

REQUEST FOR AMENDMENT TO
208 AREA-WIDE WATER
QUALITY MANAGEMENT PLAN

Prepared for
City of Kingman, Arizona
August 2007

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BROWN AND CALDWELL

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LIST OF ACRONYMS

°F	Fahrenheit
AAC	Arizona Administrative Code
ADEQ	Arizona Department of Environmental Quality
ADWR	Arizona Department of Water Resources
amsl	above mean sea level
APP	Aquifer Protection Permit
AWQS	Aquifer Water Quality Standard
AZPDES	Arizona Pollutant Discharge Elimination System
Carollo	John Carollo Engineers
City	City of Kingman
CWA	Clean Water Act
DMA	Designated Management Area
DPA	Designated Planning Agency
DU/acre	dwelling units per acre
gpcpd	gallons per capita per day
gpm	gallons per minute
GWSI	Groundwater Site Inventory
HP	horsepower
kW	kilowatt
lb	pound
mg/L	milligrams per liter
MGD	millions of gallons per day
NFPA	National Fire Protection Agency
NTU	Nephelmic turbidity units
POPTAC	Population Technical Advisory Committee
PPD	pounds per day
RAS	return activated sludge
sf	square feet
TKN	total Kjeldahl nitrogen
WAS	waste activated sludge
WIFA	Water Infrastructure Financing Authority
WWTP	wastewater treatment plant

EXECUTIVE SUMMARY

The regional Water Quality Management Plan for Mohave County, Arizona, based on Section 208(2)(b) of the Clean Water Act (CWA), is developed and provided by Mohave County. The goal of the 208 Plan is to identify area-wide wastewater treatment needs and water quality management problems, and to establish a program that will protect, maintain, and improve, where necessary and reasonable, those needs and problems. As the designated regional water quality management agency responsible for water quality planning, Mohave County has delegated authority over four Designated Management Areas (DMAs): the cities of Kingman, Lake Havasu, Bullhead City and Colorado City.

The City of Kingman (City) and surrounding area has experienced steady, sustained growth within the last decade. The City is currently served by two wastewater treatment plants (WWTPs): the Downtown WWTP and the Hilltop WWTP. Based on the population growth, an aging facility and the need for a higher degree of treatment, the City is planning to expand and upgrade the Hilltop WWTP. As such, the City has prepared this 208 Plan Amendment application to request that the Mohave County 208 Plan be amended to include the planned expansion and upgrades described herein. This amendment does not address any issues related to the Downtown WWTP.

The planned upgrades and expansion of the Hilltop WWTP will be conducted in two phases. Phase 1 will bring the plant's current permitted average day flow capacity from 3 million gallons per day (MGD) to 5.1 MGD, which will accommodate the projected population up to the year 2020. Phase 1 will consist of the following treatment process:

- Preliminary treatment – The new plant headworks will include screening, grit removal, low-head pumping and magnetic flow metering. The area of the influent screens, screenings compactors and the screenings collection containers will be enclosed in a block building. Odor control will be added for the flow channels (which will be covered), the screen enclosure and the influent pumping wet well. Foul air collection and removal equipment for the occupied space will be added to provide a safe working environment for personnel.
- Secondary treatment – The upgraded secondary process for biological nutrient reduction will utilize an oxidation ditch system and will be sized to treat the Phase 1 Maximum Day flow. The oxidation ditch process provides nitrification/denitrification to achieve Class B+ quality effluent. The flow will be treated in two oxidation ditches for Phase 1, designed with common-wall construction, followed by secondary clarifiers, and return activated sludge (RAS) pumping. The facility will be planned to easily add another pair of equally-sized oxidation ditches and additional secondary clarifiers for Phase 2.
- Polishing process – Secondary treated effluent will enter an existing transfer pump forebay that will then convey the water to the existing wetlands, where natural ultraviolet disinfection (solar radiation) and additional suspended solids removal occur, enabling the effluent to meet the Class B+ quality standards.
- Tertiary treatment – Intermittently, a sidestream of up to 1 MGD will be filtered and disinfected (chlorinated) to bring the effluent to a Class A+ quality.

Treated effluent will be primarily disposed of via the use of existing surface infiltration basins. Some amount of treated effluent will be used for onsite landscape irrigation. The sidestream of up to 1 MGD of Class A+ quality effluent will be made available for numerous types of reuse applications off site, including residential and/or school yard landscape irrigation, recreational impoundments, fire protection systems, dust control for roads and golf course irrigation. Any remaining effluent will be discharged to Mohave Wash via an Arizona Pollutant Discharge Elimination System (AZPDES) permit.

Sludge generated through the treatment process will be dewatered and transported off site to the Mohave County Cerbat Landfill.

Phase 2 will expand the total average daily flow capacity of the Hilltop WWTP to 10.1 MGD by the year 2030 by doubling the treatment trains. The plant will continue to produce primarily Class B+ effluent with the additional sidestream being treated to Class A+ quality. Phase 2 will provide capacity to serve an estimated population of 74,600.

Permits and authorizations required for the planned upgrades and expansion include an amendment to the Mohave County 208 Plan, an amendment to the existing Aquifer Protection Permit, an AZPDES permit, a Sewage Collection System 4.01 General Permit, Type 2 General Permits for Reclaimed Water and an AZPDES General Stormwater Permit for Construction Activity Discharges.

The total estimated project cost for the Phase 1 upgrades and expansion is \$34,100,000. All of the funding for Phase 1 will come from a loan secured from the Arizona Water Infrastructure Financing Authority (WIFA).

1. INTRODUCTION

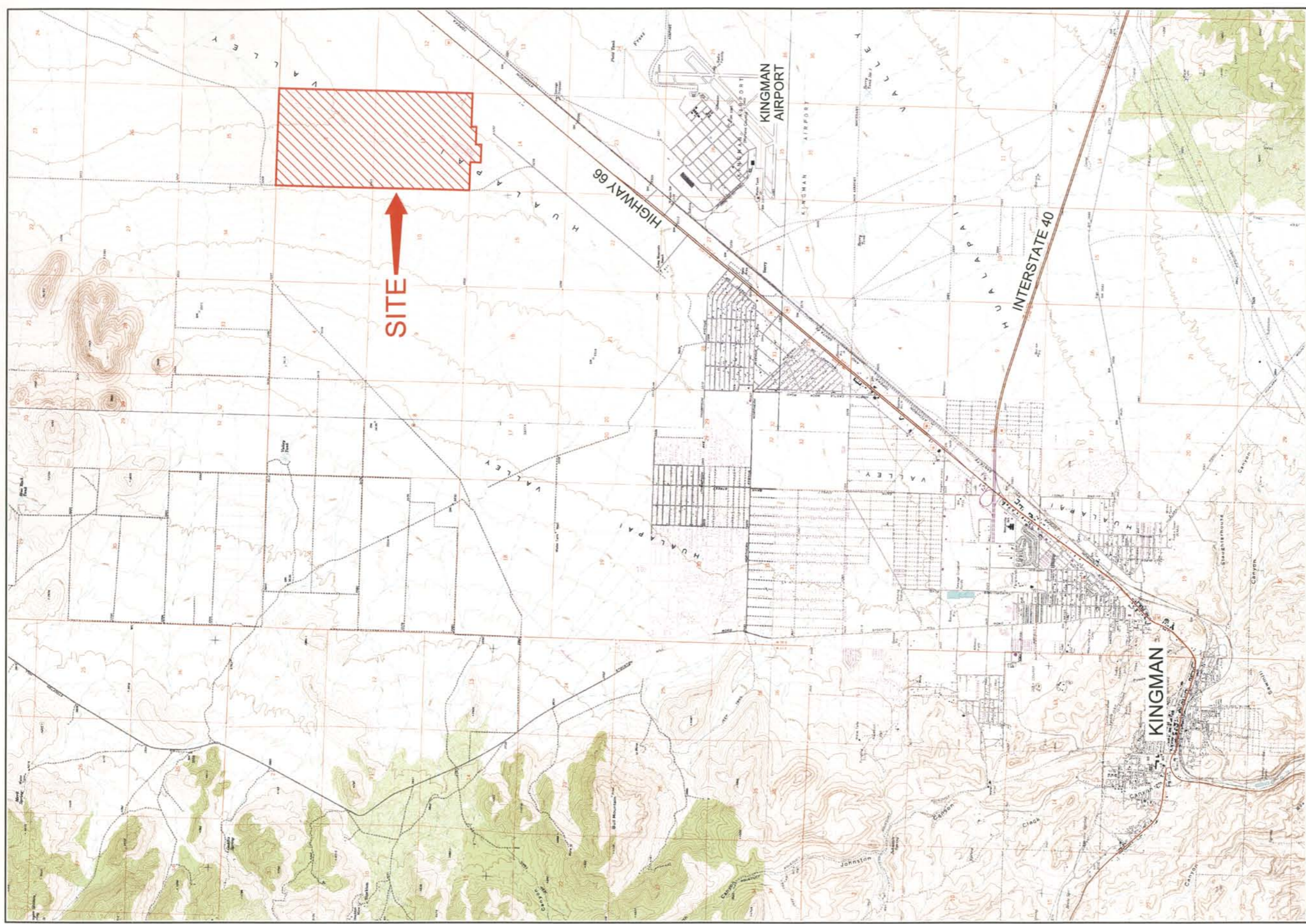
The Federal Water Pollution Control Act, or Clean Water Act (CWA) of 1972, requires states to establish regional water quality management plans to prepare for, and adequately accommodate, the sewer needs of existing and projected populations, while ensuring a high quality of water resources. Section 208 of the CWA requires each state to assign Designated Planning Agencies (DPAs) for the purpose of developing regional water quality management plans and addressing drinking water, wastewater and water quality management issues. Mohave County was authorized as the DPA for the cities of Kingman, Bullhead City, Lake Havasu and Colorado City. Mohave County developed the regional water quality management plan (208 Plan), which was approved by the Board of Supervisors on December 15, 2003.

As one of five Designated Management Areas (DMAs) within Mohave County, the City of Kingman has been granted authority to implement and enforce portions of the 208 Plan. As such, the City is requesting an amendment to the Mohave County 208 Plan to include the expansion and upgrading of the City's Hilltop Wastewater Treatment Plant (WWTP). This CWA 208 Amendment application provides information on the proposed expansion and upgrades to the Hilltop WWTP. The following sections describe how the Section 208 requirements are addressed, including treatment facility design, sludge management, treatment alternatives, permitting and financing.

There are two wastewater treatment facilities that serve the population in and near the City of Kingman. The Downtown WWTP serves a relatively small area in the southwest portion of the City. The Hilltop WWTP serves the remainder of the City and sewer development outside the city limits but inside the Kingman Planning Area, including the Kingman Airport and Airport Industrial Park. Figure 1 shows the location of the Hilltop WWTP and the surrounding area. A natural ridge separates the Downtown WWTP area from the rest of the City. Wastewater north and east of the ridge flows into the Hilltop WWTP. Due to an aging facility, population growth and the need for a higher degree of treatment, the City is planning to expand and upgrade the Hilltop WWTP. This amendment application does not address any issues related to the Downtown WWTP.

The proposed expansion and upgrades will be implemented in two phases. Phase 1 will bring the plant's current permitted capacity from 3 million gallons per day (MGD) to 5.1 MGD, which will accommodate up to the 2020 projected population. The treatment train will be designed to achieve a Class B+ quality effluent, in accordance with Arizona Administrative Code (AAC) R18-11-305. A sidestream of effluent will be treated to Class A+ quality for reuse purposes offsite. Phase 1 treatment process will include the following components:

- Headworks with screening, grit removal, low head pumping and flow measurement.
- Biological nutrient reduction using an oxidation ditch system, which will provide nitrification/denitrification of the effluent to achieve the Class B+ quality; the oxidation ditches will be sized to handle the Phase 1 Maximum Day flow.
- Natural ultraviolet disinfection and additional suspended solids removal using existing wetlands cells.



SOURCE: USGS 7.5-MINUTE TOPOGRAPHIC QUADRANGLES - KINGMAN / KINGMAN AIRPORT / RATTLESNAKE HILL / STOCKTON HILL, ARIZONA

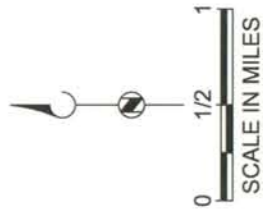


Figure 1
SITE LOCATION MAP
 CITY OF KINGMAN
 HILLTOP WASTEWATER TREATMENT PLANT

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- Tertiary treatment, which consists of filtration and disinfection (chlorination) of a sidestream of effluent, up to 1 MGD of effluent to Class A+ quality for reuse.

Phase 2 of the project will expand the total average day flow capacity of the Hilltop WWTP from 5.1 to 10.1 MGD by the year 2030. The same oxidation ditch process will be utilized in Phase 2.

2. GENERAL INFORMATION

2.1 Facility Location and Land Use

The Hilltop WWTP is located approximately 5 miles northeast of the Kingman city limits, west of State Route 66, in Mohave County, Arizona. The cadastral location of the Hilltop WWTP is all of Sections 2 and 11 and a portion of the northern quarter of Section 14 of Township 22 North, Range 16 West of the Salt and Gila rivers baseline and meridian. The WWTP site boundary encompasses over 1,300 acres. Figure 1 shows the location of the Hilltop WWTP and the surrounding area. Figure 2 shows the layout of the WWTP facilities within the property boundaries.

