PERRY PARK WATER AND SANITATION DISTRICT

2016 Water and Sewer Master Plan

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I. EXECUTIVE SUMMARY

The Perry Park Water and Sanitation District provides water and sewer service to developments both inside and outside the District boundary. The District currently provides service to approximately 1600 units, with an expected buildout of approximately 3400 units. To ensure that the District has the capacity to provide adequate service, the District maintains a Water and Sewer Master Plan to identify the infrastructure required at various stages of development. A full master plan was last prepared in 2001, and was most recently updated in 2005. Changing conditions in the District dictate preparation of a new master plan, and this 2016 Water and Sewer Master Plan is intended to replace all previous master plans and updates.

Development within the District's service area began in the late 1960s and has progressed at a relatively slow pace. The District's average annual growth rate since the beginning of development is approximately 30 units per year. The low growth rate experienced in the District has resulted in significant aging of existing infrastructure, well in advance of buildout. This condition indicates a need to adjust the focus of the District's planning efforts to concentrate on the long term viability of the systems, with or without significant additional growth.

To address this situation, this Master Plan first focuses on the ability of existing systems to continue to provide reliable service. Systems were broadly evaluated on the basis of capacity, condition, age and overall capability to provide reliable service both now and in the future. To ensure that existing systems can be upgraded to accommodate growth, this plan also evaluates the facility requirements for service at ultimate buildout of the District. Concentrating on the capabilities of existing systems, while considering system requirements at buildout will result in the ability to provide reliable service both now and in the future.

The Districts water and sewer systems both operate in compliance with applicable regulations and permits. The water system produces and delivers water that meets Colorado Department of Public Health and Environment (CDPHE) drinking water regulations. The sewer system provides collection and treatment service that complies the discharge permits issued by CDPHE.

Certain improvements are required to ensure that water and sewer systems continue to provide adequate service for existing customers, with some capacity to accommodate future growth. The most significant improvements required include:

- Increased non-tributary well pumping capacity.
- Increased water treatment capacity.
- Increased water storage capacity and redundancy.
- Distribution system upgrades to improve fire flow.
- Upgrades to improve performance of the Sageport WWTP
- Lift station upgrades to ensure continued reliability.
- Potential wastewater treatment upgrades to comply with changing regulation.

The estimated cost and timing of the required improvements is approximately $15M over the next 10 years beginning in 2016. Water system improvements represent approximately $9.3M of the total improvements and sewer system improvements representing the balance of $5.7M.

In addition to planning for capital improvements, this Master Plan also provides planning concepts to address the long term sustainability of the system. This portion of the Master Plan addresses the long term capital requirement for replacing existing facilities as the facilities reach their useful life.

Finally this Master Plan provides recommendations for associated activities required to ensure that the District has adequate information and resources available to implement both its capital improvement plan and its asset management plan.

II. INTRODUCTION

A. Perry Park Water and Sanitation District

General

The Perry Park Water and Sanitation District (PPWSD or District) provides water and sewer service for development located within the District boundary, and to limited areas outside the District Boundary. The District is located in central Douglas County, CO adjacent to the Town of Larkspur and south of Castle Rock. A vicinity map showing the general location of the District is presented in Figure II-1.

History

Development of Perry Park began in the late 1960s, prior to the formation of the Perry Park Water and Sanitation District. A service plan for the proposed District was prepared in 1969 and incorporated a number of previously developed engineering studies related to development of the required water and sewer systems.

The service area as defined in the original service plan included the 4000 acre Perry Park Development (currently referred to as West Perry Park) and the 3000 acre East Perry Park development. According to the Service Plan development was expected to include 3000 one acre lots, 1500 five acre lots, 1800 apartments and 430 acres of commercial and industrial development. Since the expected number of development units is not consistent with acreage available within the proposed District, it is likely that service beyond the original District boundary was contemplated at the time the District was formed. Development of the PPWSD service area was expected to be 95% complete in 30 years, or by the year 2000.

Development in the area has not occurred as expected. As noted above, the Service Plan was based on development of approximately 6300 residential units, plus 430 acres of commercial and industrial development. To reach the expected 95% buildout in 30 years, would have required development of approximately 200 residential units per year for the entire period. According to development data presented in the PPWSD 2009 Master Plan Update, the development rate for the first two decades (1970 to 1992) was approximately 20 units per year. The next 15 years (1993 to 2007) saw a higher growth rate of approximately 50 to 60 units per year. The downturn of the economy in 2008 dramatically reduced the rate of development, and since then the average growth rate has been approximately 15 units per year.

Future Development

While it is impossible to predict future development rates, the District has a 45 year history of low to moderate growth, and it seems likely that historical growth rates will continue. The majority of the lots within the District are individually owned and are not developed in large blocks that might result in higher growth rates. Two sizeable parcels,

Remuda Ranch (87 Units) and Sandstone Ranch (110 Units), were included in the District in the 2007-2008 timeframe, but due to the economic downturn, have not developed as planned. Development of one of these large parcels could result in a period of higher growth, although it is uncertain whether that increase could be sustained.

Previous Master Planning

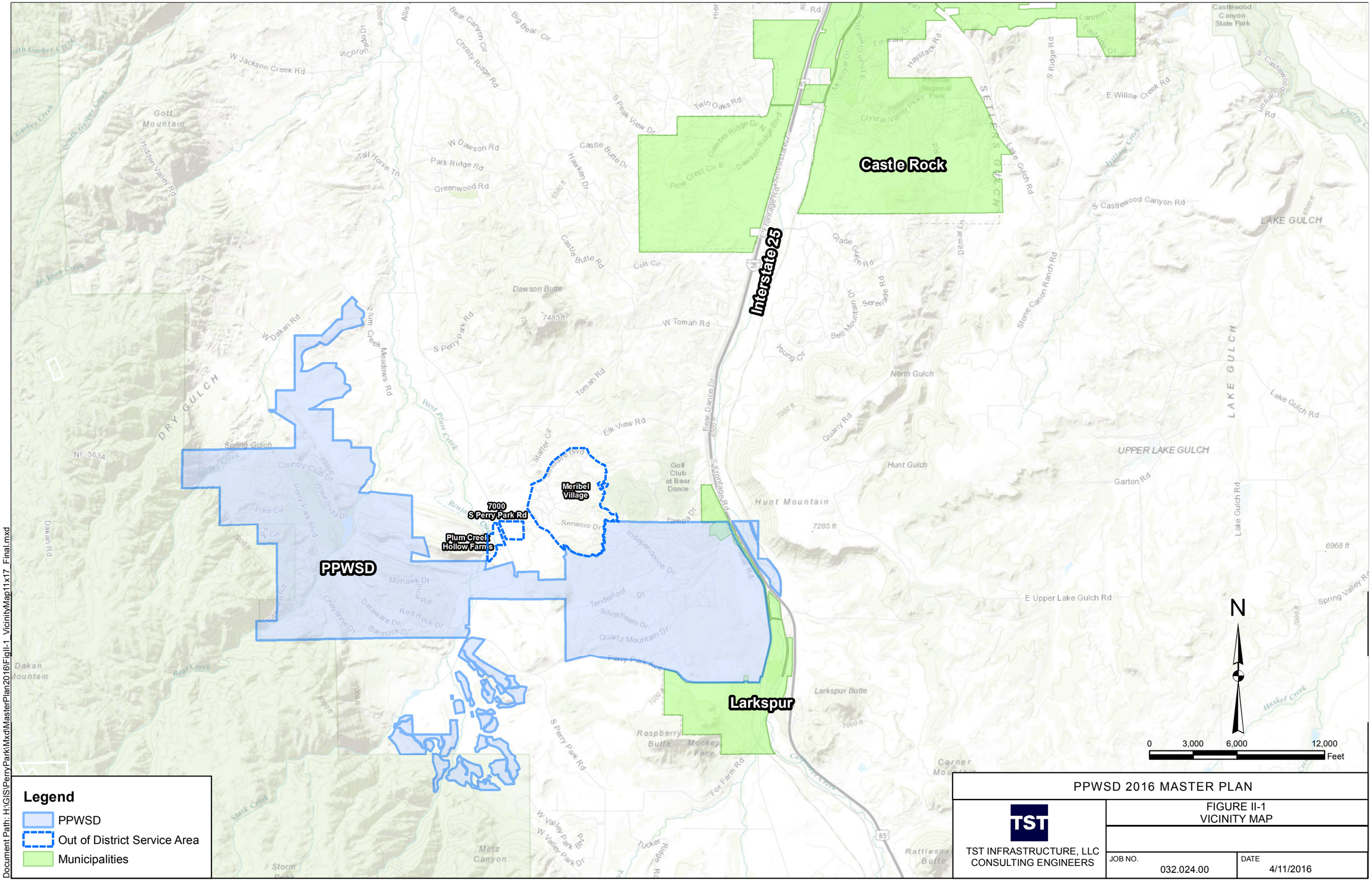
The 2009 Master Plan Update indicated that the District last prepared a full Master Plan in 2001, and that Master Plan updates were prepared in 2002, 2003, 2004, 2005, and 2009, although the 2009 Update was never formally adopted. The 2001 Master Plan, the 2005 update, and 2009 draft update were reviewed in the preparation of this Master Plan. Review of previous planning indicates that the primary focus of those plans was a 5 year planning horizon with the goal of planning for an estimated growth rate over that period.

B. 2016 Water and Sewer Master Plan

Water and sewer service providers typically use growth based planning during the early phases of development to ensure that the required facilities will be in place when required to support development. At some point, usually after the majority of the expected development has been complete, the focus of planning efforts normally shifts more towards planning for the sustainability of the systems. This shift in planning helps providers ensure that existing systems remain adequate to provide reliable service on an on-going basis.

Although a majority of the expected development in Perry Park has not yet been completed, the low growth rate experienced in the District has resulted in significant aging of existing facilities well in advance of buildout. This condition indicates a need to adjust the focus of the District's planning efforts to concentrate on the long term viability of the systems, with or without significant additional growth.

To address this situation, this Master Plan first focuses on the ability of existing systems to continue to provide reliable service. Systems were broadly evaluated on the basis of capacity, condition, age and overall capability to provide reliable service both now and in the future. To ensure that existing systems can be upgraded to accommodate growth, this plan also evaluates the facility requirements for service at ultimate buildout of the District. Due to the significant infrastructure already in place and the historically low growth rate experienced by the District, this plan puts less emphasis on projecting short term growth rates than previous plans. Concentrating on the capabilities of existing systems, while considering system requirements at buildout will result in the ability to provide reliable service both now and in the future.



Legend

- PPWSD
- Out of District Service Area
- Municipalities

PPWSD 2016 MASTER PLAN

FIGURE II-1
VICINITY MAP

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

JOB NO. 032.024.00

DATE 4/11/2016

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III. CURRENT CONDITIONS

A. Service Area

The PPWSD service area includes the area with the current District boundary as shown in Figure III-1. The service area encompasses approximately 8300 acres and is comprised of two primary development areas, East Perry Park and West Perry Park, and two additional development areas, Remuda Ranch and Sandstone Ranch, both of which are contiguous to West Perry Park. The service area includes a combination of developed areas, platted but undeveloped areas, and unplatted areas.

East Perry Park includes approximately 3200 acres located northwest of Larkspur, CO between Interstate 25 and Hwy 105. Development within East Perry Park is single family residential with lot sizes ranging from 0.5 acres to 5 acres.

West Perry Park includes approximately 3800 acres located west of East Perry Park, and west of Hwy 105, extending approximately 3.5 miles west of Hwy 105. Development with West Perry Park is primarily single family residential, but also includes multi-family residential and commercial development. Commercial development includes a golf course and clubhouse, stables, and the District office.

Remuda Ranch includes approximately 412 acres located on the north side of West Perry Park. The development was included in the District in 2008 and is planned for single family residential development.

Sandstone Ranch includes approximately 565 acres located southeast of West Perry Park. The development was included in the District in 2007 and is planned for single family residential development.

The District has also committed to serve several parcels located outside the District boundary including the Meribel Village development (680 acres) and 7000 S Perry Park Road (40 acres) and Plum Creek Hollow (Farms 38 acres) parcels.

B. Service Units and System Demands

1. Service Units

The District currently provides water service to approximately 1562 Equivalent Residential Units (EQRs). Table III-1 provides a summary of current water service units by general development area. The total number of sewer service units is somewhat lower because sewer service is not provided in large lot development areas.

Table III-1 – Current Water Service Units

	EQRs
East Perry Park	692
Meribel Village	0
Total East	**692**
West Perry Park	870
Remuda Ranch	0
Sandstone Ranch	0
Total West	**870**
TOTAL	**1562**

A detailed tabulation of SFEs by development parcel and a map of the corresponding development parcels is presented in Appendix A

Since the preparation of the 2009 MP, development has occurred at a modest rate. A total of 85 units have been added since the 2009 Master Plan Update, or approximately 15 units per year, as compared to the 25 units per year projected by the 2009 Update.

2. Water Supply Requirements

Water supply requirements addresses the total volume of water required on an annual basis and must account for annual variations in water use due variable precipitation and the resultant effect on irrigation demand. Analysis of water use performed during the 2014 Water Model Update indicated an average annual use of 0.32 AF/EQR during the period of 2009 – 2012. To account for raw water system losses and the potential variation between average use and dry year use, this Master Plan uses 0.5 AF/Y as the planning number for water supply. Based on the current 1562 EQRs and 0.5 AF/Y, the current water supply requirement is estimated at 781 AF.

3. Water Demands

Water demands are calculated based on the number of service units, the unit demand per service unit, and multipliers to account for variation in demand on a daily and hourly basis. Historically, the unit demands and multipliers used in master plans and master plan updates have varied somewhat among the different plans. Unit demands and multipliers were most recently developed during the 2014 Water Model Update, and those demands were used in this Master Plan. The unit demands and multipliers as used in this Master Plan is presented in the District Water System Modeling Books.

Table III-2 presents a summary of the estimated flow rates for the current development condition.

Table III-2 - Current Water Demands

	MGD	GPM
Average Day	0.45	312
Maximum Day	1.26	875
Peak Hour	1.89	1312

From an infrastructure planning standpoint, the projected maximum day demand of 1.26 MGD or 875 gpm is important because both water treatment capacity and well pumping capacity must be adequate to meet this demand for the current condition.

C. Water Supply

The District's current water supply is based on a combination of surface water supplies and non-renewable ground water from the Denver Basin aquifers. Surface water is withdrawn from the alluvial aquifers along West Plum Creek by 4 existing wells, and non-tributary water is withdrawn from the Denver and Arapahoe aquifers by 4 wells located in East Perry Park. The District also has two non-tributary wells located in West Perry Park that are not currently used for potable service due to water quality issues.

A summary of the District's water rights is provided in Table III-3, and a more detailed list of water rights and the associated wells is presented in Appendix B.

Table III-3 – Decreed water rights

	Ac/Ft.
Junior Surface Rights	1600
Senior Surface Rights	315
Non-Tributary	4014

The District's water supply includes 315 AF of senior surface water rights with sufficient priority to be available in most years. This supply may be diverted as required and may be fully consumed without augmentation. The District does not currently have the facilities required for capture and reuse of return flows.

The junior surface water rights provide for out of priority diversion and use of up to 1600 AF. Water diverted out of priority must be replaced, which could be accomplished through a combination of return flows, pumping from non-tributary sources, or releases from storage. The District currently has a storage agreement with Perry Park Country Club for 35 AF of storage in Waucondah Reservoir, which provides limited storage

facilities for augmentation use. The bulk of the require augmentation for out of priority diversions must be accomplished through return flows or pumping of non-tributary sources. The District currently views its junior surface water rights as being limited to the quantity of return flows from the wastewater treatment facilities.

The District's alluvial wells can be used to pump either its senior or junior water rights. Table III-4 presents a list of the existing alluvial wells along with the capacity of each well. Additional alluvial wells that could be constructed in the future are listed in Appendix B.

Table III-4 – Existing Alluvial Wells

Well	Current Capacity (gpm)
Grant Ditch	65
Glen Grove	100
West Plum #1	0
West Plum #2	100

The maximum combined output from the Grant Ditch, Glen Grove and West Plum 2 wells is approximately 427 AF/Y, which exceeds the available senior rights of 315 AF/Y, but is substantially less than the total available Junior rights of 1600 AF/Y. As previously indicated, Junior rights are effectively limited by the available return flows.

Return flows eligible for augmentation of out of priority depletions include all of the discharge from the Waucondah WWTP, and discharges from the Sageport WWTP during free river conditions on East Plum Creek, effectively winter and spring months. The current average discharge from the Waucondah WWTP is 0.14 MGD, or 157 AF/Y. The current discharge from the Sageport WWTP is 0.05 MGD, or 56 AF/Y. Assuming all of the Waucondah discharge and half of the Sageport discharge are available for augmentation of out of priority depletions, the total return flow available for depletions is approximately 185 AF/Y.

The current surface water available to the District then includes 315 AF/Y of senior water rights and 185 AF/Y of junior water rights, or a total of 500 AF/Y, which represents approximately 64% of the currently required water supply of 781 AF/Y.

Pumping capacity of the 3 wells in service on West Plum Creek is adequate to capture the District's current entitlement of surface water.

The District's 4014 AF non-tributary supply represents a substantial water supply resource that currently exceeds the water supply required at buildout. The non-tributary supply is currently used to supply all of East Perry Park and to supplement the supply for West Perry Park. A list of the non-tributary wells currently in service along

with the capacity of each well is presented in Table III-5. A list of additional decreed non-tributary wells is presented in Appendix B.

Table III-5 - List of Wells in Service

Well	Current Capacity (gpm)
Denver #4	275
Arapahoe #2	165
Arapahoe #3	175
Arapahoe #4	132

The combination of the Denver 4 and Arapahoe 2, 3, and 4 wells can produce 747 gpm or approximately 1205 AF/Y, which is much less than the 4014 AF/Y of non-tributary rights available to the District. The existing pumping capacity with the Den-4 well out of service is approximately 922 AF/Y, which exceeds the current water supply requirement of 781 AF/Y for the entire District.

D. Wells

The preceding Water Supply section indicated that the existing alluvial and non-tributary wells have the ability to utilize the District's surface and non-tributary water rights to meet the District's current annual water supply requirement. In addition to meeting the annual water supply requirement, sufficient well pumping capacity is required to meet the expected Maximum Day Demand.

Table III-6 presents the maximum pumping capacity of the District's existing wells.

Table III-6 – Current Maximum Well Capacity

Well	Current Capacity (gpm)
Alluvial	
Grant Ditch	65
Glen Grove	100
West Plum #1	0
West Plum #2	100
TOTAL	**265**
Non-Tributary	
Denver #4	275
Arapahoe #2	165
Arapahoe #3	175
Arapahoe #4	132
TOTAL	**747**

The existing facilities provide a maximum pumping capacity of 265 gpm for alluvial wells and 747 gpm for non-tributary wells, for a total pumping capacity of 1012 gpm. However the effective pumping capacity is less due to limited capacity in the Glen Grove Water Treatment Plant (GGWTP) and the Sageport Water Treatment Plant (SPWTP), as discussed in the following Water Treatment section. The capacity of the GGWTP limits the pumping capacity of the alluvial wells to 142 gpm, and the capacity of the SPWTP limits the capacity of the non-tributary pumping to 650 gpm. These limitations in treatment capacity reduce the overall maximum pumping capacity to 792 gpm.

The maximum pumping of 792 gpm is less than the expected maximum day demand of 875 gpm, indicating that with all pumps running, the raw system could not meet the projected maximum day demand for the current buildout condition. In addition, to ensure reliable service, water systems are required to meet the maximum day demand with the highest capacity well out of service. The existing system is not capable of meeting that requirement. Since the system in its current configuration cannot meet the estimated maximum day demand, it also has no ability to accommodate growth. The required design criteria are intentionally conservative and in practice systems that do not meet all the requirements of the design criteria are often able to function successfully. To date, the District has been able to meet its actual maximum day demand by utilizing storage to meet the higher demand.

E. Water Treatment

1. General

All wells used for potable service are connected to a water treatment plant. Wells in West Perry Park are connected to the Glen Grove Water Treatment Plant (GGWTP) which is located along West Plum Creek, southeast of the intersection of Red Rock Drive and Bannock Drive. The GGWTP provides service only to West Perry Park. Wells in East Perry Park are connected to the Sageport Water Treatment Plant (SPWTP) which is located in the northeast corner of the East Perry Park development near the intersection of Tenderfoot Drive and Kenosha Drive. The Sageport Plant provides service to all of the East Perry Park Development and also provides supplemental service to West Perry Park when demands exceed the capacity of the GGWTP.

2. Glen Grove Water Treatment Plant

The Glen Grove Water Treatment Plant was designed as a groundwater treatment plant to treat water from alluvial wells located along West Plum Creek. The primary treatment objective for the facility was removal of iron and manganese.

In 2010, after a determination by the Colorado Department of Public Health and Environment that the plant was required to meet treatment requirements for Groundwater Under the Direct Influence of Surface Water (GWUDI), modifications to the treatment process were implemented. The capacity of the plant was also reduced to 142 gpm or approximately 0.2 MGD with one filter out of service. As a result of this

reduction in capacity, the facility is able to provide significantly less service to West Perry Park than in its previous configuration, and more water from the Sageport Plant must be conveyed to West Perry Park to meet demand.

As initially constructed, the treatment process at the GGWTP included chlorine and potassium permanganate oxidants, greensand pressure filters for iron and manganese removal, and chlorine disinfection. The primary modification to the facility included in the GWUDI improvements was addition of a coagulant upstream of the filters. This allowed the plant to be classified as an in-line filtration process which under the design guidelines in effect at the time, was an allowable treatment process for GWUDI.

With the West Plum Well #1 out of service, raw water pumping capacity to the GGWTP is approximately 265 gpm from the Grant Ditch, Glen Grove, and West Plum #2 wells. Actual pumping capacity is limited by turbidity as flow from the wells increases. Since the plant does not have significant pretreatment to accommodate the increasing turbidity, well pump rates must be reduced to decrease turbidity to a level that the treatment plant can handle. The District considers approximately 220 gpm as the maximum allowable raw water flow rate to the current plant.

Output from the GGWTP is limited by high service pumping capacity. The plant contains 2 high service pumps rated at 200 gpm each. The control system for the pumps allows only one pump to run at a time. In the past, output pumping was the limiting factor for plant capacity, however with the capacity of the plant downgraded due to GWUDI requirements, the 200 gpm pumping capacity exceeds the allowable 142 gpm rating for the plant and is not currently the limiting factor.

The District estimates that the GGWTP was constructed in 1980 and that the facility is approximately 35 years old. The expected service life of these types of facilities is general taken to be 40 to 50 years, indicating that the facility could be expected to provide service for the next 5 to 15 years. Continued use of the facility will depend on the condition of the existing facility and equipment, obsolescence of configuration and equipment, and the ability to meet treatment requirements.

The Glen Grove plant currently produces water that meets regulatory requirements but at a significantly reduced capacity from original design. The plant does not have sufficient capacity to supply the west side of the District, and additional water must be conveyed from the east side to the west side. In addition, with its capacity limited to 142 gpm, the GGWTP does not have sufficient capacity to fully utilize the District's surface water entitlement.

3. Sageport Water Treatment Plant

The Sageport Water Treatment Plant provides treatment for the non-tributary groundwater wells located in East Perry Park. The plant was originally constructed as groundwater treatment plant and like the Glen Grove plant, the primary treatment objective of the Sageport plant was iron and manganese removal. Currently the GWUDI

issue does not apply to the Sageport plant because the plant treats only Denver Basin water which is classified as groundwater.

The Sageport plant was originally constructed with two package gravity filters with upflow clarifiers. The plant has been expanded several times and now contains a total of six filters with a maximum total filtration capacity of 650 gpm (0.94 MGD). Capacities of the individual filters are 2@50 gpm, 2@100 gpm and 2@175 gpm.

Treatment processes at the Sageport include potassium permanganate and chlorine as oxidants, upflow contact clarifier, gravity greensand filters and chlorine as the disinfectant.

Raw water supply to the WTP is accomplished with four existing non tributary wells with a total capacity of 747 gpm. As a safety factor, the District plans for a maximum pumping rate of 625 gpm with one well out of service. With one well out of service, raw water pumping capacity is the limiting factor for maximum WTP capacity.

Treated water pumping capacity is provided by a total of six high service pumps, 3 of which are located in the older section of the plant and 3 newer pumps located in the expanded portion of the treatment plant. The pumping capacity of the three newer pumps in the expanded portion of the facility is approximately 800 gpm, which exceeds treatment capacity. The high service pumps located in the older portion of the facility reportedly do not contribute significantly to high service pumping because of a restriction in the discharge piping. The existing discharge pipeline should be replaced with a larger pipe to eliminate the restriction.

4. Overall Treatment Capacity

To provide reliable service to existing customers, treatment capacity is required to meet a maximum day demand of 875 gpm (1.26 MGD) as noted in Table III-1. The current maximum capacities of the Glen Grove and Sageport plants are 142 gpm (0.2 MGD) and 650 gpm (0.86 MGD) respectively, for a combined capacity of 742 gpm (1.07 MGD). It should be noted that the stated capacity of the Sageport WTP is based on all filters running. To ensure reliable service, the capacity of the Sageport plant should be considered with one filter out of service which would reduce the capacity to 475 gpm. In either case, additional treatment capacity is required to meet the estimated maximum day demand for the current condition.

F. Water Distribution and Storage

1. General

Treated Water from the water treatment plants flows through the distribution system to storage tanks as well as directly to customers. Originally, the system was constructed as two discrete systems. The construction of the east – west pipeline in 2002 allowed water to be conveyed from the east side to supplement the supply to the west side. At

this time, water cannot be conveyed from west to east, although that capability could be added in the future.

2. Pressure Zones

Significant variations in topography throughout the District, require that the distribution system contain multiple pressure zones. Elevation in the service area varies from 6380 to 7080 MSL, which would result in a pressure variation of approximately 300 psi in a single zone system. At buildout, the system is planned to have 8 pressure zones, 5 of which are currently in use. Pressure zones are numbered 1-8, generally from the west side of the District to the east.

Table III-7 presents the HGL and service elevations for the existing pressure zones.

Table III-7 – Pressure Zones

	HGL		Service Area Elevation		
Zone	High	Low	High	Low	Served From
1	7103	7063	6900	6670	Hog John Tank
2	6832	6832	6700	6535	PRV from Zone 2
3	6776	6748	6690	6380	Echo Hills Tank
4	7225	7187	7080	6850	Future Indian Head Tank
5	6942	6942	6850	6660	PRV from Zone 4
6	7063	7031	6940	6780	School House Tank
7	6965	6965	6874	6610	PRVs from Zone 6
8	6980	6980	6880	6680	PRVs from Zone 6

Static pressures with the zones generally range from 40 psi to 190 psi. A map showing the general service area for each pressure zone is presented in Figure III-2.

3. Distribution System Piping

Distribution system piping ranges in size from 4” diameter to 16” diameter. Figure III-3 presents a map of the water system showing pipe size. In general, pipelines serving single family residential areas are 8”, although some smaller sizes were used in areas such as cul-de-sacs. In a number of cases the smaller pipelines create issues within the system. Performance of the distribution system is discussed in more detail in the modeling section. Transmission pipelines outside development parcels range from 10” diameter to 16” diameter, depending on the location.

4. Water Storage

Water storage is provided in 3 of the 5 existing pressure zones. The two zones without storage are supplied from the adjacent upper zone via PRVs.

Table III-8 presents the storage volumes and HGLs for the existing storage tanks.

Table III-8 – Water Storage Tanks

Name	Material	Diameter	Height	HGL Empty	Volume Gal
Hog John Tank No. 1	Steel	36	40	7063	300,000
Hog John Tank No. 2	Steel	26	40	7063	150,000
Echo Hills Tank No. 1	Concrete	53	28	6748	500,000
Echo Hills Tank No. 2	Steel	45	28	6748	333,000
School House Tank	Steel	65	32	7031	800,000

Zone 1 and Zone 3 each have two existing tanks, which provides redundancy and allows for maintenance or repair of one tank while maintaining service using the other. Zone 6 is supplied from a single tank and lacks the required redundancy to allow maintenance.

5. PRVs

Seven PRVs are required to establish the two existing pressure zones that do not contain storage. Table III-9 presents the PRV locations, Zones separating, and the HGL setting for each PRV. Locations of the PRVs are shown in Figure III-3

Table III-9 – Pressure Reducing Valves

Name	Size		Elevation (ft.)	Pressure Setting (psi)
	Low Flow (in.)	High Flow (in.)		
Quartz Mountain	1.5	8	6844	65-75
Silverheels	1.5	6	6806	77-82
Poncha	2.5	6	6752	95-100
Tenderfoot	1.5	6	6845	78-86
Independence	2.5	6	6696	130-135
Pike Circle	2.0	8	6643	75-82
East-West	3.0	8	6446	140-150

Each PRV location contains two separate PRV valves in parallel. Under normal conditions, service is provided through the smaller of the two PRVs. The larger of the two PRVs provides for additional flow during high demand periods or fire flow events.

6. Summary of Hydraulic Modeling

Using the demands described in the previous section, the existing water system was modeled at a variety of flow conditions including the static condition, average day flow, maximum day flow, peak hour flow and Maximum Day plus Fire Flow. Details of the modeling performed is presented in the District Water System Modeling Books.

In general, the existing system provides adequate service in most portions of the existing service area. No deficiencies were noted under the average day flow, maximum day flow, or peak hour flow scenarios. The model results that certain areas of the existing distribution system would be unable to provide adequate service in certain areas, particularly during fire flow events.

The ability of the system to provide fire flow was evaluated by sequentially applying a fire flow to each node in the system with the system carrying maximum day flows. According to the evaluation criteria, each node was required to deliver the 1000 gpm fire flow while maintaining a minimum of 20 psi in the system.

Figure III-4 presents a graphical depiction of the areas where the system could not provide the required fire flow while maintaining 20 psi in the distribution system. The areas with fire flow capacity less than 1000 gpm are general located along Perry Park Blvd in Zone 3; along Apache Road in Zone 2; and at dead-end pipelines in a number of other locations. A total of 38 locations showed fire flows less than 1000 gpm, with 14 of those less than 800 gpm. The lowest available fire flow identified in the model was approximately 600 gpm.

The primary causes of low fire flows appear to be incomplete development of the distribution system, and use pipeline sizes less than 8". As noted later in this report, modeling performed on the buildout configuration indicates that most of the nodes that show inadequate fire flow under the current system configuration do not exhibit inadequate fire flow in the buildout configuration. The buildout configuration contains more looping of pipelines, which improves the overall performance of the system.

During the development phase of a project, it is not unusual to have limited system capacity in areas where the system has not been constructed to its final configuration. While this is not desirable, it is commonly considered a short term condition and accepted on that basis. In this case, due to the slow rate of development, the condition has continued well beyond what would normally be considered temporary. Consideration should be given to installing pipeline loops or upsizing certain pipelines to improve fire flows in the deficient areas.

G. Carryover Improvements

In addition to the deficiencies noted in the previous paragraphs, several water system deficiencies were noted in the 2009 Master Plan Update that to date, have not been resolved. The carryover deficiencies include:

1. Installation of a new valve on the outlet pipeline for the original Echo Hills Tank. The existing valve is inoperative, and is undersized. Replacement of the existing valve with a larger valve is required.
2. Installation of permanent electrical service to the Hog John Tank to replace the existing solar panel system. The existing system does not provide reliable service.

H. Wastewater Collection System

1. General

Wastewater collected throughout the District is conveyed to one of two existing wastewater treatment plants through a series of collector and interceptor pipelines. The Waucondah Wastewater Treatment Plant provides treatment service for wastewater collected in West Perry Park. The Sageport Wastewater Treatment Plant provides treatment service for wastewater collected in East Perry Park.

2. Collection System

Separate collection systems provide wastewater conveyance for West Perry Park and East Perry Park. The West Perry Park system includes pipelines ranging in size from 8" diameter to 15" diameter. The East Perry Park system includes 8" and 10" diameter pipelines.

In general, both sides of the collection system are in good condition and can provide adequate service under current flow conditions. Infiltration and inflow has not been identified as a significant issue.

3. Lift Stations

The West Perry Park collection system includes two lift stations to convey wastewater from areas where topography prevents gravity flow to the wastewater treatment facility.

The Red Rock Lift Station #1 is located on the southeast corner of the intersection of Red Rock Drive and Bannock Drive and provides service to the southeast portion of West Perry Park. The Red Rock Lift Station also receives flow from the Bannock Lift Station.

The Red Rock Lift Station includes a 2000 gallon wet well and two sets of two 25 HP dry pit pumps in series, with each pump having a capacity of 176 gpm. The lift station was upgraded in 2012 and is currently in good condition. The capacity of the lift station provides adequate service under the current development condition.

The Bannock Lift Station #2 is located northeast of the intersection of Bannock Road and Kalamath Drive, and provides service to the northeast portion of West Perry Park. The Bannock Lift Station has adequate capacity to provide service under the current development condition, however certain upgrades are required. The lift station currently contains the original vacuum primed pumps. These pumps are aging and do not perform reliably, creating a significant maintenance requirement. Replacement of the pumps is required.

The East Perry Park collection system contains a single lift station. The Boreas Lift station is locate on the northern edge of East Perry Park on Boreas Drive. The Boreas

Lift Station has adequate capacity to provide service under the current development condition, however certain upgrades are required. The lift station currently contains the original vacuum primed pumps. These pumps are aging and do not perform reliably, creating a significant maintenance requirement. Replacement of the pumps is required.

I. Wastewater Treatment

1. General

The existing wastewater treatment plants have similar treatment objectives and employ similar treatment technologies. Both plants utilize Rotating Biological Contactors (RBC) for secondary treatment and UV for disinfection. The treatment facilities are separately permitted by CDPHE, and have slightly different effluent limits.

The Waucondah WWTP discharges to Bear Creek, a tributary to West Plum Creek, and the Sageport WWTP discharged to East Plum Creek. Although discharging to different creeks, both plants are located in the Chatfield Watershed and are subject to effluent limitations and a waste load allocation for phosphorus.

2. Waucondah WWTP

The Waucondah WWTP is located in the north central portion of West Perry Park adjacent to Bear Creek, and has a permitted capacity of 0.32 MGD. The plant is currently running at approximately 45% of its permitted capacity, and has sufficient capacity to provide adequate service for the existing development condition under existing effluent limits.

The treatment process at the Waucondah Plant includes screening and grit removal; primary clarifier; two RBCs; a secondary clarifier; chemical feed for phosphorus removal; and UV disinfection. Biosolids from the secondary process are treated in an aerobic digester prior to hauling to land application.

The unit processes included in the Waucondah Plant provide adequate treatment to meet the effluent limits in the current permit at current wastewater flow. The most demanding portion of the treatment process is nutrient removal, specifically ammonia and phosphorus. The RBCs are operated in series to ensure adequate removal of ammonia nitrogen. Phosphorus removal is accomplished by the addition of alum to precipitate phosphorus, followed by settling in the secondary clarifier. The current discharge permit expires in 2017, and effluent limits could be revised at that time.

The Waucondah plant was originally constructed around 1970 and has been upgraded a number of times to its current configuration. The oldest parts of the facility are now 45 years old and the majority of the major facility components are 20 years old or older.

Facilities of this type normally have a useful life of approximately 40 years.

3. Sageport WWTP

The Sageport WWTP is located in the northeast corner of East Perry Park adjacent to East Plum Creek, and has a permitted capacity of 0.1 MGD. The plant is currently running at approximately 55% of its permitted capacity, and has sufficient capacity to provide adequate service for the existing development condition under existing effluent limits.

The treatment process at the Sageport Plant includes screening and grit removal; equalization chamber; two RBCs; a secondary clarifier; chemical feed for phosphorus removal; and UV disinfection. Biosolids from the secondary process are treated in an aerobic digester prior to hauling to land application.

The unit processes included in the Sageport Plant provide adequate treatment to meet the effluent limits in the current permit at current wastewater flow. The most demanding portion of the treatment process is nutrient removal, specifically ammonia and phosphorus. The RBCs are operated in series to ensure adequate removal of ammonia nitrogen. Phosphorus removal is accomplished by the addition of alum to precipitate phosphorus, followed by settling in the secondary clarifier. The current discharge permit expires in 2017, and effluent limits could be revised at that time.

The Sageport plant exhibits a number of deficiencies that detract from the overall treatment process. Configuration of the facility, particularly through the first RBC is confined and awkward making operations, maintenance and repair challenging. The location of screening and grit removal make collection and disposal of the screenings and grit both difficult and potentially unsafe. The equalization chamber does not contain provisions for easy cleaning which combined with the deficiencies in screening and grit removal tends to encourage the collection of solids in the equalization tank.

The Sageport plant was originally constructed in 1972 and has been upgraded a number of times to its current configuration. The oldest parts of the facility are now 40 years old and the majority of the major facility components are 20 years old or older.

Facilities of this type normally have a useful life of approximately 40 years.

