3.14 UTILITIES

Section 3.14 provides a summary of the general condition, and character of, the utilities on the islands of Tinian and Pagan. The region of influence for utilities includes the U.S. government and public utilities on Tinian and Pagan.

3.14.1 Definition

Utilities refer to public utilities provided to the general population for basic services, including electrical power, potable water, wastewater services, stormwater infrastructure, municipal solid waste, and information technology/communications services.

3.14.2 Regulatory Framework

The Commonwealth Utilities Corporation is the public corporation that owns and is responsible for providing electrical power, water, and wastewater services for the CNMI. CNMI Public Law 15-35 established the Public Utilities Commission as the agency for regulatory purposes such as approval of prices, fees, charges, and terms/services for the Commonwealth Utilities Corporation.

A listing of regulatory guidelines is provided in Appendix E, *Applicable Federal and Local Regulations*. The Commonwealth Utilities Corporation is subject to all applicable regulatory requirements and the CNMI Bureau of Environmental and Coastal Quality, Division of Environmental Quality administers the following programs as delegated by the U.S. Environmental Protection Agency:

- Clean Air Act
- Clean Water Act
- Resource Conservation and Recovery Act
- Safe Drinking Water Act
- CNMI Wastewater Treatment and Disposal Rules and Regulations
- CNMI Underground Injection Well Regulations
- CNMI Water Quality Standards

The CNMI Bureau of Environmental and Coastal Quality, Division of Environmental Quality has the following responsibilities:

- **Electrical Power:** Administers air emission permits and regulation enforcement required for power generation facilities in the CNMI.
- **Potable Water:** Oversees issues related to water quality including safe drinking water.
- **Wastewater:** Enforces the CNMI Wastewater Treatment and Disposal Rules and Regulations, the CNMI Well Drilling and Well Operations regulation, the CNMI Water Quality Standards, and U.S. Environmental Protection Agency National Pollutant Discharge Elimination System permitting requirements related to wastewater treatment and disposal.
- **Stormwater:** Oversees issues related to stormwater control, quality, and permits. They have prepared stormwater management criteria and guidance for implementation of appropriate stormwater design features as well as island stormwater practice design specifications.

- **Solid Waste:** Functions as the regulatory body that would issue the required permits to operate any new landfills, incinerators, and solid waste transfer stations, or other solid waste handling facilities. The planned solid waste facilities associated with CNMI Joint Military Training (CJMT) operations would also come under the regulatory umbrella of the CNMI Bureau of Environmental and Coastal Quality, Division of Environmental Quality.

The Federal Communications Commission regulates all commercial information technology/ communications activities in the CNMI.

3.14.3 Methodology

Site visits, facility and system tours (electrical generating facility, water system), document searches and reviews, and meetings with various agencies were conducted to determine current conditions for utilities on Tinian and Pagan.

Potable water use data includes data from 2002 collected for a U.S. Army Corps of Engineers Study (Army Corps of Engineers 2003). More recent information was requested from the Commonwealth Utilities Corporation and potable water production and metered use from October 2011 through August 2014 have been received and analyzed (Commonwealth Utilities Corporation 2014). Average production and metered use values for the 2011-2014 time period were utilized to evaluate the capacity of the existing potable water system on Tinian.

3.14.4 Tinian

A Utilities Study has been prepared in support of this EIS/OEIS and is provided in Appendix P, *Utilities Study*. For more detailed information, refer to Appendix P, *Utilities Study.*

3.14.4.1 Electrical Power

The Commonwealth Utilities Corporation is responsible for providing electrical power on Tinian. CNMI TeleSource, Inc. has been contracted by the Commonwealth Utilities Corporation to operate and maintain the entire electrical power infrastructure on Tinian. This contract currently extends up to year 2035 (Deposa 2014). The electrical power resource on Tinian includes generation units and distribution facilities that make up the existing island-wide power system. This includes above ground and underground transmission and distribution cables, manholes, transformers, substations, meters, and all other supporting facilities.