The Hilltop WWTP is located within and along the southwestern edge of the Hualapai Valley. The Hualapai Valley is an elongated, north-south-trending alluvial basin bound on the west by the Cerbat Mountains and on the east by the Music Mountains and Grand Wash Cliffs. Mohave Wash, an ephemeral wash, begins in and drains north of Kingman, then flows northward parallel with the Hualapai Valley axis, through the WWTP property (see Figures 1 and 2) and eventually drains into a dry lake (Red Lake).

2.2 Land Ownership and Surrounding Land Use

The land on which the Hilltop WWTP is located is owned by the City. Currently, the area immediately surrounding the Hilltop WWTP and within at least 1/2-mile radius of the facility, consists of privately-owned vacant land. Farther out, within the 1 to 2-mile radius of the WWTP, there exists a combination of Low Density Residential (one to two dwelling units per acre [DU/acre]), Rural Density Residential (1 DU/acre or less), Light Industrial, Manufacturing Industrial zoned land, and vacant land.

2.3 Topography and Climate

Surface elevations across the Hualapai Valley range from 7,150 feet above mean sea level (amsl) in the Cerbat Mountains to approximately 3,100 feet amsl in the valley floor and 6,500 feet amsl in the Grand Wash Cliffs. The Hualapai Valley floor generally slopes downward toward the north. The Hilltop WWTP is located just east of the gently sloping alluvial fan that extends from the base of the Cerbat Mountains. Surface elevations across the WWTP property range from approximately 3,230 to 3,240 feet amsl.

The valley floor is sparsely covered with desert vegetation. The natural vegetation varies with the topography and water availability, but includes Mohave Desert scrub, juniper and pinion pines, desert mallow, brittlebush, hedgehog cactus, yucca, and numerous grasses.

The climate of the Kingman area is arid with hot, dry summers and mild, cool winters. Average annual maximum temperatures in the Kingman area range from 95.9 Fahrenheit (°F) in July to 54.1°F in January (Western Regional Climate Center 2006). Average annual minimum temperatures range from 69.3°F in July to 31.4°F in January. The average annual precipitation for the Kingman area is 10.47 inches. The peak months for rainfall in this area are March and August.

2.4 Geology

The Hualapai Valley, which covers 1,820 square miles, marks the transition between the Mohave Desert and the Colorado Plateau. The valley is bounded on the west by the Cerbat and White Mountains, on the east by the Grand Wash Cliffs and Music Mountains, on the south by the Peacock and Hualapai Mountains, and on the north by Lake Mead.

The bedrock of the mountains that bound the valley consists of granitic, metamorphic, sedimentary and volcanic rocks. In most areas, the bedrock is relatively impermeable compared to the basin fill and forms barriers to groundwater movement in the basin-fill aquifer (Anning, et.al. 2006). The thickness of the basin-fill sediments in the Hualapai Valley range from a thin veneer along the mountain fronts to more than 5,000 feet in the center of the valley. In the vicinity of the Hilltop WWTP, the thickness of the basin-fill sediments is between 1,000 and 5,000 feet (Anning, et.al. 2006).

2.5 Groundwater

The basin fill in the Hualapai Valley is divided into three separate hydrogeologic units: an older, intermediate, and younger alluvium (Anning, et al 2006.). The older alluvium is the deepest deposit and consists of moderately consolidated fragments of rocks eroded from the surrounding mountains in a silty-clay or sandy matrix (ibid.) In the southern portion of the Hualapai Valley groundwater basin, this unit is interbedded with volcanic rocks. Massive evaporative deposits occur in the older basin fill in the northern portion of the Hualapai Valley. The older alluvium is the principal aquifer in the Hualapai Valley. The intermediate alluvium consists of coarse grained sands, silts and clays. The maximum thickness of the intermediate unit in the basin center is on the order of a few hundred feet. Well yields are dependable along the margins of the valley, where the unit intersects the water table. The intermediate alluvium is dry in the central part of the valley. The younger alluvium consists mainly of the piedmont, stream and playa sediments, primarily silts, sands and gravel. In the northern portion of the valley, the younger alluvium also includes clastic sediments, limestones and basalt flows. The thickness of this unit in most areas of the valley is less than 50 feet.

Available groundwater level measurements were obtained from the Arizona Department of Water Resources (ADWR) Groundwater Site Inventory (GWSI) database. There were four wells located within a 1-mile radius of the Hilltop WWTP; the most recent groundwater level measurement for each of the four wells is listed below:

Cadastral Location of Well	Depth to Groundwater (in feet below ground surface)	Date of Water Level Measurement
(B-22-16) 01DCC	461.9	1/11/2006
(B-22-16) 03CBB	563.4	10/27/2006
(B-22-16) 11DBC	475.1	1/18/2006
(B-22-16) 15CCC	549.1	1/10/2006

Source: ADWR GWSI database.

ADWR collects groundwater level measurements every one to two years from well B-22-16 03CBB, located approximately ½ mile to the west of the Hilltop WWTP. The groundwater level measurements from that well indicate that the groundwater table has declined 30.5 feet from 1980 to 2004. Most of the wells in this vicinity of the Hualapai Valley with historic water level data show a similar trend. One well, B-22-16 28BAD, located approximately 2 miles south-southwest of the Hilltop WWTP, shows a 45-foot decline in the water table from 1980 to 2004.

The general groundwater flow direction in the Hualapai Valley is from the mountains to the center of the valley, then northward. Groundwater flows under the playa at Red Lake and finally enters the Colorado River at the upper end of Lake Mead (Gillespie and Bentley, 1971). Outflow of groundwater from the Hualapai Valley is estimated to be between 2,500 and 4,000 acre-feet per year.

The major source of groundwater recharge in the Hualapai Valley is streambed infiltration, estimated at 3,000 to 4,000 acre-feet per year. The main source of groundwater discharge is groundwater pumpage, mostly for stock and domestic uses by valley ranches and settlements.

2.6 Surface Water

Lake Mead and the Colorado River form the Hualapai Valley's northern boundary, which is approximately 54 miles due north of the Hilltop WWTP. There are no perennial streams within the Hualapai Valley; however, there are several ephemeral washes within the Hualapai Valley, which flow only in response to regionally extensive winter storms or from summer thunderstorms.

A topographic divide separates the northern and southern portions of the Hualapai Valley. Truxton Wash, which originates outside of the Hualapai Valley (in the Peach Springs Basin), flows westward into the southern part of the valley into a dry lake bed (Red Lake). Mohave Wash drains the southern and western portions of the Hualapai Valley (see Figure 2). The main stream channel of the Mohave Wash becomes poorly defined once it reaches the center of the Hualapai Valley, north of Long Mountain. Runoff in mountain tributaries usually does not reach the valley's primary streams but rather infiltrates the streambed sediments or evaporates.

3. DESCRIPTION OF EXISTING FACILITY

3.1 Description of Existing Facility and Process

The Hilltop WWTP was originally built in 1972; expansions were made in 1994 and 2001. The plant currently treats between 1.4 and 2 MGD and has a permitted, nominal capacity of 3 MGD. The existing facility was upgraded in 1992 to 1994 using a design intended to produce a Class B+ quality effluent, which in accordance with AAC R18-11-305 must include secondary treatment, nitrogen reduction and disinfection. The existing facility uses a combination of aerated lagoons and constructed wetlands to achieve nitrogen reduction and disinfection. The following sequential treatment processes are currently used at the Hilltop WWTP:

1. Preliminary treatment: headworks with mechanical bar screen, flow splitter structure and flow metering.
2. Secondary treatment: seven aerated lagoons with multiple cells used to remove dissolved organic and suspended matter; the lagoons cover an area of approximately 11 acres.
3. A “polishing pond” used for equalization as well as sedimentation and filtration purposes; this pond covers approximately 1.6 acres and also serves as forebay for the pumps that transfer flow to the treatment wetlands.
4. Wetlands: approximately 25 acres of constructed wetlands provide additional suspended solids removal and disinfection; the wetlands were constructed in three parallel trains, each with three cells.
5. Effluent disposal consisting of discharge to 22 surface infiltration basins, covering an area of approximately 36 acres.

The headworks and secondary process components are located at the southern end of the WWTP. Figure 2 shows the layout of the Hilltop WWTP. Secondary-treated effluent is pumped from the headworks and lagoons north approximately one mile to the wetlands, through an 18-inch force main that crosses Mohave Wash.

The Hilltop WWTP wetlands play a vital role in filtering the effluent and removing bacteria. Factors contributing to the reduction of bacteria by natural and constructed wetlands include sedimentation, filtration by wetland plants, disinfection by ultraviolet light found in solar radiation and temperature. From the wetlands, the effluent is piped approximately 200 feet to a series of surface infiltration basins (see Figure 2), where the water either evaporates or infiltrates into the ground recharging local aquifer system.

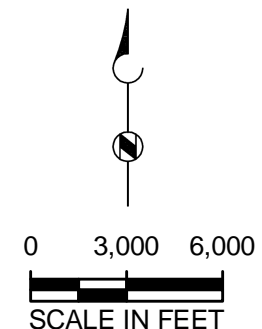
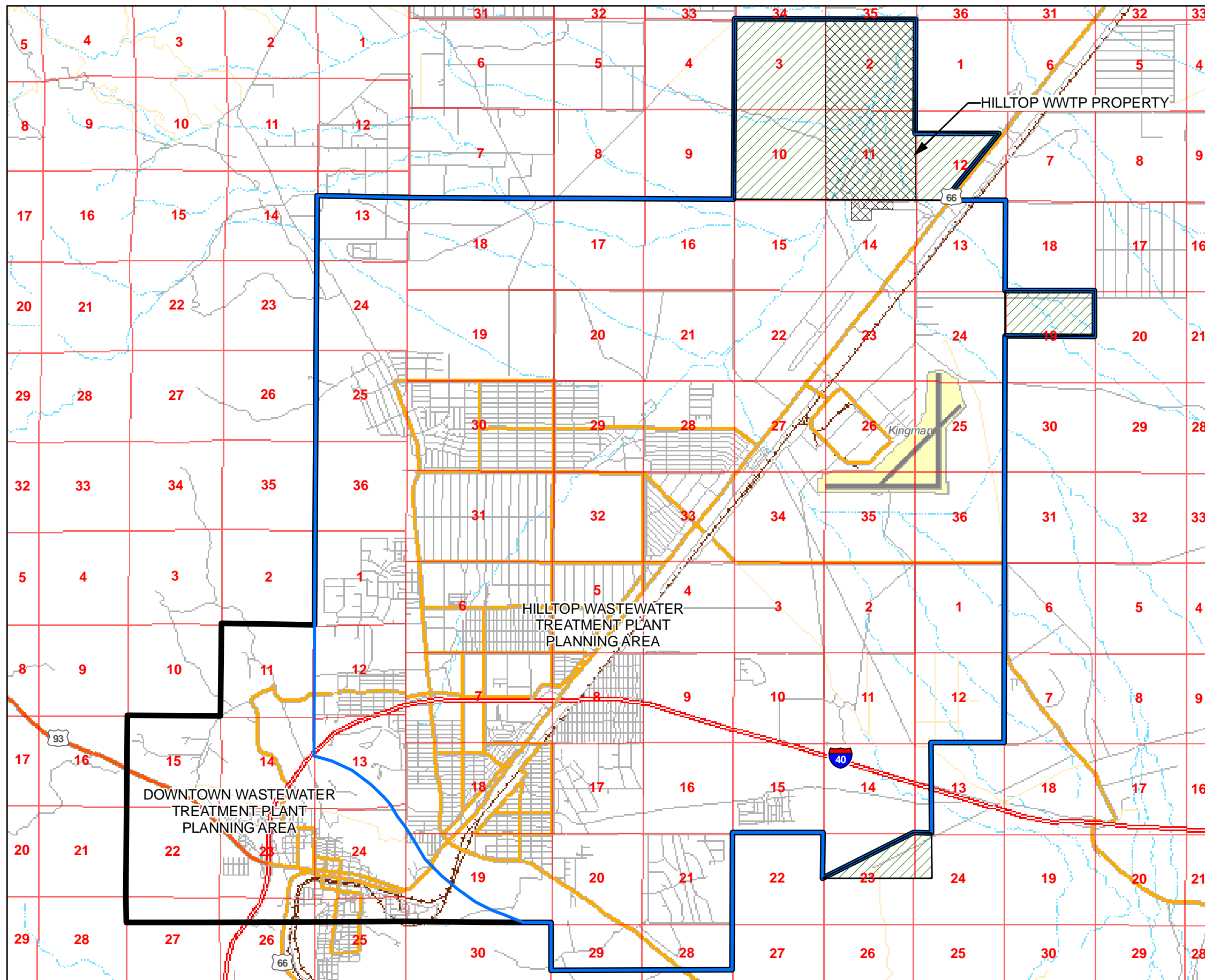
3.2 Basis for Facility Upgrade and Expansion






As stated in Section 1, the basis for the expansion and upgrades to the Hilltop WWTP includes the steady growth in population, aging equipment/facility and the need for a higher degree of treatment. Although the Hilltop WWTP was initially designed to produce Class B+ quality effluent, problems with nitrogen reduction are currently resulting in achieving only Class B quality effluent. To achieve

the Class B+ quality, total nitrogen concentration in an effluent sample must not exceed the Arizona Aquifer Water Quality Standard (AWQS) of 10 milligrams per liter (mg/L). The Aquifer Protection Permit (APP) for this facility will require that it meet not only the AWQS for total nitrogen but an Alert Level, typically set at 80 percent of the AWQS, or 8 mg/L. Exceeding an Alert Level in an effluent sample will trigger increased sampling and documentation. Therefore, the objective of the design for the Hilltop WWTP upgrade was to achieve a total nitrogen concentration of 8 mg/L or less under Maximum Day conditions. The preliminary design assumes that total nitrogen of 8 mg/L or less can be met based on the result of a monthly average of samples (perhaps one sample per week), rather than from a single sample.

