Revised Draft Environmental Impact Statement

Commonwealth of the Northern Mariana Islands Joint Military Training

Appendix M: Part 2

June 2025

EISX-007-17-XMC-1747255459

Appendix M - Part 2
Utility Studies

Wastewater Analysis

Solid Waste and Hazardous Waste Study Update

Electrical System Analysis

The appendices of this Revised Draft EIS are compliant with Section 508 of the Rehabilitation Act. This allows assistive technology to be used to obtain the available information from the document. However, accessibility is limited to a descriptive title for some graphics, figures, tables, images, and attachments. Individuals who require assistance may submit a request through the Section 508 link on the project website at CNMIJointMilitaryTrainingEIS.com

LIST OF FIGURES

WASTEWATER ANALYSIS

STORMWATER STUDY

ELECTRICAL SYSTEM ANALYSIS

LIST OF TABLES

WASTEWATER ANALYSIS

SOLID WASTE AND HAZARDOUS WASTE STUDY UPDATE

STORMWATER STUDY

ELECTRICAL SYSTEM ANALYSIS

ELECTRICAL SYSTEM ANALYSIS
IN SUPPORT OF THE
COMMONWEALTH OF THE NORTHERN MARIANA ISLANDS
JOINT MILITARY TRAINING ENVIRONMENTAL IMPACT STATEMENT

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June 2025

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1 PURPOSE

The purpose of this memorandum is to provide technical background and analysis of power distribution in support of the Commonwealth of the Northern Mariana Islands (CNMI) Joint Military Training Revised Draft Environmental Impact Statement (EIS).

1.1 BACKGROUND

The islands of the CNMI are strategically located in the United States (U.S.) Department of Defense (DoD) Indo-Pacific area of operations, as shown in Figure 1. Figure 2 shows the Military Lease Area on Tinian where the U.S. military has trained for several decades.

The Proposed Action would support the ongoing and evolving training requirements of U.S. Armed Forces forward deployed to the Western Pacific, and of U.S. allies and partners, specifically for distributed operations training within the Military Lease Area on Tinian. Proposed training events would include both ground and aviation training within the Military Lease Area.

Non-live-fire offensive and defensive training actions would continue to be conducted in the Military Lease Area with an increase in existing land-based training events, including both ground and aviation training, which are the same or similar to those currently being conducted on Tinian.

Live-fire training would be conducted at two ranges that would be developed within the Exclusive Military Use Area:

- **Multi-Purpose Maneuver Range.** A live-fire range occupying approximately 200 acres at the northern tip of Tinian to support platoon-size live-fire and maneuver, including three surface radar facilities.
- **Explosives Training Range.** A live-fire range on approximately 2.5 acres for the employment of demolitions and military explosives in support of offensive and defensive training events.

The following are also included in the Proposed Action to support training events:

- Establishment of 13 Landing Zones, areas cleared of vegetation to 6–8 inches, and associated access roads to conduct training events and to provide staging, bivouac, and gathering and rendezvous areas.
- Ground and aviation improvements at North Field, including establishment of a drop zone and the placement of a metal airfield surface.
- Construction and operation of a Base Camp.
- Clearance and improvements of roads within the Military Lease Area.

