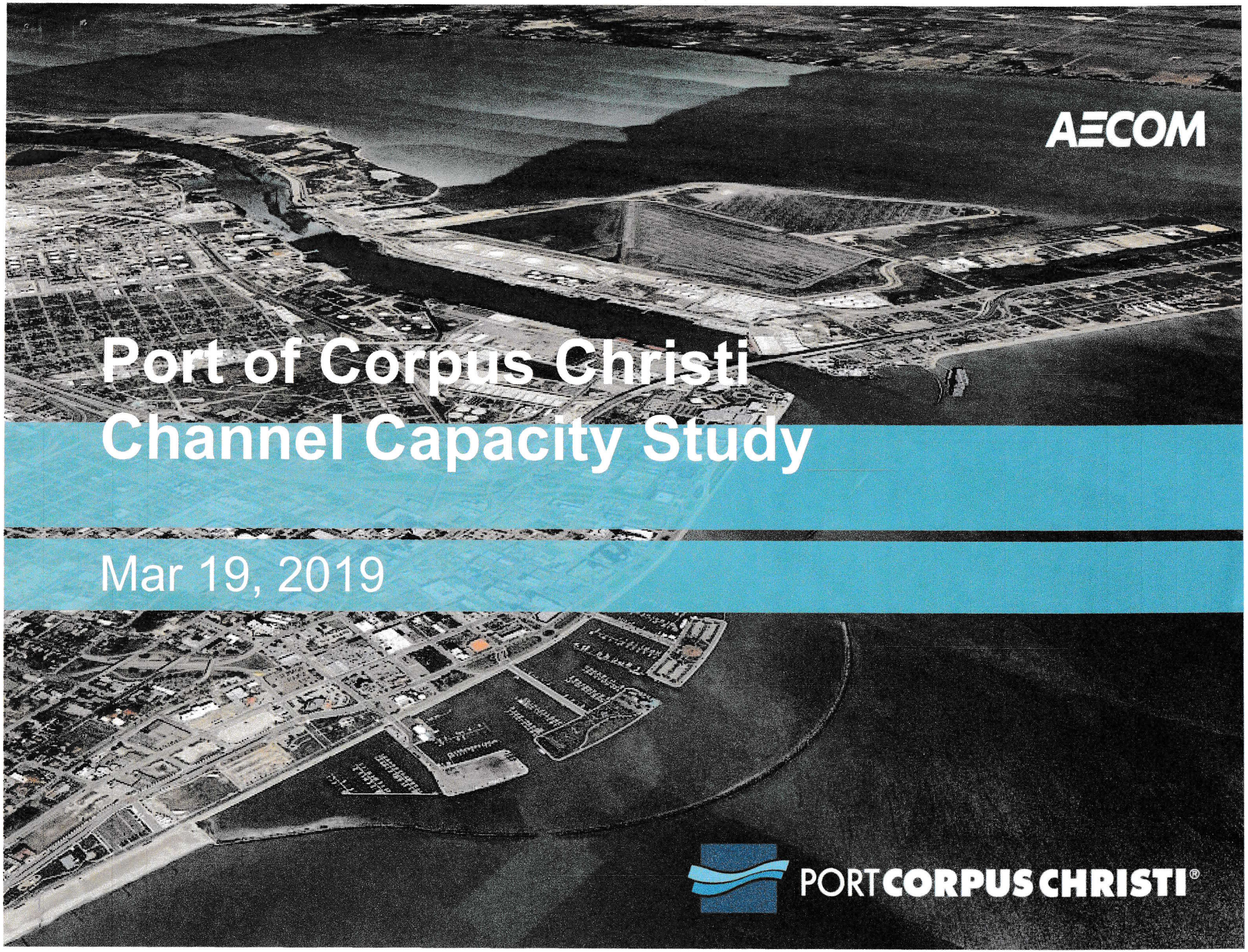