Remuda Ranch

West Perry Park

Meribel Village

7000 S Perry Park Rd

Plum Creek Hollow Farms

East Perry Park

Sandstone Ranch

S PERRY PARK RD

TOMAH RD

INTERSTATE 25

UPPER LAKE GULCH RD

W PERRY PARK AVE

SPRUCE MOUNTAIN RD

N

0 1,900 3,800 7,600 Feet

Legend

- East Perry Park
- Remuda Ranch
- Sandstone Ranch
- West Perry Park
- Out of District Service Area
- Parcels

Document Path: H:\GIS\PerryPark\Mxd\MasterPlan2016\FigIII-1 DistrictBoundaryServiceAreaMap11x17 Final.mxd

PPWSD 2016 MASTER PLAN

FIGURE III-1
DISTRICT BOUNDARY & SERVICE AREA

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

JOB NO. 032.024.00

DATE 4/11/2016

S PERRY PARK RD

INTERSTATE - 25

TOMAH RD

Remuda Ranch

Meribel Village

7000 S Perry Park Rd

Plum Creek Hollow Farms

West Perry Park

Zone 1 HGL = 7103

Zone 2 HGL = 6832

Zone 3 HGL = 6776

Zone 7 HGL = 6965

East Perry Park

Zone 6 HGL = 7063

UPPER LAKE GULCH RD

W PERRY PARK AVE

INTERSTATE - 25

SPRUCE MOUNTAIN RD

Sandstone Ranch

Legend

- PRV's
- Zone 1 HGL = 7103
- Zone 2 HGL = 6832
- Zone 3 HGL = 6776
- Zone 6 HGL = 7063
- Zone 7 HGL = 6965
- PPWSD Boundary
- Out of District Service Area
- Parcels

N

0 1,900 3,800 7,600 Feet

PPWSD 2016 MASTER PLAN

FIGURE III-2
EXISTING PRESSURE ZONES

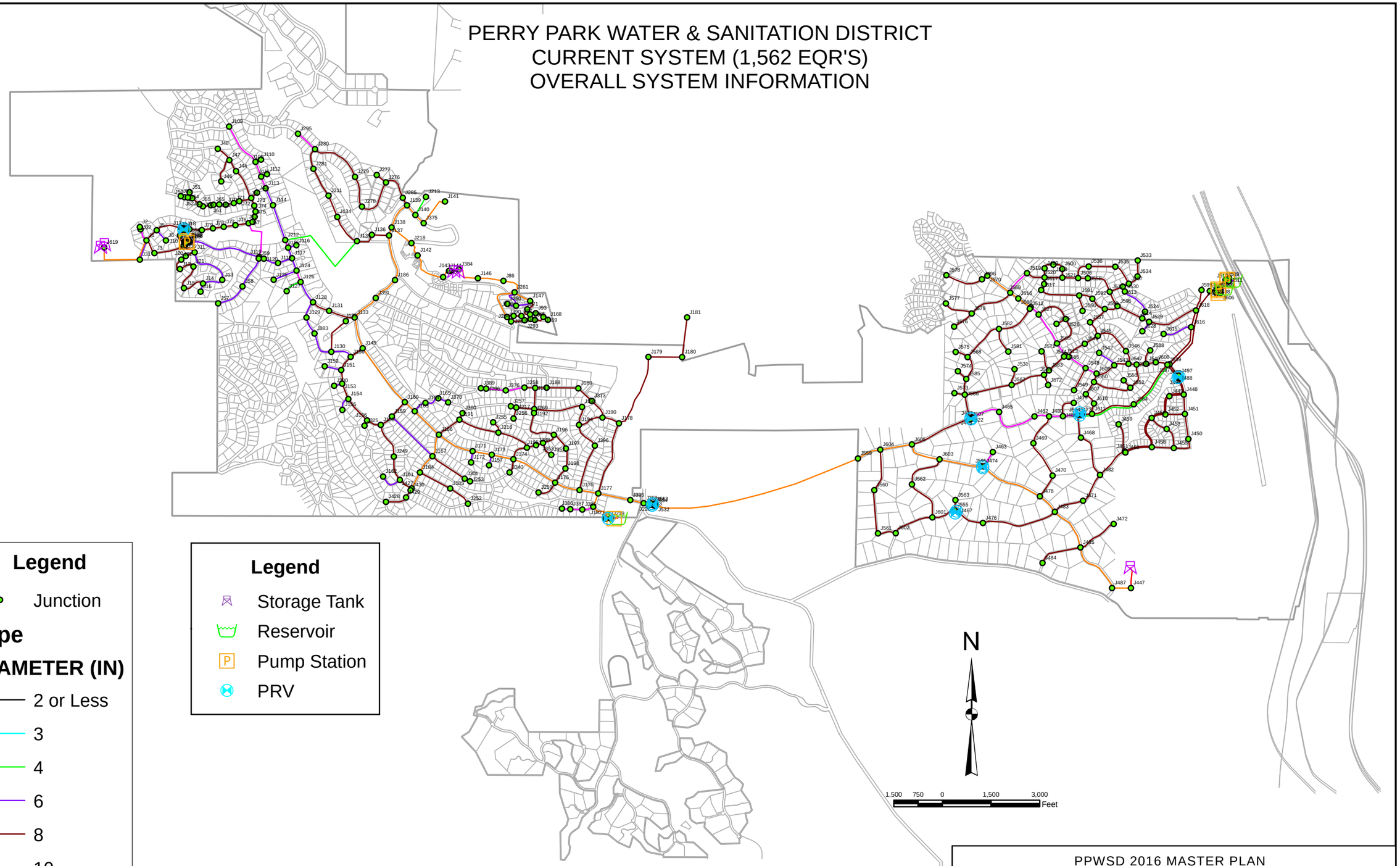
TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

JOB NO. 032.024.00

DATE 4/11/2016

Document Path: H:\GIS\PerryPark\Mxd\MasterPlan2016\FigIII-2_ExistingPressureZones_11x17_Final.mxd

PERRY PARK WATER & SANITATION DISTRICT
CURRENT SYSTEM (1,562 EQR'S)
OVERALL SYSTEM INFORMATION



PPWSD 2016 MASTER PLAN

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

FIGURE III-3
WATER MODEL (CURRENT SYSTEM)

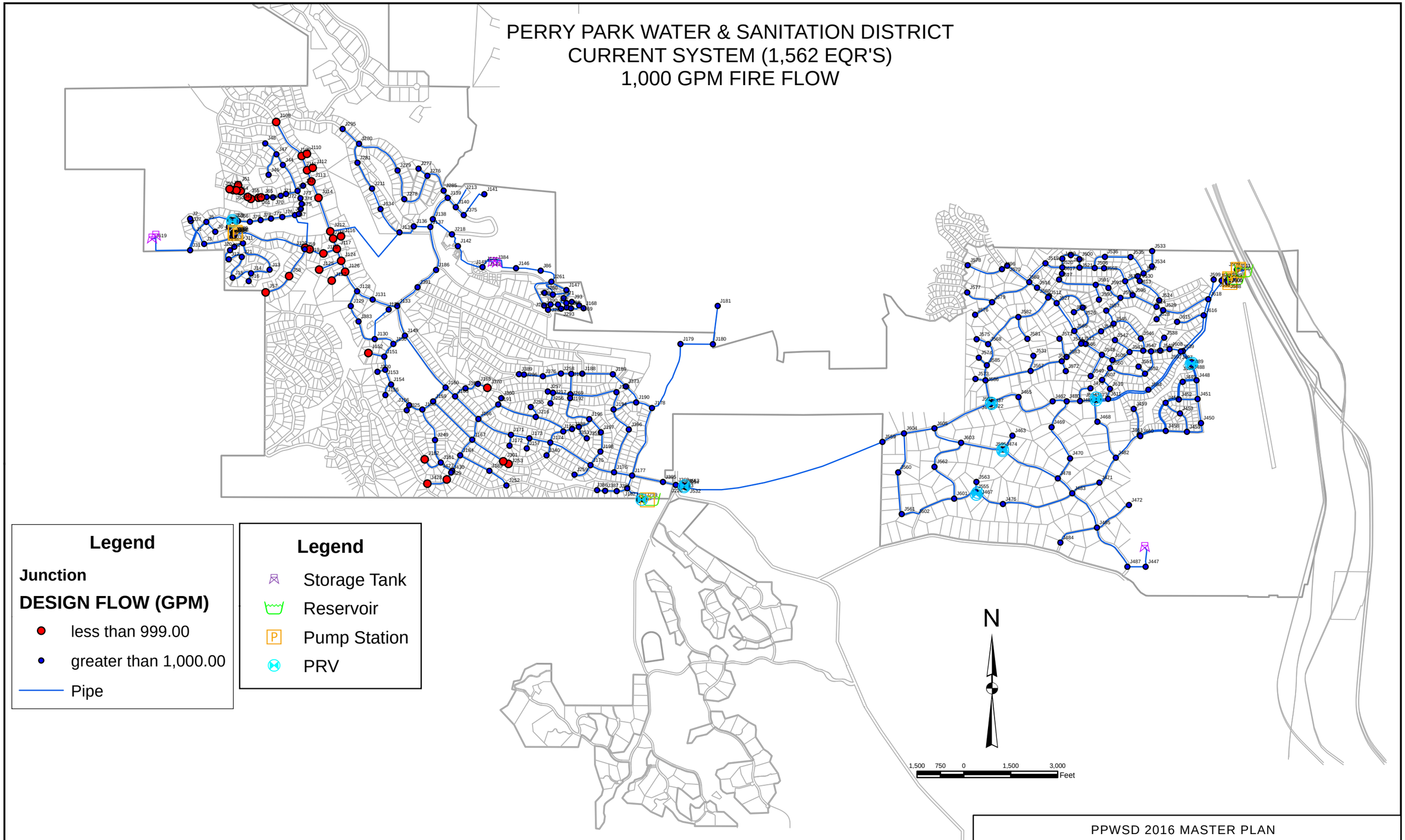
OVERALL SYSTEM INFORMATION

JOB NO. 032.024.00

DATE 1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

PERRY PARK WATER & SANITATION DISTRICT
CURRENT SYSTEM (1,562 EQR'S)
1,000 GPM FIRE FLOW



Legend

Junction

DESIGN FLOW (GPM)

- less than 999.00
- greater than 1,000.00
- Pipe

Legend

- Storage Tank
- Reservoir
- Pump Station
- PRV

PPWSD 2016 MASTER PLAN

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

FIGURE III-4
WATER MODEL (CURRENT SYSTEM)

1,000 GPM FIRE FLOW

JOB NO. 032.024.00

DATE 1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

IV. ULTIMATE SERVICE AREA AND SERVICE CUSTOMERS

A. General

Prior to this Master Plan, estimates for areas and customers to be served at buildout were most recently developed as part of the Water Model update in 2014.

The 2014 water model update addressed three development conditions including the existing condition, full development of the currently platted areas and the ultimate buildout condition which includes full development of the District's service area, including unplatted areas.

Evaluation of the water and sewer systems performed as a part of this Master plan addressed the same development conditions, however to ensure adequate overall planning, this Master Plan focuses on the ultimate buildout condition rather than the intermediate platted condition.

B. Projected Service Area

Figure IV-1 presents a map of the areas to be served at full development within the district boundary. The service are generally includes 5 primary development areas including East Perry Park, West Perry Park, Remuda Ranch, Sandstone Ranch and Meribel Village.

C. Projected Service Units

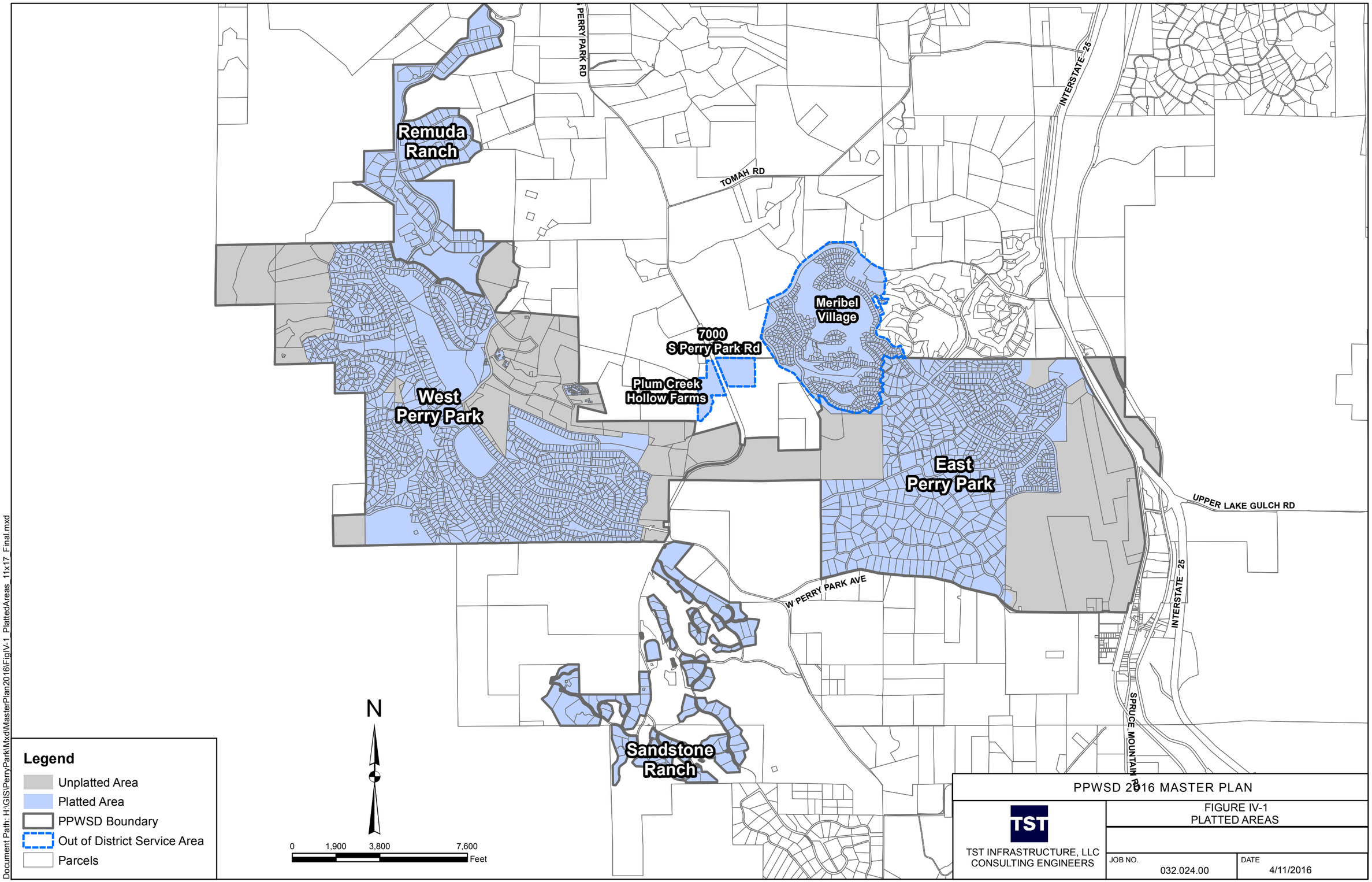
Projected service units at buildout were developed based on the best information available. For developed and platted areas, the number of units was based on a lot count for single family areas. Projections for multifamily and commercial areas were developed from billing records based on tap size. Service unit projections for unplatted areas were based on an estimated number of units per acre. A summary of the projected units at buildout is presented in Table IV-1 and a detailed tabulation of service units by development parcel is presented in Appendix D.

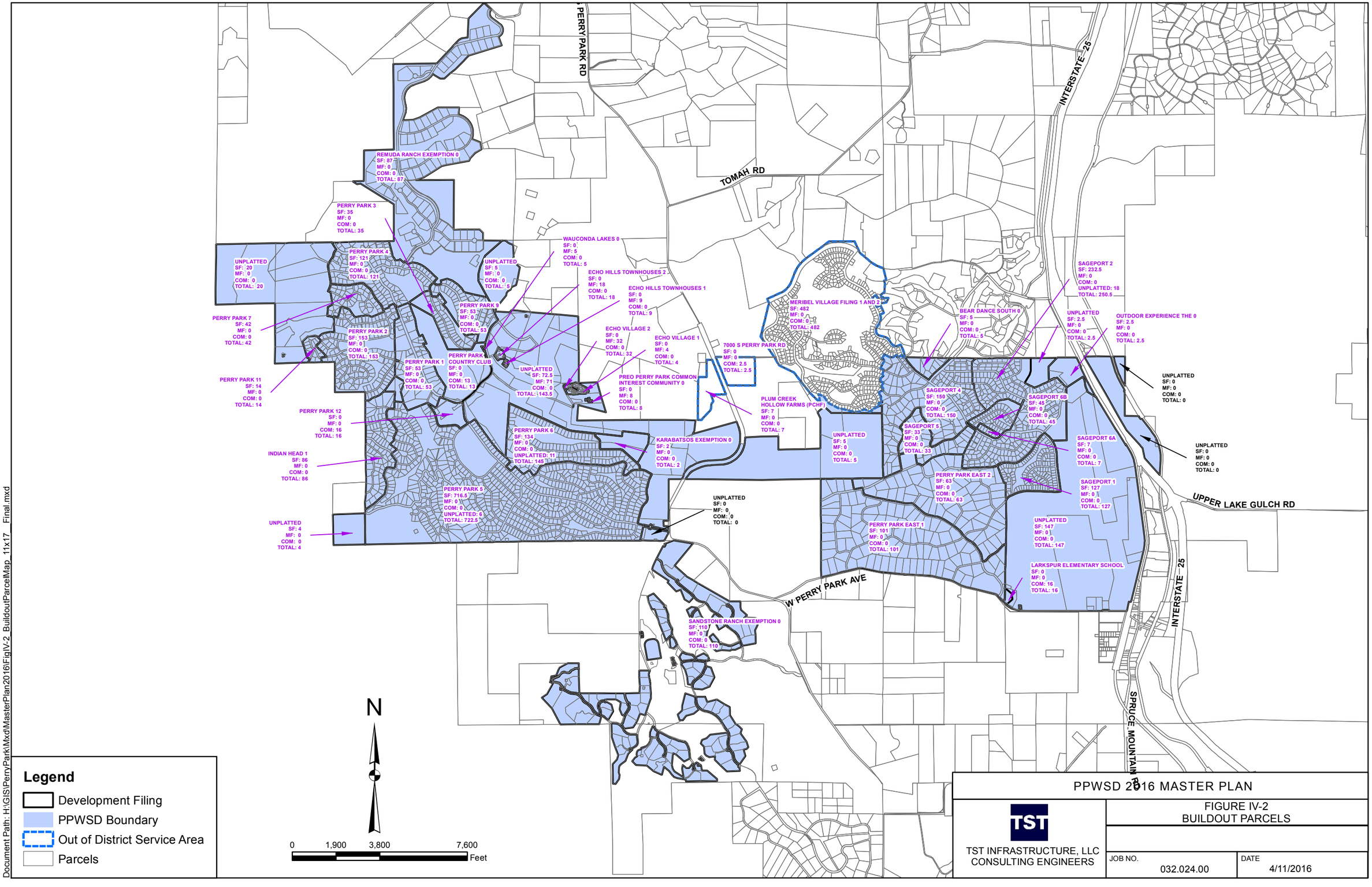
Table IV-1 – Buildout Water Service Units

	EQRs
East Perry Park	955
Meribel Village	482
Other EQRs	32
Total East	**1469**
West Perry Park	1711
Remuda Ranch	87
Sandstone Ranch	110
Other EQRs	31
Total West	**1939**

TOTAL	**3408**

At buildout, it is projected the District will provide service to approximately 3408 EQR, with approximately 500 more units on the west side of the District than on the east. Figure IV-2 shows the distribution of units throughout the District. The projected number of units in this Master Plan is 254 EQR greater than the number projected in the 2009 MP.


PERRY PARK RD
INTERSTATE - 25
TOMAH RD
Remuda Ranch
Meribel Village
7000 S Perry Park Rd
Plum Creek Hollow Farms
West Perry Park
East Perry Park
UPPER LAKE GULCH RD
W PERRY PARK AVE
INTERSTATE - 25
SPRUCE MOUNTAIN RD
Sandstone Ranch
N
0
1,900
3,800
7,600
Feet
Legend
Unplatted Area
Platted Area
PPWSD Boundary
Out of District Service Area
Parcels
Document Path: H:\GIS\PerryPark\Mxd\MasterPlan2016\FigIV-1_PlattedAreas_11x17_Final.mxd
PPWSD 2016 MASTER PLAN
FIGURE IV-1
PLATTED AREAS
TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS
JOB NO.
032.024.00
DATE
4/11/2016


PERRY PARK RD
TOMAH RD
INTERSTATE 25
UPPER LAKE GULCH RD
W PERRY PARK AVE
SPRUCE MOUNTAIN RD
REMUDA RANCH EXEMPTION 0
SF: 87
MF: 0
COM: 0
TOTAL: 87
PERRY PARK 3
SF: 35
MF: 0
COM: 0
TOTAL: 35
UNPLATTED
SF: 20
MF: 0
COM: 0
TOTAL: 20
PERRY PARK 4
SF: 121
MF: 0
COM: 0
TOTAL: 121
PERRY PARK 7
SF: 42
MF: 0
COM: 0
TOTAL: 42
PERRY PARK 11
SF: 14
MF: 0
COM: 0
TOTAL: 14
PERRY PARK 2
SF: 153
MF: 0
COM: 0
TOTAL: 153
PERRY PARK 1
SF: 53
MF: 0
COM: 0
TOTAL: 53
PERRY PARK 12
SF: 0
MF: 0
COM: 16
TOTAL: 16
INDIAN HEAD 1
SF: 86
MF: 0
COM: 0
TOTAL: 86
UNPLATTED
SF: 4
MF: 0
COM: 0
TOTAL: 4
PERRY PARK 5
SF: 716.5
MF: 0
COM: 0
UNPLATTED: 6
TOTAL: 722.5
WAUCONDA LAKES 0
SF: 0
MF: 5
COM: 0
TOTAL: 5
UNPLATTED
SF: 5
MF: 0
COM: 0
TOTAL: 5
ECHO HILLS TOWNHOUSES 2
SF: 0
MF: 18
COM: 0
TOTAL: 18
ECHO HILLS TOWNHOUSES 1
SF: 0
MF: 9
COM: 0
TOTAL: 9
PERRY PARK 9
SF: 53
MF: 0
COM: 0
TOTAL: 53
ECHO VILLAGE 2
SF: 0
MF: 32
COM: 0
TOTAL: 32
ECHO VILLAGE 1
SF: 0
MF: 4
COM: 0
TOTAL: 4
PERRY PARK COUNTRY CLUB
SF: 0
MF: 0
COM: 13
TOTAL: 13
UNPLATTED
SF: 72.5
MF: 71
COM: 0
TOTAL: 143.5
PREO PERRY PARK COMMON INTEREST COMMUNITY 0
SF: 0
MF: 8
COM: 0
TOTAL: 8
PERRY PARK 6
SF: 134
MF: 0
COM: 0
UNPLATTED: 11
TOTAL: 145
KARABATSOS EXEMPTION 0
SF: 2
MF: 0
COM: 0
TOTAL: 2
UNPLATTED
SF: 0
MF: 0
COM: 0
TOTAL: 0
MERIBEL VILLAGE FILING 1 AND 2
SF: 482
MF: 0
COM: 0
TOTAL: 482
7000 S PERRY PARK RD
SF: 0
MF: 0
COM: 2.5
TOTAL: 2.5
PLUM CREEK HOLLOW FARMS (PCHF)
SF: 7
MF: 0
COM: 0
TOTAL: 7
UNPLATTED
SF: 5
MF: 0
COM: 0
TOTAL: 5
BEAR DANCE SOUTH 0
SF: 5
MF: 0
COM: 0
TOTAL: 5
SAGEPORT 2
SF: 232.5
MF: 0
COM: 0
UNPLATTED: 18
TOTAL: 250.5
UNPLATTED
SF: 2.5
MF: 0
COM: 0
TOTAL: 2.5
OUTDOOR EXPERIENCE THE 0
SF: 2.5
MF: 0
COM: 0
TOTAL: 2.5
SAGEPORT 4
SF: 150
MF: 0
COM: 0
TOTAL: 150
SAGEPORT 6B
SF: 45
MF: 0
COM: 0
TOTAL: 45
SAGEPORT 5
SF: 33
MF: 0
COM: 0
TOTAL: 33
SAGEPORT 6A
SF: 7
MF: 0
COM: 0
TOTAL: 7
PERRY PARK EAST 2
SF: 63
MF: 0
COM: 0
TOTAL: 63
SAGEPORT 1
SF: 127
MF: 0
COM: 0
TOTAL: 127
PERRY PARK EAST 1
SF: 101
MF: 0
COM: 0
TOTAL: 101
UNPLATTED
SF: 147
MF: 0
COM: 0
TOTAL: 147
LARKSPUR ELEMENTARY SCHOOL
SF: 0
MF: 0
COM: 16
TOTAL: 16
SANDSTONE RANCH EXEMPTION 0
SF: 110
MF: 0
COM: 0
TOTAL: 110
UNPLATTED
SF: 0
MF: 0
COM: 0
TOTAL: 0
UNPLATTED
SF: 0
MF: 0
COM: 0
TOTAL: 0
N
0
1,900
3,800
7,600
Feet
Legend
Development Filing
PPWSD Boundary
Out of District Service Area
Parcels
PPWSD 2016 MASTER PLAN
FIGURE IV-2
BUILDOUT PARCELS
TST
TST INFRASTRUCTURE, LLC
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JOB NO.
032.024.00
DATE
4/11/2016
Document Path: H:\GIS\PerryPark\Mxd\MasterPlan2016\FigIV-2_BuildoutParcelMap_11x17_Final.mxd

V. ULTIMATE WATER SUPPLY

A. General Strategy

As described in previous sections of this plan, the District has substantial water resources including senior and junior surface water rights, and non-tributary groundwater rights in the Denver basin aquifers.

The long term strategy for use of the supply should be to maximize the use of the renewable water sources and rely on the non-tributary water as required to supplement the renewable supplies.

Overall, the current water supply should be adequate for the foreseeable future. In the long term, replacement of a portion of the non-tributary water will likely be required. District should monitor the availability of renewable sources, and the development of renewable resource projects in the area.

B. Required Supply

Based on the projected buildout of 3408 EQRs and a water supply requirement of 0.5 AF/EQR, the required water supply at buildout is projected to be 1704 AF/Y. As previously presented in Table III-3, the District has a substantial water portfolio from which to develop the required 1704 AF/Y supply. Because the different types of water represented in the District's portfolio have different physical and legal characteristics, a multitude of options exist for specific strategies for how to best use the available supplies. Due to changing conditions, any adopted strategy will require constant monitoring with adjustments made as required in response to conditions.

C. Surface Water

1. Availability

The District's Junior and Senior water rights represent the renewable portion of the District's water portfolio. These rights represent a permanent supply that will always be available to the District, as opposed to the non-renewable supply from the Denver Basin wells. Maximizing the use of the renewable supply will help extend the useful life of the Denver Basin aquifers.

2. Strategy for use

The District should continue to attempt to use its full allocation (315 AF/Y) of senior, consumptive use water rights on an annual basis. This water represents the most permanent supply available to the District and should be the foundation for any water supply strategy.

Although use of the District's Junior rights is limited by the availability of return flows, these rights represent another significant and permanent source of water. The primary

source of return flows is discharge from the wastewater treatment plants, which increases in proportion to growth. Use of Junior water rights should be maximized based on the availability of return flows from the wastewater treatment plants.

Additional storage should also be constructed to help maximize the use of the junior water rights. Additional water would enable the District to divert and store additional surface flows when available, for later release as augmentation flow.

D. Non-Tributary Ground Water

1. Availability

The District's 4000 AF/Y supply of non-tributary groundwater is a substantial supply of high quality water. With an adequate number of wells, this source could easily provide the entire water supply for the entire District at buildout. It is not however, a permanent supply and the water available for use will continue to decline over time. The rate of depletion of the Denver Basin Aquifers is difficult to predict so it is not possible to accurately predict the useful life of the aquifer. While it is likely that these aquifers will continue to be a reliable water source for many years to come, the District should continue to plan for the ultimate replacement of a portion of its non-tributary supply.

2. Strategy for Use

In the long run, the non-tributary water should be used as a secondary source of water if possible, with priority given to the use of renewable sources. In considering this strategy, it should be noted that use of renewable water requires a significantly higher level of treatment than the District currently has in place. Until the District is prepared to construct the required surface water treatment, substantial reliance on non-tributary wells will be required.

VI. ULTIMATE WATER SYSTEM

A. General

Significant infrastructure expansions and upgrades will be required to provide service for the buildout condition. For the distribution system, the required expansions will for the most part be limited to extending pipelines into the new service areas. Development of adequate treatment capacity will need to address a number of complex consideration including the source of water to be used, regulatory requirements for treatment, location of demands within the service area and the condition and capability of existing facilities.

B. Water Demand

Water demands for the buildout condition were developed based on the same per unit demands utilized to calculate existing demands in Section III of this Master Plan, and the projected buildout units as shown in Section IV. Table VI-1 presents a summary of the projected demands at buildout. A detailed tabulation of buildout demands is presented in Appendix E.

Table VI-1 – Water Demand

	Average Day Demand (gal.)	Maximum Day Demand (gal.)	Peak Hour Demand (gal.)
East Perry Park	274,176	767,693	1,151,539
Meribel Village	138,816	388,685	583,027
Other Demand	8,928	24,998	37,498
Total East	**421,920**	**1,181,376**	**1,772,064**
West Perry Park	493,488	1,381,766	2,072,650
Remuda Ranch	25,056	70,157	105,235
Sandstone Ranch	31,680	88,704	133,056
Other Demands	9,216	25,805	38,707
Total West	**559,440**	**1,566,432**	**2,349,648**
TOTAL	**981,360**	**2,747,808**	**4,121,712**

At buildout, the average day water demand for the entire service area is projected to be 0.98 MGD, and the maximum day water demand is projected to be 2.8 MGD. The maximum day demand is particularly significant because both well capacity and water treatment capacity must be developed to meet the maximum day demand. In addition,

the distribution system must be designed to convey maximum day demand plus fire flow.

Approximately 42% of the demand at buildout is located on the east side of the service area with 58% on the west. The breakdown of demand between east and west is a key consideration in planning the location of water treatment, well, and storage capacities.

C. Wells

To meet a maximum day capacity of 2.8 MGD, a total well pumping capacity of approximately 1950 gpm will be required. In addition to the number of wells required to provide the required pumping rate, several additional wells will also be required to provide redundancy and ensure reliable service.

As previously identified, the current pumping capacity of the District's existing wells is 1012 gpm, including 265 gpm from alluvial wells and 747 gpm from non-tributary wells. With considering redundancy requirements, the existing wells could provide approximately 52% of the pumping capacity required at buildout.

Table VI-2 presents a summary of existing wells and pumping capacities.

Table VI-2 – Well Pumping Capacities

	Current Capacity (gpm)	Design Capacity (gpm)
Non-Tributary		
Denver – 4	275	300
Arapahoe – 2	165	250
Arapahoe – 3	175	250
Arapahoe – 4	132	350
Total	**747**	**1150**
Alluvial		
Grant Ditch	65	175
Glen Grove	100	175
WP-1	0	175
WP-2	100	125
Total	**265**	**650**
Potential Future Non-Tributary		
Dakota-1	100	250
Dakota-2	0	250
Arapahoe-1	0	250
Total	**100**	**750**

It should be noted that actual pumping capacity of each existing well is below the design capacity. If each of the wells was equipped to provide its full design capacity, pumping capacity from the existing wells could be increased to approximately 1800 gpm, or 92% of the required capacity at buildout.

It should also be noted that both well capacity and the type of well impact water treatment requirements and the above discussion of well capacity assumes that the required treatment capacity would be available. To ensure efficient buildout of the District's water supply and treatment infrastructure a plan should be developed to identify the percentage of each source of water to be utilized at buildout, the locations where each source will be developed, and the treatment facility requirements based on the sources to be used.

D. Water Treatment

1. General

The primary considerations in developing adequate water treatment capability include the capacity to meet maximum day demand and the appropriate treatment processes based on the characteristics of the source water. In general, the existing water treatment facilities do not include treatment process that will be required at buildout, nor do these facilities contain provisions for expansion to the required capacity. As a result, substantial upgrades to water treatment infrastructure will be required to provide reliable service at the buildout condition.

As noted in Section III of this Master Plan, the existing treatment facilities require upgrades to provide service under the existing development condition. Upgrades to meet the current treatment requirements should be planned in conjunction with the upgrades required to meet the requirements of the buildout condition.

2. Glen Grove WTP

The Glen Grove Water Treatment Plant has neither the capacity nor adequate treatment processes to provide adequate service at buildout. The capacity of the existing facility is approximately 0.2 MGD, as compared to the buildout demand of 1.5 MGD for the west side of the service area. In addition, the treatment processes in the existing facility cannot effectively handle the turbidity levels of the raw water, and are effective at meeting surface water treatment requirements only at a limited flow rate.

With the addition of pretreatment components and significant modifications to other parts of the facility, the GGWTP could be upgraded to restore or exceed its previous capacity. Due to the magnitude of the required upgrades, the cost effectiveness of investing in an aging facility should be considered. The GGWTP is approximately 35 years old, with an anticipated remaining useful life of 5 to 15 years. Replacement of the facility may be more cost effective, provide better treatment service and be more compatible with future treatment requirements.

The District should perform a detailed evaluation of the Glen Grove Plant to determine the preferred course of action with respect to upgrading or replacing the plant. Since increased water treatment capacity is required on the west side, this evaluation should be performed as soon as possible.

3. Sageport WTP

The Sageport WTP provides significantly more treatment capability than Glen Grove plant, both in terms of capacity and treatment process. Although the Sageport plant is currently used to treat Denver Basin groundwater only, the treatment process includes both clarification and filtration which could enable the facility to be used to treat alluvial groundwater.

In its current configuration, the Sageport plant has a maximum capacity of 650 gpm (0.94 MGD). With one of the large filters out of service, the capacity would be reduced to 475 gpm (0.68 MGD). In its ultimate design with two additional filters, the plant would have a maximum capacity of 1000 gpm (1.4 MGD) and rated capacity with one filter out of service of 825 gpm (1.2 MGD).

At its maximum rated capacity with one filter out of service, the Sageport plant could provide adequate treatment service for the projected maximum day demand of 1.18 MDG for the east side of the service area at buildout. It should be noted that at buildout demand, the Sageport plant would not have adequate excess capacity to supplement treatment for the west side of the service area.

If future plans call for treatment of alluvial water at the Sageport plant, a thorough evaluation of the facility should be performed to ensure that the plant is capable of compliance with then current treatment regulations.

E. Water Distribution

1. Description of the Ultimate System

The distribution system required to serve the buildout condition will include eight pressure zones as shown in Figure VI-1. Five of the zones, including 1, 2, 3, 6, & 7 are currently in use in the existing system. Zones 4 and 5 would be created to serve new development in the southwest portion of the service area. The new zones would be served by the proposed Indian Head tank(s). The Indian Head tank would serve Zone 4 directly, and Zone 5 through a series of PRVs. Zone 8 would be created to serve the area in the southeast portion of East Perry Park. The new Zone 8 would be served from the School House Tank through new PRVs.

Figure VI-2 shows the expected configuration of distribution system piping at buildout. Piping is expected to range in size from 4’ to 16”.

Modeling of the Distribution system indicated that the majority of the existing system can provide adequate service at buildout. Figure VI-3 presents a summary of the

modeling results under peak hour flow conditions which indicates no deficiencies under that condition. Figure VI-4 presents modeling results under a maximum day plus fire flow condition which indicates that the required 1000 gpm fire flow cannot be delivered to the end of the cul-de-sacs on Ute Ct. and Tract C due to small pipe size.

2. Construction of New Distribution Facilities

Additional pipelines and PRVs will be required to provide service at the buildout condition, but it is anticipated that with the exceptions noted above, all pipeline and PRV facilities required to serve new development will be constructed by the developer and conveyed to the District.

F. Water Storage

Water storage is required to meet normal operational demands and to provide the required additional quantity of water for fire flow.

A variety of methods are used to determine storage requirements for water distribution systems. A review of the District's previous planning indicates that the 2001 Master Plan used a volume of one maximum day demand for storage requirements, while the 2009 Master Plan update used maximum day plus fire storage as the required storage volume. Because the District has historically used a relatively low fire flow requirement of 1000 gpm, the fire storage component is a relatively small portion of the overall storage requirement.

In multi zone systems, storage must be provided for each zone, although it is possible for a lower zone to receive storage from an upper zone, provided the upper zone has adequate storage for both zones.

Table VI-3 presents the maximum day demand in each zone at buildout, the fire flow storage requirement and the total storage for each zone. The table also shows the existing storage in each zone and the additional storage required to serve the buildout condition for each zone.

Table VI-3 - Storage Requirements by Zone

	Tank	Max Day Demand by Zone	Max Day Demand by Tank	Fire Storage by Tank	Total Storage by Tank	Available Storage	Required Additional Storage
1	HJ	103,219					
2	HJ	102,413	205,632	120,000	325,632	450,000	
3	EH	1,089,446	1,089,446	120,000	1,209,446	833,000	380,000
4	IH (Fut)	174,989					
5	IH (Fut)	44,352	219,341	120,000	339,341		340,000
6	SH	194,342					
7	SH	843,494					
8	SH	118,541	1,156,377	120,000	1,276,377	800,000	480,000

Based on the data shown in Table VI-3, the Hog John tanks will provide adequate storage to meet the buildout condition. Additional storage is required for both the Echo Hills and School House sites.

Currently Zones 6 and 7 are served by a single steel tank at the School House site, which does not allow for maintenance of the existing tank. A second tank at the school house site could be sized to meet the buildout storage requirement for Zone 3 (Echo Hills tanks) as well as the requirement for Zones 6, 7 and 8.

