
Subject: Preliminary Construction Schedules for Central and Eastern Corridor Options (Final Draft)

Project feature: Projectwide

Prepared for: California Department of Water Resources (DWR) / Delta Conveyance Office (DCO)

Prepared by: Delta Conveyance Design and Construction Authority (DCA)

Copies to: File

Date/Version: December 23, 2021

Reference no.: EDM_PW_CE_TMO_Prel-Const-Schedule-C-E-Options_000986_V02_FD_20211223

1. Purpose and Introduction

The Delta Conveyance Project (Project) would include intakes along the Sacramento River between its confluences with American River and Sutter Slough. The Project also includes a tunnel extending from the intakes to a pumping plant and forebay at the downstream terminus of the main tunnel in the South Delta (the Southern Forebay). Water would either flow by gravity or be lifted by the pumping plant from the tunnel into the Southern Forebay (SF). Discharge from the SF would occur at the southern end of the reservoir, flowing through dual tunnels into the South Delta Conveyance facilities (SDCF) for connection to the existing State Water Project Harvey O. Banks Pumping Plant and possibly to the Central Valley Project C.W. Bill Jones Pumping Plant.

This technical memorandum (TM) provides a narrative for construction schedules produced in support of the Project. Separate schedules were provided for both the Central and Eastern corridors that were investigated in association with the Project's Notice of Preparation (DWR, 2020) as shown in Figure 1.

2. Construction Schedules

The gantt charts provided in the attachment to this TM represent the sequenced construction activities for the following alternatives:

- 1) Option 1A: Central Alignment 6000 cubic feet per second (cfs) vertical plate screen intake
- 2) Option 1B: Central Alignment 6000 cfs tee screen intake
- 3) Option 2A: Eastern Alignment 6000 cfs vertical plate screen intake
- 4) Option 2B: Eastern Alignment 6000 cfs tee screen intake

These conceptual schedules are intended to provide relative guidance for the overall duration of the construction project and are not associated with specific notice-to-proceed dates.

The schedules were developed using scheduling software and provide a conceptual sequence of construction activities that could be used to complete the facility components. They are based on the 2020 footprint design information available at the time the schedule was developed and assumed number of construction packages (DCA, 2021). They only delineate one possible sequence of work and are not meant to dictate contractor means and methods, encapsulate possible phasing activities that could shorten the overall schedule or accommodate unforeseen elements that drive critical path.

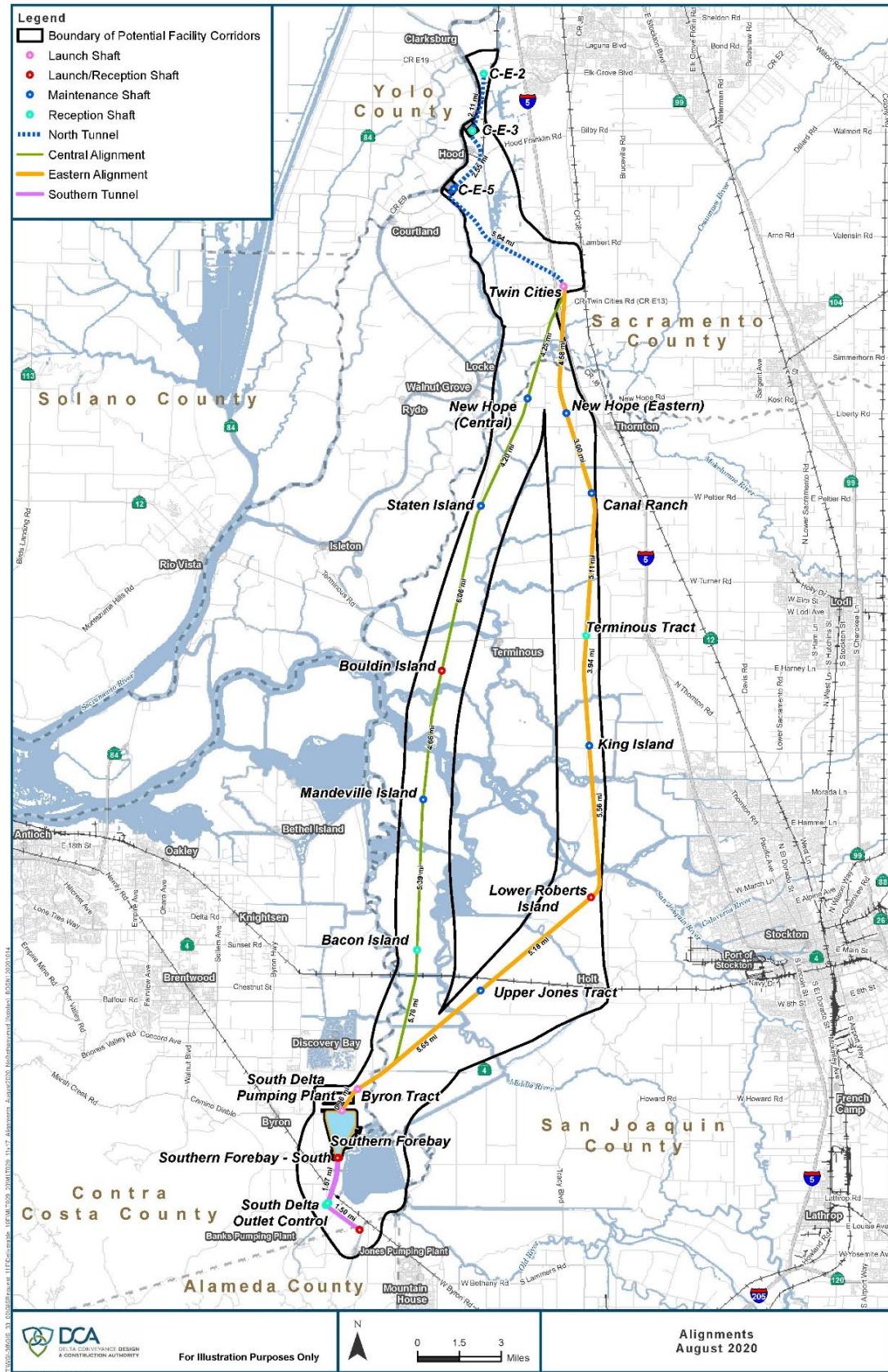


Figure 1. Proposed Conveyance System

The final sequence of activities and duration of the schedule will depend upon the actual execution of the work, the contractor's actual means and methods, definition and variation of the design, abnormal conditions, and other variable factors. Therefore, a final schedules should be expected to vary from the conceptual schedules presented here.

3. Construction Packages Sequencing

The schedules developed reflect the sequencing of various preliminary construction packages, including:

- Early works
- Intakes
- Tunnels and Shafts
- Pumping Plant
- Southern Forebay
- South Delta Conveyance Facilities

3.1 Early Works

Early works packages include work required for provision of access and utilities to each work site. Two road access works packages have been assumed for the north and south parts of the project area. The sequence of the individual access works has been set to match the order of the main feature works. Rail access, power supply and other utility provisions will also be completed as early works to support the main feature contracts.

3.2 Intakes

Each intake structure has been considered as a separate contract with a one year stagger to the start of each. The sequence of the intakes is from south to north to reflect the direction of the northern tunnel drive so that the inlet shafts are ready for the advancing tunnel drive. The sequence of construction for intakes includes:

- Stage 1 for preparation of temporary levee embankment and temporary diversion of State Route 160
- Stage 2 for construction of the cofferdam and intake structure
- Stage 3 for completion of the sediment basins and associated earthworks

The stages were established for scheduling purposes and do not match the stages shown on the drawings, which are intended to support overall sequencing of flood control features.

3.3 Tunnels and Shafts

Five tunnel contracts are assumed in the schedules. Tunnel drive contracts include shaft construction. Preparation of the shaft working pads is also included except at the intake and SF structures. At sites with tunnel drive in opposite directions, the first tunnel contract will include completion of a double launch shaft before handing over one cell of the shaft to the second contract. At the Southern Complex, the drive to the north (Reach 4) will launch from the Southern Forebay Inlet Structure Tunnel Launch Shaft and then transfer tunnel operations to the separate Byron Tract Working Shaft approximately 1 mile to the north, thereby releasing the Southern Forebay Inlet Structure Tunnel Launch Shaft to the pumping plant contractor.

Reception and maintenance shafts will be included in the tunnel contracts with the construction sequenced to follow on from the launch shaft in the direction of tunnel drive. Receptions shafts that receive two tunnel drives shall be included in the contract that is planned to arrive first.

Tunnel excavation rates were established from various tunnels of similar size and similar ground conditions utilizing the same type of equipment. The rates were determined using historical data for segmental ring erection time from published data; Colzani (2001) and Davies (2009). Using similar build up of rates the overall average for tunnel excavation for these 36 feet inside diameter tunnels using a segmental pre-cast concrete lining on a 20-hour work day was estimated at approximately 40 linear feet per day, taking into account TBM start up and stoppages.

3.4 Pumping Plant

The pumping plant contract includes the foundation/ground treatment works associated with the raised embankment surrounding the structure. On completion of the embankment area by the forebay contractor the pumping plant will continue with construction of the box structure from the raised embankment level. Following handover of the outlet shaft from the Reach 4 tunnel contract the wet well conduit and overflow structures will also be completed by the pumping plant contract.

3.5 Southern Forebay

The SF contract will include overall preparation of the southern complex site with site clearance, borrow activities, and transfer of reusable tunnel material (RTM) to the site by rail. Earthmoving activities initially include completion of the extended pad embankments for the pumping plant and the Southern Forebay Inlet Structure Tunnel Launch Shaft. Then, preloading of the east embankment areas with borrow or RTM before removal, and then final embankment work with foundation improvements as necessary. Completion of the spillway and Southern Forebay Outlet Structure will follow embankment and the work required for the southern dual tunnel drives.

3.6 South Delta Conveyance Facilities

Initial partial excavation works, including transport to the SF work area, for the SDCF is scheduled before construction of the two receiving shafts for the southern dual tunnel drives. The remaining excavation and completion of the South Delta Outlet Structure then follows completion of the tunnels with removal of the tunnel boring machine (TBM) from the receiving shafts. The construction of the California Aqueduct Control Structure take place between the initial and final stage of the outlet construction during the tunnel drives.

4. Options Considered

The schedules also reflect construction of two separate intake screening options, vertical flat plate screens and cylindrical tee screens. Schedules also were considered for several project design capacities, as presented in the NOP and as described below.

4.1.1 Intake Screen Options

Both vertical flat plate and cylindrical tee screen options were considered for the proposed intakes. Both types of intake follow the same three stage construction sequences. The key difference is between the construction of the box conduit for the vertical screen and the pipe jack for the T-screen. The box conduit

is constructed in two phases as the temporary road is diverted during stages 2 and 3 of the sequence. The pipes for the T-screen are installed during stage 2 as the intake structure is built within the cofferdam.

4.1.2 Project Design Capacities

Schedules have been developed for each of the project design capacity options with adjustments to the activity durations associated with the change in size of structures. The northern tunnel length between the Twin Cities Complex and the intakes changes depending on the alternative that use one, two or three intake structures. All other tunnels remain the same length. Other structure size changes include:

- Intakes sized for 1500 cubic feet per second (cfs) and 3000 cfs
- Tunnel diameters range from 21 foot to 40 foot internal diameter which also effects RTM generation rates
- Shaft diameters that change in proportion to the tunnel size
- Pumping plant area changes with the number of pumps required for each flow rate
- SF is unchanged for the various capacities
- SDCF are similar for the 3,000, 4,500, and 6,000 cfs project design capacity. For the 7,500 cfs project design capacity, the dual tunnels are larger in diameter and additional features are included to account for an additional 1500 cfs of conveyance to the Jones Pumping Plant inlet canal Delta-Mendota Canal (DMC).

The sequencing logic for each of the options remains the same except the 7500 cfs option which includes an additional intake and tunnel segment for Intake C-E-2 and another one to the DMC with associated inlet, outlet and control structures within the SDCF area. These flow option schedules follow the same overall sequence as the 6000 cfs options included in the attachments to this document.

5. References

The following publications, documents, or other information sources have been cited in this TM:

California Department of Water Resources (DWR). 2020. Notice of Preparation of Environmental Impact Report for the Delta Conveyance Project. January 15. (https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Delta-Conveyance/Delta_Conveyance_Project_NOP_20200115_508.pdf?la=en&hash=74B80DAAE5B9C4BC2EB0619B6A252011F72D1087)

Delta Conveyance Design and Construction Authority (DCA). 2021. Draft Engineering Project Report, Volume 2 - Engineering Concept Drawings. Final Draft.

G Colzani, J. Strid, S. Cole & D. Olsen. (2001) Tunneling at Hollywood Reservoir. Proceedings of the Rapid Excavation and Tunnelling Conference 2001.

J. Davies, K. Chin, J. Ohnigian & J. Stokes (2009) Construction of the North Dorchester Bay CSO Storage Tunnel in Boston. Proceedings of the Rapid Excavation and Tunnelling Conference 2009.

6. Document History and Quality Assurance

Reviewers listed have completed an internal quality review check and approval process for deliverable documents that is consistent with procedures and directives identified by the Engineering Design Manager (EDM) and the DCA.

Approval Names and Roles			
Prepared by	Internal Quality Control review by	Consistency review by	Approved for submission by
Martin Ellis / EDM BIM Integration Lead	Phil Ryan / EDM Design Manager	Gwen Buchholz / DCA Environmental Consultant	Terry Krause / EDM Project Manager

This interim document is considered preliminary and was prepared under the responsible charge of Martin Ellis, California Professional Engineering License C83803.

Note to Reader

This is an early foundational technical document. Contents therefore reflect the timeframe associated with submission of the initial and final drafts. Only minor editorial and document date revisions have been made to the current Conformed Final Draft for Administrative Draft Engineering Project Report version.

