SUNRISE ENGINEERING

TOWN OF MANILA WASTEWATER FACILITY PLAN

March 30, 2007

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Mayor .....Chuck Dickison
Councilmember ..... Lenita W. Steinaker
Councilmember ..... Dellene Alvis
Councilmember ..... Ida Marie Twitchell
Councilmember .....Connie Reed

PREPARED BY:

Sunrise Engineering, Inc.
12227 So. Business Park Dr. Suite 220
Draper, Utah 84020
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Scott Archibald, P.E.
State of Utah No. 334535
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1 SUMMARY

The purpose of the Town of Manila Wastewater Facility plan is to describe the existing system, analyze alternatives and propose a course of action from the engineer's perspective.

Calculations reveal that the existing wastewater collection system can handle about 310 additional connections, the bottleneck being the 8" trunk line laid at minimum slope to the lagoons. The lagoons will adequately handle the Town's wastewater for about the next 16 years.

Areas of concern include the high amount of infiltration that was observed in the older portion of town and the existing wastewater meter at the lagoons that appears to be working improperly. If pipe in the old area of town were to be replaced, it would allow for an additional 300 connections to be added to the treatment system.

Recommendations have been made to improve the deficient areas including a new trunk line capable of collecting wastewater from the majority of the valley. Also, expansion of the existing total containment lagoons appears to be the most feasible option for dealing with future wastewater flows.

On March 8, 2007 a public hearing was held at the Manila Town Hall concerning this wastewater facility plan.

2 PROJECT PLANNING AREA

2.1 Location

The Town of Manila is a rural community located in Daggett County, Utah just south of the Wyoming border. Manila is a community that increasingly being impacted by tourism. The planning area for this study extends beyond the town limits to areas that are currently or will soon be served by sewer An Area Map of the City is found in Exhibit 2.1-A. According to the 2000 U.S. Census, Manila has 308 residents within its town limits.

In 2005 an 8" sewer line was extended from the existing town collection system to the Daggett County Jail located about 4 miles west of Manila. Projections calculated at that time revealed that the Town's Lagoons have sufficient treatment capacity for the time being, but that additional capacity may be needed in the near future. Because of the scenic and recreational features in the area, Manila is expected to grow significantly in the coming years.

The purpose of this study is to determine what improvements the existing collection and treatment system needs at this time, and what improvements will be required in the future. This Facilities Plan also examines feasibility of using treated wastewater for irrigation purposes.

2.2 Environmental Resources Present

2.2.1 Environmental Information

Under the National Environmental Policy Act (NEPA), an Environmental Impact Statement (EIS) must be prepared if it appears that improvements to the wastewater system would have a significant adverse impact on the quality of human health and the environment. Preparation of an EIS is not required if a "categorical exclusion" from 40 CFR Part 6 is granted by EPA, or if a "Finding of No Significant Impact" (FONSI) is granted by the EPA.

Manila's proposed project does not qualify for a "categorical exclusion". Therefore, an "Environmental Information Package" (EIP) must be prepared as an integral part of the Facilities Plan. The Utah Department of Environmental Quality and the EPA use the EIP to determine if an EIS must be prepared. After a review of information provided in the EIP, if no significant impact is present, an FONSI will be granted and an EIS will not be required.

Environmental help and information has been sought from all appropriate State and Federal agencies regarding the planning process. Copies of all correspondence to and from each environmental agency are included in Appendix D.

2.2.2 Historical and Archaeological Sites

A letter was sent to the Utah State Historical Society requesting comments concerning any historical or archaeological sites, or concern within the study area. The response letter, dated January 18, 2007 is enclosed in Appendix D. The letter recommends that the "involved federal agency (or agency representative) conduct cultural resource identification efforts for the project". Since this project appears to be about 15 years out, a letter was sent to this agency explaining that they would be contacted when the project moves forward.

2.2.3 Floodplains and Wetlands

2.2.3.1 Floodplains

The FEMA Map Service Center reports that the Manila area in Daggett County is currently unmapped. A letter was sent to FEMA to determine the possible impacts of a wastewater improvement project on area floodplains. Barb Fitzpatrick from FEMA called Sunrise Engineering, Inc. and explained that the local flood control agency should be contacted before construction of the project. This response was to be delivered in an e-mail, but had not been at press time.

A few small creeks flow through the area including the Birch Spring Draw. These areas generally do not have a large flood plain, and are not a threat to any of the existing or proposed wastewater facilities. Also, it is important to note that no floodplain will be expanded by the project. System piping will be covered with a minimum of five (5) feet of compacted earth, and the ground surface will be restored to its pre-construction contour.

The wastewater system will be designed and constructed to minimize any impacts from a 100 year flood. Exposed project components will be protected by channels, dikes or riprap where necessary and the compacted earth cover will provide protection for underground components.

2.2.3.2 Wetlands

A letter was sent to the Army Corps of Engineers enquiring about possible impacts to wetlands in the area. An e-mail response was received from the Corps on February 23, 2007 and is included in Appendix D. This e-mail said that the Corps of Engineers has jurisdiction "over the placement of dredged or fill material within the ordinary high water mark of waters of the United States and adjacent wetlands". An application checklist was also included.

The planners will avoid wetland areas for locating a pump station and collection lines if at all possible. In the event that some areas of the project fall within wetland areas the permitting process set by the Army Corps of Engineers will be strictly followed to help mitigate the impact.

The properties surrounding the sewer mains may develop more rapidly due to the availability of the sewer improvements. As each property develops, the individual developers will be required to receive permits from the Army Corps of Engineers before any changes of the wetlands status of these lands may be realized. The installation of sewer improvements will not eliminate the due process for protecting wetlands found near or in the Town of Manila.

2.2.4 Agricultural Lands

Regarding potential important farmland in the project area, the U.S. Department of Agriculture Natural Resources Conservation Services (USDA-NRCS) was consulted. The USDA-NRCS concluded that "the proposed project does not contain, prime, state important, and unique farmlands". The response from the USDA-NRCS is attached

in Appendix D. The contractor still will be required to remove the top soil and set it aside, then place it back to preserve the topsoil. These impacts will be temporary. Long-term impacts will be imperceptible because the sewer lines will be buried at least five (5) feet deep and the area will be restored back to its prior condition. The contractor should be responsible for re-seeding the area to ensure that vegetation is restored to its original condition.

Construction of wastewater collection facilities will not affect the continued use of nearby and adjoining land parcels for traditional agriculture. However, if an adjoining landowner proposed to change his/her land to another type of use; there may be a perceived effect from the proximity of the collection facility.

The wastewater collection facilities will not affect the continued use of nearby and adjoining land for traditional agriculture.

2.2.5 Wild and Scenic Rivers

Currently, there are no rivers in the project impact area, which are included in the National Wild and Scenic Rivers System.

2.2.6 Fish and Wildlife Protection

On January 8, 2007 a letter was sent to the Director of Utah Wildlife Resources concerning potential impacts. As of March 29, 2007 the agency had yet to respond. It is believed that the proposed project will not impact any aquatic and terrestrial wildlife.

2.2.7 Endangered Species Protection

An inquiry has been submitted to the U.S. Fish and Wildlife Service (USFWS) regarding impact on fish and wildlife and threatened and endangered species (T&E). It is not expected that any endangered species will be affected by the proposed projects.

2.2.8 Air Quality

None of the alternatives considered in this facility plan will be of detriment to air quality in the area. However in the course construction, fugitive dust will occur. The contractor will be required to take measures to minimize fugitive dust through watering, and/or chemical stabilization, vegetative or synthetic cover and windbreaks.

It must be noted that air quality will be very slightly degraded during the construction of the project by exhaust from equipment. Very little dust is expected due to controls that will be required in the construction specifications. Operation of the facility will not significantly affect air quality.

2.2.9 Water Quality and Quantity

Any alternative treatment process that involves surface discharge will treat water to the extent required by State and Federal Code prior to discharge. Each alternative treatment process will treat water to the extent that is required by State and Federal Code prior to discharging to a stream. Surface waters should not be significantly impacted by erosion, either during or after project construction.

Any alternative using percolation or discharge to groundwater as a disposal method of untreated wastewater may create a health hazard. These problems are related to existing hazards from existing systems. In connection with the construction and operation of any treatment facilities that discharge treated water to groundwater resources, the Town of Manila must comply with the Groundwater Discharge Permitting regulations.

The Utah anti-degradation policy for groundwater protection broadly provides for the maintenance and protection of current and probable future beneficial uses of groundwater; protection of higher quality waters at their existing water quality; and prevention of degradation of water quality that would be injurious to existing or potential

beneficial water use. It recognizes that there are some effects on groundwater from man's activities, but limits those effects to acceptable levels. It provides a greater degree of protection to higher quality groundwater. Finally, it does not rule out man's economic, social, or recreational activities as a strictly applied non-degradation policy might.

The groundwater protection procedure will require a plan of monitoring, which will probably include monitoring wells, sampling procedures, and timetables (Utah Department of Health, 1986).

The Groundwater Protection Regulations also contain the following explanation concerning Groundwater Classification under the new regulations:

In areas where information is sufficient, the ground water in part, or within an entire aquifer, will be classified. This will allow everyone to know the criteria for operation of facilities in that area. The regulations describe the information needed and procedures to be followed for classification. The Utah Department of Water Quality determines the disposition of petitions for classification and reclassification.

Classification of an aquifer will not be necessary in order to secure a ground water discharge permit. In an unclassified area, the prospective permit holder will be expected to provide data on existing groundwater quality in order for the appropriate groundwater class to be determined. The permit will then be written, based on the indicated class's protection levels.

Aquifers furnishing water to community drinking water systems with groundwater meeting Class 1A criteria will be classified as Class 1A within the well head protection area. Other ground water aquifers of the State will initially be unclassified" (Utah Department of Health, 1986). Class 1A is the highest quality underground water classification, with both Classes 1A and 1B considered drinking water quality.

2.2.10 Direct and Indirect Impacts

The proposed wastewater facilities are not expected to have detrimental environmental impacts. Wastewater currently being treated in septic systems, or dumped on the ground will be impounded or cleaned up, which is a positive impact.

The impact to farmland, some of which may be used for land application, will be minimal. A new trunk line will not impact the predominantly agricultural land use in the surrounding area. Moreover, pipelines would be buried at least five (5) feet below the surface, and as such will not impede any normal farming activities. Secondary impact on farmlands would be minimal because permits for development of these lands would still be required.

Any wetlands disturbed where pipelines cross will be restored to their pre-construction condition. In addition, measures will be taken to ensure that wetlands, or high water table areas, are not drained as a result of pipeline installation through installation of clay cutoff walls along the pipeline. Secondary impacts should be mitigated by the development and wetland requirements that must be met for each property to develop.

Some dust will be generated during construction, which may slightly diminish the air quality temporarily. But proper construction management will limit the amount of dust generated through strict enforcement of the construction specifications, which require dust abatement.

There will be minor disruptions of traffic, which will occur during construction, but these disruptions are temporary. The Contractor will be required to repair all roads and leave trenches in a smooth and clean finished condition.

Wildlife species will not be significantly impacted either positively or negatively by the project.

The properties surrounding the sewer mains may develop more rapidly due to the availability of the sewer improvements. As each property develops, the individual developers will be required to receive permits from the Army Corps of Engineers before any changes of the wetlands status of these lands may be realized. The installation of sewer improvements will not eliminate the due process for protecting wetlands or other environmentally sensitive lands found in Manila.

2.2.11 Mitigating Adverse Impacts

It is anticipated that there will be no long-term adverse impacts. No mitigation measures are planned.

2.2.12 Determining Need for An EIS

The DWQ is responsible to determine, based on environmental information contained in this Facilities Plan, whether or not an EIS is required in connection with this project. The DWQ must prepare an EIS when any significant environmental impact is present.

Considering the minimal environmental impacts expected, it is the opinion of Sunrise Engineering that a finding of no significant impact (FONSI) would be appropriate. No significant impacts to the environment will be realized from construction and operation of the project. No known archaeological resources, important agricultural land, or endangered species are present in the project area. Erosion will be controlled. Water quality during construction of the project will not be degraded. No displacement of households or businesses will occur as a result of the project. Visual impacts will be negligible. Noise and air quality will remain unchanged.

2.3 Growth Areas and Population Trends

2.3.1 Growth Areas

In discussing the potential for growth in Manila, Mayor Chuck Dickison identified several portions of town that are likely to develop in the near future. Just south and east of town is the Palleson property which is planned for 36 half acre lots. Additional development is possible in the Captain's Cove area south of Manila. (This area has an abandoned collection system that may come back online in the future.) The first phase of this development would have about 60 homes. On the east side of 500 East is another subdivision that will have about 30 lots. The Manila Bay Subdivision currently under construction on the west side of town will have 45 lots. These are just a handful of the developments that will probably occur during the planning period. In addition, the Harbor's Landing subdivision which contains almost 90 lots will likely be built out in the next 5 years. Most available lots in the area have been purchased.

The Mayor has also indicated that portions of Wyoming may eventually be connected to the Town's wastewater facility. In the event that this happens a study should be conducted to determine the impacts of the additional flows on the Town's treatment system.

2.3.2 Population Trends

Future Conditions

The alternatives evaluated for treatment are analyzed and cost effectiveness is based on a 20 year planning period. Typically collection systems are sized sufficient to handle the flows anticipated to serve the 50 year population projection. If unexpected growth occurs by the end of the planning period, additional treatment capacity may require enlargement and expansion. If the community experiences sufficient growth to reach the projected wastewater effluent capacity in 20 years or less, the additional income to the system created by such growth will provide additional funds to assist in the expansion of any collection and treatment facilities.

Population and Land Use Projections

An essential element of a Wastewater Facility Plan is projecting the planning area population growth rate in an attempt to establish estimated future demands on a proposed wastewater facility. Projecting population of the planning area with any degree of accuracy can be a very complex process.

Historical Population

Manila has seen slow growth over the past few decades. Table 2.3-A below shows the historic growth rate within the City and provides an idea of how the community has developed from 1980 through 2000. The information found in Table 2.3-A is taken from the US Census.

TABLE 2.3-A MANILA TOWN HISTORICAL POPULATION DATA

Year	Population	Annual Average Rate of Change (AARC)
1980	272	
1990	207	-2.69%
2000	308	4.05%

Existing Population

The figures presented in Table 2.3-A are strictly for the Town of Manila. The reality is that the existing wastewater system serves a large portion of Daggett County and will likely serve more of it in the future. In addition, Manila has a large number of residents who only live in the area during the summer. These people are typically not counted as part of the census population, but have a large impact on the wastewater system. These factors were considered in estimating the 2006 population. Existing population estimates are show in Table 2.3-B

TABLE 2.3-B MANILA TOWN EXISTING POPULATION

2006 Population	**Population**
Present Full Time Residents (Projected from 2000 Census)	345
Estimated Town Summer Only Residents	555
Present County Residents	165
Present County Jail Residents	118
Sewer Service Area Residents (Full Time)	**628**
Sewer Service Area Residents (Summer)	**1183**

The State of Utah Governor's Office of Planning and Budget estimate that the town of Manila will grow at about 0.8% per year through 2030. Because Manila is located in a scenic area with a number of outdoor opportunities, it is anticipated that growth will occur faster over the planning period than it has historically. Because of the development activity and other factors indicating that growth is on the way, a growth rate of 3.0% will be used throughout this study.

Manila's future population has been calculated using the compound interest formula.

$F = P(1 + i)^N$

Where:

F = 2026 Population
P = 2006 Population
i = Historic Growth Rate = 3 %
N = Period in Years = 20

Table 2.3-C displays the population projections for the 20 year planning period.

TABLE 2.3-C MANILA TOWN FUTURE POPULATION

2026 Population	Population
Future Full Time Residents	623
Future Town Summer Only Residents	1003
Future County Residents	298
Future County Jail Residents	213
Future Sewer Service Area Residents (Full Time)	**1134**
Future Sewer Service Area Residents (Summer)	**2137**

3 EXISTING FACILITIES

3.1 Existing Collection System

The Town of Manila has a fully functioning wastewater collection and treatment system. The age and the condition of the collection system varies. In the older portion of town (west of 100 East) nearly all of the collection system is constructed of 8" concrete pipe. This concrete pipe has joints every 4' and as such is susceptible to infiltration and root problems.

At the west end of town on Highway 43, there is some 6" collection line that serves several residences and a motel. Town officials report that this line is in poor condition and should be replaced with an 8" PVC line in order to adequately serve homes and businesses in the area.

The eastern half of town wastewater collection system from 200 East to 500 East is made of 8" PVC pipe that appears to be in good condition.

