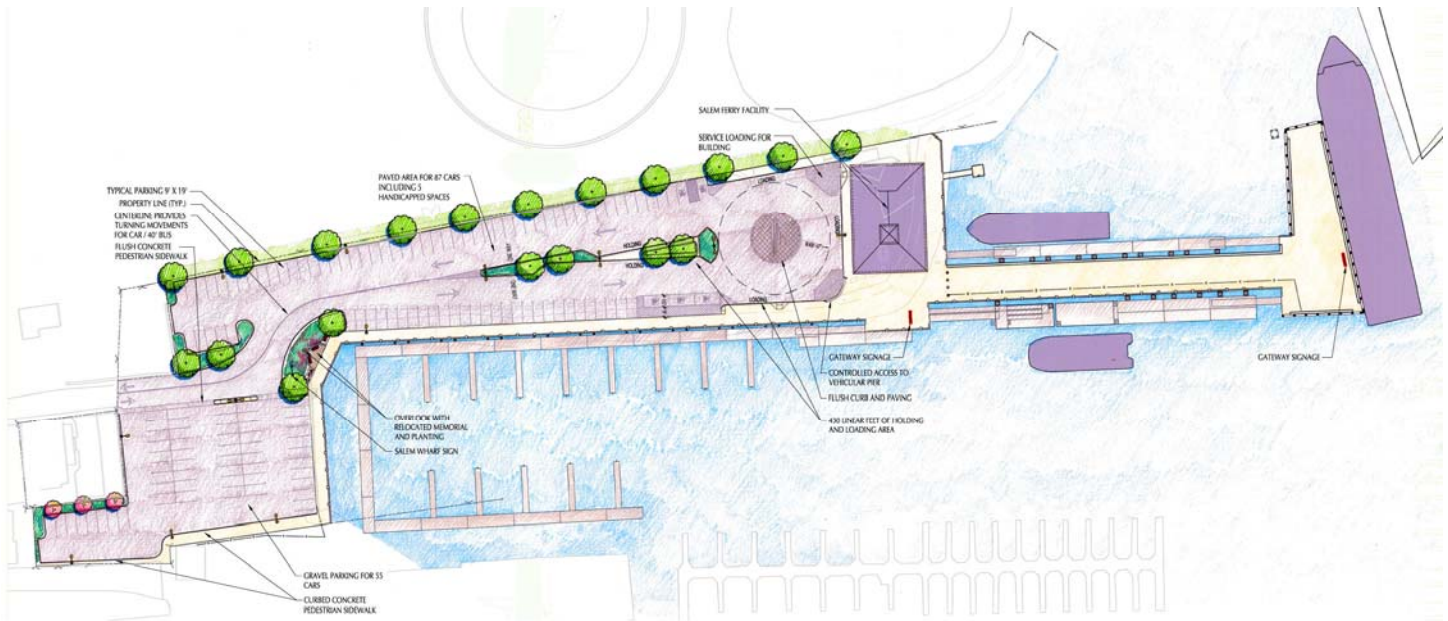


Analysis of Existing Port Plans and Development of Preferred Plan

FINAL DRAFT REPORT **Salem Wharf Project**

December 2008

**Dept. of Planning & Community Development
City of Salem
Salem, MA**



Presented by:

**Bourne Consulting Engineering
Franklin, MA**

In Association With:

**Norris & Norris Assoc.
Cambridge, MA**

**ConsultEcon, Inc.
Cambridge, MA**

**Shadley & Associates, P.C.
Lexington, MA**

**Portscape
Lexington, MA**

***Analysis of Existing Port Plans and
Development of Preferred Plan***

FINAL DRAFT REPORT
Salem Wharf Project

**Dept. of Planning & Community Development
City of Salem
Salem, MA**

December 2008

Prepared by:

**Bourne Consulting Engineering
Franklin, MA**



TABLE OF CONTENTS

- 1. INTRODUCTION**
- 2. BIBLIOGRAPHY OF EXISTING INFORMATION**
- 3. PROJECT SITE ASSESSMENT**
 - 3.1. Introduction**
 - 3.2. Review of Previous Reports and Studies**
 - 3.3. Review of Historic Market Analysis and Feasibility Findings**
 - 3.4. Watersheet Uses and Program**
 - 3.5. Landside Site Demands**
 - 3.6. Site Traffic, Circulation and Access**
 - 3.7. Site Security and Emergency Program**
 - 3.8. Building Program**
- 4. HARBOR PLAN REVIEW**
- 5. FINDINGS ON REVIEW OF EXISTING PROJECT PLANNING DOCUMENTS**
- 6. PUBLIC PRESENTATIONS AND PARTICIPATION**
- 7. RECOMMENDATIONS OF PREFERRED PLAN**
- 8. PRELIMINARY / SCHEMATIC DESIGN**
 - 8.1. Marine Elements**
 - 8.2. Site Plan and Terminal Building Context and Design**
 - 8.3. Site Plan Development**
 - 8.4. Terminal Building**
 - 8.5. Construction Cost Estimate**
 - 8.6. Preliminary Design Drawings**
- 9. IMPLEMENTATION PLAN**
- 10. SUMMARY**

APPENDIX

- A-1. *Evaluation of Market and Financial Analyses from Prior Salem Pier Reports, Memorandum prepared by ConsultEcon, Inc., September 12, 2007***
- A-2. Interviews of Key Stakeholders**
- A-3. *Draft Traffic Assessment for Salem Port Expansion, Nitsch Engineering, September 1, 2007***
- A-4. Public Meeting December 12, 2007, PowerPoint Presentation – Site Plan Alternatives**
- A-5. Public Meeting October 15, 2008, PowerPoint Presentation – Preliminary Design**
- A-6. *Salem Wharf Site Plan and Marine Terminal Building Design – Design Memorandum by Norris & Norris Associates***
- A-7. Preliminary Design Construction Cost Estimate – Salem Wharf Project**
- A-8. Salem Wharf Project – Preliminary Design Plans**
- A-9. Salem Wharf Project - Project Construction Schedule**

SALEM WHARF PROJECT
ANALYSIS OF EXISTING PORT EXPANSION PLANS
AND
DEVELOPMENT OF PREFERRED PLAN

1. INTRODUCTION

- 1.1. The City of Salem has been attempting to establish a significant municipal port facility for a number of years. It now seeks to move out of the planning phase and into an implementation program. The City contracted these services with a consultant team led by Bourne Consulting Engineering to review the planning efforts that have taken place to-date; to evaluate the market analysis associated with the previous planning efforts; to review and identify the traffic, circulation and site access issues and to provide a summary of issues and findings that need to be incorporated into a final plan

The challenge for the City of Salem is the ability to maximize the potential of the existing site while providing the flexibility of a multi-use facility. A key component will be the balancing of the watersheet utilization with the landside support limitations. The existing upland area of the site is limited in its ability to provide both parking and development area for supporting structures. The future ability to increase on-site parking will be a key component for allowing future expansion and greater site utilization.