Attachment 1
Construction Schedules

FINAL DRAFT

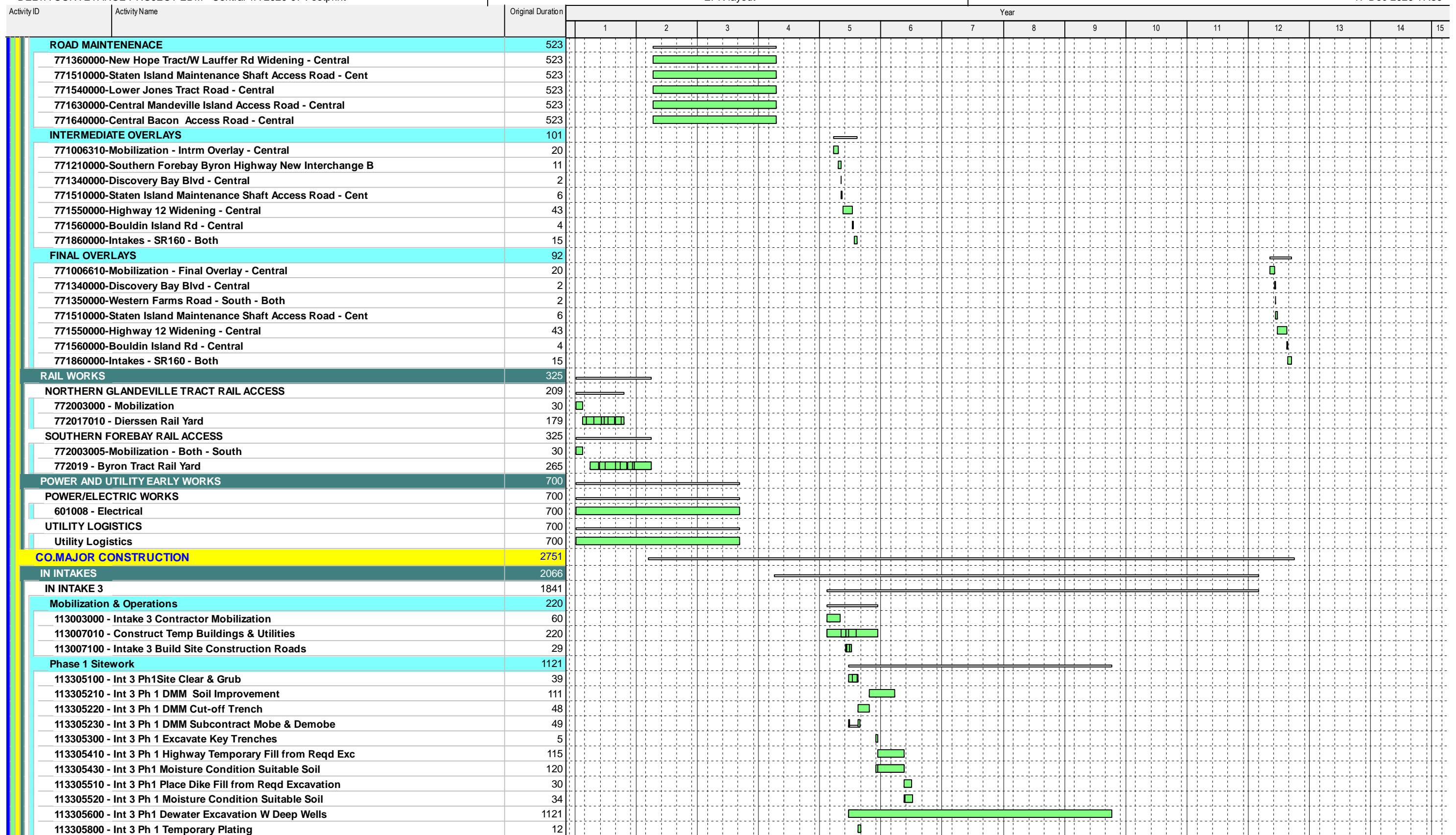
Attachment 1. Construction Schedules

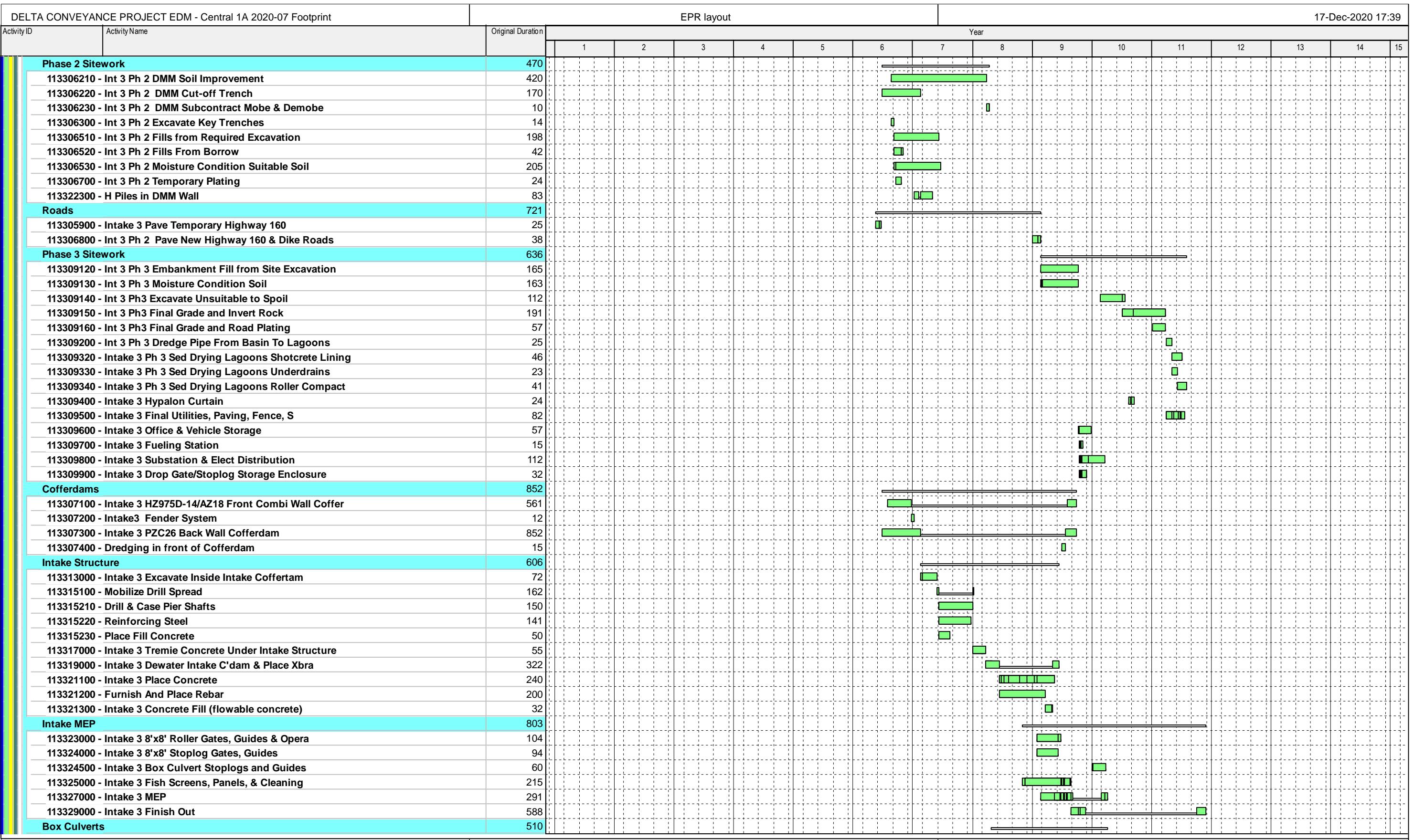
- 1-1 Construction Schedule - Option 1A: Central Alignment 6000 cfs vertical plate screen intake
- 1-2 Construction Schedule - Option 1B: Central Alignment 6000 cfs tee screen intake
- 1-3 Construction Schedule - Option 2A: Eastern Alignment 6000 cfs vertical plate screen intake
- 1-4 Construction Schedule - Option 2B: Eastern Alignment 6000 cfs tee screen intake

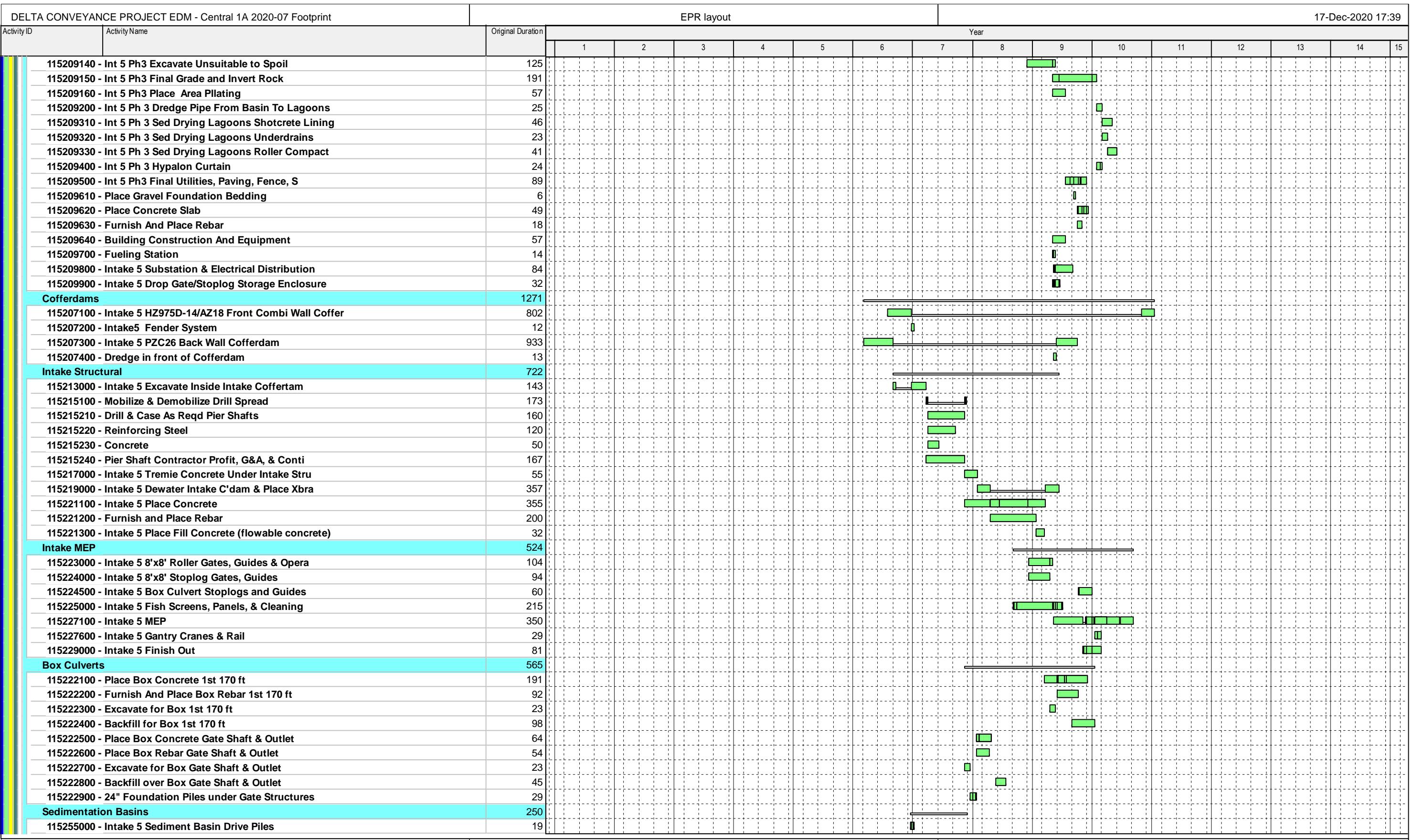
Construction Schedule - Option 1A: Central Alignment 6000 cfs Vertical Plate Screen Intake

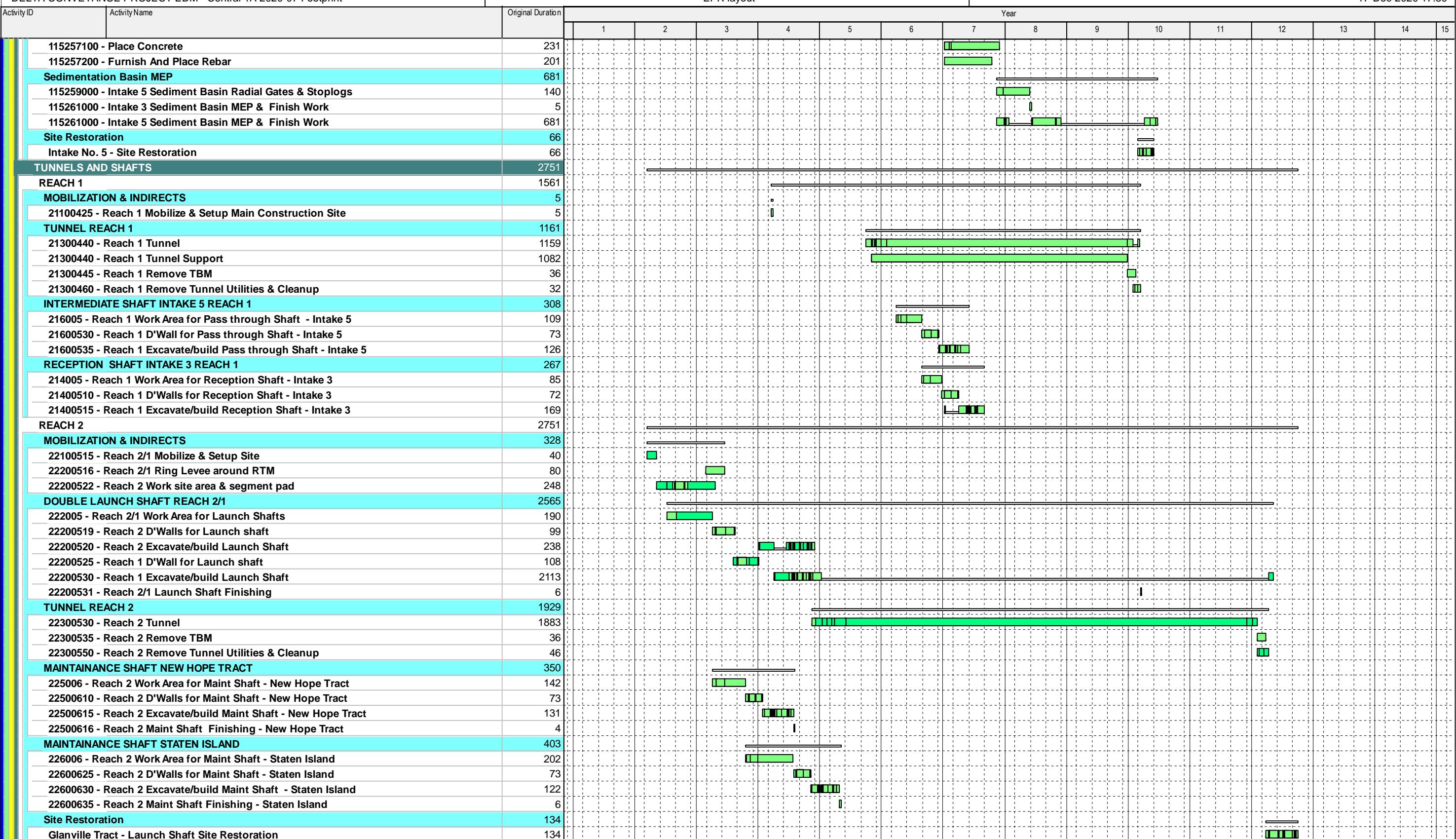
FINAL DRAFT

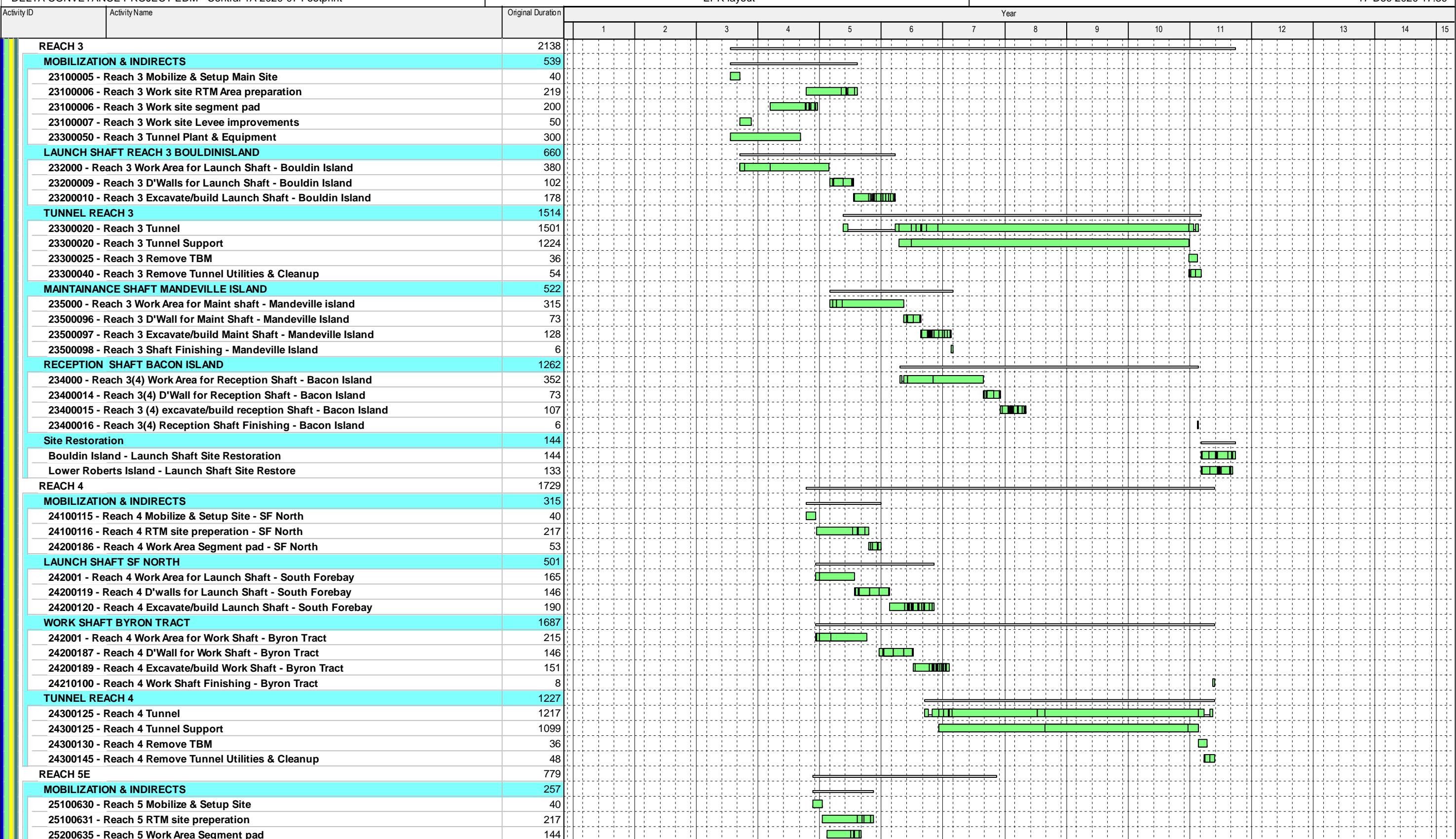
DELTA CONVEYANCE PROJECT EDM - Central 1A 2020-07 Footprint		Original Duration	EPR layout							Year							17-Dec-2020 17:39	
Activity ID	Activity Name		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
	DELTA CONVEYANCE PROJECT EDM - Central 1A 2020-07 Footprint	3721																
	CO CONSTRUCTION	3721																
	CO.PG PROGRAMMATIC MANAGEMENT	3201																
	CONSTRUCTION MILESTONES	3201																
	Construction Milestones	3201																
G1010	NTP Early works	0	◆ NTP Early works:															
K1000	NTP Pumping Plant Works	0	◆ NTP Pumping Plant Works															
A1000	NTP - Overall Construction Project	0	◆ NTP - Overall Construction Project															
E1000	NTP Reach 2	0	◆ NTP Reach 2:															
C1000	NTP Reach 4	0	◆ NTP Reach 4:															
J1000	NTP Southern Forebay	0	◆ NTP Southern Forebay															
D1000	NTP Reach 3	0	◆ NTP Reach 3:															
F1010	NTP - Reach 1	0	◆ NTP - Reach 1															
G1000	NTP Intake 5	0	◆ NTP Intake 5:															
B1000	NTP Reach 5	0	◆ NTP Reach 5:															
G9010	NTP Intake 3	0	◆ NTP Intake 3															
I1000	NTP Intermediate overlays	0	◆ NTP Intermediate overlays															
G1020	NTP South Delta Connection Structures	0	◆ NTP South Delta Connection Structures															
B9000	Reach 5 Complete	0	◆ Reach 5 Complete															
F9002	Reach 1 Complete	0	◆ Reach 1 Complete															
G9020	Intake 5 Complete	0	◆ Intake 5 Complete															
D9000	Reach 3 Complete	0	◆ Reach 3 Complete															
C9000	Reach 4 Complete	0	◆ Reach 4 Complete															
J9000	Southern Forebay Complete	0	◆ Southern Forebay Complete															
G9000	Intake 3 Complete	0	◆ Intake 3 Complete															
K9000	Pumping Plant Complete	0	◆ Pumping Plant Complete															
G1030	South Delta Connection Structures Complete	0	◆ South Delta Connection Structures Complete															
E9000	Reach 2 Complete	0	◆ Reach 2 Complete															
I1010	NTP Final overlays	0	◆ NTP Final overlays															
Z9000	Project Snagging	0	◆ Project Snagging															
Z9010	Construction Completion	0	◆ Construction Completion															
	CO.EW CONSTRUCTION EARLY WORKS	3066																
	ROAD WORKS	3066																
	NORTH ROAD WORKS	3066																
	MOB/FACILITIES NORTH	80																
	771003000 - Mobilization - North	80																
	PARK AND RIDES	162																
	771314000-Employee Park & Ride - Rio Vista - Both	18																
	771315000-Employee Park & Ride - Hood Franklin - Both	155																
	ACCESS TO INTAKES	201																
	771120000 - Hood Franklin Road Widening	5																
	771130000-Intakes Access Road - Both	15																
	771150000 - C-E-5 Intake Access Road	55																
	771460000 - Lambert Road Widening	38																
	771840000 - Intake #3	48																
	771860000-Intakes - SR160 - Both	15																
	ACCESS TO TWIN CITIES	312																
	771420000 - Diessen Road Paving	42																



