0.423	9.623
E-21	756.144	07:00 hr	0	Not Full	0.575	-0.425	6.725
F-43	752.282	15:00 hr	0	Not Full	0.241	-0.43	9.134
F-56	757.279	15:00 hr	0	Not Full	0.238	-0.429	7.06
F-57	758.571	15:00 hr	17.063	Not Full	0.238	-0.429	4.662
56-A	755.667	15:00 hr	0	Not Full	0.237	-0.429	7.706
C-23A	752.747	06:00 hr	102.078	Not Full	0.404	-0.43	6.796
H-8	757.585	08:00 hr	0	Not Full	0.57	-0.43	7.83
I-2	760.422	09:00 hr	0	Not Full	0.402	-0.431	7.198
E-14	755.932	06:00 hr	0	Not Full	0.227	-0.44	5.973
D-16	754.47	07:00 hr	0	Not Full	0.392	-0.441	6.108
D-27A	759.914	06:00 hr	0	Not Full	0.224	-0.443	3.276
H-5	755.765	18:00 hr	0	Not Full	0.553	-0.447	8.147
A-11	745.417	21:00 hr	0	Not Full	0.553	-0.447	8.247
E-33	766.743	13:00 hr	111.643	Not Full	0.217	-0.449	3.633
E-22	756.713	06:00 hr	0	Not Full	0.55	-0.45	7.65
E-15	756.833	06:00 hr	0	Not Full	0.212	-0.454	5.888
B-23	749.797	07:00 hr	0	Not Full	0.374	-0.459	7.126
B-7	743.651	07:00 hr	0	Not Full	0.535	-0.465	8.849

2035 Manhole Results with CIPs							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
H-31	760.756	06:00 hr	0	Not Full	0.358	-0.476	6.342
I-9A	766.186	06:00 hr	0	Not Full	0.179	-0.488	4.451
C-26	753.808	06:00 hr	0	Not Full	0.345	-0.488	5.455
E-20	760.576	06:00 hr	71.181	Not Full	0.178	-0.488	4.322
C-25	753.65	06:00 hr	0	Not Full	0.345	-0.489	5.214
H-2	753.788	08:00 hr	0	Not Full	0.511	-0.489	6.789
H-4	755.093	20:00 hr	0	Not Full	0.507	-0.493	8.493
I-25	764.071	06:00 hr	0	Not Full	0.172	-0.494	5.408
C-35	754.413	06:00 hr	0	Not Full	0.339	-0.495	6
A-52	753.031	19:00 hr	33.628	Not Full	0.171	-0.496	5.329
E-4	751.523	06:00 hr	0	Not Full	0.498	-0.502	8.502
I-9	766.003	06:00 hr	0	Not Full	0.165	-0.502	4.747
I-8	765.615	06:00 hr	0	Not Full	0.164	-0.502	5.26
B-20	749.542	07:00 hr	0	Not Full	0.33	-0.503	7.37
E-3	750.65	07:00 hr	0	Not Full	0.497	-0.503	8.803
I-22	761.873	06:00 hr	32.863	Not Full	0.161	-0.506	3.67
E-11	753.366	08:00 hr	0	Not Full	0.489	-0.511	7.661
I-27	765.103	06:00 hr	0	Not Full	0.155	-0.511	5.595
I-1	760.067	15:00 hr	0	Not Full	0.487	-0.51	7.797
F-44	754.924	10:00 hr	0	Not Full	0.152	-0.514	5.948
I-16	761.778	06:00 hr	0	Not Full	0.152	-0.515	6.348
I-28	766.599	06:00 hr	65.978	Not Full	0.152	-0.515	4.518
A-50	750.918	19:00 hr	0	Not Full	0.152	-0.52	6.448
B-26	753.013	06:00 hr	0	Not Full	0.15	-0.517	6.15
I-24	763.596	06:00 hr	0	Not Full	0.145	-0.52	5.105
A-47	748.676	19:00 hr	0	Not Full	0.143	-0.524	7.358
B-25	751.189	06:00 hr	0	Not Full	0.142	-0.524	5.858
A-14	747.705	19:00 hr	9.46	Not Full	0.475	-0.525	7.761
I-23	763.58	06:00 hr	31.328	Not Full	0.139	-0.528	3.691
A-48	749.602	19:00 hr	0	Not Full	0.136	-0.53	7.064
B-2	742.121	07:00 hr	0	Not Full	0.468	-0.53	9.432
H-10	758.796	07:00 hr	0	Not Full	0.468	-0.532	8.287
A-15	747.923	06:00 hr	95.407	Not Full	0.467	-0.533	7.578
A-14A	747.004	18:00 hr	0	Not Full	0.465	-0.535	8.135
E-6	752.462	07:00 hr	0	Not Full	0.462	-0.538	8.73
I-15	760.489	06:00 hr	0	Not Full	0.129	-0.538	7.271
A-51	752.571	19:00 hr	0	Not Full	0.127	-0.54	5.673
D-19	755.669	06:00 hr	0	Not Full	0.293	-0.54	5.407
C-36	754.516	06:00 hr	0	Not Full	0.293	-0.54	5.896
C-37	755.476	06:00 hr	0	Not Full	0.293	-0.54	5.807
I-17	761.895	13:00 hr	35.09	Not Full	0.126	-0.541	6.074
D-1	750.384	07:00 hr	0	Not Full	0.289	-0.544	7.311

2035 Manhole Results with CIPs							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
D-7	751.056	07:00 hr	0	Not Full	0.288	-0.545	8.012
G-13	756.873	06:00 hr	0	Not Full	0.286	-0.55	6.714
A-11A	746	16:00 hr	0	Not Full	0.451	-0.549	8.224
I-7	765.302	06:00 hr	0	Not Full	0.117	-0.549	4.883
F-46	757.063	13:00 hr	0	Not Full	0.117	-0.55	5.183
J-3	754.876	06:00 hr	0	Not Full	0.115	-0.552	8.685
H-29	759.022	06:00 hr	0	Not Full	0.28	-0.553	6.52
J-2	753.922	06:00 hr	0	Not Full	0.113	-0.554	10.287
H-26	756.659	06:00 hr	0	Not Full	0.445	-0.555	7.455
J-1	753.571	06:00 hr	0	Not Full	0.112	-0.56	10.888
D-21	756.376	06:00 hr	0	Not Full	0.278	-0.555	5.222
H-36	759.392	06:00 hr	30.439	Not Full	0.11	-0.556	4.49
D-17	755.072	07:00 hr	0	Not Full	0.275	-0.558	4.925
J-4	756.157	06:00 hr	20.814	Not Full	0.107	-0.56	7.893
D-24	757.189	06:00 hr	0	Not Full	0.271	-0.562	4.629
I-6	763.959	06:00 hr	0	Not Full	0.099	-0.568	5.301
D-13	753.912	07:00 hr	0	Not Full	0.262	-0.571	7.536
D-15	754.215	07:00 hr	0	Not Full	0.262	-0.572	6.338
H-30	760.206	06:00 hr	0	Not Full	0.261	-0.572	5.939
E-1	748.54	08:00 hr	0	Not Full	0.421	-0.579	8.479
D-24A	757.957	06:00 hr	0	Not Full	0.244	-0.59	4.043
F-48	749.999	06:00 hr	15.774	Not Full	0.071	-0.595	7.529
F-38	753.156	12:00 hr	0	Not Full	0.235	-0.60	6.665
G-9	756.399	06:00 hr	0	Not Full	0.222	-0.612	5.678
G-8	755.95	06:00 hr	0	Not Full	0.221	-0.612	5.107
E-13	755.394	07:00 hr	0	Not Full	0.387	-0.613	7.713
B-12	746.614	07:00 hr	0	Not Full	0.387	-0.613	8.363
H-13	756.408	03:00 hr	0	Not Full	0.385	-0.615	8.915
D-13A	752.951	07:00 hr	0	Not Full	0.218	-0.615	6.782
A-20	748.911	18:00 hr	0	Not Full	0.384	-0.616	7.561
G-18	757.484	06:00 hr	89.873	Not Full	0.213	-0.62	5.901
G-4	755.281	06:00 hr	0	Not Full	0.212	-0.622	5.888
C-17	750.006	07:00 hr	0	Not Full	0.374	-0.626	6.726
F-23	750.544	06:00 hr	0	Not Full	1.122	-0.628	7.778
B-10	745.439	07:00 hr	0	Not Full	0.368	-0.632	8.432
F-26	753.037	15:00 hr	0	Not Full	0.189	-0.644	7.211
F-39A	754.751	12:00 hr	0	Not Full	0.189	-0.645	6.228
F-34	754.989	15:00 hr	48.332	Not Full	0.179	-0.654	6.321
B-14	747.628	07:00 hr	0	Not Full	0.345	-0.655	8.355
F-36	752.048	07:00 hr	0	Not Full	0.844	-0.656	7.556
F-31	754.64	15:00 hr	0	Not Full	0.174	-0.659	6.726
F-35	751.516	07:00 hr	0	Not Full	0.839	-0.661	7.661

