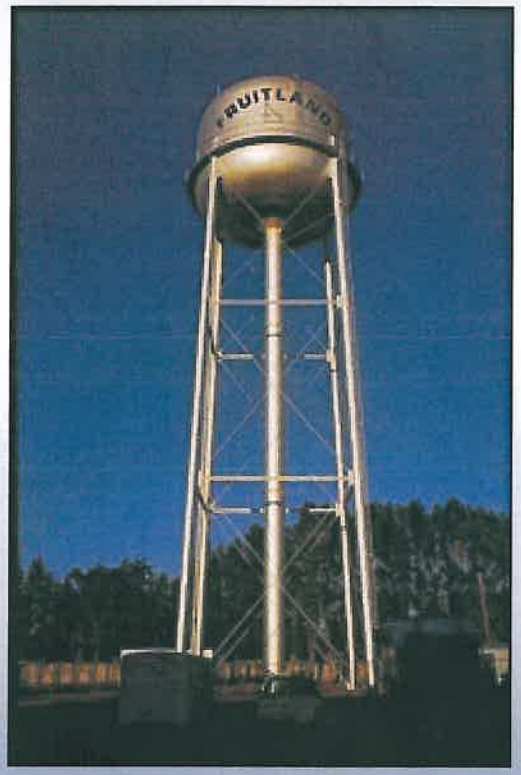
Palisades Junction Water and Sewer Services Feasibility Study

Prepared for

City of Fruitland, Idaho

FINAL REPORT



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Prepared for:

City of Fruitland

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Acknowledgements

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Executive Summary

The Palisades Area is located approximately 1.72 miles south of the City of Fruitland. Its location near Interstate 84, US Highway 95, and US Highway 30 has spurred interest in economic development in the area. The ability to provide water and sewer service to the area will be essential to commercial, industrial and residential investments. The purpose of this Feasibility Study is to determine the viability of extending water and sewer services from the City of Fruitland to the Palisades Area.

The Palisades Area, as referred to in this report, extends from NW 2nd Avenue south to SW 1st Avenue and from Elmore Road on the east to slightly past I-84 on the west. Based on projected land uses and associated zoning ordinances, the build-out population of the Palisades Area is predicted to be approximately 10,400 people with an estimated build-out water requirement of approximately 1.4 million gallons per day (mgd), and estimated build-out wastewater flow of approximately 1.25 mgd.

Three major phases of development were identified for both the water distribution system and the wastewater collection system to provide service at full build-out conditions. Phase 1 provides initial service to the Palisades Junction. Phase 2 generally provides service to the area east if Hwy 95 and Phase 3 generally provides service to the area west of Hwy 95. To provide initial service to the Palisades Junction, Phase 1A of the water distribution system and Phase 1A for wastewater collection system will be required. These are summarized below and are shown on **Figure 1**.

- Phase 1A – Water Distribution System: A 16-inch crossover pipe will be connected to the existing Fruitland water system and routed to a booster pump station that will service a new pressure zone for the area south of SW NW 2nd Ave. The current pressure zone, controlled by the existing elevated tank, cannot provide adequate pressure to meet Idaho Rules for Public Drinking Water Systems (Idaho Administrative Procedure Act (IDAPA) 58.01.08) requirements due to the increase in elevation from the edge of the current system to the Palisades Area. The booster pump station will initially be sized to deliver both maximum day (533-gpm) and peak hour (933-gpm) demands, as well as provide 1750-gpm of fire flow. From the booster pump station, a 12-inch pipe will be installed in

the Hwy 95 right-of-way along the eastern edge and extend south to the Palisades Junction. A 1.0 million gallon storage tank and pump station will be installed near the Palisades Junction to provide an additional 4000-gpm of fire flow making a total of 5000-gpm of fire flow available to Zone 2.

- Phase 1A – Wastewater Collection System: A main truck line will be installed beginning at the Palisades Junction and then heading east in the Hwy 30 right-of-way. From Hwy 30 the truck line will then go north in Richey Rd. to NW 2nd Ave. where the sewage will flow in to a lift station. From there, the lift station will pump the sewage through a force main in NW 2nd Ave. to an initial connection point to the existing Snake River Facility collection system located in S Pennsylvania Ave. This will give an initial capacity of 50,000-gpd of average daily flow. An additional 85,000-gpd of average daily flow capacity can be achieved by making improvements to the existing collection system.

The water and sewer pipelines are located in separate corridors due to minimum separation requirements and to minimize surface repairs costs. The budget level opinions of cost to provide initial service to the Palisades Junction are summarized below. These costs include contingencies and engineering.

• Water Distribution System	**$3,971,000**
Distribution Pipe:	$1,381,000
Booster Pump Station:	$655,000
Surface Repair:	$164,000
Subtotal	**$2,200,000**
Palisades Storage Tank *	$1,282,000
Palisades Pump Station (Fire Flow) *:	$489,000
Subtotal	**$1,771,000**
• Wastewater Collection System	**$2,046,000**
Collection Pipe:	$1,290,000
Lift Station and Force Main:	$756,000

* When the required fire flow exceeds the initial 1750-gpm of fire flow available from the booster pump station, the Palisades storage tank and pump station will need to be constructed to increase the available fire flow to 5000-gpm.

1.0 Introduction

The Palisades Junction is located at a major transportation intersection of Highway (Hwy) 95 and Hwy 30, and located off Interstate 84 (I-84). The area is approximately 1.75 miles from the City of Fruitland, 3.75 miles from Ontario, Oregon, and 4.5 miles from the City of New Plymouth. Current businesses located at the Palisades junction are a gas station, truck stop with food services, a tractor and farm implement store, an army surplus store, a boat and tackle shop, and a tavern. These existing commercial facilities use private wells and septic systems for water and sewer services. The area has shown a demand for economic expansion, specifically for commercial development. A major car dealership is planning to move to the Palisades Junction within the next year. The ability to provide adequate water and sewer services will be a significant factor in determining feasibility for economic development in the area.

The purpose of this project is to determine the feasibility of providing water and sewer services from the City of Fruitland to the Palisades Area and south of Interstate 84 to SW 1st Avenue, the southernmost border of the Fruitland Impact Area. The City currently has or is planning for adequate capacity to serve the needs required of their water and sewer systems. The City of Fruitland recently completed a water facility plan which outlines the requirements of the water system over the next 20 years. The City is currently working to complete a sewer facility plan by year's end.

Utilizing municipal services provides structured planning for growth and requires that such services meet health and environmental protection standards for public drinking water and wastewater systems. In addition, operation, monitoring and testing requirements for municipal systems provides superior protection and level of service than that of private individual systems. Fire flow will be provided to the area to meet the requirements of the Idaho Surveying & Rating Bureau. Fire protection will be provided by the City of Fruitland.

The specific items discussed in this feasibility study are: development of design criteria and phasing; evaluation of alternatives of water system requirements; evaluation of sewer system

requirements; identification of rights of way and alignments; and service feasibility for water and sewer system alternatives including estimated costs.

2.0 Design Criteria

The planning area for the City of Fruitland Water Facility Plan and Wastewater Facility Plan is generally the area bounded on the north by the Payette River and NW 2nd Avenue to the south and between the Snake River to the west and Elmore Rd. to the east, as shown on the City's Future Land Use map. The Palisades Area extends from NW 2nd Avenue south to SW 1st Avenue and from Elmore Rd. on the east to slightly past I-84 on the west.

The City of Fruitland Comprehensive Plan (January 2004) includes a future land use map which encompasses the area currently within the City boundary as well as the Palisades Area. The Palisades area and the planning area for this study are shown on **Figure 2.** Within the 2,370 acre Palisades Area, the land use types include large lot-, single family -, and multi-family residential; commercial; neighborhood commercial; light industrial; and schools, parks, or public lands. The total area of each type of land use is shown in **Table 1**. Although Area 7 had initially been designated as large-lot residential and is shown as such in the 2004 Comprehensive Plan, based on recent discussions with City personnel, this area will most likely become commercial development. Therefore Figure 1 has been updated to reflect this.

