



**Santa Rita Wastewater Treatment Plant
Alternative Site Investigation
Addendum
Sawmill Road Site**

October 5, 2015

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SANTA RITA WASTEWATER TREATMENT PLANT ADDENDUM 1: SAWMILL ROAD SITE

INTRODUCTION

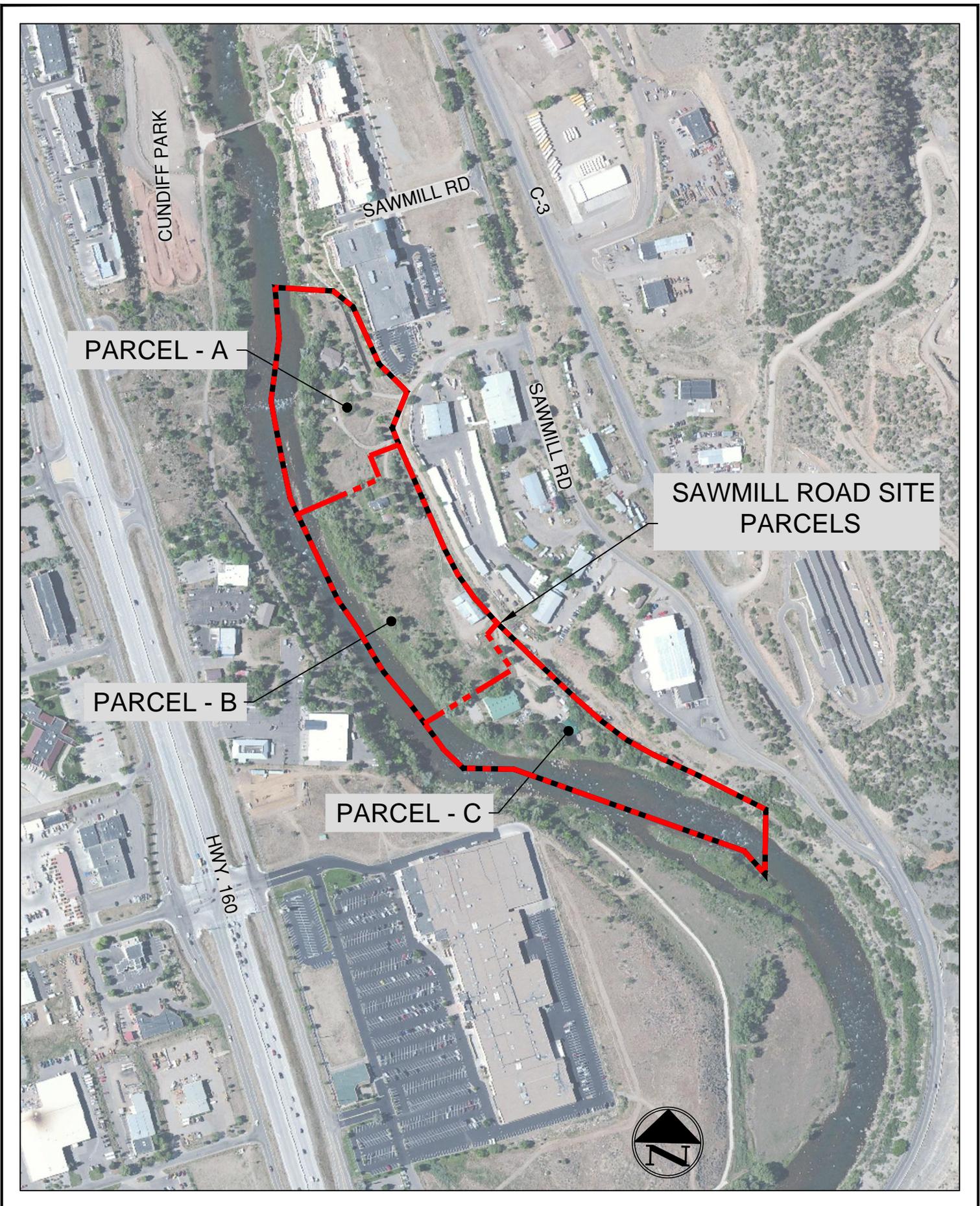
This is an addendum to the report entitled “Santa Rita Wastewater Treatment Plant, Alternative Site Investigation”. Upon completion of the original report, an additional site for a possible Santa Rita Wastewater Treatment Plant (“Santa Rita Plant”) relocation was identified as the “Sawmill Road Site” located along the east edge of the Animas River approximately 1.5 miles downstream of the existing Santa Rita Plant. This site would encompass 3 parcels of property shown on **Figure 1A** as Parcel A, Parcel B and Parcel C. A primary advantage to this site is that wastewater can be conveyed by gravity to this location thereby eliminating a costly lift station required for all other alternatives. This report will review the proposed site and its suitability for accommodating the wastewater treatment plant (“WWTP”), provide a layout of facilities on the site, determine a conveyance pipeline alignment, and estimate costs for the WWTP, the conveyance system and the land and easements required for all facilities.

PROPOSED SAWMILL ROAD PLANT SITE

The Sawmill Road site is located on the east side of the Animas River between the River and Sawmill Road. The proposed site is comprised of three private parcels of land totaling about 13 acres of land, with significant portions of each parcel in the floodplain. Existing uses are mixed with a combination of residential and commercial buildings. The site slopes from east to west at about an 8% to 10% grade towards the river, and contains multiple stands of mature trees adjacent to the river. The name ‘Sawmill Road Site’ is due to the properties location adjacent to Sawmill Road. These properties were not part of, or in any way related to the previous sawmill operation which was located further to the north.

When considering the suitability of the site for a future wastewater treatment plant, a number of items were considered. The key items, and brief considerations of each, are as follows:

- As the proposed site borders the Animas River, flooding is a concern. In order to gain enough usable area for a wastewater treatment plant, fill must occur in the 100-year floodplain to level and raise the site and reduce the risk of damage due to flooding. All tank walls and finished floors must be above the 100-year floodplain to allow operation of wastewater treatment during a flood event. Filling in the 100-year floodplain will require permitting and approval from the Federal Emergency Management Agency (“FEMA”). The permitting process involves modeling the potential effects to river water levels from filling the floodplain, and possibly developing



other mitigation measures. Submission of a Conditional Letter of Map Revision (CLOMR) and approval by FEMA will be required. Once the site earthwork is completed, a survey of the site and a Letter of Map Revision (LOMR) must be completed and approved by FEMA to document that the terms of the CLOMR have been met. The area identified as Floodway will not be filled.