3.14.4.1.1 Supply and Demand

The electrical power available from the Commonwealth Utilities Corporation power station totals 17.0 megawatts, as shown in Table 3.14-1. Current peak demand is approximately 4.5 megawatts which leaves 8 megawatts available (4.5 megawatts standby generator is kept in reserve). This peak demand can be met when one of the two largest units is down for maintenance.

Table 3.14-1. Power-Generating Facility on Tinian

Unit	*Design Megawatts*	*Available Megawatts*	*Status*
Tinian Power Plant			
Diesel Engine No. 1	5.0	4.5	Operational
Diesel Engine No. 2	5.0	4.5	Standby
Diesel Engine No. 3	2.5	2.0	Standby
Diesel Engine No. 4	2.5	2.0	Standby
Diesel Engine No. 5	2.5	2.0	Standby
Diesel Engine No. 6	2.5	2.0	Standby
Totals	**20.0**	**17.0**	**-**

Note: No. = number.

3.14.4.1.2 Generation

The power generation facility (Photo 3.14-1) consists of the following components: diesel generators, exhaust stacks, and an above ground fuel delivery pipeline from the Port of Tinian fuel storage tank to a storage tank adjacent to the power plant facility. The power generation facility is located near the coast outside of San Jose, at 25 feet (7.6 meters) above MSL. The power generation facility is 15 years old, and appears to be in very good condition and well maintained.

Photo 3.14-1. Power Generation Facility

There are other private standby electrical power generators on Tinian that include the Tinian Dynasty Casino, the International Broadcasting Bureau facility, and personal-use standby generators.

3.14.4.1.3 Distribution

Figure 3.14-1 displays the existing distribution system on Tinian. The distribution lines are 13.8 kilovolts. A primary distribution line runs from the generation facility to the International Broadcasting Bureau via 8th Avenue. This line is above ground mounted on wooden poles except for a portion west of the airport that is underground to facilitate the clear zone for the runway. The maximum anticipated load from the International Broadcasting Bureau is 1.4 megawatts which is the peak load measured by the Commonwealth Utilities Corporation. The power facilities at the International Broadcasting Bureau transmitting station were designed for a peak demand load of approximately 7 megawatts. Although the highest recorded load is 4 megawatts, if the International Broadcasting Bureau determines it is necessary to operate all of the transmitters simultaneously at full power using normal amplitude modulation or dynamic carrier control modulation, the station's peak loading on the Commonwealth Utilities Corporation power supply could approach that 7 megawatts peak design load and greatly exceed the 1.4 megawatts.

Figure 3.14-1
Tinian Power Distribution

The overhead line that provides power to the International Broadcasting Bureau has capacity of up to 13.6 megawatts. However, the total additional load that can be added is limited by the drop in voltage caused by electrical losses in the transmission line. Voltage drop depends on the length of the transmission line from the power source to the electrical load and the amount of electrical load on the transmission line.

A separate 13.8-kilovolts distribution line runs from the generation facility to the airport. This line runs above ground along Broadway north to the airport access road, then runs west along this road to the airport.

Based on the characteristics of the existing distribution system and outage records from 2011, 2012, and part of 2013, the island-wide electrical power utility system is currently providing reliable service and is well positioned to keep providing an acceptable level of service into the future. The outage history from this 2.5 year period recorded 12 brief (average of 68 minutes) occurrences, only three of which were island-wide outages (see Appendix P, *Utilities Study*).

3.14.4.2 Potable Water

Tinian's public water system is owned and operated by the Commonwealth Utilities Corporation. It services the southern third of Tinian, where the civilian population lives. This system consists of one functioning supply well (Maui Well #2), a chlorine injection system for water treatment, pumps, three storage tanks, distribution piping (typically underground), water meters, and other supporting facilities.