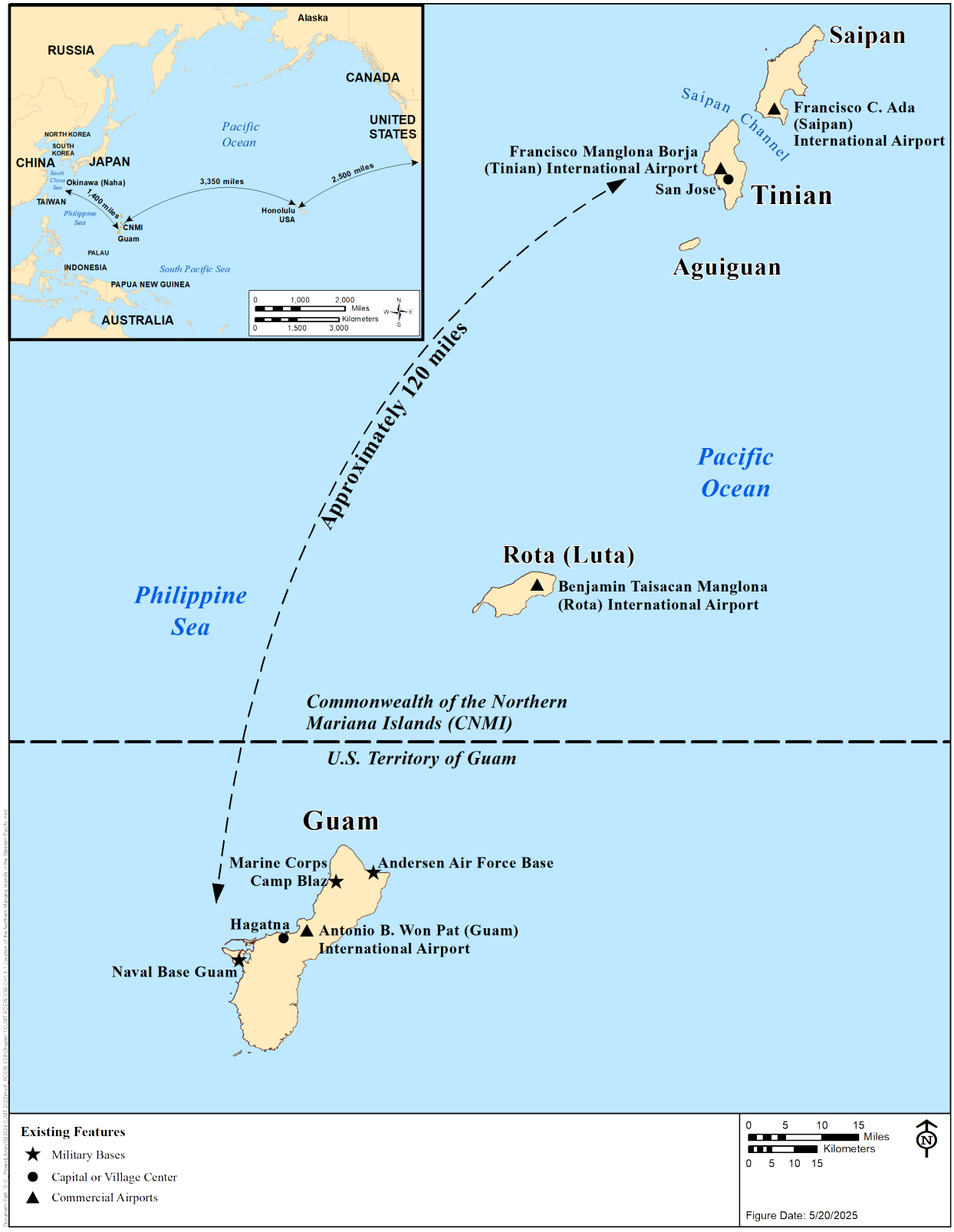

Figure 1. Island of Tinian – Location

Figure 2. Island of Tinian – Military Lease Area Boundaries

2 EXISTING ELECTRICAL SYSTEM ON TINIAN

2.1 COMMONWEALTH UTILITIES CORPORATION ISLAND-WIDE SYSTEM

The Commonwealth Utilities Corporation, a public corporation, owns the existing island-wide electrical distribution system on Tinian . Telesource CNMI, Inc., operates and maintains the system under an Independent Power Provider agreement with the Commonwealth Utilities Corporation. The status of the agreement and whether the Commonwealth Utilities Corporation would inherit the workforce and take over operations, has yet to be confirmed. This would still allow the Commonwealth Utilities Corporation to have flexibility to continue contracting certain items from Telesource CNMI, Inc., if needed. This existing system includes several electrical generation units and distribution infrastructure, which consists of overhead and underground distribution lines, power poles, utility holes, transformers, substations, and meters used to provide and measure power to island customers (Information cited in Cardno GS).

