CHANGE ORDER

In accordance with the Master Consulting Services Subcontract dated October 26, 2016 ("Subcontract") between **AECOM Technical Services, Inc.** a California corporation ("AECOM"), and **FTN Associates, LTD** ("Subconsultant"), this Change Order 02, with an effective date of September 1, 2021 modifies the Task Order No. **134672** as follows:

1. **Changes to Subcontracted Services/Work**:

BACKGROUND, PURPOSE AND TASK ORDER GOALS:

MBSD's 60% Phase of Engineering and Design comprised two periods of performance. The first period was performed and completed under LaGov 4400013603, Task Order No. 7 and its Period of Performance was January 6, 2020 thru December 31, 2020. The second period was performed under LaGov 4400020885, Task Order No. 2 and its period of performance originally was January 1, 2021 through July 9, 2021, ending with the submittal of the 60% Draft End Deliverables to Coastal Protection and Restoration Authority (CPRA) for review and comment. CPRA issued a partial NTP to perform Task Order No. 2, that included partial funding of the task order's not-to-exceed (NTE) price. CPRA subsequently issued Amendment No. 1 to Task Order No. 2, which provided the full funding of the task order's NTE price and extended the Period of Performance through August 31, 2021.

Modification (Mod) No. 2 to Task Order No. 2 extends the Period of Performance through July 1, 2022 and expands the engineering and design scope of services to include the 90% Phase of Engineering and Design, during which the Joint Permits and Section 408 Permissions applications are submitted and review agency comments are resolved, the independent construction cost estimates of the Construction Manager at Risk (CMAR), Independent Cost Estimator (ICE) and Design Team (DT) are reconciled, the designs, construction contract documents, and Operation and Maintenance, Repair, Replacement and Rehabilitation (OMRRR) Plan are advanced to a 90%-level of completion; and an Early Works of Construction Package is developed to a 95% level of completion so that construction activities may begin shortly after the Record of Decision and permits are received.

SCOPE OF WORK:

FTN shall perform the following on a time-and-materials basis according to Table 1, and the Scope of Work document (Exhibit 'B'):

- Provide AECOM input on project schedule development.
- Prior to each FTN employee performing work, submit the employee's name, highest relevant degree obtained, years of relevant experience, licensure information, contract labor classification proposed, and brief description of the work/role the employee will perform on the project. AECOM will submit the information to CPRA for approval. Work performed by employees not authorized by AECOM in writing prior to charging to the project will not be compensable.
- Provide brief weekly progress of work performed in the prior week, and time charges by employees. Summary of specific work each employee performed in the prior week shall be provided as well as a two week look ahead of upcoming activities including anticipated information required from the Design Team, CPRA, or others to perform FTN's respective scope. A template will be provided by AECOM.

2.1 90%-Phase Numerical Hydraulic and Sediment Transport Modeling: Tasks are:

1. Three-component/LaVeg Modeling:
   - Three-component Modeling:
     - Revise three-component model design with 1v:7h conveyance channel and redesigned transition and quantify system headloss.
     - Redo previous model runs presented in the 60% Design Documentation Report (DDR) for estimates of water level and velocities at various steady state flows needed for design.
     - Redo diversion discharge rating curve using Monte Carlo type runs for variable river and basin water level conditions and river discharge.

- Redo Cumulative Sediment Water Ratio (CSWR) analysis and quantify sediment loads diverted for final design.
- Evaluate evolution of scour hole at end of Outfall Transition Feature (OTF) in regard to development of near-field Basin scouring and deposition to determine if progressive backscour could develop from dendritic channel formation. Provide opinion of whether OTF will have to be modified during early period of operations to facilitate transition between OTF, scour hole and dendritic channels.

- LaVeg Modeling: Perform following additional runs:
  - No dredging 50-year run. Diversion will be allowed to degrade in conveyance and sediment delivery performance over time
  - With Dredging 50-year run with updated sediment boundary condition after discussion with CPRA.

2. River Response Modeling: No additional river response modeling will be performed during 90%-Phase. Additional narrative will be added to 90% DDR to explain there is no benefit to E&D to reperform this modeling.
3. Support for OMRR&R Plan Development:
   - Base flow modeling:
     - Develop estimates of required base flow and duration to keep channel clear of deposition during MR flow below 450k cfs period
     - Evaluate reverse flow potential during period of river flow below 450k cfs.
     - Discuss with Environmental Impact Statement (EIS) team and provide any required model data if needed
     - Run scenarios with gate bay(s) partially opened to evaluate capability to incrementally adjust base flows to regulate diverted flows below 5k cfs.
     - Provide recommendations on sluice gate opening size required for designing incorporation of sluice gate openings into gate bulkheads for purpose of regulating base flows in 1k cfs increments without raising gates.
   - Operations Modeling:
     - Analysis of observed data and development of a lead time required for trigger to open gates.
     - Develop a plan where data from observed gages (Natchez, Tarbert Landing, Baton Rouge and Belle Chasse) can be assimilated in a single method that can help operation managers take real-time decisions to open/close the diversion gates given if practical at least a 7-day lead time.
     - Development of a gate sequencing plan through modeling to inform OMRRR Plan. Model data will be complimented by synthetic observed data of water levels nearfield of the diversion in the river and the outfall to show how decisions of gate sequencing can be adapted for real time scenarios.
4. Periodic Collaboration with Mid-Breton Sediment Diversion (MBrSD) Modeling Team: Continue monthly meetings and up to three additional coordination meetings.
5. Revisions to Modeling for Storm Surge Propagation into Conveyance Channel: No further scope in 90%-Phase.
6. Additional Cloud Computing & Specialized Software license renewals. This covers 90%-Phase PoP.
7. Barataria Waterway Siltation Modeling:
   - Develop a model to simulate Barataria Waterway siltation over 50 years. Model data from current Louisiana Vegetation (LAVEG) delta building model will be used for boundary conditions.
   - Any additional modeling to devise Barataria Waterway siltation measures like placing low sills to arrest sediment delivery, building levees along east bank to keep diversion flow isolated etc. will be conducted as additional scope.

8. General:
   - Respond and resolve DT ITR, CPRA, Owner's Review Team (ORT), Program Management Team (PMT), and US Army Corps of Engineers (USACE) Comments on the 60% DDR and hydraulic modeling report appendix.
   - Complete the Numerical and Physical Modeling Comparison Report. Respond, resolve and incorporate DT ITR, CPRA, ORT, PMT, and USACE Comments and issue final version of report.

- Update the Design Criteria Document relative to numerical hydraulic and sediment transport modeling for the 90% deliverables, as appropriate.
- Intake Transition Modeling: Redesign intake transition for 1v:7h Conveyance Channel.
- Conveyance Channel Modeling: Rerun channel model to evaluate head loss and quantify berm deposition.
- Modeling and Model Input Uncertainty Analysis and Discussions will be added to 90% DDR.
- Ongoing review of physical modeling progress related to the revised river intake being designed by FTN and the AECOM Design Team. This effort may include one trip to Alden Labs facility in Holden, MA for two FTN modeling leads.
- QA/QC
- Independent Technical Review (ITR)

DELIVERABLES:

- Brief, weekly progress reports and labor charge summaries and 3-week look ahead.
- Brief numerical modeling Work plan, and high-level schedule for the next task order.
- Updates to the 90% DDR
- Written comment responses for the ORT and USACE reviews of the Revised 60% DDR numerical modeling sections and Design Criteria Document Updates.

  Memorandum for the qualitative comparison of the numerical and physical models for the original intake and Conveyance Channel.

QUALITY CONTROL/QUALITY ASSURANCE:
Perform the work in accordance with the Project QA/QC Plan.

HEALTH, SAFETY, AND ENVIRONMENT:
Perform the work in accordance with the Project HS&E Plan.

2. **Change in Time of Performance** (attach schedule if appropriate):

The period of performance is from September 1, 2021 through July 1, 2022. Work shall be performed in accordance with the project design schedule, which will be developed in consultation with FTN. Weekly time charges and associated documentation shall be provided by the close of business, Tuesday for the prior week's work.

3. **Change in Subconsultant's Compensation**:

The Subcontracted Services set forth in this Change Order will be performed on the following basis:

Subcontractor shall perform the Modification # 2 scope on a time and materials basis, **not to exceed $671,856.11 for a revised total of $1,366,704.56** per Table 1 and the project SOW. Note that this represents partial funding for this TO, full funding for this PO will be provided by modification as needed and by mutual agreement. Travel costs are included in the appropriate rates and therefore not separately compensable.

Subcontractor shall notify AECOM in writing when 50% of the ceiling price is reached, and again at 75% and 90%.

Table 1

AECOM Project No.	Task Level (Invoice at this Level)	AECOM Sub Task (Report at this level)	Task/Sub-Task Title	Assoc. FTN Scope Summary	Budget
60649021	**FTN**	**2.1**	**General Project Management**		
		2.1.2	Professional Liability Insurance	N/A	$7,760.61

		2.1.3	Technical Coordination and Review Meetings	See 90% SOW	$12,692.13
60649021	**FTN**	**2.2**	**General Project Engineering and Design Services**		
		2.2.2	CMAR Coordination	See 90% SOW	$28,326.24
		2.2.15	60% Permitting App Support	See 90% SOW	$5,291.33
		2.2.16.1	60% EIS Support	See 90% SOW	$16,593.60
60649021	**FTN**	**2.3**	**Numerical Hydraulic Modeling and River Monitoring**		
		2.3.1	3 Component /LA Veg Modeling	See 90% SOW	$176,377.59
		2.3.3	Support for OMRRR Plan Development	See 90% SOW	$88,188.80
		2.3.4	Periodic Collaboration w/ MBrSD Modeling Team	See 90% SOW	$17,637.76
		2.3.6	Addl Cloud Computing and Spec Software License renewals	See 90% SOW	$28,220.41
		2.3.7	Barataria Waterway Siltation Modeling	See 90% SOW	$52,913.28
		2.3.8	General Modelling	See 90% SOW	$201,070.46
60649021	FTN	2.4	60% Phase Monitoring Activities	See 90% SOW	$5,291.33
	FTN	2.11	Eng Support-Physical Modeling	See 90% SOW	$25,329.23
		2.12	60 & 90% Cost Estimates	See 90% SOW	$6,163.34
				FTN Not-to-Exceed Price for Modification 2 of TO 2	**$671,856.11**

4. **Other Changes (including changes to terms and conditions in the Subcontract or individual Task Order):**

None

5. **Each Party represents that the person executing this Change Order has the necessary legal authority to do so on behalf of the respective Party.**

6. **All other terms and conditions remain unchanged.**

(Signature Page Follows)

AGREEMENT AND ACCEPTANCE:

AECOM Technical Services, Inc.

Dugosh, Joey
Digitally signed by Dugosh, Joey
Date: 2022.01.25 13:08:05 -06'00'
Signature

Joey W. Dugosh
Printed Name

Subcontract Administrator
Printed Title

Address
13640 Briarwick Drive
Austin, TX 78729

SUBCONSULTANT: FTN Associates, LTD

Ranjit Jadhav
Digitally signed by Ranjit Jadhav
DN: cn=Ranjit Jadhav, o=FTN Associates, ou, email=rsj@ftn-assoc.com, c=US
Date: 2022.01.24 12:36:35 -06'00'
Signature

RANJIT JADHAV
Printed Name

VICE PRESIDENT
Printed Title

Address
7648 Picardy Ave
Ste 100
Baton Rouge, LA 70808

Exhibit B

Engineering and Design Task Order Package
90% Phase
Modification No. 2 to Task Order No. 2

(Attachment Follows)

Rev 0

AECOM

STATE OF LOUISIANA

COASTAL PROTECTION AND RESTORATION

AUTHORITY

Mid-Barataria Sediment Diversion Project

STATE PROJECT No. BA-0153

NFWF Grant No. 55129

LaGov No. 4400020885

Engineering and Design Task Order Package

90% Phase

Modification No. 2 to Task Order No. 2

September 1, 2021

CPRA

Coastal Protection and Restoration Authority of Louisiana

Acronyms and Abbreviations

ADCP	Acoustic Doppler Current Profiler
AEP	Annual Exceedance Probability
AHP	Above Head of Passes
ATR	Agency Technical Review
BOD	Basis of Design
BODR	Basis of Design Report
BUM	Beneficial Use of Material
CADD	Computer Aided Design and Drafting
CFD	Computation Fluid Dynamics
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CMAR	Construction Manager at Risk
CMFE	Construction Marsh Fill Elevation
CV	Cost Variance
CPI	Cost Performance Index
CPRA	Coastal Protection and Restoration Authority
CPT	Cone Penetration Test
CSWR	Cumulative Sediment Water Ratio
CUP	Coast Use Permit
DDR	Design Documentation Report
DMM	Deep Mixing Method
DT	Design Team
E&D	Engineering and Design
EI	Early Implementation
EIS	Environmental Impact Statement
EL	Elevation
ESA	Environmental Site Assessment
EW	Early Works (of Construction)
FHWA	Federal Highway Administration
FTN OMBA	FTN Associates, Inc Outfall Management Barataria Model
FWCA	Fish & Wildlife Coordination Act

GEBF	Gulf Environmental Benefit Fund
GIWW	Gulf Intracoastal Waterway
GMP	Guaranteed Maximum Price
GoM	Gulf of Mexico
HEC-HMS	Hydrologic Engineering Center's Hydrologic Modeling System
HEC-RAS	Hydrologic Engineering Center's River Analysis System
HME	Healthy Marsh Elevation
HMIA	Hydrologic Modifications Impacts Analysis
HSDRRSDG	Hurricane and Storm Damage Risk Reduction System Design Guidelines
H&H	Hydrology & Hydraulics
HW	Headworks
Hwy	Highway
HVAC	Heating, Ventilation, and Air Conditioning
I&C	Instrumentation & Controls
ICE	Independent Cost Estimator
ITR	Independent Technical Review
LADOTD	Louisiana Department of Transportation and Development
LAPELS	Louisiana Professional Engineering and Land Surveying Board
LaVeg	Louisiana Vegetation
LCA	Louisiana Coastal Area
MBSD	Mid-Barataria Sediment Diversion
MBrSD	Mid-Breton Sediment Diversion
MNSA	Maritime Navigation Safety Association
MPRSA	Marine Protection Research & Sanctuaries Act
MRMBSDP	Mississippi River Mid-Basin Sediment Diversion Program
MR	Mississippi River
MRL	Mississippi River Levee
NAVD88	North American Vertical Datum of 1988
NEPA	National Environmental Policy Act
NF	Non-Federal
NFL	Non-Federal Levee
NFWF	National Fish and Wildlife Foundation

NOGC	New Orleans Gulf Coast
NOGS	New Orleans Geological Society
NOV	New Orleans to Venice
NRDA	Natural Resource Damage Assessment
NTP	Notice to Proceed
O&M	Operations and Maintenance
OMBA	Outfall Management Model Barataria
OMRR&R	Operations, Maintenance Repair, Replacement and Rehabilitation
Opp.	Opportunity
ORT	Owner's Review Team
PI	Points of Intersection
PLT	Plaquemines Liquid Terminal
PLS	Professional Land Surveyor
PMIS	Program Management Information System
PMP	Project Management Plan
PMT	Program Management Team
POC	Point of Contact
POE	Point of End
Project DT	Project Design Team
"Program"	Mississippi River Mid-Basin Sediment Diversion Program
QA	Quality Assurance
QC	Quality Control
RFI	Request for Information
RM	River Mile (AHP)
RMGC	Rail Mounted Gantry Crane
ROE	Right of Entry
ROW	Right of Way
R/R	Railroad
RTK	Real Time Kinematic
SAR	Safety Assurance Review
SCADA	Supervisory Control & Data Acquisition
SIBM	Settlement-Induced Bending Moments

SLR	Sea Level Rise
SPI	Schedule Performance Index
SPT	Standard Penetration Testing
SV	Schedule Variance
SOW	Scope of Work
SOV	Schedule of Values
SUE	Subsurface Utility Engineering
SWPPP	Storm Water Pollution Prevention Plan
SWR	Sediment to Water Ratio
TBD	To Be Determined
TME	Target Marsh Elevation
TPC	Third Party Contractor
UAS	Unmanned Aerial Systems
UAV	Unmanned Aerial Vehicle
UP	Union Pacific
USACE	US Army Corps of Engineers
USCG	United States Coast Guard
USGS	United States Geological Survey
WBS	Work Breakdown Structure
WI	The Water Institute of the Gulf
WRDA	Water Resources Development Act
WSE	Water Surface Elevation

Acronyms, Abbreviations and Key Definitions

Acronyms, abbreviations and key definitions used in this document are listed in LaGov 4400020885, Task Order No. 2 Scope of Work Document, dated January 1, 2021.