Table 1 Palisades Area Estimated Water Requirement & Wastewater Production

Area	Land Use	Size (acres)	Population Density Range[1] (pers/ac)	Typical Population Density (pers/ac)	Estimated Water Usage Rate[2] (gpcd)	Estimated Water Requirement (gpd)	Estimated Total Wastewater Production Rate[3] (gpd)
1	Commercial/Neighborhood Commercial	768	15-30	20	25	384,000	345,600
2	Light Industrial	420	5-15	10	25	105,000	94,500
3	Light Industrial	157	5-15	10	25	39,250	35,325
4	Schools, Parks, or Public Lands	71	5-30	17.5	20	24,850	22,365
5	Single Family Residential	282	12	12	80	270,720	243,648
6	Single Family Residential	365	12	12	80	350,400	315,360
7	Commercial/Neighborhood Commercial	101	15-30	20	25	50,500	45,450
8	Large Lot Residential	135	0.6	0.6	80	6,480	5,832
9	Multi-Family Residential	72	35	35	80	201,600	181,440
	Total	**2,371**				**1,432,800**	**1,289,520**
	Total Estimated Population		**10,365**				

Notes:

1. Population density ranges are from Water Resources Engineering 3rd Edition, Linsley and Franzini, McGraw-Hill Inc., 1979 and from City of Fruitland Zoning Ordinances.
2. Water usage rates are estimated from existing residential, commercial and industrial users within the City of Fruitland.
3. Assumes 90% of water used will become wastewater.
4. City of Fruitland zoning defines large lot residential as 5 acres, assumes 3 people per lot.
5. City of Fruitland zoning defines single family residential as having a minimum 0.17 acre lot size, assumes 3 people per lot, 30% of each development consists of non-dwelling areas (roads, green space, etc).
6. City of Fruitland zoning defines multi-family dwelling as having a minimum of 0.09 acre lot size per dwelling unit, assumes 3 people per lot.
7. In the 2004 City of Fruitland Comprehensive Plan, Area 7 was designated as as large-lot residential, however, based on recent discussions with City personnel, this area will most likely become commercial development.

The population density for each type of land use was estimated using literature values for the commercial, light industrial, and public lands areas, and using allowable densities for single family, multi-family, and large lot residential development as specified in the City of Fruitland zoning ordinances. Based on the total acreage of each proposed residential area and the typical population density, the estimated build-out population for the Palisades Area is approximately 10,400 people (**Table 1**).

If the population takes the entire 40 year planning period to reach 10,400 people, this represents an approximate annual growth rate of 2.5 %. As part of the Water Facilities Plan prepared by Pharmer Engineering (2007), the City of Fruitland's 2006 population was estimated at 4,758 and the projected population in 2026 is estimated to be 8,146, which is equivalent to about 3.5%

annual growth. If the Palisades Area grows at a rate similar to growth within the City, the build-out capacity of the Palisades Area will be reached in approximately 28.5 years.

Estimated water usage for commercial, industrial and residential land uses were estimated in the 2007 Water Facilities Plan based on water meter readings between 2003 and 2006. These values assumed that future developments will use a non-potable sources for irrigation. Based on these values, the estimated water requirement for the Palisades Area at build-out is approximately 1.4 million gallons per day (mgd). Based on the assumption that 90% of the water used will become wastewater, the total build-out wastewater flow will be approximately 1.25 mgd.

3.0 Water System Requirements

Two possible water sources identified for the Palisades service area are groundwater wells in the area and the existing Fruitland water system. Groundwater production rates and water quality data were obtained from the Idaho Department of Water Resources (IDWR) online map server for wells in the vicinity of the Palisades area. The existing potable water drinking wells in the area were all low producers, typically less than 70-gpm. Water quality data that was available indicated that arsenic levels were elevated, between 13 and 24 ug/L, which would be in violation of the Drinking Water Standards. The City recently explored well head treatment of arsenic during an evaluation of their existing water system. This evaluation determined that due to low source production, the capital and operation and maintenance costs were not justified, thus arsenic treatment at the well heads is not a viable option. Due to the similar nature of the existing wells in the Palisades Area to the existing City wells, groundwater production and arsenic treatment are not considered a viable long term option for the Palisades Area and will not be considered any further.

The existing Fruitland water system consists of 11 wells, 2 storage tanks and 1 pump station. In order to meet current demands, the City has been utilizing a trailer mounted membrane filtration unit to treat Payette River water to supplement the City's existing low capacity wells. The City will continue to utilize the membrane filtration unit, increasing its capacity as required, to meet growing demands until the new Fruitland Water Treatment Plant (WTP) is constructed in late 2010. The new WTP will utilize surface water from the Payette River as the sole source of water for the City and no longer use groundwater wells. The WTP will initially be sized to treat and produce 2.6 million gallons per day (MGD) of Payette River water with an expansion planned up to 3.2 MGD around 2016. The plant design will allow additional expansion up to the City's pending water right of 6 MGD. As population and water demands increase, the Water Facility Plan will be updated accordingly to identify any required upgrades that would be necessary for the Facility or distribution system.

For the Palisades area, a new pressure zone will be required to meet IDAPA requirements for minimum system pressures. Initially the new pressure zone (Zone 2) has been set at 2424 ft.

This hydraulic grade line will allow for a minimum pressure of 40-psi throughout Zone 2 during peak hour demands as required by the Idaho Rules for Public Drinking Water Systems. Because Zone 2 will be a completely new system, it will be developed in phases to help decrease initial capital costs. For this Study, three major phases have been identified (see **Figure 3**) and are summarized below:

- **Phase 1A – Commercial Corridor**: This phase (Area 1 on Figure 2) will allow for commercial development to occur along Hwy 95 and Hwy 30 within the planning area identified in Section 2, excluding the area south of I-84. A maximum day demand (MDD) of 575-gpm and peak hour demand (PHD) of 1000-gpm will be supported by Phase 1A. This accounts for approximately 50% of the projected build-out demands for the Palisades area. Initially the available fire flow will be 1750-gpm from the booster pump station. A total of 5000-gpm of fire flow for a duration of 4-hours will be supported once the Palisades Tank and Pump Station are built.
- **Phase 1B – Commercial Corridor South of I-84**. This phase will allow for an extension of the Phase 1A commercial corridor to south of I-84.
- **Phase 2 – East Side of Hwy 95**: This phase (Areas 2, 3, 4, and 5 on Figure 2) will consist of a mix of single family residential development and light industrial development. A small area near the residential development is planned for a future school or park. A MDD of 1,425-gpm and a PHD of 2,500-gpm will be supported for Phase 2. This accounts for approximately 70% of build-out demands.
- **Phase 3 – West Side of Hwy 95**: This phase (Areas 6, 7, 8, and 9 on Figure 2) will be entirely residential development with the majority being single family and some large lot and multiple family developments mixed in. Phase 3 will support projected build-out demands, as well as providing 8-hours of stand-by storage (8 hours of average day demand) to the Zone. Stand-by storage of at least this magnitude is recommended to prevent any problems from cutting off Zone 2 from the source since it is relatively far away.

To determine the amount of storage capacity that the Palisades area (Zone 2) will require, each of the following components were considered:

- Operational Storage: This component of storage supplies water when, under normal conditions, the sources are not supplying water. This component is required to prevent excess pump cycling and compensate for the sensitivity of the water level sensors. It also is used to ensure that the remaining components of storage are full and ready to use when required. For preliminary sizing, an additional 5% of the total storage volume required will be added for this component of storage.
- Equalization Storage: This component of storage is water in sufficient quantity to compensate for the difference between a water system's maximum pumping capacity and peak hour demand. Assuming the source supplies maximum day demands and using a typical diurnal curve, this component of storage was calculated to be approximately 0.64 million gallons (MG) for build-out conditions.
- Fire Flow Storage: This component of storage is the volume of water needed to support fire flows. For the Palisades area it is anticipated that a fire flow of 5,000-gpm for a duration of 4 hours will be required. This will require a storage volume of 1.20 MG
- Stand-by Storage: This component of storage provides a measure of reliability or safety factor should sources fail or when unusual conditions impose higher than anticipated demands. Because of the distance between the Palisades area and the source, as well as being in a separate pressure zone, an adequate amount of stand-by storage should be provided to allow City personnel to fix any problems while still maintaining service to Zone 2. It is recommended that 8 hours of average day demand be provided, which is approximately 0.48 MG.
- Dead Storage: This component of storage is water that is not available to the system because of physical constraints or inadequate pressures. Because water is being pumped from the tank pressure is not a problem, however, typically the bottom 1 to 1.5 ft of the tank will be unusable because of the outlet design. Provisions will be taken during design to minimize dead storage, but for preliminary sizing it is assumed to be 5% of the total storage volume required.

Based on the components listed above, the Palisades area (Zone 2) will need approximately 2.56 MG of storage at build-out.

To determine the amount of pumping capacity that the Palisades area (Zone 2) will require, the following items were considered:

- Maximum day demand (MDD) at build-out of 1990-gpm.
- Peak hour flows (PHF) of an additional 1493-gpm. Because there will not be any elevated storage, the PHF must be pumped from the ground storage
- Fire Flows are anticipated to be 5000-gpm for a duration of 4 hours.