2035 Manhole Results with CIPs							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
F-37	752.514	16:00 hr	0	Not Full	0.836	-0.664	7.664
G-1	753.942	06:00 hr	0	Not Full	0.16	-0.674	6.54
F-24	751.39	15:00 hr	0	Not Full	0.158	-0.675	7.142
F-25	752.589	15:00 hr	0	Not Full	0.153	-0.68	7.247
B-27	753.973	06:00 hr	39.26	Not Full	0.153	-0.68	6.047
B-13	747.133	07:00 hr	0	Not Full	0.315	-0.685	7.685
F-39	755.633	12:00 hr	0	Not Full	0.148	-0.685	7.652
F-38B	753.046	15:00 hr	0	Not Full	0.145	-0.688	6.921
B-8	744.271	07:00 hr	0	Not Full	0.311	-0.69	7.789
B-18	748.261	07:00 hr	0	Not Full	0.307	-0.693	7.762
B-24	750.362	06:00 hr	0	Not Full	0.132	-0.701	6.768
F-38A	754.535	12:00 hr	0	Not Full	0.126	-0.707	5.674
B-9	745.019	07:00 hr	0	Not Full	0.293	-0.707	7.907
B-11	746.235	07:00 hr	0	Not Full	0.287	-0.713	8.713
H-7	757.024	08:00 hr	0	Not Full	0.28	-0.72	8.22
F-40	756.974	12:00 hr	36.536	Not Full	0.111	-0.722	7.289
H-1	753.121	06:00 hr	0	Not Full	0.524	-0.726	7.376
H-27	757.955	06:00 hr	0	Not Full	0.258	-0.742	6.342
B-6	743.648	07:00 hr	0	Not Full	0.648	-0.816	9.066
C-11	748.601	07:00 hr	0	Not Full	0.433	-0.817	7.522
C-13	749.03	07:00 hr	0	Not Full	0.431	-0.819	6.869
B-35	744.924	07:00 hr	34.455	Not Full	0.406	-0.844	8.172
B-28	743.82	07:00 hr	0	Not Full	0.406	-0.844	8.167
C-5	746.954	07:00 hr	0	Not Full	0.403	-0.847	7.466
C-7	747.553	07:00 hr	0	Not Full	0.402	-0.848	7.526
C-9	748.136	07:00 hr	0	Not Full	0.4	-0.85	8.7
C-1	745.695	07:00 hr	15.66	Not Full	0.384	-0.866	7.749
C-3	746.335	07:00 hr	0	Not Full	0.373	-0.877	7.327
A-24	750.836	08:00 hr	0	Not Full	0.516	-0.984	7.984
F-1	745.381	21:00 hr	0	Not Full	1.256	-0.994	7.444
F-11	747.182	19:00 hr	0	Not Full	0.734	-1.016	8.841
A-3	740.088	07:00 hr	0	Not Full	1.385	-1.115	7.615
F-12	747.791	19:00 hr	0	Not Full	0.624	-1.126	9.408
A-10	745.368	21:00 hr	0.498	Not Full	1.368	-1.132	7.981
F-21	748.64	18:00 hr	0	Not Full	0.584	-1.166	9.416
F-22	749.716	06:00 hr	0	Not Full	0.526	-1.224	7.774
F-8	745.402	20:00 hr	0	Not Full	0.972	-1.278	8.74
F-9	745.692	06:00 hr	0	Not Full	0.956	-1.294	9.044
A-2	739.562	08:00 hr	0	Not Full	1.109	-1.391	6.891
A-9	744.853	08:00 hr	0	Not Full	0.948	-1.552	6.352
F-10	746.372	15:00 hr	36.507	Not Full	0.689	-1.561	9.611
A-1	738.368	20:00 hr	0	Not Full	0.868	-1.632	6.632

2035 Manhole Results with CIPs							
ID	Maximum Grade (ft)	Maximum Grade Time (hour)	Load (gpm)	Status	Depth (ft)	Surcharge Depth (ft)	Unfilled Depth (ft)
A-8	744.031	18:00 hr	0	Not Full	0.754	-1.746	6.446
A-7	742.523	18:00 hr	0	Not Full	0.579	-1.921	8.221

2035 Pipe Results with CIPs														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
12-BP	12-B	12-C	420	00:03 hr	2.681	0.667	0.579	1	205.87	0.667	1	2.681	1.961	0.459
H-3P	H-3	H-2	449.905	07:19 hr	1.276	1	0.212	1	169.77	1	1	1.039	1.606	0.42
A-45P	A-45	A-36	279.12	06:19 hr	1.782	0.667	0.409	1	92.688	0.667	1	1.502	1.497	0.371
C-22P	C-22	C-19	281.95	06:28 hr	1.152	0.833	0.23	1	78.944	0.833	1	1.12	1.389	0.348
H-6P	H-6	H-5	472.715	07:08 hr	1.341	1	0.288	1	109.133	1	1	1.158	1.3	0.431
I-5P	I-5	I-4	322.233	06:27 hr	2.057	0.667	0.603	1	55.627	0.667	1	2.043	1.209	0.4
H-32P	H-32	H-31	128.6	06:03 hr	0.525	0.833	0.13	1	18.153	0.833	1	0.522	1.164	0.232
A-4P	A-4	A-3	2,612.94	06:53 hr	1.186	2.5	0.192	1	320.055	2.5	1	1.186	1.14	0.798
C-32P	C-32	C-26	184.869	06:13 hr	0.755	0.833	0.198	1	21.347	0.833	1	0.761	1.131	0.28
H-9P	H-9	H-8	350.043	07:01 hr	0.993	1	0.267	1	27.342	1	1	1.041	1.085	0.369
I-20P	I-20	I-19	201.76	06:06 hr	1.288	0.667	0.447	1	7.529	0.667	1	1.413	1.039	0.313
E-12P	E-12	E-11	434.08	06:35 hr	1.231	1	0.341	1	14.016	1	1	1.352	1.033	0.413
12-CP	12-C	A-10	420.00	00:05 hr	3.184	0.523	0.766	0.785	-18.059	0.667	1	2.681	0.959	0.459
E-28P	E-28	E-27	272.235	06:02 hr	2.189	0.494	0.675	0.74	-30.864	0.494	0.74	2.187	0.898	0.366
F-37P	F-37	F-36	1,343.21	05:47 hr	2.16	1.097	0.459	0.732	-173.962	1.097	0.732	1.998	0.885	0.658
C-18P	C-18	C-17	281.914	06:37 hr	1.491	0.601	0.408	0.721	-42.052	0.601	0.721	1.48	0.87	0.348
F-58P	F-58	F-57	102.506	15:02 hr	0.851	0.479	0.272	0.718	-15.923	0.479	0.718	0.851	0.866	0.22
A-13P	A-13	A-12	340.189	19:24 hr	1.289	0.701	0.325	0.701	-65.419	0.701	0.701	1.281	0.839	0.364
F-51AP	F-51A	F-51	217.522	06:23 hr	1.869	0.464	0.602	0.696	-44.358	0.464	0.696	1.851	0.831	0.326
A-12P	A-12	A-11A	333.083	19:25 hr	1.282	0.691	0.324	0.691	-71.601	0.691	0.691	1.27	0.823	0.36
C-39P	C-39	C-37	185.002	06:08 hr	1.622	0.456	0.507	0.683	-43.161	0.456	0.683	1.617	0.811	0.299
E-2P	E-2	E-1	425.583	07:03 hr	1.671	0.679	0.441	0.679	-104.309	0.679	0.679	1.635	0.803	0.408
I-4P	I-4	I-2	385.67	06:12 hr	2.182	0.565	0.632	0.678	-94.758	0.565	0.678	2.173	0.803	0.41
I-2P	I-2	I-1	384.373	06:48 hr	2.189	0.562	0.635	0.674	-98.333	0.562	0.674	1.942	0.796	0.41
F-36P	F-36	F-35	1,338.42	05:51 hr	2.361	1.008	0.511	0.672	-349.943	1.008	0.672	2.232	0.793	0.656
E-7P	E-7	E-6	431.997	06:41 hr	1.718	0.671	0.451	0.671	-114.366	0.671	0.671	1.664	0.791	0.412
F-23P	F-23	F-22	1,166.75	06:00 hr	1.529	1.165	0.307	0.666	-325.225	1.165	0.666	1.513	0.782	0.584
E-5P	E-5	E-4	429.458	06:48 hr	1.747	0.658	0.461	0.658	-129.048	0.658	0.658	1.689	0.769	0.41
B-3P	B-3	B-2	492.85	07:13 hr	2.054	0.644	0.551	0.644	-167.568	0.644	0.644	2.052	0.746	0.441
F-53P	F-53	F-52	217.533	06:19 hr	2.091	0.42	0.691	0.63	-83.107	0.42	0.63	2.079	0.724	0.326
E-21P	E-21	E-13	366.02	06:31 hr	1.621	0.611	0.441	0.611	-163.52	0.611	0.611	1.587	0.691	0.378
F-46P	F-46	F-45	243.791	12:51 hr	2.44	0.406	0.796	0.609	-110.876	0.406	0.609	0.152	0.687	0.346
F-35P	F-35	A-24	1,134.04	05:54 hr	2.248	0.911	0.501	0.608	-521.481	0.911	0.608	2.183	0.685	0.602
A-6P	A-6	A-5	2,527.21	06:42 hr	1.81	1.515	0.313	0.606	-1,178.13	2.263	0.905	1.065	0.682	0.784
I-21P	I-21	I-20	201.785	06:02 hr	2.048	0.401	0.687	0.602	-97.025	0.533	0.8	2.047	0.675	0.313
C-19P	C-19	C-18	281.918	06:32 hr	1.838	0.5	0.541	0.6	-137.508	0.534	0.64	1.109	0.672	0.348
A-36P	A-36	A-28	270.34	07:17 hr	1.762	0.5	0.529	0.6	-131.93	0.5	0.6	1.688	0.672	0.341
H-8P	H-8	H-7	350.018	07:04 hr	1.594	0.597	0.438	0.597	-174.561	0.597	0.597	1.568	0.667	0.369
H-5P	H-5	H-4	464.7	07:11 hr	2.152	0.589	0.592	0.589	-247.254	0.589	0.589	2.103	0.653	0.428
A-10P	A-10	A-9	2,071.67	06:27 hr	1.541	1.468	0.269	0.587	-1,117.53	1.468	0.587	1.502	0.65	0.708

