

Section 8

PHASING AND COSTS

8.1 PHASING

The phasing of the Master Plan is predicated on three major drivers:

- The demand by business users;
- The availability of funding; and,
- Contractual commitments.

Irrespective of the schedule shown in the Master Plan, it is set up to be able to adjust to these three main factors. It is important for the Port to keep pace with growth while avoiding overbuilding as it does not have the financial wherewithal to do so.

Phasing decisions will be driven by the five-year capital program that needs to be reviewed annually. In this way, the Port can stretch its resources to meet its most pressing needs. However, it is also noteworthy that, as the Port matures, the costs for renewal, replacement, and maintenance become a larger part of the overall budget.

Of particular challenge is the fact that the Port has some major short-term upcoming costs which are investments for the future. They are namely the deepening of the South Channel to allow for Super post-Panamax cargo vessels to use the cargo port facilities and the implementation of the Port access tunnel that will provide for cargo and cruise traffic efficiencies and lessen traffic impacts on the downtown Miami core. Both of these projects will consume large amounts of funds. This may have the potential effect of using all resources and prevent further development of the Port. This needs to be carefully reviewed in order to mitigate any potential financial challenges associated with future development programs.

8.2 CAPITAL PROGRAM

As part of the Master Plan, new projects that have been identified and combined with the projects that the Port already has in its current Capital Program. Figure 8.1 illustrates the totality of the many different projects. The number assigned to the project reflects the source of each. If it is a numerical code, it is from the Port's current CIP. The new projects identified as part of the Master Plan begin with MP as their code.

The projects have been divided into each of the Port's current business units in order to be able to measure the eventual return generated by each investment. These have been further segregated by business type:

- Figure 8.2 shows the capital improvements associated with cruise investments;
- Figure 8.3 shows the cargo development plan and investments;

- Figure 8.4 shows the commercial development plan and investments;
- Figure 8.5 shows the rail program; and,
- Figure 8.6 shows the transportation improvements and plan.

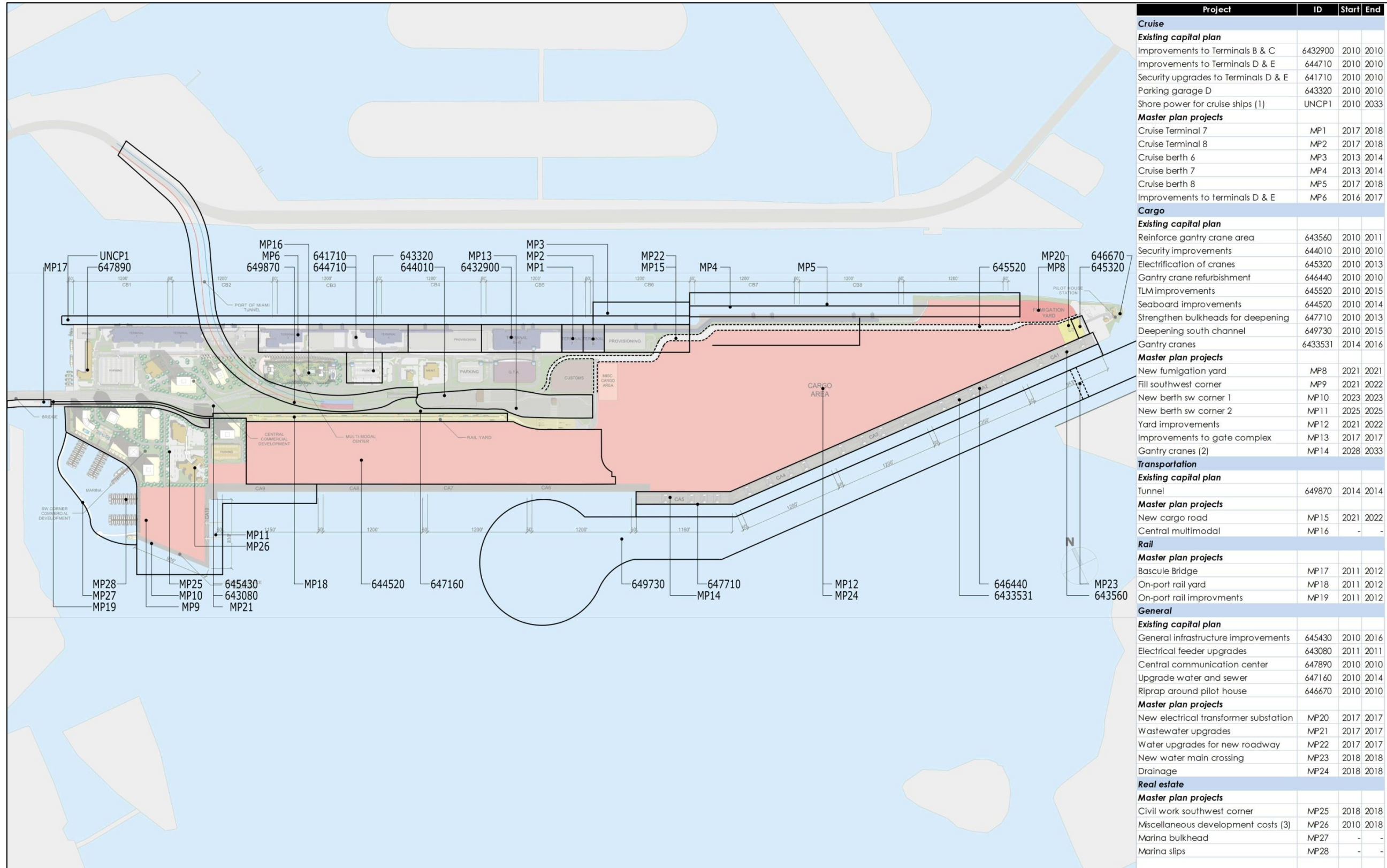
Furthermore, the phasing plans below are coordinated with the cost section. Each plan element is tied directly to this chart financially (cost is indicated for each project) and by phasing timeline (start and end dates for each project are identified) on the phasing plan list for each business unit.