In 1999 a new development called Harper's Landing was constructed east of town. This development is not within the town limits, but does utilize water and sewer services from Manila. This development consists of all new 8" PVC sewer collection pipe.

In 2005 an 8" sewer line was extended from the existing town collection system to the Daggett County Jail located about 4 miles west of Manila. This line is also made of PVC sewer pipe. A map of the collection and treatment system can be found in Exhibit 2.1-A, and a map of the collection system in the central portion of town can be found in Exhibit 2.1-B.

After reviewing Manila's sewer collection system, several problems were discovered. A majority of the problems result from the aging 6" and 8" collection lines within the system. These old lines which are primarily clay and concrete lines, were installed many years ago when pipe was manufactured in 3 or 4 foot lengths. This means that a joint exists every 3 to 4 feet. The problem with a joint every 3 to 4 feet is that the pipe has settled over the years and each one of those joints are susceptible to movement. That creates an alignment that changes direction and grade at each joint. A gravity flow sewer system needs to be straight with a uniform grade to allow water and solids to flow through without creating blockages.

3.1.1 Collection System Capacity

In order to adequately size wastewater collection facilities, the ultimate tributary area must be found. Ultimate tributary flow is figured by estimating the total flow that could contribute to the collection system in the event that all constructible areas see growth. Constructible areas are defined by several elements including: elevation, zoning, terrain, etc.

Exhibit 3.1 in Appendix A has two zones defined. Zone one includes the area now served by the Town collection system. Zone two includes the entire area that could be served by extending a new trunkline to serve the Chettyville and Captain's Cove area without using lift stations or building in the steep mountainous areas.

By assuming that similar living densities continue in Manila and the surrounding areas, estimations can be made as to the ultimate tributary flow carried by the collection system.

Zone 1 Ultimate Flows

The area of zone 1 is 1600 acres. Typically existing flows are used to project the ultimate tributary flow, but since the existing flows contain a high percentage of infiltration and inflow, state standards will be used. It is assumed that by the time the population is saturated, the bulk of the infiltration and inflow problems will be brought down

to the reasonable level assumed in the state standards. This means that at 100 gallons per capita per day, the area within the existing Manila Town collection system has the potential to produce an average flow of 704,000 gallons per day.

$$1600 acres \times \frac{2 residences}{acre} \times \frac{2.2 people}{residence} = 7{,}040 people$$

Zone 2 Ultimate Flows

The area of zone 2 is 5800 acres. Zone 2 is located more in the bottom of the valley and because of natural features such as streams is not expected to develop as dense as Zone 1. A population density of 1 residence per acre is assumed. At 100 gallons per capita per day this is approximately 1,276,000 gallons per day.

$$5800 acres \times \frac{1 residences}{1 acre} \times \frac{2.2 people}{residence} = 12{,}760 people$$

The estimated ultimate tributary average flow is based on many assumptions and should be treated as such. However it gives the planner a glimpse of possible future average flows.

3.1.1 Pipeline Size & Capacity Analysis

Existing Trunk Line

The existing trunk line services the area in Zone 1. The trunk line is an 8" PVC pipe laid at various slopes with a minimum slope of 0.28% (according to as-built drawings). This is a very flat slope for 8" pipe, so there are some concerns about capacity in the future. The Manning's Equation was used to calculate a capacity of 288 gallons per minute.

State regulations require that interceptors and outfall sewers be designed to covey 250 gallons per capita per day. In Zone 1 the build out population is 7040 people which results in a required trunkline conveyance capacity of about 1,200 gallons per minute.

$$7{,}040 people \times \frac{250 gallons}{capita \bullet day} \times \frac{1 day}{1440 \min} = 1{,}222 gpm$$

This is obviously much more than the existing trunkline conveyance capacity of 288 gpm. In order to determine how many more connections can be safely added to the system, the maximum number of connections is calculated:

$$288 gpm \times \frac{1440 \min}{1 day} \times \frac{capita \bullet day}{250 gallons} \times \frac{connection}{2.2 people} = 754 connections$$

The existing collection system has 444 connections at this time leaving about 310 connections available before exceeding the trunk line's capacity.

$$754\ connections - 444\ existing\ connections = 310\ future\ connections$$

New Trunk Line

The proposed trunk line will serve all of the area in Zone 2. This area has a saturation population of approximately 12,760 people. Using the state standard of 250 gallons per capita per day the required conveyance capacity can be found.

$$12{,}760\,people \times \frac{250\,gallons}{capita \bullet day} \times \frac{1\,day}{1440\,\min} = 2{,}215\,gpm$$

The collection system for this area should be designed to handle 2,215 gpm.

3.2 Existing Treatment System

Wastewater is treated by a total containment lagoon system located east of town near the Wyoming border. Exhibit 2.1-A shows the location of the lagoons in relation to the town. The lagoons contain four cells. The first three lagoons were constructed in 1989 and each have a capacity of approximately 42 acre-feet. An additional lagoon was constructed in about 1999 when the Harper's Landing development was constructed. This cell has a capacity of approximately 18 acre-feet. The total estimated capacity of the existing lagoons is 145 acre-feet. According to depths measured by Sunrise officials, the lagoons were at approximately 57% of capacity during June of 2006.

3.2.1 Existing Flows and Wasteloads

Records of the existing flows into the lagoons were obtained from the town of Manila. The flows in the monthly operating reports were proven to be about twice of what was actually entering the lagoon. Knowing this, the existing flows have been estimated using this information and infiltration and inflow estimates as well as connection data. (Existing infiltration and inflow is estimated at 37,000 gallons per day)

Existing Summer Flow

$$37{,}000\,{}^{gal}\!/_{day} + 1183\,persons \times \frac{100\ gal}{day.person} = 155{,}300\,{}^{gal}\!/_{day}$$

Existing Winter Flow

$$37{,}000\,{}^{gal}\!/_{day} + 628\,persons \times \frac{100\ gal}{day.person} = 99{,}800\,{}^{gal}\!/_{day}$$

The average yearly design flow will be 127,550 gal/day or 0.128 MGD.

3.2.2 Forecasts of Flows and Wasteloads

Based on the planning area populations listed in Section 2.3, the estimated flow per capita, estimated infiltration and inflow, the year 2026 flow on the wastewater treatment facility can be calculated:

Projected Summer Flow

$$37{,}000\,{}^{gal}\!/_{day} + 2137\,persons \times \frac{100\ gal}{day.person} = 250{,}700\,{}^{gal}\!/_{day}$$

Projected Winter Flow

$$37{,}000\,{}^{gal}\!/_{day} + 1134\,persons \times \frac{100\ gal}{day.person} = 150{,}400\,{}^{gal}\!/_{day}$$

The average yearly design flow will be 200,550 gal/day or 0.20 MGD. Table 3.2 summarizes these flow projections.

TABLE 3.2 MANILA TOWN FLOW PROJECTIONS

	Summer Population	Winter Population	Summer Flow (gal/day)	Winter Flow (gal/day)	Average Flow (gal/day)
2006	1,183	628	155,300	99,800	127,550
2026	2,137	1,134	250,700	150,400	200,550

3.2.3 Lagoon Water Balance

A water balance was performed to estimate the number of years until the existing lagoons are at capacity. A spreadsheet originally developed by the State of Utah incorporates information such as evaporation, seepage, rainfall, inflow, and the estimated growth rate to determine the life of the lagoons. According to this model the lagoons should be able to sufficiently handle flows through the next 16 years. A copy of the model is shown in Apendix B.

3.3 Infiltration and Inflow (I/I)

"Infiltration" is water other than wastewater that enters the wastewater system from the ground through such means as defective pipe joints, leaky service connections and leaky manhole joints. Infiltration is most prevalent in high groundwater conditions. "Inflow" is water other than wastewater that enters the sewer system through cross connections with storm drains, catch basins, roof drains, yard drains, etc. Inflow can also occur through manhole covers. It is a requirement to demonstrate that the collection system and treatment works are not, and will not be, subject to infiltration and inflow.

3.3.1 Infiltration Study

During the early morning hours of August 25, 2006 the existing collection system was examined for infiltration. Sunrise and town personnel removed manhole lids to determine where infiltration was occurring. The eastern portion of town including 200 East, 300 East, 400 East and 500 East appeared to have little if any water infiltrating into the collection pipes.

The western portion of town including 100 East, Main St, 200 North and portions of Highway 43 appeared to receive significant water from infiltration. The manhole at 100 East on Highway 43 is configured such that a 5 gallon bucket was used to determine the flow of water at about 1:00 am. The water appeared to be pretty clean, mostly a result of infiltration. The flow rate of this water was calculated at about 3.5 gallons per minute coming from the line that drains 100 E, 200 N, and the northern half of Main St.

At the manhole in the intersection of Highway 43 and Main Street, infiltration appeared to be coming from both Main Street and Highway 43, however it was difficult to quantify how much was actually flowing.

In an attempt to quantify how much water was infiltrating for the entire town, a manhole was chosen east of town along Highway 43 across from a blue storage barn. This manhole was chosen because it has the same slope entering and leaving the manhole. The depth of wastewater flowing through the manhole was measured and recorded during different times of the day. Knowing the depth of flow, slope, size and type of pipe, flows can be calculated using Manning's Equation. Table 4.2 displays the flow information calculated for this area.

Table 4.2 Instantaneous Wastewater Flows			
Date	Time	Depth (inches)	Flow (gpm)
8/24/2006	6:09 pm	1.32	66
8/25/2006	2:45 am	0.84	26
8/25/2006	9:48 am	1.26	60

The measurements made at 6:09 pm and 9:48 pm are during times of high water usage and subsequently high sewer flow. The 26 gallons per minute that was measured at 2:45 am is at a time when sewer flow should be at a minimum. Of this 26 gallons per minute, it is likely that most of it is the result of infiltration. If this is true, then this would be approximately 1.1 million gallons per month, which is nearly 50% of the total amount of wastewater going to the treatment lagoons.

3.3.2 Video Analysis

Prior to the infiltration and inflow study, the town contracted to have portions of its wastewater collection system cleaned and videoed. The line on 200 North and all of Main Street were videoed as well as most of the main line to the lagoon. This video inspection was later made available to Sunrise Engineering, Inc. for use in the wastewater facility plan.

These videos are helpful because they allow the engineer to identify possible sources of infiltration and inflow, as well as the overall condition of the pipe. The video along Main Street and 200 North showed that there are several places where water is infiltrating through manholes, pipe joints, pipe cracks, and laterals. In addition certain sewer laterals have large mineral deposits which indicate runoff is somehow inflowing through these laterals.

The video tape records also show that many of the sewer laterals protrude into the main line for nearly half the diameter of the sewer main. This creates a serious maintenance problem, which does not allow cleaning equipment to be installed and operated within those main lines. The protruding laterals may also create blockage problems due to the lateral restricting a large amount of the main line's capacity.

3.3.3 Inflow Study

Inflow typically occurs through direct connections such as rain gutters, catch basins, sump pumps and manhole covers. While there are methods such as using dyes and smoke to determine if improper connections exist, these were out of the scope of this study.

It is likely based on the video observations that improper connections to the sewer system exist on individual lots. Public education is the best way to find and remove connections. A portion of the Sewer Use Ordinance should address infiltration and inflow and require removal of infiltration and inflow from service laterals. It should also require removal of all illegal connections such as storm drains and downspouts, and outlaw cross connections to any other water sources except sanitary sewer.

In the course of the infiltration study, at least one manhole was identified as being susceptible to inflow because of its location in a swale. Photograph 1 in Appendix A shows this manhole. This manhole and any others like it should be raised above grade to prevent direct runoff from entering the manhole.

4 NEED FOR PROJECT

4.1 Health Sanitation, and Security

Manila's existing wastewater system is functioning properly for the most part therefore few health, sanitation, or security issues exist. Areas of concern include portions of the county such as Chettyville and Captain's Cove that do not have a functioning collection system and contain soils that are not optimal for drain fields. Another area of concern is the infiltration problem discussed in Section 3.

4.1.1 Existing Flow Meter

Manila's existing flow metering system includes a Palmer-Bowlus flume, ultrasonic level sensor, and a recorder. It was determined during the course of this study that the existing meter is not working properly. On November 22, 2006 Engineers from Sunrise Engineering visited the meter building near the lagoons and conducted tests to measure the accuracy of the meter. The dial on the meter indicated 130 gallons per minute +/- a few gallons for the entire period that the tests were conducted. Four different methods of measuring flow were conducted, each of which verified that the current readings are inaccurate.

Table 4.1.1 Meter Verification Method	**Flow (gpm)**
Velocity @ Pre-Flume	38
Velocity Between Manholes	52
Depth Reading at Flume	61
Manning's Equation @ Manhole	36
Actual Meter Reading	**130**

Town officials reported that the meter has been calibrated within the last few years, but it appears that the meter is still reading incorrectly. Efforts should be made by the Town to get this meter working properly or purchase a new meter to correctly monitor flows.

The Town did provide Monthly operating reports for the last 12 months, but because of the meter problems this information was deemed unreliable.

4.2 System O&M

Section 3.3 of this report describes in detail the infiltration that has been observed in the Town's wastewater collection system. Overall, the system appears to be well managed. The collections system has recently been cleaned and videoed.

4.3 Growth

In Section 2.3 population projections were made based on a growth rate of 3% for the next 20 years. These projections are used to forecast flows that will need to be treated in 2026. In Section 3 it was determined that the existing trunk line will not have enough capacity for the ultimate tributary area.

In addition, the existing lagoons are not large enough to handle the 20 year flows.

5 ALTERNATIVES CONSIDERED

Many alternatives have been considered for wastewater collection and treatment for Manila. The mayor and town officials gave input on what treatment methods interested them the most. In addition, Sunrise Engineering, Inc. discussed with representatives from the Utah Division of Water Quality what options would be most feasible for Manila.

In conversation with state officals, it was clear that discharge required would be relatively high in the Manila area. Any discharge to a wetland, stream, or the Flaming Gorge would require meeting cold water fishery standards.

5.1 Development of Alternatives

There are several alternatives for collection, treatment, and disposal of wastewater in Manila. These alternatives are dependant upon the various types of treatment, physical layout of improvements, certain disadvantages and advantages, environmental concerns, site conditions, economics, etc. The primary objective of this section is to screen a multitude of alternatives into a few, which are most feasible on a general basis. This screening process will reduce detail analyses to only those alternatives which appear to be practical for the size and type of system that would meet the town's needs.

Each alternative that passes this general screening process must, if implemented, meet effluent limitations established by EPA and the Utah DEQ. The systems must also be affordable, expandable to accommodate future growth, politically acceptable, and must meet environmental and other non-monetary criteria to warrant further evaluation in Section 4.

5.2 Optimum Operation of Existing Facilities

Historically, a wastewater collection and lagoon system has been used to treat wastewater generated in the town, and individual septic tanks and drain fields have been used to treat wastewater in areas not served by the collection system.

In Section 3.3 infiltration and inflow was discussed. In order for the existing system to operate at an optimal condition, this infiltration and inflow will need to be reduced. This can be accomplished by replacing old pipe with new PVC pipe, raising manholes that are in swales, and disconnecting illegal drains.

Manila Town Engineer Gerald Smith has done a good job of operating the existing lagoon system. The lagoons appear to be in good order. On August 25, 2006 the lagoons were observed and water levels were logged. The water levels correspond very well with the reports that Mr. Smith has been keeping.

For the homes not able to connect to the existing collection system, septic tank systems are the only option. Optimal operation of existing systems means that home and business owners must continue to use private methods of wastewater disposal at their own expense. The Town and each home or business owner could consider the following steps for implementation:

- Establish a program of regular annual or semi-annual septic tank pumping.
- Home or business owners, whose systems fail or who have lots too small to build additional systems, will have to install a holding tank large enough for 7 days wastewater storage, and then contract with a commercial waste company to empty their tank on a weekly basis.
- Denitrifying septic systems are available, which reduce the usual discharge of nitrogen to the ground. These systems should be required in the future.

5.3 Regionalization

The Town of Manila's wastewater system is the only wastewater collection and treatment system in the area. Historically this collection and treatment system only served areas inside the town limits, but within the last few

years sewer services have been extended to several homes and businesses outside the town limits. It is anticipated that this trend will continue. Areas such as Captian's Cove, Chettyville, the Manila Bay Subdivision, and possibly portions of Wyoming will likely be served by the wastewater system in the future.

5.4 Unsewered Areas

The existing collection system effectively serves the Town of Manila. In addition, areas of the county north of Highway 43 from the Wyoming border to the Daggett County Jail are generally situated such that gravity flow to the sewer main is feasible.

The Captian's Cove area has an old wastewater collection system that is not currently in use. This system drains to an abandoned pump station. It is anticipated that in the future this area of the valley will be connected to the existing wastewater system.

