City of Santa Fe
Phase 1 Engineering and Permitting /
Preliminary Design Evaluation for Reuse Pipeline
from PRWRF to the Rio Grande

PRELIMINARY DESIGN EVALUATION

FINAL | January 2019

carollo

City of Santa Fe

Phase 1 Engineering and Permitting / Preliminary Design Evaluation for Reuse Pipeline from PRWRF to the Rio Grande

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Abbreviations

2017 Reuse Feasibility Study	2017 Santa Fe Water Reuse Feasibility Study
AFY	acre-feet per year
BDD	Buckman Direct Diversion
BLM	Bureau of Land Management
BRWTP	Buckman Regional Water Treatment Plant
City	City of Santa Fe
County	Santa Fe County
LF	linear feet
MG	million gallons
mgd	million gallons per day
MRC	Municipal Recreation Complex
MSL	mean sea level
NEPA	National Environmental Policy Act
NMDCA	New Mexico Department of Cultural Affairs
NMDGF	New Mexico Department of Game and Fish
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Environment Department
NMSFD	New Mexico State Forestry Division
NMSLO	New Mexico State Land Office
NPDES	National Pollutant Discharge Elimination System
OPCC	Opinions of Probable Construction Cost
OSE	Office of the State Engineer
PDE	Preliminary Design Evaluation
PRWRF	Paseo Real Water Reclamation Facility
psi	pounds per square inch
ROW	right-of-way
SJCP	San Juan-Chama Project
SWQB	Surface Water Quality Bureau
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

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Executive Summary

Purpose of Proposed Conveyance System

The City of Santa Fe (City) Paseo Real Water Reclamation Facility (PRWRF) provides wastewater treatment for the City's entire service area, producing water quality suitable for discharge to the Santa Fe River and for existing approved non-potable water reuse applications. The April 2017 Santa Fe Water Reuse Feasibility Study (2017 Reuse Feasibility Study) identified potential water resource benefits of conveying reclaimed water from the PRWRF to the Rio Grande.

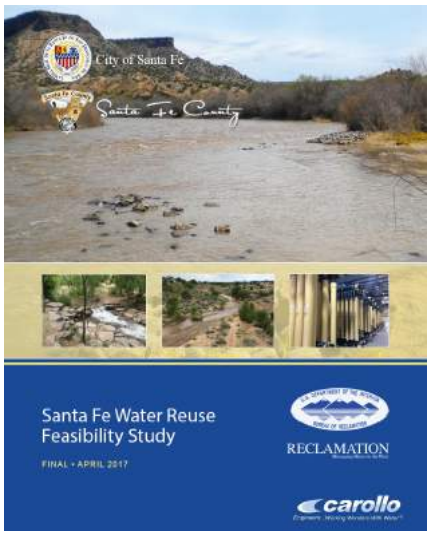
Since that time, the City and other potential partners have explored additional potential regional water resources management benefits of implementing and operating this infrastructure. In the current Preliminary Design Evaluation (PDE), the City further investigated the engineering and permitting feasibility of conveying reclaimed water from the PRWRF to the Rio Grande.

Increasing reuse from the PRWRF is a key water resource management strategy for Santa Fe.

Potential Benefits

A pump station and pipeline system comprising this water transmission infrastructure would convey reclaimed water to the Rio Grande for a range of beneficial purposes. Among these would be water resources and water supply benefits to the City and its potential partners, including partners in the proposed infrastructure system and/or water management partners in the Rio Grande watershed. The City may also be able to realize benefits in the form of avoided or reduced costs to improvements to the PRWRF that will be required in the coming years to meet increasingly stringent Santa Fe River discharge permit requirements, while meeting all Rio Grande discharge limits.

A specific point of Rio Grande discharge has not been identified, but it would be located downstream of the existing Buckman Direct Diversion (BDD) intake structure. For this analysis, it was assumed to be within a few hundred feet of the BDD intake so the same pipeline right-of-way (ROW) could be utilized for the majority of the pipeline's length. This will facilitate diversion of additional raw water supplies through the existing BDD system infrastructure and other water management benefits, while minimizing disturbance beyond existing ROWs. The new Return Flow pipeline would directly convey reclaimed water from the PRWRF to the Rio Grande, consistent with Alternative 2 ("Full Consumption of San Juan-Chama Project [SJCP] Water via Rio Grande Return Flow Credits") as described in more detail in the 2017 Reuse Feasibility Study report.



The 2017 Water Reuse Feasibility Study identified Rio Grande return flows to be a highly beneficial reuse approach.

The return flow system is intentionally configured in a way that allows for future expansion and flexibility. This provides opportunities for adaptive management as flows at the PRWRF increase over time, as partner interests in participation in the return flow conveyance system evolve, and as the uses of the flow returned to the Rio Grande are managed in the years and decades to come.

Executive Summary Contents

This document provides a synopsis of evaluations of the proposed return flow system, including the following:

- Permitting requirements associated with the proposed Return Flow pipeline, as detailed in Technical Memorandum (TM) 1 Reuse Pipeline Permit Plan (Appendix A);
- Infrastructure sizing and requirements for the proposed Return Flow pipeline, as detailed in TM 2 Reuse Pipeline Conveyance Hydraulics and Alternatives (Appendix B);
- Opinions of Probable Construction Cost (OPCC) developed for selected infrastructure configurations (Appendix C); and
- Implementation plan for selected infrastructure configurations.

Capacity and Configuration

This PDE considered a range of potential capacities for the conveyance system. Concurrently, alternative infrastructure configuration approaches were considered for providing the capacities under consideration.

Sizing

The 2017 Reuse Feasibility Study assessed the potential to return up to either 3.0 million gallons per day (mgd) or 4.5 mgd to the Rio Grande. It noted that there would be an incremental increase in return flow potential, measured in acre-feet of water delivered to the Rio Grande, if the system were sized for 4.5 mgd instead of 3.0 mgd. This requires sizing the infrastructure for the peak 4.5 mgd for wintertime use, recognizing that it will only be used at this peak capacity for a short period in the winter each year.

The PDE considered the 3.0 mgd and 4.5 mgd return flow conveyance system capacity scenarios from the 2017 Reuse Feasibility Study. Assumptions carried over from the 2017 study include:

- A constant effluent flow rate of 5.0 mgd at the PRWRF;
- Minimum releases to the lower Santa Fe River of 2.0 mgd year-round for the 3.0 mgd return flow scenario;
- Minimum releases to the lower Santa Fe River of 0.5 mgd in October through February and 2.0 mgd for the remainder of the year for the 4.5 mgd return flow scenario; and
- Continued supply to the existing non-potable reuse customers at their 2011 to 2017 average monthly demands.

The PDE found that increasing the return flow peak infrastructure capacity by 50 percent from 3.0 to 4.5 mgd results in the potential to increase annual return flows to the Rio Grande by about 32 percent, from 2,191 acre-feet per year (AFY) to nearly 2,900 AFY.

In addition to the 3.0 and 4.5 mgd pumped flow scenarios discussed above, a third, higher-flow scenario was also examined in the PDE. The third scenario considers future growth in City water demands (and associated wastewater flows at PRWRF), and would provide an opportunity for Santa Fe County (County) and Las Campanas to participate in the project. Specifically:

- **City Flows:** Future wastewater flows of 8.5 mgd, identified as the 20-year projected flow in the City's April 2018 Nutrient Loading and Removal Optimization Study, minus assumed 0.5 mgd winter release of water to the lower Santa Fe River in winter months. Flows would be pumped into the pipeline at the PRWRF.
- **County Flows:** Flows of up to 1.5 mgd could be contributed to the pipeline from the County at the PRWRF 20 years from now, recognizing that significant growth in the County's wastewater collection system would need to occur to achieve this flow rate, and there are currently no plans to convey treated or untreated wastewater to the PRWRF site for further treatment or pumping. The 1.5 mgd value was provided to the City's planning team by County representatives in mid-2018.
- **Las Campanas:** Flows of up to 0.3 mgd could be contributed from Las Campanas to the pipeline at or near the Las Campanas reclaimed water storage pond. The 0.3 mgd value was provided to the City's planning team by Las Campanas representatives in mid-2018.

Altogether, system flows in the future third, higher-flow scenario would be 9.5 mgd from the PRWRF to the Las Campanas storage pond, and 9.8 mgd from there to the Rio Grande discharge. This capacity could be configured to accommodate other uses of the conveyance system and should be considered as representative of a higher-flow system that could be adapted for use in a variety of ways.

In the near-term – while less flow is available at the PRWRF – the City could consider optimizing pumping schedules for energy costs. For example, the City could use the full capacity of the pump station and pipeline in the overnight hours or other times when unit power costs are low, and reduce on-peak pumping to achieve the overall daily pumping flow goal. Doing so would require equalization storage at the PRWRF to buffer differences between the diurnal flow patterns of effluent flow at the plant versus planned pumping to the Rio Grande. The existing 2-million-gallon (MG) Las Campanas effluent tank at the PRWRF (not currently in use) could be a beneficial component of such a system. Alternatively, the long-term system could be sized to allow off-peak pumping for energy cost optimization. Analyses of pumping cost optimization, infrastructure implications and sizing, and potential returns on capital investments were not conducted in this PDE but could be factored into preliminary design analyses.

Routing

Preliminary routing analyses for the proposed conveyance infrastructure concluded that the pipeline would be best aligned along existing ROWs/easements and previously constructed pipeline systems. Factors influencing this conclusion included an intent to:

- Provide maintenance access;
- Reduce permitting complexity and challenges, particularly in crossing federal lands and in light of previous efforts via the BDD conveyance project to obtain National Environmental Policy Act (NEPA) clearances and other previous permitting approvals; and
- Reduce pipeline lengths and costs.

Pumping facilities are required at the PRWRF under all capacity and configuration scenarios. Some scenarios also considered the use of booster pumping facilities along the conveyance route, as further described below.

Hydraulic Evaluations

It is recommended that the overall conveyance alignment follow existing ROWs and easements from the PRWRF, passing the Municipal Recreation Complex (MRC), Las Campanas, and the Buckman Regional Water Treatment Plant (BRWTP) before heading northwest along Old Buckman Road to a point of discharge to the Rio Grande.

This alignment parallels existing reclaimed water infrastructure to the MRC and Las Campanas on its way to the overall high point in the alignment at around 32,450 linear feet (LF) from the PRWRF. The high point is at an elevation of approximately 6,530 feet above mean sea level (MSL), versus the starting elevation at the PRWRF of about 6,281 feet MSL. After passing the BRWTP, the alignment parallels the BRWTP raw water supply pipeline in Old Buckman Road as the Return Flow pipeline heads downhill to its conceptual discharge point a few hundred feet downstream of the BDD intake, at a discharge elevation of approximately 5,560 feet MSL.

Pipeline Segments

To facilitate infrastructure analyses, the conveyance system was considered in two distinct components, which include:

- The segment of the conveyance system generally "uphill" from the PRWRF to a point at or near the Las Campanas effluent storage pond. The segment from the PRWRF to the Las Campanas pond is approximately 39,000 LF in length.
- The segment generally "downhill" from the Las Campanas pond to the Rio Grande, approximately 54,000 LF in length.

Both segments were hydraulically modeled to assess pump station and pipeline infrastructure requirements at the various system capacities considered.

Return flows will be discharged to the Rio Grande just downstream of the existing BDD intake structure.

Existing Infrastructure

The PDE examined options for reusing existing infrastructure to reduce the cost of construction of the Return Flow pipeline conveyance system. The MRC and Las Campanas pipeline systems were investigated separately and together for their potential to convey either 3.0 or 4.5 mgd. A summary of the two existing pipelines is provided in Table ES.1.

Table ES.1 Summary of Existing Pipelines Evaluated in this Investigation

Pipeline	Material/Diameter	Pressure Class (pounds per square inch [psi])	Approximate Length (LF)
MRC Pipeline	PVC C900 12-inch	150	6,000
	PVC C900 12-inch	100	17,000
Las Campanas Pipeline	PVC C900 12-inch	150	19,700
	PVC C900 12-inch	100	19,300

After initiation of this project, it was identified that the existing Las Campanas reclaimed water storage tank and pump station at the PRWRF, and the pipeline from the PRWRF to the Las Campanas reclaimed water storage pond could potentially be made available for the City's use. However, the pumps are no longer in place at the pump station. It was further identified that Las Campanas may be interested in working with the City to identify mutually beneficial terms whereby the City could take over operation of the Las Campanas reclaimed water assets to convey reclaimed water toward the Rio Grande. The Las Campanas reclaimed water storage pond may also be available to the City for its use as part of this system. The potential use of the PRWRF-to-Las Campanas storage pond reclaimed water system was therefore integrated into the current analyses.

Using the MRC pipeline to convey reclaimed water toward the Rio Grande would require shared use of its capacity, with the MRC using the line to fully satisfy its irrigation needs in peak irrigation months. During spring and fall months, it is anticipated that as irrigation needs taper off from peak demands, a portion of the pipeline's capacity could be used to move reclaimed water toward the Rio Grande. In wintertime, virtually all of the pipeline's capacity could be dedicated to returning reclaimed water to the Rio Grande. Managing the shared use of the pipeline would add operational complexity and may require operational agreements between the MRC and the City's use for return flows.

Evaluations included:

- Shared use of the existing MRC reclaimed water pump station and pipeline to convey reclaimed water from the PRWRF to the MRC site.
- Use of the currently idle Las Campanas pump station and pipeline that was once used to convey reclaimed water from the PRWRF along a route past the MRC to the Las Campanas pond.

These systems are illustrated in Figure ES.1, along with a potential new parallel pipeline between the MRC pond site and the Las Campanas pond site. Both infrastructure systems would convey reclaimed water partway toward the Rio Grande. Because the MRC reuse sites are all irrigation-based, the MRC pipeline's capacity is largely committed to satisfying MRC irrigation demands in peak summer months, and would have little if any capacity available in those months to convey flow from the PRWRF toward the Rio Grande.

In contrast, the MRC pipeline is essentially unused in winter months, when reclaimed water supply is at its highest at the PRWRF. This presents a potential opportunity to take advantage of seasonally underutilized infrastructure capacity. That is, reclaimed water could essentially flow year-round in the MRC pipeline. When MRC irrigation demands call for reclaimed water, the water could be sent to the MRC reclaimed water storage pond, and when not (or to the degree not), flow could continue past the MRC to be conveyed to the Rio Grande discharge. Operation of the MRC pipeline as a shared-use pipeline would be operationally and institutionally complex and challenging, but could hold the potential to save or defer investments in capital infrastructure.

The Las Campanas pipeline infrastructure is appealing from the standpoint that it is unused, operationally simple, and available year-round to convey water toward the Rio Grande. It is also appealing in that the pipeline physically extends approximately 16,000 LF closer to the Rio Grande than does the MRC pipeline.

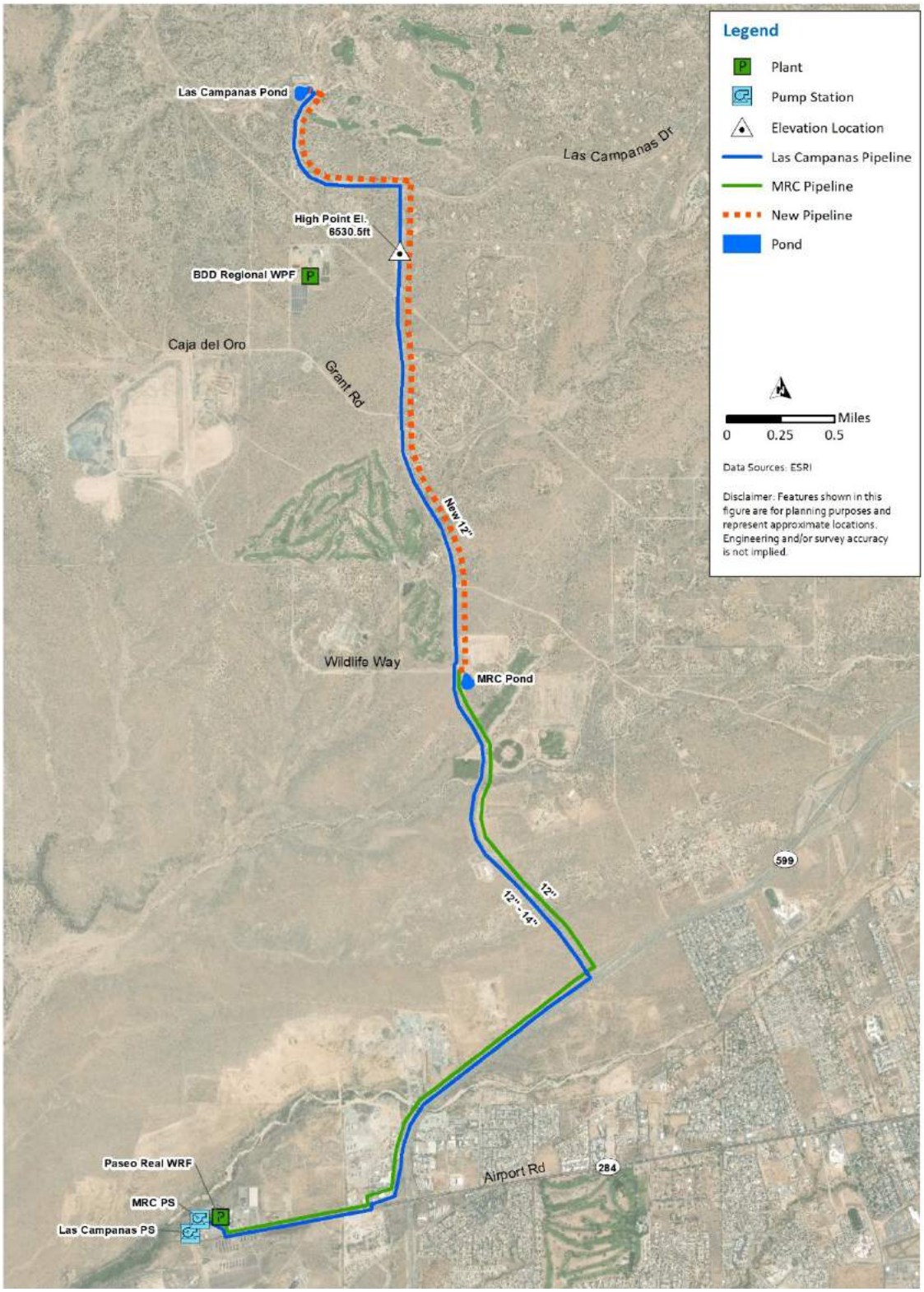


Figure ES.1 Aerial Overview of Infrastructure from PRWRF to Las Campanas Pond

A hydraulic analysis of reusing the existing pipelines to convey reclaimed water from the PRWRF to the Las Campanas pond site concluded that:

- **2.5-mgd Capacity:** The existing MRC and Las Campanas pipelines, working together, could convey 2.5 mgd from the PRWRF to the MRC reclaimed water storage pond, and could convey the 2.5 mgd to the Las Campanas pond if the MRC pipeline were extended with about 16,000 LF of new 12-inch diameter force main.
- **3.0-mgd Capacity:** Conveying 3.0 mgd of flow through the existing MRC and Las Campanas pipelines can be accomplished using the existing MRC pump station and pipeline at 0.75 mgd and retrofitting the existing Las Campanas pump station at the PRWRF with new pumps with 2.25 mgd of capacity. A new 3.0-mgd booster pump station would be required near the MRC ponds to provide system pressure to convey reclaimed water through the existing 12-inch Las Campanas pipeline from the MRC pond site to the Las Campanas pond site.
- **4.5-mgd Capacity:** 4.5 mgd could only be conveyed through existing infrastructure up to the MRC pond site, beyond which a new booster station and a new parallel or replacement pipeline would be needed to augment the capacity of the 12-inch Las Campanas pipeline. Alignments evaluated between the PRWRF and the Las Campanas storage pond would be located within existing roadway ROW, so no new easements would be required for this reach of the pipeline.
- **9.5-mgd Capacity:** It is not practical to consider using existing pumping or conveyance infrastructure; a new 9.5-mgd pump station at the PRWRF and a 24-inch diameter pipeline would be recommended.

Hydraulic modeling of the segment from the Las Campanas pond to the Rio Grande (downhill) concluded that flow could be most effectively conveyed via a 15-inch, 18-inch, or 24-inch gravity-flow pipeline for 3.0 mgd, 4.5 mgd, or 9.8 mgd, respectively. While the flow path along the recommended pipeline route encounters minor undulations, the grade line trends downward overall. Flow was found to transition back and forth between free-flowing gravity and low-pressure surcharge in most of the scenarios evaluated. From the Las Campanas storage pond to the Rio Grande discharge, the alignment would follow the existing BDD raw water pipeline in existing easements and ROW.

Opinions of Probable Construction Cost

Preliminary OPCC were prepared for the four most viable infrastructure scenarios discussed in TM 2 (Appendix B). Each detailed estimate (Appendix C) is consistent with a Class 5 AACE International estimate. All scenarios assume that the City will have access to the Las Campanas pond as a midpoint for the conveyance system. Each OPCC includes direct costs and factors for bonds and insurance, contractor overhead and profit, contingency, and markups to calculate the estimated total project cost. The four scenarios are discussed in the following sections and summarized in Table ES.2.

Table ES.2 Summary of Pump Station and Pipeline Infrastructure Scenarios

Scenario No.	Capacity (mgd)	Pump Station Improvements	Pipeline Improvements	OPCC ($M)	Advantages (+)/ Disadvantages (-)
2	4.5	• Retrofit existing MRC and Las Capanas pump stations • Construct new 4.5-mgd pump station at MRC pond	• Utilize existing MRC and Las Capanas pipelines from PRWRF to MRC pond • Construct 16,000 LF 18-inch pumped pipeline • Construct 54,000 LF 18-inch gravity pipeline	$20.0M	+ Maximized use of existing infrastructure - Requires agreement to utilize Las Capanas infrastructure - Higher capital cost
3	3.0	• Retrofit existing Las Capanas pump station • Construct new 3.0-mgd pump station at MRC pond	• Utilize existing MRC and Las Capanas pipelines from PRWRF to Las Capanas pond • Construct 54,000 LF 15-inch gravity pipeline	$13.5M	+ Maximized use of existing infrastructure. - Requires agreement to utilize Las Capanas infrastructure - Lower capacity
4A	4.5	• Construct new 4.5-mgd pump station at PRWRF	• Construct 39,000 LF 18-inch pumped pipeline • Construct 54,000 LF 18-inch gravity pipeline	$18.8M	+ New infrastructure, no agreements required - Higher capital cost
4B	9.5	• Construct new 9.5-mgd pump station at PRWRF	• Construct 39,000 LF 24-inch pumped pipeline • Construct 54,000 LF 24-inch gravity pipeline	$30.0M	+ New infrastructure, no agreements required. + High capacity provides maximum flexibility. - Higher capital cost.

Scenario 2: Utilize Existing Pipelines to Convey 4.5 mgd

This scenario includes utilizing the two existing pipelines (MRC and Las Campanas) from the PRWRF to the MRC pond. Included in the OPCC are retrofits of the existing Las Campanas and MRC pump stations, a new booster station near the MRC pond, a new pumped 18-inch diameter line from the MRC to the Las Campanas pond, and a new 18-inch diameter gravity pipeline from the Las Campanas pond site to the outfall at the Rio Grande. The total OPCC for this scenario is $20.0 million.

Scenario 3: Utilize Existing Pipelines to Convey 3.0 mgd

This scenario is similar to Scenario 2, but excludes the new uphill pumped line between the MRC pond site and the Las Campanas pond site. The existing Las Campanas pipeline from the MRC to Las Campanas can be used in this scenario because flows are lower (3.0 mgd) than in Scenario 2 (4.5 mgd). Included in the OPCC are a retrofit of the existing Las Campanas pump station at the PRWRF, a new booster station near the MRC pond, and a new 15-inch gravity pipeline from the Las Campanas pond site to the outfall at the Rio Grande. It is assumed that the existing MRC pump station is adequate to pump the required 0.75 mgd as described in TM 2, which is consistent with past pumping records from the PRWRF to the MRC, and that the MRC pump station needs no upgrades. The total OPCC for this scenario is $13.5 million.

Scenario 4A: Construct New Infrastructure to Convey 4.5 mgd

This scenario includes demolition of the existing Las Campanas pump station at the PRWRF, construction of a new 4.5-mgd pump station, a new pumped 18-inch line from the PRWRF to the Las Campanas pond, and a new 18-inch gravity pipeline from Las Campanas to the outfall at the Rio Grande. The total OPCC for this scenario is $18.8 million.

Scenario 4B: Construct New Infrastructure to Convey 9.5 mgd

This scenario includes demolition of the existing Las Campanas pump station at the PRWRF, construction of a new 9.5-mgd pump station, a new pumped 24-inch diameter line from the PRWRF to the Las Campanas pond site, and a new 24-inch diameter gravity pipeline from the Las Campanas pond site to the outfall at the Rio Grande sized to convey 9.8 mgd (including 0.3 mgd from Las Campanas). The total OPCC for this scenario is $30.0 million.

Permitting

A Reuse Pipeline Permit Plan (TM 1, Appendix A) was developed to assess the scope of permits, ROWs, and other environmental requirements and commitments (collectively referred to as "permits") for the Return Flow Pipeline Project. As currently envisioned, portions of the Return Flow pipeline will parallel the BDD pipeline through land managed by the Bureau of Land Management (BLM) and the United States Forest Service (USFS) Department of Agriculture, which may help to streamline the permitting process in these segments. A summary of each required permit is provided in the TM, comprising the Permit Plan with the data requirements, timeframes necessary to complete each item, and an assessment of the scope and schedule impacts to the project in obtaining each permit. A permit acquisition strategy, based on timeframes, data needs, and impacts, is presented in the final section of the Permit Plan.

The Permit Plan describes permits, easements and other requirements

necessary to design, construct, and operate the proposed Return Flow facilities in compliance with applicable regulations or other requirements. While infrastructure requirements will be finalized as part of design activities, the Permit Plan was developed based on construction of the pipeline facilities described in this evaluation. Permitting of pumping facilities was not evaluated in detail in the Permit Plan, as pumping needs and strategies are under ongoing engineering evaluation and will be refined during design. However, it is anticipated that any pumping facilities would be located onsite at the PRWRF and/or within the same general easement as the pipeline itself.

