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Long Mott Energy, LLC
PSAR Subsection 2.4.2 “Floods”

**Long Mott Generating Station
Preliminary Safety Analysis Report**

CHAPTER 2

SUBSECTION 2.4.2 FLOODS

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ACRONYMS AND ABBREVIATIONS

<u>Acronym/Abbreviation</u>	<u>Definition</u>
ANSI/ANS	American National Standards Institute/American Nuclear Society
ARF	Area Reduction Factor
cfs	cubic feet per second
fps	feet per second
ft.	feet
GBRA	Guadalupe-Blanco River Authority
HMR	National Weather Service Hydrometeorological Reports
in.	inch(es)
km	kilometer(s)
km ²	square kilometer(s)
LIP	local intense precipitation
LMGS	Long Mott Generating Station
m	meter(s)
MHHW	mean higher high water
mi.	mile(s)
mi ²	square mile(s)
mm	millimeter(s)
m ³ /s	cubic meters per second
NAVD 88	North American Vertical Datum of 1988

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NOAA	National Oceanic and Atmospheric Administration
PMF	probable maximum flood
PMP	probable maximum precipitation
SH	State Highway
SSC	structure(s), system(s), and component(s)
USGS	United States Geological Survey
WRF	Width Reduction Factor

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Chapter 2 Site Characteristics

2.4 HYDROLOGY

2.4.2 FLOODS

2.4.2.1 Flood History

The major credible natural events that may cause flooding near the Long Mott Generating Station (LMGS) site are flooding from the Guadalupe and San Antonio Rivers along with Coleta Creek, hurricane-induced storm surges from the Gulf of Mexico, and the effects of local intense precipitation (LIP) on the site. There are no historical records of flooding in the nearby region from ice-related events, tsunami-generated surges, channel diversions, or dam break incidences.

As mentioned in Section 2.4.1, stream gage records are available for the Guadalupe and San Antonio Rivers and Coleta Creek near the site and are representative of flood flows in the vicinity of the LMGS site.

Monthly discharge data is available from the United States Geological Survey (USGS) for a period of record from water years 1935 to 2022 for Victoria on the Guadalupe River (USGS gage number 08176500) (USGS, 2024a), from water years ~~1981~~1939 to 2022 for Coleta Creek (USGS gage number 08177500) (USGS, 2024b), and from water years ~~2013~~2014 to 2022 for Guadalupe River at State Highway (SH) 35 near Tivoli, Texas (USGS gage number 08188~~81000~~) (USGS, 2024d); however, the latter data are incomplete and comprise only five years of complete data. For the San Antonio River, the nearest gage with a long and reliable record is located at Goliad, Texas (USGS gage number 08188500) from water years 1925 to ~~2022~~2023 (USGS, 2024e).

Records were also available from water years 2006 to 2022 for McFaddin on the San Antonio River (USGS gage number 0818~~8~~570) (USGS, 2024c) (see Section 2.4.1). Monthly discharge data are available for the station at the north end of the Guadalupe-Blanco River Authority (GBRA) Calhoun Canal near the LMGS site, however, this gage has less than seven years of data. The annual peak discharges and corresponding gage heights for the period of record for the Guadalupe River and Coleta Creek gages at Victoria and for the San Antonio River gages at Goliad and McFaddin are listed in Table 2.4.2-1 through Table 2.4.2-4. Plots of the annual peak discharges at these gages are shown in Figure 2.4.2-1 through Figure 2.4.2-4. The data presented in these tables and figures are the annual maximum peak discharges by water year. A water year begins on October 1 of the calendar year preceding the water year and ends on September 30 of the water year (i.e., water year 2006 begins on October 1, 2005, and ends September 30, 2006).

Figure 2.4.1-6 depicts the locations of stream gages on the Guadalupe and San Antonio Rivers.

Based on the annual peak discharges of the nearby stream gages, it is evident that the floods of record for both the San Antonio River and Coleta Creek occurred in 1967.

The flood of record for the Guadalupe River at Victoria occurred in October 1998, with a peak discharge of 466,000 cfs (13,196 m³/s). This event corresponds to severe flooding for much of southeastern Texas. The flood of record for many gaging stations in the region occurred in

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October of 1998, and much damage was attributed to this flooding event in Victoria and other towns in southeastern Texas (USGS 1999). USGS records indicate that at the time of the event, new peak discharges were established at 11 gaging stations on the San Antonio and Guadalupe Rivers with the most historically significant peaks occurring at Cuero and Victoria and the peak discharge at Victoria approximately 2.6 times the previously recorded peak discharge. Rainfall records in the Guadalupe River Basin indicate that the storm was centered downstream of Canyon Dam with significantly more rainfall occurring on the watershed downstream of the dam (USGS, 1999).

The October 1998 flood produced the third highest flow on record at the San Antonio River gage at Goliad, with the second highest occurring in July of 2002. USGS data indicates that the largest rainfall in the San Antonio River basin associated with the 1998 storm occurred in the upstream areas. However, flood peaks on the lower San Antonio River exceeded the 100-year recurrence interval at Elmendorf and Falls City (USGS, 1999).

Flow data at all five stream gages are affected by upstream flow regulation. This is especially true for flow data on Coletto Creek near Victoria. The Coletto Creek near Victoria stream gage is located a short distance downstream of Coletto Creek Dam and Reservoir, and its stream flow record reflects primarily the discharge from the dam (See Figure 2.4.1-6) (USGS, 2023b). The Coletto Creek Reservoir serves as a cooling basin for the Coletto Creek Power coal-fired power plant.

The LMGS site is located on the north-east corner of San Antonio Bay at latitude 28.525°, longitude 96.765° (Figure 2.4.5-1) and at approximately 16 mi (25.7 km) inland upstream of Coletto Creek from its confluence with Powderhorn Lake, Texas, there are no records of flooding from hurricane surges near the site. However, coastal areas near the site have recorded flood levels as a result of hurricane-induced surges. A detailed description of historical hurricane events and storm surges along the Texas coast is presented in Section 2.4.5.

The most intense hurricane, with highest central pressure deficit and wind speed, that made landfall near the LMGS site shoreline was the Indianola hurricane in August 1886 (Blake et al., 2007 and NOAA, 2024c). Hurricanes Carla and Harvey were the most severe hurricanes along the Texas coast near the LMGS site in recent history. Landfall for both hurricanes was on Matagorda Bay. Hurricane Carla made landfall with a maximum surge water level of about 16.6 ft (5.1 m) above mean sea level (MSL) at Port Lavaca (Pararas-Karayannis, 1975), approximately 17.3 ft (5.3 m) North American Vertical Datum of 1988 (NAVD 88) based on the vertical datum conversion factor at Rockport, Texas (NOAA, 2024f). The highest six water levels at National Oceanic and Atmospheric Administration (NOAA) tide gage stations at Corpus Christi, Texas (NOAA, 2024d), and Freeport, Texas (NOAA, 2024e; NOAA, 2025), are shown in Table 2.4.2-6. These water levels are all well below the top of building foundations of 31.5 ft (9.75 m) NAVD 88 for all safety-related facilities at the LMGS site.

The highest maximum storm tides from Hurricane Harvey were observed at the Aransas Wildlife Refuge, where the storm surge levels reached a maximum of 12.5 ft (3.8 m) above ground level. Storm surge in Port Lavaca was also more than 6.78 mean higher high water (MHHW) (NOAA, 2024a) and at least 6 ft (1.8 m) in Port Aransas. Storm tide levels in the interior bays were generally from 5 to 8 ft (1.5 to 2.4 m) with higher levels, near 10 ft (3 m), on the south end of Copano Bay, the north end of Aransas Bay, and the north end of Lavaca Bay (NOAA, 2024b). Elsewhere across South Texas, storm tide levels reached near 3 to 6 ft (0.9 to 1.8 m) by 7 ft (2-

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~~m) (NAVD 88)~~ above ground level at Seadrift, Port O'Connor, Holiday Beach, Port Aransas, and Bob Hall Pier.

There are no records of any ice sheet formation, wind-driven ice ridges, or ice jams on any of the rivers, creeks, or estuaries near the LMGS site, as described in Section 2.4.7. Neither are there any records of dam break flooding nor landside-induced tsunami or distant tsunami source-induced flooding events near the LMGS site, as described in Section 2.4.4 and Section 2.4.6, respectively.