The Chettyville area is a portion of the county served by individual septic tanks. The soils in the Chettyville area are not well suited for drain fields, so a collection system would likely be welcomed by residents.

Most of the valley south of the existing wastewater collection system could be served by the existing treatment system if a new sewer main were to be installed. This new sewer main is discussed in detail in Section 5.5. This line would allow most of the valley including Chettyville and Captains Cove to connect to the existing wastewater system. A complete design should be conducted to deterime the alignment of the sewer line, what areas can be sewered and how areas such as Chettyville and Captains Cove should connect to this line.

5.5 Collection System

In the coming years the Town of Manila will likely annex portions of the county that are not currently served by the wastewater collection system. In order to sewer these areas, a new trunk like will need to be constructed. Several options are considered.

5.5.1 Gravity Line to Existing Lagoons

This option would include constructing a gravity line that would intersect the existing trunkline just upstream of the existing lagoons. This line would start near a low point on County Road 4406 and follow Birch Spring Draw for approximately 1800 feet before heading in a northwesterly direction toward the lagoons. This option would require boring under the airport as well as right of ways. Exhibit 5.5 shows this option. This option would service the entire Zone 1 as outlined in Section 3.1 and would need to sized to convey 2,215 gallons per minute

5.5.2 Lift Station near Chettyville

Because of interest by developers to connect the Captain's Cove collection system to the Town's wastewater facilities, an option allowing Chettyville and Captain's Cove was considered. In this option a lift station would be constructed near County Road 4406 that would lift area wastewater to the existing trunkline located on Highway 43. The lift station considered would handle the flow for the entire area, and not just Captain's Cove and Chettyville. (See Figure 5.5)

5.5.3 Gravity Line to Lift Station Below Lagoons

This option is similar to the "Gravity Line to Existing Lagoons" except boring under the airport and cutting across existing fields would not be required. For the most part this option would be in existing right of ways. Once the wastewater is drained to the low side of the lagoons, a lift station would be required to lift it into the lagoons. This option may be particularly attractive if a mechanical treatment plant were selected because a lift station would be required for this process anyway. Figure 5.5 displays this option.

5.6 Treatment and Discharge

At this time, Manila uses total containment lagoons for its wastewater treatment system. As the population of Manila grows, additional treatment capacity will be needed. Town officials have suggested that they would like to look into treatment processes that would result in water that could be used for a golf course, wetlands, or irrigation. The following sections explore the options available to Manila for the treatment of wastewater.

Conventional wastewater treatment technology includes biological or physical and chemical treatment of wastewater. After treatment, the water is directly discharged to surface water and the sludge products, which were extracted during the treatment process, are then disposed. These wastewater management techniques require a specific quality of effluent before final discharge and use. This would require that Manila obtain a UPDES permit for facility operation.

Treatment and disposal of reuse involves treatment techniques such that wastewater is reused or disposed of so no effluent returns to a receiving stream or surface water. The EPA designates it as alternative treatment technology. Since no discharge occurs with this type of treatment process, a UPDES permit is not required for operation of the facility. A number of alternatives are available for this type of treatment. The most practical wastewater treatment technology can only be decided through detailed analysis.

5.6.1 Mechanical Treatment

In order for treated effluent to be used for an application such as a golf course, it must reach Type 1 reuse quality. Type I is defined by the State of Utah as reclaimed water that is suitable for reuse where human contact is possible such as public parks and golf courses. In order to attain Type 1 quality, a mechanical wastewater treatment plant with final filtration would be used. Also, a reuse pump station and pressure piping would be required to pump water to its point of use. The amount of water that would be available for reuse would be limited to the State Engineer's evaluation of the consumptive use of the underlying water right. This would be determined after a reuse application is filed with the State Engineer.

A mechanical treatment plant for the Town of Manila would be designed and laid out for convenient and inexpensive modular expansion in future years. The plant site requires only a few acres of land. There will be three concrete tanks and two buildings on the fenced site, all of which would be designed to be attractive and easy to maintain. The proposed mechanical plant is also designed for relatively low cost to operate and maintain.

The proposed treatment process is a state of the art, activated sludge and fixed film process that is combined to occur in one tank. The process will consistently produce water quality of 10 mg/l BOD and TSS. This is well below the expected discharge permit limits of 25 mg/l BOD and TSS. The process will also remove ammonia through nitrification to the anticipated 1 mg/l ammonia (as nitrogen). Exhibit 5.6.1 is a process flow diagram of the proposed mechanical treatment plant.

The headwork consists of a screen, grit removal and a grinder. The screen removes material that would damage or interfere with the satisfactory operation of process equipment. Grit is small, coarse particles of sand, gravel, egg shells or other minute pieces of mineral matter. Screenings and grit will be removed, washed and in the case of screenings, compacted, before being dropped into a plastic bag lined container. The grinder will insure all solids are cut into small pieces that are more conducive to the treatment process.

The Influent Pump Station will lift the wastewater into the bioreactor for treatment. Wastewater will then flow by gravity through the rest of the processes.

Biological Treatment will occur in two parallel tanks where environmental conditions are controlled to produce an active population of bacteria. The bacteria use oxygen to feed upon the pollutants in the wastewater. Oxygen is provided to the basin by slowly rotating tubes that fill with air when above the water surface and continuously

release fine bubbles while underwater. This is a patented process called STM Aerotor that uniquely combines the advantages of the activated sludge process with those of fixed film. Activated sludge organisms will remove the bulk of the pollutants in the wastewater and nitrify the ammonia. The fixed film organisms produce excellent sludge settling characteristics. Detention time of wastewater in the STM Aerotor bioreactor will be 8 to 12 hours.

The Clarifier is a circular tank that receives effluent from the STM Aerotor tank consisting of a mixture of treated wastewater and bacteria flocculent. To maintain a heavy inventory of bacteria, a portion of the bacterial flocculent which settles in the clarifier, is returned to the STM Aerotor basin (Return Activated Sludge- RAS). The remainder is pumped to the aerobic digester (Waste Activated Sludge- WAS).

Effluent from the Clarifier flows over weirs and then flows through UV Disinfection. The treated effluent could then be used for irrigation or for a golf course.

Waste sludge is pumped to the Aerobic Digesters where it undergoes reduction in volume through further aerobic biological treatment for about 30 days. Air is again supplied via STM Aerotor mechanisms.

Digested sludge is pumped through a Sludge Dewatering Press. Wet sludge will enter the press at 1 to 2 % solids. Pressed sludge will be about 20% solids which is suitable to be handled with conveyors to a dumpster and then hauled to the land fill for final disposal.

The by-product of treated effluent water at the mechanical wastewater treatment plant is sludge. Due to the relatively small amount of sludge that will be produced and the regulatory cost of composting the sludge or sludge injection into soil, it appears that final disposal of dried sludge would be most cost effective at the present time to be buried in the public landfill.

5.6.2 Total Containment Lagoons

State regulations allow for the treatment of wastewater by impoundment in lagoons, and allowing natural processes to dispose of contamination. This is the wastewater treatment process currently used by the Town of Manila. Total containment lagoons are essentially large, shallow bodies of water into which untreated sewage is introduced and detained for a period of time sufficient to permit stabilization of sewage by a complex natural process involving sunlight, air, water current and the action of algae and bacteria. Oxygen is supplied to the pond by direct contact with the air and by the normal life processes of algae. The aerobic bacteria then use the available oxygen to decompose organic solids. The pond bottom and lower levels sustain anaerobic bacteria that digest the pollutants, which have settled out.

A total containment lagoon alternative for wastewater treatment requires construction of a holding pond, or ponds of sufficient capacity that net yearly evaporation and seepage exceeding yearly inflow. Since water loss occurs only through seepage or evaporation, water flows into the ponds, but it does not flow out. The ponds gradually fill throughout their design life as inflow due to population increase exceeds seepage and evaporation losses. For initial planning and location of a total containment lagoon system, a buffer zone of 1/4 mile from any homes must be planned. After construction, the lagoon area must be securely fenced to restrict access. A relaxation of the buffer zones may be approved by the DEQ on a case-by-case basis, if circumstances warrant.

The Town of Manila's existing total containment lagoons are situated in an area where expansion if deemed the best option, is feasible. There are not homes within a ¼ of a mile, and it appears that land adjacent to the existing lagoons could be purchased by the Town at a reasonable price.

Total Containment Design Criteria

Total Containment lagoons are made of primary and secondary lagoons. The primary cells provide a settling process and biological action to the wastewater. The secondary cells act as polishing ponds with slight biological and settling action.

Lagoons are sized based on water coming in and water leaving the lagoons.

Water In = Wastewater Influent + Precipitation
Water Out = Evaporation + Percolation

Wastewater Influent = 0.201 MGD or 224.73 Acre Feet / year
Precipitation = 0.81 ft / year
Evaporation = 2.78 ft / year
Percolation = 1/8" / day or 3.8 ft / year

Note that the flow of 0.210 MGD is based on the average flow for the entire year, and not the peak flow seen in the summer.

$$Water\ In = Water\ Out$$

$$224.73AF + (0.81ft \times acreage) \quad = \quad (2.78ft \times acreage) + (3.8ft \times acreage)$$

solve for acreage…

Total required lagoon surface acreage = 38.95 acres

Primary Lagoon Sizing

The primary lagoons are sized based on BOD loading. The projected BOD loadings will be calculated by multiplying the projected average flow by the estimated BOD concentration. Manila Town Engineer Gerald Smith reported that tests of wastewater flowing into the lagoon several years ago revealed that the influent is quite weak. This is most likely due to the high amount of infiltration and inflow observed in the collection system. These wastewater characteristic tests were not able to be located by the Town for use in this study. A conservative value of 200 mg/l will be used to size the primary lagoons. The projected BOD loading is 335 lbs per day.

$$200\frac{mg}{l} \times 200{,}550\frac{gal}{day} \times \frac{1\ lbs}{453{,}592\ mg} \times 3.785\frac{l}{gal} = 335\frac{lbs}{day}$$

State Regulations require that, at minimum, the primary lagoons be sized for 35 #BOD per acre per day.

$$\frac{335\ \#BOD/day}{35\#BOD/acre/day} = 9.6\ acres$$

This report will recommend that 2 primary cells be used, each with an acreage of approximately 9 acres. Exhibit 5.6.2 displays a preliminary layout of the proposed lagoons.

5.6.3 Discharging Lagoons with Land Disposal

The treatment capacity of the Town's existing total containment lagoons could be greatly increased by converting them to discharging lagoons. Discharging lagoons treat wastewater much like total containment lagoons. A discharging lagoon system consists of a minimum of 3 ponds, sized to ensure that wastewater flowing into the ponds has a minimum detention time of 120 days. The treated effluent, or water that has flowed through the lagoons and undergone the required detention time, then flows out of the last pond into a fourth pond called a winter storage pond. Water is stored in the winter storage pond until the irrigation season, and is then applied to a growing crop as a final treatment process. Irrigation with wastewater provides further treatment as the water flows through the soil matrix and is utilized by the crop.

Surface run off of the irrigation water is not allowed and strict regulations must be met. The irrigation site must be suitably isolated and meet State DEQ requirements. These requirements include a stock-tight fence, which is posted to exclude the public. The crops produced are limited to forage crops for animal feed, and dairy animals may not be pastured on the crop. A buffer zone of at least 1,000 feet must be maintained between the disposal site and any place of human occupancy if effluent is applied by sprinkling. Finally, other new requirements as may be deemed necessary by the Utah DEQ must be met.

This treatment process treats wastewater to meet secondary quality effluent standards of concentrations of 25 mg/l BOD and 25 mg/l TSS, which is required in the State of Utah prior to land disposal. Due to algae growth in the lagoons, it is sometimes difficult to maintain these maximum allowable concentrations, since the algae itself sometimes shows up in wastewater samples as BOD and TSS. However, the wastewater would be treated to these standards.

Land Application Design Criteria

Wastewater Influent = 0.201 MGD or 224.73 Acre Feet / year
Precipitation = 0.81 ft / year
Evaporation = 2.78 ft / year
Percolation = 1/8" / day or 3.8 ft / year
Acreage of Lagoons = 24.3

Balance for Irrigation:

$$224.73AF + (0.81ft \times 24.3acres) \quad = \quad (2.78ft \times 24.3acres) + (3.8ft \times 24.3acres) + irrigaion$$

solve for irrigation…

Total to be applied to crop = 84.52 Acre-ft/yr

Consumptive Use = 26 inches/year @ 70% efficiency

$$\frac{26\,inches/yr}{0.7} = 37.14\frac{inches}{year} = 3.1\frac{feet}{year}$$

Solve for Acreage:

$$84.52\frac{acre\ feet}{year} \div 3.1\frac{feet}{year} = 27.26\,acres$$

Since a portion of the crop's need for water will be supplied by precipitation, a larger area is recommended. Approximately 30 acres should be used.

Check Winter Storage Size:
In this case, no particular winter water storage pond would be constructed. In conversation with state officials, it was made clear that the existing lagoons could be drawn down to a depth of 3 feet in each pond. This would mean that over half of the total lagoon capacity would be available for irrigation.

$$3\,ft \times 24.3\,acres = 72.9\,acre\ feet\ of\ storage$$

This is only about 80% of the water available for irrigation, but since the water is used continuously during the irrigation season, which extends over approximately half of the year, it is not necessary to store a full years water production. Exhibit 5.6.3 displays a possible layout for this option.

5.6.4 Aerated Lagoons with Discharge to Wetland or Flaming Gorge Reservoir

Aerated lagoons are bodies of water into which untreated sewage is introduced and retained for a period of time, sufficient to permit stabilization of sewage by a complex process involving sunlight, air, water, and the action of algae and bacteria. Oxygen is supplied to the pond by compressed air released through diffusers at the lagoon bottom, or by surface disturbance known as surface aerators. The aerobic bacteria use the available oxygen to decompose organic solids. Land disposal, or discharge of wastewater effluent to the soil via surface irrigation, may be necessary as a final disposal process. In order to dispose of the effluent in this manner, the discharge must meet all discharge requirements prior to land application. Solids and bacteria are removed by the filtering action of the soil. Plants also remove nutrients. The same restrictions apply to the land application process as outlined for discharging lagoons with land disposal.

The option of discharging effluent to Flaming Gorge Reservoir or the nearby Game & Fish wetland was discussed with several state officials. Mike Herkimer from the UPDES Section of the Division of Water Quality indicated that any of the wetlands or tributaries of the Flaming Gorge Reservoir would have the same water quality standards as the Flaming Gorge. Herkimer said that the Flaming Gorge Reservoir is a 3A Classification Cold Water Fishery. This would mean a very high quality effluent would be required, which would most likely not be obtainable with discharging lagoons. Therefore this option will not be considered further.

5.7 Innovative Treatment Processes

By definition, an innovative treatment process is something new, which has not been fully proven, but is promising, based on results in research and demonstration projects. Innovative technology for treatment of wastewater includes an element of risk. It appears that no innovative technology treatment processes are applicable to Manila. No processes have been found that will present a significant cost reduction from conventional systems. No process is available which will reduce energy needs of the treatment facility, since the conventional systems will use minimal energy. Toxic wastes or other unusual considerations are not present in Manila, and conventional systems can be expected to provide reliable service. Therefore, no innovative treatment processes will be further considered.

5.8 Innovative and Alternative Cost Preference

It is important to note that the law allows for a 15% cost preference to be applied for use of either innovative or alternative technology during a cost effectiveness analysis. We have already stated (Section 5.7) that innovative processes will not be further considered.

6 SELECTION OF AN ALTERNATIVE

6.1 Alternative Evaluation

In Section 5, many alternatives for wastewater collection and treatment were evaluated and screened. Three collection alternatives and three treatment alternatives listed below are capable of meeting Federal, State, and Local criteria for the proposed project and were selected for further analysis. These alternatives also appear to be more cost effective than the other discarded alternatives.

Collection System Alternatives for Further Evaluation

Alternative A – Gravity Line to Existing Lagoons
Alternative B – Lift Station near Chettyville
Alternative C – Gravity Line to Lift Station Below Lagoons

Treatment System Alternatives for Further Evaluation

Alternative # 1 - Mechanical Treatment Plant with STM Aerator
Alternative # 2 – Increase Size of Existing Total Containment Lagoons
Alternative # 3 – Modify Lagoons into Discharging Lagoons w/ Land Disposal

The remaining portions of Section 6 contain a cost-effectiveness analysis and non-monetary analysis of the listed alternatives. Based on these analyses, selection of the best overall wastewater treatment facility alternative is made in 7. The selected alternative must be politically acceptable, environmentally sound, and economically justified when it is compared to the other alternatives. A discussion of reasons for the elimination of certain alternatives is included.