For the purposes of the Permit Plan, permits and other requirements are defined as follows:

- **Permits** are written approvals by a governing agency allowing a specific action. A formal application process is required and conditions or stipulations are typically made part of the permit approval.
- **ROWs** are agreements to allow construction and future access to maintain and operate a facility, such as a pipeline, within property owned by another entity.
- **Other requirements** encompass environmental documents and processes including NEPA, biologic and cultural resource protections, and other commitments necessary to comply with other agencies' and utilities' procedures to complete a project.

A strategy for obtaining permits was primarily based on the following factors: risk to the project, expected time to obtain the permit, and the interdependencies between permits. Table ES.3 shows these factors for each permit/ROW/other described in the Permit Plan.

The risk to the project places the permits into categories of high, moderate, and low. High risk to the project means that without the permit, the project would not be possible and the level of effort to obtain the permit is high. Permits in the moderate category are essential to the project or there would be high costs to re-design the project if the permit were not issued. Low risk category permits are those that have a straightforward permit process and if all the protocols are followed, a permit will be issued. The low risk category permits generally have the shortest timeframe for acquisition.

The majority of the pipeline route follows public ROW and existing pipeline ROW, including the BDD raw water pipeline ROW.

Table ES.3 Permit Plan and Associated Project Risk Factors

Permit No.	Agency	Permit/ROW	Permit Acquisition Timeframe (Months)	Inter-dependency	Permit Needed For	Potential Impact on Project	Risk to Project
P5	Office of the State Engineer (OSE)	Permit to Divert Surface Waters and Permit to Change Place, Purpose of Use, and Point of Diversion for Native Waters	12	N/A	Operation	Schedule	High
O1	BLM/USFS	NEPA Compliance	36	N/A	Construction/ Operation	Schedule/ Budget	High
P4	United States Environmental Protection Agency (USEPA)	National Pollutant Discharge Elimination System (NPDES) Wastewater Discharge Permit	12	Existing permit renewal schedule	Operation	Schedule	Moderate
O3	New Mexico Department of Cultural Affairs (NMDCA)	National Historic Preservation Act (Section 106) Compliance	12	Pipeline route	Construction	Schedule	Moderate
O5	New Mexico Environment Department (NMED) Surface Water Quality Bureau (SWQB)	Certification of NPDES Wastewater Discharge and United States Army Corps of Engineers (USACE) Section 404 Permits	2	P4 permit application submittal	Operation	Schedule/ Budget	Low
P1	USACE	Section 404 Permit for Discharge Outfall Structure and Arroyo Crossings	4	Design complete	Construction	Schedule	Low
P2	BLM/USFS	ROW, Temporary Use, and Special Use	3	O1	Construction	Schedule	Low
P3	USEPA	NPDES Permit for Stormwater Discharges from Construction Activities	1	N/A	Construction	Schedule	Low

Table ES.3 Factors Used to Assess Risk to Project (con't)

Permit No.	Agency	Permit/ROW	Permit Acquisition Timeframe (Months)	Inter-dependency	Permit Needed For	Potential Impact on Project	Risk to Project
P6	New Mexico Department of Transportation (NMDOT)	Permit to Install Utility Facilities within Public ROW	2	Design complete; NEPA complete	Construction	Schedule	Low
P7	Santa Fe County	Development Permit	1	R2	Construction	Schedule	Low
R1	New Mexico State Land Office (NMSLO)	ROW Easement	2	Survey	Construction	Schedule	Low
R2	Santa Fe County Public Works	County Roads ROW	0.5	Contractor selected	Construction	Schedule	Low
O2	BLM/USFS	Plan of Development/ Operations Report	4	O1	Construction/ Operation	Schedule	Low
O4	United States Fish and Wildlife Service (USFWS)/ New Mexico Department of Game and Fish (NMDGF) / New Mexico State Forestry Division (NMSFD)	Endangered Species Act and Regulations Concerning Special Status Species and Migratory Birds	0	P1, P2 and P6 Permit application submittals	Construction	Schedule	Low
O6	Santa Fe County	Noise Constraints and Stipulations	0	P7 Permit application submittal	Construction/ Operation	Schedule/ Budget	Low

Implementation Plan

The Return Flow pipeline can be completed in three phases over 4 years. The recommended implementation phases with accompanying permit-related actions are shown below. A well-orchestrated design and permitting strategy will have the design team integrating its efforts to support permitting needs and actions, and vice versa.

Early attention to long-lead permit items, as identified in the Permit Plan, will help mitigate schedule risks and in turn help mitigate cost escalation risks. A proposed implementation plan showing the integration of design and permitting actions is outlined below. Specific permit numbers from the Permit Plan (Appendix A) are noted in parentheses. Maintaining this aggressive schedule will require the dedicated attention of the proponents' team members and close coordination with key regulating agencies, as outlined in the project risk section of the Permit Plan.

Phase 1: Preliminary Design (2017 to 2019)

The preliminary design phase was initiated in 2017 with the initial investigation of infrastructure sizing and costing outlined in this PDE, along with preliminary dialogue with state water resource agency officials regarding the City and its partners' potential plans and strategies for implementing and operating the project. From a Permit Plan implementation perspective, some of the long-lead permit items should continue or be initiated during this first phase, including:

- Continue discussions with the New Mexico OSE relative to obtaining Permit to Divert Surface Waters and Permit to Change Place, Purpose of Use, and Point of Diversion for Native Waters; prepare and submit application (P5).
- Continue discussion with the USFS and BLM to establish NEPA documentation requirements and begin NEPA documentation; hold a scoping meeting if required (O1).
- BDD NPDES permit renewal application – include increased discharge (P4).
- Complete biological and cultural resource survey within project footprint (O3, O4).

Phase 2: Design and Permitting (2019-2020)

During the second phase, final design and in-depth permitting activities will define every element of the project in detail as it is readied for construction. From a permitting perspective, all long-lead permitting actions should be well underway in Phase 2 in preparation for construction to start in Phase 3. Permitting activities for Phase 2 include:

- Site visit and pre-application meeting with the USACE regarding the Section 404 Dredge and Fill Permit; determine if project can be covered under Nationwide Permits or if an individual permit will be required (P1).
- Meet with NMED SWQB about establishing Outfall 2 at the Rio Grande for the PRWRF NPDES Permit (P4).
- Develop and submit PRWRF NPDES Permit renewal application with Outfall 2 (P4).
- Compile information NMED will need for antidegradation review (P4).
- Develop special status species protection plan (O4).
- Apply for Special Use Permit from USFS and ROW from BLM, after completing the NEPA documentation (P2).
- Prepare Plan of Development/ Operations Plan to support USFS and BLM applications (P2).
- Prepare and submit NMDOT ROW application (P6).
- Request public comment on draft NEPA document (O1).

Phase 3: Construction and Startup (2020 to 2021)

Phase 3 focuses on project construction, startup, and commissioning. With design complete, the focus will shift to bidding support (or alternative delivery procurement and integration), along with the permitting aspects uniquely tied to the construction and startup phases of project implementation. Among these are the following:

- Submit application for Santa Fe County Development Permit (P7).
- Submit application for State Land Office ROW (R1).
- Contractor must apply for NPDES Stormwater Permit (P3) and County Roads ROW (R2).
- Monitor compliance with permit conditions and stipulations.
- Submit Notice of Termination for NPDES Stormwater Permit (P3) and USACE Section 404 Dredge and Fill permit (P1).

Appendix A

TECHNICAL MEMORANDUM 1
REUSE PIPELINE PERMIT PLAN

City of Santa Fe
Phase 1 Engineering and Permitting /
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Technical Memorandum 1
REUSE PIPELINE PERMIT PLAN

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City of Santa Fe

Phase 1 Engineering and Permitting / Preliminary Design Evaluation for Reuse Pipeline from PRWRF to the Rio Grande

Technical Memorandum 1

REUSE PIPELINE PERMIT PLAN

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JOHN P. REHRING
NEW MEXICO
23235
PROFESSIONAL ENGINEER

Digitally signed by John P. Rehring
Contact Info: Carollo Engineers, Inc.
Date: 2019.01.24 11:00:12-07'00'

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Reuse PipeLine Permit Plan

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Abbreviations

AFY	acre-feet per year
BDD	Buckman Direct Diversion
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
BRWTP	Buckman Regional Water Treatment Plant
CAR	Coordination Act Report
City	City of Santa Fe
County	Santa Fe County
CPP	Continuing Planning Process
CWA	Clean Water Act
dBA	A-weighted decibels
DNA	Determination of NEPA Adequacy
EA	Environmental Assessment
EIS	Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FLPMA	Federal Land Policy and Management Act
FONSI	Finding of No Significant Impact
ISC	Interstate Stream Commission
LUD	Land Use Department
MBTA	Migratory Bird Treaty Act of 1918
MDP	Master Development Plan
MRC	Municipal Recreation Complex
MRGCD	Middle Rio Grande Conservation District
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMAC	New Mexico Administrative Code
NMDCA	New Mexico Department of Cultural Affairs
NMDGF	New Mexico Department of Game and Fish
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Environment Department
NMSFD	New Mexico State Forestry Division
NMSLO	New Mexico State Land Office
NOI	Notice of Intent
NOT	Notice of Termination
NPDES	National Pollutant Discharge Elimination System

NRHP	National Register of Historic Places
NWP	Nationwide Permit
OSE	Office of the State Engineer
PCN	Preconstruction Notification
POD	Plan of Development
PRWRF	Paseo Real Water Reclamation Facility
ROD	Record of Decision
ROW	right-of-way
SF	Standard Form
SHPO	State Historic Preservation Officer
SJCP	San Juan Chama Project
SLO	State Land Office
SUP	Special Use Permit
SWPPP	Storm Water Pollution Prevention Plan
SWQB	Surface Water Quality Bureau
TM	technical memorandum
TUP	Temporary Use Permit
URGWOPS	Upper Rio Grande Basin Water Operations Review and Environmental Impact Statement
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Services

Technical Memorandum 1

REUSE PIPELINE PERMIT PLAN

1.1 Purpose and Content

This technical memorandum (TM) presents the scope of permits, rights-of-way (ROW), and other environmental requirements and commitments (collectively referred to as "permits" in this plan) for the Santa Fe (City) Return Flow Pipeline Project. As currently envisioned, portions of the Return Flow pipeline will parallel the Buckman Direct Diversion (BDD) pipeline through land managed by the Bureau of Land Management (BLM) and the United States Forest Service (USFS) Department of Agriculture, which may help to streamline the permitting process in these segments. A summary of each required permit is provided in this TM, comprising the Permit Plan with the data requirements, timeframes necessary to complete each item, and an assessment of the scope and schedule impacts to the project in obtaining each permit. A permit acquisition strategy, based on timeframes, data needs and impacts, is presented in the final section of this Permit Plan.

This plan describes permits, easements and other requirements necessary to design, construct, and operate the proposed Return Flow facilities in compliance with applicable regulations or other requirements. While infrastructure requirements will be finalized as part of design activities, this Permit Plan was developed based on construction of the following assumed facilities:

- Construction of a new pipeline segment to convey flow from a point at or near the site of the Municipal Recreation Complex (MRC) reclaimed water storage pond to a point at or near the site of the Las Campanas reclaimed water storage pond, paralleling a segment of the existing Las Campanas reclaimed water pipeline along Caja del Rio Road and Las Campanas Drive.
- Construction of remaining segments of the Return Flow pipeline from a point at or near the site of the Las Campanas reclaimed water storage pond to a point of discharge to the Rio Grande located just downstream of the existing BDD structure, generally paralleling the existing BDD raw water pipeline along Old Buckman Road.
- Construction of a discharge structure at the Rio Grande.

Permitting of pumping facilities was not evaluated in detail in this analysis, as pumping needs and strategies are under ongoing engineering evaluation and will be refined in design. However, it is anticipated that any pumping facilities would be located onsite at the Paseo Real Water Reclamation Facility (PRWRF) and/or within the same general easement as the pipeline itself.

For the purposes of this Plan, permits and other requirements are defined as follows:

- **Permits** are written approvals by a governing agency allowing a specific action. A formal application process is required and conditions or stipulations are typically made part of the permit approval.
- **ROWs** are agreements to allow construction and future access to maintain and operate a facility, such as a pipeline, within property owned by another entity.

- **Other requirements** encompass environmental documents and processes including National Environmental Policy Act (NEPA), biologic and cultural resource protections and other commitments necessary to comply with other agencies' and utilities' procedures to complete a project.

Permits, ROWs, and other requirements in this plan are organized as shown in Table 1.1.

Table 1.1 Index of Permits, ROW, and Other Requirements

Item No.	Agency	Description
		Permits
P1	USACE	United States Army Corps of Engineers (USACE), Section 404 Permit for Discharge Outfall Structure and Arroyo Crossings
P2	BLM and USFS	BLM and USFS Right-of Way, Temporary Use, and Special Use
P3	USEPA	United States Environmental Protection Agency (USEPA) Notice of Intent and Notice of Termination to Comply with National Pollutant Discharge Elimination System (NPDES) Permit for Stormwater Discharges from Construction Activities
P4	USEPA	USEPA NPDES Wastewater Discharge Permit
P5	OSE	Office of the State Engineer (OSE) Permit to Divert Surface Waters and Permit to Change Place, Purpose of Use, and Point of Diversion for Native Waters
P6	NMDOT	New Mexico Department of Transportation (NMDOT) Permit to Install Utility Facilities within Public ROW
		ROWs
R1	NMSLO	New Mexico State Land Office (NMSLO) Application for ROW Easement
R2	Santa Fe County Public Works	Santa Fe County Public Works Department Application for ROW
		Other Requirements
O1	BLM and USFS	NEPA Compliance
O2	BLM and USFS	Bureau of Land Management Plan of Development and United States Forest Service Operations Report
O3	NMDCA	New Mexico Department of Cultural Affairs (NMDCA), National Historic Preservation Act (Section 106) Compliance
O4	USFWS, NMDGF, and NMSFD	United States Fish and Wildlife Services (USFWS), New Mexico Department of Game and Fish (NMDGF), New Mexico State Forestry Division (NMSFD), Endangered Species Act and Regulations Concerning Special Status Species and Migratory Birds
O5	NMED SWQB	New Mexico Environment Department (NMED), Surface Water Quality Bureau (SWQB), permits for NPDES Wastewater Discharge and USACE Section 404
O6	City of Santa Fe	Noise Constraints and Stipulations
O7	Various Utilities	Utility Coordination

1.2 Permits

1.2.1 P1 – USACE, Permit for Discharge Outfall Structure and Arroyo Crossings

The Federal Water Pollution Control Act Amendments of 1972, as amended in 1977, became commonly known as the Clean Water Act (CWA). The Act established the basic structure for regulating discharges of pollutants into the waters of the United States. There are several sections of this Act, which pertain to regulating impacts to jurisdictional waters of the United States. The discharge of dredged or fill material into waters of the United States is subject to permitting specified under Title IV (Permits and Licenses) of this Act and specifically under Section 404 (Discharges of Dredge or Fill Material) of the Act.

The USACE administers permit applications for sediment discharges associated with utility projects under Section 404 of the CWA. The Return Flow Pipeline Project components that will disturb waterways will need to be permitted under Section 404 of the CWA prior to construction. Other construction that does not involve jurisdictional waters can proceed.

1.2.1.1 Application Process

Most projects of significant size require an individual Section 404 permit, but there is also a Nationwide Permit (NWP) system in place to reduce paperwork and processing times for smaller projects that fit into those particular guidelines. There are two Nationwide Permits that apply to the Return Flow pipeline construction:

- 12. Utility Activities: Applies to the discharge outfall structure and pipelines.
- 33. Temporary Construction, Access, and Dewatering: Applies to the cofferdam and dewatering activities if necessary during construction of the return flow structure where water is to be discharged to the Rio Grande.

The USACE strongly recommends that a pre-application meeting and site visit be scheduled to discuss project parameters and determine exactly what permit conditions apply. This project will probably meet the criteria of the Nationwide Permits, although this will be determined by the USACE upon receipt of the Preconstruction Notification (PCN). The information required in the PCN include:

- Name, address, and telephone numbers of the prospective permittee.
- Location of the proposed project.
- A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description must be sufficiently detailed to allow the USACE to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP.
- Delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the USACE.

- If the proposed activity will result in the permanent loss of greater than 1/10 acre of wetlands, a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required, or a conceptual or detailed mitigation plan.
- Listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat.
- For an activity that may affect a historic property, a statement demonstrating compliance with Section 106 of the National Historic Preservation Act.

1.2.1.2 Timeframe

Once the PCN is received by the USACE, there is a 45-day review period for the PCN to determine whether the activity will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. Activities that are expected to result in more than minimal impacts must have individual permit. If an individual permit is required, it will take approximately 60 to 120 days to review and process. The timing varies depending on the completeness and accuracy of the application, the level of complexity of the project, and the level of controversy generated. Public notification is required including the option to request a public hearing.

In addition to the USACE review of the PCN, the NMED will concurrently review the PCN for certification of the permit under authority of Section 401 of the CWA (See Permit O5).

1.2.1.3 Impact Assessment

The Section 404 Permit must be issued by the USACE before construction in waterways, unless the project can be covered by a NWP that does not require a PCN. Work in other areas can proceed, so a delay in obtaining the permit would not impact the entire project. It is unlikely that an individual permit will be required for the project because the area that will be permanently disturbed is small and will have a minor effect on water quality, wetlands, or aquatic resources. Given the scope of the project, the likelihood that the permit would be denied is very low. Holding a pre-application meeting combined with a site visit is a key to developing the PCN to meet the needs and requirements of the USACE and ultimately a timely review and decision on the part of the USACE.

1.2.2 P2 – BLM and USFS ROW, Temporary Use and Special Use

The BLM issues ROWs and Temporary Use Permits (TUP) for water facilities constructed on BLM-managed lands under the authority of the Federal Land Policy and Management Act (FLPMA) of 1976 and amendments. The same regulation provides authority to the USFS to issue Special Use Permits (SUP) and Temporary Use Authorizations. Because the facilities are within or cross lands managed by these agencies, an ROW and SUP must be obtained prior to conducting any land disturbance activities. Additionally, temporary use authorizations are required for work in areas outside the officially designated ROW for example additional land area for work, material stockpiling, equipment storage and other construction needs.

The City already holds the following ROWs and SUPs in the Return Flow Pipeline Project area:

- BLM ROW (NM-103816) for the Buckman Regional Water Treatment Plant (BRWTP) access road, potable water pipeline, raw water pipeline, and Booster Station 2A.

- USFS Term SUP (ESP 104602) for the diversion, raw water lift station, sediment removal facility, Booster Station 1A, raw water pipelines, sediment return pipeline, utility water line from Booster Station 2A to Booster Station 1A.

The City should request an amendment to the existing permits rather than applying for new permits in the same area. Meeting with the agencies to discuss the proposed amendments to the existing permits is key to timely action on the applications.

1.2.2.1 Application Process

Acquisition of the ROW and temporary use authorization requires submittal of an application using Standard Form (SF) 299. Both agencies use SF 299, although the form differs slightly for each agency. The SF 299 applications require the following information:

1. Project description including summary of facilities and areas of disturbance (temporary and permanent); construction and operating schedules; and other project information.
2. Survey, legal description, and map of proposed project.
3. Statement of technical and financial capability.
4. Signature by City Manager or other authorized agent.

The agency reviews the application and if it is consistent with NEPA documentation, will issue a ROW or SUP. Stipulations will be included in the ROW and SUP. The stipulations often include such requirements as submittal of a Plan of Development (POD) (see Permit O2); additional plans (traffic control plan, spill prevention plan, fire prevention plan are some examples); submittal of project documentation such as other permit approvals and coordination and approval by the agencies of certain facility criteria such as building colors and tree removal and use. Some of these stipulations are outlined later in this permit plan under the "Other Requirements" section. However, not all stipulations can be identified until the NEPA documentation is complete. The Realty Agents for each agency use the NEPA documentation to generate the ROW documentation and stipulations.

1.2.2.2 Timeframe

The agencies review the SF 299 permit application (or request for an amendment to the permit) and develop a permit authorizing the ROW and special use. The agencies usually require 60 to 90 days to complete the review and paperwork processing for permits, assuming the NEPA documentation is complete and approved.

1.2.2.3 Impact Assessment

These two permits (BLM ROW and USFS SUP) are critical to the project as no land disturbing activities can start until these permits are issued and signed. These permits will almost certainly be granted. However, potential issues include the NEPA requirements, timing of the permit, and the stipulations that will be included in the permits. For the BDD, the two agencies worked together and that cut down on the number of documents that had to be completed as part of the stipulations (e.g., they accepted the same POD), and it will be a goal to get them to do that again on this amendment. It is important to note the requirement that the NEPA documentation be complete and approved by the agencies, because they will not consider the permit application (or amendment) until that is complete. Early and often communication with the agencies about both the NEPA and ROW/SUP will be key in maintaining momentum on these permits.

1.2.3 P3 – USEPA NOI and NOT to Comply with NPDES Permit for Stormwater Discharges from Construction Activities

Section 402(p) of the CWA provides that storm water discharges associated with construction activity that discharges to waters of the United States must be authorized by a NPDES permit. This applies to construction and construction-related activities that result in the disturbance of one or more acres of total land area, including smaller areas that are part of a larger common plan of development or sale. The permitting requirements are enumerated in 40 CFR § 122.26(b)(14)(x)). Construction and construction-related activities refer to the actual earth disturbing construction activities and those activities supporting the construction project such as construction materials or equipment storage or maintenance (e.g., fill piles, borrow area, concrete truck washout, fueling), measures used to control the quality for storm water associated with construction activity, or other industrial storm water directly related to the construction process (e.g., concrete or asphalt batch plants). It does not refer to construction activities unrelated to earth disturbing activities such as interior remodeling, completion of interiors of structures, etc.

The USEPA developed "General Permits" to assist in entities compliance with the NPDES regulations without having to prepare an individual permit for each project. For construction activities, this permit is titled, "NPDES General Permit for Storm Water Discharges from Construction Activities." To apply for coverage under a general permit both the Contractor and the Owners must file a Notice of Intent (NOI) for coverage under the General Permit for Construction Activities with the Region 6 USEPA Office (Dallas, TX) at least 10 days prior to commencement of construction activities.

1.2.3.1 Application Process

The NOI form requires information such as applicable permit number (NMR100000), applicant contact information, site location, certification of Storm Water Pollution Prevention Plan (SWPPP) preparation, waterways near sites, construction activity dates, and total acreage. An NOI must be submitted by both the Owner and the Contractor.

In accordance with the requirements of the General Permit, a SWPPP must be prepared and kept on-site and available for inspection. The SWPPP must:

1. Identify all potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges from the construction sites;
2. Describe practices to be used to reduce pollutants in storm water discharges from the construction sites; and
3. Assure compliance with the terms and conditions of the general permit.

The SWPPP must describe the site and activity, the controls that will be implemented to prevent pollution, the management methods to minimize non-storm water discharge, and maintenance procedures.

The Contractor must implement the SWPPP as written from commencement of construction activity until final stabilization is complete. Upon completion of the project, the Owner and the Contractor must submit a Notice of Termination (NOT) form to notify USEPA work is complete. It is expected that the SWPPP will also be required by the BLM and USFS under the expected ROW stipulations and to any other agency that requests the documentation.

1.2.4 P4 – USEPA, NPDES Permit for Discharge of Wastewater

Section 402 of the CWA provides that wastewater discharges to waters of the United States must be authorized by a NPDES permit. The USEPA Region 6 is responsible for issuing NPDES permits in New Mexico. NPDES permits specify the amount and concentration of pollutants a permittee may discharge to a surface waterbody. The USEPA is also responsible for the enforcement of effluent limitations stipulated by NPDES permits. Since New Mexico is not delegated primacy for issuing NPDES permits, under Section 401 of the CWA, New Mexico is authorized to review permits and discharges to ensure the effluent limits will 1) be compatible with appropriate state law; 2) protect water quality standards adopted in accordance with Section 303 of the CWA; and 3) implement an effective water quality plan. The state review, referred to as "certification," can result in the following: 1) approve the discharge without conditions; 2) approve the discharge subject to conditions; 3) deny certification; or 4) waive certification.

The PRWRF discharges treated effluent to the Santa Fe River under NPDES Permit NM0022292, effective date September 1, 2016 with an expiration date of August 31, 2021. Modification of the existing permit should be accomplished through the renewal application (due 180 days before expiration of the current permit, or March 2021) to include the Return Flow pipeline as Outfall 002. Having both outfalls under the same permit will provide flexibility in varying the discharge flow between outfalls.

With the Return Flow pipeline, the diversion of water through the BDD could increase. The BDD has an NPDES permit for the sediment return line. As more water from the Rio Grande is diverted, there would be an incremental increase in the sediment returned to the river. The BDD Permit (NM 0030848) will expire on August 31, 2019. The renewal application must be submitted no later than March 2019. The expected increase in flow should be added to the renewal application in 2019 so that it is reflected in the renewed NPDES permit issued in 2019/2020.

1.2.4.1 Application Process

Although not required, meeting with the NMED SWQB Point Source Regulation Section prior to submitting the renewal application will make the process much smoother. At this meeting(s), the project should be described and initial calculations of the effect of the discharge on the Rio Grande presented. Understanding the NMED's concerns about this discharge will allow for addressing those concerns in the permit amendment or renewal application. The requirements for antidegradation review follow NMED's Antidegradation Policy Implementation Procedure.

The process for applying for an NPDES permit amendment or renewal is:

- Submit the NPDES application form with owner's name, address, expected discharge characteristics, receiving waterbody to USEPA.
- If necessary, submit the information required by NMED to conduct an antidegradation review.
- The USEPA drafts a permit specifying effluent limits and monitoring requirements; notice of availability of the permit for public review and comment is published in the newspaper. A hearing can be requested by any party.
- NMED conducts their review of the draft permit and provides comments and certifies the permit, with or without conditions (See Permit O5).

- If required, NMED conducts an antidegradation review, which may also require a public hearing.
- USEPA issues a final NPDES permit that remains in effect for 5 years, at which time the permit must be renewed.