While the Master Plan does tie dates to plan items, each should be reviewed by the Port in terms of need based upon commercial aspects such as cruise throughput demand and cargo capacity requirements, amongst others, in order to accurately identify the required timing. Additionally, each major capital program project will require planning by the Port and master planning to reflect the user requirements and current standards associated with government, security, and other needs.

As a reference to the below overall and individual phasing plans shown the following notes are applicable and labeled accordingly on the corresponding plan:

- 1) **SHORE POWER FOR CRUISE SHIPS (CRUISE) UNCPI:** These items happen over the course of the master planning period with investments in 2010, 2020, 2023, 2028 and 2033.
- 2) **GANTRY CRANES (CARGO) MPI4:** Over the master planning period, gantry cranes are added to support the anticipated increase in container capacity. The dates range from 2014 (4 gantry cranes purchased by POM – not included in the Master Plan budget) 2028, 2029, 2031, 2033, and 2034. Gantry crane additions are based upon the container volume and not all depicted on the master plan phasing program.
- 3) **MISCELLANEOUS DEVELOPMENT COSTS (COMMERCIAL REAL ESTATE) MP25:** These items are incurred in 2010 and 2018 for the southwest corner primarily for master planning aspects of the projects.

FIGURE 8.1: OVERALL PHASING PLAN



Project	ID	Start	End
Cruise			
Existing capital plan			
Improvements to Terminals B & C	6432900	2010	2010
Improvements to Terminals D & E	644710	2010	2010
Security upgrades to Terminals D & E	641710	2010	2010
Parking garage D	643320	2010	2010
Shore power for cruise ships (1)	UNCP1	2010	2033
Master plan projects			
Cruise Terminal 7	MP1	2017	2018
Cruise Terminal 8	MP2	2017	2018
Cruise berth 6	MP3	2013	2014
Cruise berth 7	MP4	2013	2014
Cruise berth 8	MP5	2017	2018
Improvements to terminals D & E	MP6	2016	2017
Cargo			
Existing capital plan			
Reinforce gantry crane area	643560	2010	2011
Security improvements	644010	2010	2010
Electrification of cranes	645320	2010	2013
Gantry crane refurbishment	646440	2010	2010
TLM improvements	645520	2010	2015
Seaboard improvements	644520	2010	2014
Strengthen bulkheads for deepening	647710	2010	2013
Deepening south channel	649730	2010	2015
Gantry cranes	6433531	2014	2016
Master plan projects			
New fumigation yard	MP8	2021	2021
Fill southwest corner	MP9	2021	2022
New berth sw corner 1	MP10	2023	2023
New berth sw corner 2	MP11	2025	2025
Yard improvements	MP12	2021	2022
Improvements to gate complex	MP13	2017	2017
Gantry cranes (2)	MP14	2028	2033
Transportation			
Existing capital plan			
Tunnel	649870	2014	2014
Master plan projects			
New cargo road	MP15	2021	2022
Central multimodal	MP16	-	-
Rail			
Master plan projects			
Bascule Bridge	MP17	2011	2012
On-port rail yard	MP18	2011	2012
On-port rail improvements	MP19	2011	2012
General			
Existing capital plan			
General infrastructure improvements	645430	2010	2016
Electrical feeder upgrades	643080	2011	2011
Central communication center	647890	2010	2010
Upgrade water and sewer	647160	2010	2014
Riprap around pilot house	646670	2010	2010
Master plan projects			
New electrical transformer substation	MP20	2017	2017
Wastewater upgrades	MP21	2017	2017
Water upgrades for new roadway	MP22	2017	2017
New water main crossing	MP23	2018	2018
Drainage	MP24	2018	2018
Real estate			
Master plan projects			
Civil work southwest corner	MP25	2018	2018
Miscellaneous development costs (3)	MP26	2010	2018
Marina bulkhead	MP27	-	-
Marina slips	MP28	-	-