2.4.2.2 Flood Design Considerations

The design basis flooding elevation for the LMGS site is determined by considering a number of different flooding scenarios. The potential flooding scenarios applicable and investigated for the site include:

- Probable maximum flood (PMF) on streams and rivers
- Potential dam failures
- Probable maximum surge and seiche flooding
- Probable maximum tsunami
- Flooding due to ice effects
- Potential flooding caused by channel diversions

The flooding scenarios were postulated to occur in conjunction with other flooding and meteorological events as applicable, such as wind-generated waves and tidal levels, as recommended in the guidelines presented in American National Standards Institute (ANSI) American Nuclear Society (ANS) Standard ANSI/ANS-2.8-1992 (ANSI/ANS, 1992). Detailed assessments of the flooding impacts on the safety functions of LMGS from each of these postulated flooding events are described in Section 2.4.3 through Section 2.4.7 and Section 2.4.9.

The estimation of the PMF water level on the Guadalupe River is described in Section 2.4.3. Different combinations of parameters including probable maximum precipitation (PMP) storm events and antecedent water levels, contributing catchment areas, upstream reservoir releases, and base flow conditions are considered in estimating the PMF stream-flow magnitude. The maximum PMF stillwater level for the Guadalupe River at the LMGS site has been determined to be at elevation ~~34.5~~28.0 ft (~~9.6~~8.53 m) (NAVD 88). The total water level comprised of stillwater, wave runup, wind setup, and sea level rise due to PMF is 40.80 ft (12.44 m) NAVD 88. However, due to the presence of high bluff areas on the west side of the plant, the site is not flooded during the PMF event. ~~Additional site-specific analyses and associated information that includes the postulated coincidental wind setup and wave run-up will be combined with the PMF results and be provided by the end of 2025. These updated results are not expected to impact the maximum PMF water level estimate.~~

The ~~preliminary~~ estimation of the PMF water level on ~~the~~ Coloma Creek is described in Section 2.4.3. The maximum PMF water level for the Coloma Creek at the LMGS site has been

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determined to be at elevation 32 ft (9.7 m) (NAVD 88). The postulated PMF on Coloma Creek coincidental wind setup and wave run-up is estimated to be 33 ft (10.1 m). Therefore, the site is flooded by 2 ft (0.61 m) during PMF on Coloma Creek event.

The ~~preliminary~~ impacts of postulated dam failures on the LMGS safety-related structures, systems, and components (-SSCs) are described in Section 2.4.4. Two aspects of flooding are considered. The flood elevation at the site is investigated as a result of dam failure in the Guadalupe River basin and its tributaries upstream of the site. The maximum ~~PMF~~ water level ~~for the Guadalupe River from upstream dam failure~~ at the LMGS site has been determined to be at elevation ~~33~~27.89 ft (~~10.18.5~~ m) (NAVD 88). The total water level comprised of stillwater, wave runup, wind setup, and sea level rise due to dam failure is 38.42 ft (11.71 m) NAVD 88. However, due to the presence of high bluff areas on the west side of the plant, the site is not flooded during the dam failure event. ~~Additional site-specific analyses and associated information that includes the postulated coincidental wind setup and wave run-up will be combined with the dam failure results and be provided by the end of 2025. These updated results are not expected to impact the maximum PMF water level estimate.~~

The impacts of failure of onsite water control structures are described in Section 2.4.4. Onsite basins ~~5 and 34~~ are shown in Figure 2.4.1-1 and described in Section 2.4.1.1. A maximum flood elevation of ~~32.5~~31.8 ft (9.7 m) (NAVD 88) was determined at the LMGS site as a result of the postulated ~~cooling~~ embankment breach. As noted above, all the safety-related facilities have a top of building foundation elevation of 31.5 ft (9.6 m) (NAVD 88), which indicates ~~no flooding during onsite basin failure~~ that flood protection for safety-related SSCs is necessary.

Probable maximum surge and seiche flooding as a result of the probable maximum hurricane in the Gulf of Mexico is presented in Section 2.4.5. The maximum water level at the LMGS site is estimated to be elevation ~~41.47~~36.38 ft (~~12.6~~11.1 m) (NAVD 88). This predicted flood elevation is higher than the site grade by 5.38 ft (1.64 m). The total water level comprised of stillwater and wave runup, applicable only to the buildings, is 46.49 ft (14.17 m) NAVD 88. This is higher than the site grade maximum water level because of the effects of wave runup on the buildings.

~~This preliminary predicted flood elevation is higher than the site grade by 10.47 ft (3.19m). Requirements for SSCs ensure that water ingress from the DBHL external flood does not adversely impact the capability of SR SSCs inside the Shield Structure (SST) and Fuel Handling Building (FHAB) to fulfill their RSFs, as discussed in Section 6.4 and Section 7.3, respectively. Additional site-specific analyses and associated information that includes the postulated coincidental wind setup and wave run-up will be combined with the storm surge results and be provided by the end of 2025. These updated results are not expected to impact the maximum water level estimate at the LMGS site.~~

Section 2.4.6 describes the estimation of the probable maximum tsunami water level and includes the effects of landslide-induced tsunami events. The maximum water level associated with a probable maximum tsunami including sea level rise, wind setup, and wave runup at the LMGS site is about 17.06 ft (5.2 m) (NAVD 88). Therefore, the probable maximum tsunami would not be a flood risk to the LMGS site. The expected sea level rise is described in Section 2.4.5.

As described in Section 2.4.7 and Section 2.4.9, it is unlikely that ice effects and channel diversions, respectively, would pose any flood risk to the LMGS site. ~~The maximum water level due to a local PMP storm event is estimated and described in~~ Subsection 2.4.2.3. The

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maximum water level in the nuclear island area due to a local PMP storm event is estimated to be at elevation 33.5 ft (10.21 m) (NAVD 88). The maximum flood depth due to the local PMP storm event is 2 ft (0.61 m) above the top of the foundation of the safety-related structures of LMGS.

2.4.2.3 Effects of Local Intense Precipitation

The effects of LIP or local PMP in the vicinity of the LMGS site are described in this subsection. The site drainage system and grading [plan](#) is not available at this time and therefore conservative assumptions are made to determine the effects of local PMP flooding on safety-related facilities.

2.4.2.3.1 Probable Maximum Precipitation Depths

The basis for the LIP is the all-season, 1 mi² or point PMP as obtained from the U.S. National Weather Service Hydrometeorological Reports No. 51 and 52 (HMR 51 and HMR 52) (NOAA, 1978 and NOAA, 1982). The estimated PMP depths presented in HMR 51 are for durations ranging from 6 to 72 hours and for drainage areas ranging from 10 to 20,000 mi² ([26 to 51,800 km²](#)). Using these depths, HMR 52 provides procedures for estimating short duration point (or 1 mi²) PMP depths for durations up to one hour. Figures 24 and 36 in HMR 52 provide point PMP depths of 19.4 in. (493 mm) for a 1-hour duration and 6.2 in. (157 mm) for a 5-minute duration. Fifteen-minute and 30-min durations were estimated by applying the point ratios to 1-hr rainfall from Figures 37 and 38 in HMR 52, respectively. The 6-hr rainfall is from Figure 18 of HMR [5251](#). The 15-min, 60-min, and 6-hr rainfall depth are 9.7 in., 14.2 in., and 32 in. ([246 mm, 361 mm, 813 mm](#)), respectively. Table 2.4.2-5 presents the 1 mi² PMP depths and intensities for various durations used in the analysis at the LMGS site. Then, according to Appendix B of NUREG/CR-7046, the PMP rainfall time series (see Figure 2.4.2-5) with 5-min interval was constructed by:

- The first time step was set to the highest LIP depth, which is 6.2 in. ([157 mm](#))
- The next two 5-minute time steps were set to an incremental precipitation depth of 1.75 in. ([9.7 - 6.2]/2 in.) ([44 mm](#))
- Incremental precipitation depths for the subsequent time steps were determined from the cumulative LIP depths shown in Table 2.4.2-5

2.4.2.3.2 Local Drainage Components and Sub-basins

The LMGS site nuclear island arrangement is shown in Figure 2.4.2-6. The nuclear island area is constructed on fill material that elevates the area by approximately 4 ft ([1.2 m](#)) from the existing grade. Grading inside the nuclear island and the drainage system of the site are not yet designed, therefore the following conservative assumptions are made:

1. Nuclear island area is flat.
2. For the flooding analysis performed for the LIP or the local PMP event, all storm drains, culverts, and catch basins were assumed clogged. Thus, the storm drain collection system and storm water management basins were assumed to be inoperable and were not considered in the flood analysis.