The project's scope of work is organized into five overlapping tasks. This report focuses on Task 1 - The Review and Analysis of Port Expansion Documents and a site inspection and evaluation. The intention of this project planning phase is to verify, update and refine the plans that have been prepared to date.

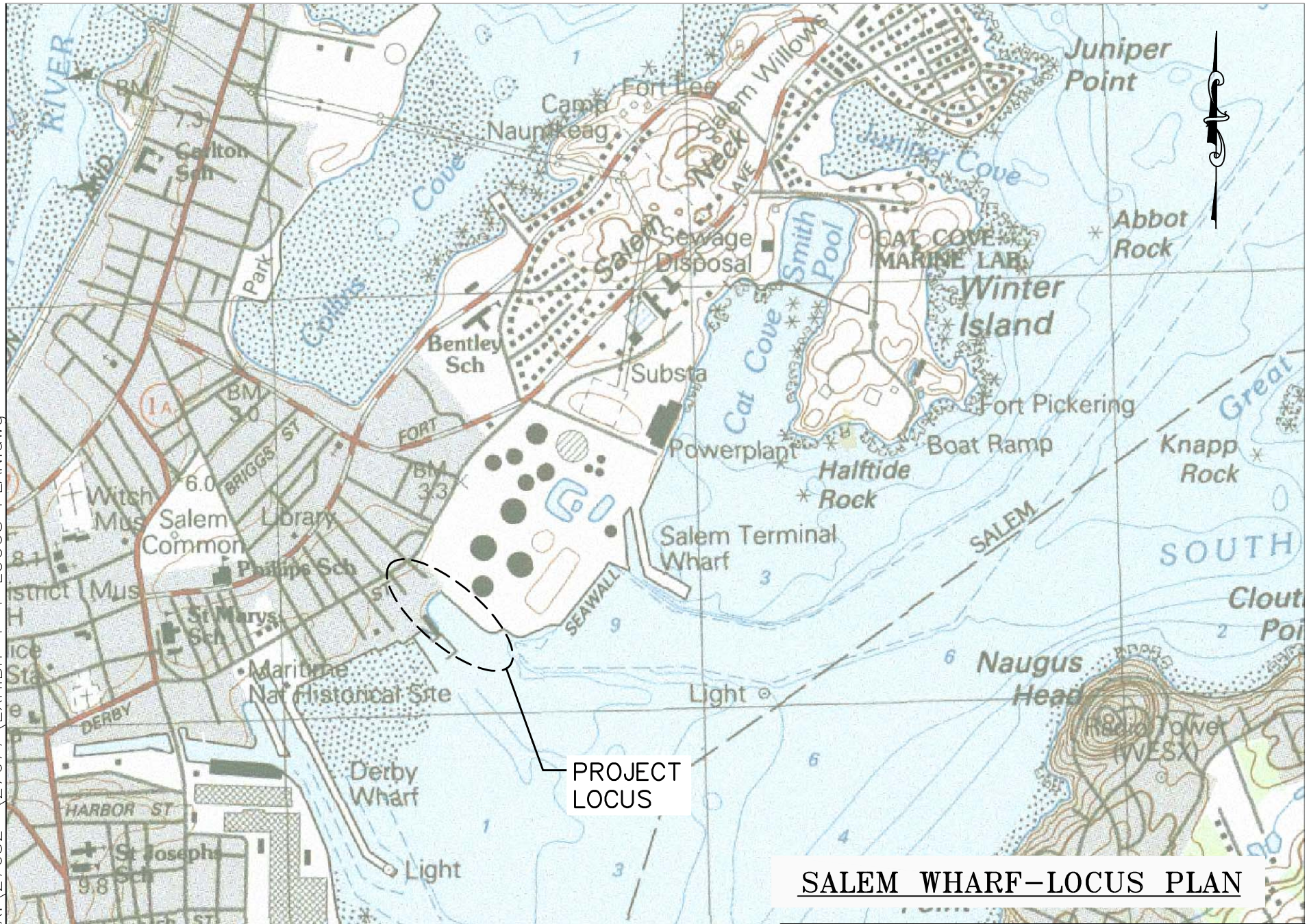
This phase of the port design process will ensure that the plan and port components will be technically and financially feasible, can be readily permitted, and that the built facility will incorporate flexibility to adapt and evolve in response to changing maritime market demands over time.

- 1.2. The Project Site is located at the end of Blaney Street which is off Derby Street. A site locus map can be seen in Exhibit 1-1.