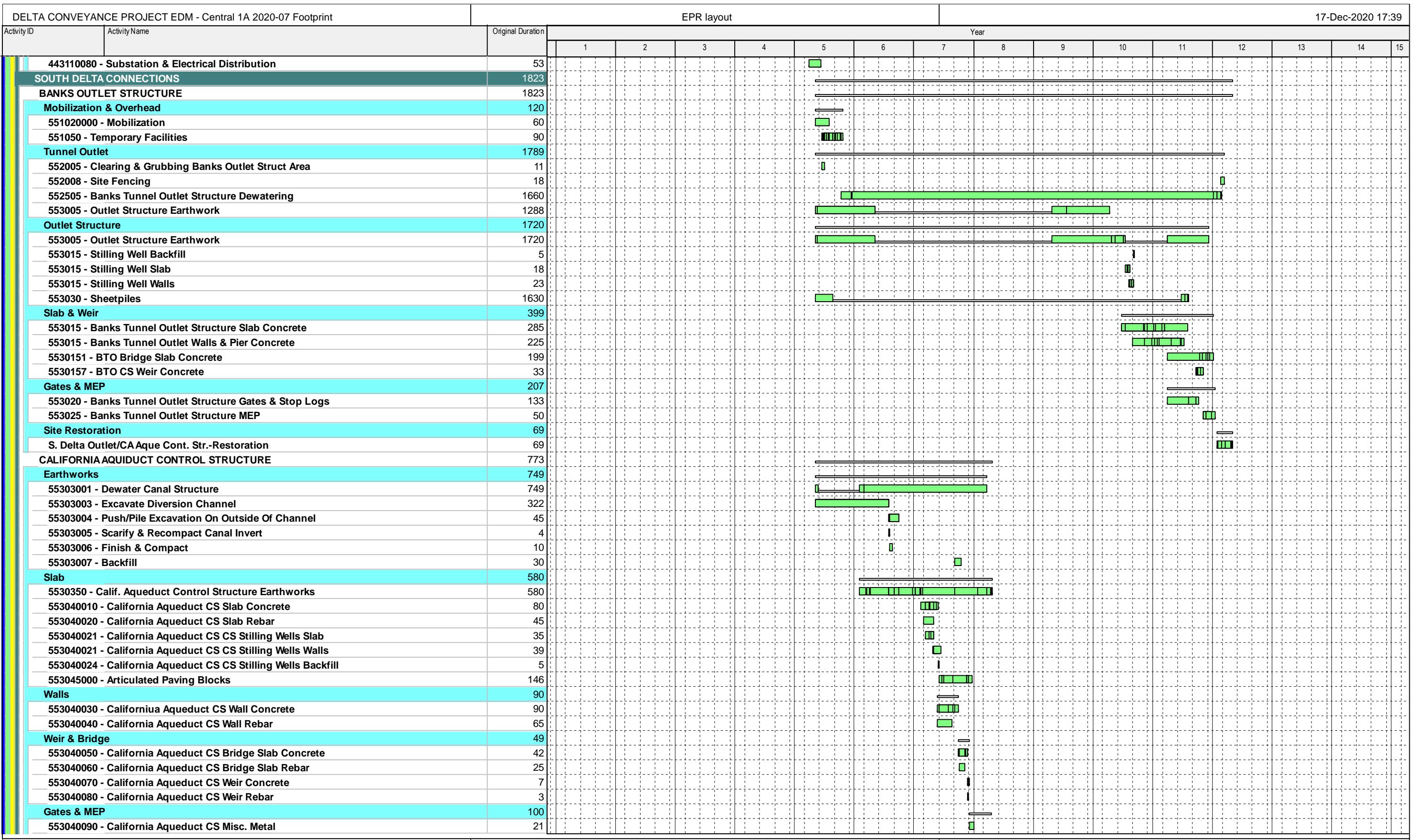


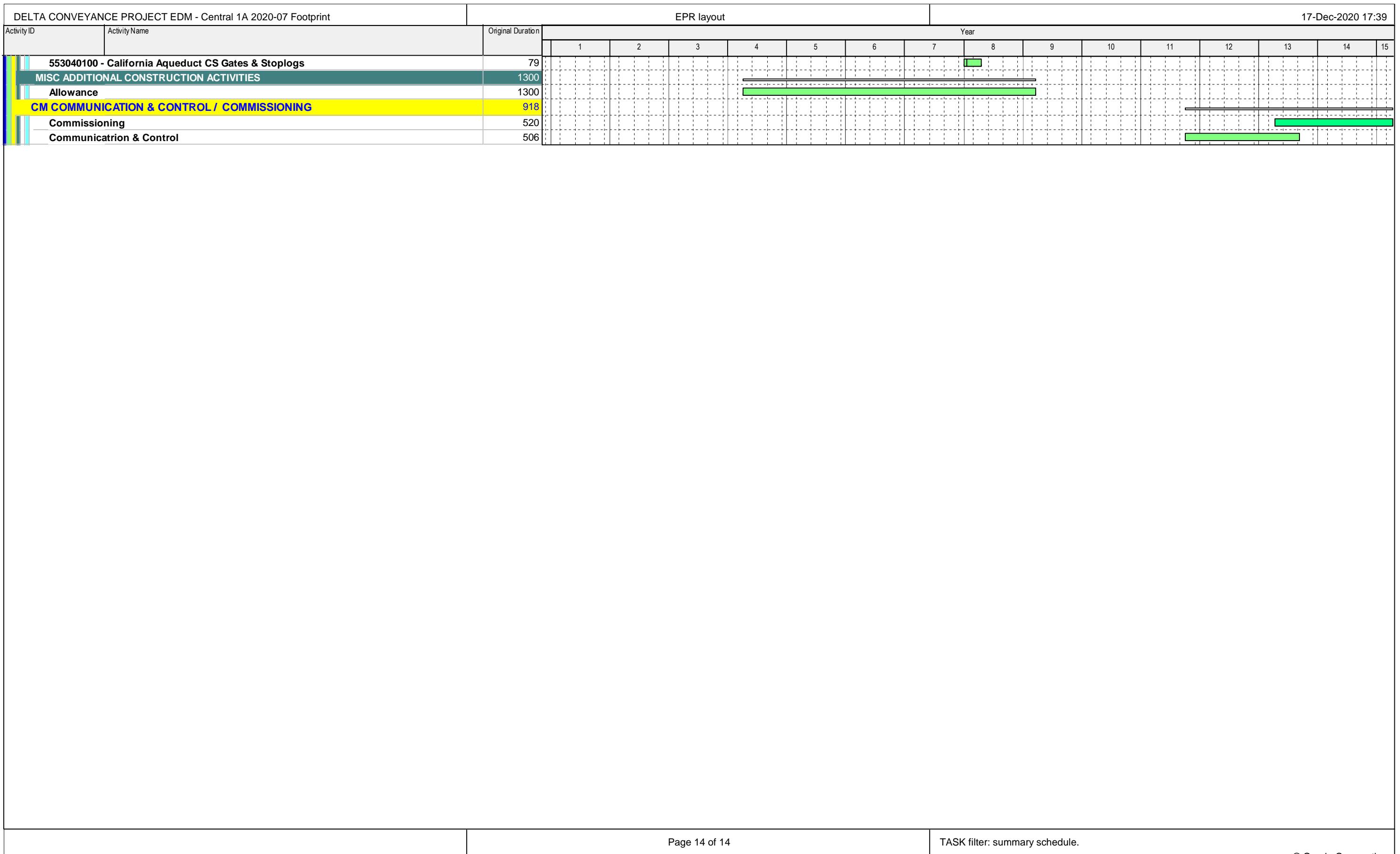






DELTA CONVEYANCE PROJECT EDM - Central 1A 2020-07 Footprint		EPR layout												17-Dec-2020 17:39					
Activity ID	Activity Name	Original Duration	Year																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
443010080 - Concrete (Int. Diaph. Walls)	59							■											
443010090 - Slurry Wall Contractor Overhead And Profit (Ext. Diaph Walls)	35						■												
Pump Plant Foundation Slabs, Walls, Pump Can Concrete	731								■										
442025000 - BT Pump Plant Exc. Pump Inside Dia. Wall	149							■	■										
442035000 - BT Pump Plant Exc. Wet Well -84 to 28.0	64							■											
442040000 - Dewater & Install Bracing	724							■	■	■	■	■	■	■	■	■	■		
443014999 - BT Pump Plant Tremie Conc. Bottom Slab	24							■											
443015010 - Place Concrete (Pump Can Concrete)	315							■	■	■	■	■	■	■	■	■	■		
443015020 - Furnish And Place Rebar (Pump Can Concrete)	260							■	■	■	■	■	■	■	■	■	■		
443020010 - Place Concrete (Exterior Struc. Walls)	235							■	■	■	■	■	■	■	■	■	■		
443020020 - Furnish And Place Rebar (exterior Struc. Walls)	200							■	■	■	■	■	■	■	■	■	■		
443025010 - Place Concrete (Slab at El.-77.0)	55								■										
443025020 - Furnish And Place Rebar (Slab at El.-77.0)	45								■										
443025030 - Foundation Prep (Slab at El.-77.0)	22								■										
Pump Plant Operation Deck & Structure Above EL. 2950	651									■									
443030010 - Interior Walls to OP Deck Place Concrete	104								■	■	■	■	■	■	■	■	■		
443030020 - Interior Walls Furnish And Place Rebar	45								■										
443030030 - Interior Walls Foundation Prep	10								■										
443035010 - Operations Deck Place Concrete	271								■	■	■	■	■	■	■	■	■		
443035020 - Operations Deck Furnish And Place Rebar	131								■	■	■	■	■	■	■	■	■		
443070000 - PP Structure Above El. 2950	200								■	■	■	■	■	■	■	■	■		
443080000 - Pump Plant Roof Structure	74								■	■	■	■	■	■	■	■	■		
Structure Misc Metals & MEP	1391									■	■	■	■	■	■	■	■		
443040000 - Pump Plant Miscellaneous Metals	975								■	■	■	■	■	■	■	■	■		
443045000 - 1123 cfs Pumps & Operators	1104								■	■	■	■	■	■	■	■	■		
443050000 - 563 cfs Pumps & Operators	105								■	■	■	■	■	■	■	■	■		
443051000 - Wet Well Dewatering Pumps	85									■	■	■	■	■	■	■	■		
Pump Plant MEP	100										■	■	■	■	■	■	■	■	
443075000 - Pump Plant Overhead Crane	68									■									
443085000 - Pump Plant Structure Finish Out	100										■	■	■	■	■	■	■	■	
Dissipation Slab	1111										■	■	■	■	■	■	■	■	
442050000 - Pump Plant Exc. For Splash Basin	174									■	■	■	■	■	■	■	■	■	
442055010 - Mobilize & Demob Drill Spread	64										■								
442055030 - Drill & Case As Rreqd Pier Shafts	23											■							
442055040 - Reinforcing Steel - CDIH Piers	13											■							
442055050 - Concrete - CDIH Piers	7											■							
442055060 - Pier Shaft Contractor Profit, G&A, & Conti	23											■							
443055000 - Piping to Splash Basin	250									■	■	■	■	■	■	■	■	■	
443060010 - PP Pipe Encasement Place Concrete	140										■	■	■	■	■	■	■	■	
443060020 - PP Pipe Encasement Furnish And Place Rebar	100										■	■	■	■	■	■	■	■	
443060030 - PP Pipe Encasement Foundation Prep	9										■								
443065010 - Splash Pad Place Concrete	115											■							
443065020 - Splash Pad Furnish And Place Rebar	75											■							
443065030 -Splash Pad Foundation Prep	24											■							
Wet Well	886												■	■	■	■	■	■	
442045000 - Dewater & Install Bracing in Wet Well Section	640										■	■	■	■	■	■	■	■	
442065000 - Excavate WetWell Inlet Conduit	20											■							
444005010 - Wet Well Slurry Wall Mobe & Demob	173											■							
444005050 - Wet Well Slurry Wall Set Guide Walls	83												■						
444005060 - Wet Well Excavate (Hydromill) Slurry Trench	50												■						
444005070 - Wet Well Reinforcing Steel	50												■						
444005080 - Wet Well Concrete	50												■						
444010010 - Wet Well Inlet Place Concrete (Bottom Slab)	23													■					

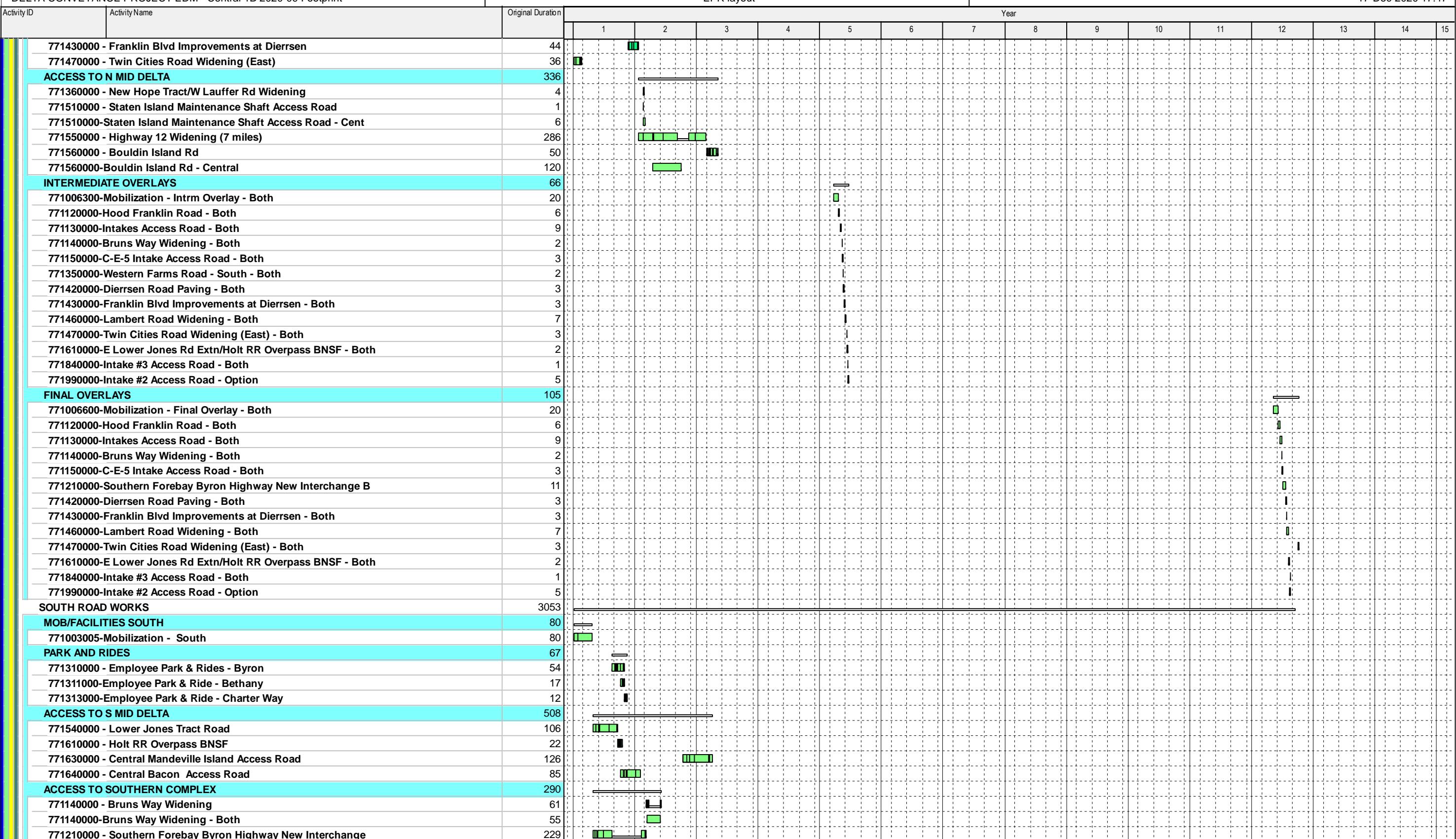




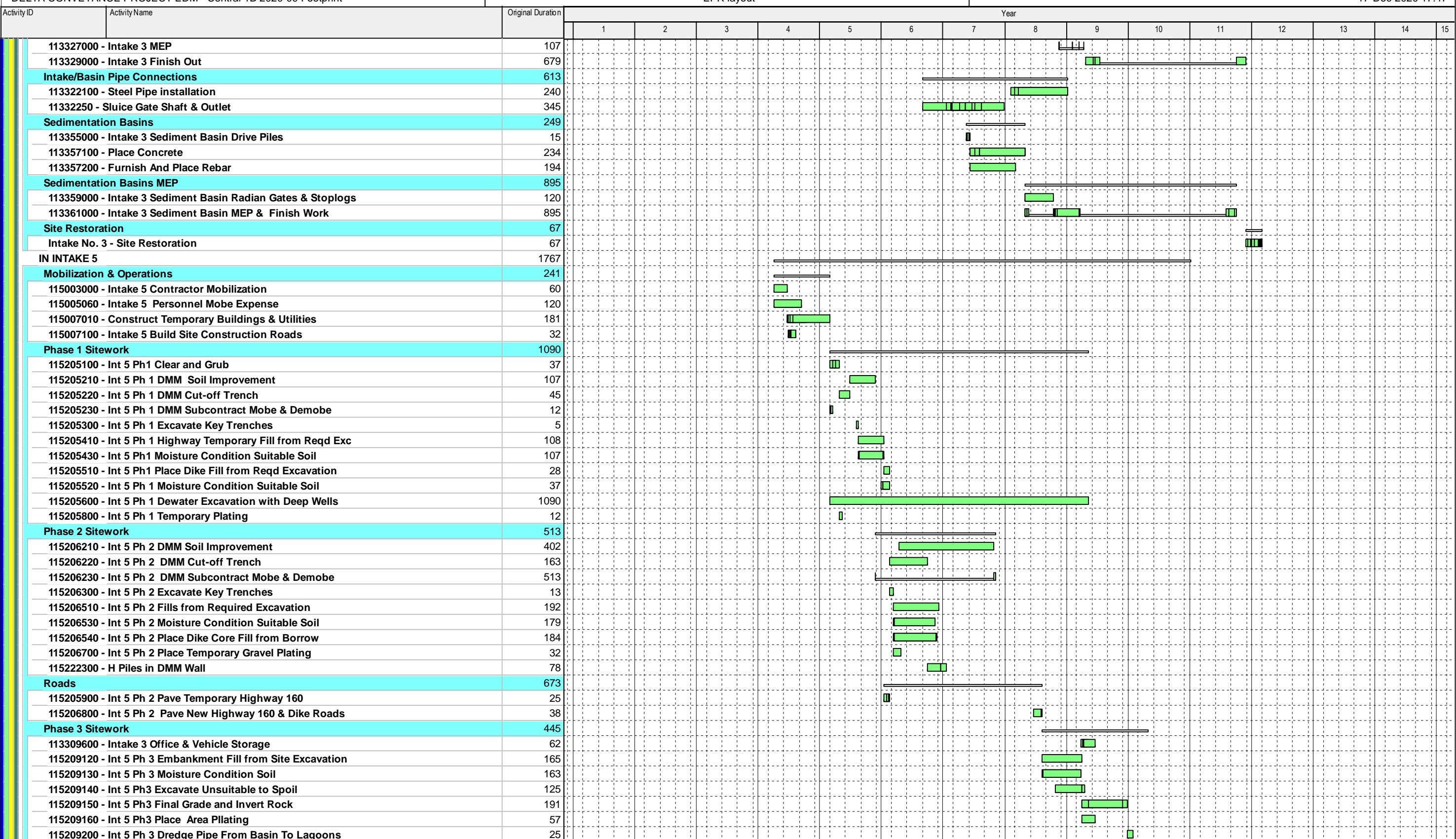
Construction Schedule - Option 1B: Central Alignment 6000 cfs Tee Screen Intake