Another major consideration to the planned facility expansion and upgrades is the substantial residential development within the Hilltop service area that may ultimately reach the site boundary. The boundaries of the Hilltop service area are shown on Figure 3, as well as the boundaries of the Hilltop WWTP service area, which coincide with the water service area boundaries.

The City has entered into water service agreements with some areas of planned development, lying outside of the current water service/sewer service area. In order to provide centralized and more cost-effective wastewater treatment, the City intends to provide sewer service and treatment to these areas as well. This will have the additional effect of allowing the City to provide treated effluent for reuse purposes, such as landscaping to reduce the use of groundwater.



- EXPLANATION**
-  HILLTOP WWTP PROPERTY
 -  HILLTOP WWTP PLANNING AREA
 -  KINGMAN DMA BOUNDARY
 -  AMENDED KINGMAN DMA BOUNDARY
 -  RIVERS AND WASHES

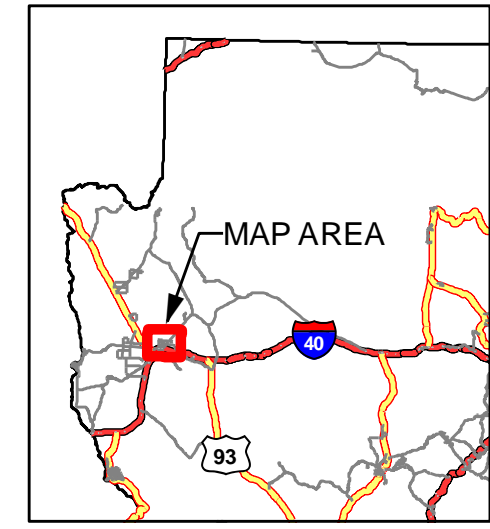


Figure 3
AMENDED KINGMAN
DESIGNATED MANAGEMENT
AREA
 CITY OF KINGMAN
 HILLTOP WASTEWATER
 TREATMENT PLANT

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4. DESCRIPTION OF CURRENT AND PLANNED SERVICE AREA

The current service area for the Hilltop WWTP includes a large portion of the incorporated City limits plus areas outside and north of the City limits. Figure 3 shows the Hilltop WWTP's service boundaries, which coincide with the City's water service area. The service boundaries shown on Figure 3 include two new areas, located adjacent and west of the WWTP (Sections 3 and 10) and northeast of the airport (Section 19).

Significant portions of the City and of surrounding areas have been developed with onsite septic systems. The City provides an incentive to single-family residence (SFR) property owners to connect to the sewer by waiving sewer investment fees if the existing SFR connects within the first year of sewer extension. It has been assumed that the existing un-sewered areas will gradually be connected to the collection system as a result of nearby development or re-development over the planning period and thus ultimately contribute flow to the Hilltop WWTP.

There are no existing or proposed private wastewater treatment systems or water providers in the Kingman area, with the exception of private septic systems.

5. POPULATION AND FLOW PROJECTIONS

The planning period used for the design of the upgrades and expansion to the Hilltop WWTP is through the year 2030; slightly over the 20-year planning period that is commonly used. The first phase is based on projections through 2020 and the second phase is through 2030.

5.1 Planning Area and Population Projections

5.1.1 Planning Area

For the purpose of estimating current and future populations, the Planning Area used for the Hilltop WWTP upgrades and expansion coincides with the City's existing water service area, which is generally coincident with the 208 Plan boundary for the City of Kingman (Kingman DMA), with some changes. The Downtown WWTP service area was subtracted out of the calculations and a development located in the area of Pate Road and State Route 66 was added in. The boundaries of the Kingman DMA, as shown in Figure 10 of the Mohave County 208 Plan, and the revised or amended Hilltop WWTP Planning Area boundaries, are shown on Figure 3. Based on current zoning, the Planning Area buildout would occur in approximately 2040.

5.1.2 Population Estimates

According to census data, the population of the City in 2000 was 20,069, approximately 13 percent of Mohave County's total population (155,032). By 2025, the Mohave County's population is projected to increase to 254,952. Using zoning and land use data obtained from the City, a buildout population of 192,500 was projected for the Kingman Planning Area. While population projection figures for Mohave County as a whole are available from Population Technical Advisory Committee (POPTAC), there are no population projection figures for each individual city within the county, particularly where the city provides services to a substantial population outside its incorporated limits. Since this is beyond the selected planning horizon, estimates of population numbers for interim dates were developed using local growth rate projections applied to the number of current connected people (see below). Therefore, in order to develop flow projections for the upgrade and expansion of the Hilltop WWTP, estimates of the current and future contributing populations to the Hilltop WWTP had to be determined using available, but limited, data.

The potential (future) contributing population to the Hilltop WWTP includes a large portion of the incorporated City of Kingman plus out-of-city areas, such as the New Kingman and Butler areas to the northeast of the City. The majority of residences and industries within City limits are on the public sewer system. Some older neighborhoods are the exception and have their own individual septic systems. The City has adopted a rule that requires new development to connect to the public sewer system, with the exception of some areas zoned Rural Density Residential. The City also expects the majority of the older, un-sewered residences to be connected to the public sewer system by the end of the planning period (2030).

Because the City's expressed intent is to connect all new development within the Hilltop WWTP Planning Area boundaries, with the exception of Rural Density Residential zoned property, it was assumed that the sewer area will increase at a similar growth rate as that used in the City's water

planning population projections (*Water System Master Plan*, C5 Engineering, 2005). An estimate of approximately 30,000 was calculated for the number of people who are currently within the Hilltop WWTP Planning Area and on un-sewered systems (primarily septic) but that will be connected by 2030.

The planning population was determined by projecting growth of the currently connected population and adding the number of people currently unsewered but who are expected to be connected by 2030, and validated by comparison with the projected Kingman DMA population, subtracting the estimated Downtown WWTP service area population.

New, un-sewered development (Rural Density Residential zoned property) within the Hilltop WWTP Planning Area will continue to be a substantial portion of the population that does not contribute flow to the Hilltop WWTP, at least within the current planning period.

Table 5-1 below lists the City's population projections through 2030 based on growth rate assumptions from the City's *Water System Master Plan* (C5 Engineering, Inc., 2005). Data years used are from specific information presented in the available studies and reports; in some cases interpolation has been used to fill in gaps.

Year	Kingman Area Population (1), (2)	City of Kingman (2), (3)	City of Kingman Without Downtown Population (3), (4)	Hilltop WWTP Service Area (2), (3), (4)
1980	20,900	10,000	8,328	6,000
1990	24,349	13,208	11,260	7,816
2000	34,879	20,069	17,279	8,937
2005	42,278	25,262	21,922	10,762
2010	54,484	31,481	27,617	17,705
2015	67,835	39,231	34,836	26,785
2020	84,534	48,889	43,817	37,582
2025	105,345	60,928	54,978	53,545
2030	131,279	75,923	68,965	74,598

Notes:

- (1) Kingman Area population from City of Kingman Water Department General Operating Statistics. Recorded population in 2003 was 38,530; a growth rate of 2.7% for 2001, 2002, and 2003. Population projections calculated using $fp=pp(1+rate)^{years}$. This data taken from *City of Kingman, Water System Master Plan*, May 25, 2005 by C5 Engineering, Inc., a growth rate of 4.5% after 2003.
- (2) Data from 1980 - 2000 Census and other sources.
- (3) Projections use similar growth rates as Kingman Area for 2004 and beyond (see note 1).
- (4) Data for Downtown Area based on declining percentage of water service area, per *City of Kingman, Water System Master Plan*.

Upon completion of the plant upgrade and expansion, improved flow metering will be available and hence, flow tracking could be used to verify and update future growth trends within the Planning Area for Phase 2 of the expansion.

5.2 Flow Projections

Wastewater flow projections were developed for this project using three separate sources of data: two consultant reports, *Hilltop Wastewater Treatment Plant Expansion and Upgrade Evaluation Study* (John Carollo Engineers [Carollo], 1991) and *Trunk Sewer Evaluation Study* (Burgess and Niple, 2003) and

actual metered influent flow data from the Hilltop WWTP. Population projections are represented as gallons per capita per day (gpcpd). (“Per capita” flows are total flow divided by connected population and include commercial, industrial, tourist and other [hospital, school, etc.] flows associated with normal municipal operation.)

The Carollo report (1991) used an equivalent per capita flow of 132 gallons per day (gpd), stated to be derived from the average winter daily flow divided by the then-connected population. A per capita flow of 156 gpcpd was used for summer flows, based on a tourist contribution assumed to be occurring in the summer (Carollo, 1991).

The Burgess and Niple report (2003) stated that, over a two-week period in spring 2002, flow in the Hilltop WWTP service area trunk sewers was 1.24 MGD. According to the report (Burgess and Niple, 2003), the metered influent flow at the Hilltop WWTP averaged 1.23 MGD for the corresponding period. Trunk sewer flows were considered to represent all but a very small portion of the then-existing sanitary sewer serving Hilltop WWTP (Burgess and Niple, 2003). Included in the Burgess and Niple report (2003) was a calculation of the connected population numbering 8,937 people within the metered trunk sewer areas (tributary to Hilltop WWTP). This number was used for estimating the proportion of sewered and un-sewered population and to determine the unit or per capita flow, which for the Burgess and Niple report (2003) was 136 gpcpd.

Actual influent metered flow for the Hilltop WWTP for 2005 averaged approximately 1.43 MGD. Sewered population was approximately 10,760, resulting in a calculated unit flow of 133 gpcpd.

Table 5-2 presents a summary of the projected population and flow data. Flows are based on a total per capita flow contribution of 136 gpd, consistent with the Carollo (1991) and Burgess and Niple (2003) reports and metered data.

Table 5-2. Population/Flow Projections		
Year	Sewered Population Served by Hilltop WWTP (1)	Calculated Average Daily Flow (MGD) (2) (3)
2010	17,705	2.4
2011	19,600	2.7
2012	21,300	2.9
2013	23,200	3.2
2014	25,000	3.4
2015	26,785	3.6
2016	28,400	3.8
2017	29,600	4.0
2018	32,200	4.4
2019	34,600	4.7
2020	37,582	5.1
2025	53,545	7.3
2030	74,598	10.1

Notes:

(1) Includes assumed gradual connection of 30,000 people served by septic systems in 2006

(2) Flows based on 136 gpcpd

5.2.1 Maximum Month Flow Factor

Maximum month flow is defined as the maximum month divided by the annual flow. The ratio of maximum month to annual average flow typically ranges from 1.1 to 1.4. The highest value observed at the Hilltop WWTP occurred in August 2001, resulting in a maximum month flow of 1.2 times the annual average. Therefore, the Maximum Month factor for all phases will be 1.2. This figure was used to size the plant processes and equipment.

Table 5-3 presents the recommended design values for the Hilltop WWTP upgrade and expansion.

Flow (MGD)	Planning Year	
	2020 (Phase 1)	2030 (Phase 2)
Annual Average	5.1	10.1
Maximum Month	6.1	12.1

Notes:
Maximum Month factor is 1.2.

5.3 Loading Characterization and Projections

For the initial process evaluation, design loading parameters were developed based on unit loadings (e.g., pounds per capita per day biochemical oxygen demand [BOD]). These unit loading factors are experience-based and were used for initial sizing to obtain suitable information for alternative comparison. Table 5-4 represents recommended design parameters, based on unit loadings, for initial process sizing.

Table 5-4. Projected Flows and Loads for Design

Year	Contributing Population	Annual Average Flows (MGD)	Maximum Month Flows (MGD)	Maximum Day Flows (MGD)	Instantaneous Peak Flows (MGD)	Annual Average BOD (1) (PPD)	Maximum Month BOD (PPD)	Maximum Day BOD (PPD)	Annual Average TKN (2) (PPD)	Maximum Month TKN (PPD)	Maximum Day TKN (PPD)
2010	17,705	2.4	3.7	8.8	13.5	3,541	4,356	11,686	708	871	2,337
2015	26,785	3.6	4.4	10.9	14.6	5,357	6,589	17,678	1,071	1,318	3,536
2020	37,582	5.1	6.1	15.3	17.9	7,516	9,245	24,804	1,503	1,849	4,961
2025	53,545	7.3	8.7	18.2	18.2	10,709	13,172	35,339	2,142	2,634	7,068
2030	74,598	10.1	12.2	25.4	25.4	14,920	18,351	49,235	2,984	3,670	9,847

Notes:

- (1) Based on 0.2 pounds per capita per day.
- (2) Based on 20 percent of BOD loading.
- (3) PPD = pounds per day
- (4) TKN = total Kjeldahl nitrogen

6. SECONDARY TREATMENT PROCESS ALTERNATIVES EVALUATION

During the initial planning effort for the upgrade and expansion project, the City conducted an evaluation of five different secondary treatment process alternatives. The five treatment alternatives consisted of the following:

1. Upgrade the existing lagoons.
 - A. Aerated lagoons/denitrification filter bed.
 - B. Aerated lagoons in activated sludge process train.
2. Biolac™ – proprietary, lagoon-based, biological nutrient reduction process.
3. Activated sludge process.
 - A. Eimco™ Carrousel oxidation ditch.
 - B. Modified Ludzack-Ettinger (MLE) process.