The existing electrical generation system at the powerplant consists of the following components:

- Four 4.16 kilovolt, 2.5 megawatt diesel generators
- Two 4.16 kilovolt, 5.5 megawatt diesel generators
- Two exhaust stacks:
- One 90-foot tall stack to service four 2.5 megawatt generators
- One 175-foot tall stack to service two 5.5 megawatt generators
- An aboveground fuel delivery pipeline from the existing diesel fuel storage tank at the Port of Tinian to a diesel storage tank, which is adjacent to the power plant facility
- Expansion capability for two additional 5.5 megawatt diesel generators (including space inside the existing generator building and tie-in points to the existing exhaust stack)

Data collected in the field indicated an installation date of 1999 for the generators.

The location, configuration, and electrical capacity are essential details for the evaluation of the Tinian Power Plant. The Tinian Power Plant is a single generation facility near the coast outside of San Jose at 25 feet above mean sea level. The powerplant has a total generator operating capacity of 18.2 megawatt with available capacity of 12.70 megawatt considering the maintenance scenario of the largest generator to accommodate additional loads. The powerplant's capacity could be expanded because it has space for two additional 5.5 megawatt generators that would provide an additional 11 megawatt to the system capacity, if installed; this would provide a total generator operating capacity of 29.2 megawatt and an available capacity of 24.7 megawatt. The 4,160-volt output from each of the six diesel generators feed the 1200A synchronizing switchgear that in turn feeds step-up transformers.

The step-up transformers increase the 4,160 volt up to 13.8 kilovolt for power distribution, except for Feeder 2, which distributes power at 4,160 volt. This feeder was anticipated to be upgraded from 4,160 volt to 13.8 kilovolt by 2024, and its current status is unknown. The island-wide electrical distribution consists of four medium voltage feeders that originate from the Commonwealth Utilities Corporation plant. Feeder 1 was identified as offline and loads transferred to Feeder 2. Feeders 2 and 3 support most of the island. Feeder 4 is a dedicated feeder that serves

the former U.S. Agency for Global Media (USAGM) facility (Department of the Navy [DON] 2018).

See Figure 3 for existing feeder distribution and designations.

Much of the existing island-wide electrical distribution system is overhead except for lines within the vicinity of the airfield runways. The existing overhead power distribution on the island has been replaced with concrete poles after impacts from Typhoon Yutu in 2018. The extent of how much of the overhead line distribution has been replaced to date has yet to be determined.

A 2017 Tinian Unscheduled Power Outages report received during the site investigation, revealed the following outages:

- 2015 – 11 Emergency Outages
- 2016 – 6 Emergency Outages

No additional information as to the cause of the outage events is known.

3 ESTIMATED ELECTRICAL DEMAND AND PROPOSED ELECTRICAL INFRASTRUCTURE WITH CJMT ACTION

3.1 POWER DEMAND

The existing system capacity at the Tinian power shall not exceed 12.70 MW. Proposed operations would add an estimated 0.146 megawatt of peak electricity demand to operate facilities and supporting infrastructure and equipment. The additional electrical demand loads on the proposed operations include the three surface radar facilities, which may alternatively be powered by temporary or permanent generators. This increase in peak demand accounts for 1.15 percent of total island-wide/Commonwealth Utilities Corporation system capacity. Table 1 provides a summary of existing and proposed electrical demands relative to the existing electrical system capacity. With this added electrical demand, the system maintains a 9.55 megawatt capacity reserve, which is 75.2 percent of the total system capacity (see Attachment A for calculation details). The existing island-wide power generation facility is capable of meeting the increased power demand during the proposed operations; therefore, the impacts would be less than significant.