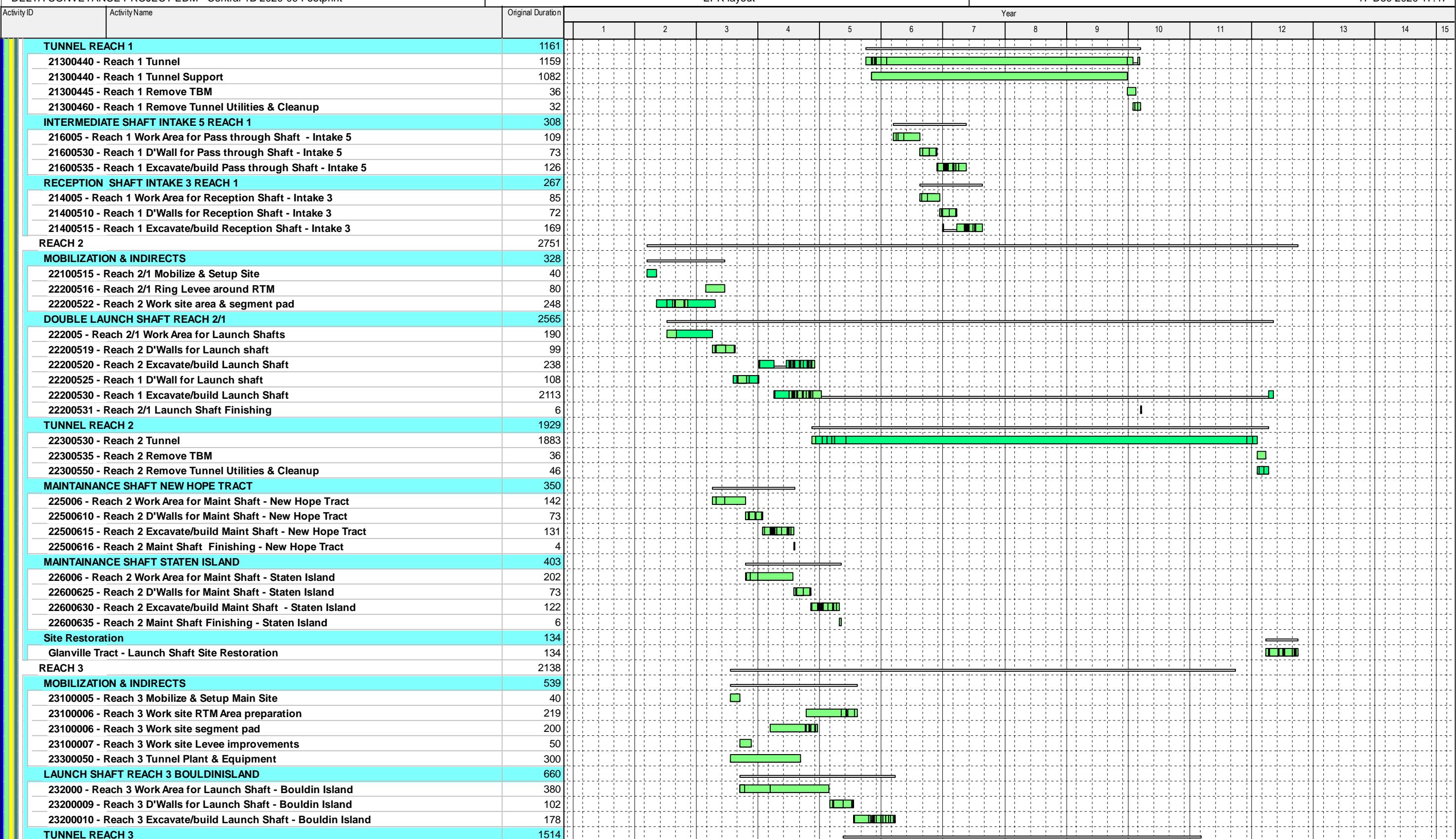
FINAL DRAFT

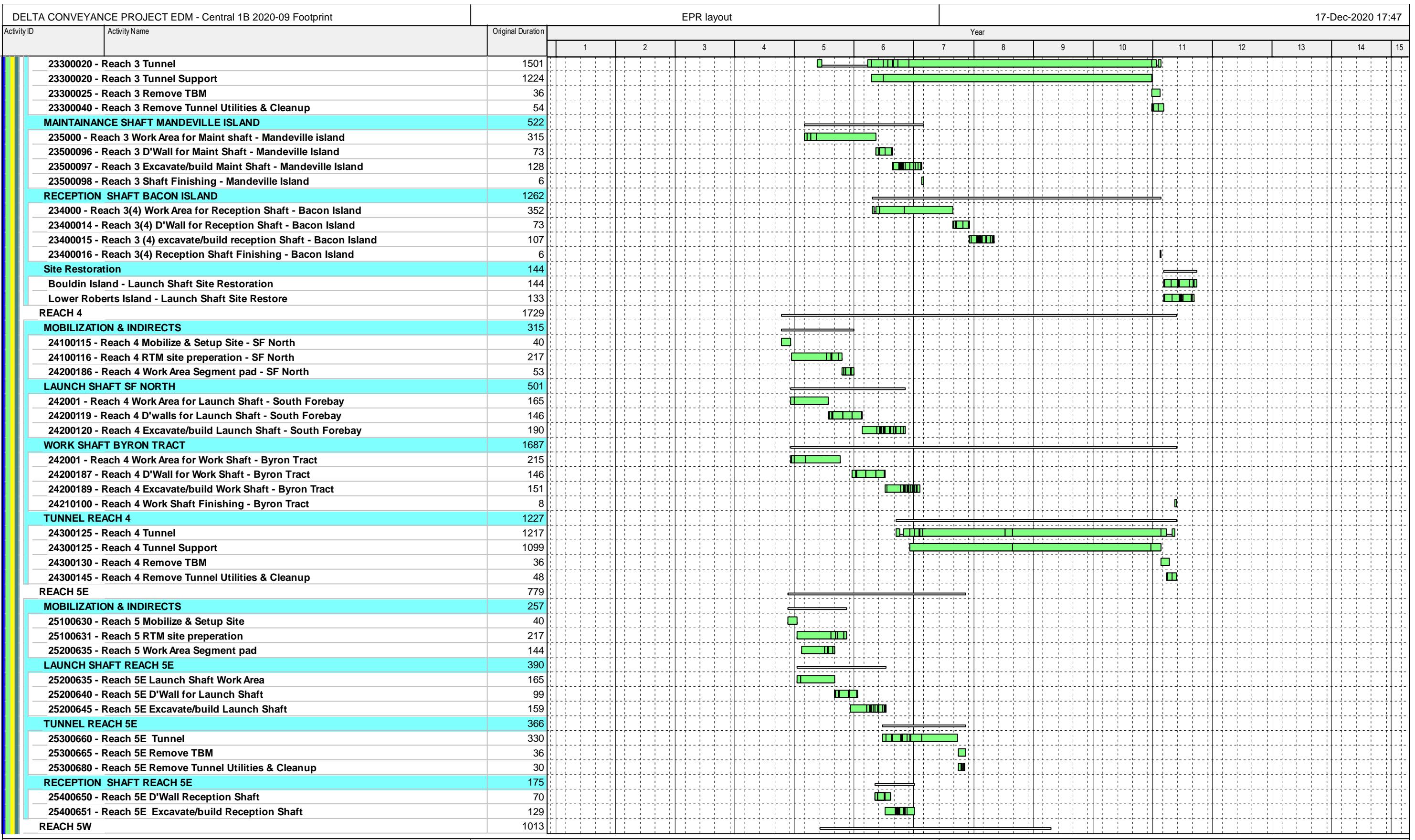
DELTA CONVEYANCE PROJECT EDM - Central 1B 2020-09 Footprint		EPR layout										Year					
Activity ID	Activity Name	Original Duration	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	DELTA CONVEYANCE PROJECT EDM - Central 1B 2020-09 Footprint	3721															
	CO CONSTRUCTION	3721															
	CO.PG PROGRAMMATIC MANAGEMENT	3201															
	CONSTRUCTION MILESTONES	3201															
	Construction Milestones	3201															
G1010	NTP Early works	0	◆ NTP Early works:														
K1000	NTP Pumping Plant Works	0	◆ NTP Pumping Plant Works														
A1000	NTP - Overall Construction Project	0	◆ NTP - Overall Construction Project														
E1000	NTP Reach 2	0	◆ NTP Reach 2:														
C1000	NTP Reach 4	0	◆ NTP Reach 4:														
J1000	NTP Southern Forebay	0	◆ NTP Southern Forebay														
D1000	NTP Reach 3	0	◆ NTP Reach 3:														
F1010	NTP - Reach 1	0	◆ NTP - Reach 1														
G1000	NTP Intake 5	0	◆ NTP Intake 5:														
B1000	NTP Reach 5	0	◆ NTP Reach 5:														
G9010	NTP Intake 3	0	◆ NTP Intake 3														
I1000	NTP Intermediate overlays	0	◆ NTP Intermediate overlays														
G1020	NTP South Delta Connection Structures	0	◆ NTP South Delta Connection Structures														
B9000	Reach 5 Complete	0	◆ Reach 5 Complete														
F9002	Reach 1 Complete	0	◆ Reach 1 Complete														
G9020	Intake 5 Complete	0	◆ Intake 5 Complete														
D9000	Reach 3 Complete	0	◆ Reach 3 Complete														
C9000	Reach 4 Complete	0	◆ Reach 4 Complete														
J9000	Southern Forebay Complete	0	◆ Southern Forebay Complete														
G9000	Intake 3 Complete	0	◆ Intake 3 Complete														
K9000	Pumping Plant Complete	0	◆ Pumping Plant Complete														
G1030	South Delta Connection Structures Complete	0	◆ South Delta Connection Structures Complete														
E9000	Reach 2 Complete	0	◆ Reach 2 Complete														
I1010	NTP Final overlays	0	◆ NTP Final overlays														
Z9000	Project Snagging	0	◆ Project Snagging														
Z9010	Construction Completion	0	◆ Construction Completion														
	CO.EW CONSTRUCTION EARLY WORKS	3066															
	ROAD WORKS	3066															
	NORTH ROAD WORKS	3066															
	MOB/FACILITIES NORTH	80															
	771003000 - Mobilization - North	80															
	PARK AND RIDES	162															
	771314000-Employee Park & Ride - Rio Vista - Both	18															
	771315000-Employee Park & Ride - Hood Franklin - Both	155															
	ACCESS TO INTAKES	201															
	771120000 - Hood Franklin Road Widening	5															
	771130000-Intakes Access Road - Both	15															
	771150000 - C-E-5 Intake Access Road	55															
	771460000 - Lambert Road Widening	38															
	771840000 - Intake #3	48															
	771860000-Intakes - SR160 - Both	15															
	ACCESS TO TWIN CITIES	312															
	771420000 - Diessen Road Paving	42															

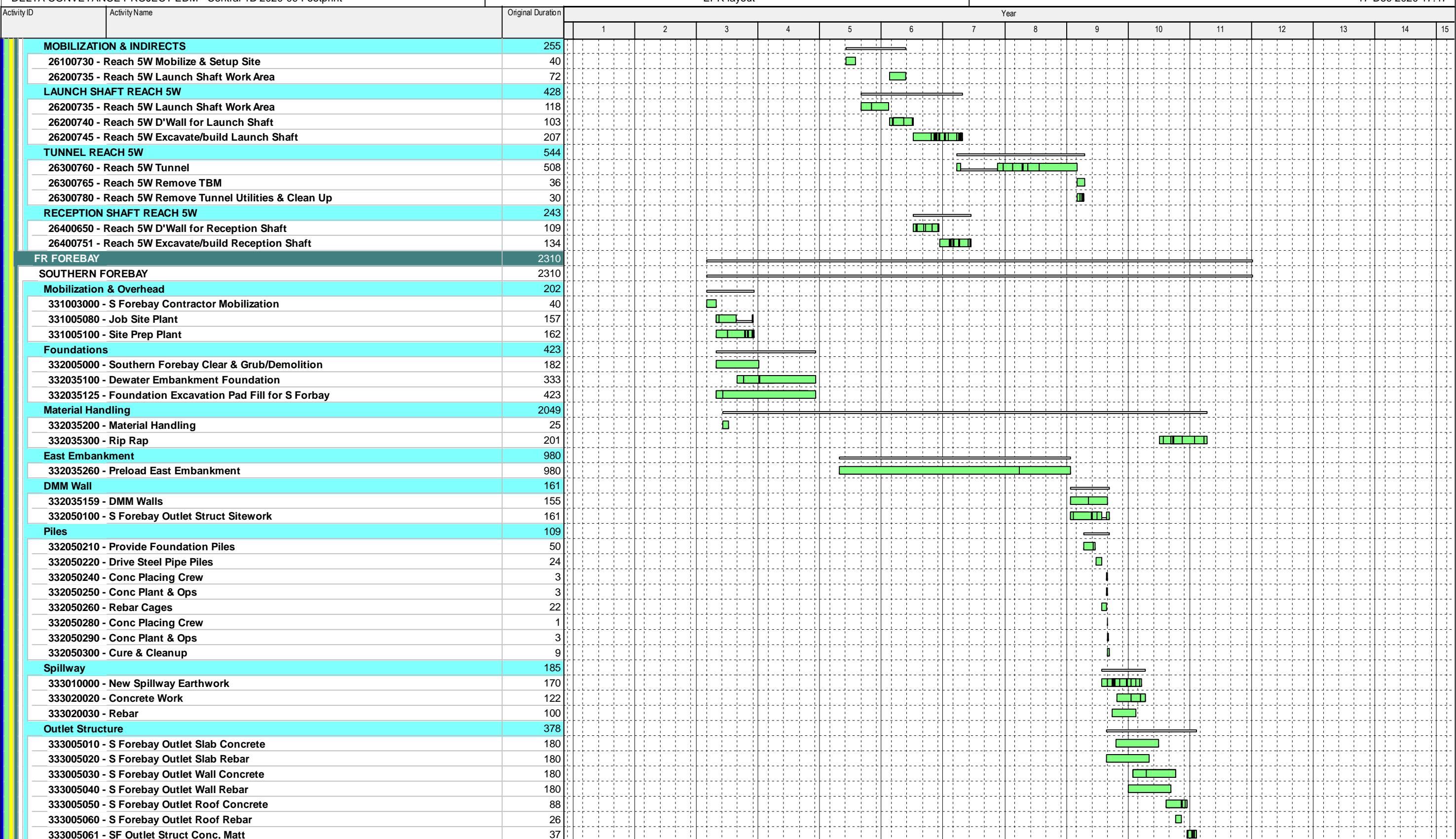


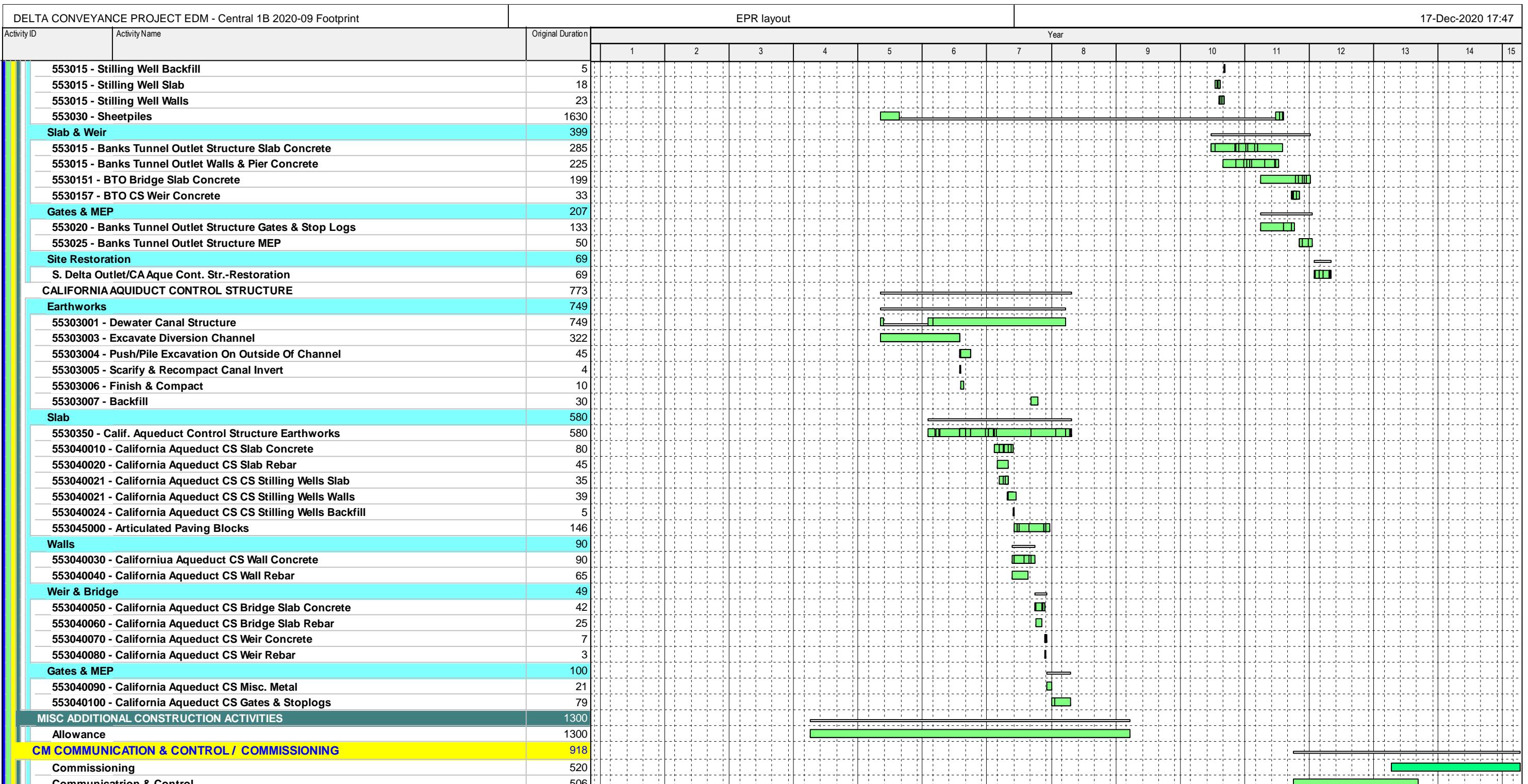
Activity ID		Activity Name	Original Duration	EPR Layout													
				Year													
				1	2	3	4	5	6	7	8	9	10	11	12	13	14
		113305510 - Int 3 Ph1 Place Dike Fill from Reqd Excavation	28						■								
		113305520 - Int 3 Ph 1 Moisture Condition Suitable Soil	32						■								
		113305600 - Int 3 Ph1 Dewater Excavation W Deep Wells	865							■							
		113305800 - Int 3 Ph 1 Temporary Plating	12						■								
	Phase 2 Sitework			452													
		113306210 - Int 3 Ph 2 DMM Soil Improvement	402							■							
		113306220 - Int 3 Ph 2 DMM Cut-off Trench	163							■							
		113306230 - Int 3 Ph 2 DMM Subcontract Mobe & Demobe	10								■						
		113306300 - Int 3 Ph 2 Excavate Key Trenches	13						■								
		113306510 - Int 3 Ph 2 Fills from Required Excavation	192							■							
		113306520 - Int 3 Ph 2 Fills From Borrow	41						■								
		113306530 - Int 3 Ph 2 Moisture Condition Suitable Soil	205							■							
		113306700 - Int 3 Ph 2 Temporary Plating	23						■								
		113322300 - H Piles in DMM Wall	76							■							
	Roads			470													
		113305900 - Intake 3 Pave Temporary Highway 160	25						■								
		113306800 - Int 3 Ph 2 Pave New Highway 160 & Dike Roads	38							■							
	Phase 3 Sitework			892													
		113309120 - Int 3 Ph 3 Embankment Fill from Site Excavation	165								■						
		113309130 - Int 3 Ph 3 Moisture Condition Soil	163									■					
		113309140 - Int 3 Ph3 Excavate Unsuitable to Spoil	112										■				
		113309150 - Int 3 Ph3 Final Grade and Invert Rock	191											■			
		113309160 - Int 3 Ph3 Final Grade and Road Plating	57											■			
		113309200 - Int 3 Ph 3 Dredge Pipe From Basin To Lagoons	25											■			
		113309320 - Intake 3 Ph 3 Sed Drying Lagoons Shotcrete Lining	46											■			
		113309330 - Intake 3 Ph 3 Sed Drying Lagoons Underdrains	23											■			
		113309340 - Intake 3 Ph 3 Sed Drying Lagoons Roller Compact	41											■			
		113309400 - Intake 3 Hypalon Curtain	24											■			
		113309500 - Intake 3 Final Utilities, Paving, Fence, S	82											■			
		113309600 - Intake 3 Office & Vehicle Storage	57											■			
		113309700 - Intake 3 Fueling Station	15											■			
		113309800 - Intake 3 Substation & Elect Distribution	112											■			
		113309900 - Intake 3 Drop Gate/Stoplog Storage Enclosure	32											■			
	Cofferdams			859													
		113307100 - Intake 3 HZ975D-14/AZ18 Front Combi Wall Coffer	556											■			
		113307200 - Intake3 Fender System	10											■			
		113307300 - Intake 3 PZC26 Back Wall Cofferdam	766											■			
		113307400 - Dredging in front of Cofferdam	13											■			
	Intake Structure			501													
		113313000 - Intake 3 Excavate Inside Intake Coffertam	58							■							
		113315100 - Mobilize Drill Spread	142								■						
		113315210 - Drill & Case Pier Shafts	130								■						
		113315220 - Reinforcing Steel	114								■						
		113315230 - Place Fill Concrete	43								■						
		113317000 - Intake 3 Tremie Concrete Under Intake Structure	45								■						
		113319000 - Intake 3 Dewater Intake C'dam & Place Xbra	261								■						
		113321100 - Intake 3 Place Concrete	202								■						
		113321200 - Furnish And Place Rebar	162								■						
		113321300 - Intake 3 Concrete Fill (flowable concrete)	26								■						
	Intake MEP			894													
		113323000 - Intake 3 Sluice Gates, Guides & Opera	184								■						
		113324500 - Intake 3 Box Shaft Sluice Gates and Guides	99								■						
		113325000 - Intake 3 Fish Screens, Panels, & Cleaning	215								■						