3.14.4.2.1 Production

Currently, Maui Well #2 supplies all potable water to the Commonwealth Utilities Corporation Tinian water system, operating three of its four pumps almost constantly (Commonwealth Utilities Corporation 2013b). With the need to keep one pump on standby for maintenance purposes, Maui Well #2 is operating near full capacity.

Between October 2011 and August 2014, the water system produced an average of 1,056,553 gallons (3,999,488 liters) per day of potable water. The potential water production from Maui Well #2 has been estimated as at least 1 million gallons per day (3.8 million liters) of potable water in the dry season and 1.5 million gallons (5.7 million liters) per day in the wet season (Army Corps of Engineers 2003). The analysis of the potable water system assumed that a maximum average pump rate of 1,260,000 gallons (4,769,619 liters) per day was a sustainable level.

Photo 3.14-2. Chlorine Injection System at Maui Well #2

Recent water quality testing has shown chloride levels range from 172 to 217 milligrams per liter, with an average of 190 milligrams per liter. Chlorides may be associated with salt content, and the general acceptable limit of chlorides in drinking water is 250 milligrams per liter to avoid affecting the taste of drinking water. A chlorine injection system treats the water at Maui Well #2 (Photo 3.14-2). The injection system consists of two 150-pound (68-kilogram) chlorine cylinders, a vacuum regulator mounted to the

top of each cylinder, and a small pressurizing pump for the chlorination circuit. The Maui Well #2 pump house and equipment are shown in Photos 3.14-3 and 3.14-4.

Photo 3.14-3. Maui Well #2 Pump

Photo 3.14-4. Maui Well #2 Pump Equipment

3.14.4.2.2 Storage

The water system includes three water storage tanks: Marpo Tank, Carolinas Tank, and Tinian Airport Tank. The Marpo Tank (Photo 3.14-5) is a 250,000-gallon (950,000-liter) tank that serves the Marpo Valley agricultural area and Marpo Heights residential area. The largest storage tank, the Carolinas Tank (Photo 3.14-6) is a 500,000-gallon (1.9 million-liter) tank located above the Carolinas residential area. It serves the Carolinas Heights Subdivision, San Jose, Tinian Dynasty Casino, Carolinas Heights Agricultural Homesteads, and a portion of Marpo Valley. The Airport tank (Photo 3.14-7) is a 60,000-gallon (227,000-liter) tank located along the airport access road and serves only the airport facilities.

Photo 3.14-5. Marpo Water Storage Tank (250,000 Gallon Tank)

Photo 3.14-6. Carolinas Water Storage Tank (500,000 Gallon Tank)

Photo 3.14-7. Tinian Airport Potable Water Storage Tank (60,000 Gallon Tank)

3.14.4.2.3 Distribution

Figure 3.14-2 shows the existing potable water distribution system. All water transmission lines also serve as distribution lines. The waterlines between Maui Well #2 and the storage tanks also serve as distribution lines to residents. A 6-inch (150-millimeter) polyvinyl chloride water line transmits water to Marpo Tank, and an 8-inch (200-millimeter) polyvinyl chloride water line transmits water to Carolinas Tank.

Figure 3.14-2
Tinian Potable Water Distribution

The system has substantial leaks due to old galvanized and transite distribution piping, overflows at storage tanks due to lack of functioning telemetry controls, and leaks due to high pressures. The large water losses result in significantly more water being pumped from the well to make up for the losses in the system.

As of November 2013, the Commonwealth Utilities Corporation provides the potable water for a total of 833 metered accounts, which includes residential, commercial, and government customers (Commonwealth Utilities Corporation 2013b). Unaccounted for water is the result of leaks, unmetered uses, and unplanned overflows within the system. The typical unaccounted for water from efficient systems should be less than 25% of the water produced. The Commonwealth Utilities Corporation has indicated that unaccounted for water (water pumped from the supply well but not billed to customers) is estimated to be approximately 75% to 80% of the water produced (Commonwealth Utilities Corporation 2013a).