1. TO 2, MODIFICATION No. 2 BACKGROUND AND SCOPE SUMMARY

MBSD's 60% Phase of Engineering and Design comprised two periods of performance. The first period was performed and completed under LaGov 4400013603, Task Order No. 7 and its Period of Performance was January 6, 2020 thru December 31, 2020. The second period was performed under LaGov 4400020885, Task Order No. 2 and its period of performance originally was January 1, 2021 through July 9, 2021, ending with the submittal of the 60% Draft End Deliverables to CPRA for review and comment. CPRA issued a partial NTP to perform Task Order No. 2, that included partial funding of the task order's not-to-exceed (NTE) price. CPRA subsequently issued Amendment No. 1 to Task Order No. 2, which provided the full funding of the task order's NTE price and extended the Period of Performance through August 31, 2021.

Modification (Mod) No. 2 to Task Order No. 2 extends the Period of Performance through July 1, 2022 and expands the engineering and design scope of services to include the 90% Phase of Engineering and Design, during which the Joint Permits and Section 408 Permissions applications are submitted and review agency comments are resolved, the independent construction cost estimates of the CMAR, ICE and DT are reconciled, the designs, construction contract documents, and OMRR&R Plan are advanced to a 90%-level of completion; and an Early Works of Construction Package is developed to a 95% level of completion so that construction activities may begin shortly after the Record of Decision and permits are received.

Task Order No. 2, Mod No. 2's general scope is to perform 90% Phase E&D Services. 90% Phase E&D Services are those services performed after submittal of the draft 60% deliverables, which occurred on July 9, 2021, with the exception of the Numerical and Physical Modeling Comparison Report Draft, which is a 90% Phase Activity and included in the scope of this task order modification. The 90% Phase is generally characterized as a period of more frequent coordination and collaboration between the CMAR and the DT to develop the drawings and specifications to a 90%-level so that the DT and CMAR's respective 90% deliverables address the CMAR's intended means, methods and sequencing. Effort is focused on design details and the DT and CMAR collaboration is expected to improve constructability. More frequent coordination meetings are expected so that discrepancies and missing information in the permanent works and temporary works plans and specifications comments are identified and corrected, and concerns are addressed.

In summary, 90%-Phase E&D services include:

- Completion of the 60% Numerical Modeling Report and the Numerical and Physical Modeling Comparison Report.
- Section 408 Permissions Application Services:
    - Responses, resolutions and incorporation of significant CPRA & ORT comments on the 60% end draft deliverables into final 60% deliverables, and compilation of the final version of the Section 408 Permissions Application supporting E&D documents.

- Responses, resolutions and incorporation of resolved USACE comments on the Section 408 Application's supporting E&D documents into the 90% documents and where appropriate by submitting additional supporting documentation into the DrChecks System.
- Responses, resolutions and incorporation of resolved Safety Assurance Review (SAR) comments on the Section 408 Application's supporting E&D documents into the 90% documents.
- Preparation of Section 408 Permissions Application Letter.
- Submittal of the Numerical and Physical Modeling Comparison Report to USACE as supplemental supporting technical documentation to the Section 408 Permissions Application.

- Incorporation of one additional VE Change to Project Components not included in the VE items selected in 2020. After submittal of the Section 408 Application to USACE, the Conveyance Channel geometry is modified to increase the cross-section area, and the side slopes are changed from 1v:4h to 1v:7h so that Channel may be constructed in the dry. Related engineering and design includes:
  - Additional Numerical Hydraulic Modeling related to this VE change include:
    - The Conveyance Channel to assess head loss and sedimentation potential in the Channel.
    - River Intake/Headworks to redesign the geometry of the discharge transition into the Conveyance Channel.
    - Three Component and Basin Modeling: Revisions to the three-component model and updates to the diversion's rating curves used in the three-component Outfall Management models. Rerunning the Outfall Management Models to assess impacts to basin evolution during the diversion's operating life.
    - Note that these additional numerical hydraulic modeling scope items are specified under 90%-Phase Hydraulic Engineering.
  - Additional Civil Engineering: Revisions to the 60% drawings to incorporate the Conveyance Channel geometry changes. Changes include the Headworks discharge transition geometry and T-wall layout, Conveyance Channel cross-sections, inverted siphon pipe bank layout, and OTF geometry.
  - Additional Structural Engineering: redesigns of the Headworks Discharge Transition T-walls to reflect the geometry changes.
  - Additional General Geotechnical Engineering: re-analyses of global stability and settlement of the of the Headworks Discharge Transition T-walls to reflect the geometry changes; re-analysis of the updated Conveyance Channel berm width for stability, review of CMAR's geotechnical analyses for 1v:7h Conveyance Channel for construction surcharge and dewatering conditions.

- 60%-90% Cost Estimating Services:
  - Provide a Post-60% Snapshot Drawing Set that includes the change in the Conveyance Channel cross-section as described previously.
  - Complete quantity take-offs started during 60% Phase, and participate in three quantity reconciliation meetings with the PMT, CMAR and ICE.
  - Prepare 60% Engineer's opinion of probable construction cost

- Participate in three cost reconciliation meetings with the PMT, CMAR and ICE and revise engineer's estimate as appropriate.
- Participate in a VE meeting to initially evaluate VE opportunities identified by the CMAR and ICE cost estimators during their preparation of their 60% cost estimates.
- Compute quantities for 90% Cost Estimate.

- Post-60% Cost Estimate Additional VE Opportunities for 90% Designs and Deliverables: As part of the 60% cost estimating price reconciliation process, the CMAR and/or ICE cost estimators may present additional VE opportunities to reduce construction costs. The CMAR and/or ICE will present a concept and documentation of the potential cost savings. With DT input, CPRA will decide based which opportunities to incorporate into the project features, if any. The DT will advise on impacts to engineering cost, schedule and task order budget. The E&D scope, schedule, and/or task order ceiling price will be modified if incorporating the changes delays the schedule or the estimated price to engineer exceeds the allocated budget.

- Early Works of Construction Engineering and Design:
  - Participate in meetings with PMT and CMAR to identify permanent and temporary project features that can be constructed within the first 12 months of the project construction phase.
  - Advance the engineering and design of identified permanent works and components thereof to the 95%-level of completion. Advance the plans and technical specifications for those permanent works to the 95%-level of completion, collaborating with the CMAR through regular meetings and consultations.
  - Review and collaborate with CMAR on the advancement of the identified temporary work features insofar as they impact the designs of the permanent works.
  - Assist PMT with compiling the Early Works 95% Draft Package
  - Respond, resolve and incorporate resolutions of ORT comments on DESIGN TEAM items of the draft Early Works 95% Package.

- Corrosion Study. Perform a corrosion study of the proposed steel structural and foundation elements that will be either located in the splash zone, in the water or beneath the ground but near the groundwater table. Use available soil and water chemistry data developed during the soils exploration and Headworks Excavation Dewatering Pumping Test Program. Provide an opinion of rate and degree of corrosion in these conditions and recommend protection systems, i.e., protective coating systems and/or cathodic protection system. If cathodic protection system is needed for certain components, design the system. Submit a report documenting the investigation and recommendations. Include the study in the technical appendices to the DDR.

- 90%-level E&D: Advance the E&D of the remaining E&D project features not included in the Early Works scope to a general 90%-level of completion in coordination and collaboration with the PMT and CMAR, and prepare and submit the draft 90% deliverables, itemized in **Section 2.X** . The DESIGN TEAM shall compile the CMAR's 90% Plans and 90% DDR sections and appendices into the deliverable set.

Task No. 2, Mod 2's scope summarized above is summarized by project component below.

90% General Geotechnical Engineering:

- Perform additional, critical geotechnical stability, settlement and seepage analyses of the project layout, as presented in the Post-60% Snapshot Drawing Set, provided to CPRA at the end of August 2021. The analyses shall demonstrate the changes meet Project Design Criteria, which is 60% DDR, Appendix A.
- Perform additional settlement analyses for the all the earthen levee-to-structural floodwall tie-ins. Perform settlement-induced bending moment (SIBM) analyses for the floodwall pile foundations as appropriate.
- Complete designs of the earthen levee and structural flood/guide wall closures of the major drainage canal crossings of the diversions.
- As part of miscellaneous CMAR support tasks, review the CMAR's 60% schedule and with CMAR input, identify construction sequencing and durations that do not conform to the 60% Phase geotechnical analyses. Revise stability, settlement and seepage analyses impact by CMAR changes to its construction schedule and present results to CPRA. Document these analyses in the Final Geotechnical Report.
- Review CMAR's geotechnical analyses and designs, and consult with CMAR and its geotechnical engineers and numerical modelers for the CMAR's design of the Headworks dewatering system. In particular, provide recommendations for the design of seepage reduction curtain wall to be included as a component of the CMAR's Headworks Dewatering System Design.
- Complete geotechnical recommendations for the designs and construction of the permanent works deep and shallow structural foundations and permanent earthworks and embankments. Revise and perform additional analyses and designs to develop these recommendations as needed. Update geotechnical parameters as warranted to reflect the interpretation of any data obtained from the Headworks Pump Testing Program that the CMAR may perform between September 1, 2021 and the end of the PoP, as amended in this task order modification. The 90% Phase Headworks Pump Testing Program is being designed, specified and performed by the CMAR and its geotechnical engineers under separate contract from the DT. The DT's role is to review, consult and provide input.
- Continue to confer and coordinate with the PMT, CMAR, and USACE NOD Geotechnical Branch to the extent they are available, to complete the geotechnical analyses, designs, and recommendations.
- Perform additional reviews as appropriate of CMAR geotechnical designs and proposed construction sequencing for conformance with the assumptions, parameters, and requirements of the permanent works designs.
- Update the geotechnical design criteria for the permanent works if needed.
- Provide geotechnical engineering input and recommendations for the Early Works and 90%-level technical specifications.
- Complete and submit the Wick Drain/Embankment Testing Program's Data and Interpretive Report.
- Prepare a Final Geotechnical Report with supporting appendices. The report is itself an appendix to the 60% DDR. Update the geotechnical section of the 90% DDR's main body.
- Confirm, and revise as needed, geotechnical recommendations related to the installation of the riprap armoring in the Conveyance Channel.

- Confirm, and revise as needed, geotechnical recommendations for the project's secondary site features and ancillary works: reservation area and buildings, permanent roads, parking lots, pads and boat launches.
- Complete geotechnical design of the permanent protection cell and the monopiles in the Mississippi River that will protect the MRL tie-in floodwalls from barge impact.
- Complete geotechnical analyses, designs and recommendations for the DMPA.
- Complete designing pile load testing program. Testing to be performed during construction. This item is scoped and budgeted under "Pile Load Testing Program."

90% General Civil Engineering:

- Complete layouts of the project's permanent works, including the Headworks major components, the Reservation Area location, major permanent collector ditches, overall site grading, security fencing, site lighting, permanent access roads, signage, any additional fill stockpile areas for future levee lift, extents of grass fertilizing and seeding of cleared forested area east of Hwy 23 and extents of tree replanting of cleared forested area east of Hwy 23.
- Advance the drawings to a 90%-level of completion, incorporating CPRA, ORT, SAR and USACE resolved comments on the 60% documents.
- Further develop the technical specifications for the permanent civil/site work to a 90%-level of completion.
- Update Quantities for the 90% Cost Estimate.

90% Headworks:

- Advance major cast-in-place, reinforced concrete structures and their foundations to a 90%-level of completion, incorporating CPRA, ORT, SAR and USACE resolved comments on the 60% documents:
    - Intake U-frame Monoliths, including miscellaneous embedments, planned joints, walkways and handrail.
    - Diversion Gate Monolith, including the Rail-Mounted Gantry Crane (RMGC) storage platform and maintenance/access bridge. Detail reinforcing steel, planned joints, handrail and guardrail, and gate slot details, and miscellaneous embedments. Detail electrical room for the RMGC.
    - Mississippi River Levee Tie-in Floodwalls.
    - Discharge Transition T-walls.
    - Submit Final Concrete Abrasion Study without incorporating Stantec's survey of history for abrasion of existing water control structures located in Canada passing flows with course sediment; study to be provided by CPRA for inclusion as an appendix. The study will only include the analyses and opinions developed by the DESIGN TEAM and is applicable only to the MBSD Project.
- Diversion Gate (w/ Rail-Mounted Gantry Crane):
    - Complete the RMGC's technical performance specifications, including gantry rail requirements, and backup power requirements.
    - Design and detail the steel, boxed truss bulkheads to a 90%-level of completion. Assess framing details for fatigue and incorporate appropriate countermeasures into the designs.

- Design and detail one or two bulkheads to include sluice gates to allow passing of small increments of river flow (i.e., in increments of 1,000 cfs up to a maximum of 2,000 cfs when the river is flowing between 300,000 to 450,000 cfs past the project site).
- Develop the associated electrical distribution.

- Ancillary Components:
  - Rock armoring in river and Headworks.
  - River protection circular cell and steel monopile dolphin.
  - ATONS.
  - Gate Operation warning system.
- Advance the drawings and technical specifications to a 90%-level of completion, incorporating resolved CPRA, ORT, SAR and USACE comments.
- Update quantities for 90% cost estimate.

90% Special Concrete Mix Designs: Complete developing special concrete mix designs and numerical heat of hydration and heat transfer modeling analyses to reduce thermal effects during concrete hydration. Consult on additional lab testing on additional mix design alternatives, review lab test results and provide recommendations for additional mix designs under consideration during the 90% Phase. Update the cast-in-place concrete technical specification to include recommendations.

