

Appendix 14

Hurricane Protection System

This appendix discusses how the physical and engineering characteristics of the Hurricane Protections System (HPS) were modeled in the risk analysis and the differences between the Pre-Katrina and June 2007 HPS. The Pre-Katrina and June 2007 HPS have been defined in the risk analysis using information from USACE design documents, Task Force Guardian, other IPET teams and extensive field surveys conducted by the IPET Risk Team. The Pre-Katrina analysis is intended to examine the risks based on the expected performance of the HPS that existed in New Orleans prior to the storm. Since the engineering models used in the analysis to assess performance are not detailed design level analyses, the risk study is not intended to recreate the performance of the “as-designed” pre-Katrina HPS or the June 2007 HPS. The failure modes used in this analysis are simplified representations of those that have been determined by the IPET Performance Team to have resulted in the failures experienced during Katrina and those used in the original design. The actual elevations of walls and levees, the in-place engineering properties of the system components and the foundation conditions that existed before Katrina are used.

The Current hurricane protection system (HPS) is defined as the system that existed on 1 June 2007 using information from the New Orleans District, USACE design documents for improvements made to the HPS since hurricane Katrina, Task Force Guardian, Task Force Hope other IPET teams and the extensive field surveys conducted by the Risk Team. The Pre-Katrina HPS risk model was modified to reflect the changes made to the system to repair damage and make critical improvements. The revised model is intended to examine the current risks based on the performance of the HPS that now exists in New Orleans. It considers the failure modes that have been studied by IPET, the actual elevations of walls and levees, the in-place engineering properties of the system components and the foundation conditions that were found to exist on 1 June 2007. The Pre-Katrina and June 2007 HPS descriptions used in the risk analysis provide the basis for an analysis of the relative risks of the two HPS for planning level comparison purposes and provides a measure of the residual risks that currently exist in New Orleans. Additional detailed engineering analyses would be required to design any improvements to the HPS and, or to confirm the predicted performance of any components of the system.

Parish Basins and Sub-basins

The Pre-Katrina and June 2007 HPS limits follow the six main parish boundaries, and each parish is subdivided into drainage sub-basins that define how water is collected within the parish. Figure 14-1 depicts the parish and sub-basin boundaries that make up the HPS. Boundaries between adjacent sub-basins are modeled to allow interflow between them based on the elevations of physical features that separate the sub-basins. Sub-basin definitions and interflow elevations were provided by the IPET Interior Drainage and Pumping Team. The physical features of each parish included in the Pre-Katrina and June 2007 HPS used in the risk model are discussed in this appendix, and detailed information for each parish is provided in subsequent appendices.

Reaches

The boundaries of the basins that provide hurricane protection are divided into sections or “reaches” that have similar engineering properties including structure type, failure modes, materials of construction and foundation type. These reaches are shown in tables for each basin that provide:

- Reach length
- Reach elevation in NAVD88 2004.65
- Structure type (W=Wall, L = Levee)
- Foundation type (H=Hydraulic fill, C=Clay, P=Pile)
- Sub-basin reference where water from the reach will flow into.

The Pre-Katrina HPS description required 135 reaches to model the boundaries of the basins. Three reaches were added to the June 2007 HPS to model the canal closure gates at the end of the 17th Street, London Avenue and Orleans Avenue drainage canals. These reaches are numbers 136, 137 and 138 in the June 2007 HPS. Considerable effort was required to determine the top of wall and levee elevations that existed prior to Katrina as well as those the June 2007 elevations. The elevations were first established by the risk team based on field surveys, the work of the IPET Geodetic Vertical and Water Level Datums Team and examinations of construction documents. These elevations were displayed on maps of the HPS and final elevations used in the analyses were confirmed as accurate by the New Orleans district during workshops with district personnel. Table 14-18 compares the Pre-Katrina and June 2007 HPS crest elevations for reaches. All other reach physical characteristics (lengths, type, etc.) are identical in both HPS. Differences in the performance characteristics of reaches between the Pre-Katrina and the June 2007 HPS due to the repairs or improvements are discussed in Appendix 10.

Features

While the reaches are the primary line of defense against storm surges and waves, other components of the HPS also perform a critical role in protecting against interior flooding. These components are considered to be features that are critical to the performance of the flood barrier and include: drainage structures, ramps that must be sandbagged during a flood event, closure

gates and pump stations. These features are included in the risk model as part of the reach in which they are located. The features of the HPS that are included in the risk model are shown in tables that provide the following information required to model their performance:

- Type of component (G= gate and O=Other type of structure)
- Reach where the component is located
- Other feature that the component is correlated with.
- Width of the potential opening
- Invert elevation for water flowing through the component
- Sub-basin reference where water from the feature will flow into.
- A description of the component.

There are a total of 238 features included in the risk model and the physical characteristics of features are identical in the Pre-Katrina and June 2007 HPS.

Transitions

The features described above generally are concrete structures located within a reach. The connection of the feature to the reach in which they are located forms a critical point of the HPS at which erosion can occur, and did occur during Katrina, if the area is overtopped. These transition points also include points where a levee and floodwall meet and are considered to be potential weak points in the flood barrier that also perform a critical role in protecting against interior flooding. These transitions that are considered to be part of the flood barrier include: structural transitions where a levee section meets a concrete wall, drainage structures, ramp, gate or pump stations. Tables are provided for each sub-basin that show the following characteristics of transitions included in the risk model:

- Type of component (T= transition, D=Drainage structure, R=Ramp, G=gate and P=Pump station)
- Reach where the component is located
- Width of the potential opening
- Invert elevation for water flowing through the component
- Sub-basin reference where water from the component will flow into.
- A description of the component.

There are a total of 178 transitions included in the risk model and the physical characteristics of transitions are identical in the Pre-Katrina and June 2007 HPS.

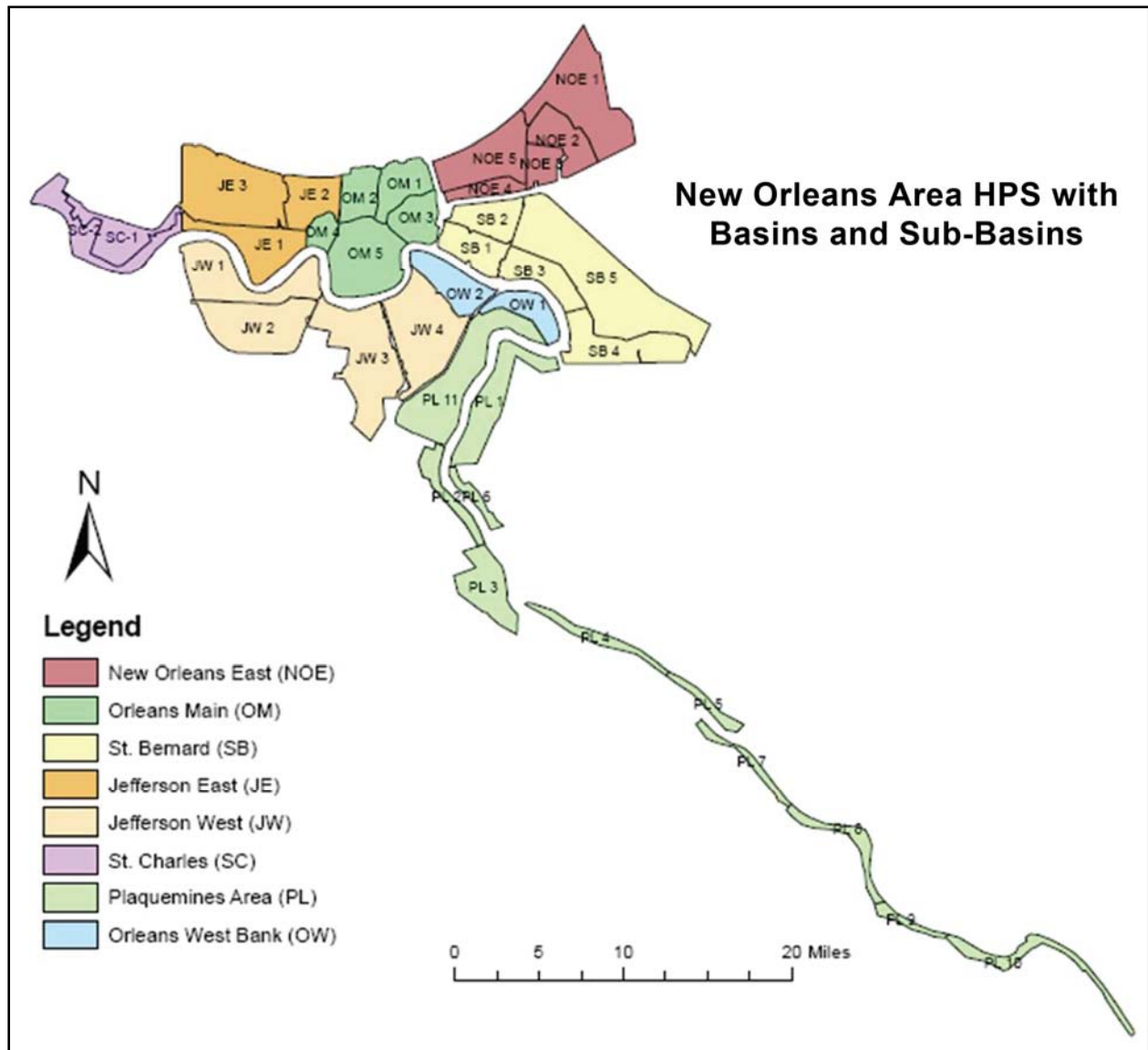


Figure 14-1. Pre-Katrina HPS Basins and Sub-basins

New Orleans East

The reaches that make up the New Orleans East risk model are shown in Figure 14-2, and data are provided in Tables 14-1, 14-2 and 14-3 for reaches, transitions and features, respectively.

