



Environmental Review for Talkeetna Water Treatment Facility Upgrades

Matanuska-Susitna Borough

Talkeetna, Alaska
June 30, 2023

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A. **PROJECT DESCRIPTION**

Talkeetna, Alaska, is located in the Matanuska-Susitna Borough (MSB) at the confluence of the Talkeetna and Susitna Rivers. It is also located near North America's tallest peak, Denali. The natural beauty of the surrounding area makes Talkeetna a popular tourist destination.

The MSB is advancing water system improvements for the community of Talkeetna, including moving the existing water treatment plant (WTP) to a new location, installing a water storage tank (WST), modifying the existing WTP, installing a pumphouse and distribution system pumps or a gravity system, and installing a Supervisory Control and Data Acquisition (SCADA) system.

The Talkeetna Sewer and Water System was designed and constructed in the 1980s and 1990s, and is supplied by two groundwater wells. A 2,000-gallon hydropneumatic tank pressurizes the raw water through the water treatment process. Sodium hypochlorite is injected for oxidation of iron and manganese and residual disinfection. Ferric chloride is injected for arsenic adsorption and coagulation. Following chemical addition, three greensand media pressure filters treat for iron, manganese, and arsenic. The treated water is distributed through the existing distribution system, which consists of approximately 6.3 miles (33,336 linear feet) of ductile iron pipe. The water system serves a total of approximately 218 customer accounts, of which 96 are residential and 122 are commercial.

1. **Beneficiaries**

The project would benefit all existing customers (approximately 96 residential and 122 commercial) of the Talkeetna Sewer & Water System (TS&WS). Beneficiaries include:

- Mountain High Pizza Pie
- Denali Brewpub
- Talkeetna Roadhouse
- Fairview Inn
- United States Postal Service
- Talkeetna Elementary School
- National Park Service
- Sheldon Community Arts Hangar

2. **Proposed Construction**

Each alternative consists of roughly the same construction plan, which would consist of the following:

1. **An exploration drilling plan for a test well** will need to be developed and conducted to determine the new potential source's water quality, quantity, well depth, well casing size, and flow direction. Some information can be gleaned from existing nearby wells with publicly available data on the Alaska Department of Natural Resources' (ADNR's) Well Log Tracking System (WELTS; ADNR 2023). Additionally, a few active wells near the alternative sites have been sampled by the MSB for arsenic, pH, and iron, with results below the EPA's national

drinking water regulations. Regardless of the results of nearby wells, drilling is assumed to occur at two test sites to determine raw water quantity and quality (arsenic, iron, and manganese levels).

- 2. Develop engineering design and plans.** The proposed water system will consist of a well pump and a distribution system. As needed, the raw water will be routed through the treatment process, and then treated water will be stored in a new WST. The submersible well pump would be sized to be able to overcome the head loss of pumping out of the well, across the WTP's treatment process (pressure filters), and up to the WST's top elevation while still accommodating the required capacity. The treated, stored water will then be pumped to the water distribution system via a variable-speed drive distribution pump located in the new pumphouse (Alternatives 1–4) or fed via gravity (Alternative 5). A secondary pump will be installed to turn on during high demand and low pressure in the system, such as during a firefighting effort. This will not be required for the gravity-fed alternative (Alternative 5).

To accommodate future demands, a storage capacity of 368,400 gallons is recommended for the new WST. For this analysis, a round, 375,000-gallon capacity, bolted steel tank with a 48-foot diameter and 30-foot height was assessed (Superior Tank 2023). This WST would require a future geotechnical engineering analysis to determine if the soils could support the structure and to develop a foundation design. Additionally, freeze protection should be considered. WST freeze protection design would be more fully developed in further design phases.

- 3. Acquire required environmental and construction permits.** A plan review of the proposed modifications to the existing system and development of a new well will need to be submitted, reviewed, and approved by the Alaska Department of Environmental Conservation (ADEC). A temporary water use authorization (TWUA) and a water rights application will need to be submitted, reviewed, and approved by ADNRC. Permits for disturbing ground, clearing, grubbing, excavation, fill, and increasing impermeable surface area will be needed to develop the preferred site and access to and from it.
- 4. Land acquisition or agreements** must be obtained for Alternatives 1, 3, and 5; see their respective sections for more information. Alternatives 2 and 4 are owned by MSB but would require further investigation into any land use restrictions or other requirements.
- 5. Site Development** could then commence and would include clearing, grubbing, and removing trees for temporary and permanent access to and on the preferred site. Generally, less than 1.0 acre will be required for temporary and permanent construction.
- 6. WTP modifications** would consist of disconnecting the existing skid-mounted WTP and then moving it from the existing site to the site of the preferred alternative. Modification of the WTP's chemical storage area to include a dedicated chemical storage room would also be completed. This would include constructing a dedicated, ventilated, and code-compliant chemical storage room within the WTP. It is assumed that the existing WTP corroded piping will be replaced or recoated, depending on condition. (Replacement of the WTP piping was assumed for a more conservative cost. If pipes can be recoated, there is likely a cost savings.) It is assumed that the existing pressure filters (installed in 2010) can be reused. For

back-up power, it is assumed the existing Cummins generator (installed in 2021) will be reused and that it is of adequate size to operate the proposed facility.

7. **Construction** would consist of conversion of the test well into a production well; installation of the new WST, installation of piping from the WTP to the WST; installation of the new pumphouse with distribution pumps (or gravity piping only for Alternative 5) and piping to the existing distribution system; installation of piping from the WTP to the backwash waste location; and installation of a chain-link fence to secure the facility.
8. **Implementation of a SCADA system** in the new pumphouse to provide overall water treatment system monitoring as well as an alarm system and emergency call-out capabilities.
9. **Removing the previous WTP site from service** is recommended, as maintaining and operating the old Well House, Well #1, Well #2, and other remaining facilities is costly and unnecessary with the proposed system's increase in water storage. The full requirements associated with decommissioning this part of the system would be investigated further in design.

For additional information, please refer to the Preliminary Engineering Report (Appendix B).

3. Need and Purpose

The MSB is pursuing the siting, design, and construction of a new WTP and WST to address identified deficiencies within the water system. The community has seen steady population and tourism growth since the original water system installation, along with increased concerns over the groundwater arsenic concentration, lack of water storage, failure to meet minimum pressure requirements, lack of alarm systems, and pipe corrosion. Improvements to the water system are sought by the MSB to keep up with future demands, avoid failures during peak demands, decrease potential hazards to public health and safety, and potentially eliminate the need for arsenic treatment.

The community needs to construct a higher-capacity WST; the existing tank does not provide 3 days of reserve water, which is the desired minimum reserve (CRW 2014). A larger WST would address the risks associated with the distribution of untreated water during an emergency (CRW 2014).

An additional need is to identify a water source that does not contain naturally occurring arsenic. This would eliminate the need to treat water for arsenic, reducing operating costs. This would also eliminate the possibility of an equipment failure or operator error that results in customers receiving water with higher than allowable arsenic levels.

4. Alternatives to the Proposed Project

Five proposed action alternatives have been identified that may meet the project's purpose and need (see Figure 1); all involve relocating the existing water treatment facility. The MSB would prefer to locate near a groundwater source that would not require water treatment for arsenic (the U.S. Environmental Protection Agency [EPA] requires less than 10 parts per billion) and therefore would potentially result in cost savings. The alternative sites being considered for new community well and WTP relocation include the following:

- Site 1. Airport
- Site 2. School
- Site 3. Lodge/Overlook
- Site 4. Library
- Site 5. Lodge – Gravity System

Each alternative site is summarized below. A No Action Alternative was also evaluated.

4.1 Alternative 1: Airport

Location: Alternative 1 is located on State of Alaska (SOA) property, north of the existing General Aviation (GA) Apron for the state-owned Talkeetna Airport. The new pumphouse, relocated WTP, and new WST are to be clear of the airport's Runway Protection Zone, Building Restriction Line, and Approach Surface, and the WST is vertically clear of the horizontal surface based on the 2020 Talkeetna Airport's Airport Layout Plan (ALP) by the Alaska Department of Transportation and Public Facilities (DOT&PF) – Central Region (DOT&PF 2020).

Alternative-Specific Project Components: In addition to the components outlined in Section 2, the following components would also be required for this alternative:

- Lease from Alaska DOT&PF to construct and use Talkeetna Airport property.
- Clearing, grubbing, and leveling of 0.4 acre.
- Installation of 448 feet of 12-inch water pipe to connect to the existing distribution system at the northeast corner of Gliska Street.
- Installation of 599 feet of 8-inch high-density polyethylene (HDPE) sanitary sewer pipe to connect into the existing collection system along Beaver Road for backwash waste disposal.
- Development of a gravel parking area and access from Beaver Road of approximately 5,764 square feet.
- Installation of 433 linear feet of chain-link fence.

4.2 Alternative 2: School

Location: Alternative 2 is located on MSB property, south of Talkeetna Elementary School, along MP 13.7 of the Talkeetna Spur Road. It is also located within the Spur Road Central Land Use District of Talkeetna's Special Land Use Districts.

Alternative Specific Project Components: In addition to the components outlined in Section 2, the following components would also be required for this alternative:

- Clearing, grubbing, and leveling of 0.4 acre.
- Installation of 505 feet of 12-inch water pipe to connect into the existing distribution system along Talkeetna Spur Road MP 13.7. This requires boring under the Talkeetna Spur Road to connect to an existing water main pipeline.

- Installation of 381 feet of 8-inch HDPE sanitary sewer pipe to connect into the existing collection system for backwash waste disposal, located along Talkeetna Spur Road MP 13.7. This requires boring under the Talkeetna Spur Road to connect to an existing sanitary sewer line.
- Development of a gravel parking area and access area, off of Talkeetna Spur Road MP 13.7, of approximately 6,591 square feet.
- Installation of 427 linear feet of chain-link fence.

4.3 Alternative 3: Lodge/Overlook

Location: Alternative 3 is located on private, Cook Inlet Regional, Inc. (CIRI), Alaska Tourism Corporation (CATC) owned property, south of Talkeetna Alaskan Lodge, along MP 12.9 of the Talkeetna Spur Road. It is also located within the Spur Road South Land Use District of Talkeetna's Special Land Use Districts. Alternative 3A refers to a site south of the Talkeetna Spur Road, while Alternative 3B refers to a site north of the road.

Alternative Specific Project Components: In addition to the components outlined in Section 2, the following components would also be required for this alternative:

- Clearing, grubbing, and leveling of 0.5 acre.
- Installation of 2,980 feet of 12-inch water pipe to connect into the existing distribution system at Talkeetna Spur Road MP 13.3. At Talkeetna Spur Road MP 13.3, the proposed water pipe would cross Alaska Railroad Corporation (ARRC) mainline track. Additional railroad-specific engineering considerations may include loading design, casing pipe (likely 18-inch diameter), minimum cover, construction setbacks from the centerline of track, permanent casing pipe setbacks from the centerline of track, location and angle of crossings, and other design factors. Discussion with the ARRC about this alternative should commence before further design.
- Installation of 30 feet of 8-inch HDPE pipe to drain to an on-site backwash lagoon. This requires design and construction of a backwash lagoon to discharge the water treatment system backwash water. Wintertime freeze protection should be considered in design.
- Development of a gravel parking area and access area, off of Talkeetna Spur Road MP 12.9, of approximately 8,764 square feet.
- Installation of 429 linear feet of chain-link fence.

4.4 Alternative 4: Library

Location: Alternative 4 is located on MSB property, north of Talkeetna Public Library, along MP 12.3 of the Talkeetna Spur Road. It is also located within the Spur Road South Land Use District of Talkeetna's Special Land Use Districts.

Alternative Specific Project Components: In addition to the components outlined in Section 2, the following components would also be required for this alternative:

- Clearing, grubbing, and leveling of 0.8 acre.

- Installation of 6,246-feet of 12-inch water pipe to connect into the existing distribution system at Talkeetna Spur Road MP 13.3. At Talkeetna Spur Road MP 13.3, the proposed water pipe would cross ARRC mainline track. Discussion with the ARRC about this alternative should commence before further design.
- Installation of 30 feet of 8-inch HDPE pipe to drain to an on-site backwash lagoon.
- Development of a gravel parking area and access area, off of the Talkeetna Public Library access road, of approximately 21,728 square feet.
- Installation of 428 linear feet of chain-link fence.

4.5 Alternative 5: Lodge Gravity System

Location: Alternative 5 is located on private, CATC property southeast of Talkeetna Alaskan Lodge, along MP 12.5 of the Talkeetna Spur Road. It is also located within the Spur Road South Land Use District of Talkeetna's Special Land Use Districts. Visibility and appearance of the WTP and WST should be taken into consideration at this site due to its proximity to the Talkeetna Alaskan Lodge (the closest building is approximately 0.25 mile northwest of the proposed location).

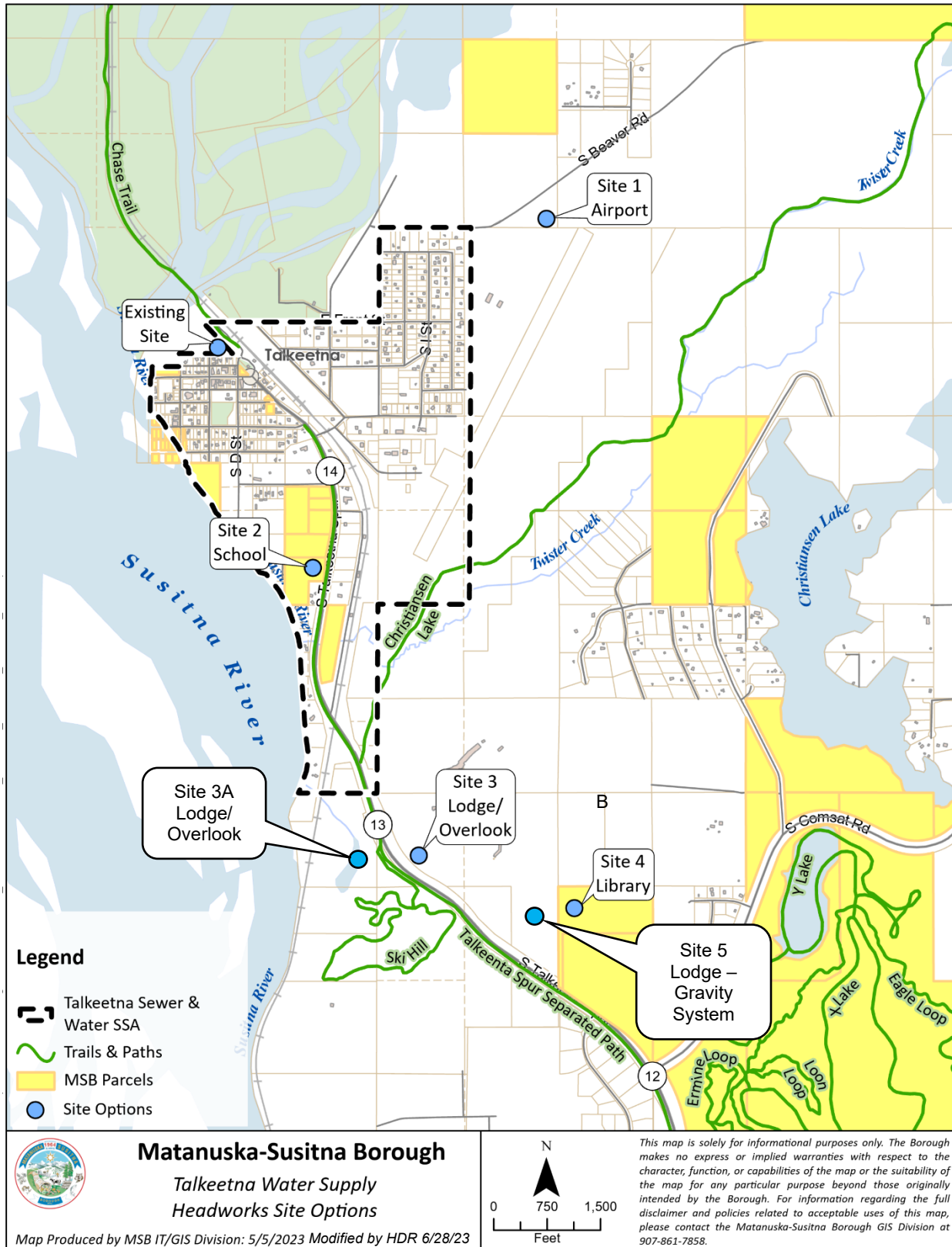
Alternative-Specific Project Components: In addition to the components outlined in Section 2, the following components will also be required for this alternative:

- Clearing, grubbing, and leveling of 0.3 acre.
- Installation of 5,119 feet of 12-inch water pipe to connect into the existing distribution system at Talkeetna Spur Road MP 13.3. At Talkeetna Spur Road MP 13.3, the proposed water pipe would cross ARRC mainline track; see Section 5.5 for railroad-specific engineering considerations. Discussion with the ARRC about this alternative should commence before further design.
- Installation of 30 feet of 8-inch HDPE pipe to drain to an on-site backwash lagoon.
- Development of a gravel parking area and access area, off of Talkeetna Spur Road MP 13.3, of approximately 18,210 square feet.
- Installation of 400 linear feet of chain-link fence.

4.6 No Action Alternative

The No Action Alternative would result in the community continuing to use the existing TS&WS treatment plant at its current location (Existing Site). The existing known issues would not be addressed, the WTP would remain vulnerable to flooding, insufficient reserve water capacity would persist, the water supply would continue to require treatment for naturally occurring arsenic, and the community would still lack treated water for use during an emergency. No Action Alternative is not considered reasonable, as the water treatment system would remain vulnerable to flooding, would restrict the future economic growth of the community, and does not meet the community's need for long-term, safe, and reliable water.

Figure 1. Proposed Alternatives



Source: Recreated from MSB.

B. HISTORIC/ARCHEOLOGICAL RESOURCES

A May 2023 review of the Alaska Heritage Resources Survey (AHRS) database indicated that there are no documented historic properties/cultural resources within the plotted locations of the Existing Site or Sites 1, 2, 3, 4 and 5. The Talkeetna Historic District, TAL-00033, is listed on the National Register of Historic Places (NRHP) and is located approximately 200 feet from the Existing Site. In addition to the Historic District, the resources listed in Table 1 are within 0.25 mile of the Existing Site. No archeological resources are identified within 0.25 mile of the Existing Site or Sites 1, 2, 3, 4, and 5.

Table 1. Known Historic Sites within 0.25 mile of the Existing Site

Site Name	AHRS Number	Type	NRHP Eligibility
Fairview Inn	TAL-00006	Historic	Contributing Property to TAL-00033
Frank Lee Cabin	TAL-00008	Historic	Contributing Property to TAL-00033
Talkeetna Railroad Depot	TAL-00014	Historic	Non-contributing Property to TAL-00033
Talkeetna River Railroad Bridge	TAL-00015	Historic	Not evaluated
Nagley's Store	TAL-00017	Historic	Contributing Property to TAL-00033
Bucket of Blood Saloon	TAL-00018	Historic	Not evaluated
David St Lawrence Cabin	TAL-00019	Historic	Contributing Property to TAL-00033
Three German Bachelors' Cabin/Peter Dana Cabin	TAL-00020	Historic	Not eligible
Ole Cabin #1	TAL-00022	Historic	Contributing Property to TAL-00033
Talkeetna Schoolhouse	TAL-00025	Historic	Contributing Property to TAL-00033
Ole Dahl Cabin #2	TAL-00027	Historic	Contributing Property to TAL-00033
H.W. Nagley House	TAL-00028	Historic	Not evaluated
Helmer Ronning Cabin	TAL-00029	Historic	Contributing Property to TAL-00033
Tom Weatherell Cabin	TAL-00030	Historic	Contributing Property to TAL-00033
Talkeetna Historic District	TAL-00033	Historic	Listed on the NRHP
George Tuffluck Cemetery	TAL-00043	Historic	Not evaluated
Black John Zulich Cabin	TAL-00048	Historic	Contributing Property to TAL-00033
David Lawrence Shop	TAL-00051	Historic	Not evaluated

Site Name	AHRS Number	Type	NRHP Eligibility
Mike Trepte House	TAL-00053	Historic	Contributing Property to TAL-00033
Red John Cuculich Cabin	TAL-00054	Historic	Contributing Property to TAL-00033
Frank Lee Barn	TAL-00056	Historic	Contributing Property to TAL-00033
David Lawrence Barn	TAL-00057	Historic	Not evaluated
Railroad Station House	TAL-00058	Historic	Non-contributing Property to TAL-00033
Curry Building	TAL-00059	Historic	Non-contributing Property to TAL-00033
Don Sheldon Hangar	TAL-00075	Historic	Not evaluated

Source: AHRS.