2035 Pipe Results with CIPs														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
A-5P	A-5	A-4	2,626.21	06:47 hr	1.968	1.458	0.344	0.583	-1,456.76	2.44	0.976	1.108	0.643	0.8
E-32P	E-32	E-31	111.643	13:06 hr	1.179	0.388	0.397	0.582	-62.425	0.388	0.582	1.179	0.641	0.23
E-23P	E-23	E-22	366.521	06:21 hr	2.489	0.483	0.756	0.58	-208.311	0.495	0.594	2.424	0.638	0.399
B-4P	B-4	B-3	492.867	07:09 hr	2.334	0.578	0.648	0.578	-284.505	0.61	0.61	1.395	0.634	0.441
F-50P	F-50	F-49	216.341	06:29 hr	2.312	0.385	0.787	0.577	-125.979	0.385	0.577	2.293	0.632	0.325
F-51P	F-51	F-50	216.346	06:27 hr	2.312	0.384	0.788	0.577	-126.174	0.384	0.577	2.273	0.632	0.325
A-3P	A-3	A-2	2,605.68	06:57 hr	2.001	1.429	0.353	0.572	-1,576.56	1.429	0.572	1.978	0.623	0.797
H-2P	H-2	H-1	443.125	07:23 hr	2.147	0.567	0.599	0.567	-276.427	0.567	0.567	2.06	0.616	0.417
C-24P	C-24	C-23	184.788	06:17 hr	1.289	0.473	0.39	0.567	-115.34	0.473	0.567	1.279	0.616	0.28
C-23P	C-23	C-23A	184.76	06:22 hr	1.293	0.472	0.391	0.566	-116.464	0.472	0.566	1.279	0.613	0.28
F-52P	F-52	F-51A	217.527	06:22 hr	2.389	0.376	0.821	0.564	-139.323	0.404	0.606	1.313	0.61	0.326
A-61P_2	A-61	Oct-55	149.84	06:05 hr	1.661	0.373	0.561	0.56	-98.90	0.373	0.56	1.658	0.602	0.268
E-27P	E-27	E-26	271.987	06:04 hr	1.938	0.465	0.594	0.558	-182.032	0.465	0.558	1.934	0.599	0.342
A-28P	A-28	A-22	254.183	07:21 hr	1.823	0.462	0.563	0.555	-173.83	0.462	0.555	1.794	0.594	0.33
A-22P	A-22	A-20	254.08	07:23 hr	1.824	0.462	0.563	0.554	-174.18	0.462	0.554	1.766	0.593	0.33
F-45P	F-45	F-44	207.126	12:54 hr	2.326	0.369	0.802	0.554	-142.691	0.369	0.554	2.269	0.592	0.317
E-22P	E-22	E-21	366.273	06:25 hr	1.832	0.553	0.517	0.553	-254.132	0.553	0.553	1.829	0.59	0.378
E-6P	E-6	E-5	430.905	06:44 hr	2.188	0.546	0.62	0.546	-313.385	0.546	0.546	1.967	0.579	0.411
F-49P	F-49	CARLSON_WW	216.34	06:33 hr	2.525	0.358	0.883	0.537	-167.81	0.358	0.537	2.506	0.563	0.325
E-26P	E-26	E-23	271.94	06:05 hr	2.071	0.44	0.65	0.529	-223.64	0.44	0.529	2.018	0.549	0.342
E-4P	E-4	E-3	428.269	06:52 hr	2.268	0.528	0.652	0.528	-353.591	0.528	0.528	2.214	0.548	0.41
E-11P	E-11	E-7	433.249	06:36 hr	2.319	0.524	0.669	0.524	-368.719	0.524	0.524	1.095	0.54	0.412
I-19P	I-19	F-55	201.756	06:09 hr	2.466	0.345	0.875	0.517	-179.143	0.345	0.517	2.459	0.53	0.313
H-4P	H-4	H-3	456.309	07:16 hr	2.487	0.516	0.721	0.516	-408.751	0.749	0.749	1.255	0.527	0.424
E-3P	E-3	E-2	426.789	06:57 hr	2.33	0.515	0.676	0.515	-384.39	0.562	0.562	1.138	0.526	0.409
F-54P	F-54	F-53	217.537	06:15 hr	2.682	0.343	0.955	0.514	-197.823	0.371	0.556	2.652	0.524	0.326
D-27P	D-27	D-27A	115.499	06:07 hr	1.432	0.341	0.505	0.512	-106.761	0.341	0.512	1.429	0.52	0.234
10-55P	#######	A-54	149.822	06:08 hr	1.864	0.34	0.658	0.51	-139.681	0.34	0.51	1.858	0.518	0.268
F-47P	F-47	F-46	243.793	12:49 hr	3.08	0.336	1.106	0.504	-237.026	0.336	0.504	2.806	0.507	0.346
A-14P	A-14	A-14A	349.33	19:17 hr	1.977	0.501	0.578	0.501	-347.095	0.501	0.501	1.932	0.502	0.369
A-15P	A-15	A-14	340.368	19:23 hr	1.964	0.493	0.579	0.493	-355.845	0.493	0.493	1.916	0.489	0.364
A-61AP	A-61A	A-61	149.922	06:01 hr	1.958	0.327	0.705	0.491	-159.276	0.35	0.525	0.955	0.485	0.268
C-23AP	C-23A	C-22	281.956	06:25 hr	2.363	0.408	0.765	0.49	-301.459	0.678	0.814	1.129	0.483	0.348
I-1P	I-1	H-10	378.168	06:53 hr	2.204	0.49	0.654	0.49	-405.906	0.49	0.49	2.198	0.482	0.384
H-10P	H-10	H-9	378.143	06:59 hr	2.205	0.489	0.654	0.489	-406.44	0.663	0.663	0.993	0.482	0.384
E-30P	E-30	E-29	111.632	13:14 hr	1.498	0.321	0.549	0.481	-127.038	0.321	0.481	1.497	0.468	0.23
D-16P	D-16	D-15	115.395	06:26 hr	0.993	0.4	0.323	0.48	-131.932	0.4	0.48	0.984	0.467	0.219
A-14AP	A-14A	A-13	340.193	19:19 hr	2.039	0.479	0.609	0.479	-392.267	0.54	0.54	0.917	0.464	0.364
B-1P	B-1	A-6	492.844	07:17 hr	3.031	0.47	0.913	0.47	-605.182	1	1	1.392	0.449	0.441
B-2P	B-2	B-1	492.844	07:17 hr	3.031	0.47	0.913	0.47	-605.187	1	1	1.392	0.449	0.441

2035 Pipe Results with CIPs														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
E-1P	E-1	F-11	424.148	07:07 hr	2.649	0.464	0.805	0.464	-540.905	0.555	0.555	1.01	0.44	0.408
C-40P	C-40	C-39	185.196	06:04 hr	2.604	0.309	0.967	0.464	-236.376	0.379	0.568	1.171	0.439	0.299
A-2P	A-2	A-1	2,596.04	07:07 hr	2.624	1.15	0.506	0.46	-3,401.60	1.15	0.46	2.582	0.433	0.795
A-11AP	A-11A	A-11	333.08	19:28 hr	2.113	0.459	0.644	0.459	-440.57	0.491	0.491	1.955	0.431	0.36
A-53P	A-53	A-45	149.792	06:11 hr	2.144	0.305	0.8	0.457	-199.597	0.597	0.895	0.94	0.429	0.268
H-1P	H-1	F-37	520.607	07:28 hr	2.122	0.571	0.581	0.457	-695.103	0.653	0.522	0.811	0.428	0.424
F-1P	F-1	A-10	1,382.20	07:53 hr	1.744	1.026	0.356	0.456	-1,859.58	1.312	0.583	0.683	0.426	0.592
B-23P	B-23	B-20	152.22	06:40 hr	1.404	0.379	0.47	0.455	-206.17	0.379	0.455	1.395	0.425	0.253
E-29P	E-29	E-28	111.631	13:18 hr	1.615	0.303	0.607	0.454	-152.451	0.367	0.551	0.709	0.423	0.23
H-26P	H-26	H-13	157.66	06:20 hr	1.019	0.452	0.313	0.452	-217.86	0.452	0.452	1.012	0.42	0.245
F-11P	F-11	F-10	1,385.20	07:39 hr	2.978	0.78	0.697	0.446	-1,998.62	0.78	0.446	2.893	0.409	0.638
A-46P	A-46	A-45	130.00	00:27 hr	1.971	0.292	0.753	0.438	-197.68	0.667	1	0.83	0.397	0.249
F-9P	F-9	F-8	1,409.29	07:46 hr	1.885	0.981	0.393	0.436	-2,166.56	0.981	0.436	1.862	0.394	0.598
H-31P	H-31	H-30	128.48	06:07 hr	1.266	0.361	0.435	0.433	-202.341	0.361	0.433	1.261	0.388	0.232
C-25P	C-25	C-24	184.82	06:15 hr	1.889	0.351	0.658	0.421	-315.08	0.404	0.484	0.732	0.37	0.28
C-26P	C-26	C-25	184.86	06:14 hr	1.89	0.351	0.658	0.421	-315.34	0.351	0.421	1.876	0.37	0.28
F-8P	F-8	F-1	1,390.05	18:37 hr	1.955	0.945	0.415	0.42	-2,387.32	1.114	0.495	0.668	0.368	0.594
A-24P	A-24	F-23	1,129.91	05:55 hr	3.688	0.615	0.97	0.41	-2,072.51	0.759	0.506	1.029	0.353	0.601
A-20P	A-20	A-15	241.987	07:28 hr	1.796	0.407	0.581	0.407	-453.815	0.412	0.412	0.616	0.348	0.305
D-27BP	D-27B	D-27	115.561	06:03 hr	1.932	0.271	0.765	0.407	-217.295	0.305	0.457	0.733	0.347	0.234
B-20P	B-20	B-18	152.206	06:45 hr	1.664	0.333	0.594	0.4	-299.432	0.333	0.4	1.657	0.337	0.253
E-13P	E-13	E-12	434.915	06:34 hr	3.306	0.4	1.078	0.4	-857.44	0.563	0.563	1.164	0.337	0.413
F-44P	F-44	F-43	188.791	12:55 hr	3.246	0.265	1.29	0.398	-376.173	0.265	0.398	2.398	0.334	0.302
F-55P	F-55	F-54	201.748	06:13 hr	3.497	0.264	1.404	0.396	-408.667	0.291	0.437	3.47	0.331	0.313
A-54P	A-54	A-53	149.79	06:10 hr	2.64	0.261	1.066	0.391	-313.98	0.28	0.42	0.942	0.323	0.268
F-21P	F-21	F-12	1,076.90	18:19 hr	2.783	0.679	0.697	0.388	-2,305.13	0.679	0.388	2.575	0.318	0.56
F-12P	F-12	F-11	1,073.33	06:07 hr	2.782	0.677	0.697	0.387	-2,310.00	0.679	0.388	1.952	0.317	0.559
B-12P	B-12	B-11	152.179	06:59 hr	1.209	0.387	0.401	0.387	-328.262	0.387	0.387	1.209	0.317	0.24
F-43P	F-43	CARLSON_WW	176.57	12:57 hr	3.187	0.256	1.295	0.384	-388.353	0.256	0.384	3.09	0.313	0.292
C-17P	C-17	C-13	281.891	06:39 hr	2.279	0.382	0.761	0.382	-629.797	0.402	0.402	0.768	0.309	0.33
A-9P	A-9	A-8	2,064.55	08:00 hr	2.695	0.948	0.571	0.379	-4,694.38	0.948	0.379	2.695	0.305	0.706
E-18P	E-18	E-15	71.119	06:10 hr	1.353	0.246	0.562	0.369	-173.399	0.246	0.369	1.346	0.291	0.182
E-25P	E-25	E-24	100	00:54 hr	1.902	0.246	0.786	0.369	-243.928	0.246	0.369	1.902	0.291	0.217
E-19P	E-19	E-18	71.119	06:05 hr	1.354	0.246	0.563	0.369	-173.646	0.246	0.369	1.35	0.291	0.182
B-10P	B-10	B-9	152.166	07:06 hr	1.288	0.369	0.438	0.369	-372.126	0.369	0.369	1.287	0.29	0.24
E-24P	E-24	E-23	100	00:59 hr	1.91	0.245	0.795	0.368	-245.886	0.308	0.462	0.638	0.289	0.217
E-31P	E-31	E-30	111.636	13:11 hr	2.137	0.245	0.891	0.368	-275.685	0.282	0.423	0.71	0.288	0.23
D-19P	D-19	D-17	115.417	06:21 hr	1.464	0.299	0.553	0.358	-304.39	0.299	0.358	1.45	0.275	0.219
F-56P	F-56	56-A	119.524	15:04 hr	2.384	0.238	1.009	0.357	-319.312	0.238	0.357	2.384	0.272	0.238
56-AP	56-A	CARLSON_WW	119.522	15:08 hr	2.384	0.238	1.009	0.357	-319.351	0.238	0.357	2.383	0.272	0.238