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3. No vehicle barrier system or fence considered around the site and flow over the site is allowed to naturally drain away from the nuclear island site boundaries on all four sides.

A PMP runoff analysis was performed on the LMGS nuclear island area to determine the maximum water levels during the PMP event and compare them to the design plant grade elevations for the safety-related structures. Drainage paths that could affect water levels near safety-related structures were determined by performing a two-dimensional hydraulic and hydrologic model. Drainage paths in other areas outside of the nuclear island that did not affect flood levels near safety-related structures were not analyzed.

2.4.2.3.3 Flood Elevations

The two-dimensional FLO-2D model is used to route floodwater in natural manner without being forced to flow in predefined directions (FLO-2D). This allows for a more accurate flood analysis than is possible with one-dimensional ~~(1D)~~ models. The site is modeled as flat surface with building as obstructions. The extent of the FLO-2D model and building footprints are illustrated in Figure 2.4.2-7. The model boundaries are placed at the edge of the raised area away from safety-related ~~Structures, Systems, and Components (SSCs)~~. The FLO-2D model covers an area of approximately 0.1 mi² (0.26 km²).

Rainfall estimated on above sections is applied directly to each FLO-2D grid cell. Applying rainfall directly using the LIP distribution is more representative of the physical runoff process than an approach that uses inflow hydrographs (e.g., using the Rational Method) because in this analysis every grid cell receives water. Runoff is allowed to leave the FLO-2D model at all boundaries. Consequently, any water that reaches a boundary is allowed to flow out of the model in a natural manner by assigning outflow cells along the entire boundary.

Square cell sizes of 5 ft (1.5 m) were selected to properly model the locations of the buildings. Considering the site grade is covered by crushed compact stone, a conservative Manning's roughness coefficient of 0.04 (Chow, 1959) is assigned to the entire model. Similar to Case 1 of NUREG/CR-7046, soil infiltration is not considered. Buildings, tanks, and other structures (Figure 2.4.2-6) are characterized in FLO-2D with Area Reduction Factors (ARF) and Width Reduction Factors (WRF). A shape-file that outlines buildings, tanks, and other structures is imported into FLO-2D, which computes the corresponding ARFs and WRFs.

To ensure that water drains off roofs appropriately, the grid cell elevations of cells blocked by large buildings or tanks (i.e., cells that represent the roof or tank top) are raised by 3 ft (0.9 m). Vehicle Barrier Systems are not provided in the preliminary layout and not considered in the analysis.

The FLO-2D results show that the maximum flood depth in the vicinity of the buildings, where the safety-related doors are located, is about 24 in. (0.61 m) above the finish grade.

Representative PMP flood depth time series at the site is presented in Figure 2.4.2-8. Flood waters during the PMP event will remain above the top of foundation elevation for a duration of 12 hours.

Maximum velocity is less than 0.5 fps during both scenarios; therefore, there is no concern on erosion at the site.

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**Table 2.4.2-1
Annual Peak Discharges in the Guadalupe River at Victoria, Texas (USGS
8176500)
(Sheet 1 of 3)**

Water Year	Date	Gage Height (feet NGVD 29)	Gage Height (feet NAVD 88)^a	Stream- flow (cfs)
1935	Jun. 20, 1935	29.72	29.44	38,500
1936	Jul. 03, 1936	31.22	30.94	179,000
1937	Oct. 04, 1936	26.77	26.49	17,200
1938	Apr. 30, 1938	28.75	28.47	25,400
1939	Jun. 06, 1939	14.52	14.24	4940
1940	Jul. 03, 1940	29.67	29.39	55,900
1941	May 03, 1941	29.73	29.45	58,000
1942	Jul. 09, 1942	29.80	29.52	56,000
1943	Oct. 21, 1942	18.80	18.52	7710
1944	Jun. 01, 1944	23.94	23.66	12,300
1945	Apr. 06, 1945	28.57	28.29	22,000
1946	Sep. 03, 1946	27.70	27.42	17,900
1947	Oct. 17, 1946	29.55	29.27	46,000
1948	May 28, 1948	17.50	17.22	6970
1949	Apr. 30, 1949	28.53	28.25	20,600
1950	Oct. 28, 1949	24.95	24.67	13,300
1951	Jun. 08, 1951	23.96	23.68	12,300
1952	Sep. 16, 1952	29.46	29.18	28,400
1953	May 04, 1953	23.19	22.91	11,600
1954	Oct. 26, 1953	19.68	19.40	8560
1955	May 22, 1955	14.83	14.55	4950
1956	May 18, 1956	7.46	7.18	1730
1957	May 02, 1957	29.92	29.64	35,300
1958	Feb. 26, 1958	30.28	30.00	58,300
1959	Apr. 15, 1959	22.33	22.05	10,100
1960	Jul. 01, 1960	29.06	28.78	23,700
1961	Jun. 22, 1961	30.35	30.07	55,800
1962	Nov. 17, 1961	23.11	22.83	10,800
1963	Feb. 21, 1963	13.22	12.94	4100
1964	Nov. 11, 1963	16.19	15.91	5720
1965	Feb. 21, 1965	27.30	27.02	15,000

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**Table 2.4.2-1
Annual Peak Discharges in the Guadalupe River at Victoria, Texas (USGS
8176500)
(Sheet 2 of 3)**

Water Year	Date	Gage Height (feet NGVD 29)	Gage Height (feet NAVD 88)^a	Stream- flow (cfs)
1966	Dec. 08, 1965	21.99	21.71	9790
1967	Sep. 21, 1967	30.67	30.39	70,000
1968	Jan. 25, 1968	29.72	29.44	44,300
1969	Apr. 13, 1969	27.13	26.85	15,200
1970	May 20, 1970	21.70	21.42	9190
1971	Sep. 12, 1971	22.48	22.20	9740
1972	May 16, 1972	30.37	30.09	58,500
1973	Jun. 17, 1973	29.33	29.05	33,100
1974	Oct. 16, 1973	28.98	28.70	25,200
1975	May 29, 1975	29.24	28.96	30,200
1976	Apr. 19, 1976	26.54	26.26	14,100
1977	Apr. 24, 1977	30.09	29.81	54,500
1978	Sep. 14, 1978	25.64	25.36	12,700
1979	May 12, 1979	28.36	28.08	19,300
1980	May 19, 1980	24.68	24.40	11,600
1981	Sep. 02, 1981	31.10	30.82	105,000
1982	May 19, 1982	28.20	27.92	18,500
1983	Nov. 20, 1982	23.95	23.67	10,900
1984	Oct. 21, 1983	11.70	11.42	3280
1985	Apr. 21, 1985	23.85	23.57	10,600
1986	Nov. 29, 1985	26.29	26.01	13,700
1987	Jun. 07, 1987	30.45	30.17	83,400
1988	Nov. 28, 1987	13.24	12.96	3900
1989	May 21, 1989	13.89	13.61	4280
1990	Sep. 12, 1990	15.61	15.33	5230
1991	Apr. 05, 1991	27.83	27.55	17,000
1992	Dec. 25, 1991	30.13	29.85	61,500
1993	Jun. 30, 1993	27.87	27.59	17,700
1994	May 19, 1994	26.04	25.76	13,300
1995	Oct. 19, 1994	29.37	29.09	39,600
1996	Sep. 22, 1996	22.71	22.43	9760
1997	Apr. 04, 1997	29.07	28.79	32,700

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**Table 2.4.2-1
Annual Peak Discharges in the Guadalupe River at Victoria, Texas (USGS
8176500)
(Sheet 3 of 3)**