Zone 6 West

Remuda Ranch

PERRY PARK RD

TOMAH RD

INTERSTATE - 25

Undetermined Pressure Zone

Zone 2 HGL = 6832

Zone 3 West HGL = 6776

Zone 1 HGL = 7103

Zone 2 HGL = 6832

West Perry Park

Zone 3 West HGL = 6776

7000 S Perry Park Rd

Meribel Village

Zone 7 HGL = 6965

Plum Creek Hollow Farms

Zone 3 West HGL = 6776

Zone 6 East HGL = 7063

East Perry Park

Zone 1 HGL = 7103

Zone 4 HGL = 7225 (ASSUMED)

Undetermined Pressure Zone

Zone 5 HCL = 6942

Undetermined Pressure Zone

UPPER LAKE GULCH RD

Zone 8 HGL = 6980

W PERRY PARK AVE

INTERSTATE - 25

Zone 3 West HGL = 6776

SPRUCE MOUNTAIN RD

Sandstone Ranch

Legend

- PRV's
- Zone 1 HGL = 7103
- Zone 2 HGL = 6832
- Zone 3 West HGL = 6776
- Zone 4 HGL = 7225 (ASSUMED)
- Zone 5 HCL = 6942
- Zone 6 East HGL = 7063
- Zone 6 West
- Zone 7 HGL = 6965
- Zone 8 HGL = 6980
- Undetermined Pressure Zone
- PPWSD Boundary
- Out of District Service Area
- Parcels

N

0 1,900 3,800 7,600 Feet

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PPWSD 2016 MASTER PLAN

FIGURE VI-1
BUILDOUT PRESSURE ZONES

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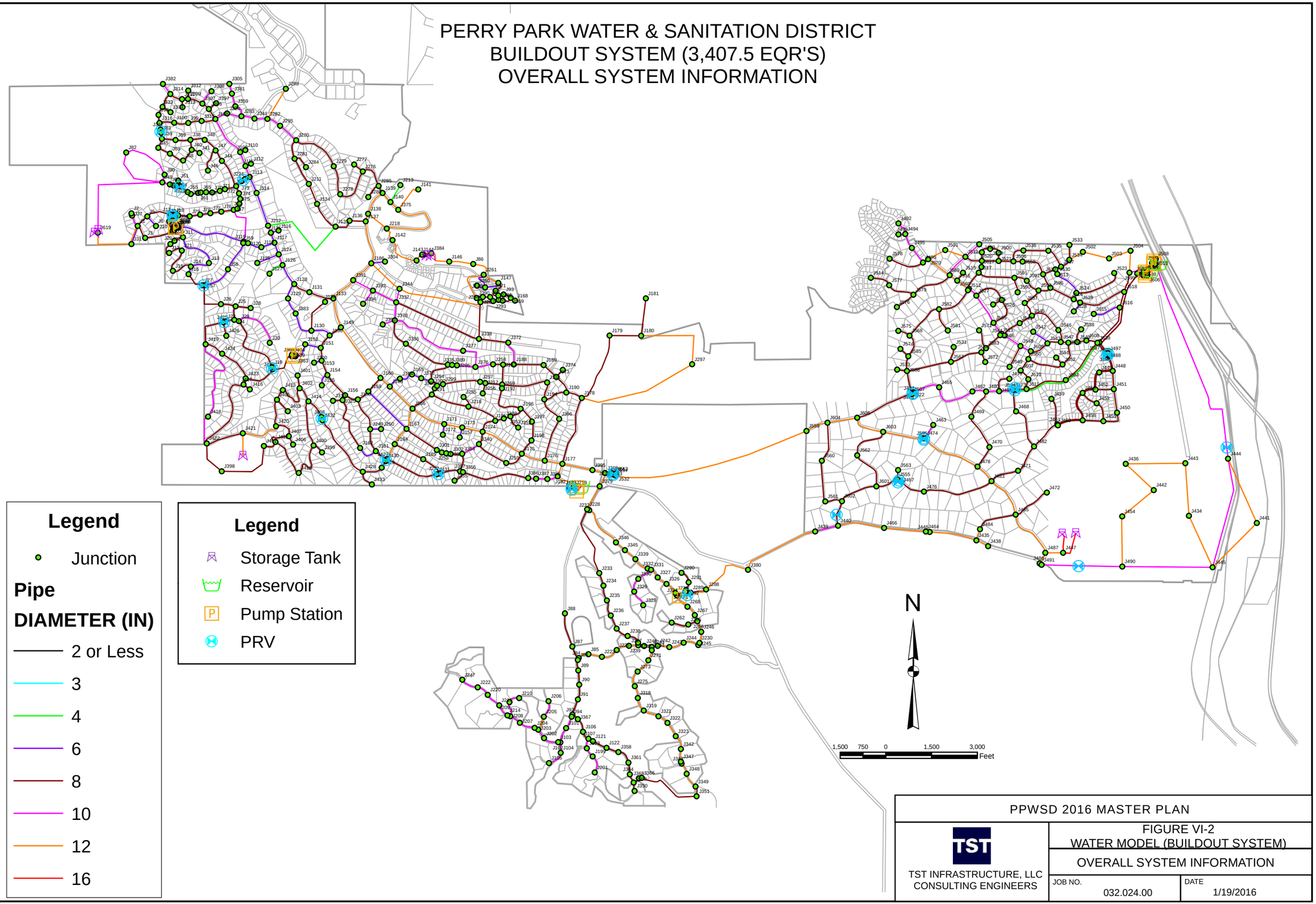
JOB NO. 032.024.00

DATE 4/11/2016

PERRY PARK WATER & SANITATION DISTRICT
BUILDOUT SYSTEM (3,407.5 EQR'S)
OVERALL SYSTEM INFORMATION



PPWSD 2016 MASTER PLAN

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

FIGURE VI-2
WATER MODEL (BUILDOUT SYSTEM)

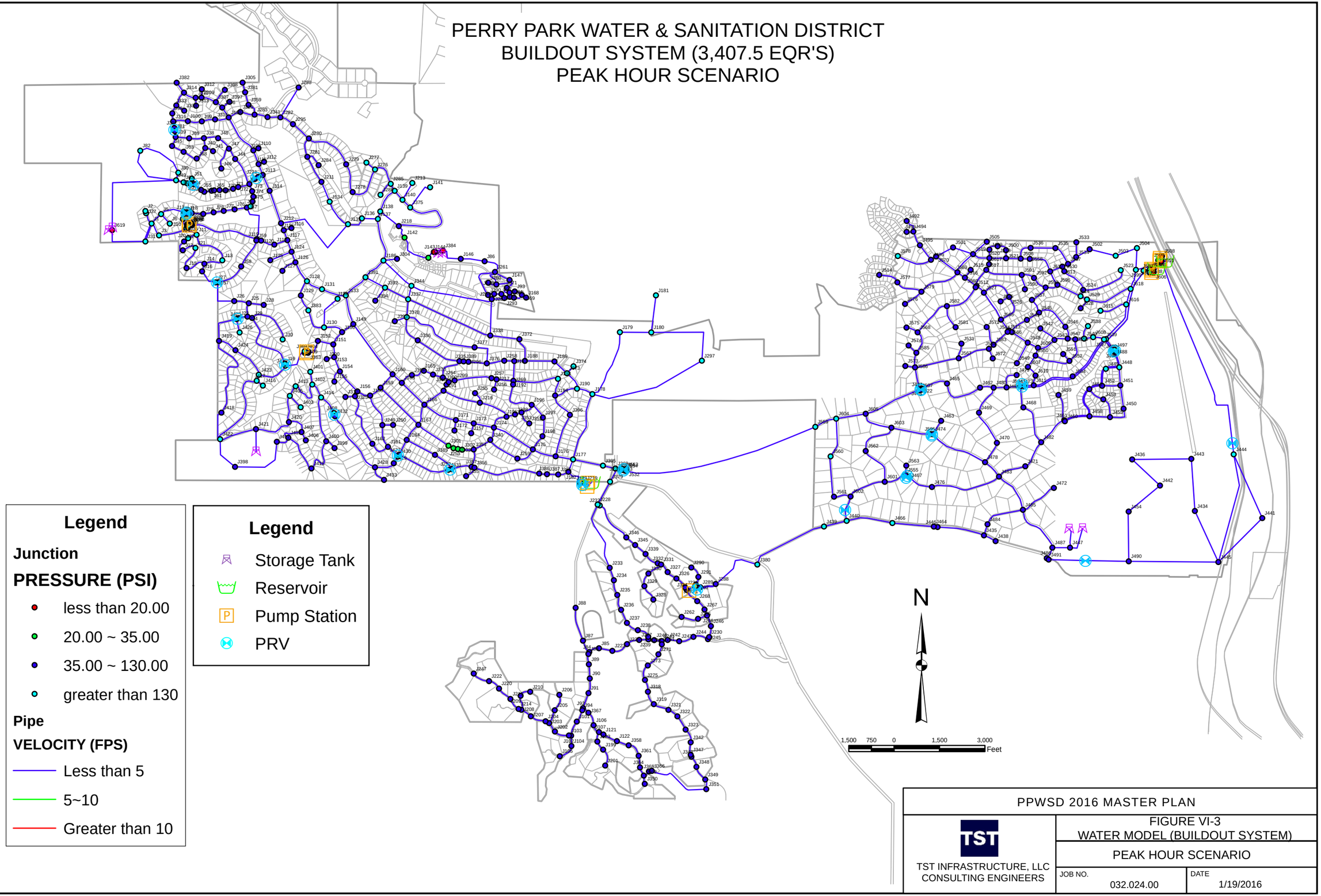
OVERALL SYSTEM INFORMATION

JOB NO. 032.024.00

DATE 1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

PERRY PARK WATER & SANITATION DISTRICT
BUILDOUT SYSTEM (3,407.5 EQR'S)
PEAK HOUR SCENARIO



PPWSD 2016 MASTER PLAN

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

FIGURE VI-3
WATER MODEL (BUILDOUT SYSTEM)

PEAK HOUR SCENARIO

JOB NO. 032.024.00

DATE 1/19/2016

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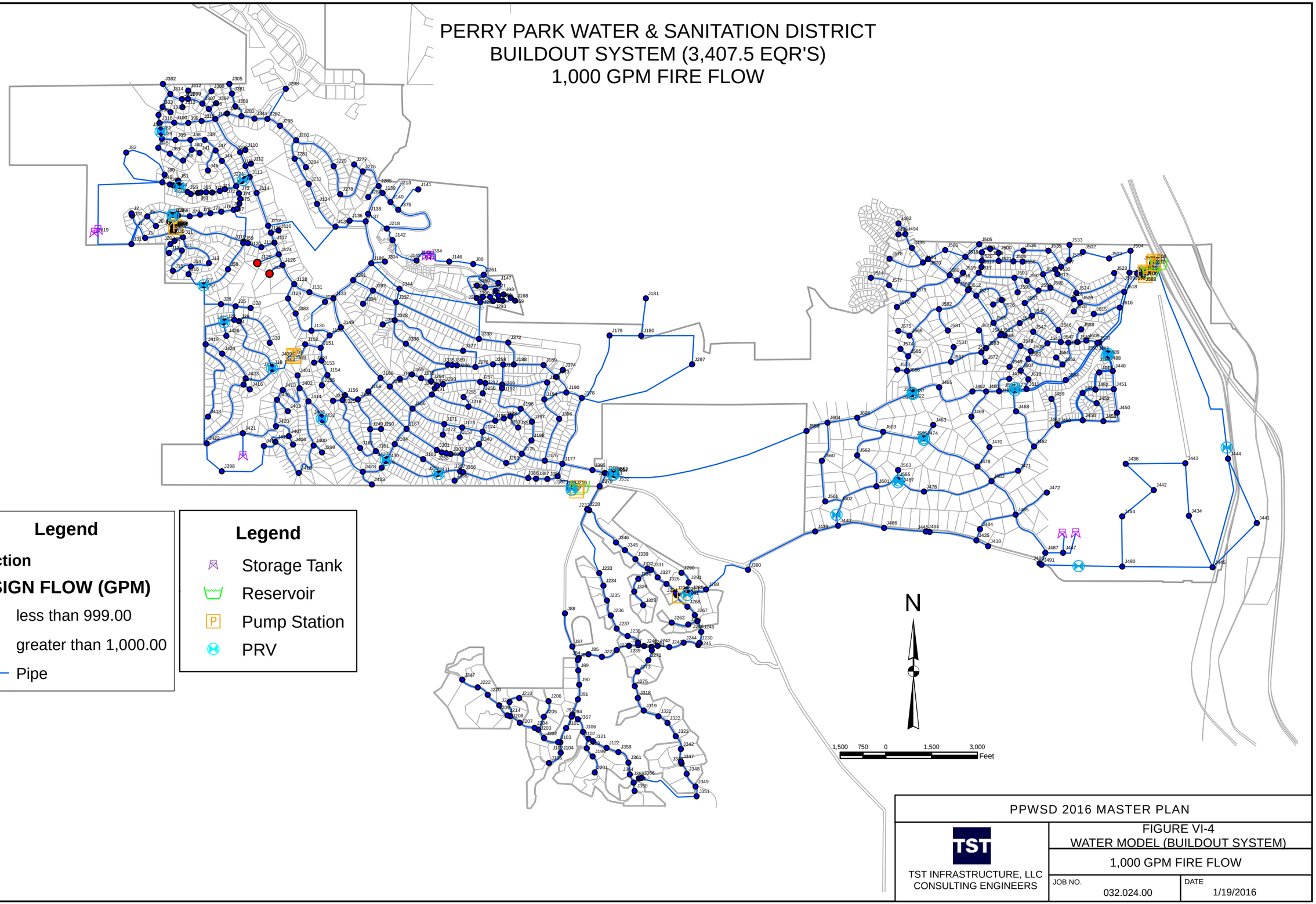
PERRY PARK WATER & SANITATION DISTRICT
BUILDOUT SYSTEM (3,407.5 EQR'S)
1,000 GPM FIRE FLOW



PPWSD 2016 MASTER PLAN

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CONSULTING ENGINEERS

FIGURE VI-4
WATER MODEL (BUILDOUT SYSTEM)

1,000 GPM FIRE FLOW

JOB NO. 032.024.00

DATE 1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

VII. ULTIMATE WASTEWATER SYSTEM

A. General

Under the buildout condition, wastewater treatment and collection service will continue to be provided by separate systems in the east and west portions of the service area. Each system will be required to function as a stand-alone system with adequate capacity for its service area.

B. Wastewater Service Units and Flow

1. Wastewater Service Units

Larger lots in the development areas utilize septic systems, and do not receive sewer service from the District. Table VII-1 presents a summary of the District's sewer service customers. A detailed tabulation of the District's sewer service customers and the associated wastewater flows are presented in Appendix F.

Table VII-1 – Buildout Wastewater Service Units

	EQRs
East Perry Park	676
Meribel Village	482
Other EQRs	31
Total East	**1189**
West Perry Park	1702
Remuda Ranch	87
Sandstone Ranch	110
Other EQRs	32
Total West	**1931**
TOTAL	**3120**

2. Per Unit Wastewater Flow

Per unit wastewater flows were developed separately for the east and west sides of the service area base on flow records from the Sageport and Waucondah plants respectively. The calculated per unit flow for the Sageport Plant (east) was 158 gpd/EQR and the calculated flow for the Waucondah Plant (west) was 210 gpd/EQR.

3. Ultimate Wastewater Flow

Projected flows for the buildout condition were calculated based on the service units and per unit flows developed above. Table VII-2 presents the projected flows by service area.

Table VII-2 – Buildout Wastewater Flow

	Wastewater Flow (GPD)
East Perry Park	106,808
Meribel Village	76,156
Other EQRs	4,898
Total East	**187,862**
West Perry Park	357,420
Remuda Ranch	18,270
Sandstone Ranch	23,100
Other EQRs	6,720
Total West	**405,510**
TOTAL	**593,372**

The projected wastewater flow for the entire service area is 0.59 MGD, with approximately two thirds of the wastewater being generated on the west side and one third on the east side.

C. Wastewater Collection

1. Sewer System Hydraulics

The configuration of the sanitary sewer collection system under both the existing and buildout conditions is presented in Figure VII-1. The sewer system was modeled at buildout flow conditions using peak flows calculated from the average flow developed above multiplied by a peaking factor. The peaking factor was calculated from an empirically derived formula that correlates expected peak flows with the population of the service area. A calculated peaking factor of 4.2 was used for the sewer system analysis.

Modeling of the sewer system was limited to the main interceptor and collector pipelines. Collection lines that serve less than the maximum number of units that can be served by a pipeline at minimum slope were not modeled. Modeling was performed with a spreadsheet model that calculates the required capacity and the available capacity for each segment of pipeline.

Sewer system models for East Perry Park and West Perry Park are presented in Appendix F. Modeling results indicate that the system has adequate capacity to accommodate buildout flow conditions.

2. Collection System Improvements

No required improvements have been identified for the collection system.

D. Lift Stations

1. Red Rock #1

The Red Rock Lift station was upgraded in 2012 has adequate capacity to serve its original drainage basin. Development of Sandstone Ranch will impact the Red Rock Lift Station, and the capacity should be confirmed at the time that Sandstone Ranch develops.

2. Bannock #2 Lift Station

Section 3 of this Master Plan indicated that Bannock Lift Station has adequate capacity to accommodate existing flows, but that replacement of the pumps is required to ensure reliable service. As part of the pump replacement, the capacity to accommodate flows at buildout should be verified.

3. Boreas Lift Station

Section 3 of this Master Plan indicated that Boreas Lift Station has adequate capacity to accommodate existing flows, but that replacement of the pumps is required to ensure reliable service. As part of the pump replacement, the capacity to accommodate flows at buildout should be verified.

E. Wastewater Treatment

1. Waucondah WWTP

Upgrades to the Waucondah WWTP will be required to provide adequate service for the buildout condition. The required upgrades will need to address both capacity and process improvements.

CDPHE design criteria currently require wastewater treatment plants to be designed for a maximum month capacity, which is often in the range of 20% higher than average day flow. Based on the expected average day wastewater flow of 0.4 MGD shown above, the required wastewater treatment capacity would be approximately 0.5 MGD, which significantly exceed the 0.32 MGD permitted capacity of the existing plant.

The current treatment process uses chemical precipitation and sedimentation for phosphorus removal. At current flow, the existing process provides adequate phosphorus removal, however the plant is currently running at approximately one half capacity, and it is unknown how the sedimentation process will perform under a full hydraulic loading.

The current treatment process uses two RBCs in series for ammonia removal. Again, this process is performing adequately under the current hydraulic loading, but the ability to perform under a full hydraulic loading is unknown.

Wastewater regulations are continuously changing and any upgrades to the Waucondah facility should consider flexibility of the process to accommodate additional treatment requirements due to future regulations. For example, effluent limits for phosphorus in other watersheds have been lowered to 0.05 mg/l which is substantially lower than the 1.0 mg/l in the current Waucondah permit, and would not be achievable with the current process.

The age of the facility should also be considered when evaluating upgrade options. Depending on the age of the components to upgraded, replacement might be a more cost effective option.

A detailed study of the Waucondah plant should be performed to evaluate its ability to provide adequate treatment at its full permitted capacity. The study should also address the condition of each process component and the expected use of the components and the overall facility. Performing this study in the near future would provide the District with a baseline for evaluating any regulatory changes that may be included in the 2017 Discharge Permit Renewal.

2. Sageport WWTP

Upgrades to the Sageport WWTP will be required to provide adequate service for the buildout condition. The required upgrades will need to address both capacity and process improvements.

CDPHE design criteria currently require wastewater treatment plants to be designed for a maximum month capacity, which is often in the range of 20% higher than average day flow. Based on the expected average day wastewater flow of 0.19 MGD shown above, the required wastewater treatment capacity would be approximately 0.23 MGD, which significantly exceeds the 0.1 MGD permitted capacity of the existing plant.

The current treatment process uses chemical precipitation and sedimentation for phosphorus removal. At current flow, the existing process provides adequate phosphorus removal, however the plant is currently running at approximately one half capacity, and it is unknown how the sedimentation process will perform under a full hydraulic loading.

The current treatment process uses two RBCs in series for ammonia removal. Again, this process is performing adequately under the current hydraulic loading, but the ability to perform under a full hydraulic loading is unknown.

As noted in Section 3, the configuration of the Sageport plant has been modified on a number of occasions, which has created a number of operations and maintenance

issues. Correcting the configuration of the facility should be considered as part of any upgrade.

Wastewater regulations are continuously changing and any upgrades to the Sageport facility should consider flexibility of the process to accommodate additional treatment requirements due to future regulations. For example, effluent limits for phosphorus in other watersheds have been lowered to 0.05 mg/l which is substantially lower than the 1.0 mg/l in the current Sageport permit, and would not be achievable with the current process.

The age of the facility should also be considered when evaluating upgrade options. Depending on the age of the components to upgrade, replacement might be a more cost effective option.

A detailed study of the Sageport plant should be performed to evaluate its ability to provide adequate treatment at its full permitted capacity. The study should also address the condition of each process component and the expected use of the components and the overall facility. Performing this study in the near future would provide the District with a baseline for evaluating any regulatory changes that may be included in the 2017 Discharge Permit Renewal.

Proposed Lift Station
Proposed Lift Station
Proposed Lift Station
WWTP
Lift Station
Lift Station
Proposed Lift Station
Proposed Lift Station
Lift Station
WWTP
Proposed Lift Station
PERRY PARK RD
TOMAH RD
INTERSTATE - 25
UPPER LAKE GULCH RD
W PERRY PARK AVE
SPRUCE MOUNTAIN RD

Legend

- Facilities
- Existing Force Main
- Existing Sewer Main
- Proposed Force Main
- Proposed Sewer Main
- Unplatted Area
- Platted Area
- PPWSD Boundary
- Out of District Service Area
- Parcels

N

0 1,900 3,800 7,600 Feet

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PPWSD 2016 MASTER PLAN

FIGURE VII-1
SEWER MAP

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

JOB NO. 032.024.00

DATE 2/12/2016

VIII. CAPITAL IMPROVEMENTS

A. General

To ensure efficient use of District resources, it is essential that the ultimate buildout condition be considered in the planning of capital improvements. At the same time, it is not realistic to schedule capital improvements for the buildout condition if that condition is not likely to be attained until well into the future, which could likely be the case for Perry Park. In those cases, a more reasonable approach is to plan for the improvements that are necessary to provide service under the existing buildout condition with a reasonable allowance to accommodate growth over a period of perhaps 10 to 20 years. The required improvements should be planned with the capability for ultimate expansion to provide service at the buildout condition. The capital improvement schedule developed for this Master Plan is based on a 10 year planning horizon.

Figure VIII-1 presents a summary of the estimated costs of improvements required over the next 10 years to ensure reliable service for existing customers, comply with current and expected regulations, and provide a reasonable allowance to accommodate growth. The estimated total for water and wastewater improvements over the 10 year period is approximately $15M.

B. Required Water System Capital Improvements

The following paragraphs provide a general description of the water system improvements required, including the need for the improvement, the required timing and the estimated costs.

1. Sageport WTP Improvements

Expanded capacity in the Sageport WTP is required to supplement treatment for the west side of the District. Capacity can be added to the Sageport plant quickly to relieve the District's overall lack of water treatment capacity. The improvements would include additional filtration capacity and upsizing of existing discharge piping. Improvements are required as soon as possible since existing treatment capacity is inadequate.

Estimated Cost: $490,000

2. Increase Well Pumping Capacity at Sageport WTP

Increased well pumping capacity is required in conjunction with the Sageport WTP improvements described in the previous item. Improvements would include replacing the pump in Well A-4 to maximize the output of the well.

Estimated Cost: $225,000

3. Second School House Water Storage Tank

A second water storage tank is required at the school house site to provide redundancy and allow for maintenance and repair of the existing tank. A second tank with capacity equal to the existing tank, 800,000 gallons, would provide complete redundancy, would meet the Zone 6/7 storage requirement at buildout, and could provide the additional storage required in Zone 3 at buildout. The second tank should be constructed in the near future to allow for inspection, maintenance and repair of the existing tank.

Estimated Cost: $1,875,000

4. Country Club Drive Water Line Loop

This water line loop is required to provide adequate fire flow along northern portion of Perry Park Blvd. The improvements include approximately 2500 lf of 10" pipeline. This improvement should be constructed in the near future to correct the existing fire flow issue.

Estimated Cost: $490,000

5. Echo Hills Tank Waterline Loop

This water line loop is required to provide a second connection from the Echo Hills tanks to the Zone 3 distribution system. The improvements include approximately 3000 lf of 12" pipeline. This improvement should be constructed in the near future to increase the reliability of the system.

Estimated Cost: $585,000

6. Apache Drive/Hog John Water Line Loop

This water line loop is required to provide adequate fire flow along Apache Drive. The improvements include approximately 3000 lf of 10" pipeline. This improvement should be constructed in the near future to correct the existing fire flow issue.

Estimated Cost: $585,000

7. Valve at Echo Hills Tank

This improvement would replace the existing defective 8" isolation valve for Tank No. 1 with a 12" valve, to provide positive control and improved flow.

Estimated Cost: $30,000

8. Permanent Electrical Service to Hog John Tank

Permanent electrical service is required at the Hog John Tank to provide power for general use at the site and for a SCADA system to enable remote monitoring of tank levels. The improvements should be constructed in the near future to improve operational capability.

Estimated Cost: $70,000

9. Glen Grove WTP Evaluation

The Glen Grove Water Treatment Plant is the key to enabling the District to utilize its surface water rights. The reduction in plant capacity due to treatment requirements for Groundwater under the Direct Influence of Surface Water have reduced the District's ability to use its surface water rights as well as reducing overall treatment capacity. A detailed evaluation is required to determine the most effective way to increase the capacity of this facility, and should be performed as soon as possible.

Estimated Cost: $75,000

10. Sageport WTP Evaluation

The Sageport WTP will eventually require expansion beyond its current maximum capacity, and an evaluation is required to determine the most effective method of expanding the capacity of the facility. Provided expansion of the Glen Grove WTP occurs as planned, expansion of the Sageport plant is not an immediate requirement. However an evaluation of the facility should be performed to ensure continued reliable operation of the facility, and to identify the scope of the future expansion.

Estimated Cost: $75,000

11. Glen Grove WTP Improvements

A major upgrade and expansion of the treatment facility is required to enable the District to utilize its surface water rights and to meet current treatment requirements. The scope of the improvements will be determined by the previously identified evaluation and could range from upgrading the existing facility to construction a new facility with different treatment technology. The estimate for the proposed improvements is based on providing a treatment capacity of 0.75 MGD, either by upgrading or replacing the plant. The estimate should be considered an allowance for planning purposes and should be updated when the evaluation has been completed. Improvements to the Glen Grove plant should be completed as soon as possible to enable full use of the District's surface water, to eliminate the District's current lack of treatment capacity, and to provide reasonable additional capacity to accommodate growth.

Estimated Cost: $3,375,000

12. Water Storage Reservoir

The proposed water storage reservoir would help the District improve the use of its surface water rights by providing for diversion and storage of water when available for use at a later time. The reservoir would be of limited benefit until improvements Glen Grove WTP have been implemented. The scope of reservoir construction has not been required and the estimate for this item was based on the estimate included in the 2009 Master Plan Update, adjusted for inflation.

Estimated Cost: $1,200,000

13. Gaging Station

The utility of the proposed gaging station is primarily related to the reservoir and the station should be constructed in conjunction with the reservoir.

Estimated Cost: $60,000

14. Redrill Well WP-1

The utility of redrilling Well WP-1 is limited by treatment capacity at the Glen Grove WTP. The well should be redrilled in conjunction with improvement to the Glen Grove Plant.

Estimated Cost: $120,000

C. Required Wastewater System Capital Improvements

The following paragraphs provide a general description of the wastewater system improvements required, including the need for the improvement, the required timing and the estimated costs.

1. Sageport WWTP Upgrades

Immediate upgrades to the Sageport WWTP are required to correct treatment deficiencies and eliminate operational issues. Improvements would include upgrades to equalization, pretreatment and digester.

Estimated Cost: $675,000

2. Bannock Lift Station Improvements

Upgrades to the Bannock Lift Station are required to improve reliability and reduce maintenance issues. The improvements will generally include replacement of existing pumps, electrical and control modifications for the new pumps, and general lift station improvements. The proposed improvements should be accomplished in the near future to ensure the reliability of the lift station.

Estimated Cost: $225,000

3. Boreas Lift Station Improvements

Upgrades to the Boreas Lift Station are required to improve reliability and reduce maintenance issues. The improvements will generally include replacement of existing pumps, electrical and control modifications for the new pumps, and general lift station improvements. The proposed improvements should be accomplished in the near future to ensure the reliability of the lift station.

Estimated Cost: $225,000

4. Waucondah WWTP Evaluation

A detailed evaluation of the Waucondah WWTP is required to assess the condition of the existing facility and its ability to comply with current and expected treatment regulations. The discharge permit for the facility scheduled for renewal in 2017, and is expected to include more stringent effluent limits, particularly for nutrients. Evaluation of the facility should occure as soon as possible after revised effluent limits are known.

Estimated Cost: $75,000

5. Sageport WWTP Evaluation

A detailed evaluation of the Sageport WWTP is required to assess the condition of the existing facility and its ability to comply with current and expected treatment regulations. The discharge permit for the facility scheduled for renewal in 2017, and is expected to include more stringent effluent limits, particularly for nutrients. Evaluation of the facility should occur as soon as possible after revised effluent limits are known.

Estimated Cost: $75,000

6. Waucondah WWTP Improvements

The renewed 2017 permit for the Waucondah is expected to contain more stringent effluent limits, and may also include a compliance schedule for meeting the new limits. It is prudent to plan for potential plant improvements at this time. These improvements can be eliminated or scaled back if not required by the new permit. The scope of the improvements required will be determined by the requirements of the new permit and the results of the plant evaluation. The estimate in this Master Plan should be considered an allowance for upgrade or replacement of the existing plant, and should be revised when the evaluation is complete.

Estimated Cost: $3,360,000

7. Sageport WWTP Improvements

The renewed 2017 permit for the Sageport plant is expected to contain more stringent effluent limits, and may also include a compliance schedule for meeting the new limits. It is prudent to plan for potential plant improvements at this time. These improvements can be eliminated or scaled back if not required by the new permit. The scope of the

improvements required will be determined by the requirements of the new permit and the results of the plant evaluation. The estimate in this Master Plan should be considered an allowance for upgrade or replacement of the existing plant, and should be revised when the evaluation is complete.

Estimated Cost: $1,050,000

D. Capital Improvement Plan

Figure VIII-2 presents a 10 year capital improvement plan to implement the improvements discussed in the preceding paragraphs. As presented the plan requires annual capital investments ranging from approximately $200,000 to $3.4M, depending on the scheduled improvements. As previously noted, a number of the proposed improvements are dependent on the outcome of more detailed evaluations or regulation changes. The Capital Improvement Plan should be reviewed and updated as necessary on an annual basis.

Figure VIII-1
ESTIMATED SYSTEM IMPROVEMENT COSTS

	WATER SYSTEM COMPONENTS	ESTIMATED COST
1	SAGEPORT WTP IMPROVEMENTS Additional Filter; Replace Discharge Piping	$490,000
2	INCREASE WELL PUMPING CAPACITY AT SAGEPORT WTP New Pump Well A-4	$225,000
3	SECOND SCHOOLHOUSE WATER STORAGE TANK 800,000 Gallons - Buildout Capacity	$1,875,000
4	COUNTRY CLUB DRIVE WATER LINE LOOP 2500 lf 10"	$490,000
5	ECHO HILLS TANK WATER LINE LOOP 3000 lf 12"	$675,000
6	APACHE DR/HOG JOHN LOOP 3000 lf 10"	$585,000
7	VALVE AT ECHO HILLS TANK Replace 8" with 12"	$30,000
8	PERMANENT ELECTRICAL SERVICE TO HOG JOHN TANK 2100 lf	$70,000
9	GLEN GROVE WTP EVALUATION	$75,000
10	SAGEPORT WTP EVALUATION	$75,000
11	GLEN GROVE WTP IMPROVEMENTS Upgrade to 0.75 MGD	$3,375,000
12	WATER STORAGE RESERVOIR	$1,200,000
13	GAGING STATION	$60,000
14	REDRILL WELL WP-1	$120,000
	TOTAL WATER SYSTEM IMPROVEMENTS	**$9,345,000**

	WASTEWATER SYSTEM COMPONENTS	ESTIMATED COST
1	SAGEPORT WWTP UPGRADES Equalization, Headworks, Digester	$675,000
2	BANNOCK LIFT STATION IMPROVEMNTS Pump Replacement	$225,000
3	BOREAS LIFT STATION IMPROVEMENTS Pump Replacement	$225,000
4	WAUCONDAH WWTP EVALUATION	$75,000
5	SAGEPORT WWTP EVALUATION	$75,000
4	WAUCONDAH WWTP IMPROVEMENTS Nutrient Removal Upgrades	$3,360,000
7	SAGEPORT WWTP IMPROVEMENTS Nutrient Removal Upgrades	$1,050,000
	TOTAL WASTEWATER SYSTEM IMPROVEMENTS	**$5,685,000**

Figure VIII-2

10 YEAR CAPITAL IMPROVEMENT PLAN

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Sageport WTP Improvements	490,000									
Increase Well Pumping Capacity Sageport WTP		225,000								
Second School House Storage Tank										
Site Acquisition	50,000	50,000								
Design		100,000								
Construct Tank			1,675,000							
Country Club Drive Water Line Loop		490,000								
Echo Hills Tank Water Line Loop		675,000								
Apache Dr/Hog John Water Line Loop		585,000								
Valve at Echo Hills Tank		30,000								
Permanent Electrical Svc to Hog John Tank		70,000								
Glen Grove WTP Evaluation		75,000								
Sageport WTP Evaluation				75,000						
Glen Grove WTP Improvements					3,375,000					
Water Storage Reservoir									1,200,000	
Gaging Station								60,000		
Redrill WP-1								120,000		
Sageport WWTP Upgrades		675,000								
Bannock Lift Station Improvements				225,000						
Boreas Lift Station Improvements				225,000						
Wauconda WWTP Evaluation			75,000							
Sageport WWTP Evaluation			75,000							
Wauconda WWTP Improvements						3,360,000				
Sageport WWTP Improvements							1,050,000			
GIS System Setup/Maintenance	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000
ANNUAL TOTAL	$ 615,000	$ 3,050,000	$ 1,900,000	$ 600,000	$ 3,450,000	$ 3,435,000	$ 1,125,000	$ 255,000	$ 1,275,000	$ 75,000

IX. SUSTAINABILITY

The District currently has substantial physical assets, all of which have a limited useful life and will eventually require replacement. While the useful life of most of these assets seems quite long, replacement costs are substantial and planning for these replacements can help reduce the financial burden at the time the replacements are required.

A general approach to managing the District's existing assets includes developing an inventory of the assets, and estimating a replacement cost and replacement period for each asset to arrive at an annual cost for sustainability of the asset. Figure IX-1 presents a basic inventory of the District's most significant assets, along with an estimated replacement cost and useful life for each asset. The conceptual estimates indicate that the replacement cost for the District's existing assets is approximately $120M. The annualized replacement cost of all assets ranges from $1.1M to $1.5M depending on the assumed useful life of the assets. Assuming the worst case, that no additional growth occurred, the cost per customer to sustain the system would range from $57 to $81 per month.

The concept shown in Figure IX-1 provides a starting point for the development of a more rigorous asset management program. To maximize the benefit received from its existing assets, the District should implement the following asset management activities:

- Develop a more detailed inventory of assets
- Perform an assessment of the condition of existing assets
- Refine the estimate useful life of each asset based on the condition assessment
- Refine the cost estimates for replacement of assets based on additional information collected during the condition assessment
- Continuously update and add information to the asset inventory
- Over time, consider implementing rates and charges to address asset replacement

FIGURE IX-1

PPWSD Water and Sewer Infrastructure-Existing
Estimated Annual Replacement Cost

	Quantity	Unit	Replacement Cost	Minimum Useful Life: Min Estimated Useful Life	Minimum Useful Life: Max Annual Replacement Cost	Maximum Useful Life: Max Estimated Useful Life	Maximum Useful Life: Min Annual Replacement Cost
Water Transmission & Distribution	1	LS	$ 54,601,860	100	$ 546,019	150	$ 364,012
Water Treatment Facility(Sageport)	1	LS	$ 4,000,000	40	$ 100,000	50	$ 80,000
Water Treatment Facility(Glen Grove)	1	LS	$ 2,000,000	40	$ 50,000	50	$ 40,000
Kiowa Pump Station	1	EA	$ 500,000	40	$ 12,500	50	$ 10,000
Hog John Pump Station	1	EA	$ 500,000	40	$ 12,500	50	$ 10,000
Hog John Tank 1 (0.3 Mgal)	1	EA	$ 600,000	75	$ 8,000	100	$ 6,000
Hog John Tank 2 (0.15 Mgal)	1	EA	$ 300,000	75	$ 4,000	100	$ 3,000
Echo Hills Tank 1 (0.5 Mgal)	1	EA	$ 1,000,000	75	$ 13,333	100	$ 10,000
Echo Hills Tank 2 (0.33 Mgal)	1	EA	$ 660,000	75	$ 8,800	100	$ 6,600
School House Tank (0.8 Mgal)	1	EA	$ 1,600,000	75	$ 21,333	100	$ 16,000
Quartz Mountain PRV	1	EA	$ 250,000	75	$ 3,333	100	$ 2,500
Silverheels PRV	1	EA	$ 250,000	75	$ 3,333	100	$ 2,500
Ponch PRV	1	EA	$ 250,000	75	$ 3,333	100	$ 2,500
Tenderfoot PRV	1	EA	$ 250,000	75	$ 3,333	100	$ 2,500
Independence PRV	1	EA	$ 250,000	75	$ 3,333	100	$ 2,500
Pike Circle PRV	1	EA	$ 250,000	75	$ 3,333	100	$ 2,500
East/West PRV	1	EA	$ 250,000	75	$ 3,333	100	$ 2,500
Denver No. 4 Nontrib. Well	1	EA	$ 1,000,000	50	$ 20,000	75	$ 13,333
Arapahoe No. 2 Nontrib. Well	1	EA	$ 1,000,000	50	$ 20,000	75	$ 13,333
Arapahoe No. 3 Nontrib. Well	1	EA	$ 1,000,000	50	$ 20,000	75	$ 13,333
Arapahoe No. 4 Nontrib. Well	1	EA	$ 1,000,000	50	$ 20,000	75	$ 13,333
Grant Ditch Trib. Well	1	EA	$ 150,000	50	$ 3,000	75	$ 2,000
Glen Grove Trib. Well	1	EA	$ 150,000	50	$ 3,000	75	$ 2,000
West Plum No. 1 Trib. Well	1	EA	$ 150,000	50	$ 3,000	75	$ 2,000
West Plum No. 2 Trib. Well	1	EA	$ 150,000	50	$ 3,000	75	$ 2,000
Arapahoe No. 1 Nontrib. Well	1	EA	$ 1,000,000	50	$ 20,000	75	$ 13,333
Dakota No. 1 Nontrib. Well	1	EA	$ 1,000,000	50	$ 20,000	75	$ 13,333
Dakota No. 2 Nontrib. Well	1	EA	$ 1,000,000	50	$ 20,000	75	$ 13,333
Sewer Collection	1	LS	$ 37,014,325	100	$ 370,143	150	$ 246,762
Sageport WWTP	1	EA	$ 4,500,000	40	$ 112,500	50	$ 90,000
Waucondah WWTP	1	EA	$ 2,000,000	40	$ 50,000	50	$ 40,000
Boreas Lift Station	1	EA	$ 500,000	40	$ 12,500	50	$ 10,000
Red Rock Drive (LS No. 1) Lift Station	1	EA	$ 500,000	40	$ 12,500	50	$ 10,000
Bannock (LS No. 2) Lift Station	1	EA	$ 500,000	40	$ 12,500	50	$ 10,000
Total Infrastructure			$ 120,126,185		$ 1,521,959		$ 1,071,205
			Estimated Existing EQRs		1562		1562
			Monthly Fee/EQR		$ 81.20		$ 57.15

X. RECOMMENDED RELATED ACTIVITIES

Successful implementation of any plan requires consistent monitoring of progress. Conditions affecting the ownership and maintenance of water and systems are constantly changing and system planning must adjust to the changes. The following activities are recommended to help ensure successful implementation of the District's system planning:

A. Master Plan Reviews

Perform annual reviews of this Master Plan to monitor progress and identify changed conditions that require modification of the plan. Update the Capital Improvement Plan based on progress and revised cost information. Update the capital replacement (asset management) spreadsheet to reflect updated cost data and additional system information.