2. BIBLIOGRAPHY OF EXISTING INFORMATION

The following reports and plans were reviewed

- 2.1. *Salem Wharf Management and Operations Plan*, City of Salem, Bourne Consulting Engineering, November 2008.
- 2.2. Existing Site Plan, Salem Ferry Terminal – City of Salem, Vine Associates August 2007
- 2.3. Implementation of Ferry Landing:
- 2.3.1. *Facility Installation (H-13) Salem Ferry Pier, Contract No. H-13* – City of Salem, Massachusetts, Vine Associates, Inc., November 2005
- 2.3.2. *Float Procurement (H-14) Salem Ferry Pier, Contract No. H-14*– City of Salem, Massachusetts, Vine Associates, Inc., November 2005
- 2.3.3. *Gangway Procurement (H-15) Salem Ferry Pier, Contract No. 15* – City of Salem, Massachusetts, Vine Associates, Inc., November 2005



0 1000
SCALE: 1" = 1000'-0"

SALEM WHARF-LOCUS PLAN

- 2.4. *Final Site Development Plan, Salem City Pier* – Office of Planning and Development, City of Salem, Massachusetts, Vine Associates, Inc., December 2005
- 2.5. *Transportation Improvement Study for Routes 1A, 114, and 107, and Other Major Roadways in Downtown Salem*; Central Transportation Planning Staff (CTPS) for the Boston Region Metropolitan Planning Organization; November 2005.
- 2.6. *Traffic Impact Assessment, Proposed Condominiums and Retail Center, Salem, Massachusetts*; McMahon Associates, Inc.; September 14, 2004.
- 2.7. *Findings Report - New Salem Wharf Project, Salem, Massachusetts*; Vine Associates, Inc.; November 2001
- 2.8. *The Salem Ferry and New Salem Wharf Project, A Phased Approach to Completion*; The Salem Partnership; October 2001
- 2.9. *ALTA/ACSM Land Title Survey, 4-10 Blaney Street*, First Mass Land Company LLC, Salem, Massachusetts, Cullinan Engineering, January 4, 2001
- 2.10. *Salem Harbor Management Plan, City of Salem, Massachusetts*; The Cecil Group, Inc.; May 2000.
- 2.11. *New Salem Wharf Study, Salem Harbor Plan*, – City of Salem, Massachusetts, The Cecil Group, Inc., August 14, 1998
- 2.12. *Existing Conditions Report, Salem Port Development Project* – Salem Port Development Corporation, Salem, Massachusetts, Nucci Vine Associates, Inc., April 25, 1997

3. PROJECT SITE ASSESSMENT

3.1. Introduction

Under this task, the team reviewed the available site information, performed site visits and investigations to understand and document the existing conditions. The following provides a summary of the documents identified in Section 2.0.

3.2. Review of Previous Reports and Studies

3.2.1. 1997 Existing Condition Report, Salem Port Development Project

This report provides background site data for the proposed site and includes the following:

- Soil borings were taken upland and outshore. The outshore borings extend down to various depths but did not locate the bottom of the clay layer and therefore will have limited value in the design of the future pier. The single upland boring did locate the rock/till layer but did not specifically determine if bedrock or till. Bottom of boring was ended with refusal at -52.5 feet from surface or approximately Elev. - 38.8 (MLW). This upland has significant difficulty in penetrating the site fill. This will be a concern for pile driving within the historically filled footprint of the site. Outshore borings appear to have ended below the refusal elevation of the upland boring.
- Testing of the offshore samples was performed to obtain general levels of contaminants of the soils in anticipation of future dredging. The use of this information is beyond the scope of this study and was not reviewed.

- Hydrographic survey was performed and presented. No formal upland topographic survey appeared to have been performed at this time.
- Although utilities were identified in the area, no information on service levels or capacity was presented.

3.2.2. New Salem Wharf Study, Salem Harbor Plan

- This report presents the initial and most comprehensive development plan for the site. It presents three different alternatives with varying degrees of development. The level of development of all the alternatives proposed a substantial upland commitment to development and associated infrastructure improvements. The preferred development included the creation of a hotel, commercial retail and parking for 298 vehicles but identified a shortage of parking by 69-89 spaces. It aligned the primary site egress with Webb Street to minimize impacts on Derby Street.
- This study was the foundation for the City of Salem Harbor Plan which was developed in 2000 for this specific area of the City.
- This study was scaled down in subsequent development plans to address site constraints.
- This study also provided the original market analysis that was utilized in this as well as subsequent study updates.

3.2.3. Salem Harbor Plan, City of Salem 2000

- The 2000 Salem Harbor Plan is currently being updated by the City of Salem. This plan utilized the New Salem Wharf Study as the definitive plan for this area. This provides little flexibility to changes and site restrictions and limitations. Because of this rigid presentation of the plan, subsequent plan updates that have been developed conflicted with the current harbor plan as developed.
- It is currently understood that the revised Harbor Plan will provide the overall goals and objectives for the Salem Port Expansion will allow greater latitude in site development to achieve these goals now as well as for future growth and site utilization. Section 4 provides comments on current harbor plan and considerations for revisions in the updating of the plan.

3.2.3.1. ALTA/ACSM Land Title Survey – 4-10 Blaney Street

- This plan provides for the detailed boundaries of the project site as well as for Dominion (current property owner) power generating facility. At this time the City of Salem has an agreement with Dominion for use of the use and does not yet obtained ownership of the property which is an ultimate goal. The boundaries as presented were incorporated onto the current project base plan.

3.2.3.2. The Salem Ferry and New Salem Wharf Project, A Phased Approach to Completion, October 2001

This provided a phased approach to development for the 1998 New Salem Wharf Project

3.2.3.3. *Findings Report - New Salem Wharf Project, Salem, Massachusetts; Vine Associates, Inc.; November 2001*

This report appears to provide an additional narrative to the proposed project phasing associated with the October 2001 report.

3.2.3.4. *Traffic Impact Assessment, Proposed Condominiums and Retail Center, Salem, Massachusetts 2004*

Report on traffic impacts from proposed area development projects. Findings on how current traffic conditions will impact the proposed Salem Port Expansion Project are presented in the Traffic Assessment Report by Nitsch Engineering which has been included in the Appendix A-3.

3.2.3.5. *Transportation Improvement Study for Routes 1A, 114, and 107, and Other Major Roadways in Downtown Salem 2005*

City-wide report on current traffic impacts for the City of Salem. Findings on how current traffic conditions will impact the proposed Salem Port Expansion Project are presented in the Traffic Assessment Report by Nitsch Engineering which has been included in the Appendix A-3.