The option of utilizing and upgrading the existing lagoons (Alternatives 1A and 1B) was eliminated early on in the evaluation process due to a number of reasons. Those reasons included the inability of the existing aerated lagoons to nitrify the wastewater, odor from the lagoons caused by seasonal overturn and concern about the safety of aerator access for maintenance.

The remaining three alternatives (No. 2, 3A and 3B) were further evaluated on the following factors:

- Cost
- Operational effort
- Process reliability/flexibility (ability to consistently achieve permit limits under flow and loading variation)
- Power requirement/efficiency
- Space utilization
- Ability to be manually operated (since in-house instrumentation and control is limited)
- Odor control potential
- Equipment/system redundancy (capacity of the process to absorb failure of a major piece of equipment without serious negative effect on effluent quality)
- Reliance on one vendor in order to maintain proprietary equipment
- Demonstrated technology (“track record” of the process).

Based on the above criteria, the highest ranking (selected) alternative was the oxidation ditch process with pre-anoxic zones (Eimco™ Carrousel). Because the three alternatives planning costs were very close, the final decision on process was based on non-cost issues. The most important non-cost issues for selection of this alternative were:

- Operational effort (particularly skill level)
- Process reliability
- Power requirement/efficiency
- Capacity for manual operation
- Process track record.

7. PLANNED UPGRADES AND EXPANSION

The planned upgrades and expansion of the Hilltop WWTP will be conducted in two phases. Phase 1 will consist of upgrading the treatment capability and expanding the capacity to 5.1 MGD average daily flow. Phase 2 will expand the total capacity of the Hilltop WWTP to 10.1 MGD by the year 2030. The treatment process is designed to achieve a B+ quality effluent in accordance with AAC R18-11-305.

7.1 Treatment Process

7.1.1 Preliminary Treatment

The new plant headworks will include screening, grit removal, low-head pumping and magnetic flow metering on each influent pump. The area of the headworks including influent screens, compactors and the screenings collection containers will be enclosed in a block building. Odor control will be achieved through the use of covers over the flow channels; step screen enclosure, influent pumping wet well and grit removal room. Air collection and removal equipment will be sized to meet current National Fire Protection Agency (NFPA) 820 standards for Class I, Division 2 and to provide a safe working environment for personnel. The headworks equipment will include the following:

- One 6-millimeter step screen (for coarse solids), sized for a 36-inch wide channel and capable of handling 12 MGD peak flow. The screen would be complete with a stainless steel shroud to minimize release of odor and hydrogen sulfide into the operating space. Two influent channels will be provided; the second channel will be equipped with a manually-cleaned bar screen and can be used to route flow around the screen if it is out of service for maintenance or repair. The second channel will be designed to be equipped with a second, matching screen for Phase 2. A screenings washer/compactor will be furnished with the screen. Stainless steel slide gates will be provided at each end of each channel for isolation. Shear box diffusers will be installed in the floors of the channels to maintain solids in suspension. Provided with air from a small blower/compressor, these simple diffusers consist of an orifice opening into a small (typically 4-inch square) stainless steel box embedded in the channel floor. This prevents build up on the channel floors that creates odor and reduces maintenance requirements.
- One flow-through type grit removal chamber (to be installed in a reinforced concrete structure). The system is sized to handle a hydraulic maximum of 12 MGD with removal of grit down to an equivalent size of 150 microns. Grit washer and dewatering screen are included. A second, identical grit removal system would be added for Phase 2.
- A low-head pump station to raise the hydraulic grade line to provide sufficient head without driving the water level in the oxidation ditch below grade to a point where access is difficult. For Phase 1, the pump station will include four non-clog, variable speed, submersible pumps with a design operating point of 3,500 gallons per minute (gpm) (firm capacity to meet peak flow of 15 MGD).
- Flow metering – Each pump discharge will include a flow meter. Flows will be totalized to provide a continuous record of plant influent flow.

Table 7-1 below lists the main elements for the preliminary process selections with their design parameters. Dimensions, horsepower, etc. are preliminary and may be modified slightly during design.

Table 7-1. Eimco Carrousel Oxidation Ditch: Basis of Design - Phase 1				
Component	Number	Size	Dimensions/ Capacity	Comments
Flow (average day)			5.1 MGD	
Flow (maximum month)			6.1 MGD	
Effluent quality	Class B+			AAC R18-11-305
Influent Screen	1	36 inch	12 MGD peak flow, 6 mm spacing	Step screen (provision to install second, parallel screen in future). 316 stainless, explosion-proof motor/control package
Influent Pumps	4		3500 gpm	Firm capacity is 15 MGD; achieved with 3 pumps operating. Pumps are variable speed.
Screenings washer/ compactor	1			Furnished with the screen
Grit removal	1	15.3 MGD	150 micron and larger	Eutek Headcell. (provision to install a second, parallel unit in future)
Grit pumps	2		200 gpm	Recessed impeller pumps
Grit washer	1		200 gpm	Requires 50 gpm wash water flow (intermittent). Furnished with grit removal package.
Grit screw (dewatering)			1 CY/hr (cubic yards per hour)	Furnished with grit removal package.
Plant Water System				Hydropneumatic tank, pressure pumps, and distribution piping; size to be determined during design.
Stand-By Power		Total capacity 1,250 kilowatt (kW) (estimated)		Diesel generators; number and size to be determined during design.
Flow Splitter Structure	1			Design for split to Phase 1 and future Phase 2 ditch. Design for expansion to third ditch.
Oxidation Ditches	2	1.3 million gallons (mg) each	220 feet x 70 feet	Dimensions are overall (include anoxic zones). Liquid depth is 18 feet 6 inches
Anoxic Zones	2/ditch	0.48 mg (each)		Total system volume is 3.6 mg
Aerators	1/ditch	200 horsepower (HP)		Variable speed
Anoxic Basin Mixers	1/cell	10 HP		Total of 4 mixers provided
Dissolved Oxygen Probe	2			Located upstream of discharge weir
Secondary Clarifiers	3	90-foot diameter	16-foot SWD (side water depth)	Circular type with scum beach, hydraulic type sludge collector
RAS Pumps	3	30 HP	2100 – 2700 gpm/pump	Variable speed
Waste activated sludge (WAS) Pumps	2	5 HP	250 gpm/ pump	Submersible, non-clog, constant speed

Table 7-1. Eimco Carrousel Oxidation Ditch: Basis of Design - Phase 1

Component	Number	Size	Dimensions/ Capacity	Comments
WAS Holding/ Equalization Tank	1	0.35 MG	75 ft. x 11 ft. water depth	
WAS Tank Mixers	2	15 HP		
WAS Dewatering Belt Press	1	2-meter belt	300 gpm	Furnished as skid-mounted package with controller, emulsion polymer feed system, inclined cake conveyor, washwater booster pump
Sludge feed pumps	2		350 gpm at maximum 250 rpm	Progressing cavity, 2 stage

7.1.2 Secondary (Biological Nutrient Reduction) Treatment

As discussed above in Section 6.0, the City initially evaluated five different treatment trains. The selected alternative includes an oxidation ditch (Eimco™ Carrousel) activated sludge process. The oxidation ditch activated sludge process consists of a proprietary oxidation ditch with vertical low speed turbine mixers, mechanically mixed pre-anoxic basins, secondary clarifiers, return activated sludge (RAS) and sludge wasting to a dewatering process. Two oxidation ditches will be constructed, each preceded by a two-pass anoxic zone for denitrification. Flow enters the ditch, where it is both mixed and aerated by a large, single, low-speed turbine aerator. The oxidation ditch is configured so that the flow circulates continuously in a circle. Mixed liquor (in the amount of the incoming flow) passes over a weir and is conveyed to the secondary clarifiers. A side stream is diverted through the “internal recycle” channels back to the anoxic basins, where the fully-nitrified mixed liquor contacts incoming wastewater and RAS in an environment containing essentially no free oxygen. Because of the oxygen demand of the incoming flows, the oxygen is stripped from the nitrate contained in the recycling mixed liquor, thus “denitrifying” it.

For Phase 1, the flow will be treated in two oxidation ditches, designed with common-wall construction. A provision will be made in the design of Phase 1 to add another pair of equally-sized oxidation ditches for Phase 2. A spare, non-installed gear box and motor will be provided as part of Phase 1 to provide additional redundancy. An oxidation ditch has a long hydraulic retention time and can accommodate short-term high flows and loadings, up to and including the maximum day condition. Because there is no equipment installed within the oxidation ditch that requires dewatering the ditch for access, taking a ditch completely out of service is a rare event; should this occur all flow can be routed to a single ditch for a short time.

The oxidation ditch alternative, because of its relatively high mixed liquor solids concentration, requires three 90-foot diameter secondary clarifiers. These also benefit the facility by handling the projected peak flows.

7.1.3 Tertiary Treatment

Following the secondary clarifiers, the effluent will enter a transfer pump forebay that will convey the treated effluent to the existing wetlands where it will undergo disinfection (via exposure to sunlight). From the wetlands, effluent is then conveyed to the existing surface infiltration basins for disposal of the Class B+ quality effluent.

7.1.3.1 Additional Filtration and Disinfection for Class A+ Quality Effluent

Based on the City's interest in promoting reuse of treated effluent, a sidestream of up to 1 MGD will be provided using tertiary filtration and disinfection (chlorination). This polishing process will bring the effluent quality up to Class A+, which is suitable for unlimited reuses in accordance with Appendix A of Title 18 AAC 11, Article 3. Table 7-2 lists the components for the proposed tertiary treatment train.

Component	Number	Size	Dimensions/ Capacity	Comments
Flow (maximum)		1.0 MGD		
Effluent quality	Class A+			AAC R18-11-303
Chemical Coagulant System				Space will be left for installation in the future, if required
Tertiary Filtration	2	1.61 gpm/square feet (sf), max. flow	430 sf	Aqua-Aerobics disc filters, sized for total suspended solids reduction from maximum of 15 mg/L to 2 Nephelmic turbidity units (NTU)
Disinfection			2 - 150 pound (lb) cylinders	Gas chlorination package; includes emergency chlorine shut-off system and alarm relay module
Chlorine contact basin	1	30 minutes contact time	35 feet x 20 feet, 5 pass	If required. During design potential location of reuse and conveyance will be evaluated to determine whether sufficient contact is available in conveyance pipe and/or impoundments at the reuse site.

7.1.4 Solids Handling and Treatment

Secondary sludge will flow from the clarifiers to a RAS/WAS pumping station. WAS will be conveyed to an aerated holding tank where it will be mixed and equalized. The holding tank will be sized to allow dewatering to occur 5 days per week, 6 hours per day, at the design maximum month flow and loading. A belt filter press will be used to achieve biosolids of suitable quality for landfilling.

7.1.5 Electrical Power

UniSource Energy Services will continue to provide electrical power for the Hilltop WWTP. Power upgrades will include a single service entrance section to reduce the number of power company meters and standby power will be provided by diesel generators for the essential process equipment. This may consist of one or two generators; the sizes, location and number will be determined during design. A power-shedding scheme will be developed to be used if power loss to the facility requires utilization of the standby generation equipment.

8. FINANCING AND PROJECT SCHEDULE

8.1 Cost Estimate for Proposed Expansion and Upgrade

The Hilltop WWTP upgrade and expansion project will be funded through a loan from the Arizona Water Infrastructure and Finance Authority (WIFA). The loan amount will be \$34,100,000, which includes engineered equipment, construction materials, construction labor, construction equipment, contractor overheads, profit, indirect costs, freight, sales/use taxes and an appropriate contingency. Table 8-1 lists the estimated costs. The WIFA funds will be available by early 2008.

Appendix B provides financial information related to the planned upgrade and expansion (to be provided when available).

Labor rates used to develop costs in Table 8-1 were based on subcontracted prevailing wage construction for the area of this project (labor pool is assumed to reside within Arizona). The rates include crew base rates and fringes, payroll taxes and insurance, small tools, consumables, construction equipment, safety equipment, supervision, temporary facilities, subcontractor overhead and profit.

The estimated costs are escalated to the proposed mid-point of construction (mid to late 2009). The escalation factor is the ENR Construction Cost Index projected at an approximate annual rate of 4.5 percent.

Electrical and instrumentation estimates were based on a percentage of equipment cost (15 percent for electrical and 8 percent for instrumentation and control). The construction contingency accounts for the work that will be included in the project that is not identified at this planning level of effort (but will be identified during detailed design) for owner-directed changes in equipment type or number and for site-related unknowns.

8.2 Project Schedule

The planned upgrades and expansion of the Hilltop WWTP will be implemented in two phases. Phase 1 is currently under design; construction is scheduled to begin by late 2008 or early 2009, with substantial completion anticipated in 2010. Phase 2 will begin when the flow to Hilltop WWTP reaches 80 percent of the total Phase 1 capacity. A project schedule is provided in Appendix C.