Water Year	Date	Gage Height (feet NGVD 29)	Gage Height (feet NAVD 88) ^a	Stream- flow (cfs)
1998	Oct. 13, 1997	28.30	28.02	20,600
1999	Oct. 20, 1998	34.04	33.76	466,000
2000	Jun. 12, 2000	17.54	17.26	6220
2001	Sep. 03, 2001	29.36	29.08	39,300
2002	Jul. 10, 2002	30.32	30.04	71,700
2003	Nov. 08, 2002	29.99	29.71	58,500
2004	Jun. 15, 2004	27.48	27.20	16,100
2005	Nov. 26, 2004	30.90	30.62	102,000
2006	Jul. 06, 2006	13.73	13.45	4290
2007	Jul. 03, 2007	29.33	29.05	38,600
2007	Jul. 3, 2007	29.33 13.26	29.05 12.98	38,600 3990
2007 2008	Nov. 21, 2007	13.26 25.84	12.98 25.56	3990 13,800
2009	Apr. 21, 2009	25.84 28.96	25.56 28.68	13,800 30,400
2009 2010	Nov. 24, 2009	28.96 8.84	28.68 8.56	30,400 1620
2011	Jan. 17, 2011	8.84 25.66	8.56 25.38	1620 13,500
2012	Jan. 29, 2012	25.66 9.36	25.38 9.08	13,500 1920
2013	May 28, 2013	9.36 25.75	9.08 25.47	1920 13,700
2013 2014	Nov. 4, 2013	25.75 30.18	25.47 29.90	13,700 49,100
2015	May 30, 2015	30.18 28.38	29.90 28.10	49,100 21,300
2016	Jun. 6, 2016	28.38 31.3	28.10 31.02	21,300 86,500
2017	Aug. 30, 2017	31.30 24.67	31.02 24.39	86,500 12,400
2018	Apr. 1, 2018	24.67 27.38	24.39 27.10	12,400 14,300
2019	Dec. 12, 2018	27.38 15.31	27.10 15.03	14,300 4610
2020	Apr. 7, 2020	15.31 27.84	15.03 27.53	4610 16,200
2021	Jun. 4, 2021	27.81 29.94	27.53 29.66	16,200 34,000
2022	Oct. 18, 2021	29.94 29.07	29.66 28.79	34,000 n/a
2023	May 17, 2023	29.07	28.79	n/a

a. Conversion based on datum shift of -0.282 ft. at Lat. 28° 47' 34", Lon. 97° 00' 46" (U. S. National Geodetic Survey, 2024f)

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Preliminary Safety Analysis Report**

**Table 2.4.2-2
Annual Peak Discharges in Coleta Creek near Victoria, Texas (USGS 08177500)
(Sheet 1 of 2)**

Water Year	Date	Gage Height (feet NGVD 29)	Gage Height (feet NAVD 88)^a	Stream-flow (cfs)
1939	Jul. 12, 1939	11.40	11.11	8820
1940	Jun. 30, 1940	22.05	21.76	39,200
1941	Nov. 25, 1940	24.25	23.96	48,200
1942	Jul. 06, 1942	20.75	20.46	34,300
1943	May 31, 1943	6.76	6.47	2530
1944	Mar. 18, 1944	13.08	12.79	12,200
1945	Apr. 20, 1945	7.09	6.80	2700
1946	May 23, 1946	12.02	11.73	10,000
1947	Oct. 16, 1946	31.64	31.35	89,000
1948	May 24, 1948	8.78	8.49	4260
1949	Apr. 26, 1949	6.89	6.60	2700
1950	Oct. 26, 1949	6.43	6.14	2290
1951	Sep. 13, 1951	11.60	11.31	9440
1952	May 28, 1952	15.18	14.89	17,300
1953	Aug. 30, 1953	13.73	13.44	14,400
1954	May 25, 1954	3.33	3.04	731
1967	Sep. 22, 1967	42.00	41.71	236,000
1979	May 11, 1979	N/A	N/A	15,500
1980	Jan. 20, 1980	15.72	15.43	8550
1981	Sep. 01, 1981	19.73	19.44	16,500
1982	Oct. 31, 1981	27.02	26.73	39,100
1983	Nov. 19, 1982	19.50	19.21	15,900
1984	Mar. 12, 1984	18.82	18.53	14,400
1985	Jul. 04, 1985	16.35	16.06	9590
1986	Jun. 13, 1986	8.17	7.88	1090
1987	Jun. 11, 1987	19.15	18.86	15,100
1988	Nov. 25, 1987	5.32	5.03	231
1989	Apr. 30, 1989	4.23	3.94	37
1990	Jul. 17, 1990	20.86	20.57	19,200
1991	Apr. 05, 1991	28.00	27.71	37,000
1992	Apr. 17, 1992	27.68	27.39	41,700
1993	May 05, 1993	23.27	22.98	25,900

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**Table 2.4.2-2
Annual Peak Discharges in Coletto Creek near Victoria, Texas (USGS 08177500)
(Sheet 2 of 2)**

Water Year	Date	Gage Height (feet NGVD 29)	Gage Height (feet NAVD 88)^a	Stream- flow (cfs)
1994	May 14, 1994	14.00	13.71	6020
1995	Oct. 18, 1994	28.41	28.12	44,700
1996	Aug. 30, 1996	4.95	4.66	23
1997	Apr. 04, 1997	32.05	31.76	50,100
1998	Oct. 13, 1997	26.03	25.74	28,500
1999	Oct. 18, 1998	23.25	22.96	22,400
2000	Jun. 12, 2000	6.75	6.46	504
2001	Sep. 01, 2001	22.39	22.10	20,200
2002	Dec. 02, 2001	17.97	17.68	11,500
2003	Oct. 25, 2002	19.97	19.68	15,800
2004	May 14, 2004	18.52	18.23	13,200
2005	Nov. 21, 2004	28.93	28.64	41,700
2006	Jun. 01, 2006	4.94	4.65	117
2007	Jul. 02, 2007	21.67	21.38	19,300
2008	Mar. 6, 2008	4.28	4.00	33
2009	Jan. 20, 2009	4.00	3.72	16
2010	May 15, 2010	20.41	20.13	16,700
2011	Jan. 17, 2011	6.89	6.61	562
2012	Jul. 11, 2012	7.12	6.84	640
2013	May 25, 2013	9.68	9.40	2130
2014	Jan. 9, 2014	4.27	3.99	22
2015	Jun. 18, 2015	19.79	19.51	15,400
2016	Mar. 10, 2016	16.01	15.73	9210
2017	Aug. 26, 2017	24.02	23.74	24,700
2018	Sep. 15, 2018	8.37	8.09	1290
2019	Dec. 8, 2018	19.32	19.04	14,300
2020	Apr. 7, 2020	4.48	4.20	22
2021	Jul. 9, 2021	26.16	25.88	18,800
2022	Oct. 16, 2021	10.66	10.38	2700

a. Conversion based on datum shift of -0.217 ft. at Lat. 28° 43' 51", Lon. 97° 08' 18" (U. S. National Geodetic Survey, 2024f)

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**Table 2.4.2-3
Annual Peak Discharges in the San Antonio
River at Goliad, Texas (USGS 08188500)
(Sheet 1 of 3)**

Water Year	Date	Gage Height (feet NGVD 29)	Gage Height (feet NAVD 88)^a	Stream- flow (cfs)
1914	Oct. 02, 1913	44.90	44.68	33,800
1925	Jul. 13, 1925	11.90	11.68	1830
1926	Apr. 25, 1926	31.00	30.78	11,900
1927	Apr. 16, 1927	22.50	22.28	5410
1928	May 16, 1928	19.00	18.78	3880
1929	Jan. 11, 1929	31.79	31.57	13,100
1935	Jun. 15, 1935	44.90	44.68	33,800
1939	Jul. 12, 1939	11.22	11.00	1900
1940	Jul. 02, 1940	31.37	31.15	11,600
1941	May 01, 1941	34.55	34.33	15,700
1942	Jul. 09, 1942	44.90	44.68	33,800
1943	Oct. 08, 1942	25.51	25.29	7330
1944	May 30, 1944	29.01	28.79	9880
1945	Apr. 03, 1945	21.84	21.62	5170
1946	Sep. 01, 1946	41.66	41.44	25,500
1947	Oct. 02, 1946	42.67	42.45	29,400
1948	Aug. 28, 1948	29.41	29.19	10,200
1949	Apr. 28, 1949	33.76	33.54	14,100
1950	Oct. 27, 1949	24.04	23.82	6420
1951	Sep. 14, 1951	26.90	26.68	8370
1952	Sep. 14, 1952	39.82	39.60	23,900
1953	May 20, 1953	28.76	28.54	8560
1954	May 27, 1954	12.77	12.55	2050
1955	Sep. 02, 1955	13.83	13.61	2320
1956	May 16, 1956	14.33	14.11	2420
1957	May 02, 1957	31.56	31.34	10,300
1958	Feb. 25, 1958	36.21	35.99	16,000
1959	Nov. 01, 1958	22.82	22.60	5220
1960	Jun. 29, 1960	23.28	23.06	5440
1961	Oct. 29, 1960	31.62	31.40	11,300
1962	Jun. 03, 1962	23.16	22.94	5660
1963	Apr. 30, 1963	10.36	10.14	1680