There are no documented AHRS sites located within 0.25 mile of Sites 1, 2, 3, 4, and 5.

1.1 Environmental Consequences

The proposed project involves ground-disturbing work that may result in the potential to impact unknown cultural, archaeological, or historic sites. All five action alternatives are anticipated to have less than 1.0 acre of ground-disturbing activity.

While TAL-00033, the Talkeetna Historic District, is located outside the boundaries of the Existing Site, adverse effects to this District and its contributing properties could still occur through changes to the District's setting, auditory environment, or visual environment. If the water treatment facility is relocated to a new site, the decommissioning of the existing facility at the Existing Site should be evaluated for potential adverse impacts to the Talkeetna Historic District, as required by statutes and regulations.

1.2 Mitigation

If cultural, archaeological, or historic sites are discovered during project construction, all work that may impact these resources would stop until the MSB and the Economic Development Administration (EDA) consult with the State Historic Preservation Officer (SHPO) and other consulting parties to determine the appropriate corrective action.

C. AFFECTED ENVIRONMENT

1. Affected Area

The project site is located in the community of Talkeetna in the MSB. The Talkeetna area was originally the lands of the Dena'ina EInena peoples (Talkeetna Chamber of Commerce 2023). Gold was discovered in the area in the early 1900s, which brought miners to the area. The population area increased substantially between 1915 and 1920 due to the construction of the ARRC (Talkeetna Chamber of Commerce 2023). The population of Talkeetna grew and shrank over the next several decades in response to world events and changes in

access. In the 1970s, mountaineering on Denali became popular and started the prosperous tourism industry that Talkeetna enjoys today.

There is no designated or proposed Wilderness in the project area, nor are there any wild and scenic rivers.

2. Coastal Zones

As of July 1, 2011, there is no longer a Coastal Zone Management Act program in Alaska.

3. Wetlands

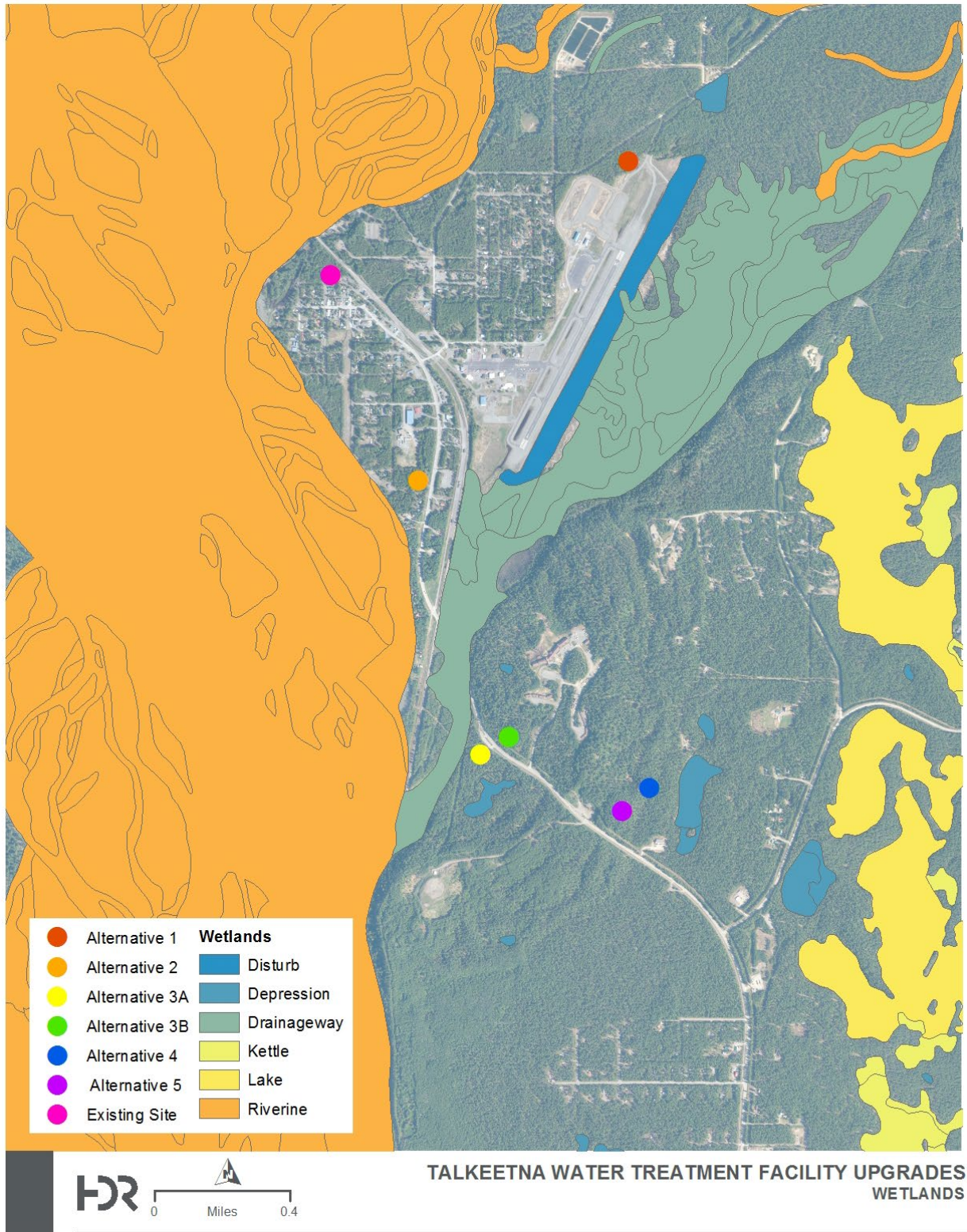
3.1 Affected Environment

According to a May and June 2023 review of the MSB Wetland Viewer, none of the proposed WTP and storage tank locations associated with each of the five alternatives are located on wetlands (see Figure 2).

The wetlands viewer indicates that there is a wetland (identified as a drainageway) located less than 500 feet north of Alternative 3A. In addition, a wetland (identified as a depression) is located approximately 750 feet south of Alternative 3A. The wetlands viewer indicates that there is a wetland (depression) located west of Alternatives 4 and 5.

Depending on the final design, the new piping needed to connect the proposed facility to the existing system, or the access road may result in wetland impacts. Formal wetland delineations and jurisdictional determinations were not conducted at this time.

Figure 2. Wetlands near Alternatives



Source: MSB.

3.2 Environmental Consequences

Construction of the WTP, WST, well, and other on-site facilities in each of the proposed alternatives is not anticipated to impact wetlands.

However, the piping connecting the new facility to the existing system may require construction in wetland areas. The amount and types of wetlands cannot be determined until the project design has been developed. The impacts to wetlands are expected to be minimal (less than 1.0 acre) given the small footprint of the improvements.

Under the No Action Alternative, no wetland impacts are anticipated.

3.3 Mitigation

No formal wetlands delineation was performed since the project's site has not been selected. During the design process, potential impacts to wetlands would be re-evaluated. If there is a potential for wetlands to be impacted, the project would incorporate all practicable avoidance and minimization measures required to obtain a permit from the U.S. Army Corps of Engineers (USACE), if required.

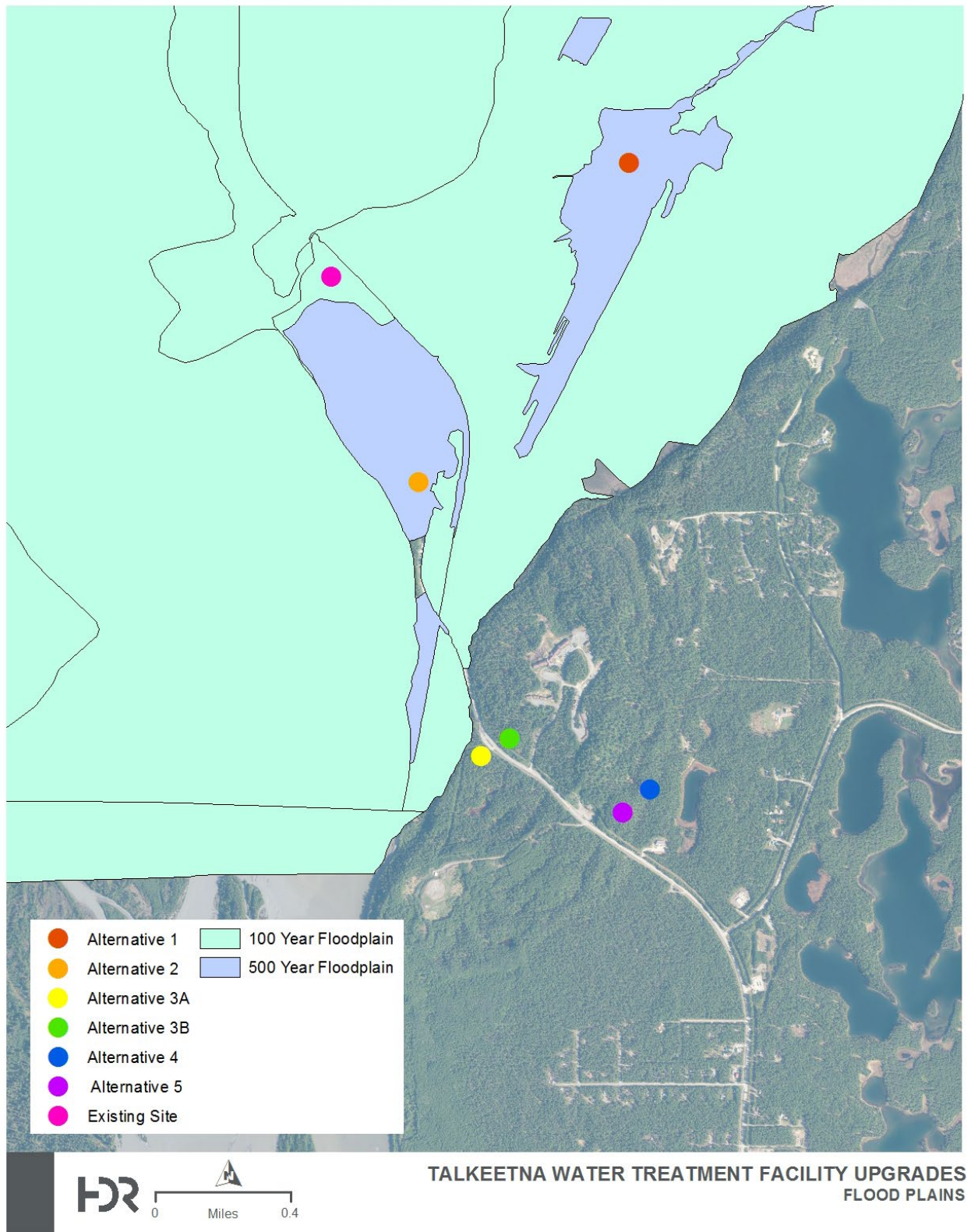
During the design process, a wetlands delineation and functional assessment would be completed to assist with the minimization of wetland impacts, determine USACE jurisdiction, and determine if compensatory mitigation is needed.

4. Floodplains

4.1 Affected Environment

According to Federal Emergency Management Agency (FEMA) and MSB data, none of the project alternatives are located in a 100-year floodplain. The 100-year floodplain is located less than 1,000 feet from Alternative 1. This site is located within the 500-year floodplain. Alternative 2 is located approximately 250 feet from the edge of the mapped 100-year floodplain and is within the 500-year floodplain. Alternative 3A is approximately 350 feet from the 100-year floodplain, while Alternative 3B is approximately 700 feet away. Alternatives 4 and 5 are just over 0.5 mile away from the closest mapped 100-year floodplain. Figure 3 shows the locations of the 100-year floodplains in the project area. The MSB participates in the National Flood Insurance Program.

Figure 3. 100-Year Floodplains



Source: MSB.

4.2 Environmental Consequences

The WTP and storage tanks associated with the five alternatives are not anticipated to impact the 100-year floodplain. Alternatives 1 and 2 may have an impact on the 500-year floodplain. The piping between the new facility and the existing system may require development in a floodplain depending on their locations under all build alternatives (1–5). The acres of floodplain impacts cannot be calculated until the design has been developed.

Under the No Action Alternative, the existing water treatment facility continues to be in the 100-year floodplain and would remain vulnerable to flooding.

4.3 Mitigation

If construction of the proposed project requires development in a floodplain, a Hydraulic and Hydrologic Study would be completed. In addition, a Floodplain Development Permit would be developed and submitted to the MSB Permit Center. Coordination with the MSB Permit Center would occur prior to construction.

5. Climate Change

The MSB, like the rest of Alaska, is experiencing climate-related changes. Between 1948 and 2009, the greatest temperature changes in Alaska were observed in the Talkeetna area (an increase of 4.9 degrees Fahrenheit) (NPS 2023). Other climate-related changes that have been experienced in Alaska include loss of sea ice, increases in flooding, more severe storms, and an increase in wildfires.

The project's location and scale limit its vulnerability to climate change. The project is not located in or near a coastal area where it is threatened from sea level rise or erosion.

The area around the proposed facility would be evaluated to determine if any vegetation clearing is necessary to reduce wildfire risk.

During the design process, measures to minimize the project's environmental impacts and energy use would be considered to determine if they can be implemented in a cost-effective and technically feasible manner.

6. Endangered Species

6.1 Affected Environment

A review of the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) planning tool in May 2023 indicated that there are no threatened or endangered species within the project area (USFWS 2023).

The IPaC review also indicated that seven species of migratory birds may be found within the area (USFWS 2023), including bald and golden eagles. Surveys should be conducted prior to and during construction to identify eagles and eagle nests located near the proposed project area. Other migratory birds listed on the USFWS Birds of Conservation Concern that may occur within or near the proposed project area are listed in Table 2 below (USFWS 2023).

Table 2. Migratory Bird Species Identified within Project Area

Species Name	Breeding Season
Bald Eagle	February 1 – September 30
Golden Eagle	January 1 – August 31
American Golden-Plover	May 20 – August 15
Hudsonian Godwit	May 15 – July 31
Lesser Yellowlegs	May 1 – August 15
Olive-Sided Flycatcher	May 20 – August 31
Short-Billed Dowitcher	June 1 – August 10

6.2 Environmental Consequences

The proposed project would have no impact on threatened or endangered species. The project area contains habitat suitable for migratory birds and would result in a minor amount of permanent suitable habitat loss. The proposed project has a low potential to impact migratory birds, as vegetation clearing is expected to be minimal (less than 1.0 acre).

The No Action Alternative is expected to have no impact on threatened and endangered species.

6.3 Mitigation

Prior to construction, an eagle nest survey would be conducted to determine the presence of active nests. If active nests are found within 660 feet of construction activity, either construction would be prohibited during sensitive nesting times or monitoring would be conducted according to USFWS protocol.

The MSB would require the Contractor to follow the USFWS *Timing Recommendations for Land Disturbance and Vegetation Clearing: Planning Ahead to Protect Nesting Birds* advisory (USFWS 2017).

7. Land Use and Zoning

7.1 Affected Environment

The site is located within the unincorporated Talkeetna Community Council area of the MSB. None of the land in Talkeetna has a formal zoning designation. None of the lands are considered prime/unique agricultural lands.

Land use planning documents for the Talkeetna area include the 1999 *Talkeetna Comprehensive Plan* and the 2005 *MSB Comprehensive Plan*. The *Talkeetna Comprehensive Plan* (MSB 1999) does not identify specific future land uses for each alternative site under consideration. However, it does express the following land use and community development goals:

- Maintain the community's small town atmosphere, sense of community, and high quality of life.
- Protect and conserve the wilderness values and natural resources of the lands surrounding Talkeetna.

- Keep Talkeetna a pleasant place to live, work, and visit.
- Plan and provide for population growth that can be adequately absorbed by the area without negative impacts on the sense of community, services, the environment, or the quality of life.
- Guide development in a manner that enhances Talkeetna's natural appeal, taking steps to ensure that future growth and change will build a desirable human environment.
- Maintain Talkeetna's major recreation and ecologically sound tourism economy and avoid conflicting activities.

Talkeetna also has a Special Land Use District (SpUD) (see Figure 4). Alternative 2 is located in the Spur Road Central (SRC) district, while Alternatives 3, 4, and 5 are in the Spur Road South (SRS) district. The SRC district has two purposes (MSB Code 17.25.065):

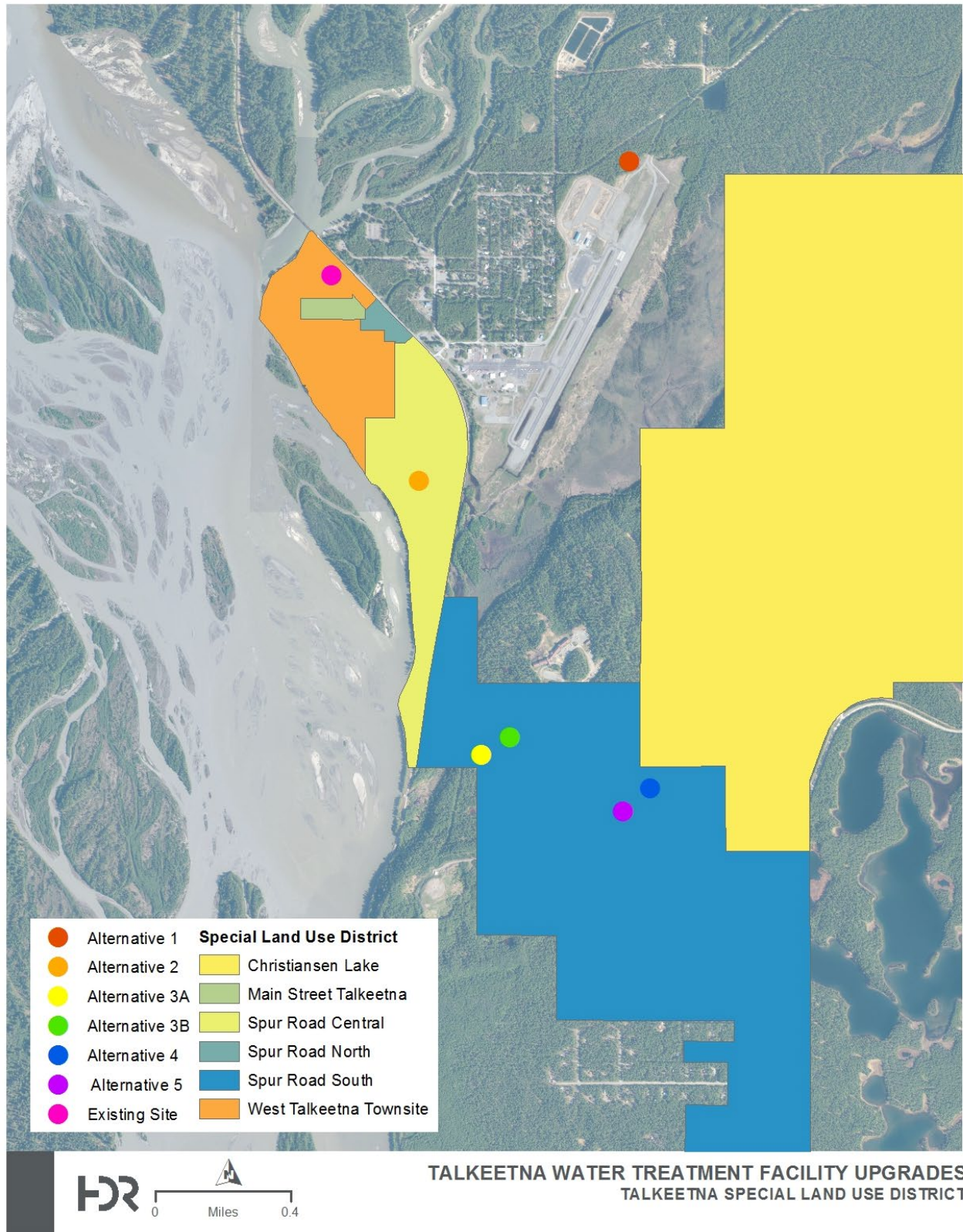
- (1) Maintain the qualities that make this area an attractive community entry and a transitional area between less developed areas to the south, and the denser commercial development along Main Street and the northern Spur Road; these qualities include buildings set back from the street, predominance of trees and other vegetation and building sizes and styles that reflect Talkeetna's history, natural setting, and local building traditions; and
- (2) Encourage this area to support resident and tourist-serving commercial activities. Future commercial growth can be more readily accommodated in this area than on Main Street.