Table 8-1. Estimated Costs for Upgrade and Expansion of Hilltop WWTP

Item	Estimated Cost (\$)	Notes
Site/Civil	1,280,000	Includes MCC building for headworks/IPS and sludge hauling station
Yard Piping	680,000	Includes plant water system
Headworks	1,280,000	Includes screenings building and biofilter
Influent Pump Station	500,000	
RAS/WAS Pump Station	470,000	
New Effluent Transfer Pumps	80,000	
Solids Handling	1,780,000	Includes sludge equalization tank, belt press, press building and biofilter
Electrical/Instrumentation	3,100,000	Includes stand-by generator for essential loads
Secondary Clarifiers	2,120,000	Three 90-foot diameter clarifiers included
Oxidation Ditches with Anoxic Compartments	3,440,000	Two; common wall construction. One spare gear box and motor, packed for storage is included. Includes Eimco™ quote for process equipment.
Tertiary Treatment Train	800,000	1 MGD capacity; filtration and gas chlorinator
Subtotals - Base Costs	\$15,530,000	
Net Costs	5,040,000	Contractor GC, mark-ups, shipping and handling for to specific categories of cost, escalation to midpoint construction (2009)
Subtotal	\$20,570,000	
	200,000	Start-up, training, O&M (1 percent)
	6,210,000	Construction contingency (30 percent)
Subtotal	\$27,280,000	
	560,000	Contractor insurance (2 percent)
	550,000	Performance and payment bonds (1 percent, each)
	1,480,000	Taxes (5.27 percent)
Subtotal	\$29,870,000	
Engineering and Technical Assistance	4,200,000	Design, Bidding Assistance, Construction Management, Operations Manual, Record Drawings Preparation, Permitting and Start-Up Assistance.
Total Estimated Project Cost	\$34,100,000	

Notes:

Figures rounded to nearest \$10,000.

Engineering cost assumes design-bid-build procurement, 18-month construction period; documentation required for Permit to Construct and Permit to Operate.

Contingency of 30 percent = 25 percent of net costs for estimator-owned costs, plus 5 percent of net costs for possible change orders resulting from unknown conditions or Owner changes during construction.

9. EFFLUENT DISPOSAL PLAN

The City evaluated various effluent management methods, including discharge to the existing surface infiltration basins and Mohave Wash, disposal via injection wells and reuse. This section discusses the selected methods of effluent disposal/reuse.

9.1 Surface Infiltration Basins

The City currently operates 22 spreading basins, or surface infiltration basins, at the Hilltop WWTP. Twelve of the 22 basins were constructed with the Hilltop WWTP upgrade in 1992. The remaining 10 were added later. Although the basins have worked well there is limited capacity in the system. The actual capacity is difficult to quantify but may be approximately 2 MGD.

The City considered increasing the number and size of the existing infiltration basin system but due to a number of problems, this idea will not be pursued. One of the problems is that there is little or no available land located outside the designated 100-year flood plain of Mohave Wash. Expansion of the surface infiltration basins would require purchase of additional land (lying west of the existing infiltration basins) and/or constructing more basins within the designated 100-year flood plain. Constructing infiltration basins within the 100-year flood plain would require a permit from the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act (404 permit) in addition to the AZPDES permit from the Arizona Department of Environmental Quality (ADEQ) to discharge to Mohave Wash.

The land lying west of the existing infiltration basins is owned by the City and while it may be suitable for recharge, pumping would be required to convey the water to the higher-elevation land at this location. This would entail bringing electric power to the site (a distance of approximately 2 miles) and installing pumps and pipelines. In addition, the infiltration feasibility of that land is unknown. A comprehensive hydrogeologic investigation would be required to evaluate the feasibility for recharge (infiltration) for any new surface infiltration basins.

9.2 Reuse

The Hilltop WWTP upgrade and expansion will produce Class B+ quality effluent in accordance with the requirements of the AAC R18-11-305. Class B treated effluent requires that the wastewater has undergone secondary treatment and disinfection; the “+” designates that the wastewater has undergone nitrogen removal. Nitrogen removal is of primary value in achieving an effluent that may be applied to the ground or to unlined impoundments.

Class B+ effluent quality is suitable for several types of reuses, including golf course irrigation, restricted access landscape irrigation, livestock watering, dust control and irrigation of fiber seed, forage and similar non-food crops. Appendix A of 18 AAC 11, Article 3 lists all of the direct reuse applications for the various classes of reclaimed water. The City will pursue discussions with one or more developers to evaluate the potential future demand for treated effluent for landscape irrigation and other reuse applications.

In addition, up to 1 MGD of effluent will be treated to Class A+ quality, which requires filtration and supplemental disinfection. This will allow the City to provide reclaimed water to additional end users for any reuse application that is listed in Appendix A of 18 AAC 11, Article 3.

The major problem with relying on reuse as the sole effluent disposal method is that reuse applications tend to be seasonal and/or require water at intervals; for example, filling lakes for landscape or golf course irrigation. Hence, the effluent supply tends not to match the effluent demand. Therefore, a back-up disposal method typically needs to be available to even out the supply and demand of effluent. For the Hilltop WWTP, the back-up disposal method will be to discharge excess effluent to Mohave Wash.

9.3 Surface Discharge to Mohave Wash

The City is planning to apply to ADEQ for an AZPDES permit that will authorize discharge of treated effluent to Mohave Wash. AZPDES permits regulate the discharge of wastewater and storm water into surface waters and require facilities to meet specific effluent limitations to protect the environment. Discharge to Mohave Wash will be used as a final option; that is, at times when the surface infiltration basins are at capacity and the demand for reclaimed water is low.

As discussed in Section 2.5, Mohave Wash is an ephemeral wash that flows only in response to storm events, and hence, there are no uses (i.e. agricultural, domestic or industrial) of surface water in Mohave Wash. In addition, there are no riparian or wetland habitats along the wash.

10. REQUIRED PERMITS

The potential permits required for the expansion and upgrades to the Hilltop WWTP are listed below in Table 10-1.

Table 10-1. Potential Permits Required for Expansion and Upgrades	
Permit	Regulatory Agency
Amendment to existing Aquifer Protection Permit (APP) Number 100611	ADEQ
Sewage Collection System – Type 4.01 General Permit	ADEQ
AZPDES Individual Permit for Discharge to Mohave Wash	ADEQ
Stormwater Discharge Permit (Notice of Intent)	ADEQ/EPA
Reclaimed Water General Permit for Direct Reuse of Class A+ Reclaimed Water	ADEQ
Reclaimed Water General Permit for Direct Reuse of Class B+ Reclaimed Water	ADEQ
Class II Air Quality Permit (for internal combustion engines)	ADEQ

11. REFERENCES

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- John Carollo Engineers, 1991. Hilltop Wastewater Treatment Plant Expansion and Upgrade Evaluation Study. Consultant report prepared for City of Kingman.
- Stantec Consulting, 2003. Area Wide Water Quality Management 208 Plan Mohave County, September 2003. 208 Plan prepared for Mohave County by Stantec Consulting; September 2003.

APPENDIX A

Completed 208 Amendment Checklist

208 AMENDMENT CHECKLIST

Facility:	Kingman Hilltop Wastewater Treatment Plant
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AUTHORITY			
Item	Description	Comment	Section
1	Proposed Designated Management Agency (DMA) shall self-certify that it has the authorities required by Section 208 (c)(2) of the Clean Water Act (CWA) to implement the plan for its proposed planning and service areas. Self-certification shall be in the form of a legal opinion by the DMA or entity attorney.	The City of Kingman is one of five Designated Management Areas authorized to implement and enforce portions of the Mohave County Area Wide Water Quality Management 208 Plan.	Section 1.0

20-YEAR PLANNING			
Item	Description	Comment	Section
2	Clearly describe the existing WWT facilities.	<p>The City of Kingman provides treatment of wastewater at two facilities: the Downtown wastewater treatment plant (WWTP), which serves a relatively small area in the southwest portion of the City and the Hilltop WWTP, which serves the remainder of the City plus the Kingman Airport and Airport Industrial Park.</p> <p>The current Hilltop WWTP property encompasses over 1,300 acres and consists of a headworks with mechanical bar screen, flow splitter structure, flow metering; seven aerated lagoons, covering approximately 11 acres; a 1.6 acre polishing pond; surface-flow constructed wetlands; and 22 surface infiltration basins, covering an area of approximately 36 acres.</p> <p>The Hilltop WWTP is currently permitted to treat 3 MGD. Due to an aging facility, population growth, and the need for a higher degree of treatment, the City is planning to expand and upgrade the Hilltop WWTP.</p> <p>There are currently no plans to modify the Downtown WWTP and, hence, that facility is not addressed in this 208 Plan amendment application.</p>	Section 3.1

208 AMENDMENT CHECKLIST

Facility:	Kingman Hilltop Wastewater Treatment Plant
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20-YEAR PLANNING			
Item	Description	Comment	Section
3	Show WWT certified and service areas for private utilities and sanitary district boundaries, if appropriate.	The Hilltop WWTP service area coincides approximately with the incorporated City limits (minus the Downtown service area), plus additional areas to the north referred to as the New Kingman-Butler area and other properties, with which the City has water service agreements. There are no private utility water or sewer companies within the planning area, although there are many homes with onsite septic systems.	Section 2.1 Section 4.0 and Figure 3
Clearly describe alternatives and the recommended WWT plan:			
4	Provide POPTAC population estimates (or COG-approved estimates only where POPTAC not available) over 20-year period.	No POPTAC or COG estimates are available for the City of Kingman. According to census data, the population of Kingman in 2000 was 20,069. The estimated sewer 2000 population within the Hilltop WWTP Planning Area was 8,937. Using a growth rate of 2.7 percent for 2001, 2002 and 2003, and a growth rate of 4.5 percent for years after 2003, population estimates were projected for the areas contributing to sewers, plus the incremental addition of existing homes with septic systems tying into the Hilltop sewer tributary area. By 2030, the population within the Hilltop WWTP Planning Area is projected to be 74,598.	Section 5.1, and Table 5-1
5	Provide wastewater flow estimates over 20-year planning period.	The calculated average daily flow from 2010 to 2030 is estimated to increase from 2.4 million gallons per day (MGD) in 2010 to 10.1 MGD in 2030, based on population growth estimates and using a per capita flow of 136 gallons per day (gpd).	Section 5.2, and Table 5-2
6	Illustrate the WWT planning and service area.	The Planning and Service Area is shown in Figure 3.	Figure 3

208 AMENDMENT CHECKLIST

Facility:	Kingman Hilltop Wastewater Treatment Plant
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20-YEAR PLANNING			
Item	Description	Comment	Section
7	Describe the type and capacity of the recommended WWT plant.	<p>The proposed expansion and upgrades will be implemented in two phases. Phase 1, will increase the plant’s current permitted capacity from 3 MGD to 5.1 MGD. Phase 2 will increase the capacity to 10.1 MGD.</p> <p>The treatment train for Phase 1 will include screening, grit removal, oxidation ditches designed for nitrification/denitrification and secondary clarifiers. The facility will also incorporate sludge storage equalization and dewatering. Effluent will be treated to Class B+ quality; sidestream of up to 1 MGD will be treated to Class A+ quality.</p> <p>Treated effluent will be discharged to existing surface infiltration basins, used for reuse applications, and/or discharged to Mohave Wash.</p>	Section 7.0
8	Identify water quality problems, consider alternative control measures, and recommend solution for implementation.	Through compliance with Arizona Administrative Code (A.A.C.) Title 18, no water quality problems for the Hilltop WWTP are anticipated. The effluent will meet the criteria for Class B+ reclaimed water, with a sidestream of up to 1 MGD being treated to Class A+ quality.	Section 7.0
9	If private WWT utilities with certificated areas are within the proposed regional service area; define who (municipal or private utility) serves what area and when. Identify whose sewer lines can be approved in what areas and when.	There are no private WWT utilities in the planning area.	Section 4.0
10	Describe method of effluent disposal and reuse sites (if appropriate).	The primary method of effluent disposal will be the use of the 22 surface infiltration basins. The secondary method of effluent disposal will be reuse of the Class A+ effluent for turf irrigation within City service area. Locations have yet to be determined. The last method of effluent disposal will be discharge into Mohave Wash via an Arizona Pollutant Discharge Elimination System (AZPDES) Permit.	Section 9.0

208 AMENDMENT CHECKLIST

Facility:	Kingman Hilltop Wastewater Treatment Plant
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20-YEAR PLANNING			
Item	Description	Comment	Section
11	If Sanitary Districts are within a proposed planning or service area, describe who serves the Sanitary Districts and when.	There are no sanitary districts within the City planning area.	Section 4.0
12	Describe ownership of land proposed for plant sites and reuse areas.	The City of Kingman owns the land on which the Hilltop WWTP is located. Reuse sites have yet to be determined. The City will apply to the Arizona Department of Environmental Quality (ADEQ) to provide effluent for reuse applications.	Section 2.1 and Section 9.0
13	Address time frames in the development of the treatment works.	Phase 1 upgrades and expansion of the plant are currently under design. Construction will begin at the end of 2008 with substantial completion anticipated for the beginning of 2010. Phase 2 will begin when capacity of the current facility reaches 80 percent of the total Phase 1 capacity.	Appendix C and Section 8.2
14	Address financial constraints in the development of the treatment works.	There are no foreseeable financial constraints for the Phase 1 upgrades. A loan is proposed to be secured by the City through WIFA.	Sec. 8.1
15	Describe how discharges will comply with EPA municipal and industrial stormwater discharge regulations (Section 405 CWA).	Sludge from the Hilltop WWTP will be contained in the solids handling building and therefore, no impacts to stormwater discharges are anticipated. Sludge will be dewatered and hauled off site to the Mohave County Cerbat landfill. Solids handling process will include odor control, a holding tank, and a belt filter press.	Section 7.1.4