3.2.3.6. *Final Site Development Plan, Salem City Pier 2005*

- This plan reflects an update of the 1998 plan after meetings with the Harbor Plan Implementation Committee resulting in a reduction in the parking requirements. The resulting plan, although scaled back, included:
 - Slip and Dockage Use
 - Whale Watch, Ferry, and Headboats – 1 each
 - Excursion Boats / Coastal Cruise Ship – 1 each
 - Transient Dockage – 20 boats
 - Lobster Boats/Commercial Fishing Boats – 7 boats
 - Buildings
 - Fishing Support – 2,600 sf
 - Terminal Building – 1,800 sf
 - Parking – 231 spaces
- The market analysis was updated along with project costs. A review of the market analysis was performed and is presented in the Appendix A-1.

3.2.3.7. *Implementation of Ferry Landing 2005*

- Series of plans and specifications that represent the construction of the current ferry landing facility and associated structures. It is understood that these structures will be incorporated into the final Port Expansion Plan to the maximum extent possible.

3.2.3.8. *Management and Operations Plan 2008*

- This report was generated concurrently with the work associated with development of the preferred plan and the preliminary/schematic design for the site. It provided clarification on the markets to be served and the site needs and limitations to serve those markets. It served as the predominate resource in finalization of the site program.

3.3. Review of Historic Market Analysis and Feasibility Findings

The historic market analysis used for the project was reviewed by ConsultEcon, Inc. as to its ability to be used for the current facility development by updating the previous information. At the initiation of this study, the most recent report on the project market analysis was the *Final Site Development Plan – Salem City Pier* which was produced in December 2005.

A summary of ConsultEcon's findings is presented below. A full copy of their draft report can be found in the Appendix A-1.

- The market analysis of program uses is outdated because it is based on work completed for the 1998 study. New information was not introduced in the 2005 study. (In general, information presented in market analyses and feasibility studies is current for a period at most 2 or 3 years.)
- Hence, it is recommended that a new market analysis be conducted in order to ensure that current pier planning, which is intended to lead directly into facility construction, is informed by up-to-date market information.
- Proposed market analysis would review the demand for other maritime uses from the earlier reports including the cruise industry, whale watch, headboats, commercial fishing fleet, transient marina slips, excursion ferry services, and growth of the Boston ferry ridership.
- Analysis would also review new site uses including the home port facilities for LNG supply operations. The proposed use of the facility as a home port for an LNG operator is a new use that has not been reviewed within a market context
- Review would also include the experience of comparable pier operations.
- It is recommended that the revenue assumptions and revenue potential be revised based on the new market analysis, as well as the documented experience of the new ferry service. The proposed mix and priorities of uses for the Salem pier has changed since the 2005 study, necessitating new revenue assumptions.
- A plan that estimates operating costs and net income should be prepared in order to develop realistic estimates of the pier's stabilized financial performance. If the City expects the facility to be financially self-sufficient, the plan should include an accurate accounting of personnel, maintenance, utilities, and other operating costs. Moreover, the City should not borrow capital to support the pier's development and construction without due diligence that this plan would present.
- City may need to be aware of operations and revenue impacts of proposed users, such as an LNG supply homeport, before capital improvements and lease arrangements are committed.
- If it is found that the pier does not support the cost of its operations through earned revenue, the economic benefits of pier development should be revisited. The City (or another source) may need to contribute revenue for operating costs.
- It is recommended that an economic impact evaluation be prepared that estimates the amount of direct and indirect economic activity that results from the construction and operation of the new pier in order to justify any one-time capital and ongoing operational expenses borne by the City.

Subsequent to the review of the above, the City initiated an updated market analysis which was included with the Salem Wharf Management and Operations Plan.

3.4. Watersheet Uses and Program

The site development proposals prepared in the previous studies anticipated significant expansion of marine activities at the site and assumed that a much greater upland area would be available to

support the development of the site. The current available site under the current project scope has been substantially reduced which will ultimately restrict the type and extent of maritime uses. The current site has only approximately 2 acres of upland.

The project lies within the Designated Port Area (DPA) of the City of Salem. This provides the City with some opportunities for commercial use of the site but also come with some restrictions unless removed or modified by the City in an approved harbor plan.

In the 1998 development of the watersheet for maritime uses, the vessel berthing focused around the following:

Whale Watch	3 vessels
Headboats	2
Lobster	12
Ferry	1
Cruise Ship	1
Transient – 510 lf	
Water Taxi	1

In the 2005 update of the project, the vessel berthing requirements were modified to the following:

Whale Watch	1 vessels	40 vehicles
Headboats	1	30
Lobster	7	35
Ferry	1	120
Excursion/Cruise Ship	1	0
Transient	20	6
Water Taxi	0	0

In the review of the latest program for the marine facilities, the identification of a home-port for a LNG offshore-supply vessel at the facility has become a strong possibility. This and other uses have been identified to develop the current proposed maritime facility requirements as follows:

LNG Offshore Supply	1 vessels	10 vehicles
Ferry	1	80
Whale Watch	1	40
Excursion	1	75
Cruise Ship	1 (infrequent)	2
Water Taxi	1	0
Tall Ships / Visiting Vessels	1 (infrequent)	
Commercial Fishing	20	20

In addition, a number of amenities need to be included with the pier including:

- Truck access with ability to turn around on pier – refueling, provisioning, etc.
- 10 ton crane capacity
- Electrical, water, sewage pump-out, trash dumpsters, lighting
- Ample pedestrian ways
- Floating barge berthing for offshore supply vessel, ferry, small coastal cruise ships
- Fixed pier berthing for larger coastal cruise ships, visiting vessels

Preliminary Marine Program Elements:

LNG Offshore Supply Vessel	130 ft berth	at floating barge	Home Port
Salem Ferry	120 ft berth	at ADA barge	Home Port

Coastal Cruise Vessels	250 ft berth	at ADA Barge	Day Use
Small to Medium Cruise Vessels	up to 400 ft	at pier face	Day Use
Medium Cruise Ships	up to 800 ft	Anchorage	Day Use
		Tenders to ADA barge	Day Use
Visiting Vessels/Tall Ships	up to 400 ft	at pier face	Day/Overnight
Excursion Vessels	120 ft berth	at ADA Barge	Live Berth
Water Taxi	50 ft berth	Float at ADA Barge	
Commercial Fishing	40 ft slips	Inner Basin Area	Home Port

Summary of facility berthing needs:

- ADA Barge (existing) with functional use of 2 berths
- 130 feet of float barge berth reserved for LNG Offshore Supply Vessel
- Min. 200 foot fixed pier berthing for various commercial/passenger vessel use

3.5. Landside Site Demands

3.5.1. Site and Pier Use Support Circulation and Infrastructure Needs.

The site and pier use support and circulation needs were derived from the site user interviews along with general projected site public safety, service, and recreational needs. This section addresses the specific pier use circulation and utility needs. The potential site users interviewed (to date) include the Salem Ferry operators (WTA), the potential LNG crewboat operation (Excelerate Energy and designated marine operators), potential whale watch and excursion ferry operator (WTA), and the harbor pilot. The cruise vessel pier support needs have been described in terms of research completed for comparable Massachusetts ports (Including Fall River and Gloucester). Other users such as visiting tall ships, other visiting vessels, and other small commercial vessels have at this time been also addressed on a comparable port basis. As potential users not currently operating at the site, the cruise industry and other commercial marine vessels comprise a large number of potential users too numerous to interview effectively.

3.5.1.1. Primary User Needs (from interviews):

Salem Ferry Operators (WTA – existing): The ferry operator reports the need for the following types of pier side access. Preferences are indicated between fixed pier access and floating pier access. Ferry support needs assume continued homeporting of the vessel at Salem Wharf. While the operator has alternative service facilities in Salem, the ferry schedule does not allow for easy diversion to that site without disruption of current operations. All service needs are projected for the 4-5 month seasonal duration from May through October.

- Fuel delivery by truck; preferred tie up with truck access to one flexible use fixed pier berth. Alternative fueling on floating pier by long hose to truck location at entrance to floating pier (current method).
- Vessel service for dock side maintenance and repair; preferred fixed pier berth with truck access and crane or lift for heavy items such as engine parts. Alternative would be light repair and maintenance at floats with heavy work done at remote facility.
- Water supply at fixed or floating pier. Requires pipe connection from Derby Street to pier.
- Electrical connection at layover berth location. Requires electrical service connection to Derby Street, possibly through the marine terminal building.

- Sewage pumpout from layover berth to City sewer. Requires sewer link to Derby Street or a holding tank pumpout facility near the pier, most likely for joint use by several vessels.
- Vehicular access across site to dockside for service, trash removal and maintenance vehicles. Vehicular connection from ferry storage to dockside

LNG Supply Crewboat Operation (Excelerate Energy and designated marine operators – potential site users); Supply boat needs are the same as those described for the ferry vessel, with several additional requirements. The fixed pier side berth needs to be a minimum of 150 feet to accommodate the larger vessel.

- Supply and equipment handling. Fixed pier truck access needs to accommodate a fork lift truck and a 10 ton mobile crane.
- Vehicular access across site to dockside for service and maintenance vehicles. Vehicular connection from ferry storage to dockside

Whale Watch and Excursion Ferry Operator (WTA as potential operator); Site support needs would vary for a whale watch or excursion vessel depending on whether or not the vessel was homeported at the site. If homeported, the needs would be the same as for the Salem Ferry. If such operations were to be port of call only, minimal site service needs could be met with a fixed pier truck delivery berth and transfer point, to be shared with the ferry and crewboat.

- Depending on the combined number of ferries, whale watch and excursion vessels, the live loading berth(s) would need to be managed to coordinate docking slots for the different ferry operations, particularly for peak demand periods such as summer weekends.
- Similarly, limited on-site landside parking supplies will need to be apportioned to accommodate the multiple uses with the Salem Ferry having priority.

3.5.1.2. Other User Needs (from comparable port analysis):

Cruise Vessels: For port of call cruise vessels, the site support needs would be limited to shared facilities with the ferry and supply boat plus utilities. Most coastal cruise to mid sized cruise vessels are self-sufficient for port of call operations. However, provision of basic services might be helpful in attracting cruise business to Salem. Seasonal use would be predominantly in the summer and fall. Optional port of call cruise services would include the following shared infrastructure:

- Fuel delivery by truck; preferred tie up with truck access to one flexible use fixed pier berth.
- Water supply at fixed or floating pier.
- Electrical connection at berth location.
- Sewage pumpout from layover berth to City sewer. Requires sewer link to Derby Street or a holding tank pumpout facility near the pier, most likely for joint use by several vessels.
- Vehicular access across site to dockside for supply or trash removal vehicles. Vehicular connection from ferry storage to dockside

Mid or larger sized cruise vessels anchored off site would not require service or support infrastructure beyond that which could be handled by the lighters or tenders used for bringing passengers ashore.

Home ported cruise vessels berthed at Salem Wharf were not considered as regards service and support needs since the site is too small to accommodate other landside passenger handling needs. Supplying and maintaining homeported cruise vessels would be likely to conflict with the other primary marine uses being considered for the site.

Visiting Tall Ships and Other Vessels: Port of call visiting tall ships, research or other vessels would generally benefit from the same shared support infrastructure as described for the cruise vessels. Visits are potentially year round, with generally heavier use in the spring summer and fall.

Other Small Commercial Vessels: Berthing of several other types of small commercial vessel have been proposed in past plans including commercial fishing boats (primarily lobster boats) and headboats for fishing parties. The need for lobster vessel berthing has been identified with a specific need for year-round berthing. Needs for these uses include dockside water and power as well as a central pumpout facility. More intensive needs associated with loading/unloading of vessels would occur at the fixed pier used by the ferry and supply vessels.

It should be noted that the seasonal needs for site users may vary greatly and depend on the specific season of use.

Summary of Combined Site Support and Infrastructure Uses: Many of the support needs can be shared or combined between different users. An infrastructure program to accommodate the primary and secondary site users would include:

- Flexible use fixed pier berth: 1) over 200 feet berth length, 2) Truck access, 3) crane capacity, 4) water supply, 5) commercial vessel pumpout station
- Dock side utilities for layover berths including water, and electrical
- Service and supply vehicular access across site to fixed and floating docks

3.5.2. Passenger Handling Requirements:

Each of the primary and secondary marine uses have landside passenger handling requirements such as curbside drop-off, pedestrian connections to boarding locations, and pedestrian links to visitor attractions or parking. For ferry, excursion and cruise vessels, a clear and safe pedestrian circulation network is needed. For bus and trolley connections, as well as taxi and auto drop-off, clear and efficient drop-off areas are needed with enough capacity to handle the maximum anticipated loads. Because of site size and shape limitations, there are likely to be some crossings of vehicular and pedestrian traffic which will need to be designed for safety and legibility within the constrained site. Specific needs of the marine users are highlighted below. While most users need ADA/MAAB access including landside and waterside, the facility requirements vary somewhat depending on public use needs of the different operations.