Phase 1A of the water system infrastructure will include the following components:

- Distribution System: A 16-inch crossover pipe will be constructed to connect the existing pressure zone (Zone 1) to the new Zone 2. Zone 1 will need to be modified to supply Zone 2 with the projected flows. The modifications will consist of connecting the existing 12-inch pipe at the south end of Kansas Ave and the 10-inch pipe at Pennsylvania and Hwy 95 to the crossover pipe. The crossover pipe will directly feed the new booster pump station and a future tank (Phase 2). The first portion of the Zone 2 distribution system will be a 12-inch pipe installed within the eastern side of the Hwy 95 right-of-way from NW 2nd Ave. southward to Interstate 84.
- Storage: A 1.0 MG welded steel storage tank will be constructed near the Palisades Junction to provide fire flow storage for Zone 2. The tank will be fed by Zone 2 and will be filled similar to the existing Fruitland ground storage tank, in that a pressure reducing valve will reduce line pressure to approximately 10-psi and let water flow into the tank. An elevated tank will not be installed for Zone 2. A small sodium hypochlorite system will be installed at the tank site to help maintain a free chlorine residual of 0.2 mg/L within the distribution system.
- Pumping: Two pump stations will be required for Phase 1. Mechanical redundancy and back-up power generation will be required at both pump stations to meet IDAPA requirements.
    - The Booster Pump Station (BPS) will be constructed near the intersection of Hwy 95 and NW 2nd Ave. As previously mentioned, Zone 1 will supply Zone 2 through the crossover pipe. Zone 1 system pressures, approximately 40 psi at the connection point, will be boosted to meet Zone 2 requirements of approximately 75 psi. The BPS will be sized to pump build-out maximum day demand (MDD)

of approximately 2,000-gpm. The 2,000-gpm flow will be supplied by three 50-hp pumps (two duty and one stand-by), each sized to pump 1,000-gpm. Each pump will have a variable frequency drive (VFD) to allow for operational flexibility. During Phase 1, the BPS will easily meet the required MDD and peak hour demands (PHD) for the Zone. It will also provide approximately 1,000-gpm of fire flow. A 15-hp jockey pump (200-gpm) operated by a VFD and a pressure relief valve will also be installed within the BPS to maintain system pressures during lower demand periods. Space will be provided within the BPS for future expansion during Phase 2.

- The Palisades Pump Station (PPS) will be constructed near the Palisades junction and will be supplied by the Palisades tank. The PPS will provide 4,000-gpm of fire flow to the Zone. The fire flow will be supplied by three 60-hp pumps (two duty and one stand-by), each sized to deliver 2,000-gpm. A 10-hp jockey pump (200-gpm) will also be installed at the PPS to help maintain system pressures during low demands and to help prevent stagnant water from occurring within the Palisades tank.

Phase 1B of the water system infrastructure will include the following components:

- Distribution System: A crossing under Interstate 84 will be required to serve the southern most part of the planning area south of the Interstate. The crossing will be accomplished by horizontal directional drilling under the Interstate.
- Storage: Adequate storage capacity will be provided by Phase 1A of the water distribution system for both Phase 1A and 1B.
- Pumping: Adequate pumping capacity will be provided by Phase 1A of the water distribution system for both Phase 1A and 1B. .

Phase 2 of the water system infrastructure will include the following components:

- Distribution System: Looping along the east side of the planning area will include 12-inch pipes in Elmore Rd., NW 2nd Ave, NW 1st Ave., Hwy 30, and SW 1st Ave.
- Storage: A 1.0-MG welded steel storage tank at the BPS site will be required for Phase 2. Similar to the Palisades tank, the BPS tank will be filled by a pressures reducing valve

and a sodium hypochlorite system will be installed to maintain a free chlorine residual in the system.

- Pumping: Additional pumps for Phase 2 will be installed within the BPS. However, these pumps will be supplied by the storage tank rather than by Zone 1 directly. An additional 1,500-gpm of pumping capacity will be added to the system by two 60-hp pumps (one duty and one stand-by), each sized for 1,000-gpm and one 30-hp pump sized for 500-gpm.

Phase 3 of the water system infrastructure will include the following components:

- Distribution System: Looping along the west side of the planning area will include 12-inch pipes in S. Whitley Dr., NW 2nd Ave., NW 1st Ave., and SW 1st Ave.
- Storage: A 0.5-MG welded steel storage tank will be required for Phase 3. Similar to the other tanks, the tank will be filled by a pressure reducing valve and a sodium hypochlorite system will be installed to maintain a free chlorine residual in the system.
- Pumping: An additional 1,000-gpm of pumping capacity will be added to the system by three 30-hp pumps (two duty and one stand-by), each sized for 500-gpm.

4.0 Sewer System Requirements

The Snake River Facility (SRF) is the closest wastewater treatment facility that would be capable of treating the wastewater from the Palisades area. The design capacity of the SRF is for an average yearly flow of 500,000 gpd, a biochemical oxygen demand (BOD) loading of 2,500 lbs/day and a total suspended solids (TSS) loading of 1,250 lbs/day. Currently the facility treats an average of approximately 300,000-gpd of influent flow, 1,450 lbs/day of BOD and 590 lbs/day of TSS. Therefore, the facility is currently operating at approximately 60% of its design capacity based on two of the three design parameters.

The current National Pollution Discharge Elimination System (NPDES) permit issued to the SRF sets the effluent discharge limits at a monthly average of 45 mg/L BOD and 70 mg/L TSS and a weekly average of 65 mg/L BOD and 105 mg/L TSS. The SRF adequately treats the influent wastewater to below these limits. During turnover events within the treatment ponds, both BOD and TSS levels increase; however, they remain below the effluent limits. Turnover events occur in the spring and fall at the SRF and are caused by the mixing of the stratified layers within the pond due to changing liquid densities from temperature changes. As a result of the mixing, settled solids become suspended and are discharged to the effluent. Based on recent discussions with the Environmental Protection Agency (EPA) Region 10, the next NPDES permit is expected to take effect in the latter part of 2010 or early 2011. This dated is based on a two-year backlog at EPA and allowing adequate time for the new permit to be written (3 to 4 months), for the draft permit to be issued and reviewed (3 months), and for the final permit to be issued (3 months). The permit is expected to have more stringent effluent discharge limits of 30 mg/L BOD and 45 mg/L TSS for a monthly average and 45 mg/L BOD and 65 mg/L TSS for a weekly average. The SRF will on average be capable of treating the influent wastewater to these lower levels, but turnover events will likely put the facility out of compliance. At this point, the SRF will require upgrades which will be identified in the Wastewater Facility Plan. Based on expected NPDES permit limits, upgrades to the SRF will likely be required regardless of increased flow and loading due to development of the Palisades area.

The sewer collection system for the Palisades area will be an extension of the SRF collection system. Limited topographic data was used to develop the sewer collection system alignment. Initial piping sizing was based upon assuming that the pipe material will be PVC and the pipes will be laid at minimum slopes per 10 States Standards. If the pipes are laid at a steeper slope, the pipe diameters could possibly be reduced. The sizing is also assuming the maximum depth/diameter ratios identified in the latest edition of the Fruitland Wastewater Facilities Plan are used. After a detailed survey of the area is completed, the actual alignments and pipe sizes can be confirmed.

The sewer collection system will be developed in three phases which are summarized below:

- **Phase 1A – Palisades Area:** This phase will allow for sewer service to be established at the Palisades Junction. It will start at the Intersection of Hwy 95 and Hwy 30 and continue east on Hwy 30 to the approximate location of the future Richey Rd. It will then head north to NW 2nd Ave. At this point a lift station will be required to pump the wastewater over Hwy 95. Phase 1A will be designed to allow the sewage to be pumped to the end of the existing collection system located in S. Pennsylvania Ave. near Hwy 95. This will allow for an initial capacity of approximately 50,000 gpd of average day flow (ADF). The limiting factor will be the capacity of the existing collection system during peak hour flow. An upgrade is already being planned to address this bottleneck, which is around the SW 7th Ave. and S. Pennsylvania Ave. area. With the planned upgrade, the existing collection system will be able to accept approximately 135,000 gpd of ADF from the Palisades area. Flow monitoring may be done on the existing system to better determine available capacity.
- **Phase 1B – Extension of Service Area**: This phase will include extension of sewer service to south of Interstate 84 (remainder of Area 1 and Area 7), as well as provide additional service on the eastern side of Hwy 95 (Areas 2, 3, 4, and 5) within the planning area. To serve the area south of I-84, a small lift station will be required to pump sewage under I-84.
- **Phase 2A – Alternate Connection to Existing Collection System**: This phase will extend the Phase 1A portion of the collection system to the permanent tie-in point with the existing SRF collection system. It will extend west from the intersection of Hwy 95

and NW 2nd Ave. to the intersection of S Whitley Dr. and NW 2nd Ave and then north to near the intersection of S Whitley Dr. and SW 8th St. where it will connect to the existing system. This phase will accommodate approximately 200,000 gpd of average day flow.