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**Table 2.4.2-3
Annual Peak Discharges in the San Antonio
River at Goliad, Texas (USGS 08188500)
(Sheet 2 of 3)**

Water Year	Date	Gage Height (feet NGVD 29)	Gage Height (feet NAVD 88)^a	Stream- flow (cfs)
1964	Aug. 10, 1964	20.03	19.81	4360
1965	May 24, 1965	30.79	30.57	10,600
1966	Dec. 06, 1965	18.52	18.30	3880
1967	Sep. 23, 1967	53.70	53.48	138,000
1968	Jan. 24, 1968	41.98	41.76	25,900
1969	Feb. 17, 1969	24.93	24.71	6380
1970	Jun. 02, 1970	25.28	25.06	6100
1971	Aug. 09, 1971	22.01	21.79	4970
1972	May 15, 1972	34.16	33.94	12,800
1973	Jul. 24, 1973	34.53	34.31	14,900
1974	Oct. 02, 1973	40.09	39.87	21,800
1975	May 28, 1975	27.48	27.26	8660
1976	Apr. 18, 1976	29.00	28.78	9780
1977	Apr. 25, 1977	36.07	35.85	15,900
1978	Nov. 05, 1977	23.99	23.77	6770
1979	Apr. 23, 1979	28.34	28.12	9310
1980	Sep. 09, 1980	25.68	25.46	8240
1981	Jun. 21, 1981	31.96	31.74	12,800
1982	Oct. 31, 1981	24.49	24.27	7460
1983	Sep. 21, 1983	23.43	23.21	6960
1984	Nov. 08, 1983	14.94	14.72	3120
1985	Jul. 07, 1985	21.44	21.22	5990
1986	Jun. 10, 1986	29.45	29.23	10,700
1987	Jun. 07, 1987	43.08	42.86	33,200
1988	Jul. 24, 1988	11.08	10.86	1850
1989	Jun. 17, 1989	11.30	11.08	1920
1990	Jul. 21, 1990	27.66	27.44	9480
1991	Apr. 06, 1991	25.92	25.70	8330
1992	Dec. 25, 1991	41.58	41.36	27,500
1993	Jun. 30, 1993	35.37	35.15	16,200
1994	May 18, 1994	28.71	28.49	10,200
1995	Oct. 18, 1994	28.50	28.28	10,100

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**Table 2.4.2-3
Annual Peak Discharges in the San Antonio
River at Goliad, Texas (USGS 08188500)
(Sheet 3 of 3)**

Water Year	Date	Gage Height (feet NGVD 29)	Gage Height (feet NAVD 88)^a	Stream- flow (cfs)
1996	Sep. 26, 1996	13.09	12.87	2460
1997	Jun. 28, 1997	31.78	31.56	12,600
1998	Mar. 19, 1998	18.78	18.56	4610
1999	Oct. 22, 1998	51.78	51.56	59,200
2000	Jun. 14, 2000	16.82	16.60	4070
2001	Sep. 02, 2001	41.97	41.75	27,200
2002	Jul. 09, 2002	52.81	52.59	70,600
2003	Oct. 28, 2002	36.13	35.91	18,000
2004	Jun. 14, 2004	31.43	31.21	13,000
2005	Nov. 27, 2004	40.42	40.20	23,400
2006	May 08, 2006	12.04	11.82	2280
2007	Aug. 23, 2007	38.52	38.30	20,800
2008	Sep. 14, 2009	14.49	14.27	3100
2009	Sep. 12, 2010	11.41	11.19	2480
2010	Jan. 12, 2011	28.99	28.77	11,200
2011	Mar. 30, 2012	8.6	8.38	1510
2012	May 30, 2013	23.32	23.10	7920
2013	May 28, 2014	28.6	28.38	10,900
2014	May 18, 2015	22.82	22.60	7660
2015	Aug. 25, 2016	32.66	32.44	10,400
2016	Dec. 8, 2016	34.592	34.38	18,600
2017	Sep. 14, 2018	(b)	(b)	11,900
2018	Nov. 11, 2018	27.1	26.88	10,000
2019	Sep. 12, 2020	21.36	21.14	6350
2020	Jul. 11, 2021	21.02	20.80	6730
2021	Oct. 18, 2021	31.67	31.45	13,300
2022	May 15, 2023	28.49	28.27	10,800
2023	Sep. 14, 2009	27.87	27.65	9260

a) Conversion based on datum shift of -0.217 feet at Lat. 28° 38' 58", Lon. 97° 23' 04" (U. S. National Geodetic Survey, 2024f)

b) Data not available.

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**Table 2.4.2-4
Annual Peak Discharges in the San Antonio River near McFaddin, Texas (USGS
08188570)**

Water Year	Date	Gage Height (feet NGVD 29)	Gage Height (feet NAVD 88)^a	Stream-flow (cfs)
2006	Jun. 2, 2006	19.63	19.35	2980
2007	Aug. 25, 2007	33.58	33.30	20,600
2008	Aug. 24, 2008	19.34	19.06	2670
2009	Sep. 15, 2009	17.70	17.42	1860
2010	Sep. 14, 2010	27.13	26.85	9310
2011	Jan. 13, 2011	19.68	19.40	1160
2012	Mar. 31, 2012	24.91	24.63	4380
2013	Jun. 1, 2013	25.88	25.60	5250
2014	May 29, 2014	24.64	24.36	4400
2015	May 22, 2015	29.48	29.20	11,200
2016	Aug. 28, 2016	29.31	29.03	10,900
2017	Dec. 11, 2016	27.77	27.49	8680
2018	Sep. 15, 2018	27.22	26.94	5900
2019	Nov. 12, 2018	26.41	26.13	6340
2020	Sep. 13, 2020	24.90	24.62	4650
2021	Jul. 14, 2021	30.08	29.80	12,100
2022	Oct. 20, 2021	27.67	27.39	6660
2023	May 18, 2023	27.78	27.50	6410

a) Conversion based on datum shift of -0.282 ft. at Lat. 28° 47' 34", Lon. 97° 00' 46" (U. S. National Geodetic Survey, 2024f)

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**Table 2.4.2-5
Long Mott Generating Station Site Short Duration Local PMP Depths**

Duration	Area (mi ²)	Multiplier	Applied to	PMP Depth (in.)
6 hr.	10	NA	NA	32.0 (HMR 51 Figure 18)
1 hr.	1	NA	NA	19.4 (HMR 52 Figure 24)
30 min.	1	0.73 (HMR 52 Figure 38)	1-hr., 1-mi ² PMP	14.2
15 min.	1	0.5 (HMR 52 Figure 37)	1-hr., 1-mi ² PMP	9.7
5 min.	1	0.632 (HMR 52 Figure 36)	1-hr., 1-mi ² PMP	6.2

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**Table 2.4.2-6
Recorded Maximum Water Surface Elevations at Corpus Christi, Texas, and
Freeport, Texas, Tide Gage Stations**

Rank	Corpus Christi, Texas				Freeport, Texas			
	Date	Water Level		Coincident Hurricane ^c	Date	Water Level		Coincident Hurricane ^c
		Station Datum ^a (feet)	NAVD 88 ^b (feet)			Station Datum ^a (feet)	NAVD 88 ^b (feet)	
1	20050924 03:00	25.73	4.42	Hurricane Rita	20030715 12:00	10.76	6.85	Hurricane Claudette
2	20080913 08:00	26.57	5.26	Hurricane Ike	19980911 02:42	9.95	6.04	Tropical Storm Frances
3	20200725 18:00	27.73	6.42	Hurricane Hanna	20210914 05:24	-9.39	5.52 5.48	Hurricanes Ida/Nicholas
4	19980909 23:00	25.82	4.51	Tropical Storm Frances	19980910 10:42	9.27	5.36	Tropical Storm Frances
5	19880916 21:00	25.5	4.19	Hurricane Gilbert	19800809 00:00	9.00	5.09	Hurricane Allen
6	20170825 21:00	25.26	3.95	Hurricane Harvey	20200827 11:24	-8.62	5.00 4.74	Hurricane Laura