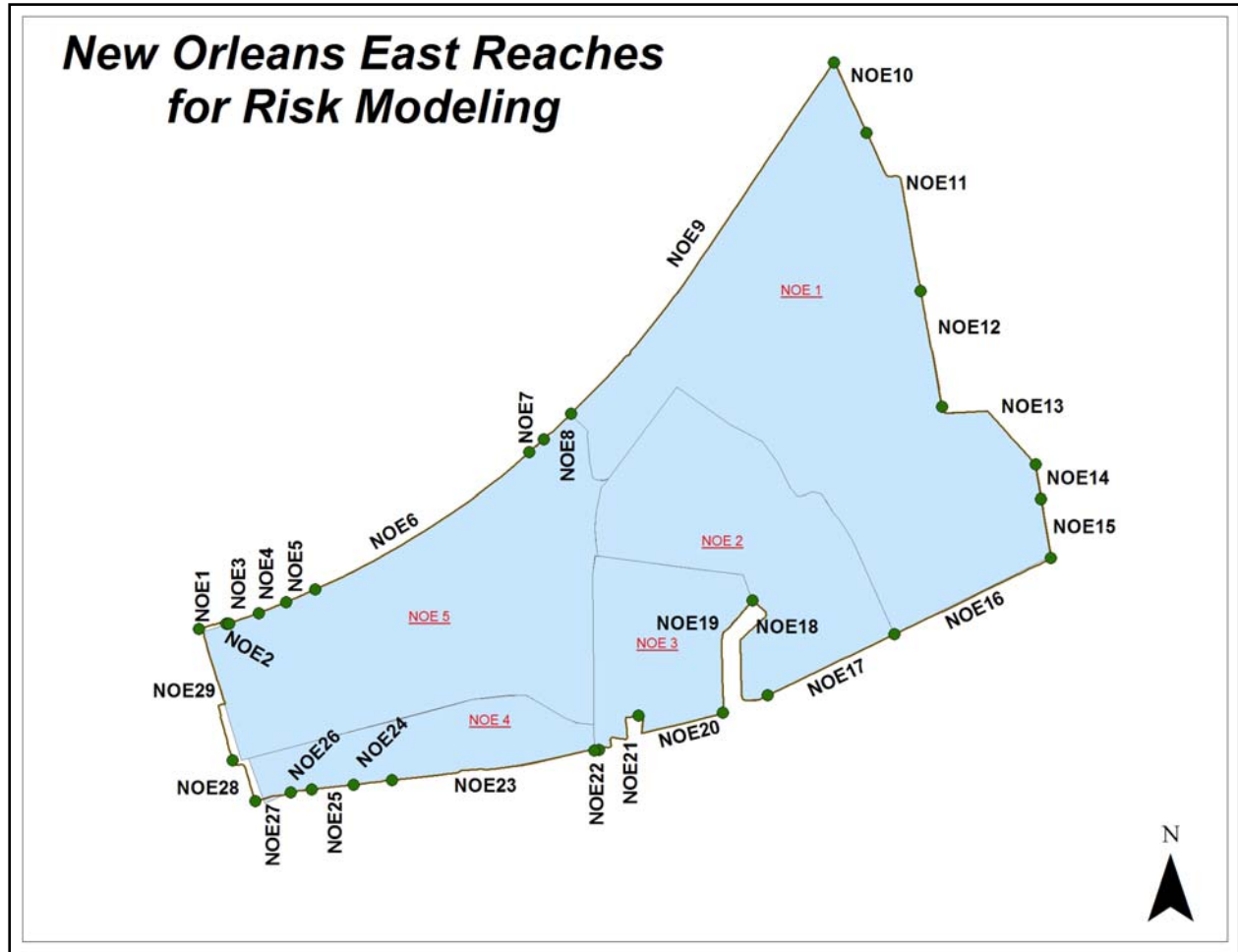


Figure 14-2. New Orleans East Reaches

| Table 14-1 New Orleans East Reaches | | | | | |
|--|--------------------------|---|-------------------|---|--------------------------------|
| Risk Model Reach No. | Reach Length (ft) | Pre-Katrina Elevation (NAVD88 2004.65) | Reach Type | Foundation Material Type (H, C, P) | Subpolder Reference (3) |
| 1 | 2,405 | 10.80 | W | H | NOE5 |
| 2 | 250 | 10.80 | L | H | NOE5 |
| 3 | 2,325 | 10.80 | W | H | NOE5 |
| 4 | 2,330 | 10.80 | L | H | NOE5 |
| 5 | 2,270 | 10.80 | W | H | NOE5 |
| 6 | 19,110 | 13.00 | L | H | NOE5 |
| 7 | 1,475 | 13.00 | W | H | NOE5 |
| 8 | 2,725 | 13.00 | L | H | NOE5 |
| 9 | 32900 | 18.20 | L | H | NOE1 |
| 10 | 5,830 | 13.80 | L | H | NOE1 |
| 11 | 13,325 | 14.00 | L | H | NOE1 |
| 12 | 8,910 | 15.00 | L | H | NOE1 |
| 13 | 9,185 | 15.80 | L | H | NOE1 |
| 14 | 2,615 | 16.00 | L | H | NOE1 |
| 15 | 4,470 | 16.00 | L | H | NOE1 |
| 16 | 13,045 | 16.00 | L | H | NOE1 |
| 17 | 10,570 | 16.00 | L | H | NOE2 |
| 18 | 10,760 | 17.90 | W | H | NOE2 |
| 19 | 9,320 | 17.90 | W | H | NOE3 |
| 20 | 7,905 | 16.00 | L | H | NOE3 |
| 21 | 5520 | 16.00 | W | H | NOE3 |
| 22 | 385 | 16.00 | L | H | NOE3 |
| 23 | 15,320 | 13.90 | L | H | NOE4 |
| 24 | 2,910 | 13.80 | W | H | NOE4 |
| 25 | 3,230 | 13.80 | L | H | NOE4 |
| 26 | 1,640 | 13.80 | W | H | NOE4 |
| 27 | 2,750 | 13.80 | L | H | NOE4 |
| 28 | 4,100 | 12.00 | L | H | NOE4 |
| 29 | 11,185 | 13.50 | W | H | NOE5 |

Table 14-2 New Orleans East Transitions

| Feature Number | Transition Type | Reach | Width (ft) | Elevation (ft) (NAVD88 2004.65) | Sub-Basin | Description of Feature |
|----------------|-----------------|--------|------------|---------------------------------|-----------|---|
| 1 | R | NOE1 | 25 | 9 | NOE5 | Ramp between RR track and bridge |
| 2 | T | NOE3 | 125 | 5.0 | NOE5 | LWT NOE 2/3 |
| 3 | T | NOE3 | 80 | 5.0 | NOE5 | WLT NOE 3/4 |
| 4 | T | NOE5 | 155 | 5.0 | NOE5 | LWT NOE 4/5 |
| 5 | T | NOE5 | 95 | 5.0 | NOE5 | WLT NOE 5/6 |
| 6 | T | NOE7 | 140 | 5.0 | NOE5 | LWT NOE 6/7 |
| 7 | T | NOE7 | 130 | 5.0 | NOE5 | WLT NOE 7/8 |
| 8 | D | NOE9 | 450 | 16.5 | NOE1 | Drainage Structure through levee |
| 9 | D | NOE9 | 830 | 17.5 | NOE1 | Drainage Structure through levee |
| 10 | D | NOE10 | 65 | 14.0 | NOE1 | Drainage Structure through levee |
| 11 | R | NOE10 | 215 | 8.0 | NOE1 | I-10 SB ramps |
| 12 | R | NOE11 | 145 | 7.0 | NOE1 | I-10 NB ramps |
| 13 | G | NOE11 | 255 | 6.0 | NOE1 | Hwy 11 Gate |
| 14 | D | NOE11 | 75 | 11.0 | NOE1 | Drainage Structure |
| 15 | D | NOE12 | 55 | 15.0 | NOE1 | Drainage Structure |
| 16 | G | NOE12 | 330 | 15.0 | NOE1 | Hwy 90 Gate |
| 17 | D | NOE14 | 120 | 17.0 | NOE1 | Drainage Structure |
| 18 | G | NOE15 | 95 | 14.0 | NOE1 | CSX RR Transition |
| 19 | P | NOE17 | 870 | 17.3 | NOE2 | Pump Station #15 |
| 20 | T | NOE18 | 135 | 5.0 | NOE2 | LWT NOE 17/18 |
| 21 | T | NOE19 | 60 | 5.0 | NOE3 | WLT NOE 19/20 |
| 22 | R | NOE20 | 75 | 13.0 | NOE3 | Saturn Blvd Ramp |
| 23 | T | NOE21 | 140 | 17.0 | NOE3 | LWT NOE 20/21 |
| 24 | T | NOE21 | 25 | 5.0 | NOE3 | WLT NOE 21/22 |
| 25 | P | NOE23 | 50 | 5.0 | NOE4 | Grant Street PS |
| 26 | R | NOE23 | 40 | 13.0 | NOE4 | Ramp in levee at steel plant |
| 27 | R | NOE23 | 40 | 14.0 | NOE4 | Ramp in levee at steel plant |
| 28 | T | NOE24 | 75 | 13.0 | NOE4 | LWT NOE 23/24 - sheet pile transition |
| 29 | T | NOE24 | 80 | 14.0 | NOE4 | WLT NOE 24/25 |
| 30 | T | NOE26 | 75 | 13.0 | NOE4 | LWT NOE 25/26 - sheet pile transition |
| 31 | T | NOE26 | 60 | 13.0 | NOE4 | WLT NOE 26/27 |
| 32 | P | NOE26 | 150 | 13.0 | NOE4 | Amid PS - PS #20 |
| 33 | R | NOE27 | 70 | 12.0 | NOE4 | Ramp to Offload Facility |
| 34 | R | NOE27 | 70 | 9.0 | NOE4 | Jourdan Rd Ramp |
| 35 | G | NOE27 | 90 | 5.0 | NOE4 | RR spur gate closure adjacent to Jourdan Road |
| 36 | G | NOE28 | 100 | 11.0 | NOE4 | Gate E-4 |
| 37 | G | NOE28 | 100 | 6.0 | NOE4 | Gate E-5 |
| 38 | G | NOE28 | 195 | 12.0 | NOE4 | Gate E-6 |
| 39 | G | NOE28 | 135 | 12 | NOE4 | Gate E-7 |
| 40 | R | NOE28 | 35 | 12 | NOE4 | Almonaster Ave Ramp from bridge |
| 41 | G | NOE 28 | 80 | 13 | NOE4 | Gate E-8 |
| 42 | G | NOE28 | 90 | 13 | NOE4 | Gate E-9 |
| 43 | T | NOE29 | 95 | 13 | NOE5 | LWT NOE 28/29 |
| 44 | R | NOE29 | 50 | 13 | NOE5 | Jourdan Rd Ramp at Dwyer Road |
| 45 | G | NOE29 | 30 | 6 | NOE5 | RR Gate near Hayne Blvd |

Table 14-3 New Orleans East Features

| Feature Number | Gate (G) or Other Point Feature (O) | Reach | Correlated Features | Width (ft) | Elevation (ft) (NAVD88 2004.65) - Sill Elevation | Subbasin | Description of Feature | Notes |
|----------------|-------------------------------------|-------|---------------------|------------|--|----------|---|------------------|
| 1 | G | NOE1 | 1 | 35 | 1 | NOE5 | L-13 Swing gate into Lakefront airport by IHNC (under bridge) | |
| 2 | G | NOE1 | 2 | 22.0 | 1.75 | NOE5 | Gate L14 | |
| 3 | G | NOE1 | 3 | 63.0 | -0.5 | NOE5 | Gate L15 | |
| 4 | G | NOE7 | 4 | 32.0 | -1.5 | NOE5 | Lincoln Beach FW Gate | |
| 5 | G | NOE11 | 5 | 30.0 | 6 | NOE1 | Hwy 11 Gate | |
| 6 | G | NOE12 | 6 | 80.0 | 10 | NOE1 | Hwy 90 Gate | |
| 7 | G | NOE15 | 7 | 20.0 | 5.7 | NOE1 | CSX Gate | |
| 8 | G | NOE18 | 8 | 20.0 | 9.75 | NOE2 | Michoud Gate 1 | Not used |
| 9 | G | NOE18 | 9 | 20.0 | 9.75 | NOE2 | Michoud Gate 2 | Not used |
| 10 | G | NOE18 | 10 | 20.0 | 9.75 | NOE2 | Michoud Gate 3 | Open |
| 11 | G | NOE18 | 11 | 20.0 | 9.75 | NOE2 | Michoud Gate 4 | Open |
| 12 | G | NOE18 | 12 | 20.0 | 9.75 | NOE2 | Michoud Gate 5 | Not used |
| 13 | G | NOE18 | 13 | 20.0 | 9.75 | NOE2 | Michoud Gate 6 | Open |
| 14 | G | NOE18 | 14 | 20.0 | 9.75 | NOE2 | Michoud Gate 7 | Open |
| 15 | G | NOE18 | 15 | 20.0 | 9.75 | NOE2 | Michoud Gate 8 | Not used |
| 16 | G | NOE18 | 16 | 20.0 | 9.75 | NOE2 | Michoud Gate 9 | Open |
| 17 | G | NOE18 | 17 | 20.0 | 9.75 | NOE2 | Michoud Gate 10 | Open |
| 18 | G | NOE18 | 18 | 20.0 | 9.75 | NOE2 | Michoud Gate 11 | Open |
| 19 | G | NOE18 | 19 | 20.0 | 9.75 | NOE2 | Michoud Gate 12 | Open |
| 20 | G | NOE18 | 20 | 20.0 | 9.75 | NOE2 | Michoud Gate 13 | Open |
| 21 | G | NOE18 | 21 | 20.0 | 9.75 | NOE2 | Michoud Gate 14 | Open |
| 22 | G | NOE18 | 22 | 20.0 | 9.75 | NOE2 | Michoud Gate 15 | Open |
| 23 | G | NOE18 | 23 | 20.0 | 9.75 | NOE2 | Michoud Gate 16 | Open |
| 24 | G | NOE18 | 24 | 20.0 | 9.75 | NOE2 | Michoud Gate 17 | Open |
| 25 | G | NOE18 | 25 | 20.0 | 9.75 | NOE2 | Michoud Gate 18 | Not used |
| 26 | G | NOE19 | 26 | 20.0 | 12.8 | NOE3 | NASA Gate 1 to power plant | Open |
| 27 | G | NOE21 | 27 | 20.0 | 12.8 | NOE3 | NASA Gate 2 to power plant | Open |
| 28 | G | NOE21 | 28 | 20.5 | 6.5 | NOE3 | Gate closure N-1 for Bulk Loading Facility | Open |
| 29 | G | NOE27 | 29 | 20.0 | 7.8 | NOE4 | RR spur gate closure adjacent to Jourdan Road | Open |
| 30 | G | NOE28 | 30 | 20.0 | 6.5 | NOE4 | Gate E-4 | Closed |
| 31 | G | NOE28 | 31 | 20.0 | 6.5 | NOE4 | Gate E-5 | Open |
| 32 | G | NOE28 | 32 | 17.0 | 6.5 | NOE4 | Gate E-6 | Closed - RR spur |
| 33 | G | NOE28 | 33 | 20.0 | 7.2 | NOE4 | Gate E-7 | Closed |
| 34 | G | NOE28 | 34 | 37.0 | 6.5 | NOE4 | Gate E-8 | Open RR |
| 35 | G | NOE29 | 35 | 35.0 | 6.5 | NOE4 | Gate E-9 | Closed road |
| 36 | G | NOE29 | 36 | 15.0 | 7.2 | NOE5 | Gate E-10 | Open to docks |

| | | | | | | | | |
|----|---|-------|----|------|------|------|-----------|---------------------------|
| 37 | G | NOE29 | 37 | 17.0 | 4.7 | NOE5 | Gate E-11 | Open, RR, heavily damaged |
| 38 | G | NOE29 | 38 | 20.0 | 5.2 | NOE5 | Gate E-12 | Open road |
| 39 | G | NOE29 | 39 | 17.0 | 2.2 | NOE5 | Gate E-13 | Open RR |
| 40 | G | NOE29 | 40 | 30.0 | -0.8 | NOE5 | Gate E-14 | Open road Hayne Blvd |
| 41 | G | NOE29 | 41 | 33.0 | 9.2 | NOE5 | Gate E-15 | RR gate |
| 42 | G | NOE29 | 42 | 32.0 | 5.7 | NOE5 | Gate L-12 | Open road |

Jefferson

The reaches that represent the Jefferson parish east and west bank areas in the risk model are shown in Figure 14-3, and data are provided in Tables 14-4, 14-5 and 14-6 for reaches, transitions and features, respectively. Jefferson West Bank reaches are shown in Figure 14-4.