- The steep topography of the site, in its natural state, is not conducive to construction of large wastewater holding tanks or efficient and safe operation of a wastewater treatment facility. We reviewed the topography and propose that extensive grading, including cut, fill, and retaining walls be utilized to level the topography. A cost for leveling the site and retaining walls was included in the site work.
- Access to the proposed site is limited and two access roads should be provided through easements on parcels between the site and Sawmill Road. On the northern end of the site, there is an existing access road through private parcels that would be improved. On the southern end, an access road would require significant grading and retaining walls due to the steep topography and proximity to the river, but is possible to construct from Sawmill Road by obtaining an easement on the south side of the lumber yard through 2 parcels of property, shown as Parcels D and E on **Figure 2A**. Because the southern access is more direct and would be a private entry, this access is recommended as the primary access, and the north access would instead be used as a secondary or emergency access. These access roads are shown on the site layout plan, **Figure 3A**. All roadways must be adequate in width, provide all weather pavement, and be gentle in slope to accommodate fully loaded tractor trailer type vehicles for chemical delivery and biosolids hauling.
- The current stands of mature trees along the river provide a natural buffer between recreational users and the proposed wastewater treatment plant. As such, the proposed layout attempts to preserve these trees. There is substantial grading required to raise and level the site, and long retaining walls are necessary. Additionally, to screen retaining walls and the facility from the restaurants and other businesses on the west side of the river, a cost for landscaping was added to the site work.
- Odor control at this site will be necessary for the wastewater treatment plant to be acceptable to surrounding land owners and businesses. A similar level of odor control as that proposed for the Santa Rita site is proposed for this site.
- An advantage this site has is its close proximity to the river. The closer proximity allows for a short wastewater effluent discharge pipe

The proposed layout of a wastewater treatment plant at this location is shown on **Figure 3A**. For this site, sufficient space is available to locate all treatment plant facilities on these parcels, and hence remove all facilities from the Santa Rita site except for the existing raw water pump station as shown on

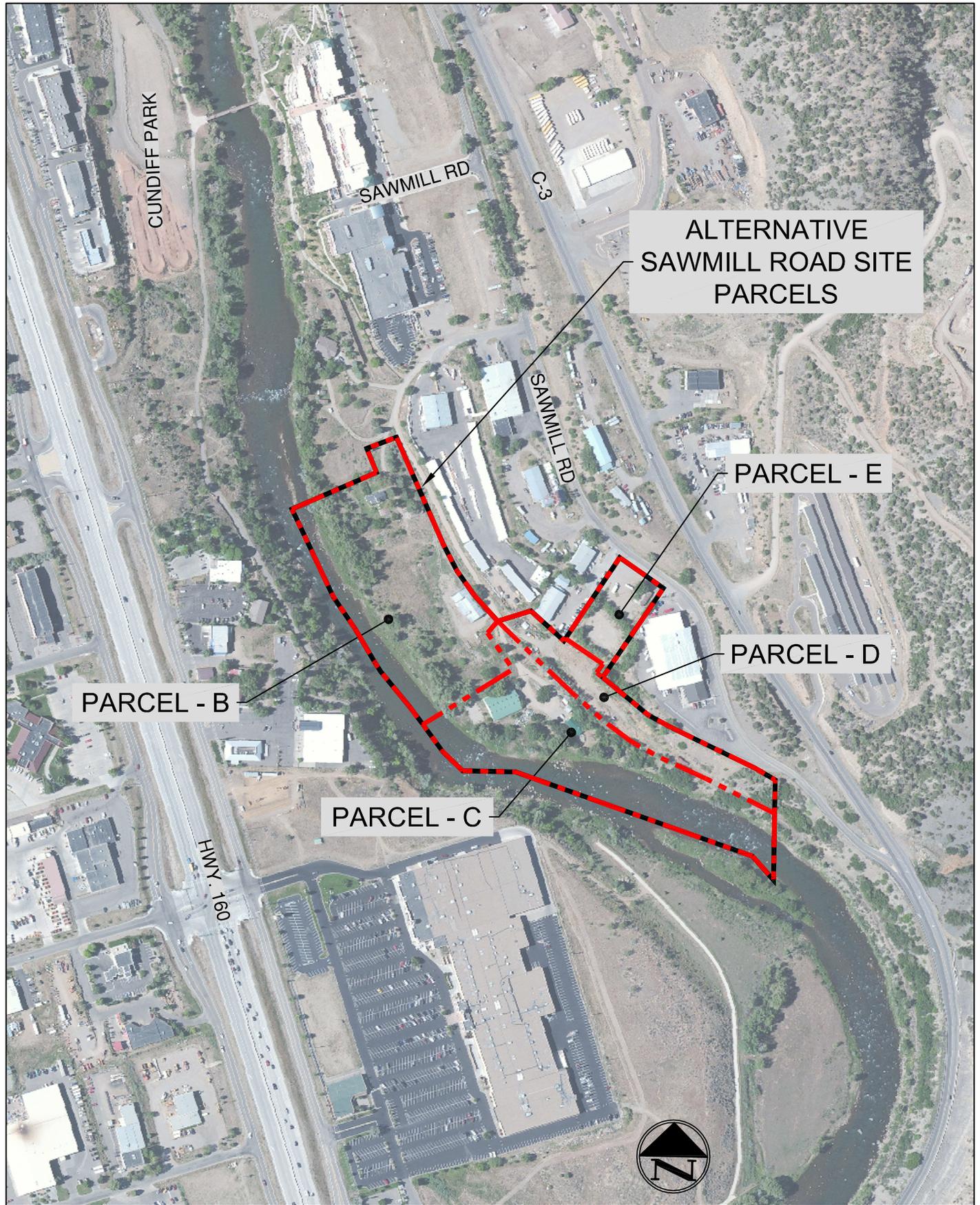


Figure 4A. The plant is laid out in an elongated fashion as necessary for this site with processes proceeding from north to south including a raw sewage lift pump building, the headworks and septage receiving, the primary clarifiers, emergency storage, the biological nutrient removal (“BNR”) facilities, the secondary clarifiers, odor control facilities, the anaerobic digesters, the biosolids handling facilities, the disinfection building, and the administration building. This includes all facilities proposed at the Santa Rita site except for a storage yard (“boneyard”), which could also be provided by acquiring Parcel D which is shown on **Figure 2A**. Access roads are provided around facilities and access to the site is provided on the north and south ends as previously described.