- **Phase 2B – Upgrades to Existing Collection System**: This phase will upgrade the existing SRF collection system to accept the projected build-out flows from the Palisades area.
- **Phase 3A – West Side of Hwy 95**: This phase will allow for service on the western side of the planning area (Areas 1, 6 and 9) between Hwy 95 and the I-84. It will include a trunk line that extends from the Phase 2A extension at the intersection of S Whitley Dr. and NW 2nd Ave. and will extend south NW 1st Ave.
- **Phase 3B – Extension of Service Area**: This phase will allow for service to be extended to the south of I-84 (Area 8). A small lift station and force main will be required to pump the sewage under I-84.

Phase 1A, as shown on **Figure 4**, will include an 8-inch trunk line in Hwy 30, a 15-inch trunk line in Richey Rd, from Hwy 30 to NW 1st Ave and an 18-inch trunk line from NW 1st Ave. to NW 2nd Ave. The lift station that will be required at the end of the 18-inch trunk line will require 1800-gpm of pumping capacity against a head of approximately 25ft. It is estimated that this will require two 25-hp submersible pumps, one duty and one stand-by, with variable frequency drives. The lift station will also require a separate valve vault and an emergency generator. A 12-inch force main and a small section of 6-inch force main will be required to convey flow from the lift station to the connection point with the existing collection system. The existing SRF collection system downstream of the connection point currently has an ADF excess capacity of approximately 50,000 gpd. This translates to approximately 120-gpm of excess PHF capacity. An upgrade is currently planned for the bottle neck area. Assuming that the upgrades consist of replacing the existing 8-inch bottle neck with 12-inch piping, the excess capacity within the collection system will be increased to approximately 135,000 gpd of ADF, or approximately 325-gpm of PHF.

Phase 1B will include extensions from the Phase 1A trunk line with 8- and 10-inch laterals. Several collector pipes that run east and west along the main roads will be required to serve the

planning area. Although the sizes and actual configuration will be determined as development occurs, some assumptions on size and alignment have been made and are shown on **Figure 4**. To serve the area south of I-84 (Areas 1 and 7) a 200-gpm lift station and a 6-inch force main that will be bored under the Interstate will be required. Two 5-hp submersible pumps will be required for the lift station, as well as a valve vault and a stand-by generator.

Phase 2A will consist of the installation of a 21-inch trunk line in NW 2nd Ave and a 27-inch trunk line in S. Whitley Dr. The sewage being pumped through the 12-inch force main by the Phase 1A lift station will be redirected from the connection in S. Pennsylvania Ave. to the 21-inch trunk line. The small section of 6-inch force main will be removed from service but left in place for emergency use if required. The 27-inch trunk line will connect to an existing 12-inch line in the SRF collection system near the intersection of S Whitley Dr. and SW 8th St. The existing SRF downstream of the new connection point currently has an excess capacity of approximately 200,000-gpd of ADF or 485-gpm of PHF.

Phase 2B will consist of replacing the SRF piping from the Phase 2A connection point to the SRF treatment plant. The existing pipes range in size from 12- to 24-inches in diameter. For projected build-out flows, the pipes will need to be upgraded to 18-, 21-, and 27-inch sizes. This is assuming that the new pipes would be installed at relatively the same slope as the existing pipes, which is greater than the minimum recommended by Ten State Standards. The actual sizes of the replacement piping will need to be verified when the actual pipe slopes are determined.

Phase 3A continues from Phase 2A at the intersection of S. Whitley Dr. and NW 2nd Ave. southward on S. Whitley Dr. to NW 1st Ave. Pipe sizes, ranging from 8- to 18-inch, will be required and are shown on **Figure 4**. Midway between NW 1st ½ St. and NW 1st St., the trunk line branches off and crosses diagonally to the southeast towards NW 1st St. and then continue east on NW 1st Ave. An 8-inch pipe will also extend westward from the intersection of S Whitley Dr. and NW 2nd Ave. to the existing subdivision at the end of NW 2nd Ave.

Phase 3B will provide service to Area 8 on the south side of Interstate 84. A small 80-gpm lift station and 3-inch force main will be required to pump the sewage under the interstate and into the trunk line in S. Whitley Dr. Two 5-hp pumps will be required for the lift station. Similar to the other lift stations, a valve vault and a standby generator will be required.

5.0 Rights of Way & Alignment

It is planned to install both water and sewer pipelines within existing right-of-ways (ROW) so that private property or easements do not have to be purchased. The existing roadways in the planning area are overseen by three agencies: the Idaho Transportation Department (ITD), Payette County Highway District No. 1 (PCHD) and the City of Fruitland. Several pieces of private property will be required to install storage tanks, pump stations, and lift stations. It is anticipated that as development occurs, agreements will be made with developers to donate the land and/or easements required for these items.

During a meeting with ITD it was determined that they allow utilities to be installed within their right-of-way (ROW); however they have requirements that must be followed. ITD has jurisdiction over Interstate 84, US Highway 95 and US Highway 30. ITD requirements that would pertain to this project include:

- A *Right-Of-Way Encroachment Application and Permit for Utilities* must be filled out and submitted to ITD. The application fee will be waived if the application is submitted by a public agency.
- ITD prefers that utilities be installed as close to the ROW line as possible to allow for the greatest distance between the improved roadway and the utility. If at any time it is required that the utility be moved, it will be the responsibility of the owner of the utility to pay for its movement.
- It is generally ITD's policy that they do not allow utilities beneath their roadways, however, in certain instances they will allow a utility to be installed provided that the entire lane beneath which the utility is installed is replaced. A lean concrete backfill for the pipeline would also be required. Further discussion with Doherty and Associates (City of Fruitland's traffic engineer) indicates that ITD may allow variances if slightly in the ROW.
- ITD does not allow open cut trenching across their roadways. They require that all crossing be made by boring beneath the roadway so there are no disturbances to the roadway surface.

A meeting with PCHD determined that they allow utilities to be installed within their ROW as long as the City is involved with the planning, design, and construction process as they will ultimately be the owner of the utility. PCHD requires that Idaho Standards for Public Works Construction (ISPWC) be followed for any utilities that are installed.

6.0 Service Feasibility

For this study, budget level opinions of cost have been developed for each development option and are located in **Appendix A**. A budget level opinion of cost is developed with the use of some detailed engineering data such as layout or specific equipment details. Opinions of cost are typically determined using costs from similar type projects and scaling the costs as required based on project size. It is normally expected that cost of this type would be accurate within plus 30 percent or minus 15 percent.

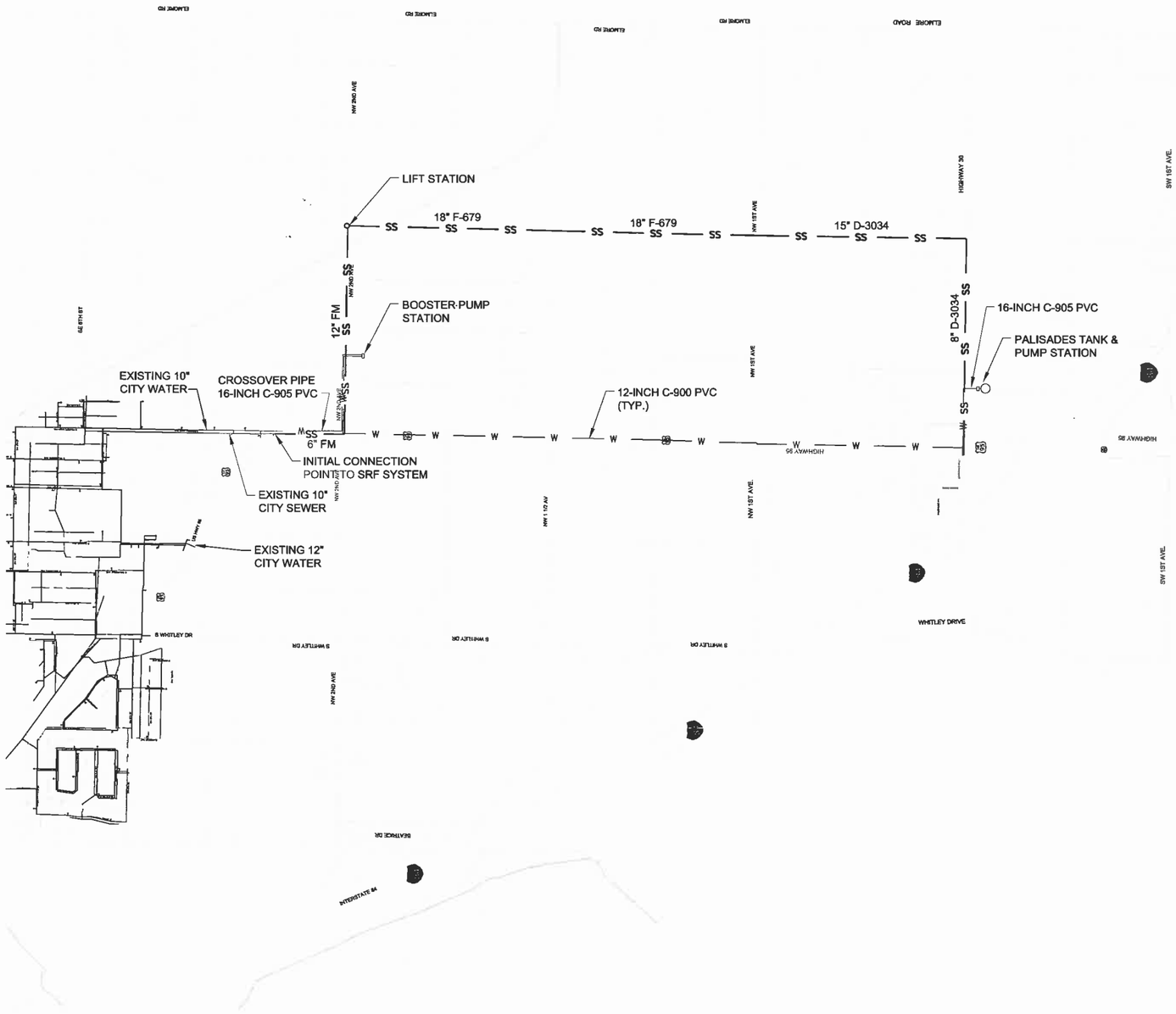
For the potable water system that will serve the Palisades area, the opinion of costs are summarized below:

- Phase 1A: $3,971,000
- Phase 1B: $627,000
- Phase 2: $5,221,000
- Phase 3: $2,760,000

For the wastewater collection system that will serve the Palisades area, the opinion of costs are summarized below:

- Phase 1A: $2,046,000
- Phase 1B: $2,595,000
- Phase 2A: $911,000
- Phase 2B: $695,000
- Phase 3A: $1,002,000
- Phase 3B: $478,000

Figures



PLAN

1"=2000'

0 1000' 2000'

LEGEND:

— W — PHASE 1A WATER

— SS — PHASE 1A SEWER

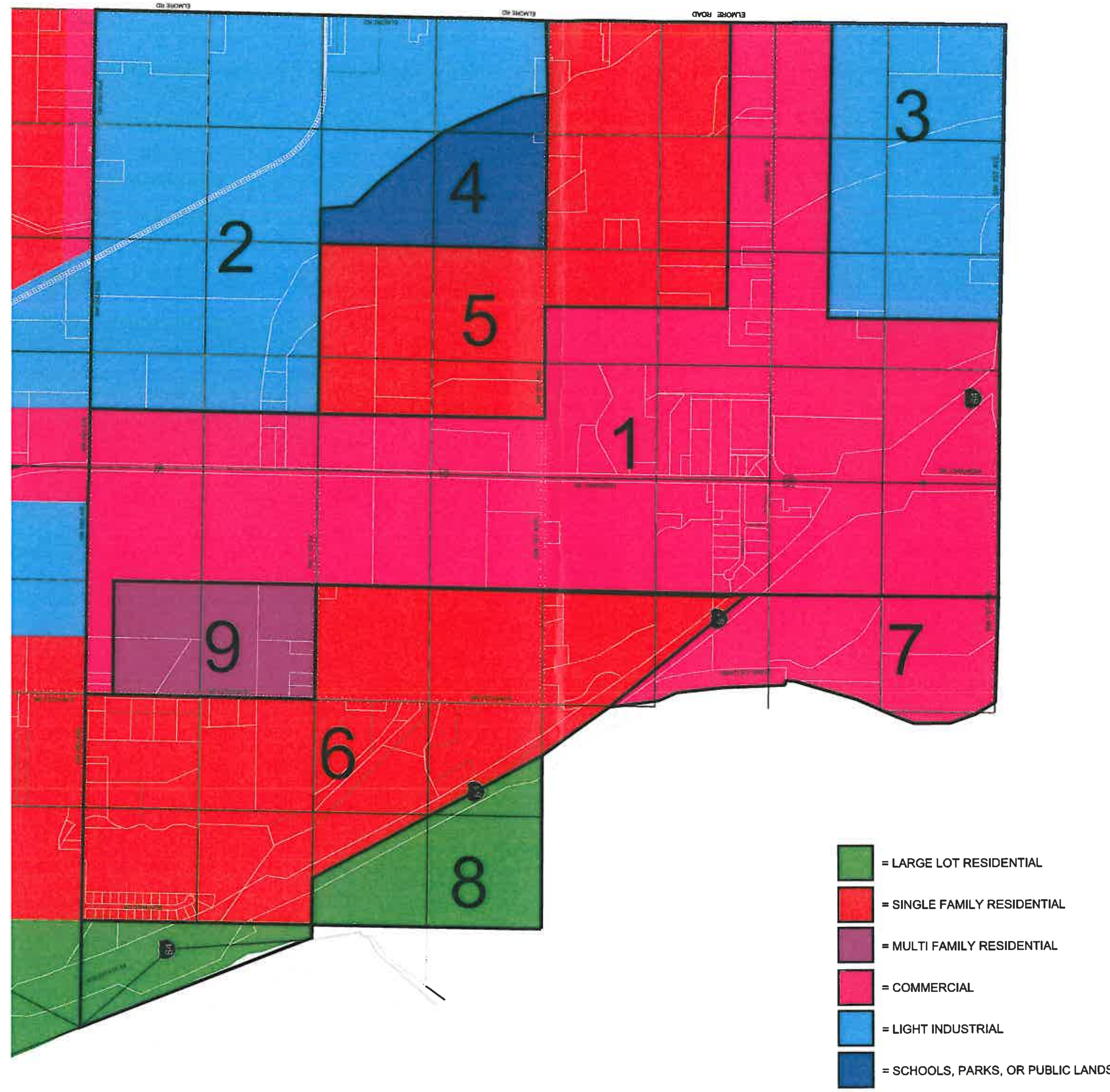
FIGURE 1
INITIAL PALISADES JUNCTION SERVICES
CITY OF FRUITLAND
PALISADES WATER AND SEWER STUDY
PAYETTE COUNTY, IDAHO

PHARMER ENGINEERING L.L.C.

OCTOBER 2007

10188.000

N:\10188 - Palisades Water & Sewer\DWG\FIGURE 1 (Phase 1).dwg, 10/30/2007 11:31:12 AM, Acrobat (StdSet2D24.pc3)



PLAN

1"=2000'

0 1000' 2000'

FIGURE 2

PALISADES LAND USE PLAN

CITY OF FRUITLAND

PALISADES WATER AND SEWER STUDY

PAYETTE COUNTY, IDAHO

PHARMER ENGINEERING L.L.C.