Figure 14-3. Jefferson East Bank Reaches

| Table 14-4 Jefferson East Reaches | | | | | |
|--|--------------------|---|-----------------------|---|-------------------------------|
| Reach No. | Length (ft) | Pre-Katrina Elevation (NAVD88 2004.65) | Reach Type (1) | Foundation Material Type (H, C, P) (2) | Subbasin Reference (3) |
| 30 | 6,745 | 12.80 | W | C | JE3 |
| 31 | 5,915 | 13.90 | W | C | JE3 |
| 32 | 4,945 | 13.90 | W | C | JE3 |
| 33 | 36,430 | 14.40 | L | C | JE3 |
| 34 | 19,925 | 15.50 | L | C | JE2 |
| 35 | 12,300 | 15.50 | W | H | JE2 |
| 36 | 4,205 | 25.30 | L | C | OM4 |
| 37 | 53090 | 25.40 | L | C | JE1 |
| 38 | 2,595 | 9.60 | L | C | JE3 |
| Table 14-4 Jefferson West Reaches | | | | | |
| 108 | 21496 | 6.5 | L | H | JW1 |
| 109 | 13947 | 7.8 | L | H | JW2 |
| 110 | 24047 | 7.0 | L | H | JW2 |
| 111 | 8180 | 6.5 | W | C | JW2 |
| 112 | 1730 | 4.0 | L | C | JW2 |
| 113 | 320 | 8.0 | W | C | JW2 |
| 114 | 1495 | 9.0 | W | C | JW3 |
| 115 | 85639 | 26.3 | L | C | JW1 |
| 116 | 3060 | 9.0 | W | C | JW3 |
| 117 | 11240 | 8.0 | L | C | JW3 |
| 118 | 16370 | 9.8 | L | C | JW3 |
| 119 | 22135 | 12.5 | L | C | JW3 |
| 120 | 6690 | 12.0 | W | C | JW3 |
| 121 | 16120 | 9.0 | L | C | JW3 |
| 122 | 26700 | 8.0 | L | C | JW3 |
| 123 | 9510 | 5.0 | L | C | JW3 |
| 124 | 1165 | 24.8 | W | C | JW3 |
| 125 | 20710 | 24.2 | L | C | JW3 |
| 126 | 40198 | 22.0 | L | C | OW2 |
| 127 | 14550 | 23.2 | L | C | JW4 |
| 128 | 28337 | 5.0 | L | C | JW4 |
| 129 | 44000 | 8.3 | L | H | JW4 |
| 135 | 990 | 24.8 | L | H | JW4 |

Table 14-5 Jefferson East Features

| Feature Number | Gate (G) or Other Point Feature (O) | Reach | Width (ft) | Elevation (ft) (NAVD88 2004.65) - Sill Elevation | Subbasin | Description of Feature | Notes |
|----------------|-------------------------------------|-------|------------|--|----------|--|-------|
| 43 | G | JE2 | 6 | 6 | JE3 | Gate W-7 West Esplanade, no transition | |
| 44 | G | JE3 | 6 | 6 | JE3 | Gate W-8 Vintage Street, no transition | |
| 45 | G | JE4 | 20 | 10 | JE3 | Gate L1 Floodwall | |
| 46 | G | JE4 | 22 | 10 | JE3 | Gate L3 Duncan Canal Pump Station, gate within transition for PS#4 | |
| 47 | G | JE4 | 60 | 10 | JE3 | Gate L4 Williams Blvd | |
| 48 | G | JE5 | 22 | 11.8 | JE2 | Gate L9A Bonnabel Blvd South | |
| 49 | G | JE5 | 22 | 11.8 | JE2 | Gate L9B Bonnabel Blvd North | |
| 50 | G | JE5 | 20 | 9.5 | JE2 | Gate L 10 Orpheum Ave - 58 ft gap | |
| 51 | G | JE6 | 8 | 7.3 | JE2 | Gate W4 - Veterans Blvd., In I-wall | |
| 52 | G | JE6 | 8 | 7.3 | JE2 | Gate W5 - Veterans Blvd, In I-wall | |
| 53 | G | JE6 | 10 | 11.3 | JE2 | Gate W8 - Canal Street, In I-wall | |
| 54 | G | JE6 | 22 | 10.6 | JE2 | Gate W9 - Southern RR, In I-wall | |

Table 14-5 Jefferson West Features

| | | | | | | | |
|-----|---|-----|----|----|-----|-----------------------------------|--|
| 178 | G | CW4 | 40 | 2 | JW2 | Swing gate at south end of park | |
| 179 | G | CW4 | 40 | 2 | JW2 | Swing gate at north end of park | |
| 180 | G | CW4 | 30 | 2 | JW2 | Swing gate at boat launch | |
| 181 | G | CW4 | 30 | 2 | JW2 | Swing gate at boat launch | |
| 182 | G | CW4 | 6 | 2 | JW2 | Pedestrian gate at boat launch | |
| 183 | G | CW4 | 6 | 2 | JW2 | Pedestrian gate at boat launch | |
| 184 | G | CW4 | 30 | 2 | JW2 | Swing gate at boat launch | |
| 185 | G | CW7 | 6 | 2 | JW3 | Pedestrian gate at boat launch | |
| 186 | G | CW7 | 6 | 2 | JW3 | Pedestrian gate at boat launch | |
| 187 | G | CW7 | 6 | 2 | JW3 | Pedestrian gate at boat launch | |
| 188 | G | CW7 | 6 | 2 | JW3 | Pedestrian gate at boat launch | |
| 189 | G | CW7 | 6 | 2 | JW3 | Pedestrian gate at boat launch | |
| 190 | G | WH5 | 30 | 2 | JW3 | Hwy 45 closure gate | |
| 191 | G | HA1 | 30 | 17 | OW2 | Gate WB1 - Canal Street Ferry | |
| 192 | G | HA1 | 30 | 17 | OW2 | Gate WB2 - Canal Street Ferry | |
| 193 | G | HA2 | 21 | 17 | JW4 | RR Gate MR18 - near Magellen St. | |
| 194 | G | HA2 | 30 | 17 | JW4 | Gate MR17 - westerly of Rupp St | |
| 195 | G | HA2 | 18 | 17 | JW4 | Gate MR16 - westerly of Isbell St | |
| 196 | G | HA2 | 16 | 17 | JW4 | Gate MR 15 | |
| 197 | G | HA2 | 20 | 17 | JW4 | Gate MR 13 | |

Table 14-6 Jefferson East Transitions

| Feature Number | Transition Type | Reach | Width (ft) | Elevation (ft) (NAVD88 2004.65) | Sub-Basin | Description of Feature |
|----------------|-----------------|-------|------------|---------------------------------|-----------|--|
| 46 | P | JE1 | 50.0 | 13 | JE3 | Parish Line Pump Station |
| 47 | T | JE3 | 50.0 | 15 | JE3 | WLT JEB 3/4 |
| 48 | P | JE4 | 2200.0 | 18.5 | JE3 | Duncan Canal Pump Station #4 FW |
| 49 | G | JE4 | 195.0 | 13.75 | JE3 | Williams Blvd Boat Launch |
| 50 | R | JE4 | 30.0 | 10 | JE3 | Gate L4 Williams Blvd |
| 51 | P | JE4 | 685.0 | 17.3 | JE3 | Elmwood Canal Pump Station #3 FW |
| 52 | P | JE4 | 1320.0 | 13.3 | JE3 | Suburban Canal Pump Station #2 FW |
| 53 | T | JE5 | 50.0 | 13.5 | JE3 | LWT Causeway Blvd |
| 54 | T | JE5 | 50.0 | 13.5 | JE2 | WLT Causeway Blvd |
| 55 | P | JE5 | 1010.0 | 21.3 | JE2 | Bonnable Pump Station #1 FW |
| 56 | G | JE5 | 100.0 | 11.8 | JE2 | Gate L9A Bonnabel Blvd South |
| 57 | G | JE5 | 100.0 | 11.8 | JE2 | Gate L9B Bonnabel Blvd North |
| 58 | R | JE5 | 105 | 13.3 | JE2 | Ramp over levee from Hammond Hwy |
| 59 | R | JE5 | 50 | 14.5 | JE2 | Ramp over levee |
| 60 | G | JE5 | 20 | 14 | JE2 | Gate off Orpheum Ave |
| 61 | P | JE6 | 125 | 13.8 | JE2 | Pump Station OP#6 - End of 17th St Canal |

Table 14-6 Jefferson West Transitions

| | | | | | | |
|-----|---|-----|------|------|-----|---|
| 152 | P | CW3 | 270 | 8 | JW2 | Lake Cataouatche PS 1 and 2 |
| 153 | T | CW4 | 90 | 9 | JW2 | LWT at State Park |
| 154 | P | CW4 | 255 | 10 | JW2 | Old/New Segnette PS |
| 155 | R | CW4 | 35 | 5 | JW2 | Louisana Street (northerly of Shrimp Plant) |
| 156 | P | WH1 | 70 | 10 | JW3 | Old Westwego PS |
| 157 | P | WH1 | 125 | 11 | JW3 | New Westwego PS |
| 158 | P | WH3 | 560 | 14 | JW3 | Westminster PS |
| 159 | P | WH3 | 590 | 12 | JW3 | Ames PS |
| 160 | P | WH3 | 600 | 12 | JW3 | Mt Kennedy PS |
| 161 | P | WH4 | 100 | 12 | JW3 | Oak Cove PS |
| 162 | T | WH5 | 330 | 9 | JW3 | Route 45 gate transition |
| 163 | R | WH6 | 330 | 11.5 | JW3 | Lafitt Larose Hwy ramp |
| 164 | P | WH6 | 900 | 11 | JW3 | Estelle PS |
| 165 | P | WH7 | 815 | 11 | JW3 | New Estelle PS |
| 166 | P | WH7 | 415 | 10 | JW3 | Cousins PS |
| 167 | P | WH7 | 400 | 10 | JW3 | Harvey PS |
| 174 | P | HA4 | 640 | 10 | JW4 | Hero Pump Station |
| 175 | P | HA4 | 1200 | 18 | JW4 | Pump Station not named |
| 176 | P | HA4 | 460 | 10 | JW4 | Planters Pump Station |
| 177 | P | HA4 | 480 | 10 | JW4 | Pump Station #13 |

Jefferson West and Orleans West Reaches for Risk Modeling

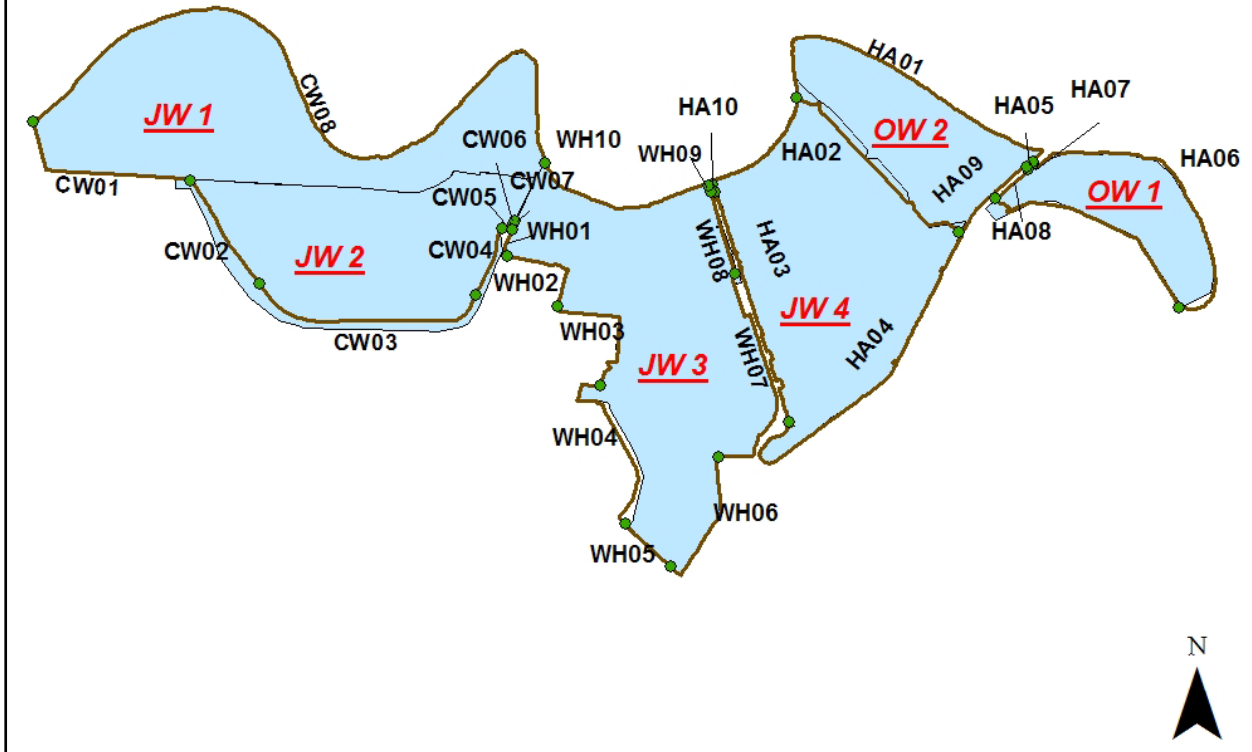


Figure 14-4 West Bank Reaches

St. Charles

The reaches that make up the St. Charles risk model are shown in Figure 14-5, and data are provided in Tables 14-7, 14-8 and 14-9 for reaches, transitions and features, respectively.