ALTERNATIVE SAWMILL ROAD PLANT SITE

In identifying the Parcels shown **Figure 1A** as a potential site, there was strong objection by the owner of the northernmost property, Parcel A, to a plant being located on its property or in the area. A second option is to site the plant on Parcels B, C, D, and E as shown on **Figure 2A**. While this site, due to its size and configuration, is not adequate to contain all of the necessary treatment facilities, by leaving the headworks, septage receiving, emergency storage and bone yard at the existing Santa Rita site, this land does provide adequate space to accommodate a relocated plant.

The proposed layout of a plant on this Alternate Sawmill Road Site is shown on **Figure 5A**. Again the site is laid out in an elongated fashion starting with the raw sewage lift pumps, then the primary clarifiers, the biological nutrient removal facilities, the secondary clarifiers, the odor control facilities, the anaerobic digesters, the biosolids handling facilities, and the disinfection building. The administration building is located on Parcel E, adjacent to the primary access road.

Under this alternative, substantial facilities will remain at the Santa Rita site as shown on **Figure 6A**. This includes the headworks and septage receiving, the raw water pump station, odor control facilities and emergency storage. The emergency storage at the Santa Rita Site is provided as with previous alternatives through conversion of the existing clarifiers.



PROPOSED PLANT LAYOUT
SAWMILL ROAD SITE

FIGURE
5A

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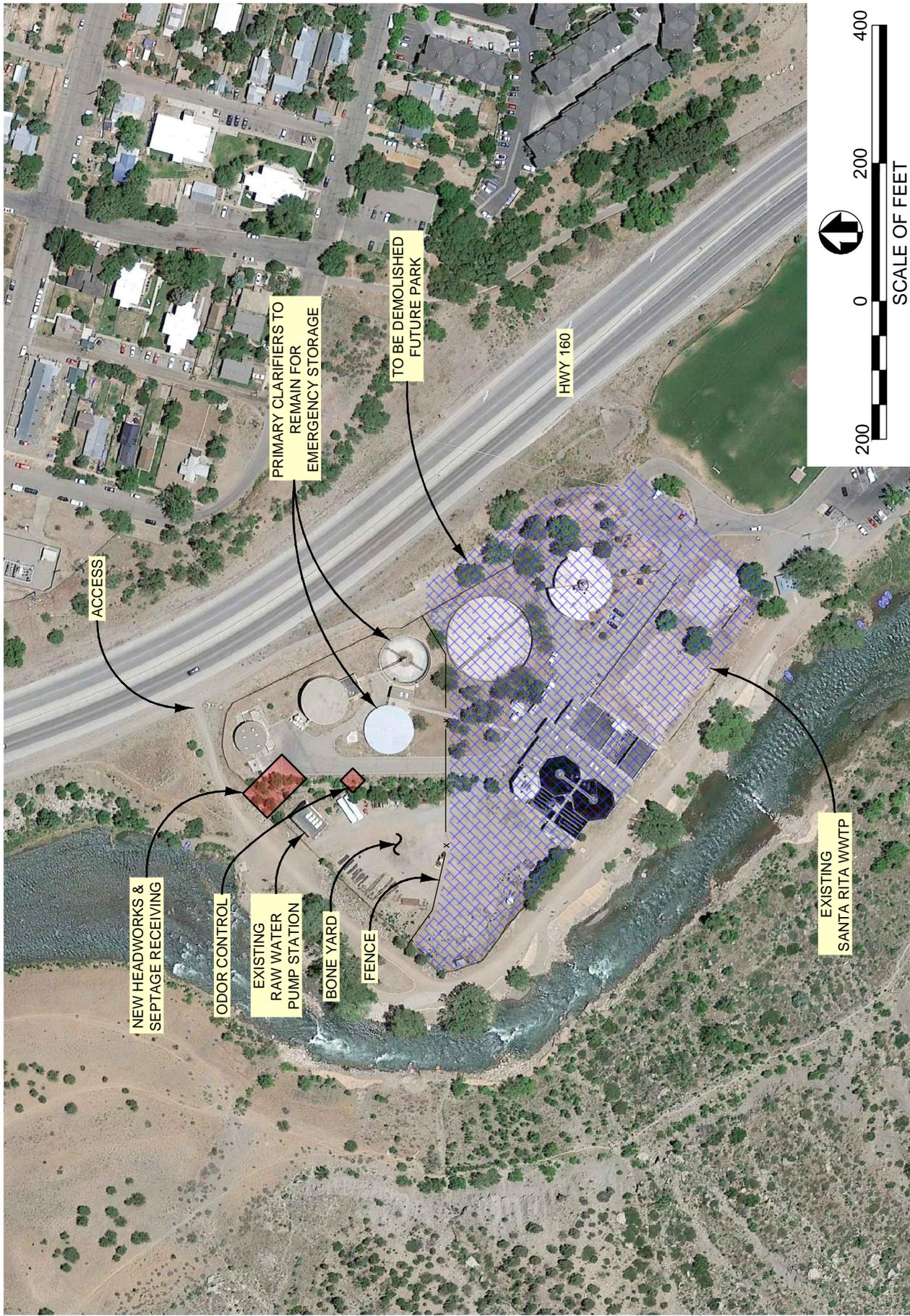


FIGURE 6A

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HEADWORKS AND SEPTAGE RECEIVING SAWMILL ROAD SITE



WASTEWATER CONVEYANCE

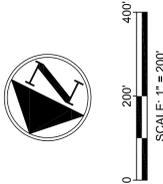
Two alignments, S1 and S2 (**Figures 7A1 and 7A2**) and (**Figures 8A1 and 8A2**) respectively, were considered to convey wastewater flows to the Sawmill Road Site by gravity. While the wastewater flows reach the plant site entirely by gravity, the sewer is located approximately 20 feet in depth. Therefore, raw water lift pumps are required at the head of the plant to deliver the sewage at the required hydraulic head.

Alignment S1 – This alignment would follow the same path along the Animas River from the Santa Rita Site to Cundiff Park as the previous alternatives, as shown on **Figures 7A1 and 7A2**. This includes a bore under Highway 160 and a crossing of the Animas River with an inverted siphon immediately east of the Highway 160 Bridge. From the north end of Cundiff Park, the pipelines will traverse south for approximately 1,300 feet along the west side of the Animas River paralleling the trail to a location across from the proposed Sawmill Road Site. A second river crossing would occur there to reach the site, again in an inverted siphon. Once the pipelines reach the east bank of the river, the alignment will connect to the new plant just outside the existing floodway on the north end of the plant site.