The SRS district also has two purposes (MSB Code 17.25.070):

- (1) Maintain the visual integrity of the Spur Road, so that, like today, people traveling along this route experience the corridor as a largely natural area, separating more developed communities to the north and south.
- (2) Continue to allow residential and commercial development along the corridor, as long as it is pulled back from the highway, and a buffer of native trees and other vegetation is retained.

Utility facilities are permitted uses in both districts, but structures that exceed the maximum building height or building footprint development standards may require a conditional use permit.

Figure 4. Talkeetna Special Land Use District



Source: MSB.

Under each alternative, construction of the proposed project would convert the existing land use to a utility use. Construction of the access road would permanently convert land from its existing use to a transportation use. Construction of the piping between the existing and new facilities would be temporarily converted to a construction use but would revert to the previous land use once construction is complete.

Alternative 1

The existing land use for Alternative 1's WTP and storage tank is undeveloped/green space. Most of the adjacent land is also undeveloped (see Figure 5). The Talkeetna airport is located south of the proposed facility location. The existing sewage lagoon is located approximately 0.3 mile northwest of the site. The closest resident development is approximately 0.25 mile to the west. This parcel is owned by the DOT&PF.

Alternative 2

The existing land use for Alternative 2's WTP and storage tank is undeveloped/green space. Most of the adjacent land is either low-density residential development or the Talkeetna Elementary School (see Figure 6). This parcel is owned by the MSB. This alternative would have to comply with the SRC standards of the SpUD.

Alternative 3

Alternative 3 is located along the Talkeetna Spur Road. There are two potential sites at this location; one on either side of the Talkeetna Spur Road (Alternatives 3A and 3B; see Figure 7). This land is owned by CIRI. This area is largely undeveloped/green space. On the west side of the road, there is a pull-out, called the Mt. McKinley Scenic Overlook, that offers views of the Susitna River and Denali. The Talkeetna Alaskan Lodge is located on the west side of the road. This alternative would have to comply with the SRS standards of the SpUD.

Alternative 4

The existing land use for Alternative 4 is undeveloped/green space. Most of the adjacent land is also undeveloped/green space. This site is located behind the Talkeetna branch of the MSB library (see Figure 7). This parcel is owned by the MSB. This alternative would have to comply with the SRS standards of the SpUD.

Alternative 5

The existing land use for Alternative 5 is similar to Alternative 4: undeveloped/green space. Most of the adjacent land is also undeveloped/green space. This site is located behind the Talkeetna branch of the MSB library (see Figure 7). This parcel is owned by the MSB. This alternative would have to comply with the SRS standards of the SpUD.

Figure 5. Existing Land Use near Alternative 1 and Alternative 2



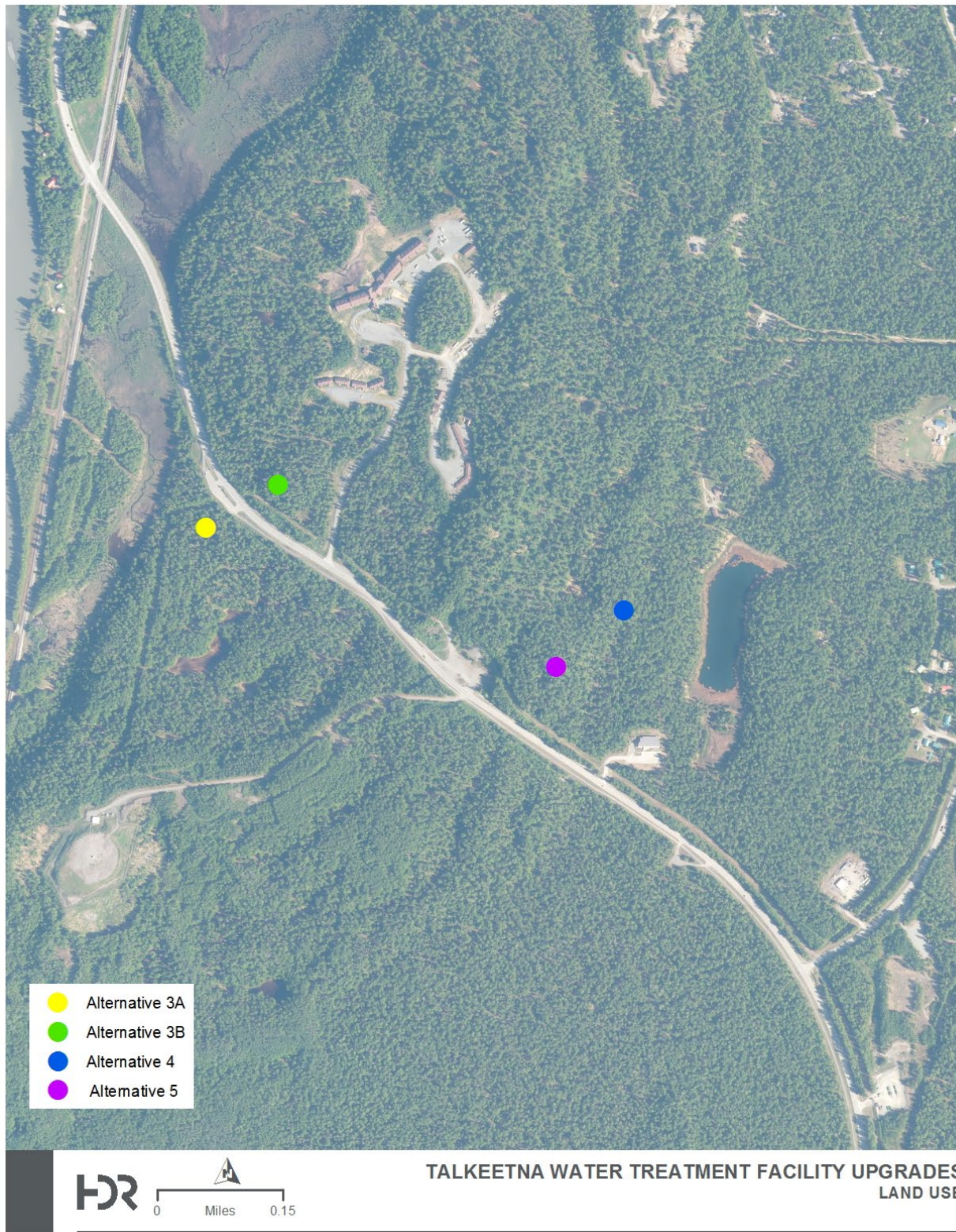
Source: MSB.

Figure 6. Existing Land Use near Alternative 2



Source: MSB.

Figure 7. Existing Land Use near Alternatives 3A, 3B, 4, and 5



Source: MSB.

No Action Alternative

The No Action Alternative is expected to have no impact on land use and zoning.

7.2 Environmental Consequences

All of the alternatives would convert land that is currently undeveloped to public utility. This is expected to have no adverse impact on adjacent land uses.

Alternatives 2 and 4 are located on MSB-owned land. Use of either site for a water treatment facility would not interfere with the existing use of the site. Due to the proximity of Alternative 3A to the Mt. McKinley Scenic Overlook, it may negatively impact the use and visitor enjoyment of the pull-out. Additional action may be needed by the MSB to allow development of utility infrastructure on the Alternative 2 site.

Alternatives 3 and 5 are located on private land and would require the MSB to negotiate with the landowner to purchase the land or obtain permission to construct and operate the new water treatment system. This would not interfere with the existing land on this parcel.

Each of the proposed alternatives is generally consistent with the *Talkeetna Comprehensive Plan* (MSB 1999). Alternative 2 is likely to need a conditional use permit for exceeding the maximum building height (30 feet) for the SRC district.

None of the alternatives would impact prime/unique agricultural lands. None of the alternatives would impact national monuments, landmarks, wild and scenic rivers, state or national parks, reservations, recreation areas, or other formally designated lands. The Talkeetna River is designated a Recreational River by the State of Alaska but is not expected to be impacted by any of the alternatives.

If the No Action Alternative is selected, the existing system would likely meet the existing community needs. It would prevent that expansion of existing businesses and limit the development of new businesses in Talkeetna's downtown district. This would limit the community's economy.

7.3 Mitigation

No mitigation is proposed.

8. Solid Waste Management

8.1 Affected Environment

The proposed facility is not anticipated to generate substantial amounts of solid waste. All alternatives are expected to generate quantities and types of solid waste similar to those from the existing facility. Most of the solid waste would be associated with maintenance activities or office activities.

8.2 Environmental Consequences

Under all five proposed alternatives, the amounts and types of solid waste generated are expected to be minimal and similar to what is produced by the existing facility. Solid waste generated by the facility would be transported as needed by MSB staff to the MSB's

Talkeetna Transfer Station. The MSB Solid Waste Services (or a commercial waste collection service) would transport the solid waste from the Transfer Center to the MSB Central Landfill. The Central Landfill has a lifespan of approximately 160 years and is located approximately 80 miles from the project site (MSB 2000). It is also anticipated to have no substantial negative impacts on the MSB Central Landfill. The MSB would encourage recycling when possible.

Under the No Action Alternative, solid waste disposal is not anticipated to change.

8.3 Mitigation

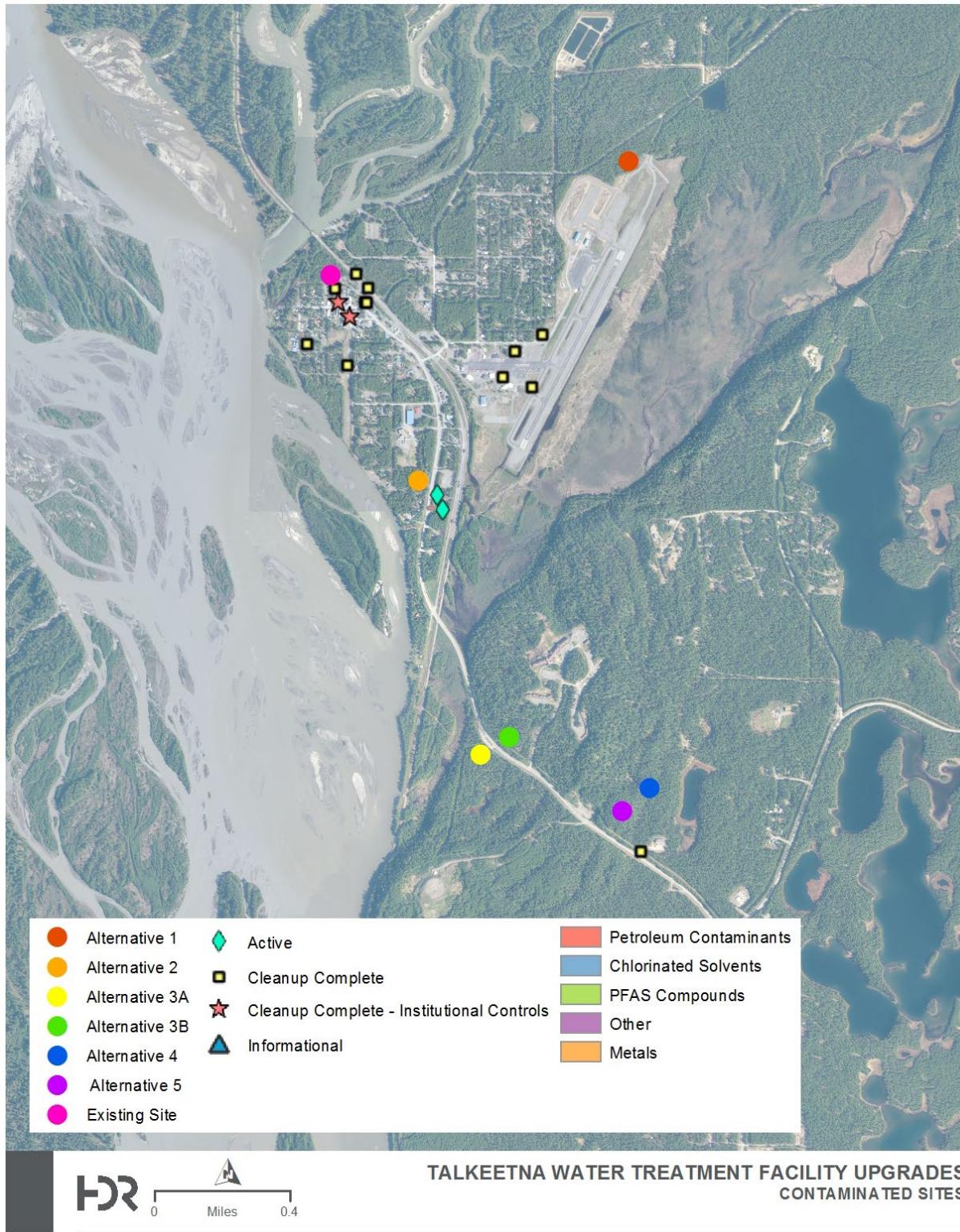
No mitigation is proposed.

9. Hazardous or Toxic Substances

9.1 Affected Environment

A May and June 2023 review of the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites database (ADEC 2023) showed contaminated sites near Talkeetna (see Figure 8). There are no known contaminated sites within 0.5 mile of Alternatives 1, 3, 4, and 5.

Figure 8. Known Contaminated Sites, June 2023



Source: ADEC Contaminated Sites Database.

There are two active contaminated sites and one groundwater plume (Figure 8) within 0.5 mile of Alternative 2. One of the active contaminated sites (ID 23167) is associated with a gas station and has contamination in the soil and groundwater.¹ The other active site (ID 26005) contains gasoline-range organics (GRO) and benzene in soil; and GRO, diesel-range organics (DRO), and benzene in ground water above ADEC cleanup levels.²

The groundwater plume consists of petroleum contaminants.³

No recent Phase I or Phase II Environmental Site Assessment has been performed for any of the project alternatives.

9.2 Environmental Consequences

The proposed facility would produce no toxic, hazardous, or radioactive substance. The proposed facility may store chemicals such as ferric chloride that are considered hazardous or toxic that are required for water treatment operations.

Hazardous materials would be disposed of properly. The MSB Landfill's hazardous waste station is open twice a week to collect paints, solvents, oils, and other materials.

If Alternative 2 is selected as the recommended location, consultation with ADEC would be conducted and, potentially, a Phase I Environmental Site Assessment performed to confirm that the soil and groundwater do not contain hazardous materials.

Under the No Action Alternative, ferric chloride and sodium hypochlorite would continue to be stored at the existing facility. The existing facility is experiencing corrosion on the ductile iron fittings and chemical shower due to the presence of these corrosive chemicals in the WTP (CRW 2014). Storage of these materials would continue in the WTP, as it is cost-prohibitive to develop a separate storage facility or install chemical storage cabinets.

9.3 Mitigation

No mitigation is proposed.

10. Water Resources

10.1 Affected Environment

Water bodies at or near the project site include the Talkeetna River, Christiansen Lake, and Talkeetna Lake. A May 2023 review of ADEC's Water Quality Map (ADEC 2022) indicates that none of these water bodies in the study area are considered impaired waters.

¹ Additional information can be found at <https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/23167>

² Additional information about this site can be found at <https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/26055>

³ Additional information about the plume can be found at <https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/23167>

A May 2023 review of the ADF&G *Anadromous Waters Catalog* (AWC; ADF&G 2023) indicates that coho salmon and Chinook salmon are located in Twister Creek.

Chum salmon, coho salmon, Chinook salmon, pink salmon, and sockeye salmon can be found in the Talkeetna River. In addition, coho salmon are found in the unnamed stream (AWC Code 247-41-10200-2370-3018) located north of S. Beaver Road.

None of the alternatives are located within an area mapped by the EPA's sole-source aquifer recharge area (EPA undated; reviewed May 2023).

10.2 Environmental Consequences

None of the alternatives are expected to have an adverse impact on water resources.

10.3 Mitigation

The proposed project would be constructed under the National Pollutant Discharge Elimination System general permit (now the Alaska Pollutant Discharge Elimination System [APDES]) for construction activities in Alaska. The Contractor would be responsible for performing all work in accordance with the General Permit (GP) conditions. A Storm Water Pollution Prevention Plan (SWPPP) would be implemented by the Contractor as required by the GP.

The bid documents for the project would include language requiring the Contractor to comply with the APDES construction general permit and approved SWPPP prior to the start of construction.

Impacts to local water resources are not anticipated. However, storm water best management practices (BMPs) would be used during construction to stabilize slopes.

11. Water Supply and Distribution System

11.1 Affected Environment

The TS&WS was constructed in the late 1980s after flooding of the Talkeetna and Susitna Rivers damaged personal wells and septic systems in the area. The system includes water treatment, water distribution, wastewater collection, and wastewater treatment.

In the existing system, water is supplied by two groundwater wells located in the same pump house. The water is treated to remove arsenic, manganese, and iron. It is also disinfected using chlorine prior to entering the distribution system. The water distribution system includes 5.3 miles, or 27,980 linear feet, of ductile iron pipe. The system serves approximately 96 residential and 122 commercial users. The system complies with, or has an exemption for, all state and federal regulations.

For a more complete description of the water system and system needs, please see the *Water System Technical Memorandum* (CRW 2014). The WST is considered a top priority of the community (KTNA 2023).

11.2 Environmental Consequences

Under all five build alternatives, the two existing wells would be taken out of service and a new well(s) established. The new well(s) would meet all applicable ADEC regulations.

Under the No Action Alternative, the community would continue to use the existing wells, WTP, and WST. This means that the community would continue to experience restrictions on the existing water flow and the threat of the water system being unusable during a flood event.

The proposed project would benefit all residents of the Talkeetna Water Service area by providing adequate drinking water. All residents on the water system receive water from the same source. Under Alternatives 3, 4, and 5, the water service area could be expanded, increasing the number of customers and potential revenue.

11.3 Mitigation

No mitigation is proposed.