FIGURE 8.2: CRUISE DEVELOPMENT PHASING PLAN



FIGURE 8.3: CARGO DEVELOPMENT PHASING PLAN

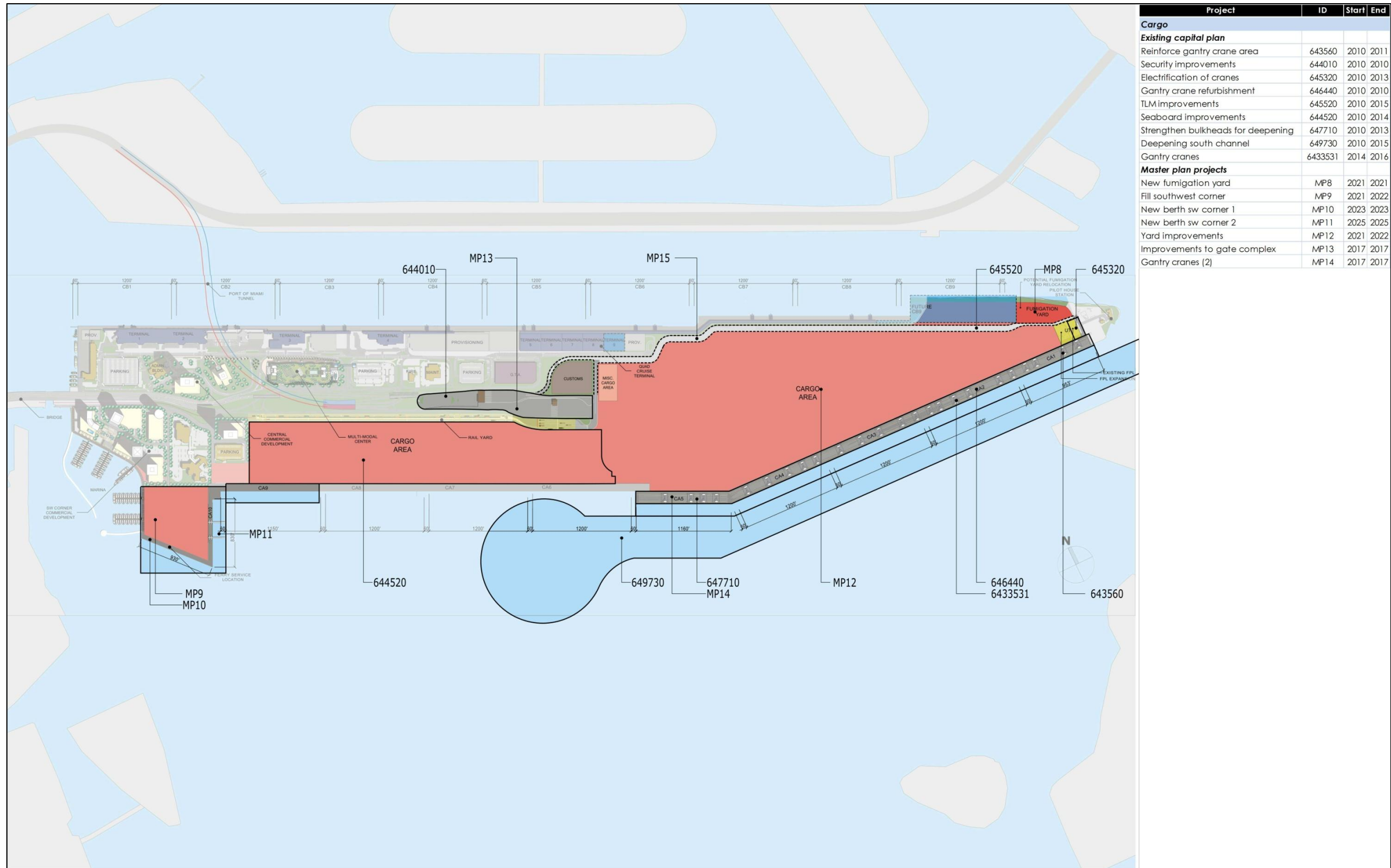
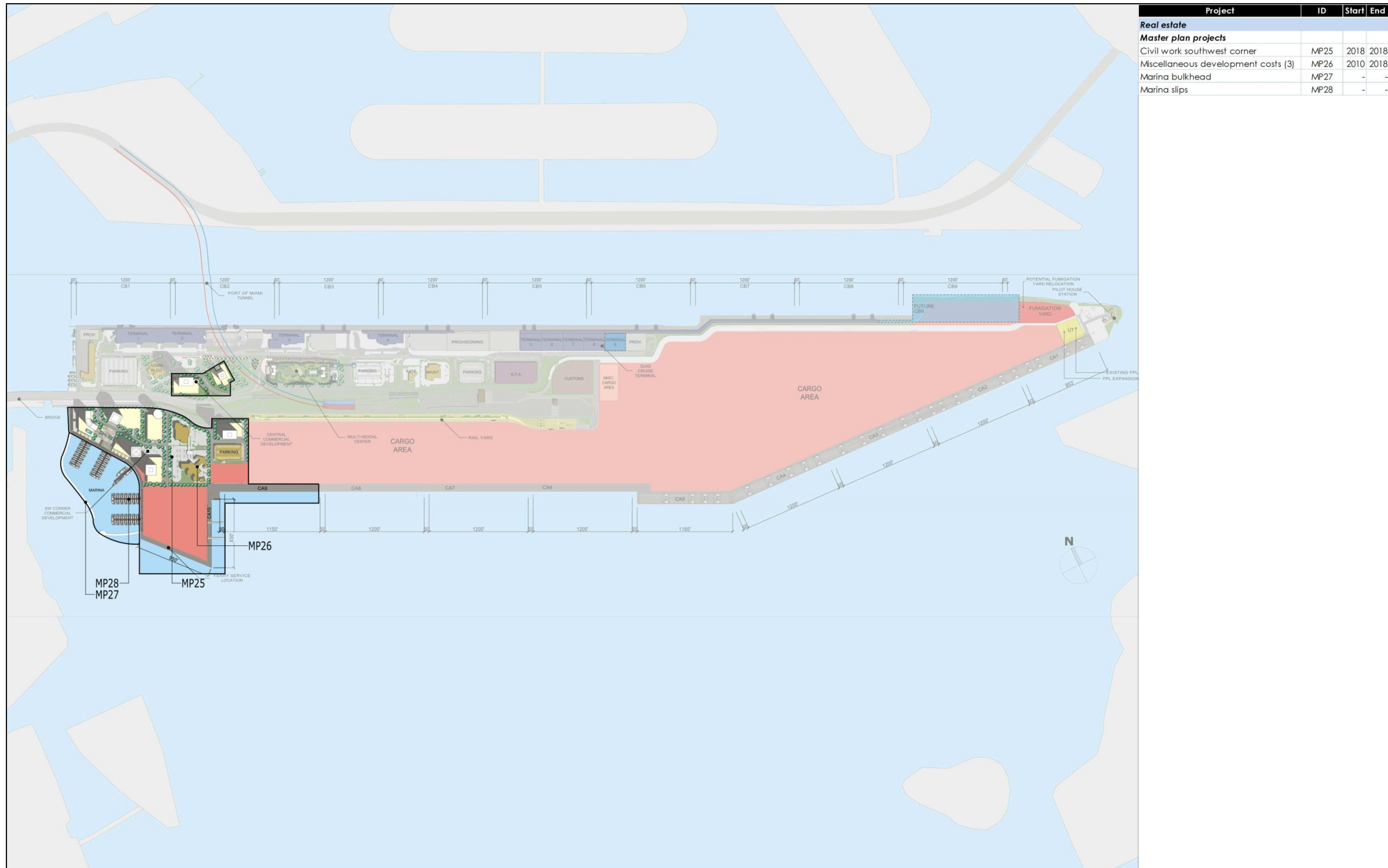


FIGURE 8.4: COMMERCIAL DEVELOPMENT PHASING PLAN



Project	ID	Start	End
Real estate			
Master plan projects			
Civil work southwest corner	MP25	2018	2018
Miscellaneous development costs (3)	MP26	2010	2018
Marina bulkhead	MP27	-	-
Marina slips	MP28	-	-