Part of State certification of NPDES permits is assurance that antidegradation requirements are met. Water quality standards have three components: designated use, water quality criteria to protect the use, and antidegradation. New Mexico has detailed antidegradation review procedures in the Continuing Planning Process (CPP). The antidegradation review procedures apply to all proposed new or increased discharges of pollutants to a surface water of the state. "New or increased discharge" includes NPDES permits issued by the USEPA pursuant to CWA Section 402 and Dredge and Fill permits issued by the USACE pursuant to CWA Section 404. Antidegradation review generally consists of:

- Determining which antidegradation tier the receiving water body belongs in. For segments that are not listed as impaired on the New Mexico Integrated 303(d)/305(b) Report are Tier 2 waters for antidegradation purposes.
- Determine if the discharge is de minimus using a decision flow defined in the CPP.
- If the discharge does not qualify as de minimus, compile information on the economic impact of discharges following procedures in the New Mexico CPP for review by the NMED.
- Public hearing, if requested, to obtain technical and non-technical testimony on the economic benefits and costs of a new discharge.
- NMED determination antidegradation requirements have been satisfied and that the economic benefits of a new discharge outweigh the impacts to water quality.
- The full antidegradation review process resulting in certification of the NPDES can take up to 180 days.

Projects that qualify for general or nationwide permits are considered de minimus under the antidegradation review procedures in the New Mexico CPP. De minimus discharges are exempted from antidegradation review, unless the discharge will cause more than 90 percent of the assimilative capacity of the stream to be used. The NPDES permit for discharge to the Rio Grande will require an antidegradation review.

1.2.4.2 Timeframe

The amendment or renewal application must be submitted not less than 180 days before the expiration date of the current discharge or expected commencement of the discharge. USEPA has 1 year after a permit application is submitted to take some action. After a period of 1 year, the application goes into "backlog status." NMED's antidegradation review of the permit application can take up to 180 days.

The antidegradation review begins within 30 days of receipt of the complete permit application. The NMED will notify the applicant regarding the standard of review for the new or increased discharge or the renewal of a permit for an existing discharge and its obligation to submit the information described below, as well as any other information that the NMED may require to conduct the review. Within 30 days of receipt of the notification, the applicant will submit the required information. Within 30 days of receipt of the applicant's response, the NMED will notify the applicant whether the response is adequate and whether additional information is required.

NMED will use the information provided by the applicant to determine that the application is complete and initiate the antidegradation review.

1.2.4.3 Impact Assessment

It is essential that this permit be amended or renewed to include the Rio Grande discharge outfall before operations can begin. Developing the permit application should begin 2 years before operations are planned to start. USEPA Region 6 has historically yielded significant deference to NMED, so lining up NMED support prior to application submittal is paramount. The antidegradation review, conducted by NMED, would also go faster with cooperation. At least one public hearing should be anticipated for the NPDES permit and possibly a second public hearing for the antidegradation review may also be requested. It is unlikely that this permit will be denied, but the conditions and monitoring requirements could raise the operational costs of this permit.

1.2.5 P5 – OSE Permit to Divert Surface Waters

A permit to divert surface water from the New Mexico OSE is required to divert surface water from the Rio Grande for either San Juan-Chama water rights or native Rio Grande water rights. For the BDD, the City and Santa Fe County jointly submitted an Application for Permit to Divert San Juan-Chama Project (SJCP) Water in the State of New Mexico on September 11, 2003. The application was for the 5,605 acre-feet per year (AFY) of San Juan-Chama water rights shared by the City and Santa Fe County. The OSE granted Permit No. SP 4842 (later renumbered to SP2847-E) to divert 5,606 AFY of SJCP water at the BDD on November 1, 2006. Both Santa Fe County and the Club at Las Campanas applied for permits to divert native and SJCP water from the Rio Grande at the BDD. The permits issued are:

- Santa Fe County, Permit to divert Rio Grande native water at BDD: SP-4842,
- The Club at Las Campanas, Permit to divert Rio Grande native water at BDD: SD-03106,
- City of Santa Fe and Santa Fe County, Permit to divert SJCP water at BDD: SP-2847-E, and
- The Club at Las Campanas, SJCP water at BDD: SP-2847-N-A.

The theoretical construct for this project is that SJCP water is diverted at the BDD, used by City customers, returned to the Rio Grande, and a like amount of SCJP water is diverted at the BDD. This construct requires that the SJCP water maintains its SJCP designation after diversion and use. The New Mexico Interstate Stream Commission (ISC) will be involved due to the potential effects on the Rio Grande Compact. How it would be permitted has been discussed at meetings with the OSE and the ISC. No definitive permitting approach has been settled on and discussions are continuing.

1.2.5.1 Application Process

The OSE issues permits for both surface and groundwater uses. A permit authorizes the use of water and describes the limits on that use, but a permit is not itself a water right. The OSE has application forms online. Once the type of permit has been established, the appropriate application form is completed along with supporting documentation. The applications include the following information: the name and address of the applicant, the proposed use, the annual diversion of water requested for the proposed use, legal descriptions of the point of diversion and the place of use, the method of conveyance, the annual diversion schedule, and other information the state engineer may deem necessary.

The criteria that OSE uses when considering whether to grant any application are whether:

- It will impair existing rights (senior rights);
- It will be contrary to the conservation of water; and
- It will be detrimental to the public welfare of the state.

Public Notice of the application alerts other water users in the area that someone is petitioning for a water use that may affect them. The OSE writes the notice and the applicant have the notice published for three consecutive weeks in a newspaper of general circulation in the county(s) that could be affected. After the notice period has run and if there are no protests, the OSE can either approve or deny the permit. Anyone who believes their water right will be impaired or the proposed action does not meet the other two criteria can file a protest. The OSE encourages the parties to resolve protests. If the applicant and protestant cannot reach agreement by which the protest can be withdrawn, the matter shall proceed to hearing, unless the OSE determines that the application should be denied, in which case the application may be denied prior to holding a hearing. Upon OSE approval, an application becomes a permit. A permit allows the permittee to place water to beneficial use in accordance with the permit conditions of approval.

In the case of an emergency change in point of diversion, storage, or use of water, written authorization from the state engineer is required. Emergency authorization may be requested upon the filing of an application and an affidavit showing that an emergency exists in which the delay caused by awaiting publication or hearing would result serious economic loss. The OSE may grant the authorization if it is determined, that no foreseeable detriment will occur to existing water rights of other ownership. Within 30 days of an emergency authorization granted by the OSE, the applicant must publish the public notice. The emergency authorization shall continue in effect as conditioned in the emergency authorization or until the state engineer enters a final decision on the application, whichever occurs first.

1.2.5.2 Timeframe

The rules governing the administration of surface water (19.26.2 New Mexico Administrative Code [NMAC]) do not contain a specified the time period in which the OSE must decide on an application. The City's experience with previous permit applications is that the process takes years rather than months. The timing of this process is most effected by the number and type of protests received.

1.2.5.3 Impact Assessment

This permit is the crux of the project. Continued discussion with and concurrence of the OSE and ISC is the only way to obtain this permit. Even with OSE and ISC support, the permit application is likely to be protested and may require a hearing.

1.2.6 P6 – NMDOT Permit to Install Utility Facilities within Public ROW

The NMDOT requires an "Application for Permit to Install Utility Facilities within Public Right-of-Way" for all installations of utility facilities on state ROWs. This permit would be required if a new pipeline is installed in the ROW along State Highway 599. If an existing pipeline is utilized (e.g., the MRC and/or Las Campanas reclaimed water pipelines) or the Highway 599 ROW is not utilized, this permit would not be necessary.

1.2.6.1 Application Process

The applicant is required to prepare the application package according to the following guidelines:

- No construction may be performed on a state ROW before the utility has received an executed permit from NMDOT.
- The applicant must submit a complete application package that includes the following items:
  - The "Application for Permit to Install Utility Facilities within Public Right-of-Way" form.
  - A vicinity map showing the location of the utility work.
  - Plan drawings of the facility, with either profile drawings for parallel installation, or cross sections for each crossing facility. The plan drawings for the proposed installation shall include, but not be limited to, the following:
    - Roadway features, such as construction centerline, edge of pavement, slope limits, and ROW lines.
    - For crossing facilities, include Engineering Station, angle relative to the construction centerline, and distances relative to the ROW lines pertaining to the facility.
    - All utility facility appurtenances, physical dimensions, and length of encasement(s), if applicable.
    - A profile drawing depicting the profile grade of the facility, including all appurtenances, physical dimensions, and the length of encasement(s), if applicable.
    - A cross-section drawing that reflects the ROW lines, the full cross-section within the existing or proposed ROW, including elevation at the lowest point in the ROW, the roadway typical section (including finished grade elevation at the centerline(s), and location of the utility facility and casing or the clearance relative to the above features).
    - Any attachments to highway structures, if applicable.
    - Information, including utility owner's name, date, drawing scale, county, and north arrow.
  - An approved Traffic Control Plan, archeological and environmental clearance documentation, and/or proof of compliance with the NPDES Permit for Storm Water Discharges from Construction Activities must accompany each permit.
  - Documentation of coordination with other utilities in the ROW must be furnished.
  - The appropriate insurance coverage must be secured and documents submitted with the application.
- Upon receipt of the approved permit, the applicant shall notify NMDOT in writing within 48 hours of the utility installation date. The installation is subject to inspection by NMDOT at any time.

- The applicant shall also notify NMDOT upon completion of the project within 48 hours. The installation is subject to inspection by NMDOT at any time.
- The applicant shall submit record or as-built plans to NMDOT within 30 days after completion of the project. The as-built plans must be stamped by a registered NM Land Surveyor, with elevations provided every 500 feet and at all survey break points (including all high and low points).

1.2.6.2 Timeframe

A review timeframe of 30 days is typical for the complete application package. However, the NMDOT Environmental Clearance Review must be completed and included as part of the application. The Environmental Clearance Review can take 30 days prior to application submittal. Obtaining environmental clearance and documentation of coordination with other utilities will require 30 to 60 days in order to compile a complete application package.

1.2.6.3 Impact Assessment

The process for obtaining this permit is straightforward, if this permit is required. Pipeline routing and engineering drawings will be required for the application, so the design should be at 90 percent to submit a complete application package. It is unlikely that this permit will be denied, if all the NMDOT specifications are complied with in the application package.

1.2.7 P7 – Santa Fe County Land Use Department, Development Permit Application

1.2.7.1 Application, Plan Review, and Approval

A Development Permit from the Santa Fe County Land Use Department (LUD) would be required for the pipeline and pump station because it will be built in Santa Fe County. The LUD requires a comprehensive plan review before the Development Permit is approved and before construction may begin. LUD is responsible for review and approval of construction plans and the issuance of development permits within Santa Fe County. However, the LUD does not have jurisdiction on state or federal lands, so permitting for project facilities on state or federal lands will not be required through the LUD.

LUD reviews the plans to verify compliance with hydrology, watershed, and terrain management requirements, including soil and slope stability, erosion control, sedimentation, and water runoff to protect water quality and the natural character of the land. LUD approvals are typically received within 30 days.

1. General Requirements for Each Permit:
    a. A completed Santa Fe County "Development Permit Application."
    b. A Letter of Intent to submit a Development Permit, which should indicate the facilities that will be constructed on federal land. Being on federal land eliminates LUD review of those portions.
    c. Written directions and map to the site (separate from the required building plans).
    d. A site plan drawn to scale (separate from those required with the building plans) showing all existing and proposed structures, including septic systems.
    e. No buildings are allowed within Urban Wildland Interface area.
    f. Assigned address form from Rural Addressing.

2. Roads, Driveways, Grading, Clearing, etc.:
    a. All items listed in item 1 above, plus the following:
        i. Detailed cross section of road.
        ii. If road is accessing more than one property, notification to all property owners is required.
        iii. Property slope map and/or terrain management plan for site.
        iv. For Buckman Road, previously completed engineering study and BLM stipulations to communicate the limitations placed upon the improvements by the federal agencies.
3. Terrain Management:
    a. All items listed in items 1 and 2 above, plus the following.
        i. A topographic map, such as the 7.5-minute series quadrangle maps published by the United States Geological Survey, showing the natural features and topography.
        ii. A plat map and legal description of the property showing the boundaries and legal description (Township, Range, and Section) of the property.
        iii. An excess storm water detention/retention plan.
        iv. A soil survey for the development, showing the location of each different soil type, description of each soil type, and areas of severe soil limitations.
        v. A clearing and grading plan, showing the finished contours of the development, the location of all cuts and fills, and profiles of the existing ground surface.
        vi. A revegetation and landscape plan, showing areas of proposed revegetation, trees to be removed/planted, description of methods of revegetation protection, and slope stabilization.
        vii. A storm drainage and erosion control plan, showing on and offsite drainage and control measures.
        viii. A construction schedule.
4. Flood Hazard (if any facilities will be located within the flood plain):
    a. All items previously listed, plus the following.
        i. Plans drawn to scale showing the location, dimensions, and elevation of proposed landscape alterations, existing and proposed structures, and the location of the foregoing in relation to the flood way, flood fringe, flood plain, and flood hazard area.
        ii. Elevation in relation to mean sea level of the lowest floor. For the diversion, raw water low-lift pump station and diversion support facility, the finished floor of the structures shall be constructed 1 foot above the base flood elevation, which is the elevation of the water during a 100-year storm event. However, the applicant (the Design Build Contractor) shall consult with the Santa Fe County Floodplain Manager(s) to discuss construction options, as an exemption may be allowed based upon the flood regulations.
        iii. Elevation in relation to mean sea level, to which any structure (non-residential) shall be flood-proofed.

iv. Flood elevation data adjacent to the proposed development. If Federal Emergency Management Agency (FEMA) flood elevation data is unavailable, such information shall be provided by a registered New Mexico Professional Engineer.
v. Description of the extent to which any course or natural drainage will be altered or relocated as a result of proposed development.

Upon approval from the LUD, development permit and approved plans must be posted on site for the duration of construction.

For the pipeline installation through private property, a development permit must be acquired from the LUD. Easement documentation shall also be included in the application to the LUD for this permit. Any realignment through private land will require a new development permit from the LUD.

For the pipeline installations through the Extraterritorial Zone, La Cienega Traditional Community, and the Historic Community of Agua Fria an informational session/presentation must be provided for the residents, either as a joint presentation or individual community presentation. The(se) presentation(s) shall be held at least 30 days prior to construction.

1.2.7.2 Timeframe

The Santa Fe County Floodplain Manager(s) should be contacted to discuss construction options for the facilities near the Rio Grande (discharge structure) at least 30 days prior to submittal for LUD approval. The Development Permit application(s) should be submitted at least 30 days prior construction of pipelines. The LUD will review each submittal within 30 days and provide written approval/rejection to the applicant. The LUD will also require proof of easement acquisition for any pipeline segment(s) on private land and that an ROW from the Santa Fe County Public Works has been obtained for installing pipelines along the county roads (Caja del Rio Road specifically). Construction must begin with 1 year of issuance of the Development Permit and the permit is valid for 2 years.

1.2.7.3 Impact Assessment

The process for obtaining this permit is straightforward and it is unlikely that the permit would be denied. Pipeline routing and engineering drawings will be required for the application, so the design should be at 90 percent to submit a complete application package.

1.3 ROW

1.3.1 R1 – New Mexico State Land Office Application for ROW Easement

There is state-owned land managed by the State Land Office (SLO) along Caja del Rio Road and Highway 599 (See Figure 1.1). The SLO requires a survey plant to accompany an "Application for Right-of-Way Easement" for utility installations across state lands. The fee for this ROW is based on the SLO appraisal of the value of land.

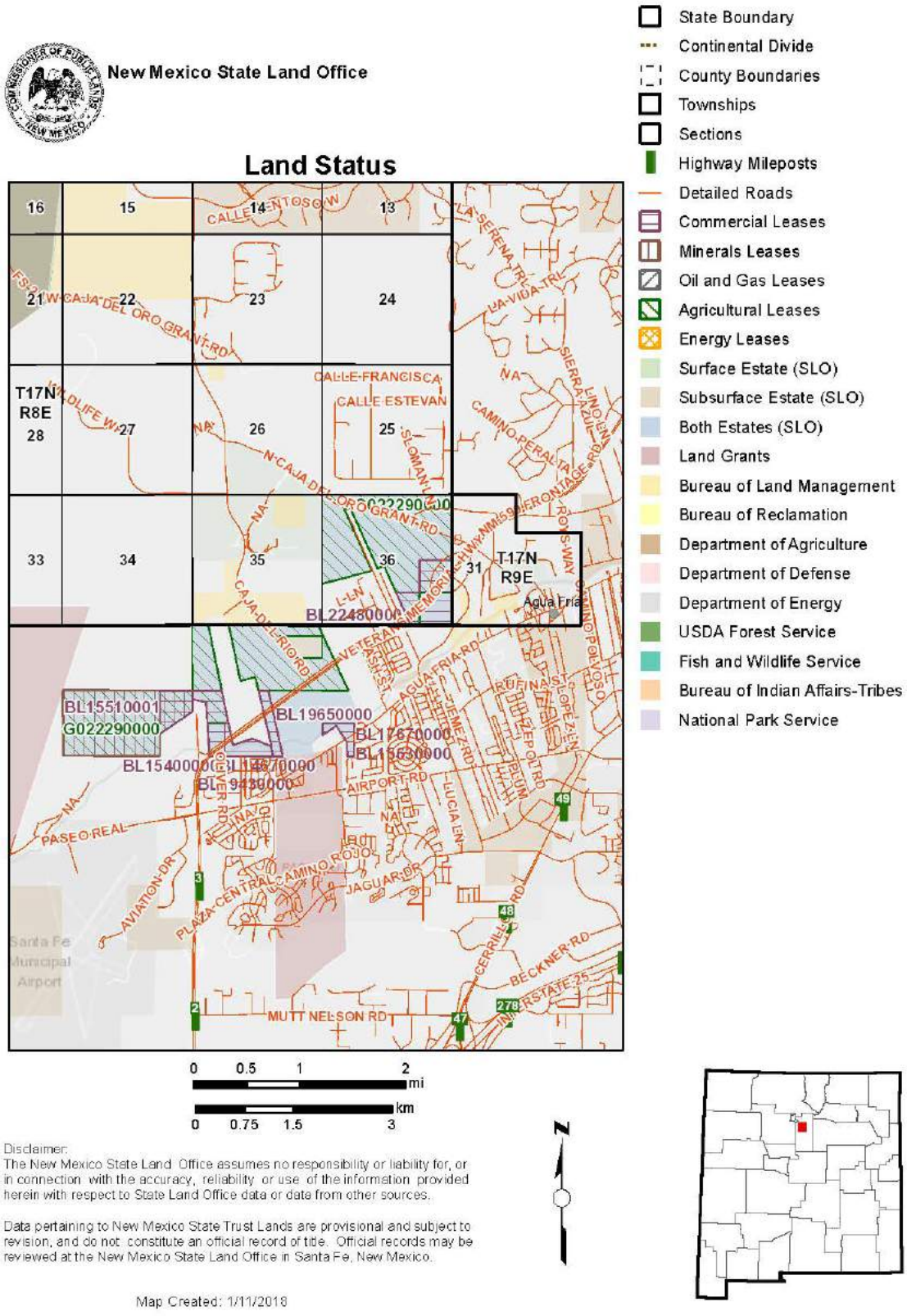

Figure 1.1 Map of State-Owned Land

1.3.1.1 Application Process

The applicant must submit the application package according to the following guidelines:

- Submit letters as a written NOI to conduct a survey of each proposed location of the ROW. The letter must adequate describe the proposed project including purpose, general location, projected survey schedule and an agreement to hold the State harmless against liability. The right of entry authorization is typically granted by the SLO in under a week.
- A New Mexico Registered Land Surveyor must prepare survey plats and descriptions for the ROW location(s) that include centerline descriptions, acreage allocated to 40-acre tracts and the total number of rods required for the ROW. The plats should be no larger than 8-1/2 inches by 14 inches, and the ROW location should be indicated by a red line.
- The applicant shall submit two completed "Application for Right-of-Way Easement" forms to the SLO. Each application shall be accompanied by the survey plat and description.
- A cover letter explaining the need for a ROW must accompany the application, including, the purpose, general location, and projected construction time. This notice shall contain an agreement to hold harmless the SLO against liability for loss of life, personal injury or property damage occurring due to survey activities and cause by the applicant, his employees, and contractors or subcontractors and their employees.
- The appropriate application fees ($100.00 Application Fee and $75.00 Appraisement Fee). A bond of $500.00 per application may also be required. The SLO also requires a one-time payment of $30.00 per rod (16.5 feet) of ROW.
- Upon completion of construction within the ROW, the applicant shall file an Affidavit of Completion with SLO.

1.3.1.2 Timeframe

Upon receipt of the complete application package, the SLO will review the application and provide written approval/rejection to the applicant within 5 to 8 weeks.

1.3.1.3 Impact Assessment

The probability that this ROW would be denied, if it were necessary, is low. The cost of this ROW is tied to a land appraisal, which can be significant in some parts of Santa Fe.

1.3.2 R2 – Santa Fe County Public Works Department Application for ROW

Per Santa Fe County Ordinance 2003-01, constructing a pipeline with a ROW of a county road requires an application and approval from the Santa Fe County Public Works Department. Caja del Rio Road is a county road and the distribution pipelines planned along Caja del Rio Road will be within the road ROW. A portion of this ROW is within state lands also and must be permitted by both agencies.

1.3.2.1 Application Process

The permit application requires general information for the contactor including licensing, insurance and bonding information; a video of the ROW prior to disturbance to establish pre-existing conditions traffic control plan; dates of construction; and dimensions. The application also requires a $15,000 bond be on file with Santa Fe County Public Works for the duration of the work. The fees associated with the application are $75.00 per 600 feet of ROW and a $200

nonrefundable application fee. The work along this ROW, as well as all others, will require revegetation as a stipulation of the ROW.

1.3.2.2 Timeframe

Per the ordinance, the application will be reviewed and processed within 5 days.

1.3.2.3 Impact Assessment

There is little risk this ROW will not be obtained as long as the application is completed correctly and the contractor meets the requirements of the ordinance.

1.4 Other Requirements

1.4.1 O1 – BLM and USFS NEPA Compliance

The purpose of the NEPA process is to ensure that environmental factors are weighted equally when compared to other factors in the decision making process undertaken by federal agencies. NEPA applies to any major project or action, whether on a federal, state, or local level, that has a federal nexus: involves federal funding, work performed by the federal government, located on federal land, or permits issued by a federal agency. These actions are defined at 40 CFR 1508.18. Some portions of the Return Flow pipeline would be constructed on land managed by the BLM and USFS as well as requiring federal permits, therefore compliance with NEPA is required.

Because the portions of the Return Flow pipeline that will traverse federal land parallel to the BDD raw water pipeline, those portions of new pipe requiring federal permits were evaluated in the Environmental Impact Statement (EIS) completed for the BDD Project. The BDD Project completed the NEPA process and the Record of Decision (ROD) states that both the BLM and USFS decided to implement the BDD Project with specified mitigations and monitoring. The following is the timeline for BDD Project NEPA compliance:

- NOI to prepare an Environmental Impact Statement: July 22, 2002.
- Scoping meetings: August-September, 2002.
- Notice of Availability Draft Environmental Impact Statement: December 17, 2004.
- Comment Period on Draft Environmental Impact Statement: December 17, 2004 - February 14, 2005.
- Bureau of Reclamation (BOR) will not provide assurance to USFWS that the BDD Project is "not likely to impact" the endangered silvery minnow, triggering Section 7 consultation requirements: December 2, 2005.
- Biological Assessment submitted to USFWS: February 5, 2007.
- Initiation of formal consultation pursuant to the Endangered Species Act of 1973 (Section 7 consultation): March 2, 2007.
- Notice of Availability Final Environmental Impact Statement: May 10, 2007.
- Final Biological Opinion issued: June 25, 2007.
- Final Fish and Wildlife Coordination Act Report: July 6, 2007.
- Final Record of Decision signed: October 5, 2007.
- Notice of Availability for the Record of Decision: February 11, 2008.
- Appeal period for the Record of Decision: February 11, 2008 to March 27, 2008.

Since the environmental effects of constructing pipelines, pump stations, and a discharge outfall to the Rio Grande were analyzed in the BDD EIS, this analysis should not have to be redone.

However, for components of the reuse pipeline that go beyond the BDD project analysis, the City may have to analyze the additional environmental impact of such actions.

The BLM and USFS could take one of multiple paths to comply with NEPA. These NEPA compliance paths include:

- Determination of NEPA Adequacy (DNA): A DNA is a determination that an action is adequately analyzed in an existing NEPA document and conforms to the approved land use plan. A DNA is a means by which existing NEPA documents cover a proposed action. The DNA is a Department of the Interior procedure and could be applied by BLM. The USFS does not have an analogous process.
- Supplemental EIS: The USFS (FSH 1909.15, Chapter 10, Section 18) and the BLM (H-1790-1, Section 5.3) allow supplementation of an EIS when:
  - The agency makes substantial changes in the proposed action that are relevant to environmental concerns; or
  - There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.

Supplemental EISs are prepared, circulated, and filed with the same requirements as EISs, except that supplemental EISs do not require scoping (40 CFR 1502.9) and may incorporate by reference the relevant portions of the EIS. The agencies have indicated that a Supplemental EIS would be a reasonable alternative for this project.

- Tier to the EIS: "Tiering" is using the coverage of general matters in broader NEPA documents in subsequent, narrower NEPA documents (40 CFR 1508.28, 40 CFR 1502.20). This allows the tiered NEPA document to narrow the range of alternatives and concentrate solely on the issues not already addressed for a proposed action that will be a more site specific or project-specific refinement or extension of the existing NEPA document. A tiered document is appropriate when the narrower action is clearly consistent with the decision associated with the broader action.
- Environmental Assessment (EA): The purpose of an EA is to determine the significance of the proposal's environmental outcomes and to evaluate the environmental impacts associated with the alternatives. An EA provides sufficient evidence and analysis to determine if significant impacts may result from the action (thus requiring an EIS) or whether there can be a Finding of No Significant Impact (FONSI) and the project can proceed.
- EIS: If the action will have a significant impact on the human or natural environment or if the action is considered an environmentally controversial issue, an EIS is required to describe the environmental impacts of the proposed action, any adverse environmental impacts that cannot be avoided should the proposal be implemented, the reasonable alternatives to the proposed action, the relationship between local short-term uses of man's environment along with the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitments of resources that would be involved in the proposed action.