12. Wastewater Collection and Treatment Facilities

12.1 Affected Environment

Talkeetna's existing wastewater system consists of a piped collection system and a newly renovated wastewater treatment plant (WWTP) that discharges into the Talkeetna River just northeast of downtown. The wastewater collection system contains approximately 2,633 linear feet of 12-inch ductile iron pipe (DIP) lines, 21,579 linear feet of 8-inch DIP lines as Class 50 gravity mains, and 5,790 linear feet of 6-inch DIP lines as Class 52 force mains.

After flowing through the station, the wastewater arrives through a manhole at the water treatment facility where it is split into two anaerobic tanks that each contain two cells. Each cell is pumped once a year, and approximately 65,000 gallons of sludge is pumped from each cell. The wastewater then flows into the first two lagoons equally split in a zig-zag pattern to maximize detention time. It is then rejoined at the third lagoon and follows a similar pattern before flowing to the wastewater treatment building.

The treatment facility uses chlorine to disinfect the wastewater for 8–12 hours and then neutralizes the chlorine quickly using sodium bisulfite. The facility uses a SCADA control panel to monitor things such as power, generators, flow rates, and chemical levels. It also configures the alarms and provides leak detections. The wastewater then flows out the effluent and into a side channel of the Talkeetna River. Wastewater treatment is performed only during the months of April through October. From November through March, winter conditions prevent treatment, so wastewater is stored until treatment can resume.

12.2 Environmental Consequences

Additional work is required to determine if the backwash would be connected to the sanitary sewer system or an alternative disposal site for all five alternatives. If the proposed facility is connected to the sanitary sewer system, no adverse impacts are anticipated, as the volume of material entering the system is anticipated to be similar to existing levels. Similar to the existing facility, none of the proposed water treatment facilities include a restroom.

Surface runoff/storm water from the proposed facility would be directed into on-site bio-swales and is not anticipated to impact the wastewater system.

The No Action Alternative is not expected to have an impact on the wastewater collection system or treatment facility.

12.3 Mitigation

No mitigation is proposed.

13. Environmental Justice (Executive Order 12898)

13.1 Affected Environment

All of the alternatives are in Block Group 021700001021 of the MSB. Selected demographic characteristics of the block group are compared to those of the MSB in Table 3. According to the EPA’s EJ Screen tool, the area was 5 percent minority (compared to 22 percent for the MSB) and was 15 percent low income (compared to 24 percent for the MSB). The area has a lower percentage rate of unemployment, people with limited ability to speak English, and people with less than a high school education. The area has a higher percentage of its population under age 5 and over age 64 than the MSB.

Table 3. Selected Demographic Characteristics

Characteristic	Block Group	MSB
Population	1,163	107,360
People of Color Population	57 (5%)	23,177 (22%)
Per Capita Income	\$26,613	\$31,963
Low Income	15%	24%
Unemployment Rate	7%	10%
Limited English Speaking	0%	1%
Population with Less Than High School Education	1%	6%
Population under Age 5	13%	7%
Population over Age 64	14%	12%

Source: EJ Screen 2023.

13.2 Environmental Consequences

The proposed project is not expected to disproportionately affect minority and low-income communities. Development of any of the proposed alternatives would not displace or cause the relocation of any households. The proposed project would benefit all customers of the TS&WS by providing adequate drinking water. All residents on the water system receive water from the same source.

The No Action Alternative would negatively impact all customers of the TS&WS.

13.3 Mitigation

No mitigation is proposed.

14. Transportation (Streets, Traffic, and Parking)

14.1 Affected Environment

Talkeetna is accessible by air and road. There is a state-owned paved runway in the community. The majority of residents and visitors access Talkeetna via the Talkeetna Spur Road, which connects the community to the Parks Highway. The ARRC also goes through the project area and has a depot in downtown Talkeetna.

14.2 Environmental Consequences

It is anticipated that Alternatives 1, 2, and 3 would require the development of a driveway (less than 250 feet). Alternative 4 would require an access road that is approximately 1,000 feet in length. Alternative 5 would require an access road that is approximately 511 feet in length. Any access roads or driveways constructed as part of the project would be built to MSB standards. Driveway permits would be obtained from either the MSB or DOT&PF as appropriate.

All five alternatives would result in a minor change in traffic patterns. Water service related traffic would no longer go to the existing water treatment facility; rather, it would go to the new facility. Construction of any of the five alternatives is not expected to substantially increase the amount of traffic (estimated at fewer than five trips per day).

No land uses in the vicinity of any alternative are expected to be adversely impacted by the new traffic pattern.

Construction of any alternative may have a temporary adverse impact on traffic. Alternatives 3B and 4 are likely to require pipes being installed under the Talkeetna Spur Road. Construction would be planned to minimize traffic impacts and would not impact long-term operations. As the Talkeetna Spur Road is the only road connecting the Parks Highway and Talkeetna, short-term road closures may be required.

Alternatives 3, 4 and 5 would require pipes to be installed under the ARRC. Construction would be planned to minimize impacts to the railroad and would not impact long-term ARRC operations.

14.3 Mitigation

No mitigation is proposed.

15. Air Quality

15.1 Affected Environment

A May 2023 review of the EPA list of Nonattainment and Maintenance areas indicated that the proposed project area is not within a nonattainment or maintenance area for any National Ambient Air Quality Standards (EPA 2023).

15.2 Environmental Consequences

The construction of the proposed project may lead to a temporary and minor decrease in air quality because of increased airborne dust and emission-related particulate matter. No permanent adverse impacts to air quality are anticipated from any of the alternatives.

There would be a temporary minor impact on air quality from vehicle emissions associated with the delivery of construction materials and paving activities. Construction-related impacts are not expected to lead to levels that exceed National Ambient Air Quality Standards or lead to the establishment of a new nonattainment area.

The operations of the proposed facility are not expected to lead to levels that exceed National Ambient Air Quality Standards or lead to the establishment of a new nonattainment area.

None of the primary beneficiaries of this project are expected to change their impact on air quality because of this project.

15.3 Mitigation

An erosion and sediment control plan and other protective measures would be used during construction to help mitigate fugitive dust issues. BMPs such as limiting construction equipment idling times and watering disturbed areas to control dust would be implemented.

16. Noise

16.1 Affected Environment

Alternative 1 is located near the Talkeetna Airport, which is subject to periodic noise associated with air traffic. Alternative 2 is located in a lightly developed area that consists of a mix of land uses including residential, commercial, and the Talkeetna Elementary School. Alternative 3, while largely undeveloped, is located next to the Talkeetna Spur Road and frequently experiences traffic-related noise. Alternatives 4 and 5 are located in an undeveloped area. The closest development, the Talkeetna Library, is approximately 0.15 mile away.

16.2 Environmental Consequences

The noise generated by the routine operations of this facility would be minimal and is not expected to be heard outside the facility. Alternative 2 would be less than 0.5 mile from the Talkeetna Elementary School. Alternatives 4 and 5 would be approximately 0.15 mile from the Talkeetna Library. The project is not expected to increase local ambient noise levels. There may be slight, temporary increases in noise associated with traffic going to and from the site. This is expected to be minimal, as traffic to the site is anticipated to be two trips per day.

The proposed project is not anticipated to cause any project beneficiaries to increase local ambient noise.

Increased noise levels may also occur during construction, but these impacts are considered minor and temporary. They would also be highly localized. Construction activities are exempted from MSB Code Chapter 17.61 noise requirements.

16.3 Mitigation

No mitigation is proposed.

17. Permits

The following permits and approvals are anticipated:

- ADEC APDES - Likely for storm water discharge – Contractor to acquire
- ADEC Non-domestic Wastewater Plan Approval
- ADEC Drinking Water Division, Approval to Construct
- ADEC 401 Certificate for SWPPP
- ARRC temporary construction easement
- ADNR Water Right Permit/Certificate
- USACE Section 404 (likely for Alternatives 3, 4, and 5)
- MSB Land Use permit
- MSB Conditional Use Permit (Alternative 2 only)
- Alaska Department of Public Safety Fire and Life Safety Plan Review
- MSB or DOT&PF Driveway Permit (depending on location)
- ADNR, SHPO, concurrence of No Historic Properties Affected

As of May 2023, no permit applications have been prepared. Permits would be acquired prior to construction.

In addition to the permits listed above, the project would need clearance under the National Environmental Policy Act (NEPA) if there is a federal nexus such as the need for a federal-issued permit or use of federal funds. The lead federal agency will be determined at the time such federal nexus is identified, and they will be responsible for ensuring compliance with NEPA requirements.

18. Public Notification/Controversy

The needed improvements to Talkeetna's water treatment system have been an issue for almost a decade. A report identifying needed improvements to the water and sewer system is available to the public on the Talkeetna Community Council website. There has been no public controversy associated with relocating and upgrading the existing water treatment facility.

The proposed project has been discussed numerous times during the TS&WS Advisory Board Meetings. The TS&WS Advisory Board consists of five qualified voting members, two of whom may reside in the Talkeetna Community Council Area, and three of whom must reside in or own real property in, or own or operate a business in the sewer and water service area and/or have an active sewer and water account. The board is the key communication link between the community and the MSB.

The Advisory Board meetings occur monthly on the first Wednesday of the month. The meetings are open to the public. They are advertised on the MSB and Talkeetna Community Council websites.

The Talkeetna Community Council has an update on the water and sewer system on their agenda for all regular board meetings.

19. Cumulative Effects

The proposed action may result in an increase in economic activity in the Talkeetna water and sewer service area such as additional commercial and residential development in the downtown area, enabled by an increase in available water and sewer services. This may result in minor increases in traffic and noise, as well as impacts to land use, wetlands, and floodplains. It may also result in an increase in tourism activity in Talkeetna. An increase in visitors would also improve economic conditions in the MSB through visitor-related spending and associated increases in tourism-related employment and hospitality-related businesses throughout the MSB.

Construction of the proposed facility may have impacts on vegetation, as construction is likely to require vegetation clearing. In addition, construction of piping between the existing system and the new facility may require vegetation clearing in wetland areas or development in floodplains. These impacts are considered minor due to the small footprint of the pipes. Prior to construction, coordination with relevant agencies would occur. All necessary permits would be obtained prior to construction and would be complied with during construction.

D. MITIGATION

This section summarizes the environmental mitigation identified earlier in this document. In addition to the proposed mitigation, additional measures may be identified during the design and permitting processes. Proposed mitigation includes:

- If cultural, archaeological, or historic sites are discovered during project construction, all work that may impact these resources would stop until the MSB and the EDA consult with SHPO and other consulting parties to determine the appropriate corrective action.
- No formal wetlands delineation was performed since the project site has not been selected. During the design process, a wetlands delineation and functional assessment would be completed to assist with the minimization of wetland impacts and to determine if compensatory mitigation is needed. If there is a potential for wetlands to be impacted, the project would incorporate all practicable avoidance and minimization measures in order to obtain a permit from USACE, if required.
- If construction of the project requires development in a floodplain, a Hydraulic and Hydrologic Study would be completed. In addition, a Floodplain Development Permit would be developed and submitted to the MSB Permit Center. Coordination with the MSB Permit Center would occur prior to construction.
- Prior to construction, an eagle nest survey would be conducted to determine the presence of active nests. If active nests are found within 660 feet of construction

activity, either construction would be prohibited during sensitive nesting times or monitoring would be conducted according to USFWS protocol.

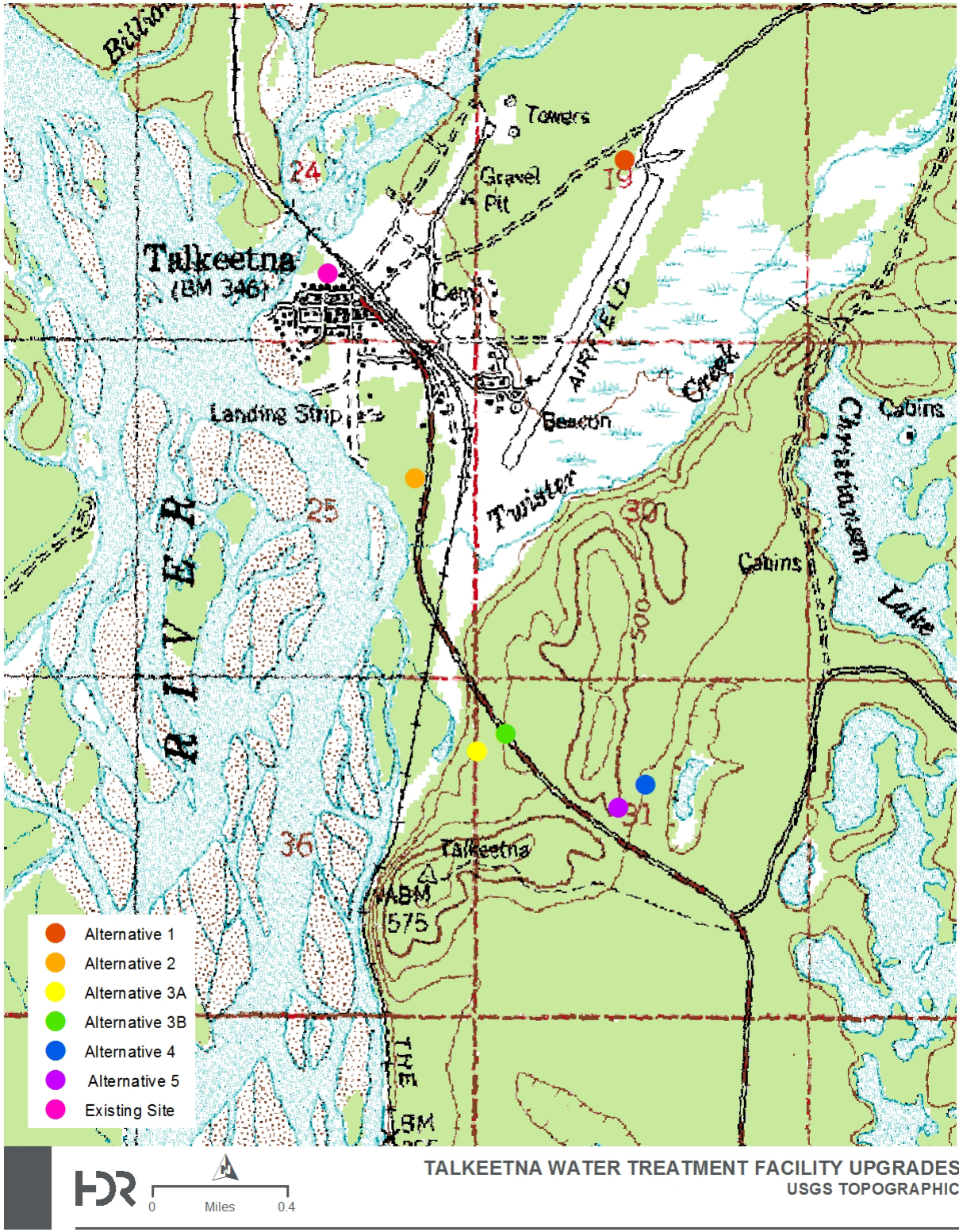
- The MSB would require the Contractor to follow the USFWS *Timing Recommendations for Land Disturbance and Vegetation Clearing: Planning Ahead to Protect Nesting Birds* advisory (USFWS 2017).
- Disturbed areas would be reseeded and vegetated with native vegetation.
- The bid documents for the project would include language requiring the Contractor to obtain the construction APDES general permit and approved SWPPP prior to the start of construction. Prior to initial disbursement of any construction costs, the MSB would provide the EDA with satisfactory documentation that the permit has been obtained.
- Impacts to local water resources are not anticipated. However, storm water BMPs would be used during construction to stabilize slopes.
- An erosion and sediment control plan and other protective measures would be used during construction to help mitigate dust issues. BMPs such as limiting construction equipment idling times and watering disturbed areas to control dust would be implemented.

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Appendix A: Contour Map



Appendix B: Preliminary Engineering Report



Preliminary Engineering Report

Talkeetna Water System Upgrades

Matanuska-Susitna Borough

Talkeetna, Alaska

June 30, 2023

Revised July 19, 2023

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- Appendix B – Gravity System Preliminary Headloss Calculations
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1 Purpose and Need

The Matanuska-Susitna Borough (MSB) is pursuing the siting, design, and construction of a new water treatment plant (WTP) and water storage tank (WST) to address identified deficiencies within the Talkeetna water system. The community has seen steady population and tourism growth since the original water system installation, along with increased concerns over the groundwater arsenic concentration, lack of water storage, failure to meet minimum pressure requirements, lack of alarm systems, and pipe corrosion. Improvements to the water system are sought by the MSB to keep up with future demands, avoid low-pressure events during peak demands, decrease potential hazards to public health and safety, and potentially eliminate the need for arsenic treatment.

Associated projects include feasibility of new well sites, moving the existing WTP to the proposed site, installing a WST, modifying the existing WTP, and installing a pumphouse and distribution system pumps or a gravity system, as well as installing a Supervisory Control and Data Acquisition (SCADA) system. This report summarizes the preliminary engineering assessment of five alternative well sites and associated improvement projects for Talkeetna's water system.

2 Background

Talkeetna is located within the MSB and identified as a census-designated place. The community is located at the confluence of the Susitna, Chulitna, and Talkeetna Rivers and sits within their floodplains. Talkeetna's public sewer and water systems are owned, operated, and maintained by the MSB. The Talkeetna water system was designed and constructed in the 1980s and 1990s.

Two groundwater wells currently provide raw water to the system, which is operated on an on-demand basis. Well #1 is 160 feet deep with an 8-inch casing and a capacity of 200 gallons per minute (gpm). Well #2 is 160 feet deep with a 12-inch casing and a capacity of 1,000 gpm, which can be brought online to accommodate peak demands, low pressure, and fire flows. Well #1 uses a 15-horsepower (HP) submersible well pump that was reportedly replaced in 2009. Well #2 uses a 75-HP vertical turbine pump that appears to be the same pump installed when the wells were drilled in 1988.

A 2,000-gallon hydropneumatic tank pressurizes the raw water through the water treatment process. Sodium hypochlorite is injected for oxidation of iron and manganese and residual disinfection. Ferric chloride is injected for arsenic adsorption and coagulation. Following chemical addition, three greensand media pressure filters treat for iron, manganese, and arsenic. It has been noted that the storage of the chemicals in the WTP is resulting in corrosion of the WTP pipes.

The distribution system consists of approximately 6.3 miles (33,336 linear feet) of Class 52 ductile iron pipe (approximately 30,703 feet of 8-inch and 2,633 feet of 12-inch pipe). The water distribution system typically provides 50 to 70 pounds per square inch (psi) but has dropped below 20 psi during times of peak demand. Pipe burial depths vary between 5 and 10 feet. Freeze protection is provided in sections of less cover with foam board insulation or arctic pipe. The distribution system was flow tested in 2009 and found to be capable of conveying flows up to 1,525 gpm. The system has 35 fire hydrants. The system also has 54 isolation valves on the water mains, 50 of which were located and swing-tied for location in 2014. Additional information about the existing system can be found in the

2014 Talkeetna Sewer and Water Assessment – Water System Technical Memorandum (2014 Water System Technical Memo) by CRW Engineering Group, LLC (CRW). A map of the Talkeetna water system is provided in Appendix A.

For firefighting or other emergency reasons, a bypass line from the secondary well can provide up to 1,000 gpm of untreated water through the distribution system. This practice is not common or recommended, as the system would distribute untreated water, requiring the system to go on a boil-water status until the system could be flushed and disinfected. Reportedly, this bypass practice has happened historically only a few times.

The water system serves approximately 218 customer accounts, of which 96 are residential and 122 are commercial. It is noted that the majority of the commercial accounts are smaller businesses (bed and breakfasts, gift shops, air services, small tourism shops) that have water usage volumes similar to those of residential accounts.