2035 Pipe Results with CIPs														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
A-11P	A-11	A-10	327.37	19:29 hr	2.904	0.357	1.004	0.357	-875.193	0.96	0.96	0.919	0.272	0.356
F-57P	F-57	F-56	119.538	15:03 hr	2.386	0.238	1.01	0.356	-319.795	0.238	0.356	2.367	0.272	0.238
C-36P	C-36	C-35	184.905	06:10 hr	2.37	0.296	0.899	0.356	-497.797	0.316	0.379	2.283	0.271	0.28
C-37P	C-37	C-36	185.002	06:10 hr	2.372	0.296	0.9	0.355	-498.381	0.296	0.355	0.74	0.271	0.28
C-35P	C-35	C-32	184.905	06:11 hr	2.372	0.296	0.899	0.355	-498.362	0.593	0.711	0.738	0.271	0.28
A-1P	A-1	WWTF	2,588.19	07:09 hr	3.695	0.887	0.81	0.355	-6,998.78	0.887	0.355	3.654	0.27	0.794
C-11P	C-11	C-9	281.869	06:46 hr	1.634	0.439	0.509	0.351	-783.743	0.439	0.351	1.623	0.265	0.309
C-13P	C-13	C-11	281.876	06:43 hr	1.634	0.439	0.509	0.351	-784.49	0.439	0.351	1.607	0.264	0.309
D-1P	D-1	B-23	115.355	06:40 hr	1.507	0.292	0.576	0.351	-321.919	0.331	0.398	0.462	0.264	0.219
D-7P	D-7	D-1	115.369	06:36 hr	1.507	0.292	0.576	0.351	-322.024	0.292	0.351	1.483	0.264	0.219
B-6P	B-6	B-4	483.37	07:08 hr	2.84	0.434	0.89	0.348	-1,378.92	0.506	0.404	0.876	0.26	0.408
B-14P	B-14	B-13	152.19	06:52 hr	1.403	0.346	0.492	0.346	-437.71	0.346	0.346	1.4	0.258	0.24
E-14P	E-14	E-13	71.088	06:15 hr	1.483	0.23	0.638	0.345	-206.478	0.304	0.456	0.442	0.256	0.182
G-13P	G-13	G-9	89.829	06:05 hr	1.201	0.287	0.463	0.345	-261.714	0.287	0.345	1.199	0.256	0.193
H-29P	H-29	H-27	128.42	06:14 hr	1.741	0.284	0.675	0.341	-384.079	0.284	0.341	1.728	0.251	0.232
D-21P	D-21	D-19	115.436	06:17 hr	1.583	0.282	0.616	0.338	-352.439	0.286	0.343	0.459	0.247	0.219
D-27AP	D-27A	D-24A	115.483	06:08 hr	2.477	0.225	1.078	0.338	-353.331	0.234	0.351	0.727	0.246	0.234
D-17P	D-17	D-16	115.41	06:24 hr	1.594	0.281	0.622	0.337	-357.01	0.333	0.4	0.454	0.244	0.219
D-24P	D-24	D-21	115.44	06:14 hr	1.647	0.274	0.651	0.329	-379.10	0.274	0.329	0.462	0.233	0.219
F-22P	F-22	F-21	1,105.77	06:01 hr	3.596	0.573	0.983	0.328	-3,664.53	0.573	0.328	3.435	0.232	0.568
E-33P	E-33	E-32	111.643	13:03 hr	2.516	0.217	1.116	0.326	-373.69	0.303	0.454	0.712	0.23	0.23
B-35P	B-35	B-28	331.904	07:04 hr	2.136	0.407	0.693	0.325	-1,119.02	0.407	0.325	2.136	0.229	0.336
B-28P	B-28	B-6	331.902	07:05 hr	2.137	0.406	0.694	0.325	-1,120.26	0.527	0.422	0.602	0.229	0.336
C-9P	C-9	C-7	281.84	06:50 hr	1.831	0.404	0.596	0.323	-966.30	0.404	0.323	1.792	0.226	0.309
F-10P	F-10	F-9	1,409.29	07:42 hr	2.826	0.727	0.686	0.323	-4,832.41	0.806	0.358	1.889	0.226	0.598
C-7P	C-7	C-5	281.84	06:53 hr	1.831	0.404	0.596	0.323	-966.867	0.404	0.323	1.788	0.226	0.309
C-5P	C-5	C-3	281.816	06:56 hr	1.831	0.404	0.597	0.323	-966.962	0.404	0.323	1.83	0.226	0.309
E-15P	E-15	E-14	71.088	06:12 hr	1.631	0.215	0.729	0.322	-245.818	0.22	0.329	0.444	0.224	0.182
D-13P	D-13	D-13A	115.386	06:30 hr	1.711	0.266	0.686	0.32	-405.831	0.266	0.32	1.696	0.221	0.219
D-15P	D-15	D-13	115.386	06:27 hr	1.711	0.266	0.686	0.32	-406.14	0.266	0.32	1.691	0.221	0.219
H-30P	H-30	H-29	128.48	06:11 hr	1.926	0.264	0.776	0.317	-460.943	0.271	0.325	0.514	0.218	0.232
B-13P	B-13	B-12	152.187	06:56 hr	1.595	0.316	0.588	0.316	-552.32	0.351	0.351	1.369	0.216	0.24
A-8P	A-8	A-7	2,064.55	08:03 hr	3.482	0.786	0.814	0.314	-7,570.42	0.786	0.314	3.405	0.214	0.706
B-8P	B-8	B-7	152.154	07:14 hr	1.615	0.313	0.598	0.313	-565.03	0.423	0.423	0.428	0.212	0.24
B-18P	B-18	B-14	152.202	06:49 hr	1.643	0.309	0.613	0.309	-582.09	0.326	0.326	0.427	0.207	0.24
C-1P	C-1	B-35	297.501	07:01 hr	2.072	0.384	0.693	0.307	-1,154.18	0.395	0.316	0.54	0.205	0.318
C-3P	C-3	C-1	281.812	06:59 hr	2.04	0.373	0.693	0.299	-1,169.28	0.379	0.303	1.456	0.194	0.309
D-24AP	D-24A	D-24	115.468	06:10 hr	1.916	0.246	0.803	0.295	-494.871	0.257	0.309	0.464	0.189	0.219
B-9P	B-9	B-8	152.16	07:10 hr	1.763	0.294	0.676	0.294	-658.31	0.302	0.302	0.429	0.188	0.24
B-11P	B-11	B-10	152.173	07:03 hr	1.819	0.287	0.706	0.287	-694.63	0.328	0.328	0.431	0.18	0.24