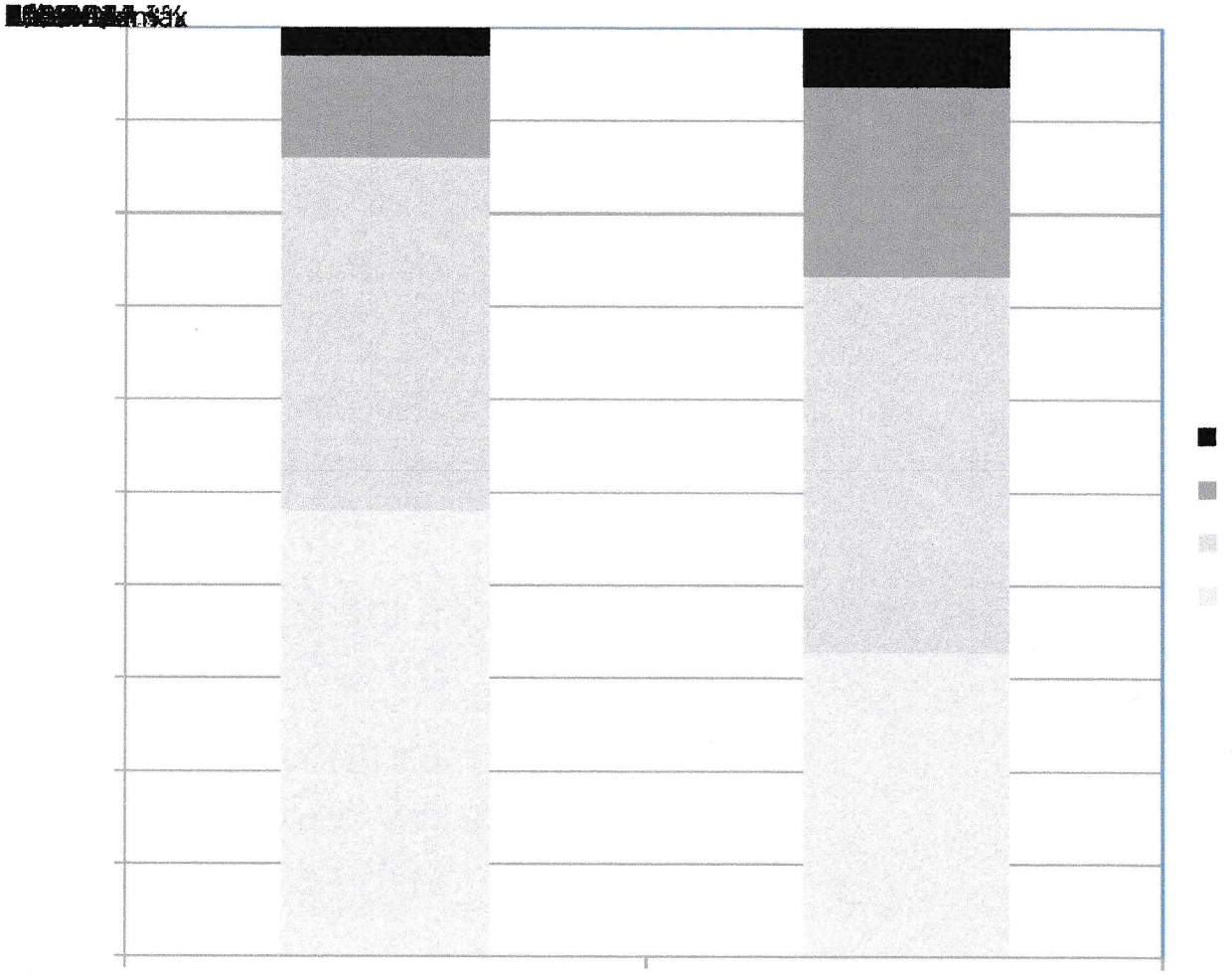