3 Population and Future Growth

The 2020 U.S. Census results for Talkeetna record a population of 1,055 with 522 occupied housing units. The 2014 Water System Technical Memo (CRW 2014) assessed approximately half of these residents to be transient or summertime residents. Historic U.S. Census population results for Talkeetna are provided in Table 1. A constant-percentage growth rate was applied to Talkeetna’s historic population trend between 2010 and 2020 to project a future annual population growth rate of 1.86 percent. For planning purposes and to estimate future water demands, a conservative annual growth rate of 2.0 percent was applied to Talkeetna based on historic growth rates. The results of this population projection are provided in Table 1.

Table 1. Talkeetna Population

Growth Rate	Year	Population
Historical	1920	70
	1930	89
	1940	136
	1950	106
	1960	76
	1970	182
	1980	264
	1990	250
	2000	772
	2010	876
	2020	1,055
Projected	2030	1,288
	2040	1,573

Source: ADLWD 2020.

Assuming a 20-year analysis period and that the percentage of the population on the water system grows linearly, 2020 values (population of 1,055, with 552 occupied housing units, 184 served individuals, 96 residential water accounts) can be extrapolated with a 2.0 percent population growth to project an additional 90 individuals on the water system (47 new residential water accounts) in 2040. It is therefore estimated that in 2040, there will be 274 individuals with 143 residential water accounts using the Talkeetna water system. Commercial accounts were not projected due to the inconsistency of assigning a number of individuals to any specific commercial account.

4 System Demands

The Talkeetna Water System monitors water production at two places: the Well #1 meter (in the pumphouse) and the effluent meter on the three filter vessels (Pressure Filters #1, #2, and #3 in the WTP). Ideally, the Well #1 meter should closely match the 24-hour combined readings of the filter vessel meters; however, the values sometimes have a notable difference. This difference was observed in the *2014 Water System Technical Memo* (CRW 2014) and thought to be due to differences in meter calibration and tolerance. To calculate an average daily water production rate, the Well #1 reading was compared to the 24-hour reading from the WTP filter log, and the larger value was conservatively used to obtain the blended average monthly water used, shown in Table 2. The average daily water used between January 1, 2022, and April 30, 2023, was 45,006 gallons per day; the maximum daily water used during that time period was 81,879 gallons per day on June 30, 2022. The historic water use values account for residential and commercial usage.

Table 2. Water Production for January 2022 – April 2023

Date	Well #1 Meter		WTP Filter Log		Blended Average Monthly Water Used (gal/day)
	Total Water Used (gal)	Average Monthly Water Used (gal/day)	Average Monthly Water Used (gal/day)	Maximum Daily Water Used (gal/day)	
1/31/2022	2,013,900	57,488	59,365	72,746	59,365
2/28/2022	3,612,800	57,104	57,314	66,287	57,314
3/31/2022	4,947,200	44,480	44,711	70,616	44,711
4/30/2022	5,537,700	20,362	18,362	26,612	20,362
5/31/2022	6,844,700	39,606	37,451	67,519	39,606
6/30/2022	8,720,900	64,697	64,542	81,879	64,697
7/31/2022	10,426,100	58,800	55,379	75,859	58,800
8/31/2022	12,209,700	52,459	50,463	58,436	52,459
9/30/2022	13,530,100	44,013	43,816	51,940	44,013
10/31/2022	14,362,900	30,844	28,985	36,436	30,844
11/30/2022	15,473,700	32,671	33,953	53,189	33,953
12/31/2022	16,625,900	38,407	37,178	41,301	38,407
1/31/2023	17,843,400	38,047	37,079	40,893	38,047
2/28/2023	19,013,900	41,804	40,868	46,715	41,804
3/31/2023	20,488,200	47,558	47,328	54,849	47,558
4/30/2023	21,625,500	47,388	48,161	55,718	48,161
Summary					
Total Water Used (January 2022 - April 2023)			21,451,200	gal	
Average Daily Use			45,006	gal/day	
Maximum Daily Use			81,879	gal/day	

Assuming a 20-year analysis period and projecting historical data, it is estimated that average water demand will be 62,800 gallons per day in 2040. Since the WTP was designed for a future average capacity of 82,000 gallons per day, water production should be sufficient to accommodate future growth for at least 20 years.

In addition to residential uses, the system sees significant water demands from tourism during the summer months. These seasonal demands are largely reflected in the increased water usage by commercial accounts. During the peak summer months, the system has seen demands approaching 82,000 gallons per day. The peak demand estimate for 2040 is 114,200 gallons per day. Since the WTP was designed to accommodate a peak demand of 164,000 gallons per day, it should be sufficient to accommodate an increase in tourism. A summary of water demands is provided in Table 3.

Table 3. WTP Design Criteria

Type of Demand (Unit)	Demand Scenario		Existing WTP Capacity
	Current (2020)	Projected (2040)	
Average Demand (gal/day)	45,006	62,800	82,000
Peak Daily Demand (gal/day)	81,879	114,200	164,000
Peak Instantaneous Capacity (gal/min)	-	-	250

Fire flows were determined using Table B105.1(2) of the 2021 International Fire Code (ICC 2021). The Talkeetna Elementary School was assumed to be the largest building in town; however, it contains a sprinkler system and was therefore not used to determine required fire flows. Instead, various other buildings around town were estimated to be less than 12,700 square feet in size and assumed to be of Type II, non-combustible construction. Based on these assumptions, the required fire flow rate was determined to be 1,500 gpm sustained for up to 2 hours, or 180,000 gallons.

Assuming a 20-year analysis period, the following criteria were used to determine the recommended 2040 water storage volume: peak instantaneous demand, required fire flows, and a 3-day reserve (based on average daily demand). Based on these criteria, a WST capable of holding at least 368,400 gallons is required. For analysis, a WST capable of an operating volume of 375,000 gallons is proposed.

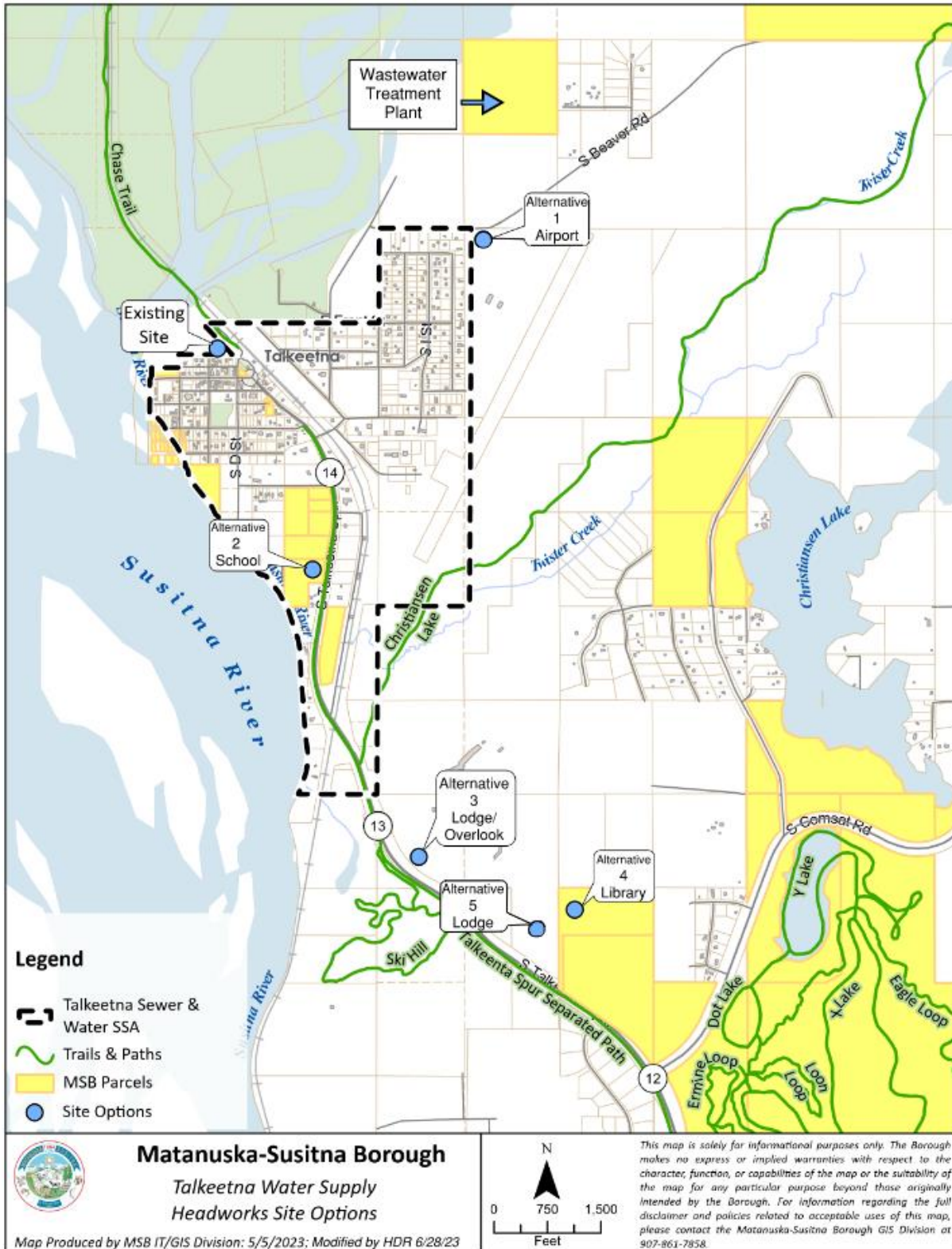
5 Alternatives

The MSB would prefer to locate a groundwater source that would not require water treatment for arsenic. The U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) for arsenic is 10 parts per billion (EPA 2023). Achieving this goal would potentially result in cost savings and reduced WTP complexity. Four alternatives are being considered for new community well and WTP relocation: (1) Airport, (2) School, (3) Overlook/ Lodge, (4) Library, and (5) Lodge Gravity System.

5.1 Locations

The existing pump house, skid-mounted WTP, chemical storage, and fuel tank are located on C Street in downtown Talkeetna. The existing WTP location and alternative locations are provided in Figure 1 and Table 4.

Figure 1. Overview Map



Source: Recreated from MSB.

Note: The Talkeetna Sewer & Water Special Service Areas (SSA) encompass the distribution system where sewer and water services are provided and sales tax applies.

Table 4. Site Locations

Site	Name	Meridian, Township, Range, Section, Lot	Latitude, Longitude (NAD83)	Average Elevation (feet, NAD83)	Ownership
Existing WTP	Existing Site	Seward, T26N, R5W, S24	62.32456556, -150.11494746	348	Federal
Existing WWTP	WWTP	Seward, T26N, R4W, S19, Lot B3	62.33374174, -150.09287151	358	MSB
Alternative 1	Airport	Seward, T26N, R4W, S19	62.32851271, -150.09370278	353	State of Alaska (SOA)
Alternative 2	School	Seward, T26N, R5W, S25, Lot A28	62.31584325, -150.10692894	349	MSB
Alternative 3	Lodge/Overlook	Seward, T26N, R4W, S31, Lot B1	62.30480709, -150.09826597	470	CIRI Alaska Tourism Corporation (CATC)
Alternative 4	Library	Seward, T26N, R4W, S31, Lot A6	62.30202109, -150.085708	418	MSB
Alternative 5	Lodge Gravity System	Seward, T26N, R4W, S31, Lot B1	62.301746, -150.088383	520	CATC

Source: MSB Parcel Viewer, MSB Special Use District Maps (MSB 2023a)

Note: NAD83 = North American Datum 1982; WWTP = Wastewater Treatment Plant

The approximate ground elevation of the existing distribution system ranges from 343 feet to 357 feet. Pumped and gravity systems were evaluated where feasible, depending on the elevation of the alternative and the target water distribution system pressure (40–60 psi). Specific details on each alternative site are discussed in Sections 5.3 through 5.7.

5.2 General Project Components

The alternatives consist of roughly the same plan, which would consist of the following:

1. **An exploration drilling plan for a test well** will need to be developed and conducted to determine the new potential source’s water quality, quantity, well depth, well casing size, and flow direction. Some information can be gleaned from existing nearby wells with publicly available data on the Alaska Department of Natural Resources’ (ADNR’s) Well Log Tracking System (WELTS; ADNR 2023). Additionally, a few active wells near the alternative sites have been sampled by the MSB for arsenic, pH, and iron, with results below the EPA’s national drinking water regulations (EPA 2023). Regardless of the results of nearby wells, drilling is assumed to occur at two test sites to determine raw water quantity and quality (arsenic, iron, and manganese levels).
2. **Develop engineering design and plans.** The proposed water system will consist of a well pump and a distribution system. As needed, the raw water will be routed through the

treatment process, and then treated water will be stored in a new WST. The submersible well pump would be sized to be able to overcome the head loss of pumping out of the well, across the WTP's treatment process (pressure filters), and up to the WST's top elevation while still accommodating the required capacity. The treated, stored water will then be pumped to the water distribution system via a variable-speed drive distribution pump located in the new pumphouse (Alternatives 1–4) or fed via gravity (Alternative 5). A secondary pump will be installed to turn on during high demand and low pressure in the system, such as during a firefighting event. Note that it is assumed that a secondary fire flow pump will not be required for the gravity-fed alternative (Alternative 5).

To accommodate future demands, a storage capacity of 375,000 gallons is recommended for the new WST. For this analysis, a round, 375,000-gallon working capacity, bolted steel tank with a 48-foot diameter and 30-foot height was assessed (Superior Tank 2023). This WST would require a geotechnical engineering analysis to determine if the soils could support the structure and develop a foundation design. Additionally, freeze protection should be considered, and preliminary tank insulation costs are included in the proposed cost estimates. WST freeze protection options including tank mixers and baffles should be considered and fully developed in further design phases.

3. **Acquire required environmental and construction permits.** Refer to Section 17 of the Environmental Narrative for environmental permit requirements. A plan review of the proposed modifications to the existing system and development of a new well will need to be submitted, reviewed, and approved by the Alaska Department of Environmental Conservation (ADEC). A temporary water use authorization (TWUA) and a water rights application will need to be submitted, reviewed, and approved by ADNR. Permits for disturbing ground, clearing, grubbing, excavation, fill, and increasing impermeable surface area will be needed to develop the preferred site and access to and from it.
4. **Land acquisition or agreements** must be obtained for Alternatives 1, 3, and 5; see their respective sections for more information. The sites of Alternatives 2 and 4 are owned by MSB but would require further investigation into any land use restrictions or other requirements.
5. **Site development** could then commence and would include clearing, grubbing, and removing trees for temporary and permanent access to and on the preferred site. Generally, less than 1.0 acre will be required for temporary and permanent construction.
6. **WTP modifications** would consist of disconnecting the existing skid mounted WTP and then moving it from the existing site to the site of the preferred alternative. Modification of the WTP's chemical storage area to include a dedicated chemical storage room would also be completed. This would include constructing a dedicated, ventilated, and code-compliant chemical storage room within the WTP. It is assumed that the existing WTP corroded piping will be replaced or recoated, depending on condition. (Replacement of the WTP piping was assumed for a more conservative cost. If pipes can be recoated, there would likely be cost savings.) It is assumed that the existing pressure filters (installed in 2010) can be reused. For back-up power, it is assumed that the existing Cummins generator (installed in 2021) will be reused and that it is of adequate size to operate the proposed facility.
7. **Construction** would consist of conversion of the test well into a production well; installation of the new WST; installation of piping from the WTP to the WST; installation of the new

pumphouse with distribution pumps (or gravity piping only for Alternative 5) and piping to the existing distribution system; installation of piping from the WTP to the backwash waste location; and installation of a chain link fence to secure the facility.

8. **Implementation of a SCADA system** in the new pumphouse to provide overall water treatment system monitoring as well as an alarm system and emergency call-out capabilities.
9. **Removing the other existing WTP facilities from service** is recommended because maintaining and operating the old Well House, Well #1, Well #2, and other remaining facilities is costly and unnecessary with the proposed system’s increase in water storage. The full requirements associated with decommissioning this part of the system would be investigated further in design.

Project Component Cost Estimate: The preliminary cost of drilling two test wells is included in Table 5. It is assumed that drilling of the two test wells will occur in one mobilization.

Table 5. Cost Estimate for Test Well Exploration

Item	Quantity	Units	Unit Cost	Cost
Mobilization & Demobilization	1	LS	\$5,000	\$5,000
Drilling (x2, 200-foot deep, 10-inch diameter well)	400	Feet	\$320	\$128,000
Screen Wells (x2)	20	Feet	\$1,000	\$20,000
Development of Well (x2)	12	HR	\$600	\$7,200
Pump Test (x2, 12 hours)	2	EA	\$10,000	\$20,000
Construction Subtotal				\$180,200
Item	Unit	Percent	Cost	
Drilling Contingency		30%	\$54,060	
Water Quality Testing	LS	-	\$5,000	
Construction Contingency		10%	\$18,020	
Permitting & Agency Consultation	LS	-	\$15,000	
Engineering & Design		12%	\$21,624	
Project Total				\$293,904

Proposed Construction Method: It is anticipated that traditional design/bid/build with a sealed competitive bid process will be used for two contracts: test well exploration and developing the preferred alternative. For the test well exploration, the proposed method of construction will be at the discretion of the contracted well driller. General development the preferred alternative is described above.

Proposed Schedule: A general project schedule is provided in Table 6 and shows the anticipated phases and the estimated duration of each phase for any of the alternatives.

Table 6. Proposed Schedule

Phase	Objectives	Anticipated Duration
Design	0% design to bid documents	12 months
Permits	All permits required for specific alternative	4 months
Right-of-Way (ROW) Acquisition/Land Agreements	Initial discussions to an approved agreement	3 months
Solicitation of Bids and Award	Solicited bids and award to a Contractor	3 months
Construction	Exploration drilling to fully constructed system	12 months

5.3 Alternative 1: Airport

Location: Alternative 1 is located on State of Alaska (SOA) property, north of the existing General Aviation (GA) Apron for the state-owned Talkeetna Airport (see Figure 2). The new pumphouse, relocated WTP, and new WST are to be clear of the airport’s Runway Protection Zone, Building Restriction Line, and Approach Surface; and the WST is vertically clear of the horizontal surface based on the 2020 Talkeetna Airport’s Airport Layout Plan (ALP) by the Alaska Department of Transportation and Public Facilities (DOT&PF) – Central Region (DOT&PF 2020).

The existing wastewater treatment plant (WWTP) is located approximately 1,900 feet to the north of Alternative 1’s site. It is recommended to test for nitrates contamination due to previously unlined wastewater lagoons to ensure acceptable groundwater quality.

Figure 2. Alternative 1 Layout



Alternative-Specific Project Components: In addition to the components outlined in Section 5.2, the following components will be required for this alternative:

- Lease from DOT&PF to construct on and use Talkeetna Airport property.
- Clearing, grubbing, and leveling of 0.4 acre.
- Installation of 448 feet of 12-inch water pipe to connect to the existing distribution system at the northeast corner of Gliska Street.
- Installation of 599 feet of 8-inch high-density polyethylene (HDPE) sanitary sewer pipe to connect into the existing collection system along Beaver Road for backwash waste disposal.
- Development of a gravel parking area and access from Beaver Road of approximately 5,764 square feet.
- Installation of 433 linear feet of chain-link fence.

Project Component Cost Estimate: The cost estimate for the work specific to Alternative 1 is provided in Table 7.