1.4.1.1 Application Process

The most extensive process for getting a decision under NEPA is the EIS. The EIS process is:

- NOI published in the Federal Register which is public notification that an agency intends to prepare an EIS for a particular proposed project. It provides a brief description of the proposed action and possible alternatives, as well as the proposed scoping process.
- Scoping with the overall goal to define the scope of issues to be addressed in depth in the analyses that will be included in the EIS. CCEQ NEPA Regulations, 40 C.F.R. § 1501.7).
- Notice of Availability of the Draft EIS in the Federal Register is the next major step in the EIS process. It provides an opportunity for public comment. The comment period is at least 45 days long, but it may be longer at the agency's discretion.
- Request comments from other federal, state, tribal, and local agencies that may have jurisdiction or interest in the matter.
- Response to comments on the Draft EIS. When the public comment period is finished, the agency must respond to the substantive comments received from other government agencies and members of the public. A copy or a summary of substantive comments and the response to them will be included in the final EIS.
- Notice of Availability of the Final EIS published in the Federal Register. The Notice of Availability marks the start of a 30-day waiting period.
- ROD is made publically available. The ROD is a document that states what the decision is; identifies the alternatives considered, including the environmentally preferred alternative; and discusses mitigation plans, including any enforcement and monitoring commitments (e.g., revegetation, invasive species, and soil protection). The NEPA process is complete when the ROD has been signed by the agency.

1.4.1.2 Timeframe

The timeframe will vary with the documentation requirement negotiated with the federal agencies. An EIS can take as long as several years, depending on the outcome of the scoping process, the number and detail of environmental issues identified, and the degree of public comment received. The DNA process could be completed within a month, whereas a supplemental EIS typically requires 2 to 3 years.

1.4.1.3 Impact Assessment

Compliance with NEPA is necessary to complete the project as proposed. The critical element is the level of documentation the USFS and BLM will accept. The agencies have indicated that the proposed project would have similar impacts as the BDD Project and would lean towards less extensive documentation, likely a Supplemental EIS. However, there is the risk that there would be public concerns with discharging effluent to the Rio Grande, which were not part of the BDD EIS and would have to addressed. On the other side of the equation, the current federal administration has made timely approval of NEPA documents a high priority. Now is the time to engage the agencies in NEPA discussions in light of Executive Order 13807 and the Council on Environmental Quality's "Initial List of Actions to Enhance and Modernize the Federal Environmental Review and Authorization Process" (Federal Register, Vol. 82, No. 177, page 43226). The NEPA requirements represent a risk to the project schedule and budget. Therefore obtaining agreement from the agencies on the NEPA requirements is crucial.

1.4.2 O2 – BLM Plan of Development and USFS Operations Report

A requirement for the BLM and USFS ROW SUP and Temporary Use Authorizations is to submit a POD to the BLM and a Master Development Plan (MDP) to the USFS. For the BDD permits, the agencies agreed to a single document, referred to as POD, which was reviewed and approved by both agencies. A POD/MDP is generally required for projects that require an EIS and/or are large in scope. The BDD POD could be amended to incorporate the Return Flow pipeline, if that is acceptable to the agencies. A substantial amount of the documentation cannot be completed until final design, with the exception of defining temporary use areas and surveying.

1.4.2.1 Application Process

The POD must contain the following information:

1. Description of Facility:
    a. Description of what is to be constructed,
    b. Purpose of the facility,
    c. Alternatives to building on public lands and why they are not feasible,
    d. Construction schedule,
    e. How long the authorization is requested, and
    f. Description of additional temporary construction area (TUP) needed outside of the ROW grant area, including the type of proposed use, dimensions, duration of the temporary use needed, including time to rehabilitate the site.
2. Design Criteria:
    a. The degree of design must be compatible with the proposed use and anticipated environmental impacts. All disturbances must be within the boundary of the ROW/TUP.
    b. Pipeline Specifications including length and width of ROW/TUP; diameter of pipe and type of material; depth of pipeline; size of trench; construction access requirements during and after construction; construction equipment requirements; survey plat; site specific engineering surveys for critical areas; cathodic protection site; and pump stations.

1.4.2.2 Timeframe

If the agencies agree to amend the BDD POD for the Return Flow pipeline, the agency review time should be less than 3 months. A new POD or MDP could take up to 6 months for review and approval.

1.4.2.3 Impact Assessment

The POD/MDP will have to be approved before either of the agencies will issue the ROW or SUP. The BDD POD provides a good example of what the agencies are expecting, so either amending the existing POD or developing a new one that is easily "approve-able" should be simple. This step has to be included in the federal agency permit timeline.

1.4.3 O3 – NMDCA, NHPA (Section 106) Compliance, Consultation, and Concurrence

The Return Flow Pipeline Project will include construction of a pipeline across federal lands (BLM and USFS), thus the land management agencies must consider possible effects to historic properties under Section 106 of National Historic Preservation Act (NHPA) (16 U.S.C. § 470).

Historic properties include archaeological sites, historic buildings and landscapes, and traditional cultural places. The regulations for protection of historic properties are in 36 CFR Part 800.

The regulatory responsibility for Section 106 compliance is the USFS or BLM, as the federal management agency. The USFS or BLM is responsible for consulting with the State Historic Preservation Officer (SHPO) and obtaining concurrence regarding the effects and treatment of historic resources. However, the Return Flow pipeline as proposed would be within the BDD ROW, for which Section 106 concurrence has been granted by the New Mexico Department of Cultural Affairs. If the Return Flow pipeline route is outside the area with Section 106 concurrence for BDD or other similar pipeline projects (e.g., Las Campanas reclaimed water pipeline), the Section 106 compliance process must be completed for that area.

An archaeological survey was conducted during the BDD EIS process to identify archaeological sites within the BDD Project footprint. The USFS has consulted with the SHPO regarding the eligibility of the 15 sites that were identified in the BDD Project area. With SHPO concurrence, eight sites were determined to be eligible for the National Register of Historic Places (NRHP). The raw water pipelines and Buckman Road will cross through the following known significant archaeological sites:

- Buckman Townsite (LA 15222) near the Rio Grande,
- Prehistoric site LA 137068 located between Buckman Road and the raw water pipeline to the southeast of the Rio Grande, and
- Remnants of the historic Chili Line Railroad (LA 128580) that is crossed several times by Buckman Road and the raw water pipeline.

Preconstruction treatment (data recovery) was completed for Site LA 137068 (prehistoric site) and archival data research was completed for and Site LA 128580 (Chili Line Railroad) as required by SHPO. All of the identified sites required fencing and monitoring during construction at or within 100 feet of the site.

The USFS/BLM are responsible for consulting with Native American tribes and other interested parties as part of their Section 106 compliance.

1.4.3.1 Application Process

Generally, the Section 106 compliance process requires the following:

1. Identification of the Area of Potential Effect,
2. Identification and evaluation for significance of resources and an assessment of project affect by conducting a cultural resource survey of the area
3. Consultation between federal agencies and Department of Cultural Affairs, SHPO regarding Steps 1 and 2,
4. Development of an avoidance or mitigation plan to address adverse effects to significant resources,
5. Consultation between federal agencies and SHPO regarding the avoidance or mitigation plan and issuance of excavation permit(s) as needed to complete data recovery,
6. Implementation of mitigation plan - excavation of sites or other studies as described in the mitigation plan and documented in a data recovery report,
7. Completion of interim data recovery report (allows agency to release permit or easement), and
8. Completion of final data recovery report.

1.4.3.2 Timeframe

If the Return Flow pipeline extends through BLM or USFS land that was not part of the BDD Section 106 compliance or similar pipeline projects, the process for eliciting approval for the new area(s) could take over a year. If the cultural resource survey finds no sites potentially eligible for listing, the process could be a month or two. However, if sites are identified and a mitigation plan and data recovery are necessary, the process could extend over a year.

1.4.3.3 Impact Assessment

If the Return Flow pipeline route is within the area analyzed for the BDD, there should be no impact from this requirement. The addition of areas that were not analyzed could have significant schedule impacts.

1.4.4 O4 – Endangered Species Act and Regulations Concerning Special Status Species and Migratory Birds, Compliance

The USFWS, NMDGF, and NMSFD require agency coordination and/or consultation for any listed special status species that could be impacted by a project. In particular, these agencies are concerned about construction activity that could adversely impact or result in the "take" of special status species. For example, construction activities may be limited during the nesting season of migratory birds. The regulatory statutes for special status species are:

1. Endangered Species Act of 1973: Requires federal agencies to obtain information from the USFWS regarding any species, listed or proposed for listing that could be affected by the proposed project. Section 7(c) consultation is required with the USFWS to determine the impacts and mitigation for federally listed special status species. Once a Biological Assessment is submitted to the USFWS, a review timeframe of between 30 and 135 days should be allotted. The number of species impacted and the severity of the impacts will dictate the time it takes for the review.
2. New Mexico Wildlife Conservation Act of 1978: NMDGF will review the NEPA documentation and make determinations on state level special status species at that time. Additional comments may be submitted by NMDGF if new concerns are raised. Once a final NEPA document is submitted, a review timeframe of 30 days should be allotted. NMDGF could review in as little as 15 days depending on project urgency.
3. New Mexico Endangered Plant Species Act Section 75-6-1 et seq. is administered by the NMSFD within the New Mexico Energy, Minerals, and Natural Resources Department. The NMSFD will review the NEPA document and make determinations on state level special status species at that time. Additional comments may be submitted by NMSFD if new concerns are raised. Once the NEPA document is finalized and submitted to NMSFD, a review timeframe of 30 days should be allotted.
4. Migratory Bird Treaty Act of 1918 (MBTA): Administered by the USFWS, this Act provides protection of migratory birds from harassment, harm, or harvest. Generally, a preconstruction survey by a qualified biologist is required. Nests found between April and July in project construction areas require waiting until chicks fledge. If the construction schedule will not allow waiting for the nest to become inactive, the contractor can apply for a Take Permit from USFWS. Removal of unused nests found between August and March does not require a USFWS Take Permit. Unless a Take Permit is required, NEPA document, MBTA, and general USFWS monitoring guidelines

for nesting migratory birds will apply. The USFWS will review the migratory bird protection plan and a review timeframe of 30 days should be allotted.

5. The Middle Rio Grande Collaborative Program is a cooperative effort meant to develop a long-term strategy that would assist in the conservation and recovery of the southwestern willow flycatcher and Rio Grande silvery minnow, while protecting existing and future water uses. The USFWS, BOR, USACE, Bureau of Indian Affairs (BIA), City of Albuquerque, Middle Rio Grande Conservation District (MRGCD), New Mexico ISC, NMDGF, and the Alliance for the Rio Grande Heritage are all members of the program. Information from the NEPA document concerning project impacts to these special status species will be shared with the Collaborative Program prior to the start of project construction activities.
6. USFWS Coordination Act Report (CAR): The CAR is a document that is produced internally by the USFWS for the project. While the ESA Section 7(c) review deals with special status species, the CAR deals with all species for the project regardless of status. The USFWS will review the CAR immediately following completion of the final NEPA document. Issues may be raised by USFWS prior to construction activities concerning species impacts from the proposed project. USFWS would include mitigation guidelines for construction activities to address these concerns, if any.
7. Upper Rio Grande Basin Water Operations Review and Environmental Impact Statement (URGWOPS): Is a cooperative effort meant to develop a long-term strategy that would assist in monitoring impacts to aquatic species from water operations in the upper Rio Grande Basin. The BOR, USACE, and ISC are all partners in this collaborative effort. Mitigation measures in the NEPA document will be reviewed relative to the most current version of the URGWOPS EIS to assure compliance with URGWOPS environmental commitments.

1.4.4.1 Application Process

Special status species protection compliance is required for many of the other permits, specifically USFS SUP, BLM ROW, NMDOT ROW, and USACE Dredge and Fill Permit. Compliance is included as stipulations in the permits and is not issued as a standalone permit. There is no specific application process. The most cost effective way to meet the anticipated stipulations in the permits is to develop one plan to describe how special status species will be protected during construction and operation. This plan can be submitted as part of the applications for the other permits that require these protections. The plan should specify how the presence special status species will be confirmed (e.g., surveys), protections (e.g., scheduling construction outside of the nesting season), and monitoring to ensure the protections are in place. The resource specialists at the USFS and BLM should be consulted in the development of the plan, so that the completed plan will be considered adequate for protecting special status species.

1.4.4.2 Timeframe

The special status species protection plan would be submitted as part of applications for other permits and would be approved as a part of the permits. No additional time is necessary for compliance.

1.4.4.3 Impact Assessment

With an adequate special status species protection plan, there is little chance that the proposed protections will not be accepted by the agencies. Implementing the plan is likely to limit active construction activities to the fall and winter months.

1.4.5 O5 – NMED, SWQB, Permit Certification

Since New Mexico does not issue either NPDES permits under Section 402 or dredge and fill permits under Section 404, New Mexico is authorized to review permits and discharges to ensure the effluent limits will 1) be compatible with appropriate state law; 2) protect water quality standards adopted in accordance with Section 303 of the CWA; and 3) implement an effective water quality plan under Section 401 of the CWA. The state review, referred to as "certification" can result in the following: 1) approve the discharge without conditions; 2) approve the discharge subject to conditions; 3) deny certification; or 4) waive certification.

1.4.5.1 Application Process

The NMED begins its certification process when a draft permit has been prepared by the USEPA in the case on an NPDES Permit or by the USACE in the case of a Dredge and Fill Permit. Permits may not be issued until the State is provided an opportunity to review and certify the permit. If NMED certifies that additional or more stringent effluent limitations are necessary, USEPA or USACE are obligated to incorporate them into the permit. Section 20.6.2.2001 NMAC of the Ground and Surface Water Protection Regulations sets forth procedures for state certification of NPDES and dredge and fill permits. The procedures specify public notice requirements, a public comment period, the content and distribution of a certification or denial, timeframes, and appeal requirements. The USEPA and USACE provide the draft permits to the NMED for certification review. Nothing is required of the applicant.

1.4.5.2 Timeframe

The certification review occurs during the public comment period for an NPDES or Dredge and Fill permit, generally a 30-day time period. The degradation review process can take 3 to 6 months. The best way to manage the time for this process is to provide the NMED with the requested information as soon as possible.

1.4.5.3 Impact Assessment

The NMED rarely denies certification of a permit, but it is common for the NMED to add conditions to the certification, which will be incorporated into the permit. The standard NMED conditions for a dredge and fill permit add some schedule constraints for construction, but are generally easy to meet. Certification conditions for NPDES permits are likely to add costs to the operations of the treatment facility and monitoring staff. The certification of NPDES and dredge and fill permits are expected to have little impact on the design and construction of the project.

1.4.6 O6 – Noise Constraints and Stipulations, Compliance

Santa Fe County's noise ordinance (7.24.1 of Santa Fe County Land Development Code) outlines noise limits for various districts within the County as shown in the Table 1.2.

Table 1.2 Santa Fe County Noise Limits

Location	Daytime	Nighttime
Regional and Community Center Districts	70 A-weighted decibels (dBA), or 10 dBA above ambient; whichever is less	55 dBA, or 5 dBA above ambient; whichever is less
All Other Districts	55 dBA, or 5 dBA above ambient; whichever is less	45 dBA, or 5 dBA above ambient; whichever is less

The Development Plan application prepared for the Santa Fe County LUD will be reviewed by the Santa Fe County LUD to determine if the facility is likely to produce unreasonable high temporary or long-term average levels of noise. Any actual or projected noise measurements exceeding the average conditions presented in Table 1.2 calculated over a 12-hour period, at the property limits may result in denial of the application. These limitations apply to construction and operations of the facilities. In the event the Santa Fe County Noise Ordinance hinders the construction or operation of the facilities, a potential for variance or exemption could be explored.

The portions of the project on federal land will be subject to the requirements of the BLM and USFS ROW and SUPs and not the Santa Fe County Ordinance. The BLM Farmington Field Office imposes a noise standard on facilities on BLM managed lands of 48.6 decibels Leq (defined as the A-weighted noise level averaged over a 24-hour period at a distance of 300 feet from the noise source). This standard is equivalent to noise criteria used by other federal agencies such as the USFS. In general, the existing BDD facilities were found to conform to the noise standard when measured within a few hundred feet of the noise source. The noise limitations will be outlined as a stipulation in the ROW and SUP and will impact the selection of equipment and building design to ensure that the stipulation noise limitations are met during long-term operation of the facilities. The Return Flow Pipeline facilities are surrounded by federal land that provides a buffer for noise.

1.4.6.1 Timeframe

Noise levels in Santa Fe County will be evaluated in the Development Permit, so no additional time is required to address noise in Santa Fe County. Similarly, the noise constraints on federal land are addressed in the ROW and SUPs, and will not require additional time.

1.4.6.2 Impact Assessment

Noise restrictions may impact that selection of equipment used for construction and the schedule of construction activities. Noise constraints are expected to have little impact on the design and construction of the project.

1.5 Permit Acquisition Strategy

The strategy for obtaining permits is primarily based on the following factors: risk to the project, expected time to obtain the permit, and the interdependencies between permits. Table 1.3 shows these factors for each permit/ROW/other described in the preceding sections.

The risk to the project places the permits into categories of high, moderate, and low. High risk to the project means that without the permit the project would not be possible and the level of effort to obtain the permit is high. Permits in the moderate category are essential to the project or there would be high costs to redesign the project if the permit were not issued. Low risk category permits

are those that have a straight forward permit process and if all the protocols are followed, a permit will be issued. The low risk category permits generally have the shortest timeframe for acquisition.

The Return Flow pipeline is expected to be completed in three phases over 4 years. The recommended permit-related actions are shown with respect to the project phases below.

Phase 1: Preliminary Design (2017 to 2019)

- Continue discussions with OSE relative to obtaining Permit to Divert Surface Waters and Permit to Change Place, Purpose of Use, and Point of Diversion for Native Waters; prepare and submit application (P5).
- Continue discussion with USFS and BLM to establish NEPA documentation requirements and begin the NEPA documentation; hold scoping meeting if required (O1).
- BDD NPDES permit renewal application – include increased discharge (P4).
- Complete biological and cultural resource survey within project footprint (O3, O4).

Phase 2: Design and Permitting (2019 to 2020)

- Site visit and pre-application meeting with USACE regarding the Section 404 Dredge and Fill Permit; determine if project can be covered under Nationwide Permits or if an individual permit will be required (P1).
- Meet with NMED Surface Water Quality Bureau about establishing Outfall 2 at the Rio Grande for the PRWRF NPDES Permit (P4).
- Develop and submit PRWRF NPDES Permit renewal application with Outfall 2 (P4).
- Compile information NMED will need for antidegradation review (P4).
- Develop special status species protection plan (O4).
- Apply for SUP from USFS and ROW from BLM, after completing the NEPA documentation (P2).
- Prepare Plan of Development/Operations Plan to support USFS and BLM applications (P2).
- Prepare and submit NMDOT ROW application (P6).
- Request public comment on draft NEPA document (O1).

Phase 3: Construction and Startup (2020 to 2021)

- Submit application for Santa Fe County Development Permit (P7).
- Submit application for State Land Office ROW (R1).
- Contractor must apply for NPDES Stormwater Permit (P3) and County Roads ROW (R2).
- Monitor compliance with permit conditions and stipulations.
- Submit Notice of Termination for NPDES Stormwater Permit (P3) and USACE Section 404 Dredge and Fill Permit (P1).

Table 1.3 Factors Used to Assess Risk to Project

Permit No.	Agency	Permit/ROW	Permit Acquisition Timeframe (Months)	Inter-dependency	Permit Needed For	Potential Impact on Project	Risk to Project
P5	OSE	Permit to Divert Surface Waters and Permit to Change Place, Purpose of Use, and Point of Diversion for Native Waters	12	N/A	Operation	Schedule	High
O1	BLM/USFS	NEPA Compliance	36	N/A	Construction/ Operation	Schedule/ Budget	High
P4	USEPA	NPDES Wastewater Discharge Permit	12	Existing permit renewal schedule	Operation	Schedule	Moderate
O3	NMDCA	NHPA (Section 106) Compliance	12	Pipeline route	Construction	Schedule	Moderate
O5	NMED SWQB	Certification of NPDES Wastewater Discharge and USACE Section 404 Permits	2	P4 permit application submittal	Operation	Schedule/ Budget	Low
P1	USACE	Section 404 Permit for Discharge Outfall Structure and Arroyo Crossings	4	Design complete	Construction	Schedule	Low
P2	BLM/USFS	ROW, Temporary Use, and Special Use	3	O1	Construction	Schedule	Low
P3	USEPA	NPDES Permit for Stormwater Discharges from Construction Activities	1	N/A	Construction	Schedule	Low
P6	NMDOT	Permit to Install Utility Facilities within Public ROW	2	Design complete; NEPA complete	Construction	Schedule	Low
P7	Santa Fe County	Development Permit	1	R2	Construction	Schedule	Low

Table 1.3 Factors Used to Assess Risk to Project (con't)

Permit No.	Agency	Permit/ROW	Permit Acquisition Timeframe (Months)	Inter-dependency	Permit Needed For	Potential Impact on Project	Risk to Project
R1	NMSLO	ROW Easement	2	Survey	Construction	Schedule	Low
R2	Santa Fe County Public Works	County Roads ROW	0.5	Contractor selected	Construction	Schedule	Low
O2	BLM/USFS	Plan of Development/Operations Report	4	O1	Construction/ Operation	Schedule	Low
O4	USFWS/ NMDGF/ NMSFD	Endangered Species Act and Regulations Concerning Special Status Species and Migratory Birds	0	P1, P2 and P6 Permit application submittals	Construction	Schedule	Low
O6	Santa Fe County	Noise Constraints and Stipulations	0	P7 Permit application submittal	Construction/ Operation	Schedule/ Budget	Low

Appendix B

TECHNICAL MEMORANDUM 2 REUSE PIPELINE HYDRAULICS AND ALTERNATIVES

City of Santa Fe
Phase 1 Engineering and Permitting /
Preliminary Design Evaluation for Reuse Pipeline
from PRWRF to the Rio Grande

Technical Memorandum 2
REUSE PIPELINE HYDRAULICS AND ALTERNATIVES

FINAL | January 2019

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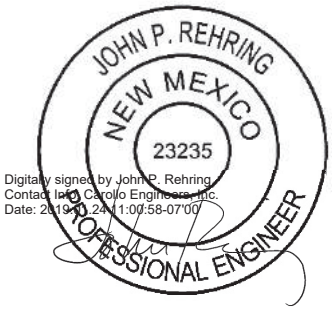
City of Santa Fe

Phase 1 Engineering and Permitting / Preliminary Design Evaluation for Reuse Pipeline from PRWRF to the Rio Grande

Technical Memorandum 2

REUSE PIPELINE CONVEYANCE HYDRAULICS AND ALTERNATIVES

FINAL | January 2019



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Abbreviations

AF	acre-feet
AFY	acre-feet per year
BDD	Buckman Direct Diversion
BRWTP	Buckman Regional Water Treatment Plant
City	City of Santa Fe
County	Santa Fe County
El	elevation
Feasibility Study	Santa Fe Water Reuse Feasibility Study
FM	forcemain
HDPE	high-density polyethylene
HGL	hydraulic grade line
LC	Las Campanas
LF	linear feet
mgd	million gallons per day
MRC	Municipal Recreation Complex
Pc	Pressure Class
PRWRF	Paseo Real Water Reclamation Facility
PS	pump station
psi	pounds per square inch
PVC	polyvinyl chloride
ROW	right-of-way
SJCP	San Juan-Chama Project
TDH	total dynamic head
TM	technical memorandum

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Technical Memorandum 2

REUSE PIPELINE CONVEYANCE HYDRAULICS AND ALTERNATIVES

2.1 Background

2.1.1 Introduction and Purpose

The City of Santa Fe (City) Paseo Real Water Reclamation Facility (PRWRF) provides wastewater treatment for the entire City service area, producing water quality suitable for discharge to the Santa Fe River and for existing approved non-potable water reuse applications. Following the completion of the Santa Fe Water Reuse Feasibility Study (Feasibility Study) in April 2017, the City has been further investigating the engineering and permitting feasibility of implementing a pipeline from the PRWRF to the Rio Grande.

The intended point of discharge would be downstream of the existing Buckman Direct Diversion (BDD) intake facilities, to facilitate diversion of additional water supplies through the existing BDD system infrastructure. The new Return Flow pipeline would directly convey reclaimed water to the Rio Grande, consistent with Alternative 2 ("Full Consumption of San Juan-Chama Project [SJCP] Water via Rio Grande Return Flow Credits") as described in more detail in the April 2017 Feasibility Study report.

This Technical Memorandum (TM) 2 describes hydraulic analyses used to evaluate the feasibility of using existing pipelines to convey reclaimed water from the PRWRF toward the Rio Grande. It also examines infrastructure needs for conveying reclaimed water from the downstream terminus of those existing reclaimed water pipelines to the Rio Grande.

2.1.2 Flow Rates and Sizing

The highest-ranked alternative in the Feasibility Study was analyzed using an assumed maximum combined water reuse flow of 3 million gallons per day (mgd), including existing non-potable reuse and new return flow credits to the Rio Grande. Given that PRWRF flows average about 5 mgd year-round, this provides about 2 mgd available for discharge from the PRWRF to the Lower Santa Fe River. While the Feasibility Study focused its analyses on this 3 mgd target for conveyance of return flows to the Rio Grande (and other alternatives), the report suggested that additional analyses should examine the costs and water resources benefits of increasing the return flow infrastructure capacity to make full wintertime use of available return flow resources.

The Feasibility Study used a value of 0.5 mgd of the PRWRF's 5.0 mgd as an assumed value for minimum wintertime releases to the Lower Santa Fe River to support environmental/habitat needs. Therefore, wintertime reuse could be as high as 4.5 mgd. With very little non-potable reuse demand in winter, nearly all wintertime reuse flows could be directed to the Return Flow pipeline. Therefore, in addition to the 3.0 mgd return flow capacity scenario, this TM also examines infrastructure associated with a 4.5 mgd return flow capacity scenario.