Table 1. Electrical Power System Peak Demand and Capacity

Item	*MW of Electricity*	*% of System Capacity*
Tinian Power Plant Effective Design Capacity	12.70	100
Peak Electrical Demand from Existing Customers	3.00	23.5
Additional Peak Electrical Demand from Proposed Facilities	0.146	1.15
Total Electrical Demand with Proposed Facilities	**3.146**	**24.8**
Remaining Electrical Generating Capacity with Proposed Action	**9.51**	**75.2**

Legend: % = percent; MW = megawatt.

Multiple interconnection points to the grid exist. However, a spare breaker is available that could be used for the U.S. Marine Corps (USMC) and, based on peak demand load information received for 2016 and 2017, it is recommended that the USMC be tied to the existing Feeder 4 with the former USAGM infrastructure. Further analysis and investigations and data gathering on peak demand readings are required to validate this recommendation.

Demand load information indicated a peak demand load of 1.4 megawatt on Feeder 4; the demand from the proposed facilities is approximately 0.146 megawatt. The addition of the 0.146 megawatt load on Feeder 4 is insignificant and would not require the installation of a dedicated feeder.

Figure 3. Existing Electrical Distribution System

3.2 MEDIUM VOLTAGE POWER DISTRIBUTION

Power and communications would be required at the proposed facilities, surface radars, and communications towers. Power would originate from the existing Commonwealth Utilities Corporation powerplant. Feeder taps on the existing 13.8-kilovolt USAGM overhead Feeder 4 would be required to support the facilities, surface radars, and communications towers.

Communications would originate from the Tinian commercial internet service provider hub, east of the Commonwealth Utilities Corporation power plant.

The electrical feeder and communications lines would be routed to the proposed facilities and surface radar towers via underground distribution. Surface radar towers supported via underground feeders would provide less maintenance, increased reliability and less cost in operating than if were supported by generators. However, initial cost of using generators would be substantially less. The underground distribution would include concrete-encased duct banks and medium-voltage utility holes. Utility holes would be installed at each change in direction and spaced not greater than 400 feet on straight runs as indicated per Unified Facilities Criteria 3-550-01 (DoD 2019). Where tapped from the existing overhead line, additional overhead power equipment and a riser would be required for the proposed distribution. Additional coordination with Commonwealth Utilities Corporation would be required for any outages during cutover of the 13.8-kilovolt feeder to the proposed operations.

Figure 4 reflects the proposed routing of the underground distribution for both power and communications. Further site investigation is required to verify the exact routing of the underground duct bank and utility hole locations to support the proposed operations. Duct bank configurations, utility hole sizes, and exact cable termination points would be deferred and determined during the detailed design effort.

3.2.1 Electrical Distribution System

The existing 13.8-kilovolt Commonwealth Utilities Corporation overhead line running north along 8th Street would be tapped at the power poles to provide underground lateral feeds to the proposed operations, except for the Base Camp and the communications towers.

The demobilization of the former USAGM facilities would allow reuse of the existing medium voltage distribution to support the Base Camp. An existing medium voltage switchgear would remain in place to be used from site electrical distribution. It was noted that the existing switchgear requires repair to the existing bus. The extent of the repair to the switchgear is currently unknown.

The feeder and communications lines would continue underground to the north approximately 2,000 feet east of Runway Baker to feed the two surface radar locations, the Multi-Purpose Maneuver Range, AHA1, and wells.

The feeder would also branch at 86th Street due west to support Base Camp Well Field – Option A or due east towards Base Camp Well Field – Option B, the preferred option.

A recently installed extension of Feeder 4 located north of the Francisco Manglona Borja/Tinian International Airport as part of the Tinian Divert Infrastructure Improvements would be tapped and routed underground to feed the proposed aircraft shelter.