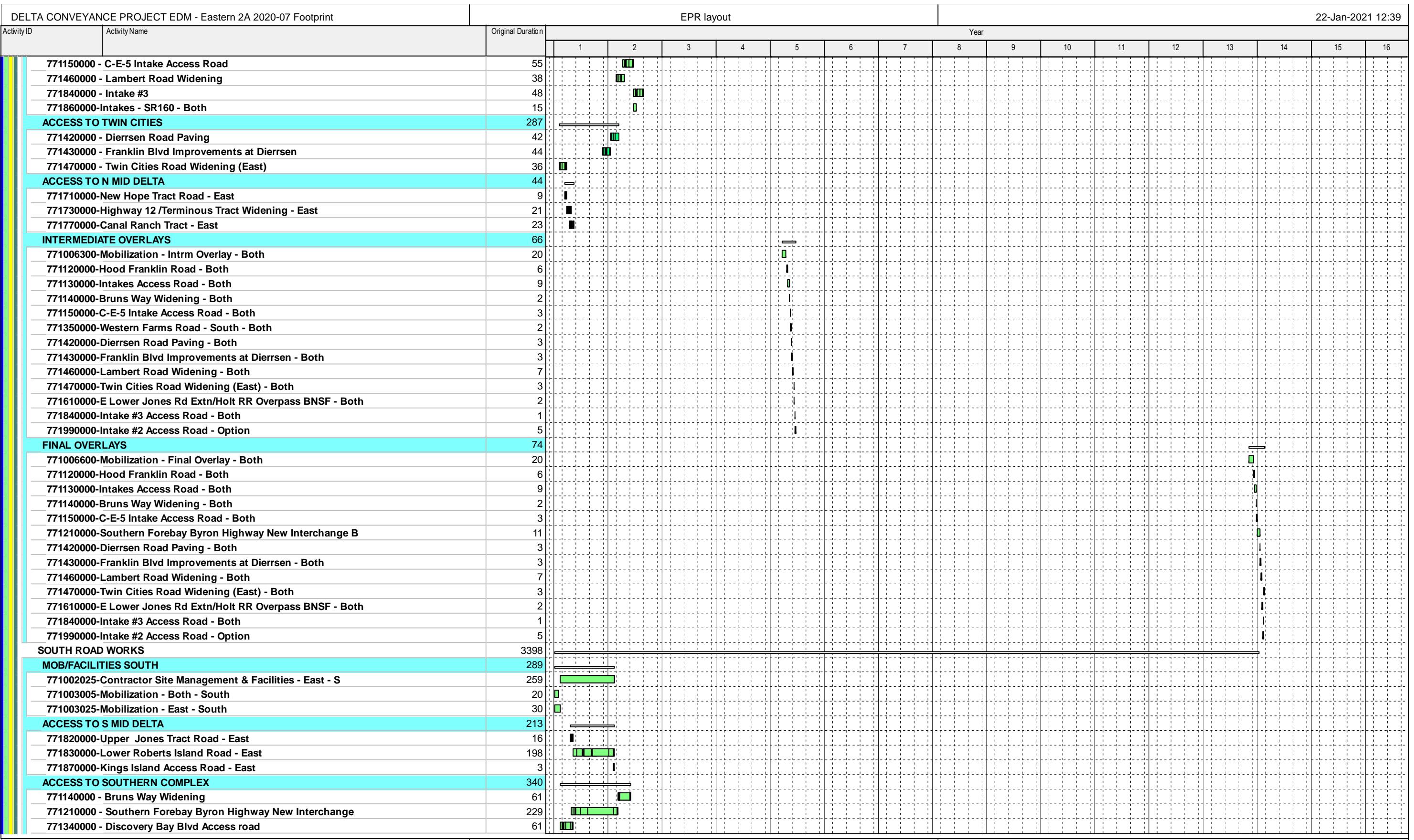


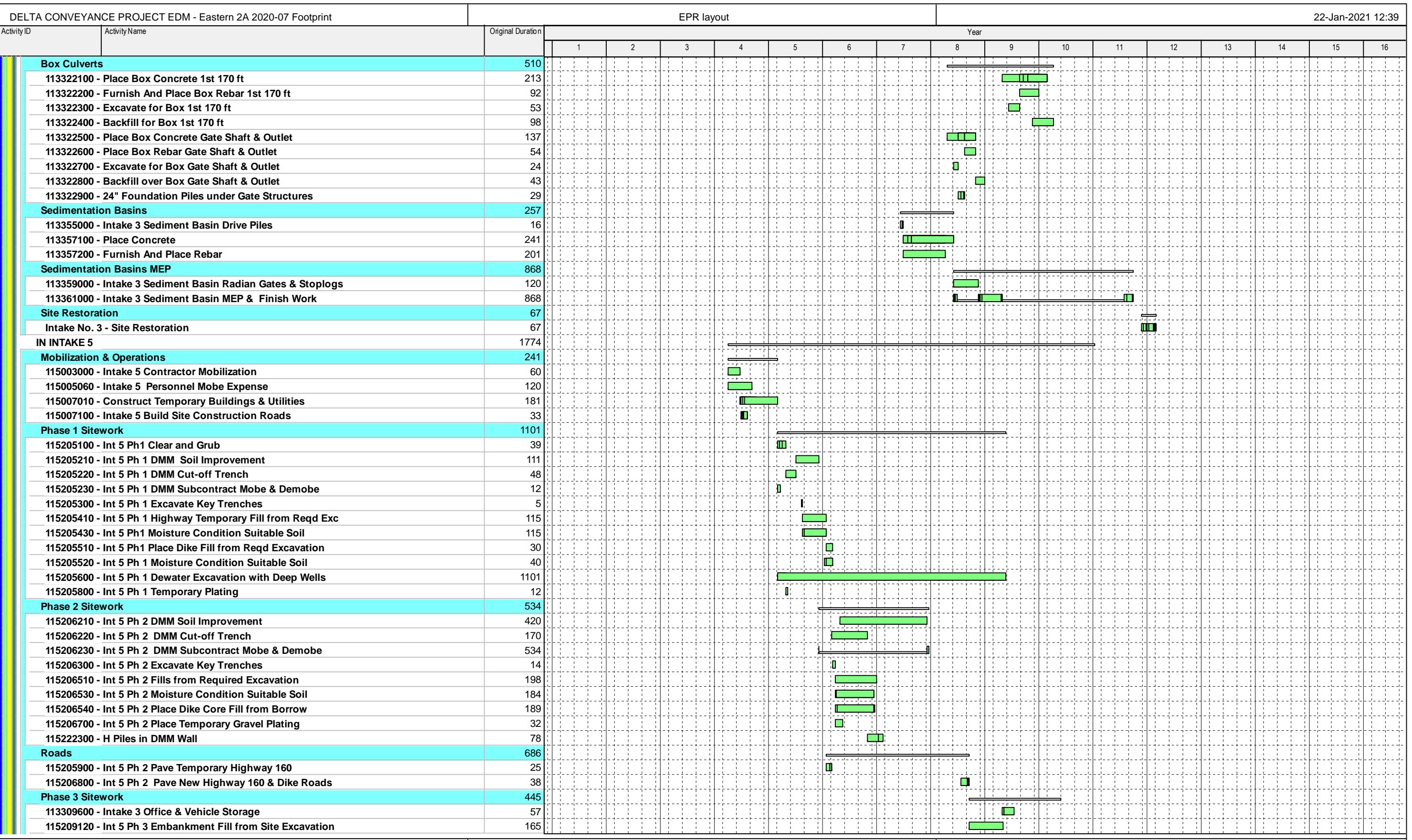


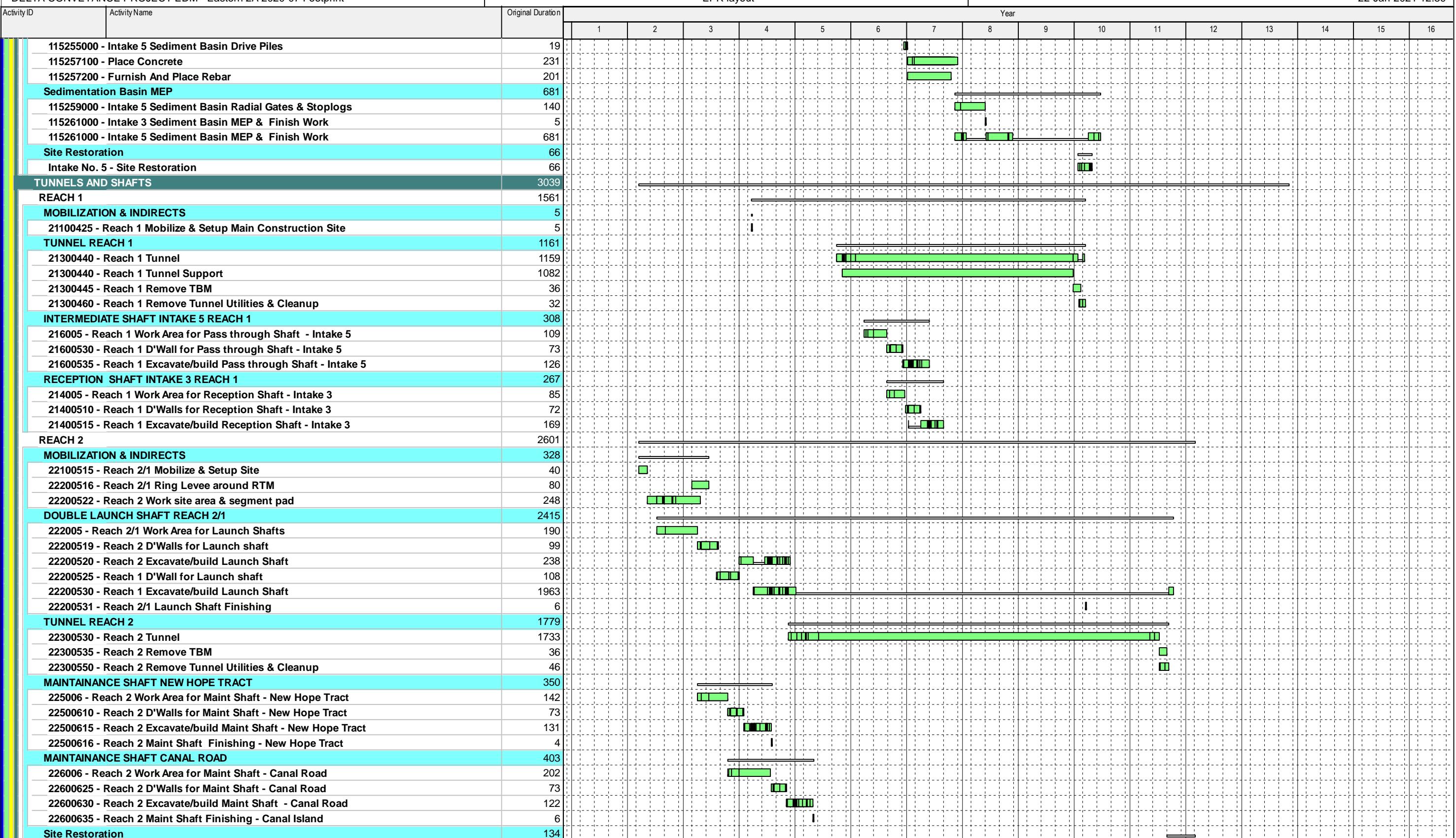
Construction Schedule - Option 2A: Eastern Alignment 6000 cfs Vertical Plate Screen Intake