90% Conveyance Channel and Guide/Hurricane Levees:

- Coordinate with CMAR on the development of the layouts, details, and technical requirements for the Conveyance Channel and Guide/Hurricane Levees.
- Develop the details for the tie-ins of the Floodwalls to the earthen embankment
- Revise riprap armoring system if the alternatives investigation started during 60% Phase identifies a more cost effective system for all or part of the Channel. Complete detailing of armoring transitions and tie-ins.
- Complete details in coordination with geotechnical engineers for the permanent closures of the major drainage canals and ditches.
- Coordinate with electrical engineers, CMAR, and utility owners on the permanent site utilities along the Conveyance Channel and Headworks.
- Update and advance the drawings and technical specifications to a 90%-level of completion, incorporating resolved CPRA, ORT, SAR and USACE comments and showing in the drawings the details of the required stages of construction of the Guide/Hurricane Levees.
- Update Quantities for 90% Cost Estimate.

90% Outfall Transition Feature:

- Complete the OTF component designs (braced sheet pile toe wall, braced sheet pile guide walls, armoring, and tie-ins to the existing Back Levee) to a 90%-level of design and detailing.
- Review and consult with CMAR about CMAR's plan to backfill dredged routes across the OTF to achieve finished grade and armoring requirements.
- Complete investigation of rock mattresses in lieu of loose rock armoring for OTF protection.
- Advance the drawings and technical specifications to a 90%-level of completion, incorporating resolved CPRA, ORT, SAR and USACE comments.
- Update Quantities for 90% Cost Estimate.

60%-Final and 90%-Final Hwy 23 Bridge & Roadway:

- Collaborate and review CMAR's design of temporary drainage modifications during construction at Hwy 23 Bridge and Roadway to avoid conflicts with proposed permanent drainage modifications.
- Collaborate and review CMAR's proposed at-grade crossings and traffic control plan for Hwy 23 to traverse Hwy 23 roadway by its proposed heavy dump truck traffic during construction.
- Complete the final engineering and design of the LA23 Bridge and Roadway to a LADOTD 60%-Final Level of Completion as defined by *Part I-Policies and Procedures I, Chapter 3, Appendix K* of the **LADOTD Bridge Design and Evaluation Manual, latest edition**. Submit the 60%-Final Drawings to DOTD for review and comment, resolve comments and incorporate into the 90%-Final documents.
- Prepare and submit the 90%-Final Drawings to LADOTD.
- Advance the T-walls under the bridge to a 90%-level of completion.
- Develop the waterline relocation design to a 90%-level of completion. It is not anticipated that PPG will not review or provide input into the design.
- Coordinate technical specification requirements for bridge with requirements for corresponding items of other project components with goal of improving ease of construction and quality.

NOGC Railroad Bridge & Temporary Spurs & Emergency Access Ramps: E&D to be performed in coordination with PMT, CMAR and NOGC R/R.

- Advance the engineering and design of the 60% railroad bridge and approaches to a 90%-level of completion.
- Advance the temporary vehicular access ramps from the MRL crown to the railroad bridge approaches to a 90%-level of completion
- Advance the detailed engineering and design of the temporary railroad spur for the geometrics shown in the 60% drawings to a 90%-level of completion, in coordination with NOGC.
- Advance the drawings and technical specifications to a 90%-level of completion, incorporating resolved CPRA, ORT, SAR and USACE comments.
- Update quantities for 90% cost estimate

60% Site (Interior) Drainage and Inverted Siphon:

- Area-wide and Local Drainage Designs:
    - Complete an area-wide drainage modification report for inclusion in the Coastal Use Permit Application.
    - Respond, resolve and incorporate comments on the area-wide drainage modification report that will be submitted as part of the Coastal Use Permit Application.
    - Improve calibration of the area-wide HEC-RAS numerical model, as collected water gage data may warrant after comparison of data to model predictions for storm events.
    - Complete layout and sizing of permanent collector ditches and cross pipes within the project's permanent ROW.
    - Confirm the H&H design of the proposed drainage structure on the north side of the Diversion, within the NOV-NF-W-05a.1 Levee.
    - Provide recommendations and input into the O&M procedures for operating the sluice gates at the Inverted Siphon and the NOV-NF-W-05a.1 Drainage Structure.

- Inverted Siphon:
    - Advance the inverted siphon design and its inlet and outlet structures to a 90%-level of completion.
    - Design tie-in T-walls to a 60%-level of completion.
    - Continue developing operating protocols and maintenance requirements for inclusion in OMRR&R Plan.
    - Complete detailing the re-alignment and backfilling of the abandoned segment of the New Timber Canal ditch to tie into the Inlet and Outlet Structures' basins.
    - Complete details for ancillary components of Siphon System.
    - Advance the drawings and technical specifications to a 90%-level of completion, incorporating resolved CPRA, ORT, SAR and USACE comments.
    - Provide O&M guidance on sluice gate actuation procedures.
    - Update quantities for 90% cost estimate.

- NOV-NF-W-05a.1 Drainage Structure:

    - Advance the Drainage Structure in the NOV-NF-W-05a.1 Levee on the north side of the Inverted Siphon to a 90%-level of completion.
    - Coordinate the foundation designs of the tie-in T-walls and transitions to be in accordance with CPRA and USACE agreement on order of work between the NOV-NF-W-05a.1 Levee and Diversion Project construction.
    - Confirm layout of vehicular and authorized personnel walking access routes to the drainage structure from the access roads.
    - Advance the drawings and technical specifications to a 90%-level of completion, incorporating resolved CPRA, ORT, SAR and USACE comments on the 60% documents.
    - Provide O&M guidance on sluice gate actuation procedures.
    - Compute quantities for 90% cost estimate.

<u>60% Secondary Site Features and Site work outside of Guide Levees</u>:

- Advance the architectural, structural, and building system designs to a 90%-level for the combined administration/operations building.
- Confirm the reservation area fill plan does not conflict with the CMAR's temporary site layout.
- Complete the detailing of the site layout of the Reservation Area for grading, driveways and parking area, surfacing, signage, traffic safety devices, sewerage treatment unit, utilities, standby power, fuel storage and site lighting. Confirm the CMAR's temporary haul routes and staging area layouts do not conflict with the Reservation Area.
- Advance the Basin and Mississippi River Boat Launches to the 90%-level of completion.
- Advance architectural, structural, civil/site, and MEP drawings and technical specifications to a 90%-level of completion, incorporating CPRA, ORT, and SAR comments on the 60% documents.
- Update related DDR sections for 90%.
- Update quantities for 90% cost estimate.

<u>90%-Phase Utility Relocations Coordination</u>:

- Continued coordination with affected utility owners-Shell (Pecten petroleum pipeline), Entergy (electrical distribution and transmission lines), AT&T (communications line), NewWave Com/ Sparklight (cable line), PPG (potable water line)-for their utility relocations.

90%-Phase Design of DMPAs:

- Design stockpile plan to a 90%-level for the two landside temporary stockpile areas on Midway Cattle and Conoco Phillips properties respectively. Stockpile plan shall consider haul routes into areas and drainage runoff onto adjacent properties and impacts to collector ditches caused by raising grade through stockpiling. If required, runoff retention ponds shall be designed so that they are fed and discharge by gravity in a controlled manner into adjacent drainage ditches.
- Prepare drawing(s) showing fill disposal and adjacent haul route requirements for the east disposal landside pond site north of the diversion.
- Review CMAR's 60% schedule and obtain a fill disposal material allocation table with quantities and forecast timeframes for incremental disposal by designated area.
- Reduce the limits of the two designated Basin DMPAs if appropriate to hold the fill quantity to be placed.
- Advance the DMPA designs to a 90%-level of completion according to the design standards specified in the 60% DDR.
- Advance drawings and technical specifications to a 90%-level of completion, incorporating CPRA, ORT, SAR and USACE comments on the 60% documents.
- Update quantities.

90%-Phase Updates to Rights-of-Way Plans and Shape Files:

- Update the ROW plans to incorporate:
    - Boundary, water bottom and existing infrastructure ROW boundary surveys provided by CPRA.
    - CMAR dredged access routes through the Basin to the project site using the geo-referenced limits of work boundaries determined, laid out and provided by the CMAR in dwg format, and existing utility infrastructure in the Basin which cross the CMAR's proposed dredged access route. The access route's engineering and design is the responsibility of the CMAR and the CMAR will provide the route's limits of work. The utility information will be provided by CMAR for inclusion in the ROW Drawings.

90%-Phase EIS and Public Outreach-E&D Support:

- Periodically update shape files and project renderings to provide to the EIS Team;
- Engineering support for the completion of the draft EIS being prepared by others will continue and will be performed as requested of the ADT by CPRA or the PMT. Support is providing clarifications of in-progress engineering and designs of the permanent works. The CMAR will provide the same support for the temporary works.
    - Provide numerical hydraulic modeling output from in-progress basin modeling and respond to EIS-related RFIs. Additional modeling requests that cannot be answered with

existing models previously completed or that are being done as part of the current scope will be by modification.

- Support CPRA in responding to public comments regarding the engineering and design of the permanent works. The CMAR will respond to public comments on the temporary works. Responding to comments requiring additional analyses or investigations not performed as part of the E&D scope for the permanent works will be by modification to the Task Order.
- Representative(s) of the DESIGN TEAM may be asked by CPRA to attend public meetings about the EIS.

<u>90% OMRR&R Plan</u>:

- Respond and resolve CPRA, ORT, PMT, and USACE Comments on the 60% OMRR&R Plan;
- Participate in meetings with CPRA on development of operational requirements for the diversion complex and its water control plan.
- Provide recommendations for onsite staffing levels, skills required, skills training CPRA should provide onsite staff.
- Advance the OMRR&R Plan to a 90%-level of completion, incorporating resolved review comments on 60% Plan:
    - Improve and further develop specific procedures for diversion bulkhead gates opening and closure. Include order gate bays should be opened and closed for different river flow conditions across the range of river flows when diversion will be operated. The procedures shall be based on hydraulic modeling results and recommendations.
    - Further develop diversion gates operations procedures for hurricane and other anticipated potential emergency closure scenarios.
    - Further develop general procedures for repairs of localized damage to River Intake concrete walls and slabs using a dewatering chamber.
    - Further develop general procedures for a major dewatering of River Intake Bays using gate bulkheads. Include coordination and procedural requirements for temporary removal and replacement of railroad bridge span to allow floating plant access into the gate bays landside of the railroad bridge.
    - Include placeholder in Plan document for RMGC maintenance requirements that will be obtained from crane manufacturer.
    - Further develop procedures for inverted siphon and drainage structure sluice gates during design rainfall event and hurricane events.
    - Further develop procedures and anticipated schedule for siphon pipe inspections and maintenance.
    - Incorporate the Monitoring Plan into the OMRR&R Plan.
    - Develop and include a “Start-Up and Commissioning Plan” into the OMRR&R Plan.

<u>90%-Phase Numerical Hydraulic and Sediment Transport Modeling</u>:

- Respond and resolve DT ITR, CPRA, ORT, PMT, and USACE Comments on the 60% DDR and hydraulic modeling report appendix.
- Complete the Numerical and Physical Modeling Comparison Report. Respond, resolve and incorporate DT ITR, CPRA, ORT, PMT, and USACE Comments and issue final version of report.

- Update the Design Criteria Document relative to numerical hydraulic and sediment transport modeling for the 90% deliverables, as appropriate.
- Intake Transition Modeling: Redesign intake transition for 1v:7h Conveyance Channel.
- Conveyance Channel Modeling: Rerun channel model to evaluate head loss and quantify berm deposition.
- Three-component Modeling:
    - Revise three-component model design with 1v:7h conveyance channel and redesigned transition and quantify system headloss.
    - Redo previous model runs presented in the 60% DDR for estimates of water level and velocities at various steady state flows needed for design.
    - Redo diversion discharge rating curve using Monte Carlo type runs for variable river and basin water level conditions and river discharge.
    - Redo CSWR analysis and quantify sediment loads diverted for final design.
    - Evaluate evolution of scour hole at end of OTF in regard to development of near-field Basin scouring and deposition to determine if progressive backscour could develop from dendritic channel formation. Provide opinion of whether OTF will have to be modified during early period of operations to facilitate transition between OTF, scour hole and dendritic channels.
- Base flow modeling:
    - Develop estimates of required base flow and duration to keep channel clear of deposition during MR flow below 450k cfs period
    - Evaluate reverse flow potential during period of river flow below 450k cfs.
    - Discuss with EIS team and provide any required model data if needed
    - Run scenarios with gate bay(s) partially opened to evaluate capability to incrementally adjust base flows to regulate diverted flows below 5k cfs.
    - Provide recommendations on sluice gate opening size required for designing incorporation of sluice gate openings into gate bulkheads for purpose of regulating base flows in 1k cfs increments without raising gates.
- Operations Modeling:
    - Analysis of observed data and development of a lead time required for trigger to open gates.
    - Develop a plan where data from observed gages (Natchez, Tarbert Landing, Baton Rouge and Belle Chasse) can be assimilated in a single method that can help operation managers take real-time decisions to open/close the diversion gates given if practical at least a 7-day lead time.
    - Development of a gate sequencing plan through modeling to inform OMRRR Plan. Model data will be complimented by synthetic observed data of water levels nearfield of the diversion in the river and the outfall to show how decisions of gate sequencing can be adapted for real time scenarios.
- LaVeg (land building) Modeling: Perform following additional runs:
    - No dredging 50-year run. Diversion will be allowed to degrade in conveyance and sediment delivery performance over time

- With Dredging 50-year run with updated sediment boundary condition after discussion with CPRA.

- Barataria Waterway Siltation Modeling
  - Develop a model to simulate Barataria Waterway siltation over 50 years. Model data from current LAVEG delta building model will be used for boundary conditions.
  - Any additional modeling to devise Barataria Waterway siltation measures like placing low sills to arrest sediment delivery, building levees along east bank to keep diversion flow isolated etc. will be conducted as additional scope.

- Modeling and Model Input Uncertainty Analysis and Discussions will be added to 90% DDR.

90% Monitoring Plan: Further develop the Monitoring Plan Draft developed during 60% Phase with consideration for CPRA's expected operating budget, prioritizing information needed to confirm the diversion is operating within permitted parameters as specified in the Final EIS Report and the Joint Permits. Establish minimum required data collection frequencies needed to confirm regulatory compliance. Confirm instruments to be installed. If CPRA decides to procure instruments as part of the MBSD construction scope, prepare technical specification for instruments. Specify event-based data collection locations and other requirements, such as data reporting formats. Lab testing standards for testing of collected samples shall be specified in the Plan. Deliverables include the monitoring plan document, schematics showing locations of permanent instruments, support/access structures, and locations of boat-based sampling.

- USGS Workshop participation and support (January 2022).
- Develop the document to a 60%-level of completion. A schematic showing the proposed locations of fixed instruments to be installed as part of construction of the diversion will be included in the 60% drawings.

Pile Load Test Program: Complete the design and specification of the pile load test program to be performed during construction, identifying which tests will be done in Early Works Phase of construction and which will be done later in the construction phase. Recommendations are to be updated in the Geotechnical Report. Requirements are to be incorporated into the 60% plans and specifications.