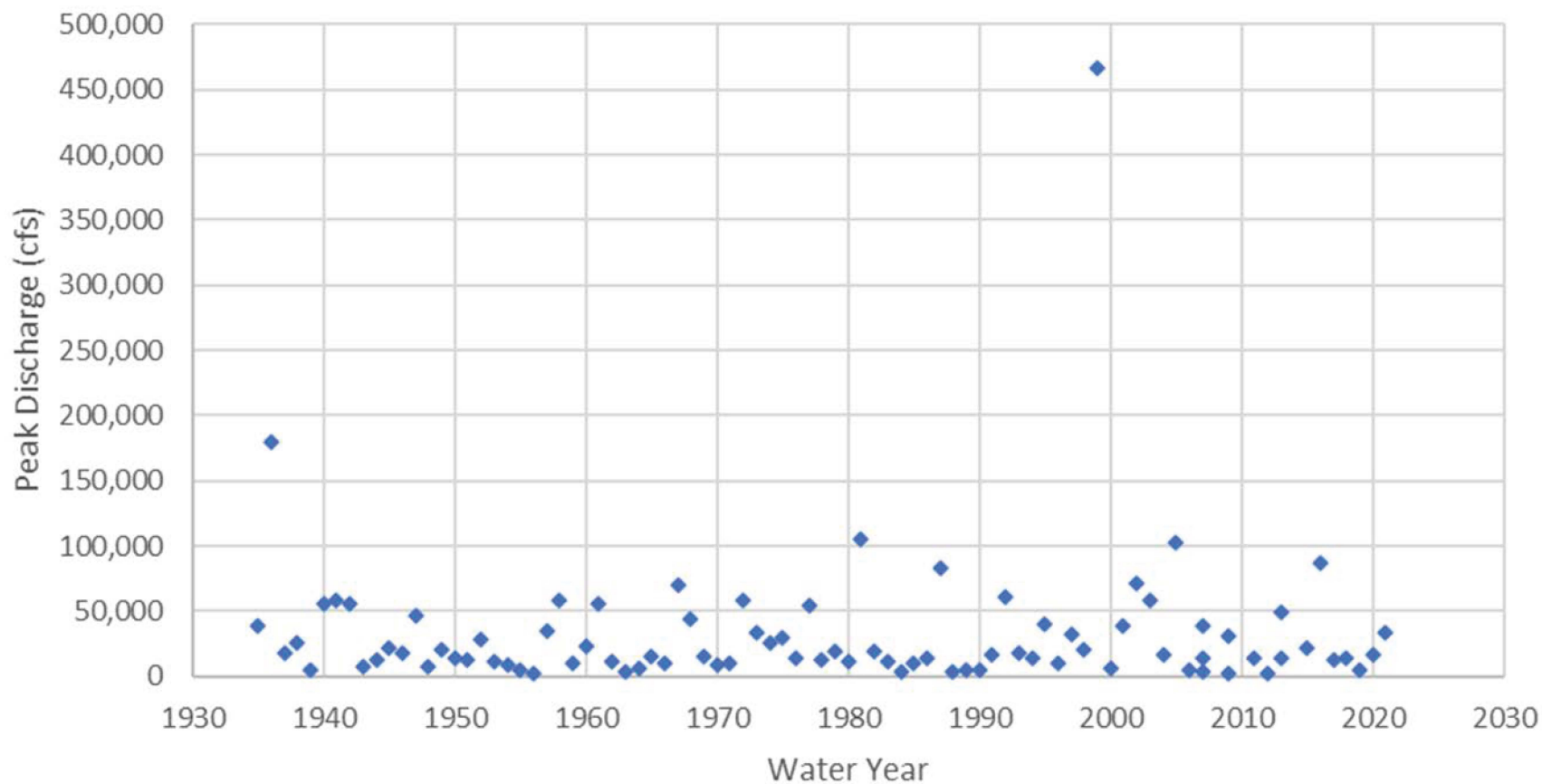
a. In Station Datum

b. (NAVD 88) Datum at Bob Hall Pier, Corpus Christi, Texas, is 21.31 ft. above the Station Datum. (NAVD 88) Datum at Freeport, Texas, is approximately 3.91 ft. above the Station Datum ([Claudette, Frances, and Allen; NOAA, 2024e](#)). [Ida/Nicholas and Laura \(NAVD 88\) from 8772471, Freeport Harbor \(NOAA, 2025\)](#).

c. Coincident hurricanes are identified from NOAA historical hurricane database (NOAA, 2024c).

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Figure 2.4.2-1
Annual Peak Discharges in the Guadalupe River at Victoria, Texas (USGS 08176500)



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Figure 2.4.2-2
Annual Peak Discharges in Coleta Creek near Victoria, Texas (USGS 08177500)

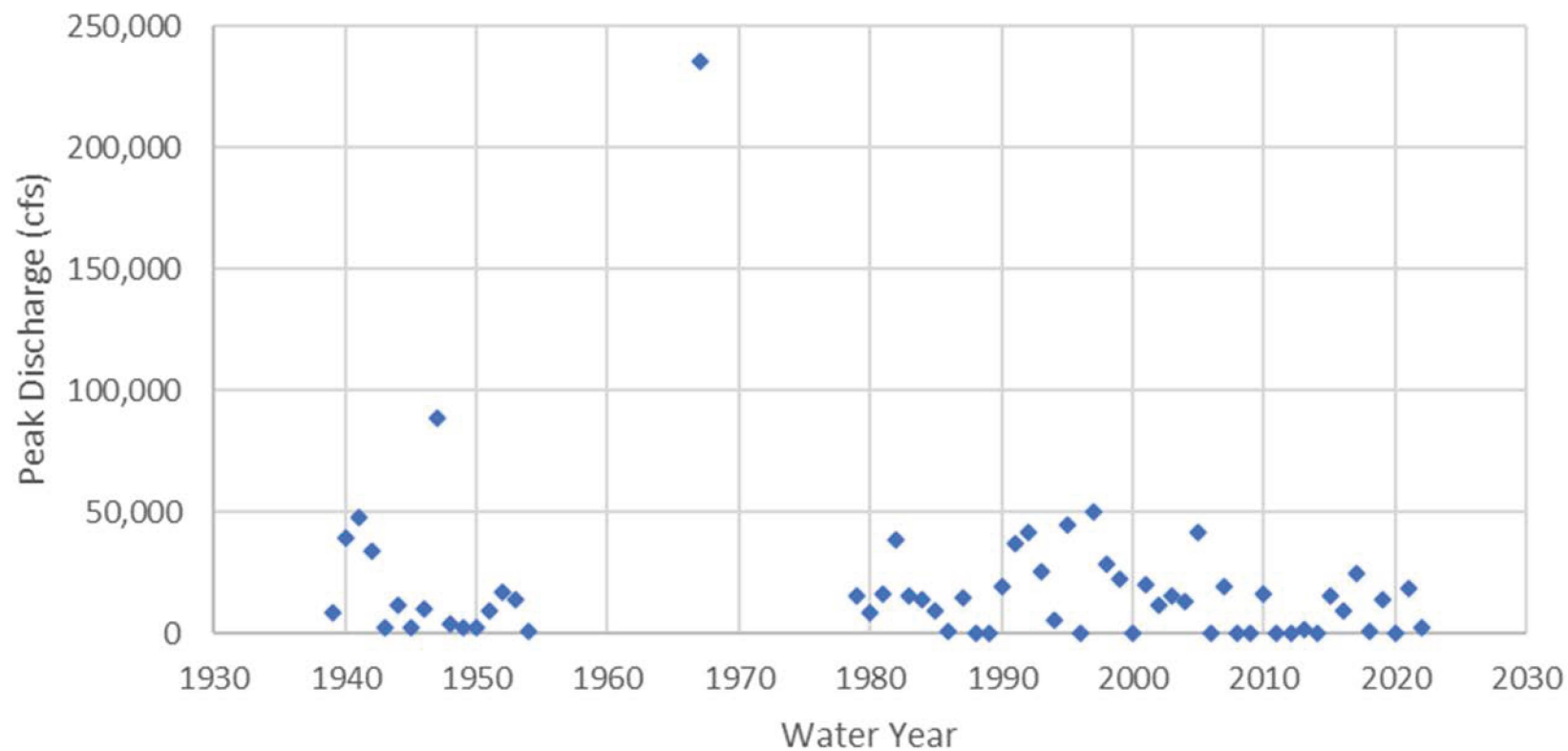


Figure 2.4.2-3
Annual Peak Discharges in San Antonio River at Goliad, Texas (USGS 08188500)