The average recorded water production in all of 2002 was 1,200,000 gallons (4,500,000 liters) per day. Over the first 7 months of 2002, a monthly average of 680,265 gallons (2,575,083 liters) per day of potable water was metered to users (Army Corps of Engineers 2003). This indicates that in 2002, approximately 641,781 gallons (2,429,405 liters) of potable water was lost within the distribution system on Tinian daily (an average unaccounted for water of 48%).

Between October 2011 and August 2014, the water system produced an average of 1,056,553 gallons (3,999,412 liters) per day of potable water (Commonwealth Utilities Corporation 2014). The monthly average of 320,384 gallons (1,212,785 liters) per day of potable water was metered to residential, commercial and government users. This means that between 2011 and 2014, daily potable water lost within the distribution system averaged 787,031 gallons (2,979,236 liters) per day, (an average unaccounted for water of 70%).

Although the Tinian International Airport relies on the Commonwealth Utilities Corporation system for its water source, it has its own local water distribution system. In addition, the International Broadcasting Bureau facilities are not connected to the Commonwealth Utilities Corporation Tinian municipal water supply system. Instead, they use non-potable rainwater collection, non-potable bulk water trucked in from the Commonwealth Utilities Corporation system, and bottled drinking water.

3.14.4.3 Wastewater

Figure 3.14-3 shows the existing wastewater systems on Tinian. There is no centralized municipal wastewater collection and treatment system on Tinian. Decentralized collection and treatment systems on Tinian serve some residential areas, such as the housing area in San Jose, and lead to a central septic and leaching field system. Most public and private buildings on Tinian use septic tanks with leaching fields or cesspools for treatment and disposal of wastewater. The Tinian Dynasty Hotel and Casino owns the largest private wastewater system on Tinian and the only treatment system that does not use a septic tank. The Dynasty Hotel and Casino uses a tertiary treatment plant that is permitted to discharge a maximum average monthly flow of 0.24 million gallons (0.91 million liters) per day. Discharge monitoring reports from April 2014 to May 2014 show that the average daily wastewater flow to the plant ranged from 0.14 to 0.15 million gallons (0.51 to 0.57 million liters) per day. The system discharges the treated effluent to leaching fields on the hotel's property.