2035 Pipe Results with CIPs														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
F-38P	F-38	F-38B	36.506	12:08 hr	0.639	0.236	0.274	0.284	-171.56	0.236	0.284	0.637	0.175	0.122
H-7P	H-7	H-6	328.949	07:04 hr	4.045	0.281	1.588	0.281	-1,575.24	0.591	0.591	0.924	0.173	0.357
B-7P	B-7	B-6	152.146	07:15 hr	1.88	0.28	0.739	0.28	-734.307	0.592	0.592	0.428	0.172	0.24
I-9AP	I-9A	I-9	22.349	06:05 hr	0.656	0.18	0.323	0.27	-118.193	0.18	0.27	0.655	0.159	0.101
H-13P	H-13	H-6	157.636	06:21 hr	2.058	0.269	0.827	0.269	-834.7	0.704	0.704	0.434	0.159	0.244
E-20P	E-20	E-19	71.181	06:02 hr	2.106	0.179	1.039	0.268	-381.256	0.212	0.317	0.452	0.157	0.182
G-9P	G-9	G-8	89.818	06:06 hr	1.711	0.223	0.757	0.267	-485.879	0.223	0.267	1.707	0.156	0.193
G-8P	G-8	G-4	89.818	06:07 hr	1.711	0.222	0.757	0.267	-486.273	0.222	0.267	1.706	0.156	0.193
D-13AP	D-13A	D-7	115.376	06:33 hr	2.218	0.221	0.984	0.265	-633.661	0.253	0.304	0.458	0.154	0.219
H-27P	H-27	H-26	157.66	06:17 hr	2.164	0.26	0.886	0.26	-906.74	0.351	0.351	0.439	0.148	0.245
I-25P	I-25	I-24	43.58	06:07 hr	1.348	0.173	0.677	0.26	-251.426	0.173	0.26	1.344	0.148	0.142
A-52P	A-52	A-51	33.628	19:02 hr	1.057	0.171	0.534	0.257	-198.965	0.171	0.257	1.056	0.145	0.124
G-18P	G-18	G-13	89.873	06:01 hr	1.811	0.214	0.819	0.256	-533.77	0.25	0.3	0.366	0.144	0.193
G-4P	G-4	G-1	89.801	06:11 hr	1.814	0.213	0.821	0.256	-535.276	0.213	0.256	1.806	0.144	0.193
I-8P	I-8	I-7	22.34	06:12 hr	0.735	0.166	0.377	0.249	-142.365	0.166	0.249	0.731	0.136	0.101
I-9P	I-9	I-8	22.349	06:10 hr	0.735	0.166	0.378	0.249	-142.524	0.166	0.249	0.732	0.136	0.101
I-22P_2	I-22	LINDEN_WW	64.133	06:09 hr	2.199	0.161	1.148	0.241	-437.49	0.161	0.241	2.197	0.128	0.173
A-7P	A-7	A-6	2,064.55	08:04 hr	5.156	0.593	1.402	0.237	-14,639.15	1.362	0.545	0.892	0.124	0.706
I-27P	I-27	I-25	43.58	06:05 hr	1.561	0.156	0.829	0.234	-319.012	0.164	0.246	0.276	0.12	0.142
I-16P	I-16	I-15	43.564	06:12 hr	1.599	0.153	0.856	0.23	-331.326	0.153	0.23	1.59	0.116	0.142
I-28P	I-28	I-27	43.613	06:03 hr	1.616	0.152	0.869	0.229	-336.975	0.154	0.231	0.277	0.115	0.142
I-28P2	I-28	I-9A	22.365	06:03 hr	0.829	0.152	0.446	0.229	-172.805	0.166	0.248	0.142	0.115	0.101
A-50P	A-50	A-48	33.619	19:09 hr	1.249	0.152	0.672	0.228	-260.75	0.152	0.228	1.247	0.114	0.124
F-26P	F-26	F-25	48.323	15:10 hr	1.153	0.19	0.556	0.228	-376.899	0.19	0.228	1.152	0.114	0.141
F-39AP	F-39A	F-38A	36.512	12:06 hr	0.872	0.19	0.421	0.227	-285.323	0.19	0.227	0.87	0.113	0.122
B-26P	B-26	B-25	39.219	06:07 hr	1.477	0.151	0.799	0.226	-310.753	0.151	0.226	1.47	0.112	0.134
I-24P	I-24	I-16	43.56	06:09 hr	1.713	0.146	0.942	0.219	-369.86	0.149	0.223	0.274	0.105	0.142
B-25P	B-25	B-24	39.219	06:09 hr	1.578	0.144	0.875	0.216	-345.226	0.144	0.216	1.569	0.102	0.134
F-34P	F-34	F-31	48.332	15:01 hr	1.249	0.179	0.62	0.215	-427.795	0.179	0.215	1.249	0.102	0.141
A-47P_2	A-47	SOUTH_BEECH_WW	33.615	19:12 hr	1.361	0.143	0.756	0.215	-298.742	0.143	0.215	1.359	0.101	0.124
F-31P	F-31	F-26	48.323	15:07 hr	1.298	0.174	0.654	0.209	-454.589	0.182	0.218	0.197	0.096	0.141
I-23P	I-23	I-22	31.328	06:04 hr	1.327	0.139	0.75	0.208	-298.966	0.15	0.224	0.199	0.095	0.12
A-48P	A-48	A-47	33.615	19:10 hr	1.459	0.136	0.832	0.205	-333.139	0.139	0.209	0.213	0.092	0.124
I-15P_2	I-15	PENNY_WW	43.556	06:13 hr	2.027	0.13	1.186	0.195	-480.917	0.13	0.195	2.015	0.083	0.142
G-1P	G-1	H-1	89.79	06:11 hr	2.708	0.161	1.423	0.193	-1,010.62	0.342	0.411	0.361	0.082	0.193
A-51P	A-51	A-50	33.619	19:04 hr	1.611	0.127	0.953	0.191	-388.167	0.139	0.209	0.214	0.08	0.124
F-24P	F-24	F-23	48.319	15:17 hr	1.485	0.159	0.786	0.191	-559.992	0.63	0.757	0.196	0.079	0.141
I-17P	I-17	I-1	35.09	13:01 hr	1.71	0.126	1.018	0.189	-415.832	0.126	0.189	1.71	0.078	0.127
F-25P	F-25	F-24	48.319	15:12 hr	1.557	0.154	0.839	0.184	-602.338	0.156	0.187	0.196	0.074	0.141
B-27P	B-27	B-26	39.26	06:03 hr	1.268	0.153	0.684	0.184	-491.008	0.153	0.184	1.265	0.074	0.126

2035 Pipe Results with CIPs														
ID	From ID	To ID	Maximum Flow (gpm)	Maximum Flow Time (hour)	Maximum Velocity (ft/s)	Maximum Water Depth (ft)	Maximum Froude Number	Maximum d/D	Maximum Overflow (gpm)	Maximum Adjusted Depth (ft)	Maximum Adjusted d/D	Maximum Adjusted Velocity (ft/s)	Maximum q/Q	Maximum Critical Depth (ft)
F-39P	F-39	F-39A	36.528	12:04 hr	1.236	0.149	0.678	0.178	-490.605	0.168	0.202	0.148	0.069	0.122
I-7P	I-7	I-6	22.34	06:16 hr	1.185	0.119	0.727	0.178	-301.559	0.119	0.178	1.177	0.069	0.101
F-38BP	F-38B	F-37	36.501	12:12 hr	1.265	0.146	0.7	0.175	-508.315	0.49	0.589	0.147	0.067	0.122
J-3P	J-3	J-2	20.788	06:04 hr	1.149	0.115	0.715	0.173	-298.473	0.115	0.173	1.145	0.065	0.097
J-2P	J-2	J-1	20.788	06:05 hr	1.179	0.113	0.741	0.17	-310.409	0.113	0.17	1.175	0.063	0.097
J-1P_2	J-1	IDAHO_WW	20.775	06:06 hr	1.186	0.113	0.748	0.169	-313.617	0.113	0.169	1.181	0.062	0.097
H-36P	H-36	H-27	30.439	06:01 hr	1.788	0.111	1.139	0.166	-479.355	0.184	0.276	0.194	0.06	0.118
J-4P	J-4	J-3	20.814	06:02 hr	1.277	0.107	0.826	0.161	-350.177	0.111	0.166	0.132	0.056	0.097
B-24P	B-24	B-23	39.198	06:10 hr	1.544	0.134	0.894	0.16	-662.715	0.251	0.302	0.157	0.056	0.126
F-38AP	F-38A	F-38	36.511	12:07 hr	1.552	0.127	0.924	0.152	-692.336	0.181	0.217	0.147	0.05	0.122
I-6P	I-6	I-5	22.334	06:19 hr	1.504	0.101	1.005	0.151	-431.986	0.556	0.834	0.139	0.049	0.101
F-40P	F-40	F-39	36.536	12:00 hr	1.881	0.111	1.2	0.133	-921.386	0.13	0.156	0.149	0.038	0.122
F-48P	F-48	BRANDING_IRON_WW	15.774	06:01 hr	1.746	0.072	1.392	0.107	-636.448	0.072	0.107	1.744	0.024	0.085

APPENDIX I

COST ESTIMATES

CITY OF TOPPENISH
PHASE II - COLLECTION SYSTEM REPLACEMENT
TOTAL ESTIMATED CONSTRUCTION COST (2017 DOLLARS)

No.	Item	Quantity	Unit	Unit Price	Amount
1.	HDPE Sanitary Sewer Pipe and Fittings for Trenchless, 8-Inch Diameter	4,057	LF	$135.00	$547,695.00
2.	PVC Sanitary Sewer Pipe and Fittings, 8-Inch Diameter	12,170	LF	$148.00	$1,801,160.00
3.	HDPE Sanitary Sewer Pipe and Fittings for Trenchless, 10-Inch Diameter	611	LF	$155.00	$94,705.00
4.	PVC Sanitary Sewer Pipe and Fittings, 10-Inch Diameter	1,834	LF	$162.00	$297,108.00
				Subtotal :	**$2,740,668**
				Contingency (25%):	$685,167
				Construction Subtotal:	**$3,425,835**
				TERO (3%)	$102,775
				Sales Tax (8.2%)	$289,346
				Total Construction Cost	**$3,817,956**
				Predesign Report/Video Analysis	$5,000
				YIN Cultural Resource Survey	$7,500
				Engineering, Legal, and Administration (25%)	$954,489
				Total Estimate Construction Cost	**$4,785,000**

CITY OF TOPPENISH
PHASE III - COLLECTION SYSTEM REPLACEMENT
TOTAL ESTIMATED CONSTRUCTION COST (2017 DOLLARS)