AECOM
Port of Corpus Christi
Channel Capacity Study
Mar 19, 2019
PORT CORPUS CHRISTI®

Project History

- Original channel capacity study took place 2016-17
- That study did not include VLCCs, nor most of current export crude volume projections
- Current study began in Spring 2018
  - Updated volume and vessel size inputs
  - Updated model features
- Focus of current study is evaluation of impact of future large crude vessels and LNG on harbor

Port Users are Rapidly Shifting to Larger Vessels



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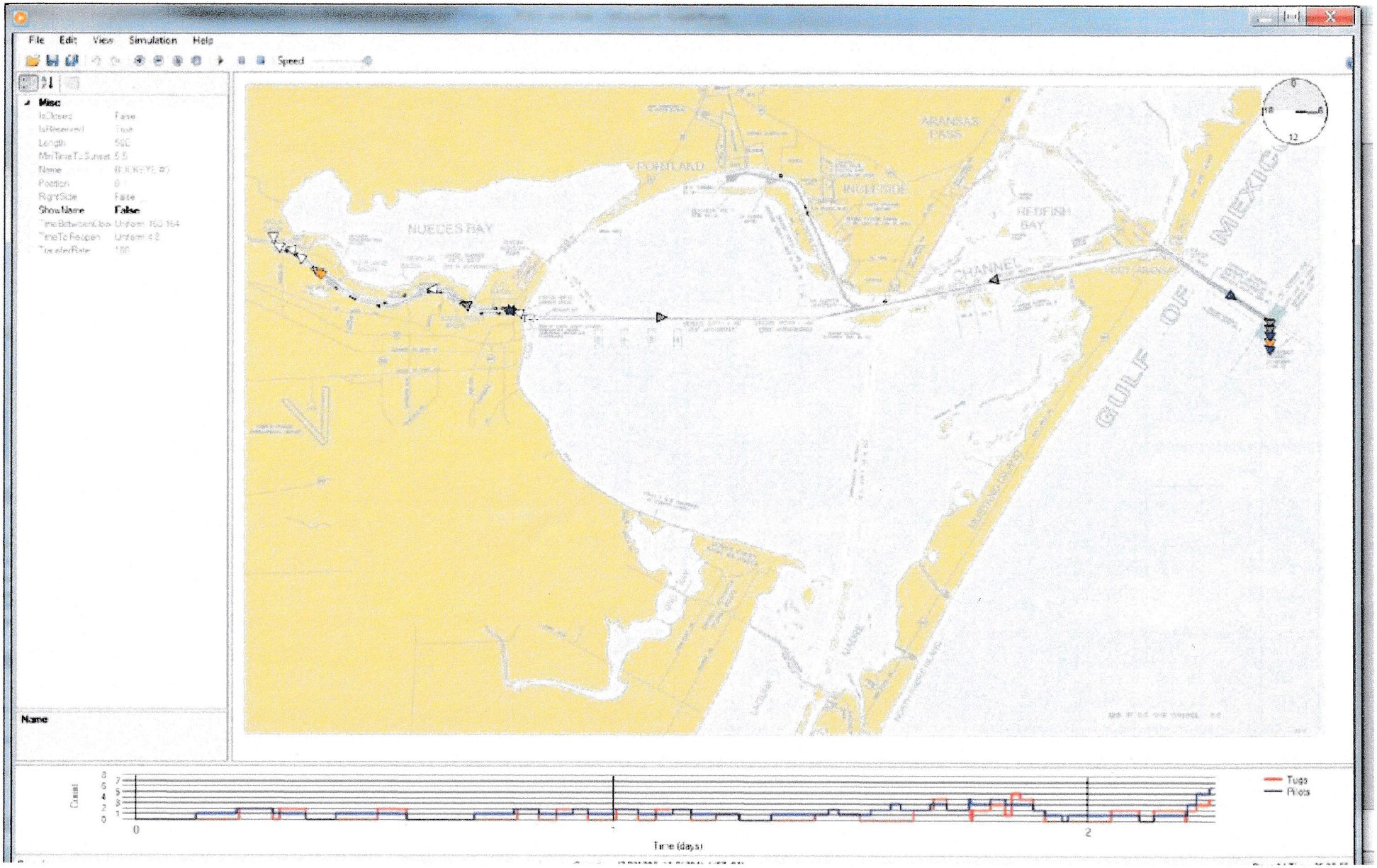
Vessel Class Summary

Analysis assumes sufficient pilots and tugs are available to match demand

Rule	VLCC	LNGC	Suezmax	Aframax	Panamax	Handy	Sub-handy	ATB (Ocean Barge)
Tugs inbound	5	4	3	2.5	2	2	2	1
Tugs outbound	5	4	3	2.5	2	1.5	1	1
Pilots @ day	3	2	2	1.5	1.5	1	1	1
Pilots @ night	NA	NA	NA	2	1.5	1	1	1
Typical beam (ft.)	200	154	158	138	106	90	75	75
Daylight only Y/N	Y	Y	Y	Y for 40.9'+	N	N	N	N