208 AMENDMENT CHECKLIST

Facility:	Kingman Hilltop Wastewater Treatment Plant
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20-YEAR PLANNING			
Item	Description	Comment	Section
16	Describe how open areas and recreational opportunities will result from improved water quality and how those will be used.	Treated effluent from the Hilltop WWTP will provide safe quality water for Class A+ and Class B+ reuse purposes within the community. Additionally, Class B+ quality water will benefit the aquifer system through recharge via the surface infiltration basins.	Section 9.0
17	Describe potential use of lands associated with treatment works and increased access to water-based recreation, if applicable.	The Hilltop WWTP property is used only for treatment purposes.	N/A

REGULATIONS			
Item	Description	Comment	Section
18	Describe types of permits needed, including NPDES, APP and reuse.	Permits and authorizations required for the upgrade and expansion of this facility include the 208 Plan amendment, modification to the existing Aquifer Protection Permit (APP), General Permit for Class B+ and Class A+ Reuse, AZPDES Individual permit for discharge to Mohave Wash and Air Permit. All of the above permits are issued through ADEQ. The contractor constructing the facility will be responsible for securing the AZPDES General Permit for Discharge from Construction Activities and preparing the SWPPP.	Section 10.0
19	Describe restrictions on NPDES permits, if needed, for discharge and sludge disposal.	No restrictions are anticipated for the AZPDES Individual permit. However, periodic monitoring of the effluent and biosolids will be required.	Section 10.0

208 AMENDMENT CHECKLIST

Facility:	Kingman Hilltop Wastewater Treatment Plant
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REGULATIONS			
Item	Description	Comment	Section
20	Provide documentation of communication with ADEQ Permitting Section 30 to 60 days prior to public hearing regarding the need for specific permits.	Documentation will be provided once the public hearing has been scheduled.	N/A
21	Describe pretreatment requirements and method of adherence to requirements (Section 208 (b)(2)(d), CWA).	Significant industrial discharges are not anticipated in the service area. In the event that an industrial user requests to discharge non-sanitary wastes to the Hilltop WWTP, the ADEQ and the City will review the process and water quality, and implement any local limits that may be required.	
22	Identify, if appropriate, specific pollutants that will be produced from excavations and procedures that will protect ground and surface water quality (Section 208 (b)(2)(K) and Section 304, CWA).	Any potential dust, sediment, inert construction debris, and inert residual construction materials resulting from the construction activities will be addressed through the AZPDES General Permit for Discharge from Construction Activities and associated SWPPP. No discharges to groundwater are anticipated.	
23	Describe alternatives and recommendation in the disposition of sludge generated. (Section 405 CWA.)	Sludge from the Hilltop WWTP will be dewatered using belt filter presses and then sent offsite to the Mohave County Cerbat landfill.	Executive Summary
24	Define any non-point issues related to the proposed facility and outline procedures to control them.	Non-point discharges are not anticipated.	N/A

208 AMENDMENT CHECKLIST

Facility:	Kingman Hilltop Wastewater Treatment Plant
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REGULATIONS			
Item	Description	Comment	Section
25	Describe process to handle all mining runoff, orphan sites and underground pollutants, if applicable.	Not applicable.	N/A
26	If mining related, define where collection of pollutants has occurred, and what procedures are going to be initiated to contain contaminated areas.	Not applicable.	N/A
27	If mining related, define what specialized procedures will be initiated for orphan sites, if applicable.	Not applicable.	N/A

CONSTRUCTION			
Item	Description	Comment	Section
28	Define construction priorities and time schedules for initiation and completion.	Construction of Phase 1 of the Hilltop WWTP upgrades and expansion will begin by the end of 2008; completion of the upgrades and expansion is anticipated to be in 2010.	Section 8.2 and Appendix C
29	Identify agencies who will construct, operate and maintain the facilities and otherwise carry out the plan.	A construction company has not been selected at this time. Brown and Caldwell has been contracted to design the upgrades and expansion. The City of Kingman will operate and maintain the expanded Hilltop WWTP.	N/A

208 AMENDMENT CHECKLIST

Facility:	Kingman Hilltop Wastewater Treatment Plant
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CONSTRUCTION			
Item	Description	Comment	Section
30	Identify construction activity-related sources of pollution and set forth procedures and methods to control, to the extent feasible, such sources.	Any potential dust, sediment, inert construction debris, and inert residual construction materials resulting from the construction activities will be addressed through the AZPDES General Permit for Discharge from Construction Activities and associated SWPPP.	Section 10.0

FINANCING AND OTHER MEASURES NECESSARY TO CARRY OUT THE PLAN			
Item	Description	Comment	Section.
31	If plan proposes to take over certificated private utility, describe how, when and financing will be managed.	Not applicable.	N/A
32	Describe any significant measure necessary to carry out the plan, e.g., institutional, financial, economic, etc.	The City will apply for a loan from the Arizona Water Infrastructure and Finance Authority (WIFA) in October 2007 for funds to cover the planned upgrades and expansion.	Section 8.1 and Appendix B
33	Describe proposed method(s) of community financing.	Funds for the planned upgrades and expansion will be secured through a loan from WIFA.	Section 8.1 and Appendix B
34	Provide financial information to assure DMA has financial capability to operate and maintain wastewater system over its useful life.	The City of Kingman is a municipality and has successfully owned and operated the Hilltop WWTP since 1972.	Appendix B

208 AMENDMENT CHECKLIST

Facility:	Kingman Hilltop Wastewater Treatment Plant
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FINANCING AND OTHER MEASURES NECESSARY TO CARRY OUT THE PLAN			
Item	Description	Comment	Section.
35	Provide a timeline outlining period of time necessary for carrying out plan implementation.	Design of Phase 1 of the upgrades and expansion are currently underway (June 2007). Construction is planned to begin in late 2008; substantial completion is scheduled for 2010. Initiation of Phase 2 will begin when the capacity of Phase 1 reaches 80 percent of the permitted capacity.	Section 8.2 and Appendix C
36	Provide financial information indicating the method and measures necessary to achieve project financing. (Section 201 CWA or Section 604 may apply.)	Financial information will be provided (when available) in Appendix B of the Request for 208 Plan Amendment.	Appendix B

IMPLEMENTABILITY			
Item	Description	Comment	Section
37	Describe impacts and implementability of Plan: Describe impacts on existing wastewater (WW) facilities, e.g., sanitary district, infrastructure/facilities and certificated areas.	The upgrades and expansion will alleviate capacity issues within the Hilltop WWTP sewer tributary area. Additionally, the upgrades and expansion will provide capacity to connect currently unsewered homes to a sanitary system. There are currently no other sanitary districts or private utilities within the Hilltop WWTP Planning Area.	Section 4.0 and Section 5.1.2
38	Describe how and when existing package plants will be connected to a regional system.	Not applicable.	N/A

208 AMENDMENT CHECKLIST

Facility:	Kingman Hilltop Wastewater Treatment Plant
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IMPLEMENTABILITY			
Item	Description	Comment	Section
39	Describe the impact on communities and businesses affected by the plan.	Communities and businesses will benefit from the increased capacity available to the Hilltop WWTP, which will allow for additional growth. Local improvements to groundwater quality will be attained when existing septic systems are connected to the sanitary sewer system and treated at the Hilltop WWTP. Reuse of Class A+ water will also benefit the overall water resource budget for the community.	Section 5.1.2 and Section 9.0
40	If a municipal waste water system is proposed, describe how WWT service will be provided until the municipal system is completed: i.e., will package plants and septic systems be allowed and under what circumstances.	The existing Hilltop WWTP will remain operational through and up to completion of the planned upgrades and expansion. Homes with existing septic systems will be encouraged to connect to the centralized treatment system. The only new development which will be allowed the option of septic systems within the Hilltop WWTP tributary area are those zoned “Rural Density Residential.”	Section 5.1

PUBLIC PARTICIPATION			
Item	Description	Comment	Section
41	Submit copy of mailing list used to notify the public of the public hearing on the 208 amendment (40 CFR, Chapter 1, Part 25.5).	All public notifications will be coordinated through Mohave County.	N/A
42	List location where documents are available for review at least 30 days before public hearing.	All public notifications will be coordinated through Mohave County.	N/A

208 AMENDMENT CHECKLIST

Facility:	Kingman Hilltop Wastewater Treatment Plant
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PUBLIC PARTICIPATION			
Item	Description	Comment	Section
43	Submit copy of the public notice of the public hearing as well as an official affidavit of publication from the area newspaper. Clearly show the announcement that appeared in the newspaper at least 45 days before the hearing.	All public notifications will be coordinated through Mohave County.	N/A
44	Submit affidavit of publication for official newspaper publication.	All public notifications will be coordinated through Mohave County.	N/A
45	Submit responsiveness summary of public hearing.	All public notifications will be coordinated through Mohave County.	N/A

APPENDIX B

Financial Information



City of Kingman

310 NORTH FOURTH STREET • KINGMAN • ARIZONA • 86401 • 928 • 753-5561
www.ci.kingman.az.us

October 10, 2007

Judy Navarrete, Executive Director
Water Infrastructure Finance Authority of Arizona
1110 West Washington Street, Suite 290
Phoenix, AZ 85007

Re: City of Kingman Project Finance Application
Hilltop Waste Water Treatment Plant
CW 015-2007

Dear Ms. Navarrete:

We are pleased to submit our Project Finance Application for the City of Kingman Hilltop Waste Water Treatment Plant.

The City of Kingman is requesting a loan in the amount of \$ 35,000,000 in order to expand our plant capacity and upgrade the treatment process for nitrogen removal. We also intend to provide advanced treatment for up to 1 MGD of A+ quality reclaimed waste water.

The City has contracted with Brown & Caldwell to prepare 60 percent design plans for the project. We are fully prepared to finalize the design and proceed with bidding upon receipt of the loan.

On September 7, we were advised that an Environmental Information Document (EID) would be required for this project. The City proposes to utilize Brown and Caldwell to complete this work. The final EID will be submitted as soon as it is available.

Please call us if you have any questions.

Sincerely,

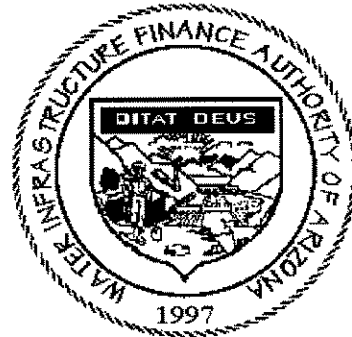
Jack Kramer
Acting City Manager
(928) 753-8100

Sincerely,

Gregory T. Henry, P.E.
City Engineer
(928) 753-8329

Enc. Project Finance Application
Cc: Nancy Ash, Brown & Caldwell
Mike LaVallee, Stoneberg & Young
Keith Hoskins, Gust-Rosenfeld
Coral Loyd, City Finance Director

Project Finance Application City of Kingman CW 015-2007



Water Infrastructure Finance Authority of Arizona

Arizona's Source for Water and Wastewater Financing

Section 1: Applicant Information

1.1 Name of Applicant: City of Kingman

1.2 Mailing Address and/or Principal Place of Business:

310 North Fourth St., Kingman, AZ 86401

1.3 System Identification Number: APP # 100611 System ID# 38001

1.4 Designated Contact Person *(for all matters relating to the submission of this application)*

Name: Gregory T. Henry, P.E.

Title: City Engineer

Telephone: (928) 753-8329

FAX: (928) 753-8118

Mailing Address: 310 North Fourth St., Kingman, AZ 86401

E-Mail Address: ghenry@cityofkingman.gov

1.5 Authorized Representative *(individual authorized by applicant to execute assistance agreements)*

Name: Lester Byram

Title: Mayor

Telephone: 928-753-8102

FAX: 928-753-6867

Mailing Address: 310 North Fourth St., Kingman, AZ 86401

E-Mail Address: lbyram@cityofkingman.gov

1.6 Officers of the Organization

Members Name	Title	Term of Position	Time in Position
Lester Byram	Mayor	2	1*
Dave French	Vice Mayor	4	8
Tom Carter	Council Member	4	3
Kerry Deering	Council Member	4	1
Ray Lyons	Council Member	4	5
Tom Spear	Council Member	4	11
Janet Watson	Council Member	4	1

* Lester Byram also served as Mayor of Kingman from 1996 to 2004.

1.7 Professional Services

A. Project Engineer: Nancy Ash, P.E., Brown & Caldwell

Mailing Address: 201 E Washington St., Suite 500, Phoenix, AZ 85004

E-Mail Address: nash@brwnaald.com

Website Address: <http://brownandcaldwell.com/>

Telephone: (602) 567-4000 FAX: (602) 567-4001

B. Financial Advisor: Mike LaVallee, Stone & Youngberg

Mailing Address: 2555 East Camelback Road, Suite 280, Phoenix, AZ 85016

E-Mail Address: mlavallee@syllc.com

Website Address: <http://www.syllc.com>

Telephone: (602) 794-4000 FAX: (602) 794-4046

C. Legal Counsel: Carl Cooper, City Attorney

Mailing Address: 310 N. Fourth Street, Kingman, AZ 86401

E-Mail Address: ccooper@cityofkingman.gov

Website Address: www.cityofkingman.gov

Telephone: (928) 753-8091 FAX: (928) 753-8007

D. Bond Counsel: Keith Hoskins

Mailing Address: 201 E. Washington Street, Suite 800, Phoenix, AZ 85004

E-Mail Address: khoskins@gustlaw.com

Website Address: <http://www.gustlaw.com/>

Telephone: 602.257.7967 FAX: 602.254.4878

Section 2 Application Certification and Authorization

The Undersigned, being duly authorized agent(s), principal(s), and officer(s) of the proposed borrower ("Applicant"), requests that the Water Infrastructure Finance Authority of Arizona ("WIFA") accept this Project Finance Application and related addendums ("Application") for review. Applicant hereby acknowledges that the Application includes the information contained herein, the attachments hereto and the information previously or subsequently provided to WIFA. The Applicant certifies that the Application is accurate and complete. Applicant understands that any material misstatement or misleading statement herein is cause for denial or rescission of any approval or assistance received in connection with this Application.