B. Rate Studies

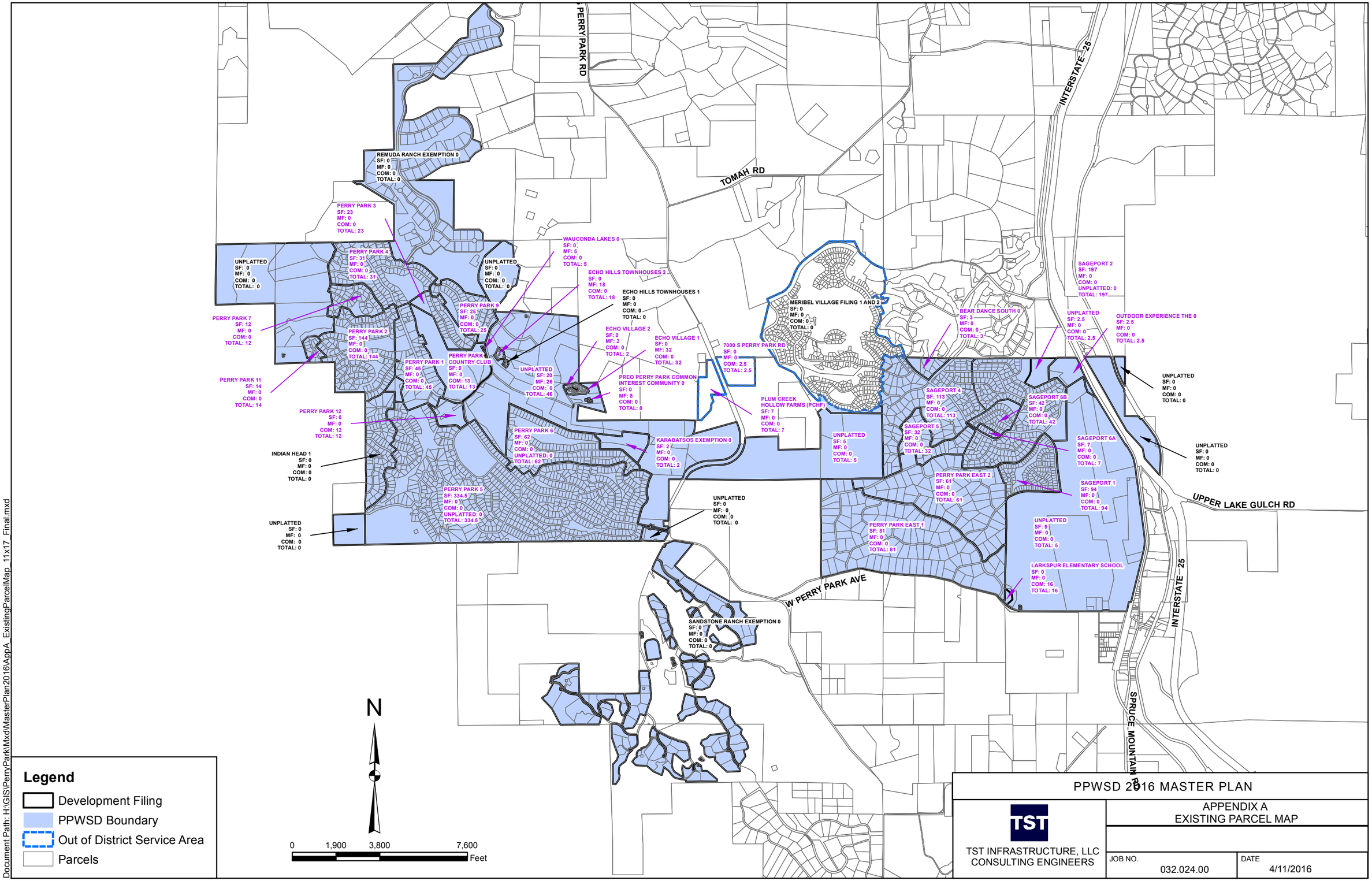
Perform rate studies annually. Identify separate rate components for operations and maintenance, capital improvements, and capital replacements. Update system development charges (tap fees) based on the value of existing infrastructure and the current capital improvement program.

C. Information Systems

Improve the District's information systems to enable better tracking of District assets. Geographic Information Systems (GIS) are the current standard for collecting and maintaining information regarding water and sewer system assets. A well maintained GIS system provides ready access to essential information and should be considered a normal part of the District's management systems.

LIST OF APPENDICES

Appendix A
Existing Development – Map & Tabulation of EQRS



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PPWSD 2016 MASTER PLAN

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

APPENDIX A
EXISTING PARCEL MAP

JOB NO. 032.024.00

DATE 4/11/2016

PERRY PARK WATER AND SANITATION DISTRICT
DEVELOPMENT PARCEL TABLE
CURRENT BY FILING

Area	Development Filing	Block	Pressure Zone	Type of EQR	EQRs
East Perry Park	**Perry Park East 1**	1	7	SF	4
		2	7	SF	8
		2	6	SF	2
		3	7	SF	14
		4	7	SF	9
		4	6	SF	12
		5	7	SF	4
		5	6	SF	17
		6	6	SF	8
		7	6	SF	3
		Total			**81**
	Perry Park East 2	8	6	SF	9
		9	6	SF	5
		9	7	SF	1
		10	6	SF	17
		11	6	SF	17
		11	7	SF	7
		12	6	SF	5
		Total			**61**
	Sageport 1	1	6	SF	10
		1	7	SF	26
		2	6	SF	24
		2	7	SF	1
		3	6	SF	11
		4	6	SF	13
		5	6	SF	9
		Total			**94**
	Sageport 2	1	7	SF	22
		2	7	SF	18
		3	7	SF	10
		4	7	SF	15
		5	7	SF	9
		6	7	SF	5
		7	7	SF	8
		8	7	SF	20
		9	7	SF	1
		10	7	SF	9
		11	7	SF	3
		12	7	SF	16
		12	6	SF	6
		13	7	SF	16
		14	7	SF	33
		14	6	SF	6
	(Assumed 0.8 EQR/Acre)	Unplatted	6	SF	0
		Total			**197**
	Sageport 4	N/A	7	SF	113
		Total			**113**

	Sageport 5	N/A	7	SF	32
		Total			**32**
	Sageport 6A	N/A	7	SF	7
		Total			**7**
	Sageport 6B	N/A	7	SF	42
		Total			**42**
	Bear Dance South 0	N/A	7	SF	3
		Total			**3**
	Outdoor Experience The 0	N/A	7	SF	2.5
		Total			**2.5**
	Larkspur Elementary School	N/A	6	COMM	16
		Total			**16**
Unplatted Areas	(Existing (2) 1" taps outside platted area)	Unplatted	7	SF	5
	(Assumed 5 Acre Lots)	Unplatted	7	SF	5
	Near Sageport 2	Unplatted	7	SF	2.5
		Total			**12.5**
	*EQRs From Taps Larger Than 5/8"			COMM	**31**
		Area Total			**692**
West Perry Park	**Perry Park 1**	PP1	3	SF	45
	(Including Tracts B & C)	**Total**			**45**
	Perry Park 2	1	2	SF	12
		2	1	SF	1
		2	2	SF	8
		2	3	SF	10
		3	1	SF	23
		4	1	SF	12
		5	1	SF	9
		6	3	SF	10
		6	2	SF	4
		7	2	SF	2
		7	3	SF	2
		8	2	SF	12
		8	1	SF	6
		9	2	SF	13
		10	2	SF	14
		11	1	SF	6
		Total			**144**
	Perry Park 3	1	3	SF	13
		2	3	SF	10
		Total			**23**
	Perry Park 4	1	2	SF	5
		1	3	SF	15
		2	3	SF	0
		3	3	SF	0
		4	3	SF	0
		5	3	SF	1
		6	3	SF	10
		Total			**31**
	Perry Park 5	1	3	SF	32
		2	3	SF	34
		3	3	SF	23
		4	3	SF	24

		5	3	SF	18
		6	3	SF	10
		7	3	SF	16
		8	3	SF	5
		9	3	SF	2
		9	5	SF	3
		10	3	SF	4
		10	5	SF	1
		11	3	SF	12
		12	3	SF	31
		13	3	SF	22
		14	3	SF	19
		15	3	SF	29
		16	3	SF	14
		17	3	SF	30.5
		17	5	SF	1
		18	4	SF	0
		19	4	SF	0
		20	4	SF	0
		21	4	SF	0
		22	4	SF	0
		23	4	SF	0
		24	1	SF	0
		25	3	SF	4
	(Assumed estimate from PPWSD)	Unplatted	4	SF	0
		Total			**334.5**
	Perry Park 6	1	3	SF	24
		2	3	SF	14
		3	3	SF	8
		4	3	SF	5
		5	3	SF	11
	(From Feasibility Study)	Unplatted	3	SF	0
		Total			**62**
	Perry Park 7	1	2	SF	12
		2	2	SF	0
		3	2	SF	0
		Total			**12**
	Perry Park 9	1	3	SF	12
		2	3	SF	13
		Total			**25**
	Perry Park 11	1	1	SF	3
		2	1	SF	9
		3	1	SF	2
		Total			**14**
	Perry Park 12	N/A		COMM	12
		Total			**12**
	Indian Head 1	1	1	SF	0
		2	4	SF	0
		3	4	SF	0
		4	4	SF	0
		Total			**0**
	Wauconda Lakes 0	N/A	3	MF	5

		Total			**5**
	Echo Hills Townhomes 1	N/A	3	MF	0
		Total			**0**
	Echo Hills Townhomes 2	N/A	3	MF	18
		Total			**18**
	Echo Village 1	N/A	3	MF	32
		Total			**32**
	Echo Village 2	N/A	3	MF	2
		Total			**2**
	Preo Perry Park Common Interest Community 0	N/A	3	MF	8
		Total			**8**
	Karabatsos Exemption 0	N/A	3	SF	2
		Total			**2**
	Perry Park Country Club	N/A	3	COMM	13
		Total			**13**
	7000 S Perry Park Rd		3	COMM	2.5
		Total			**2.5**
Unplatted Areas	(Assumed estimate from PPWSD)	Unplatted	3	SF	0
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0
	(Estimated from est. density/road layout)	Unplatted	3	SF	20
	(Estimated from density and road layout)	Unplatted	3	MF	26
	Outside of Service Boundary (PCHF Gooding)	Existing	3	SF	7
		Total			**53**
	*EQRs From Taps Larger Than 5/8"			COMM	**32**
		Area Total			**870**
Remuda	**Remuda Ranch Exemption 0**	N/A		SF	0
		Area Total			**0**
Sandstone	**Sandstone Ranch Exception 0**	N/A		SF	0
		Area Total			**0**
Meribel	**Meribel Village**	N/A		SF	0
		Area Total			**0**
	Master Plan Totals:				**1562**

PERRY PARK WATER AND SANITATION DISTRICT
DEVELOPMENT PARCEL TABLE
CURRENT BY PRESSURE ZONE

Area	Development Filing	Block	Pressure Zone	Type of EQR	EQRs
West Perry Park	Perry Park 2	2	1	SF	1
	Perry Park 2	3	1	SF	23
	Perry Park 2	4	1	SF	12
	Perry Park 2	5	1	SF	9
	Perry Park 2	8	1	SF	6
	Perry Park 2	11	1	SF	6
	Perry Park 5	24	1	SF	0
	Perry Park 11	1	1	SF	3
	Perry Park 11	2	1	SF	9
	Perry Park 11	3	1	SF	2
	Indian Head 1	1	1	SF	0
		Pressure Zone 1 Total:			**71**
	Perry Park 2	1	2	SF	12
	Perry Park2	2	2	SF	8
	Perry Park2	6	2	SF	4
	Perry Park2	7	2	SF	2
	Perry Park2	8	2	SF	12
	Perry Park2	9	2	SF	13
	Perry Park2	10	2	SF	14
	Perry Park 4	1	2	SF	5
	Perry Park 7	1	2	SF	12
	Perry Park 7	2	2	SF	0
	Perry Park 7	3	2	SF	0
		Pressure Zone 2 Total:			**82**
	Perry Park 1	PP1	3	SF	45
	Perry Park2	2	3	SF	10
	Perry Park2	6	3	SF	10
	Perry Park2	7	3	SF	2
	Perry Park 3	1	3	SF	13
	Perry Park 3	2	3	SF	10
	Perry Park 4	1	3	SF	15
	Perry Park 4	2	3	SF	0
	Perry Park 4	3	3	SF	0
	Perry Park 4	4	3	SF	0
	Perry Park 4	5	3	SF	1
	Perry Park 4	6	3	SF	9
	Perry Park 5	1	3	SF	32
	Perry Park 5	2	3	SF	34
	Perry Park 5	3	3	SF	23
	Perry Park 5	4	3	SF	24
	Perry Park 5	5	3	SF	18
	Perry Park 5	6	3	SF	10
	Perry Park 5	7	3	SF	16
	Perry Park 5	8	3	SF	5
	Perry Park 5	9	3	SF	2

	Perry Park 5	10	3	SF	4
	Perry Park 5	11	3	SF	12
	Perry Park 5	12	3	SF	31
	Perry Park 5	13	3	SF	22
	Perry Park 5	14	3	SF	19
	Perry Park 5	15	3	SF	29
	Perry Park 5	16	3	SF	14
	Perry Park 5	17	3	SF	30.5
	Perry Park 5	25	3	SF	4
	Perry Park 6	1	3	SF	24
	Perry Park 6	2	3	SF	14
	Perry Park 6	3	3	SF	8
	Perry Park 6	4	3	SF	5
	Perry Park 6	5	3	SF	11
	(From Feasibility Study)	Unplatted	3	SF	0
	Perry Park 9	1	3	SF	12
	Perry Park 9	2	3	SF	13
	Wauconda Lakes 0	N/A	3	MF	5
	Echo Hills Townhomes 1	N/A	3	MF	0
	Echo Hills Townhomes 2	N/A	3	MF	18
	Echo Village 1	N/A	3	MF	32
	Echo Village 2	N/A	3	MF	2
	Preo Perry Park Common Interest Community 0	N/A	3	MF	8
	Karabatsos Exemption 0	N/A	3	SF	2
	Perry Park Country Club	N/A	3	COMM	13
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0
	(Estimated from est. density/road layout)	Unplatted	3	SF	20
	(Estimated from density and road layout)	Unplatted	3	MF	26
	Outside of Service Boundary (PCHF Gooding)	Existing	3	SF	7
	Perry Park 12	N/A	3	COMM	12
	7000 S Perry Park Rd		3	COMM	2.5
		Pressure Zone 3 Total:			**679**
	Perry Park 5	18	4	SF	0
	Perry Park 5	19	4	SF	0
	Perry Park 5	20	4	SF	0
	Perry Park 5	21	4	SF	0
	Perry Park 5	22	4	SF	0
	Perry Park 5	23	4	SF	0
	(Assumed estimate from PPWSD)	Unplatted	4	SF	0
	Perry Park 5	2	4	SF	0
	Perry Park 5	3	4	SF	0
	Perry Park 5	4	4	SF	0
		Pressure Zone 4 Total:			**0**
	Perry Park 5	9	5	SF	3
	Perry Park 5	10	5	SF	1
	Perry Park 5	17	5	SF	1
		Pressure Zone 5 Total:			**5**

	*EQRs From Taps Larger Than 5/8"			COMM	32
East Perry Park	Perry Park East 1	2	6	SF	2
	Perry Park East 1	4	6	SF	12
	Perry Park East 1	5	6	SF	17
	Perry Park East 1	6	6	SF	8
	Perry Park East 1	7	6	SF	3
	Perry Park East 2	8	6	SF	9
	Perry Park East 2	9	6	SF	5
	Perry Park East 2	10	6	SF	17
	Perry Park East 2	11	6	SF	17
	Perry Park East 2	12	6	SF	5
	Sageport 1	1	6	SF	10
	Sageport 1	2	6	SF	24
	Sageport 1	3	6	SF	12
	Sageport 1	4	6	SF	13
	Sageport 1	5	6	SF	9
	Sageport 2	12	6	SF	6
	Sageport 2	14	6	SF	6
	(Assumed 0.8 EQR/Acre)	Unplatted	6	SF	0
	Larkspur Elementary School	N/A	6	COMM	16
		Pressure Zone 6 Total:			**191**
	Perry Park East 1	1	7	SF	4
	Perry Park East 1	2	7	SF	8
	Perry Park East 1	3	7	SF	14
	Perry Park East 1	4	7	SF	9
	Perry Park East 1	5	7	SF	4
	Perry Park East 2	9	7	SF	1
	Perry Park East 2	11	7	SF	7
	Sageport 1	1	7	SF	26
	Sageport 1	2	7	SF	1
	Sageport 2	1	7	SF	22
	Sageport 2	2	7	SF	18
	Sageport 2	3	7	SF	10
	Sageport 2	4	7	SF	15
	Sageport 2	5	7	SF	9
	Sageport 2	6	7	SF	5
	Sageport 2	7	7	SF	8
	Sageport 2	8	7	SF	20
	Sageport 2	9	7	SF	1
	Sageport 2	10	7	SF	9
	Sageport 2	11	7	SF	3
	Sageport 2	12	7	SF	16
	Sageport 2	13	7	SF	16
	Sageport 2	14	7	SF	33
	Sageport 4	N/A	7	SF	113
	Sageport 5	N/A	7	SF	32
	Sageport 6A	N/A	7	SF	7
	Sageport 6B	N/A	7	SF	42
	Bear Dance South 0	N/A	7	SF	3
	Outdoor Experience The 0	N/A	7	SF	2.5

	(Existing (2) 1" taps outside platted area)	Unplatted	7	SF	5
	(Assumed 5 Acre Lots)	Unplatted	7	SF	5
	Near Sageport 2	Unplatted	7	SF	2.5
		Pressure Zone 7 Total:			**471**
	*EQRs From Taps Larger Than 5/8"			COMM	**31**
	Master Plan Totals:				**1562**

Appendix B
Existing Water Rights

Perry Park Water Sanitation District
Water Rights Summary
Appendix B

TRIBUTARY WELLS/JUNIOR WATER RIGHTS				
Glen Grove Feeder Ditch Well	89CW225			
Grant Ditch Well	89CW255			
EP-1	89CW225			
EP-2	89CW225			
WP-1	89CW225			
WP-3	89CW225			
BC-1	89CW225			
Total tributary well pumping:				1600.0 acre feet per year
CONSUMPTIVE USE/SENIOR DITCH RIGHTS (Average Annual Yield)				
Bear Creek Ditch	80CW056	83.9		
Glen Grove Feeder Ditch	80CW056	10.3		
Grant Ditch	80CW056	20.6		
Plum Creek Ditch	80CW056	60.4		
Pleasant Park Ditch (30.4%)	89CW225	21.0		
Pleasant Park Ditch (50.0%)[2]	10CW263	90.0		
Gove Ditch	---[1]	59.0		
Total senior ditch rights				345.2 acre feet per year
NONTRIBUTARY				
Dakota No. 1	W-6199	181		
Dakota No. 2	84CW259	297		
		478.0	acre feet per year	
Den-3	82CW181	509		
Den-5	82CW181	509		
Den-6	82CW181	511		
		1529.0	acre feet per year	
DA-3, 5, and 6	89CW225	416		
Sageport Arapahoe #1	W-8148	105		
Sageport Arapahoe #2	W-8148	295		
Sageport Arapahoe #4	W-8148	320		
		1136.0	acre feet per year	
A-3	81CW308	100		
A-5	81CW308	100		
A-6	81CW308	101		
		301.0	acre feet per year	
LFH-3	82CW183	285		
LFH-6	82CW183	285		
		570.0	acre feet per year	
Total Nontributary Groundwater				4014.0 acre feet per year
Waucondah Reservoir No. 2	83CW344	125.0		
Gravel Pit Reservoir	83CW345	125.0		
				250.0 acre feet per year

1) Less 29.9 acre feet per year late season return flow obligation.
2) No water court change case has been filed.

Appendix C
Existing Demands & Summary Model Results

PERRY PARK WATER AND SANITATION DISTRICT
WATER DEMAND TABLE
CURRENT BY FILING

Area	Development Filing	Block	Type of EQR	EQRs	Avg. Day Flow (gpd)	Max Day Flow (gpd)	Peak Hour Flow (gpd)	Avg. Day Flow (gpm)
East Perry Park	**Perry Park East 1**	1	SF	4	1,152	3,226	4,838	0.8
		2	SF	10	2,880	8,064	12,096	2
		3	SF	14	4,032	11,290	16,934	2.8
		4	SF	21	6,048	16,934	25,402	4.2
		5	SF	21	6,048	16,934	25,402	4.2
		6	SF	8	2,304	6,451	9,677	1.6
		7	SF	3	864	2,419	3,629	0.6
		Total		**81**	**23,328**	**65,318**	**97,978**	**16.2**
	Perry Park East 2	8	SF	9	2,592	7,258	10,886	1.8
		9	SF	6	1,728	4,838	7,258	1.2
		10	SF	17	4,896	13,709	20,563	3.4
		11	SF	24	6,912	19,354	29,030	4.8
		12	SF	5	1,440	4,032	6,048	1
		Total		**61**	**17,568**	**49,190**	**73,786**	**12.2**
	Sageport 1	1	SF	36	10,368	29,030	43,546	7.2
		2	SF	25	7,200	20,160	30,240	5
		3	SF	11	3,168	8,870	13,306	2.2
		4	SF	13	3,744	10,483	15,725	2.6
		5	SF	9	2,592	7,258	10,886	1.8
		Total		**94**	**27,072**	**75,802**	**113,702**	**18.8**
	Sageport 2	1	SF	22	6,336	17,741	26,611	4.4
		2	SF	18	5,184	14,515	21,773	3.6
		3	SF	10	2,880	8,064	12,096	2
		4	SF	15	4,320	12,096	18,144	3
		5	SF	9	2,592	7,258	10,886	1.8
		6	SF	5	1,440	4,032	6,048	1
		7	SF	8	2,304	6,451	9,677	1.6
		8	SF	20	5,760	16,128	24,192	4
		9	SF	1	288	806	1,210	0.2
		10	SF	9	2,592	7,258	10,886	1.8
		11	SF	3	864	2,419	3,629	0.6
		12	SF	22	6,336	17,741	26,611	4.4
		13	SF	16	4,608	12,902	19,354	3.2
		14	SF	39	11,232	31,450	47,174	7.8
	(Assumed 0.8 EQR/Acre)	Unplatted	SF	0	0	0	0	0
		Total		**197**	**56,736**	**158,861**	**238,291**	**39.4**
	Sageport 4	N/A	SF	113	32,544	91,123	136,685	22.6
		Total		**113**	**32,544**	**91,123**	**136,685**	**22.6**
	Sageport 5	N/A	SF	32	9,216	25,805	38,707	6.4
		Total		**32**	**9,216**	**25,805**	**38,707**	**6.4**
	Sageport 6A	N/A	SF	7	2,016	5,645	8,467	1.4
		Total		**7**	**2,016**	**5,645**	**8,467**	**1.4**
	Sageport 6B	N/A	SF	42	12,096	33,869	50,803	8.4
		Total		**42**	**12,096**	**33,869**	**50,803**	**8.4**
	Bear Dance South 0	N/A	SF	3	864	2,419	3,629	0.6
		Total		**3**	**864**	**2,419**	**3,629**	**0.6**
	Outdoor Experience The 0	N/A	SF	2.5	720	2,016	3,024	0.5
		Total		**2.5**	**720**	**2,016**	**3,024**	**0.5**
	Larkspur Elementary School	N/A	COMM	16	4,608	12,902	19,354	3.2
		Total		**16**	4,608	12,902	19,354	3.2
Unplatted Areas	(Existing (2) 1" taps outside platted area)	Unplatted	SF	5	1,440	4,032	6,048	1
	(Assumed 5 Acre Lots)	Unplatted	SF	5	1,440	4,032	6,048	1
	Near Sageport 2	Unplatted	SF	2.5	720	2,016	3,024	0.5
		Total		**12.5**	3,600	10,080	15,120	2.5
	*EQRs From Taps Larger Than 5/8"		COMM	**31**	**8,928**	**24,998**	**37,498**	**6.2**
		Area Total		**692**	**199,296**	**558,029**	**837,043**	**138.4**
West Perry Park	**Perry Park 1**	PP1	SF	45	12,960	36,288	54,432	9

	(Including Tracts B & C)	**Total**		**45**	**12,960**	**36,288**	**54,432**	**9**
	Perry Park 2	1	SF	12	3,456	9,677	14,515	2.4
		2	SF	19	5,472	15,322	22,982	3.8
		3	SF	23	6,624	18,547	27,821	4.6
		4	SF	12	3,456	9,677	14,515	2.4
		5	SF	9	2,592	7,258	10,886	1.8
		6	SF	14	4,032	11,290	16,934	2.8
		7	SF	4	1,152	3,226	4,838	0.8
		8	SF	18	5,184	14,515	21,773	3.6
		9	SF	13	3,744	10,483	15,725	2.6
		10	SF	14	4,032	11,290	16,934	2.8
		11	SF	6	1,728	4,838	7,258	1.2
		Total		**144**	**41,472**	**116,122**	**174,182**	**28.8**
	Perry Park 3	1	SF	13	3,744	10,483	15,725	2.6
		2	SF	10	2,880	8,064	12,096	2
		Total		**23**	**6,624**	**18,547**	**27,821**	**4.6**
	Perry Park 4	1	SF	20	5,760	16,128	24,192	4
		2	SF	0	0	0	0	0
		3	SF	0	0	0	0	0
		4	SF	0	0	0	0	0
		5	SF	1	288	806	1,210	0.2
		6	SF	10	2,880	8,064	12,096	2
		Total		**31**	**8,928**	**24,998**	**37,498**	**6.2**
	Perry Park 5	1	SF	32	9,216	25,805	38,707	6.4
		2	SF	34	9,792	27,418	41,126	6.8
		3	SF	23	6,624	18,547	27,821	4.6
		4	SF	24	6,912	19,354	29,030	4.8
		5	SF	18	5,184	14,515	21,773	3.6
		6	SF	10	2,880	8,064	12,096	2
		7	SF	16	4,608	12,902	19,354	3.2
		8	SF	5	1,440	4,032	6,048	1
		9	SF	5	1,440	4,032	6,048	1
		10	SF	5	1,440	4,032	6,048	1
		11	SF	12	3,456	9,677	14,515	2.4
		12	SF	31	8,928	24,998	37,498	6.2
		13	SF	22	6,336	17,741	26,611	4.4
		14	SF	19	5,472	15,322	22,982	3.8
		15	SF	29	8,352	23,386	35,078	5.8
		16	SF	14	4,032	11,290	16,934	2.8
		17	SF	31.5	9,072	25,402	38,102	6.3
		18	SF	0	0	0	0	0
		19	SF	0	0	0	0	0
		20	SF	0	0	0	0	0
		21	SF	0	0	0	0	0
		22	SF	0	0	0	0	0
		23	SF	0	0	0	0	0
		24	SF	0	0	0	0	0
		25	SF	4	1,152	3,226	4,838	0.8
	(Assumed estimate from PPWSD)	Unplatted	SF	0	0	0	0	0
		Total		**334.5**	**96,336**	**269,741**	**404,611**	**66.9**
	Perry Park 6	1	SF	24	6,912	19,354	29,030	4.8
		2	SF	14	4,032	11,290	16,934	2.8
		3	SF	8	2,304	6,451	9,677	1.6
		4	SF	5	1,440	4,032	6,048	1
		5	SF	11	3,168	8,870	13,306	2.2
	(From Feasibility Study)	Unplatted	SF	0	0	0	0	0
		Total		**62**	**17,856**	**49,997**	**74,995**	**12.4**
	Perry Park 7	1	SF	12	3,456	9,677	14,515	2.4
		2	SF	0	0	0	0	0
		3	SF	0	0	0	0	0
		Total		**12**	**3,456**	**9,677**	**14,515**	**2.4**
	Perry Park 9	1	SF	12	3,456	9,677	14,515	2.4
		2	SF	13	3,744	10,483	15,725	2.6
		Total		**25**	**7,200**	**20,160**	**30,240**	**5**

	Perry Park 11	1	SF	3	864	2,419	3,629	0.6
		2	SF	9	2,592	7,258	10,886	1.8
		3	SF	2	576	1,613	2,419	0.4
		Total		**14**	**4,032**	**11,290**	**16,934**	**2.8**
	Perry Park 12	N/A	COMM	12	3,456	9,677	14,515	2.4
		Total		**12**	**3,456**	**9,677**	**14,515**	**2.4**
	Indian Head 1	1	SF	0	0	0	0	0
		2	SF	0	0	0	0	0
		3	SF	0	0	0	0	0
		4	SF	0	0	0	0	0
		Total		**0**	0	0	0	0
	Wauconda Lakes 0	N/A	MF	5	1,440	4,032	6,048	1
		Total		**5**	1,440	4,032	6,048	1
	Echo Hills Townhomes 1	N/A	MF	0	0	0	0	0
		Total		**0**	**0**	**0**	**0**	**0**
	Echo Hills Townhomes 2	N/A	MF	18	5,184	14,515	21,773	3.6
		Total		**18**	**5,184**	**14,515**	**21,773**	**3.6**
	Echo Village 1	N/A	MF	32	9,216	25,805	38,707	6.4
		Total		**32**	**9,216**	**25,805**	**38,707**	**6.4**
	Echo Village 2	N/A	MF	2	576	1,613	2,419	0.4
		Total		**2**	**576**	**1,613**	**2,419**	**0.4**
	Preo Perry Park Common Interest Community 0	N/A	MF	8	2,304	6,451	9,677	1.6
		Total		**8**	**2,304**	**6,451**	**9,677**	**1.6**
	Karabatsos Exemption 0	N/A	SF	2	576	1,613	2,419	0.4
		Total		**2**	**576**	**1,613**	**2,419**	**0.4**
	Perry Park Country Club	N/A	COMM	13	3,744	10,483	15,725	2.6
		Total		**13**	**3,744**	**10,483**	**15,725**	**2.6**
	7000 S Perry Park Rd		COMM	2.5	720	2,016	3,024	0.5
		Total		**2.5**	**720**	**2,016**	**3,024**	**0.5**
Unplatted Areas	(Assumed estimate from PPWSD)	Unplatted	SF	0	0	0	0	0
	(Assumed estimate from PPWSD)	Unplatted	SF	0	0	0	0	0
	(Assumed estimate from PPWSD)	Unplatted	SF	0	0	0	0	0
	(Assumed estimate from PPWSD)	Unplatted	SF	0	0	0	0	0
	(Estimated from est. density/road layout)	Unplatted	SF	20	5,760	16,128	24,192	4
	(Estimated from density and road layout)	Unplatted	MF	26	7,488	20,966	31,450	5.2
	Outside of Service Boundary (PCHF Gooding)	Existing	SF	7	2,016	5,645	8,467	1.4
		Total		**53**	15,264	42,739	64,109	10.6
	*EQRs From Taps Larger Than 5/8"		COMM	**32**	**9,216**	**25,805**	**38,707**	**6.4**
		Area Total		**870**	**250,560**	**701,568**	**1,052,352**	**174**
Remuda	**Remuda Ranch Exemption 0**	N/A	SF	0	0	0	0	0
		Area Total		**0**	**0**	**0**	**0**	**0**
Sandstone	**Sandstone Ranch Exception 0**	N/A	SF	0	0	0	0	0
		Area Total		**0**	**0**	**0**	**0**	**0**
Meribel	**Meribel Village**	N/A	SF	0	0	0	0	0
		Area Total		**0**	**0**	**0**	**0**	**0**
	Master Plan Totals:			**1562**	**449,856**	**1,259,597**	**1,889,395**	**312.4**

Avg. Day Demand (gpm/EQR):	0.2
Max Day Demand (gpm/EQR):	0.56
Peak Hour Demand (gpm/EQR):	0.84

PERRY PARK WATER AND SANITATION DISTRICT
WATER DEMAND TABLE
CURRENT BY PRESSURE ZONE

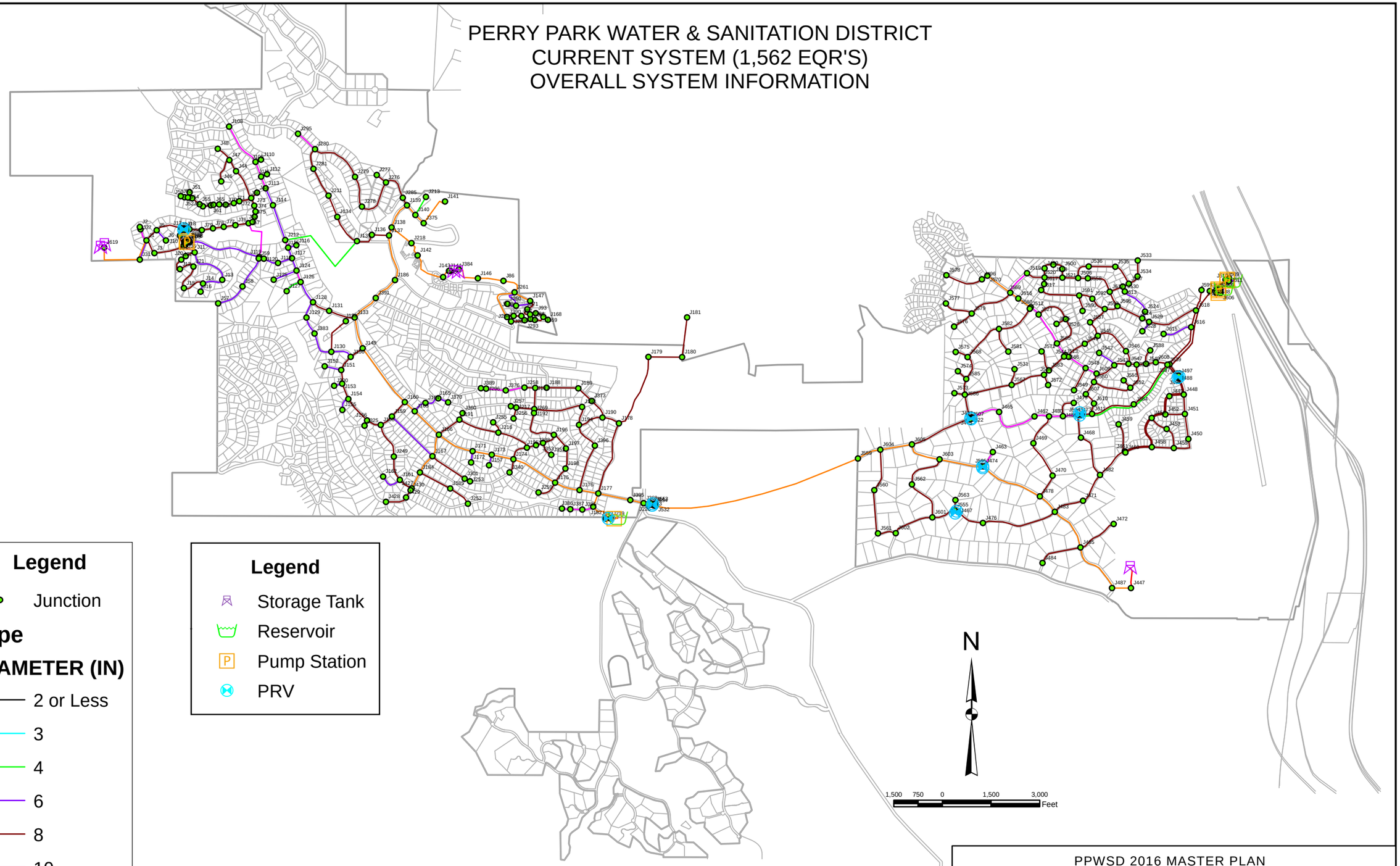
Area	Development Filing	Block	Pressure Zone	Type of EQR	EQRs	Avg. Day Flow (gpd)	Max Day Flow (gpd)	Peak Hour Flow (gpd)	Avg. Day Flow (gpm)
West Perry Park	Perry Park 2	2	1	SF	1	288	806	1,210	0.2
	Perry Park 2	3	1	SF	23	6,624	18,547	27,821	4.6
	Perry Park 2	4	1	SF	12	3,456	9,677	14,515	2.4
	Perry Park 2	5	1	SF	9	2,592	7,258	10,886	1.8
	Perry Park 2	8	1	SF	6	1,728	4,838	7,258	1.2
	Perry Park 2	11	1	SF	6	1,728	4,838	7,258	1.2
	Perry Park 5	24	1	SF	0	0	0	0	0
	Perry Park 11	1	1	SF	3	864	2,419	3,629	0.6
	Perry Park 11	2	1	SF	9	2,592	7,258	10,886	1.8
	Perry Park 11	3	1	SF	2	576	1,613	2,419	0.4
	Indian Head 1	1	1	SF	0	0	0	0	0
		Pressure Zone 1 Total:			**71**	**20,448**	**57,254**	**85,882**	**14.2**
	Perry Park 2	1	2	SF	12	3,456	9,677	14,515	2.4
	Perry Park2	2	2	SF	8	2,304	6,451	9,677	1.6
	Perry Park2	6	2	SF	4	1,152	3,226	4,838	0.8
	Perry Park2	7	2	SF	2	576	1,613	2,419	0.4
	Perry Park2	8	2	SF	12	3,456	9,677	14,515	2.4
	Perry Park2	9	2	SF	13	3,744	10,483	15,725	2.6
	Perry Park2	10	2	SF	14	4,032	11,290	16,934	2.8
	Perry Park 4	1	2	SF	5	1,440	4,032	6,048	1
	Perry Park 7	1	2	SF	12	3,456	9,677	14,515	2.4
	Perry Park 7	2	2	SF	0	0	0	0	0
	Perry Park 7	3	2	SF	0	0	0	0	0
		Pressure Zone 2 Total:			**82**	**23,616**	**66,125**	**99,187**	**16.4**
	Perry Park 1	PP1	3	SF	45	12,960	36,288	54,432	9
	Perry Park2	2	3	SF	10	2,880	8,064	12,096	2
	Perry Park2	6	3	SF	10	2,880	8,064	12,096	2
	Perry Park2	7	3	SF	2	576	1,613	2,419	0.4
	Perry Park 3	1	3	SF	13	3,744	10,483	15,725	2.6
	Perry Park 3	2	3	SF	10	2,880	8,064	12,096	2
	Perry Park 4	1	3	SF	15	4,320	12,096	18,144	3
	Perry Park 4	2	3	SF	0	0	0	0	0
	Perry Park 4	3	3	SF	0	0	0	0	0
	Perry Park 4	4	3	SF	0	0	0	0	0
	Perry Park 4	5	3	SF	1	288	806	1,210	0.2
	Perry Park 4	6	3	SF	9	2,592	7,258	10,886	1.8
	Perry Park 5	1	3	SF	32	9,216	25,805	38,707	6.4
	Perry Park 5	2	3	SF	34	9,792	27,418	41,126	6.8
	Perry Park 5	3	3	SF	23	6,624	18,547	27,821	4.6
	Perry Park 5	4	3	SF	24	6,912	19,354	29,030	4.8
	Perry Park 5	5	3	SF	18	5,184	14,515	21,773	3.6
	Perry Park 5	6	3	SF	10	2,880	8,064	12,096	2
	Perry Park 5	7	3	SF	16	4,608	12,902	19,354	3.2
	Perry Park 5	8	3	SF	5	1,440	4,032	6,048	1
	Perry Park 5	9	3	SF	2	576	1,613	2,419	0.4
	Perry Park 5	10	3	SF	4	1,152	3,226	4,838	0.8
	Perry Park 5	11	3	SF	12	3,456	9,677	14,515	2.4
	Perry Park 5	12	3	SF	31	8,928	24,998	37,498	6.2
	Perry Park 5	13	3	SF	22	6,336	17,741	26,611	4.4
	Perry Park 5	14	3	SF	19	5,472	15,322	22,982	3.8
	Perry Park 5	15	3	SF	29	8,352	23,386	35,078	5.8
	Perry Park 5	16	3	SF	14	4,032	11,290	16,934	2.8
	Perry Park 5	17	3	SF	30.5	8,784	24,595	36,893	6.1
	Perry Park 5	25	3	SF	4	1,152	3,226	4,838	0.8
	Perry Park 6	1	3	SF	24	6,912	19,354	29,030	4.8
	Perry Park 6	2	3	SF	14	4,032	11,290	16,934	2.8
	Perry Park 6	3	3	SF	8	2,304	6,451	9,677	1.6
	Perry Park 6	4	3	SF	5	1,440	4,032	6,048	1
	Perry Park 6	5	3	SF	11	3,168	8,870	13,306	2.2
	(From Feasibility Study)	Unplatted	3	SF	0	0	0	0	0
	Perry Park 9	1	3	SF	12	3,456	9,677	14,515	2.4
	Perry Park 9	2	3	SF	13	3,744	10,483	15,725	2.6
	Wauconda Lakes 0	N/A	3	MF	5	1,440	4,032	6,048	1
	Echo Hills Townhomes 1	N/A	3	MF	0	0	0	0	0
	Echo Hills Townhomes 2	N/A	3	MF	18	5,184	14,515	21,773	3.6