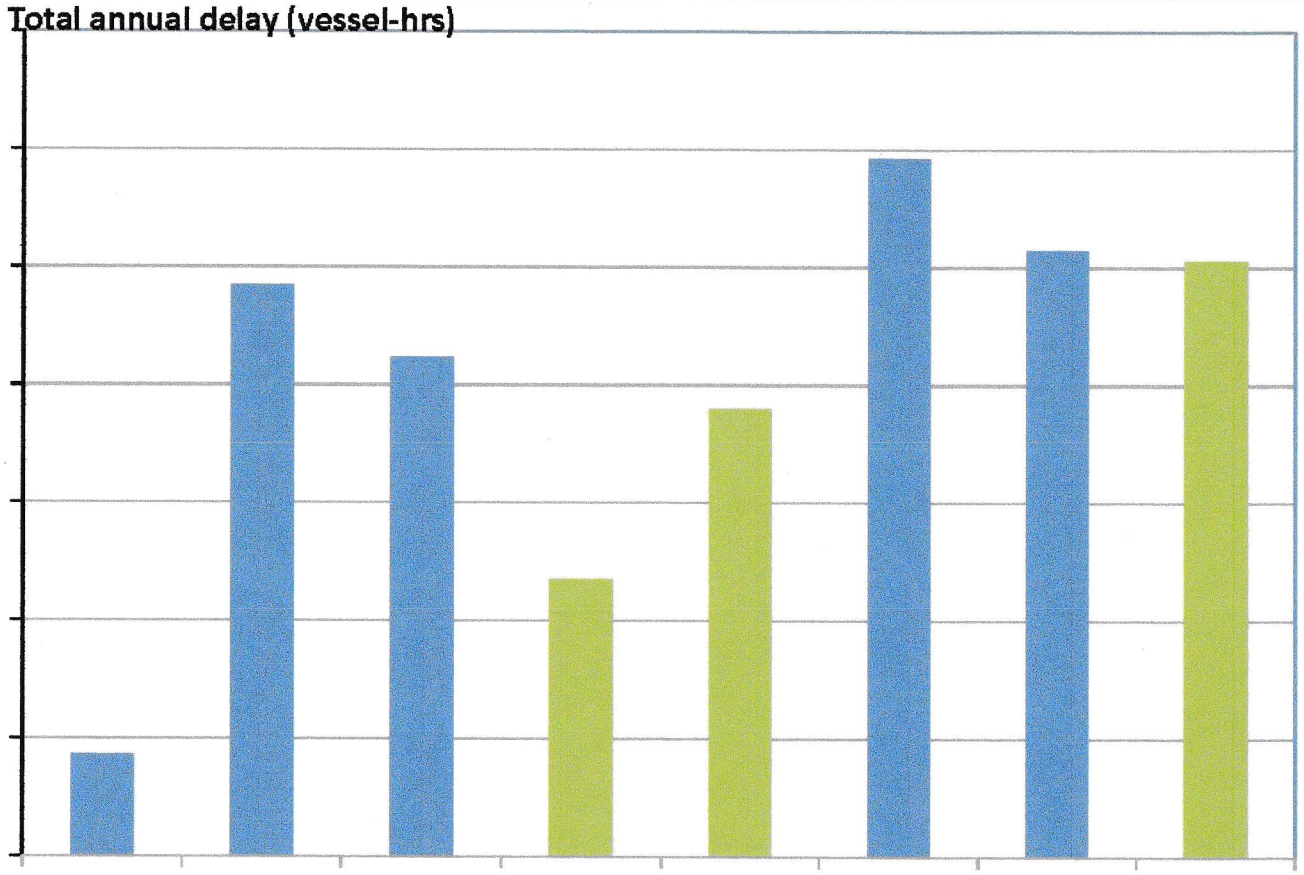
VLCC and LNGC vessels cannot meet/pass any other vessel types regardless of channel width

Model Animation Screen Capture



Results Summary

Total annual delay (vessel-hrs)