FIGURE 8.5: RAIL DEVELOPMENT PHASING PLAN

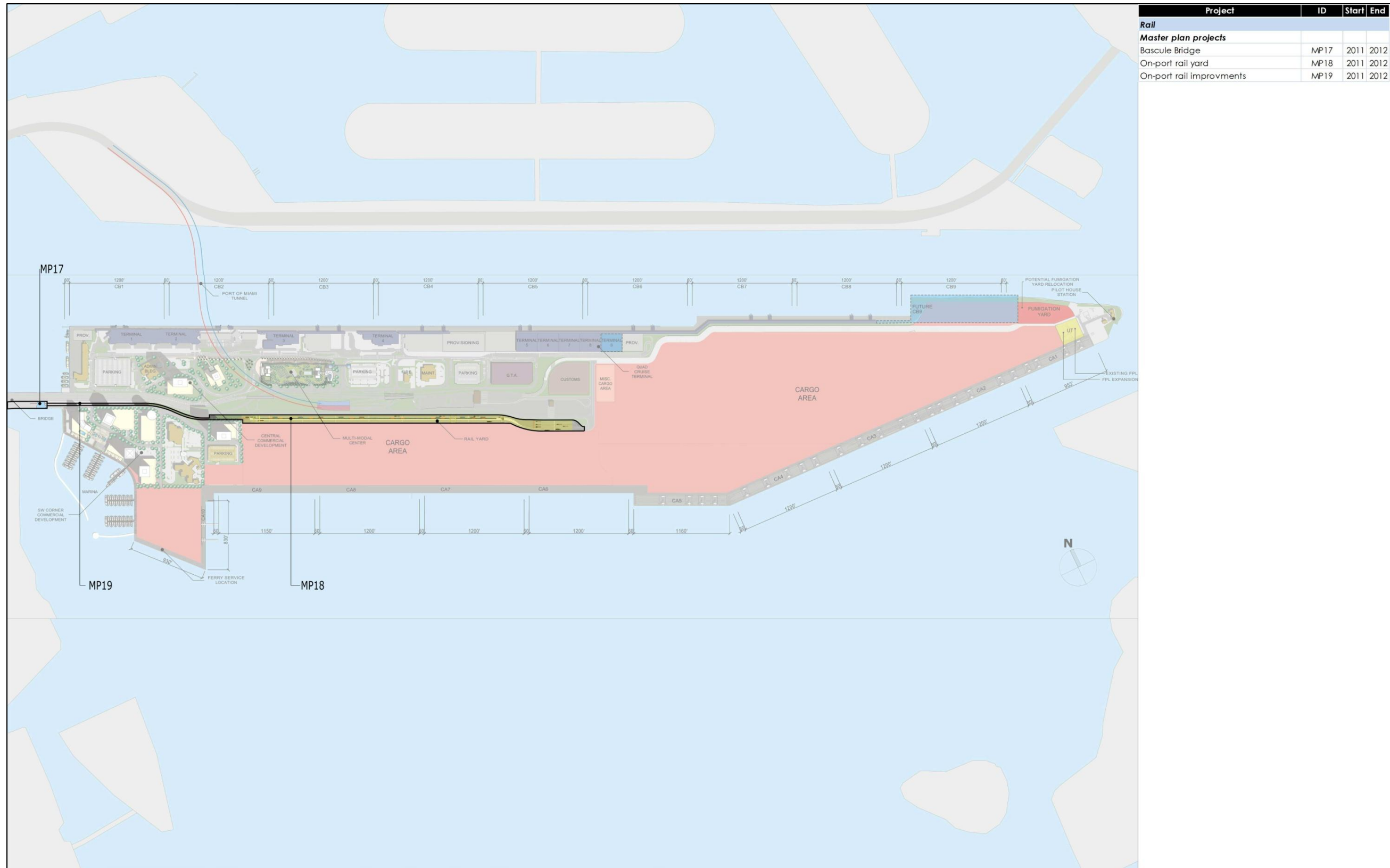


FIGURE 8.6: TRANSPORTATION DEVELOPMENT PHASING PLAN



Project	ID	Start	End
Transportation			
Existing capital plan			
Tunnel	649870	2014	2014
Master plan projects			
New cargo road	MP15	2021	2022
Central multimodal	MP16	-	-

8.3 COSTS

Costs for the implementation of the Preferred Master Plan are shown in Table 8.1. All costs are in 2010 dollars.

These costs are a combination of figures provided by the Port in its current funded and unfunded Capital Work Program and TIP, as well as the new estimates performed for new works as part of the Master Plan.