	Echo Village 1	N/A	3	MF	32	9,216	25,805	38,707	6.4
	Echo Village 2	N/A	3	MF	2	576	1,613	2,419	0.4
	Preo Perry Park Common Interest Community 0	N/A	3	MF	8	2,304	6,451	9,677	1.6
	Karabatsos Exemption 0	N/A	3	SF	2	576	1,613	2,419	0.4
	Perry Park Country Club	N/A	3	COMM	13	3,744	10,483	15,725	2.6
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0	0	0	0	0
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0	0	0	0	0
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0	0	0	0	0
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0	0	0	0	0
	(Estimated from est. density/road layout)	Unplatted	3	SF	20	5,760	16,128	24,192	4
	(Estimated from density and road layout)	Unplatted	3	MF	26	7,488	20,966	31,450	5.2
	Outside of Service Boundary (PCHF Gooding)	Existing	3	SF	7	2,016	5,645	8,467	1.4
	Perry Park 12	N/A	3	COMM	12	3,456	9,677	14,515	2.4
	7000 S Perry Park Rd		3	COMM	2.5	720	2,016	3,024	0.5
		Pressure Zone 3 Total:			**679**	**195,552**	**547,546**	**821,318**	**135.8**
	Perry Park 5	18	4	SF	0	0	0	0	0
	Perry Park 5	19	4	SF	0	0	0	0	0
	Perry Park 5	20	4	SF	0	0	0	0	0
	Perry Park 5	21	4	SF	0	0	0	0	0
	Perry Park 5	22	4	SF	0	0	0	0	0
	Perry Park 5	23	4	SF	0	0	0	0	0
	(Assumed estimate from PPWSD)	Unplatted	4	SF	0	0	0	0	0
	Perry Park 5	2	4	SF	0	0	0	0	0
	Perry Park 5	3	4	SF	0	0	0	0	0
	Perry Park 5	4	4	SF	0	0	0	0	0
		Pressure Zone 4 Total:			**0**	**0**	**0**	**0**	**0**
	Perry Park 5	9	5	SF	3	864	2,419	3,629	0.6
	Perry Park 5	10	5	SF	1	288	806	1,210	0.2
	Perry Park 5	17	5	SF	1	288	806	1,210	0.2
		Pressure Zone 5 Total:			**5**	**1,440**	**4,032**	**6,048**	**1**
	*EQRs From Taps Larger Than 5/8"			COMM	**32**	**9,216**	**25,805**	**38,707**	**6.4**
East Perry Park	Perry Park East 1	2	6	SF	2	576	1,613	2,419	0.4
	Perry Park East 1	4	6	SF	12	3,456	9,677	14,515	2.4
	Perry Park East 1	5	6	SF	17	4,896	13,709	20,563	3.4
	Perry Park East 1	6	6	SF	8	2,304	6,451	9,677	1.6
	Perry Park East 1	7	6	SF	3	864	2,419	3,629	0.6
	Perry Park East 2	8	6	SF	9	2,592	7,258	10,886	1.8
	Perry Park East 2	9	6	SF	5	1,440	4,032	6,048	1
	Perry Park East 2	10	6	SF	17	4,896	13,709	20,563	3.4
	Perry Park East 2	11	6	SF	17	4,896	13,709	20,563	3.4
	Perry Park East 2	12	6	SF	5	1,440	4,032	6,048	1
	Sageport 1	1	6	SF	10	2,880	8,064	12,096	2
	Sageport 1	2	6	SF	24	6,912	19,354	29,030	4.8
	Sageport 1	3	6	SF	12	3,456	9,677	14,515	2.4
	Sageport 1	4	6	SF	13	3,744	10,483	15,725	2.6
	Sageport 1	5	6	SF	9	2,592	7,258	10,886	1.8
	Sageport 2	12	6	SF	6	1,728	4,838	7,258	1.2
	Sageport 2	14	6	SF	6	1,728	4,838	7,258	1.2
	(Assumed 0.8 EQR/Acre)	Unplatted	6	SF	0	0	0	0	0
	Larkspur Elementary School	N/A	6	COMM	16	4,608	12,902	19,354	3.2
		Pressure Zone 6 Total:			**191**	**55,008**	**154,022**	**231,034**	**38.2**
	Perry Park East 1	1	7	SF	4	1,152	3,226	4,838	0.8
	Perry Park East 1	2	7	SF	8	2,304	6,451	9,677	1.6
	Perry Park East 1	3	7	SF	14	4,032	11,290	16,934	2.8
	Perry Park East 1	4	7	SF	9	2,592	7,258	10,886	1.8
	Perry Park East 1	5	7	SF	4	1,152	3,226	4,838	0.8
	Perry Park East 2	9	7	SF	1	288	806	1,210	0.2
	Perry Park East 2	11	7	SF	7	2,016	5,645	8,467	1.4
	Sageport 1	1	7	SF	26	7,488	20,966	31,450	5.2
	Sageport 1	2	7	SF	1	288	806	1,210	0.2
	Sageport 2	1	7	SF	22	6,336	17,741	26,611	4.4
	Sageport 2	2	7	SF	18	5,184	14,515	21,773	3.6
	Sageport 2	3	7	SF	10	2,880	8,064	12,096	2
	Sageport 2	4	7	SF	15	4,320	12,096	18,144	3
	Sageport 2	5	7	SF	9	2,592	7,258	10,886	1.8
	Sageport 2	6	7	SF	5	1,440	4,032	6,048	1
	Sageport 2	7	7	SF	8	2,304	6,451	9,677	1.6
	Sageport 2	8	7	SF	20	5,760	16,128	24,192	4
	Sageport 2	9	7	SF	1	288	806	1,210	0.2
	Sageport 2	10	7	SF	9	2,592	7,258	10,886	1.8
	Sageport 2	11	7	SF	3	864	2,419	3,629	0.6

	Sageport 2	12	7	SF	16	4,608	12,902	19,354	3.2
	Sageport 2	13	7	SF	16	4,608	12,902	19,354	3.2
	Sageport 2	14	7	SF	33	9,504	26,611	39,917	6.6
	Sageport 4	N/A	7	SF	113	32,544	91,123	136,685	22.6
	Sageport 5	N/A	7	SF	32	9,216	25,805	38,707	6.4
	Sageport 6A	N/A	7	SF	7	2,016	5,645	8,467	1.4
	Sageport 6B	N/A	7	SF	42	12,096	33,869	50,803	8.4
	Bear Dance South 0	N/A	7	SF	3	864	2,419	3,629	0.6
	Outdoor Experience The 0	N/A	7	SF	2.5	720	2,016	3,024	0.5
	(Existing (2) 1" taps outside platted area)	Unplatted	7	SF	5	1,440	4,032	6,048	1
	(Assumed 5 Acre Lots)	Unplatted	7	SF	5	1,440	4,032	6,048	1
	Near Sageport 2	Unplatted	7	SF	2.5	720	2,016	3,024	0.5
		Pressure Zone 7 Total:			**471**	**135,648**	**379,814**	**569,722**	**94.2**
	*EQRs From Taps Larger Than 5/8"			COMM	**31**	**8,928**	**24,998**	**37,498**	**6.2**
	Master Plan Totals:				**1562**	**449,856**	**1,259,597**	**1,889,395**	**312.4**

Avg. Day Demand (gpm/EQR):	0.2
Max Day Demand (gpm/EQR):	0.56
Peak Hour Demand (gpm/EQR):	0.84

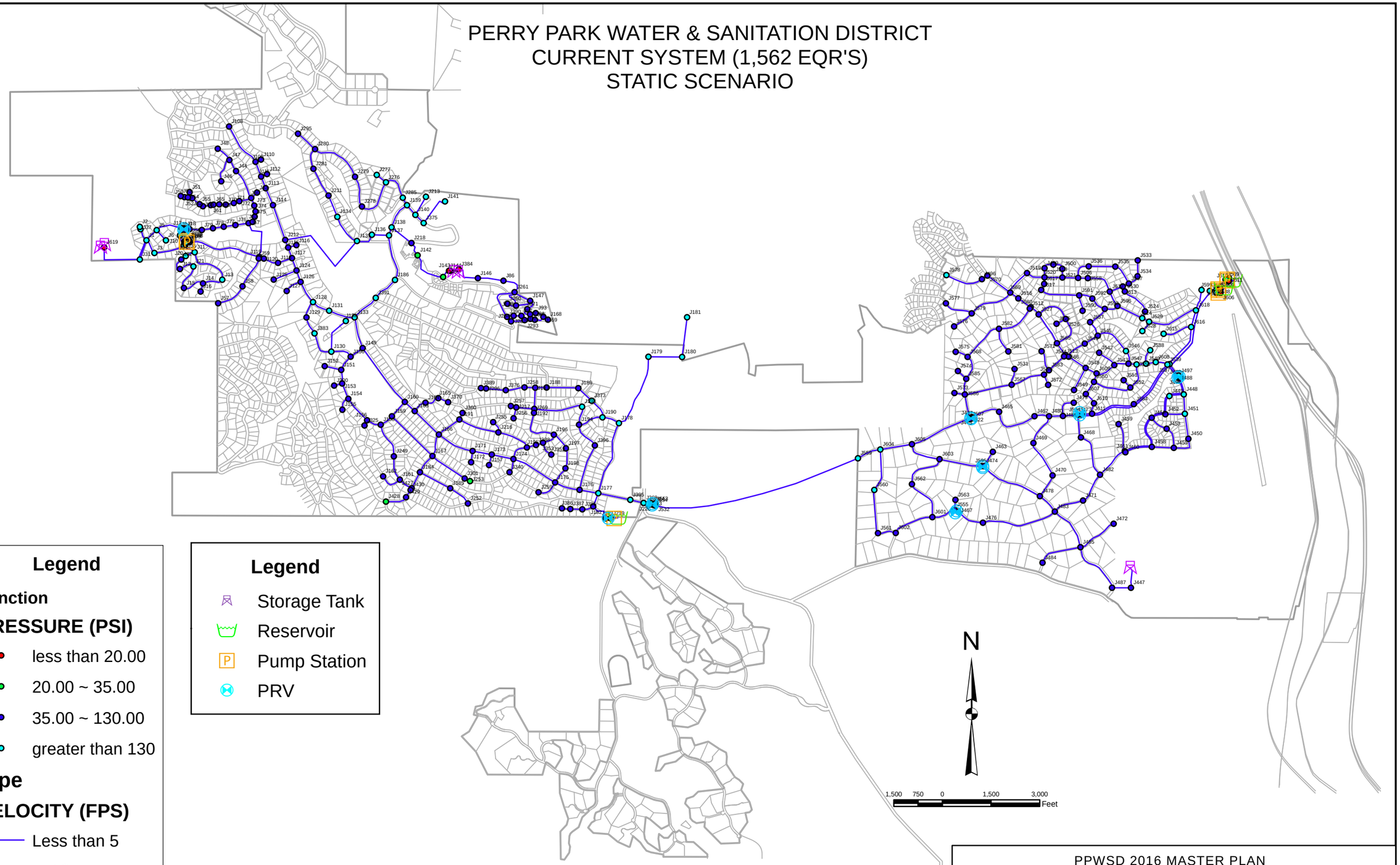
PERRY PARK WATER & SANITATION DISTRICT
CURRENT SYSTEM (1,562 EQR'S)
OVERALL SYSTEM INFORMATION



PPWSD 2016 MASTER PLAN	
TST INFRASTRUCTURE, LLC CONSULTING ENGINEERS	WATER MODEL (CURRENT SYSTEM)
	OVERALL SYSTEM INFORMATION
JOB NO. 032.024.00	DATE 1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

PERRY PARK WATER & SANITATION DISTRICT
CURRENT SYSTEM (1,562 EQR'S)
STATIC SCENARIO



Legend

Junction

PRESSURE (PSI)

- less than 20.00
- 20.00 ~ 35.00
- 35.00 ~ 130.00
- greater than 130

Pipe

VELOCITY (FPS)

- Less than 5
- 5~10
- Greater than 10

Legend

- Storage Tank
- Reservoir
- Pump Station
- PRV

PPWSD 2016 MASTER PLAN

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

WATER MODEL (CURRENT SYSTEM)

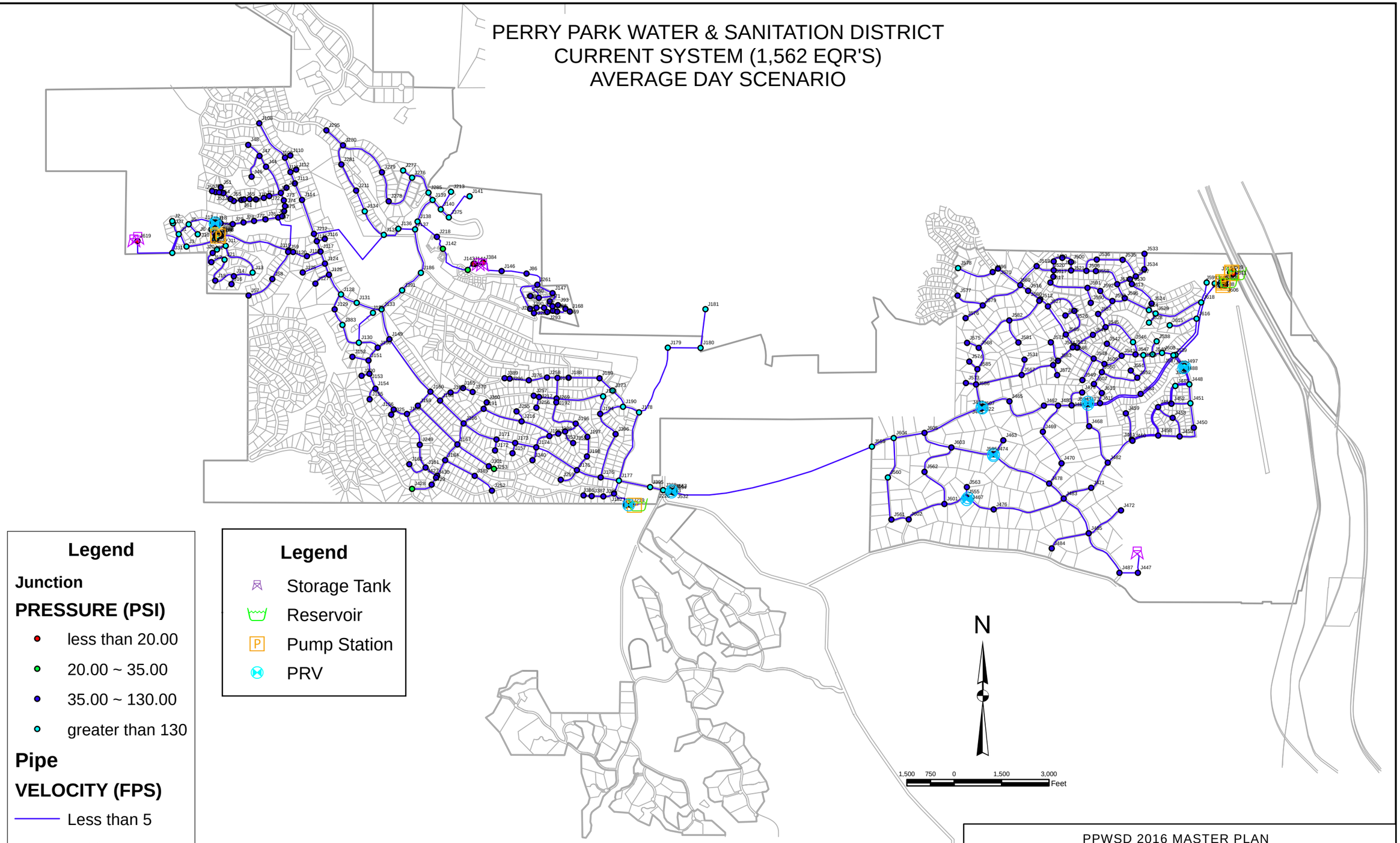
STATIC SCENARIO

JOB NO. 032.024.00

DATE 1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

PERRY PARK WATER & SANITATION DISTRICT
CURRENT SYSTEM (1,562 EQR'S)
AVERAGE DAY SCENARIO



Legend

Junction

PRESSURE (PSI)

- less than 20.00
- 20.00 ~ 35.00
- 35.00 ~ 130.00
- greater than 130

Pipe

VELOCITY (FPS)

- Less than 5
- 5~10
- Greater than 10

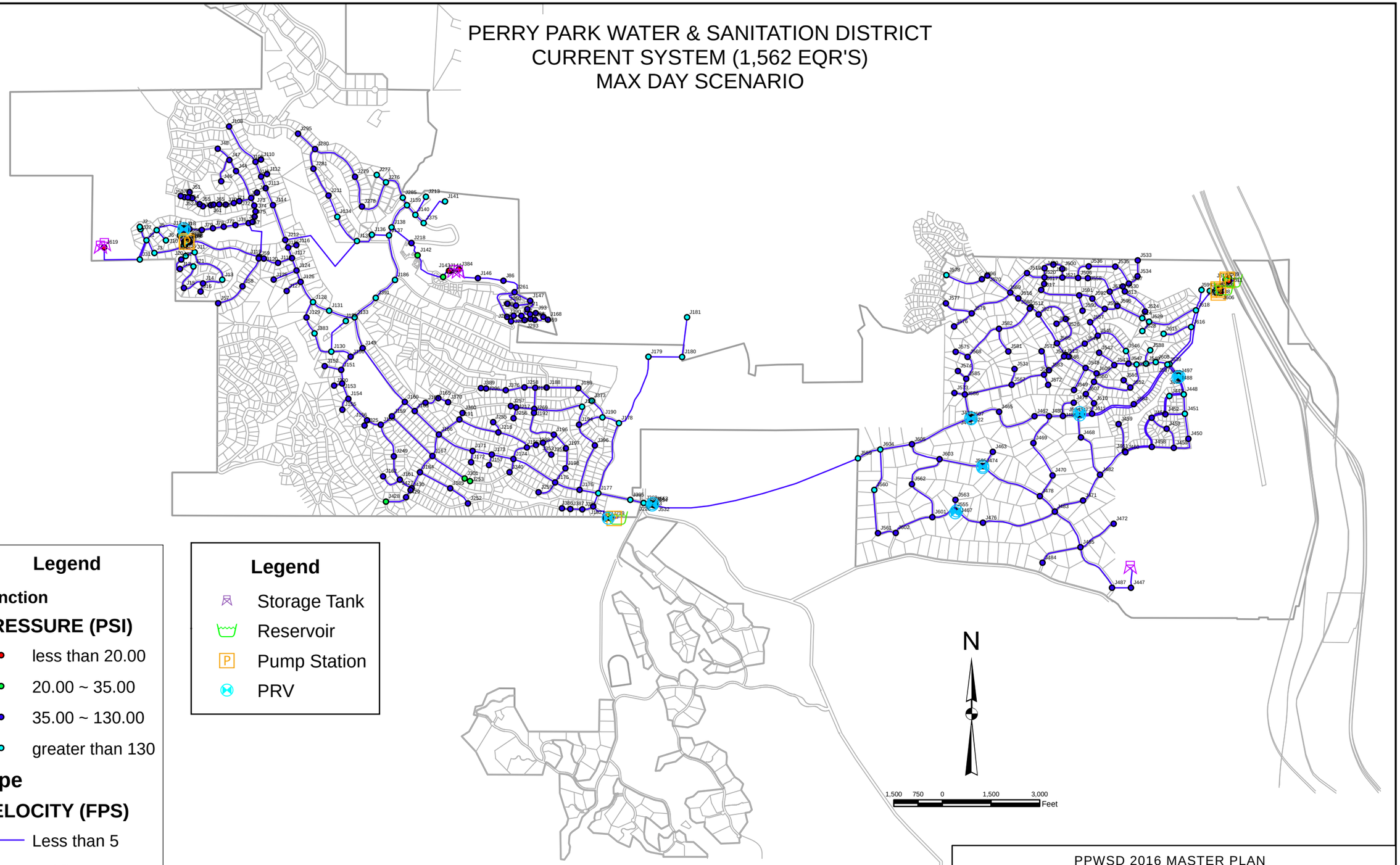
Legend

- Storage Tank
- Reservoir
- Pump Station
- PRV

PPWSD 2016 MASTER PLAN	
TST INFRASTRUCTURE, LLC CONSULTING ENGINEERS	WATER MODEL (CURRENT SYSTEM)
	AVERAGE DAY SCENARIO
JOB NO. 032.024.00	DATE 1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

PERRY PARK WATER & SANITATION DISTRICT
CURRENT SYSTEM (1,562 EQR'S)
MAX DAY SCENARIO



Legend

Junction

PRESSURE (PSI)

- less than 20.00
- 20.00 ~ 35.00
- 35.00 ~ 130.00
- greater than 130

Pipe

VELOCITY (FPS)

- Less than 5
- 5~10
- Greater than 10

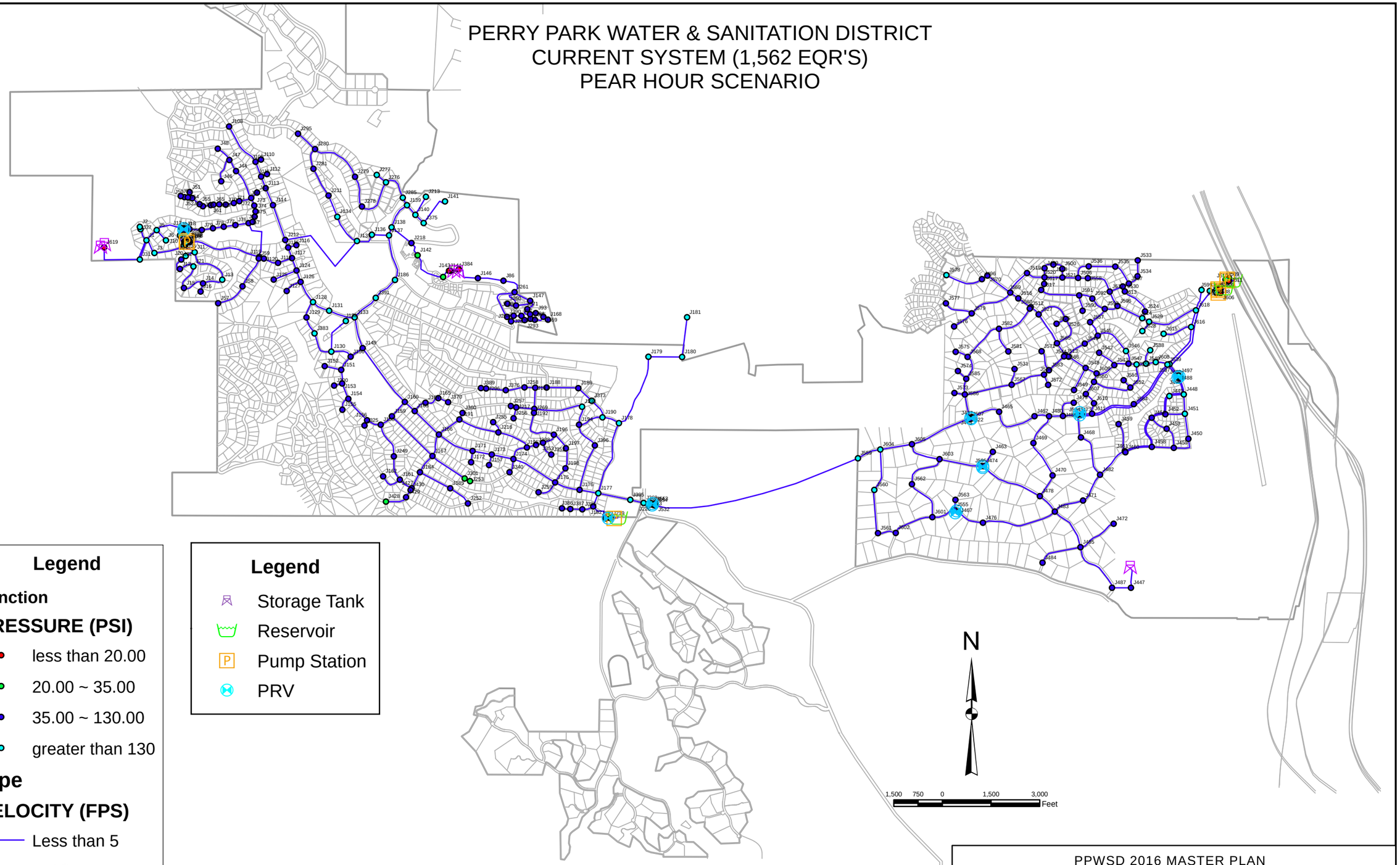
Legend

- Storage Tank
- Reservoir
- Pump Station
- PRV

PPWSD 2016 MASTER PLAN	
TST INFRASTRUCTURE, LLC CONSULTING ENGINEERS	WATER MODEL (CURRENT SYSTEM) MAX DAY SCENARIO
JOB NO. 032.024.00	DATE 1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

PERRY PARK WATER & SANITATION DISTRICT
CURRENT SYSTEM (1,562 EQR'S)
PEAR HOUR SCENARIO



Legend

Junction

PRESSURE (PSI)

- less than 20.00
- 20.00 ~ 35.00
- 35.00 ~ 130.00
- greater than 130

Pipe

VELOCITY (FPS)

- Less than 5
- 5~10
- Greater than 10

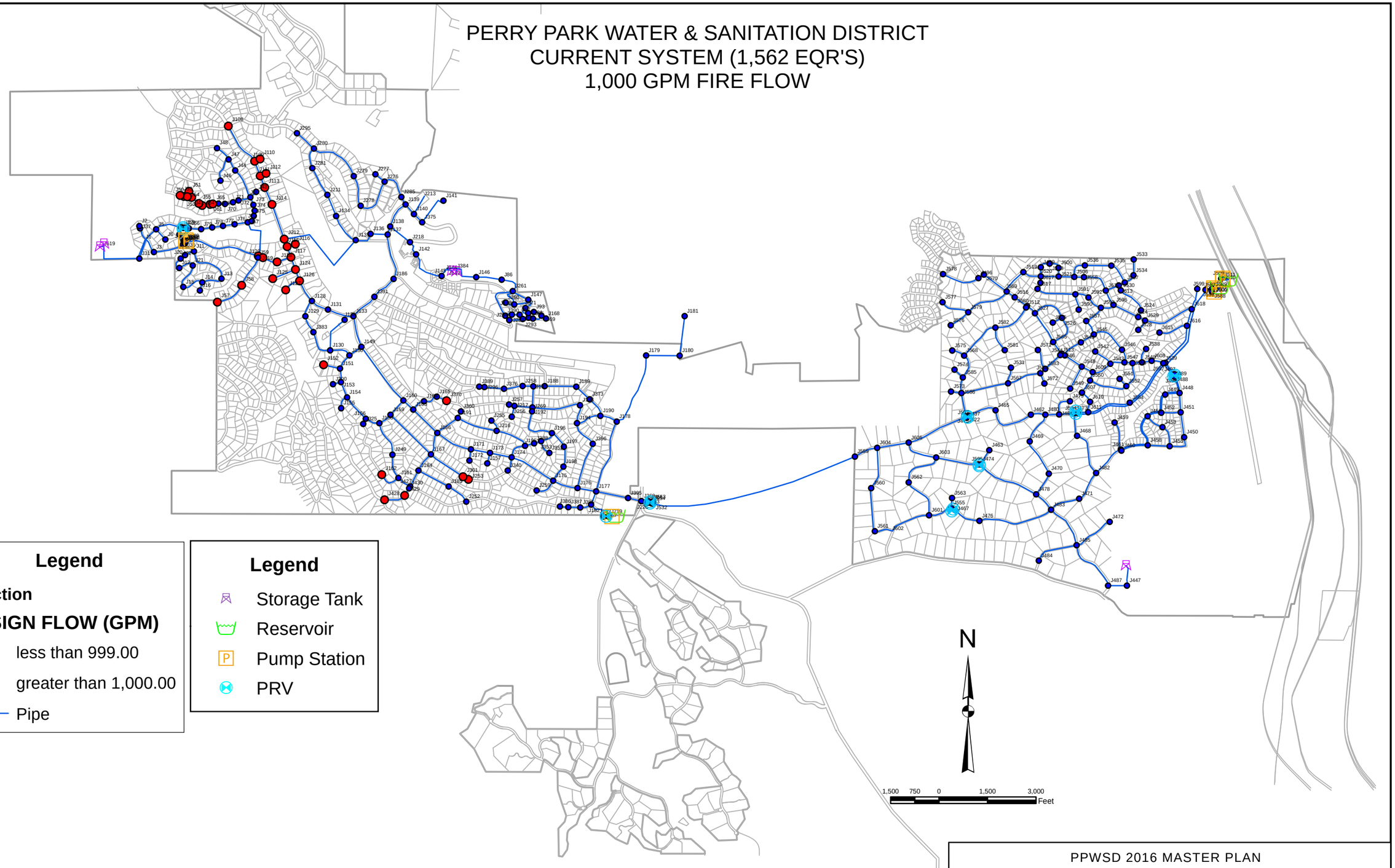
Legend

- Storage Tank
- Reservoir
- Pump Station
- PRV

PPWSD 2016 MASTER PLAN	
TST INFRASTRUCTURE, LLC CONSULTING ENGINEERS	WATER MODEL (CURRENT SYSTEM)
	PEAK HOUR SCENARIO
	JOB NO. 032.024.00 / DATE 1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

PERRY PARK WATER & SANITATION DISTRICT
CURRENT SYSTEM (1,562 EQR'S)
1,000 GPM FIRE FLOW



Legend

Junction

DESIGN FLOW (GPM)

- less than 999.00
- greater than 1,000.00
- Pipe

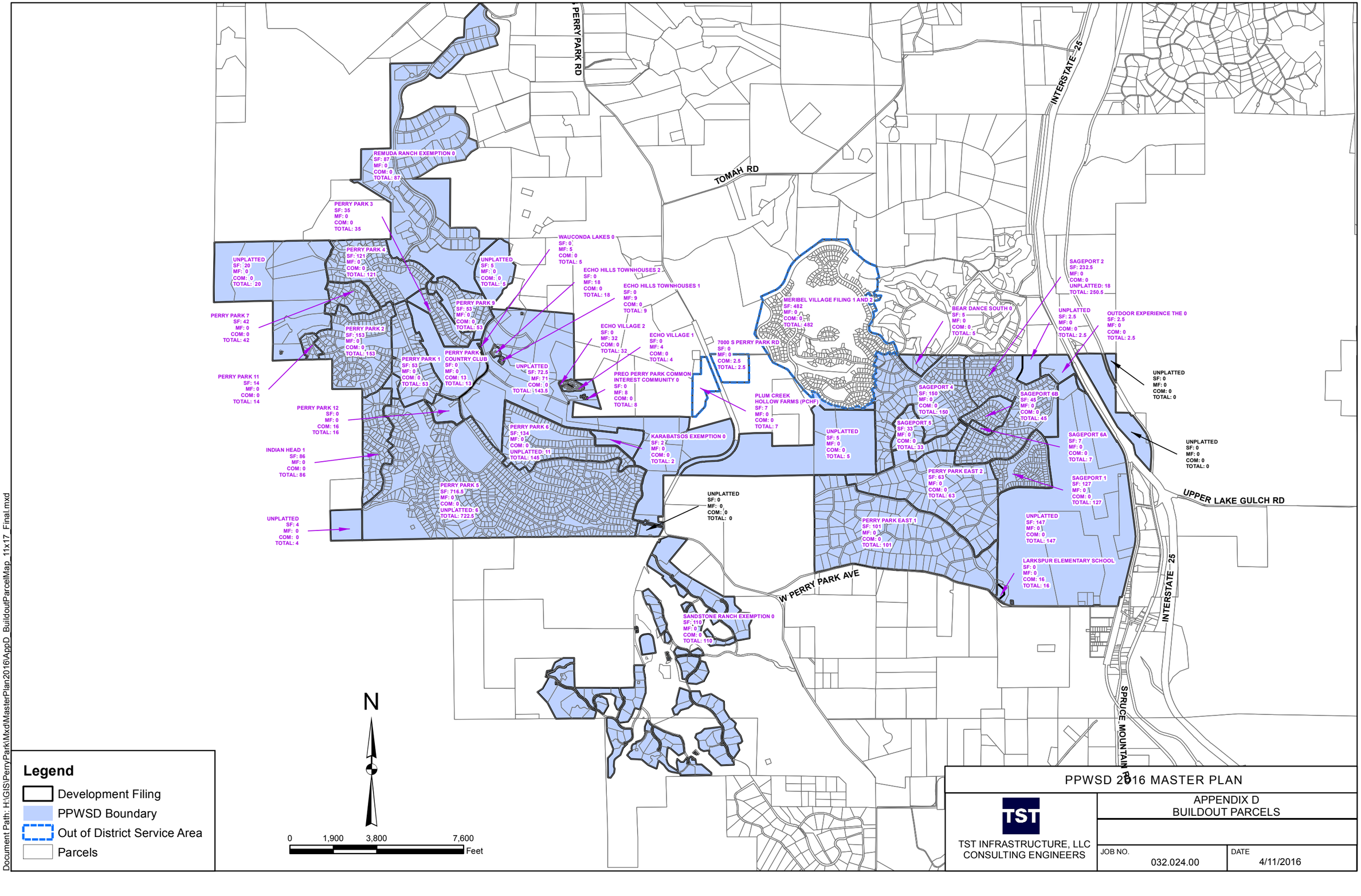
Legend

- Storage Tank
- Reservoir
- Pump Station
- PRV

PPWSD 2016 MASTER PLAN	
TST INFRASTRUCTURE, LLC CONSULTING ENGINEERS	WATER MODEL (CURRENT SYSTEM)
	1,000 GPM FIRE FLOW
JOB NO. 032.024.00	DATE 1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

Appendix D
Buildout – Map & Tabulation of EQRs


PERRY PARK RD
TOMAH RD
INTERSTATE - 25
UPPER LAKE GULCH RD
W PERRY PARK AVE
SPRUCE MOUNTAIN RD
REMUDA RANCH EXEMPTION 0
SF: 87
MF: 0
COM: 0
TOTAL: 87
PERRY PARK 3
SF: 35
MF: 0
COM: 0
TOTAL: 35
UNPLATTED
SF: 20
MF: 0
COM: 0
TOTAL: 20
PERRY PARK 4
SF: 121
MF: 0
COM: 0
TOTAL: 121
PERRY PARK 7
SF: 42
MF: 0
COM: 0
TOTAL: 42
PERRY PARK 2
SF: 153
MF: 0
COM: 0
TOTAL: 153
PERRY PARK 11
SF: 14
MF: 0
COM: 0
TOTAL: 14
PERRY PARK 12
SF: 0
MF: 0
COM: 16
TOTAL: 16
INDIAN HEAD 1
SF: 86
MF: 0
COM: 0
TOTAL: 86
UNPLATTED
SF: 4
MF: 0
COM: 0
TOTAL: 4
PERRY PARK 5
SF: 716.5
MF: 0
COM: 0
UNPLATTED: 6
TOTAL: 722.5
WAUCONDA LAKES 0
SF: 0
MF: 5
COM: 0
TOTAL: 5
UNPLATTED
SF: 5
MF: 0
COM: 0
TOTAL: 5
ECHO HILLS TOWNHOUSES 2
SF: 0
MF: 18
COM: 0
TOTAL: 18
ECHO HILLS TOWNHOUSES 1
SF: 0
MF: 9
COM: 0
TOTAL: 9
PERRY PARK 9
SF: 53
MF: 0
COM: 0
TOTAL: 53
ECHO VILLAGE 2
SF: 0
MF: 32
COM: 0
TOTAL: 32
ECHO VILLAGE 1
SF: 0
MF: 4
COM: 0
TOTAL: 4
PERRY PARK 1
SF: 53
MF: 0
COM: 0
TOTAL: 53
PERRY PARK COUNTRY CLUB
SF: 0
MF: 0
COM: 13
TOTAL: 13
UNPLATTED
SF: 72.5
MF: 71
COM: 0
TOTAL: 143.5
PREO PERRY PARK COMMON INTEREST COMMUNITY 0
SF: 0
MF: 8
COM: 0
TOTAL: 8
PERRY PARK 6
SF: 134
MF: 0
COM: 0
UNPLATTED: 11
TOTAL: 145
KARABATSOS EXEMPTION 0
SF: 2
MF: 0
COM: 0
TOTAL: 2
UNPLATTED
SF: 0
MF: 0
COM: 0
TOTAL: 0
MERIBEL VILLAGE FILING 1 AND 2
SF: 482
MF: 0
COM: 0
TOTAL: 482
7000 S PERRY PARK RD
SF: 0
MF: 0
COM: 2.5
TOTAL: 2.5
PLUM CREEK HOLLOW FARMS (PCHF)
SF: 7
MF: 0
COM: 0
TOTAL: 7
UNPLATTED
SF: 5
MF: 0
COM: 0
TOTAL: 5
BEAR DANCE SOUTH 0
SF: 5
MF: 0
COM: 0
TOTAL: 5
SAGEPORT 2
SF: 232.5
MF: 0
COM: 0
UNPLATTED: 18
TOTAL: 250.5
UNPLATTED
SF: 2.5
MF: 0
COM: 0
TOTAL: 2.5
OUTDOOR EXPERIENCE THE 0
SF: 2.5
MF: 0
COM: 0
TOTAL: 2.5
SAGEPORT 4
SF: 150
MF: 0
COM: 0
TOTAL: 150
SAGEPORT 6B
SF: 45
MF: 0
COM: 0
TOTAL: 45
SAGEPORT 5
SF: 33
MF: 0
COM: 0
TOTAL: 33
SAGEPORT 6A
SF: 7
MF: 0
COM: 0
TOTAL: 7
PERRY PARK EAST 2
SF: 63
MF: 0
COM: 0
TOTAL: 63
SAGEPORT 1
SF: 127
MF: 0
COM: 0
TOTAL: 127
PERRY PARK EAST 1
SF: 101
MF: 0
COM: 0
TOTAL: 101
UNPLATTED
SF: 147
MF: 0
COM: 0
TOTAL: 147
LARKSPUR ELEMENTARY SCHOOL
SF: 0
MF: 0
COM: 16
TOTAL: 16
SANDSTONE RANCH EXEMPTION 0
SF: 110
MF: 0
COM: 0
TOTAL: 110
UNPLATTED
SF: 0
MF: 0
COM: 0
TOTAL: 0
UNPLATTED
SF: 0
MF: 0
COM: 0
TOTAL: 0
N
0
1,900
3,800
7,600
Feet
Legend
Development Filing
PPWSD Boundary
Out of District Service Area
Parcels
PPWSD 2016 MASTER PLAN
APPENDIX D
BUILDOUT PARCELS
TST
TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS
JOB NO.
032.024.00
DATE
4/11/2016
Document Path: H:\GIS\PerryPark\Mxd\MasterPlan2016\AppD_BuildoutParcelMap_11x17_Final.mxd