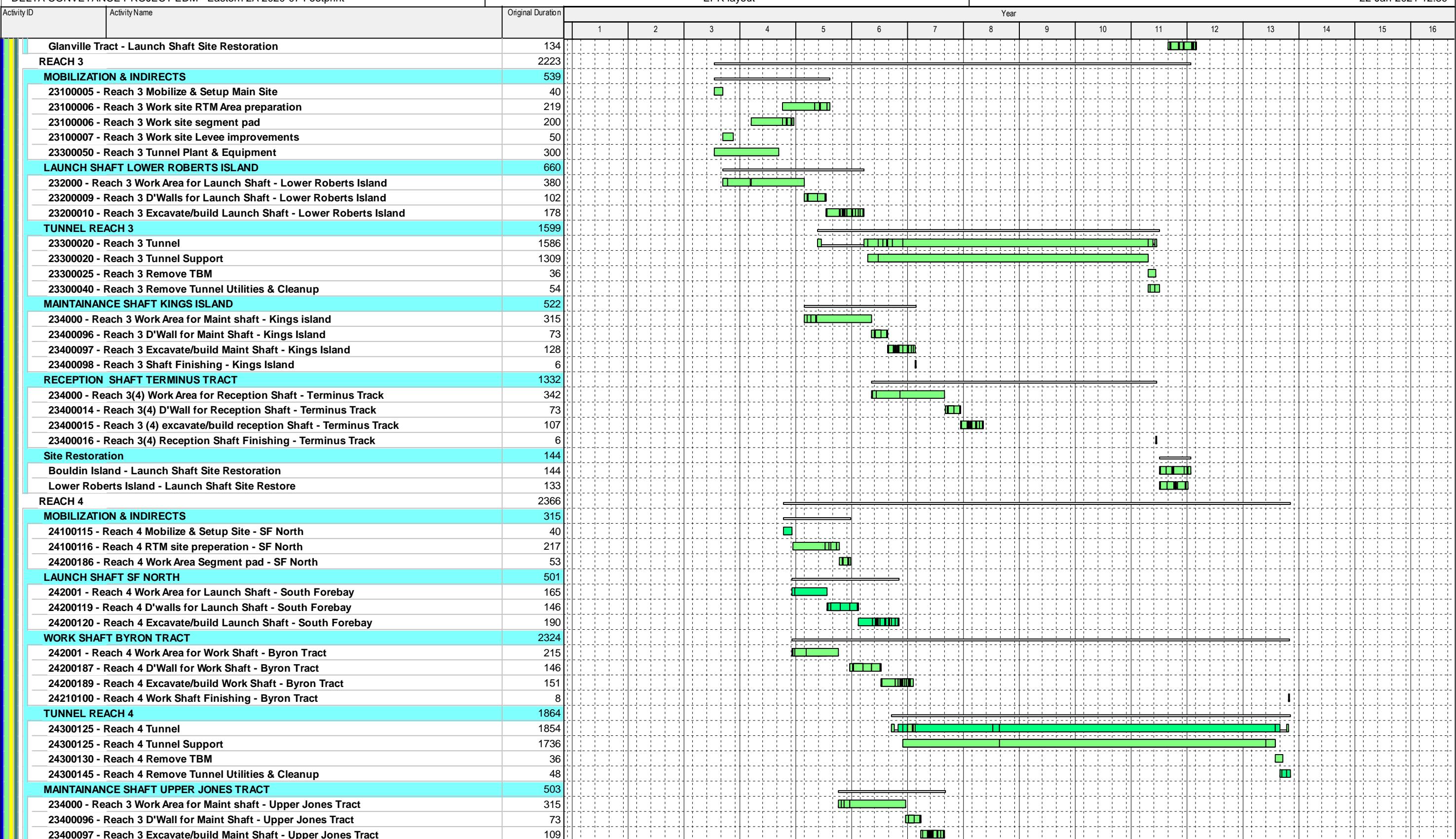
FINAL DRAFT

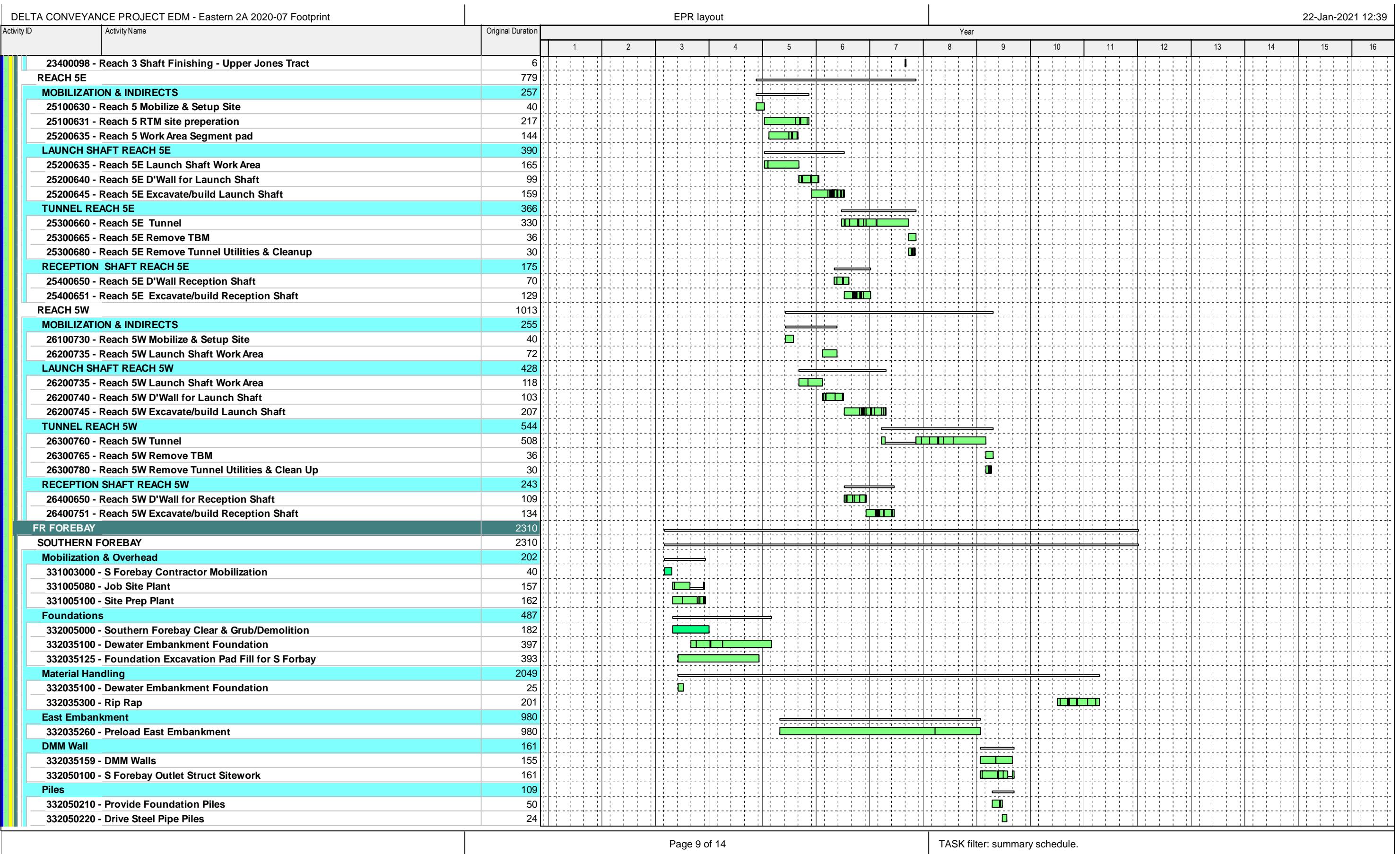
DELTA CONVEYANCE PROJECT EDM - Eastern 2A 2020-07 Footprint			EPR layout												Year											
Activity ID	Activity Name	Original Duration													Year											
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16								
DELTA CONVEYANCE PROJECT EDM - Eastern 2A 2020-07 Footprint		4111																								
CO CONSTRUCTION		4111																								
CO.PG PROGRAMMATIC MANAGEMENT		3591																								
CONSTRUCTION MILESTONES		3591																								
Construction Milestones		3591																								
G1010	NTP Early works	0	◆ NTP Early works																							
K1000	NTP Pumping Plant Works	0		◆ NTP Pumping Plant Works																						
A1000	NTP - Overall Construction Project	0		◆ NTP - Overall Construction Project																						
E1000	NTP Reach 2	0		◆ NTP Reach 2																						
C1000	NTP Reach 4	0			◆ NTP Reach 4																					
J1000	NTP Southern Forebay	0			◆ NTP Southern Forebay																					
D1000	NTP Reach 3	0			◆ NTP Reach 3																					
F1010	NTP - Reach 1	0				◆ NTP - Reach 1																				
G1000	NTP Intake 5	0				◆ NTP Intake 5																				
B1000	NTP Reach 5	0				◆ NTP Reach 5																				
G9010	NTP Intake 3	0				◆ NTP Intake 3																				
I1000	NTP Intermediate overlays	0				◆ NTP Intermediate overlays																				
G1020	NTP South Delta Connection Structures	0				◆ NTP South Delta Connection Structures																				
B9000	Reach 5 Complete	0					◆ Reach 5 Complete																			
F9002	Reach 1 Complete	0						◆ Reach 1 Complete																		
G9020	Intake 5 Complete	0							◆ Intake 5 Complete																	
D9000	Reach 3 Complete	0								◆ Reach 3 Complete																
J9000	Southern Forebay Complete	0								◆ Southern Forebay Complete																
E9000	Reach 2 Complete	0								◆ Reach 2 Complete																
G9000	Intake 3 Complete	0								◆ Intake 3 Complete																
K9000	Pumping Plant Complete	0									◆ Pumping Plant Complete															
G1030	South Delta Connection Structures Complete	0										◆ South Delta Connection Structures Complete														
C9000	Reach 4 Complete	0											◆ Reach 4 Complete													
I1010	NTP Final overlays	0												◆ NTP Final overlays												
Z9000	Project Snagging	0													◆ Project Snagging											
Z9010	Construction Completion	0														◆ Construction Completion										
CO.EW CONSTRUCTION EARLY WORKS		3425																								
ROAD WORKS		3425																								
NORTH ROAD WORKS		3425																								
MOB/FACILITIES NORTH		95																								
771002020-Contractor Site Management & Facilities - East - N		95																								
771003000 - Mobilization Both North		80																								
771003020-Mobilization - East - North		25																								
PARK AND RIDES		167																								
771310000 - Employee Park & Rides		54																								
771311000-Employee Park & Ride - Byron & Bethany - Both		17																								
771312000-Employee Park & Ride - Flag City - Both		11																								
771313000-Employee Park & Ride - I-5 & Charter Way - Both		12																								
771314000-Employee Park & Ride - Rio Vista - Both		18																								
771315000-Employee Park & Ride - Hood Franklin - Both		155																								
ACCESS TO INTAKES		201																								
771120000 - Hood Franklin Road Widening		5																								
771130000-Intakes Access Road - Both		15																								