TABLE 8.1: PREFERRED PLAN CAPITAL COSTS, 2010 - 2017

Project	Total capital cost	2010	2011	2012	2013	2014	2015	2016	2017
Cruise									
Improvements to Terminals B & C	\$ 1,434,000	\$ 1,434,000							
Improvements to Terminals D & E	\$ 4,704,000	\$ 4,704,000							
Security upgrades to Terminals D & E	\$ 1,807,000	\$ 1,807,000							
Parking garage D	\$ 1,538,000	\$ 1,538,000							
Shore power for cruise ships	\$ 2,000,000								\$ 2,000,000
Cruise Terminal 7	\$ 52,000,000						\$ 4,000,000	\$ 24,000,000	\$ 24,000,000
Cruise Terminal 8	\$ 52,000,000						\$ 4,000,000	\$ 24,000,000	\$ 24,000,000
Cruise berth 6	\$ 11,600,000						\$ 5,800,000	\$ 5,800,000	
Cruise berth 7	\$ 26,600,000						\$ 13,300,000	\$ 13,300,000	
Cruise berth 8	\$ 27,800,000						\$ 13,900,000	\$ 13,900,000	
Cruise berth 9	\$ -								
Improvements to terminals D & E	\$ 52,000,000							\$ 26,000,000	\$ 26,000,000
Parking	\$ -								
Cargo									
Reinforce gantry crane area	\$ 6,000,000	\$ 1,000,000	\$ 5,000,000						
Security improvements	\$ 500,000	\$ 500,000							
Electrification of cranes	\$ 5,296,000	\$ 1,324,000	\$ 1,324,000	\$ 1,324,000	\$ 1,324,000				
Gantry crane refurbishment	\$ 1,000,000	\$ 1,000,000							
TLM improvements	\$ 16,000,000	\$ 1,000,000	\$ 3,000,000	\$ 3,000,000	\$ 3,000,000	\$ 3,000,000	\$ 3,000,000		
Seaboard improvements	\$ 22,235,000	\$ 6,715,000	\$ 2,920,000	\$ 2,960,000	\$ 4,820,000	\$ 4,820,000			
Seaboard improvements	\$ 7,040,000	\$ 3,300,000	\$ 1,900,000	\$ 1,840,000					
Strengthen bulkheads for deepening	\$ 23,720,000	\$ 1,520,000		\$ 12,100,000	\$ 10,100,000				
Strengthen bulkheads for deepening	\$ 2,390,000	\$ 550,000			\$ 1,840,000				
Deepening south channel	\$ 78,624,000		\$ 1,428,000	\$ 19,299,000	\$ 19,299,000	\$ 19,299,000	\$ 19,299,000		
Deepening south channel	\$ 3,680,000					\$ 1,840,000	\$ 1,840,000		
Deepening south channel	\$ 70,081,000		\$ 2,142,000	\$ 16,372,000	\$ 16,372,000	\$ 17,598,000	\$ 17,597,000		
Crane Maintenance facility	\$ 1,000,000								\$ 1,000,000
CLPS facility	\$ 1,020,000								\$ 1,020,000
Yard Stacker cranes	\$ 22,000,000			\$ 11,000,000	\$ 11,000,000				
Gantry cranes	\$ 33,000,000	\$ -	\$ -	\$ -	\$ -	\$ 11,000,000	\$ 11,000,000	\$ 11,000,000	
New fumigation yard	\$ -								
Central basin yard expansion	\$ -								
New cargo berth 5	\$ -								
New cargo berth 6	\$ -								
New cargo berth 7	\$ -								
Fill southwest corner	\$ -								
New berth sw corner	\$ -								
New berth sw corner	\$ -								
Yard improvements	\$ -								
Improvements to gate complex	\$ 2,500,000								\$ 2,500,000
Gantry cranes	\$ 11,000,000								\$ 11,000,000
Transportation									
Tunnel	\$ 43,500,000					\$ 43,500,000			
New cargo road	\$ -								
Central multimodal	\$ -								
Rail									
Bascule Bridge	\$ 3,900,000		\$ 1,950,000	\$ 1,950,000					
On-port rail yard	\$ 20,084,000		\$ 10,042,000	\$ 10,042,000					
On-port rail improvements	\$ 3,983,000		\$ 1,991,500	\$ 1,991,500					
Port lead improvements	\$ 23,173,000		\$ 11,586,500	\$ 11,586,500					
Off-site improvements	\$ -		\$ -	\$ -					
General									
General infrastructure improvements	\$ 8,500,000	\$ 2,500,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	
Electrical feeder upgrades	\$ 3,000,000		\$ 3,000,000						
Central communication center	\$ 3,168,000	\$ 3,168,000							
Upgrade water and sewer	\$ 14,000,000	\$ 500,000	\$ 2,500,000	\$ 6,000,000	\$ 2,000,000	\$ 3,000,000			
Riprap around pilot house	\$ 1,758,000	\$ 1,758,000							
Command and Control Phase 4 & 5	\$ -								
Command and Control remodel	\$ -								
Green energy initiatives	\$ 4,000,000					\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000
New electrical transformer substation	\$ 608,000								\$ 608,000
Wastewater upgrades	\$ 960,000								\$ 960,000
Water upgrades for new roadway	\$ 1,700,000								\$ 1,700,000
New water main crossing	\$ -								
Drainage	\$ -								
Real estate									
Civil work southwest corner	\$ -								
Miscellaneous development costs	\$ 200,000	\$ 200,000							
Marina bulkhead	\$ -								
Marina slips	\$ -								
Totals (without escalation)	\$ 673,103,000	\$ 34,518,000	\$ 49,784,000	\$ 100,465,000	\$ 70,755,000	\$ 106,057,000	\$ 95,736,000	\$ 120,000,000	\$ 95,788,000

TABLE 8.I CONTINUED: PREFERRED PLAN CAPITAL COSTS, 2018 – 2025

Project	Total capital cost	2018	2019	2020	2021	2022	2023	2024	2025
Cruise									
Improvements to Terminals B & C	\$ -								
Improvements to Terminals D & E	\$ -								
Security upgrades to Terminals D & E	\$ -								
Parking garage D	\$ -								
Shore power for cruise ships	\$ 4,000,000			\$ 2,000,000			\$ 2,000,000		
Cruise Terminal 7	\$ 24,000,000	\$ 24,000,000							
Cruise Terminal 8	\$ 24,000,000	\$ 24,000,000							
Cruise berth 6	\$ -								
Cruise berth 7	\$ -								
Cruise berth 8	\$ 13,900,000	\$ 13,900,000							
Improvements to terminals D & E	\$ 52,000,000			\$ 26,000,000	\$ 26,000,000				
Parking	\$ -								
Cargo									
Reinforce gantry crane area	\$ -								
Security improvements	\$ -								
Electrification of cranes	\$ -								
Gantry crane refurbishment	\$ -								
TLM improvements	\$ -								
Seaboard improvements	\$ -								
Seaboard improvements	\$ -								
Strengthen bulkheads for deepening	\$ -								
Strengthen bulkheads for deepening	\$ -								
Deepening south channel	\$ -								
Deepening south channel	\$ -								
Deepening south channel	\$ -								
Crane Maintenance facility	\$ -								
CIPS facility	\$ -								
Yard Stacker cranes	\$ -								
Gantry cranes	\$ -								
New fumigation yard	\$ 600,000				\$ 600,000				
Central basin yard expansion	\$ -								
New cargo berth 5	\$ -								
New cargo berth 6	\$ -								
New cargo berth 7	\$ -								
Fill southwest corner	\$ 27,000,000				\$ 13,500,000	\$ 13,500,000			
New berth sw corner	\$ 15,100,000						\$ 15,100,000		
New berth sw corner	\$ 11,300,000								\$ 11,300,000
Yard improvements	\$ 12,000,000				\$ 6,000,000	\$ 6,000,000			
Improvements to gate complex	\$ -								
Gantry cranes	\$ -								
Transportation									
Tunnel	\$ -								
New cargo road	\$ 5,400,000				\$ 2,700,000	\$ 2,700,000			
Central multimodal	\$ -								
Rail									
Bascule Bridge	\$ -								
On-port rail yard	\$ -								
On-port rail improvements	\$ -								
Port lead improvements	\$ -								
Off-site improvements	\$ -								
General									
General infrastructure improvements	\$ -								
Electrical feeder upgrades	\$ -								
Central communication center	\$ -								
Upgrade water and sewer	\$ -								
Riprap around pilot house	\$ -								
Command and Control Phase 4 & 5	\$ 4,900,000	\$ 4,900,000							
Command and Control remodel	\$ 5,520,000	\$ 5,520,000							
Green energy initiatives	\$ 16,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000
New electrical transformer substation	\$ 608,000				\$ 608,000				
Wastewater upgrades	\$ 960,000				\$ 960,000				
Water upgrades for new roadway	\$ 1,700,000				\$ 1,700,000				
New water main crossing	\$ 632,000	\$ 632,000							
Drainage	\$ 1,100,000	\$ 1,100,000							
Real estate									
Civil work southwest corner	\$ 1,100,000	\$ 1,100,000							
Miscellaneous development costs	\$ 5,000,000	\$ 5,000,000							
Marina bulkhead	\$ -								
Marina slips	\$ -								
Totals (without escalation)	\$ 226,820,000	\$ 82,152,000	\$ 5,268,000	\$ 30,000,000	\$ 50,800,000	\$ 24,200,000	\$ 19,100,000	\$ 2,000,000	\$ 13,300,000