PERRY PARK WATER AND SANITATION DISTRICT
DEVELOPMENT PARCEL TABLE
BUILDOUT BY FILING

Area	Development Filing	Block	Pressure Zone	Type of EQR	EQRs
East Perry Park	**Perry Park East 1**	1	7	SF	4
		2	6	SF	3
		2	7	SF	9
		3	7	SF	16
		4	6	SF	15
		4	7	SF	9
		5	6	SF	29
		5	7	SF	4
		6	6	SF	8
		7	6	SF	4
		Total			**101**
	Perry Park East 2	8	6	SF	9
		9	6	SF	5
		9	7	SF	1
		10	6	SF	17
		11	6	SF	16
		11	7	SF	10
		12	6	SF	5
		Total			**63**
	Sageport 1	1	6	SF	18
		1	7	SF	23
		2	6	SF	28
		2	7	SF	2
		3	6	SF	12
		4	6	SF	25
		5	6	SF	19
		Total			**127**
	Sageport 2	1	7	SF	25
		2	7	SF	19
		3	7	SF	14
		4	7	SF	16
		5	7	SF	10
		6	7	SF	12
		7	7	SF	16
		8	7	SF	21
		9	7	SF	1
		10	7	SF	10
		11	7	SF	4
		12	7	SF	17
		12	6	SF	6
		13	7	SF	16
		14	7	SF	37
		14	6	SF	6
	(Assumed 0.8 EQR/Acre)	Unplatted	7	SF	18
		Total			**248**

	Sageport 4	N/A	7	SF	150
		Total			**150**
	Sageport 5	N/A	7	SF	33
		Total			**33**
	Sageport 6A	N/A	7	SF	7
		Total			**7**
	Sageport 6B	N/A	7	SF	45
		Total			**45**
	Bear Dance South 0	N/A	7	SF	5
		Total			**5**
	Outdoor Experience The 0	N/A	7	SF	2.5
		Total			**2.5**
	Larkspur Elementary School	N/A	6	COMM	16
		Total			**16**
Unplatted Areas	(Existing (2) 1" taps outside platted area)	Unplatted	7	SF	5
	(Assumed 5 Acre Lots)	Unplatted	8	SF	147
	Near Sageport 2	Unplatted	7	SF	2.5
		Total			**154.5**
	*EQRs From Taps Larger Than 5/8"			COMM	**31**
		Area Total			**983**
West Perry Park	**Perry Park 1**	PP1	3	SF	53
	(Including Tracts B & C)	**Total**			**53**
	Perry Park 2	1	2	SF	12
		2	1	SF	1
		2	2	SF	10
		2	3	SF	9
		3	1	SF	25
		4	1	SF	12
		5	1	SF	10
		6	3	SF	10
		6	2	SF	4
		7	2	SF	2
		7	3	SF	2
		8	1	SF	6
		8	2	SF	13
		9	2	SF	15
		10	2	SF	16
		11	1	SF	6
		Total			**153**
	Perry Park 3	1	3	SF	23
		2	3	SF	12
		Total			**35**
	Perry Park 4	1	3	SF	22
		1	2	SF	13
		2	3	SF	19
		3	3	SF	26
		4	3	SF	8
		5	3	SF	9
		6	3	SF	24
		Total			**121**

	Perry Park 5	1	3	SF	31
		2	3	SF	43
		3	3	SF	39
		4	3	SF	29
		5	3	SF	28
		6	3	SF	16
		7	3	SF	35
		8	3	SF	18
		9	3	SF	10
		9	5	SF	19
		10	3	SF	9
		10	5	SF	9
		11	3	SF	23
		12	3	SF	40
		13	3	SF	23
		14	3	SF	21
		15	3	SF	34
		16	3	SF	22
		17	3	SF	48.5
		17	4	SF	13
		17	5	SF	15
		18	4	SF	34
		18	5	SF	12
		19	4	SF	42
		20	4	SF	19
		21	4	SF	6
		22	1	SF	22
		22	4	SF	19
		23	1	SF	9
		23	4	SF	7
		24	4	SF	14
		25	3	SF	7
	(Assumed estimate from PPWSD)	Unplatted	Undeterm.	SF	6
		Total			**722.5**
	Perry Park 6	1	3	SF	25
		2	3	SF	26
		3	3	SF	10
		4	3	SF	18
		5	3	SF	55
	(From Feasibility Study)	Unplatted	3	SF	11
		Total			**145**
	Perry Park 7	1	2	SF	27
		2	2	SF	10
		3	2	SF	5
		Total			**42**
	Perry Park 9	1	3	SF	25
		2	3	SF	28
		Total			**53**
	Perry Park 11	1	1	SF	3
		2	1	SF	9
		3	1	SF	2
		Total			**14**
	Perry Park 12	N/A	3	COMM	16
		Total			**16**

	Indian Head 1	1	1	SF	16
		2	4	SF	20
		2	1	SF	7
		3	4	SF	32
		4	4	SF	11
		Total			**86**
	Wauconda Lakes 0	N/A	3	MF	5
		Total			**5**
	Echo Hills Townhomes 1	N/A	3	MF	9
		Total			**9**
	Echo Hills Townhomes 2	N/A	3	MF	18
		Total			**18**
	Echo Village 1	N/A	3	MF	4
		Total			**4**
	Echo Village 2	N/A	3	MF	32
		Total			**32**
	Preo Perry Park Common Interest Community 0	N/A	3	MF	8
		Total			**8**
	Karabatsos Exemption 0	N/A	3	SF	2
		Total			**2**
	Perry Park Country Club	N/A	3	COMM	13
		Total			**13**
	7000 S Perry Park Rd		3	COMM	2.5
		Total			**2.5**
Unplatted Areas	(Assumed estimate from PPWSD)	Unplatted	Undeterm.	SF	20
	(Assumed estimate from PPWSD)	Unplatted	Undeterm.	SF	4
	(Assumed estimate from PPWSD)	Unplatted	3	SF	5
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0
	(Estimated from density and road layout)	Unplatted	3	SF/COMM	72.5
	(Estimated from density and road layout)	Unplatted	3	MF	71
	Outside of Service Boundary (PCHF Gooding)	Existing	3	SF	7
		Total			**179.5**
		Area Total			**1713.5**
Remuda	**Remuda Ranch Exemption 0**	N/A	3	SF	56
		N/A	6	SF	31
		Area Total			**87**
Sandstone	**Sandstone Ranch Exception 0**	N/A	3	SF	110
		Area Total			**110**
Meribel	**Meribel Village**	N/A	7	SF	482
		Area Total			**482**
	*EQRs From Taps Larger Than 5/8"			COMM	**32**
	Master Plan Totals:				**3407.5**

PERRY PARK WATER AND SANITATION DISTRICT
DEVELOPMENT PARCEL TABLE
BUILDOUT BY PRESSURE ZONE

Area	Development Filing	Block	Pressure Zone	Type of EQR	EQRs
West Perry Park	Perry Park 2	2	1	SF	1
	Perry Park 2	3	1	SF	25
	Perry Park 2	4	1	SF	12
	Perry Park 2	5	1	SF	10
	Perry Park 2	8	1	SF	6
	Perry Park 2	11	1	SF	6
	Perry Park 2	22	1	SF	22
	Perry Park 2	23	1	SF	9
	Perry Park 11	1	1	SF	3
	Perry Park 11	2	1	SF	9
	Perry Park 11	3	1	SF	2
	Indian Head 1	1	1	SF	16
	Indian Head 1	2	1	SF	7
			Pressure Zone 1 Total:		**128**
	Perry Park 2	1	2	SF	12
	Perry Park 2	2	2	SF	10
	Perry Park 2	6	2	SF	4
	Perry Park 2	7	2	SF	2
	Perry Park 2	8	2	SF	13
	Perry Park 2	9	2	SF	15
	Perry Park 2	10	2	SF	16
	Perry Park 4	1	2	SF	13
	Perry Park 7	1	2	SF	27
	Perry Park 7	2	2	SF	10
	Perry Park 7	3	2	SF	5
			Pressure Zone 2 Total:		**127**
	Perry Park 1	PP1	3	SF	53
	Perry Park 2	2	3	SF	9
	Perry Park 2	6	3	SF	10
	Perry Park 2	7	3	SF	2
	Perry Park 3	1	3	SF	23
	Perry Park 3	2	3	SF	12
	Perry Park 4	1	3	SF	22
	Perry Park 4	2	3	SF	19
	Perry Park 4	3	3	SF	26
	Perry Park 4	4	3	SF	8
	Perry Park 4	5	3	SF	9
	Perry Park 4	6	3	SF	24
	Perry Park 5	1	3	SF	31
	Perry Park 5	2	3	SF	43
	Perry Park 5	3	3	SF	39
	Perry Park 5	4	3	SF	29
	Perry Park 5	5	3	SF	28
	Perry Park 5	6	3	SF	16
	Perry Park 5	7	3	SF	35
	Perry Park 5	8	3	SF	18
	Perry Park 5	9	3	SF	10

	Perry Park 5	10	3	SF	9
	Perry Park 5	11	3	SF	23
	Perry Park 5	12	3	SF	40
	Perry Park 5	13	3	SF	23
	Perry Park 5	14	3	SF	21
	Perry Park 5	15	3	SF	34
	Perry Park 5	16	3	SF	22
	Perry Park 5	17	3	SF	48.5
	Perry Park 5	25	3	SF	7
	Perry Park 6	1	3	SF	25
	Perry Park 6	2	3	SF	26
	Perry Park 6	3	3	SF	10
	Perry Park 6	4	3	SF	18
	Perry Park 6	5	3	SF	55
	(From Feasibility Study)	Unplatted	3	SF	11
	Perry Park 9	1	3	SF	25
	Perry Park 9	2	3	SF	28
	Perry Park 12	N/A	3	COMM	16
	Wauconda Lakes 0	N/A	3	MF	5
	Echo Hills Townhomes 1	N/A	3	MF	9
	Echo Hills Townhomes 2	N/A	3	MF	18
	Echo Village 1	N/A	3	MF	4
	Echo Village 2	N/A	3	MF	32
	Preo Perry Park Common Interest Community 0	N/A	3	MF	8
	Karabatsos Exemption 0	N/A	3	SF	2
	(Assumed estimate from PPWSD)	Unplatted	3	SF	5
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0
	(Estimated from density and road layout)	Unplatted	3	SF	72.5
	(Estimated from density and road layout)	Unplatted	3	MF	71
	Outside of Service Boundary (PCHF Gooding)	Existing	3	SF	7
	Remuda Ranch Exemption 0	N/A	3	SF	56
	Sandstone Ranch Exception 0	N/A	3	SF	110
	Perry Park Country Club	N/A	3	COMM	13
	7000 S Perry Park Rd		3	COMM	2.5
			Pressure Zone 3 Total:		**1322.5**
	Perry Park 5	17	4	SF	13
	Perry Park 5	18	4	SF	34
	Perry Park 5	19	4	SF	42
	Perry Park 5	20	4	SF	19
	Perry Park 5	21	4	SF	6
	Perry Park 5	22	4	SF	19
	Perry Park 5	23	4	SF	7
	Perry Park 5	24	4	SF	14
	Indian Head 1	2	4	SF	20
	Indian Head 1	3	4	SF	32
	Indian Head 1	4	4	SF	11
			Pressure Zone 4 Total:		**217**

	Perry Park 5	9	5	SF	19
	Perry Park 5	10	5	SF	9
	Perry Park 5	17	5	SF	15
	Perry Park 5	18	5	SF	12
			Pressure Zone 5 Total:		**55**
	Remuda Ranch Exemption 0	N/A	6W	SF	31
			Pressure Zone 6W Total:		**31**
	*EQRs From Taps Larger Than 5/8"			COMM	**32**
East Perry Park	Perry Park East 1	2	6E	SF	3
	Perry Park East 1	4	6E	SF	15
	Perry Park East 1	5	6E	SF	29
	Perry Park East 1	6	6E	SF	8
	Perry Park East 1	7	6E	SF	4
	Perry Park East 2	8	6E	SF	9
	Perry Park East 2	9	6E	SF	5
	Perry Park East 2	10	6E	SF	17
	Perry Park East 2	11	6E	SF	16
	Perry Park East 2	12	6E	SF	5
	Sageport 1	1	6E	SF	18
	Sageport 1	2	6E	SF	28
	Sageport 1	3	6E	SF	12
	Sageport 1	4	6E	SF	25
	Sageport 1	5	6E	SF	19
	Sageport 2	12	6E	SF	6
	Sageport 2	14	6E	SF	6
	Larkspur Elementary School	N/A	6E	COMM	16
			Pressure Zone 6E Total:		**241**
	Perry Park East 1	1	7	SF	4
	Perry Park East 1	2	7	SF	9
	Perry Park East 1	3	7	SF	16
	Perry Park East 1	4	7	SF	9
	Perry Park East 1	5	7	SF	4
	Perry Park East 2	9	7	SF	1
	Perry Park East 2	11	7	SF	10
	Sageport 1	1	7	SF	23
	Sageport 1	2	7	SF	2
	Sageport 2	1	7	SF	25
	Sageport 2	2	7	SF	19
	Sageport 2	3	7	SF	14
	Sageport 2	4	7	SF	16
	Sageport 2	5	7	SF	10
	Sageport 2	6	7	SF	12
	Sageport 2	7	7	SF	16
	Sageport 2	8	7	SF	21
	Sageport 2	9	7	SF	1
	Sageport 2	10	7	SF	10
	Sageport 2	11	7	SF	4
	Sageport 2	12	7	SF	17
	Sageport 2	13	7	SF	16
	Sageport 2	14	7	SF	37

	(Assumed 0.8 EQR/Acre)	Unplatted	7	SF	18
	Sageport 4	N/A	7	SF	150
	Sageport 5	N/A	7	SF	33
	Sageport 6A	N/A	7	SF	7
	Sageport 6B	N/A	7	SF	45
	Bear Dance South 0	N/A	7	SF	5
	Outdoor Experience The 0	N/A	7	SF	2.5
	(Existing (2) 1" taps outside platted area)	Unplatted	7	SF	5
	Meribel Village	N/A	7	SF	482
	Near Sageport 2	Unplatted	7	SF	2.5
			Pressure Zone 7 Total:		**1046**
	(Assumed 5 Acre Lots)	Unplatted	8	SF	147
			Pressure Zone 8 Total:		**147**
	(Assumed estimate from PPWSD)	Unplatted	Undeterm.	SF	6
	(Assumed estimate from PPWSD)	Unplatted	Undeterm.	SF	20
	(Assumed estimate from PPWSD)	Unplatted	Undeterm.	SF	4
			Undetermined Total:		**30**
	*EQRs From Taps Larger Than 5/8"			COMM	**31**
	Master Plan Totals:				**3407.5**

Appendix E
Buildout – Demands & Summary Model Results

PERRY PARK WATER AND SANITATION DISTRICT
WATER DEMAND TABLE
BUILDOUT BY FILING

Area	Development Filing	Block	Type of EQR	EQRs	Avg. Day Flow (gpd)	Max Day Flow (gpd)	Peak Hour Flow (gpd)	Avg. Day Flow (gpm)
East Perry Park	**Perry Park East 1**	1	SF	4	1,152	3,226	4,838	0.8
		2	SF	12	3,456	9,677	14,515	2.4
		3	SF	16	4,608	12,902	19,354	3.2
		4	SF	24	6,912	19,354	29,030	4.8
		5	SF	33	9,504	26,611	39,917	6.6
		6	SF	8	2,304	6,451	9,677	1.6
		7	SF	4	1,152	3,226	4,838	0.8
		Total		**101**	**29,088**	**81,446**	**122,170**	**20.2**
	Perry Park East 2	8	SF	9	2,592	7,258	10,886	1.8
		9	SF	6	1,728	4,838	7,258	1.2
		10	SF	17	4,896	13,709	20,563	3.4
		11	SF	26	7,488	20,966	31,450	5.2
		12	SF	5	1,440	4,032	6,048	1
		Total		**63**	**18,144**	**50,803**	**76,205**	**12.6**
	Sageport 1	1	SF	41	11,808	33,062	49,594	8.2
		2	SF	30	8,640	24,192	36,288	6
		3	SF	12	3,456	9,677	14,515	2.4
		4	SF	25	7,200	20,160	30,240	5
		5	SF	19	5,472	15,322	22,982	3.8
		Total		**127**	**36,576**	**102,413**	**153,619**	**25.4**
	Sageport 2	1	SF	25	7,200	20,160	30,240	5
		2	SF	19	5,472	15,322	22,982	3.8
		3	SF	14	4,032	11,290	16,934	2.8
		4	SF	16	4,608	12,902	19,354	3.2
		5	SF	10	2,880	8,064	12,096	2
		6	SF	12	3,456	9,677	14,515	2.4
		7	SF	16	4,608	12,902	19,354	3.2
		8	SF	21	6,048	16,934	25,402	4.2
		9	SF	1	288	806	1,210	0.2
		10	SF	10	2,880	8,064	12,096	2
		11	SF	4	1,152	3,226	4,838	0.8
		12	SF	23	6,624	18,547	27,821	4.6
		13	SF	16	4,608	12,902	19,354	3.2
		14	SF	43	12,384	34,675	52,013	8.6
	(Assumed 0.8 EQR/Acre)	Unplatted	SF	18	5,184	14,515	21,773	3.6
		Total		**248**	**71,424**	**199,987**	**299,981**	**49.6**
	Sageport 4	N/A	SF	150	43,200	120,960	181,440	30
		Total		**150**	**43,200**	**120,960**	**181,440**	**30**
	Sageport 5	N/A	SF	33	9,504	26,611	39,917	6.6
		Total		**33**	**9,504**	**26,611**	**39,917**	**6.6**
	Sageport 6A	N/A	SF	7	2,016	5,645	8,467	1.4
		Total		**7**	**2,016**	**5,645**	**8,467**	**1.4**
	Sageport 6B	N/A	SF	45	12,960	36,288	54,432	9
		Total		**45**	**12,960**	**36,288**	**54,432**	**9**
	Bear Dance South 0	N/A	SF	5	1,440	4,032	6,048	1
		Total		**5**	1,440	4,032	6,048	1
	Outdoor Experience The 0	N/A	SF	2.5	720	2,016	3,024	0.5
		Total		**2.5**	**720**	**2,016**	**3,024**	**0.5**
	Larkspur Elementary School	N/A	COMM	16	4,608	12,902	19,354	3.2
		Total		**16**	**4,608**	**12,902**	**19,354**	**3.2**
Unplatted Areas	(Existing homes outside platted area)	Unplatted	SF	5	1,440	4,032	6,048	1
	(Assumed 5 Acre Lots)	Unplatted	SF	147	42,336	118,541	177,811	29.4
	Near Sageport 2	Unplatted	SF	2.5	720	2,016	3,024	0.5
		Total		**154.5**	**44,496**	**124,589**	**186,883**	**30.9**
	*EQRs From Taps Larger Than 5/8"		COMM	**31**	**8,928**	**24,998**	**37,498**	**6.2**
		Area Total		**983**	**283,104**	**792,691**	**1,189,037**	**196.6**
West Perry Park	**Perry Park 1**	PP1	SF	53	15,264	42,739	64,109	10.6
	(Including Tracts B & C)	**Total**		**53**	**15,264**	**42,739**	**64,109**	**10.6**
	Perry Park 2	1	SF	12	3,456	9,677	14,515	2.4
		2	SF	20	5,760	16,128	24,192	4
		3	SF	25	7,200	20,160	30,240	5
		4	SF	12	3,456	9,677	14,515	2.4
		5	SF	10	2,880	8,064	12,096	2
		6	SF	14	4,032	11,290	16,934	2.8
		7	SF	4	1,152	3,226	4,838	0.8

Area	Development Filing	Block	Type of EQR	EQRs	Avg. Day Flow (gpd)	Max Day Flow (gpd)	Peak Hour Flow (gpd)	Avg. Day Flow (gpm)
		8	SF	19	5,472	15,322	22,982	3.8
		9	SF	15	4,320	12,096	18,144	3
		10	SF	16	4,608	12,902	19,354	3.2
		11	SF	6	1,728	4,838	7,258	1.2
		Total		**153**	**44,064**	**123,379**	**185,069**	**30.6**
	Perry Park 3	1	SF	23	6,624	18,547	27,821	4.6
		2	SF	12	3,456	9,677	14,515	2.4
		Total		**35**	**10,080**	**28,224**	**42,336**	**7**
	Perry Park 4	1	SF	35	10,080	28,224	42,336	7
		2	SF	19	5,472	15,322	22,982	3.8
		3	SF	26	7,488	20,966	31,450	5.2
		4	SF	8	2,304	6,451	9,677	1.6
		5	SF	9	2,592	7,258	10,886	1.8
		6	SF	24	6,912	19,354	29,030	4.8
		Total		**121**	**34,848**	**97,574**	**146,362**	**24.2**
	Perry Park 5	1	SF	31	8,928	24,998	37,498	6.2
		2	SF	43	12,384	34,675	52,013	8.6
		3	SF	39	11,232	31,450	47,174	7.8
		4	SF	29	8,352	23,386	35,078	5.8
		5	SF	28	8,064	22,579	33,869	5.6
		6	SF	16	4,608	12,902	19,354	3.2
		7	SF	35	10,080	28,224	42,336	7
		8	SF	18	5,184	14,515	21,773	3.6
		9	SF	29	8,352	23,386	35,078	5.8
		10	SF	18	5,184	14,515	21,773	3.6
		11	SF	23	6,624	18,547	27,821	4.6
		12	SF	40	11,520	32,256	48,384	8
		13	SF	23	6,624	18,547	27,821	4.6
		14	SF	21	6,048	16,934	25,402	4.2
		15	SF	34	9,792	27,418	41,126	6.8
		16	SF	22	6,336	17,741	26,611	4.4
		17	SF	76.5	22,032	61,690	92,534	15.3
		18	SF	46	13,248	37,094	55,642	9.2
		19	SF	42	12,096	33,869	50,803	8.4
		20	SF	19	5,472	15,322	22,982	3.8
		21	SF	6	1,728	4,838	7,258	1.2
		22	SF	41	11,808	33,062	49,594	8.2
		23	SF	16	4,608	12,902	19,354	3.2
		24	SF	14	4,032	11,290	16,934	2.8
		25	SF	7	2,016	5,645	8,467	1.4
	(Assumed estimate from PPWSD)	Unplatted	SF	6	1,728	4,838	7,258	1.2
		Total		**722.5**	**208,080**	**582,624**	**873,936**	**144.5**
	Perry Park 6	1	SF	25	7,200	20,160	30,240	5
		2	SF	26	7,488	20,966	31,450	5.2
		3	SF	10	2,880	8,064	12,096	2
		4	SF	18	5,184	14,515	21,773	3.6
		5	SF	55	15,840	44,352	66,528	11
	(From Feasibility Study)	Unplatted	SF	11	3,168	8,870	13,306	2.2
		Total		**145**	**41,760**	**116,928**	**175,392**	**29**
	Perry Park 7	1	SF	27	7,776	21,773	32,659	5.4
		2	SF	10	2,880	8,064	12,096	2
		3	SF	5	1,440	4,032	6,048	1
		Total		**42**	**12,096**	**33,869**	**50,803**	**8.4**
	Perry Park 9	1	SF	25	7,200	20,160	30,240	5
		2	SF	28	8,064	22,579	33,869	5.6
		Total		**53**	**15,264**	**42,739**	**64,109**	**10.6**
	Perry Park 11	1	SF	3	864	2,419	3,629	0.6
		2	SF	9	2,592	7,258	10,886	1.8
		3	SF	2	576	1,613	2,419	0.4
		Total		**14**	**4,032**	**11,290**	**16,934**	**2.8**
	Perry Park 12	N/A	COMM	16	4,608	12,902	19,354	3.2
		Total		**16**	**4,608**	**12,902**	**19,354**	**3.2**
	Indian Head 1	1	SF	16	4,608	12,902	19,354	3.2
		2	SF	27	7,776	21,773	32,659	5.4
		3	SF	32	9,216	25,805	38,707	6.4
		4	SF	11	3,168	8,870	13,306	2.2
		Total		**86**	**24,768**	**69,350**	**104,026**	**17.2**

Area	Development Filing	Block	Type of EQR	EQRs	Avg. Day Flow (gpd)	Max Day Flow (gpd)	Peak Hour Flow (gpd)	Avg. Day Flow (gpm)
	Wauconda Lakes 0	N/A	MF	5	1,440	4,032	6,048	1
		Total		**5**	**1,440**	**4,032**	**6,048**	**1**
	Echo Hills Townhomes 1	N/A	MF	9	2,592	7,258	10,886	1.8
		Total		**9**	**2,592**	**7,258**	**10,886**	**1.8**
	Echo Hills Townhomes 2	N/A	MF	18	5,184	14,515	21,773	3.6
		Total		**18**	**5,184**	**14,515**	**21,773**	**3.6**
	Echo Village 1	N/A	MF	32	9,216	25,805	38,707	6.4
		Total		**32**	**9,216**	**25,805**	**38,707**	**6.4**
	Echo Village 2	N/A	MF	4	1,152	3,226	4,838	0.8
		Total		**4**	**1,152**	**3,226**	**4,838**	**0.8**
	Preo Perry Park Common Interest Community 0	N/A	MF	8	2,304	6,451	9,677	1.6
		Total		**8**	**2,304**	**6,451**	**9,677**	**1.6**
	Karabatsos Exemption 0	N/A	SF	2	576	1,613	2,419	0.4
		Total		**2**	576	1,613	2,419	0.4
	Perry Park Country Club	N/A	COMM	13	3,744	10,483	15,725	2.6
		Total		**13**	**3,744**	**10,483**	**15,725**	**2.6**
	7000 S Perry Park Rd	N/A	COMM	2.5	720	2,016	3,024	0.5
		Total		**2.5**	**720**	**2016**	**3024**	**0.5**
Unplatted Areas	(Assumed 0.5 Acre Lots)	Unplatted	SF	20	5,760	16,128	24,192	4
	(Assumed 0.5 Acre Lots)	Unplatted	SF	4	1,152	3,226	4,838	0.8
	(Assumed 0.5 Acre Lots)	Unplatted	SF	5	1,440	4,032	6,048	1
	(Assumed 0.5 Acre Lots)	Unplatted	SF	0	0	0	0	0
	(Estimated from density and road layout)	Unplatted	SF/COMM	72.5	20,880	58,464	87,696	14.5
	(Estimated from density and road layout)	Unplatted	MF	71	20,448	57,254	85,882	14.2
	Outside of Service Boundary (PCHF Gooding)	Existing	SF	7	2,016	5,645	8,467	1.4
		Total		**179.5**	**51,696**	**144,749**	**217,123**	**35.9**
		Area Total		**1713.5**	**493,488**	**1,381,766**	**2,072,650**	**342.7**
Remuda	**Remuda Ranch Exemption 0**	N/A	SF	87	25,056	70,157	105,235	17.4
		Area Total		**87**	**25,056**	**70,157**	**105,235**	**17.4**
Sandstone	**Sandstone Ranch Exception 0**	N/A	SF	110	31,680	88,704	133,056	22
		Area Total		**110**	**31,680**	**88,704**	**133,056**	**22**
Meribel	**Meribel Village 1 & 2**	N/A	SF	482	138,816	388,685	583,027	96.4
		Area Total		**482**	**138816**	**388685**	**583027**	**96.4**
	*EQRs From Taps Larger Than 5/8"		COMM	**32**	**9,216**	**25,805**	**38,707**	**6.4**
	Master Plan Totals:			**3407.5**	**981,360**	**2,747,808**	**4,121,712**	**681.5**

Avg. Day Demand (gpm/EQR):	0.2
Max Day Demand (gpm/EQR):	0.56
Peak Hour Demand (gpm/EQR):	0.84

PERRY PARK WATER AND SANITATION DISTRICT
WATER DEMAND TABLE
BUILDOUT BY PRESSURE ZONE

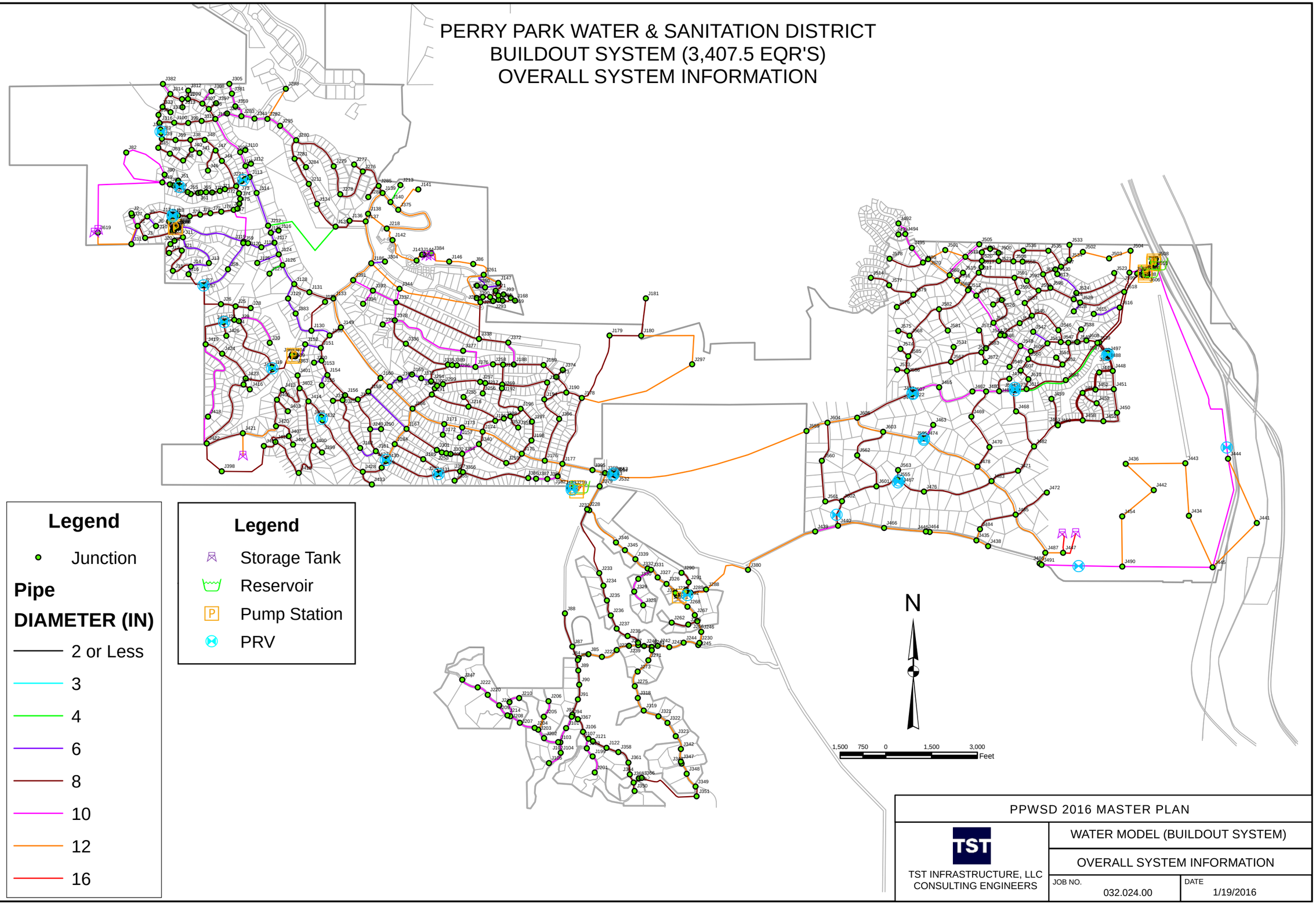
Area	Development Filing	Block	Pressure Zone	Type of EQR	EQRs	Avg. Day Flow (gpd)	Max Day Flow (gpd)	Peak Hour Flow (gpd)	Avg. Day Flow (gpm)
West Perry Park	Perry Park 2	2	1	SF	1	288	806	1,210	0.2
	Perry Park 2	3	1	SF	25	7,200	20,160	30,240	5
	Perry Park 2	4	1	SF	12	3,456	9,677	14,515	2.4
	Perry Park 2	5	1	SF	10	2,880	8,064	12,096	2
	Perry Park 2	8	1	SF	6	1,728	4,838	7,258	1.2
	Perry Park 2	11	1	SF	6	1,728	4,838	7,258	1.2
	Perry Park 2	22	1	SF	22	6,336	17,741	26,611	4.4
	Perry Park 2	23	1	SF	9	2,592	7,258	10,886	1.8
	Perry Park 11	1	1	SF	3	864	2,419	3,629	0.6
	Perry Park 11	2	1	SF	9	2,592	7,258	10,886	1.8
	Perry Park 11	3	1	SF	2	576	1,613	2,419	0.4
	Indian Head 1	1	1	SF	16	4,608	12,902	19,354	3.2
	Indian Head 1	2	1	SF	7	2,016	5,645	8,467	1.4
			Pressure Zone 1 Total:		**128**	**36,864**	**103,219**	**154,829**	**25.6**
	Perry Park 2	1	2	SF	12	3,456	9,677	14,515	2.4
	Perry Park 2	2	2	SF	10	2,880	8,064	12,096	2
	Perry Park 2	6	2	SF	4	1,152	3,226	4,838	0.8
	Perry Park 2	7	2	SF	2	576	1,613	2,419	0.4
	Perry Park 2	8	2	SF	13	3,744	10,483	15,725	2.6
	Perry Park 2	9	2	SF	15	4,320	12,096	18,144	3
	Perry Park 2	10	2	SF	16	4,608	12,902	19,354	3.2
	Perry Park 4	1	2	SF	13	3,744	10,483	15,725	2.6
	Perry Park 7	1	2	SF	27	7,776	21,773	32,659	5.4
	Perry Park 7	2	2	SF	10	2,880	8,064	12,096	2
	Perry Park 7	3	2	SF	5	1,440	4,032	6,048	1
			Pressure Zone 2 Total:		**127**	**36,576**	**102,413**	**153,619**	**25.4**
	Perry Park 1	PP1	3	SF	53	15,264	42,739	64,109	10.6
	Perry Park 2	2	3	SF	9	2,592	7,258	10,886	1.8
	Perry Park 2	6	3	SF	10	2,880	8,064	12,096	2
	Perry Park 2	7	3	SF	2	576	1,613	2,419	0.4
	Perry Park 3	1	3	SF	23	6,624	18,547	27,821	4.6
	Perry Park 3	2	3	SF	12	3,456	9,677	14,515	2.4
	Perry Park 4	1	3	SF	22	6,336	17,741	26,611	4.4
	Perry Park 4	2	3	SF	19	5,472	15,322	22,982	3.8
	Perry Park 4	3	3	SF	26	7,488	20,966	31,450	5.2
	Perry Park 4	4	3	SF	8	2,304	6,451	9,677	1.6
	Perry Park 4	5	3	SF	9	2,592	7,258	10,886	1.8
	Perry Park 4	6	3	SF	24	6,912	19,354	29,030	4.8
	Perry Park 5	1	3	SF	31	8,928	24,998	37,498	6.2
	Perry Park 5	2	3	SF	43	12,384	34,675	52,013	8.6
	Perry Park 5	3	3	SF	39	11,232	31,450	47,174	7.8
	Perry Park 5	4	3	SF	29	8,352	23,386	35,078	5.8
	Perry Park 5	5	3	SF	28	8,064	22,579	33,869	5.6
	Perry Park 5	6	3	SF	16	4,608	12,902	19,354	3.2
	Perry Park 5	7	3	SF	35	10,080	28,224	42,336	7
	Perry Park 5	8	3	SF	18	5,184	14,515	21,773	3.6
	Perry Park 5	9	3	SF	10	2,880	8,064	12,096	2
	Perry Park 5	10	3	SF	9	2,592	7,258	10,886	1.8
	Perry Park 5	11	3	SF	23	6,624	18,547	27,821	4.6
	Perry Park 5	12	3	SF	40	11,520	32,256	48,384	8
	Perry Park 5	13	3	SF	23	6,624	18,547	27,821	4.6
	Perry Park 5	14	3	SF	21	6,048	16,934	25,402	4.2
	Perry Park 5	15	3	SF	34	9,792	27,418	41,126	6.8
	Perry Park 5	16	3	SF	22	6,336	17,741	26,611	4.4
	Perry Park 5	17	3	SF	48.5	13,968	39,110	58,666	9.7
	Perry Park 5	25	3	SF	7	2,016	5,645	8,467	1.4
	Perry Park 6	1	3	SF	25	7,200	20,160	30,240	5
	Perry Park 6	2	3	SF	26	7,488	20,966	31,450	5.2
	Perry Park 6	3	3	SF	10	2,880	8,064	12,096	2
	Perry Park 6	4	3	SF	18	5,184	14,515	21,773	3.6
	Perry Park 6	5	3	SF	55	15,840	44,352	66,528	11
	(From Feasibility Study)	Unplatted	3	SF	11	3,168	8,870	13,306	2.2
	Perry Park 9	1	3	SF	25	7,200	20,160	30,240	5
	Perry Park 9	2	3	SF	28	8,064	22,579	33,869	5.6
	Perry Park 12	N/A	3	COMM	16	4,608	12,902	19,354	3.2
	Wauconda Lakes 0	N/A	3	MF	5	1,440	4,032	6,048	1
	Echo Hills Townhomes 1	N/A	3	MF	9	2,592	7,258	10,886	1.8
	Echo Hills Townhomes 2	N/A	3	MF	18	5,184	14,515	21,773	3.6
	Echo Village 1	N/A	3	MF	4	1,152	3,226	4,838	0.8
	Echo Village 2	N/A	3	MF	32	9,216	25,805	38,707	6.4
	Preo Perry Park Common Interest Community 0	N/A	3	MF	8	2,304	6,451	9,677	1.6