6.1.1 Evaluation of Monetary Costs

OPINION OF PROBABLE COST

An opinion of probable cost is based on current prevailing market prices for all aspects of a project and include: capital costs, land costs, and annual costs, such as: operation and maintenance, rights-of-way, construction interest, legal, fiscal, engineering, etc. Estimates are determined from an evaluation of scope and difficulty of work, recent bid prices of similar work in the area, quotations from vendors and contractors, and from engineering judgment. Since the planner does not control the economic conditions that affect construction costs, the estimates are not a guarantee of actual cost. Estimates therefore represent anticipated project costs and indicate the cost range that the Town of Manila should expect for the project. Appendix C contains the engineers opinion of probable costs for the six alternatives represented above.

In summary, the total engineer's opinion for each alternative is summarized below in Table 6.1-A.

Table 6.1-A Probable Costs	Opinion of Total Cost
Alternative A – Gravity Line to Existing Lagoons	$1,070,000
Alternative B – Lift Station near Chettyville	$ 990,000
Alternative C – Gravity Line to Lift Station Below Lagoons	$2,304,000
Alternative #1 – Manila Town Mechanical Treatment Plant	$4,950,000
Alternative #2 – Increase Size of Existing Total Containment Lagoons	$1,000,000
Alternative #3 –Discharging Lagoons w/ Land Disposal	$1,312,000

OPERATION AND MAINTENANCE COSTS

The requirements to operate and maintain a total containment lagoon are very minimal when compared to operating and maintaining a discharging lagoon system or a mechanical treatment plant. There are no mechanical parts to repair or replace, the monitoring requirements by the State are much less stringent and time consuming, there are no costs to chlorinate and energy costs are nearly none. Other than a brief daily check and vegetation control, total containment lagoons take care of themselves.

In order to compare the three possible treatment alternatives, the annual operation and maintenance costs have been estimated and are summarized in Table 6.1-B.

Table 6.1-B Annual Operation and Maintenance Costs	**Annual O&M**
Alternative A – Gravity Line to Existing Lagoons	$2000
Alternative B – Lift Station near Chettyville	$23,000
Alternative C – Gravity Line to Lift Station Below Lagoons	$25,000
Alternative #1 – Manila Town Mechanical Treatment Plant	$167,000
Alternative #2 – Increase Size of Existing Total Containment Lagoons	$64,000
Alternative #3 –Discharging Lagoons w/ Land Disposal	$80,000

NET PRESENT VALUE

Because the capital cost is a lump sum and the cost for operation and maintenance is an annual cost, the O&M costs will need to be converted to a "present value cost" to combine the two costs. The present value cost for operation and maintenance has been calculated using an annual inflation rate of 3% and a time period of 20 years. The following formula was used:

$$\text{Present Value} = D\left(\frac{n}{1+E}\right)$$

Where D = The annual O&M cost at year 1
n = The time period
E = The escalation or inflation rate

The NPV financial formula takes into account the initial purchase value plus the operation and maintenance costs as well as the salvage value. A comparison of the net present worth of each alternative will indicate which alternative is the most cost effective. A summary of these net preset value comparisons is found below in Table 6.1-C.

Table 6.1-C Net Present Value	Capital Cost	Present Value of Annual O&M Costs	Net Present Value
Alternative A – Gravity Line to Existing Lagoons	$1,070,000	$38,835	$1,108,835
Alternative B – Lift Station near Chettyville	$990,000	$454,369	$1,444,369
Alternative C – Gravity Line to Lift Station Below Lagoons	$2,304,000	$493,204	$2,797,204
Alternative #1 – Manila Town Mechanical Treatment Plant	$4,950,000	$3,241,534	$8,191,534
Alternative #2 – Increase Size of Existing Total Containment Lagoons	$1,000,000	$1,242,338	$2,242,338
Alternative #3 –Discharging Lagoons w/ Land Disposal	$1,312,000	$1,557,872	$2,869,872

Each alternative was evaluated using the same terms for cost comparison, which resulted in comparable net present worth values.

It is apparent from Table 6.1-C that Collection Alternative A and Treatment Alternative #2 are the best financial options.

6.1.2 Sunk Costs

Sunk costs will vary for each alternative. If a Mechanical Treatment Plant is constructed, the existing lagoons will be abandoned. Whatever the book value of the existing lagoons is would be the sunk cost for that option. Treatment Alternatives 2 and 3 will utilize the existing lagoons, therefore they will have little if any sunken costs.

6.1.3 Cost Escalation Factors for Energy Use

It is anticipated that the Town of Manila will incur any costs resulting from energy use with the selection of any of the proposed alternatives. Energy costs associated with Treatment Alternative 1 will be higher due to the difference to operate a treatment facility over a lift station. Treatment Alternative 2 will have the lowest energy costs since little energy is required for total containment lagoons. Treatment Alternative 3 would require a small amount of energy for disinfection processes and to pump water for land application.

6.2 Reserve Capacity

Each alternative that is evaluated in detail includes reserve capacity, which is the treatment capability beyond the needs of the population at the present time. The design life and planning period is 20 years for treatment alternatives and at least 50 years for the collection system. The Administrative Rules for *Design Requirements for Wastewater Collection, Treatment and Disposal Systems (R317-3 Utah Administrative Code)* states that "sewers should be designed for the ultimate tributary population or 50 year planning period whichever requires a larger capacity." The collection system may be oversized due to minimum pipe size requirements dictated by Utah State Code, which dramatically increases hydraulic capacity. The projected treatment facilities are sized only for the projected 20 year growth. However, methods and sites for enlargement and expansion have been identified, and possible future expansion needs have been considered in doing the preliminary design.

7 PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)

7.1 Justification and Description of Selected Plan

At the conclusion of Section 6, Collection Alternative A and Treatment Alternative #2 are the best financial options for the Town of Manila. These options are preferred in part because they require little operation and maintenance, testing, electricity or monitoring requirements.

SELECTED PLAN

ALTERNATIVE A AND ALTERNATIVE #2:

1. Gravity Line to Existing Lagoons
2. Increase Size of Existing Total Containment Lagoons

7.2 Design of Selected Plan

Preliminary design of the selected plan has been completed. In summary, all piping will be PVC and manholes will be precast concrete. The collection system will be composed of 8" to 12" pipe. The interceptor will be 12" diameter and will have sufficient capacity to handle 100% of waste flow during periods of peak flow. Any new service laterals will be 4" diameter. All design and construction of the collection and treatment systems will be in accordance with the *Administrative Rules for Design Requirements for Wastewater Collection, Treatment and Disposal Systems (R317-3 Utah Administrative code).*

7.3 Cost Estimates for Selected Plan

Appendix C contains a cost estimate of the selected plan including collection, treatment, engineering and other costs necessary to realize the plan.

7.4 Energy Requirements of Selected Plan

The selected plan is designed to conserve energy. The collection system is 100% gravity flow. Total Containment Lagoons require virtually no energy. Energy will also be used in constructing the system in the form of fuel for equipment, but energy consumption for construction equipment ends when construction is completed.

7.5 Environmental Impacts of Selected Plan

An environmental information package is included in this plan in Section 2. No significant detrimental environmental impacts are associated with this project.

Unavoidable Adverse Impacts

This project will not have unavoidable adverse impacts.

Irretrievable Resource Commitment

The rights-of-way for the interceptor pipelines can be considered irretrievable resource commitments. Since the pipeline will be aligned along fence lines and existing road rights-of-way as far as possible, this impact will be negligible. Where collector or interceptor piping crosses farmland, it will be deep enough that farming operations can continue unaffected. No other significant effects in this area are anticipated by this project.

Uses of the Environment

The project offers some possible improvement to area wildlife habitat. Concerns about progressive pollution of the groundwater aquifer in the area, due to portions of the valley with septic tank/drain field systems, will be alleviated. This will improve the long-term environmental quality in the area.

7.6 Arrangements for Implementation

FUNDING AGENCIES

The proposed project can only happen with cooperation and assistance among various agencies. The project will be neither affordable, nor politically acceptable, if funding assistance is not received. Manila may receive financial assistance from:

Utah Water Quality Board (UWQB)
US Department of Agriculture/Rural Development

The Utah State Department of Environmental Quality, Division of Water Quality (DWQ) may fund the design and construction of the proposed project. Rural Development may provide financial assistance to individual low-income homeowners that must abandon septic tanks and connect to the sewer mains. This individual assistance from Rural Development is available to those who qualify and apply on an individual basis.

7.6.1 Inter Municipal Service Agreements

The implementation of this plan will require annexation or agreements between Manila and Dagget County.

7.6.2 Civil Rights Compliance

The Town of Manila complies with the requirements in the Civil Rights Act of 1964. Required certification will be obtained for EPA EEO compliance, fair labor compliance, and all other applicable regulations as required.

7.6.3 Operation and Maintenance (O&M) Requirements

Operation and Maintenance costs have been included in the cost effectiveness analysis. The O&M costs along with debt service constitute the basis for required user fees.

Operation and Maintenance costs are ongoing on a year to year basis and are not grant eligible. At present, there are 444 wastewater connections in the town.

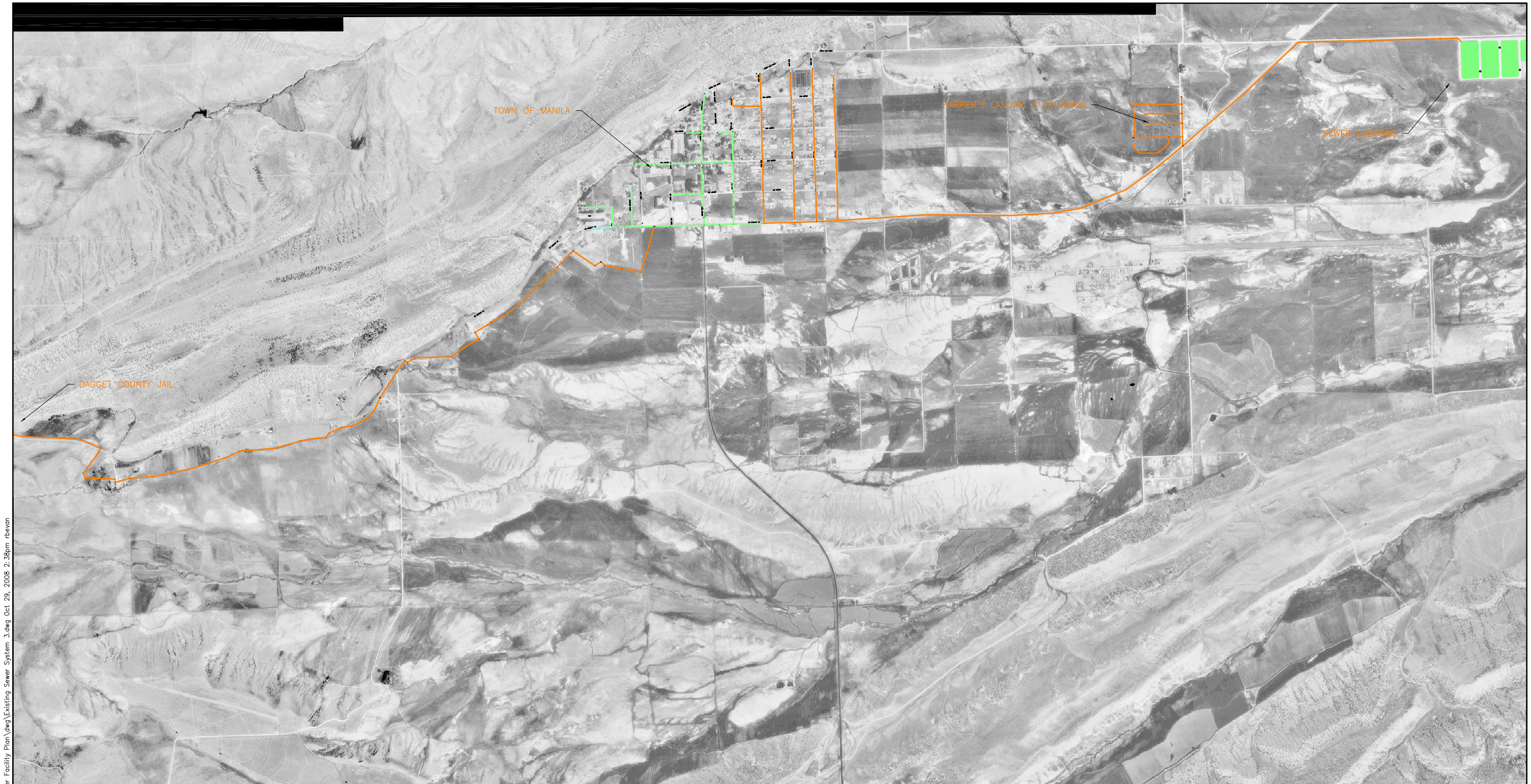
Operation and Maintenance will be dealt with more thoroughly if one of the proposed projects progress. A detailed plan of operation which includes O&M requirements is part of the project. During construction of the project, a Plan of Operation and an Operation and Maintenance Manual will be completed with detailed instructions for operators of the facilities.

7.6.4 Pre-Treatment Program

It is recommended that the Town of Manila develop a pretreatment program now for inclusion in the Sewer Use Ordinance. The purpose of a pretreatment program is to prevent the introduction into the treatment facilities of pollutants that interfere with the proper operation of the treatment processes. The costs of pretreatment of wastewater will be the responsibility of business owner or developer.

7.7 Land Acquisition

The implementation of Alternative 2, (expanding the existing total containment lagoons), will require purchase of additional property and rights-of way for the collection system pipelines that are not in existing streets. Manholes will be located in street or highway rights-of-way, or in the rights-of-way obtained for collection or interceptor piping.



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LEGEND

- EXISTING 8" PVC SEWER PIPE
- EXISTING 8" CONCRETE SEWER PIPE
- EXISTING 6" SEWER PIPE
- ○ EXISTING SEWER MANHOLE

SCALE
0 1000 2000
HORIZ: 1" =2000'

NORTH

REV NO.	COMMENT	DATE

SUNRISE ENGINEERING
12227 SOUTH BUSINESS PARK DRIVE, SUITE 220
DRAPER, UTAH 84020
TEL 801.523.0100 · FAX 801.523.0990
www.sunrise-eng.com

TOWN OF MANILA

WASTEWATER FACILITY PLAN 2006
MANILA WASTEWATER SYSTEM

SCALE	DESIGNED	DRAWN	CHECKED	SHEET NO. of	
None	DAJ	DAJ	SLA		2.1-A

LEGEND

- EXISTING 8" PVC SEWER PIPE
- EXISTING 8" CONCRETE SEWER PIPE
- EXISTING 6" SEWER PIPE
- EXISTING SEWER MANHOLE

NORTH

SCALE
0 200 400
HORIZ: 1" =400 '

REV NO.	COMMENT	DATE

SUNRISE ENGINEERING
12227 SOUTH BUSINESS PARK DRIVE, SUITE 220
DRAPER, UTAH 84020
TEL 801.523.0100 · FAX 801.523.0990
www.sunrise-eng.com