1) Salem Ferry and Excursion/ Whale Watch: ADA/MAAB access required. Up to 149 arriving and 149 departing passengers need to be comfortably, safely and efficiently handled for the 7 to 8 daily arrival and departure times of the Salem Ferry. Needs are similar for possible future whalewatch or excursion vessels although the vessel size and capacity may vary. Queuing of departing passengers needs to be kept separate from the path of arriving passengers. Passengers are expected to arrive and depart from the terminal as

pedestrians or in vehicles. Direct access from the curbside to the live boarding berth needs to be maintained as well as a path through the terminal. The curbside drop-off area needs to have a live area for drop-off and pick-up by buses, trolleys, rickshaws, taxis and autos. The terminal area also needs to have a clearly defined pathway from terminal to Derby Street to encourage arriving and departing passengers to walk to and from Salem destinations. A variety of waiting areas inside and outside are needed for use in different seasons and weather conditions. Orientation signage on site and leading to and from Salem visitor destinations will be important for ferry passengers, particularly those on foot. Information service in the terminal will also be useful.

2) Coastal Cruise Vessels (Berthed at Pier): ADA/MAAB access required. Passenger handling needs for smaller port of call cruise vessels are similar to those of the ferries. The number of passengers may vary from 100 to 250, depending on the vessel size.

3) Mid-size Cruise Vessels (anchored in outer harbor): ADA/MAAB access required. The mid-sized cruise ship passenger handling will also be similar to the ferries, since passengers will need to be transported by tender to Salem Wharf. Once they have arrived or depart at a floating dock in groups of 100 to 150, they will be handled in much the same as ferry passengers.

4) Visiting Vessels: ADA/MAAB access as responsibility of vessel, since vessel freeboards and boarding points vary. Passenger numbers will also vary, with crews often comprising the majority. As visitors, passenger handling would be similar to the ferries and cruise vessels.

5) LNG Supply Boat: ADA/MAAB access as responsibility of vessel. Crew changes would constitute the passenger loads. Since they will be going to and from work activities, they will be handled either from curbside or the terminal building, with orientation the responsibility of the company and crewboat operators. Since the vessels are foreign flagged, there may be a need for customs and immigration processing along the path of arrival and departure. It is unclear at this point whether such procedures will be on or off site, but may necessitate availability of secure passageways to and from the supply vessel berth to curbside.

3.5.3. Parking Demand by User

The area limitations of the site will limit the number of parking spaces available for employees and visitors. The parking needs for each user are summarized in the table below.

1) Salem Ferry and Excursion/ Whale Watch: ADA/MAAB access required. Variable parking demand will include Salem Ferry employees and a combination of weekday commuters and Salem based recreational riders.

2) Coastal Cruise Vessels (Berthed at Pier): ADA/MAAB access required. As the vessels are projected to be port-of-call and are unlikely to be homeported at the pier, a minimal number of employee spaces will be needed. Site and nearby parking limitations will preclude homeport operations until an increased supply of nearby or on-site spaces are provided.

3) Mid-size Cruise Vessels (anchored in outer harbor): ADA/MAAB access required. Mid-sized cruise vessels would also be port-of-call and not homeported. Parking needs would be the same as for the coastal cruise ships.

4) Visiting Vessels: ADA/MAAB access as responsibility of vessel. Parking needs are also minimal and could be shared with the cruise vessels.

5) LNG Supply Boat: ADA/MAAB access as responsibility of vessel. Parking needs for employees would be exclusively for crew and staff.

6) Other Small Commercial Vessels - Commercial Fishing

Table III – Onsite Parking Demand

Vessel Operation	Passenger Spaces	Crew/staff Spaces	Sub -Total	Notes
Salem Ferry	60-80	3-6	63-86	Seasonal demand
Excursion / Whale Watch	75	3	78	Assume 2.5 pass/space; Seasonal demand
LNG Supply	-0-	6-8	6-8	Year round exclusive demand
Small and Medium Cruise Vessels	0	2-3	2-3	Limited – staff at time of docking; seasonal and intermittent.
Visiting Vessels	-0-	1-2	1-2	Limited – staff at time of docking; year round but intermittent
Commercial Fishing		1	10-20	May dictate having to reduce peak season parking
TOTAL	135 - 155	15-22	160 - 197	

3.5.4. Pedestrian Access:

Pedestrian access to and from the site and terminal are critical to the smooth functioning of the site and for the safety and enjoyment of the users. Since Salem Wharf and a new marine terminal are within walking distance of many of the major visitor attractions in Salem, the connecting pathways and sidewalks need to be comfortably sized, easy to follow and properly connected to the Marine terminal and docks. An improved pedestrian network on and off site will be a major benefit to Salem residents both during ferries, cruise ship and excursions operations, as well as during the off season.

The pedestrian access needs for the various passenger operations are virtually the same and can be grouped together as the following;

- ADA/MAAB access guidelines for all sidewalks, ramps and cross walks along the path of travel within the site, and connecting to the offsite sidewalks and pathways.
- An improved primary perimeter walkway along the harbor and Hawthorne Cove edges of the site. The current pathway, although picturesque, does not meet ADA or MAAB standards.
- Direct pedestrian walkways from the curbside drop-off areas to the boarding berth locations for the passenger and supply vessels.
- Direct walkways from Curbside through the terminal building waiting and ticketing area to the boarding berths for the passenger vessels. Covered walkways are recommended for areas where queuing for boarding occurs on the docks.

- Lighting along all on site pathways for safe nighttime use. Down lights are always recommended in a marine environment to minimize navigation impacts in the harbor.