Applicant further authorizes WIFA, as it may deem appropriate, to obtain or to furnish and release all or any portion of the Application to all sources for financial or technical assistance, in its efforts to promote and make a determination on this Application for assistance. Applicant further agrees that WIFA shall not be held liable for any assistance or advice given by any such referral entity. It is further understood that WIFA is held without liability or any loss whatsoever that might be incurred by Applicant in any business or personal relationship that may be established in any activity Applicant should hereinafter undertake.

Applicant acknowledges that WIFA, its directors, officers, employees, auditors, counsel, agents, including, but not limited to Project Finance committee members ("WIFA Representatives"), are in possession of, or may access financial or other information concerning Applicant, or any of Applicant's principals, guarantors, subsidiaries or affiliates, and that such information may be shared in the consideration of the Application. Applicant consents to the disclosure of such information among WIFA Representatives and releases WIFA and WIFA Representatives from any and all claims and causes of action that Applicant may have against WIFA or WIFA Representatives arising out of such disclosure and the consideration and disposition of the application.

Applicant hereby acknowledges that WIFA does not guarantee any specific performance and that all approvals will be in writing and subject to the terms and conditions set forth in a commitment letter signed by an officer of WIFA.

Signature: _____

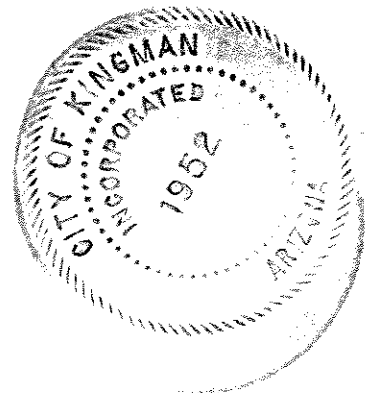
Justin D'Zam

Date: _____

10-8-07

Title: Mayor, City of Kingman

Attest: *Deborah Francis,*
City Clerk



PROJECT DATA ADDENDUM

Project Data Addendum

Enter detailed information on each individual project financed by the WIFA and its environmental benefits.

1. Explain the reason or need for the Project:

The City of Kingman Hilltop Wastewater Treatment Plant is presently not meeting the criteria for Nitrogen removal. A preliminary consent order has been discussed with ADEQ and a compliance order was issued in 1999 and 2000. Also, because of growth and development, the City needs to increase the capacity of the plant.

2. Project Description -- Attach additional pages, if necessary:

A. Select the category(ies) that applies to this project, and report the estimated dollar amount of the loan that will fund each category.

- | | |
|---|------------------------------|
| <input checked="" type="checkbox"/> Secondary Treatment | \$ 32,344,000 (B+ Treatment) |
| <input type="checkbox"/> New Collector Sewers | \$ _____ |
| <input checked="" type="checkbox"/> Advanced Treatment | \$ 1,756,000 (A+ Treatment) |
| <input type="checkbox"/> New Interceptor Sewer Systems | \$ _____ |
| <input type="checkbox"/> Infiltration/Inflow Correction | \$ _____ |
| <input type="checkbox"/> Recycled Water Distribution | \$ _____ |
| <input type="checkbox"/> Sewer System Rehabilitation | \$ _____ |
| <input type="checkbox"/> Individual/Decentralized Treatment | \$ _____ |

B. Indicate what has been completed to date with the planning, design and/or construction for the project.

The following reports have been prepared by Brown and Caldwell:

1. Summary and Recommendations, February 2007 (Exhibit A)
2. Flow and Loading Projections, February 2007 (Exhibit B)
3. Process Alternative Development and Evaluation, February 2007 (Exhibit C)
4. Effluent Management Strategies, February 2007 (Exhibit D)
5. Estimated Costs, February 2007 (Exhibit E)
6. Permitting Plan, February 2007 (Exhibit F)
7. Water Quality 208 Plan Amendment, August 2007 (Exhibit G)

The City has contracted with Brown and Caldwell to prepare 60 percent design plans and specifications.

C. Project Information: See attached Exhibits A through G

Attach copies of available Project Engineering Information, such as:

- Plans and Specifications
- Project Engineering Reports
- Project Feasibility Studies

City of Kingman – CW 015-2007

- Other Technical Data, if related to the Project
- Capital Improvement Plan

3. Estimated Project Schedule

Please submit all approval documentation.

Task	Date
Planning, Design & Specifications Submitted	September 2008
Approval to Construct	November 2008
Advertisement for Bids	November/December 2008
Construction Commencement	February 2009
Construction Completion	June 2010
Initiate Operation	July/August 2010

4. Contractor Selection:

Have you selected a Contractor(s)? Yes No *If "Yes," summarize the bidding process. If "No," on what date will the Contractors be selected?*

January 2009

5. Licenses and Permits

List Local, State, and Federal Licenses and Permits required for the Proposed Project. Please include NPDES, AZPDES, or APP permit numbers.

License/Permit Approvals	Date Expected	Date Approved
APP amendment	November 2008	
Possible NPDES	November 2008	
Possible AZPDES	November 2008	
208 amendment	July 2008	

6. Project Funding Sources & Uses

Uses by Budget Item	WIFA Funding	Local Funding	Other:	Total By Use
Planning				
Design & Engineering	\$4,200,000			
Legal/FA/Surety/Rating/Insurance	\$500,000			
Land/System Acquisition				
Equipment/Materials				
Construction/Installation/Improvement	\$29,900,000			

LEGAL CAPACITY ADDENDUM

Legal Capacity Addendum – Gov

1. Date of Debt Authorization – or Expected Date of Authorization:

October 1, 2007 City Council Meeting

2. Enclose the applicable debt authorization materials with the application:

See attached City of Kingman Resolution No. 4471 – Exhibit L

FINANCIAL CAPACITY ADDENDUM

Financial Capacity Addendum – Gov1

Financial Capacity is the capability of the system to acquire and manage sufficient financial resources to maintain compliance with lending requirements, regulatory concerns, managerial concerns, and with technical requirements.

1. **Source of Repayment:** System Revenues & Impact Fees (Development Investment Fees)
2. **Enclose the following Financial Statements and/or Annual Reports with the application:** (See Attached PDF files on compact disk)

²⁰⁰⁶ Current Year, if available 2005 2004 2003 2002 2001

3. **Enclose the following Monthly Financial Data for the Source of Repayment with the application:** (See Exhibit M)

Monthly Revenue Data for the most recent 12 months.
 Monthly Operating Expenditure Data for the most recent 12 months.

The City has hired Red Oak consulting to prepare a rate study. This study is expected to be complete in December with implementation in February.

4. **Enclose the Rate Ordinance with the application.**

The rate ordinance will be provided as soon as it is available.

5. **Summarize what action is taken against delinquent ratepayers? Are other measures legally available?**

Service may be disconnected and outstanding bills may be turned over to a collection agency.

6. **Enclose copies of loan agreements, official statements and any other documentation for any indebtedness payable by the Source of Repayment source.**

Currently the only outstanding debt the city has is the loan with WIFA.

TECHNICAL CAPACITY ADDENDUM

Technical Capacity Addendum

Technical Capacity represents the ability of system personnel to implement and utilize the past, present, and future technology of the system for the term of the loan in compliance with all regulatory and infrastructure design requirements. Technical Capacity measures the ability of system personnel to identify and correct problems with infrastructure, operations, and maintenance.

1. Service Area

- A. Attach Map of Service Area (See Exhibit D)
- B. Project population served (the number of people that the project serves directly):

Facility population served (the number of people connected to the permitted facility or system that the loan improves): 14,000

- C. # of Connections:

Type of Connection	Current	2006	2005	2004	2003
Residential	7,366	7,362	6,727	6,327	5,338
Commercial	664	645	599	594	533
Industrial	41	42	40	38	34
Other	89	90	82	86	81
Total	8,160	8,139	7,448	7,045	5,986

2. Current Facilities

- A. Briefly, describe the general condition of the existing facilities and the treatment process used.

The Hilltop WWTP was originally built in 1972; expansions were made in 1994 and 2001. The plant currently treats between 1.4 and 2 MGD and has a permitted, nominal capacity of 3 MGD. The existing facility was upgraded in 1992 to 1994 using a design intended to produce a Class B+ quality effluent, which in accordance with AAC R18-11-305 must include secondary treatment, nitrogen reduction and disinfection. The existing facility uses a combination of aerated lagoons and constructed wetlands to achieve nitrogen reduction and disinfection. The following sequential treatment processes are currently used at the Hilltop WWTP:

- 1. Preliminary treatment: headworks with mechanical bar screen, flow splitter structure and flow metering.

City of Kingman – CW 015-2007

2. Secondary treatment: seven aerated lagoons with multiple cells used to remove dissolved organic and suspended matter; the lagoons cover an area of approximately 11 acres.
3. A “polishing pond” used for equalization as well as sedimentation and filtration purposes; this pond covers approximately 1.6 acres and also serves as forebay for the pumps that transfer flow to the treatment wetlands.
4. Wetlands: approximately 25 acres of constructed wetlands provide additional suspended solids removal and disinfection; the wetlands were constructed in three parallel trains, each with three cells.
5. Effluent disposal consisting of discharge to 22 surface infiltration basins, covering an area of approximately 36 acres.

The headworks and secondary process components are located at the southern end of the WWTP. Secondary-treated effluent is pumped from the headworks and lagoons north approximately one mile to the wetlands, through an 18-inch force main that crosses Mohave Wash.

The Hilltop WWTP wetlands play a vital role in filtering the effluent and removing bacteria. Factors contributing to the reduction of bacteria by natural and constructed wetlands include sedimentation, filtration by wetland plants, disinfection by ultraviolet light found in solar radiation and temperature. From the wetlands, the effluent is piped approximately 200 feet to a series of surface infiltration basins, where the water either evaporates or infiltrates into the ground recharging local aquifer system.

- B. Design Capacity (MGD): 2 MGD (3 MGD discharge)
- C. Average Daily Usage (MGD): 1.5 MGD
- D. Peak Daily Usage (MGD): 2.3 MGD to 2.7 MGD
- E. Is the system in compliance with Local, State, and Federal health and environmental requirements? Yes No *If “No,” what actions are being taken to achieve compliance?*

Actions being taken: (1) Applying for a WIFA Loan
 (2) New secondary treatment process is under design

- F. Existing Facilities: Provide information pertaining to all applicable facilities including; storage tanks, collection/distribution lines, booster/lift stations, etc... -- *Attach additional pages, if necessary.* City to provide the information requested below.

Item	Year Constructed or Manufactured	Year Constructed or Installed	Condition
Outfall Sewer Mains		1972 - 1993	Good

City of Kingman – CW 015-2007

Hilltop Treatment Plant		1972	Good – With the exception of meeting B+ effluent
Construct Wetlands		1994	Good – With the exception of meeting B+ effluent
Expand Wetlands & Infiltration		2001	Good – With the exception of meeting B+ effluent

G. Describe the type of waterbody that the project affects by discharge of effluent.

Possible future AZPDES discharge would be to Mohave Wash – an ephemeral stream

H. Is the discharge seasonal? Yes No *If “Yes,” Please explain and provided pertinent documentation.*

3. **System Employees** -- *Name the key personnel with day-to-day operational responsibility. Please submit Operator(s) certification(s).*

For Operator’s certificates – see Exhibit J.

Name	Title	Certification Grade	Total Years Experience	Time in Position
Robert Norrell	Waste Water Technician A	Waste Water Treatment Grade 4	11	5
Mark Smith	Waste Water Technician B	Waste Water Treatment Grade 2	3	1

4. **Operation and Technical impact:**

Will there be significant operating or technical impacts as the result of the proposed technology? Yes No *Explain response below*

Additional operators will be required, potentially a minimum Grade III operator.

MANAGERIAL CAPACITY ADDENDUM

Managerial Capacity Addendum

Managerial Capacity represents the ability of the management structure of the system to conduct its affairs in a manner, which enables the system to maintain compliance with all regulatory and infrastructure design requirements. Managerial Capability depends on staffing, organization, accountability, legal policy, administration, and effective linkages.

1. Are the terms of the Officers of the Organization staggered?

XX Yes No *If "No," please explain below.*

2. Has any past or present Officer of the Organization been recalled or is any recall action pending? Yes No *If "Yes," please explain below.*

3. Does the organization have by-laws, rate ordinances, and connection ordinances in place? XX Yes No *If "Yes," submit a copy of bylaws. If "No," please explain below.*

See attached Exhibit K – Excerpts from the City of Kingman Utility Regulations: Article IV, Sewer System and Article VI, Fees: Rates and Charges.