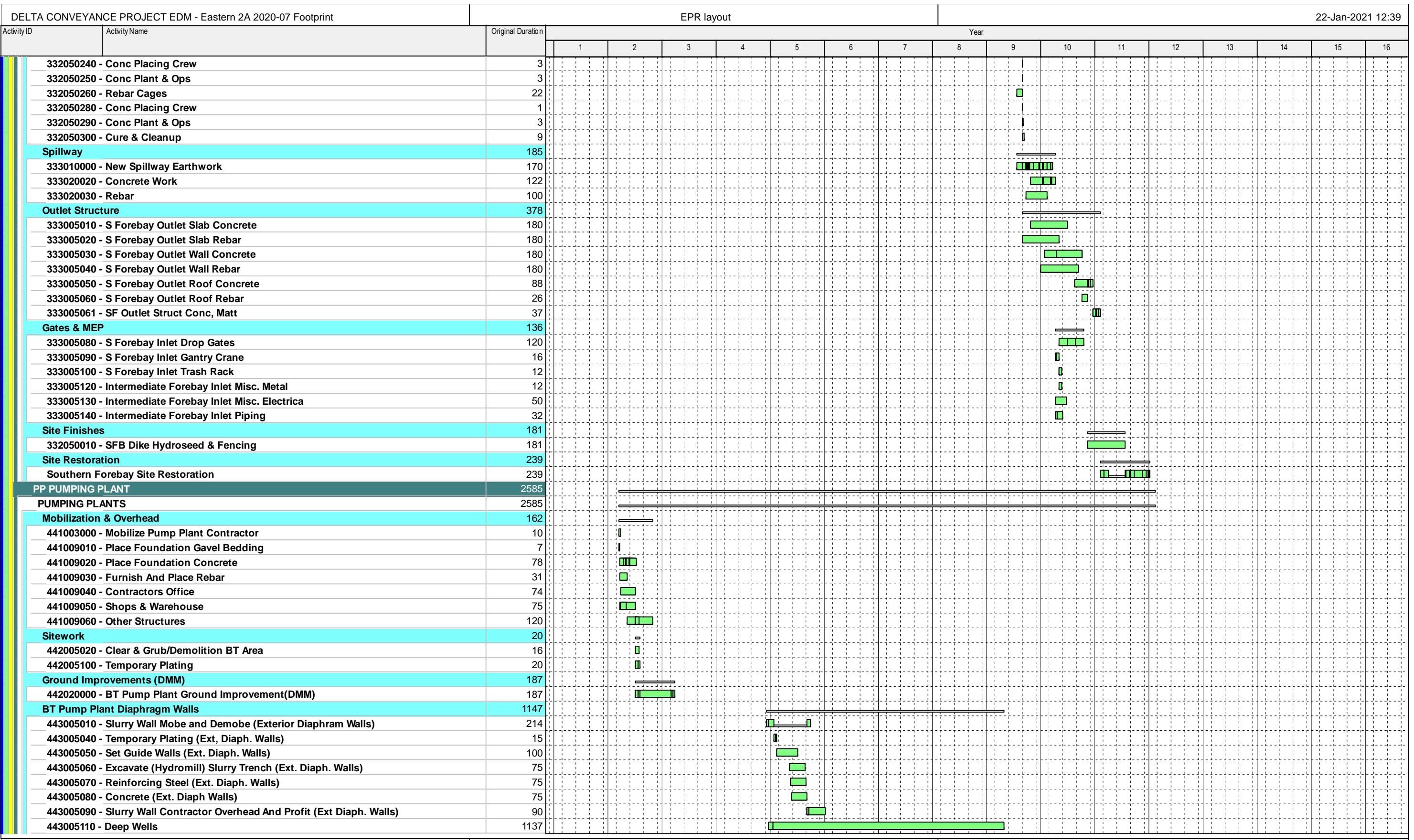




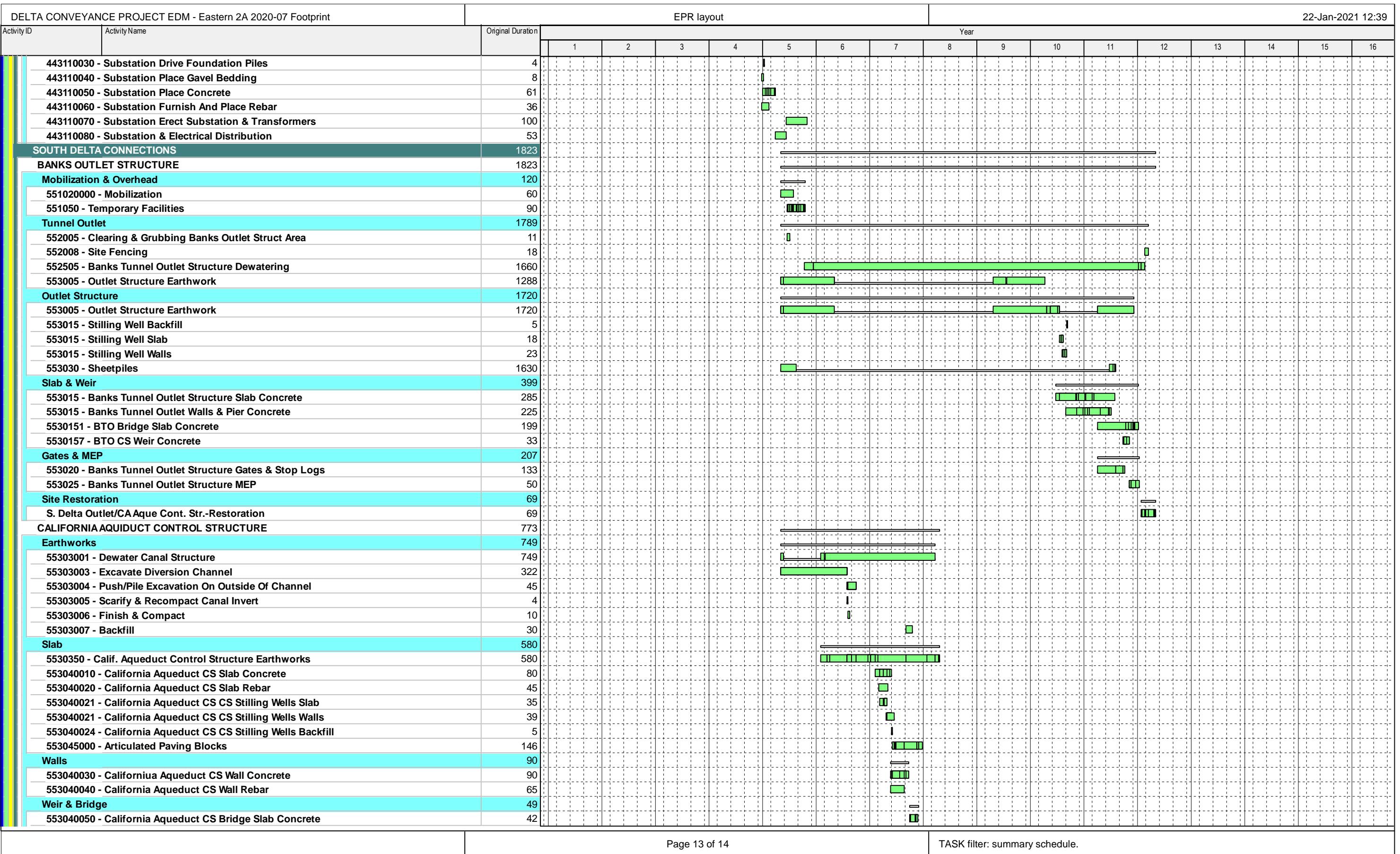


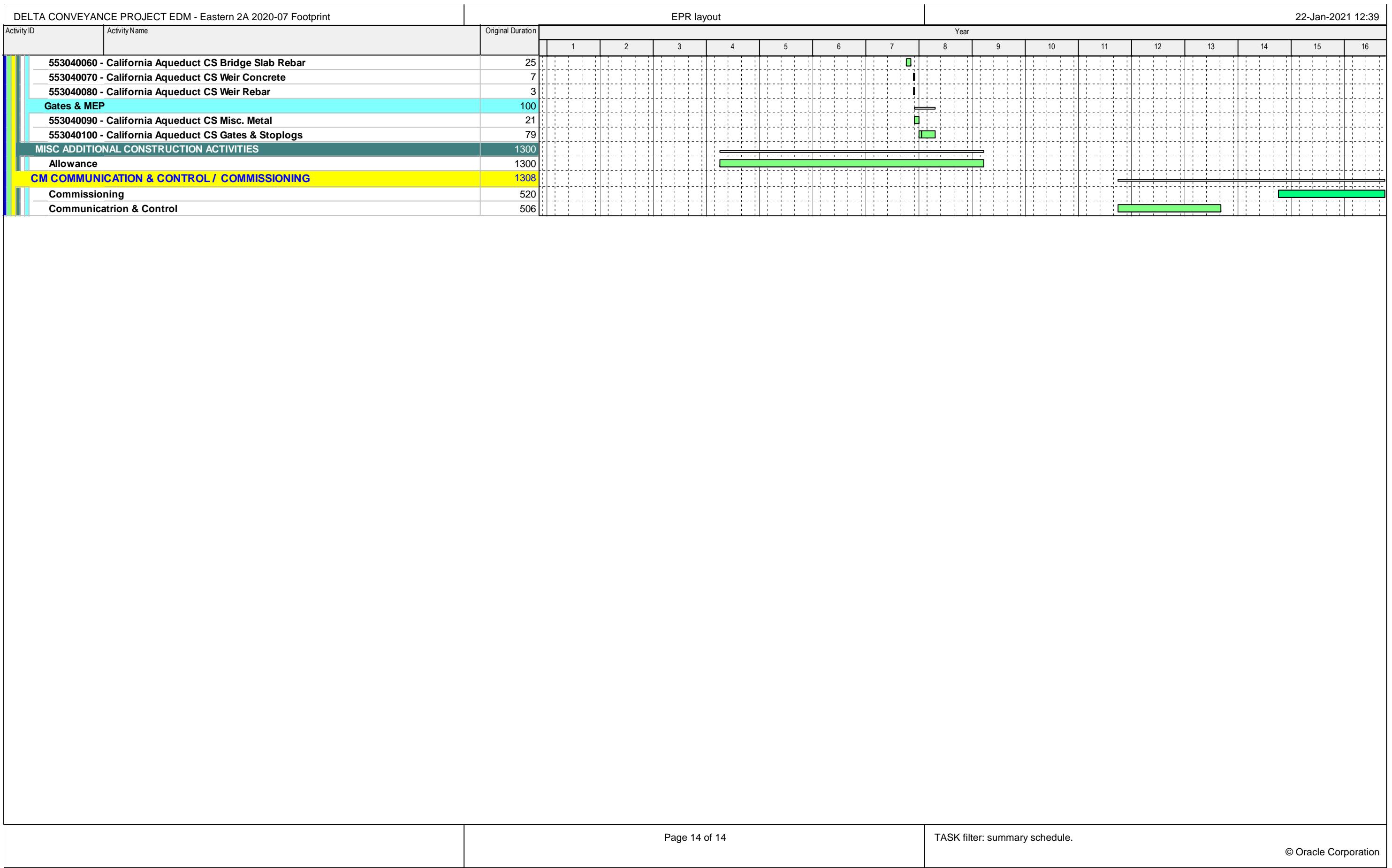






DELTA CONVEYANCE PROJECT EDM - Eastern 2A 2020-07 Footprint		Original Duration	EPR layout							Year											
Activity ID	Activity Name		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16			
444005050 - Wet Well Slurry Wall Set Guide Walls	83																				
444005060 - Wet Well Excavate (Hydromill) Slurry Trench	50																				
444005070 - Wet Well Reinforcing Steel	50																				
444005080 - Wet Well Concrete	50																				
444010010 - Wet Well Inlet Place Concrete (Bottom Slab)	23																				
444010020 - Wet Well Inlet Furnish And Place Rebar (Bottom Slab)	23																				
444010030 - Wet Well Inlet Foundation Prep (Bottom Slab)	4																				
444015010 - Wet Well Inlet Place Concrete (Walls)	103																				
444015020 - Wet Well Inlet Furnish And Place Rebar (Walls)	98																				
444020010 - Wet Well Inlet Top Deck Place Concrete	82																				
444020020 - Wet Well Inlet Top Deck Furnish And Place Rebar	20																				
444025010 - Wet Well Inlet Top Deck Double Isolation Roller Gates	144																				
444025020 - Wet Well Inlet Top Deck Double Isolation Gantry Crane	15																				
Outlet Structure	657																				
442070000 - Gravity Flow Outlet Structure Sheet Pile for Exc.	68																				
442071000 - Remove Top 105' of Interior Wall	24																				
442080000 - Excavation for Gravity Flow Structure	51																				
444030010 - Place Concrete (Bottom Slab)	70																				
444030020 - Furnish And Place Rebar (Bottom Slab)	50																				
444030030 - Foundation Prep (Bottom Slab)	20																				
444035010 - Place Concrete (Walls)	69																				
444035020 - Furnish And Place Rebar (Walls)	37																				
444040010 - Place Concrete (Top Slab)	109																				
444040020 - Furnish And Place Rebar (Top Slab)	80																				
444050010 - Gravity Flow Roller Gates	35																				
444050020 - Gravity Flow Gantry Crane	15																				
444055010 - Gravity Flow Structure Place Concrete	160																				
444055020 - Gravity Flow Structure Furnish And Place Rebar	120																				
444055030 - Gravity Flow Structure Foundation Prep	59																				
444060010 - PP Outlet Retaining Wall Concrete	50																				
444060020 - PP Outlet Retaining Wall Rebar	25																				
444060030 - PP Outlet Retaining Wall Concrete	2																				
444061010 - Slab & Walls Between PP & Launch Shaft Wall Concrete	55																				
444065000 - PP Gravity Outlet Flow Structure Overhead Crane	68																				
Ancillary Buildings & Structures	1731																				
443090010 - PP MCC/Electrical Building Foundation Slab	60																				
443090020 - PP MCC/Electrical Building Furnish And Place Rebar	23																				
443090030 - PP MCC/Electrical Building Building Construction And Equipment	102																				
443095010 - PP Storage Area & Yard Place Gavel Bedding	11																				
443095020 - PP Storage Area & Yard Place Foundation Slab Concrete	109																				
443095030 - PP Storage Area & Yard Furnish And Place Rebar	69																				
443095040 - PP Storage Area & Yard Building Construction And Equipment	229																				
443100020 - PP Storage Area & Yard Place Gavel Bedding	3																				
443105010 - Generator Building Place Foundation Gravel Bedding	1																				
443105020 - Generator Building Place Foundation Concrete	18																				
443105030 - Generator Building Furnish And Place Rebar	9																				
443105040 - Generator Building Construction And Equipment	18																				
443106010 - HVAC Yard Place Foundation Gravel Bedding	3																				
443106020 - HVAC Yard Place Foundation Concrete	14																				
443106030 - HVAC Yard Furnish And Place Rebar	5																				
443106040 - HVAC Yard Equipment Install	10																				
443110010 - Substation Excavate/Grade Foundation Slab	3																				
443110020 - Substation Provide Foundation Piles (50 LF)	10																				

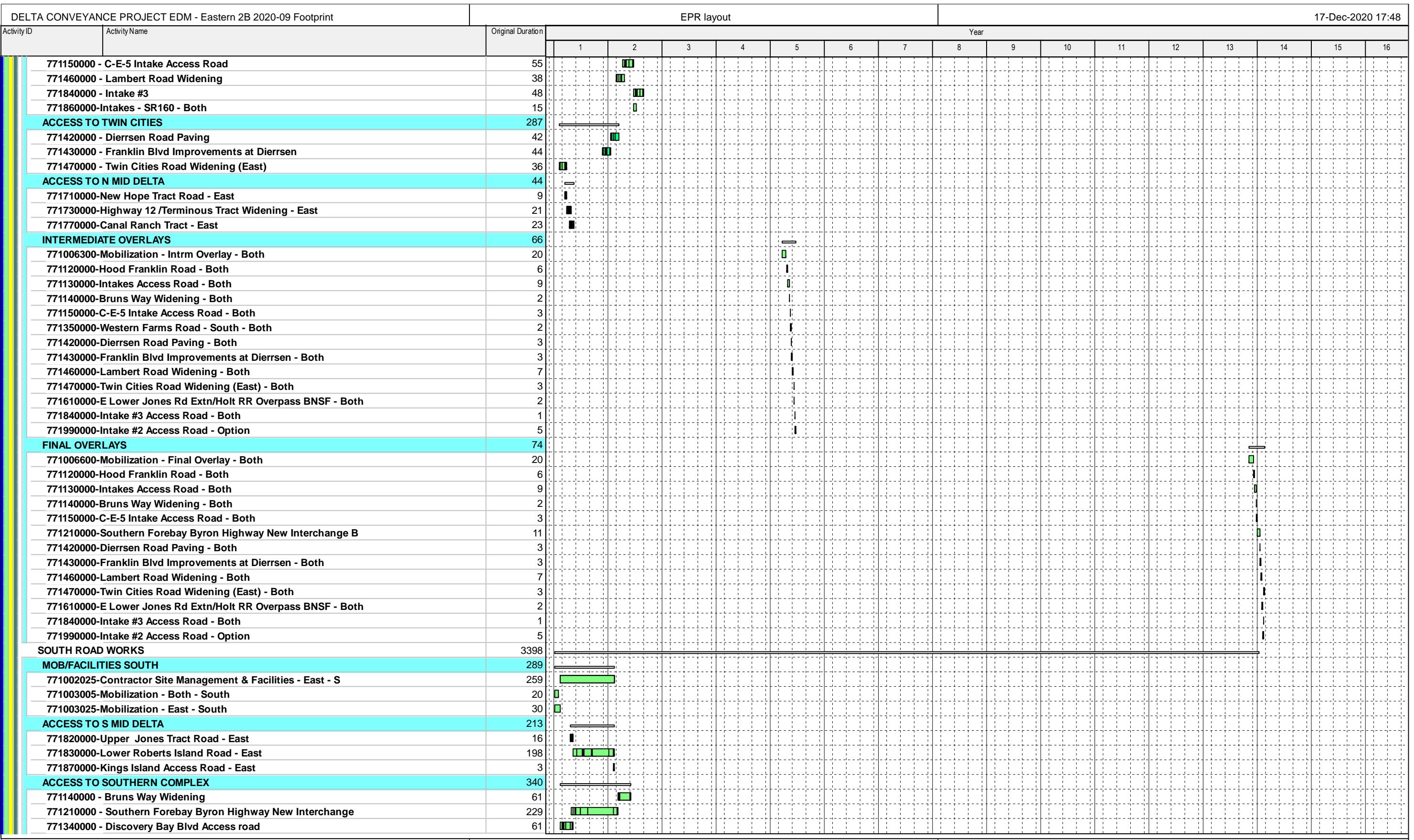


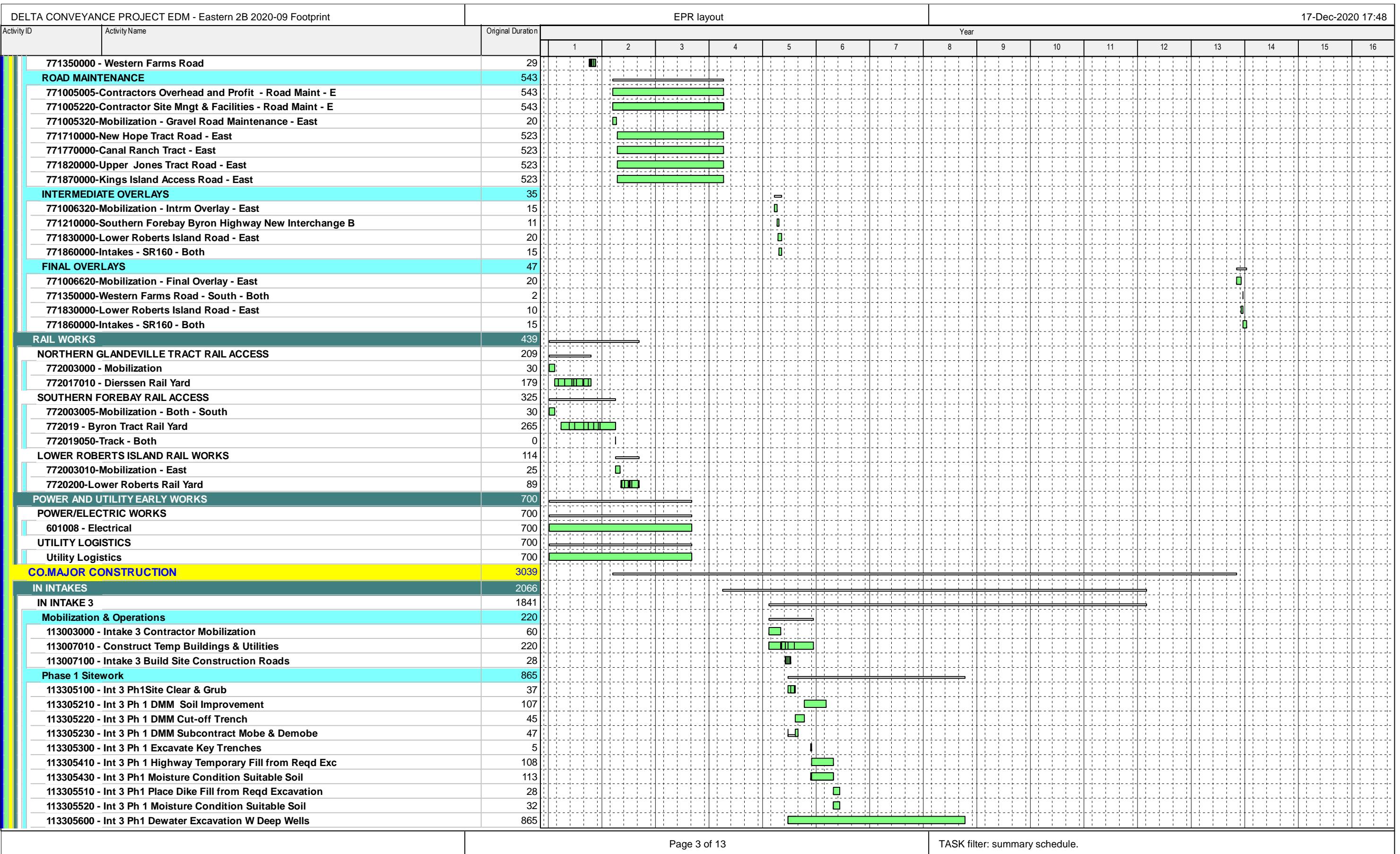


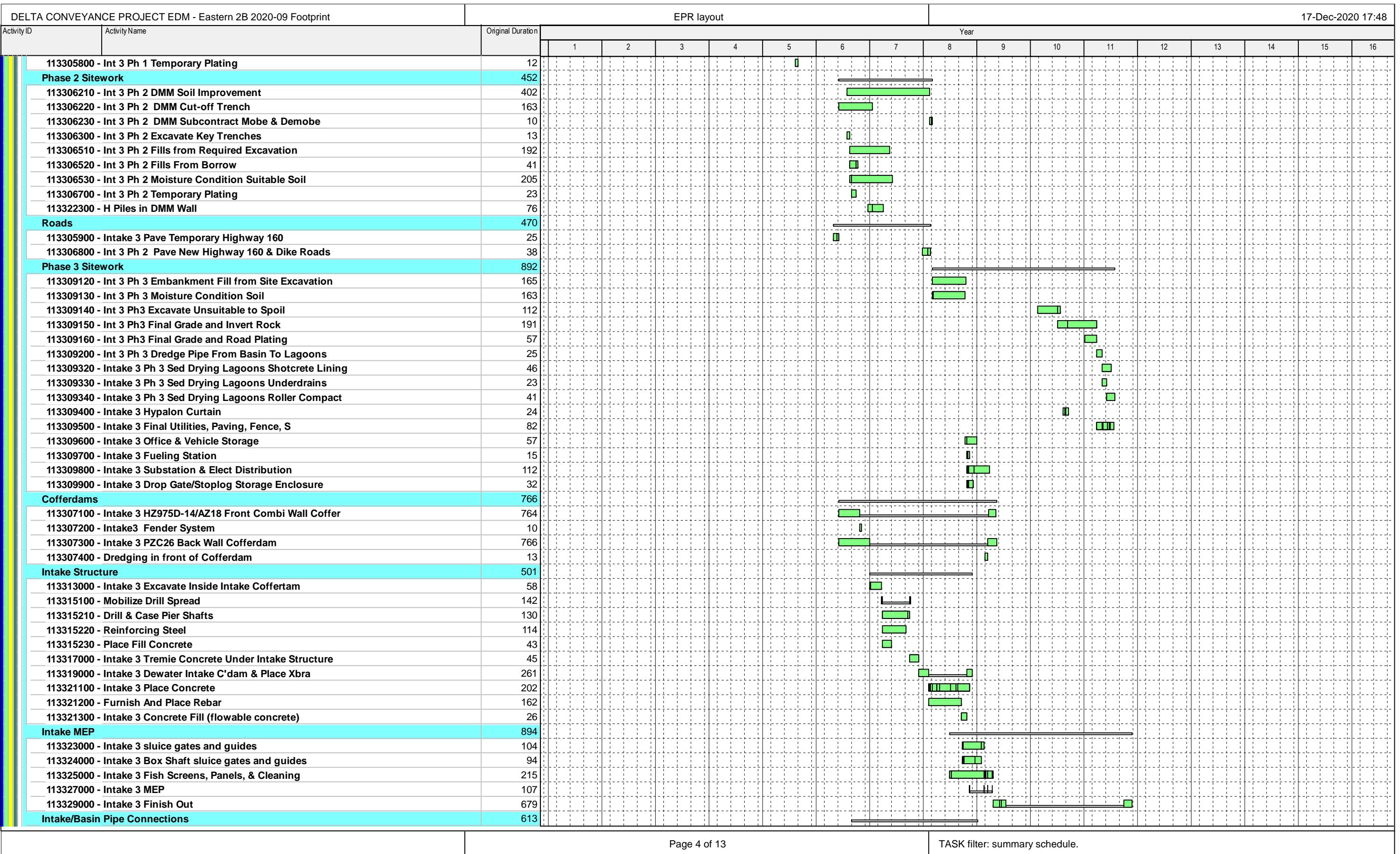
Construction Schedule - Option 2B: Eastern Alignment 6000 cfs Tee Screen Intake