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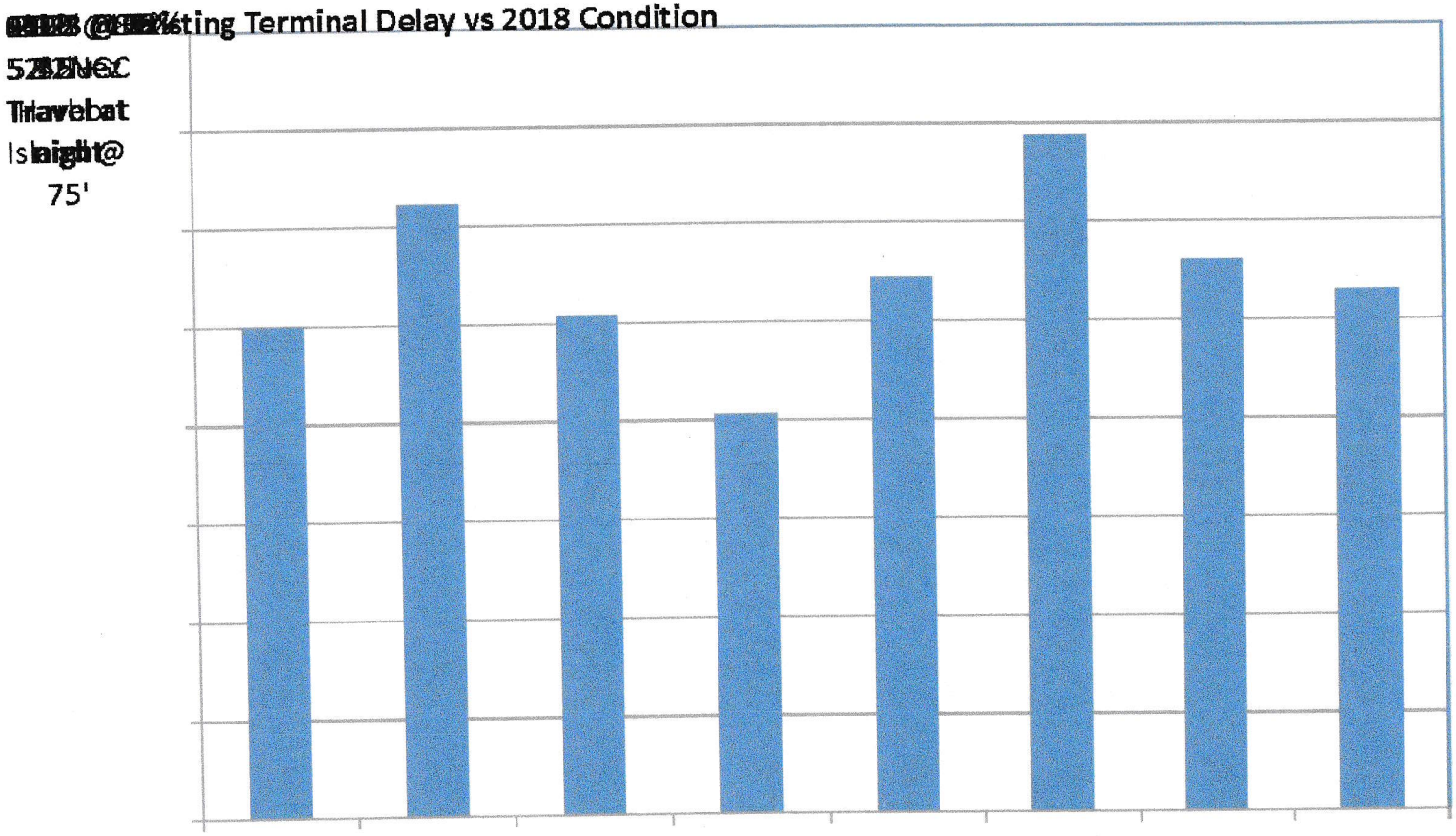
Delay to Existing Port Users