TOWN OF MANILA

WASTEWATER FACILITY PLAN 2006
MANILA WASTEWATER SYSTEM

SCALE	DESIGNED	DRAWN	CHECKED	SHEET NO. of	
None	DAJ	DAJ	SLA		2.1-B

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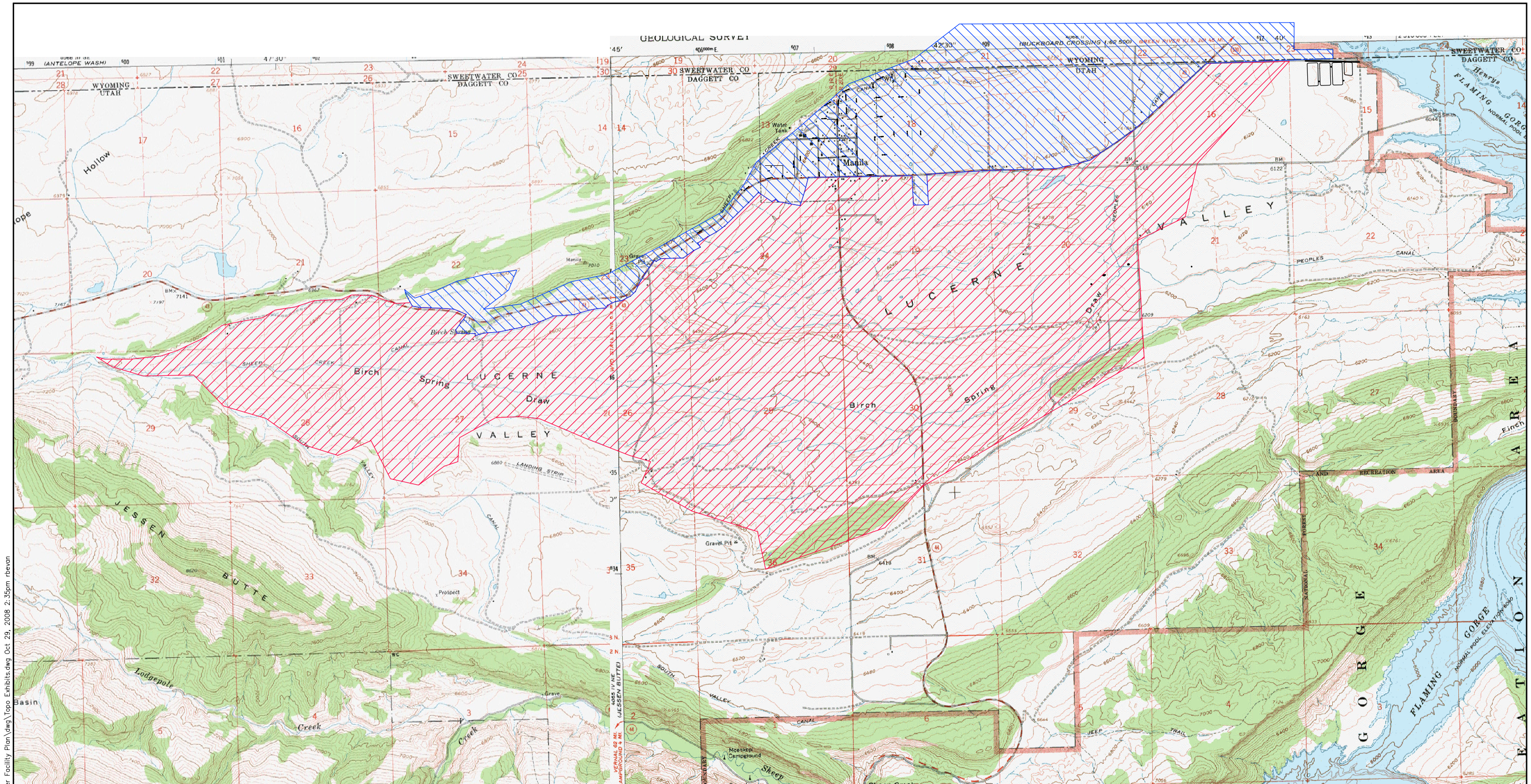

LEGEND

ZONE 1 TRIBUTARY AREA

ZONE 2 TRIBUTARY AREA

SCALE
0 1000 2000
HORIZ: 1" =2000'

NORTH

REV NO.	COMMENT	DATE

SUNRISE ENGINEERING
12227 SOUTH BUSINESS PARK DRIVE, SUITE 220
DRAPER, UTAH 84020
TEL 801.523.0100 · FAX 801.523.0990
www.sunrise-eng.com

TOWN OF MANILA

WASTEWATER FACILITY PLAN 2006
ULTIMATE TRIBUTARY AREA

SCALE	DESIGNED	DRAWN	CHECKED	SHEET NO. of	
None	DAJ	DAJ	SLA		3.1

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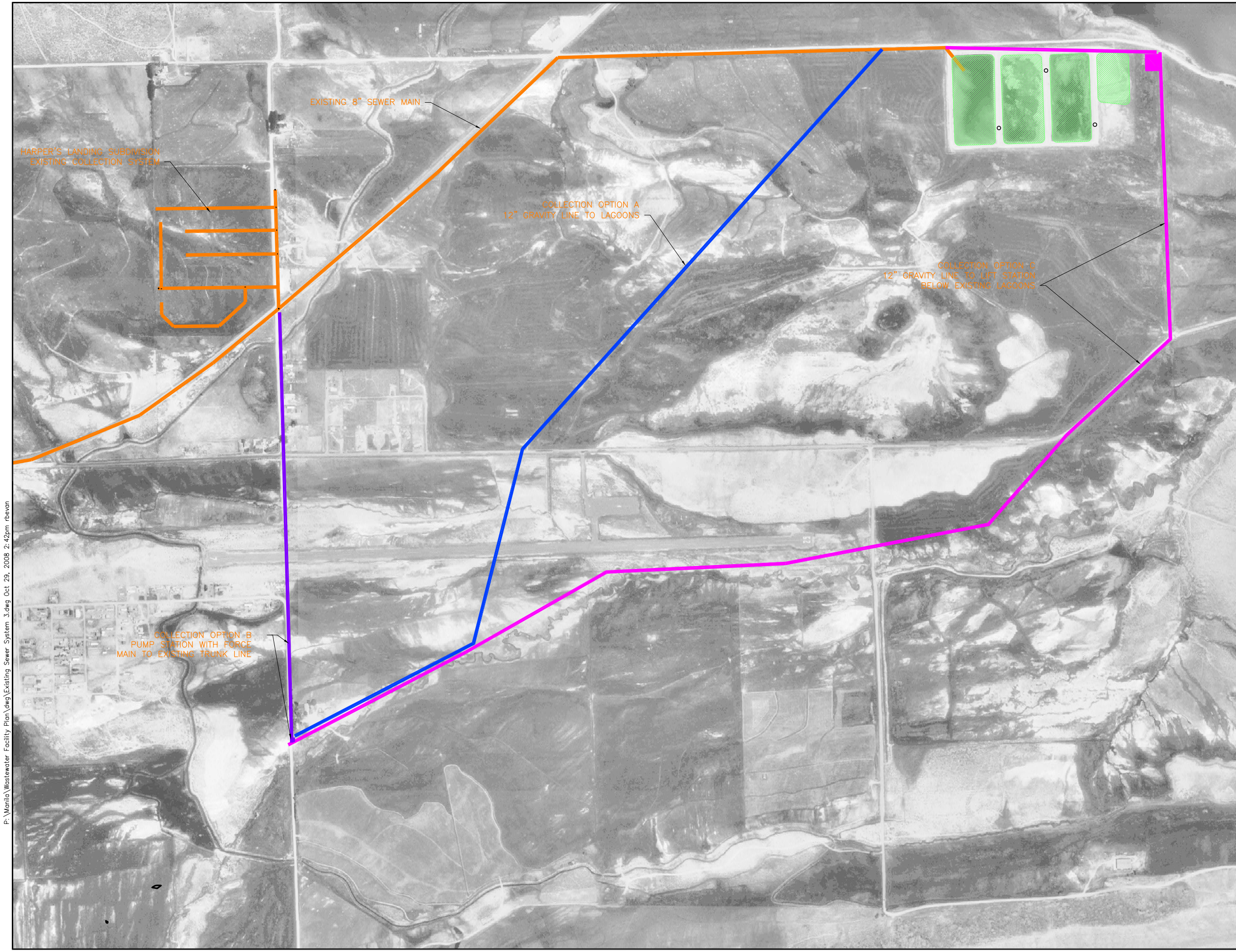

LEGEND

EXISTING 8" PVC SEWER PIPE

EXISTING SEWER MANHOLE

NORTH

SCALE
0 200 400
HORIZ: 1" =400 '

REV NO.	COMMENT	DATE

SUNRISE ENGINEERING
12227 SOUTH BUSINESS PARK DRIVE, SUITE 220
DRAPER, UTAH 84020
TEL 801.523.0100 · FAX 801.523.0990
www.sunrise-eng.com

TOWN OF MANILA

WASTEWATER FACILITY PLAN 2006
COLLECTION SYSTEM OPTIONS

SCALE	DESIGNED	DRAWN	CHECKED	SHEET NO. of	
None	DAJ	DAJ	SLA		5.5

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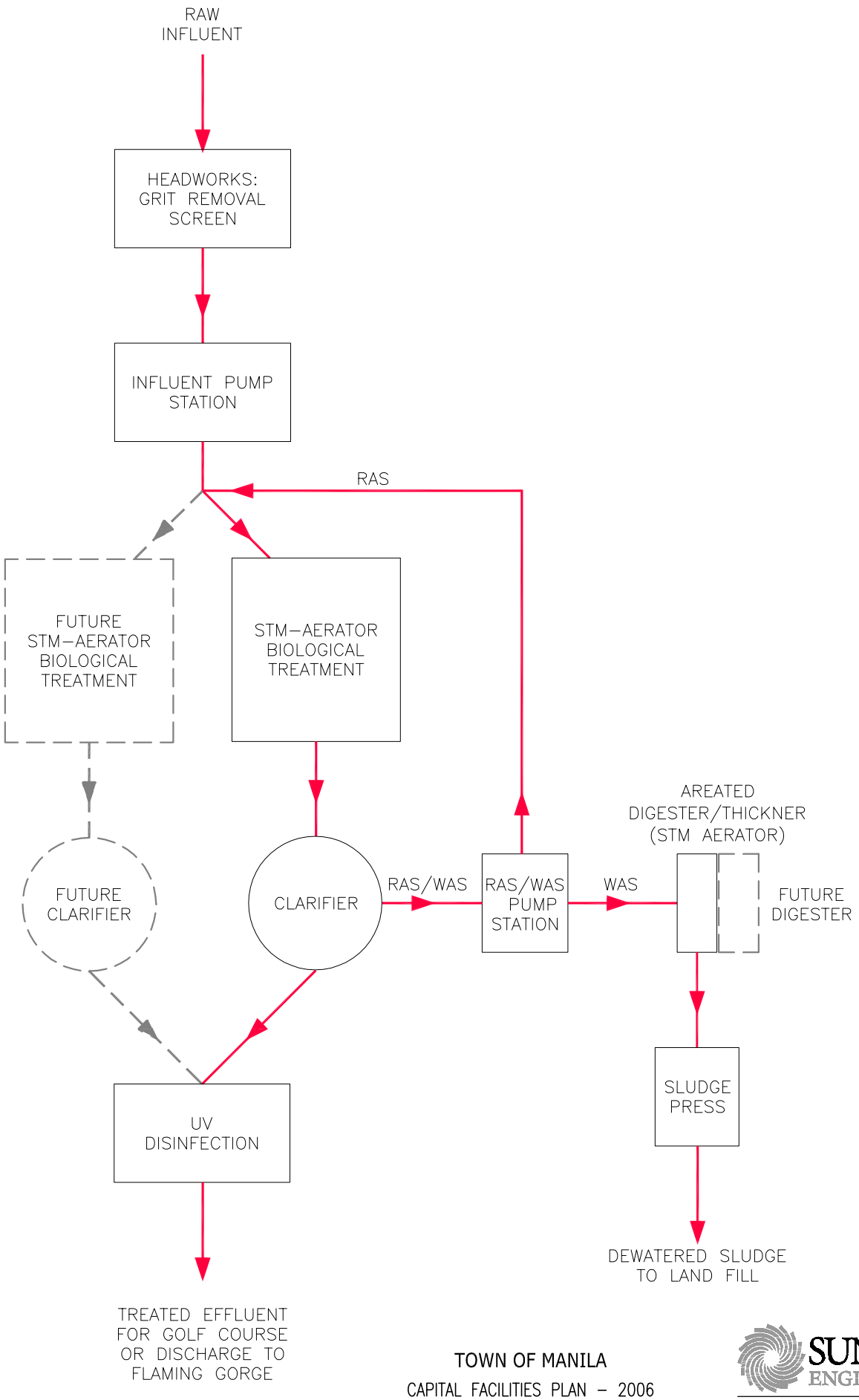

TOWN OF MANILA

CAPITAL FACILITIES PLAN – 2006
PROCESS FLOW DIAGRAM FOR MECHANICAL TREATMENT PLANT

EXHIBIT 5.6.1

SUNRISE ENGINEERING
12227 SOUTH BUSINESS PARK DRIVE, SUITE 220
DRAPER, UTAH 84020
TEL 801.523.0100 · FAX 801.523.0990
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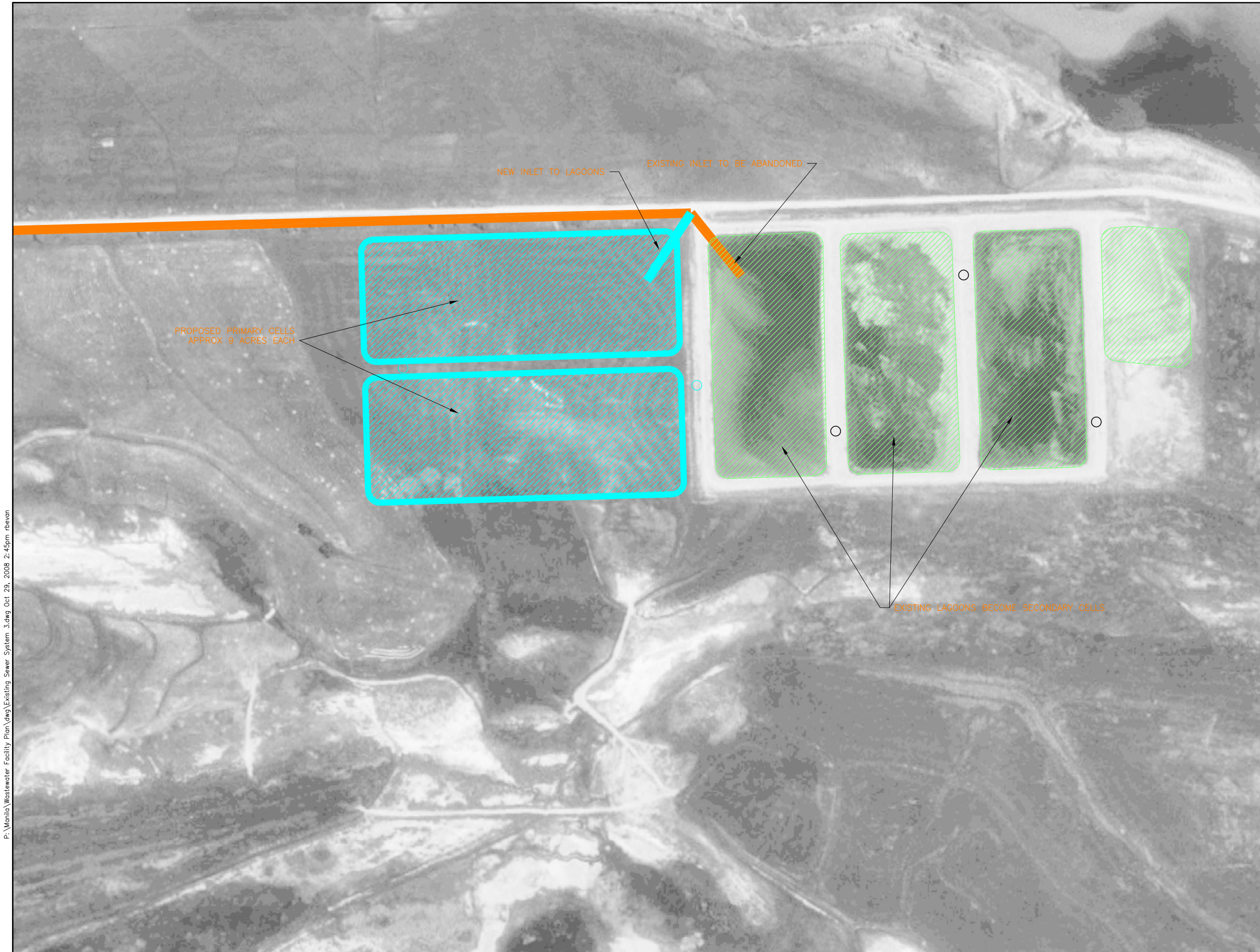

LEGEND

- EXISTING SEWER MANHOLE
- PROPOSED SEWER MANHOLE
- PROPOSED LAGOONS
- EXISTING LAGOONS

NORTH

SCALE
0 100 200
HORIZ: 1" =200 '

REV NO.	COMMENT	DATE

SUNRISE ENGINEERING
12227 SOUTH BUSINESS PARK DRIVE, SUITE 220
DRAPER, UTAH 84020
TEL 801.523.0100 · FAX 801.523.0990
www.sunrise-eng.com