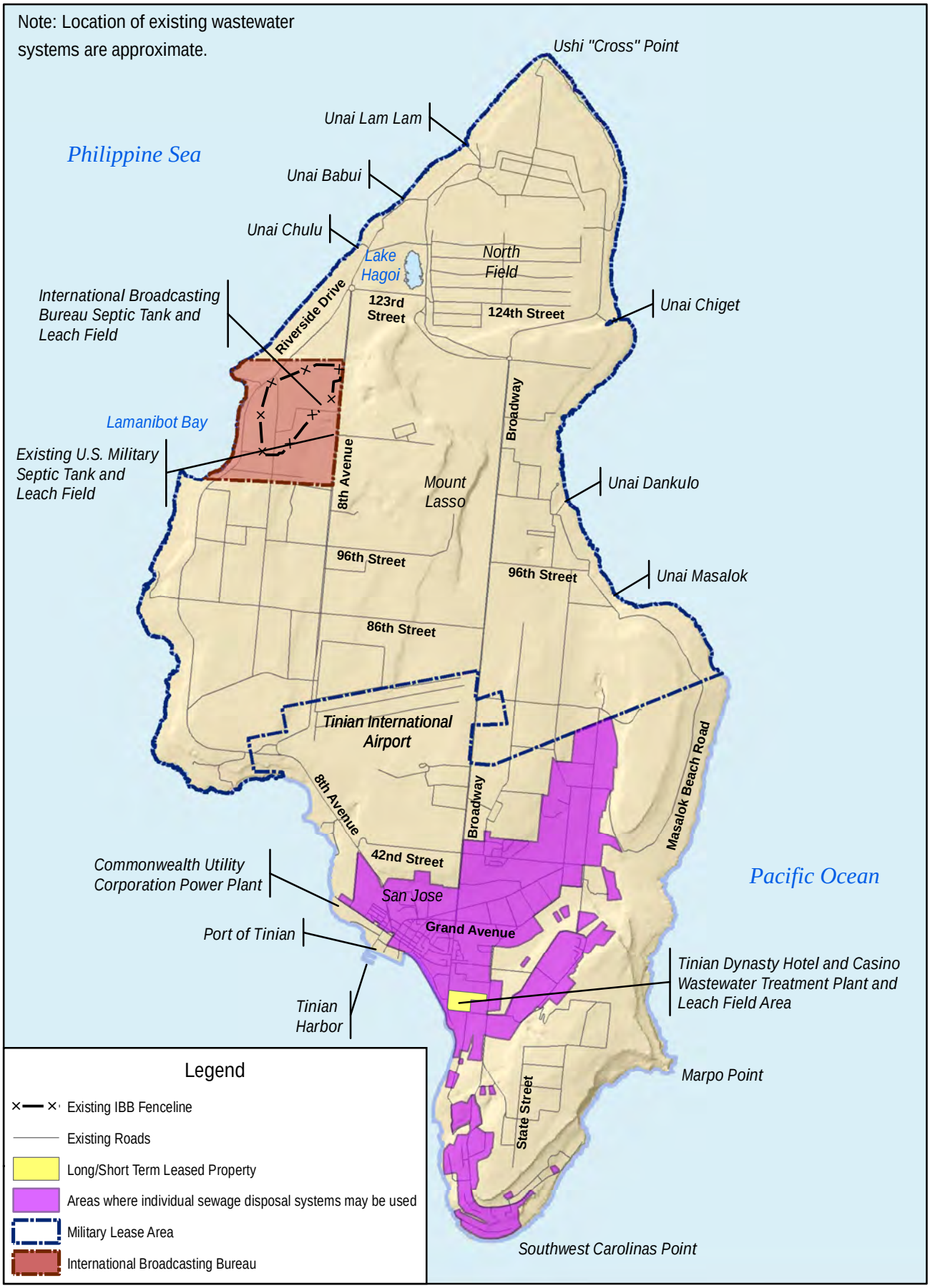

Figure 3.14-3
Tinian Wastewater Systems

A U.S. military septic tank and leaching field system was constructed on Tinian to support military training personnel. It was first made available during a military training exercise in March-April 1999. The system is located south of the International Broadcasting Bureau fence line adjacent to the west side of 8th Avenue. It was sized to support a population of 2,500 military training personnel and to an average daily flow of 6,640 gallons per day (25,000 liters per day). The system is currently not operational. There are plans for its rehabilitation.

3.14.4.4 Stormwater

As discussed in Section 3.3, *Water Resources,* Rainfall on Tinian averages 83 inches (212 centimeters) per year (Water and Environmental Research Institute 2003), 58% of which typically occurs from July to November while only 14% typically occurs during the dry season from January to April (DoN 2010). Stormwater management within the Military Lease Area is minimal, consisting primarily of shallow roadside swales for conveyance. Due to the high porosity of the soils and karst surface geology, the majority of stormwater collects in naturally occurring depressions and infiltrates into the ground. Outside of the Military Lease Area, such as in portions of San Jose, a few areas contain curb and gutter for stormwater conveyance. Most other areas allow stormwater to flow naturally away from the roadways.