Completion of the Wick Drain Testing Program: Submit the data and interpretive report. All field data was collected during 60% Phase.

Engineering Support for Additional Physical Modeling:

- Reviews of Additional Physical Modeling Runs being performed under **Task Order No. 1, Modification No. 1**.
- One trip to Alden Labs Holden, MA lab to observe testing.

The modified scope and budget for this Task Order are based on the following schedule:

Table 1-Task Order Mod 2 Schedule

Task	Schedule Start	Schedule Finish	Scheduled Task Duration (Calendar Days)	Notes
Section 408 Permissions Application Supporting E&D Documentation:				
Respond, Resolve & Incorporate ORT comments into Section 408 Application Final version of Supporting E&D docs & Submit to CPRA.	July 10, 2021	August 12, 2021	34	Scope of Modification No. 2 covers 90% Phase scope performed under PoP of Modification No. 1
Prepare and Submit Numerical & Physical Modeling Comparison Report Draft to CPRA	July	September 24, 2021		
Receive, respond and resolve Comments on Numerical & Physical Modeling Comparison Report Draft and Submit Final Version of Report to CPRA	September 25, 2021	October 29, 2021		
NTP for Modification No. 2	**September 1, 2021**	**September 1, 2021**	**0**	
60% Engineer's Cost Estimate:				
60% Cost Estimating and Submittal of Engineer's Estimate Draft	September 1, 2021	October 13, 2021	44	
60% Engineer's Cost Estimate Cost Reconciliation with PMT, ICE & Submittal of Final Version of 60% Engineer's Cost Estimate	October 14, 2021	November 13, 2021	32	
Submit the Concrete Abrasion Study, Final Version	September 1, 2021	November 15, 2021	77	Report Finalization was on hold during 60% Phase pending MBrSD DT input. Submit w/o further revisions.
Review concrete mix test data, perform numerical modeling of concrete mixes, prepare & submit Draft Version of the Concrete Mix Testing Report	July 10, 2021	November 15, 2021	129	Testing plan was developed under TO2original PoP and testing began under Amendment 1 PoP.

Task	Schedule Start	Schedule Finish	Scheduled Task Duration (Calendar Days)	Notes
Submit Wick Drain/Test Embankments Data and Interpretive Report	September 1, 2021	November 15, 2021	77	
Hwy 23 Bridge Deliverables:				
Complete & Submit Hwy 23 Bridge 60% Final Draft to CPRA	July 10, 2021	November 5, 2021	119	
ORT Review, Comment Responses & Incorporation & Submittal of 60%-Final Hwy 23 Bridge Plans to LADOTD	Nov 6, 2021	December 3, 2021	28	
LADOTD Review & Preparation of 90%-Final Hwy 23 Bridge Plans Draft & Submittal to ORT	December 4, 2021	June 3, 2022	182	
ORT Review of 90%-Final Hwy 23 Bridge Plans Draft, Comment Responses & Incorporation, Submittal to LADOTD	June 4, 2022	July 1, 2022	28	
Early Works				
Complete & Submit 95% Early Works Package to CPRA	September 1, 2021	January 13, 2022	135	
90% P&S, DDR & OMRR&R Plan				
Complete and Submit 90% P&S, DDR, and OMRR&R Plan Drafts, Corrosion Study Draft to CPRA	September 1, 2021	June 3, 2022	276	
ORT Review, Comment Responses & Resolutions, Submittal of 90% P&S, DDR, and OMRR&R Plan Final to CPRA	June 4, 2022	July 1, 2022	28	
End of TO 2 PoP, 90% Phase	**July 1, 2022**	**July 1 2022**	**0**	**0**
Total Duration, TO2 Mod 2	**September 1, 2021**	**July 1 2022**	**304**	

Table 1 (con't)

2 90% PHASE SCOPE OF E&D SERVICES

2.1 Project Management:

2.1.1 Project Management Plan Updates: Update project management plan and related control documents as required, originally prepared as part of **LaGov 4400010386, Task Order No. 2**. Re-baseline the design schedule for **4400020885, Task Order No. 2, Mod 2** (this Task Order).

2.1.2 General Project Management: Perform routine project management per **LaGov 4400020885 Task Order No. 2 Scope of Work** for the Period of Performance. General Project Management includes the costs for the extra $10 Million of Errors and Omissions Insurance for calendar year 2022for those sub-consultant companies to AECOM who are performing scope AECOM high risk and is flowing down the CPRA contract requirement for the insurance coverage.

2.1.3 Coordination and Review Meetings: From July 10, 2021 thru July 1, 2022, participate in a maximum of **89** coordination and review meetings with the CPRA, Project Management Team (PMT), Construction Manager at Risk (CMAR), Environmental Impact Statement (EIS) Team, Independent Cost Estimator (ICE) Contractor, Owner's Review Team (ORT), and the Mid-Breton Design Team (MBr DT). Meetings include: 60% periodic Section 408 coordination meetings; periodic H&H modeling progress meetings; coordination meetings with the MBr DESIGN TEAM about H&H modeling, major component design issues, logistics, and opportunities for sharing work done for one design that can be use to the other project; OMRR&R Plan development coordination meetings; miscellaneous stakeholder meetings; comment resolution meetings; and meetings to develop the technical approach and work plan for 90% Phase.

Table 2: Coordination and Review Meetings

Mtg. No.	Mtng. Description	No. Mtgs.	DT-Prepared Agenda/ Minutes	Remarks
2.1.3.2	Project Admin. Meetings	35	N/N	One-hour, weekly, periodic meetings to review schedule and other project management and administrative issues. The meetings will be attended by the DT Senior PM and the Deputy PM and will be scheduled to occur immediately prior to the weekly CMAR Captains Meetings. Mtgs cancelled in Mod 1.

Mtg. No.	Mtng. Description	No. Mtgs.	DT-Prepared Agenda/ Minutes	Remarks
2.1.3.3	H&H Modeling Meetings	6	Y/Y (for meetings conducted by ADT)	5 meetings to discuss methods and results of modeling performed during 90% Phase.
2.1.3.4	Permitting Coordination Meetings	4	N/N	Periodic meetings to discuss JP and CUP.
2.1.3.5	Monitoring Plan Development Meetings	4	Y/Y	Meetings with USGC, PMT, Mid-Breton Team, Tulane and TWI to further develop fixed instrumentation and boat-based sampling during diversion operations.
2.1.3.6	LADOTD (Hwy 23 Bridge) Meetings	4	Y/Y	Meetings to review milestone designs for road and bridge, Meeting to review any comments to finalize the traffic report. Mod 2 meetings to obtain feedback on design details.
2.1.3.7	NOGC (R/R Bridge) & Port of Plaquemines	4	Y/Y	Engineering support for the MOU negotiations between CPRA and NOGC regarding the R/R crossing of diversion ROW
2.1.3.8	PPG	2	Y/Y	Meetings to coordinate siphon design & O&M, also waterline along Hwy 23.
2.1.3.9	Entergy	8	Y/Y	In support of CPRA, meetings with Entergy to coordinate electrical distribution and transmission lines and poles relocations. 4 meetings for Entergy Transmission/ 4 for Entergy Distribution

Mtg. No.	Mtng. Description	No. Mtgs.	DT-Prepared Agenda/ Minutes	Remarks
2.1.3.10	Communications Lines along Hwy 23 (Sparklight/ Cable One & AT&T)	2	Y/Y	In support of CPRA, it is assumed there will be two meetings with the utility owners (one per utility owner) to coordinate the relocation of their lines.
2.1.3.11	Shell (pipeline)	4	Y/Y	In support of CPRA, meetings with Shell to coordinate the design, permitting and planning for the relocation of Shell's 20-inch pipeline adjacent to the Back Levee. Mod 2 meetings to coordinate directional drilling details beneath OTF.
2.1.3.12	Other Stakeholders	2	Y/Y	In support of CPRA, potential meetings with other stakeholders such as USFWS, LA Dept of Wildlife and Fisheries and Port of Plaquemines.
2.1.3.15	OMRR&R Document Development Meetings	14	N/N	Meetings led by PMT typically every two weeks to coordinate development of Plan
Total		**89**		

Table 2 (con't)

2.1.4 NOT USED.

2.2 General Project Engineering:

Specific tasks under General Project Engineering include:

2.2.1 Task Management: Continue to perform task management during 90% Phase. Task management responsibilities are the same as those defined in the Scope of Work for **LaGov 4400013603, Task Order No. 4**.

2.2.2 CMAR Coordination: Continue to coordinate with CMAR during 90% Phase. 90% Phase tasks are:

1. E&D Functional Team Meetings
2. Captains Meetings: During 90% Phase, participate in a maximum of **45** periodic Captains Meeting .

3. Review CMAR In-progress designs for coordination with designs of permanent works, both revisions to their 60% designs and the development of the 90%-level designs, drawings and DDR sections for the temporary works.

2.2.3 Miscellaneous Tasks in Support of CMAR:

1. 60% & 90% Draft Deliverables Compilation. This task's scope is increased to include coordinating with CMAR for compilation of CMAR plans, technical specifications, computations, and DDR sections into the 90% Draft Deliverables at the end of the Period of Performance of 90% Phase. Review CMAR documents for completeness and consistency with the permanent works deliverables.
2. 60%-90% Technical Specifications Collaboration. This task's scope is increased to include collaborating on the advancement of the technical specifications to the 90% level of completion, considering CMAR technical requirements and constructability and construction administration and monitoring recommendations. CMAR and its engineers are responsible to provide written comments on the in-progress specifications in their working electronic copies, which the ADT and PMT will review and consider. ADT will comment on the CMAR and its respective engineers of records' specifications for the temporary works. Participate in twice weekly technical specifications functional team meetings to address and resolve comments.
3. 60%-90% Drawings Collaboration. This task's scope is increased to include reviewing in-progress 90% drawings with the CMAR at weekly drawing review meetings. CMAR and its engineers are responsible to provide written comments on the in-progress drawings in their electronic pdf copies, which the ADT and PMT will review and consider. ADT will comment on the CMAR and its respective engineers of records' pdf in-progress drawings for the temporary works.
4. 60% & 90% Draft Submittal Summary Presentation for ICE. Prepare and present in a one-day meeting a summary of the design changes and advancements since the post-60% Snapshot. The CMAR will present the design changes and advancements of their major temporary works.
5. CMAR Headworks Excavation Dewatering System Design Consultations for Predicted Offsite Settlements. During 90% Phase, review and provide input into the CMAR's analyses and design of its Headworks Dewatering System with regard to offsite settlements induced by the system:

    - CMAR groundwater model setup. Review and provide input on the soil stratigraphy and soil properties CMAR is modeling, boundary conditions they incorporated.
    - Review and comment on the CMAR groundwater model results and CMAR-computed ground settlements. The DT may perform alternate modeling for comparison purposes and the CMAR EOR's consideration.
    - Consult with the CMAR's engineers designing the system on the feasibility and effectiveness of a slurry seepage reduction wall around the perimeter of the excavation. Provide an opinion about its predicted effectiveness in mitigating offsite settlements.
    - Collaborate with CMAR's engineers to evaluate the impact(s) of CMAR proposed dewatering system's slurry wall on permanent structures' foundations, specifically groundwater billowing/mounding. Collaborate with CMAR to evaluate incorporating design improvements to the proposed slurry wall to mitigate this phenomenon. The CMAR's engineers will perform the designs and the DT will review them.

- Provide professional opinions on layout and scope of potential further groundwater pump testing and groundwater monitoring that the CMAR may perform to obtain additional subsurface data that would be useful in more accurately calibrating and validating the CMAR's groundwater models.
- Provide recommendations for installation of piezometers within and near the Headworks; review field data obtained from piezometer monitoring.
- Review CMAR-collected piezometer data. The CMAR will install all field instruments and collect readings and process data in format that helps DT to efficiently evaluate collected data.

2.2.4 90% General Civil, Geotechnical and Headworks Engineering & Design:

1. Project Design Criteria Update for 60%-90%: This task's scope is expanded to include updating criteria as required for the 90% Phase as appropriate. Include criteria for the bulkhead gate internal sluice gates, if included in project scope.
2. 60%-90% General Civil Engineering: This task's scope is expanded to include performing the following during the 90% Phase:
   - Finalize overall site layouts in coordination with CMAR.
   - Finalize site plans. Include the new bulkhead gate structure, reduction in size of diversion, modifications to the NOGC R/R bridge alignment resulting from gate change, shift of the diversion c/l to the north, and removal of the safe house.
   - Complete drainage maps for inclusion in the drawings
   - Update designated soil stockpiling locations and extents, in coordination with CMAR. CMAR will determine locations within the project's ROW limits.
   - Finalize clearing and grubbing extents. Address disposition of cleared and grubbed vegetation in coordination with CMAR.
   - Finalize demolition drawings.
   - Finalize layouts of permanent Access Roads. Coordinate with CMAR on construction access routes to site and temporary haul routes within the project work limits.
   - Finalize required modifications to grading of existing drainage ditches.
   - Finalize requirements for truck wash racks on site drawings.
   - Finalize fencing drawings.
   - Finalize signage drawings.
   - Finalize typical details associated with Storm Water Pollution Prevention measures.
   - Update General Drawings-notes and index sheets.
   - Specify the construction sequencing constraints, which will be prescribed to the Construction Contractor (CMAR), in the Special Provisions of the Technical Specifications and referenced on the drawings. These constraints will communicate the imposed requirements on activities such as the progression of excavations and backfilling and the maintenance of the pre-project authorized level of flood protection through the sequence of construction.
   - Develop the civil/site and earthwork technical specifications to a 90% level.
   - Develop the temporary flood protection specification to a 90% level.

- Include emergency closure plan requirements for inclusion in the Special Provisions of the Technical Specifications.
- Prepare maintenance of drainage requirements for inclusion in the Technical Specifications.
- Update quantities for 90% cost estimate.

3. 60% & 90% General Geotechnical Engineering & Geotechnical Engineering Report (Final Draft):

This task's scope is modified to include completing the 90%-level geotechnical engineering and the Geotechnical Data Report (Final Draft). The task also includes finalizing and submitting the Wick Drain Test Embankment Program's data and interpretive reports, which was delayed in order to begin addressing the geotechnical aspects of the additional VE opportunity accepted by CPRA in late February 2021 to change the Conveyance Channel side slopes to 1v:7h.