TOWN OF MANILA

WASTEWATER FACILITY PLAN 2006
TREATMENT OPTION 2
TOTAL CONTAINMENT LAGOONS

SCALE	DESIGNED	DRAWN	CHECKED	SHEET NO. of	
None	DAJ	DAJ	SLA		5.6.2

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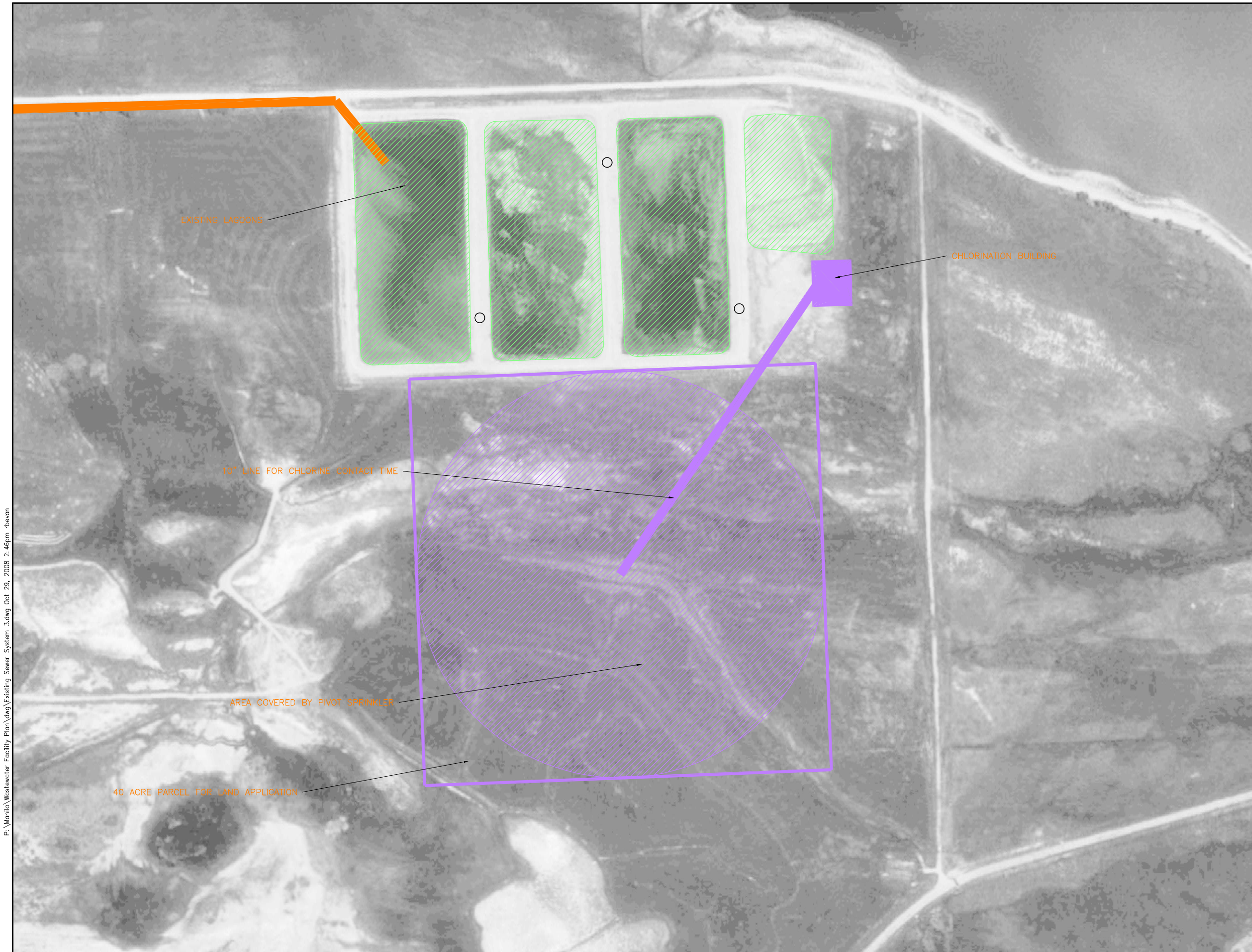

LEGEND

- EXISTING SEWER MANHOLE
- EXISTING LAGOONS
- PROPOSED LAND APPLICATION AREA

NORTH

SCALE
0 100 200
HORIZ: 1" =200 '

REV NO.	COMMENT	DATE

SUNRISE ENGINEERING
12227 SOUTH BUSINESS PARK DRIVE, SUITE 220
DRAPER, UTAH 84020
TEL 801.523.0100 · FAX 801.523.0990
www.sunrise-eng.com

TOWN OF MANILA

WASTEWATER FACILITY PLAN 2006
TREATMENT OPTION 3
DISCHARGING WITH LAND APPLICATION

SCALE	DESIGNED	DRAWN	CHECKED	SHEET NO. of	
None	DAJ	DAJ	SLA		5.6.3

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Table 3 Manila Lagoon Water Balance

Lagoon Water Balance for Manila

														Design Flow		
														(MGD)		
										Year Round Resident		**345**	**Persons**	**0.0345**		
										Summer Residents		900	**Persons**	**0.0900**		
Design Parameters					Number of years of life remainin			16.3		County Jail Residents		118	**Persons**	**0.0118**		
Pond Floor Area (acres):			24.3							County Residents		165	**Persons**	**0.0165**		
Seepage Flux:			#######							Summer Total		1183	**Persons**	**0.1183**		
Initial Pond Depth (feet):			5.84							Winter Total		628	**Persons**	**0.0628**		
Liner Thickness (feet):			1.0						Design Flow		100	gal per capita				
Growth factor:			1.61710													
Population rate increase:			3.000%													
											Adjusted	Adjusted	Adjusted		Observed	Projected
						Initial	Change in	Cumulative	Pond	Adjusted	Change in	Cumulative	Pond	Calculated	I&I	Base
	Days in	Inflow	Inflow	Avg PPT	Avg Evap	Seepage	Storage	Storage	Depth	Seepage	Storage	Storage	Depth	Inflow	Inflow	Inflow
Month	Month	(Mgals)	(ac ft)	(inches)	(inches)	(inches)	(ac ft)	(ac ft)	(ft)	(inches)	(ac ft)	(ac ft)	(ft)	MGD	MGD	MGD
Jan	31	4.30	13.19	0.37	0.185	7.21	-1.01	141	5.79	7.16	-1	141	5.80	0.062800	0.037129	0.1387
Feb	28	3.88	11.92	0.51	0.577	6.51	-1.38	139	5.74	6.42	-1	140	5.75	0.06	0.04	0.1387
Mar	31	5.23	16.04	0.69	1.258	7.21	0.31	140	5.75	7.12	0	140	5.77	0.08	0.04	0.1686
Apr	30	5.96	18.28	1.31	2.945	6.98	0.86	140	5.79	6.92	1	141	5.81	0.09980	0.037129	0.1985
May	31	7.08	21.73	1.25	4.573	7.21	0.43	141	5.80	7.17	1	141	5.83	0.12	0.04	0.2284
Jun	30	6.85	21.03	0.87	5.380	6.98	-2.20	139	5.71	6.85	-2	140	5.75	0.12	0.04	0.2284
Jul	31	7.08	21.73	0.92	6.061	7.21	-3.24	135	5.58	6.94	-3	137	5.64	0.12	0.04	0.2284
Aug	31	7.08	21.73	0.92	4.699	7.21	-0.49	135	5.56	6.92	0	137	5.64	0.12	0.04	0.2284
Sep	30	5.96	18.28	0.93	3.641	6.98	-1.31	134	5.50	6.64	-1	136	5.62	0.10	0.04	0.1985
Oct	31	5.23	16.04	1.08	2.405	7.21	-1.22	132	5.45	6.81	0	136	5.60	0.08	0.04	0.1686
Nov	30	4.16	12.77	0.48	1.058	6.98	-2.51	130	5.35	6.48	-2	134	5.54	0.06	0.04	0.1387
Dec	31	4.30	13.19	0.38	0.555	7.21	-1.74	128	5.28	6.62	-1	134	5.51	0.06	0.04	0.1387
Total:	365	67.10	205.95	9.71	33.337	84.87	-13.48			82.05	-7.78					

Note: Enter data in green boxes; enter initial pond depth in blue box; estimate a "growth factor" which projects future flows & check that yellow box is approximately = 0 and adjusted pond depth (column "N") does not exceed 6 feet. Number of years of existing lagoon life is calculated and shown in red box.

Use Solver set the years to max with the constraints of adjusted pond depth <= 6, the total change in storage = to zero, with the initial depth >= 0

*Base inflow from measured inflows much higher than the caluculated 100 gallons per capita

SUNRISE ENGINEERING, INC.

CONSULTING ENGINEERS AND SURVEYORS

Opinion of Probable Costs

SUNRISE ENGINEERING

Project: Town of Manila
Wastwater Treatment Study
Gravity Flow Line
Collection
Alternative A

Project No: 1696
Date:
By: DJ
Exhibit:

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	
1	Mobilization	1	L.S.	$ 61,000.00	$ 61,000
2	Pre Construction Photography	1	L.S.	$ 3,500.00	$ 3,500
3	Subsurface Investigation	10	Hrs.	$ 100.00	$ 1,000
4	Service Connection Documentation	100	Each	$ 15.00	$ 1,500
5	Traffic Control	1	L.S.	$ 1,000.00	$ 1,000
6	**SUBTOTAL**				**$ 68,000**
COLLECTION					
7	8" Gravity Sewer Pipe (PVC SDR 35 ASTM)	0	Ln. Ft.	$ 22.00	$ -
8	12" Gravity Intercepter Sewer Pipe (PVC SDR 35 ASTM	8,800	Ln. Ft.	$ 25.00	$ 220,000
9	Pumping in Wet Trench Conditions	4,000	Ln. Ft.	$ 15.00	$ 60,000
10	4" Service Lateral Connection	0	Each	$ 60.00	$ -
11	4" Service Lateral Pipe (PVC SDR 35 ASTM)	0	Ln. Ft.	$ 20.00	$ -
12	48" Manhole (Precast Concrete)	26	Each	$ 3,500.00	$ 91,000
13	60" Manhole (Precast Concrete)	2	Each	$ 4,000.00	$ 8,000
14	Manhole Drops	2	Each	$ 500.00	$ 1,000
15	Clay Cut-Off Wall	10	Each	$ 100.00	$ 1,000
16	Imported Pipe Bedding (Sand or Drain Gravel)	3,000	Cu. Yds.	$ 15.00	$ 45,000
17	Imported Pit Run Borrow	3,000	Cu. Yds.	$ 12.00	$ 36,000
18	Untreated Base Course	750	Cu. Yds.	$ 16.00	$ 12,000
19	Bituminous Surface Course	350	Cu. Yds.	$ 100.00	$ 35,000
20	Bituminous Pavement Sawing	36,000	In. Ft.	$ 1.00	$ 36,000
21	Concrete Removal and Replacement	0	Ln. Ft.	$ -	$ -
22	Property Restoration	50,000	Sq. Yds.	$ 1.00	$ 50,000
23	Transport Existing Clay on Project Site	50	Cu. Yds.	$ 10.00	$ 500
24	Soil Proctor and Compaction Testing	0	L.S.	$ -	$ -
25	Boring and Jacking Under Airport	150	Ln. Ft.	$ 350.00	$ 52,500
29	**SUBTOTAL**				**$ 648,000**
30	**CONSTRUCTION SUBTOTAL**				**$ 716,000**
31	Construction Contingency (15%)	1	L.S.	$ 110,000.00	**$ 110,000**
32	**CONSTRUCTION SUBTOTAL W/CONTINGENCY**				**$ 826,000**

PROFESSIONAL SERVICES & MISC. PROJECT COSTS					
33	Update Facility Plan	0	L.S.	$ 50,000.00	$ -
34	Administrative Services & Pre-Design	1	L.S.	$ 17,000.00	$ 17,000
35	Engineering Detailed Design Collection System	1	L.S.	$ 66,000.00	$ 66,000
36	Quality Control & Construction Observation	1	L.S.	$ 82,000.00	$ 82,000
37	Additional Engineering and Survey	1	L.S.	$ 17,000.00	$ 17,000
38	Attorney Fees (Legal & Bonding)	1	L.S.	$ 17,000.00	$ 17,000
39	DWQ Administration	1	L.S.	$ 20,000.00	$ 20,000
40	Inflation Increase	1	L.S.	$ 25,000.00	$ 25,000
41	Land Acquisition	0	Acres	$ 5,000.00	
42	**SUBTOTAL**				**$ 244,000**
43	**TOTAL PROJECT COST**				**$ 1,070,000**

SUNRISE ENGINEERING, INC.

CONSULTING ENGINEERS AND SURVEYORS

Opinion of Probable Costs

SUNRISE ENGINEERING

Project: Town of Manila
Wastewater Treatment Study
Lift Station near Chettyville
Collection
Alternative B

Project No: 1696
Date:
By: DJ
Exhibit:

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	
1	Mobilization	1	L.S.	$ 54,750.00	$ 54,750
2	Pre Construction Photography	1	L.S.	$ 3,500.00	$ 3,500
3	Subsurface Investigation	10	Hrs.	$ 100.00	$ 1,000
4	Service Connection Documentation	50	Each	$ 15.00	$ 750
5	Traffic Control	1	L.S.	$ 1,000.00	$ 1,000
6	**SUBTOTAL**				**$ 61,000**
LIFT STATION					
7	Site Earthwork and Excavation	1	L.S.	$ 30,000.00	$ 30,000
8	Wet Well	1	L.S.	$ 50,000.00	$ 50,000
9	Biological Odor Control System	1	L.S.	$ 20,000.00	$ 20,000
10	Building and Misc. Equipment, Materials and Supplies	1	L.S.	$ 100,000.00	$ 100,000
11	Triplex Pump System (Pumps, Rails, MCC etc.)	1	L.S.	$ 50,000.00	$ 50,000
12	Pump Plumbing (Labor, Materials and Supplies)	1	L.S.	$ 40,000.00	$ 40,000
13	Electrical Work (Wiring, Conduits Lighting, Equipment e	1	L.S.	$ 75,000.00	$ 75,000
14	Standby Generator, Connection, Transfer Switch	1	L.S.	$ 50,000.00	$ 50,000
15	Power to Site	3,000	Ln. Ft.	$ 5.00	$ 15,000
16	16' x 4" Gravel Access Road	1,000	Ln. Ft.	$ 7.00	$ 7,000
17	**SUBTOTAL**				**$ 437,000**
FORCE MAIN					
18	Pumping in Wet Trench Conditions	0	Ln. Ft.	$ 15.00	$ -
19	8" PVC Pipe and Fittings (150 psi)	2,500	Ln. Ft.	$ 20.00	$ 50,000
20	Imported Pipe Bedding (Sand or Drain Gravel)	1,000	Cu. Yds.	$ 15.00	$ 15,000
21	Imported Pit Run Borrow	0	Cu. Yds.	$ 12.00	$ -
22	Air/Vac Assemblies	3	L.S.	$ 3,500.00	$ 10,500
23	Untreated Base Course	200	Cu. Yds.	$ 15.00	$ 3,000
24	Bituminous Surface Course	0	Cu. Yds.	$ 100.00	$ -
25	Bituminous Pavement Sawing	9000	Ln. Ft.	$ 1.00	$ 9,000
26	Line Tie-Ins (Beginning and end of the line)	2	Each	$ 3,500.00	$ 7,000
27	Boring and Jacking at Airport	150	Ln. Ft.	$ 350.00	$ 52,500
28	Soil Proctor and Compaction Testing	1	L.S.	$ 1,000.00	$ 1,000
29	**SUBTOTAL**				**$ 148,000**
30	**CONSTRUCTION SUBTOTAL**				**$ 646,000**
31	Construction Contingency (15%)	1	L.S.	$ 100,000.00	**$ 100,000**
32	**CONSTRUCTION SUBTOTAL W/CONTINGENCY**				**$ 746,000**

PROFESSIONAL SERVICES & MISC. PROJECT COSTS					
33	Update Facility Plan	0	L.S.	$ 50,000.00	$ -
34	Administrative Services & Pre-Design	1	L.S.	$ 16,000.00	$ 16,000
35	Engineering Detailed Design Collection System	1	L.S.	$ 64,000.00	$ 64,000
36	Quality Control & Construction Observation	1	L.S.	$ 80,000.00	$ 80,000
37	Additional Engineering and Survey	1	L.S.	$ 16,000.00	$ 16,000
38	Attorney Fees (Legal & Bonding)	1	L.S.	$ 16,000.00	$ 16,000
39	DWQ Administration	1	L.S.	$ 20,000.00	$ 20,000
40	Inflation Increase	1	L.S.	$ 24,000.00	$ 24,000
41	Land Acquisition	1	Acres	$ 8,000.00	$ 8,000
41	**SUBTOTAL**				**$ 244,000**
42	**TOTAL PROJECT COST**				**$ 990,000**

SUNRISE ENGINEERING, INC.