OCTOBER 2007

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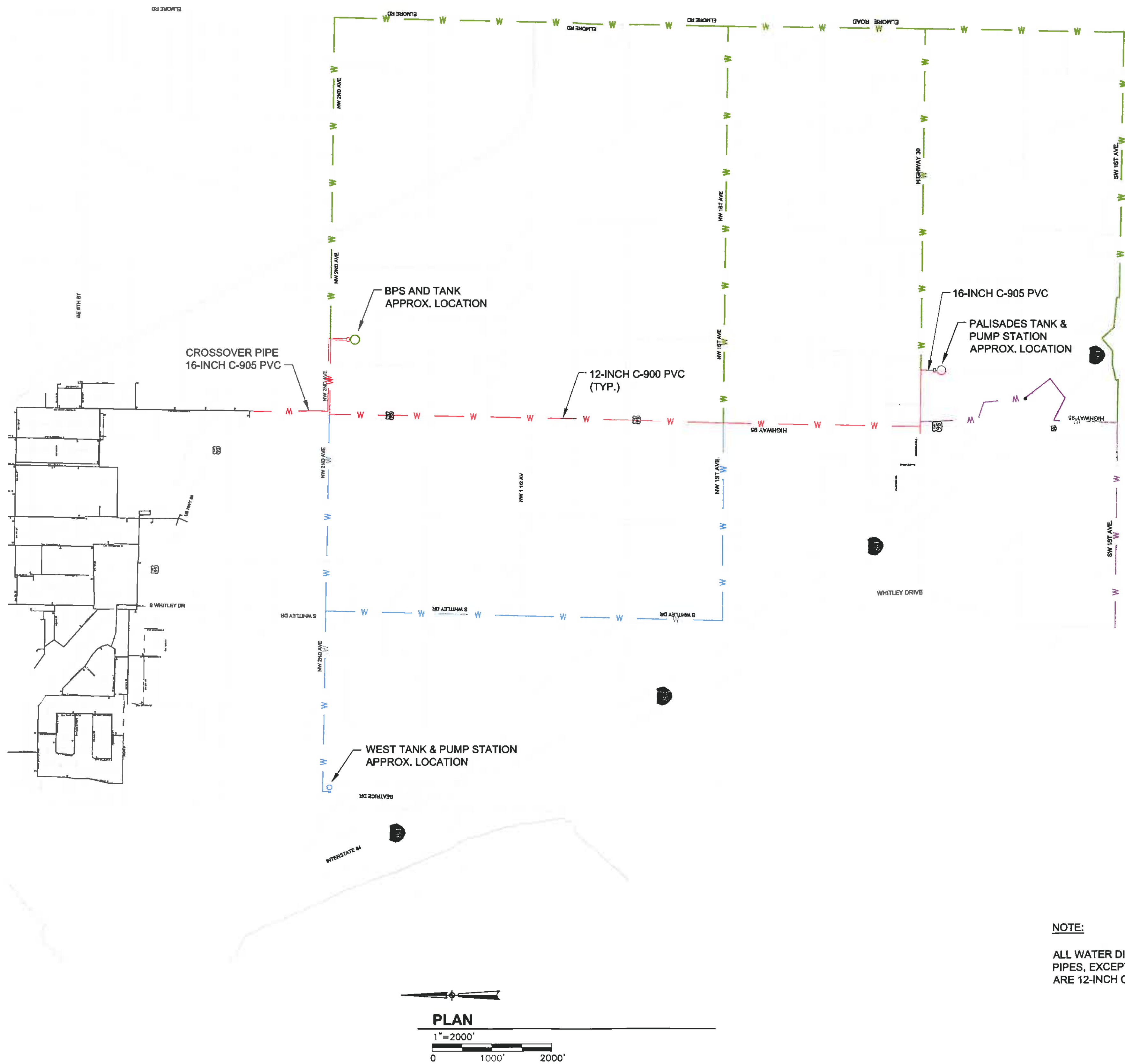

NOTE:

ALL WATER DISTRIBUTION PIPES, EXCEPT AS NOTED, ARE 12-INCH C-900 PVC PIPE.

LEGEND:

- W — PHASE 1A
- W — PHASE 1B
- W — PHASE 2
- W — PHASE 3

FIGURE 3
PROPOSED WATER DISTRIBUTION SYSTEM
CITY OF FRUITLAND
PALISADES WATER AND SEWER STUDY

PAYETTE COUNTY, IDAHO

PHARMER ENGINEERING L.L.C.

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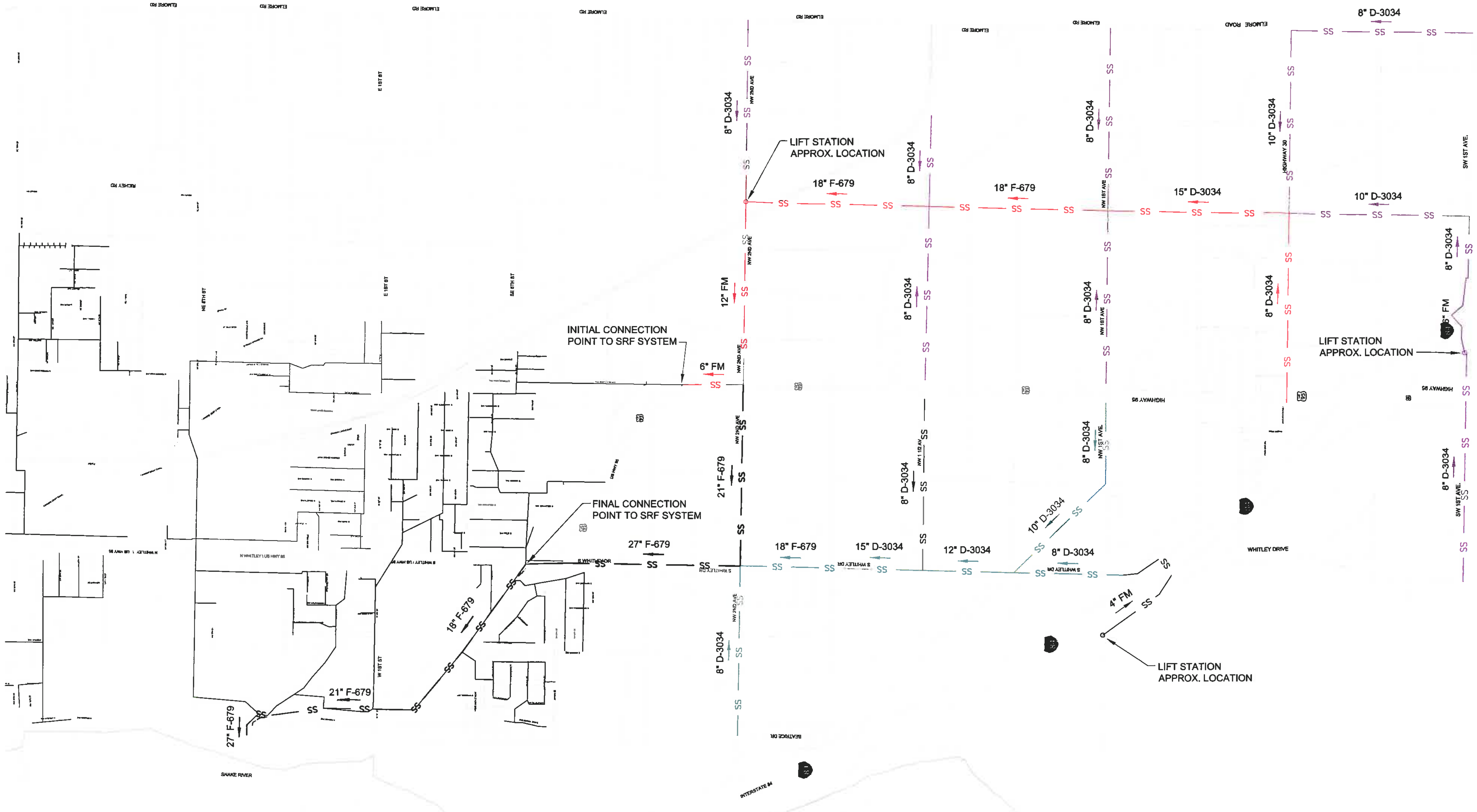

PLAN

1"=2000'

0 1000' 2000'

NOTE:

FORCE MAINS, DENOTED "FM", CAN BE EITHER C-900 PVC PIPE OR C-906 HDPE PIPE.

LEGEND:

— SS —	PHASE 1A
— SS —	PHASE 1B
— SS —	PHASE 2A
— SS —	PHASE 2B
— SS —	PHASE 3A
— SS —	PHASE 3B

FIGURE 4
PROPOSED SEWER COLLECTION SYSTEM

CITY OF FRUITLAND
PALISADES WATER AND SEWER STUDY

PAYETTE COUNTY, IDAHO

PHARMER ENGINEERING L.L.C.

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Appendix A

Budget Level Opinions of Cost

Opinion of Probable Construction Cost (Budget Level +30%/-15%)

Palisades Water Distribution System

Phase 1A - Booster Pump Station, Palisades Tank and Pump Station, and Commercial Corridor Piping