	Karabatsos Exemption 0	N/A	3	SF	2	576	1,613	2,419	0.4
	(Assumed estimate from PPWSD)	Unplatted	3	SF	5	1,440	4,032	6,048	1
	(Assumed estimate from PPWSD)	Unplatted	3	SF	0	0	0	0	0
	(Estimated from density and road layout)	Unplatted	3	MF	72.5	20,880	58,464	87,696	14.5
	(Estimated from density and road layout)	Unplatted	3	MF	71	20,448	57,254	85,882	14.2
	Outside of Service Boundary (PCHF Gooding)	Existing	3	SF	7	2,016	5,645	8,467	1.4
	Remuda Ranch Exemption 0	N/A	3	SF	56	16,128	45,158	67,738	11.2
	Sandstone Ranch Exception 0	N/A	3	SF	110	31,680	88,704	133,056	22
	Perry Park Country Club	N/A	3	COMM	13	3,744	10,483	15,725	2.6
	7000 S Perry Park Rd		3	COMM	2.5	720	2,016	3,024	0.5
			Pressure Zone 3 Total:		**1322.5**	**380,880**	**1,066,464**	**1,599,696**	**264.5**
	Perry Park 5	17	4	SF	13	3,744	10,483	15,725	2.6
	Perry Park 5	18	4	SF	34	9,792	27,418	41,126	6.8
	Perry Park 5	19	4	SF	42	12,096	33,869	50,803	8.4
	Perry Park 5	20	4	SF	19	5,472	15,322	22,982	3.8
	Perry Park 5	21	4	SF	6	1,728	4,838	7,258	1.2
	Perry Park 5	22	4	SF	19	5,472	15,322	22,982	3.8
	Perry Park 5	23	4	SF	7	2,016	5,645	8,467	1.4
	Perry Park 5	24	4	SF	14	4,032	11,290	16,934	2.8
	Indian Head 1	2	4	SF	20	5,760	16,128	24,192	4
	Indian Head 1	3	4	SF	32	9,216	25,805	38,707	6.4
	Indian Head 1	4	4	SF	11	3,168	8,870	13,306	2.2
			Pressure Zone 4 Total:		**217**	**62,496**	**174,989**	**262,483**	**43.4**
	Perry Park 5	9	5	SF	19	5,472	15,322	22,982	3.8
	Perry Park 5	10	5	SF	9	2,592	7,258	10,886	1.8
	Perry Park 5	17	5	SF	15	4,320	12,096	18,144	3
	Perry Park 5	18	5	SF	12	3,456	9,677	14,515	2.4
			Pressure Zone 5 Total:		**55**	**15,840**	**44,352**	**66,528**	**11**
	Remuda Ranch Exemption 0	N/A	6W	SF	31	8,928	24,998	37,498	6.2
			Pressure Zone 6W Total:		**31**	**8,928**	**24,998**	**37,498**	**6.2**
	*EQRs From Taps Larger Than 5/8"			COMM	**32**	**9,216**	**25,805**	**38,707**	**6.4**
East Perry Park	Perry Park East 1	2	6E	SF	3	864	2,419	3,629	0.6
	Perry Park East 1	4	6E	SF	15	4,320	12,096	18,144	3
	Perry Park East 1	5	6E	SF	29	8,352	23,386	35,078	5.8
	Perry Park East 1	6	6E	SF	8	2,304	6,451	9,677	1.6
	Perry Park East 1	7	6E	SF	4	1,152	3,226	4,838	0.8
	Perry Park East 2	8	6E	SF	9	2,592	7,258	10,886	1.8
	Perry Park East 2	9	6E	SF	5	1,440	4,032	6,048	1
	Perry Park East 2	10	6E	SF	17	4,896	13,709	20,563	3.4
	Perry Park East 2	11	6E	SF	16	4,608	12,902	19,354	3.2
	Perry Park East 2	12	6E	SF	5	1,440	4,032	6,048	1
	Sageport 1	1	6E	SF	18	5,184	14,515	21,773	3.6
	Sageport 1	2	6E	SF	28	8,064	22,579	33,869	5.6
	Sageport 1	3	6E	SF	12	3,456	9,677	14,515	2.4
	Sageport 1	4	6E	SF	25	7,200	20,160	30,240	5
	Sageport 1	5	6E	SF	19	5,472	15,322	22,982	3.8
	Sageport 2	12	6E	SF	6	1,728	4,838	7,258	1.2
	Sageport 2	14	6E	SF	6	1,728	4,838	7,258	1.2
	Larkspur Elementary School	N/A	6E	COMM	16	4,608	12,902	19,354	3.2
			Pressure Zone 6E Total:		**241**	**69,408**	**194,342**	**291,514**	**48.2**
	Perry Park East 1	1	7	SF	4	1,152	3,226	4,838	0.8
	Perry Park East 1	2	7	SF	9	2,592	7,258	10,886	1.8
	Perry Park East 1	3	7	SF	16	4,608	12,902	19,354	3.2
	Perry Park East 1	4	7	SF	9	2,592	7,258	10,886	1.8
	Perry Park East 1	5	7	SF	4	1,152	3,226	4,838	0.8
	Perry Park East 2	9	7	SF	1	288	806	1,210	0.2
	Perry Park East 2	11	7	SF	10	2,880	8,064	12,096	2
	Sageport 1	1	7	SF	23	6,624	18,547	27,821	4.6
	Sageport 1	2	7	SF	2	576	1,613	2,419	0.4
	Sageport 2	1	7	SF	25	7,200	20,160	30,240	5
	Sageport 2	2	7	SF	19	5,472	15,322	22,982	3.8
	Sageport 2	3	7	SF	14	4,032	11,290	16,934	2.8
	Sageport 2	4	7	SF	16	4,608	12,902	19,354	3.2
	Sageport 2	5	7	SF	10	2,880	8,064	12,096	2
	Sageport 2	6	7	SF	12	3,456	9,677	14,515	2.4
	Sageport 2	7	7	SF	16	4,608	12,902	19,354	3.2
	Sageport 2	8	7	SF	21	6,048	16,934	25,402	4.2
	Sageport 2	9	7	SF	1	288	806	1,210	0.2
	Sageport 2	10	7	SF	10	2,880	8,064	12,096	2
	Sageport 2	11	7	SF	4	1,152	3,226	4,838	0.8
	Sageport 2	12	7	SF	17	4,896	13,709	20,563	3.4
	Sageport 2	13	7	SF	16	4,608	12,902	19,354	3.2
	Sageport 2	14	7	SF	37	10,656	29,837	44,755	7.4
	(Assumed 0.8 EQR/Acre)	Unplatted	7	SF	18	5,184	14,515	21,773	3.6
	Sageport 4	N/A	7	SF	150	43,200	120,960	181,440	30
	Sageport 5	N/A	7	SF	33	9,504	26,611	39,917	6.6

	Sageport 6A	N/A	7	SF	7	2,016	5,645	8,467	1.4
	Sageport 6B	N/A	7	SF	45	12,960	36,288	54,432	9
	Bear Dance South 0	N/A	7	SF	5	1,440	4,032	6,048	1
	Outdoor Experience The 0	N/A	7	SF	2.5	720	2,016	3,024	0.5
	(Existing (2) 1" taps outside platted area)	Unplatted	7	SF	5	1,440	4,032	6,048	1
	Meribel Village	N/A	7	SF	482	138,816	388,685	583,027	96.4
	Near Sageport 2	Unplatted	7	SF	2.5	720	2,016	3,024	0.5
			Pressure Zone 7 Total:		**1046**	**301,248**	**843,494**	**1,265,242**	**209.2**
	(Assumed 5 Acre Lots)	Unplatted	8	SF	147	42,336	118,541	177,811	29.4
			Pressure Zone 8 Total:		**147**	**42,336**	**118,541**	**177,811**	**29.4**
	(Assumed estimate from PPWSD)	Unplatted	Undeterm.	SF	6	1,728	4,838	7,258	1.2
	(Assumed estimate from PPWSD)	Unplatted	Undeterm.	SF	20	5,760	16,128	24,192	4
	(Assumed estimate from PPWSD)	Unplatted	Undeterm.	SF	4	1,152	3,226	4,838	0.8
			Undetermined Total:		**30**	**8,640**	**24,192**	**36,288**	**6**
	*EQRs From Taps Larger Than 5/8"			COMM	**31**	**8,928**	**24,998**	**37,498**	**6.2**
	Master Plan Totals:				**3407.5**	**981,360**	**2,747,808**	**4,121,712**	**681.5**

Avg. Day Demand (gpm/EQR):	0.2
Max Day Demand (gpm/EQR):	0.56
Peak Hour Demand (gpm/EQR):	0.84

PERRY PARK WATER & SANITATION DISTRICT
BUILDOUT SYSTEM (3,407.5 EQR'S)
OVERALL SYSTEM INFORMATION



PPWSD 2016 MASTER PLAN

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

WATER MODEL (BUILDOUT SYSTEM)

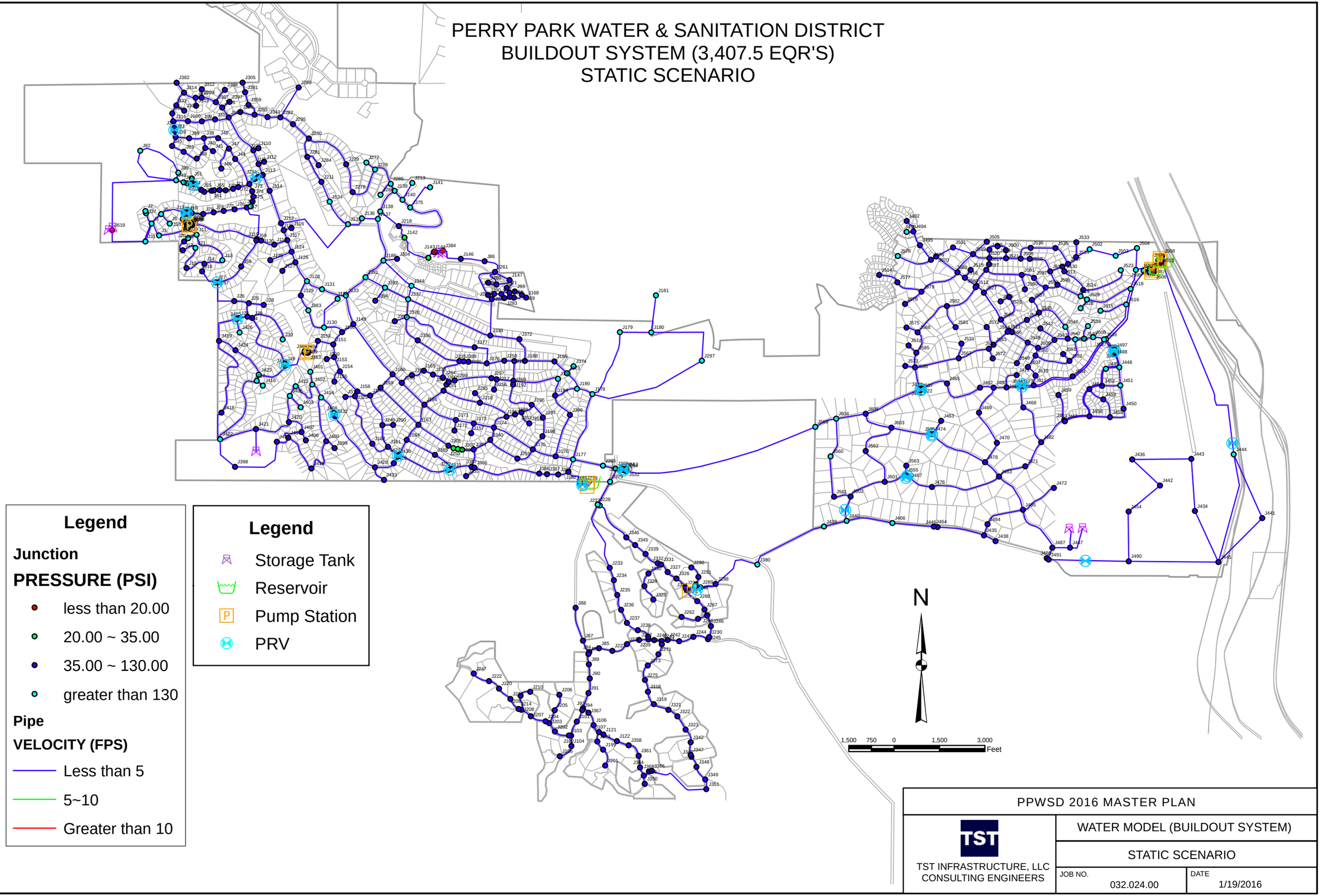
OVERALL SYSTEM INFORMATION

JOB NO. 032.024.00

DATE 1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

PERRY PARK WATER & SANITATION DISTRICT
BUILDOUT SYSTEM (3,407.5 EQR'S)
STATIC SCENARIO



Legend

Junction

PRESSURE (PSI)

- less than 20.00
- 20.00 ~ 35.00
- 35.00 ~ 130.00
- greater than 130

Pipe

VELOCITY (FPS)

- Less than 5
- 5~10
- Greater than 10

Legend

- Storage Tank
- Reservoir
- Pump Station
- PRV

PPWSD 2016 MASTER PLAN

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

WATER MODEL (BUILDOUT SYSTEM)

STATIC SCENARIO

JOB NO. 032.024.00

DATE 1/19/2016

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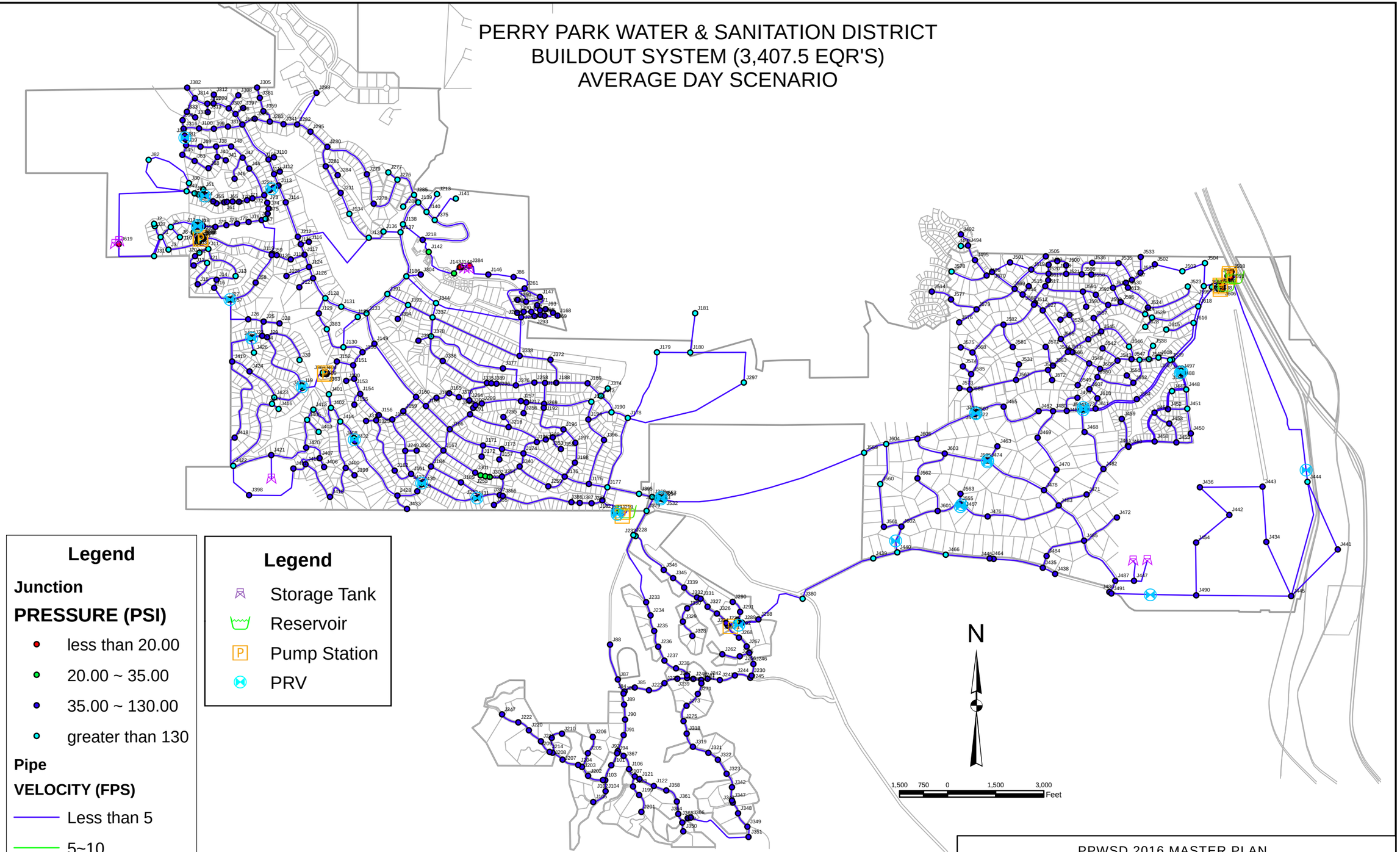
PERRY PARK WATER & SANITATION DISTRICT
BUILDOUT SYSTEM (3,407.5 EQR'S)
AVERAGE DAY SCENARIO



Legend

Junction

PRESSURE (PSI)

- less than 20.00
- 20.00 ~ 35.00
- 35.00 ~ 130.00
- greater than 130

Pipe

VELOCITY (FPS)

- Less than 5
- 5~10
- Greater than 10

Legend

- Storage Tank
- Reservoir
- Pump Station
- PRV

PPWSD 2016 MASTER PLAN

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

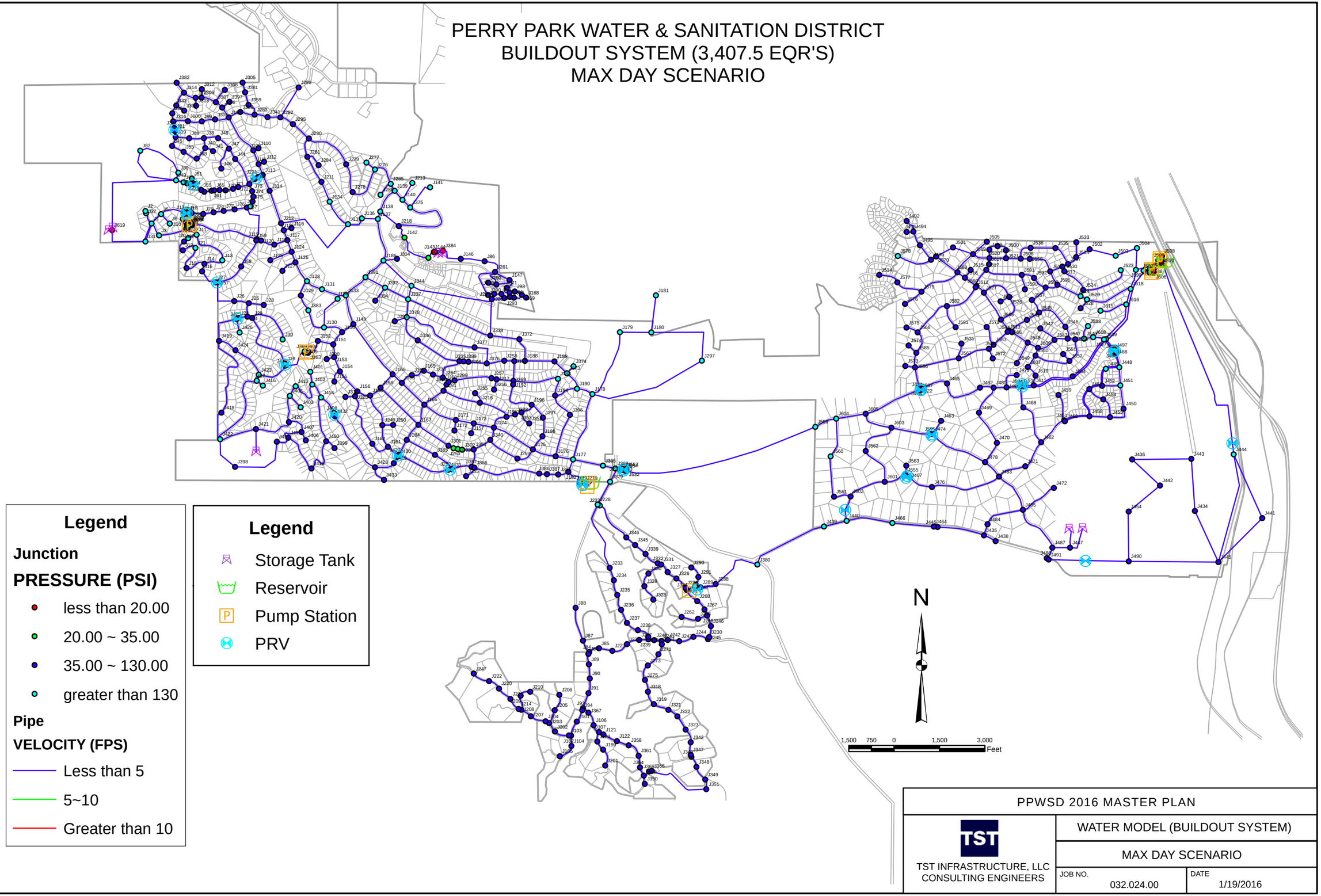
WATER MODEL (BUILDOUT SYSTEM)

AVERAGE DAY SCENARIO

JOB NO.	DATE
032.024.00	1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

PERRY PARK WATER & SANITATION DISTRICT
BUILDOUT SYSTEM (3,407.5 EQR'S)
MAX DAY SCENARIO



Legend

Junction

PRESSURE (PSI)

- less than 20.00
- 20.00 ~ 35.00
- 35.00 ~ 130.00
- greater than 130

Pipe

VELOCITY (FPS)

- Less than 5
- 5~10
- Greater than 10

Legend

- Storage Tank
- Reservoir
- Pump Station
- PRV

PPWSD 2016 MASTER PLAN

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

WATER MODEL (BUILDOUT SYSTEM)

MAX DAY SCENARIO

JOB NO. 032.024.00

DATE 1/19/2016

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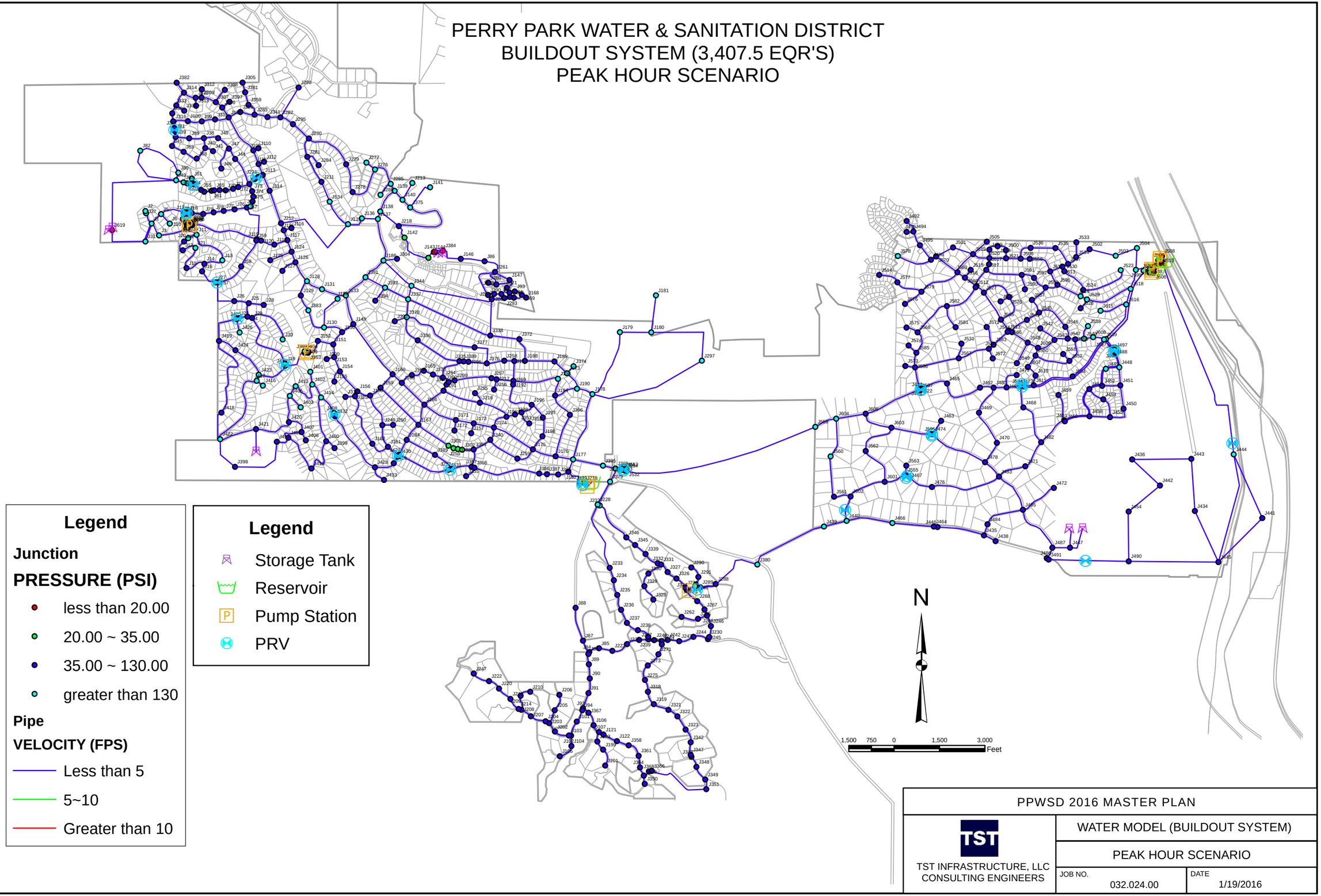
PERRY PARK WATER & SANITATION DISTRICT
BUILDOUT SYSTEM (3,407.5 EQR'S)
PEAK HOUR SCENARIO



Legend

Junction

PRESSURE (PSI)

- less than 20.00
- 20.00 ~ 35.00
- 35.00 ~ 130.00
- greater than 130

Pipe

VELOCITY (FPS)

- Less than 5
- 5~10
- Greater than 10

Legend

- Storage Tank
- Reservoir
- Pump Station
- PRV

PPWSD 2016 MASTER PLAN	
TST INFRASTRUCTURE, LLC CONSULTING ENGINEERS	WATER MODEL (BUILDOUT SYSTEM)
	PEAK HOUR SCENARIO
JOB NO. 032.024.00	DATE 1/19/2016

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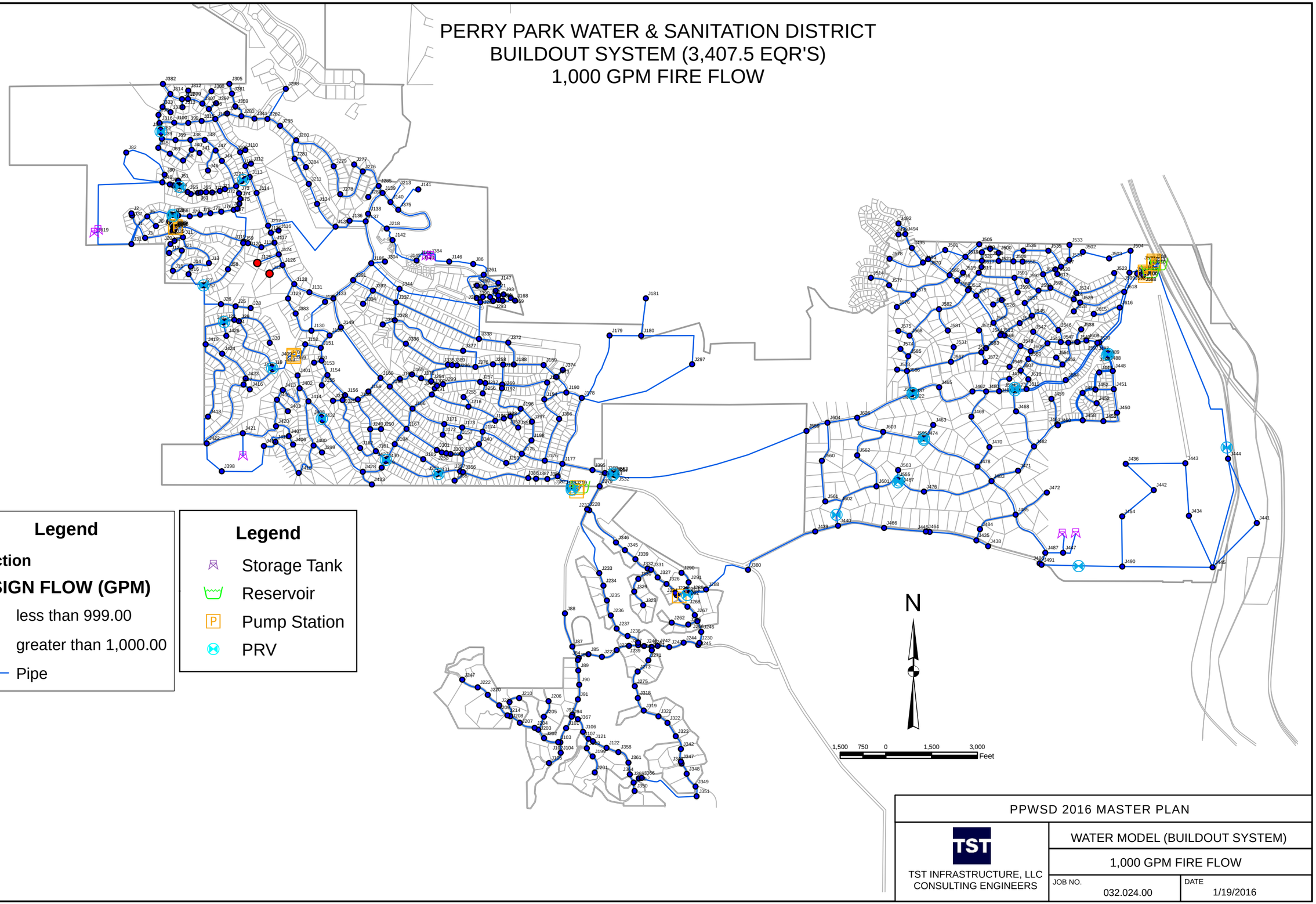
PERRY PARK WATER & SANITATION DISTRICT
BUILDOUT SYSTEM (3,407.5 EQR'S)
1,000 GPM FIRE FLOW



Legend

Junction

DESIGN FLOW (GPM)

- less than 999.00
- greater than 1,000.00
- Pipe

Legend

- Storage Tank
- Reservoir
- Pump Station
- PRV

PPWSD 2016 MASTER PLAN	
TST INFRASTRUCTURE, LLC CONSULTING ENGINEERS	WATER MODEL (BUILDOUT SYSTEM)
	1,000 GPM FIRE FLOW
JOB NO. 032.024.00	DATE 1/19/2016

Document Path: H:\Working Files\Document Files\Perry Park\032.024.00 Perry Park Master Plan\Water Model\PPWSD Model buildout_ASP_1-13-16.mxd

Appendix F

Wastewater Flow Tabulation & Model Results

PERRY PARK WATER AND SANITATION DISTRICT
SEWER DEMAND TABLE
CURRENT

Area	Development Filing	Block	Type of EQR	EQRs	Avg. Day Flow (gpd)	Peak Flow (gpd)	Peak Flow (gpm)
East Perry Park	**Sageport 1**	1	SF	36	5,688.0	24,174.0	16.79
		2	SF	25	3,950.0	16,787.5	11.66
		3	SF	11	1,738.0	7,386.5	5.13
		4	SF	13	2,054.0	8,729.5	6.06
		5	SF	9	1,422.0	6,043.5	4.20
		Total		**94**	**14,852.0**	**63,121.0**	**43.83**
	Sageport 2	1	SF	22	3,476.0	14,773.0	10.26
		2	SF	18	2,844.0	12,087.0	8.39
		3	SF	10	1,580.0	6,715.0	4.66
		4	SF	15	2,370.0	10,072.5	6.99
		5	SF	9	1,422.0	6,043.5	4.20
		6	SF	5	790.0	3,357.5	2.33
		7	SF	8	1,264.0	5,372.0	3.73
		8	SF	19	3,002.0	12,758.5	8.86
		9	SF	1	158.0	671.5	0.47
		10	SF	9	1,422.0	6,043.5	4.20
		11	SF	3	474.0	2,014.5	1.40
		12	SF	16	2,528.0	10,744.0	7.46
		13	SF	16	2,528.0	10,744.0	7.46
		14	SF	39	6,162.0	26,188.5	18.19
	(Assumed 0.8 EQR/Acre)	Unplatted	SF	0	0.0	0.0	0.00
		Total		**190**	**30,020.0**	**127,585.0**	**88.60**
	Sageport 4	N/A	SF	71	11,218.0	47,676.5	33.11
		Total		**71**	**11,218.0**	**47,676.5**	**33.11**
	Sageport 5	N/A	SF	0	0.0	0.0	0.00
		Total		**0**	**0.0**	**0.0**	**0.00**
	Sageport 6A	N/A	SF	7	1,106.0	4,700.5	3.26
		Total		**7**	**1,106.0**	**4,700.5**	**3.26**
	Sageport 6B	N/A	SF	42	6,636.0	28,203.0	19.59
		Total		**42**	**6,636.0**	**28,203.0**	**19.59**
Unplatted Areas	(Existing (2) 1" taps outside platted area)	Unplatted	SF	0	0.0	0.0	0.00
	(Assumed 5 Acre Lots)	Unplatted	SF	0	0.0	0.0	0.00
	Near Sageport 2	Unplatted	SF	0	0.0	0.0	0.00
		Total		**0**	**0.0**	**0.0**	**0.00**
	*EQRs From Taps Larger Than 5/8"		COMM	**31**	**4,898.0**	**20,816.5**	**14.46**
		Area Total		**435**	**68,730.0**	**292,102.5**	**202.85**
West Perry Park	**Perry Park 1**	PP1	SF	24.5	5,145.0	21,866.3	15.18
	(Including Tracts B & C)	**Total**		**24.5**	**5,145.0**	**21,866.3**	**15.18**
	Perry Park 2	1	SF	12	2,520.0	10,710.0	7.44
		2	SF	19	3,990.0	16,957.5	11.78
		3	SF	23	4,830.0	20,527.5	14.26
		4	SF	12	2,520.0	10,710.0	7.44
		5	SF	9	1,890.0	8,032.5	5.58
		6	SF	14	2,940.0	12,495.0	8.68
		7	SF	4	840.0	3,570.0	2.48
		8	SF	18	3,780.0	16,065.0	11.16
		9	SF	13	2,730.0	11,602.5	8.06
		10	SF	14	2,940.0	12,495.0	8.68
		11	SF	6	1,260.0	5,355.0	3.72
		Total		**144**	**30,240.0**	**128,520.0**	**89.25**

	Perry Park 3	1	SF	13	2,730.0	11,602.5	8.06
		2	SF	10	2,100.0	8,925.0	6.20
		Total		**23**	**4,830.0**	**20,527.5**	**14.26**
	Perry Park 4	1	SF	20	4,200.0	17,850.0	12.40
		2	SF	0	0.0	0.0	0.00
		3	SF	0	0.0	0.0	0.00
		4	SF	0	0.0	0.0	0.00
		5	SF	1	210.0	892.5	0.62
		6	SF	10	2,100.0	8,925.0	6.20
		Total		**31**	**6,510.0**	**27,667.5**	**19.21**
	Perry Park 5	1	SF	32	6,720.0	28,560.0	19.83
		2	SF	34	7,140.0	30,345.0	21.07
		3	SF	23	4,830.0	20,527.5	14.26
		4	SF	24	5,040.0	21,420.0	14.88
		5	SF	18	3,780.0	16,065.0	11.16
		6	SF	10	2,100.0	8,925.0	6.20
		7	SF	16	3,360.0	14,280.0	9.92
		8	SF	5	1,050.0	4,462.5	3.10
		9	SF	5	1,050.0	4,462.5	3.10
		10	SF	5	1,050.0	4,462.5	3.10
		11	SF	12	2,520.0	10,710.0	7.44
		12	SF	31	6,510.0	27,667.5	19.21
		13	SF	22	4,620.0	19,635.0	13.64
		14	SF	19	3,990.0	16,957.5	11.78
		15	SF	29	6,090.0	25,882.5	17.97
		16	SF	14	2,940.0	12,495.0	8.68
		17	SF	31.5	6,615.0	28,113.8	19.52
		18	SF	0	0.0	0.0	0.00
		19	SF	0	0.0	0.0	0.00
		20	SF	0	0.0	0.0	0.00
		21	SF	0	0.0	0.0	0.00
		22	SF	0	0.0	0.0	0.00
		23	SF	0	0.0	0.0	0.00
		24	SF	0	0.0	0.0	0.00
		25	SF	4	840.0	3,570.0	2.48
	(Assumed estimate from PPWSD)	Unplatted	SF	0	0.0	0.0	0.00
		Total		**334.5**	**70,245.0**	**298,541.3**	**207.32**
	Perry Park 6	1	SF	24	5,040.0	21,420.0	14.88
		2	SF	14	2,940.0	12,495.0	8.68
		3	SF	8	1,680.0	7,140.0	4.96
		4	SF	5	1,050.0	4,462.5	3.10
		5	SF	11	2,310.0	9,817.5	6.82
	(From Feasibility Study)	Unplatted	SF	0	0.0	0.0	0.00
		Total		**62**	**13,020.0**	**55,335.0**	**38.43**
	Perry Park 7	1	SF	12	2,520.0	10,710.0	7.44
		2	SF	0	0.0	0.0	0.00
		3	SF	0	0.0	0.0	0.00
		Total		**12**	**2,520.0**	**10,710.0**	**7.44**
	Perry Park 9	1	SF	12	2,520.0	10,710.0	7.44
		2	SF	13	2,730.0	11,602.5	8.06
		Total		**25**	**5,250.0**	**22,312.5**	**15.49**
	Perry Park 11	1	SF	3	630.0	2,677.5	1.86
		2	SF	9	1,890.0	8,032.5	5.58
		3	SF	2	420.0	1,785.0	1.24
		Total		**14**	**2,940.0**	**12,495.0**	**8.68**
	Perry Park 12	N/A	COMM	12	2,520.0	10,710.0	7.44
		Total		**12**	**2,520.0**	**10,710.0**	**7.44**

	Indian Head 1	1	SF	0	0.0	0.0	0.00
		2	SF	0	0.0	0.0	0.00
		3	SF	0	0.0	0.0	0.00
		4	SF	0	0.0	0.0	0.00
		Total		**0**	**0.0**	**0.0**	**0.00**
	Wauconda Lakes 0	N/A	MF	5	1,050.0	4,462.5	3.10
		Total		**5**	**1,050.0**	**4,462.5**	**3.10**
	Echo Hills Townhomes 1	N/A	MF	0	0.0	0.0	0.00
		Total		**0**	**0.0**	**0.0**	**0.00**
	Echo Hills Townhomes 2	N/A	MF	18	3,780.0	16,065.0	11.16
		Total		**18**	**3,780.0**	**16,065.0**	**11.16**
	Echo Village 1	N/A	MF	32	6,720.0	28,560.0	19.83
		Total		**32**	**6,720.0**	**28,560.0**	**19.83**
	Echo Village 2	N/A	MF	2	420.0	1,785.0	1.24
		Total		**2**	**420.0**	**1,785.0**	**1.24**
	Preo Perry Park Common Interest Community 0	N/A	MF	8	1,680.0	7,140.0	4.96
		Total		**8**	**1,680.0**	**7,140.0**	**4.96**
	Karabatsos Exemption 0	N/A	SF	2	420.0	1,785.0	1.24
		Total		**2**	**420.0**	**1,785.0**	**1.24**
	Perry Park Country Club	N/A	COMM	13	2,730.0	11,602.5	8.06
		Total		**13**	**2,730.0**	**11,602.5**	**8.06**
Unplatted Areas	(Assumed estimate from PPWSD)	Unplatted	SF	0	0.0	0.0	0.00
	(Assumed estimate from PPWSD)	Unplatted	SF	0	0.0	0.0	0.00
	(Assumed estimate from PPWSD)	Unplatted	SF	0	0.0	0.0	0.00
	(Assumed estimate from PPWSD)	Unplatted	SF	0	0.0	0.0	0.00
	(Estimated from est. density/road layout)	Unplatted	SF	20	4,200.0	17,850.0	12.40
	(Estimated from density and road layout)	Unplatted	MF	26	5,460.0	23,205.0	16.11
	Outside of Service Boundary (PCHF Gooding)	Existing	SF	0	0.0	0.0	0.00
		Total		**46**	**9,660.0**	**41,055.0**	**28.51**
	*EQRs From Taps Larger Than 5/8"		COMM	**32**	**6,720.0**	**28,560.0**	**19.83**
		Area Total		**840**	**176,400.0**	**749,700.0**	**520.63**
Remuda	**Remuda Ranch Exemption 0**	N/A	SF	0	0.0	0.0	0.00
		Area Total		**0**	**0.0**	**0.0**	**0.00**
Sandstone	**Sandstone Ranch Exception 0**	N/A	SF	0	0.0	0.0	0.00
		Area Total		**0**	**0.0**	**0.0**	**0.00**
Meribel	**Meribel Village**	N/A	SF	0	0.0	0.0	0.00
		Area Total		**0**	**0.0**	**0.0**	**0.00**
	Master Plan Totals:			**1275**	**245,130.0**	**1,041,802.5**	**723.48**