Table 7. Cost Estimate for Alternative 1

Item	Quantity	Unit	Unit Cost	Cost
Mobilization & Demobilization	1	LS	\$150,000	\$150,000
Site Development (Clearing & Grubbing)	0.4	Acre	\$30,000	\$11,932
WTP Relocation	1	LS	\$100,000	\$100,000
WTP Modifications - Chemical Storage Room	1	LS	\$10,000	\$10,000
New Pumphouse	1	LS	\$150,000	\$150,000
Well Pump, Controls, & Appurtenances	1	LS	\$30,000	\$30,000
Distribution Pump, Fire Pump, & Controls	1	LS	\$75,000	\$75,000
Water Storage Tank	375,000	Gallon	\$5	\$1,875,000
Water Storage Tank Insulation	1	LS	\$375,000	\$375,000
12-Inch Ductile Iron Water Pipe	448	LF	\$400	\$179,200
8-Inch HDPE Backwash Pipe	599	LF	\$300	\$179,744
Electrical & Instrumentation	1	LS	\$100,000	\$100,000
Access Road & Parking Area	5,764	SF	\$10	\$57,638
Fencing	433	LF	\$100	\$43,259
WTP Modifications - Corroded Pipe Replacement	1	LS	\$30,000	\$30,000
SCADA System & Installation	1	LS	\$100,000	\$100,000
Decommission Existing WTP	1	LS	\$50,000	\$50,000
Construction Subtotal				\$3,516,774

Item	Unit	Percent	Cost
Site Control - State of Alaska Agreement/ Easement	LS	-	\$15,000
Construction Contingency		30%	\$1,055,032
Permitting & Agency Consultation		10%	\$351,677
Engineering & Design		12%	\$422,013
Construction Management & Administration		8%	\$281,342
Project Total			\$5,641,838

Note: LF = linear foot; LS = Lump Sum; SF = square foot

Real Property Acquisition: This alternative requires a lease agreement between MSB and DOT&PF.

Permits: See permit requirements discussed in Section 5.2.

Proposed Schedule: See Table 6.

5.4 Alternative 2: School

Location: Alternative 2 is located on MSB property, south of Talkeetna Elementary school, along MP 13.7 of the Talkeetna Spur Road (see Figure 3). It is also located within the Spur Road Central Land Use District of Talkeetna’s Special Land Use Districts (SpUD, MSB 2023b).

The ADEC’s Contaminated Sites Program (CSP; ADEC 2023) shows two active, petroleum-contaminated sites within approximately 420 feet of the site: one on the Mat-Su Borough Talkeetna Library Subdivision Tract A and the other on Hales Tesoro property. The spread of the contaminated plumes and potential mitigation efforts should be investigated before further well development efforts at this site.

Figure 3. Alternative 2 Layout



Alternative-Specific Project Components: In addition to the components outlined in Section 5.2, the following components will be required for this alternative:

- Clearing, grubbing, and leveling of 0.4 acre.
- Installation of 505 feet of 12-inch water pipe to connect into the existing distribution system along Talkeetna Spur Road MP 13.7. This requires boring under the Talkeetna Spur Road to connect to an existing water main pipeline.
- Installation of 381 feet of 8-inch HDPE sanitary sewer pipe to connect into the existing collection system for backwash waste disposal, located along Talkeetna Spur Road MP 13.7. This requires boring under the Talkeetna Spur Road to connect to an existing sanitary sewer line.
- Development of a gravel parking area and access area, off of Talkeetna Spur Road MP 13.7, of approximately 6,591 square feet.
- Installation of 427 linear feet of chain-link fence.

Project Component Cost Estimate: The cost estimate for the work specific to Alternative 2 is provided in Table 8.

Table 8. Cost Estimate for Alternative 2

Item	Quantity	Unit	Unit Cost	Cost
Mobilization & Demobilization	1	LS	\$150,000	\$150,000
Site Development (Clearing & Grubbing)	0.4	Acre	\$30,000	\$12,268
WTP Relocation	1	LS	\$100,000	\$100,000
WTP Modifications - Chemical Storage Room	1.0	LS	\$10,000	\$10,000
New Pumphouse	1	LS	\$150,000	\$150,000
Well Pump, Controls, & Appurtenances	1.0	LS	\$30,000	\$30,000
Distribution Pump, Fire Pump, & Controls	1	LS	\$75,000	\$75,000
Water Storage Tank	375,000.0	Gallon	\$5	\$1,875,000
Water Storage Tank Insulation	1	LS	\$375,000	\$375,000
12-Inch Ductile Iron Water Pipe	505.0	LF	\$400	\$202,000
8-Inch HDPE Backwash Pipe	381	LF	\$300	\$114,292
Electrical & Instrumentation	1.0	LS	\$100,000	\$100,000
Access Road & Parking Area	6,591	SF	\$10	\$65,914
Fencing	426.9	LF	\$100	\$42,693
WTP Modifications - Corroded Pipe Replacement	1	LS	\$30,000	\$30,000
SCADA System & Installation	1.0	LS	\$100,000	\$100,000
Water Main Boring	100	LF	\$1,000	\$100,000
Sanitary Sewer Boring	100.0	LF	\$1,000	\$100,000
Decommission Existing WTP	1	LS	\$50,000	\$50,000
Construction Subtotal				\$3,682,166
Item		Unit	Percent	Cost
Construction Contingency			30%	\$1,104,650
Permitting & Agency Consultation			10%	\$368,217
Engineering & Design			12%	\$441,860
Construction Management & Administration			8%	\$294,573
Project Total				\$5,891,466

Real Property Acquisition: This land is owned by the MSB, and further investigation into reclassifying the property to be utilized for public utilities, as well as any land use restrictions or other requirements, should be completed before further design efforts commence.

Permits: See permit requirements discussed in Section 5.2. Application for a conditional use permit for exceeding maximum building height (30 feet) in the Talkeetna Special Use District (SpUD);

Talkeetna Community Council 2022) - Spur Road Central restrictions may apply if the WST's insulation increases its proposed height greater than 30 feet.

Proposed Schedule: See Table 6.

5.5 Alternative 3: Lodge/Overlook

Location: Alternative 3 is located on private, CATC property, southwest of Talkeetna Alaskan Lodge, along MP 12.9 of the Talkeetna Spur Road (see Figure 4). It is also located within the Spur Road South Land Use District of Talkeetna's SpUD. Visibility and appearance from the WTP and WST should be taken into consideration at this site due to its proximity to the Talkeetna Alaskan Lodge and Talkeetna Spur Road MP 12.9 overlook.

Figure 4. Alternative 3 Layout



Alternative-Specific Project Components: In addition to the components outlined in Section 5.2, the following components will be required for this alternative:

- Clearing, grubbing, and leveling of 0.5 acre.

- Installation of 2,980 feet of 12-inch water pipe to connect into the existing distribution system at Talkeetna Spur Road MP 13.3. At Talkeetna Spur Road MP 13.3, the proposed water pipe would cross the Alaska Railroad Corporation (ARRC) mainline track. Additional railroad-specific engineering considerations may include loading design, casing pipe (likely 18-inch diameter), minimum cover, construction setbacks from the centerline of track, permanent casing pipe setbacks from the centerline of track, location and angle of crossings, and other design factors. Discussion with the ARRC about this alternative should commence before further design efforts commence.
- Installation of 30 feet of 8-inch HDPE pipe to drain to an on-site backwash lagoon. This requires design and construction of a backwash lagoon to discharge the water treatment system backwash water. Wintertime freeze protection should be considered in design. For this analysis, a two-cell lagoon was used (27-foot by 52-foot) and requires approximately 1,456 square feet. The wastewater lagoon design should be more fully developed in further design phases.
- Development of a gravel parking area and access area, off of Talkeetna Spur Road MP 12.9, of approximately 8,764 square feet.
- Installation of 429 linear feet of chain-link fence.

Project Component Cost Estimate: The cost estimate for the work specific to this alternative is provided in Table 9.

Table 9. Cost Estimate for Alternative 3

Item	Quantity	Unit	Unit Cost	Cost
Mobilization & Demobilization	1	LS	\$150,000	\$150,000
Site Development (Clearing & Grubbing)	0.5	Acre	\$30,000	\$14,997
WTP Relocation	1	LS	\$100,000	\$100,000
WTP Modifications - Chemical Storage Room	1	LS	\$10,000	\$10,000
New Pumphouse	1	LS	\$150,000	\$150,000
Well Pump, Controls, & Appurtenances	1	LS	\$30,000	\$30,000
Distribution Pump, Fire Pump, & Controls	1	LS	\$75,000	\$75,000
Water Storage Tank	375,000	Gallon	\$5	\$1,875,000
Water Storage Tank Insulation	1	LS	\$375,000	\$375,000
12-Inch Ductile Iron Water Pipe	2,980	LF	\$400	\$1,191,988
8-Inch HDPE Backwash Pipe	30	LF	\$300	\$9,000
Backwash Lagoon	1,456	SF	\$30	\$43,680
Electrical & Instrumentation	1	LS	\$100,000	\$100,000
Access Road & Parking Area	8,764	SF	\$10	\$87,638
Fencing	429	LF	\$100	\$42,890
WTP Modifications - Corroded Pipe Replacement	1	LS	\$30,000	\$30,000
SCADA System & Installation	1	LS	\$100,000	\$100,000
ARRC Crossing Boring	100	LF	\$1,000	\$100,000
Decommission Existing WTP	1	LS	\$50,000	\$50,000
Construction Subtotal				\$4,535,193
Item	Unit	Percent	Cost	
Site Control - CATC Agreement/ Easement	LS	-	\$50,000	
Construction Contingency		30%	\$1,360,558	
Permitting & Agency Consultation		10%	\$453,519	
Engineering & Design		12%	\$544,223	
Construction Management & Administration		8%	\$362,815	
Project Total			\$7,306,309	

Real Property Acquisition: This alternative requires a land acquisition or that an agreement between MSB and CATC be reached. As of May 2023, MSB has preliminarily reached out to CATC, and high-level discussions are ongoing. An underground utility within ARRC right-of-way (ROW), a temporary construction easement within ARRC ROW, and a trenching and shoring plan would need to be reviewed and approved by ARRC (ARRC 2014).

Permits: See permits discussed in Section 5.2.

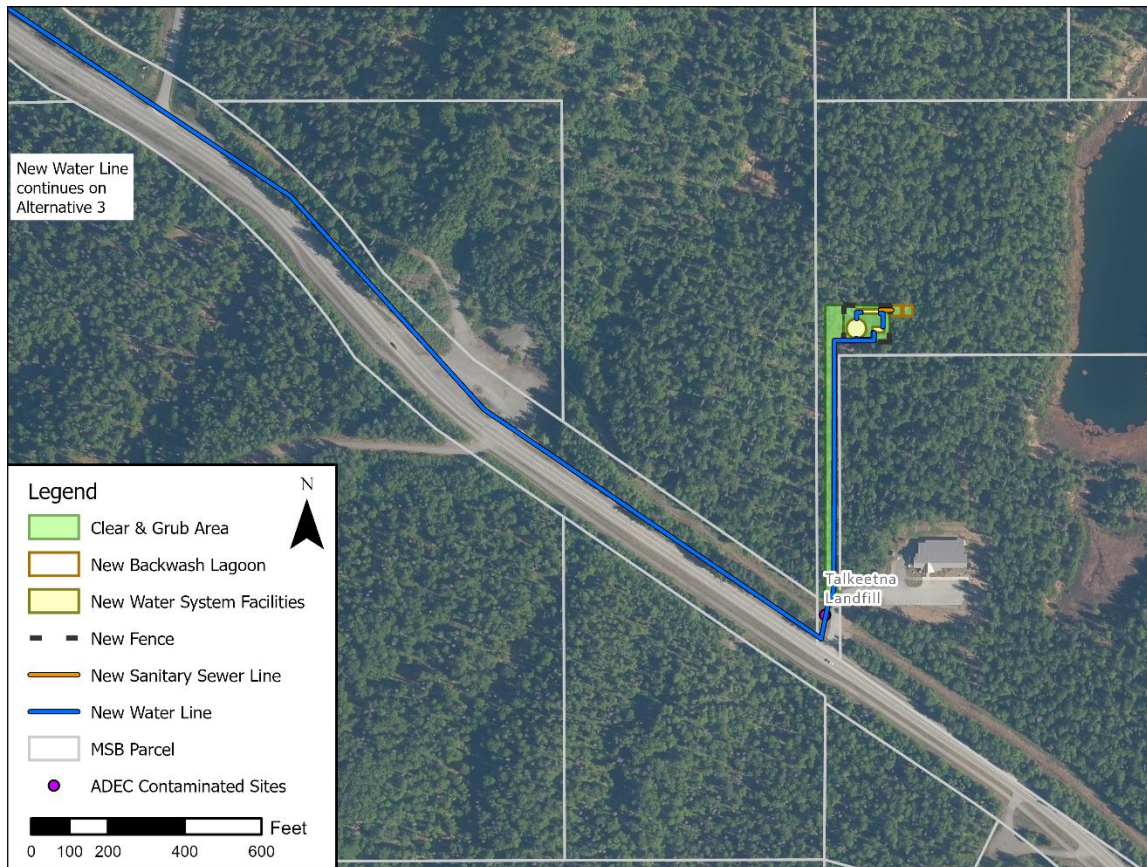
Proposed Schedule: See Table 6.

5.6 Alternative 4: Library

Location: Alternative 4 is located on MSB property, north of Talkeetna Public Library, along MP 12.3 of the Talkeetna Spur Road (see Figure 5). It is also located within the Spur Road South Land Use District of Talkeetna’s SpUD.

ADEC’s CSP (ADEC 2023) shows the retired Talkeetna Landfill within approximately 1,000 feet of the proposed well site. This previously contaminated site has completed cleanup, meaning that remediation efforts are complete and any remaining contamination is expected to be below the levels that would pose a threat to human health or the environment. This would need to be verified by sampling of test well water quality.

Figure 5. Alternative 4 Layout



Alternative-Specific Project Components: In addition to the components outlined in Section 5.2, the following components will also be required for this alternative:

- Clearing, grubbing, and leveling of 0.8 acre.
- Installation of 6,368 feet of 12-inch water pipe to connect into the existing distribution system at Talkeetna Spur Road MP 13.3. At Talkeetna Spur Road MP 13.3, the proposed water pipe would cross ARRC mainline track; see Section 5.5 for railroad-specific engineering

considerations. Discussion with ARRC about this alternative should commence before further design efforts commence.

- Installation of 30 feet of 8-inch HDPE pipe to drain to an on-site backwash lagoon. See Section 5.5 for backwash lagoon design discussion.
- Development of a gravel parking area and access area, off of Talkeetna Public Library access road, of approximately 21,728 square feet.
- Installation of 428 linear feet of chain-link fence.

Project Component Cost Estimate: The cost estimate for the work specific to Alternative 4 is provided in Table 10.

Table 10. Cost Estimate for Alternative 4

Item	Quantity	Unit	Unit Cost	Cost
Mobilization & Demobilization	1	LS	\$150,000	\$150,000
Site Development (Clearing & Grubbing)	0.8	Acre	\$30,000	\$23,848
WTP Relocation	1	LS	\$100,000	\$100,000
WTP Modifications - Chemical Storage Room	1	LS	\$10,000	\$10,000
New Pumphouse	1	LS	\$150,000	\$150,000
Well Pump, Controls, & Appurtenances	1	LS	\$30,000	\$30,000
Distribution Pump, Fire Pump, & Controls	1	LS	\$75,000	\$75,000
Water Storage Tank	375,000	Gallon	\$5	\$1,875,000
Water Storage Tank Insulation	1	LS	\$375,000	\$375,000
12-Inch Ductile Iron Water Pipe	6,368	LF	\$400	\$2,547,019
8-Inch HDPE Backwash Pipe	30	LF	\$300	\$9,000
Backwash Lagoon	1,456	SF	\$30	\$43,680
Electrical & Instrumentation	1	LS	\$100,000	\$100,000
Access Road & Parking Area	21,728	SF	\$10	\$217,285
Fencing	428	LF	\$100	\$42,826
WTP Modifications - Corroded Pipe Replacement	1	LS	\$30,000	\$30,000
SCADA System & Installation	1	LS	\$100,000	\$100,000
ARRC Crossing Boring	100	LF	\$1,000	\$100,000
Decommission Existing WTP	1	LS	\$50,000	\$50,000
Construction Subtotal				\$6,028,658

Item	Unit	Percent	Cost
Construction Contingency		30%	\$1,808,598
Permitting & Agency Consultation		10%	\$602,866
Engineering & Design		12%	\$723,439
Construction Management & Administration		8%	\$482,293
Project Total			\$9,645,853

Real Property Acquisition: This land is owned by the MSB, and further investigation into any land use restrictions or other requirements should be completed before further design efforts commence.

This alternative would also require a proposed water main pipeline crossing with the ARRC mainline track at Talkeetna Spur Road MP 13.3. Associated ROW requirements are discussed in Section 5.5.

Permits: See permit requirements discussed in Section 5.2. Associated ARRC permit requirements are discussed in Section 5.5.

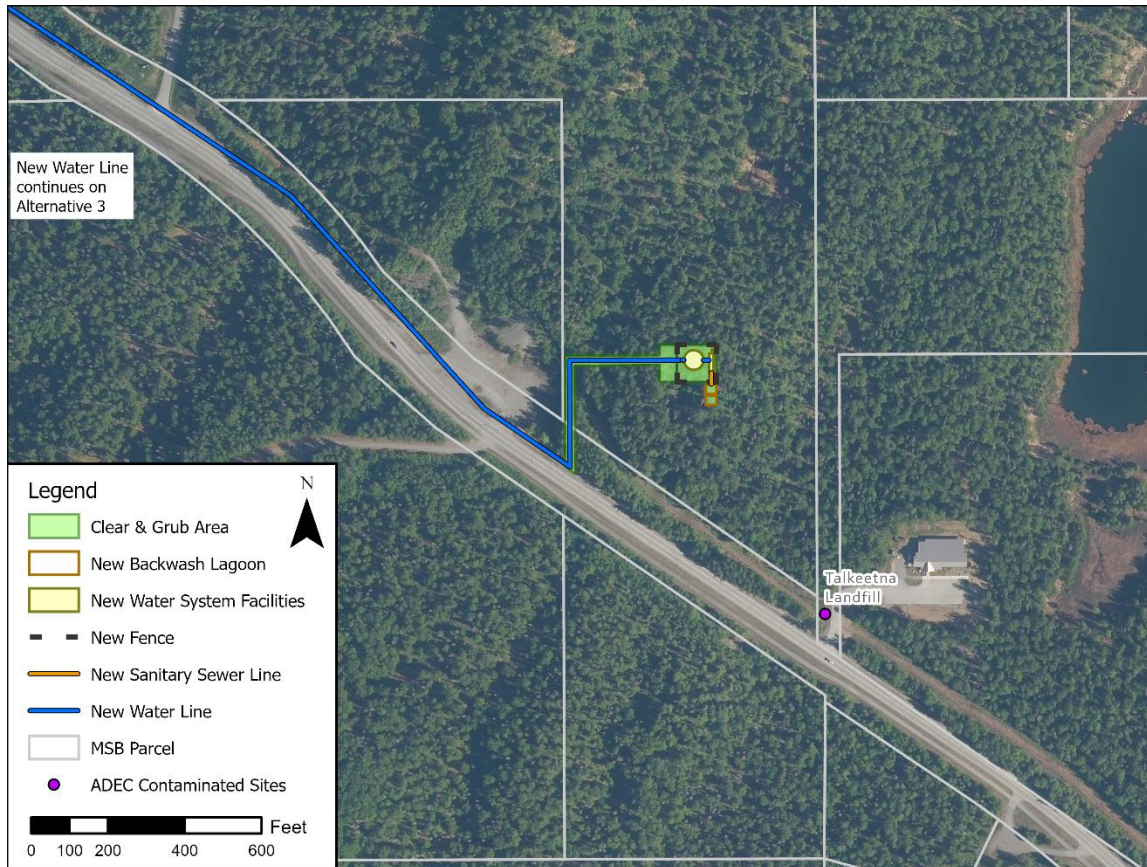
Proposed Schedule: See Table 6.