Impacts to the existing electrical and communication systems on the neighboring Island of Saipan have been explored for training activities. No training activities would be conducted at the USAGM site on Saipan. Military traffic would be limited to occasional inspection and maintenance of the communication antenna. Replacement of the existing high-powered shortwave transmission station tower with lower-powered Radio Frequency antennas would either offset or result in a net increase of the existing electrical distribution capacity. Consequently, there would be no impact to the electrical distribution at this site on Saipan.

Figure 4. Proposed Electrical Distribution System

3.3 QUANTITIES – UNDERGROUND DISTRIBUTION

Below is a summary of the anticipated quantities of utility holes, trenching, and backfill for both the electrical and communications underground distribution systems.

This underground distribution includes approximately 85,665 linear feet of underground duct bank with 121 electrical utility holes and 221 communication utility holes. Table 2 provides the estimated quantity of duct bank (excavation, backfill, and concrete).

Table 2. Duct Bank Quantities

Type	*Total + 15% Contingency (Cubic Yards)*
Excavation	36,037
Concrete	14,299
Backfill	18,818

Legend: % = percent.

4 REFERENCES

DON. 2018. *Electrical Study Update V2a1 Final in Support of the Commonwealth of the Northern Mariana Islands Joint Military Training Environmental Impact Statement/Overseas Environmental Impact Statement.* JBPHH, HI. Prepared for NAVFAC Pacific.

DoD. 2019. *Unified Facilities Criteria (UFC), Exterior Electrical Power Distribution.* UFC 3-550-01. Including Change 3. November 1.

ATTACHMENT A
CALCULATIONS

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Base Camp Load Schedule

Tinian Base Camp Structures

Facility Name	*Unit of Measure*	*Quantity/ Size*	*Watt/ SF*	*Watt/ EA*	*Calculated (kW)*	*Calculated (kVA)*	*Total kVA inc. 25% spare*	*Xfmr size (kVA)*	*Total Demand (kVA)*	*Assumption & Notes*
Outdoor Services										
Ammunition Holding Area (AHA-1)	SF	100	2.19		0.22	0.27	0.34	7.5		
Bivouac Concrete Pad	SF	1	0		0.00	0.00	0.00	0		Electrical needs provided by generators
Biosecurity/Washrack	SF	5,400	0.15		0.81	1.01	1.27	7.5		
Facilities										
Administration/HQ Building	SF	2,115	24		50.76	63.45	79.31	112.5		
Range Control Building (Admin)	SF	4,155	7.5		31.16	38.95	48.69	75		
Base Camp	SF	1	0		0.00	0.00	0.00	0		Electrical needs provided by existing USAGM service
Warehouse	SF	18,000	2		36.00	45.00	56.25	75		
Exercise Control (Training Unit Operational Facility)	SF	1,000	6		6.00	7.50	9.38	15		
Restroom/Showers	SF	5,700	2		11.40	14.25	17.81	25		
Miscellaneous Facilities										
Surface Radar 1	EA	1		12500.00	12.50	15.63	19.53	25		
Surface Radar 2	EA	1		12500.00	12.50	15.63	19.53	25		
Communications Towers	EA	3	0		0.00	0.00	0.00	0		Electrical needs provided by existing USAGM service
Hardened Aircraft Shelter	SF	20,020	6		120.12	150.15	187.69	225		
Well Field Monitor	EA	2		750.00	1.50	1.88	2.34	7.5		(2) Sensor, (1) Data Logger, Aux. Equip., Lighting
Fueling/Fuel Tanks	SF	1,500	0.5		0.75	0.94	1.17	7.5		
								607.5	182.25	Demand kVA based on 30% of the sum of all transformer ratings
									145.8	Demand kW with 0.8 PF

Legend: % = percent; Admin = administration; USAGM = United States Agency for Global Media; Aux. = auxiliary; EA = each; HQ = headquarters; kVA = kilovolt ampere; kW = kilowatt; PF = power factor; SF = square foot; Xfmr = transformer.