The Feasibility Study noted that there would be an incremental increase in return flow potential, measured in acre-feet of water delivered to the Rio Grande, if the system were sized for 4.5 mgd instead of 3.0 mgd. This requires sizing the infrastructure for the peak 4.5 mgd for wintertime use, recognizing that it will only be used at this peak capacity for a short period each year.

Table 2.1 illustrates the potential water supply benefit associated with increasing the infrastructure capacity from 3.0 to 4.5 mgd. Assumptions carried over from the 2017 Reuse Feasibility Study include:

- A constant effluent flow rate of 5.0 mgd at the PRWRF;
- Minimum releases to the lower Santa Fe River of 2.0 mgd year-round for the 3.0 mgd return flow credit scenario;
- Minimum releases to the lower Santa Fe River of 0.5 mgd in October through February and 2.0 mgd for the remainder of the year for the 4.5 mgd return flow credit scenario; and
- Continued supply to the existing non-potable reuse customers at their 2011 to 2017 average monthly demands.

Table 2.1 Summary of Return Flow Credit Supply Availability

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Assumed PRWRF Total Effluent Flow (mgd)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Average Non-Potable Reuse Demand 2011-2017 (mgd)	0.04	0.12	0.81	0.84	1.72	2.21	1.98	1.61	1.54	1.12	0.41	0.07	
Releases to Lower Santa Fe River (mgd, 2.0 mgd minimum)	2	2	2	2	2	2	2	2	2	2	2	2	
Available for SJCP Return Flows (mgd)	2.96	2.88	2.19	2.16	1.28	0.79	1.02	1.39	1.46	1.88	2.59	2.93	
Available for SJCP Return Flows (acre-feet [AF])	**282**	**248**	**208**	**199**	**121**	**73**	**97**	**132**	**134**	**179**	**239**	**279**	**2,191**
Releases to Lower Santa Fe River (mgd, 0.5 mgd minimum)	0.5	0.5	2	2	2	2	2	2	2	0.5	0.5	0.5	
Available for SJCP Return Flows (mgd)	4.46	4.38	2.19	2.16	1.28	0.79	1.02	1.39	1.46	3.38	4.09	4.43	
Available for SJCP Return Flows (AF)	**425**	**376**	**208**	**199**	**121**	**73**	**97**	**132**	**134**	**322**	**377**	**422**	**2,886**

In summary, increasing the return flow peak infrastructure capacity by 50 percent from 3.0 to 4.5 mgd results in the potential to increase annual return San Juan-Chama Project flows to the Rio Grande by about 32 percent, from 2,191 acre-feet per year (AFY) to nearly 2,900 AFY.

In addition to the 3.0 and 4.5 mgd pumped flow scenarios discussed above, a third, higher-flow scenario was also examined in this study. The third scenario would provide for future growth in

City water demands (and associated wastewater flows at PRWRF), and provide an opportunity for Santa Fe County (County) and Las Campanas to participate in the project. Specifically:

- City flows: Future wastewater flows of 8.5 mgd, identified as the 20-year projected flow in the City's April 2018 Nutrient Loading and Removal Optimization Study, minus 0.5 mgd minimum winter release of water to the lower Santa Fe River in winter months. Flows would be contributed to the pipeline at the PRWRF.
- County flows: Flows of up to 1.5 mgd could be contributed to the pipeline from the County at the PRWRF by 20 years from now, recognizing that significant growth in the County's wastewater collection system would need to occur to achieve this flow rate, and there are currently no plans to convey treated or untreated wastewater to the PRWRF site for further treatment or pumping. The 1.5 mgd value was provided to the City's planning team at a June 2018 workshop in Santa Fe by County representatives.
- Las Campanas: Flows of up to 0.3 mgd could be contributed from Las Campanas to the pipeline at or near the Las Campanas reclaimed water storage pond. The 0.3 mgd value was provided to the City's planning team at a June 2018 workshop in Santa Fe by Las Campanas representatives.

Altogether, system flows in the third, higher-flow scenario would be 9.5 mgd from the PRWRF to the Las Campanas storage pond, and 9.8 mgd from there to the Rio Grande discharge.

2.1.3 Existing Infrastructure

The Phase 1 Engineering and Permitting/Preliminary Design Evaluation project originally set out to assess the feasibility of shared use of the Municipal Recreation Complex (MRC) reclaimed water pipeline and pump station to convey reclaimed water from the PRWRF partway toward the Rio Grande. Because the MRC reuse sites are all irrigation-based, the MRC pipeline's capacity is largely committed to satisfying MRC irrigation demands in peak summer months, and would have little if any capacity available in those months to convey flow from the PRWRF toward the Rio Grande.

In contrast, the MRC pipeline is essentially unused in winter months, when reclaimed water supply is at its highest at the PRWRF. This presents a potential opportunity to take advantage of seasonally underutilized infrastructure capacity. That is, reclaimed water could essentially flow year-round in the MRC pipeline. When MRC irrigation demands call for reclaimed water, the water could be sent to the MRC reclaimed water storage pond, and when not (or to the degree not), flow could continue past the MRC to be conveyed to Rio Grande discharge for return flow credits. Operation of the MRC pipeline as a shared-use pipeline would be operationally and institutionally complex and challenging, but could hold the potential to save or defer investments in capital infrastructure.

After initiation of this Phase 1 project, it was identified that the existing Las Campanas reclaimed water storage tank and booster station at the PRWRF and the pipeline from the PRWRF to the Las Campanas reclaimed water storage pond are currently unused. It was further identified that Las Campanas may be interested in working with the City to identify mutually-beneficial terms whereby the City could take over operation of the Las Campanas reclaimed water asset to convey reclaimed water toward the Rio Grande. The Las Campanas reclaimed water storage pond may also be available to the City for its use as part of this system. The potential use of the PRWRF-to-Las Campanas storage pond reclaimed water system was therefore integrated into the current analyses.

The MRC and Las Campanas pipeline systems were investigated separately and together for their potential to convey either 3.0 or 4.5 mgd. A summary of the two existing pipelines is provided in Table 2.2. The MRC pipeline consists of a combination of 12-inch polyvinyl chloride (PVC) pipe and 14-inch high-density polyethylene (HDPE) pipe. HDPE has a smaller inside diameter than PVC. The MRC essentially is a 12-inch equivalent pipeline and was evaluated as such. Existing pump station systems were not assessed in detail in this investigation, because it is expected that pumping improvements would likely be necessary in order to maximize the conveyance capacity of either system.

Table 2.2 Summary of Existing Pipelines Evaluated in this Investigation

Pipeline	Material/Diameter	Pressure Class (psi)	Approximate Length (LF)
MRC Pipeline	PVC C900 12-inch	150	6,000
	PVC C900 12-inch	100	17,000
Las Campanas Pipeline	PVC C900 12-inch	150	19,700
	PVC C900 12-inch	100	19,300

Notes:
LF linear feet psi pounds per square inch

2.1.4 Alignments

Pipeline alignments for the subject analyses generally followed existing pipeline corridors, either in existing roadway rights-of-way (ROW) or in existing utility easements. Segments evaluated are described below:

PRWRF to Las Campanas Storage Pond:

- Use of the existing MRC pipeline from the PRWRF to the MRC reclaimed water storage pond. This line follows Paseo Real/Airport Road and NM 599, and then follows Caja del Rio Road to the MRC storage pond.
- Use of the existing Las Campanas pipeline from the PRWRF to the Las Campanas reclaimed water storage pond. This line follows the same alignment as the MRC pipeline, but continues on past the MRC pond along Caja del Rio Road to Las Campanas Drive, then follows Las Campanas Drive west to the Las Campanas reclaimed water storage pond.

Las Campanas Storage Pond to the Rio Grande Discharge:

- Paralleling the existing BDD raw water pipeline that brings untreated water from the BDD Rio Grande diversion to the Buckman Regional Water Treatment Plant (BRWTP) near the Las Campanas reclaimed water storage pond. The current analysis considered running a reclaimed water pipeline parallel to, and in the opposite direction of, the BDD raw water line back to a point of discharge to the Rio Grande. A specific point of discharge has not been identified, but it would be located downstream of the existing BDD diversion. For this analysis, it was assumed to be within a few hundred feet of the BDD diversion structure so that the same pipeline alignment could be utilized for the majority of the pipeline's length.

Alignments evaluated between the PRWRF and the Las Campanas storage pond would be located within existing roadway ROW, so no new easements would be required for this reach of the pipeline.

From the Las Campanas storage pond to the Rio Grande discharge, the alignment would follow the existing BDD raw water pipeline in existing easements and ROW. A preliminary evaluation of these

easements indicates that a 20-foot wide utility easement has been dedicated, centered on the BDD raw water pipeline. In addition, a 40-foot wide roadway easement was dedicated along the same route for construction of the BDD raw water pipeline. Other utilities along the route include a Las Campanas Pipeline, a fiber optic line, and an electrical service line. Descriptions of utilities indicated that all are located within the boundaries of the 40-foot wide roadway ROW. These preliminary evaluations indicate that there may be sufficient space for a new return line in the existing 40-foot wide ROW. As design progresses, a registered land surveyor should be retained to perform a title search and to compile these easements into a comprehensive base map.

Separately, an analysis of permitting needs and considerations for pipeline construction along these alignments has been conducted, as documented in TM 1.

The analysis of reclaimed water conveyance was conducted in two parts:

- Conveyance from the PRWRF uphill to the high point along the alignment. The highest elevation along the alignment is near the sites of the BRWTP or the Las Campanas reclaimed water storage pond. Because the Las Campanas pond may become available for the City's use, it was used as the assumed mid-point for transitioning flow from uphill conveyance from the PRWRF, to downhill conveyance toward the Rio Grande. If the Las Campanas pond is unavailable for the City's use, a different site can be utilized, and storage at that site would be advantageous to buffer pumping flow rates.
- Conveyance from the alignment high point downhill to the Rio Grande.

Alternatives for conveying flow to the alignment high point are discussed in Section 2.2. Approaches for conveying flow from that point to the Rio Grande are discussed in Section 2.3.

2.2 Conveyance Alternatives to the Alignment High Point

2.2.1 Overview

Ideally, the City could convey at least 3.0 mgd of reclaimed water to the alignment high point, and as much as 4.5 mgd, using existing infrastructure. This would avoid the need to build new conveyance infrastructure, reduce capital costs, and avoid the need for parallel piping in public ROWs. This study investigated the maximum capacity of both the Las Campanas pipeline and the MRC pipeline to test the feasibility of conveying 3.0 or 4.5 mgd through either pipeline individually or both lines working together. For the purposes of this analysis, a minimum pipeline pressure class of 150 psi was used.

The Las Campanas pipeline infrastructure is appealing from the standpoint that it is unused, operationally simple, and available year-round to convey water toward the Rio Grande. It is also appealing in that the pipeline physically extends approximately 16,000 LF closer to the Rio Grande than does the MRC pipeline.

Using the MRC pipeline to convey reclaimed water toward the Rio Grande would require shared use of its capacity, with the MRC using the line to fully satisfy its irrigation needs in peak irrigation months. During spring and fall months, it is anticipated that as irrigation needs taper off from peak demands, a portion of the pipeline's capacity could be used to move reclaimed water toward the Rio Grande. In wintertime, virtually all of the pipeline's capacity could be dedicated to returning reclaimed water to the Rio Grande. Managing the shared use of the pipeline would add operational complexity and may require operational agreements between the MRC and the City's use for return flow credits. Figure 2.1 provides a summary of recent years' MRC reclaimed water use by month.

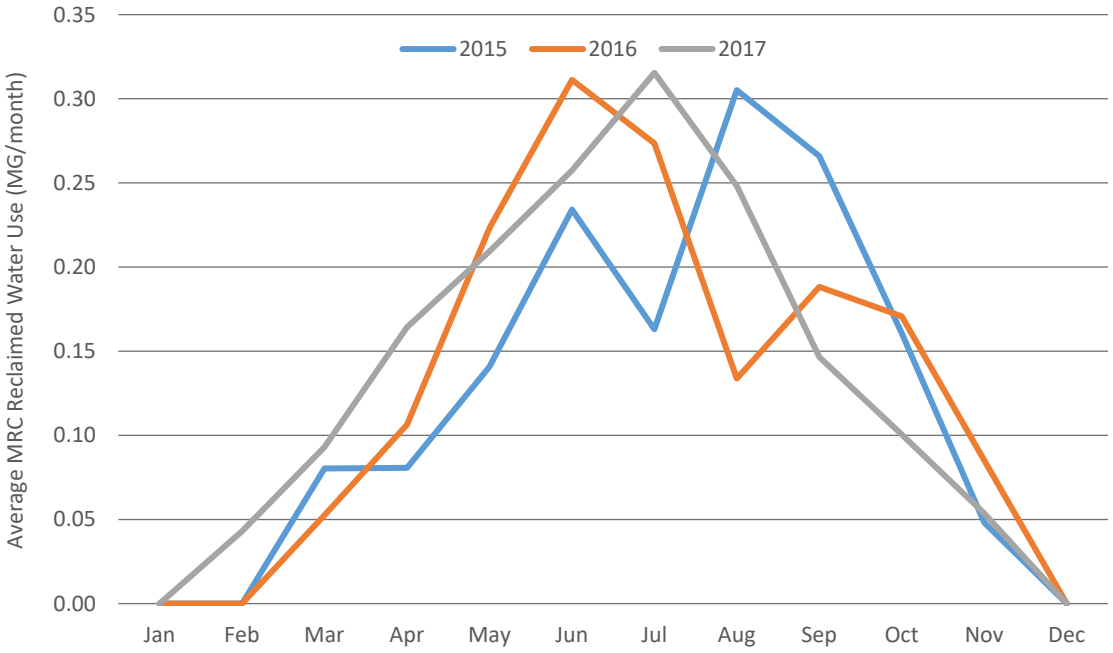

Figure 2.1 Monthly MRC Reclaimed Water Use for 2015 through 2017

2.2.2 Scenario 1: Use of Existing Infrastructure Only

Hydraulic models of both the existing Las Campanas reclaimed water pipeline and the existing MRC reclaimed water pipeline were created based on record drawings of each pipeline system. Key to the development of the hydraulic models was the diameter, elevation profile, and pressure class for the various segments of each pipeline.

An initial set of model runs concluded that the Las Campanas pipeline would not have the hydraulic capacity, regardless of pump station or lift station equipment, to convey 3.0 mgd by itself to the Las Campanas pond. The pipeline's capacity is limited by the line's segment of pressure class 100 pipe material. Similarly, modeling concluded that the MRC pipeline could also not convey 3.0 mgd by itself to the MRC pond, again limited by the MRC pipeline's pressure class 100 segments.

Therefore, the initial investigation shifted focus to a question of how much flow the two existing lines, used together at peak delivery times (e.g., winter deliveries when MRC irrigation demands are minimal), could convey to the Las Campanas reclaimed water pond. To do so would require construction of a new force main segment from the terminus of the MRC pipeline near the MRC pond, paralleling the Las Campanas pipeline to discharge to the Las Campanas pond. It was assumed for this analysis that this force main (FM) segment would be 12 inches in diameter to match the existing MRC pipeline and would be approximately 16,000 LF in length.

An overview of this system is shown overlaid on an aerial view in Figure 2.2. Hydraulic modeling concluded that the combined capacity of the Las Campanas and MRC pipelines in this configuration, from the PRWRF to the Las Campanas reclaimed water pond, totals 2.5 mgd, as shown in the profile view in Figure 2.3. Therefore, using these two existing pipelines in combination would fall short of the City's minimum goal of 3.0 mgd, and would require extending the MRC pipeline some 16,000 LF to connect it from the MRC pond to the Las Campanas pond.

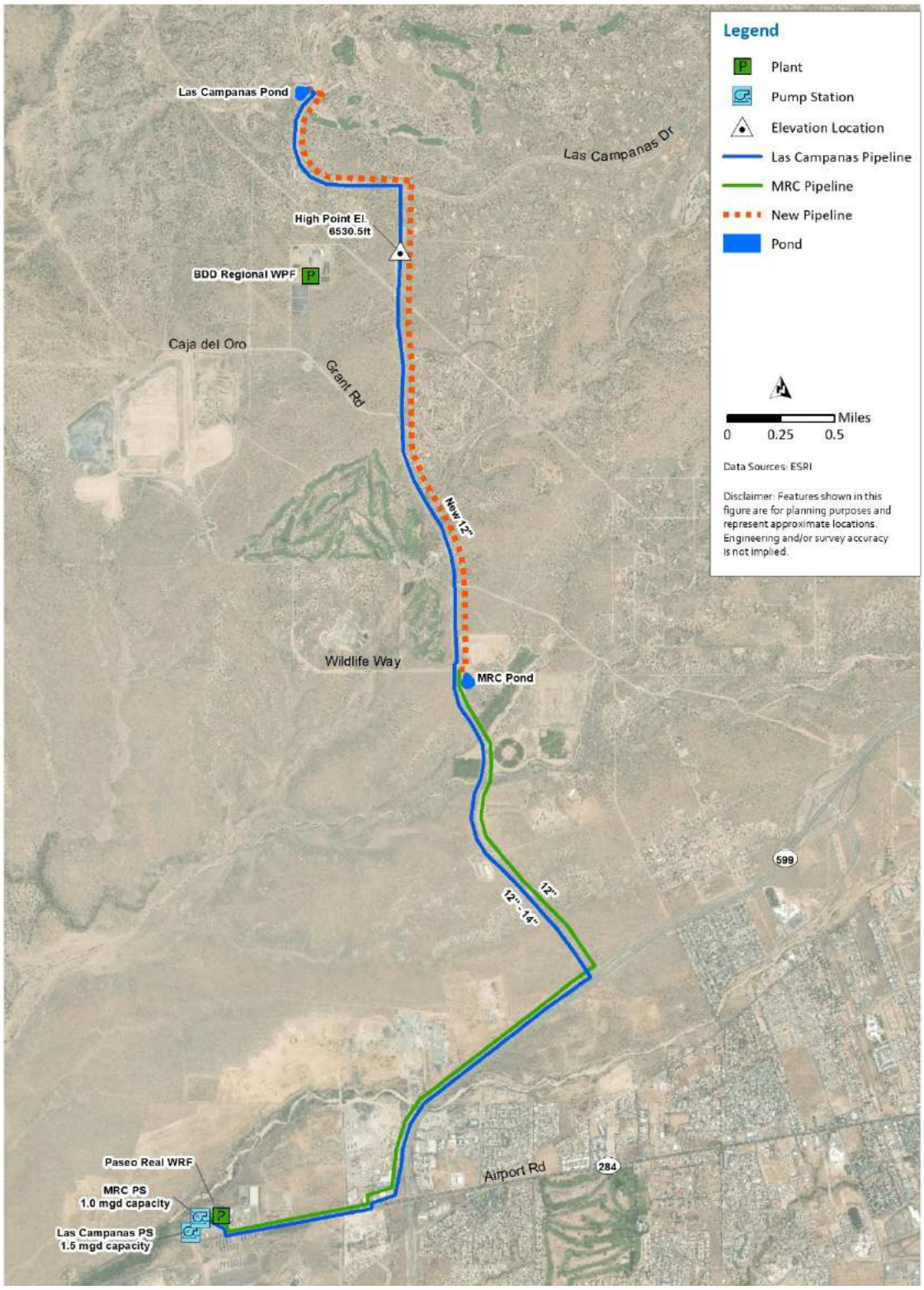

Figure 2.2 Scenario 1 Infrastructure

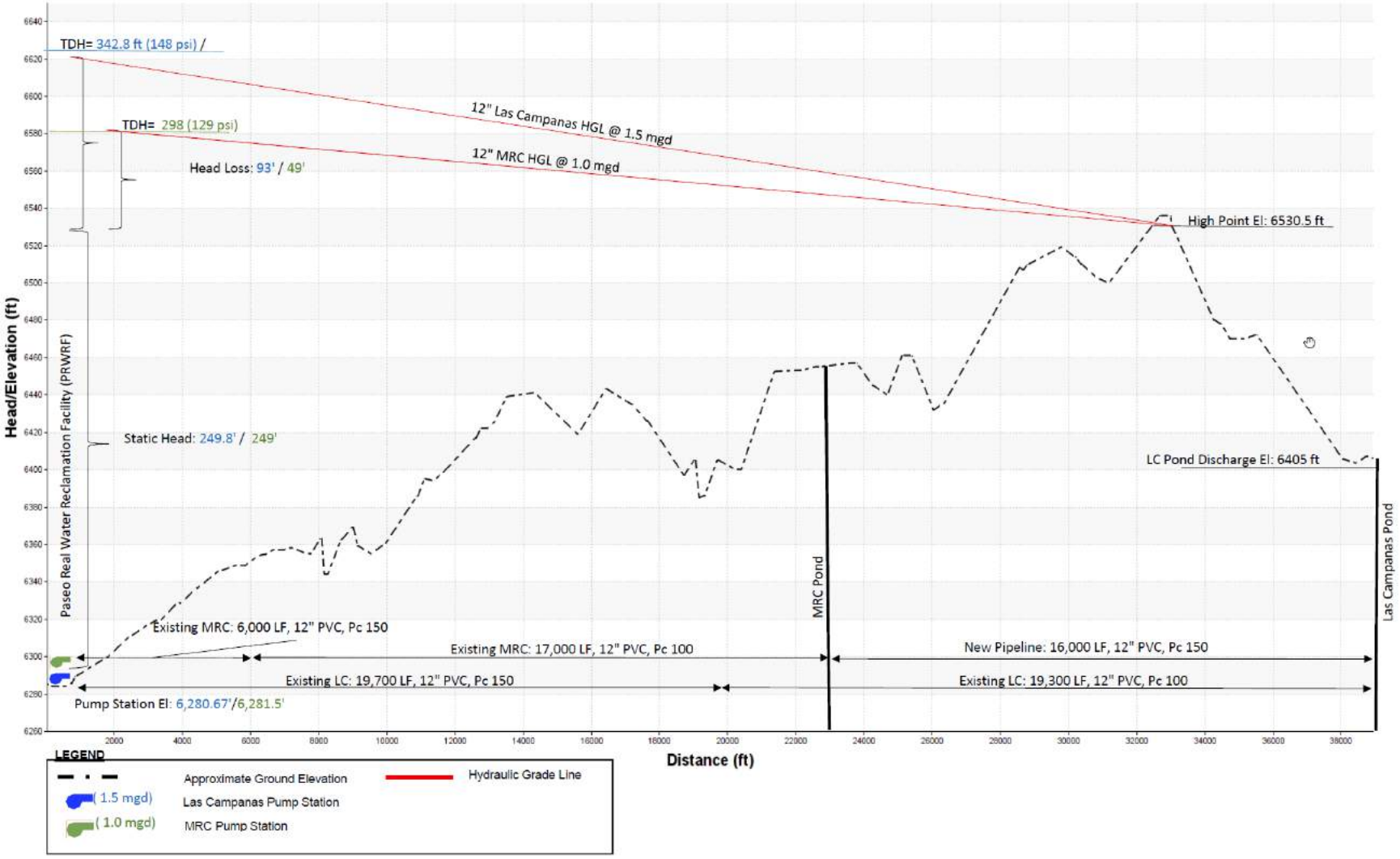

Figure 2.3 Scenario 1 Hydraulic Profile – 2.5 mgd Capacity

2.2.3 Scenario 2: Booster Pumping to Achieve 4.5 mgd Capacity

Recognizing that Scenario 1 fell short of the minimum 3.0 mgd capacity goal, and recognizing that it also would require construction of some 16,000 LF of new 12-inch diameter piping, a second scenario was developed to assess the potential to achieve the upper-end target of 4.5 mgd that could fully utilize the water reuse potential of the proposed infrastructure system.

In order to overcome the hydraulic limitations of the existing pipeline systems, booster pumping could be added near the site of the MRC pond, and flows from the Las Campanas and MRC pipelines could be combined at the new booster station and pumped from the MRC pond site to the Las Campanas pond. Hydraulic modeling identified that the existing Las Campanas pipeline would not have the capacity to convey the combined 4.5 mgd of peak flow, but a new 16,000 LF pipeline 18 inches in diameter could convey 4.5 mgd of peak flow.

The Scenario 2 system is depicted on an aerial overview in Figure 2.4 and in a profile view of the hydraulic modeling results in Figure 2.5.

2.2.4 Scenario 3: Booster Pumping to Achieve 3.0 mgd Capacity

While Scenario 2 achieved the maximum 4.5 mgd target capacity goal, it requires constructing both a 4.5-mgd booster station and a 16,000 LF reach of 18-inch FM. An analysis was conducted to assess the feasibility of achieving the 3.0 mgd target by instead constructing a 3-mgd booster station near the MRC pond and pumping all flow through the segment of the Las Campanas pipeline north of the MRC pond, instead of constructing a new pipeline for the combined pumped flow north of that point.

Hydraulic modeling analyses concluded that this approach would indeed be technically feasible. The Scenario 3 system is depicted on an aerial overview in Figure 2.6 and in a profile view of the hydraulic modeling results in Figure 2.7.