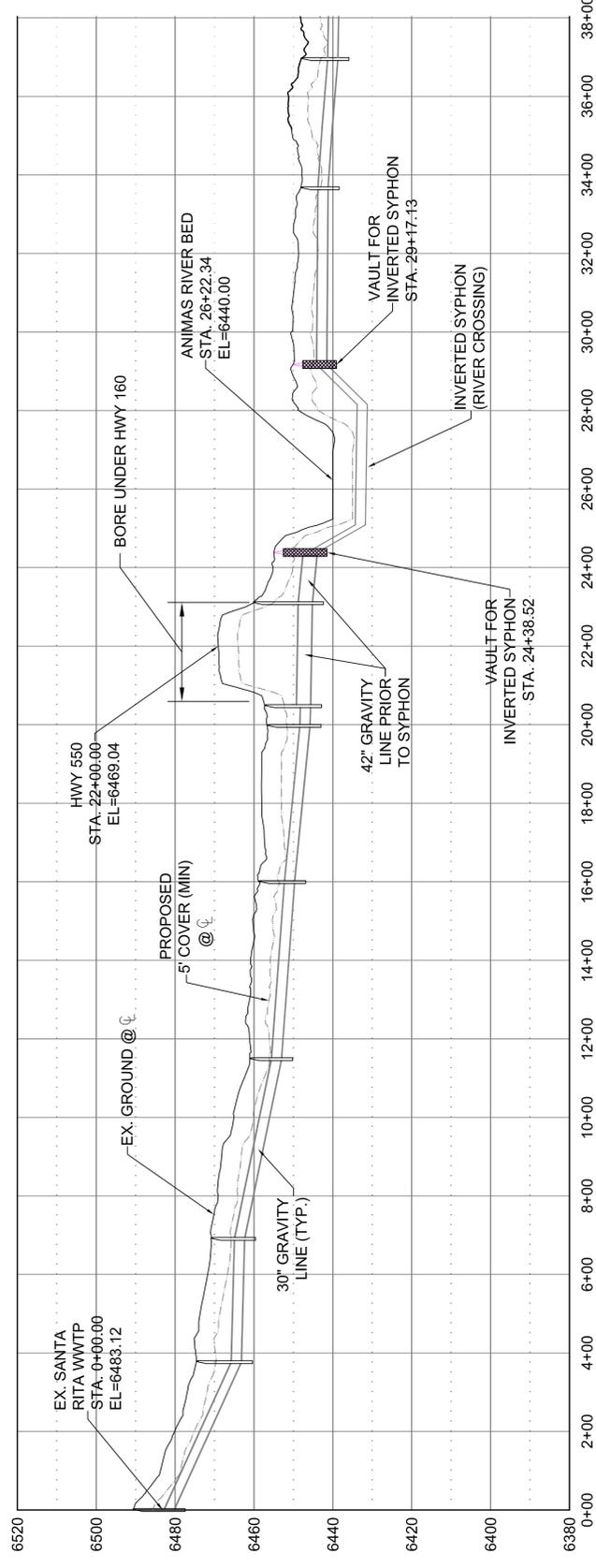
This alignment includes about 7,200 feet of gravity pipeline which is 30 inch in diameter and expands to 42 inch diameter above the two river crossings. For the most part, this alignment would have an average cut over the pipe of 13 feet, with limited lengths where depths reach close to 20 feet.

This alignment has good constructability since access is relatively easy and the cuts over the pipe for the most part allow for typical sanitary sewer construction techniques. The two river crossings will include multiple barrels for maintenance and redundancy and may require individual 404 permits and mitigation measures as discussed for previous alternatives. The significant advantage of this alternative is that this alignment will allow for a gravity system throughout thereby avoiding a costly lift station, although sewage lift pumps are required to lift the flow approximately 20 feet to the head of the plant.

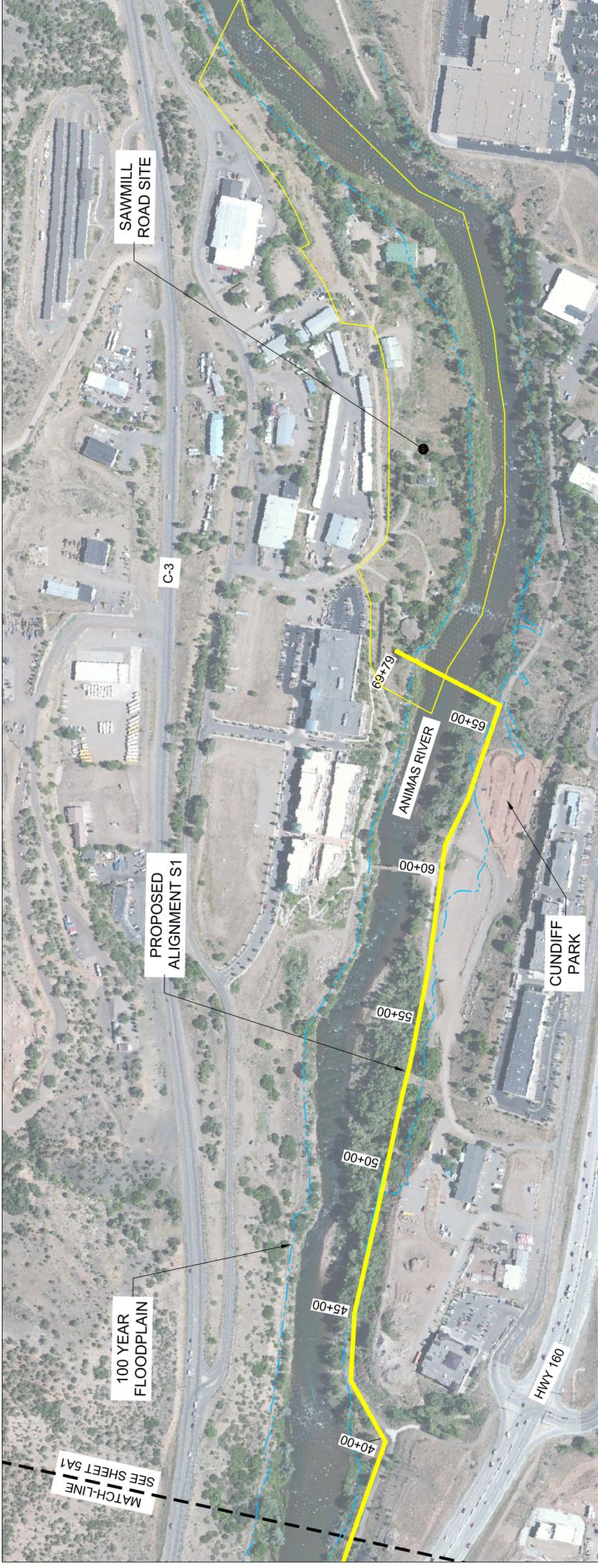
Alignment S2 – This alignment is shown of **Figures 8A1 and 8A2**. This alignment was developed in an effort to avoid any river crossings to convey wastewater to the Sawmill Road Site. This alignment is the same as Alignment S1 until it crosses under Highway 160. The alignment then traverses east onto the steep east side bank of the Animas River and follows along the bank for approximately 1,500 feet before reaching an area of lesser slopes and more typical constructability. In the area of these steep slopes, a water main has been installed which would need to be relocated to accommodate the new sewer main. In addition, to construct the line in this location, a larger bench would need to be excavated to accommodate the pipeline construction and there is substantial concern regarding the stability of the slope, given steep grades and loose material. Because this option would not offer any substantive cost savings over Alignment S1, and because of the issues noted, this alignment was not studied further. The benefit of this alignment is that river crossings would be