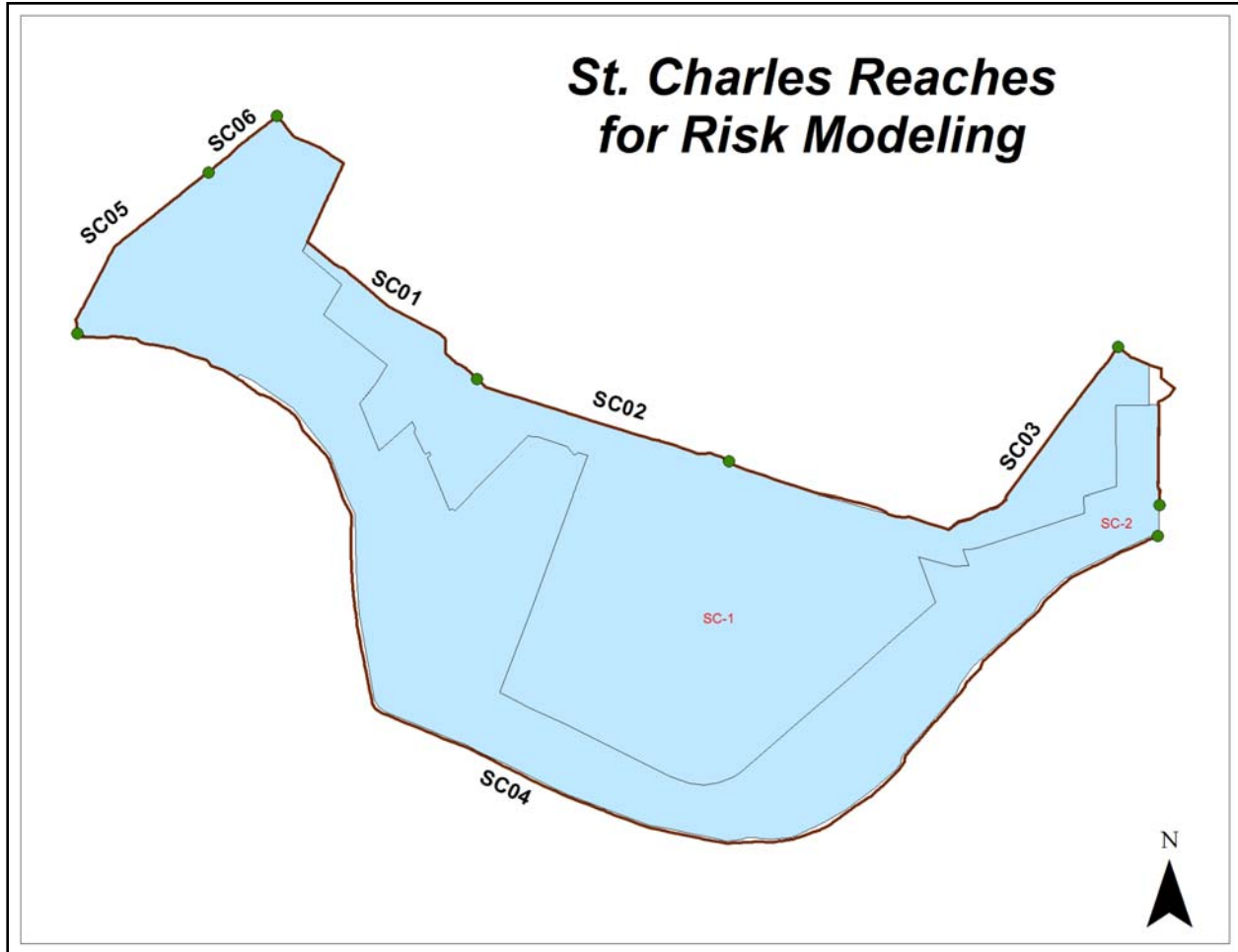


Figure 14-5. St. Charles Reaches

| Table 14-7 St. Charles Reaches | | | | | |
|---------------------------------------|--------------------|---|-----------------------|---|-------------------------------|
| Reach No. | Length (ft) | Pre-Katrina Elevation (NAVD88 2004.65) | Reach Type (1) | Foundation Material Type (H, C, P) (2) | Subbasin Reference (3) |
| 40 | 11710 | 10.0 | L | C | SC1 |
| 41 | 23190 | 10.0 | L | C | SC1 |
| 42 | 70465 | 27.9 | L | C | SC2 |
| 43 | 9280 | 20.5 | L | C | SC2 |
| 44 | 3795 | 20.3 | L | C | SC2 |

| Table 14-8 St. Charles Transitions | | | | | | |
|---|------------------------|--------------|-------------------|--|------------------|---|
| Feature Number | Transition Type | Reach | Width (ft) | Elevation (ft) (NAVD88 2004.65) | Sub-Basin | Description of Feature |
| 62 | P | SC1 | 415.0 | 10.5 | SC2 | Bayou Trepagneir DS |
| 63 | G | SC1 | 145.0 | 10.5 | SC1 | Gate in levee - no road |
| 64 | G | SC1 | 530.0 | 10.5 | SC1 | Gate and sheetpile transition at Swept Road |
| 65 | R | SC1 | 30.0 | 10.5 | SC1 | Road off Airline Hwy |
| 66 | R | SC1 | 25.0 | 10.5 | SC1 | Road off Airline Hwy |
| 67 | T | SC2 | 455.0 | 12.3 | SC1 | Goodhope DS |
| 68 | D | SC2 | 543.0 | 11.8 | SC1 | Cross Bayou DS |
| 69 | D | SC2 | 510.0 | 11.3 | SC1 | St. Rose DS |
| 70 | G | SC3 | 28.0 | 11.8 | SC1 | Swing Gate at I-310 |
| 71 | T | SC3 | 100.0 | 11.5 | SC1 | LWT I-310 FW |
| 72 | T | SC3 | 100.0 | 11.5 | SC1 | WLT I-310 FW |
| 73 | D | SC3 | 450.0 | 11.3 | SC1 | Almedia Canal Drainage |
| 74 | D | SC3 | 450 | 11.3 | SC1 | Walker Canal DS |
| 75 | G | SC3 | 450 | 11.3 | SC1 | RR Closure Structure |

| Table 14-9 St. Charles Features | | | | | | | | |
|--|--|--------------|----------------------------|-------------------|---|-----------------|-------------------------------|--------------|
| Feature Number | Gate (G) or Other Point Feature (O) | Reach | Correlated Features | Width (ft) | Elevation (ft) (NAVD88 2004.65) - Sill Elevation | Subbasin | Description of Feature | Notes |
| Jefferson East | | | | | | | | |
| 55 | G | SC1 | 55 | 35 | 10.5 | SC3 | Gate in levee - no road | |
| 56 | G | SC3 | 56 | 28 | 6 | SC3 | Swing Gate at I-310 | |

Orleans Metro

The reaches that make up the Orleans East Bank (also referred to as Orleans Metro or Orleans Main) risk model are shown in Figure 14-6, and data are provided in Tables 14-10, 14-11 and 14-12 for reaches, transitions and features, respectively. Orleans West Bank reaches are shown in Figure 14-4.

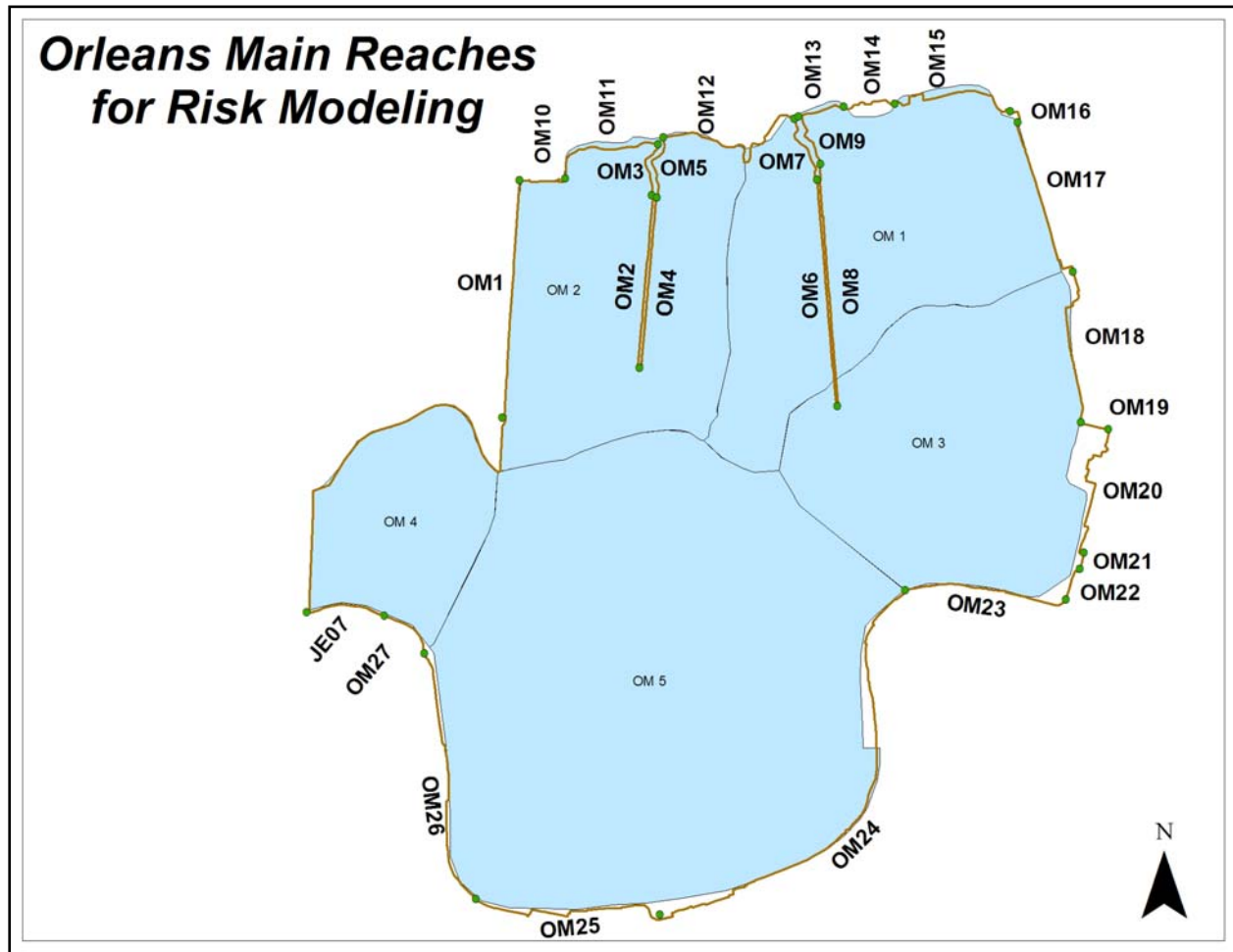


Figure 14-6. Orleans Metro Reaches

Table 14-10 Orleans Metro Reaches

| Reach No. | Length (ft) | Pre-Katrina Elevation (NAVD88 2004.65) | Reach Type (1) | Foundation Material Type (H, C, P) (2) | Subbasin Reference (3) |
|-----------|-------------|--|----------------|--|------------------------|
| 45 | 12,740 | 15.50 | W | H | OM2 |
| 46 | 9,280 | 14.00 | W | H | OM2 |
| 47 | 3,155 | 14.00 | L | H | OM2 |
| 48 | 9,110 | 14.00 | W | H | OM2 |
| 49 | 3,610 | 14.70 | L | H | OM2 |
| 50 | 12,130 | 13.50 | W | H | OM1 |
| 51 | 3,880 | 13.50 | L | H | OM1 |
| 52 | 12,765 | 13.50 | W | H | OM1 |
| 53 | 3,030 | 13.50 | L | H | OM1 |
| 54 | 2,925 | 12.00 | W | C | OM2 |
| 55 | 6,310 | 18.00 | L | C | OM2 |
| 56 | 9,940 | 17.00 | L | C | OM1 |
| 57 | 2,380 | 16.50 | L | C | OM1 |
| 58 | 3,220 | 16.50 | W | C | OM1 |
| 59 | 7,605 | 16.50 | L | C | OM1 |
| 60 | 1,155 | 14.40 | W | H | OM1 |
| 61 | 9,095 | 13.50 | W | H | OM1 |
| 62 | 9,170 | 13.80 | W | H | OM3 |
| 63 | 1,490 | 13.80 | L | H | OM3 |
| 64 | 8,390 | 13.80 | W | H | OM3 |
| 65 | 875 | 20.10 | W | H | OM3 |
| 66 | 1,980 | 21.50 | L | H | OM3 |
| 67 | 8,915 | 22.50 | W | H | OM3 |
| 68 | 25,450 | 23.60 | W | H | OM5 |
| 69 | 10,780 | 24.30 | L | H | OM5 |
| 70 | 14,180 | 24.80 | L | C | OM5 |
| 71 | 3,350 | 25.80 | L | C | OM4 |