3.14.4.5 Solid Waste

Photo 3.14-8. Current Solid Waste Disposal on Tinian

The existing solid waste facility consists of an unlined, open disposal site located about 0.5 mile (0.8 kilometer) north of San Jose and west of 8th Avenue (Photo 3.14-8 and Figure 3.14-4). This disposal site receives all of the municipal solid waste generated on Tinian. The CNMI Department of Public Works operates the facility, which does not comply with the CNMI Administrative Code Chapter 65-80 Solid Waste Management Regulations or the Resource Conservation and Recovery Act Subtitle D regulations applicable to municipal solid waste landfills (40 CFR Part 258) and were issued a Cease and Desist Administrative Order, CASE NO. DEQ SWM 2010-01 in 2010. The CNMI government has initiated contracting and construction for a solid waste transfer station that would handle the solid waste generated by the civilian population.

Figure 3.14-4
Tinian Solid Waste Facility

3.14.4.6 Information Technology/Communications

The information technology/communications resources on Tinian include all telephone, internet, cable, and satellite information technology/communications infrastructure. Tinian has commercial information technology/communications services provided by IT&E, which supplies phone and internet services through overhead distribution in the southern part of Tinian but not in the Military Lease Area. Cellular phone service is also provided by towers that serve the southern part of the island. Marianas Cable Vision Broadband provides cable television service on Tinian. There is no commercial or existing military information technology/communications infrastructure in the Military Lease Area. The International Broadcasting Bureau has significant broadcasting facilities on the northwest portion of Tinian but is not served by commercial services. It relies instead on wireless communications with infrastructure on Saipan.

An undersea fiber optic cable links Tinian and other islands in the CNMI to the Trans-Pacific Cable hub on Guam. In addition to the undersea fiber optic cable, a microwave system between Saipan, Tinian, and Rota provides alternative connectivity and provides diverse and redundant capability for IT&E commercial communications to Tinian in the event the undersea fiber optic cable is disabled (IT&E n.d.). The IT&E Cable Landing Facility is located on Tinian near Broadway and Canal Street in San Jose.

3.14.5 Pagan

3.14.5.1 Electrical Power

There is no public electrical generation or distribution infrastructure on Pagan. Visitors to Pagan may utilize personal-use generators or other power sources.

3.14.5.2 Potable Water

There is no potable water infrastructure or known freshwater source on Pagan. There are two large lakes in northern Pagan; Laguna Sanhiyon and Laguna Sanhalom. Knowledge of the groundwater resources of Pagan is limited to a 1957 study of the geology and hydrogeology of the island (Corwin et al. 1957), a 1978 planning study by the CNMI Office of Transition Studies and Planning; and limited water sampling conducted by the U.S. Geological Survey in 1983 and 2001 (U.S. Geological Survey 2014).

Figure 3.3-3 shows the location of the known groundwater wells on Pagan. Six relatively broadly-distributed groundwater samples were collected from accessible wells on Pagan by the U.S. Geological Survey in 1983 and two were collected in 2001 (U.S. Geological Survey 2014). Three of the wells Corwin et al. (1957) tested (Wells 1, 2, and 3) had total dissolved solids below the secondary drinking water maximum contaminant level. Two of these wells (Wells 2 and 3) had nitrate concentrations below the primary drinking water maximum contaminant level (i.e., mandatory drinking water quality standards under the Safe Drinking Water Act). Therefore these two wells might be considered potable; however both of these have water high in silica.

Visitors to Pagan utilize rainwater harvesting techniques to supply water for personal use. Additional information is provided in the Appendix P, *Utilities Study* (Volume III, Section 2.5.2 [DoN 2014]) and Section 3.3, *Water Resources*.

3.14.5.3 Wastewater

There is currently no publicly operated wastewater infrastructure on Pagan.

3.14.5.4 Stormwater

Average annual rainfall on Pagan is 70 to 80 inches (178 to 203 centimeters). There are no existing man made serviceable stormwater management features on Pagan. Existing culverts near Blue Beach are rusted, filled with holes, and partially crushed. The only related improvements include some grading around the airstrip performed decades ago.

3.14.5.5 Solid Waste

There is no publicly operated solid waste infrastructure on Pagan.

3.14.5.6 Information Technology/Communications

There is no existing information technology/communications infrastructure on Pagan.