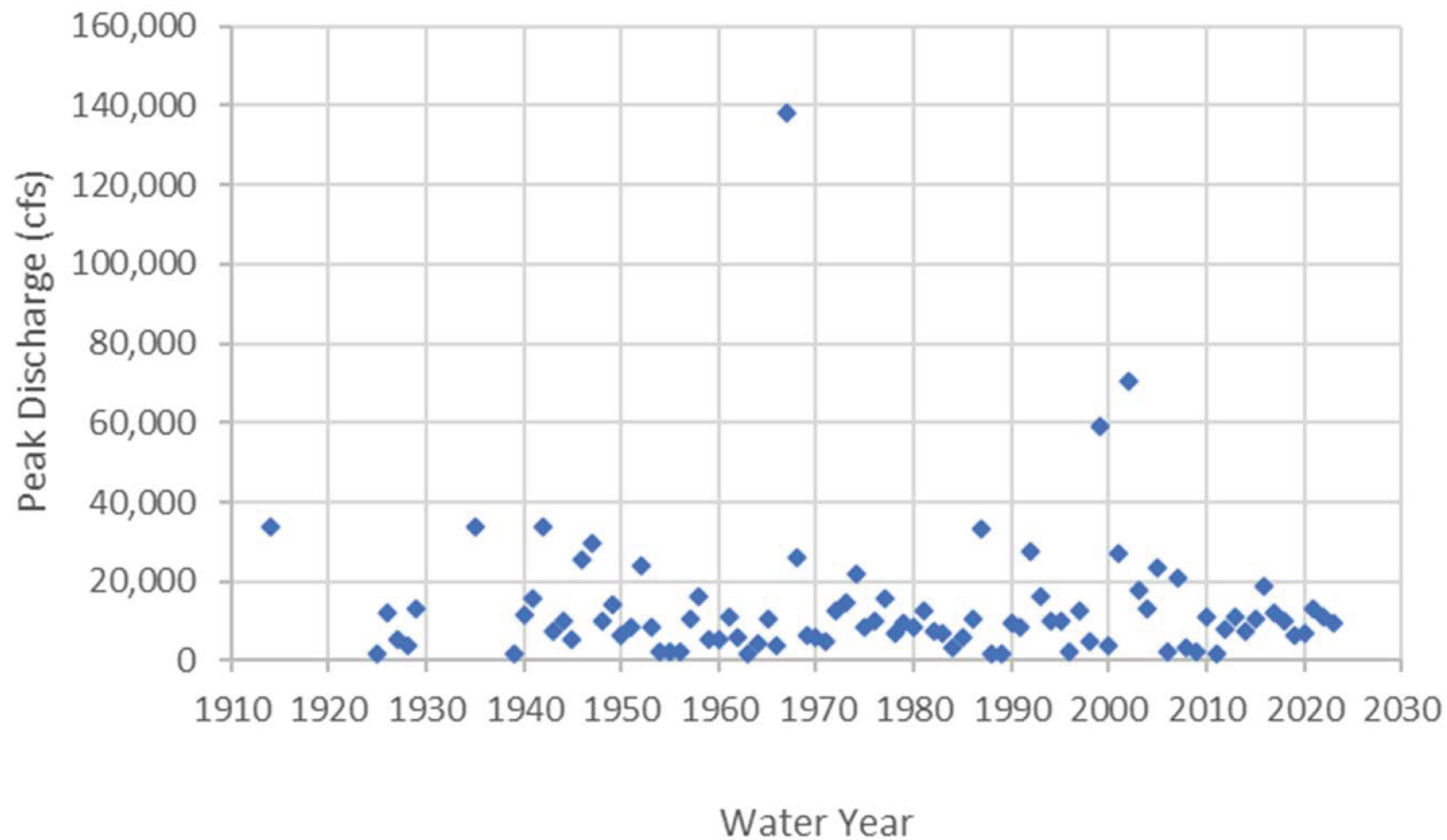
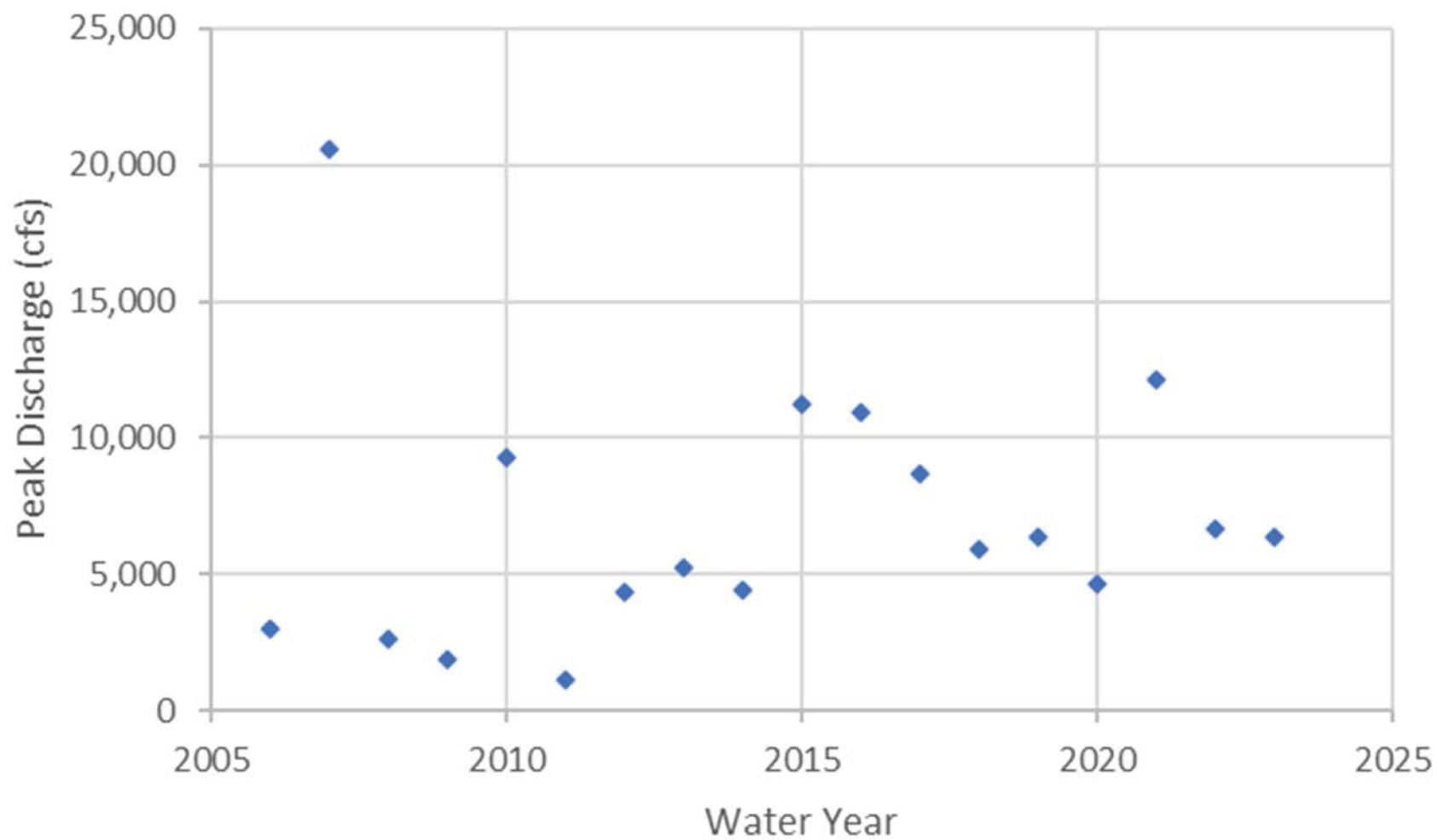
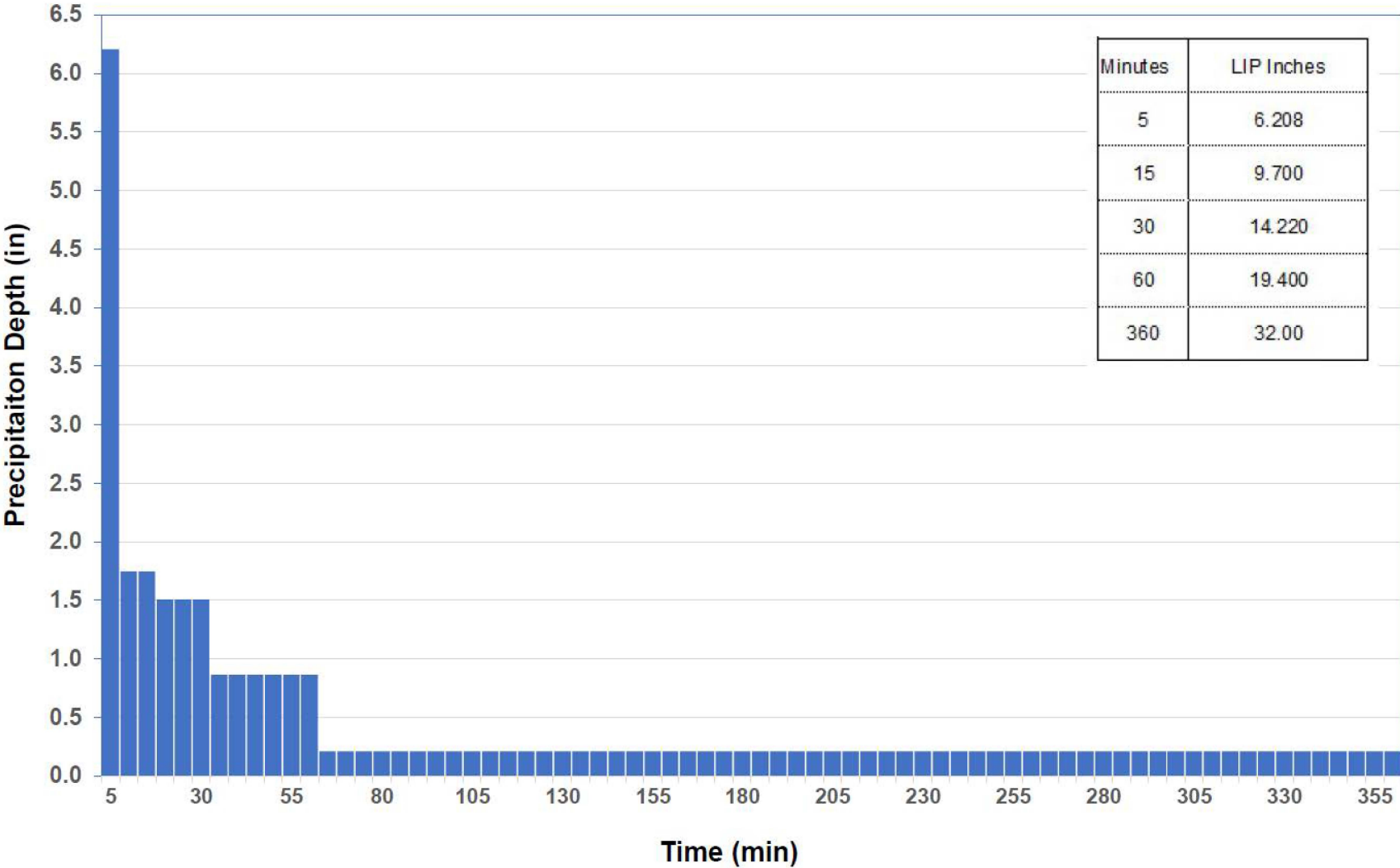