CONSULTING ENGINEERS AND SURVEYORS

Opinion of Probable Costs

SUNRISE ENGINEERING

Project: Town of Manila
Wastewater Treatment Study
Lift Station near Reservoir
Collection
Alternative C

Project No: 1696
Date:
By: DJ
Exhibit:

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	
1	Mobilization	1	L.S.	$ 143,000.00	$ 143,000
2	Pre Construction Photography	1	L.S.	$ 4,000.00	$ 4,000
3	Subsurface Investigation	10	Hrs.	$ 100.00	$ 1,000
4	Service Connection Documentation	50	Each	$ 20.00	$ 1,000
5	Traffic Control	1	L.S.	$ 1,000.00	$ 1,000
6	**SUBTOTAL**				**$ 150,000**
COLLECTION					
7	8" Gravity Sewer Pipe (PVC SDR 35 ASTM)	0	Ln. Ft.	$ 22.00	$ -
8	12" Gravity Intercepter Sewer Pipe (PVC SDR 35 ASTM)	12,000	Ln. Ft.	$ 25.00	$ 300,000
9	Pumping in Wet Trench Conditions	6,000	Ln. Ft.	$ 15.00	$ 90,000
10	4" Service Lateral Connection	0	Each	$ 60.00	$ -
11	4" Service Lateral Pipe (PVC SDR 35 ASTM)	0	Ln. Ft.	$ 20.00	$ -
12	48" Manhole (Precast Concrete)	30	Each	$ 3,500.00	$ 105,000
13	60" Manhole (Precast Concrete)	2	Each	$ 4,000.00	$ 8,000
14	Manhole Drops	2	Each	$ 500.00	$ 1,000
15	Clay Cut-Off Wall	30	Each	$ -	$ -
16	Imported Pipe Bedding (Sand or Drain Gravel)	1,500	Cu. Yds.	$ 15.00	$ 22,500
17	Imported Pit Run Borrow	0	Cu. Yds.	$ 12.00	$ -
18	Untreated Base Course	0	Cu. Yds.	$ 15.00	$ -
19	Bituminous Surface Course	0	Cu. Yds.	$ 100.00	$ -
20	Bituminous Pavement Sawing	0	In. Ft.	$ 1.00	$ -
21	Concrete Removal and Replacement	0	Ln. Ft.	$ -	$ -
22	Property Restoration	70,000	Sq. Yds.	$ 1.00	$ 70,000
23	Transport Existing Clay on Project Site	50	Cu. Yds.	$ 10.00	$ 500
24	Soil Proctor and Compaction Testing	1	L.S.	$ 1,000.00	$ 1,000
25	Boring and Jacking Railroad & Highway	0	Ln. Ft.	$ 350.00	$ -
26	**SUBTOTAL**				**$ 598,000**
LIFT STATION					
27	Site Earthwork and Excavation	1	L.S.	$ 50,000.00	$ 50,000
28	Wet Well	1	L.S.	$ 70,000.00	$ 70,000
29	Biological Odor Control System	1	L.S.	$ 22,000.00	$ 22,000
30	Building and Misc. Equipment, Materials and Supplies	1	L.S.	$ 130,000.00	$ 130,000
31	Triplex Pump System (Pumps, Rails, MCC etc.)	1	L.S.	$ 60,000.00	$ 60,000
32	Pump Plumbing (Labor, Materials and Supplies)	1	L.S.	$ 60,000.00	$ 60,000
33	Electrical Work (Wiring, Conduits Lighting, Equipment et	1	L.S.	$ 100,000.00	$ 100,000
34	Standby Generator, Connection, Transfer Switch	1	L.S.	$ 60,000.00	$ 60,000
35	Power to Site	9,000	L.S.	$ 5.00	$ 45,000
36	16' x 4" Gravel Access Road	200	Ln. Ft.	$ 5.00	$ 1,000
37	**SUBTOTAL**				**$ 598,000**

FORCE MAIN					
38	Pumping in Wet Trench Conditions	2,000	Ln. Ft.	$ 15.00	$ 30,000
39	8" PVC Pipe and Fittings (150 psi)	2,000	Ln. Ft.	$ 20.00	$ 40,000
40	Imported Pipe Bedding (Sand or Drain Gravel)	700	Cu. Yds.	$ 15.00	$ 10,500
41	Imported Pit Run Borrow	0	Cu. Yds.	$ 12.00	$ -
42	Air/Vac Assemblies	1	L.S.	$ 3,500.00	$ 3,500
43	Untreated Base Course	400	Cu. Yds.	$ 15.00	$ 6,000
44	Bituminous Surface Course	0	Cu. Yds.	$ 100.00	$ -
45	Bituminous Pavement Sawing	0	Ln. Ft.	$ 1.00	$ -
46	Line Tie-Ins (Beginning and end of the line)	2	Each	$ 3,500.00	$ 7,000
47	Boring and Jacking I-15, HWY 89, or Rail Road	0	Ln. Ft.	$ 350.00	$ -
48	Soil Proctor and Compaction Testing	1	L.S.	$ 1,000.00	$ 1,000
49	**SUBTOTAL**				**$ 98,000**
50	**CONSTRUCTION SUBTOTAL**				**$ 1,444,000**
51	Construction Contingency (15%)	1	L.S.	$ 220,000.00	**$ 220,000**
52	**CONSTRUCTION SUBTOTAL W/CONTINGENCY**				**$ 1,664,000**
PROFESSIONAL SERVICES & MISC. PROJECT COSTS					
53	Update Facility Plan	0	L.S.	$ 50,000.00	$ -
54	Administrative Services & Pre-Design	1	L.S.	$ 44,000.00	$ 44,000
55	Engineering Detailed Design Collection System	1	L.S.	$ 170,000.00	$ 170,000
56	Quality Control & Construction Observation	1	L.S.	$ 210,000.00	$ 210,000
57	Additional Engineering and Survey	1	L.S.	$ 45,000.00	$ 45,000
58	Attorney Fees (Legal & Bonding)	1	L.S.	$ 42,000.00	$ 42,000
59	Land Acquisition	5	Acres	$ 8,000.00	$ 40,000
60	DWQ Administration	1	L.S.	$ 25,000.00	$ 25,000
61	Inflation Increase	1	L.S.	$ 64,000.00	$ 64,000
62	**SUBTOTAL**				**$ 640,000**
63	**TOTAL PROJECT COST**				**$ 2,304,000**

SUNRISE ENGINEERING, INC.

CONSULTING ENGINEERS AND SURVEYORS

Opinion of Probable Costs

SUNRISE ENGINEERING

Project: Town of Manila
Wastewater Treatment Study
Mechanical Treatment Plant
Treatment
Alternative 1

Project No: 1696
Date:
By: DJ
Exhibit:

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	
TREATMENT PLANT (0.25 MGD)					
1	Mobilization	1	L.S.	$ 120,000.00	$ 120,000
2	Headworks	1	L.S.	$ 196,000.00	$ 196,000
3	Influent Pump Station	2	L.S.	$ 393,000.00	$ 786,000
4	STM Aerotor Biological Treatment	1	Each	$ 314,000.00	$ 314,000
5	Clarifier	1	L.S.	$ 236,000.00	$ 236,000
6	Disinfection	1	L.S.	$ 118,000.00	$ 118,000
7	RAS/WAS Pump Station	1	L.S.	$ 118,000.00	$ 118,000
8	Aerobic Digester	1	L.S.	$ 314,000.00	$ 314,000
9	Sludge Press	1	L.S.	$ 413,000.00	$ 413,000
10	Electrical Work	1	L.S.	$ 157,000.00	$ 157,000
11	SCADA and Instrumentation	1	L.S.	$ 79,000.00	$ 79,000
12	Misc. Equipment & Supplies	1	L.S.	$ 127,000.00	$ 127,000
13	Site Earthwork	1	L.S.	$ 157,000.00	$ 157,000
14	Landscaping	1	L.S.	$ 59,000.00	$ 59,000
15	Power to Site	7,000	Ln. Ft.	$ 20.00	$ 140,000
16	Fencing	1,300	Ln. Ft.	$ 20.00	$ 26,000
17	16' x 4" Gravel Access Road	400	Ln. Ft.	$ 5.00	$ 2,000
18	12" Discharge Line	500	Ln. Ft.	$ 35.00	$ 17,500
19	48" Manhole (Precast Concrete)	4	Each	$ 2,000.00	$ 8,000
20	**SUBTOTAL**				**$ 3,267,500**
21	**CONSTRUCTION SUBTOTAL**				**$ 3,267,500**
22	Construction Contingency (15%)	1	L.S.	$ 500,000.00	**$ 500,000**
23	**CONSTRUCTION SUBTOTAL W/CONTINGENCY**				**$ 3,767,500**
PROFESSIONAL SERVICES & MISC. PROJECT COSTS					
24	Update Facility Plan	1	L.S.	$ 50,000.00	$ 50,000
25	Administrative Services & Pre-Design	1	L.S.	$ 75,400.00	$ 75,400
26	Engineering Detailed Design Treatment Plant	1	L.S.	$ 301,400.00	$ 301,400
27	Electrical Engieering Design	1	L.S.	$ 74,100.00	$ 74,100
28	Quality Control & Construction Observation	1	L.S.	$ 376,800.00	$ 376,800
29	Additional Engineering and Survey	1	L.S.	$ 75,400.00	$ 75,400
30	Attorney Fees (Legal & Bonding)	1	L.S.	$ 75,400.00	$ 75,400
31	DWQ Administration	1	Each	$ 25,000.00	$ 25,000
31	Inflation Increase	1	L.S.	$ 113,000.00	$ 113,000
32	Land Acquisition	2	Acres	$ 8,000.00	$ 16,000
33	**SUBTOTAL**				**$ 1,182,500**
34	**TOTAL PROJECT COST**				**$ 4,950,000**

SUNRISE ENGINEERING, INC.

CONSULTING ENGINEERS AND SURVEYORS

Opinion of Probable Costs

SUNRISE ENGINEERING

Project: Town of Manila
Wastewater Treatment Study
Total Containment Treatment Lagoons
Treatment
Alternative 2

Project No: 1696
Date:
By: DJ
Exhibit:

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	
TREATMENT LAGOONS TOTAL CONTAINMENT					
1	Mobilization	1	L.S.	$ 36,500.00	$ 36,500
2	Clearing and Grubing	1	L.S.	$ 5,000.00	$ 5,000
3	Earthwork for Lagoon Construction	1	L.S.	$ 150,000.00	$ 150,000
4	Level Indicators	3	Each	$ 500.00	$ 1,500
5	Clay Lagoon Liner	5,300	Cu. Yd.	$ 15.00	$ 79,500
6	Riprap	5,300	Cu. Yd.	$ 20.00	$ 106,000
7	Inlet Sturcture	2	L.S.	$ 10,000.00	$ 20,000
8	Transfer Sturcture	3	L.S.	$ 8,000.00	$ 24,000
9	12" Gravity Sewer Pipe (PVC SDR 35 ASTM)	500	Ln. Ft.	$ 35.00	$ 17,500
10	Removal of Existing Fence	1	Ln. Ft.	$ 5,000.00	$ 5,000
11	Fencing	3,000	L.S.	$ 20.00	$ 60,000
12	Connect Existing Lagoon to New Lagoons	1	L.S.	$ 10,000.00	$ 10,000
13	Gravel Access Road (16'x4")	2,000	Ln. Ft.	$ 7.00	$ 14,000
14	**SUBTOTAL**				**$ 529,000**
15	**CONSTRUCTION SUBTOTAL**				**$ 529,000**
16	Construction Contingency (15%)	1	L.S.	$ 80,000.00	**$ 80,000**
17	**CONSTRUCTION SUBTOTAL W/CONTINGENCY**				**$ 609,000**
PROFESSIONAL SERVICES & MISC. PROJECT COSTS					
18	Update Facility Plan	1	L.S.	$ 50,000.00	$ 50,000
19	Administrative Services & Pre-Design	1	L.S.	$ 12,000.00	$ 12,000
20	Engineering Detailed Design Collection System	1	L.S.	$ 45,000.00	$ 45,000
21	Quality Control & Construction Observation	1	L.S.	$ 56,000.00	$ 56,000
22	Additional Engineering and Survey	1	L.S.	$ 13,000.00	$ 13,000
23	Attorney Fees (Legal & Bonding)	1	L.S.	$ 12,000.00	$ 12,000
24	DWQ Administration	1	L.S.	$ 25,000.00	$ 25,000
25	Inflation Increase	1	L.S.	$ 18,000.00	$ 18,000
26	Land Acquisition	20	Acres	$ 8,000.00	$ 160,000
27	**SUBTOTAL**				**$ 391,000**
28	**TOTAL PROJECT COST**				**$ 1,000,000**

SUNRISE ENGINEERING, INC.

CONSULTING ENGINEERS AND SURVEYORS

Opinion of Probable Costs

SUNRISE ENGINEERING

Project: Town of Manila
Wastewater Treatment Study
Treatment Lagoons Discharging / Land Application
Treatment
Alternative 3

Project No: 1696
Date:
By: DJ
Exhibit:

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	
TREATMENT LAGOONS DISCHARGING / LAND APPLICATION (0.25 MGD)					
1	Mobilization	1	L.S.	$ 50,000.00	$ 50,000
2	Headworks	1	L.S.	$ 1,000.00	$ 1,000
3	Disinfection	1	L.S.	$ 90,000.00	$ 90,000
4	Pump Station	1	L.S.	$ 100,000.00	$ 100,000
5	420 GPM Pump and Controls	1	L.S.	$ 12,000.00	$ 12,000
6	Electrical Work	1	L.S.	$ 24,000.00	$ 24,000
7	Misc. Equipment & Supplies	1	L.S.	$ 25,000.00	$ 25,000
8	Site Earthwork	1	L.S.	$ 30,000.00	$ 30,000
9	Landscaping	1	L.S.	$ 5,000.00	$ 5,000
10	Power to Site	9,000	Ln. Ft.	$ 5.00	$ 45,000
11	Power to the Pivot	2,000	Ln. Ft.	$ 10.00	$ 20,000
12	Fencing	5,400	Ln. Ft.	$ 20.00	$ 108,000
13	16' x 4" Gravel Access Road	1,000	Ln. Ft.	$ 7.00	$ 7,000
14	12" Discharge Line	2,000	Ln. Ft.	$ 25.00	$ 50,000
15	48" Manhole (Precast Concrete)	2	Each	$ 3,500.00	$ 7,000
16	Run off Berm	1	L.S.	$ 50,000.00	$ 50,000
17	Pivot Sprinkler, Filter and Instrumentation	1	Each	$ 55,000.00	$ 55,000
18	**SUBTOTAL**				**$ 679,000**
19	**CONSTRUCTION SUBTOTAL**				**$ 679,000**
20	Construction Contingency (15%)	1	L.S.	$ 110,000.00	**$ 110,000**
21	**CONSTRUCTION SUBTOTAL W/CONTINGENCY**				**$ 789,000**
PROFESSIONAL SERVICES & MISC. PROJECT COSTS					
22	Update Facility Plan	1	L.S.	$ 50,000.00	$ 50,000
23	Administrative Services & Pre-Design	1	L.S.	$ 16,000.00	$ 16,000
24	Engineering Detailed Design Collection System	1	L.S.	$ 62,000.00	$ 62,000
25	Electrical Engieering Design	1	L.S.	$ 39,000.00	$ 39,000
26	Quality Control & Construction Observation	1	L.S.	$ 76,000.00	$ 76,000
27	Additional Engineering and Survey	1	L.S.	$ 16,000.00	$ 16,000
28	Attorney Fees (Legal & Bonding)	1	L.S.	$ 16,000.00	$ 16,000
29	Land Acquisition	40	Acres	$ 5,000.00	$ 200,000
30	DWQ Administration	1	L.S.	$ 25,000.00	$ 25,000
31	Inflation Increase	1	L.S.	$ 23,000.00	$ 23,000
32	**SUBTOTAL**				**$ 523,000**
33	**TOTAL PROJECT COST**				**$ 1,312,000**

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
240 West Highway 40 (333-4)
Roosevelt, UT 84066

FEB - 9 2007

February 8, 2007

Derek Johnson
Sunrise Engineering
12227 South Business Park DR., STE 220
Draper, Utah 84020

RE: Manila Wastewater System Environmental Assessment

Dear Mr. Johnson:

We have reviewed your request for evaluation of the potential impact of the proposed project on prime, state important and unique farmlands. The areas involved in the proposed project do not contain, prime, state important and unique farmlands for one or more of the following reasons:

1. The work will be within existing right-of-ways; and or

2. The soils can not be managed so that, in all horizons within a depth of 40 inches (1.0 meters) or in the root zone if the root zone is less than 40 inches deep during part of each year, the conductivity of the saturation extract is less than 4 mmhos/cm; and or

3. The soils have a pH of greater than 8.5 in horizons within a depth of 40 inches (1 meter) or in the root zone if the root zone is less than 40 inches deep; and or

4. The product of I (soil erodibility) X C (climatic factor) exceeds 60.

I am enclosing a NRCS-CPA-106 FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS for your use. Should you have any questions regarding this determination, please contact me at (435) 722-4621 ext. 116 or e-mail me at robert.fish@ut.usda.gov.