NO.	DESCRIPTION	QTY	Unit	Unit Cost	Installation	TOTAL	Comment
1.	Contractor Mobilization	1	LS	$100,000 00	0%	$100,000	
2.	Bonds and Insurance	2	%	$50,109 50	0%	$50,110	
3.	16-inch Crossover Pipe	2,500	FT	$42 50	100%	$212,500	16-inch C-905 PVC
4.	BPS Bldg	1,000	SF	$160.00	0%	$160,000	CMU with Control Room incl HVAC
5.	BPS Duty Pumps	3	EA	$25,000.00	25%	$93,750	1000-gpm @ 131-ft & 50-hp, each (2 Duty + 1 stand-by)
6	BPS Jockey Pump	1	EA	$7,500.00	25%	$9,375	300-gpm @ 131-ft & 15-hp
7.	BPS Mechanical Piping	1	LS	$25,000.00	50%	$37,500	Incl. Stubs for Future Pumps & Tank
8.	BPS Backup Generator	1	EA	$40,000.00	25%	$50,000	125kW, Outdoors, incl. ATS, Fuel Tank and Pad
9.	BPS Electrical	1	LS	$45,000.00	0%	$45,000	
10	BPS I & C	1	LS	$17,500 00	0%	$17,500	
11.	12-inch Distribution Piping	9,200	LF	$30.00	100%	$552,000	12-inch C-900 PVC, does not include surface repair
12.	Directional Drill Under US 95	465	LF	$230 00	0%	$106,950	Stubs under US 95 for future
13.	Asphalt Sidwalk Repair along US 95	7,200	SY	$12.50	0%	$90,000	8-ft walk, back of curb to ROW
14.	Driveway Replacements	26	EA	$525.00	0%	$13,650	12-ft x 8-ft
15.	Palisades Tank	1,000,000	Gal	$0 65	0%	$650,000	Welded Steel Tank,covered, above grade
16.	Palisades Tank Foundation	310	CY	$400.00	25%	$155,000	
17	Palisades Tank Hypochlorite Feed System	1	LS	$2,500 00	50%	$3,750	
18	Palisades PS Bldg	400	SF	$115 00	0%	$46,000	Wood Framed Building, incl. HVAC
19.	Palisades PS Fire Flow Pumps	3	EA	$30,000 00	25%	$112,500	2000-gpm @ 76 ft & 60-hp, each (2 Duty + 1 stand-by)
20.	Palisades PS Jockey Pump	1	EA	$4,000 00	25%	$5,000	200-gpm @ 129-ft & 10-hp
21	Palisades PS Mechanical Piping	1	LS	$25,000 00	50%	$37,500	
22	Palisades PS Backup Generator	1	EA	$40,000.00	25%	$50,000	125kW, Outdoors, incl. ATS, Fuel Tank and Pad
23.	Palisades PS Electrical	1	LS	$45,000 00	0%	$45,000	
24	Palisades PS I & C	1	LS	$12,500 00	0%	$12,500	
	SUBTOTAL					**$2,655,585**	
	CONTINGENCY					$796,675	30% of Construction Costs
	SUBTOTAL					**$3,452,260**	
	ENGINEERING & CONSTRUCTION ASST.					$517,839	15% of Construction Costs
	TOTAL ESTIMATED COST					**$3,970,100**	

Opinion of Probable Construction Cost (Budget Level +30%/-15%)

Palisades Water Distribution System

Phase 1B - South of I-84 Commercial Corridor Piping

NO.	DESCRIPTION	QTY	Unit	Unit Cost	Installation	TOTAL	Comment
1.	Contractor Mobilization	1	LS	$15,000.00	0%	$15,000	
2.	Bonds and Insurance	2	%	$7,930.00	0%	$7,930	
3	12-inch Distribution Piping	3,200	LF	$35.00	100%	$224,000	12-inch C-900 PVC
4	Directional Drill Under I-84 & US 95	750	LF	$230.00	0%	$172,500	
	SUBTOTAL					**$419,430**	
	CONTINGENCY					$125,829	**30%** of Construction Costs
	SUBTOTAL					**$545,259**	
	ENGINEERING & CONSTRUCTION ASST.					$81,789	15% of Construction Costs
	TOTAL **ESTIMATED** COST					**$627,100**	

Opinion of Probable Construction Cost (Budget Level +30%/-15%)

Palisades Water Distribution System

Phase 2 - BPS Tank, Add'n BPS Pumps & East Side Looping

NO.	DESCRIPTION	QTY	Unit	Unit Cost	Installation	TOTAL	Comment
1.	Contractor Mobilzation	1	LS	$100,000.00	0%	$100,000	
2.	Bonds and Insurance	2	%	$66,510.00	0%	$66,510	
3.	BPS Tank	1,000,000	Gal.	$0.65	0%	$650,000	Welded Steel Tank,covered, above grade
4.	BPS Tank Foundation	310	CY	$400.00	25%	$155,000	
5.	BPS Tank Hypochlorite Feed System	1	LS	$2,500.00	50%	$3,750	
6.	Add'n BPS Duty Pumps	2	EA	$30,000.00	25%	$75,000	1000-gpm @ 177 ft & 60-hp, each (1 Duty + 1 stand-by)
7.	Add'n BPS Duty Pump	1	EA	$30,000.00	25%	$37,500	500-gpm @ 177 ft & 30-hp, each (1 Duty)
8.	Add'n BPS Mechanical & Yard Piping	1	LS	$25,000.00	50%	$37,500	
9.	Add'n BPS Backup Generator	1	EA	$35,000.00	25%	$43,750	100kW, Outdoors, incl. ATS, Fuel Tank and Pad
10.	Add'n BPS Electrical	1	LS	$32,500.00	0%	$32,500	
11.	Add'n I & C for Phase 2	1	LS	$10,000.00	0%	$10,000	
12.	12-inch Distribution Piping	31,100	LF	$35.00	100%	$2,177,000	12-inch C-900 PVC, Incl. surface repair
13.	Directional Drill Under I-84 & US 30	450	LF	$230.00	0%	$103,500	
	SUBTOTAL					**$3,492,010**	
	CONTINGENCY					$1,047,603	30% of Construction Costs
	SUBTOTAL					**$4,539,613**	
	ENGINEERING & CONSTRUCTION ASST.					$680,942	15% of Construction Costs
	TOTAL ESTIMATED COST					**$5,220,600**	

Opinion of Probable Construction Cost (Budget Level +30%/-15%)

Palisades Water Distribution System

Phase 3 - West Tank, West Pump Station & West Side Looping

NO.	DESCRIPTION	QTY	Unit	Unit Cost	Installation	TOTAL	Comment
1.	Contractor Mobilization	1	LS	$50,000.00	0%	$50,000	
2.	Bonds and Insurance	2	%	$35,220.00	0%	$35,220	
3.	West Tank	500,000	Gal.	$0.65	0%	$325,000	Welded Steel Tank, includes foundation
4.	Palisades Tank Foundation	210	CY	$400.00	25%	$105,000	
5.	West Tank Hypochlorite Feed System	1	LS	$2,500.00	50%	$3,750	
6.	West PS Bldg	400	SF	$115.00	0%	$46,000	Wood Framed Building, incl. HVAC
7.	West PS Duty Pumps	3	EA	$15,000.00	25%	$56,250	500-gpm @ 161-ft & 30-hp, each (2 Duty + 1 stand-by)
8.	West PS Mechanical Piping	1	LS	$12,500.00	50%	$18,750	
9.	West PS Backup Generator	1	EA	$33,000.00	25%	$41,250	75kW, Outdoors, incl. ATS, Fuel Tank and Pad
10.	West PS Electrical	1	LS	$35,000.00	0%	$35,000	
11.	Add'n I & C for Phase 3	1	LS	$10,000.00	0%	$10,000	
12.	12-inch Distribution Piping	16,000	LF	$35.00	100%	$1,120,000	C-900 PVC, Incl. surface repair
	SUBTOTAL					**$1,846,220**	
	CONTINGENCY					$553,866	30% of Construction Costs
	SUBTOTAL					**$2,400,086**	
	ENGINEERING & CONSTRUCTION ASST.					$360,013	15% of Construction Costs
	TOTAL ESTIMATED COST					**$2,760,100**	

Opinion of Probable Construction Cost (Budget Level +30%/-15%)

Palisades Wastewater Collection System

Phase 1A- East Side Collection System & Lift Station

NO.	DESCRIPTION	QTY	Unit	Unit Cost	Installation	TOTAL	Comment
1.	Contractor Mobilzation	1	LS	$50,000.00	0%	$50,000	
2.	Bonds and Insurance	2	%	$25,853.60	0%	$25,854	
3.	8-inch Gravity Sewer Pipe	2,770	FT	$ 22.00	100%	$121,880	ASTM D-3034, DR 35, incl surface repair
4.	15-inch Gravity Sewer Pipe	2,650	FT	$ 31.00	100%	$164,300	ASTM D-3034, DR 35, incl surface repair
5.	18-inch Gravity Sewer Pipe	5,300	FT	$ 35.00	100%	$371,000	ASTM F-679, T-1, incl surface repair
6.	Manholes	28	EA	$3,000.00	0%	$84,000	4-ft ID
7.	Directional Drill Under US 95	200	LF	$275.00	0%	$55,000	
8.	Asphalt Replacement along US 30	950	SY	$20.00	0%	$19,000	Portion of US 30 roadway
9.	Lift Station Wet Well & Valve Vault	1	EA	$32,000.00	25%	$40,000	6-ft ID wet well & valve vault
10.	Lift Station Pumps	2	EA	$18,000.00	25%	$45,000	1800-gpm @ 25ft and 25 hp, each (1 duty + 1 stand-by)
11.	Lift Station Mechanical	1	LS	$20,000.00	50%	$30,000	
12.	Lift Station Backup Generator	1	EA	$26,000.00	25%	$32,500	30kW, Outdoors, incl. ATS, Fuel Tank and Pad
13.	Lift Station Electrical	1	LS	$25,000.00	0%	**$25,000**	
14.	Lift Station I & C	1	LS	$8,000.00	0%	$8,000	
15.	12-inch Force Main	3,600	FT	$35.00	100%	$252,000	PVC, incl. surface repair
16.	6-inch Force Main	900	FT	$25.00	100%	$45,000	PVC, incl. surface repair
	SUBTOTAL					**$1,368,534**	
	CONTINGENCY					$410,560	30% of Construction Costs
	SUBTOTAL					**$1,779,094**	
	ENGINEERING & CONSTRUCTION ASST.					$266,864	15% of Construction Costs
	TOTAL ESTIMATED COST					**$2,046,000**	