Table 14-10 Orleans West Bank Reaches

| | | | | | |
|-----|-------|------|---|---|-----|
| 126 | 40198 | 22.0 | L | C | OW2 |
| 130 | 920 | 16.0 | L | H | OW2 |
| 131 | 26040 | 20.1 | L | H | OW1 |
| 132 | 920 | 16.0 | L | C | OW1 |
| 133 | 5050 | 5.70 | L | C | OW1 |
| 134 | 10745 | 8.0 | L | H | OW2 |

Table 14-11 Orleans Metro Transitions

| Feature Number | Transition Type | Reach | Width (ft) | Elevation (ft) (NAVD88 2004.65) | Sub-Basin | Description of Feature |
|--------------------------|-----------------|-------|------------|---------------------------------|-----------|--|
| Orleans East Bank | | | | | | |
| 76 | P | OM1 | 355 | 15 | OM2 | Pump Station #6 - End of 17th Street Canal |
| 77 | P | OM1 | 180 | 15 | OM2 | Pump Station OP#10 |
| 78 | P | OM4 | 170 | 15 | OM2 | Pump Station OP#7 FW - End of Orleans Canal |
| 79 | U | OM6 | 165 | 9.0 | OM1 | Unprotected area adjacent Pump Station #3 |
| 80 | P | OM6 | 285 | 14.6 | OM1 | Pump Station #4 West FW - Middle of London Canal |
| 81 | P | OM8 | 179 | 13.6 | OM1 | Pump Station #3 FW - End of London Canal |
| 82 | P | OM8 | 355 | 17.3 | OM1 | Pump Station #4 East FW - Middle of London Canal |
| 83 | G | OM10 | 50 | 13.8 | OM2 | Gate at W. Roadway Street |
| 84 | T | OM10 | 180 | 14 | OM2 | WLT - OM 10/11 |
| 85 | G | OM11 | 62 | 7.55 | OM2 | Gate 10 - Topaz Dr |
| 86 | R | OM11 | 58 | 13.8 | OM2 | NB Ramp at Canal Blvd |
| 87 | R | OM11 | 62 | 13.8 | OM2 | SB Ramp at Canal Blvd |
| 88 | T | OM12 | 50 | 12.05 | OM2 | Gate 9 - Marconi Dr. |
| 89 | R | OM12 | 160 | 16 | OM2 | Ramp 6 - Lakeshore Dr. |
| 90 | R | OM12 | 55 | 16 | OM1 | Ramp Lake Terrace Dr. |
| 91 | R | OM12 | 100 | 16 | OM1 | Ramp 5 - Lakeshore Dr. |
| 92 | R | OM14 | 150 | 16.8 | OM1 | Ramp 4 - Lakeshore Dr. |
| 93 | R | OM15 | 150 | 16.8 | OM1 | Ramp 3 - Lakeshore Dr. |
| 94 | R | OM15 | 150 | 16.3 | OM1 | Ramp 2 - Franklin Ave - double wide ramp |
| 95 | R | OM15 | 80 | 14.5 | OM1 | Ramp 1 - Leroy Johnson Drive |
| 96 | G | OM15 | 60 | 11.8 | OM1 | Gate 5 - Navy Reserve |
| 97 | G | OM15 | 145 | 11.55 | OM1 | Gate 4 - Navy Reserve |
| 98 | T | OM15 | 100 | 14 | OM1 | WLT O 16/15 |
| 99 | G | OM16 | 28 | 10.05 | OM1 | Road Gate 3 |
| 100 | G | OM16 | 33 | 7.3 | OM1 | RR - Gate 2 |
| 101 | R | OM16 | 30 | 13.25 | OM1 | Ramp east of France Road near Hickey Bridge |
| 102 | R | OM17 | 30 | 14.75 | OM1 | France Road Ramp near Chef Mentuer Hwy |
| 103 | G | OM18 | 79 | 6.25 | OM3 | Road Gate 7W |
| 104 | G | OM18 | 67.5 | 7.4 | OM3 | RR Gate 8W |
| 105 | R | OM18 | 40 | 9 | OM3 | Ramp to Bridge |
| 106 | G | OM18 | 47 | 4.75 | OM3 | RR Gate 9W |
| 107 | R | OM18 | 35 | 14.75 | OM3 | France Rd Ramp |
| 108 | G | OM19 | 30 | 4.25 | OM3 | Gate 10W - RR open |
| 109 | R | OM19 | 80 | 14.75 | OM3 | France Road Ramp |
| 110 | G | OM19 | 75 | 2.25 | OM3 | Gate in Levee at Port of NO |
| 111 | G | OM19 | 75 | 2.25 | OM3 | Gate in Levee at Port of NO |
| 112 | P | OM20 | 330 | 6 | OM3 | Pump Station near Florida Ave Bridge |

| | | | | | | |
|--|---|------|-----|------|-----|--|
| 113 | T | OM23 | 25 | 14 | OM3 | LWT OM 22/23 |
| Table 14-11 Orleans West Bank Transitions | | | | | | |
| 168 | R | HA1 | 50 | 17 | OW2 | Chalmette - Lower Algiers Ferry Ramp |
| 169 | R | HA1 | 50 | 17 | OW2 | Chalmette - Lower Algiers Ferry Ramp |
| 170 | R | HA1 | 50 | 17 | OW2 | Chalmette - Lower Algiers Ferry Ramp |
| 171 | R | HA1 | 35 | 18 | OW2 | Ramp to Piers |
| 172 | R | HA1 | 125 | 15 | OW2 | Ramp to park area at point |
| 173 | T | HA1 | 420 | 17 | OW2 | Flood wall and gates around parking area |
| 178 | P | HA8 | 360 | 18.0 | OW1 | Pump Station #11 |

Table 14-12 Orleans Metro Features

| Feature Number | Gate (G) or Other Point Feature (O) | Reach | Correlated Features | Width (ft) | Elevation (ft) (NAVD88 2004.65) - Sill Elevation | Subbasin | Description of Feature | Notes |
|------------------------------|-------------------------------------|-------|---------------------|------------|--|----------|---------------------------------------|-----------|
| Orleans East Features | | | | | | | | |
| 57 | G | OM1 | 57 | 22 | 10.6 | OM2 | Gate E9 - Southern RR | In I-wall |
| 58 | G | OM1 | 58 | 10 | 7 | OM2 | Gate at OP#10 Pump Station | In I-wall |
| 59 | G | OM1 | 59 | 10 | 7 | OM2 | Gate north of I-10 | In I-wall |
| 60 | G | OM1 | 60 | 8 | 7.3 | OM2 | Gate E4 - Veterans Blvd. | In I-wall |
| 61 | G | OM1 | 61 | 8 | 7.3 | OM2 | Gate E5 - Veterans Blvd | In I-wall |
| 62 | G | OM4 | 62 | 8.0 | 7 | OM2 | Gate at Harrison Ave | In I-wall |
| 63 | G | OM4 | 63 | 8.0 | 7 | OM2 | Gate at Harrison Ave | In I-wall |
| 64 | G | OM4 | 64 | 8.0 | 7 | OM2 | Gate at Filmore Ave | In I-wall |
| 65 | G | OM4 | 65 | 8.0 | 7 | OM2 | Gate at Filmore Ave | In I-wall |
| 66 | G | OM6 | 66 | 30 | 10 | OM1 | West CSX RR gate near Pump Station #3 | RR tracks |
| 67 | G | OM6 | 67 | 8 | 7 | OM1 | Gate at Filmore Ave | In I-wall |
| 68 | G | OM6 | 68 | 8 | 7 | OM1 | Gate at Filmore Ave | In I-wall |
| 69 | G | OM8 | 69 | 30 | 10 | OM1 | East CSX RR gate near Pump Station #3 | RR tracks |
| 70 | G | OM8 | 70 | 8 | 7 | OM1 | Gate at Filmore Ave | In I-wall |
| 71 | G | OM8 | 71 | 8 | 7 | OM1 | Gate at Filmore Ave | In I-wall |
| 72 | G | OM8 | 72 | 8 | 7 | OM1 | Gate at Leon C Simon Blvd | In I-wall |
| 73 | G | OM10 | 73 | 25 | 8.8 | OM2 | W. Roadway St | With ramp |
| 74 | G | OM10 | 74 | 25 | 8.8 | OM2 | Gate 15 - Into Marina Parking | |
| 75 | G | OM10 | 75 | 25 | 8.8 | OM2 | Gate 14 - Into Marina Parking | |
| 76 | G | OM10 | 76 | 25 | 8.8 | OM2 | Gate 13 - Into Marina Parking | |
| 77 | G | OM10 | 77 | 30 | 8.8 | OM2 | Gate 12 - Entrance to Marina | |
| 78 | G | OM10 | 78 | 60 | 6.05 | OM2 | Gate 11 - Lakeshore Dr. | |
| 79 | G | OM11 | 79 | 62 | 7.55 | OM2 | Gate 10 - Topaz Dr | |
| 80 | G | OM12 | 80 | 50 | 12.05 | OM2 | Gate 9 - Marconi Dr. | |
| 81 | G | OM12 | 81 | 60.0 | -5 | OM1 | Bayou St John Floodgate | |

| Feature Number | Gate (G) or Other Point Feature (O) | Reach | Correlated Features | Width (ft) | Elevation (ft) (NAVD88 2004.65) - Sill Elevation | Subbasin | Description of Feature | Notes |
|----------------|-------------------------------------|-------|---------------------|------------|--|----------|----------------------------------|--------------------------------|
| 82 | G | OM14 | 82 | 25 | 10 | OM1 | Gate 3 UNO | |
| 83 | G | OM14 | 83 | 25 | 10 | OM1 | Gate 2 UNO | |
| 84 | G | OM14 | 84 | 25 | 10 | OM1 | Gate 1 UNO | |
| 85 | G | OM15 | 85 | 22 | 11.8 | OM1 | Gate 5 - Navy Reserve | |
| 86 | G | OM15 | 86 | 34 | 11.55 | OM1 | Gate 4 - Navy Reserve | |
| 87 | G | OM16 | 87 | 28 | 10.05 | OM1 | Road Gate 3 | |
| 88 | G | OM16 | 88 | 33 | 7.3 | OM1 | RR - Gate 2 | |
| 89 | G | OM17 | 89 | 30 | 5 | OM1 | Gate in France Road | |
| 90 | G | OM17 | 90 | 20 | 7.25 | OM1 | Gate 1W road closed | |
| 91 | G | OM17 | 91 | 20 | 7.55 | OM1 | Gate 2W RR open | |
| 92 | G | OM18 | 92 | 30 | 9.5 | OM3 | Gate 3W access open | |
| 93 | G | OM18 | 93 | 30 | 11.25 | OM3 | Gate 4W access open | |
| 94 | G | OM18 | 94 | 30 | 11.25 | OM3 | Gate 5W access open | |
| 95 | G | OM18 | 95 | 30 | 11.25 | OM3 | Gate 6W access open | |
| 96 | G | OM18 | 96 | 79 | 6.25 | OM3 | Gate 7W road closed | damaged |
| 97 | G | OM18 | 97 | 67.5 | 7.4 | OM3 | Gate 8W RR open | Failed during Katrina |
| 98 | G | OM18 | 98 | 47 | 4.75 | OM3 | Gate 9W RR open | damaged |
| 99 | G | OM18 | 99 | 80 | 4.25 | OM3 | Double Gates - France Rd Parkway | damaged |
| 100 | G | OM19 | 100 | 30 | 4.25 | OM3 | Gate 10W - RR open | damaged |
| 101 | G | OM19 | 101 | 25 | 4.25 | OM3 | Gate in levee at Port of NO | Failed during Katrina |
| 102 | G | OM19 | 102 | 25 | 4.25 | OM3 | Gate in levee at Port of NO | Failed during Katrina |
| 103 | G | OM20 | 103 | 45 | 2.5 | OM3 | Gate in pier access | no damage |
| 104 | G | OM20 | 104 | 45 | 2.5 | OM3 | Gate in pier access | no damage |
| 105 | G | OM20 | 105 | 25 | 6 | OM3 | Gate next to pump station | |
| 106 | G | OM20 | 106 | 30 | 2.25 | OM3 | Road closed | Florida Avenue Bridge Gate W20 |
| 107 | | OM20 | 107 | 20 | 2 | OM3 | RR closed | |
| 108 | G | OM20 | 108 | 30 | 2.25 | OM3 | RR open | Gate W21 |
| 109 | G | OM20 | 109 | 40 | 2.75 | OM3 | Road open | Florida Ave Bridge |
| 110 | G | OM20 | 110 | 30 | 7.45 | OM3 | Road open | Florida Avenue Wharf |