Figure 2.4.2-4
Annual Peak Discharges in San Antonio River near McFaddin, Texas (USGS 08188570)



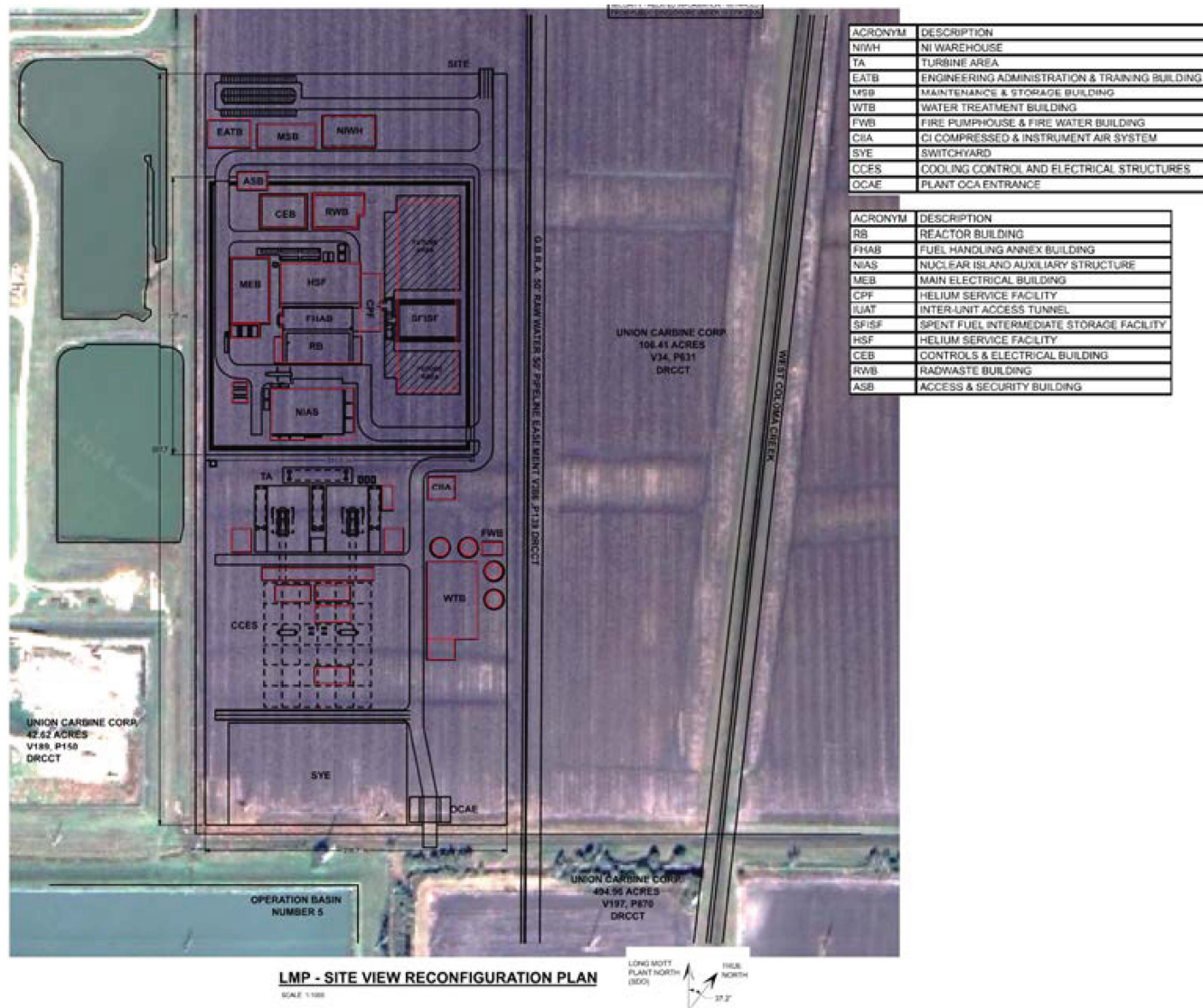
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Figure 2.4.2-5
Long Mott Generating Station Site Local PMP Intensity-Duration Plot



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**Figure 2.4.2-6
Long Mott Generating Station Site Nuclear Island Arrangement**



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Figure 2.4.2-7
Extent of FLO-2D Model and Building Locations



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Figure 2.4.2-8
Maximum Representative Water Depth over Time