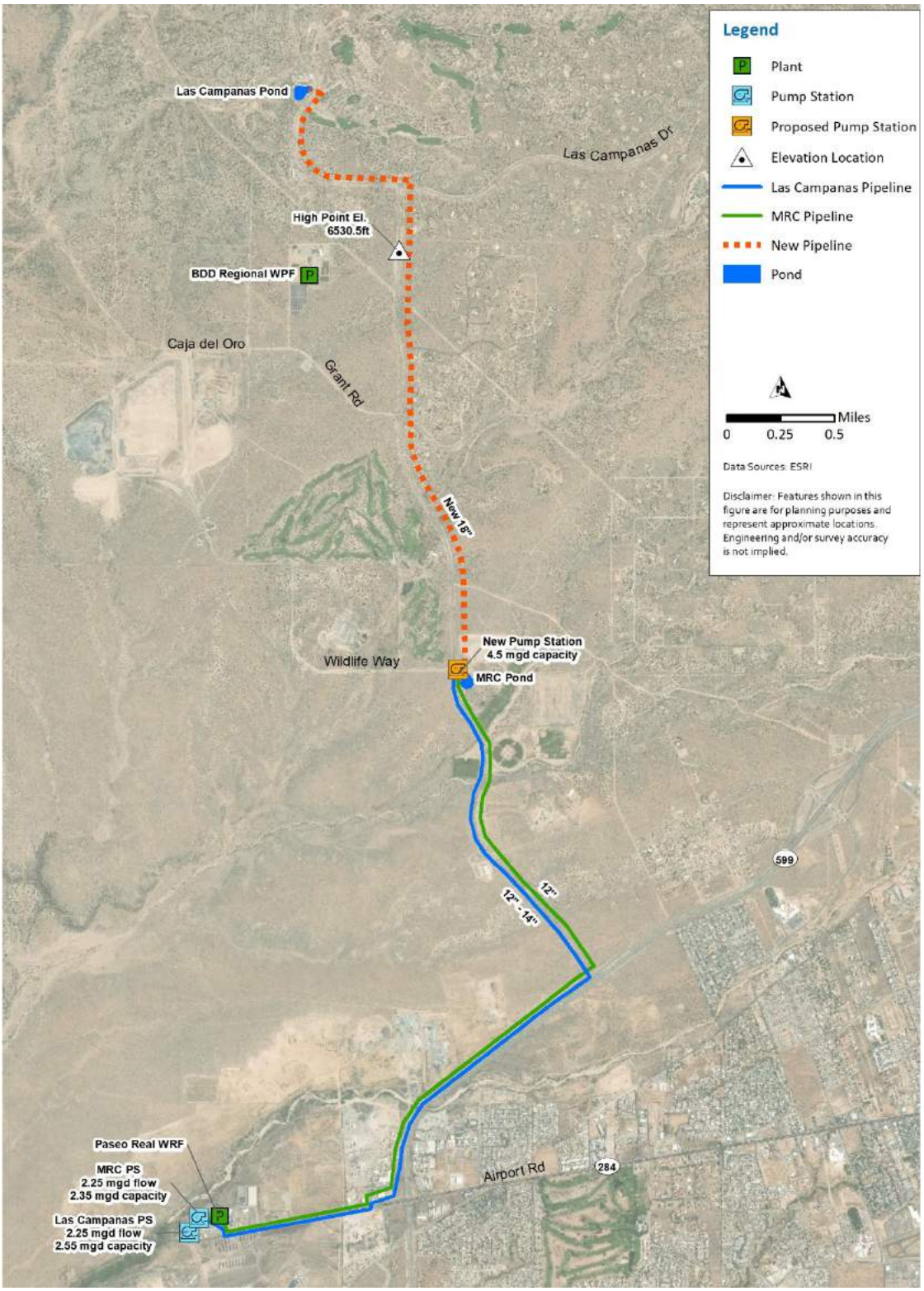

Figure 2.4 Scenario 2 Infrastructure

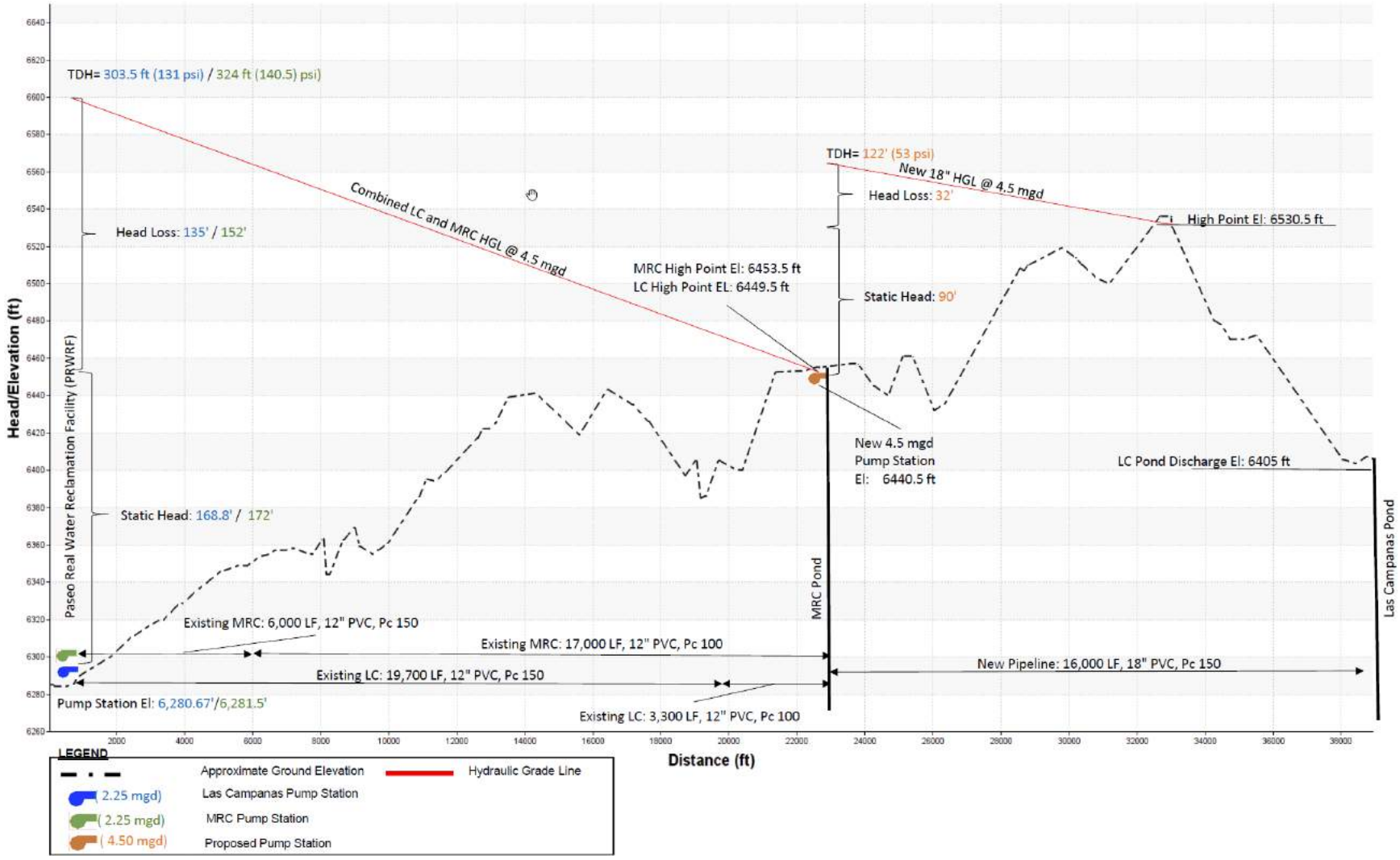

Figure 2.5 Scenario 2 Hydraulic Profile – 4.5 mgd Capacity

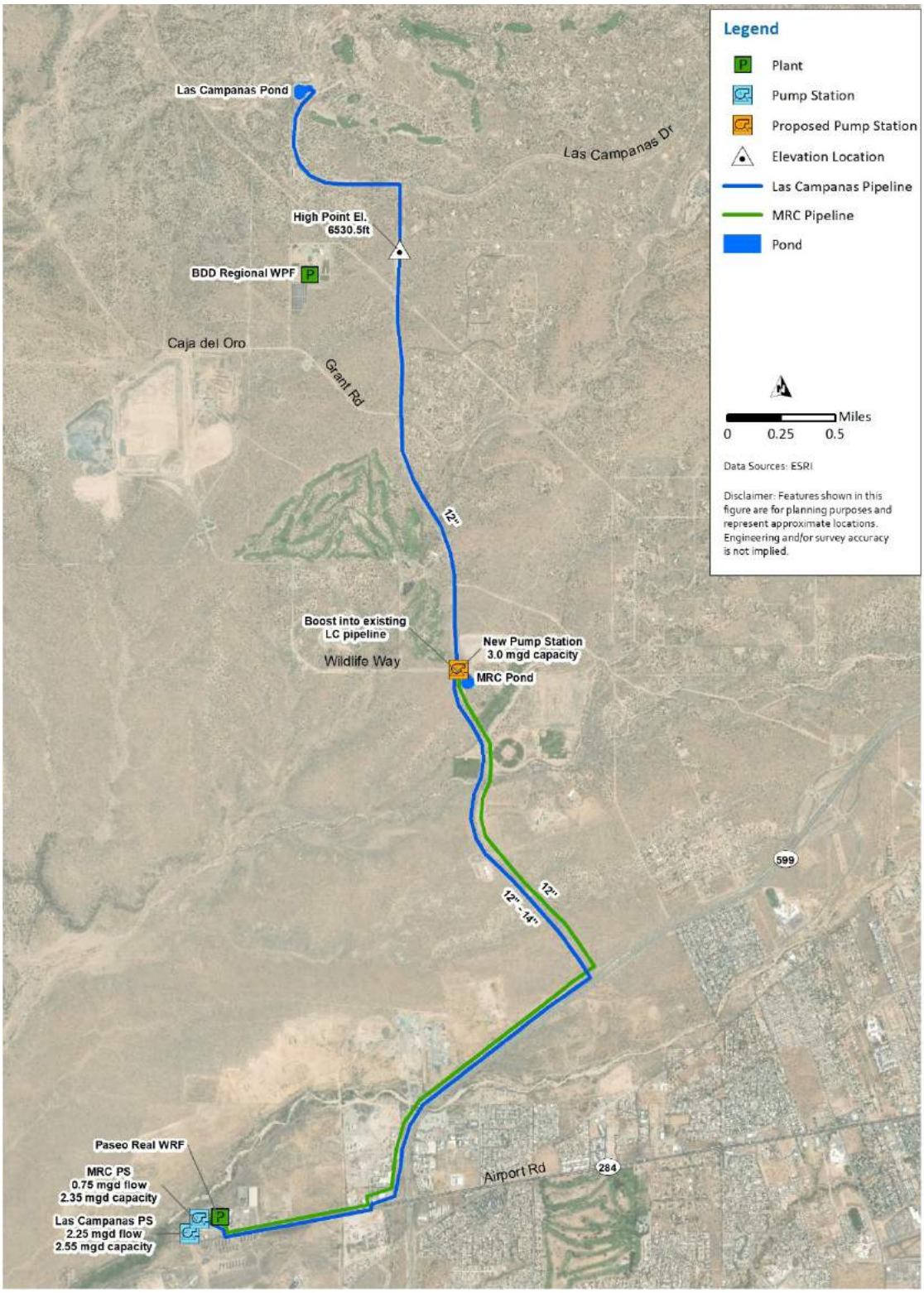

Figure 2.6 Scenario 3 Infrastructure

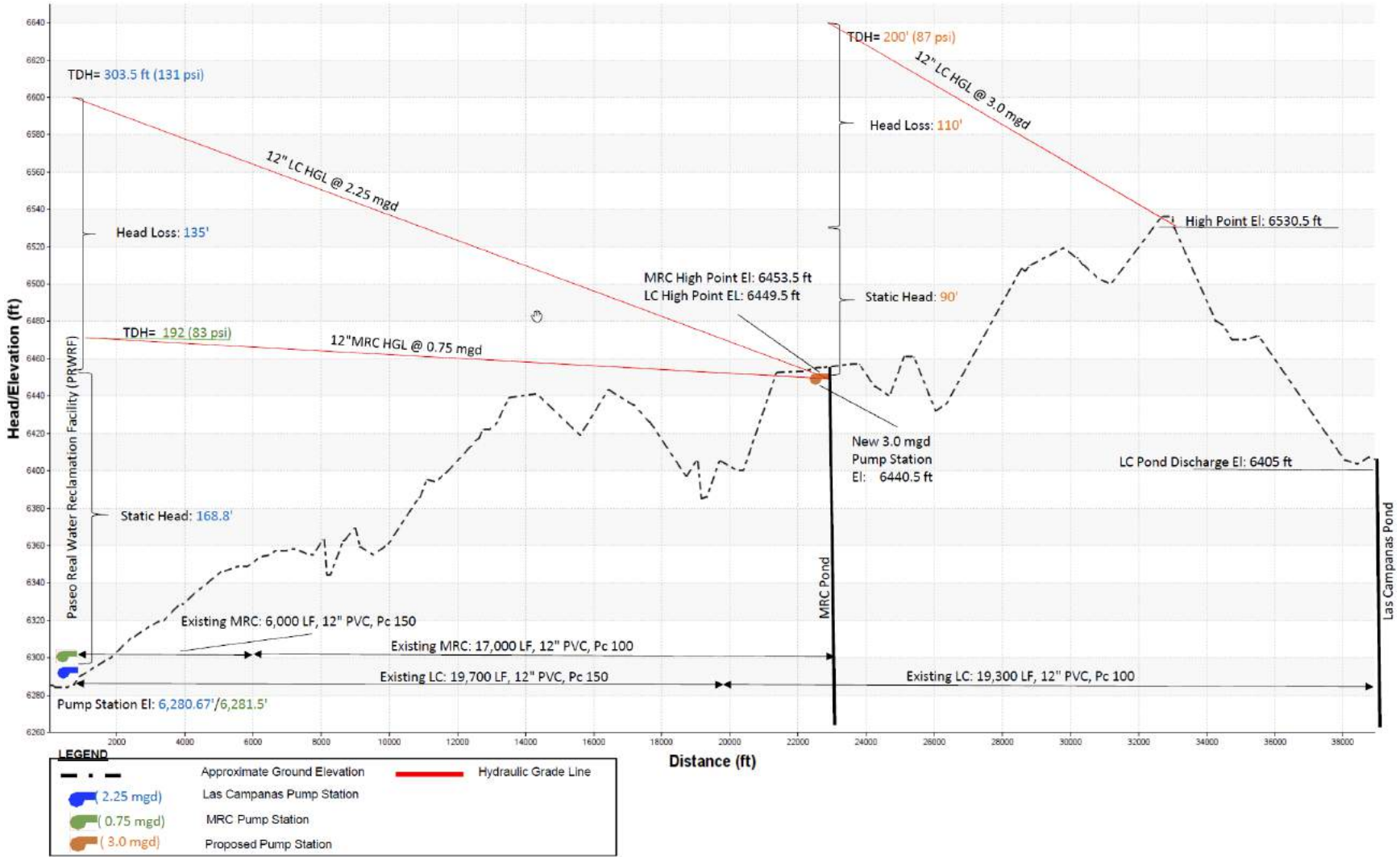

Figure 2.7 Scenario 3 Hydraulic Profile – 3.0 mgd Capacity

2.2.5 Scenario 4: New Infrastructure

There are inherent complexities and risks in using existing infrastructure and a combination of two existing pipelines and pump station systems to convey water to the high point of the proposed return flow system. In light of those complexities and risks, and to provide a point of comparison, a fourth scenario was developed where a new conveyance system would be constructed instead of using the existing systems. Moreover, it was also clear from the first three scenarios that new infrastructure would be necessary to convey flow from the PRWRF to the Las Campanas storage pond if the City was going to consider implementing the higher-flow system, which was estimated at 9.5 mgd for 20-year City and County flows in Section 2.1.2.

It was assumed for purposes of this analysis that the new pipeline would follow the same alignment as the Las Campanas pipeline to the Las Campanas reclaimed water storage pond, as shown in Figure 2.8. The analysis showed that a 16-inch diameter, 150 psi pressure class pipeline would be appropriate to convey 3.0 mgd of peak flow to the Las Campanas pond. To convey this flow, a pump station rated for about 350 feet of total dynamic head (TDH) would be required at the PRWRF. A summary overview of the hydraulic profile for this scenario is provided in Figure 2.9.

A range of infrastructure approaches could be taken to convey flows between 3.0 and 9.5 mgd, including alternate diameters, pump station operating head, and each flowrate discussed in this TM. These approaches are summarized in Table 2.3.

Table 2.3 Sizing Options for New Pipeline from PRWRF to Las Campanas Pond

Flow (mgd)	Pipeline Diameter (inches)	Static Head (feet)	Headloss (feet per 1,000 LF)	TDH (feet)	Maximum Pressure (psi)	Velocity (feet/sec)
3.0	16	249.8	2.9	342	148	3.3
3.0	18	249.8	1.6	302	131	2.6
4.5	16	249.8	6.0	446	193	5.0
4.5	18	249.8	3.4	359	156	3.9
4.5	20	249.8	2.0	316	137	3.2
9.5	24	249.8	3.3	358	155	4.7

To provide flexibility for potential future expansion, an 18-inch pipeline could serve flows at both 3.0 mgd and 4.5 mgd while maintaining acceptable design and operational parameters. The cost of upsizing from a 16-inch to an 18-inch diameter pipeline at initial construction would be significantly less than adding a parallel pipeline at a later date.

For 3.0 mgd, the 16-inch diameter pipeline would likely be the most cost-effective diameter for both construction of the pipeline and pump station, and for long-term operation of the pump station. For this flowrate and pipeline diameter, head losses, velocities, and operating pressures are all within reasonable design and operational ranges. If instead, 4.5 mgd is to be conveyed through the pipeline, an 18-inch diameter pipeline appears to be a favorable size for the same reasons.

Under the higher-flow 20-year City/County 9.5 mgd scenario, a 24-inch diameter pipeline with a pump station providing 358 of total dynamic head would be appropriate. A summary overview of the hydraulic profile for this scenario is provided in Figure 2.10.

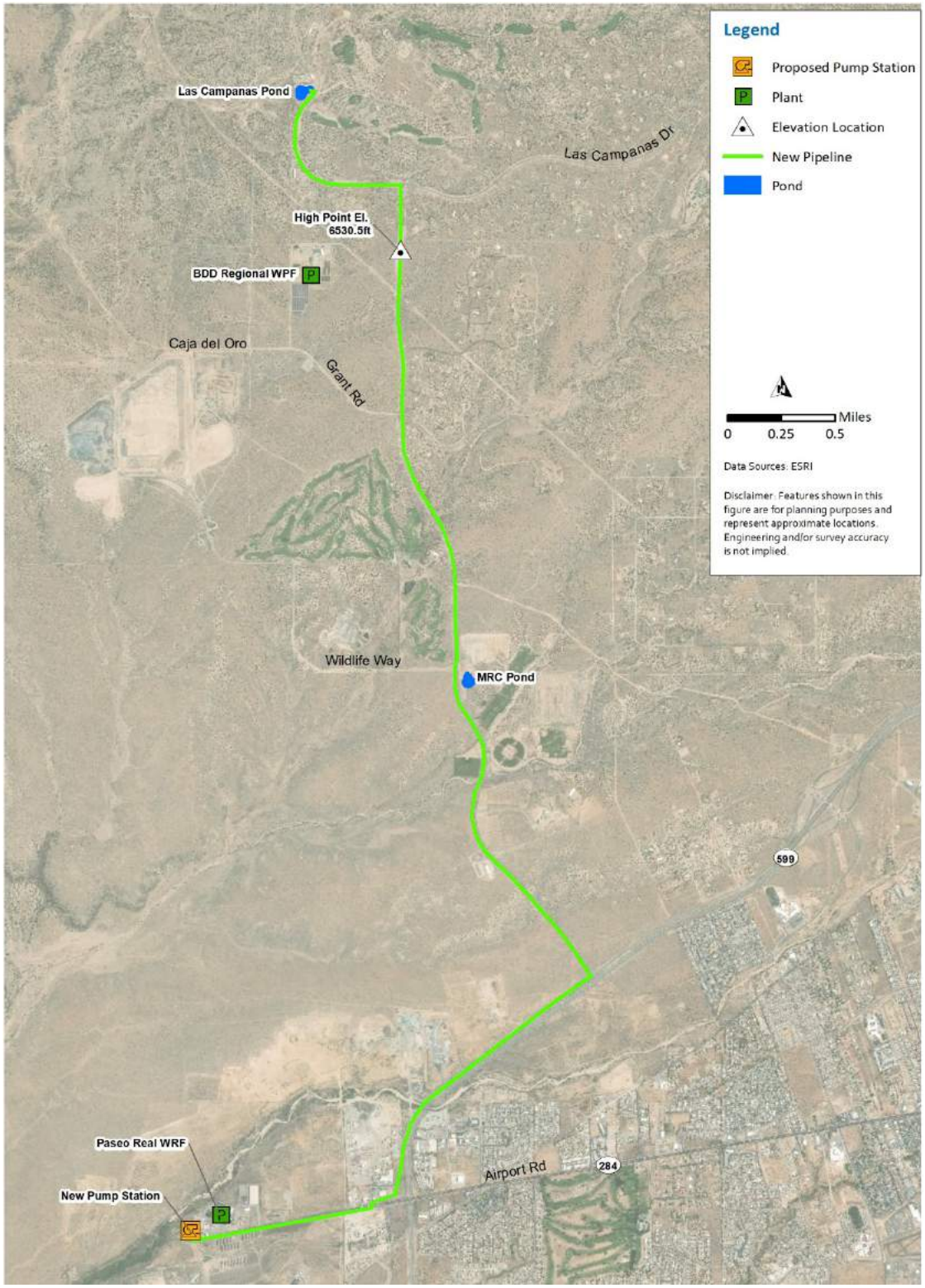

Figure 2.8 Scenario 4 Infrastructure

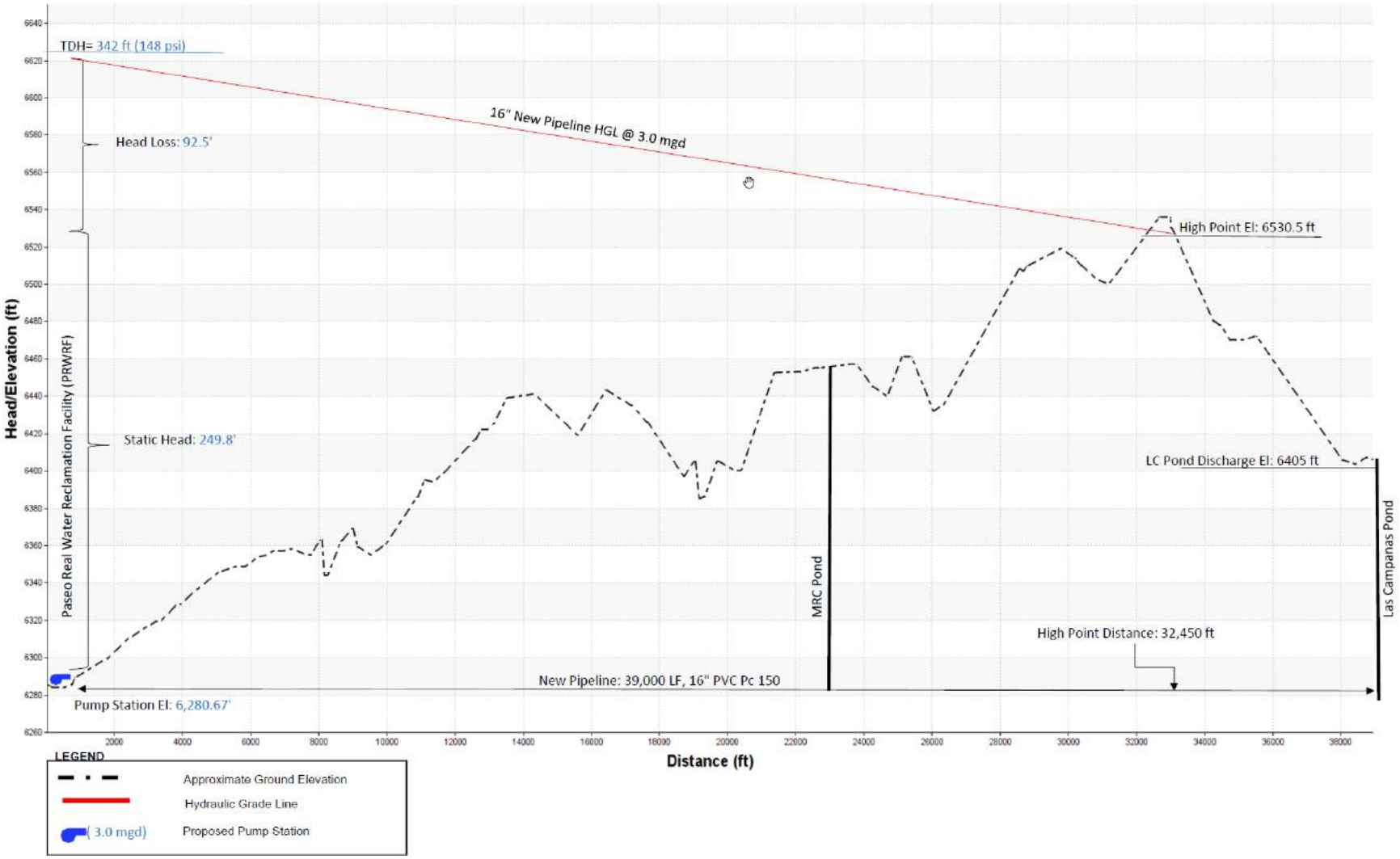

Figure 2.9 Scenario 4 Hydraulic Profile – 3.0 mgd Capacity with 16-inch Pipeline

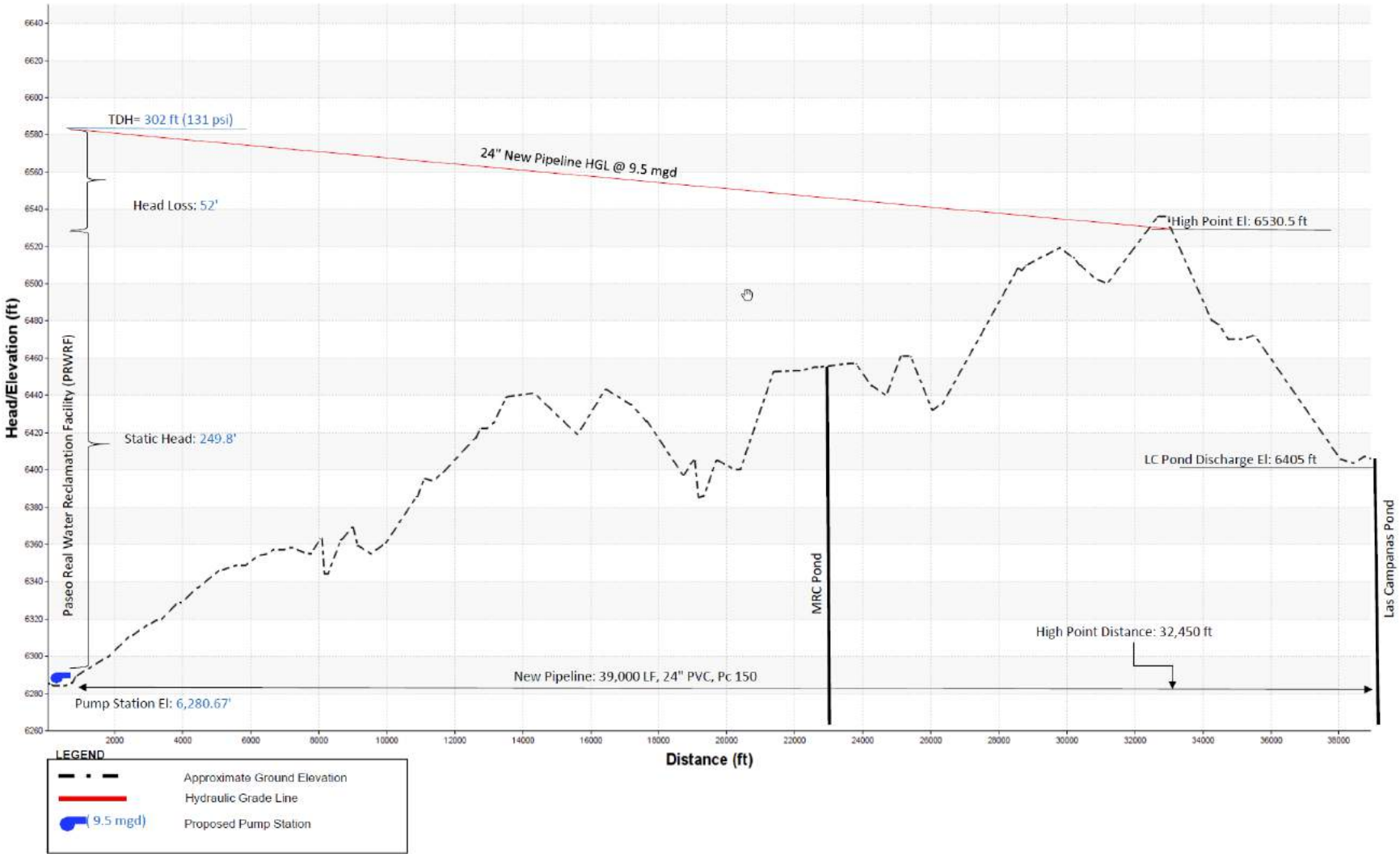

Figure 2.10 Scenario 4 Hydraulic Profile – 9.5 mgd Capacity with 24-inch Pipeline

2.3 Conveyance Alternatives from the Alignment High Point to the Rio Grande

2.3.1 Overview

Options were assessed for conveying flow from the end point of the Section 2.2 analyses, the Las Campanas reclaimed water pond, to the Rio Grande discharge point conceptually located within a few hundred feet downstream of the BDD raw water diversion structure.