5.7 Alternative 5: Lodge Gravity System

Location: Alternative 5 is located on private, CATC property, southeast of Talkeetna Alaskan Lodge, along MP 12.5 of the Talkeetna Spur Road (see Figure 6). It is also located within the Spur Road South Land Use District of Talkeetna’s SpUD. Visibility and appearance from the WTP and WST should be taken into consideration at this site due to its proximity to the Talkeetna Alaskan Lodge.

ADEC’s CSP (ADEC 2023) shows the retired Talkeetna Landfill within approximately 1,000 feet of the proposed well site. This previously contaminated site has completed cleanup, meaning that remediation efforts are complete and any remaining contamination is expected to be below the levels that would pose a threat to human health or the environment. This would need to be verified by sampling of test well water quality.

Figure 6. Alternative 5 Layout



Alternative-Specific Project Components: In addition to the components outlined in Section 5.2, the following components will also be required for this alternative:

- Clearing, grubbing, and leveling of 0.3 acre.
- Installation of 5,119 feet of 12-inch water pipe to connect into the existing distribution system at Talkeetna Spur Road MP 13.3. At Talkeetna Spur Road MP 13.3, the proposed water pipe would cross the ARRC mainline track; see Section 5.5 for railroad-specific engineering considerations. Discussion with ARRC about this alternative should commence before further design efforts commence.
- This alternative will provide gravity distribution from the WST. The elevation of the WST at an elevation of 520 feet will provide adequate pressure to serve the community with pressures in the range of approximately 25 to 85 psi depending on tank level and flow. Normal operating pressures will range from approximately 75 to 85 psi under normal demand scenarios. Headloss calculations are provided in Appendix B. The worst-case scenario of 25 psi residual pressure would occur during a 1,000-gpm fire flow at fire hydrant #18 at the northeast part of town near the intersection of Gliska Street and Easy Street (see Appendix A for hydrant location). This worst-case scenario takes into consideration the headloss in the proposed 12-inch ductile iron pipe and assumes existing 8-inch pipe from the connection point at the south end of the existing distribution to fire hydrant #18. It should be noted that hydraulic modeling indicates that a fire flow of 1,500 gpm is not possible with the existing water distribution system pipe size. Additionally, the condition of the existing water

distribution system piping was not evaluated, so the remaining useful life should be determine in future design phases.

- Installation of 30 feet of 8-inch HDPE pipe to drain to an on-site backwash lagoon. See Section 5.5 for backwash lagoon design discussion.
- Development of a gravel parking area and access area from Talkeetna Spur Road MP 13.3, of approximately 18,210 square feet.
- Installation of 400 linear feet of chain-link fence.

Project Component Cost Estimate: The cost estimate for the work specific to this alternative is provided in Table 11.

Table 11. Cost Estimate for Alternative 5

Item	Quantity	Unit	Unit Cost	Cost
Mobilization & Demobilization	1	LS	\$150,000	\$150,000
Site Development (Clearing & Grubbing)	0.3	Acre	\$30,000	\$7,800
WTP Relocation	1	LS	\$100,000	\$100,000
WTP Modifications - Chemical Storage Room	1	LS	\$10,000	\$10,000
Valve Vault	1	LS	\$30,000	\$30,000
Well Pump, Controls, & Appurtenances	1	LS	\$30,000	\$30,000
Water Storage Tank	375,000	Gallon	\$5	\$1,875,000
Water Storage Tank Insulation	1	LS	\$375,000	\$375,000
12-Inch Ductile Iron Water Pipe	5,119	LF	\$400	\$2,047,571
8-Inch HDPE Backwash Pipe	30	LF	\$300	\$9,000
Backwash Lagoon	1,456	SF	\$30	\$43,680
Electrical & Instrumentation	1	LS	\$75,000	\$75,000
Access Road & Parking Area	18,210	SF	\$10	\$182,100
Fencing	400	LF	\$100	\$39,991
WTP Modifications - Corroded Pipe Replacement	1	LS	\$30,000	\$30,000
SCADA System & Installation	1	LS	\$100,000	\$100,000
ARRC Crossing Boring	100	LF	\$1,000	\$100,000
Decommission Existing WTP	1	LS	\$50,000	\$50,000
Construction Subtotal				\$5,255,142

Item	Unit	Percent	Cost
Site Control - CATC Agreement/ Easement	LS	-	\$50,000
Construction Contingency		30%	\$1,576,543
Permitting & Agency Consultation		10%	\$525,514
Engineering & Design		12%	\$630,617
Construction Management & Administration		8%	\$420,411
Project Total			\$8,458,227

Real Property Acquisition: This alternative requires a land acquisition or that an agreement between MSB and CATC be reached. As of May 2023, MSB has preliminarily reached out to CATC, and high-level discussions are ongoing. An underground utility within ARRC ROW, a temporary construction easement within ARRC ROW, and a trenching and shoring plan would need to be reviewed and approved by ARRC (ARRC 2014).

Permits: See permit requirements discussed in Section 5.2. Associated ARRC permit requirements are discussed in Section 5.5.

Proposed Schedule: See Table 6.

5.8 Summary of Alternatives

Five alternatives have been presented, each with its own specific design considerations, limitations, and benefits. Regardless of the preferred alternative, test well exploration will need to occur. Well drilling for the top two alternatives is recommended. A cost comparison of the five alternatives is provided in Table 12.

Table 12. Cost Comparison of the Alternatives

Test Well Exploration	Cost
Well Drilling Program	\$293,904
Alternative	Cost
1) Airport	\$5,641,838
2) School	\$5,891,466
3) Overlook / Lodge	\$7,306,309
4) Library	\$9,645,853
5) Lodge Gravity System	\$8,458,227

However, cost is not the only driver of the preferred alternative, and other factors should also be considered. A matrix of benefits and limitations for the five alternatives is provided in Table 13.



Table 13. Benefits and Limitations Comparison of the Alternatives

Alternative	Alternative Cost	Land Ownership	Water Quality & Quantity	Nearby Contaminated Sites	Conditional Use Permit	ARRC Crossing	Fire Flows	O&M
1) Airport	✓ Least Expensive	State of Alaska	<i>TBD</i>	✓ None	✓ None	✓ No Crossing	✓ Can accommodate	Pumped system
2) School	Less Expensive	✓ MSB, land use requires change	<i>TBD</i>	X Several active sites nearby	X Required based on WST height	✓ No Crossing	✓ Can accommodate	Pumped system
3) Overlook / Lodge	More Expensive	CATC	<i>TBD</i>	✓ None	Dependent on WST height	X Crossing Required	✓ Can accommodate	Pumped system
4) Library	X Most Expensive	✓ MSB	<i>TBD</i>	Closed site nearby	Dependent on WST height	X Crossing Required	✓ Can accommodate	Pumped system
5) Lodge Gravity System	More Expensive	CATC	<i>TBD</i>	Closed site nearby	Dependent on WST height	X Crossing Required	X Can only accommodate 1,000 gpm	✓ Simpler system

After discussion, comments, and feedback from MSB and the Talkeetna Sewer and Water Advisory Board (TSWAB) it was determined that Alternative 1 is the top ranked preferred site. The full ranking of the alternatives is shown in Table 14.

Table 14. Ranked Alternatives

Rank	Preferred Alternatives
1	1) Airport
2	3) Overlook/ Lodge
3	5) Lodge Gravity System
4	2) School
5	4) Library

Alternative 1 is the least expensive pumped system that does not have contaminated site concerns nor requires crossing the ARRC mainline track, making it the highest rated alternative.

Alternative 3 is the second ranked site, has a median construction cost, and does not have contaminated site concerns.

Alternative 5 is desirable due to the use of gravity to supply the distribution system, however, the estimated annual operations and maintenance cost savings in not having to pump (approximately \$10,000 per year) does not overcome the significant difference in the capital cost to construct as compared to some of the other alternatives.

Alternative 2 is the second least expensive; however, it is not desirable due to two active petroleum contaminated sites nearby.

Alternative 4 is the most expensive (primarily due to the distance from the community) and still requires pumping; so, it is the lowest rated alternative.

It is recommended that the well drilling program be initiated for the identification of source water quality and quantity at the sites of Alternatives 1 and 3. Preliminary site plans for both Alternatives 1 and 3 are included in Appendix C. Upon completion of the well drilling program and site control communication, a final site shall be selected by MSB and moved forward with full design of the improvements.

6 References

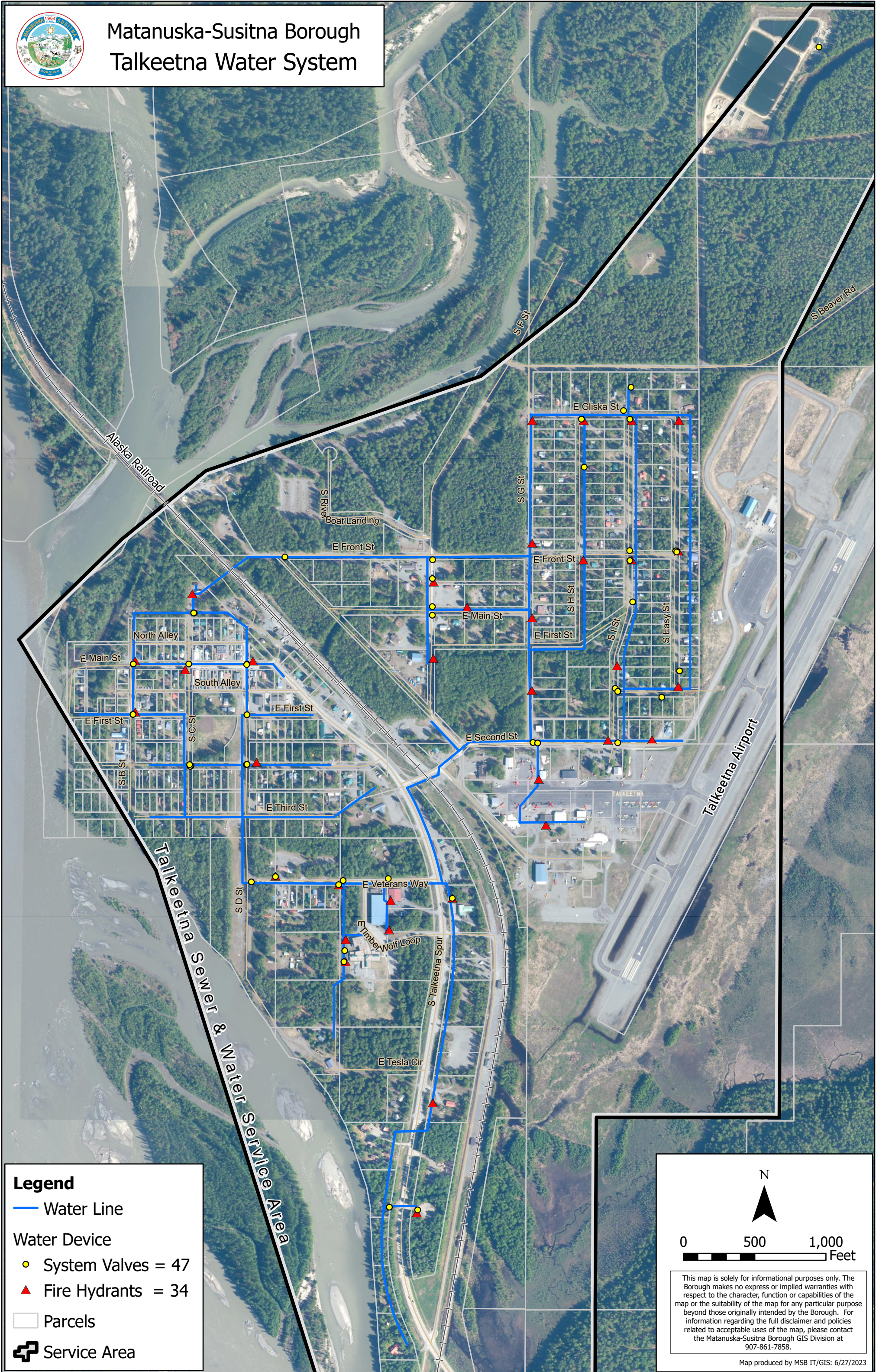
- ADEC (Alaska Department of Environmental Conservation). 2023. Contaminated Sites Program (CSP). Accessed at <https://dec.alaska.gov/spar/csp/>. May 2023.
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- Talkeetna Community Council, Inc. 2022. Talkeetna Special Land Use District (SpUD). Accessed at <https://www.talkeetnacouncil.org/talkeetna-spud>. May 2023.



Appendix A – Talkeetna Water System Maps



Matanuska-Susitna Borough Talkeetna Water System



Legend

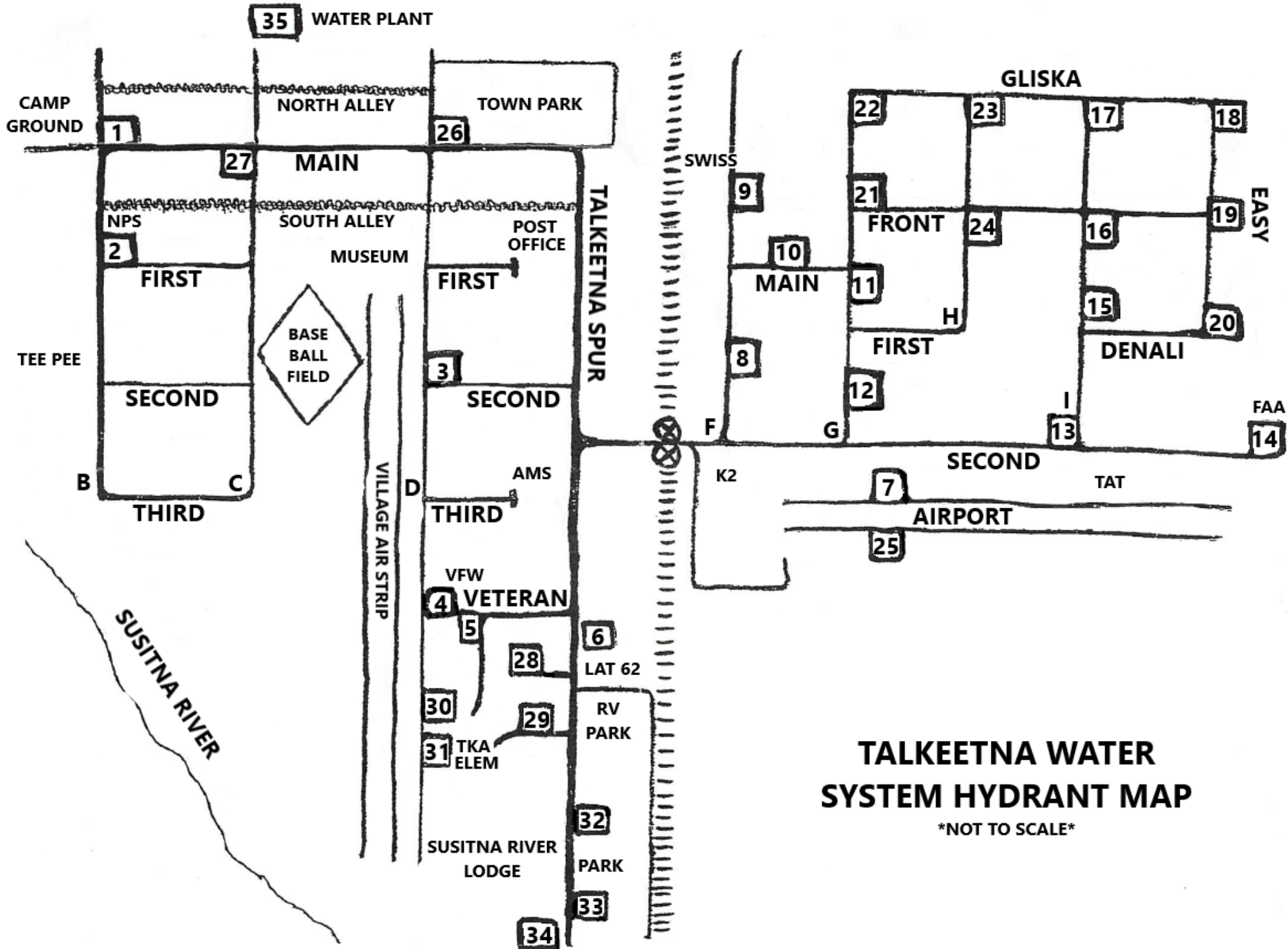
- Water Line
- Water Device**
- System Valves = 47
- ▲ Fire Hydrants = 34
- Parcels
- Service Area

N

0 500 1,000
Feet

This map is solely for informational purposes only. The Borough makes no express or implied warranties with respect to the character, function or capabilities of the map or the suitability of the map for any particular purpose beyond those originally intended by the Borough. For information regarding the full disclaimer and policies related to acceptable uses of the map, please contact the Matanuska-Susitna Borough GIS Division at 907-861-7858.