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Appendix

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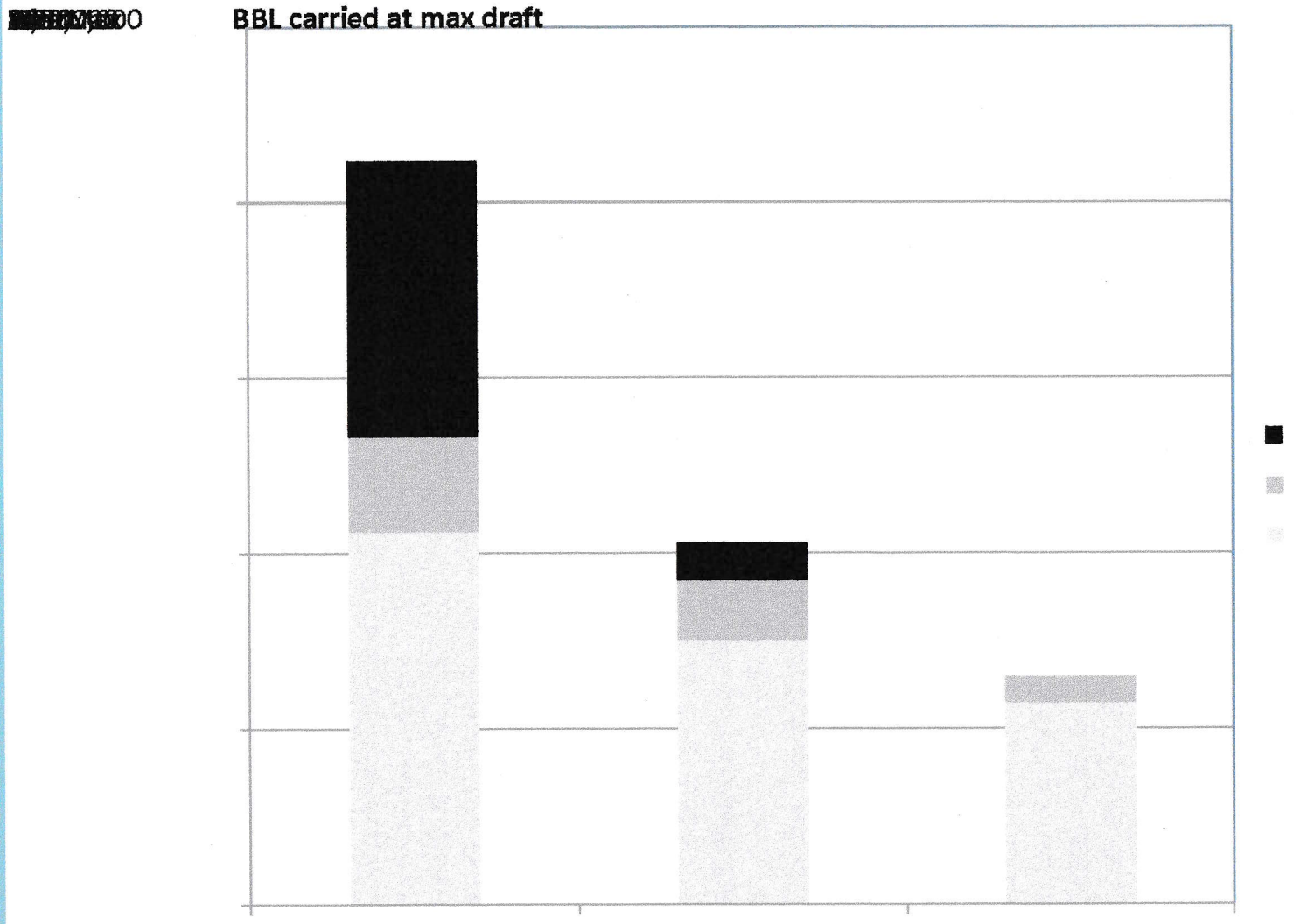
Vessel Size vs Capacity and Draft