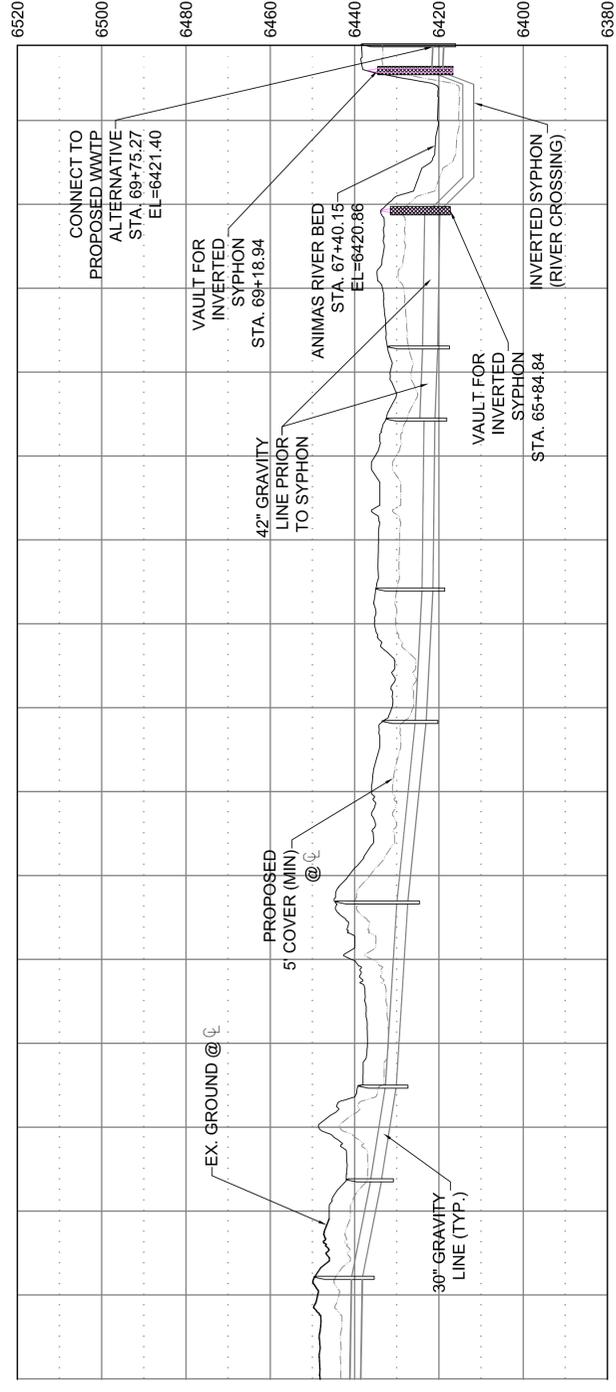
PLAN



PROFILE



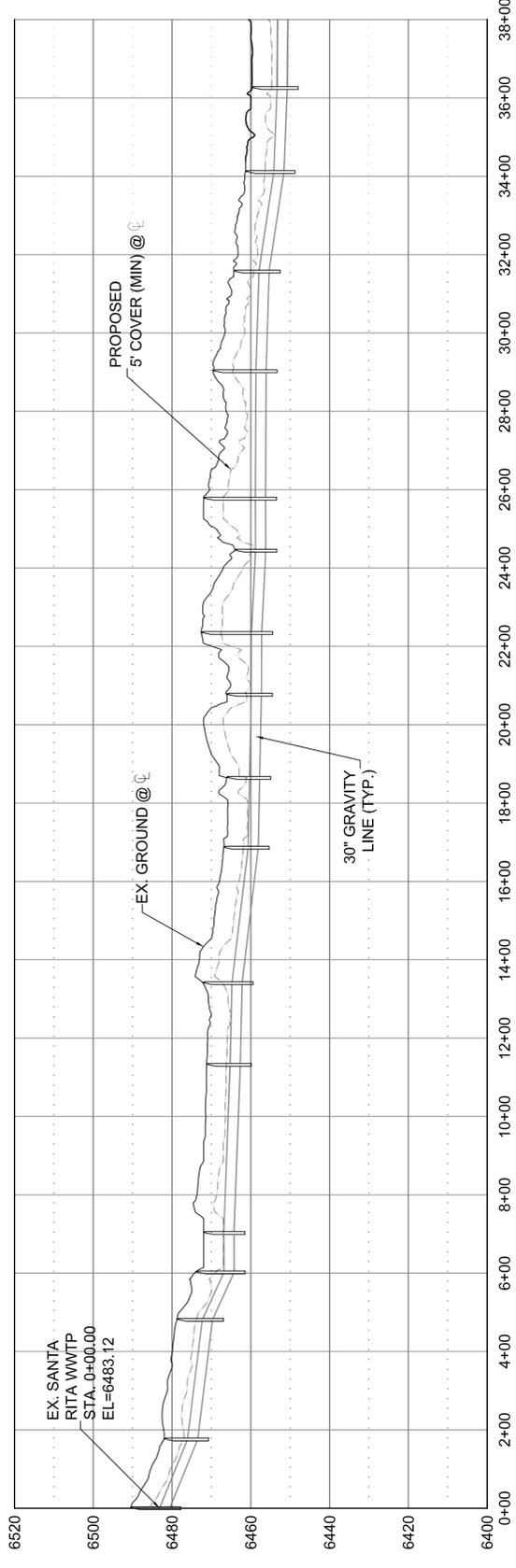
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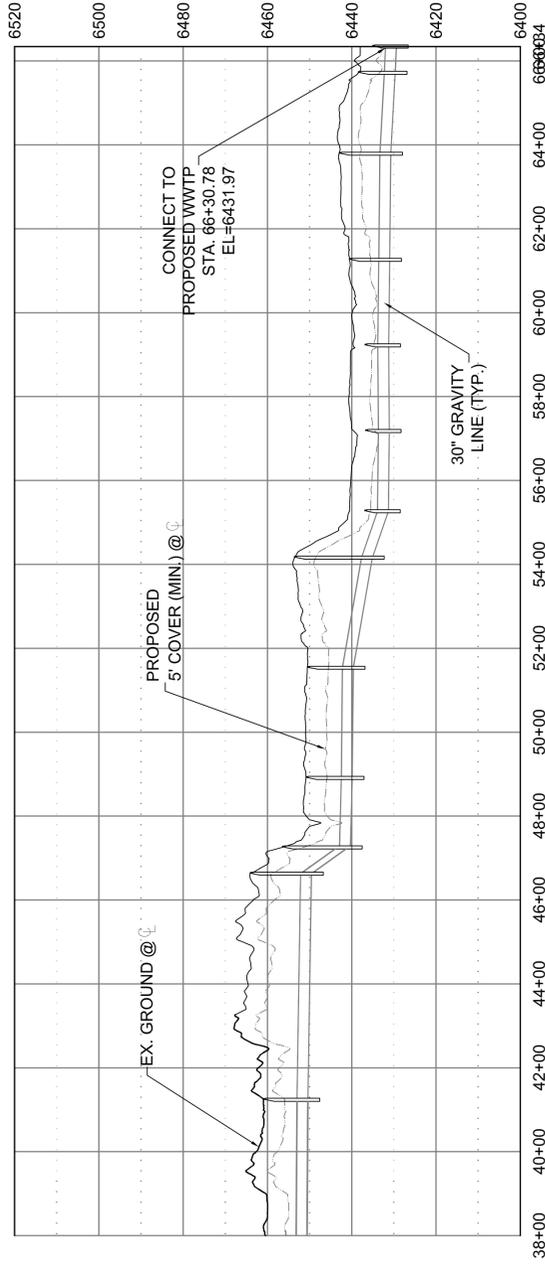
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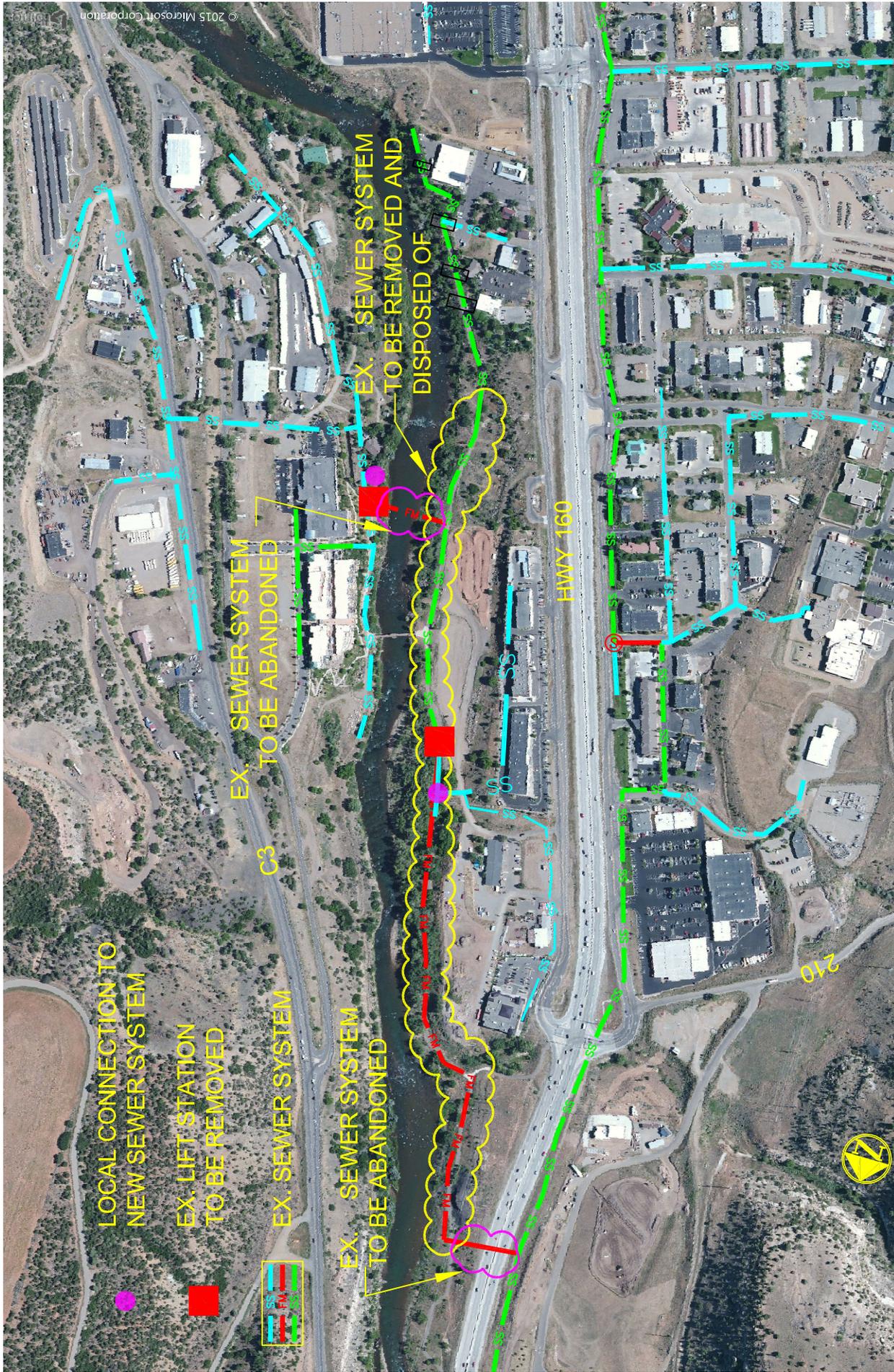


avoided. However, the construction of this main on the steep east slope of the river will be costly and failures in this area would allow for the potential of direct spills to the river in the event of a failure similar to a river crossing.

Revised Alignments, Alternative Sawmill Road Site – The alignment to reach the Alternative Sawmill Road Site is the same as Alignments S1 except at the south end. Here the alignment extends further to the south to reach the head of the plant on Parcel B as shown on **Figure 9A**. An issue with this alignment is that in order to reach the head of the plant, an easement will be required across a small portion of Parcel A which is shown on **Figure 9A**. Hence, even though the Alternative Sawmill Road site avoids use of Parcel A, this easement will be required to deliver the wastewater to the head of the plant.