3.6. Site Traffic, Circulation and Access

Due to the constraints of a narrow and awkwardly shaped site, circulation and access needs to be carefully planned and managed. The main access road needs to be located for safe transit by passenger and service vehicles across the site while at the same time allowing for adequate circulation of buses, trucks, etc. to minimize site congestion.

Off-site traffic and circulation are also major issues in terms of a smoothly working site and minimizing impacts on the surrounding neighborhood. Those issues are covered in the Appendix in the traffic analysis section.

Summary of Traffic and Circulation Findings: While it appears that the primary passenger and service circulation needs can be addressed within the current site limits, the circulation and parking constraints clearly limit the types and intensity of commercial marine activities.

- For optimal circulation, parking and pedestrian access layouts of the current site, it may be necessary to extend the south bulkhead and Hawthorne Cove land/water edges with a pile supported harborwalk to allow the maximum use of the current land area for site traffic circulation and parking.
- Future growth of existing and proposed new vessel and shore activities will be dependent on several important off site additions, similar to those recommended in previous Salem Wharf Plans:
 - 1) Alternative access and egress at the northeast end of the site to Webb Street to relieve traffic impacts on Blaney Street and Derby Street.
 - 2) Additional nearby off site parking for at least 50 to 100 spaces to accommodate primary uses and additional spaces to accommodate additional commercial vessels activity.
 - 3) Area wide traffic management measures and pedestrian improvements to handle the added vehicular and foot traffic generated by Salem Wharf.

3.7. Site Security and Emergency Program

In review of the previous studies, no identification of security issues was made. Although security issues were not a major factor when the project was first conceived, it now is an important factor to consider in facilities planning. The current ferry operating at the site is limited to 149 passengers and falls below USCG requirements for a Vessel security Plan and a landside Facility Security Plan.

As this project moves forward, a number of vessels can exceed the 149 passenger threshold including larger ferry vessels, excursion vessels, whale watch and cruise ships. Each of these vessel operators will be responsible for their own Vessel Security Plan. Under the original development of the program, the project site would be required to develop a Facility Security Plan. However, the USCG had identified certain facilities which are exempted from being required to have an individual facility security plan. These include the following:

Public Access Facilities that are used by the public primarily for purposes such as recreation, entertainment, retail, or tourism, and not for receiving certain passenger vessels subject to the

regulations. Owners and operators of public access facilities will be responsible for implementing appropriate security measures in accordance with the Area Security Plan

It is believed that the Salem Port Expansion would fall under the definition of a Public Access Facility and would be subject to minimal requirements under these regulations.

3.8. Building Program

3.8.1. Interior User Needs from Interviews and Comparable Ports:

Current and future Salem Wharf users have expressed space needs for their operations, which could be housed in a single or multiple buildings in close proximity to the dock area. A single multi-purpose building could be known as the Salem Marine Terminal.

1) Primary User Needs (from interviews):

Salem to Boston Ferry: (WTA – existing operator),

The ferry is in its second year of operation since its inaugural season of 2006. The seasonal route serves Salem commuters to Boston and visitors in both directions from May through October. The Salem owned vessel is homeported at the current Salem Wharf. Interior building facility needs include:

- Public waiting area: including ticketing and visitor information: The area would be climate controlled and provide ticketing, seating, information, and other amenities. Ideally there would be views from the waiting area to both the boarding dock and the curbside drop-off area, contingent on the siting and layout of the terminal building. This waiting area would be designed to accommodate existing and future growth of the Salem Ferry, in addition to cruise vessel port of call visits, and future excursion/whalewatch operations. Adjacent covered outdoor seating would serve as an overflow and fair weather extension of the waiting area. Flexibility may be needed for expanding the ticketing area for future excursion and whalewatch operators.
- Public rest rooms and vending area: Located in close proximity to the waiting area, the restrooms would serve the ferry and other passenger vessel functions. Depending on city policy and terminal operating hours these facilities would also be open to the general public.
- Operator's office space: Located adjacent to the ticketing and information area, the offices would serve the operators' administrative needs. Flexibility for adding work stations may be needed for future.
- Workshop and storage: The workshop/storage could be located in a different part of the building and accessed from the exterior. The area could also be adjacent to the LNG workshop/storage. The WTA workshop would not need to be fully climate controlled, since it would be used on a seasonal basis.

Whale Watch and Excursion Ferry Operator (WTA was interviewed as a potential operator), similar passenger needs as the Salem Ferry. Potential new uses not currently operating. Seasonal use overlapping with Salem to Boston ferry operations.

- Waiting and ticketing. Would use same space as the Salem Ferry. Might require a separate ticketing window if either ferry is operated by a different company.
- Visitor information; Shared space with the Salem Ferry.

LNG Supply Crewboat Operation (Interview with Excelerate Energy and designated marine operators – potential site users), Year round building use.

- Office and Administration Space: The offices, crew waiting and other functions related to crew and administration of the LNG landside supply center would be housed in a separate part of the terminal building, away from the public waiting area, or possibly in a separate building. The space could be located on grade or on an upper level depending on the terminal building layout. While the operation will be continuous throughout the year, the busiest periods of delivery will be during the fall and winter months. More information is needed from Excelerate and their marine associates to understand the breakdown of the 2500 sf space functions and needs.
- Workshop: The workshop area would be used by Excelerate for supply boat and buoy repair needs, stores, and equipment. A portion of the space would also be devoted to the buoy monitoring program to be administered by Excelerate. Needs to be at grade with truck delivery access.
- Storage: An additional storage area is needed for purposes of short term storing supplies and equipment to be delivered to the offshore LNG ships. Proximity to the departure berth and transfer cranes is needed. Needs to be at grade with truck delivery access.

2) Other User Needs (from comparable port analysis):

Cruise Vessels: Could include either coastal cruise vessels berthed at pier, or medium cruise vessels anchored off shore with tender connections to the landing and building. These would be seasonal uses that overlap with ferry operations.

- Waiting and information area: Shared with Salem Ferry.