TABLE 8.I CONTINUED: PREFERRED PLAN CAPITAL COSTS, 2026 - 2035

Project	Total capital cost	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Cruise											
Improvements to Terminals B & C	\$ -										
Improvements to Terminals D & E	\$ -										
Security upgrades to Terminals D & E	\$ -										
Parking garage D	\$ -										
Shore power for cruise ships	\$ 4,000,000			\$ 2,000,000					\$ 2,000,000		
Cruise Terminal 7	\$ -										
Cruise Terminal 8	\$ -										
Cruise berth 6	\$ -										
Cruise berth 7	\$ -										
Cruise berth 8	\$ -										
Improvements to terminals D & E	\$ -										
Parking	\$ -										
Cargo											
Reinforce gantry crane area	\$ -										
Security improvements	\$ -										
Electrification of cranes	\$ -										
Gantry crane refurbishment	\$ -										
TLM improvements	\$ -										
Seaboard improvements	\$ -										
Seaboard improvements	\$ -										
Strengthen bulkheads for deepening	\$ -										
Strengthen bulkheads for deepening	\$ -										
Deepening south channel	\$ -										
Deepening south channel	\$ -										
Deepening south channel	\$ -										
Crane Maintenance facility	\$ -										
CIPS facility	\$ -										
Yard Stacker cranes	\$ -										
Gantry cranes	\$ -										
New fumigation yard	\$ -										
Central basin yard expansion	\$ 85,400,000					\$ 42,700,000	\$ 42,700,000				
New cargo berth 5	\$ 18,000,000								\$ 9,000,000	\$ 9,000,000	
New cargo berth 6	\$ 19,400,000								\$ 9,700,000	\$ 9,700,000	
New cargo berth 7	\$ 19,800,000									\$ 9,900,000	\$ 9,900,000
Fill southwest corner	\$ -										
New berth sw corner	\$ -										
New berth sw corner	\$ -										
Yard improvements	\$ -										
Improvements to gate complex	\$ -										
Gantry cranes	\$ 55,000,000			\$ 11,000,000	\$ 11,000,000		\$ 11,000,000		\$ 11,000,000	\$ 11,000,000	
Transportation											
Tunnel	\$ -										
New cargo road	\$ -										
Central multimodal	\$ -										
Rail											
Bascule Bridge	\$ -										
On-port rail yard	\$ -										
On-port rail improvements	\$ -										
Port lead improvements	\$ -										
Off-site improvements	\$ -										
General											
General infrastructure improvements	\$ -										
Electrical feeder upgrades	\$ -										
Central communication center	\$ -										
Upgrade water and sewer	\$ -										
Riprap around pilot house	\$ -										
Command and Control Phase 4 & 5	\$ -										
Command and Control remodel	\$ -										
Green energy initiatives	\$ 11,000,000	\$ 2,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000	\$ 1,000,000
New electrical transformer substation	\$ -										
Wastewater upgrades	\$ -										
Water upgrades for new roadway	\$ -										
New water main crossing	\$ -										
Drainage	\$ -										
Real estate											
Civil work southwest corner	\$ -										
Miscellaneous development costs	\$ -										
Marina bulkhead	\$ -										
Marina slips	\$ -										
Totals (without escalation)	\$ 212,600,000	\$ 2,000,000	\$ 1,000,000	\$ 14,000,000	\$ 12,000,000	\$ 43,700,000	\$ 54,700,000	\$ 1,000,000	\$ 32,700,000	\$ 40,600,000	\$ 10,900,000