Avg. Day Demand (gpd/EQR):	210	(Waucondah WWTP)
Avg. Day Demand (gpd/EQR):	158	(Sageport WWTP)
Peaking Factor:	4.25	

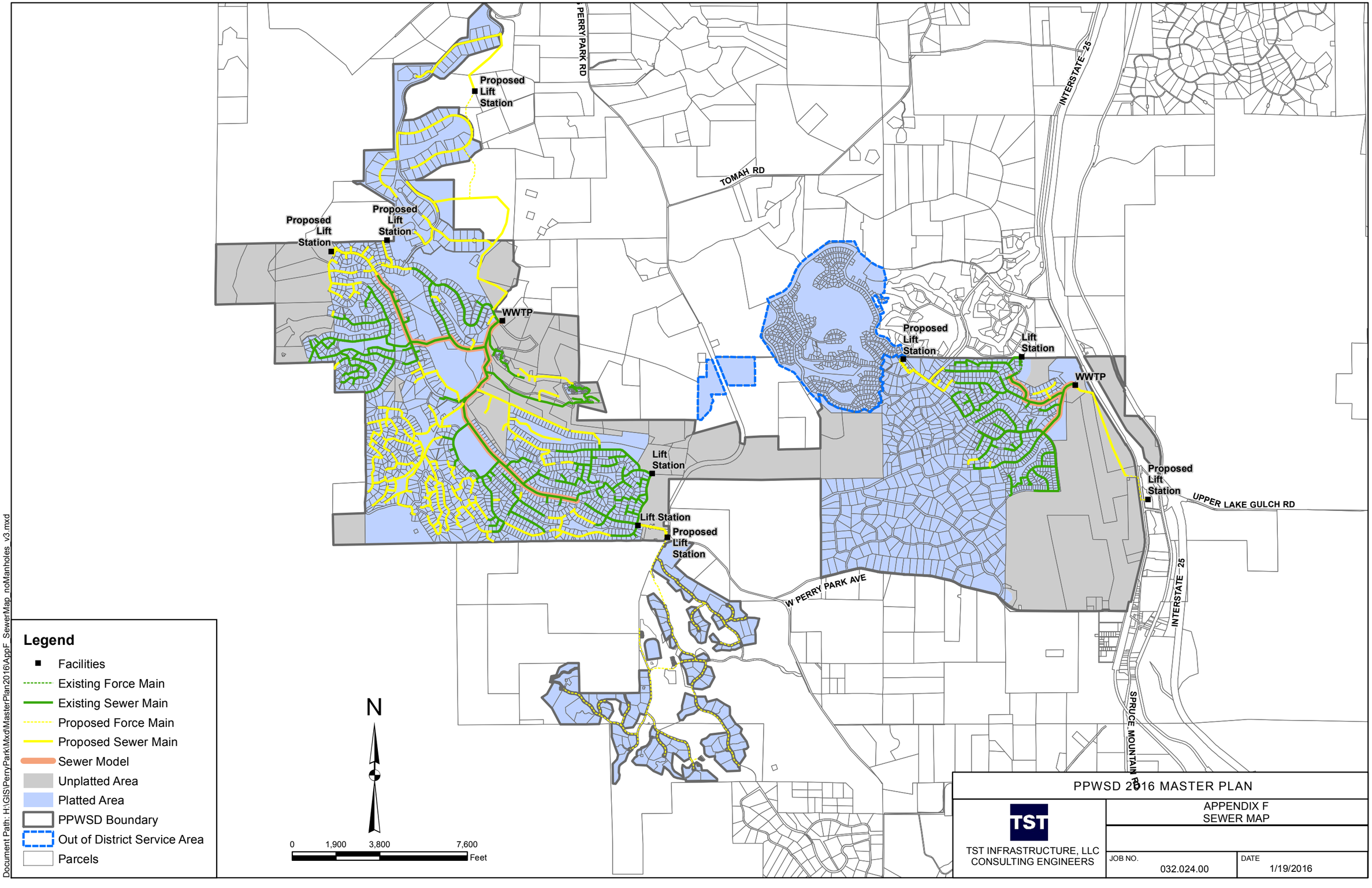
PERRY PARK WATER AND SANITATION DISTRICT
SEWER DEMAND TABLE
BUILDOUT

Area	Development Filing	Block	Type of EQR	EQRs	Avg. Day Flow (gpd)	Peak Flow (gpd)	Peak Flow (gpm)
East Perry Park	**Sageport 1**	1	SF	41	6,478.0	27,531.5	19.12
		2	SF	30	4,740.0	20,145.0	13.99
		3	SF	12	1,896.0	8,058.0	5.60
		4	SF	25	3,950.0	16,787.5	11.66
		5	SF	19	3,002.0	12,758.5	8.86
		Total		**127**	**20,066.0**	**85,280.5**	**59.22**
	Sageport 2	1	SF	25	3,950.0	16,787.5	11.66
		2	SF	19	3,002.0	12,758.5	8.86
		3	SF	14	2,212.0	9,401.0	6.53
		4	SF	16	2,528.0	10,744.0	7.46
		5	SF	10	1,580.0	6,715.0	4.66
		6	SF	12	1,896.0	8,058.0	5.60
		7	SF	16	2,528.0	10,744.0	7.46
		8	SF	21	3,318.0	14,101.5	9.79
		9	SF	1	158.0	671.5	0.47
		10	SF	10	1,580.0	6,715.0	4.66
		11	SF	4	632.0	2,686.0	1.87
		12	SF	23	3,634.0	15,444.5	10.73
		13	SF	16	2,528.0	10,744.0	7.46
		14	SF	43	6,794.0	28,874.5	20.05
	(Assumed 0.8 EQR/Acre)	Unplatted	SF	18	2,844.0	12,087.0	8.39
		Total		**248**	**39,184.0**	**166,532.0**	**115.65**
	Sageport 4	N/A	SF	63	9,954.0	42,304.5	29.38
		Total		**63**	**9,954.0**	**42,304.5**	**29.38**
	Sageport 5	N/A	SF	32	5,056.0	21,488.0	14.92
		Total		**32**	**5,056.0**	**21,488.0**	**14.92**
	Sageport 6A	N/A	SF	7	1,106.0	4,700.5	3.26
		Total		**7**	**1,106.0**	**4,700.5**	**3.26**
	Sageport 6B	N/A	SF	45	7,110.0	30,217.5	20.98
		Total		**45**	**7,110.0**	**30,217.5**	**20.98**
Unplatted Areas	(Existing (2) 1" taps outside platted area)	Unplatted	SF	5	790.0	3,357.5	2.33
	(Assumed 5 Acre Lots)	Unplatted	SF	147	23,226.0	98,710.5	68.55
	Near Sageport 2	Unplatted	SF	2.5	395.0	1,678.8	1.17
		Total		**154.5**	24,411.0	103,746.8	72.05
	*EQRs From Taps Larger Than 5/8"		COMM	**31**	**4,898.0**	**20,816.5**	**14.46**
		Area Total		**707.5**	**111,785.0**	**475,086.3**	**329.92**
West Perry Park	**Perry Park 1**	PP1	SF	51	10,710.0	45,517.5	31.61
	(Including Tracts B & C)	**Total**		**51**	**10,710.0**	**45,517.5**	**31.61**
	Perry Park 2	1	SF	12	2,520.0	10,710.0	7.44
		2	SF	20	4,200.0	17,850.0	12.40
		3	SF	25	5,250.0	22,312.5	15.49
		4	SF	12	2,520.0	10,710.0	7.44
		5	SF	10	2,100.0	8,925.0	6.20
		6	SF	14	2,940.0	12,495.0	8.68
		7	SF	4	840.0	3,570.0	2.48
		8	SF	19	3,990.0	16,957.5	11.78
		9	SF	15	3,150.0	13,387.5	9.30
		10	SF	16	3,360.0	14,280.0	9.92
		11	SF	6	1,260.0	5,355.0	3.72
		Total		**153**	**32,130.0**	**136,552.5**	**94.83**
	Perry Park 3	1	SF	23	4,830.0	20,527.5	14.26
		2	SF	12	2,520.0	10,710.0	7.44
		Total		**35**	**7,350.0**	**31,237.5**	**21.69**

	Perry Park 4	1	SF	35	7,350.0	31,237.5	21.69
		2	SF	19	3,990.0	16,957.5	11.78
		3	SF	26	5,460.0	23,205.0	16.11
		4	SF	8	1,680.0	7,140.0	4.96
		5	SF	9	1,890.0	8,032.5	5.58
		6	SF	24	5,040.0	21,420.0	14.88
		Total		**121**	**25,410.0**	**107,992.5**	**74.99**
	Perry Park 5	1	SF	31	6,510.0	27,667.5	19.21
		2	SF	43	9,030.0	38,377.5	26.65
		3	SF	39	8,190.0	34,807.5	24.17
		4	SF	29	6,090.0	25,882.5	17.97
		5	SF	28	5,880.0	24,990.0	17.35
		6	SF	16	3,360.0	14,280.0	9.92
		7	SF	35	7,350.0	31,237.5	21.69
		8	SF	18	3,780.0	16,065.0	11.16
		9	SF	29	6,090.0	25,882.5	17.97
		10	SF	18	3,780.0	16,065.0	11.16
		11	SF	23	4,830.0	20,527.5	14.26
		12	SF	40	8,400.0	35,700.0	24.79
		13	SF	23	4,830.0	20,527.5	14.26
		14	SF	21	4,410.0	18,742.5	13.02
		15	SF	34	7,140.0	30,345.0	21.07
		16	SF	22	4,620.0	19,635.0	13.64
		17	SF	76.5	16,065.0	68,276.3	47.41
		18	SF	46	9,660.0	41,055.0	28.51
		19	SF	42	8,820.0	37,485.0	26.03
		20	SF	19	3,990.0	16,957.5	11.78
		21	SF	6	1,260.0	5,355.0	3.72
		22	SF	41	8,610.0	36,592.5	25.41
		23	SF	16	3,360.0	14,280.0	9.92
		24	SF	14	2,940.0	12,495.0	8.68
		25	SF	7	1,470.0	6,247.5	4.34
	(Assumed estimate from PPWSD)	Unplatted	SF	6	1,260.0	5,355.0	3.72
		Total		**722.5**	**151,725.0**	**644,831.3**	**447.80**
	Perry Park 6	1	SF	25	5,250.0	22,312.5	15.49
		2	SF	26	5,460.0	23,205.0	16.11
		3	SF	10	2,100.0	8,925.0	6.20
		4	SF	18	3,780.0	16,065.0	11.16
		5	SF	55	11,550.0	49,087.5	34.09
	(From Feasibility Study)	Unplatted	SF	11	2,310.0	9,817.5	6.82
		Total		**145**	**30,450.0**	**129,412.5**	**89.87**
	Perry Park 7	1	SF	27	5,670.0	24,097.5	16.73
		2	SF	10	2,100.0	8,925.0	6.20
		3	SF	5	1,050.0	4,462.5	3.10
		Total		**42**	**8,820.0**	**37,485.0**	**26.03**
	Perry Park 9	1	SF	25	5,250.0	22,312.5	15.49
		2	SF	28	5,880.0	24,990.0	17.35
		Total		**53**	**11,130.0**	**47,302.5**	**32.85**
	Perry Park 11	1	SF	3	630.0	2,677.5	1.86
		2	SF	9	1,890.0	8,032.5	5.58
		3	SF	2	420.0	1,785.0	1.24
		Total		**14**	**2,940.0**	**12,495.0**	**8.68**
	Perry Park 12	N/A	COMM	16	3,360.0	14,280.0	9.92
		Total		**16**	**3,360.0**	**14,280.0**	**9.92**
	Indian Head 1	1	SF	16	3,360.0	14,280.0	9.92
		2	SF	27	5,670.0	24,097.5	16.73
		3	SF	32	6,720.0	28,560.0	19.83
		4	SF	11	2,310.0	9,817.5	6.82
		Total		**86**	**18,060.0**	**76,755.0**	**53.30**

	Wauconda Lakes 0	N/A	MF	5	1,050.0	4,462.5	3.10
		Total		**5**	**1,050.0**	**4,462.5**	**3.10**
	Echo Hills Townhomes 1	N/A	MF	9	1,890.0	8,032.5	5.58
		Total		**9**	**1,890.0**	**8,032.5**	**5.58**
	Echo Hills Townhomes 2	N/A	MF	18	3,780.0	16,065.0	11.16
		Total		**18**	**3,780.0**	**16,065.0**	**11.16**
	Echo Village 1	N/A	MF	32	6,720.0	28,560.0	19.83
		Total		**32**	**6,720.0**	**28,560.0**	**19.83**
	Echo Village 2	N/A	MF	4	840.0	3,570.0	2.48
		Total		**4**	**840.0**	**3,570.0**	**2.48**
	Preo Perry Park Common Interest Community 0	N/A	MF	8	1,680.0	7,140.0	4.96
		Total		**8**	**1,680.0**	**7,140.0**	**4.96**
	Karabatsos Exemption 0	N/A	SF	2	420.0	1,785.0	1.24
		Total		**2**	**420.0**	**1,785.0**	**1.24**
	Perry Park Country Club	N/A	COMM	13	2,730.0	11,602.5	8.06
		Total		**13**	**2,730.0**	**11,602.5**	**8.06**
Unplatted Areas	(Assumed estimate from PPWSD)	Unplatted	SF	20	4,200.0	17,850.0	12.40
	(Assumed estimate from PPWSD)	Unplatted	SF	4	840.0	3,570.0	2.48
	(Assumed estimate from PPWSD)	Unplatted	SF	5	1,050.0	4,462.5	3.10
	(Assumed estimate from PPWSD)	Unplatted	SF	0	0.0	0.0	0.00
	(Estimated from density and road layout)	Unplatted	SF/COMM	72.5	15,225.0	64,706.3	44.93
	(Estimated from density and road layout)	Unplatted	MF	71	14,910.0	63,367.5	44.01
	Outside of Service Boundary (PCHF Gooding)	Existing	SF	0	0.0	0.0	0.00
		Total		**172.5**	**36,225.0**	**153,956.3**	**106.91**
	*EQRs From Taps Larger Than 5/8"		COMM	**32**	**6,720.0**	**28,560.0**	**19.83**
		Area Total		**1734**	**364,140.0**	**1,547,595.0**	**1,074.72**
Remuda	**Remuda Ranch Exemption 0**	N/A	SF	87	18,270.0	77,647.5	53.92
		Area Total		**87**	**18,270.0**	**77,647.5**	**53.92**
Sandstone	**Sandstone Ranch Exception 0**	N/A	SF	110	23,100.0	98,175.0	68.18
		Area Total		**110**	**23,100.0**	**98,175.0**	**68.18**
Meribel	**Meribel Village**	N/A	SF	482	76,156.0	323,663.0	224.77
		Area Total		**482**	**76,156.0**	**323,663.0**	**224.77**
	Master Plan Totals:			**3120.5**	**593,451.0**	**2,522,166.8**	**1,751.51**

Avg. Day Demand (gpd/EQR):	210	(Waucondah WWTP)
Avg. Day Demand (gpd/EQR):	158	(Sageport WWTP)
Peaking Factor:	4.25	



PPWSD 2016 MASTER PLAN

APPENDIX F
SEWER MAP

TST INFRASTRUCTURE, LLC
CONSULTING ENGINEERS

JOB NO. 032.024.00

DATE 1/19/2016

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PERRY PARK WATER AND SANITATION DISTRICT
EAST PERRY PARK
SEWER MODEL

Peaking Factor: 4.25
n= 0.013
① * Inforation was collected from as-built drawings provided by PPWSD.
② * Information was collected from the 2009 Master Plan Update.

UPSTREAM MH			DOWNSTREAM MH		PIPE INFORMATION			ACTUAL FLOW									CALCULATED PIPE CAPACITY					
MH No.	RIM Elev.①	INVERT OUT①	MH No.	INVERT IN①	LENGTH①	DIAMETER①	SLOPE①	EQR CONTRIBUTING TO WW FLOW AT UPSTREAM MH	EQR CONTRIBUTING TO WW FLOW BY LIFT STATION	TOTAL EQR CONTRIBUTING TO WW FLOW AT UPSTREAM MH	WASTEWATER① FLOW PER EQR	AVG. FLOW	PEAK FLOW	PEAK FLOW FROM LIFT STATION	TOTAL PEAK FLOW	PEAK FLOW	PIPE AREA	FULL PIPE HYDRAULIC RADIUS	FULL PIPE FLOW	FULL PIPE FLOW	AVAILABLE CAPACITY @ PEAK FLOW	ADEQUATE PIPE CAPACITY?
					(ft)	(in)	(ft/ft)				(gpd)	(gpm)	(gpm)	(gpm)	(gpm)	(cfs)	ft^2	(ft)	(cfs)	(gpm)	(gpm)	
MARSHALL ROAD & KENOSHA DRIVE																						
BOR-1	6784.50	6775.30	D-3	6765.20	240.00	8	0.0429	32	64	96	158	3.51	14.92	80.00	94.92	0.21	0.35	0.17	2.54	1139.95	1045.03	YES
D-3	6774.70	6765.00	D-2	6741.90	350.00	8	0.066	36	64	100	158	3.95	16.79	80.00	96.79	0.22	0.35	0.17	3.15	1413.72	1316.93	YES
D-2	6749.70	6741.70	D-1	6716.70	334.10	8	0.0748	38	64	102	158	4.17	17.72	80.00	97.72	0.22	0.35	0.17	3.36	1507.97	1410.25	YES
D-1	6724.50	6716.50	D-0	6706.50	191.00	8	0.0524	40	64	104	158	4.39	18.65	80.00	98.65	0.22	0.35	0.17	2.81	1261.13	1162.48	YES
D-0	6714.30	6706.30	IC-7	6695.70	202.00	8	0.0525	42	64	106	158	4.61	19.59	80.00	99.59	0.22	0.35	0.17	2.81	1261.13	1161.54	YES
IC-7	6706.40	6695.20	IC-6	6682.80	261.50	8	0.0474	602	64	666	158	66.05	280.72	80.00	360.72	0.80	0.35	0.17	2.67	1198.30	837.58	YES
IC-6	6692.20	6682.60	IC-5	6670.10	277.30	8	0.0451	610	64	674	158	66.93	284.45	80.00	364.45	0.81	0.35	0.17	2.61	1171.37	806.92	YES
IC-5	6679.40	6670.00	IC-4	6660.30	280.00	8	0.0346	612	64	676	158	67.15	285.39	80.00	365.39	0.81	0.35	0.17	2.28	1023.26	657.87	YES
IC-4	6669.30	6660.10	IC-3	6652.70	224.80	8	0.0329	616	64	680	158	67.59	287.25	80.00	367.25	0.82	0.35	0.17	2.23	1000.82	633.57	YES
IC-3	6662.00	6652.50	IC-2	6639.40	350.00	8	0.0374	637	64	701	158	69.89	297.05	80.00	377.05	0.84	0.35	0.17	2.37	1063.66	686.61	YES
IC-2	6649.20	6639.20	IC-1	6635.00	330.00	8	0.0127	637	64	701	158	69.89	297.05	80.00	377.05	0.84	0.35	0.17	1.38	619.34	242.29	YES
IC-1	6642.80	6634.80	IA-0	6627.00	145.00	8	0.0538	637	64	701	158	69.89	297.05	80.00	377.05	0.84	0.35	0.17	2.85	1279.08	902.03	YES
TENDERFOOT DRIVE																						
IA-6	6699.70	6690.90	IA-5	6678.20	330.00	8	0.0384	285	0	285	158	31.27	132.90	0.00	132.90	0.30	0.35	0.17	2.41	1081.61	948.71	YES
IA-5	6688.30	6678.00	IA-4	6666.10	350.00	8	0.034	287	0	287	158	31.49	133.83	0.00	133.83	0.30	0.35	0.17	2.26	1014.29	880.46	YES
IA-4	6676.00	6665.90	IA-3	6657.10	350.00	8	0.0251	291	0	291	158	31.93	135.70	0.00	135.70	0.30	0.35	0.17	1.95	875.16	739.46	YES
IA-3	6667.20	6656.90	IA-2	6635.30	348.00	8	0.0621	291	0	291	158	31.93	135.70	0.00	135.70	0.30	0.35	0.17	3.06	1373.33	1237.63	YES
IA-2	6643.20	6635.10	IA-1	6631.50	110.00	8	0.0327	291	0	291	158	31.93	135.70	0.00	135.70	0.30	0.35	0.17	2.22	996.34	860.64	YES
IA-1	6641.00	6631.30	IA-01	6628.50	245.00	10	0.0085	335	0	335	158	36.76	156.22	0.00	156.22	0.35	0.55	0.21	2.04	915.55	759.33	YES
IA-01	Not Listed	6629.21	IA-0	6627.00	270.00	10	0.0085	335	0	335	158	36.76	156.22	0.00	156.22	0.35	0.55	0.21	2.04	915.55	759.33	YES
IA-0	6636.20	6626.70	IB-1	6623.20	172.00	10	0.0203	972	64	1036	158	106.65	453.26	80.00	533.26	1.19	0.55	0.21	3.15	1413.72	880.46	YES
IB-1	6636.50	6623.00	IB-2	6622.20	100.00	10	0.008	972	64	1036	158	106.65	453.26	80.00	533.26	1.19	0.55	0.21	1.98	888.62	355.36	YES
IB-2	6637.00	6622.00	IB-3	6621.30	75.00	10	0.0093	972	64	1036	158	106.65	453.26	80.00	533.26	1.19	0.55	0.21	2.13	955.94	422.68	YES
IB-3	6636.00	6621.20	IB-4	6620.10	215.00	10	0.0051	972	64	1036	158	106.65	453.26	80.00	533.26	1.19	0.55	0.21	1.58	709.10	175.84	YES
IB-4	6629.80	6620.00	IB-4A	6619.70	80.00	10	0.0056	1125.5	64	1189.5	158	123.49	524.84	80.00	604.84	1.35	0.55	0.21	1.65	740.52	135.68	YES

Peaking Factor: 4.25

PERRY PARK WATER AND SANITATION DISTRICT
WEST PERRY PARK
SEWER MODEL

Peaking Factor: 4.25
Manning's Eqn. n= 0.013
① * Information was collected from as-built drawings provided by PPWSD.
② * Information was collected from the 2009 Master Plan Update.

UPSTREAM MH			DOWNSTREAM MH		PIPE INFORMATION			ACTUAL FLOW									CALCULATED PIPE CAPACITY					
MH No.	RIM Elev. ①	INVERT OUT ①	MH No.	INVERT IN ①	LENGTH ①	DIAMETER ①	SLOPE ①	EQR CONTRIBUTING TO WW FLOW AT UPSTREAM MH	EQR CONTRIBUTING TO WW FLOW BY LIFT STATION AT UPSTREAM MH	TOTAL EQR CONTRIBUTING TO WW FLOW AT UPSTREAM MH	WASTEWATER ① FLOW PER EQR	AVG. FLOW FROM GRAVITY EQR	PEAK FLOW FROM GRAVITY EQR	PEAK FLOW FROM LIFT STATION	TOTAL PEAK FLOW	TOTAL PEAK FLOW	PIPE AREA	FULL PIPE HYDRAULIC RADIUS	FULL PIPE FLOW	FULL PIPE FLOW	AVAILABLE CAPACITY @ PEAK FLOW	ADEQUATE PIPE CAPACITY?
					(ft)	(in)	(ft/ft)				(gpd)	(gpm)	(gpm)	(gpm)	(gpm)	(cfs)	ft^2	(ft)	(cfs)	(gpm)	(gpm)	
RED ROCK DRIVE & PERRY PARK BLVD.																						
PP5-4	6645.20	6638.70	PP5-3	6637.00	345.00	8	0.0049	4	498.5	502.5	210	0.58	2.48	352.00	354.48	0.79	0.35	0.17	0.86	385.97	31.49	YES
PP5-3	6643.80	6636.80	PP5-2	6631.90	345.00	8	0.0142	25	498.5	523.5	210	3.65	15.49	352.00	367.49	0.82	0.35	0.17	1.46	655.25	287.76	YES
PP5-2	6640.70	6631.70	PP5-1	6624.60	294.70	8	0.0241	25	498.5	523.5	210	3.65	15.49	352.00	367.49	0.82	0.35	0.17	1.91	857.21	489.72	YES
PP5-1	6633.90	6624.40	E-16	6617.92	300.00	8	0.0216	25	498.5	523.5	210	3.65	15.49	352.00	367.49	0.82	0.35	0.17	1.80	807.84	440.35	YES
E-16	6626.35	6617.81	E-15	6612.20	350.00	8	0.0424	25	498.5	523.5	210	3.65	15.49	352.00	367.49	0.82	0.35	0.17	2.53	1135.46	767.97	YES
E-15	6614.65	6602.87	E-14	6591.07	305.00	8	0.0380	25	498.5	523.5	210	3.65	15.49	352.00	367.49	0.82	0.35	0.17	2.39	1072.63	705.14	YES
E-14	6602.97	6590.71	E-13	6579.30	305.00	8	0.0452	25	498.5	523.5	210	3.65	15.49	352.00	367.49	0.82	0.35	0.17	2.61	1171.37	803.88	YES
E-13	6587.41	6579.12	E-12	6577.01	252.00	8	0.0084	25	498.5	523.5	210	3.65	15.49	352.00	367.49	0.82	0.35	0.17	1.12	502.66	135.17	YES
E-12	6582.42	6576.01	E-11	6561.61	300.00	8	0.0480	56	498.5	554.5	210	8.17	34.71	352.00	386.71	0.86	0.35	0.17	2.69	1207.27	820.56	YES
E-11	6569.48	6561.51	E-10	6545.07	300.00	8	0.0548	56	498.5	554.5	210	8.17	34.71	352.00	386.71	0.86	0.35	0.17	2.87	1288.06	901.35	YES
E-10	6550.18	6544.97	E-9	6529.40	225.00	8	0.0692	56	498.5	554.5	210	8.17	34.71	352.00	386.71	0.86	0.35	0.17	3.23	1449.62	1062.91	YES
E-9	6534.80	6522.56	E-8	6511.76	200.00	8	0.0540	135	498.5	633.5	210	19.69	83.67	352.00	435.67	0.97	0.35	0.17	2.85	1279.08	843.41	YES
E-8	6520.81	6511.66	E-7	6504.10	230.00	8	0.0336	150	498.5	648.5	210	21.88	92.97	352.00	444.97	0.99	0.35	0.17	2.25	1009.80	564.83	YES
E-7	6509.98	6504.00	E-6	6492.12	200.00	8	0.0594	150	498.5	648.5	210	21.88	92.97	352.00	444.97	0.99	0.35	0.17	2.99	1341.91	896.94	YES
E-6	6500.75	6492.04	E-5	6479.17	390.00	8	0.0330	290	498.5	788.5	210	42.29	179.74	352.00	531.74	1.18	0.35	0.17	2.23	1000.82	469.08	YES
E-5	6486.74	6479.07	E-4	6475.87	200.00	8	0.0155	290	498.5	788.5	210	42.29	179.74	352.00	531.74	1.18	0.35	0.17	1.53	686.66	154.92	YES
E-4	6482.84	6475.87	E-3	6463.23	390.00	8	0.0324	290	498.5	788.5	210	42.29	179.74	352.00	531.74	1.18	0.35	0.17	2.21	991.85	460.11	YES
E-3	6469.52	6463.13	E-2	6451.27	390.00	8	0.0304	290	498.5	788.5	210	42.29	179.74	352.00	531.74	1.18	0.35	0.17	2.14	960.43	428.69	YES
E-2	6457.97	6451.17	E-1	6441.19	390.00	8	0.0256	290	498.5	788.5	210	42.29	179.74	352.00	531.74	1.18	0.35	0.17	1.96	879.65	347.91	YES
E-1	6447.22	6441.09	A-22	6423.09	374.14	10	0.0483	290	498.5	788.5	210	42.29	179.74	352.00	531.74	1.18	0.55	0.21	4.85	2176.68	1644.94	YES
A-22	6431.13	6422.93	A-21	6416.00	244.00	12	0.0284	442.5	498.5	941	210	64.53	274.26	352.00	626.26	1.40	0.79	0.25	6.02	2701.78	2075.52	YES
A-21	6424.70	6416.00	A-20	6405.92	300.00	12	0.0336	442.5	498.5	941	210	64.53	274.26	352.00	626.26	1.40	0.79	0.25	6.55	2939.64	2313.38	YES
A-20	6412.92	6405.92	A-19	6386.64	315.00	12	0.0612	442.5	498.5	941	210	64.53	274.26	352.00	626.26	1.40	0.79	0.25	8.84	3967.39	3341.13	YES
A-19	6399.25	6386.64	A-18	6386.11	265.00	15	0.0020	628.5	498.5	1127	210	91.66	389.54	352.00	741.54	1.65	1.23	0.31	2.88	1292.54	551.00	YES
A-18	6390.50	6386.11	A-17E	6385.31	400.00	15	0.0020	647.5	498.5	1146	210	94.43	401.32	352.00	753.32	1.68	1.23	0.31	2.88	1292.54	539.22	YES
A-17E	6390.67	6385.31	A-17	6384.61	350.00	15	0.0020	715.5	498.5	1214	210	104.34	443.46	352.00	795.46	1.77	1.23	0.31	2.88	1292.54	497.08	YES
A-17	6388.40	6384.61	A-16	6384.21	200.00	15	0.0020	715.5	498.5	1214	210	104.34	443.46	352.00	795.46	1.77	1.23	0.31	2.88	1292.54	497.08	YES
A-16	6387.74	6384.21	A-15	6383.64	285.00	15	0.0020	715.5	498.5	1214	210	104.34	443.46	352.00	795.46	1.77	1.23	0.31	2.88	1292.54	497.08	YES
A-15	6389.43	6383.64	A-14	6383.24	200.00	15	0.0020	715.5	498.5	1214	210	104.34	443.46	352.00	795.46	1.77	1.23	0.31	2.88	1292.54	497.08	YES
A-14	6391.30	6383.24	A-13	6382.59	325.00	15	0.0020	830.5	498.5	1329	210	121.11	514.74	352.00	866.74	1.93	1.23	0.31	2.88	1292.54	425.80	YES
A-13	6391.00	6382.59	A-12	6381.95	320.00	15	0.0020	830.5	498.5	1329	210	121.11	514.74	352.00	866.74	1.93	1.23	0.31	2.88	1292.54	425.80	YES
A-12	6391.00	6381.95	A-11	6381.46	245.00	15	0.0020	843.5	498.5	1342	210	123.01	522.79	352.00	874.79	1.95	1.23	0.31	2.88	1292.54	417.75	YES
A-11	6391.00	6381.46	A-10	6380.60	231.00	15	0.0020	848.5	498.5	1347	210	123.74	525.89	352.00	877.89	1.96	1.23	0.31	2.88	1292.54	414.65	YES
A-10	6391.31	6380.60	A-7	6377.28	92.50	12	0.0480	848.5	498.5	1347	210	123.74	525.89	352.00	877.89	1.96	0.79	0.25	7.83	3514.10	2636.21	YES
A-7	6383.00	6377.28	A-6	6361.00	92.50	12	0.0480	1161.5	602.5	1764	210	169.39	719.89	352.00	1071.89	2.39	0.79	0.25	7.83	3514.10	2442.21	YES
A-6	6366.50	6361.00	A-5	6344.48	370.00	15	0.0200	1161.5	602.5	1764	210	169.39	719.89	352.00	1071.89	2.39	1.23	0.31	9.11	4088.57	3016.68	YES
A-5	6348.64	6344.48	A-4	6339.68	240.00	15	0.0200	1161.5	602.5	1764	210	169.39	719.89	352.00	1071.89	2.39	1.23	0.31	9.11	4088.57	3016.68	YES
A-4	Not Listed	6339.68	A-3	6335.48	210.00	15	0.0200	1188.5	602.5	1791	210	173.32	736.62	352.00	1088.62	2.43	1.23	0.31	9.11	4088.57	2999.95	YES
A-3	6340.00	6335.48	A-2	6327.48	400.00	15	0.0200	1188.5	602.5	1791	210	173.32	736.62	352.00	1088.62	2.43	1.23	0.31	9.11	4088.57	2999.95	YES
A-2	6326.09	6327.48	A-1/ WWTP	6327.40	100.00	15	0.0200	1328.5	602.5	1931	210	193.74	823.39	352.00	1175.39	2.62	1.23	0.31	9.11	4088.57	2913.18	YES
PERRY PARK BLVD. & WAUCONDAH																						
14	6609.31	6604.11	13	6603.58	140.00	8	0.0042	47	104	151	210	6.85	29.13	0.00	29.13	0.06	0.35	0.17	0.80	359.04	329.91	YES
13	6610.03	6603.38	12	6592.32	262.00	8	0.0420	47	104	151	210	6.85	29.13	0.00	29.13	0.06	0.35	0.17	2.52	1130.98	1101.85	YES
12	6596.82	6592.12	11	6583.93	138.00	8	0.0630	47	104	151	210	6.85	29.13	0.00	29.13	0.06	0.35	0.17	3.08	1382.30	1353.17	YES
11	6588.43	6583.73	10	6568.43	238.00	8	0.0650	47	104	151	210	6.85	29.13	0.00	29.13	0.06	0.35	0.17	3.13	1404.74	1375.61	YES
10	6575.03	6568.23	9	6556.30	187.00	8	0.0635	47	104	151	210	6.85	29.13	0.00	29.13	0.06	0.35	0.17	3.09	1386.79	1357.66	YES
9	6565.45	6550.75	8	6549.69	231.00	8	0.0042	47	104	151	210	6.85	29.13	0.00	29.13	0.06	0.35	0.17	0.80	359.04	329.91	YES
8	6557.89	6549.49	7	6540.91	231.00	8	0.0361	47	104	151	210	6.85	29.13	0.00	29.13	0.06	0.35	0.17	2.33	1045.70	1016.57	YES
7	6549.34	6534.14	6	6528.13	318.00	8	0.0189	47	104	151	210	6.85	29.13	0.00	29.13	0.06	0.35	0.17	1.69	758.47	729.34	YES
6	6534.22	6528.10	5	6505.50	343.00	8	0.0400	47	104	151	210	6.85	29.13	0.00	29.13	0.06	0.35	0.17	2.46	1104.05	1074.92	YES
5	6513.00	6505.30	4	6500.50	331.53	8	0.0145	62	104	166	210	9.04	38.43	0.00	38.43	0.09	0.35	0.17	1.48	664.22	625.79	YES
4	6507.30	6500.50	3	6492.50	203.65	8	0.0393	62	104	166	210	9.04	38.43	0.00	38.43	0.09	0.35	0.17	2.43	1090.58	1052.15	YES
3	6500.00	6492.50	2	6485.93	254.00	8	0.0259	62	104	166	210	9.04	38.43	0.00	38.43	0.09	0.35	0.17	1.98	888.62	850.19	YES
2	6490.96	6485.45	1	6483.75	400.00	8	0.0043	62	104	166	210	9.04	38.43	0.00	38.43	0.09	0.35	0.17	0.80	359.04	320.61	YES
1	6495.00	6483.55	9A	6483.05	196.00	8	0.0040	278	104	382	210	40.54	172.30	0.00	172.30	0.38	0.35	0.17	0.78	350.06	177.76	YES
9A	6490.50	6482.85	B-9	6482.65	50.00	8	0.0040	278	104	382	210	40.54	172.30	0.00	172.30	0.38	0.35	0.17	0.78	350.06	177.76	YES
B-9	6489.21	6482.10	B-8	6463.90	410.00	8	0.0444	278	104	382	210	40.54	172.30	0.00	172.30	0.38	0.35	0.17	2.59	1162.39	990.09	YES
B-8	6469.67	6463.90	B-7E	6442.60	355.00	8	0.0600	278	104	382	210	40.54	172.30	0.00	172.30	0.38	0.35	0.17	3.01	1350.89	1178.59	YES
B-7E	6449.87	6442.60	B-7	6428.40	250.00	8	0.0568	278	104	382	210	40.54	172.30	0.00	172.30	0.38	0.35	0.17	2.93	1314.98	1142.68	YES
B-7	6434.47	6428.40	B-6	6418.00	200.00	8	0.0520	278	104	382	210	40.54	172.30	0.00	172.30	0.38	0.35	0.17	2.80	1256.64	1084.34	YES
B-6	6422.49	6418.00	B-5	6409.47	261.62	8	0.0326	278	104	382	210	40.54	172.30	0.00	172.30	0.38	0.35	0.17	2.22	996.34	824.04	YES
B-5	6419.96	6409.47	B-4	6395.59	380.79	8	0.0364	313	104	417	210	45.65	193.99	0.00	193.99	0.43	0.35	0.17	2.34	1050.19	856.20	YES
B-4	6405.40	6395.59	B-3	6385.87	300.00	8	0.0324	313	104	417	210	45.65	193.99	0.00	193.99	0.43	0.35	0.17	2.21	991.85	797.86	YES
B-3	6391.30	6385.87	B-2	6383.88	397.00	8	0.0050	313	104	417	210	45.65	193.99	0.00	193.99	0.43	0.35	0.17	0.87	390.46	196.47	YES
B-2	6392.00	6382.26	B-1-E	6378.85	275.00	8	0.0124	313	104	417	210	45.65	193.99	0.00	193.99	0.43	0.35	0.17	1.37	614.86	420.87	YES
B-1-E	6394.06	6378.85	B-1	6378.27	116.00	8	0.0050	313	104	417	210	45.65	193.99	0.00	193.99	0.43	0.35	0.17	0.87	390.46	196.47	YES
B-1	6894.06	6378.27	A-7	6377.28	146.00	8	0.0068	313	104	417	210	45.65	193.99	0.00	193.99	0.43	0.35	0.17	1.01	453.29	259.30	YES