Opinion of Probable Construction Cost (Budget Level +30%/-15%)

Palisades Wastewater Collection System

Phase 1B - East & South Collection System, & South Lift Station

NO.	DESCRIPTION	QTY	Unit	Unit Cost	Installation	TOTAL	Comment
1.	Contractor Mobilzation	1	LS	$75,000.00	0%	$75,000	
2.	Bonds and Insurance	2	%	$32,565.00	0%	$32,565	
3.	8-inch Gravity Sewer Pipe	18,750	FT	$ 22.00	100%	$825,000	ASTM D-3034, DR 35, incl. surface repair
4.	10-inch Gravity Sewer Pipe	5,350	FT	$ 25.00	100%	$267,500	ASTM D-3034, DR 35, incl. surface repair
5.	Manholes	63	EA	$3,000.00	0%	$189,000	4-ft ID
6.	Directional Drill Under US 95 & I 84	600	LF	$275.00	0%	$165,000	
7.	Lift Station Wet Well & Valve Vault	1	EA	$32,000.00	25%	$40,000	6-ft ID wet well & valve vault
8.	Lift Station Pumps	2	EA	$6,000.00	25%	$15,000	200-gpm @ 40ft and 5 hp, each (1 duty + 1 stand-by)
9.	Lift Station Mechanical	1	LS	$15,000.00	50%	$22,500	
10.	Lift Station Backup Generator	1	EA	$15,000.00	25%	$18,750	15kW, Outdoors, incl. ATS, Fuel Tank and Pad
11.	Lift Station Electrical	1	LS	$15,000.00	0%	$15,000	
12.	Lift Station I & C	1	LS	$8,000.00	0%	$8,000	
13.	6-inch Force Main	1,250	FT	$25.00	100%	$62,500	PVC, incl. surface repair
	SUBTOTAL					**$1,735,815**	
	CONTINGENCY					$520,745	30% of Construction Costs
	SUBTOTAL					**$2,256,560**	
	ENGINEERING & CONSTRUCTION ASST.					$338,484	15% of Construction Costs
	TOTAL ESTIMATED COST					**$2,595,100**	

Opinion of Probable Construction Cost (Budget Level +30%/-15%)

Palisades Wastewater Collection System

Phase 2A - Connection to Existing System

NO.	DESCRIPTION	QTY	Unit	Unit Cost	Installation	TOTAL	Comment
1.	Contractor Mobilization	1	LS	$20,000.00	0%	$20,000	
2.	Bonds and Insurance	2	%	$11,549.00	0%	$11,549	
3.	21-inch Gravity Sewer Pipe	2,650	FT	$ 38.00	100%	$201,400	ASTM F-679, T-1, incl. surface repair
4.	27-inch Gravity Sewer Pipe	3,150	FT	$ 46.00	100%	$289,800	ASTM F-679, T-1, incl. surface repair
5.	Manholes	15	EA	$3,000.00	0%	$45,000	4-ft ID
6.	Directional Drill Under US 95	150	LF	$275.00	0%	$41,250	
	SUBTOTAL					**$608,999**	
	CONTINGENCY					$182,700	**30%** of Construction Costs
	SUBTOTAL					**$791,699**	
	ENGINEERING & CONSTRUCTION ASST.					$118,755	15% of Construction Costs
	TOTAL ESTIMATED COST					**$910,500**	

Opinion of Probable Construction Cost (Budget Level +30%/-15%)

Palisades Wastewater Collection System

Phase 2B - Improvements to Existing System

NO.	DESCRIPTION	QTY	Unit	Unit Cost	Installation	TOTAL	Comment
1.	Contractor Mobilzation	1	LS	$15,000.00	0%	$15,000	
2.	Bonds and Insurance	2	%	$8,814.40	0%	$8,814	
3.	18-inch Gravity Sewer Pipe	3,300	FT	$ 35.00	100%	$231,000	ASTM F-679, T-1, incl. surface repair
4.	21-inch Gravity Sewer Pipe	1,550	FT	$ 38.00	100%	$117,800	ASTM F-679, T-1, incl. surface repair
5.	27-inch Gravity Sewer Pipe	510	FT	$ 46.00	100%	$46,920	ASTM F-679, T-1, incl. surface repair
6.	Manholes	15	EA	$3,000.00	0%	$45,000	4-ft ID
	SUBTOTAL					**$464,534**	
	CONTINGENCY					$139,360	30% of Construction Costs
	SUBTOTAL					**$603,895**	
	ENGINEERING & CONSTRUCTION ASST.					$90,584	15% of Construction Costs
	TOTAL ESTIMATED COST					**$694,500**	

Opinion of Probable Construction Cost (Budget Level +30%/-15%)

Palisades Wastewater Collection System

Phase 3A - West Side Collection System

NO.	DESCRIPTION	QTY	Unit	Unit Cost	Installation	TOTAL	Comment
1.	Contractor Mobilization	1	LS	$2,000.00	0%	$2,000	
2.	Bonds and Insurance	2	%	$13,097.00	0%	$13,097	
3.	8-inch Gravity Sewer Pipe	5,000	FT	$ 22.00	100%	$220,000	ASTM D-3034, DR 35, incl. surface repair
4.	10-inch Gravity Sewer Pipe	1,875	FT	$ 25.00	100%	$93,750	ASTM D-3034, DR 35, incl. surface repair
5.	12-inch Gravity Sewer Pipe	1,350	FT	$ 27.00	100%	$72,900	ASTM D-3034, DR 35, incl. surface repair
6.	15-inch Gravity Sewer Pipe	1,350	FT	$ 31.00	100%	$83,700	ASTM D-3034, DR 35, incl. surface repair
7.	18-inch Gravity Sewer Pipe	1,350	FT	$ 35.00	100%	$94,500	ASTM F-679, T-1, incl. surface repair
8.	Manholes	30	EA	$3,000.00	0%	$90,000	4-ft ID
	SUBTOTAL					**$669,947**	
	CONTINGENCY					$200,984	30% of Construction Costs
	SUBTOTAL					**$870,931**	
	ENGINEERING & CONSTRUCTION ASST.					$130,640	15% of Construction Costs
	TOTAL ESTIMATED COST					**$1,001,600**	

Opinion of Probable Construction Cost (Budget Level +30%/-15%)

Palisades Wastewater Collection System

Phase 3B - East and South Collection System & South Lift Station

NO.	DESCRIPTION	QTY	Unit	Unit Cost	Installation	TOTAL	Comment
1.	Contractor Mobilzation	1	LS	$2,000.00	0%	$2,000	
2.	Bonds and Insurance	2	%	$3,968.00	0%	$3,968	
3.	8-inch Gravity Sewer Pipe	2,500	FT	$ 39.66	0%	$99,150	ASTM D-3034, DR 35, incl. surface repair
4.	Manholes	1	EA	$3,000.00	0%	$3,000	4-ft ID
5.	Lift Station Wet Well & Valve Vault	1	EA	$32,000.00	25%	$40,000	6-ft ID wet well & valve vault
6.	Lift Station Pumps	2	EA	$6,000.00	25%	$15,000	80-gpm @ 130ft and 5 hp, each (1 duty + 1 stand-by)
7.	Lift Station Mechanical	1	LS	$15,000.00	50%	$22,500	
8.	Lift Station Backup Generator	1	EA	$15,000.00	25%	$18,750	15kW, Outdoors, incl. ATS, Fuel Tank and Pad
9.	Lift Station Electrical	1	LS	$15,000.00	0%	$15,000	
10.	Lift Station I & C	1	LS	$8,000.00	0%	$8,000	
11.	4-inch Force Main	2,300	FT	$20.00	100%	$92,000	PVC, incl. surface repair
	SUBTOTAL					**$319,368**	
	CONTINGENCY					$95,810	30% of Construction Costs
	SUBTOTAL					**$415,178**	
	ENGINEERING & CONSTRUCTION ASST.					$62,277	15% of Construction Costs
	TOTAL ESTIMATED COST					**$477,500**	