Local Wastewater Collection System Revisions – The local wastewater collection system would be revised to connect the Bodo East area to the new collection system. This is shown on **Figure 10A**. For the Sawmill Road Alternative, the lift station that serves the Sawmill Road area east of the Animas River would be eliminated and the sewer would instead be extended a short distance to connect directly to the new plant headworks. An additional lift station located on the west side of the river would be eliminated as shown and flow would be connected directly to the new wastewater conveyance main. The cost of making these connections would be minimal. There would be annual savings associated with eliminating operation of both of these lift stations.

For the Alternative Sawmill Road Alternative, it is assumed that the east side lift station serving the Sawmill Road area would continue to operate since a direct connection to the plant would require crossing Parcel A which is unlikely given the opposition of the Parcel A property owner. The west side lift station would be eliminated and a direct connection to the wastewater conveyance system would be made as described above. Hence, in this alternative, one lift station would be eliminated.



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COST ESTIMATES

Sawmill Road Site - The cost estimate for relocation of the wastewater treatment plant facilities to the Sawmill Road Site is shown in **Table 1A**. Total project costs for the plant facilities are **\$68,560,000**. The detail of this cost estimate is provided in the **Appendix A1** to this Addendum.

This includes all costs for a new plant at the Sawmill Road Site. It also includes the cost of demolition of the existing facilities at Santa Rita. This plan includes the same level of odor control, and hence the same odor control facilities proposed if the plant were to remain at Santa Rita. The investment in odor control facilities is substantial at an estimated \$5.8 million, and is proposed at this level because of the perceived sensitivity of neighbors including the nearby hospital, residential units, restaurants and businesses.

TABLE 1A. Opinion of Probable Cost for Sawmill Road Site

Description - Base	Total Project Cost
<i>New WWTP - Sawmill Road Site</i>	
Santa Rita WWTP Demolition	\$1,560,000
Site/Civil	\$5,730,000
Headworks	\$4,100,000
Primary Clarifiers	\$3,740,000
Secondary Process + Thickening	\$21,800,000
Anaerobic Digestion	\$6,580,000
Dewatering - Fournier Rotary Press	\$3,080,000
Sidestream Treatment	\$1,360,000
Class A Biosolids - Heat Dryer	\$3,660,000
UV Disinfection	\$2,260,000
Chemical Building	\$660,000
Admin/Lab Building	\$6,480,000
FOG/Septage Receiving	\$1,740,000
Odor Control	\$5,810,000
<i>Subtotal</i>	\$68,560,000

The cost of the wastewater conveyance system is shown in **Table 2A**. The only cost for this alternative is the conveyance pipeline since no lift station is required. However, there are pump facilities at the plant for lifting raw sewage to the hydraulic head required as it enters the plant. The detail of this cost estimate is provided in **Appendix A1** to this Addendum.

Table 2A. Sawmill Road Conveyance – Summary of Costs

Alignment	Conveyance Cost	Lift Station Costs	Total Costs
S1	\$6,051,000	\$0	\$6,051,000

The cost of land and easements associated with the Sawmill Road Site is shown in **Table 3A**. These costs include acquisition of Parcels A, B, and C as shown on **Figure 2A**. This also includes costs for easements along the conveyance pipeline alignment and access easements for both access roads. The cost of land acquisition is estimated to be at the market value of the property as determined by the La Plata County Assessor. Since available values are from 2014, and land values have been increasing in the area, a 3% escalation of these costs is included for an estimate of current value. Land values in this area are difficult to ascertain due to a lack of applicable comparables, the effect of the river and floodplain within these parcels, and the limited access. Therefore, a detailed appraisal will be required to determine values which could be substantially different than the assessor values used herein. Land acquisition costs, however, are relatively small compared to the total cost of a relocation, and hence a difference in the actual cost of land will have a relatively small effect on the overall relocation cost.

Table 3A. Sawmill Road Land Costs Estimate

Land	Easements	Acquisition Costs (legal/appraisal)	Total Costs
\$2,476,000	\$458,000	\$150,000	\$3,084,000

The total project costs for the Sawmill Road Alternative are shown in **Table 4A**.

Table 4A. Total Project Costs for Sawmill Road

Treatment Facilities	Conveyance System	Lift Station	Land/Easements	Total Cost
\$68,560,000	\$6,051,000	\$0	\$3,084,000	\$77,695,000

Conveyance system operating costs for the Sawmill Road Alternative are much lower than other alternatives because no lift station is required to convey wastewater to the Sawmill Road site. Operating system costs over a 20 year period are estimated in **Table 5A**.

Table 5A. Net Present Value Operating Costs for the Sawmill Road

Parameter	Construction Cost	O&M Factor	Annual Operating/O&M Cost	20-Yr Net Present Value
Conveyance Pipelines				
Conveyance Pipelines	\$4,840,000	0.014	\$68,000	\$1,355,000

Alternative Sawmill Road Site - The cost estimate for relocation of the wastewater treatment plant facilities to the Alternative Sawmill Road Site is shown in **Table 6A**. This table shows in detail the cost of facilities at the Sawmill Road Site followed by the cost of facilities to be constructed or revised at the Santa Rita Site under this alternative. Total project costs for the plant facilities are **\$68,140,000**. The detail of this cost estimate is provided in **Appendix A1** to this Addendum.

This includes all costs for a new plant at the Alternative Sawmill Road Site. It also includes the facilities that remain at the Santa Rita Site including demolition of those to be removed. This plan again includes the same level of odor control as if the plant were to remain at Santa Rita.

TABLE 6A. Opinion of Probable Cost for Alternative Sawmill Road Site

Description - Base	Total Project Cost
<i>New WWTP – Sawmill Road - Without Headworks and Storage</i>	
Santa Rita WWTP Demolition	\$1,380,000
Site/Civil	\$5,490,000
Headworks (see alternative below)	\$0
Primary Clarifiers	\$3,740,000
Secondary Process + Thickening	\$21,800,000
Anaerobic Digestion	\$6,580,000
Dewatering - Fournier Rotary Press	\$3,080,000
Sidestream Treatment	\$1,360,000
Class A Biosolids - Heat Dryer	\$3,660,000
UV Disinfection	\$2,260,000
Chemical Building	\$660,000
Admin/Lab Building	\$6,480,000
FOG/Septage Receiving (see alternative below)	\$0
Odor Control	\$5,810,000
<i>Subtotal</i>	\$62,300,000

Description - Alt. A	Total Project Cost
<i>New WWTP – Sawmill Road - Headworks and Storage at Santa Rita</i>	
Headworks	\$4,100,000
FOG/Septage Receiving	\$1,740,000
Ex. Primary Clarifiers (reused for emergency storage)	\$0
Odor Control (included with Headworks)	\$0
<i>Total Project Cost Base + Alt. A</i>	\$68,140,000

The cost of the wastewater conveyance system is shown in **Table 7A**. The only cost for this alternative is the conveyance pipeline since no lift station is required. However, there remains the need at the plant for facilities to lift raw sewage to the hydraulic head required as it enters the plant. The detail of this cost estimate is again provided in **Appendix A1** to this addendum.