| Feature Number | Gate (G) or Other Point Feature (O) | Reach | Correlated Features | Width (ft) | Elevation (ft) (NAVD88 2004.65) - Sill Elevation | Subbasin | Description of Feature | Notes |
|----------------|-------------------------------------|-------|---------------------|------------|--|----------|------------------------|------------------------------------|
| 111 | G | OM20 | 111 | 25 | 4.45 | OM3 | RR open | Florida Avenue Wharf |
| 112 | G | OM20 | 112 | 30 | 7.25 | OM3 | Road open | Florida Avenue Wharf |
| 113 | G | OM20 | 113 | 30 | 8 | OM3 | Road open | |
| 114 | G | OM20 | 114 | 30 | 8.25 | OM3 | Road open | |
| 115 | G | OM20 | 115 | 30 | 7.5 | OM3 | Road open | |
| 116 | G | OM20 | 116 | 30 | 1.75 | OM3 | Road open | Gate W6 |
| 117 | G | OM20 | 117 | 30 | 2.35 | OM3 | RR closed | Gate W5 |
| 118 | G | OM20 | 118 | 30 | 5.35 | OM3 | Road open | Gate W4 |
| 119 | G | OM20 | 119 | 30 | 5.35 | OM3 | RR Access closed | Gate W3 |
| 120 | G | OM20 | 120 | 30 | 3.5 | OM3 | Road open | Gate W2 |
| 121 | G | OM20 | 121 | 30 | 2.25 | OM3 | Road open | Gate W1 |
| 122 | G | OM23 | 122 | 30 | 7.5 | OM3 | Road Access | Off Poland Ave - Navy Complex |
| 123 | G | OM23 | 123 | 20 | 7.5 | OM3 | Road Access | Off Poland Ave - Navy Complex |
| 124 | G | OM23 | 124 | 20 | 7.5 | OM3 | RR Gate | Pauline St Wharf |
| 125 | G | OM23 | 125 | 35 | 7.5 | OM3 | Road Access | Pauline St Wharf |
| 126 | G | OM23 | 126 | 20 | 7.5 | OM3 | RR Gate | Pauline St Wharf |
| 127 | G | OM23 | 127 | 20 | 7.5 | OM3 | RR Gate | Off Charles St. - photo |
| 128 | G | OM23 | 128 | 30 | 7.5 | OM3 | Road Access | Off Charles St. |
| 129 | G | OM23 | 129 | 30 | 7.5 | OM3 | Road Access | Off Charles St. |
| 130 | G | OM24 | 130 | 20 | 7.5 | OM5 | RR Gate | Press St. Wharf |
| 131 | G | OM24 | 131 | 50 | 7.5 | OM5 | Road Access | Esplande St and Wharf |
| 132 | G | OM24 | 132 | 25 | 7.5 | OM5 | Road Access | To riverfront parking off N Peters |
| 133 | G | OM24 | 133 | 25 | 7.5 | OM5 | Road Access | To riverfront parking - St Peters |
| 134 | G | OM24 | 134 | 25 | 7.5 | OM5 | Road Access | To riverfront parking - Toulouse |
| 135 | G | OM24 | 135 | 25 | 7.5 | OM5 | Road Access | To riverfront parking - St. Louis |
| 136 | G | OM24 | 136 | 25 | 7.5 | OM5 | Road Access | To riverfront parking - Conti St |
| 137 | G | OM24 | 137 | 25 | 7.5 | OM5 | Road Access | To riverfront parking - Bienville |
| 138 | G | OM24 | 138 | 15 | 7.5 | OM5 | Pedestrian Crossing | North end of Riverwalk |
| 139 | G | OM24 | 139 | 25 | 7.5 | OM5 | Road Access | Convention Center openings |

| Feature Number | Gate (G) or Other Point Feature (O) | Reach | Correlated Features | Width (ft) | Elevation (ft) (NAVD88 2004.65) - Sill Elevation | Subbasin | Description of Feature | Notes |
|---|-------------------------------------|-------|---------------------|------------|--|----------|-------------------------------|---------------------------------|
| 140 | G | OM24 | 140 | 25 | 5 | OM5 | Road Access | Henderson Street |
| 141 | G | OM24 | 141 | 25 | 5 | OM5 | Road Access | Race Street |
| 142 | G | OM24 | 142 | 25 | 5 | OM5 | Road Access | Orange Street |
| 143 | G | OM24 | 143 | 50 | 5 | OM5 | Road Access | Celeste St - photo |
| 144 | G | OM24 | 144 | 50 | 5 | OM5 | Road Access | Port of NO - near Felicity St |
| 145 | G | OM24 | 145 | 30 | 5 | OM5 | Road Access | Port of NO - 3rd St |
| 146 | G | OM24 | 146 | 30 | 5 | OM5 | Road Access | Port of NO - Washington St |
| 147 | G | OM24 | 147 | 30 | 5 | OM5 | RR Gate | Port of NO - across from 9th ST |
| 148 | G | OM24 | 148 | 25 | 5 | OM5 | Road Access | Port of NO |
| 149 | G | OM24 | 149 | 20 | 5 | OM5 | RR Gate | Port of NO |
| 150 | G | OM24 | 150 | 25 | 7.5 | OM5 | Road Access | Port of NO - Louisiana Ave |
| 151 | G | OM24 | 151 | 25 | 7.5 | OM5 | Road Access | Port of NO |
| 152 | G | OM24 | 152 | 20 | 7.5 | OM5 | RR Gate | Port of NO - Napoleon Ave |
| 153 | G | OM24 | 153 | 30 | 7.5 | OM5 | Road Access | Port of NO - Warehouse Rd |
| 154 | G | OM24 | 154 | 30 | 7.5 | OM5 | Road Access | Port of NO |
| 155 | G | OM24 | 155 | 30 | 7.5 | OM5 | Road Access | Port of NO - Coffee Dr |
| 156 | G | OM24 | 156 | 30 | 7.5 | OM5 | Road Access | Port of NO - Leake Ave |
| 157 | G | OM24 | 157 | 30 | 7.5 | OM5 | Road Access | Port of NO - Henry Clay Dr |
| Table 14-11 Orleans West Bank Features | | | | | | | | |
| 191 | G | HA1 | 191 | 30 | 17 | OW2 | Gate WB1 - Canal Street Ferry | Canal Street Ferry |
| 192 | G | HA1 | 192 | 30 | 17 | OW2 | Gate WB2 - Canal Street Ferry | Canal Street Ferry |

St. Bernard

The reaches that make up the St. Bernard risk model are shown in Figure 14-7, and data are provided in Tables 14-13, 14-14 and 14-15 for reaches, transitions and features, respectively.

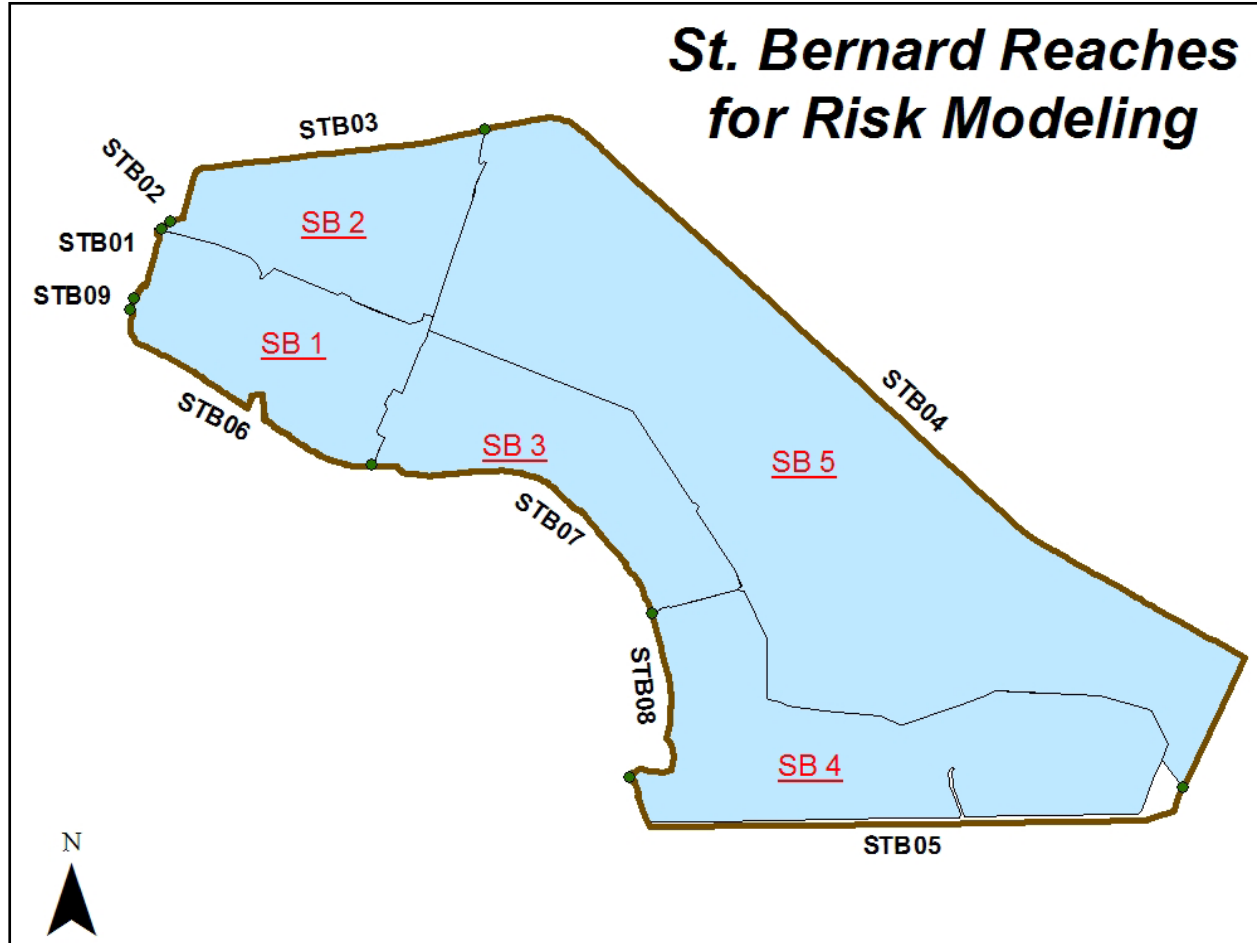


Figure 14-7. St. Bernard Reaches

| Table 14-13. St. Bernard Reaches | | | | | |
|----------------------------------|-------------|--|----------------|--|------------------------|
| Reach No. | Length (ft) | Pre-Katrina Elevation (NAVD88 2004.65) | Reach Type (1) | Foundation Material Type (H, C, P) (2) | Subbasin Reference (3) |
| 72 | 6,570 | 13.80 | W | H | SB1 |
| 73 | 1,115 | 13.30 | W | H | SB2 |
| 74 | 26,995 | 13.60 | L | H | SB2 |
| 75 | 84,195 | 15.50 | L | H | SB5 |
| 76 | 44,650 | 15.70 | L | H | SB4 |
| 77 | 25,545 | 22.00 | L | H | SB4 |
| 78 | 26,950 | 21.20 | L | H | SB3 |
| 79 | 15,885 | 20.50 | L | H | SB1 |
| 80 | 870 | 22.00 | W | H | SB1 |

Table 14-14. St. Bernard Transitions

| Feature Number | Transition Type | Reach | Width (ft) | Elevation (ft) (NAVD88 2004.65) | Sub-Basin | Description of Feature |
|----------------|-----------------|-------|------------|---------------------------------|-----------|--|
| 114 | R | SB1 | 30.0 | 9 | SB1 | Ramp for Surekote Rd |
| 115 | P | SB2 | 150.0 | 14 | SB1 | Pump Station #5 |
| 116 | G | SB3 | 275.0 | 6 | SB2 | Gate in levee near Treasure Street |
| 117 | G | SB4 | 255.0 | 6 | SB5 | Transition Gate - near Bienvenue CS |
| 118 | D | SB4 | 430.0 | -3 | SB5 | Transition Control Structure - Bayou Bienvenue |
| 119 | D | SB4 | 455.0 | -3 | SB5 | Transition Control Structure - Bayou Dupre |
| 120 | R | SB5 | 170.0 | 6 | SB4 | Paris Road (Route 46) ramp |
| 121 | G | SB5 | 155.0 | 6 | SB4 | Bayou Road gate transition |
| 122 | P | SB5 | 230.0 | 15 | SB4 | Transition Pump Station #8 - St. Mary's |
| 123 | R | SB5 | 20.0 | 6 | SB4 | Ramp - Dean Road |
| 124 | R | SB8 | 30.0 | 10 | SB4 | Ramp at end of River Road |
| 125 | G | SB8 | 195.0 | 16.5 | SB4 | Road Gate Closure - canal |
| 126 | G | SB8 | 90 | 16 | SB4 | RR Gate Closure - canal |
| 127 | R | SB8 | 30 | 15 | SB4 | Ramp for Lumberyard Rd |
| 128 | G | SB8 | 160 | 16 | SB4 | RR Gate Closure - canal - 2 RR gates |
| 129 | G | SB8 | 40 | 14.5 | SB4 | Gate Closure - Domino Sugar Plant |
| 130 | G | SB8 | 45 | 14 | SB4 | Gate Closure - Port Ship Service Dock |
| 131 | G | SB8 | 65 | 13.5 | SB4 | Gate Closure - Near Mehle Ave |