The options included hydraulic modeling of a pumped flow scenario, which would allow for:

- Flow to easily transition across variable elevation drops and gains as the pipeline traverses the terrain that encompasses an overall reduction as it moves toward the Rio Grande; and
- Minimization of pipeline diameter to reduce capital construction costs.

However, the pumped flow scenario requires the capital and operating costs associated with construction and operation of a new remote booster station. Alternatives to this scenario include a larger-diameter gravity flow pipeline from the Las Campanas pond to the Rio Grande. These scenarios were evaluated for their ability to convey 3.0 or 4.5 mgd as part of the overall system for conveying reclaimed water from the PRWRF to the Rio Grande. The gravity flow pipeline from the Las Campanas pond to the Rio Grande discharge was also evaluated for the longer-term 9.8 mgd flow scenario (20-year flows from the City, the County, and Las Campanas) as described in Section 2.1.2. For the purposes of this analysis, a minimum pipeline pressure class of 150 psi was used.

2.3.2 Pumped Flow Scenario

The hydraulic grade line for the pumped flow scenarios at 3.0 and 4.5 mgd are depicted in Figure 2.11. These scenarios were evaluated to determine the smallest feasible pipeline diameter and pumping requirements at the Las Campanas Pond.

A new 12-inch diameter pipeline can convey either 3.0 or 4.5 mgd within generally accepted pipeline velocities. Each would require pumping to overcome head losses associated with pipeline velocity and friction. The Las Campanas pump station could be designed for either 3.0 mgd at 114 psi TDH or 4.5 mgd at 200 psi TDH.

As shown in Figure 2.11, the ground surface profile generally decreases in elevation along the pipeline route, but there is an interim increase in elevation at about 42,000 LF of the approximately 54,000-LF pipeline length between the Las Campanas pond and the Rio Grande discharge point. The hydraulic grade lines shown are required to overcome pipeline headloss to get over this interim high point.

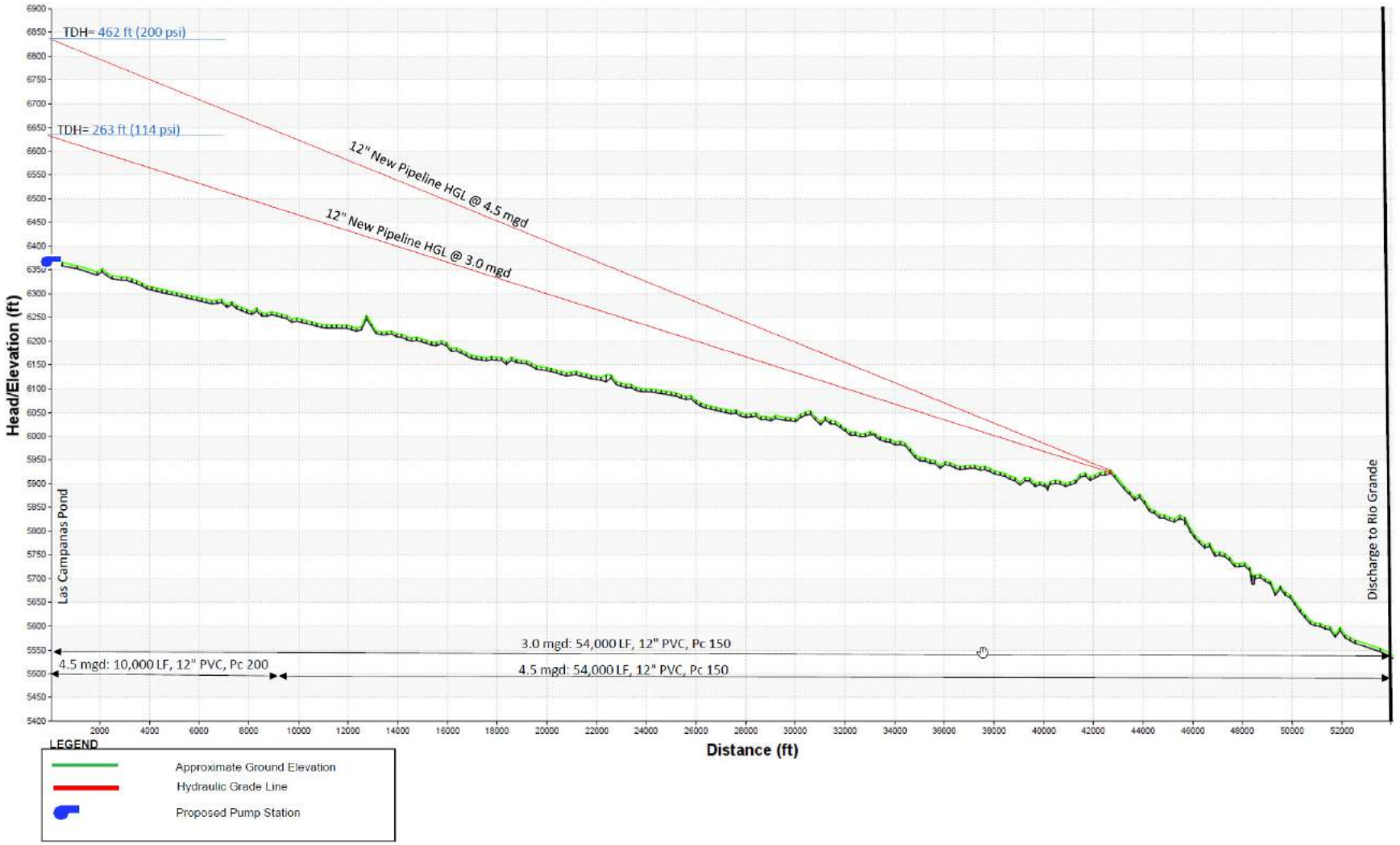

Figure 2.11 Pumped Flow Hydraulic Profile from Las Campanas Pond to Rio Grande Discharge

2.3.3 Gravity Flow Scenario

A gravity flow scenario was also evaluated to determine the pipeline diameter needed for three design flows, including 3.0, 4.5, and 9.8 mgd. A gravity flow pipeline will transition along its length from open channel free surface flow to a surcharged condition. Pipeline diameters for each flow scenario evaluated are:

- 3.0 mgd – 15-inch,
- 4.5 mgd – 18-inch, and
- 9.8 mgd – 24-inch.

A 21-inch diameter pipeline could potentially convey the 9.8 mgd flow but would induce flow velocities in excess of generally accepted industry practice.

The hydraulic profiles for the flow scenarios evaluated are shown in Figure 2.12. The flow transitions between free surface and surcharged conditions can be seen where the hydraulic grade line is above the ground surface. The 3.0 mgd hydraulic profile is depicted in Figure 2.12, but the 4.5 and 9.8 mgd scenarios are nearly identical and the differences would be undiscernible. Therefore, the hydraulic grade line presented is representative of all three flow scenarios.

The relatively small increase in pipe diameter (15- or 18-inch diameter) relative to the pumped flow alternative (12-inch diameter) suggests that the increased capital cost of the gravity flow approach is likely a sound investment for the lower-flow scenarios. That is, the additional pipeline capital invested is expected to be paid back rapidly by returns on that investment, measured in terms of life-cycle costs (incorporating both capital and operating and maintenance costs) and the operational implications of having a remote pump station operating at or near the Las Campanas pond site. However, no cost analyses or detailed alternatives assessments were conducted as part of the current evaluation.

2.4 Conclusions and Next Steps

The analysis of pipeline alternatives for conveying flow from the PRWRF to the Rio Grande led to the following conclusions:

- The existing MRC and Las Campanas pipeline systems are limited to a combined capacity of about 2.5 mgd. Lower pressure class piping material in both existing pipelines limits the conveyance capacity.
- Up to 3.0 mgd could be conveyed through existing MRC and Las Campanas piping from the PRWRF to the Las Campanas pond, if a new 3-mgd booster pump station is constructed at or near the site of the MRC storage pond. This capacity could be increased to 4.5 mgd under a similar approach if a new 4.5-mgd booster pump station and a new 18-inch diameter piping is installed from the MRC pond to the Las Campanas pond.
- Without use of the MRC or Las Campanas lines, a new 16-inch diameter pipeline would likely be most cost-effective for conveyance of 3.0 mgd, and an 18-inch diameter pipeline would be best for conveyance of 4.5 mgd from the PRWRF to the Las Campanas pond. For a 20-year planning period with higher flows and potential County involvement, a 24-inch pipeline would be best for conveying up to 9.5 mgd over this same route.
- Increasing the return flow peak infrastructure capacity by 50 percent from 3.0 to 4.5 mgd results in the potential to increase annual return San Juan-Chama Project flows to the

Rio Grande by about 32 percent, from 2,191 AFY to nearly 2,900 AFY, based on an analysis of near-term flow availability from the PRWRF.

- From the Las Campanas pond to a point of discharge on the Rio Grande immediately downstream of the existing BDD, the costs of pumping are not expected to be recovered by smaller-diameter pipe sizes.
- For the Las Campanas pond to Rio Grande reach of the pipeline, a gravity pipeline diameter of 15 inches, 18 inches, or 24 inches would be recommended for the 3.0 mgd, 4.5 mgd, or 9.8 mgd (20-year future City/County/Las Campanas combined flows) scenarios, respectively.

Next steps in the analysis are to confirm the preferred scenario and capacity for purposes of completing this preliminary design evaluation. Key steps in that analysis will include:

- Conceptual level pump station costing,
- Conceptual level pipeline and outfall costing,
- Development of a project implementation timeline, and
- Development of a project implementation plan.

These steps will be documented in the Preliminary Design Evaluation Report.

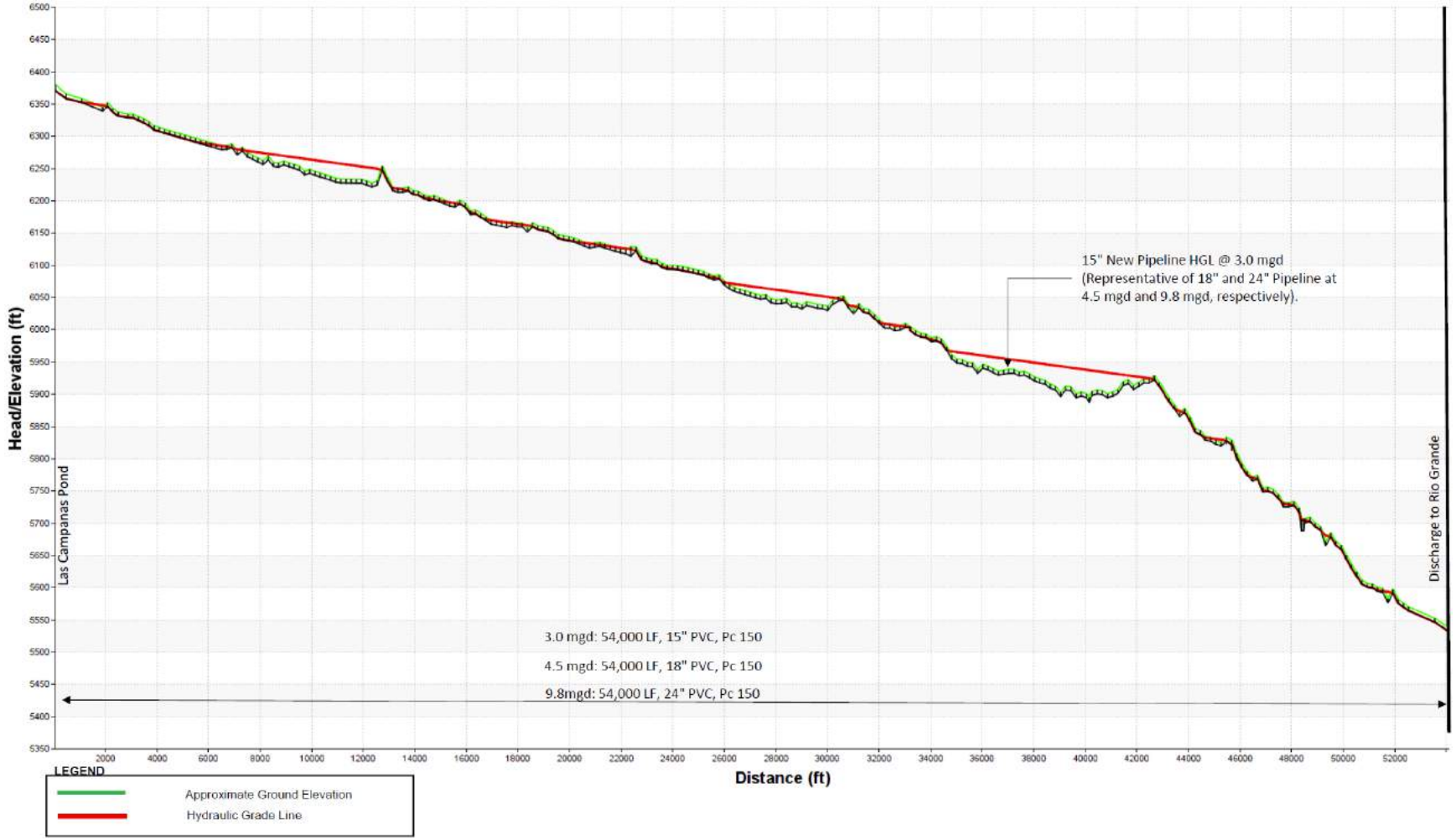

Figure 2.12 Gravity Flow Hydraulic Profile from Las Campanas Pond to Rio Grande Discharge

Appendix C

OPINIONS OF PROBABLE CONSTRUCTION COST FOR REUSE CONVEYANCE ALTERNATIVES

Spreadsheet Level	Takeoff Quantity		Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit		Total Amount
02 Scenario 2											
02 Buried Pipe											
33-110-005 18" Downhill Gravity Pipeline											
Freight - Pipe	211.00	ld		-	-	234,210	-	-	1,110.00	/ld	234,210
Freight - Manhole	13.00	ld		-	-	14,430	-	-	1,110.00	/ld	14,430
Mobilization Cost/Demobilization Costs	1.00	ls		-	11,100	-	-	-	11,100.00	/ls	11,100
Site Restoration - per day	120.00	day	2,880.0	101,083	-	-	159,840	-	2,174.36	/day	260,923
Site Clearing - per day	120.00	day	2,880.0	96,812	-	-	137,006	-	1,948.49	/day	233,818
Trench Bedding - Sand	12,280.00	cy	1,023.3	33,214	340,770	-	45,436	-	34.16	/cy	419,420
Silt Fence	54,000.00	lf	771.4	20,962	104,895	-	-	-	2.33	/lf	125,857
18" RCP Utility Pipe Excav, Install and Backfill Crew, 225 lf/day	240.00	day	13,440.0	440,555	-	-	1,033,636	-	6,142.47	/day	1,474,192
Buried Pipe Crossing, Support Exisiting Lines w/ I Beam and Straps, Up to 12" dia., 25' Long	3.00	ea	96.0	2,301	-	-		-	766.88	/ea	2,301
Spread Surplus onsite	240.00	day	3,840.0	126,380	-	-	330,336	-	1,902.98	/day	456,716
Thrust Block Concrete	14.00	cy		-	1,554	-	-	-	111.00	/cy	1,554
Warning Tape Detectable	54,000.00	lf	270.0	7,337	1,499	-	-	-	0.16	/lf	8,835
Manhole - 4' Diameter - 6 - 12' Deep	54.00	ea	1,296.0	47,933	97,103	-	112,208	-	4,763.77	/ea	257,243
PURCHASE RCP Class III Glipp Joint 18	54,000.00	lf			1,438,560	-		-	26.64	/lf	1,438,560
18" Downhill Gravity Pipeline	***54,000.00***	***lf***	***26,496.8***	***876,576***	***1,995,480***	***248,640***	***1,818,462***		***91.47***	***/lf***	***4,939,158***
33-110-005 18" Uphill Pumped Pipeline											
Freight - pipe	63.00	ld		-	-	69,930	-	-	1,110.00	/ld	69,930
Mobilization Cost/Demobilization Costs	1.00	ls		-	11,100	-	-	-	11,100.00	/ls	11,100
Site Restoration - per day	27.00	day	648.0	22,744	-	-	35,964	-	2,174.36	/day	58,708
Site Clearing - per day	27.00	day	648.0	21,783	-	-	30,826	-	1,948.49	/day	52,609
Trench Bedding - Sand	3,638.00	cy	303.2	9,840	100,955	-	13,461	-	34.16	/cy	124,255
Silt Fence	16,000.00	lf	228.8	6,216	31,080	-	-	-	2.33	/lf	37,296
18" PVC Utility Pipe Excav, Install and Backfill Crew, 300 lf/day	54.00	day	2,592.0	80,539	-	-	175,024	-	4,732.65	/day	255,563
Buried Pipe Crossing, Support Exisiting Lines w/ I Beam and Straps, Up to 12" dia., 25' Long	3.00	ea	96.0	2,301	-	-		-	766.88	/ea	2,301
Spread Surplus onsite	54.00	day	864.0	28,436	-	-	74,326	-	1,902.98	/day	102,761
Thrust Block Concrete	17.00	cy		-	1,887	-	-	-	111.00	/cy	1,887
Warning Tape Detectable	16,000.00	lf	80.0	2,174	444	-	-	-	0.16	/lf	2,618
PVC C-900 Pressure Pipe - 18"	16,000.00	lf			408,480	-		-	25.53	/lf	408,480
PVC C-900 Pressure Pipe DI OD 22 bend 18	6.00	ea			12,188	-	-	-	2,031.30	/ea	12,188
PVC C-900 Pressure Pipe DI OD 45 bend 18	6.00	ea			11,908	-	-	-	1,984.68	/ea	11,908
PVC C-900 Pressure Pipe DI OD 90 ell 18	5.00	ea			13,387	-	-	-	2,677.32	/ea	13,387
18" Uphill Pumped Pipeline	***16,000.00***	***lf***	***5,459.9***	***174,031***	***591,428***	***69,930***	***329,600***		***72.81***	***/lf***	***1,164,990***
02 Buried Pipe	***0.00***		***31,956.7***	***1,050,607***	***2,586,908***	***318,570***	***2,148,063***				***6,104,148***
03 Concrete											
03-110-060 Outfall, SOG											
Mat Foundation Edge Form	16.00	sf	4.0	168	12	-	-	-	11.21	/sf	179
Strip & Oil Mat Found. Form	16.00	sf	0.6	17	-	-	-	-	1.09	/sf	17
Waterstop 9" Flat	12.00	lf	7.7	209	98	-	-	-	25.55	/lf	307
Rebar by CY - SOG Rebar	0.06	ton	1.2	46	67	-	-	-	1,910.51	/ton	113
4500 psi Concrete	0.59	cy		-	90	-	-	-	151.60	/cy	90
Ice Chips	0.59	cy		-	4	-	-	-	7.39	/cy	4
Truck Place Mat Foundation	0.59	cy	0.6	17	-	-	-	-	28.28	/cy	17
Finish- Broom	16.00	sf	0.2	6	0	-	-	-	0.36	/sf	6
Liquid Curing Compounds	32.00	sf	0.1	2	1	-	-	-	0.08	/sf	2
Outfall, SOG	***0.59***	***cy***	***14.3***	***463***	***272***				***1,240.05***	***/cy***	***735***
03-120-014 Outfall Walls											
Panel Form System 0-4'	84.00	sf	10.5	440	98	-	-	-	6.40	/sf	538
Strip & Oil Wall Forms	84.00	sf	0.8	23	-	-	-	-	0.27	/sf	23
Rebar by CY - Wall Rebar	0.19	ton	2.3	90	221	-	-	-	1,601.96	/ton	311
4500 psi Concrete	1.56	cy		-	236	-	-	-	151.53	/cy	236
Ice Chips	1.56	cy		-	11	-	-	-	7.37	/cy	11
Truck Place Walls	1.56	cy	1.6	44	-	-	-	-	28.30	/cy	44
Finish- Top of Wall & Curb	12.00	sf	0.1	4	-	-	-	-	0.30	/sf	4
Grind/Patch Walls	84.00	sf	1.3	34	1	-	-	-	0.42	/sf	36
Rub Walls	42.00	sf	1.3	34	7	-	-	-	0.98	/sf	41
Liquid Curing Compounds	84.00	sf	0.2	5	2	-	-	-	0.08	/sf	6

Spreadsheet Level	Takeoff Quantity	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
Outfall Walls	***1.56 cy***	***18.0***	***673***	***576***				***803.02 /cy***	***1,250***
32-320-010 Outfall, Rip Rap									
Rip Rap Machine Place	10.00 cy	10.0	351	333	-	1,499	-	218.25 /cy	2,182
Outfall, Rip Rap	***600.00 sf***	***10.0***	***351***	***333***		***1,499***		***3.64 /sf***	***2,182***
03 Concrete	***0.00***	***42.4***	***1,488***	***1,181***		***1,499***			***4,167***
06 Process Equipment									
40-0400-130 Retrofit Las Campanas Pump Station									
Retrofit Las Campanas Pump Station	2.25 mgd				984,015	-	-	437,340.00 /mgd	984,015
Retrofit Las Campanas Pump Station	***1.00 ea***				***984,015***			***984,015.00 /ea***	***984,015***
40-0400-130 New Booster Pump Station near MRC pond									
New Booster Pump Station near MRC pond	4.50 mgd				2,622,375	-	-	582,750.00 /mgd	2,622,375
New Booster Pump Station near MRC pond	***1.00 ea***				***2,622,375***			***2,622,375.00 /ea***	***2,622,375***
40-0400-130 New MRC Pump Station									
New MRC Pump Station	2.25 mgd				1,311,188	-	-	582,750.00 /mgd	1,311,188
New MRC Pump Station	***1.00 ea***				***1,311,188***			***1,311,187.50 /ea***	***1,311,188***
06 Process Equipment	***0.00***				***4,917,578***				***4,917,578***
02 Scenario 2	***0.00***	***31,999.1***	***1,052,095***	***2,588,089***	***5,236,148***	***2,149,561***			***11,025,893***

Partial Totals

Description	Amount	Totals	Hours	Rate	Cost Basis	Percent of Total	
Labor	1,052,095		31,999.067 hrs			5.26%	
Material	2,588,089					12.93%	
Subcontract	5,236,148					26.17%	
Equipment	2,149,561		28,514.666 hrs			10.74%	
Other							
Direct Costs	**11,025,893**	**11,025,893**				**55.10%**	**55.10%**
GC Labor & Exp.	1,102,589			10.000 %	T	5.51%	
BR & GL Ins.	176,414			1.600 %	T	0.88%	
P&P Bond	105,243				B	0.53%	
Cost of Work	**1,384,246**	**12,410,139**				**6.92%**	**62.02%**
Fee	1,861,521			15.000 %	T	9.30%	
Cost to Construct	**1,861,521**	**14,271,660**				**9.30%**	**71.32%**
Contigency	4,281,498			30.000 %	T	21.40%	
Markup & Bond	**4,281,498**	**18,553,158**				**21.40%**	**92.72%**
NM GR Tax	1,456,423			7.850 %	T	7.28%	
Partial Total		***20,009,581***					