Table 7A. Alternative Sawmill Road Conveyance – Summary of Costs

Alignment	Conveyance Cost	Lift Station Costs	Total Costs
S1	\$6,246,000	\$0	\$6,246,000

The cost of land and easements associated with the Alternative Sawmill Road Site is shown in **Table 8A**. These costs include acquisition of Parcels B, C, D, and E as shown on **Figure 2A**. This also includes costs for easements along the conveyance pipeline alignment and access easements for the north access. The cost of land acquisition is estimated in the same manner as estimated for the Sawmill Road site.

Table 8A. Alternative Sawmill Road Land Costs Estimate

Land	Easements	Acquisition Costs (legal/appraisal)	Total Costs
\$2,203,000	\$345,000	\$150,000	\$2,698,000

The total project costs for the Sawmill Road Alternative are shown in **Table 9A**.

Table 9A. Total Project Costs for Alternative Sawmill Road

Treatment Facilities	Conveyance System	Lift Station	Land/Easements	Total Cost
\$68,140,000	\$6,246,000	\$0	\$2,698,000	\$77,084,000

Conveyance system operating costs for the Alternative Sawmill Road site are slightly higher than the Sawmill Road site because of the further length of sewer required to reach the head of the plant at Parcel B. These operating system costs over a 20 year period are estimated in **Table 10A**.

Table 10A. Net Present Value Operating Costs for the Alternative Sawmill Road

Parameter	Construction Cost	O&M Factor	Annual Operating/O&M Cost	20-Yr Net Present Value
Conveyance Pipelines				
Conveyance Pipelines	\$5,208,000	0.014	\$72,900	\$1,458,000

COST COMPARISONS

A comparison of total project costs between a renovation at the Santa Rita Plant and a relocated plant at the Sawmill Road Site is shown in **Table 11A**. This shows that the estimated cost to relocate the facility with the assumptions that are made in this study is about \$19.5 million.

Table 11A. Cost Comparison Santa Rita versus Sawmill Road Sites

Expense Item	Santa Rita	Sawmill Road	Cost Difference
Process Facilities	\$46.9M	\$57.1M	+10.2M
Site Civil	\$5.3M	\$5.7M	+0.4M
Odor Control	\$6.0M	\$5.8M	-0.2M
Wastewater Conveyance	-	\$6.0M	+6.0M
Land	-	+3.1M	+3.1M
TOTAL	\$58.2M	\$77.7M	+19.5M

This cost difference is made up of costs related to process facilities, site civil work (grading, roads, retaining walls, landscaping, and utilities), odor control facilities, wastewater conveyance including pipelines, and the cost of land. An estimate of a value to the re-utilization of existing facilities at the Santa Rita site is the difference in the cost of new process facilities at a new site and the cost of renovated process facilities at the Santa Rita site. This is estimated at \$10.2 million. This is very much an estimate since it is very difficult to determine without contractor bids of each facility.

Both of these sites are deemed to be areas very sensitive to odors from a wastewater treatment plant. Therefore, the same level of odor control is proposed at both sites and the cost of these facilities is estimated to be very much the same as well. Odor control at the Pepsi Site and La Posta Site which were part of the original study were assumed not to be as sensitive, and hence odor control costs were substantially less at those sites.

There is a large amount of site civil work at the Santa Rita site since many new facilities will require that most of the site paving and utilities will need to be removed and redone. However, at the Sawmill Road Site, the long, narrow site with grading and access requirements also make civil work at that site substantial. The estimate of this civil work and improvements at each site is very close. The wastewater conveyance, while the least of any of the alternatives, still requires about \$6 million in pipelines to reach the Sawmill Site, while staying at the Santa Rita Site requires no new wastewater conveyance. The cost of land at the Sawmill Road Site is estimated at \$3.1 million and no further investment in land is required at Santa Rita.

PROJECT TIMELINE

For a relocation of the plant to the Sawmill Road Site, the timing would be similar to that described in the original study. That is, it will take an estimated 4.5 to 6 years to complete a new plant at this site. The difference in timeline between 4.5 and 6 years relates to the amount of time required for the City to obtain the property and easements prior to moving to the Site Approval Process through the Colorado Department of Public Health and Environment (“CDPHE”). This location will also include FEMA approvals as described, but these can be accomplished in the timeframe described previously. Hence, the new plant cannot be constructed by February, 2018 when the existing permit expires and the City will be subject to a compliance schedule that will need to be negotiated with the CDPHE.

SUMMARY

The total cost of each of the alternatives presented is shown in **Table 12A**. The Santa Rita Site renovation remains the lowest cost alternative.

Table 12A. Summary of Total Costs for each Alternative

Site	Plant Facilities	Conveyance	Lift Stations	Land	Total Costs
Santa Rita	\$58,194,000				\$58,194,000
La Posta	\$62,370,000	\$20,511,000	\$5,010,000	\$5,857,000	\$93,748,000
Pepsi	\$63,110,000	\$7,320,000	\$5,010,000	\$3,833,000	\$79,273,000
Sawmill Road	\$68,560,000	\$6,051,000	\$0	\$3,084,000	\$77,695,000
Alternative Sawmill Road	\$68,140,000	\$6,246,000	\$0	\$2,698,000	\$77,084,000

The Alternative Sawmill Road Site presents the lowest cost alternative for relocation of the Santa Rita Plant at \$77,084,000. This option also allows for relocation to this area without having to acquire Parcel A. However, it does require that some facilities remain at the Santa Rita Site. This alternative will require approximately \$18.9 million in costs above that of renovating the Santa Rita Site. There are additional operating costs as well but these only amount to about \$68,000 per year.

Costs for the Sawmill Road Site are similar. The Sawmill Road Site requires acquisition of Parcel A where the landowner is strongly opposed. The advantage of this alternative, however, is that the entire Santa Rita wastewater facilities can be removed from the Santa Rita Site.

The Sawmill Road alternatives have the significant advantage of conveying wastewater to the site from the Santa Rita Site by gravity. These are the only alternatives for a plant relocation that do not require a lift station which saves over \$5,010,000 in facility cost, and over \$200,000 in annual operating costs, compared to other relocation alternatives.