4. Do the Officers of the Organization have experience in managing similar organizations? XX Yes No *If "Yes," describe experience below. If "No," explain intended actions to mitigate this lack of experience.*

Council member Janet Watson has served on the Kingman Elementary School Board for 18 years. Vice Mayor Dave French currently serves as director of the Kingman Airport Authority.

5. Do the Officers of the Organization have experience in managing similar projects?

XX Yes No *If "Yes," describe experience below. If "No," explain intended actions to mitigate this lack of experience.*

Council member Tom Carter has managed projects while working for Mohave Engineering Associates, a local civil engineering firm.

6. Who oversees day-to-day management of the system?

- System Manager
 Officer of the Organization

XX Other: Wastewater Superintendent, Jeff Corwin

7. Does the Manager, Officer of the Organization or other individual with day-to-day management responsibility have experience in managing similar organizations?

XX Yes No *If "Yes," describe experience below. If "No," explain intended actions to mitigate this lack of experience.*

Acting City Manager/Public Works Director Jack Kramer has worked for the City of Kingman for 28 years and has been involved with all aspects of compliance and regulatory issues related to the Hilltop Plant. Mr. Kramer was also involved with the wetlands installation and subsequent expansion in 1994 and 2001, respectively.

8. **Does the Manager, Officer of the Organization or other individual with day-to-day management responsibility have experience in managing similar projects?**

XX Yes No *If "Yes," describe experience below. If "No," explain intended actions to mitigate this lack of experience.*

City Engineer Greg Henry has over 16 years of experience in the Public Works sector, including more than 12 years with the City of Kingman. Mr. Henry has designed and administered construction contracts for numerous water and sewer projects while employed with the City.

9. **Will there be significant management impacts as the result of the proposed project or any technology associated with the project?** Yes XX No *Explain response below.*

The same individuals who manage the existing facility will be responsible for managing the new facility. New technology is expected to make reporting requirements easier.

10. **Is there an actual or potential managerial impact on the Applicant because of any current or past litigation?** Yes XX No *If "Yes", describe below.*

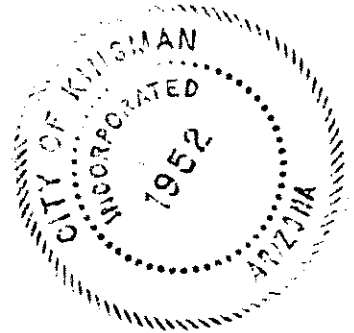
CERTIFICATION

I certify that the attached copy of Resolution No. 4471 adopted by the City of Kingman City Council on October 1, 2007 is a true and correct copy of the resolution authorizing the Public Works Director, City Engineer, or Financial Services Director to execute the Loan Agreement in an amount not to exceed \$35,000,000 between the Water Infrastructure Finance Authority of Arizona (WIFA) and the City of Kingman, Arizona for the Hilltop Wastewater Treatment Plant Project.

Dated this 2nd day of October 2007.

Deborah Francis

Deborah Francis
City Clerk
City of Kingman



RESOLUTION NO. 4471

RESOLUTION OF THE MAYOR AND COUNCIL OF THE CITY OF KINGMAN, ARIZONA, AUTHORIZING A LOAN AGREEMENT IN AN AMOUNT NOT TO EXCEED \$35,000,000 BETWEEN THE WATER INFRASTRUCTURE FINANCE AUTHORITY OF ARIZONA (WIFA) AND THE CITY OF KINGMAN FOR THE HILLTOP WASTEWATER TREATMENT PLANT PROJECT.

WHEREAS, the City of Kingman is a political subdivision of the State of Arizona vested with all associated rights, privileges and benefits and is entitled to the immunities and exemptions granted municipalities and political subdivisions under the Constitution and laws of the State of Arizona and the United States (the "City"); and

WHEREAS, pursuant to A.R.S. 9-511, *et seq.*, the City has the requisite statutory authority to acquire, own and maintain a wastewater treatment plant for the benefit of the landowners within and without the City's corporate boundaries; and

WHEREAS, the City has identified a need for a wastewater treatment plant capital improvement project; and

WHEREAS, pursuant to A.R.S. §9-521 through 540 and specifically A.R.S. §9-571, the City may obligate the revenue generated by its wastewater system to repay a loan from the Water Infrastructure Finance Authority of Arizona ("WIFA"); and

WHEREAS, it is in the City's best interest to approve the Loan Agreement to be prepared by WIFA for design and construction of the Hilltop Wastewater Treatment Plant Project; and

WHEREAS, the City of Kingman certifies that the population of the City is under 50,000 in population as of the most recent U.S. Census date; and

WHEREAS, the City's population at the time of this request is 27,605, which meets the requirement under A.R.S. §9-571.

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND COUNCIL OF THE CITY OF KINGMAN, ARIZONA to enter into the Loan Agreement, in an amount not to exceed \$35,000,000 between WIFA and the City for the Hilltop Wastewater Treatment Plant Project.

BE IT FURTHER RESOLVED that the Public Works Director, City Engineer or Financial Services Director are hereby authorized to take such steps as are necessary to execute and implement the terms of the Loan Agreement between WIFA and the City for the Hilltop Wastewater Treatment Plant Project.

ENVIRONMENTAL REVIEW CHECK LIST

Environmental Review Checklist

Community Name: City of Kingman

Project Contact: Greg Henry

Phone Number: (928) 753-8329

Date: 10/09/2007

Project Title: City of Kingman Hilltop Wastewater Treatment Plant

Please fill out the following checklist to the best of your ability. The information below will aid in determining the necessary environmental review requirements for the proposed project.

- | | Yes | No | NA | |
|----|-------------------------------------|-------------------------------------|--------------------------|--|
| 1. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | The project is directed towards rehabilitation of existing facilities, functional replacement of equipment, or the construction of new ancillary facilities adjacent or appurtenant to existing facilities which do not affect the degree of treatment or capacity of the existing facility. |
| 2. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | The project is for minor upgrading or minor expansion (<i>minor – less than 30%</i>) of existing treatment works, collection or distribution systems. |
| 3. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | The project is in an unsewered community where on-site technologies are proposed. (<i>Clean Water Projects only</i>) |
| 4. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The project will create a new, or relocate an existing, discharge to surface or ground waters. |
| 5. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | The project will result in substantial increases in the volume of discharge or the loading of pollutants from an existing source or from new facilities to receiving waters. |
| 6. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | The project is known or expected to have a significant effect on the quality of the human environment, either individually, cumulatively over time, or in conjunction with other federal, state, local or private actions. |
| 7. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | The project is known or expected to directly or indirectly affect cultural resources, habitat of endangered or threatened species, environmentally important natural resource areas such as floodplains, wetlands, important farmlands and aquifer recharge zones: or other resource areas. |
| 8. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | The project is known or expected to cause significant public controversy. |
| 9. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | The project is known or expected not to be cost effective. |

Please fax the Environmental Review Checklist to WIFA at: (602) 364-1327

CHECK LIST OF REQUIRED DOCUMENTS

Checklist of Required Documents and Attachments

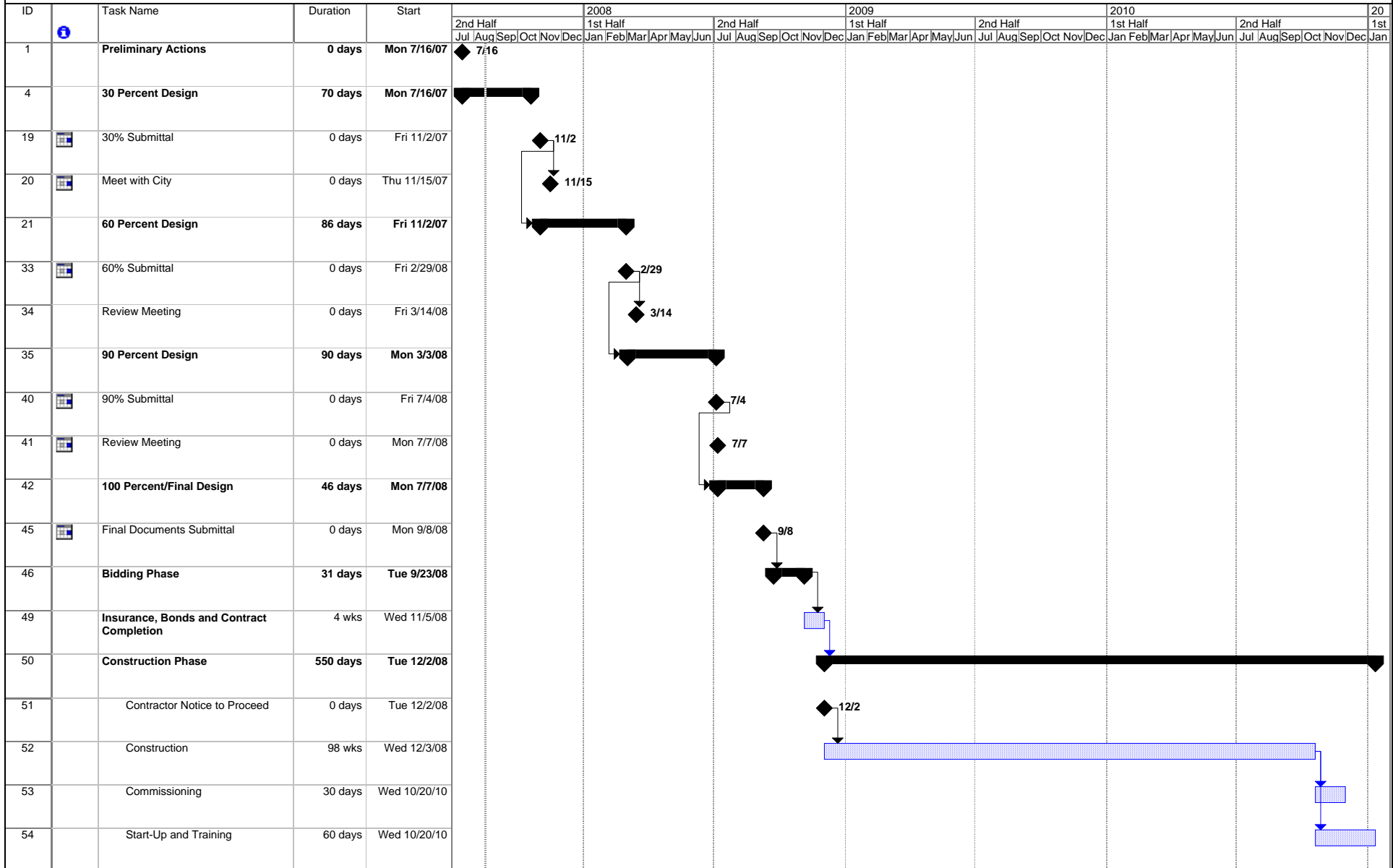
Below is a list applications, addendums, and attachments required for a complete Project Finance Application. If “Required” (see column entitled “WIFA Requirements”), enclose required application, document, or attachment with the Project Finance Application. If “N/A” (see column entitled “WIFA Requirements”), applicant is not required to submit the addendum or attachment.

Application/Addendum	Requested Attachments	WIFA Requirements	Applicant Checklist
Project Finance Application	Application Authorization	Required	<input checked="" type="checkbox"/> Completed
Project Data Addendum	Project Information	Required	<input checked="" type="checkbox"/> Completed
Legal Capacity Addendum	Debt Authorization Materials	Required	<input checked="" type="checkbox"/> Enclosed/Attached
Financial Capacity Addendum	Evidence of Corporate Authority	Required or N/A	<input checked="" type="checkbox"/> Enclosed/Attached
	Financial Statements/Reports	Required or N/A	<input type="checkbox"/> Enclosed/Attached, <i>if Required</i>
	Monthly Financial Data	Required or N/A	<input checked="" type="checkbox"/> Enclosed/Attached, <i>if Required</i>
	Rate Ordinance	Required or N/A	<input checked="" type="checkbox"/> Enclosed/Attached, <i>if Required</i>
	Tariff Schedule	Required or N/A	<input type="checkbox"/> Enclosed/Attached, <i>if Required</i>
	Bank Statements	Required or N/A	<input type="checkbox"/> Enclosed/Attached, <i>if Required</i>
	Evidence of Insurance Coverage	Required or N/A	<input type="checkbox"/> Enclosed/Attached, <i>if Required</i>
	Outstanding Debt Information	Required or N/A	<input type="checkbox"/> Enclosed/Attached, <i>if Required</i>
Technical Capacity Addendum	Map of Service Area	Required or N/A	<input checked="" type="checkbox"/> Completed, <i>if Required</i>
Managerial Capacity Addendum		Required or N/A	<input checked="" type="checkbox"/> Enclosed/Attached, <i>if Required</i>
Consultant Capacity Addendum		Required or N/A	<input checked="" type="checkbox"/> Completed, <i>if Required</i>
Community Description Addendum		Required or N/A	<input type="checkbox"/> Completed, <i>if Required</i>
W-9 Form	W-9 Form	Required or N/A	<input checked="" type="checkbox"/> Completed, <i>if Required</i>
Certification of Positive Effort for MBE/WBE	Certification Form	Required or N/A	<input type="checkbox"/> Completed, <i>if Required</i>

APPENDIX C

Hilltop WWTF Upgrade and Expansion Schedule

**CITY OF KINGMAN
HILLTOP WWTF UPGRADE AND EXPANSION
SCHEDULE**



Project: Schedule.mpp
Date: Thu 8/16/07

Task		Progress		Summary		External Tasks		Deadline	
Split		Milestone		Project Summary		External Milestone			