90%-Phase General Geotechnical tasks include:

- Responding, resolving and incorporating ORT, CPRA, SAR and USACE comments on the DDR geotechnical section and technical appendices and data report.
- Reviewing the CMAR's 60% Construction Schedule with assistance from the CMAR and identifying differences between the construction sequencing and durations shown therein compared to the assumptions made for: staged construction analyses of the U-frame and Diversion Gate Monolith, the settlement analyses at the Mississippi River Levee tie-in t-walls, the railroad bridge and spur, the Inverted Siphon; and in general floodwall-earthen levee tie-ins and Settlement-Induced Bending Moment (SIBD) analyses of pile-supported structures. If in the opinion of the DT, the differences will require either or both redesign of structures and changes to the CMAR's sequencing and durations, prepare a memorandum documenting the findings and opinions and predicted schedule impacts to 90% Phase tasks. Work collaboratively with CPRA, PMT and to develop a path forward.
- Confirming backfill requirements and sequencing constraints for the backfilling of the Headworks Excavation, modifying them as needed to conform to resolutions of review comments by ORT and/or USACE on the 60%-Phase deliverables.
- Analyzing and Designing the modifications to the layout of the Deep-Mixing Panels at the Headworks Discharge Transition Walls to accommodate the change in the transition geometry and grading.
- Performing a FLAC analysis of the modified Headworks Discharge Transition Walls for global stability and settlement, using the CMAR's 60% construction schedule for sequencing durations.
- Re-designing, if needed for change to the 1h:7h slope in Channel, the DMM for the inlet and outlet structures and tie-in walls at the Siphon.
- Finalizing geotechnical analyses for the T-walls beneath the Hwy 23 Bridge, including addressing downdrag settlement of the bridge foundations by fill placement for the channel and hurricane/guide levee construction.
- Finalizing geotechnical analyses and recommendations for Hwy 23 Bridge, roadway and side access roads.

- Coordinating with the CMAR on their preferred sequencing with the cofferdams for the bridge piers and the adjacent earthen preloading/surcharging of the approach embankments.
- Finalizing geotechnical analyses and recommendations for NOGC R/R Bridge, approaches, track embankments, and emergency access routes from the MRL crown.
- Finalizing designs and sequencing requirements for the drainage canal closures by the hurricane/guide levees and the OTF guide walls.
- Finalizing the geotechnical design of the Mississippi River Permanent Protection Dolphin Cell.
- Providing input on construction requirements for the tie-ins of the NOV-NF-W-05a.1 Levee to the Hurricane/Guide Levees.
- Specifying sequencing requirements for the construction of the Hurricane/Guide Levees adjacent and within footprint of the CMAR's temporary MRL and its slurry wall around the Headworks Excavation.
- Specifying the requirements of the DMM validation process and acceptance criteria.
- Specifying quality requirements for DMM used as local shoring at the Inverted Siphon.
- Finalizing pile capacity curves pre-load testing using the latest strength lines.
- Finalizing Pile Head axial deflection versus axial load curves, generated from T-Z analyses
- Finalizing Pile Head lateral load versus Moment, Shear, and deflection graphs generated from P-Y analyses.
- Finalizing at pile-supported structures-to-earthen embankment transitions analyses for settlement-induced bending moments and shears in battered piles supporting the permanent works.
- Finalizing layouts of underseepage cut-off/reduction walls.
- Finalizing lateral earth pressure recommendations.
- Finalizing Backfill and compaction recommendations, including recommendations for blending of earthen materials.
- Finalizing geotechnical recommendations for the Reservation Area and its facilities.
- Finalizing geotechnical recommendations for the two boat launches.
- Finalizing geotechnical recommendations for the permanent access roads.
- Finalizing geotechnical analyses and recommendations for the DMPAs, including the landside, designated stockpile area option.
- Periodic, "over-the-shoulder" geotechnical reviews of CMAR designs and analyses for the temporary works for the purpose of assessing their impacts on the permanent works, including the finished site grading. The CMAR's engineers will perform their own QA/QC.
- Providing input into the Special Provision of the "Upfront" Specifications that specifies construction sequencing requirements and constraints so that the CMAR's means and methods do not result in the temporary or permanent reduction in the level of safety of the flood risk reduction systems and do not conflict with the geotechnical bases of the DT designs of permanent works.

4. 90% Headworks, U-frames: During 90% Phase, perform the following:

- Respond, resolve and incorporate ORT, CPRA, SAR and USACE comments on the DDR sections pertaining to the U-frames, structural computations, drawings and related technical specifications.
- Review CMAR's 60% construction schedule; evaluate their concrete pour sequence and schedule conforms to the basis of design of the U-frames.
- Finalize pile size and section and pile foundation layout.
- Standardize pile head connections to the base slab with the pile head connection system used for the Gate Monolith.
- Finalize planned joint locations.
- Finalize layout of underseepage and scour protection sheet pile walls.
- Confirm the design scour hole depth the scour protection sheet pile wall at the river intake entrance must protect against.
- Detail reinforcing steel and embedments.
- Provide and detail embedded steel nosing armoring at pier ends.
- Detail waterstops at expansion joint locations, standardizing details with other concrete structures.
- Detail walkways and handrail on top of walls. Detail access to walkways from R/R bridge. Security gates may be required. Provide walkway lighting to end of walkway at river.
- Confirm the U-frame supporting the railroad bridge spans is designed for all environmental design conditions with and without bridge being installed. It has not been decided that the bridge across the diversion will be constructed as part of this project and may be done later, after the diversion is completed and operating.
- Confirm the U-frame structural design lateral earth pressure loads are for the soil backfill specified against the U-frames.
- Confirm with geotechnical engineers total amount of predicted settlement of U-frames. Add an overbuild of the walls to account if CPRA concurs.
- Confirm specified pile lengths match latest pile capacity curves.
- Specify on drawings extent of protective coatings for pilings and sheet piling according to recommendations of the Corrosion Study.
- Include in drawings settlement markers/ "tell-tales" for future monitoring of U-frame settlement.
- Design and detail the storage supports for the removable NOGC R/R bridge span. Coordinate with rail bridge engineers.
- Participate in establishing the cast-in-place concrete mix design, placement, and curing requirements for the U-frame concrete.
- Provide input into the technical specifications pertaining to the U-frame construction, including the Special Provision specifying construction sequencing requirements and order of work.
- Advance the U-frame drawings to 90%-level of completion.
- Update quantities for 90% cost estimate.

5. <u>90% Headworks, MRL Tie-in Floodwalls</u>:
   - Respond, resolve and incorporate ORT, CPRA, SAR, USACE and CMAR comments on 60% deliverables.

- Finalize the designs of the floodwalls connecting the U-frame to the MRL earthen embankment.
- Coordinate the finalization of the support/bearing details for the emergency access ramps supported by the T-walls.
- Provide input into the standardization of pile head connector details.
- Confirm specified pile lengths match latest pile capacity curves.
- Specify on drawings extent of protective coatings for pilings and sheet piling according to recommendations of the Corrosion Study.
- Finalize T-wall structural details.
- Confirm structural backfill requirements shown on drawings and/or specified in technical specification match geotechnical recommendation.
- Include in drawings settlement markers/ "tell-tales" for future monitoring of T-wall settlement.
- Provide input into the technical specifications pertaining to the T-wall construction, including the Special Provision specifying construction sequencing requirements and order of work.
- Advance the T-wall drawings to 90%-level of completion.
- Update quantities for 90% cost estimate.
- Barge impact protection monopiles in front of the walls are removed from project scope.

6. 90% Headworks, Steel Bulkhead Gate. During 90% Phase, perform the following:
   - Respond, resolve and incorporate ORT, CPRA, SAR, USACE and CMAR comments on 60% deliverables.
   - Design the "dogging" devices and detail on drawings. Confirm locations of devices meets requirements of gate operations for base flow conditions. Coordinate with numerical hydraulic modelers and engineers writing the OMRR&R Plan.
   - Design bulkhead framing connections and detail on drawings. Specifying weld non-destructive testing requirements on drawings.
   - Detail water seals and bearing bars. Confirm details prevent seals from being over-compressed. Confirm durometer hardness specified for seal rubber is appropriate for design head conditions.
   - Finalize gate wheel details. Coordinate finalization of gate wheel details, water seal details and bearing bar details with guide slot details. Coordinate with engineers writing OMRR&R Plan to include painting schedule and maintenance requirements for wheels.
   - Detail bulkhead lifting eyes. Coordinate with crane manufacturers to confirm lifting eye dimensions will accommodate their furnished lifting hardware.
   - Investigate whether eye hooks are needed for tether lines to assist in bulkhead stabilizing when installing and removing bulkheads during design wind events.
   - Confirm gate monolith embedded bearing plates in slab match locations of bulkhead support stanchions.
   - Confirm corrosion protection measures specified and shown on drawings conform to recommendations of corrosion study.
   - Confirm bulkhead design and details are appropriate for fatigue considerations arising from gate vibrations.

- Finalize drawings showing proper bulkhead stacking and storage arrangements in the guide slots and beneath the storage platform.
- Provide input into the technical specifications pertaining to the bulkhead gates fabrication, installation, and testing, including the Special Provision specifying any construction sequencing requirements and order of work constraints.
- Advance the bulkhead gate drawings to 90%-level of completion.
- Recompute gate weight after detailing gate to 90%-level and confirm lifting capacity specified for RMGC is adequate.
- Additional bulkhead gate structural and mechanical design scope is specified in **Section 2.2.2.23**.
- Update quantities for 90% cost estimate.

7. 90% Headworks, RMGC:
   - Respond, resolve and incorporate ORT, CPRA, SAR, USACE and CMAR comments on 60% deliverables.
   - Finalize the RMGC performance specification in collaboration with CMAR, confirming. the crane travel ranges and speeds, lifting capacity, environmental (weather) operating conditions, rail gage, power sources, redundant mechanical and electrical and control systems, operator's cab (including climate control requirements inside cab), access, spreader/lifting beam, wind shields (if any), and stowage/tie-down. The crane's power source will be redundant diesel generators mounted onboard.
   - Coordinate stowage/tie-down anchorages/embedments with gate monolith designers to confirm necessary clearances are provided and concrete finished elevations specified are sufficiently stringent.
   - Coordinate with gate monolith designers and crane manufacturers about procedures for lifting of bulkheads during design operating wind event. The goal is to have a carefully specified sequence of installation and removal in operating winds such that the bulkheads do not sway significantly enough to make installation and storage difficult and unsafe. If tethers are necessary to attach to bulkhead(s), coordinate with crane manufacturers about their provision of a winch system to stabilize the bulkheads. Proper coordination may require some or all of the following:
     - Providing crane manufacturer sketches/drawings showing range of lifting, controlled lateral movement requirements and requirements to lower of bulkheads into guide slots, including maximum permitted range of sway of bulkheads in wind.
     - Providing design wind pressures for all directions (wind rose-style diagram). Consider change in direction of tether lines and need to manually adjust or relocate tether lines.
   - Finalize the mechanical, plumbing, electrical, and instrumentation system design for onshore diesel storage and transfer to the crane's onboard fuel storage tanks and the electrical power distribution for charging of the crane's ancillary systems (e.g., batteries).
     - Confirm locations of equipment to structural engineers designing their foundations.
     - Coordinate with civil/site engineers on spill containment requirements for fuel transfer from delivery truck to storage tanks.
     - Advance the drawings and technical for fuel storage and transfer equipment to 90%-level of design.

- Update quantities for 90% cost estimate.

- Coordinate with CMAR on RMGC delivery, erection, and testing procedures and crane manufacturer's responsibilities thereto, and time allowed in performance specification for completing.
- Finalize the RMGC's rail specifications (part of performance specification).

8. 90% Headworks, (Diversion) Gate Monolith, Platform, & Maintenance Bridge:
   - Diversion Gate Monolith:
     - Confirm deck area is sufficient for personnel to be positioned to safely install, remove, and store the bulkheads, and enlarge if needed. Coordinate with bulkhead gate designers, engineers developing RMGC performance specifications and engineers writing the OMRR&R Plan.
     - Finalize designs and detailing of guard rails at edges and removable grating over slots. Where railings are removable, they shall be laid out so that a single individual can remove the railings when needed for installation and removal of the bulkheads. Address break in railing where outside wall walkways adjoin deck.
     - Provide top-side lighting so the crane can be operated, and the bulkheads installed and removed at night.
     - If the RMGC will ride on rails in slots in the gate structure's operating deck, provide drainage outlets for the slots if recessed.
     - Coordinate with engineers preparing the RMGC guide specification and include rail stops if needed or required by crane manufacturer.
     - Locate and specify a wind speed and direction gage on deck and can be read on site from deck and remotely relay wind data securely to CPRA.
     - Detail guide slots including frame portion that extends above top of deck. Specify painting requirements.
     - Finalize design and detailing of reinforcing steel and embedments.
     - Review CMAR's 60% construction schedule; evaluate their concrete pour sequence and schedule conforms to the basis of design of the gate monolith.
     - Finalize pile size and section and pile foundation layout. Investigate standardizing pile sizes with the U-frame piling.
     - Standardize pile head connections to the base slab with the pile head connection system used for the U-frame.
     - Finalize planned joint locations.
     - Finalize layout of underseepage sheet pile walls.
     - Provide and detail embedded steel nosing armoring at pier ends.
     - Detail waterstops at expansion joint locations, standardizing details with other concrete structures.
     - Confirm details for walkways and handrail on top of walls are standardized for project. Provide walkway lighting.
     - Confirm the gate monolith structural design lateral earth pressure loads are for the soil backfill specified against the U-frames.
     - Confirm with geotechnical engineers the total amount of predicted settlement of gate monolith. Add an overbuild of the walls and piers to account if CPRA concurs.
     - Confirm specified pile lengths match latest pile capacity curves.

- Specify on drawings extent of protective coatings for pilings and sheet piling according to recommendations of the Corrosion Study.
- Include in drawings settlement markers/ “tell-tales” for future monitoring of gate monolith settlement.
- Participate in establishing the cast-in-place concrete mix design, placement, and curing requirements for the gate monolith concrete.
- Provide input into the technical specifications pertaining to the gate monolith construction, including the Special Provision specifying construction sequencing requirements and order of work.
- Advance the gate monolith drawings to 90%-level of completion.
- Update quantities for 90% cost estimate.

- Storage Platform:
  - Finalize the design and detailing of the storage platform.
  - Design at-grade foundation for storage of extra set of bulkheads. Provide a bulkhead stacking/storage arrangement drawing, including blocking details. Confirm bulkheads can be readily removed from beneath the platform for onsite maintenance, such as painting.
  - Coordinate with CMAR and DT engineers writing OMRR&R Plan development of procedures for transporting the spare bulkheads to the slots on the riverside of the R/R bridge for installation for maintenance dewatering of an intake bay. The bulkheads must be transported or lifted across the NOGC rail line and the MRL, placed on a barge and installed by barge-mounted crane.
  - Review the CMAR’s 60% construction schedule and consult with geotechnical engineers to confirm whether CMAR’s schedule and sequence of construction will not result in total settlement or differential settlements between the platform and the gate monolith that will adversely affect RMGC performance and/or cause the crane manufacturer’s warranty to be voided. If the DT’s opinion is that adverse impacts will occur, prepare a memorandum to CPRA explaining the issues and the required changes to the construction sequence.
  - Complete design and detailing of the electrical room and fuel storage for RMGC.
  - Provide input into the technical specifications pertaining to the storage platform construction, including the Special Provision specifying construction sequencing requirements and order of work.
  - Advance the storage drawings to 90%-level of completion.
  - Update quantities for 90% cost estimate.
- Maintenance (/Access) Bridge:
  - Finalize the bridge design according to the design criteria in 60% DDR, Appendix A.
  - Detail the deck and pile cap reinforcing steel, bearing seats, and approaches.
  - Revisit traffic guardrail design and confirm whether integrated jersey-style barriers are appropriate.
  - Provide a pile-supported approach slab(s) and a transition slab from grade to the outer-most pile cap on each side of the diversion.