Table 14-15. St. Bernard Features

| Feature Number | Gate (G) or Other Point Feature (O) | Reach | Correlated Features | Width (ft) | Elevation (ft) (NAVD88 2004.65) - Sill Elevation | Subbasin | Description of Feature | Notes |
|----------------|-------------------------------------|-------|---------------------|------------|--|----------|---------------------------------------|------------------|
| 158 | G | SB1 | 158 | 40 | 6.5 | SB1 | Gate Closure E-1 | damaged |
| 159 | G | SB1 | 159 | 21 | 6.5 | SB1 | RR Gate Closure E-2 | damaged |
| 160 | G | SB1 | 160 | 40 | 6.5 | SB2 | Gate Closure S-1 | damaged |
| 161 | G | SB3 | 161 | 25 | 6.5 | SB2 | Gate near Treasure Street | no damage |
| 162 | G | SB4 | 162 | 40 | 6.5 | SB2 | Gate near Paris Road Bridge | severely damaged |
| 163 | G | SB4 | 163 | 50.0 | 6.5 | SB5 | Gate before Bayou Bienvenue Structure | damaged |
| 164 | G | SB4 | 164 | 56.0 | -10.8 | SB5 | Bayou Bienvenue Sector Gate | damaged |
| 165 | G | SB4 | 165 | 56.0 | -10.8 | SB5 | Bayou Dupre Sector Gate | damaged |
| 166 | G | SB5 | 166 | 34.0 | 10.9 | SB4 | Bayou Road swing gate | damaged |
| 167 | G | SB5 | 167 | 20 | 7.4 | SB4 | RR gate open | damaged |
| 168 | G | SB5 | 168 | 45 | 6.7 | SB4 | Highway 39 closure gate | damaged |
| 169 | G | SB8 | 169 | 4 | 17 | SB4 | Gate Closure - military park | no damage |
| 170 | G | SB8 | 170 | 32 | 16.5 | SB4 | Road Gate Closure - canal | no damage |
| 171 | G | SB8 | 171 | 20 | 16 | SB4 | RR gate - canal | no damage |
| 172 | G | SB8 | 172 | 24 | 16 | SB4 | RR Gate Closure - canal | no damage |
| 173 | G | SB8 | 173 | 24 | 16 | SB4 | RR Gate Closure - canal | no damage |
| 174 | G | SB8 | 174 | 20 | 14.5 | SB4 | Gate Closure - Domino Sugar Plant | no damage |
| 175 | G | SB8 | 175 | 45 | 14 | SB4 | Gate Closure - Port Ship Service Dock | no damage |
| 176 | G | SB8 | 176 | 35 | 13.5 | SB4 | Gate Closure - Near Mehle Ave | no damage |

Plaquemines

The reaches that make up the Plaquemines risk model are shown in Figure 14-8a and Figure 14-8b, and data are provided in Tables 14-16 and 14-17 for reaches and transitions, respectively. There are no point features in the risk model for Plaquemines.

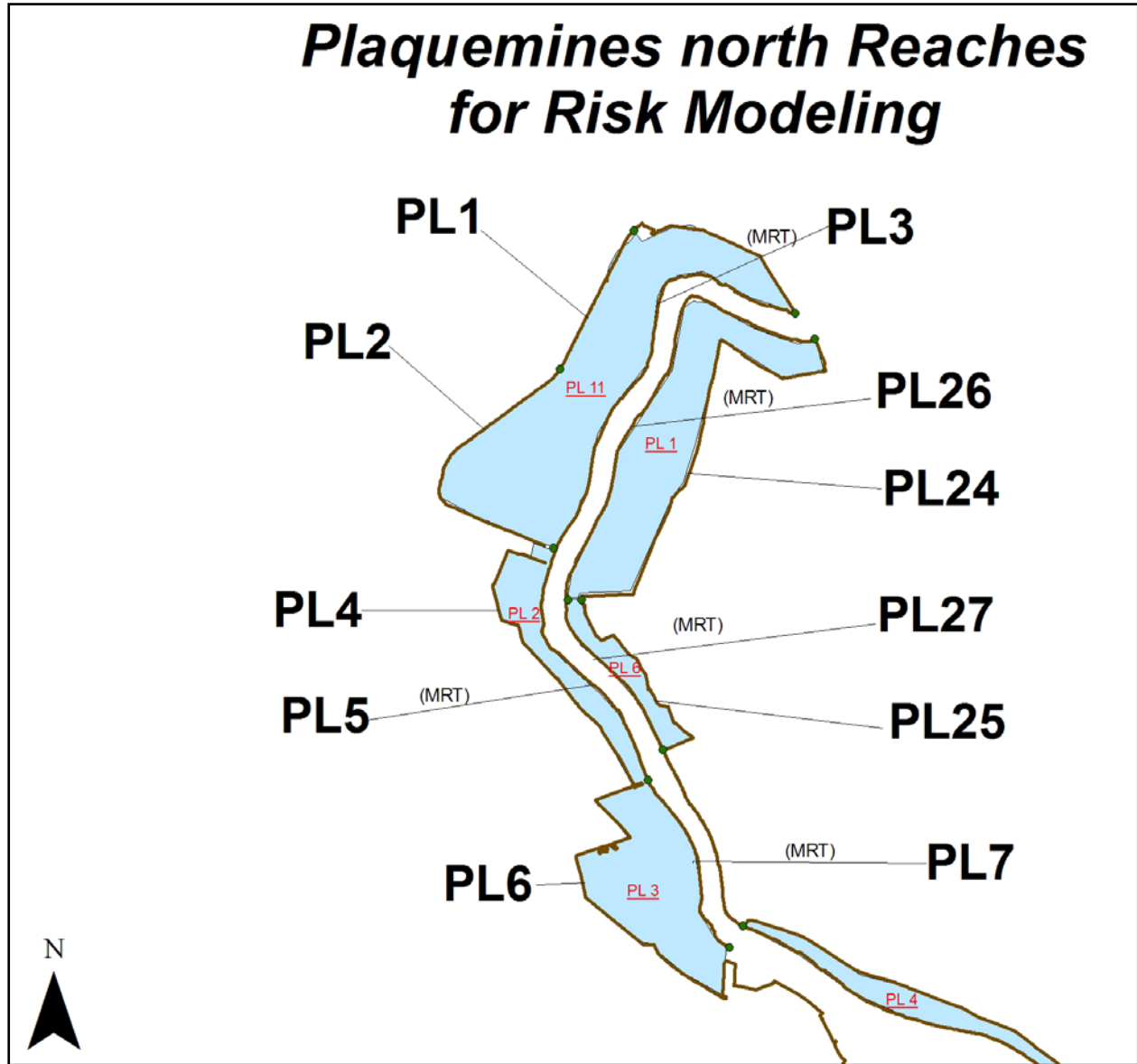


Figure 14-8a. Plaquemines North Reaches

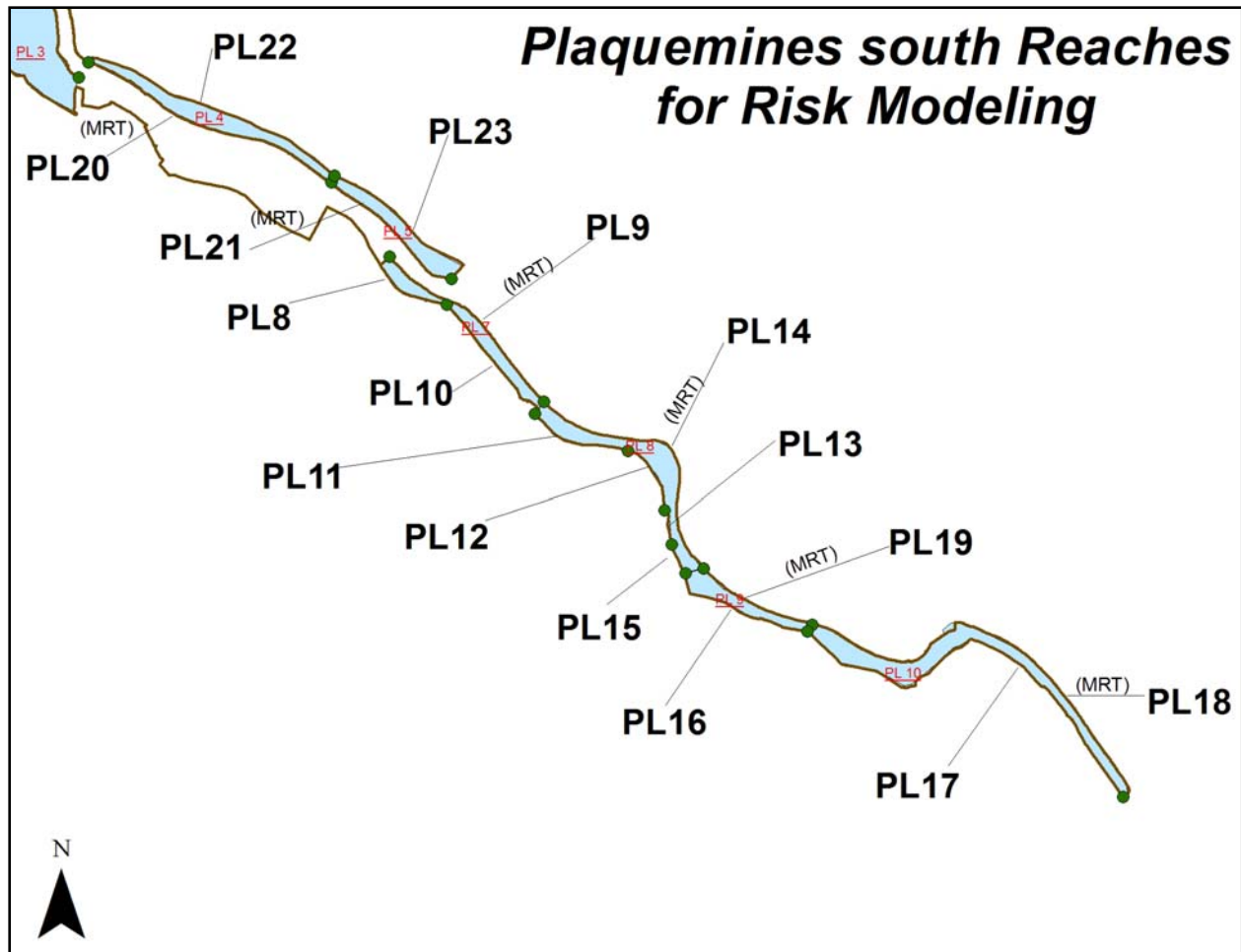


Figure 14-8b. Plaquemines South Reaches

| Table 14-16 - Plaquemines Reaches | | | | | |
|--|--------------------|---|-----------------------|---|-------------------------------|
| Reach No. | Length (ft) | Pre-Katrina Elevation (NAVD88 2004.65) | Reach Type (1) | Foundation Material Type (H, C, P) (2) | Subbasin Reference (3) |
| 81 | 22,000 | 6.00 | L | H | PL11 |
| 82 | 41,525 | 8.50 | L | H | PL11 |
| 83 | 57,470 | 18.10 | L | C | PL11 |
| 84 | 50,610 | 8.50 | L | H | PL2 |
| 85 | 36,605 | 16.40 | L | C | PL2 |
| 86 | 60,615 | 6.40 | L | H | PL3 |
| 87 | 25,865 | 15.70 | L | C | PL3 |
| 88 | 17,170 | 11.20 | L | H | PL7 |
| 89 | 39,195 | 16.20 | L | C | PL7 |
| 90 | 27,100 | 13.50 | L | H | PL7 |
| 91 | 19,120 | 13.60 | L | H | PL8 |
| 92 | 13,774 | 12.70 | L | H | PL8 |
| 93 | 6,635 | 13.80 | L | H | PL8 |
| 94 | 49,470 | 16.30 | L | C | PL8 |
| 95 | 6,160 | 14.90 | L | H | PL8 |
| 96 | 26,710 | 15.00 | L | H | PL9 |
| 97 | 78,500 | 14.70 | L | H | PL10 |
| 98 | 79,100 | 15.00 | L | C | PL10 |
| 99 | 22,740 | 13.90 | L | C | PL9 |
| 100 | 51,200 | 16.60 | L | C | PL4 |
| 101 | 32,235 | 15.60 | L | C | PL5 |
| 102 | 50,475 | 17.30 | L | H | PL4 |
| 103 | 29,050 | 17.50 | L | H | PL5 |
| 104 | 62,810 | 12.00 | L | H | PL1 |
| 105 | 30,940 | 12.40 | L | H | PL6 |
| 106 | 61,710 | 18.60 | L | C | PL1 |
| 107 | 25,225 | 17.00 | L | C | PL6 |