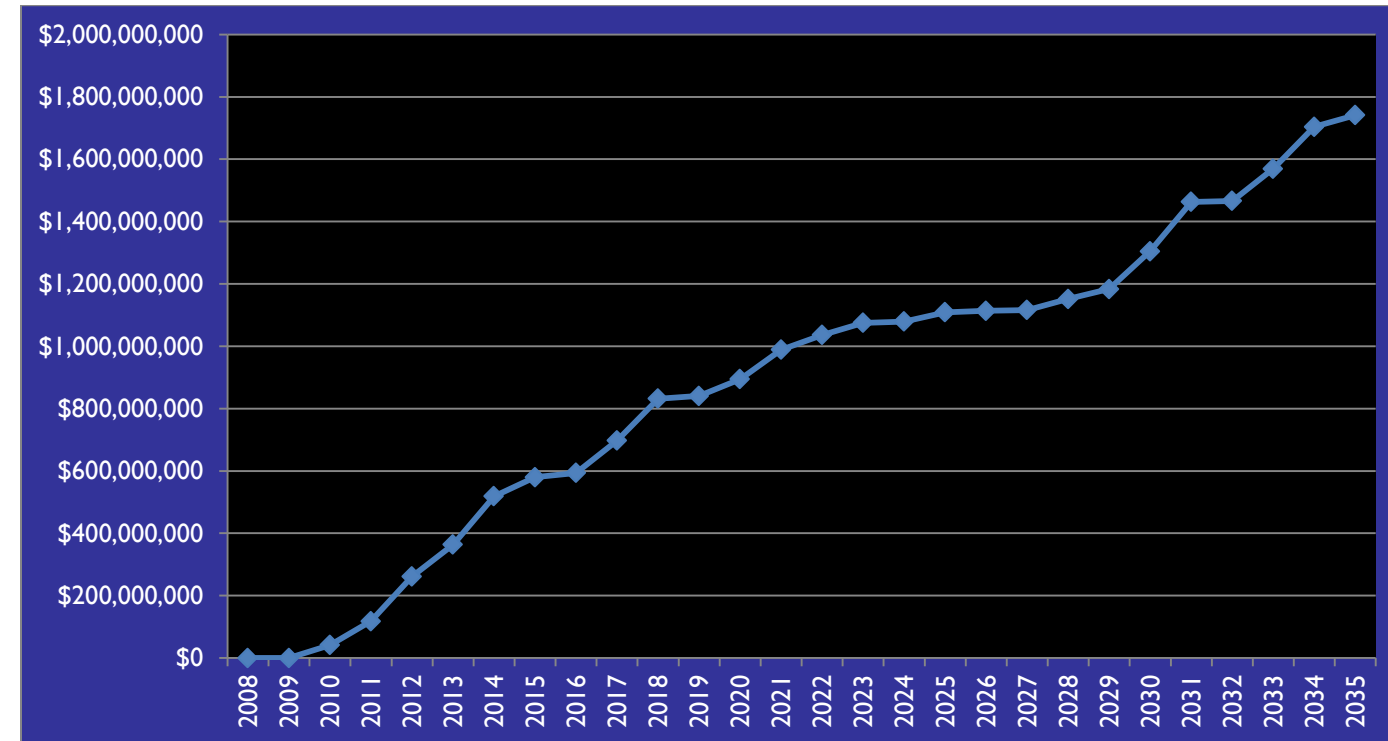
8.4 SCHEDULE AND CAPITAL PROGRAM

The Figures below show the allocation of cost for all of the improvements described above and have been scheduled in accordance to need without any capital capacity constraints. For those projects which had flexibility, they have been delayed since it is recognized that availability of capital will be controlling the pace of expenditures.

8.4.1 CAPITAL PROGRAM

The master plan carries a total cumulative price tag of slightly less than \$1.8 billion over the 25-year period. This number includes an annual escalation of 3% which accounts for a total of \$682 million. Totals are shown in Figure 8.7.

FIGURE 8.7: CUMULATIVE CAPITAL PROGRAM

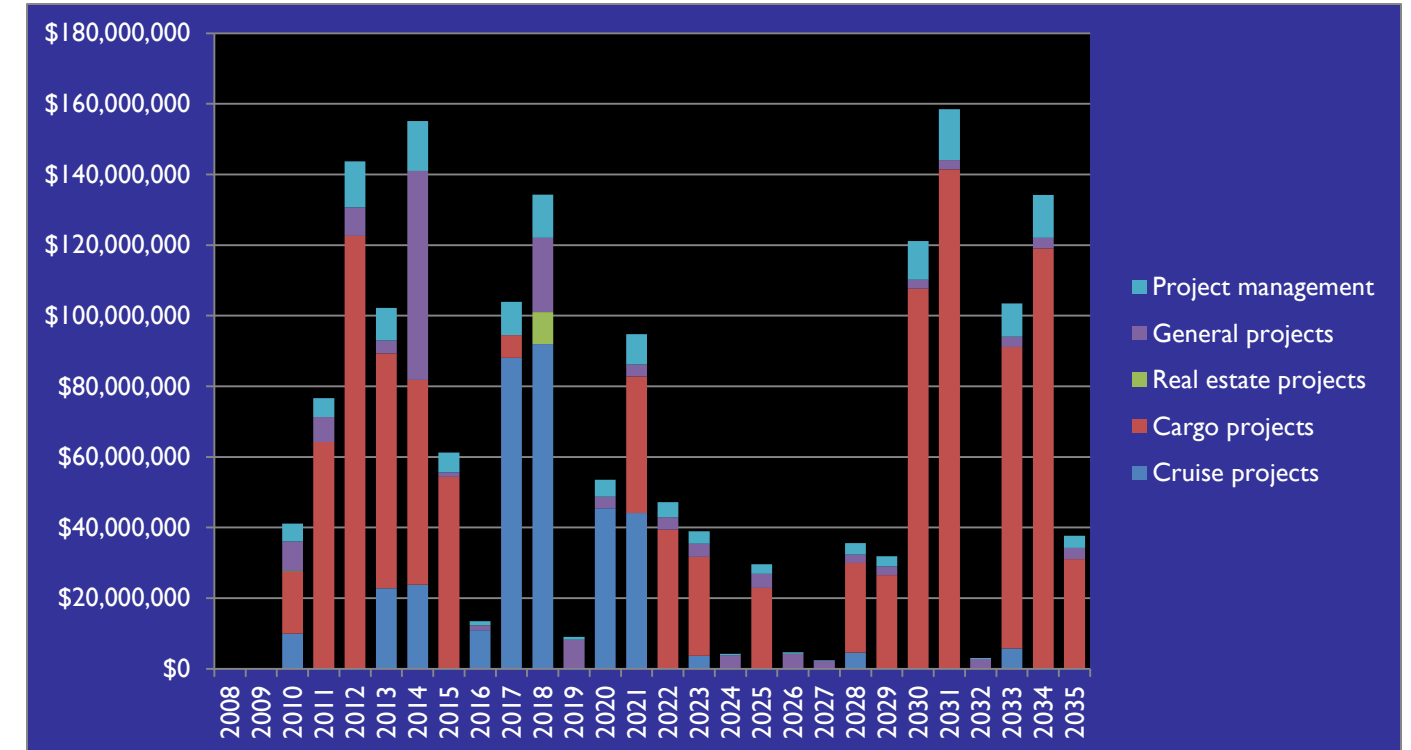


The capital program is divided into three periods: The immediate one from 2010 to 2016 is (large and expensive) to complete the major projects currently underway. The second cycle begins in 2017 thru 2026 and mainly accounts for additional cruise terminals and facilities. The final cycle is 2027 thru 2035 which will deal with the major expansion needs for cargo at that time, as well as a potential 9th cruise berth.