Robert H. Fish
Area Soil Scientist

Enclosure

Cc: Karyl Fritsche, DC, NRCS, Vernal, UT

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
(Rev. 1-91)

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*	3. Date of Land Evaluation Request 1/8/07	4. Sheet 1 of 1
1. Name of Project Manila Wastewater System, Daggett Co., UT	5. Federal Agency Involved	
2. Type of Project Wastewater Treatment and Other Improvem	6. County and State Daggett County, UT	

PART II *(To be completed by NRCS)*	1. Date Request Received by NRCS 1/9/07	2. Person Completing Form Robert H. Fish
3. Does the corridor contain prime, unique statewide or local important farmland? YES ☐ NO ☑ (If no, the FPPA does not apply - Do not complete additional parts of this form)		4. Acres Irrigated / Average Farm Size
5. Major Crop(s)	6. Farmable Land In Government Jurisdiction Acres: %	7. Amount of Farmland As Defined in FPPA Acres: %
8. Name Of Land Evaluation System Used	9. Name of Local Site Assessment System	10. Date Land Evaluation Returned by NRCS

PART III *(To be completed by Federal Agency)*	Alternative Corridor For Segment			
	Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly				
B. Total Acres To Be Converted Indirectly, Or To Receive Services				
C. Total Acres In Corridor	0	0	0	0
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*				
PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))*	Maximum Points			
1. Area In Nonurban Use	15			
2. Perimeter In Nonurban Use	10			
3. Percent Of Corridor Being Farmed	20			
4. Protection Provided By State And Local Government	20			
5. Size of Present Farm Unit Compared To Average	10			
6. Creation Of Nonfarmable Farmland	25			
7. Availability Of Farm Support Services	5			
8. On-Farm Investments	20			
9. Effects Of Conversion On Farm Support Services	25			
10. Compatibility With Existing Agricultural Use	10			
TOTAL CORRIDOR ASSESSMENT POINTS	160	0	0	0	0
PART VII *(To be completed by Federal Agency)*				
Relative Value Of Farmland (From Part V)	100			
Total Corridor Assessment (From Part VI above or a local site assessment)	160	0	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	0	0	0	0

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES ☐ NO ☐

5. Reason For Selection:

Signature of Person Completing this Part: DATE

NOTE: Complete a form for each segment with more than one Alternate Corridor

CORRIDOR - TYPE SITE ASSESSMENT CRITERIA

The following criteria are to be used for projects that have a linear or corridor - type site configuration connecting two distant points, and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor - type site or design alternative for protection as farmland along with the land evaluation information.

(1) How much land is in nonurban use within a radius of 1.0 mile from where the project is intended?
More than 90 percent - 15 points
90 to 20 percent - 14 to 1 point(s)
Less than 20 percent - 0 points

(2) How much of the perimeter of the site borders on land in nonurban use?
More than 90 percent - 10 points
90 to 20 percent - 9 to 1 point(s)
Less than 20 percent - 0 points

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?
More than 90 percent - 20 points
90 to 20 percent - 19 to 1 point(s)
Less than 20 percent - 0 points

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?
Site is protected - 20 points
Site is not protected - 0 points

(5) Is the farm unit(s) containing the site (before the project) as large as the average - size farming unit in the County ?
(Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage or Farm Units in Operation with $1,000 or more in sales.)
As large or larger - 10 points
Below average - deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average - 9 to 0 points

(6) If the site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?
Acreage equal to more than 25 percent of acres directly converted by the project - 25 points
Acreage equal to between 25 and 5 percent of the acres directly converted by the project - 1 to 24 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project - 0 points

(7) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?
All required services are available - 5 points
Some required services are available - 4 to 1 point(s)
No required services are available - 0 points

(8) Does the site have substantial and well-maintained on-farm investments such as barns, other storage building, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?
High amount of on-farm investment - 20 points
Moderate amount of on-farm investment - 19 to 1 point(s)
No on-farm investment - 0 points

(9) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?
Substantial reduction in demand for support services if the site is converted - 25 points
Some reduction in demand for support services if the site is converted - 1 to 24 point(s)
No significant reduction in demand for support services if the site is converted - 0 points

(10) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?
Proposed project is incompatible to existing agricultural use of surrounding farmland - 10 points
Proposed project is tolerable to existing agricultural use of surrounding farmland - 9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland - 0 points

Derek Johnson

From: Green, Nathan J SPK [Nathan.J.Green@spk01.usace.army.mil]
Sent: Friday, February 23, 2007 12:35 PM
To: djohnson@sunrise-eng.com
Subject: Manila Wastewater System EA (UNCLASSIFIED)

Classification: UNCLASSIFIED
Caveats: NONE

Hello Mr. Johnson,

This email is in response to your letter, dated January 8, 2007, regarding the Manila Wastewater System Environmental Assessment. In your letter you requested information on the possible impacts of this project on Waters of the United States and wetlands. We do not have a comprehensive list or map of jurisdictional waters or wetlands. The Corps of Engineers has jurisdiction over the placement of dredged or fill material within the ordinary high water mark of waters of the United States and adjacent wetlands under Section 404 of the Clean Water Act and under Section 10 of the Rivers and Harbors Act. In order to process a Department of the Army permit, the applicant needs to submit a wetlands delineation with the permit application describing all jurisdictional waters within the project area. This delineation then would be verified by a representative of this office. I have included a short checklist describing the necessary items for a complete application. I appreciate the opportunity to comment on this project. Please feel free to contact me with any other questions.

Sincerely,

Nathan Green
Regulatory Project Manager
Colorado/Gunnison Basin Regulatory Office
400 Rood Avenue, Room 142
Grand Junction, Colorado 81501-2563
(970) 243-1199 extension 12
(970) 241-2358 fax

www.spk.usace.army.mil/regulatory

<<NWchecklist.doc>>

Classification: UNCLASSIFIED
Caveats: NONE

State of Utah

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

Department of Community and Culture

PALMER DePAULIS
Executive Director

State History

PHILIP F. NOTARIANNI
Division Director

January 18, 2007

Derek Johnson
Sunrise Engineering
12227 South Business Park Drive, Suite 220
Draper, Utah 84020

RE: Manila Wastewater System Environmental Assessment

In reply, please refer to Case No. 07-0043

Dear Mr. Johnson:

The Utah State Historic Preservation Office received your request for comment on the above referenced project on January 10, 2007. You have noted that you are producing an Environmental Assessment for the project. We therefore assume that a federal agency or agency representative is involved in the project and that you are conducting consultation with our office on their behalf under Section 106 of the National Historic Preservation Act and its implementing regulations (36CFR800). You have requested our comment regarding the "potential impact of the proposed project on historical properties."

We appreciate the consideration of cultural resources and can provide the following comment. Your project is in an area with moderate to high potential for cultural resources, particularly historical resources and archaeological sites, and that it appears that each alternative has the potential to affect cultural resources (per 36CFR800.3(a)(1)). We therefore recommend that the involved federal agency (or agency representative) conduct cultural resource identification efforts for the project, per 36CFR800.4. We are available for consultation regarding the scope and nature of these identification efforts (per 36CFR800.4(b)). We recommend that you contact the involved agency(ies) or their representatives regarding how best to proceed further with consultation with our office for this project. We note that we do not consider consultation with our office under 36CFR800 to be complete at this point as we have not received an agency determination of eligibility and effect for this project.

This letter serves as our comment per your request. If you have questions, please contact me at (801) 533-3555 or mseddon@utah.gov.

Sincerely,

Matthew T. Seddon, Ph.D., RPA
Deputy State Historic Preservation Officer - Archaeology

January 8, 2007

Rick Sprott, Director
Utah Division of Air Quality
P.O. Box 144820
Salt Lake City, Utah 84114-4820

RE: Manila Wastewater System Environmental Assessment

Dear Mr. Sprott:

Sunrise Engineering Inc. is working on an environmental assessment (EA) for the Town of Manila in Daggett County, Utah. In order to convey and treat future wastewater flows, the Town has plans to expand its treatment facility and construct a new interceptor line (see Map1). The main interceptor line will need to run through some agricultural land. The study is looking at three alternatives for the treatment of the wastewater.

- Alternative 1 New Manila Town Mechanical Wastewater Treatment Plant. The plant will be located adjacent to the Town's existing total containment lagoons.
- Alternative 2 Increase the size of the Town's existing total containment lagoons. (See map 2)
- Alternative 3 Convert existing lagoons to discharging lagoons with land disposal. (See map 3)

The construction of the proposed interceptor line will primarily involve excavation of trenches, installation of sewer pipes and backfilling of the trenches after pipe installation.

Please evaluate the potential impact of the proposed project on prime and unique farmlands if any. We appreciate your help in this matter.

Should you have any questions regarding this request, please contact me at (801) 523-0100 or e-mail me at djohnson@sunrise-eng.com.

Sincerely,

Derek Johnson E.I.T.

Enclosure(s): Maps

January 8, 2007

Mr. Kevin Conway, Director
Utah Wildlife Resources
1594 West North Temple
Salt Lake City, Utah 84116-3195

RE: Manila Wastewater System Environmental Assessment

Dear Mr. Conway:

Sunrise Engineering Inc. is working on an environmental assessment (EA) for the Town of Manila in Daggett County, Utah. In order to convey and treat future wastewater flows, the Town has plans to expand its treatment facility and construct a new interceptor line (see Map1). The main interceptor line will need to run through some agricultural land. The study is looking at three alternatives for the treatment of the wastewater.

- Alternative 1 New Manila Town Mechanical Wastewater Treatment Plant. The plant will be located adjacent to the Town's existing total containment lagoons.
- Alternative 2 Increase the size of the Town's existing total containment lagoons. (See map 2)
- Alternative 3 Convert existing lagoons to discharging lagoons with land disposal. (See map 3)

The construction of the proposed interceptor line will primarily involve excavation of trenches, installation of sewer pipes and backfilling of the trenches after pipe installation.

Please evaluate the potential impact of the proposed project on any aquatic and terrestrial wildlife concerns if any. We appreciate your help in this matter.

Should you have any questions regarding this request, please contact me at (801) 523-0100 or e-mail me at djohnson@sunrise-eng.com.

Sincerely,

Derek Johnson E.I.T.

Enclosure(s): Maps

January 8, 2007

Mr. Brooks Carter, Chief
Corps of Engineers
Utah Regulatory Office
1403 South 600 West
Bountiful, Utah 84010

RE: Manila Wastewater System Environmental Assessment

Dear Mr. Carter:

Sunrise Engineering Inc. is working on an environmental assessment (EA) for the Town of Manila in Daggett County, Utah. In order to convey and treat future wastewater flows, the Town has plans to expand its treatment facility and construct a new interceptor line (see Map1). The main interceptor line will need to run through some agricultural land. The study is looking at three alternatives for the treatment of the wastewater.

- Alternative 1 New Manila Town Mechanical Wastewater Treatment Plant. The plant will be located adjacent to the Town's existing total containment lagoons.
- Alternative 2 Increase the size of the Town's existing total containment lagoons. (See map 2)
- Alternative 3 Convert existing lagoons to discharging lagoons with land disposal. (See map 3)

The construction of the proposed interceptor line will primarily involve excavation of trenches, installation of sewer pipes and backfilling of the trenches after pipe installation.

Please evaluate the potential impact of the proposed project on local wetlands if any. We appreciate your help in this matter.

Should you have any questions regarding this request, please contact me at (801) 523-0100 or e-mail me at djohnson@sunrise-eng.com.

Sincerely,

Derek Johnson E.I.T.

Enclosure(s): Maps

January 8, 2007

Henry R. Maddux
U.S. Fish and Wildlife Service
2360 W. Orton Circle, Suite 50
West Valley City, Utah 84119

RE: Manila Wastewater System Environmental Assessment

Dear Mr. Maddux:

Sunrise Engineering Inc. is working on an environmental assessment (EA) for the Town of Manila in Daggett County, Utah. In order to convey and treat future wastewater flows, the Town has plans to expand its treatment facility and construct a new interceptor line (see Map1). The main interceptor line will need to run through some agricultural land. The study considers three alternatives for the treatment of the wastewater.

- Alternative 1 New Manila Town Mechanical Wastewater Treatment Plant. The plant will be located adjacent to the Town's existing total containment lagoons.
- Alternative 2 Increase the size of the Town's existing total containment lagoons. (See map 2)
- Alternative 3 Convert existing lagoons to discharging lagoons with land disposal. (See map 3)

The construction of the proposed interceptor line will primarily involve excavation of trenches, installation of sewer pipes and backfilling of the trenches after pipe installation.

Please evaluate the potential impact of the proposed project on any endangered species if any. We appreciate your help in this matter.

Should you have any questions regarding this request, please contact me at (801) 523-0100 or e-mail me at djohnson@sunrise-eng.com.

Sincerely,

Derek Johnson E.I.T.

Enclosure(s): Maps

January 8, 2007

Dan Carlson
Flood Plain Manager
Federal Emergency Management Agency
Federal Center, Bldg. 710
P.O. Box 25267
Denver, Colorado 80225-0267

RE: Manila Wastewater System Environmental Assessment

Dear Mr. Carlson:

Sunrise Engineering Inc. is working on an environmental assessment (EA) for the Town of Manila in Daggett County, Utah. In order to convey and treat future wastewater flows, the Town has plans to expand its treatment facility and construct a new interceptor line (see Map1). The main interceptor line will need to run through some agricultural land. The study considers three alternatives for the treatment of the wastewater.

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- Alternative 2 Increase the size of the Town's existing total containment lagoons. (See map 2)
- Alternative 3 Convert existing lagoons to discharging lagoons with land disposal. (See map 3)

The construction of the proposed interceptor line will primarily involve excavation of trenches, installation of sewer pipes and backfilling of the trenches after pipe installation.

Please evaluate the potential impact of the proposed project on any flood plain concerns if any. We appreciate your help in this matter.

Should you have any questions regarding this request, please contact me at (801) 523-0100 or e-mail me at djohnson@sunrise-eng.com.

Sincerely,

Derek Johnson E.I.T.

Enclosure(s): Maps

January 8, 2007

Mr. James L. Dykman
Compliance Archaeologist
Division of State History
300 Rio Grande
Salt Lake City, Utah 84101-1182

RE: Manila Wastewater System Environmental Assessment

Dear Mr. Dykman:

Sunrise Engineering Inc. is working on an environmental assessment (EA) for the Town of Manila in Daggett County, Utah. In order to convey and treat future wastewater flows, the Town has plans to expand its treatment facility and construct a new interceptor line (see Map1). The main interceptor line will need to run through some agricultural land. The study considers three alternatives for the treatment of the wastewater.

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- Alternative 2 Increase the size of the Town's existing total containment lagoons. (See map 2)
- Alternative 3 Convert existing lagoons to discharging lagoons with land disposal. (See map 3)

The construction of the proposed interceptor line will primarily involve excavation of trenches, installation of sewer pipes and backfilling of the trenches after pipe installation.

Please evaluate the potential impact of the proposed project on historical properties if any. We appreciate your help in this matter.

Should you have any questions regarding this request, please contact me at (801) 523-0100 or e-mail me at djohnson@sunrise-eng.com.

Sincerely,

Derek Johnson E.I.T.

Enclosure(s): Maps

January 8, 2007

Mr. Bill Broderson
State Soil Scientist
USDA, Soil Conservation Service
125 South State, Room 4402
Salt Lake City, Utah 84138

RE: Manila Wastewater System Environmental Assessment

Dear Mr. Broderson:

Sunrise Engineering Inc. is working on an environmental assessment (EA) for the Town of Manila in Daggett County, Utah. In order to convey and treat future wastewater flows, the Town has plans to expand its treatment facility and construct a new interceptor line (see Map1). The main interceptor line will need to run through some agricultural land. The study is looking at three alternatives for the treatment of the wastewater.

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- Alternative 2 Increase the size of the Town's existing total containment lagoons. (See map 2)
- Alternative 3 Convert existing lagoons to discharging lagoons with land disposal. (See map 3)

The construction of the proposed interceptor line will primarily involve excavation of trenches, installation of sewer pipes and backfilling of the trenches after pipe installation.

Please evaluate the potential impact of the proposed project on prime and unique farmlands if any. We appreciate your help in this matter.

Should you have any questions regarding this request, please contact me at (801) 523-0100 or e-mail me at djohnson@sunrise-eng.com.

Sincerely,

Derek Johnson E.I.T.

Enclosure(s): Maps