| Table 14-17 Plaquemines Transitions | | | | | | |
|--|------------------------|--------------|-------------------|--|------------------|--|
| Feature Number | Transition Type | Reach | Width (ft) | Elevation (ft) (NAVD88 2004.65) | Sub-Basin | Description of Feature |
| 132 | P | PL1 | 400.0 | 8 | PL12 | Pump Station - Belle Chase #2 |
| 133 | P | PL1 | 175.0 | 10 | PL12 | Pump Station - Belle Chase #1 |
| 134 | P | PL4 | 280.0 | 10 | PL2 | Pump Station - Upper Ollie |
| 135 | P | PL6 | 100.0 | 8 | PL3 | Pump Station - Wilkerson Canal |
| 136 | P | PL8 | 120.0 | 18 | PL8 | Pointe A Lache West Pump Station |
| 137 | P | PL8 | 170.0 | 10 | PL7 | Diamond Pump Station |
| 138 | P | PL10 | 342.0 | 16 | PL11 | Hayes Pumping Station |
| 139 | P | PL11 | 550.0 | 17 | PL8 | Gainard Woods Pump Station |
| 140 | P | PL16 | 1010.0 | 20 | PL9 | Sunrise Pumping Station |
| 141 | G | PL16 | 635.0 | 19.5 | PL9 | Empire Flood Gate |
| 142 | P | PL17 | 627.0 | 19 | PL10 | Venice Pumping Station |
| 143 | P | PL17 | 975.0 | 19 | PL10 | Grand Liard (Buras) PS |
| 144 | P | PL22 | 100 | 18 | PL4 | Bellevue Pumping Station |
| 145 | P | PL27 | 175 | 20 | PL5 | Pointe A La Hache East Pumping Station |
| 146 | P | PL25 | 100 | 10.5 | PL6 | Belair Pump Station |
| 147 | P | PL25 | 200 | 14 | PL1 | Scarsdale Pump Station |
| 148 | P | PL24 | 80 | 9 | PL1 | Braitwaithe Pump Station |
| 149 | U | PL2 | 2200 | 8 | PL2 | Unprotected area between PL11 and PL2 |
| 150 | U | PL1 | 1650 | 5 | PL1 | Unprotected area between PLAQ and STB |
| 151 | U | PL1 | 1730 | 18 | PL1 | MRT between PLAQ and STB |

**Table 14-18
Pre-K and June 2007 Reach Elevations**

| Station No. | Reach Name | Subbasin Reference (2) | Levee Heights [ft] (1) | | Station No. | Reach Name | Subbasin Reference (2) | Levee Heights [ft] (1) | |
|-------------|------------|------------------------|------------------------|-----------|-------------|------------|------------------------|------------------------|-----------|
| | | | Pre-K | June 2007 | | | | Pre-K | June 2007 |
| 1 | NOE 1 | NOE5 | 10.80 | 10.80 | 33 | JE4 | JE3 | 14.40 | 16.50 |
| 2 | NOE 2 | NOE5 | 10.80 | 10.80 | 34 | JE5 | JE2 | 15.50 | 16.50 |
| 3 | NOE 3 | NOE5 | 10.80 | 10.80 | 35 | JE6 | JE2 | 15.50 | 16.50 |
| 4 | NOE 4 | NOE5 | 10.80 | 10.80 | 36 | JE7 | OM4 | 25.30 | 26.60 |
| 5 | NOE 5 | NOE5 | 10.80 | 10.80 | 37 | JE8 | JE1 | 25.40 | 27.00 |
| 6 | NOE 6 | NOE5 | 13.00 | 13.00 | 38 | JE9 | JE3 | 9.60 | 14.00 |
| 7 | NOE 7 | NOE5 | 13.00 | 13.00 | 39 | SC1 | SC1 | 11.00 | 13.50 |
| 8 | NOE 8 | NOE5 | 13.00 | 13.00 | 40 | SC2 | SC1 | 10.00 | 13.00 |
| 9 | NOE 9 | NOE1 | 18.20 | 18.20 | 41 | SC3 | SC1 | 10.00 | 12.50 |
| 10 | NOE 10 | NOE1 | 13.80 | 13.80 | 42 | SC4 | SC2 | 27.90 | 28.40 |
| 11 | NOE 11 | NOE1 | 14.60 | 14.00 | 43 | SC5 | SC2 | 20.50 | 20.60 |
| 12 | NOE 12 | NOE1 | 15.00 | 15.00 | 44 | SC6 | SC2 | 20.30 | 20.70 |
| 13 | NOE 13 | NOE1 | 15.80 | 15.80 | 45 | OM1 | OM2 | 15.50 | 16.50 |
| 14 | NOE 14 | NOE1 | 17.00 | 16.00 | 46 | OM2 | OM2 | 14.00 | 18.00 |
| 15 | NOE 15 | NOE1 | 17.30 | 18.00 | 47 | OM3 | OM2 | 14.00 | 18.00 |
| 16 | NOE 16 | NOE1 | 15.80 | 18.00 | 48 | OM4 | OM2 | 14.00 | 18.00 |
| 17 | NOE 17 | NOE2 | 17.30 | 18.00 | 49 | OM5 | OM2 | 14.70 | 18.00 |
| 18 | NOE 18 | NOE2 | 17.90 | 17.90 | 50 | OM6 | OM1 | 13.50 | 18.00 |
| 19 | NOE 19 | NOE3 | 17.90 | 17.90 | 51 | OM7 | OM1 | 13.50 | 18.00 |
| 20 | NOE 20 | NOE3 | 17.90 | 16.00 | 52 | OM8 | OM1 | 13.50 | 18.00 |
| 21 | NOE 21 | NOE3 | 18.50 | 16.00 | 53 | OM9 | OM1 | 13.50 | 18.00 |
| 22 | NOE 22 | NOE3 | 18.50 | 16.00 | 54 | OM10 | OM2 | 14.00 | 14.00 |
| 23 | NOE 23 | NOE4 | 13.90 | 13.90 | 55 | OM11 | OM2 | 18.50 | 18.50 |
| 24 | NOE 24 | NOE4 | 13.80 | 13.80 | 56 | OM12 | OM1 | 17.00 | 18.00 |
| 25 | NOE 25 | NOE4 | 13.80 | 13.80 | 57 | OM13 | OM1 | 16.50 | 18.00 |
| 26 | NOE 26 | NOE4 | 13.80 | 13.80 | 58 | OM14 | OM1 | 16.50 | 20.50 |
| 27 | NOE 27 | NOE4 | 13.80 | 13.80 | 59 | OM15 | OM1 | 16.50 | 18.50 |
| 28 | NOE 28 | NOE4 | 13.80 | 13.00 | 60 | OM16 | OM1 | 14.40 | 18.00 |
| 29 | NOE 29 | NOE5 | 13.50 | 13.50 | 61 | OM17 | OM1 | 13.50 | 13.50 |
| 30 | JE1 | JE3 | 12.80 | 12.80 | 62 | OM18 | OM3 | 13.80 | 14.50 |
| 31 | JE2 | JE3 | 13.90 | 13.90 | 63 | OM19 | OM3 | 13.80 | 14.50 |
| 32 | JE3 | JE3 | 13.90 | 13.90 | 64 | OM20 | OM3 | 13.80 | 14.50 |
| | | | | | 65 | OM21 | OM3 | 20.10 | 22.00 |

| Station No. | Reach Name | Subbasin Reference (2) | Levee Heights [ft] (1) | | Station No. | Reach Name | Subbasin Reference (2) | Levee Heights [ft] (1) | |
|-------------|------------|------------------------|------------------------|---------|-------------|------------|------------------------|------------------------|---------|
| | | | Pre-K | Current | | | | Pre-K | Current |
| 66 | OM22 | OM3 | 21.50 | 21.50 | 103 | PL23 | PL5 | 17.50 | 17.50 |
| 67 | OM23 | OM3 | 22.50 | 23.70 | 104 | PL24 | PL1 | 12.00 | 14.50 |
| 68 | OM24 | OM5 | 23.60 | 24.40 | 105 | PL25 | PL6 | 12.40 | 14.50 |
| 69 | OM25 | OM5 | 24.30 | 25.50 | 106 | PL26 | PL1 | 18.60 | 18.70 |
| 70 | OM26 | OM5 | 24.80 | 26.00 | 107 | PL27 | PL6 | 17.00 | 17.60 |
| 71 | OM27 | OM4 | 25.80 | 26.60 | 108 | CW1 | JW1 | 6.5 | 10.0 |
| 72 | SB1 | SB1 | 13.80 | 15.50 | 109 | CW2 | JW2 | 7.8 | 10.0 |
| 73 | SB2 | SB2 | 13.30 | 16.50 | 110 | CW3 | JW2 | 7.9 | 11.0 |
| 74 | SB3 | SB2 | 13.60 | 14.60 | 111 | CW4 | JW2 | 6.5 | 11.0 |
| 75 | SB4 | SB5 | 17.20 | 18.00 | 112 | CW5 | JW2 | 4.0 | 11.0 |
| 76 | SB5 | SB4 | 15.70 | 17.20 | 113 | CW6 | JW2 | 8.0 | 10.0 |
| 77 | SB6 | SB4 | 22.00 | 22.50 | 114 | CW7 | JW3 | 9.0 | 9.5 |
| 78 | SB7 | SB3 | 21.20 | 21.30 | 115 | CW8 | JW1 | 26.3 | 27.0 |
| 79 | SB8 | SB1 | 20.50 | 20.50 | 116 | WH1 | JW3 | 9.0 | 9.5 |
| 80 | SB9 | SB1 | 22.00 | 22.00 | 117 | WH2 | JW3 | 9.5 | 10.5 |
| 81 | PL1 | PL1 | 6.00 | 10.00 | 118 | WH3 | JW3 | 9.8 | 11.5 |
| 82 | PL2 | PL1 | 8.50 | 10.00 | 119 | WH4 | JW3 | 12.5 | 12.5 |
| 83 | PL3 | PL1 | 18.10 | 19.00 | 120 | WH5 | JW3 | 12.5 | 12.5 |
| 84 | PL4 | PL2 | 8.50 | 8.50 | 121 | WH6 | JW3 | 9.0 | 10.0 |
| 85 | PL5 | PL2 | 16.40 | 17.50 | 122 | WH7 | JW3 | 9.0 | 10.0 |
| 86 | PL6 | PL3 | 6.40 | 8.30 | 123 | WH8 | JW3 | 10.0 | 10.0 |
| 87 | PL7 | PL3 | 15.70 | 17.20 | 124 | WH9 | JW3 | 24.8 | 24.8 |
| 88 | PL8 | PL7 | 11.20 | 12.80 | 125 | WH10 | JW3 | 24.2 | 25.0 |
| 89 | PL9 | PL7 | 16.20 | 17.50 | 126 | HA1 | OW2 | 22.0 | 22.0 |
| 90 | PL10 | PL7 | 13.50 | 13.50 | 127 | HA2 | JW4 | 23.2 | 24.3 |
| 91 | PL11 | PL8 | 13.60 | 14.00 | 128 | HA3 | JW4 | 9.6 | 10.0 |
| 92 | PL12 | PL8 | 12.70 | 14.50 | 129 | HA4 | JW4 | 8.3 | 10.0 |
| 94 | PL13 | PL8 | 13.80 | 15.10 | 130 | HA5 | OW2 | 16.0 | 21.7 |
| 95 | PL14 | PL8 | 16.30 | 17.50 | 131 | HA6 | OW1 | 20.1 | 20.8 |
| 96 | PL15 | PL8 | 14.90 | 15.50 | 132 | HA7 | OW1 | 16.0 | 21.7 |
| 96 | PL16 | PL9 | 15.00 | 15.50 | 133 | HA8 | OW1 | 5.70 | 10.00 |
| 97 | PL17 | PL10 | 14.70 | 15.50 | 134 | HA9 | OW2 | 8.0 | 10.0 |
| 98 | PL18 | PL10 | 15.00 | 16.80 | 135 | HA10 | JW4 | 24.80 | 24.80 |
| 99 | PL19 | PL9 | 13.90 | 17.50 | 136 | CL1 | OM2 | N/A | 16.5 |
| 100 | PL20 | PL4 | 16.60 | 16.70 | 137 | CL2 | OM2 | N/A | 18.0 |
| 101 | PL21 | PL5 | 15.60 | 16.50 | 138 | CL3 | OM1 | N/A | 18.0 |
| 102 | PL22 | PL4 | 17.30 | 17.50 | | | | | |

Notes: (1) Elevation Datum NAVD88-2004.65 ; (2) Subbasin where water from overtopping or breaching of reach will collect