- Consult with geotechnical engineers that lightweight fill is not needed for the road embankment adjacent to the approaches. Coordinate roadway with civil/site engineers.
- Consult with CPRA whether bridge lighting is desired and include in the 90% plans and specifications accordingly.
- Advance the drawings to the 90% level of completion.
- Participate in finalizing technical specifications, in particular to confirm whether DOTD specifications and pay items are going to be followed. Reinforcing steel will not be detailed to the "shop drawing" level with bar charts shown on drawings. Confirm whether a special provision needs to be added to the specifications to modify the bridge measurement and payment items to reflect.
- Update quantities for 90% cost estimate.

- Miscellaneous equipment pads at grade:
  - Finalize the location and sizes of any equipment pads needed for tanks, pumps and motors for storage and transfer of diesel fuel to the RMGC's onboard storage tanks.
  - Advance the drawings and technical specifications.
  - Update quantities for 90% cost estimate.

9. 90% Headworks, Transition Walls:
   - Redesign the T-wall monoliths for the 1v:7h transition and revised DMM panel arrangement.
   - Consult with geotechnical engineers on their predictions of settlement induced bending of T-wall piles.
   - Confirm with geotechnical engineers:
     - Presence and magnitude of unbalanced loads for revised wall layouts
     - Lateral earth pressures to be used for wall designs.
     - Predictions of settlement induced bending of T-wall piles. For shorter height walls, consider use of vertical piles with fixed head connection or piles with steeper batters than typical to reduce the bending moments in pile while meeting criteria for lateral displacement and rotation.
   - Detail the transition to the earthen hurricane/guide levee embankment.
   - Provide settlement markers on the T-walls for settlement monitoring.
   - Advance the drawings to the 90%-level. Use joint pile head connection, sheet pile embedment details and reinforcing steel arrangement consistent with the other T-walls on the project.
   - Specify protective coatings and their extents for sheet piling and piles according to recommendations of corrosion study.
   - Review and provide input into the technical specifications relevant for T-wall construction.
   - Update quantities for 90% cost estimate.

10. 90% Headworks, (Mississippi River Permanent) Protection (Circular) Cell:
    - Finalize design of permanent structural components of the cell: reinforced concrete ring and supporting piles, permanent in-fill, cell cap, and protective coating system. Confirm whether access hatch will be installed in concrete cap.

- Include ATONS on cell and paint striping and/or light reflectors. Coordinate with MNSA and Coast Guard.
- Coordinate with engineers developing diversion Monitoring Plan to confirm whether instruments will be installed and need to be accessed to measure river flows.
- Advance drawings and technical specifications to 90% level of completion. Specify protective coating system for sheet piles and its extents in accordance with corrosion study. Provide cathodic protection system if study recommends.
- Update quantities for 90% cost estimate.

11. 90% Headworks, ATONS (at River Intake): Consultations with U.S. Coast Guard (USCG) were delayed during 60% Phase. During 90%, consults with MNSA and USCG and lay out and specify ATONS to be placed on the permanent river structures. The CMAR is responsible for ATONS for the temporary structures. ATON lights will be powered by solar panels and/or batteries.
    - Finalize schematic drawing(s) showing the ATONS at the River Intake for diversion operations, including any needed on the protection cell and dolphin in the river.
    - Prepare technical specification for ATONS to a 90%-level.
    - River Intake Operating Warning System: The system components shall be located to be accessible by walkway for inspection and periodic maintenance. The warning system will be included in the OMRR&R Plan documents at the 90%-level of completion.
        - Meet with CPRA Operations and incorporate their feedback for the proposed warning as discussed in the 60% DDR. Incorporate CPRA feedback. Establish procedure and criteria for its use for opening and closing the diversion gates. Along with the engineers writing the OMRR&R Plan, meet with MNSA and Coast Guard to obtain input and modify procedures and equipment accordingly.
        - Prepare a schematic drawing showing the system components.
        - Prepare technical specification(s) to a 90% level of completion. The system components shall be located to be accessible by walkway for inspection and periodic maintenance. The warning system will be included in the OMRR&R Plan documents at the 90%-level of completion.
        - Participate in OMRR&R Plan development meeting(s) during which ATONS are addressed and provide input. Review the Plan document ATONS section and provide comments.

2.2.5 90% Special concrete mix design(s):

- Submit the Concrete Abrasion Study, final version. No comments were provided on the draft version the DT submitted during the 60% Phase, so DT shall submit the draft version as the final version.
- Prepare and submit to CPRA a mix testing report summarizing the concrete mix design tests, numerical heat modeling results, opinions, and recommendations, including scope of recommended additional mix designs to be tested, any recommended changes to the test procedures based on lessons learned during the first round of testing, and any additional, recommended numerical modeling to be performed during 90% Phase. The report should explain the purpose, goals, and benefits to CPRA of the recommended

additional tests and modeling. Include input from the CMAR's SME on mix design. Solicit and consider input from the engineers designing the various mass concrete structures.

- The CMAR will contract separately with CPRA to perform the additional tests and sampling and collect the data.
- The DT SME shall be on site for the additional tests.
- The results of the additional tests and additional numerical modeling shall be added to the testing report as an addendum. The addendum shall include recommendations for acceptable mix designs to be included in the cast-in-place concrete specification, curing procedures, temperature measurements to be taken during placement of mass concrete during construction, requirements to be included in the specifications to address any contractor-proposed deviations from the approved mix designs and constituent materials used in tests, and recommendations for onsite trial placements of the concrete prior to placement of production concrete. The report should also identify contractor responsibilities for placement and workability.
- Respond, resolve and incorporate review comments on report addendum.

2.2.6 90% Conveyance Channel and Guide Levees. This scope item is for E&D of the 1v:7h trapezoidal Conveyance Channel from the end of the Headworks Discharge Transition Segment to the Outfall at the existing Back Levee. Specific Conveyance Channel features included under this scope item include: channel and earthen guide cross-sections, benches and stability berms; wick drain system details, including drainage blanket and seepage cut-off plug; T-wall segments beneath Hwy 23 Bridge; Timber Canal Closures; Back Levee Canal Closures; tie into the new NOV-5a Levee; ties into the existing Back Levee. A ramp over the upriver guide levee for boat launch in the Conveyance Channel may also a Conveyance Channel and Guide Levee feature. The tie-in T-walls at the Siphon are scoped under "Interior Drainage". The 60% designs of the tie-in T-walls under the Hwy 23 Bridge are scoped under "Hwy 23 Bridge and Detour and T-walls beneath Bridge". 90% E&D tasks are:

- Revise all Conveyance Channel civil/site drawings and layouts of floodwalls for the 1h:7h Conveyance Channel, including cross sections showing construction and design grades for benches, embankments and stability berms along the length of the Conveyance Channel, detailed grading plans at T-wall transitions, including pre-loads.
- Complete civil/site designs and drawings of intersecting canal closures (i.e., Timber and Back Levee Canals) and sequencing of their construction.
- Complete drawings for sequencing of construction of levee embankments to achieve required seepage cut-off.
- Complete investigation of channel armoring system alternatives and revise drawings if appropriate. Finalize armoring and turf details. Show Hwy 23 Bridge piers and scour protection armoring in the drawings. Coordinate with Hwy 23 Bridge DT in this regard.
- Finalize grading plans for tying in Guide Levees to the new NOV-NF-W-05a.1 Levee.
- Finalize grading plans for tying in Guide Levees to existing Back Levee. Address armoring requirements at the tie-ins.
- Develop 90%-level technical specification.
- Update quantities for Early Works Pricing and 90%.
- Prepare a material allocation table for inclusion in the 60% Plans.

2.2.7 90% Outfall Transition Feature (OTF). 90% E&D tasks are:

- Verify the toe sheeting's design is sufficient for any updated scour hole depth prediction that may be developed as part of the three-component modeling and LaVeg modeling.
- Finalize the analyses and designs of the OTF braced sheet pile guide walls.
- Confirm the designs of the toe sheeting and a braced sheet pile guide wall consider the CMAR's means and methods to position floating plant to construct these walls.
- Finalize selection of the OTF armoring system and update layout, details and specifications if appropriate. Confirm the OTF armoring is sufficient for the revised storm surge modeling propagating into the OTF and Conveyance Channel.
- In coordination with CMAR and Shell Pipeline, confirm the layout and CMA design of the proposed dredge access channel from Barataria Waterway to near the Outfall. Channel would be used by both CMAR and Shell to deliver equipment and materials for Conveyance Channel construction and petroleum pipeline relocation, respectively. Include requirements in the P&S for backfilling any channel that crosses the OTF footprint.
- Coordinate Placement of permanent, fixed monitoring station near OTF discharge.
- 90% Design of Horn Warning System in OTF.
- Develop 90%-level drawings and technical specifications. Drawings will show the geometry of the Outfall Transition Feature, toe sheeting layout, Sheet Pile Guide Wall layout, and armoring extents. Cross-sections shall be prepared. Armoring details shall be presented. Structural details of sheet pile anchor connections shall be started. Tie-in details of transition from fully earthen guide levee to sheet pile wall shall be developed.
- Perform quantity take-offs for 90% estimate.

2.2.8 60%-Final Hwy 23 Bridge:

Specific 90%-Phase E&D Tasks include:

- Complete and submit draft and final versions of 60% Final (Bridge and Roadway) Plans, including permanent drainage modifications along Hwy 23. Coordinate with CMAR on temporary drainage to confirm there are no confirmed with Hwy 23 phasing or design.
- Raise the bridge foundation pile caps beneath the Conveyance Channel Slopes and top bench according to DOTD acceptance of this raise that was given during 60% Phase.
- Reference DOTD specifications in the corresponding project technical specifications. Perform coordination check of plans and specifications so it is clear which items of work and their limits are to be furnished and constructed/installed according to DOTD requirements.
- Respond, resolve and incorporate ORT and DOTD comments on 60%-Final Submittal.
- Perform 90%-Final-level engineering and design of the Bridge and Roadway and prepare 90%-Final plans and specification according to LADOTD Project Delivery Manual, 2013 and the requirements of LADOTD Bridge Design and Evaluation Manual, Part I-Policies and Procedures, Chapter 3, Appendix K and other applicable LADOTD EDSMs, Standard Drawings and Details.
- Complete construction phasing drawings to a 90%-Final level of completion.
- Complete roadway and drainage details to a 90%-Final level of completion.

- Complete Water Line tap/tie-in details and bridge support details to a 90%-level. Develop water-line tap and tie-in specifications to a 90%-level of completion.
- Respond, resolve and incorporate ORT comments on 90%-Final Submittal. Submit 90%-Final to DOTD. Resolving DOTD comments will occur in future phase of E&D.
- Confirm 60% designs of T-walls beneath Hwy 23 Bridge and their tie-ins. Revise foundation designs as needed. Advance T-wall Plans and technical specifications to a 90%-level of completion. Include tie-in details and pre-loading requirements.

2.2.9 90% New Orleans Gulf Coast (NOGC) Railroad (R/R) Bridge and Temporary Spurs and Emergency Access Ramps: The scopes of 90%-Phase E&D tasks are based on the layouts shown in the 90% Drawings.

- Perform a 90%-level design of the railroad bridge crossing the Diversion Intake and its approaches, in accordance with Union Pacific and American Railway Engineering and Maintenance-of-Way Association (AREMA) standards. The permanent river boat launch crossing of the tracks (design by Secondary Site Features Design Team) will be at grade. Identify the specific location of the required track switch and frogs.
- Perform a 90%-level design of the temporary spurs in accordance with Union Pacific and American Railway Engineering and Maintenance-of-Way Association (AREMA) standards. The spurs shall remain in service continuously while the existing rail line is temporarily out of service for project construction. Include cross drain pipes and swales for drainage, coordinating with drainage engineer.
- Perform 90%-level designs of the emergency access ramps from the MRL levee crown to the R/R bridge. Detail security gates, including specifying requirements for locks and access. Detail the access route crossing of the tracks on the bridge and the concrete panels which will serve as the driving lane for vehicles.
- Detail the bridge, approaches, spur and emergency access ramps to a 90%-level of completion.
- Provide input into emergency evacuation procedures and notification protocols for inclusion in the OMRR&R Plan.
- Develop plans and specifications to a 90%-level of completion.
- Update quantities for EW and 90%.

2.2.10 90% Site (Interior) Drainage and Inverted Siphon:

- 90% Site (Interior) Drainage:
  - Review water gage data and improve calibration of area-wide H&H model.
  - Confirm and Complete the H&H designs of the new drainage ditches, canals, and culverts needed to drain the diversion facilities and convey flows to and from the siphon and New Timber Canal, which will be constructed by others as part of NOV-NF-W-05a.1 Project.
  - Consult on the specification of the flap valves for the drainage structure in the NOV-NF-W-05a.1 Levee north of the diversion. The flap gates must not unduly impede water conveyance through the structure because the weight of the gates prevents gates from opening sufficiently to pass flows.

- Provide input into operations procedures for the Siphon sluice gates for inclusion in the OMRR&R Plan.
- Develop maintenance procedures to clean the inverted siphon(s): Start developing plan to clean the siphons of accumulated, deposited sediment and conceptually design these alternatives. Prepare a memorandum recommending method to be used. Participate in 1-2 meetings with PPG or CPRA Operations to select the maintenance method. Once CPRA has selected the maintenance method, prepare maintenance procedures documentation for inclusion in the OMRR&R Plan.
- Site Drainage Report: The Drainage (aka, HMIA) Report, Final Version, will be part of the submission of the CUP permit application. Respond to comments on the report that may be received as part of the CUP application review.
- Related Site (Interior) Drainage Tasks. For the permanent works:
  - Design the permanent drainage ditches along the proposed railroad spurs, and the perimeter of the Diversions permanent ROW.
  - Design hydraulic modifications to the existing ditches and culverts at Hwy 23 at the new bridge over the diversion in accordance with DOTD standards. The CMAR's engineer will design the temporary drainage for construction.

- <u>90% Inverted Siphon Civil, Structural & Electrical Designs</u>.
  - Advance to a 90%-level the structural designs of the siphon inlet and outlet structures and adjoining floodwalls. Finalize foundation designs and reinforcing steel requirements. Participate in the standardization the pile head connections across the project. Provide input on the pile load test program development. Coordinate the pile layouts with the DMM panel layouts.
  - Advance the designs of the maintenance bulkheads and detail bulkhead slots and embedments. Confirm where bulkheads will be stored. Design any storage structures or facilities will be designed after the 60% Phase
  - Confirm sluice gate selection and specify them in the Technical Specifications.
  - Design the maintenance bridges for an AASHTO design Highway Truck and for a long-arm excavator with outriggers to operate from the bridge, a jib crane to install maintenance bulkheads and remove sluice gates for maintenance, as well as for highway trucks crossing the bridge.
  - Begin designing the bar screen at the inlet. Investigate bar screen opening size in consultation with CPRA Operations and PPG to reduce clogging of screens from accumulated water lilies.
  - Confirm secondary screen locations upstream from the inlet structure to catch water lilies from being drawn towards the siphon. Detail screens to 90% level.
  - Confirm whether thrust blocks are required for siphon pipe elbows at bottom of Conveyance Channel and design and detail if required.
  - Confirm with CPRA and in coordination with CMAR use and economy of flowable fill as siphon pipe backfill and select flowable fill mix design for permeability and unit weight requirements.
  - Provide local security fencing and gates if CPRA decides the diversion complex perimeter fencing is not sufficient at the inlet and outlet structures.