8.4.2 CAPITAL EXPENDITURES BY PROGRAM

Figure 8.8 shows the total annual capital demand by business unit. In this case, both the channel deepening and tunnel have been assigned to the cargo unit as they will be the recipients of the benefits. However, it is assumed that both cruise and cargo will benefit from the tunnel project during the lifetime due to the ability to directly access the Port from the main highway corridors.

FIGURE 8.8: ANNUAL CAPITAL NEEDS BY BUSINESS UNIT



The Figure 8.8 shows a few interesting trends:

- There is an initial period from 2010 to 2016 during which capital is needed to support mostly cargo, due to the channel deepening and tunnel construction.
- In 2018 there is a very modest investment in the commercial sector to prepare properties for leasing.
- Between 2016 and 2021 there are several important investments in cruise to reflect the anticipated growth forecasts and cruise line needs.
- Finally, in the outer years of 2030 more cargo improvements are also required.

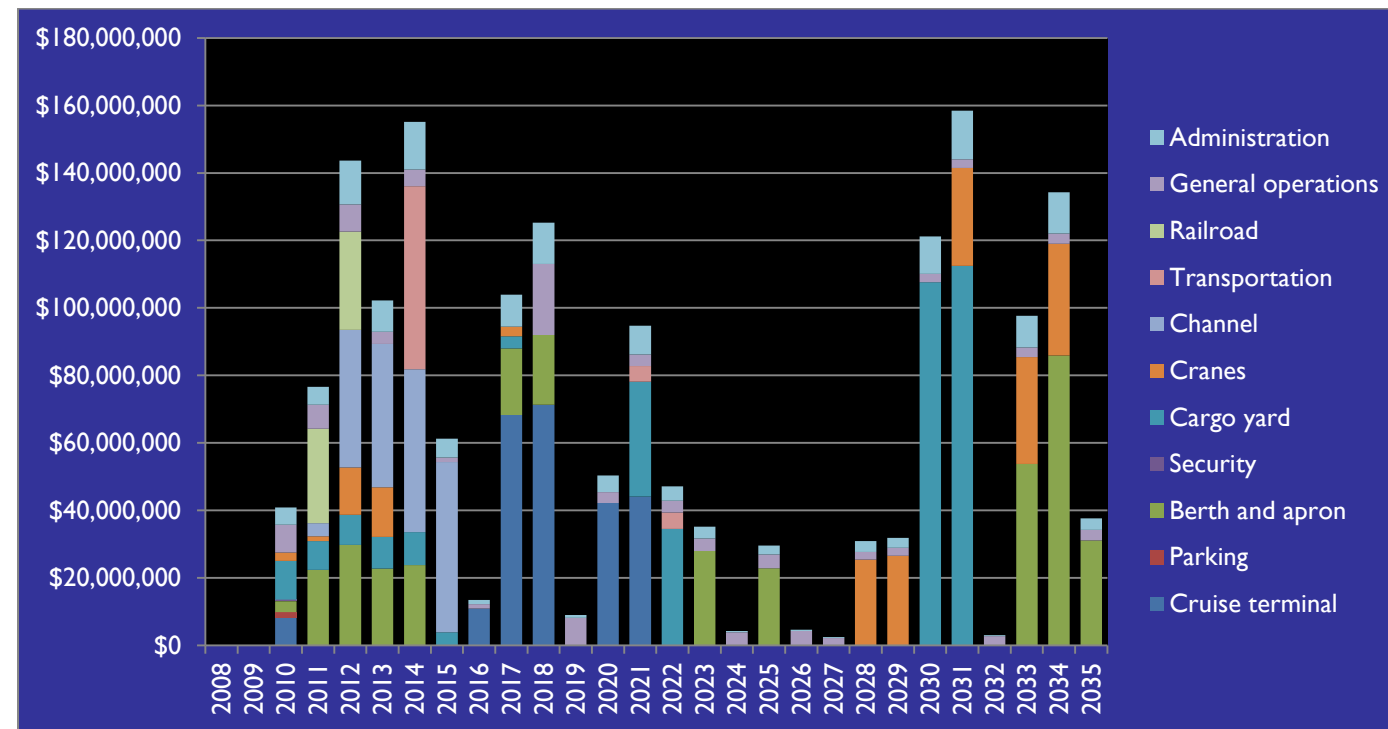
The Table below reflects the balance at the Port and the need to have a business plan where each business unit contributes to the bottom line. Some years, the income from the whole will be needed for one particular use. In other years the trend will be reversed. The total expenditures for each business unit are shown in Table 8.2 below.

Table 8.2 – Capital Expenditures by Business Unit	
Business Unit	Total Capital Costs
Cruise	\$350,997,568
Cargo	\$1,055,091,978
Real Estate	\$9,274,180
General	\$167,899,626
Management	\$158,068,766
Total	\$1,741,332,118

8.4.3 CAPITAL EXPENDITURES BY CONSTRUCTION TYPE

Figure 8.9 shows the same expenditures classified by the type of work that will be needed.

FIGURE 8.9: ANNUAL CAPITAL NEEDS BY TYPE OF WORKS



The Figure above shows that the initial monies will go towards transportation and channel improvements. The second cycle will be mostly for cruise terminals and berths. The final Plan cycle will be the additional cargo yards and berths needed for the expansion of the cargo forecast for the Port of Miami.