Duct Bank - Quantities

		L (FT.)	*W (FT.)*	*D (FT.)*	*Cross Section Area (FT.)*	*CU. FT.*	*CU. YD*
Power/Comm	Excavation	53138.56	3.50	3.83	13.41	712322.34	26382.31
	Concrete	53138.56	3.50	1.83	5.30	281678.63	10432.54
	Backfill	53138.56	3.50	2.00	7.00	371969.89	13776.66
Comm	Excavation	45376.48	1.50	3.83	5.75	260687.89	9655.11
	Concrete	45376.48	1.50	1.83	2.30	104391.12	3866.34
	Backfill	45376.48	1.50	2.00	3.00	136129.44	5041.83

All Conduit Areas	
sqin.	Sqft.
95.00	0.66
64.00	0.44
159.00	1.10

Comm Conduit Areas	
sqin.	Sqft.
64.00	0.44
64.00	0.44

TOTALS		
		CUBIC YARDS
Total + 15% Contingency	Excavation	**36037.42**
	Concrete	**14298.88**
	Backfill	**18818.49**

Legend: % = percent; Comm = communications; CU. FT. = cubic foot; CU. YD = cubic yard; D = depth; FT. = foot or feet; L = length; squin. = square inch; Sqft. = square foot; W = width.

Electrical Distribution System – Quantities

Route Segments	*Connecting Segment Numbers*	*Route Description*	*Routing Type*	*Length (Feet)*	*Number of Poles @135' Spacing*	*Number of Manholes @400' Spacing*	*Length (Meters)*	*Notes*
Segment 1	A to B	Existing OH electrical to Tinian Powerplant	Existing Electrical (OH)	9,823			2,994	Tinian Powerplant to Airport, existing poles.
Segment 2	B to C	Existing UG electrical to Tinian Powerplant	Existing Electrical (UG)	2,810		8	856	West of Tinian International Airport clearance zone (west), required to be underground.
Segment 3	C to D	Existing OH electrical to USAGM	Existing Electrical (OH), Proposed Comm (OH)	17,392			5,301	Existing USAGM Feeder from Airport to Base Camp would connect wells in Well Option A Site. Comm installed on existing OH poles.
Segment 4	E to F	Proposed UG electrical and comm lines	Proposed Elec/Comm (UG)	11,205		29	3,415	Base Camp to Surface Radar Site 1.
Segment 5	G to H	Proposed UG electrical and comm lines	Proposed Elec/Comm (UG)	13,381		34	4,079	Unai Chulu Road to Ushi Point Road.
Segment 6	H to J	Proposed UG electrical and comm lines	Proposed Elec/Comm (UG)	5,260		14	1,603	Proposed UG from 8th Avenue To North Comm Tower.
Segment 7	H to K	Proposed UG electrical and comm lines	Proposed Elec/Comm (UG)	4,763		13	1,452	Ushi Point Road to AHA 1 (lighting, comms), also connects MPMR water tanks/wells.
Segment 8	L to M	Proposed UG electrical and comm lines	Proposed Elec/Comm (UG)	11,599		30	3,535	Proposed UG elec/comm from 8th Avenue to Well Field Option B (connects wells).
Segment 9	L to O	Proposed UG comm lines	Proposed Comm (UG)	26,236		67	7,997	Base Camp to Broadway (inside MLA Boundary).
Segment 10	N to P	Proposed UG comm lines	Proposed Comm (UG)	13,222		34	4,030	Broadway MLA to Commercial Internet Service Provider (San Jose).

Total Comm OH Poles	0
Total Elec OH Poles	0
Total # Poles	**0**
Total Comm Manholes	221
Total Elec Manholes	121
Total # of Manholes	**342**
MH Spacing	400
Pole Spacing	135

Legend: ADN = area distribution node; AHA = Ammunition Holding Area; Comm = communications; Elec = electrical; MLA = Military Lease Area; MPMR = Multi-Purpose Maneuver Range; OH = overhead; UG = underground; USAGM = United States Agency for Global Media.

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