Spreadsheet Level	Takeoff Quantity		Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit		Total Amount
03 Scenario 3											
02 Buried Pipe											
33-110-005 15" Downhill Gravity Pipeline											
Freight - Pipe	211.00	ld		-	-	234,210	-	-	1,110.00	/ld	234,210
Freight - Manhole	13.00	ld		-	-	14,430	-	-	1,110.00	/ld	14,430
Mobilization Cost/Demobilization Costs	1.00	ls		-	11,100	-	-	-	11,100.00	/ls	11,100
Site Restoration - per day	120.00	day	2,880.0	101,083	-	-	159,840	-	2,174.36	/day	260,923
Site Clearing - per day	120.00	day	2,880.0	96,812	-	-	137,006	-	1,948.49	/day	233,818
Trench Bedding - Sand	12,280.00	cy	1,023.3	33,214	340,770	-	45,436	-	34.16	/cy	419,420
Silt Fence	54,000.00	lf	772.1	20,979	104,895	-	-	-	2.33	/lf	125,874
15" RCP Utility Pipe Excav, Install and Backfill Crew, 225 lf/day	240.00	day	13,440.0	440,555	-	-	1,033,636	-	6,142.47	/day	1,474,192
Buried Pipe Crossing, Support Exisiting Lines w/ I Beam and Straps, Up to 12" dia., 25' Long	3.00	ea	96.0	2,301	-	-		-	766.88	/ea	2,301
Spread Surplus onsite	240.00	day	3,840.0	126,380	-	-	330,336	-	1,902.98	/day	456,716
Thrust Block Concrete	14.00	cy		-	1,554	-	-	-	111.00	/cy	1,554
Warning Tape Detectable	54,000.00	lf	270.0	7,337	1,499	-	-	-	0.16	/lf	8,835
Manhole - 4' Diameter - 6 - 12' Deep	54.00	ea	1,296.0	47,933	97,103	-	112,208	-	4,763.77	/ea	257,243
RCP Class III Glipp Joint 15	54,000.00	lf			1,198,800	-		-	22.20	/lf	1,198,800
15" Downhill Gravity Pipeline	***54,000.00***	***lf***	***26,497.4***	***876,593***	***1,755,720***	***248,640***	***1,818,462***		***87.03***	***/lf***	***4,699,416***
02 Buried Pipe	***0.00***		***26,497.4***	***876,593***	***1,755,720***	***248,640***	***1,818,462***				***4,699,416***
03 Concrete											
03-110-060 Outfall, SOG											
Mat Foundation Edge Form	16.00	sf	4.0	168	12	-	-	-	11.21	/sf	179
Strip & Oil Mat Found. Form	16.00	sf	0.6	17	-	-	-	-	1.09	/sf	17
Waterstop 9" Flat	12.00	lf	7.7	209	98	-	-	-	25.55	/lf	307
Rebar by CY - SOG Rebar	0.06	ton	1.2	46	67	-	-	-	1,910.50	/ton	113
4500 psi Concrete	0.59	cy		-	90	-	-	-	151.60	/cy	90
Ice Chips	0.59	cy		-	4	-	-	-	7.39	/cy	4
Truck Place Mat Foundation	0.59	cy	0.6	17	-	-	-	-	28.30	/cy	17
Finish- Broom	16.00	sf	0.2	6	0	-	-	-	0.36	/sf	6
Liquid Curing Compounds	32.00	sf	0.1	2	1	-	-	-	0.08	/sf	2
Outfall, SOG	***0.59***	***cy***	***14.3***	***463***	***272***				***1,240.05***	***/cy***	***735***
03-120-014 Outfall Walls											
Panel Form System 0-4'	84.00	sf	10.5	440	98	-	-	-	6.40	/sf	538
Strip & Oil Wall Forms	84.00	sf	0.8	23	-	-	-	-	0.27	/sf	23
Rebar by CY - Wall Rebar	0.19	ton	2.3	90	221	-	-	-	1,601.90	/ton	311
4500 psi Concrete	1.56	cy		-	236	-	-	-	151.54	/cy	236
Ice Chips	1.56	cy		-	11	-	-	-	7.36	/cy	11
Truck Place Walls	1.56	cy	1.6	44	-	-	-	-	28.30	/cy	44
Finish- Top of Wall & Curb	12.00	sf	0.1	4	-	-	-	-	0.29	/sf	4
Grind/Patch Walls	84.00	sf	1.3	34	1	-	-	-	0.42	/sf	36
Rub Walls	42.00	sf	1.3	34	7	-	-	-	0.98	/sf	41
Liquid Curing Compounds	84.00	sf	0.2	5	2	-	-	-	0.08	/sf	6
Outfall Walls	***1.56***	***cy***	***18.0***	***673***	***576***				***803.03***	***/cy***	***1,250***
32-320-010 Outfall, Rip Rap											
Rip Rap Machine Place	10.00	cy	10.0	351	333	-	1,499	-	218.25	/cy	2,182
Outfall, Rip Rap	***600.00***	***sf***	***10.0***	***351***	***333***		***1,499***		***3.64***	***/sf***	***2,182***
03 Concrete	***0.00***		***42.4***	***1,488***	***1,181***		***1,499***				***4,167***
06 Process Equipment											
40-0400-130 Retrofit Las Campanas Pump Station											
Retrofit Las Campanas Pump Station	2.25	mgd				984,015	-	-	437,340.00	/mgd	984,015
Retrofit Las Campanas Pump Station	***1.00***	***ea***				***984,015***			***984,015.00***	***/ea***	***984,015***
40-0400-130 New Booster Pump Station near MRC pond											
New Booster Pump Station near MRC pond	3.00	mgd				1,748,250	-	-	582,750.00	/mgd	1,748,250

Spreadsheet Level	Takeoff Quantity	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
New Booster Pump Station near MRC pond	*1.00 ea*				*1,748,250*			*1,748,250.00 /ea*	*1,748,250*
06 Process Equipment	*0.00*				*2,732,265*				*2,732,265*
03 Scenario 3	*0.00*	*26,539.8*	*878,081*	*1,756,901*	*2,980,905*	*1,819,961*			*7,435,848*

Partial Totals

Description	Amount	Totals	Hours	Rate	Cost Basis	Percent of Total	
Labor	878,081		26,539.774 hrs			6.50%	
Material	1,756,901					13.01%	
Subcontract	2,980,905					22.08%	
Equipment	1,819,961		23,790.444 hrs			13.48%	
Other							
Direct Costs	**7,435,848**	**7,435,848**				**55.07%**	**55.07%**
GC Labor & Exp.	743,585			10.000 %	T	5.51%	
BR & GL Ins.	118,974			1.600 %	T	0.88%	
P&P Bond	75,961				B	0.56%	
Cost of Work	**938,520**	**8,374,368**				**6.95%**	**62.02%**
Fee	1,256,155			15.000 %	T	9.30%	
Cost to Construct	**1,256,155**	**9,630,523**				**9.30%**	**71.32%**
Contigency	2,889,157			30.000 %	T	21.40%	
Markup & Bond	**2,889,157**	**12,519,680**				**21.40%**	**92.72%**
NM GR Tax	982,795			7.850 %	T	7.28%	
Partial Total		***13,502,475***					

Spreadsheet Level	Takeoff Quantity		Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit		Total Amount
04A Scenario 4A											
01 Sitework & Demo											
40-0400-130 Demo Las Campanas Pump Station											
Demolition Pump Station	7.00	day	280.0	9,095	-	-	18,959	-	4,007.69	/day	28,054
Dump Fees by CY	200.00	cy		-	12,623	-	-	-	63.12	/cy	12,623
Demo Las Campanas Pump Station	***1.00***	***ls***	***280.0***	***9,095***	***12,623***		***18,959***		***40,677.17***	***/ls***	***40,677***
01 Sitework & Demo	***0.00***		***280.0***	***9,095***	***12,623***		***18,959***				***40,677***
02 Buried Pipe											
33-110-005 18" Downhill Gravity Pipeline											
Freight - Pipe	211.00	ld		-	-	234,210	-	-	1,110.00	/ld	234,210
Freight - Manhole	13.00	ld		-	-	14,430	-	-	1,110.00	/ld	14,430
Mobilization Cost/Demobilization Costs	1.00	ls		-	11,100	-	-	-	11,100.00	/ls	11,100
Site Restoration - per day	120.00	day	2,880.0	101,083	-	-	159,840	-	2,174.36	/day	260,923
Site Clearing - per day	120.00	day	2,880.0	96,812	-	-	137,006	-	1,948.49	/day	233,818
Trench Bedding - Sand	12,280.00	cy	1,023.3	33,214	340,770	-	45,436	-	34.16	/cy	419,420
Silt Fence	54,000.00	lf	772.1	20,979	104,895	-	-	-	2.33	/lf	125,874
18" RCP Utility Pipe Excav, Install and Backfill Crew, 225 lf/day	240.00	day	13,440.0	440,555	-	-	1,033,636	-	6,142.47	/day	1,474,192
Buried Pipe Crossing, Support Exisiting Lines w/ I Beam and Straps, Up to 12" dia., 25' Long	3.00	ea	96.0	2,301	-	-		-	766.87	/ea	2,301
Spread Surplus onsite	240.00	day	3,840.0	126,380	-	-	330,336	-	1,902.98	/day	456,716
Thrust Block Concrete	14.00	cy		-	1,554	-	-	-	111.00	/cy	1,554
Warning Tape Detectable	54,000.00	lf	270.0	7,337	1,499	-	-	-	0.16	/lf	8,835
Manhole - 4' Diameter - 6 - 12' Deep	54.00	ea	1,296.0	47,933	97,103	-	112,208	-	4,763.77	/ea	257,243
PURCHASE RCP Class III Glipp Joint 18	54,000.00	lf			1,438,560	-		-	26.64	/lf	1,438,560
18" Downhill Gravity Pipeline	***54,000.00***	***lf***	***26,497.4***	***876,593***	***1,995,480***	***248,640***	***1,818,462***		***91.47***	***/lf***	***4,939,176***
33-110-005 18" Uphill Pumped Pipeline											
Freight - pipe	153.00	ld		-	-	169,830	-	-	1,110.00	/ld	169,830
Mobilization Cost/Demobilization Costs	1.00	ls		-	11,100	-	-	-	11,100.00	/ls	11,100
Site Restoration - per day	65.00	day	1,560.0	54,753	-	-	86,580	-	2,174.36	/day	141,333
Site Clearing - per day	65.00	day	1,560.0	52,440	-	-	74,212	-	1,948.49	/day	126,652
Trench Bedding - Sand	8,868.00	cy	739.0	23,985	246,087	-	32,812	-	34.16	/cy	302,884
Silt Fence	39,000.00	lf	557.6	15,151	75,758	-	-	-	2.33	/lf	90,909
18" PVC Utility Pipe Excav, Install and Backfill Crew, 300 lf/day	130.00	day	6,240.0	193,891	-	-	421,354	-	4,732.65	/day	615,244
Buried Pipe Crossing, Support Exisiting Lines w/ I Beam and Straps, Up to 12" dia., 25' Long	3.00	ea	96.0	2,301	-	-		-	766.88	/ea	2,301
Spread Surplus onsite	130.00	day	2,080.0	68,456	-	-	178,932	-	1,902.98	/day	247,388
Thrust Block Concrete	21.00	cy		-	2,331	-	-	-	111.00	/cy	2,331
Warning Tape Detectable	39,000.00	lf	195.0	5,299	1,082	-	-	-	0.16	/lf	6,381
PVC C-900 Pressure Pipe - 18"	39,000.00	lf			995,670	-		-	25.53	/lf	995,670
PVC C-900 Pressure Pipe DI OD 22 bend 18	8.00	ea			16,250	-	-	-	2,031.30	/ea	16,250
PVC C-900 Pressure Pipe DI OD 45 bend 18	8.00	ea			15,877	-	-	-	1,984.68	/ea	15,877
PVC C-900 Pressure Pipe DI OD 90 ell 18	5.00	ea			13,387	-	-	-	2,677.32	/ea	13,387
18" Uphill Pumped Pipeline	***39,000.00***	***lf***	***13,027.6***	***416,276***	***1,377,542***	***169,830***	***793,889***		***70.71***	***/lf***	***2,757,537***
02 Buried Pipe	***0.00***		***39,525.0***	***1,292,869***	***3,373,022***	***418,470***	***2,612,351***				***7,696,712***
03 Concrete											
03-110-060 Outfall, SOG											
Mat Foundation Edge Form	16.00	sf	4.0	168	12	-	-	-	11.21	/sf	179
Strip & Oil Mat Found. Form	16.00	sf	0.6	17	-	-	-	-	1.09	/sf	17
Waterstop 9" Flat	12.00	lf	7.7	209	98	-	-	-	25.55	/lf	307
Rebar by CY - SOG Rebar	0.06	ton	1.2	46	67	-	-	-	1,910.50	/ton	113
4500 psi Concrete	0.59	cy		-	90	-	-	-	151.60	/cy	90
Ice Chips	0.59	cy		-	4	-	-	-	7.39	/cy	4
Truck Place Mat Foundation	0.59	cy	0.6	17	-	-	-	-	28.30	/cy	17
Finish- Broom	16.00	sf	0.2	6	0	-	-	-	0.36	/sf	6
Liquid Curing Compounds	32.00	sf	0.1	2	1	-	-	-	0.08	/sf	2
Outfall, SOG	***0.59***	***cy***	***14.3***	***463***	***272***				***1,240.05***	***/cy***	***735***
03-120-014 Outfall Walls											

Spreadsheet Level	Takeoff Quantity	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
03-120-014 Outfall Walls									
Panel Form System 0-4'	84.00 sf	10.5	440	98	-	-	-	6.40 /sf	538
Strip & Oil Wall Forms	84.00 sf	0.8	23	-	-	-	-	0.27 /sf	23
Rebar by CY - Wall Rebar	0.19 ton	2.3	90	221	-	-	-	1,601.96 /ton	311
4500 psi Concrete	1.56 cy		-	236	-	-	-	151.54 /cy	236
Ice Chips	1.56 cy		-	11	-	-	-	7.37 /cy	11
Truck Place Walls	1.56 cy	1.6	44	-	-	-	-	28.30 /cy	44
Finish- Top of Wall & Curb	12.00 sf	0.1	4	-	-	-	-	0.29 /sf	4
Grind/Patch Walls	84.00 sf	1.3	34	1	-	-	-	0.42 /sf	36
Rub Walls	42.00 sf	1.3	34	7	-	-	-	0.98 /sf	41
Liquid Curing Compounds	84.00 sf	0.2	5	2	-	-	-	0.08 /sf	6
Outfall Walls	***1.56 cy***	***18.0***	***673***	***576***				***803.02 /cy***	***1,250***
32-320-010 Outfall, Rip Rap									
Rip Rap Machine Place	10.00 cy	10.0	351	333	-	1,499	-	218.25 /cy	2,182
Outfall, Rip Rap	***600.00 sf***	***10.0***	***351***	***333***		***1,499***		***3.64 /sf***	***2,182***
03 Concrete	***0.00***	***42.4***	***1,488***	***1,181***		***1,499***			***4,167***
06 Process Equipment									
40-0400-130 New Las Campanas Pump Station									
New Las Campanas Pump Station	4.50 mgd				2,622,375	-	-	582,750.00 /mgd	2,622,375
New Las Campanas Pump Station	***1.00 ea***				***2,622,375***			***2,622,375.00 /ea***	***2,622,375***
06 Process Equipment	***0.00***				***2,622,375***				***2,622,375***
04A Scenario 4A	***0.00***	***39,847.4***	***1,303,451***	***3,386,827***	***3,040,845***	***2,632,809***			***10,363,932***

Partial Totals

Description	Amount	Totals	Hours	Rate	Cost Basis	Percent of Total	
Labor	1,303,451		39,847.371 hrs			6.93%	
Material	3,386,827					18.01%	
Subcontract	3,040,845					16.17%	
Equipment	2,632,809		35,343.777 hrs			14.00%	
Other							
Direct Costs	**10,363,932**	**10,363,932**				**55.10%**	**55.10%**
GC Labor & Exp.	1,036,393			10.000 %	T	5.51%	
BR & GL Ins.	165,823			1.600 %	T	0.88%	
P&P Bond	99,844				B	0.53%	
Cost of Work	**1,302,060**	**11,665,992**				**6.92%**	**62.02%**
Fee	1,749,899			15.000 %	T	9.30%	
Cost to Construct	**1,749,899**	**13,415,891**				**9.30%**	**71.32%**
Contigency	4,024,767			30.000 %	T	21.40%	
Markup & Bond	**4,024,767**	**17,440,658**				**21.40%**	**92.72%**
NM GR Tax	1,369,092			7.850 %	T	7.28%	
Partial Total		***18,809,750***					

Spreadsheet Level	Takeoff Quantity		Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit		Total Amount
04B Scenario 4B											
01 Sitework & Demo											
40-0400-130 Demo Las Campanas Pump Station											
Demolition Pump Station	7.00	day	280.0	9,095	-	-	18,959	-	4,007.69	/day	28,054
Dump Fees by CY	200.00	cy		-	12,623	-	-	-	63.12	/cy	12,623
Demo Las Campanas Pump Station	***1.00***	***ls***	***280.0***	***9,095***	***12,623***		***18,959***		***40,677.17***	***/ls***	***40,677***
01 Sitework & Demo	***0.00***		***280.0***	***9,095***	***12,623***		***18,959***				***40,677***
02 Buried Pipe											
33-110-005 24" Uphill Pumped Pipeline											
Freight - pipe	271.00	ld		-	-	300,810	-	-	1,110.00	/ld	300,810
Mobilization Cost/Demobilization Costs	1.00	ls		-	11,100	-	-	-	11,100.00	/ls	11,100
Site Restoration - per day	71.00	day	1,704.0	59,807	-	-	94,572	-	2,174.36	/day	154,379
Site Clearing - per day	71.00	day	1,704.0	57,280	-	-	81,062	-	1,948.49	/day	138,342
Trench Bedding - Sand	13,622.00	cy	1,135.2	36,843	378,011	-	50,401	-	34.16	/cy	465,255
Silt Fence	39,000.00	lf	557.6	15,151	75,758	-	-	-	2.33	/lf	90,909
24" PVC Utility Pipe Excav, Install and Backfill Crew, 275 lf/day	142.00	day	6,816.0	211,788	-	-	460,248	-	4,732.65	/day	672,036
Buried Pipe Crossing, Support Exisiting Lines w/ I Beam and Straps, Up to 12" dia., 25' Long	3.00	ea	96.0	2,301	-	-		-	766.88	/ea	2,301
Spread Surplus onsite	142.00	day	2,272.0	74,775	-	-	195,449	-	1,902.98	/day	270,224
Thrust Block Concrete	21.00	cy		-	2,331	-	-	-	111.00	/cy	2,331
Warning Tape Detectable	39,000.00	lf	195.0	5,299	1,082	-	-	-	0.16	/lf	6,381
PVC C-900 Pressure Pipe - 24"	39,000.00	lf			2,205,193	-		-	56.54	/lf	2,205,193
PVC C-900 Pressure Pipe DI OD 22 bend 24	8.00	ea			24,456	-	-	-	3,056.94	/ea	24,456
PVC C-900 Pressure Pipe DI OD 45 bend 24	8.00	ea			26,853	-	-	-	3,356.64	/ea	26,853
PVC C-900 Pressure Pipe DI OD 90 ell 24	5.00	ea			21,612	-	-	-	4,322.34	/ea	21,612
24" Uphill Pumped Pipeline	***39,000.00***	***lf***	***14,479.8***	***463,245***	***2,746,394***	***300,810***	***881,732***		***112.62***	***/lf***	***4,392,182***
33-110-005 24" Downhill Gravity Pipeline											
Freight - Pipe	375.00	ld		-	-	416,250	-	-	1,110.00	/ld	416,250
Freight - Manhole	17.00	ld		-	-	18,870	-	-	1,110.00	/ld	18,870
Mobilization Cost/Demobilization Costs	1.00	ls		-	11,100	-	-	-	11,100.00	/ls	11,100
Site Restoration - per day	131.00	day	3,144.0	110,349	-	-	174,492	-	2,174.36	/day	284,841
Site Clearing - per day	131.00	day	3,144.0	105,686	-	-	149,565	-	1,948.49	/day	255,252
Trench Bedding - Sand	18,860.00	cy	1,571.7	51,011	523,365	-	69,782	-	34.16	/cy	644,158
Silt Fence	54,000.00	lf	772.1	20,979	104,895	-	-	-	2.33	/lf	125,874
24" RCP Utility Pipe Excav, Install and Backfill Crew, 205 lf/day	263.00	day	14,728.0	482,775	-	-	1,132,693	-	6,142.47	/day	1,615,468
Buried Pipe Crossing, Support Exisiting Lines w/ I Beam and Straps, Up to 12" dia., 25' Long	3.00	ea	96.0	2,301	-	-		-	766.88	/ea	2,301
Spread Surplus onsite	263.00	day	4,208.0	138,492	-	-	361,993	-	1,902.98	/day	500,485
Thrust Block Concrete	14.00	cy		-	1,554	-	-	-	111.00	/cy	1,554
Warning Tape Detectable	54,000.00	lf	270.0	7,337	1,499	-	-	-	0.16	/lf	8,835
Manhole - 6' Diameter - 6 - 12' Deep	54.00	ea	1,458.0	53,924	142,417	-	126,234	-	5,973.62	/ea	322,576
PURCHASE RCP Class III Glipp Joint 18	54,000.00	lf			2,337,660	-		-	43.29	/lf	2,337,660
24" Downhill Gravity Pipeline	***54,000.00***	***lf***	***29,391.7***	***972,853***	***3,122,490***	***435,120***	***2,014,759***		***121.21***	***/lf***	***6,545,222***
02 Buried Pipe	***0.00***		***43,871.5***	***1,436,098***	***5,868,884***	***735,930***	***2,896,491***				***10,937,404***
03 Concrete											
03-110-060 Outfall, SOG											
Mat Foundation Edge Form	16.00	sf	4.0	168	12	-	-	-	11.21	/sf	179
Strip & Oil Mat Found. Form	16.00	sf	0.6	17	-	-	-	-	1.09	/sf	17
Waterstop 9" Flat	12.00	lf	7.7	209	98	-	-	-	25.55	/lf	307
Rebar by CY - SOG Rebar	0.06	ton	1.2	46	67	-	-	-	1,910.50	/ton	113
4500 psi Concrete	0.59	cy		-	90	-	-	-	151.60	/cy	90
Ice Chips	0.59	cy		-	4	-	-	-	7.39	/cy	4
Truck Place Mat Foundation	0.59	cy	0.6	17	-	-	-	-	28.30	/cy	17
Finish- Broom	16.00	sf	0.2	6	0	-	-	-	0.36	/sf	6
Liquid Curing Compounds	32.00	sf	0.1	2	1	-	-	-	0.08	/sf	2
Outfall, SOG	***0.59***	***cy***	***14.3***	***463***	***272***				***1,240.05***	***/cy***	***735***
03-120-014 Outfall Walls											

Spreadsheet Level	Takeoff Quantity	Labor Man Hrs	Labor Amount	Material Amount	Sub Amount	Equip Amount	Other Amount	Total Cost/Unit	Total Amount
03-120-014 Outfall Walls									
Panel Form System 0-4'	84.00 sf	10.5	440	98	-	-	-	6.40 /sf	538
Strip & Oil Wall Forms	84.00 sf	0.8	23	-	-	-	-	0.27 /sf	23
Rebar by CY - Wall Rebar	0.19 ton	2.3	90	221	-	-	-	1,601.90 /ton	311
4500 psi Concrete	1.56 cy		-	236	-	-	-	151.54 /cy	236
Ice Chips	1.56 cy		-	11	-	-	-	7.37 /cy	11
Truck Place Walls	1.56 cy	1.6	44	-	-	-	-	28.30 /cy	44
Finish- Top of Wall & Curb	12.00 sf	0.1	4	-	-	-	-	0.29 /sf	4
Grind/Patch Walls	84.00 sf	1.3	34	1	-	-	-	0.42 /sf	36
Rub Walls	42.00 sf	1.3	34	7	-	-	-	0.98 /sf	41
Liquid Curing Compounds	84.00 sf	0.2	5	2	-	-	-	0.08 /sf	6
Outfall Walls	***1.56 cy***	***18.0***	***673***	***576***				***803.02 /cy***	***1,250***
32-320-010 Outfall, Rip Rap									
Rip Rap Machine Place	10.00 cy	10.0	351	333	-	1,499	-	218.25 /cy	2,182
Outfall, Rip Rap	***600.00 sf***	***10.0***	***351***	***333***		***1,499***		***3.64 /sf***	***2,182***
03 Concrete	***0.00***	***42.4***	***1,488***	***1,181***		***1,499***			***4,167***
06 Process Equipment									
40-0400-130 New Las Campanas Pump Station									
New Las Campanas Pump Station	9.50 mgd				5,536,125	-	-	582,750.00 /mgd	5,536,125
New Las Campanas Pump Station	***1.00 ea***				***5,536,125***			***5,536,125.00 /ea***	***5,536,125***
06 Process Equipment	***0.00***				***5,536,125***				***5,536,125***
04B Scenario 4B	***0.00***	***44,193.9***	***1,446,681***	***5,882,689***	***6,272,055***	***2,916,949***			***16,518,373***

Partial Totals

Description	Amount	Totals	Hours	Rate	Cost Basis	Percent of Total	
Labor	1,446,681		44,193.872 hrs			4.83%	
Material	5,882,689					19.63%	
Subcontract	6,272,055					20.93%	
Equipment	2,916,949		39,733.112 hrs			9.73%	
Other							
Direct Costs	**16,518,374**	**16,518,374**				**55.13%**	**55.13%**
GC Labor & Exp.	1,651,837			10.000 %	T	5.51%	
BR & GL Ins.	264,294			1.600 %	T	0.88%	
P&P Bond	150,042				B	0.50%	
Cost of Work	**2,066,173**	**18,584,547**				**6.90%**	**62.02%**
Fee	2,787,682			15.000 %	T	9.30%	
Cost to Construct	**2,787,682**	**21,372,229**				**9.30%**	**71.32%**
Contigency	6,411,669			30.000 %	T	21.40%	
Markup & Bond	**6,411,669**	**27,783,898**				**21.40%**	**92.72%**
NM GR Tax	2,181,036			7.850 %	T	7.28%	
Partial Total		***29,964,934***					