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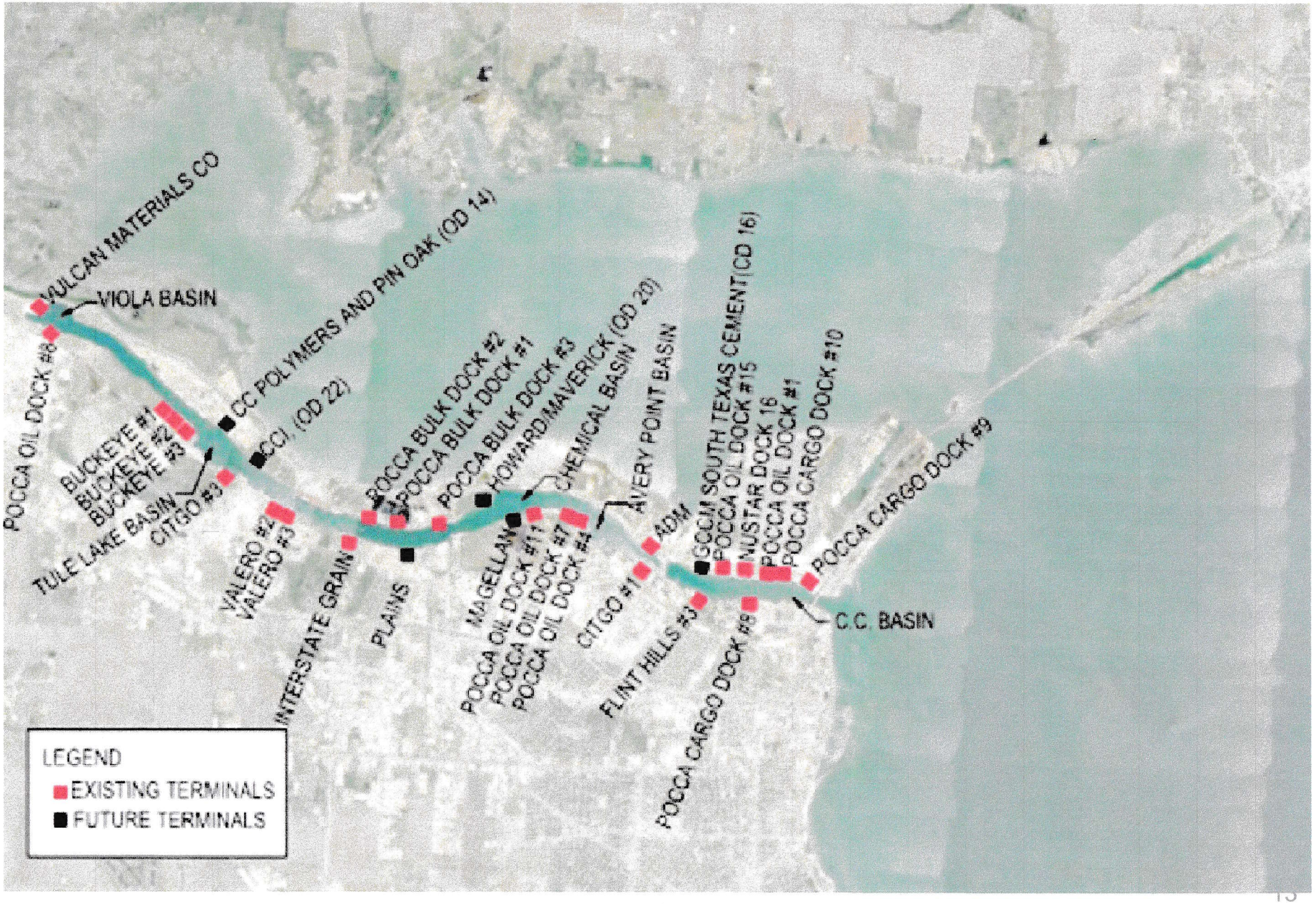
Inner Harbor Terminals



La Quinta Terminals

Model Logic Sequence

1. Ship is created near harbor entrance
2. Checks to see if target berth is free
3. Checks to see if daylight is OK
4. Checks to see if weather is OK
5. If all are OK, attempts to seize channel capacity to target berth. This depends on beam and draft of outbound vessels
6. Once capacity is reserved, ship proceeds all the way to target berth
7. Vessels tend to naturally convoy, especially behind large ships, since oncoming traffic is blocked
8. Vessel draft changes while at berth based on size, cargo transferred, and ballast carried

2023 Crude Oil Projection

Terminal	VLCC/yr	Suez/yr	Afra/yr	BBL per day @ 45'	BBL per day @ 52'
Plains		60	20	154,000	188,000
Moda Midstream	100	100	100	651,000	798,000
CC Polymers & Pin Oak (OD 14)		60	20	154,000	188,000
Magellan		60	20	154,000	188,000
CCI (OD 22)		60	20	154,000	188,000
Buckeye (STG)	50	50	50	326,000	399,000
Harbor Island	100	100	100	651,000	798,000
2023 Total	250	490	330	**2,244,000**	**2,747,000**

2028 Crude Oil Projection

Terminal	VLCC/yr	Suez/yr	Afra/yr	BBL per day @ 45'	BBL per day @ 52'
Plains		78	26	200,000	244,000
Moda Midstream	100	100	100	651,000	798,000
CC Polymers & Pin Oak (OD 14)		78	26	200,000	244,000
Magellan		78	26	200,000	244,000
CCI (OD 22)		78	26	200,000	244,000
Buckeye (STG)	103	103	103	671,000	822,000
Harbor Island	100	100	100	651,000	798,000
2028 Total	303	615	407	**2,773,000**	**3,394,000**

Areas for Further Study

- Lay berth or in-harbor anchorage options
- Convoy options
- Landside capacity issues for key terminals (Harbor Is etc.)
- Detailed analysis of pilot and tug resources
- Reverse lightering