No.	Item	Quantity	Unit	Unit Price	Amount
1.	HDPE Sanitary Sewer Pipe and Fittings for Trenchless, 8-Inch Diameter	5,646	LF	$135.00	$762,210.00
2.	PVC Sanitary Sewer Pipe and Fittings, 8-Inch Diameter	16,548	LF	$148.00	$2,449,104.00
3.	HDPE Sanitary Sewer Pipe and Fittings for Trenchless, 10-Inch Diameter	1,205	LF	$155.00	$186,775.00
4.	PVC Sanitary Sewer Pipe and Fittings, 10-Inch Diameter	3,615	LF	$162.00	$585,630.00
5.	HDPE Sanitary Sewer Pipe and Fittings for Trenchless, 12-Inch Diameter	876	LF	$155.00	$135,780.00
6.	PVC Sanitary Sewer Pipe and Fittings, 12-Inch Diameter	2,629	LF	$168.00	$441,672.00
7.	PVC Sanitary Sewer Pipe and Fittings, 15-Inch Diameter	233	LF	$182.00	$42,406.00
8.	PVC Sanitary Sewer Pipe and Fittings, 18-Inch Diameter	608	LF	$202.00	$122,816.00
9.	PVC Sanitary Sewer Pipe and Fittings, 21-Inch Diameter	667	LF	$209.00	$139,403.00
10.	PVC Sanitary Sewer Pipe and Fittings, 27-Inch Diameter	707	LF	$222.00	$156,954.00
11.	PVC Sanitary Sewer Pipe and Fittings, 30-Inch Diameter	142	LF	$229.00	$32,518.00
				Subtotal :	**$5,055,268**
				Contingency (25%):	$1,263,817
				Construction Subtotal:	**$6,319,085**
				TERO (3%)	$189,573
				Sales Tax (8.2%)	$533,710
				Total Construction Cost	**$7,042,367**
				Predesign Report/Video Analysis	$5,000
				YIN Cultural Resource Survey	$7,500
				Engineering, Legal, and Administration (25%)	$1,760,592
				Total Estimate Construction Cost	**$8,816,000**

CITY OF TOPPENISH
PHASE IV - COLLECTION SYSTEM REPLACEMENT
TOTAL ESTIMATED CONSTRUCTION COST (2017 DOLLARS)

No.	Item	Quantity	Unit	Unit Price	Amount
1.	HDPE Sanitary Sewer Pipe and Fittings for Trenchless, 8-Inch Diameter	2,608	LF	$135.00	$352,080.00
2.	PVC Sanitary Sewer Pipe and Fittings, 8-Inch Diameter	7,904	LF	$148.00	$1,169,792.00
3.	HDPE Sanitary Sewer Pipe and Fittings for Trenchless, 10-Inch Diameter	598	LF	$155.00	$92,690.00
4.	PVC Sanitary Sewer Pipe and Fittings, 10-Inch Diameter	1,794	LF	$162.00	$290,628.00
5.	HDPE Sanitary Sewer Pipe and Fittings for Trenchless, 12-Inch Diameter	446	LF	$155.25	$69,241.50
6.	PVC Sanitary Sewer Pipe and Fittings, 12-Inch Diameter	1,337	LF	$168.75	$225,618.75
7.	PVC Sanitary Sewer Pipe and Fittings, 15-Inch Diameter	1,176	LF	$182.25	$214,326.00
8.	PVC Sanitary Sewer Pipe and Fittings, 30-Inch Diameter	1,930	LF	$229.50	$442,935.00
				Subtotal :	**$2,857,311**
				Contingency (25%):	$714,328
				Construction Subtotal:	**$3,571,639**
				TERO (3%)	$107,149
				Sales Tax (8.2%)	$301,661
				Total Construction Cost	**$3,980,449**
				Predesign Report/Video Analysis	$5,000
				YIN Cultural Resource Survey	$7,500
				Engineering, Legal, and Administration (25%)	$995,112
				Total Estimate Construction Cost	**$4,989,000**

CITY OF TOPPENISH
CARLSON LIFT STATION REPLACEMENT
TOTAL ESTIMATED PROJECT COST (2017 DOLLARS)

NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization	1	LS	$40,000	$40,000
2	SPCC Plan	1	LS	$1,000	$1,000
3	Submersible Pumps w/ Install	2	EA	$22,000	$44,000
4	Wetwell, Excavation and Install	1	EA	$120,000	$120,000
5	Dewatering	1	LS	$35,000	$35,000
6	Piping	1	LS	$26,000	$26,000
7	Valves and Appurtenances	1	LS	$25,000	$25,000
8	Electrical	1	EA	$120,000	$120,000
9	Trench Excavation and Safety Systems	1	LS	$2,000	$2,000
10	8-Inch Force Main	20	LF	$45	$900
11	8-inch Gravity Sewer	100	LF	$65	$6,500
12	Bank Run Gravel for Trench Backfill	60	CY	$25	$1,500
13	Surface Repair	400	SY	$40	$16,000
				Subtotal (rounded):	$438,000
				Contingency (25%, rounded):	$110,000
				Construction Subtotal:	$548,000
				TERO (3%)	$16,440
				Sales Tax (8.2%, rounded)	$47,000
				Total Construction Cost	$611,440
				Land Acquisition	$20,000
				New Commercial Electrical Service	$20,000
				YIN Cultrual Resource Survey	$3,000
				Investment Grade Efficiency Audit	$5,000
				Engineering, Legal, and Administration (25%, rounded)	$153,000
				Total Estimate Construction Cost	**$813,000**

CITY OF TOPPENISH
SOUTH BEECH LIFT STATION REPLACEMENT
TOTAL ESTIMATED PROJECT COST (2017 DOLLARS)

NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization	1	LS	$22,000	$22,000
2	SPCC Plan	1	LS	$1,000	$1,000
3	Submersible Pumps w/ Install	2	EA	$14,000	$28,000
4	Wetwell, Excavation and Install	1	EA	$40,000	$40,000
5	Dewatering	1	LS	$15,000	$15,000
6	Piping	1	LS	$20,000	$20,000
7	Valves and Appurtenances	1	LS	$25,000	$25,000
8	Electrical	1	EA	$75,000	$75,000
9	Trench Excavation and Safety Systems	1	LS	$9,000	$9,000
10	6-Inch Force Main	30	LF	$35	$1,050
11	8-inch Gravity Sewer	30	LF	$65	$1,950
12	Bank Run Gravel for Trench Backfill	10	CY	$25	$250
13	Surface Repair	100	SY	$50	$5,000
				Subtotal (rounded):	$244,000
				Contingency (25%, rounded):	$61,000
				Construction Subtotal:	$305,000
				TERO (3%)	$9,150
				Sales Tax (8.2%, rounded)	$26,000
				Total Construction Cost	$340,150
				Land Acquisition	$5,000
				New Commercial Electrical Service	$20,000
				YIN Cultural Resource Survey	$3,000
				Investment Grade Efficeincy Audit	$5,000
				Engineering, Legal, and Administration (25%, rounded)	$86,000
				Total Estimate Construction Cost	**$460,000**

CITY OF TOPPENISH
BRANDING IRON LIFT STATION IMPROVEMENTS
TOTAL ESTIMATED PROJECT COST (2017 DOLLARS)

NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Mobilization/Demobilization	1	LS	$12,000	$12,000
2	SPCC Plan	1	LS	$1,000	$1,000
3	Submersible Pumps w/ Install	2	EA	$15,000	$30,000
4	Valves and Appurtenances	1	LS	$25,000	$25,000
5	Electrical	1	EA	$60,000	$60,000
6	Trench Excavation and Safety Systems	1	LS	$1,000	$1,000
7	Fencing	120	LF	$50	$6,000
8	Surface Repair	100	SY	$20	$2,000
				Subtotal (rounded):	$137,000
				Contingency (25%, rounded):	$35,000
				Construction Subtotal:	$172,000
				TERO (3%)	$5,160
				Sales Tax (8.2%, rounded)	$15,000
				Total Construction Cost	$192,160
				New Commercial Electrical Service	$12,000
				Investment Grade Efficiency Audit	$5,000
				Engineering, Legal, and Administration (25%, rounded)	$49,000
				Total Estimate Construction Cost	**$259,000**

CITY OF TOPPENISH
SAFEWAY STORM SEWER LIFT STATION IMPROVEMENTS
TOTAL ESTIMATED PROJECT COST (2017 DOLLARS)

NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Submersible Pumps	2	EA	$21,000	$42,000
2	Electrical	1	LS	$1,200	$1,200
				Subtotal (rounded):	$44,000
				Contingency (10%, rounded):	$5,000
				Total Estimate Construction Cost	$49,000

CITY OF TOPPENISH
DEL MONTE LIFT STATION IMPROVEMENTS
TOTAL ESTIMATED PROJECT COST (2017 DOLLARS)

NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Submersible Pumps	2	EA	$20,000	$40,000
2	Electrical	1	ls	$1,200	$1,200
				Subtotal (rounded):	$42,000
				Contingency (10%, rounded):	$5,000
				Total Estimate Construction Cost	$47,000

CITY OF TOPPENISH
IDAHO LIFT STATION IMPROVEMENTS
TOTAL ESTIMATED PROJECT COST (2017 DOLLARS)

NO.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Fencing	200	LF	$50	$10,000
				Subtotal (rounded):	$10,000
				Contingency (10%, rounded):	$1,000
				Total Estimate Construction Cost	$11,000