- Develop 90%-level drawings. Update site plan at siphon, siphon pipe plan and profile drawings to define pipe geometry, inlet and outlet structural drawings and Tie-in T-walls. Detail reinforcing steel. Develop structural details of sluice gates, bar screens, embedments, joints, etc. Prepare dewatering bulkhead drawings.
- 90% Inverted Siphon Electrical: Detail and specify site lighting at siphon inlet and outlet structures. Sluice gates will be operated pneumatically and will not require site power. Bar screen cleaning will be done by mobile equipment. No mechanical cleaners will be specified and do not require power. Confirm any lighting calculations and select fixtures for lighting the siphon structure.
- 90% Inverted Siphon Technical Specifications: Prepare technical specifications for structural components, earthwork requirements, and power requirements.
- Update 90% DDR.
- Compute quantities for 90%.

- 90% NOV-NF-W-05a.1 Drainage Structure Civil, Structural and Electrical Designs. Perform 90% Design of the drainage structure and tie-ins to be constructed in the alignment of the NOV Levee on the north side of the diversion:

  - Respond, resolve and incorporate ORT and USACE comments on the 60% design and deliverables.
  - Confirm the designs of the structure and tie-in wall foundations account for the order of work and schedule of the USACE's NOV-NF-W-05a.1 Levee Construction relative to the Diversion's construction and its sequence and schedule of construction.
  - Confirm specification of sluice gates.
  - Detail reinforcing steel, joints, waterstops, embedments, slots, walkways, access bridges, and sluice gate operating stem access platforms.
  - Investigate need for counterbalancing the flap gates and specify requirements if needed.
  - Finalize grading and details of driving route path from the Hurricane/Guide Levee to the NOV-NF-W-05a.1 Levee and across the drainage structure.
  - Layout and specify details of site lighting at drainage structure for nighttime operations.
  - Provide input into OMRR&R Plan about the drainage structure.
  - Advance the drawings and specifications to 90%-level of completion.
  - Update the 90% DDR.
  - Compute quantities for EW and 90%.

2.2.11 90% Secondary Site Features and Site work outside of Guide Levees: Complete to a 90%-level the architectural, civil, structural, geotechnical, mechanical and electrical designs of the secondary project and site features. Finalize facility communications requirements and develop to a 90%-level of completion. This may require coordination with utilities. Advance drawings and technical specifications to a 90%-level of completion. Update the 90% DDR and compute quantities for 90%.

2.2.12 90% Phase Utility Relocations Coordination: Continue to coordinate with utility owners the planning, scheduling, budgeting, and permitting of the relocation of utilities within the project rights-of-way and temporary construction easements. Continue to support CPRA in working with utility owners to establish relocation schedules and scopes and utility owner-provided permitting documents, which may include engineering drawings for the relocations, if such owner documents

are needed as part of the Sections 408/404/10 and/or EIS. The DT shall finalize a utility disposition table that shows dispositions of the identified utilities. Utility relocation coordination requirements for construction will be included as a special provision in the specifications. Include required contact information and notification procedure in the special provision.

2.2.13 90%-Phase Design of Designated Material Placement Areas (DMPAs):

- Respond, resolve and incorporate ORT and CPRA comments on the 60% Phase design and deliverables.
- Finalize work limits of the two designated Basin DMPAs accounting for CMAR's schedule and sequencing for placement of excess materials there.
- Finalize material allocation table to be included in the 90% drawings.
- Design to 90%-level using geotechnical recommendations for DMPAs.
- Develop designs for the stockpile areas designated for Midway Cattle and Conoco Phillips properties. Design so that the stockpiles do not shed water onto adjacent properties or produce larger maximum discharge rates into nearby ditches and canals. This may limit the available footprint of the stockpiles. Layout haul routes into properties, coordinating with CMAR and property owners. Geotechnical analyses will be performed to establish maximum permissible stockpile height. The geotechnical engineer will provide settlement predictions so that the quantity of reclaimable fill can be estimated. Produce a graph that shows the estimate quantity of reclaimable fill by 12-month increments relative to completion of placement. Graph shall cover 10 years of full stockpile storage.
- Review CUP drawings.
- Respond, resolve and incorporate comments on DMPAs in the Section 408 Application and CUP application.
- Develop drawings and technical specifications to a 90% level.
- Update 90% DDR.
- Update quantities for 90%.

2.2.14 90%-Phase Updates to Rights-of-Way Plans and Shape Files: Update a maximum of two times for use by CPRA to complete land and easement acquisitions necessary for the construction, operation, and maintenance of the three major components of the project. Existing ROW boundaries and property boundaries will be provided by CPRA. The updates include updates to the property boundary lines after CPRA has provided all surveyed property boundaries.

2.2.15 90%-Phase Sections 408/404/10/CUP Permit Applications:

- Respond in DrChecks to USACE comments on the 408 Application.
- Attend a comment resolution meeting with USACE during 90% Phase after receiving all USACE comments.
- Note that if additional modeling is required to resolve particular comments, the additional modeling will be performed by modification to this Task Order.
- Prepare a drawing list for permanent works for CUP application.
- Provide a snapshot drawing set of in-progress CUP drawings.
- Attend one meeting with CPRA to review in-progress CUP drawings.
- Meet with MNSA and USCG regarding the Section 10 permit application.

- Submit draft CUP drawing package to CPRA and respond and incorporate comments. Prepare CUP application drawings and quantities for the permanent works. The CMAR will provide the same for the temporary works.
- Attend meetings with other stakeholders in support of CPRA. Periodic meetings with USACE NOD to coordinate design details is specified and budgeted under "Coordination and Review Meetings".

2.2.16 90%-Phase EIS and Public Outreach-E&D Support:

- Engineering Support for Draft EIS Public Comment Responses: Review the draft EIS document. Provide readily available information as requested by EIS Team to help them prepare comment responses. No additional modeling, designs or layouts will be required. Participate in coordination meetings to provide input into responses formulations.
- Renderings and Shape File Updates for EIS Team: Provide updated renderings and shape files for the limits of work and the three components if requested.
- EIS RFI Responses: The effort is to provide clarifications to ongoing designs of the permanent works. Review draft EIS document. Provide information to the EIS Team related to ADT analyses and designs. No additional designs or investigations will be required to provide responses. For questions related to numerical hydraulic and sediment transport modeling, it is anticipated that the LAVEG modeling will provide the modeling output information needed from the MBSD DT for the EIS. If further modeling is required, the ADT shall prepare detailed scopes and budget estimates and schedules for review and approval by CPRA prior to performing modeling CPRA may request. Adjustment to the ADT's scope, schedule and budget will be made if necessary.
- Mitigation Studies: There are no mitigation studies or conceptual designs in this Task Order's scope.
- Animated Construction Sequencing Video: No animated video will be prepared during this task order.

2.2.17 90% OMRR&R Plan:

- Respond to and resolve ORT, CPRA and USACE comments on the 60% OMRR&R Plan and incorporate resolutions into the 90% version.
- Develop the plan document to a 90%-level of completion. Incorporate input from the designers of the diversion components on those components operations. Coordinate with the hydraulic modelers on the modeling of gate operations for various flow conditions
- Address river fuel/oil spill response procedures in the document.
- Provide input to CPRA about diversion staffing, operations budgets, and outsourcing of certain tasks.
- Meet periodically with CPRA operations staff to obtain input.
- Meet biweekly with CPRA Operations Management and PMT as 90%-level document is developed.
- Incorporate the diversion's Monitoring Plan into the OMRR&R Plan.
- 60% Diversion Commissioning Plan: Prepare a commissioning plan for the diversion.

2.2.18 Water Gages Repairs/Replacements: No scope in 90% Phase.

2.3 90%-Phase Numerical Hydraulic and Sediment Transport Modeling: Tasks are:

1. Three-component/LaVeg Modeling:
   - Three-component Modeling:
     - Revise three-component model design with 1v:7h conveyance channel and redesigned transition and quantify system headloss.
     - Redo previous model runs presented in the 60% DDR for estimates of water level and velocities at various steady state flows needed for design.
     - Redo diversion discharge rating curve using Monte Carlo type runs for variable river and basin water level conditions and river discharge.
     - Redo CSWR analysis and quantify sediment loads diverted for final design.
     - Evaluate evolution of scour hole at end of OTF in regard to development of near-field Basin scouring and deposition to determine if progressive backscour could develop from dendritic channel formation. Provide opinion of whether OTF will have to be modified during early period of operations to facilitate transition between OTF, scour hole and dendritic channels.
   - LaVeg Modeling: Perform following additional runs:
     - No dredging 50-year run. Diversion will be allowed to degrade in conveyance and sediment delivery performance over time
     - With Dredging 50-year run with updated sediment boundary condition after discussion with CPRA.
2. River Response Modeling: No additional river response modeling will be performed during 90%-Phase. Additional narrative will be added to 90% DDR to explain there is no benefit to E&D to reperform this modeling.
3. Support for OMRR&R Plan Development:
   - Base flow modeling:
     - Develop estimates of required base flow and duration to keep channel clear of deposition during MR flow below 450k cfs period
     - Evaluate reverse flow potential during period of river flow below 450k cfs.
     - Discuss with EIS team and provide any required model data if needed
     - Run scenarios with gate bay(s) partially opened to evaluate capability to incrementally adjust base flows to regulate diverted flows below 5k cfs.
     - Provide recommendations on sluice gate opening size required for designing incorporation of sluice gate openings into gate bulkheads for purpose of regulating base flows in 1k cfs increments without raising gates.
   - Operations Modeling:
     - Analysis of observed data and development of a lead time required for trigger to open gates.
     - Develop a plan where data from observed gages (Natchez, Tarbert Landing, Baton Rouge and Belle Chasse) can be assimilated in a single method that can help operation managers take real-time decisions to open/close the diversion gates given if practical at least a 7-day lead time.
     - Development of a gate sequencing plan through modeling to inform OMRRR Plan. Model data will be complimented by synthetic observed data of water levels nearfield of the

diversion in the river and the outfall to show how decisions of gate sequencing can be adapted for real time scenarios.

4. Periodic Collaboration with MBrSD Modeling Team: Continue monthly meetings and up to three additional coordination meetings.
5. Revisions to Modeling for Storm Surge Propagation Into Conveyance Channel: No further scope in 90%-Phase.
6. Additional Cloud Computing & Specialized Software license renewels. This covers 90%-Phase PoP.
7. Barataria Waterway Siltation Modeling:
    - Develop a model to simulate Barataria Waterway siltation over 50 years. Model data from current LAVEG delta building model will be used for boundary conditions.
    - Any additional modeling to devise Barataria Waterway siltation measures like placing low sills to arrest sediment delivery, building levees along east bank to keep diversion flow isolated etc. will be conducted as additional scope.
8. General:
    - Respond and resolve DT ITR, CPRA, ORT, PMT, and USACE Comments on the 60% DDR and hydraulic modeling report appendix.
    - Complete the Numerical and Physical Modeling Comparison Report. Respond, resolve and incorporate DT ITR, CPRA, ORT, PMT, and USACE Comments and issue final version of report.
    - Update the Design Criteria Document relative to numerical hydraulic and sediment transport modeling for the 90% deliverables, as appropriate.
    - Intake Transition Modeling: Redesign intake transition for 1v:7h Conveyance Channel.
    - Conveyance Channel Modeling: Rerun channel model to evaluate head loss and quantify berm deposition.
    - Modeling and Model Input Uncertainty Analysis and Discussions will be added to 90% DDR.

2.4 60%-Phase Monitoring Activities:

1. Attendance by Monitoring Plan Lead at one workshop with USGS. The attendance of the numerical modelers is scoped and budgeted under **Section 2.3**.
2. 90% Monitoring Plan Update and Related P&S:
    - Further develop both boat-based sampling and fixed instrumentation.
    - Periodically meet with CPRA, PMT and key stakeholders about finalizing what information needs to be monitored for diversion operations and permit compliance, and finalize the corresponding data that needs to be collected.
    - Research and advise on available remotely operated, unmanned vehicles that could perform some boat-based monitoring.
    - With engineers developing OMRR&R Plan, consult with USGS about sampling from the Hwy 23 Bridge deck and procedures for doing so. Consult with CPRA and finalize whether bridge will be used. Incorporate accordingly technical and safety requirements into 90% Monitoring Plan. If bridge is not going to be used, state so in Monitoring Plan.
    - Specify data reporting standards for electronic files and hard copy files. Consult with CPRA because the goal is to standardize across the organization.

- Specify laboratory and laboratory testing standards for collected sediments. The goal is for commercial labs to be able to perform the testing and to be validated.
- Detail to a 90%-level the instrument supports to be constructed by CMAR. Address access, power (solar or battery), brackets for instrument attachment, corrosion protection, signage and reflectors, and lighting/warning lights. Update the instrumentation site plan schematic. this schematic(s) in the 60% plan document. As part of this effort, address whether there is a need for an additional Mississippi River water gage near the diversion and if so propose its location. Begin developing a technical specification(s) for the fixed instruments to be installed by the CMAR. Detailing of the instrumentation supports/mounting details will be developed in a future task order. Coordinate with the MBrSD Team as the plan is progressed.
- Consult with CPRA and confirm whether CPRA wants to have CMAR purchase instruments as part of their contract or to have the instruments be furnished by CPRA for CMAR installation. If CPRA wants CMAR to purchase, consult with CPRA on contractual procedures for doing so given the goal is to obtain the latest instruments at the time installation is performed at the end of the project. Write a special provision to specify CMAR responsibilities.
- Prepare 90%-level drawings and technical specifications.
- Update 90% DDR.
- Update Monitoring Plan to 90%-level.
- Compute quantities. Obtain vendor pricing for instruments if requested by CPRA.

2.5 Additional Surveys During 90% Phase: Survey services to be performed by ADT may include miscellaneous topographical or bathymetric surveys needed to finalize existing site plans, designs and project ties into adjacent features.

2.6 NOT USED

2.7 NOT USED

2.8 Construction Phase Pile Load Test Program: Complete design and specification of the Pile Load Testing Program During Construction Phase: To a 95%-level of completion (as this will be part of EW), design and specify a pile load testing program during construction. Investigate the economy of pile testing at each of the pile-support structures where a pile load test is being considered. The testing program may include static and dynamic testing. The number, type and locations of the tests will be shown on drawings. Reaction frame concepts will be shown on the drawings. The actual reaction frames will be a CMAR design. The drawings will also show any required measures to compensate for tests performed at locations that will be later excavated. The ADT is responsible for the permanent works and the CMAR for the temporary works. Collaborate with CMAR on development of the technical specifications.

2.9 Completion of Wick Drain Test Embankment Test Program. Complete and submit data and interpretive report. Submit draft report, respond to comments, and issue final report. The report will be part of the geotechnical appendix to the DDR.