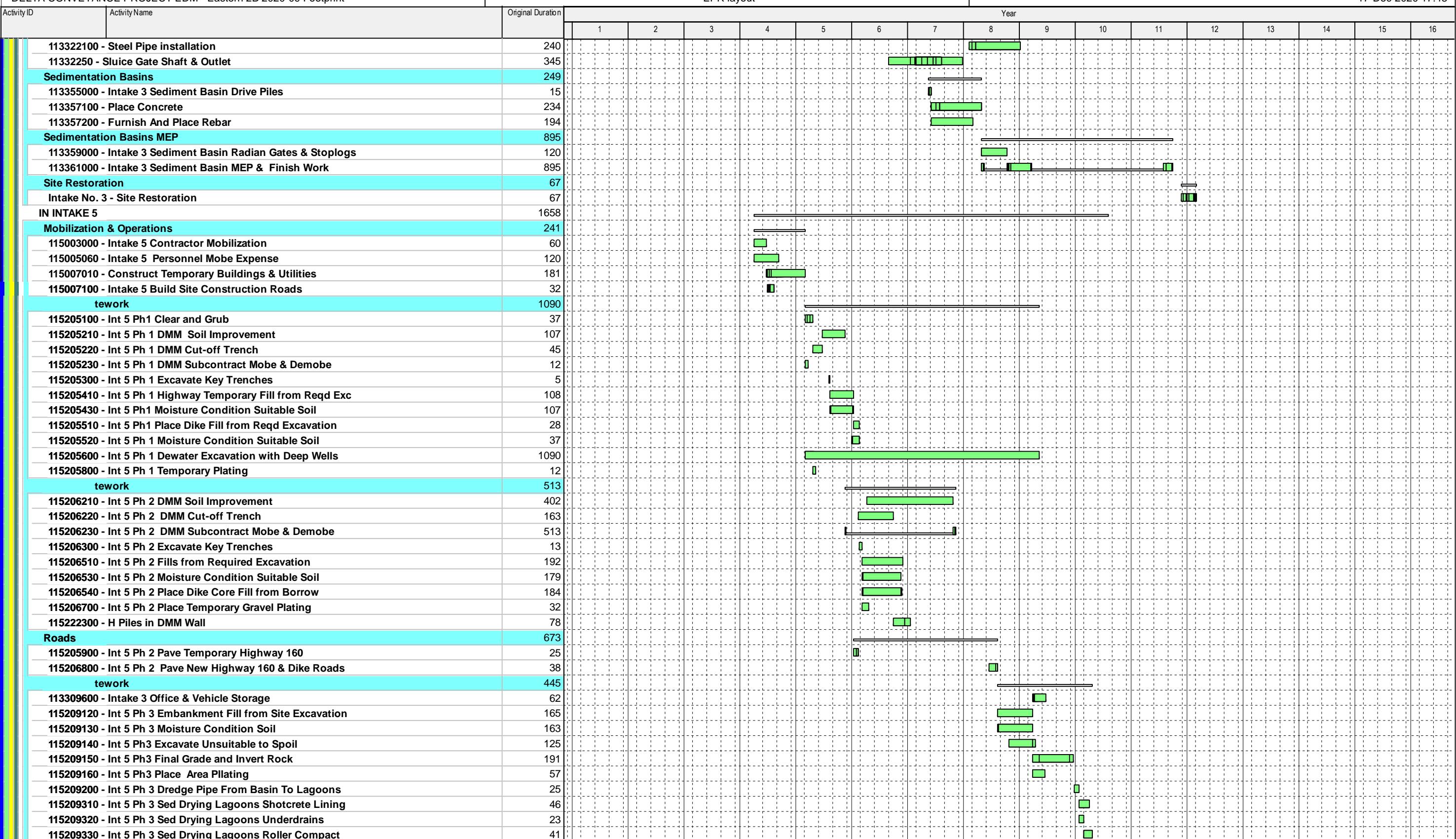
FINAL DRAFT

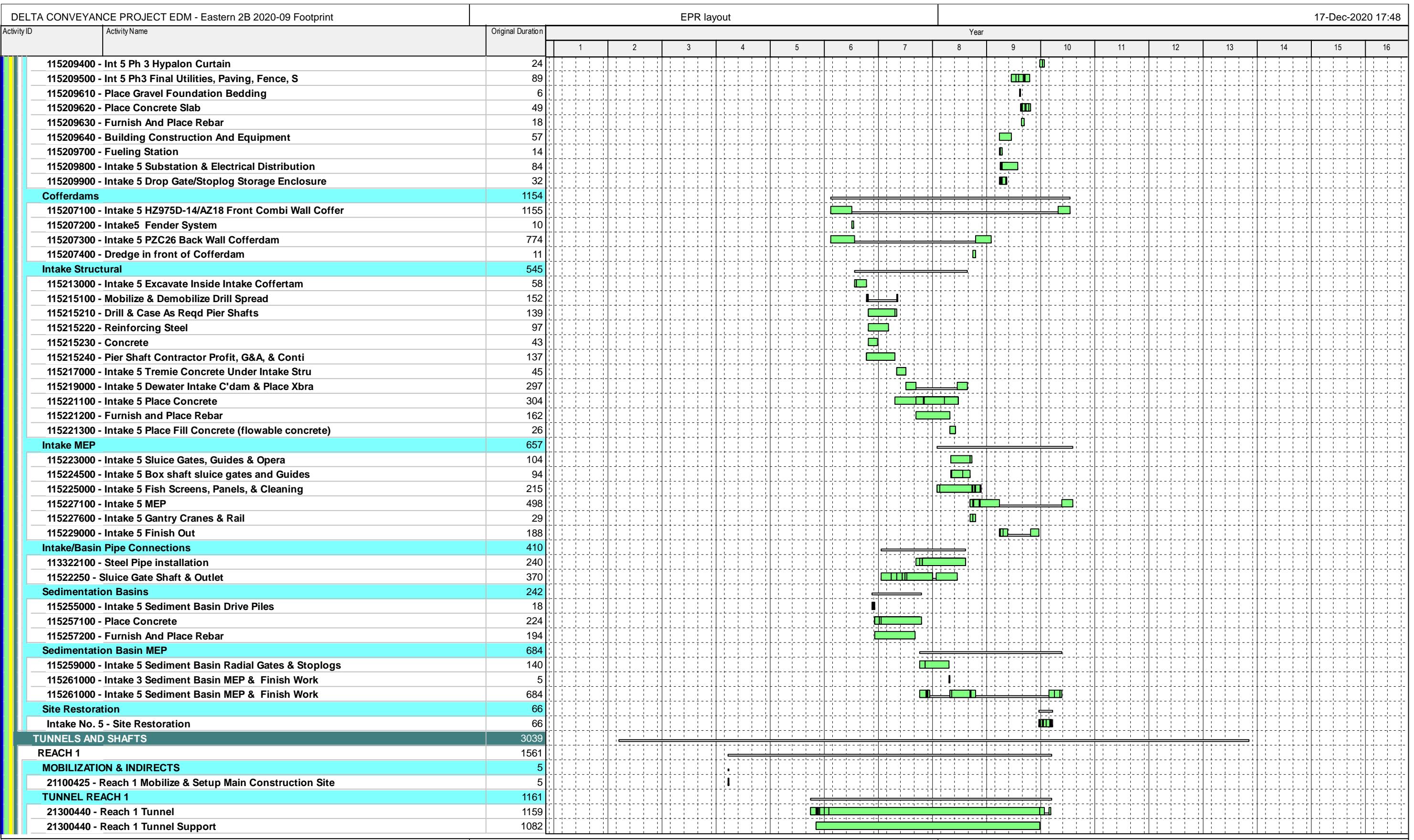
DELTA CONVEYANCE PROJECT EDM - Eastern 2B 2020-09 Footprint			EPR layout												Year											
Activity ID	Activity Name	Original Duration													Year											
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16								
DELTA CONVEYANCE PROJECT EDM - Eastern 2B 2020-09 Footprint		4111																								
CO CONSTRUCTION		4111																								
CO.PG PROGRAMMATIC MANAGEMENT		3591																								
CONSTRUCTION MILESTONES		3591																								
Construction Milestones		3591																								
G1010	NTP Early works	0	◆ NTP Early works																							
K1000	NTP Pumping Plant Works	0		◆ NTP Pumping Plant Works																						
A1000	NTP - Overall Construction Project	0		◆ NTP - Overall Construction Project																						
E1000	NTP Reach 2	0		◆ NTP Reach 2																						
C1000	NTP Reach 4	0			◆ NTP Reach 4																					
J1000	NTP Southern Forebay	0			◆ NTP Southern Forebay																					
D1000	NTP Reach 3	0			◆ NTP Reach 3																					
F1010	NTP - Reach 1	0				◆ NTP - Reach 1																				
G1000	NTP Intake 5	0				◆ NTP Intake 5																				
B1000	NTP Reach 5	0				◆ NTP Reach 5																				
G9010	NTP Intake 3	0				◆ NTP Intake 3																				
I1000	NTP Intermediate overlays	0				◆ NTP Intermediate overlays																				
G1020	NTP South Delta Connection Structures	0				◆ NTP South Delta Connection Structures																				
B9000	Reach 5 Complete	0					◆ Reach 5 Complete																			
F9002	Reach 1 Complete	0						◆ Reach 1 Complete																		
G9020	Intake 5 Complete	0						◆ Intake 5 Complete																		
D9000	Reach 3 Complete	0							◆ Reach 3 Complete																	
J9000	Southern Forebay Complete	0							◆ Southern Forebay Complete																	
E9000	Reach 2 Complete	0							◆ Reach 2 Complete																	
G9000	Intake 3 Complete	0							◆ Intake 3 Complete																	
K9000	Pumping Plant Complete	0								◆ Pumping Plant Complete																
G1030	South Delta Connection Structures Complete	0								◆ South Delta Connection Structures Complete																
C9000	Reach 4 Complete	0									◆ Reach 4 Complete															
I1010	NTP Final overlays	0									◆ NTP Final overlays															
Z9000	Project Snagging	0										◆ Project Snagging														
Z9010	Construction Completion	0											◆ Construction Completion													
CO.EW CONSTRUCTION EARLY WORKS		3425																								
ROAD WORKS		3425																								
NORTH ROAD WORKS		3425																								
MOB/FACILITIES NORTH		95																								
771002020-Contractor Site Management & Facilities - East - N		95																								
771003000 - Mobilization Both North		80																								
771003020-Mobilization - East - North		25																								
PARK AND RIDES		167																								
771310000 - Employee Park & Rides		54																								
771311000-Employee Park & Ride - Byron & Bethany - Both		17																								
771312000-Employee Park & Ride - Flag City - Both		11																								
771313000-Employee Park & Ride - I-5 & Charter Way - Both		12																								
771314000-Employee Park & Ride - Rio Vista - Both		18																								
771315000-Employee Park & Ride - Hood Franklin - Both		155																								
ACCESS TO INTAKES		201																								
771120000 - Hood Franklin Road Widening		5																								
771130000-Intakes Access Road - Both		15																								

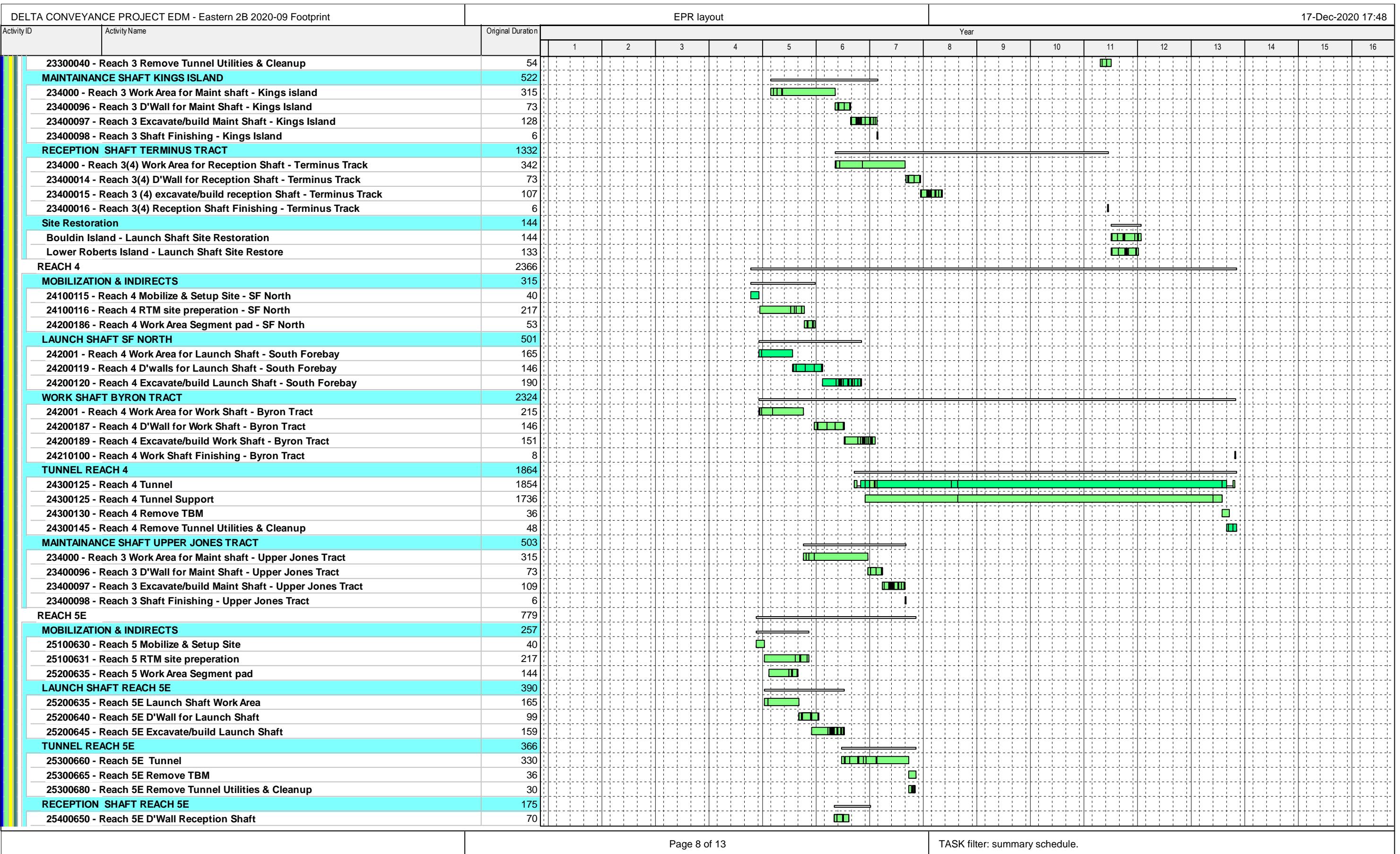


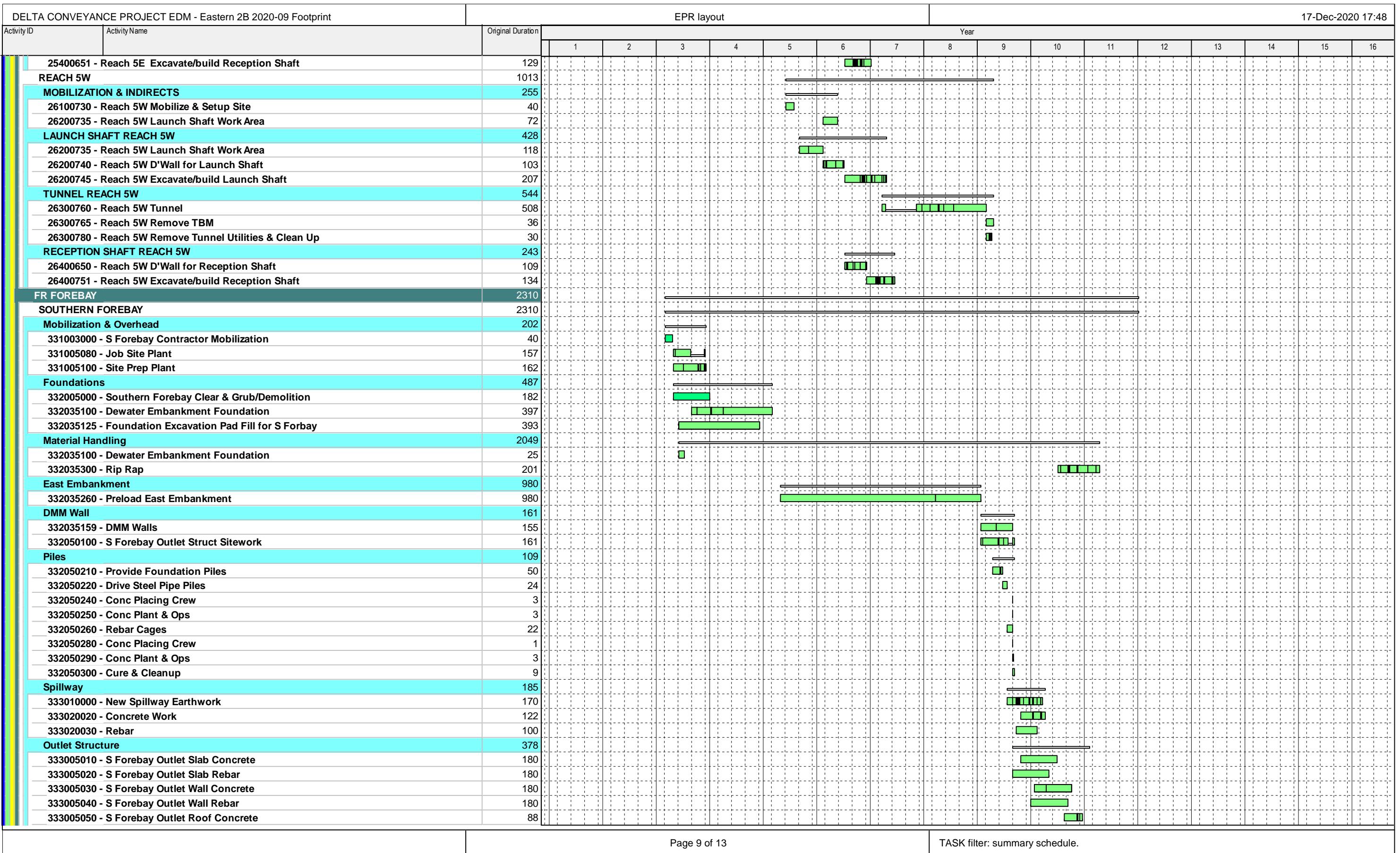












DELTA CONVEYANCE PROJECT EDM - Eastern 2B 2020-09 Footprint		Original Duration	EPR layout								Year											
Activity ID	Activity Name		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
	443025010 - Place Concrete (Slab at El.-77.0)	55																				
	443025020 - Furnish And Place Rebar (Slab at El.-77.0)	45																				
	443025030 - Foundation Prep (Slab at El.-77.0)	22																				
	Pump Plant Operation Deck & Structure Above El. 2950	651																				
	443030010 - Interior Walls to OP Deck Place Concrete	104																				
	443030020 - Interior Walls Furnish And Place Rebar	45																				
	443030030 - Interior Walls Foundation Prep	10																				
	443035010 - Operations Deck Place Concrete	271																				
	443035020 - Operations Deck Furnish And Place Rebar	131																				
	443070000 - PP Structure Above El. 2950	200																				
	443080000 - Pump Plant Roof Structure	74																				
	Structure Misc Metals & MEP	1391																				
	443040000 - Pump Plant Miscellaneous Metals	975																				
	443045000 - 1123 cfs Pumps & Operators	1104																				
	443050000 - 563 cfs Pumps & Operators	105																				
	443051000 - Wet Well Dewatering Pumps	85																				
	Pump Plant MEP	100																				
	443075000 - Pump Plant Overhead Crane	68																				
	443085000 - Pump Plant Structure Finish Out	100																				
	Dissipation Slab	1111																				
	442050000 - Pump Plant Exc. For Splash Basin	174																				
	442055010 - Mobilize & Demob Drill Spread	64																				
	442055030 - Drill & Case As Reqd Pier Shafts	23																				
	442055040 - Reinforcing Steel - CDIH Piers	13																				
	442055050 - Concrete - CDIH Piers	7																				
	442055060 - Pier Shaft Contractor Profit, G&A, & Conti	23																				
	443055000 - Piping to Splash Basin	250																				
	443060010 - PP Pipe Encasement Place Concrete	140																				
	443060020 - PP Pipe Encasement Furnish And Place Rebar	100																				
	443060030 - PP Pipe Encasement Foundation Prep	9																				
	443065010 - Splash Pad Place Concrete	115																				
	443065020 - Splash Pad Furnish And Place Rebar	75																				
	443065030 -Splash Pad Foundation Prep	24																				
	Wet Well	886																				
	442045000 - Dewater & Install Bracing in Wet Well Section	640																				
	442065000 - Excavate WetWell Inlet Conduit	20																				
	444005010 - Wet Well Slurry Wall Mobe & Demob	173																				
	444005050 - Wet Well Slurry Wall Set Guide Walls	83																				
	444005060 - Wet Well Excavate (Hydromill) Slurry Trench	50																				
	444005070 - Wet Well Reinforcing Steel	50																				
	444005080 - Wet Well Concrete	50																				
	444010010 - Wet Well Inlet Place Concrete (Bottom Slab)	23																				
	444010020 - Wet Well Inlet Furnish And Place Rebar (Bottom Slab)	23																				
	444010030 - Wet Well Inlet Foundation Prep (Bottom Slab)	4																				
	444015010 - Wet Well Inlet Place Concrete (Walls)	103																				
	444015020 - Wet Well Inlet Furnish And Place Rebar (Walls)	98																				
	444020010 - Wet Well Inlet Top Deck Place Concrete	82																				
	444020020 - Wet Well Inlet Top Deck Furnish And Place Rebar	20																				
	444025010 - Wet Well Inlet Top Deck Double Isolation Roller Gates	144																				
	444025020 - Wet Well Inlet Top Deck Double Isolation Gantry Crane	15																				
	Outlet Structure	657																				
	442070000 - Gravity Flow Outlet Structure Sheet Pile for Exc.	68																				
	442071000 - Remove Top 105' of Interior Wall	24																				