Path: M:\Product\Public_Works\Operations_and_Maintenance\TalkeetnaSewerWater\Talkeetna_SewerWater.aprx



TALKEETNA WATER SYSTEM HYDRANT MAP

NOT TO SCALE



Appendix B – Gravity System Preliminary Headloss Calculations

Talkeetna Water System Improvements

Water head loss calcs

Alternative 5 - Gravity analysis

Hazen-Williams Equation: $h_L = ((V^{1.85} * L) / (1.318 C_{11}^{1.85} R^{1.17}))$

Total Length of line (ft):	5200	To connection point at south end of town
Diameter of line (in):	12.34	12" Ductile Iron Pipe - CL 52 - Cement Lined Inside diamter
Hydraulic radius:	0.2571	
Roughness, C_{11} :	140	DIP Roughness Coefficient

Flow (gpm)	Area(ft^2)	Velocity (ft./s):	Friction H_L (ft)	Friction HL (psi)
50	0.8305	0.1	0	0
250	0.8305	0.7	1	0
1000	0.8305	2.7	10	4
1500	0.8305	4.0	22	9

Tank Ground Elevation	520	feet	
Full Tank Elevation	548.5	feet	(28.5 feet)
Tank (5 feet full)	525	feet	

Ground Elevation at connection point	347	feet
Ground Elevation in Town	355	feet
Assume 20 feet building height (2 story worse case)	375	feet

Tank Full - Pressure at connection point (ground surface)

Flow (gpm)	Friction HL (psi)	Elevation Difference (psi)	Location Pressure (psi)
50	0.0	87.3	87.3
250	0.3	87.3	87.0
1000	4.4	87.3	82.9
1500	9.3	87.3	78.0

Tank 5 feet Full - Pressure at connection point (ground surface)

Flow (gpm)	Friction HL (psi)	Elevation Difference (psi)	Location Pressure (psi)
50	0.0	77.1	77.1
250	0.3	77.1	76.8
1000	4.4	77.1	72.7
1500	9.3	77.1	67.8

Tank Full - Pressure at Hydrant #18 (Assume ground elev of 355)

Flow (gpm)	Friction HL (psi)	Elevation Difference (psi)	Additional pressure loss through town (psi)	Location Pressure (psi)
50	0.0	83.8	0.2	83.6
250	0.3	87.3	3.6	83.4
1000	4.4	87.3	47.0	35.9
1500	9.3	87.3	99.5	-21.5

See next page for calculaiton of additional head loss through town

Tank 5 feet Full - Pressure at Hydrant #18 (ground surface = elev 355)

Flow (gpm)	Friction HL (psi)	Elevation Difference (psi)	Additional pressure loss through town (psi)	Location Pressure (psi)
50	0.0	77.1	0.2	76.9
250	0.3	77.1	3.6	73.2
1000	4.4	77.1	47.0	25.7
1500	9.3	77.1	99.5	-31.7

See next page for calculaiton of additional head loss through town

Talkeetna Water System Improvements

Water head loss calcs

Alternative 5 - Head loss calc from connection to Hydrant 18 in NE corner of town

Hazen-Williams Equation: $h_L = \frac{(V^{1.85} * L)}{(1.318 C_H^{1.85} R^{1.17})}$

Total Length of line (ft):	7900	From hydrant 33 to 18
Diameter of line (in):	8.27	8" Ductile Iron Pipe - CL 52 - Cement Lined Inside diameter
Hydraulic radius:	0.1723	
Roughness, C _H :	140	

Flow (gpm)	Area(ft ²)	Velocity (ft./s):	Friction H _L (ft)	Friction (psi)
50	0.3730	0.3	0	0.2
250	0.3730	1.5	8	3.6
1000	0.3730	6.0	108	47.0
1500	0.3730	9.0	230	99.5

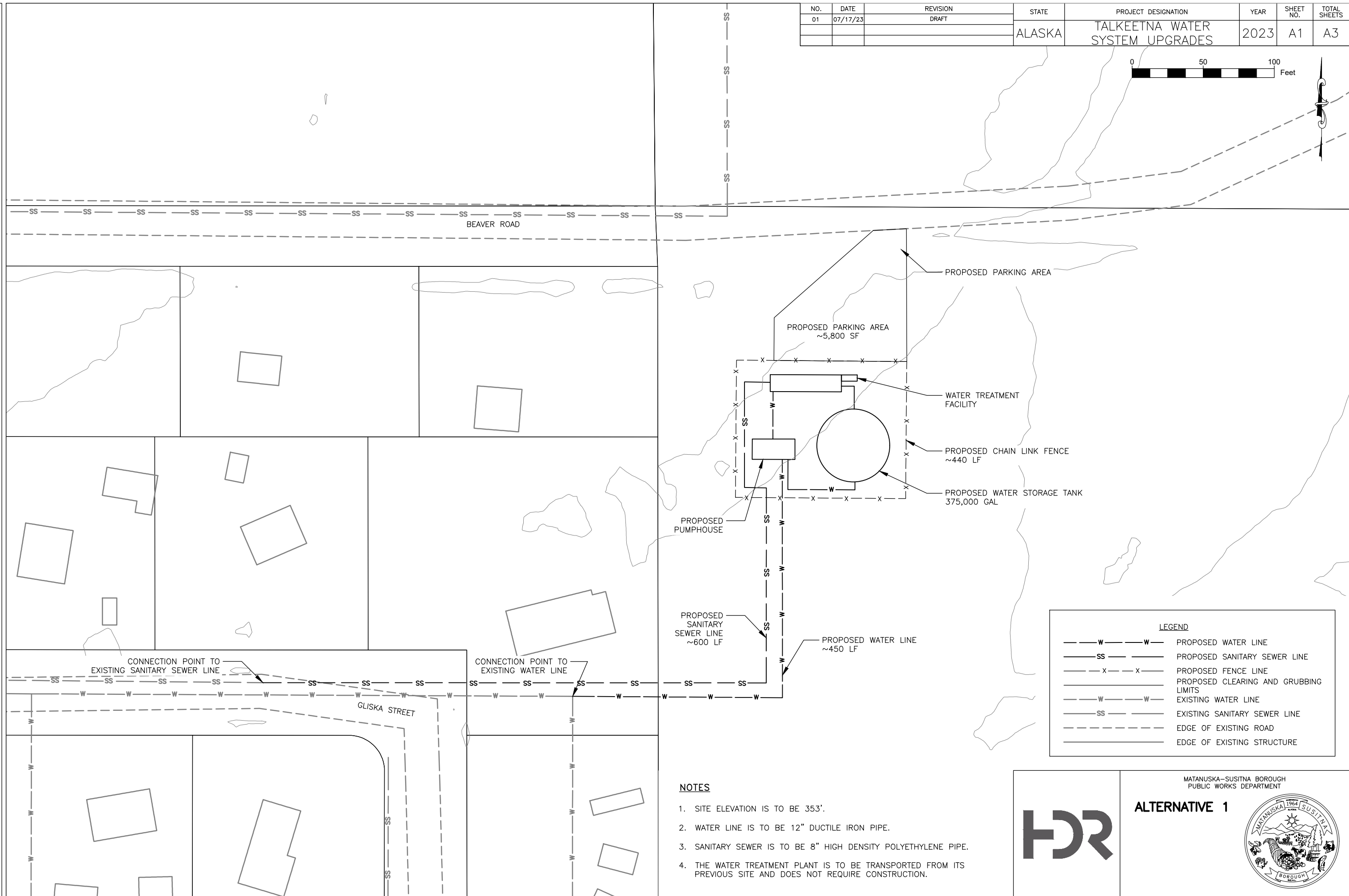


Appendix C – Preliminary Site Plans

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
01	07/17/23	DRAFT	ALASKA	TALKEETNA WATER SYSTEM UPGRADES	2023	A1	A3



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 CHECKED BY: []
 DRAFTED BY: []
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 TIME: 10:43 AM
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LEGEND	
— W — W —	PROPOSED WATER LINE
— SS —	PROPOSED SANITARY SEWER LINE
— X — X —	PROPOSED FENCE LINE
— — —	PROPOSED CLEARING AND GRUBBING LIMITS
- - - W - - -	EXISTING WATER LINE
- - - SS - - -	EXISTING SANITARY SEWER LINE
- - - - -	EDGE OF EXISTING ROAD
- - - - -	EDGE OF EXISTING STRUCTURE

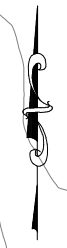
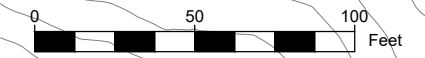
- NOTES**
1. SITE ELEVATION IS TO BE 353'.
 2. WATER LINE IS TO BE 12" DUCTILE IRON PIPE.
 3. SANITARY SEWER IS TO BE 8" HIGH DENSITY POLYETHYLENE PIPE.
 4. THE WATER TREATMENT PLANT IS TO BE TRANSPORTED FROM ITS PREVIOUS SITE AND DOES NOT REQUIRE CONSTRUCTION.



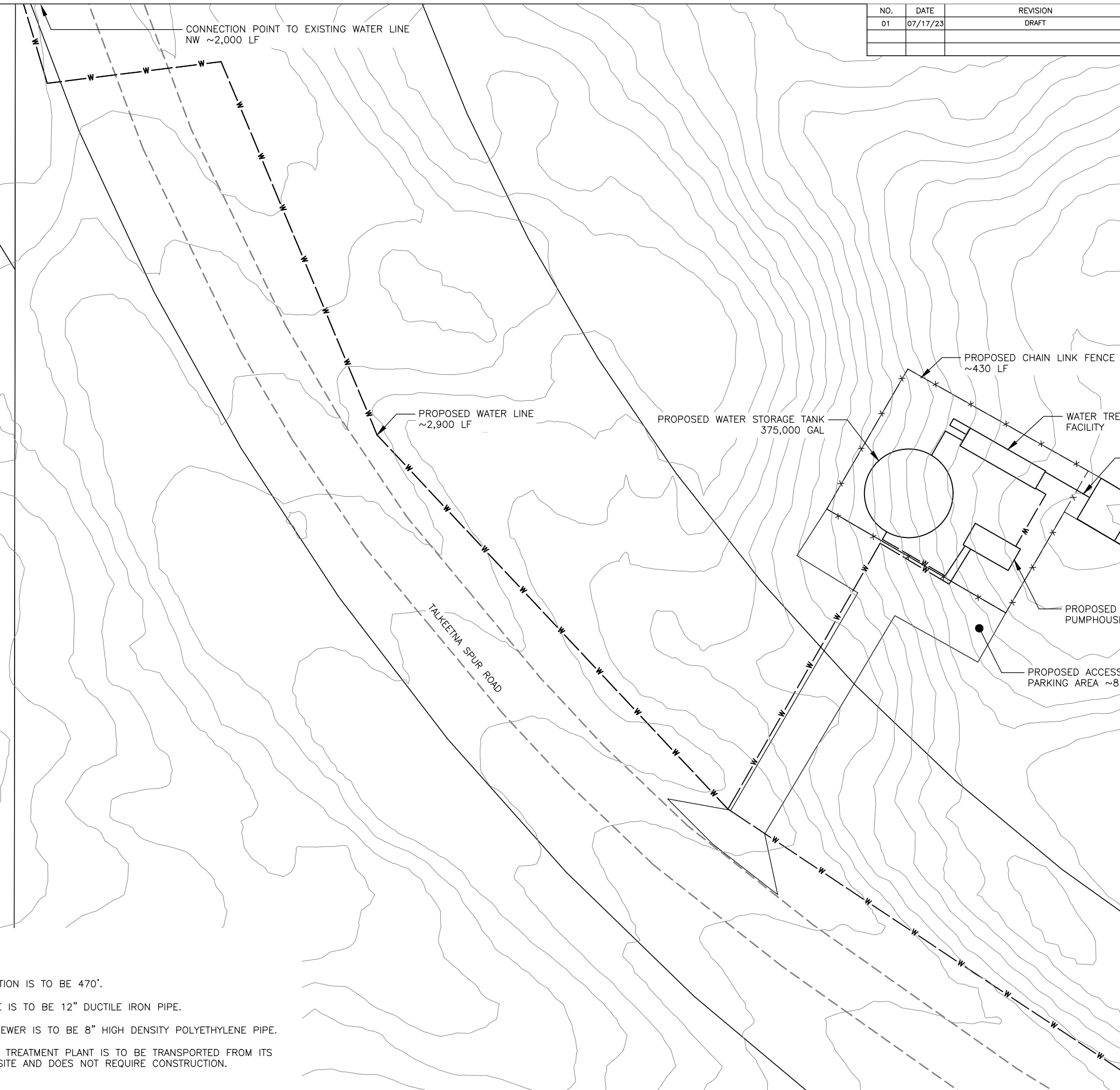
MATANUSKA-SUSITNA BOROUGH
PUBLIC WORKS DEPARTMENT

ALTERNATIVE 1

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
01	07/17/23	DRAFT	ALASKA	TALKEETNA WATER SYSTEM UPGRADES	2023	A2	A3



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 CHECKED BY: []
 DRAFTED BY: []
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 SCALE: []



LEGEND	
--- W --- W ---	PROPOSED WATER LINE
--- SS ---	PROPOSED SANITARY SEWER LINE
--- X --- X ---	PROPOSED FENCE LINE
---	PROPOSED CLEARING AND GRUBBING LIMITS
--- W --- W ---	EXISTING WATER LINE
--- SS ---	EXISTING SANITARY SEWER LINE
---	EDGE OF EXISTING ROAD
---	EDGE OF EXISTING STRUCTURE

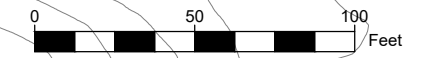
- NOTES**
- SITE ELEVATION IS TO BE 470'.
 - WATER LINE IS TO BE 12" DUCTILE IRON PIPE.
 - SANITARY SEWER IS TO BE 8" HIGH DENSITY POLYETHYLENE PIPE.
 - THE WATER TREATMENT PLANT IS TO BE TRANSPORTED FROM ITS PREVIOUS SITE AND DOES NOT REQUIRE CONSTRUCTION.

HJR

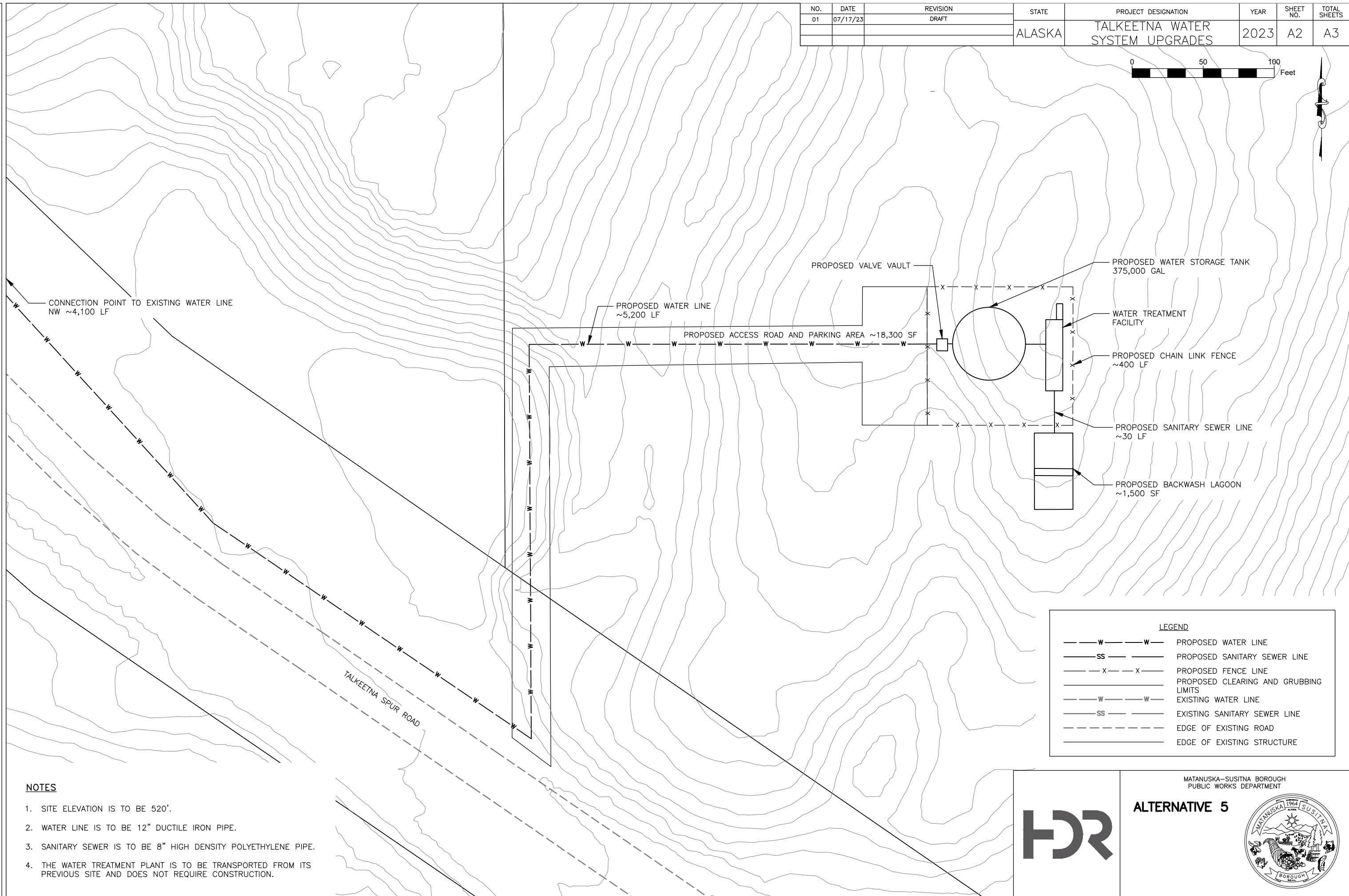
ALTERNATIVE 3

MATANUSKA-SUSITNA BOROUGH
PUBLIC WORKS DEPARTMENT

NO.	DATE	REVISION	STATE	PROJECT DESIGNATION	YEAR	SHEET NO.	TOTAL SHEETS
01	07/17/23	DRAFT	ALASKA	TALKEETNA WATER SYSTEM UPGRADES	2023	A2	A3



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 DRAFTED BY: []
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CONNECTION POINT TO EXISTING WATER LINE
NW ~4,100 LF

PROPOSED WATER LINE
~5,200 LF

PROPOSED ACCESS ROAD AND PARKING AREA
~18,300 SF

PROPOSED VALVE VAULT

PROPOSED WATER STORAGE TANK
375,000 GAL

WATER TREATMENT FACILITY

PROPOSED CHAIN LINK FENCE
~400 LF

PROPOSED SANITARY SEWER LINE
~30 LF

PROPOSED BACKWASH LAGOON
~1,500 SF

TALKEETNA SPUR ROAD

LEGEND	
--- W --- W ---	PROPOSED WATER LINE
--- SS ---	PROPOSED SANITARY SEWER LINE
--- X --- X ---	PROPOSED FENCE LINE
---	PROPOSED CLEARING AND GRUBBING LIMITS
--- W --- W ---	EXISTING WATER LINE
--- SS ---	EXISTING SANITARY SEWER LINE
---	EDGE OF EXISTING ROAD
---	EDGE OF EXISTING STRUCTURE

- NOTES**
- SITE ELEVATION IS TO BE 520'.
 - WATER LINE IS TO BE 12" DUCTILE IRON PIPE.
 - SANITARY SEWER IS TO BE 8" HIGH DENSITY POLYETHYLENE PIPE.
 - THE WATER TREATMENT PLANT IS TO BE TRANSPORTED FROM ITS PREVIOUS SITE AND DOES NOT REQUIRE CONSTRUCTION.



MATANUSKA-SUSITNA BOROUGH
PUBLIC WORKS DEPARTMENT

ALTERNATIVE 5



Appendix C: Media

Community Radio for the Susitna Valley

Donate

Listen

Talkeetna Water Storage a Priority for Funding

March 29, 2023 | [Jenny Willoughby](#)

Talkeetna will soon begin exploring water storage and the potential relocation of its water supply wells.

Talkeetna's public water system serves the downtown and east Talkeetna areas, about 220 accounts. A few new accounts are added each year as more property owners connect to the system. The remainder of Talkeetna's population is served by private wells or other water sources for dry cabins.

Drew Haag, Chair of Talkeetna Sewer and Water Advisory Board, also called TSWAB (tee-swab), shares how Talkeetna's water and sewer services began.

"Back in the '80s the Borough I believe got funding to install a sewer and water system in the townsite and east Talkeetna residential area. It's not a very good spot to have private wells and septic systems because the lot sizes are so small and there's a very shallow groundwater table. The system took several years to install and there were some complications and oversights during

the installation which are showing up today through leaks in water mains and infiltration into the sewer system from various

sources so that's created some of the problems we have now. Also it's just a timed-out system."

The Talkeetna Facilities and Utilities Operational Unit Supervisor Amanda Fleming says the project is expected to be funded by a mix of American Rescue Plan funds, along with Alaska Department of Environmental Conservation State Revolving Fund Program or Economic Development Administration Public Works grant. Any required matching funds from the grant or loan would come from Area 36 sales tax funds.

Fleming talks about how Talkeetna is prioritizing the immediate needs for using the already-allocated federal dollars and potential additional funds.

"When we presented to the Advisory Board the needs of the system and what we wanted to do, we prioritized them. So the storage tank is a priority that really has to happen. Of course there is the preliminary research phase, but that's the primary goal of the project no matter what because the community system as it stands doesn't have treated, stored water. We operate on a hydropneumatic pressure tank essentially, so the pumps are turning on and off and then the treatment plant is restricted on the amount of flow we can produce as treated water."

Fleming goes on to say that upgrading the SCADA communications system and exploring potential new well locations could also be included in this round of funding. Matching funds will bring the total project cost to a little more than two million dollars.

In advance of applying for the loan program, Fleming says she is updating Talkeetna's Source Water Protection Plan, last completed in 2013. This update will help boost Talkeetna's chances of getting additional funding for the project.

The TSWAB meets on the first Wednesday of each month in the Talkeetna Library at 1pm. The public is invited to attend.



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