APPENDIX J

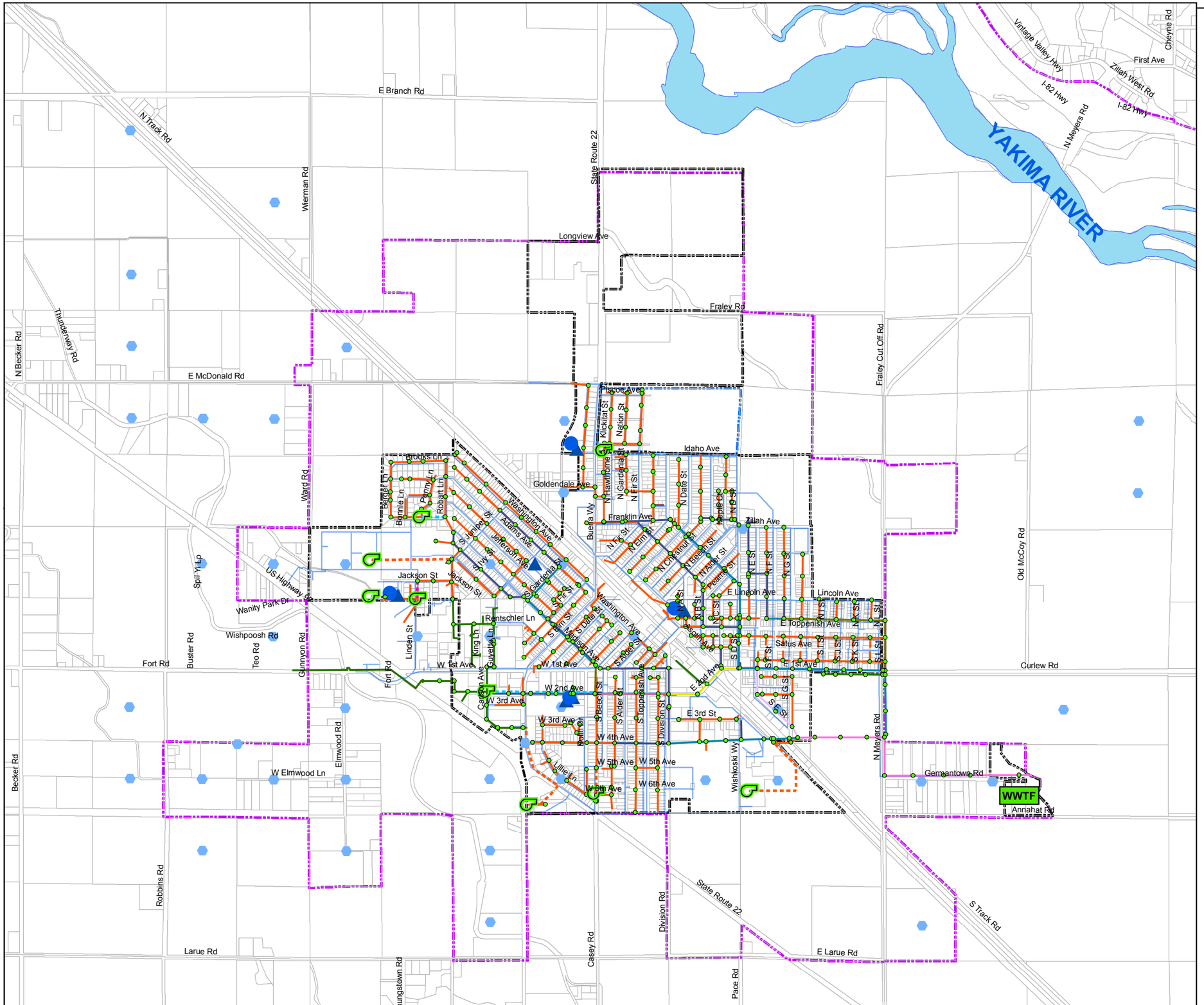
SHORT-LIVED ASSETS

USDA RURAL DEVELOPMENT
ESTIMATED SCHEDULE OF SHORT-LIVED ASSETS

Owner:	City of Toppenish									
Project:	Sewer System Improvements Project	initial date			updated			final date		
		2 to 5 year period			6 to 10 year period			11 to 15 year period		
Sewer System Assets		quantities	unit price	total	quantities	unit price	total	quantities	unit price	total
	Collection System Pipes	0	$ -	$ -	810	$ 35	$ 28,350	810	$ 35	$ 28,350
Items 1	Collection System Pumps	0	$ -	$ -	0	$ -	$ -	4	$ 22,000	$ 88,000
Items 2	WWTF Telemetry	1	$ 5,000	$ 5,000	1	$ 5,000	$ 5,000	1	$ 5,000	$ 5,000
Items 3	WWTF - Headworks Screen Rebuild	0	$ -	$ -	1	$ 15,000	$ 15,000	0	$ -	$ -
Items 3	WWTF - IPS Level Transducer	0	$ -	$ -	1	$ 5,500	$ 5,500	0	$ -	$ -
Items 4	WWTF - IPS Pump Replacement	0	$ -	$ -	1	$ 22,000	$ 22,000	0	$ -	$ -
Items 5	WWTF - PC Scum Pump Replacement	0	$ -	$ -	1	$ 15,000	$ 15,000	0	$ -	$ -
Items 6	WWTF - PC Drive Motor	0	$ -	$ -	0	$ -	$ -	1	$ 16,000	$ 16,000
Items 9	WWTF - AB IR Pump Replacement	0	$ -	$ -	1	$ 25,000	$ 25,000	1	$ -	$ -
Items 10	WWTF - AB Anoxic Mixer Rebuild	0	$ -	$ -	1	$ 8,000	$ 8,000	0	$ -	$ -
Items 11	WWTF - AB Blower Rebuild	0	$ -	$ -	2	$ 5,000	$ 10,000	0	$ -	$ -
Items 12	WWTF - RAS/WAS Pump Replacement	0	$ -	$ -	1	$ 16,000	$ 16,000		$ -	$ -
Items 13	WWTF - Filtrate Tank Level Transduce Replacement	0	$ -	$ -	1	$ 5,500	$ 5,500		$ -	$ -
Items 14	WWTF - Filtrate Tank Pump Replacement	0	$ -	$ -	1	$ 16,000	$ 16,000		$ -	$ -
Items 15	WWTF - Digester Recirulcation Pump Rebuild	0	$ -	$ -	1	$ 5,000	$ 5,000		$ -	$ -
Items 16	WWTF - Digester Mix Pump Rebuild	0	$ -	$ -	1	$ 5,000	$ 5,000		$ -	$ -
Items 17	WWTF - Digester Building Roof Replacement	0	$ -	$ -	1	$ 12,000	$ 12,000		$ -	$ -
Items 18	WWTF - NPW Pump Rebuild	0	$ -	$ -	1	$ 7,000	$ 7,000		$ -	$ -
Items 19	WWTF - Operations Building Lab Equipment	1	$ 3,000	$ -	1	$ 3,000	$ 3,000	1	$ 3,000	$ 3,000
Items 20	WWTF - Operations Building Roof Replacement	0	$ -	$ -	1	$ 15,000	$ 15,000		$ -	$ -
		subtotal		$ 5,000	subtotal		$190,000	subtotal		$ 112,000
User Note:	This schedule is used as an estimating tool only. It is of the simplist format, and does not include inflation, depreciation, or other factors.									
	The estimated item costs should be based on current replacement costs (material, sales tax, engineer's $, contractor's $, but not typical labor of owner).									

APPENDIX K

GROUNDWATER WELLS AND WELL LOGS



N

0 2,400 4,800 Feet

LEGEND:

- LIFT STATION
- MANHOLE
- WASTEWATER TREATMENT FACILITY
- WATER RESERVOIR
- MUNICIPAL WATER WELL
- WATER WELL

FORCE MAIN DIAMETER

- 4
- 6"
- 8"
- UNKNOWN SIZE

GRAVITY MAIN DIAMETER

- 6"
- 8"
- 10"
- 12"
- 15"
- 18"
- 21"
- 27"
- 30"
- UNKNOWN SIZE
- WATER MAIN
- WATER
- PARCELS
- CITY LIMITS
- UGA
- YNHA RESIDENTIAL COMPLEX

CITY OF TOPPENISH

GENERAL SEWER PLAN

APPENDIX K

GROUNDWATER WELLS

Gray & Osborne, Inc.

Document Path: M:\TOPPENISH\15039 General Sewer Plan\GIS\Figure 3-8 Existing Municipal and Private Wells.mxd