2.10 Boring Storage: Store the boring cores at Eustis' Metairie, LA facility for the Period of Performance of this task order

2.11 Engineering Support for Additional Physical Modeling: The Numerical Modeling Team Leads and DT PM will make one trip to the physical models in Holden, MA to observe testing. The physical modeler's effort is scoped under a separate task order.

2.12 60%90% Engineer's Cost Estimates (Opinions of Probable Construction Costs)

1. 60% Cost Estimate: Perform the following:
    - Organize the estimate's work breakdown structure to align with the CMAR and ICE's structure.
    - Participate in weekly estimate meetings with CPRA, PMT, CMAR and ICE.
    - Submit 60% quantities and participate in a three-day quantity reconciliation workshop.
    - Prepare an opinion of probable construction cost, updating material, labor, and equipment costs for current pricing.
    - Do not include escalation or contingency. If requested, provide an opinion on appropriate contingencies. If requested, participate in a risk register review meeting an offer opinions on assigned probabilities and costs, as well as risks that may not have been identified.
    - Participate in a three-day cost reconciliation workshop.
    - Revise 60% estimate and submit.
2. 90% Cost Estimate: 90% estimate scope during the PoP is limited to: 1) revisions to WBS of estimate if needed to align with Measurement and Payment sections of Specifications and scope changes to project; 2) compiling 90% quantities. The engineer's 90% estimate will be performed in a future phase as a modification to this task order.

2.13 Post-60% Cost Estimate Add'l VE Opps: As part of the 60% Cost Estimate's cost reconciliation workshop, additional opportunities for construction cost savings will be discussed. Some opportunities will be already planned revisions to the designs, drawings and specifications to reflect the advancement to 90%. Other opportunities could involve changes to the current layouts and designs that would require rework. The ADT shall offer an opinion of impacts to E&D scope, schedule, budget. A task order modification will be made if there are impacts. The ADT will propose a technical approach to designing and incorporating opportunities that CPRA accepts and a budget and schedule for accomplishing the work.

2.14 Early Works of Construction. Early works of construction are items of work the CMAR can complete during the first 12 months relative to receipt of the Record of Decision. The ADT shall advance the designs, drawings, and technical specifications for those items CPRA designates as Early Works. The EW deliverables are pricing documents and will not be issued as separate contract documents for construction. Construction will be performed using the issued for construction contract documents for the entire project. One deliverable will be made. There will be no ORT or USACE review of the EW deliverables. Those will be made on the project's entire 90% deliverable per the project schedule.

2.15 Corrosion Study: Review available soils testing results and water quality test results previously obtained. Perform additional soils testing for corrosion properties if needed. Prepare a report for project components with recommendations to mitigate corrosion. The report will be an appendix to 90% DDR.

2.16 90% E&D of Sluice Gates Incorporated into Gate Bulkheads. Investigate feasibility of incorporating sluice gates into the bulkheads to facilitate finer control (in increments of 1,000 cfs up to a max of 5,00o) of low flows when the river is flowing between 350,000 to 450,000 cfs. Below 350,000 cfs,

reverse flows are predicted likely to occur and the diversion will not be passing low flows to prevent reverse flow. If feasible, design and detail to 90%-level of completion as part of the 90% deliverables.

2.17 NOGC Crossing of MBSD-Engineering Alternatives Investigation and 90%-level Engineering of alternate NOGC R/R Crossing of the Diversion

1. NOGC Alternatives Crossings Conceptual Layout and Add'l Coordination with NOGC: Develop conceptual alternatives for crossing (5% level of completion). Prepare renderings. Provide support to CPRA coordinating with stakeholders.
2. 90%-level Design of At-Grade NOGC Shoo-Fly Crossing Alternative: Layout and design a 10-mph shoo-fly across the diversion located on the earth plug between the Headworks Excavation and the Conveyance Channel excavation east of Hwy 23. There will be grade separation bridges, one on each side of the diversion, between the tracks and haul routes. The ADT's scope will terminate at the south ROW boundary line. Beyond will be designed by others.

2.18 Task Order Deliverables:

1. Numerical and Physical Modeling Comparison Report, Draft and Final
2. Concrete Abrasion Study Final
3. Concrete Mix Design Testing Report Draft, Addendum Draft, and Final.
4. Two 90% revisions to ROW plans, if requested.
5. 90% Monitoring Plan
6. Wick Drain Data and Interpretive Report
7. Updated Drainage Report, if needed
8. CUP drawings for permanent works and associated quantities needed for permit application.
9. 60% Engineer's Cost Estimate, Draft and Final
10. EW Plans and Technical Specifications
11. 90% Quantities
12. 90% Draft Deliverables (Plans, Technical Specifications, DDR and appendices)
13. 60%-Final LA23 Bridge & Roadway Draft and Final Draft Plans
14. 90%-Final LA23 Bridge & Roadway Draft and Final Draft Plans

3. ASSUMPTIONS AND CLARIFICATIONS:

Key assumptions affecting the scope, budget, and/or schedule for performing 90% Phase of E&D are listed in **Table 3**:

Assumption ID	Table 3 Assumption/Clarification Description	Impacts
2.0-1	**General**: There will be no change to the MBSD Project's CMAR delivery method. The engineering, designs, and production of construction contract documents are based on the CMAR AWA JV performing the construction.	Scope Schedule Budget

Assumption ID	Table 3 Assumption/Clarification Description	Impacts
2.0-2	**General:** The CMAR will engineer and design all temporary works of construction. The DT will review the temporary designs to evaluate the designs impacts to the designs and layouts of the permanent works. The DT's review does not constitute the CMAR's QA/QC reviews, which they will perform and document prior to submitting to the DT for inclusion in the 90% Phase deliverables, or as an early construction phase contractor submittals that may be made during the E&D Phase, or as part of the Early Works Package.	Scope Schedule Budget
2.0-3	**General:** The permitting agency and stakeholder comments that may be made on the Section 408 and Section 10/404/CUP submittals will not require additional geotechnical explorations, surveys, numerical and scaled physical H&H modeling runs; redesigns of the project features; or investigations of impacts to features beyond the diversion's three major components, except to the extent specifically scoped in this document.	Scope Schedule Budget
2.0-4	**General:** The scope and schedule do not include contingencies for re-engineering or re-designs of the project features to accommodate the operations of proposed facilities at properties adjacent to the MBSD, except as specifically scoped in this document.	Scope Schedule Budget
2.0-5	**General**: Deliverables will be in electronic format only. The cost to prepare hard copies of the submittals is not included.	Budget
2.0-6	**General**: The E&D scope for 90% includes no engineering field support.	Scope Budget
2.0-7	**General:** There will be no further work involving the Hurricane/Guide Levee Risk Assessment that was performed during LaGov 4400013603 Task Order No. 4, or USACE reviews of the assessment's report.	Scope Budget Schedule
2.0-8	**Schedule**: Performance of work according to the project milestones listed in this SOW document is contingent upon there being no detrimental impacts from COVID-19, either resulting from local, state or federal government restrictions or the infection of DT staff.	Budget Schedule
2.0-9	**Schedule**: Submittal of the compiled 90% draft deliverables, which include both the permanent and major temporary works, the latter being the CMAR's responsibility, according to the Project Milestones is contingent upon the CMAR preparing and submitting the necessary drawings, DDR narratives, computations, and technical specifications, all developed to the 90%-level of completion, no later than the end of April 2022.	Schedule

Assumption ID	Table 3 Assumption/Clarification Description	Impacts
2.0-10	**General**: CMAR will provide timely input into the ADT's analyses and designs as the work progresses. Input offered after the work is substantially completed may require rework and revisions.	Scope Budget Schedule
2.1.1.-1	**Project Risk Register Update:** For construction, the ADT's risk register only includes risks that the ADT has identified related to the impacts of the design and performance of the major temporary works to the proper performance of the permanent works. The CMAR is keeping a separate, comprehensive risk register for construction. The ADT will provide its risk register update to CPRA/PMT and they will relay to CMAR and coordinate and verify that the CMAR's register includes the identified items and CPRA/PMT determines appropriate. The ADT is not reviewing and monitoring the CMAR's risk register.	Scope Budget
2.1.1-2	**Project Management Plan Updates-Project Risk Register Updates:** For adaptive management/operations, the ADT's risk register only includes identified risk items related to the adaptive management and operations of the three major components influenced by near field considerations. It does NOT include risks related to far-field environmental impacts in the Mississippi River and Barataria Basin. The ADT assumes the PMT is including far field impacts in its programmatic risk register. The ADT is not reviewing and monitoring the programmatic risk register.	Scope Budget
2.1.2-1	**General Project Management, Extra Errors & Omissions (E&O) Insurance:** AECOM is flowing down the contract requirement for the $10 M/ $10 M of E&O insurance coverage to sub-consultants performing what AECOM considers high risk work. Of those companies, Eustis Engineering and FTN Associates will request to have added to the contract to design special, abrasion-resistant, concrete mix design(s), do not carry the required level of insurance coverage. CPRA has agreed to reimburse at cost the sub-consultants for this cost. Performance of the scope of the task order is contingent upon these costs being reimbursed.	Scope Budget Schedule
2.2.2-1	**Permits and 90% Draft Deliverable Compilations**: The CMAR will prepare and submit to ADT for incorporation into the overall deliverables for the temporary works, 90% plans, the 90% DDR sections covering temporary works, and their engineers' respective computations. CMAR will prepare drawings, narratives and quantities for the temporary works for the JPA. The CMAR documents will bear the names and license numbers of their LA-registered engineers in responsible charge for the respective temporary works features.	Scope Budget Schedule
2.2.2.-2	**CMAR Dredged Access Channel:** The CMAR will design their proposed access route and include all required items, including cross-sections, turning basins, utility crossings, required demolition, spoil placement, erosion protection, and backfill placement. The layout will minimize impacts to diversion operations. The CMAR will coordinate specific details with Shell so that there is joint use of the route.	Scope Budget Schedule

Assumption ID	Table 3 Assumption/Clarification Description	Impacts
2.2.2-3	**CMAR Support for Permit Applications:** The CMAR will prepare sketches, slides and other information as may be required for pre-application meetings with regulatory agencies.	Scope Budget Schedule
2.2.4.2-1	**General Civil Engineering, SWPPP:** The SWPPP(s) will be prepared by the CMAR. Typical details of SWPPPs will be included in the plan sets	Scope Budget
2.2.4.3-1	**General Geotechnical Engineering, Additional Field Data Acquisition**: The ADT will not obtain or process additional soils or ground data during the PoP of this modification. ADT will review data acquired, process and presented in readily reviewable format by CMAR.	Scope Budget Schedule
2.2.5-1	**90% Special Concrete Mix Design(s)** Concrete mix designs will focus on thermal issues associated with placement of mass concrete and incorporating mix design, concrete placement and curing requirements into the cast-in-place technical specification.	Scope Budget Schedule
2.2.8-1	**60%-Final thru 90%-Final Hwy 23 Bridge, Design of PPG Waterline Relocation**: PPG is not going to provide parish standards, review comments or other relocation phasing and sequencing requirements. The State will review the relocation design and technical requirements. The design and technical requirements of the waterline are based on standard practice for potable water main relocation. PPG will not request or require changes to the water main relocation engineering and design after the 90% Phase E&D has started.	Scope Budget Schedule
2.2.19-1	**90% Cost Estimate:** The DT's scope for the 90% cost estimate during the PoP is to update quantities. The DT's scope does not include preparing an estimate for Early Works. The quantities will conform to the same WBS used for the 60% estimate.	Scope Budget Schedule
2.2.20-1	**Post-60% Cost Estimate Additional VE Opportunities for 90% Designs and Deliverables**: The CMAR and/or ICE will present all information at the scheduled VE meeting during the price reconciliation period that is necessary to evaluate potential cost savings. No investigations will be required to be made by DT.	Scope Budget Schedule
2.2.20-2	**Post-60% Cost Estimate Additional VE Opportunities for 90% Designs and Deliverables**: For those proposed opportunities CPRA decides to incorporate into the project features, no significant redesigns of permanent works will be required. The E&D revisions will entail updates to drawings that can be accomplished within two calendar weeks and within the approved budget for this scope item.	Scope Budget Schedule

Assumption ID	Table 3 Assumption/Clarification Description	Impacts
2.2.20-3	**Post-60% Cost Estimate Additional VE Opportunities for 90% Designs and Deliverables**: For those proposed opportunities CPRA decides to incorporate into the project features, none will be in the scope of Early Works.	Scope Budget Schedule
2.11-1	No further physical modeling testing of CMAR's cofferdam, temporary dock or other staging/fleeting area(s) in Mississippi River will be performed.	Scope Budget Schedule
2.14-1	**Early Works**: There will be an early start to construction (aka, "Early Works") and stand-alone contract documents are being developed based on the Early Works Scope Items listed in the file "BA-0153_Early_Works_Construction_Activities_List_20210827.xlsx".	Scope Schedule Budget
2.14-2	**Early Works, Deliverables**: The DT EW deliverables will include only the drawings and specifications for the permanent works and will not include computations or analyses. The EW deliverables will be drawings and specifications comprising part of the entire set of P&S. EW items in drawings and specifications may be identified by table, highlighting, or clouding, as mutually agreed to with CPRA. Revisions to EW documents will be tracked by issue date. Revision mark numbers and ledger will not be filled out on drawings. The PMT will track revision details separately.	Scope Schedule Budget
2.14-3	**Early Works, DT role post-95% submittal**: The DT's scope is limited to: preparing 95% plans and specs for permanent works items in Early Works (EW) Package, compiling the temporary and permanent works documents and the PMT-prepared Division 0 documents. After the 95% submittal of EW Deliverable, DT assumes there will be revisions of certain drawings to clarify and correct identified omissions or errors in the documents, but will not involve redesigning or producing new drawings or specifications. .	Scope Schedule Budget
2.14-4	**Early Works, Engineer's Cost Estimate**: The engineer will not prepare an Opinion of Probable Construction Cost for EW. DT will compute quantities The quantities will be broken down by project areas defined in the CMAR's WBS as was done for the entire project.	Scope Schedule Budget

4.0 KEY RISKS AND OPPORTUNITIES:

Key risks potentially affecting the scope, budget, and/or schedule for performing Task Order No. 7 are listed in **Table 5**:

Table 5

Risk/Opp ID	Risk / Opportunity Description	Impact	Probability	Severity	Mitigation
1.0-1	COVID-19	Government restrictions and/or infection of DT staff members impede performance of the work	Possible	Moderate Impact	Perform E&D remotely. Update SH&E plan to include best practices for reducing the risk of exposure of staff members.
1.0-3	Proposed facilities adjacent to diversion project require changes to diversion component layouts and designs	Redesigns of components required resulting in increase in E&D cost, construction cost, and / or schedule slippage	Possible	Moderate to Severe Impacts	CPRA should consider impacts as part of proposed facilities permit applications reviews. CPRA should consult with ADT about potential project impacts during permit reviews.
1.0-3	Project converts to design-bid-build method.	Significant rework of designs of temporary works, layouts, and P&S. Schedule delays and increased engineering results happen.	Possible	Moderate effect	Engage in a diligent cost reconciliation process for 60% estimates.

Table 5 (con't)