well_log_id	well_tag_nr	nit_id_nr	well_depth_qt	well_diameter_qt	well_owner_nm	township_nr	range_nr	range_dir_cd	section_nr	qtr_section_cd	qtr_qtr_section_cd	well_comp_dt	county_nm	well_type_cd	well_log_recv_dt	tax_parcel_nr	ST_PLANE_XCOORD_NR	ST_PLANE_YCOORD_NR
255002	AFE096	W118047	80	6	ABEL GARZA/A&A CONSTRUCTION	10	20	E	9	NE	SW	1/24/2000	Yakima	W	2/11/2000	201009-42406	1685161	377919
255003	AFE089	W118037	95	6	ADAM GARZA	10	20	E	9	SE	SW	12/13/1999	Yakima	W	1/18/2000	201009-43400	1685173	375281
192070	AEM816	W105207	82	6	ARNOLDO HERNANDEZ	10	20	E	5	SE	SE	7/7/1999	Yakima	W	8/12/1999		1681167	380555
112362			47	6	AUDREY MCGOVERN	10	20	E	5	NE	NW	5/1/1975	Yakima	W	6/6/1975		1679877	384570
112613			50	6	BILL DAVISON	11	20	E	33	SW	SW	12/10/1986	Yakima	W	12/12/1986		1682531	385889
123786	AET926	W105342	75	6	CARMEN RAMIREZ/SERAFIN MAGANA	10	20	E	4	NE	SE	3/31/1999	Yakima	W	4/28/1999	201004-14418	1686531	383210
302648	AFQ924	W113797	85	6	CECELIA TAHKEAL	10	20	E	8	NW	NE	4/10/2001	Yakima	W	4/19/2001		1678520	379249
398896	ALF080	W170742	110	6	CENTRAL PRE-MIX CONCRETE	11	20	E	32	SW	NE	11/2/2004	Yakima	W	2/2/2005	201132-31007	1678553	387237
138019			863	16	CITY OF TOPPENISH	10	20	E	9	NE		12/18/1959	Yakima	W	6/28/1960		1685822	378583
291224			237	20	CITY OF TOPPENISH	10	20	E	9	NE	NE	6/23/1992	Yakima	W	7/16/1992		1686485	379245
797485	BAL874	WE13546	460	12	City Of Toppenish	10	20	E	4	NE	SE	3/28/2012	Yakima	W	6/25/2012	20100411006	1686531	383210
849207	BIB506	WE15101	444	12	City Of Toppenish	10	20	E	4	NE	NE	11/30/2012	Yakima	W	3/7/2013	2010041106	1686549	384530
567853	BBA191	D051622	40	30	CITY OF TOPPENISH	10	20	E	11	NW	SE	12/31/2008	Yakima	W	1/15/2009	20101124002	1694446	377877
113528			38	6	CLARENCE BRIDGES	10	20	E	9	NE	SE	7/6/1990	Yakima	W	8/7/1990		1686486	377925
113782			60	6	DARRELL HIATT	10	20	E	8	NE	SE	8/22/1991	Yakima	W	8/28/1991		1681184	377911
466041	ALE479	W183032	90	6	DAVID GARCIA	10	20	E	4	NE	SE	10/2/2006	Yakima	W	11/8/2006	201004-14417	1686531	383210
113870			65	6	DAVID ROWE	10	20	E	10	NW	SE	1/27/1986	Yakima	W	8/27/1986		1689147	377908
403527	ALF462	W176566	100	6	DAVID WARD	10	20	E	5	NE	NE	2/9/2005	Yakima	W	2/16/2005	201005-11001	1681195	384562
113936			42		DEL MONTE CORPORATION	10	20	E	10	NE	SW	1/1/1947	Yakima	W			1690480	377895
291283			17	6	DEL MONTE CORPORATION	10	20	E	11	SW	SW	12/9/1987	Yakima	W	12/28/1987		1693145	375224
113915			238	14	DEL MONTE CORPORATION #122	10	20	E	10	NE	NW	3/25/1942	Yakima	W	3/8/1974		1690477	379218
113942			50	10	DELMAR BANGS	10	20	E	11	NW	SE	4/4/1992	Yakima	W	4/14/1992	YIN PERMIT 1992-5	1694446	377877
466043	ALE807	W255964	88	6	DICK ROBINS	10	20	E	9	NW	SW	9/20/2006	Yakima	W	10/11/2006	201009-23436	1682511	377911
389526	ACL444	W050546	86	6	EDNA NYCE	10	20	E	11	NW	SE	6/9/1997	Yakima	W	10/31/1997		1694446	377877
389517	ABL321	W036004	39	6	FAITH LUTHERN CHURCH	10	20	E	9	SE	NW	7/8/1995	Yakima	W	7/25/1995	201009-12011	1685168	376601
114682		W003389	78	6	Frank Osorio	10	20	E	5	SE	NE	8/24/1993	Yakima	W	5/4/1994		1681178	381891
114691			40	6	FRANK SHEARE	10	20	E	4	SW	SE	9/30/1991	Yakima	W	8/9/1991		1683828	380560
114858			40	6	GARY RUFENER	10	20	E	9	NE	SE	10/1/1991	Yakima	W	11/14/1991	2100091-4014	1686486	377925
114911			55	6	GEORGE FINCH	11	20	E	32	NW	NE	5/19/1991	Yakima	W	5/22/1991	201132-21002	1678536	389889
783303	BBJ250	W272639	85	6	Gorge Ascencia	10	20	E	5	NE	NW	8/9/2011	Yakima	W	4/2/2012	201005-12403	1679877	384570
115042			66	6	GRAHAM & MORRIS	11	20	E	32	SW	SE	3/29/1990	Yakima	W	4/25/1990		1678561	385911
449941	ALE074	W207781	86	6	GREOGRY LANE HILL	10	20	E	5	NW	NE	3/20/2006	Yakima	W	5/10/2006	201005-21405	1678560	384580
391518	AKW622	W160971	85	6	JAMES WENTZ	11	20	E	33	SW	SW	10/13/2004	Yakima	W	11/5/2004	201133-33401	1682531	385889
115781			50	6	JIM RATHBUN	10	20	E	11	NW	SW	7/13/1990	Yakima	W	8/7/1990		1693134	377876
115855			60	6	JOHANNA LEE	10	20	E	8	NE	SE	8/21/1991	Yakima	W	8/9/1991		1681184	377911
415101	ALC764	W182981	87	6	JOHN ROCHA SR	10	20	E	4	NE	SE	6/6/2005	Yakima	W	8/10/2005	201004-14427	1686531	383210
255038	AET799	W113373	85	6	JOSE GONZALEZ	11	20	E	32	NW	NE	11/13/1999	Yakima	W	11/29/1999		1678536	389889
391506	ALF068	W170729	107	6	JUANITA SOTO	10	20	E	9	NW	SW	8/30/2004	Yakima	W	11/5/2004	201009-23409	1682511	377911
116041			50	6	JUDY HUGHS	10	20	E	2	NE	NE	4/22/1992	Yakima	W	5/5/1992		1697148	384527
116386			26	3	LAWRENCE & RUTH GLEASON	10	20	E	3			10/22/1974	Yakima	W	10/22/1974		1689837	382534
847941	BIB114	DE01216	30	12	Legends Casino	10	20	E	5	SE	NW	12/4/2012	Yakima	W	12/20/2012		1679855	381902
116452			50	6	LEROY CONNER	10	20	E	4	SW	SE	12/2/1992	Yakima	W	1/12/1993	YAKIMA NATION APP 1992-57	1683828	380560
116499			58	6	LIQUID SUGARS INC	11	20	E	32	NE	SE	10/26/1990	Yakima	W	11/13/1990	201133-41004-7	1681199	388564
116633			100	6	MANUAL OROZCO	10	20	E	4	SE	NW	9/24/1992	Yakima	W	10/2/1992	201004-24432	1685177	381888
302644	AFQ923	W113794	87	6	MANUEL RODRIGUEZ	11	20	E	32	NW	NE	4/5/2001	Yakima	W	4/19/2001		1678536	389889
781640	BAE631	W274504	85	6	MARK KOFFLER	10	20	E	8	SE	NW	4/30/2010	Yakima	W	2/3/2012	201008-24005	1679867	376603
727360	BBJ737	W276017	85	6	MIGUEL PINEDA	10	20	E	8	NE	SW	5/3/2011	Yakima	W	5/3/2011	201008-13010	1679857	377921
117188			50	6	NICK TENAZA	11	20	E	32	SW	SE	3/28/1978	Yakima	W	4/1/1978		1678561	385911
530641	APT900	W254649	96	6	NOE GONZALEZ	10	20	E	4	NE	SE	4/16/2008	Yakima	W	5/7/2008	20100414451	1686531	383210
117223			100	6	NORMA BENSON	10	20	E	5	NE	NE	1/26/1993	Yakima	W	3/15/1993		1681195	384562
328732			143	8	NORTHERN PACIFIC RAILWAY CO	11	20	E	36	NW	NE		Yakima	W			1699772	389776
449875	ALE079	W207783	97	6	PEARL SCHMIDT	10	20	E	5	SE	NE	4/13/2006	Yakima	W	5/10/2006	201005-41012	1681178	381891
302721	ACL446	W050547	86	6	PETE MACIAS	10	20	E	11	NW	SE	6/11/1997	Yakima	W	10/31/1997		1694446	377877
357123			60	6	RENA SANCHEZ	10	20	E	11	NE	NW	11/14/1991	Yakima	W	2/26/1992		1695759	379205
117904			50	6	RG KELLEY	10	20	E	4	SE	NE	7/30/1979	Yakima	W	8/6/1979	201004-41488	1686511	381889
392531	AKO495	W176545	100	6	RICK RAINVILLE	10	20	E	9	SW	NW	10/25/2004	Yakima	W	11/30/2004	20100932005	1682523	376594
389525	ABX810	W048458	125	6	ROBERT NORTHRUP	10	20	E	11	NW	SW	9/19/1995	Yakima	W	9/27/1995		1693134	377876
118625			94	6	SITE 967 MALDANADO	10	20	E	5	SE	NW	12/19/1990	Yakima	W	2/4/1991		1679855	381902
352474	AHK180	W149517	100	6	SPRINT TELEPHONE	10	20	E	3	SW	SW	10/10/2002	Yakima	W	12/17/2002	201003-33903	1687824	380565
119004			59	6	TERESA MESPLIE	10	20	E	5	SE	NE	4/16/1992	Yakima	W	6/3/1992		1681178	381891
338241	AGL758	W160663	84	6	TOM MOORE	10	20	E	8	NE	SE	5/28/2002	Yakima	W	6/28/2002	201008-14006	1681184	377911
119271			49	6	TOPPENISH DAY CARE CENTER	10	20	E	4	SE	SW	5/1/1975	Yakima	W	6/6/1975		1685161	380564
119272			21	2	TOPPENISH EVANGELICAL CHURCH	10	20	E	9	NE		6/6/1976	Yakima	W	10/18/1976		1685822	378583
328731			160	8	TOWN OF ZILLAH	11	20	E	36			1/1/1908	Yakima	W			1700422	387821
432819			85	6	VIRGINIA BEAVERT	10	20	E	4	SW	SE	9/2/2000	Yakima	W	1/13/2000		1683828	380560
685906		W048984	375	16	WASHINGTON BEEF	10	20	E	9	NW	NW	6/26/1995	Yakima	W	1/12/2000		1682497	379227
119802			55	6	WESLEY TAKHEAL	10	20	E	1	SW	SE	7/30/1973	Yakima	W	9/23/1974		1699744	380524
121524	ACE546	W087429	80	6	WILLARD GILE	10	20	E	2	NE	SE	4/16/1996	Yakima	W	8/12/1996		1697129	383197
396222		W176907	257	6	YAKAMA LEGENDS CASINO	10	20	E	8	NE	SW	10/27/2004	Yakima	W	11/12/2004	20100899990	1679857	377921
398889	AKH571	W176908	234	12	YAKAMA LEGENDS CASINO	10	20	E	8	NE		1/6/2005	Yakima	W	1/14/2005		1680512	378573
595988	BAR657	WE10171	455	10	Yakama Nation Legends Casino	10	20	E	8	NW	SE	6/30/2009	Yakima	W	7/17/2009	Tribal Exempt	1678528	377931
120042			62	8	YAKIMA INDIAN NATION LAND ENTERPRISE	10	20	E	4	SW	NW	12/5/1992	Yakima	W	1/12/1993		1682504	381888
122565	ACT735	W062797	85	6	ZENAIDA MALDONADO	10	20	E	11	NW	SE	1/15/1998	Yakima	W	1/28/1998		1694446	377877