Visiting Tall Ships and Other Vessels:

- Waiting and information area: Shared with Salem Ferry

Other Small Commercial Vessels

- Needs may vary depending on the business. Proximity to the Terminal is not necessary and separation is preferred.

3) General Utilities and Building Support:

The combined building utility needs would be connected to the City system on Derby Street and would include water, sewer, electrical service and fire protection. The specific service requirements will be determined when the building size and loads are identified.

Energy efficiency measures may be incorporated into the design in a variety of ways to reduce greenhouse emissions and make use of alternative sustainable energy sources: Supplemental solar, thermal and/or wind energy sources will be considered and may be used to reduce building and site dependence on conventional commercial energy.

4) Summary of Building Program Interior Space Needs: The combined building needs described are derived from Interviews with current and prospective users, representing the best estimates at present.

- The current building program projections are considerably larger and more complex than the building program recommended in the last study. As such the larger program has a significant capital and operations cost increase over those assumed in the 2005 study.

- Future expansion needs are not reflected in the quantitative summary, and may need to be considered in the building layout and site plan configurations.
- Further discussions with the potential users are recommended to determine potential joint use of spaces, particularly with respect to different seasonal and daily use patterns.
- Further discussions of port security requirements for different users are needed as the building design proceeds.
- The 2005 site plan is no longer applicable for the set of uses and their respective building and access requirements. Further plan analysis and assessment is needed for;
 - 1) the site location and orientation of the respective building areas,
 - 2) user access patterns for the upland approaches,
 - 3) the pier and live berth access on the waterside.

3.8.2. Summary of Building Program Interior Space Needs:

Table III – Preliminary Terminal Building Program

Tenant/User	Function	Net Area Need	Gross Area Needed	Notes/Needs/Equipment
1. Salem Ferry	(subtotal)	3,370sf		Seasonal space needs at present, April through October
Waiting/Ticketing/Info	Public	1200sf		
Office	Private	850sf		
Workshop/Storage	Private	1000sf		
Public Restrooms	Public (2 @ 160sf)	320sf		
Outdoor covered waiting porch	Public	400sf*		
3. Cruise Vessels		-0-		Seasonal use; can share waiting and public space with ferry
Waiting/Info	Shared with Ferry	-0-		
4. Visiting Vessels		-0-		Can share waiting and public space with ferry
Waiting/Info	Shared with Ferry	-0-		
5. LNG Supply Center		4,700sf		Year round use; heavier activity during fall and winter months
Office	Private	2500sf		
Workshop	Private	1000sf		

Storage	Private	1000sf		
Private Restrooms	Private; 2 @ 100	200sf		
6. Other Shared		250sf		General building needs
Utilities	Common	150sf		
Maintenance/Storage	Common	100sf		
<u>Total Net Square Feet</u>		8,070sf		Area without circulation, wall s etc.
<u>Total Gross Square Feet</u>	One Storey Building @ 1.1x		<u>8,877sf</u>	Site limits may preclude a 1 storey building
<u>Total Gross Square Feet</u>	Two Storey Building @ 1.3 x		<u>10,491sf</u>	2 Storey building would require more circulation space; footprint of approximately 5, 250 sf

- Exterior space; Not included in net square footage

4. HARBOR PLAN REVIEW

This Harbor Plan continues to strongly support a program to develop the proposed Salem Wharf off Blaney Street on the west side of the Harbor's Designated Port Area (DPA). A preliminary conceptual design for this new municipal complex was developed in the 1990s and details were included in the City's 2000 Municipal Harbor Plan. Since that time, there have been many changes that now need to be considered in creating a commercial wharf facility that will meet the current needs of marine operations and of a changing local economy. Among these new considerations are the increased security requirements since 9/11, a growing and dynamic cruise ship industry, lessons learned from the reestablished ferry service to Boston, and changes in local marine industries including offshore LNG operations and other infrastructure needed for future energy production.

Recognizing the need to update the wharf design, the City has contracted with a team of waterfront specialists to develop a revised conceptual plan for the development of the Blaney Street site. Since the initiative is not expected to be completed until after approval of this Harbor Plan update, the following direction is provided to guide this development.

- The site will remain a part of the DPA and thus its use will be dedicated principally to the support of a mix of water-dependent marine industries.
- The site was used in the late 1990s for a seasonal ferry service connecting Salem and Boston. This service was reestablished in 2006 after acquisition of a new ferry and the addition of a new wharf and floating docks with the support of funding from the Seaport Bond Bill and a grant from the State Executive Office of Transportation. If this service continues to be economically viable, its operation should be accommodated as one of the principal activities within the new wharf complex.
- In addition to ferries, the new wharf should be designed to support the needs of small to mid-size cruise ships, water-dependent excursion/tourist businesses, and dockage for other commercial boats, and landside development directly supporting these activities.
- The City should continue to aggressively negotiate with the current owner(s) of this Blaney Street property to either purchase the site or obtain a long-term lease for its use in supporting water-dependent commercial operations.

- To realize the site's full potential to serve the marine businesses proposed for the wharf, some offsite improvements will most likely be needed. Most critical are improved access and additional parking.
 - Options for improved access include increasing the width of Derby Street from Webb Street to India Street or possibly as far west as Blaney Street would allow for two-way traffic between the end of Webb Street and an improved or newly created access road onto the site. Creating a new access road off Derby Street east of Blaney Street (that is, closer to Webb Street) would allow vehicles to move onto and off the site without conflicting with pedestrian traffic moving safely between the wharf and downtown Salem or having to negotiate the sharp turn at the corner of Blaney and Derby Streets.

As the site is more fully developed, more parking will likely be needed during the peak summer and early fall tourist season than can be accommodated on the 2.2 acre Blaney Street parcel. Ideally additional parking lot(s) or garage(s) should be created within easy walking distance of the site (3 to 4 minute walk or less than ¼ mile). If possible, this "accessory" parking should be located within the DPA with use shared with others located in the industrial port. If this proves not to be feasible, then a study should be completed to identify opportunities for creating satellite parking utilizing shuttle service that would serve the DPA's needs.

5. FINDINGS ON REVIEW OF EXISTING PROJECT PLANNING DOCUMENTS

- 5.1. The earlier plans were reviewed to identify their program elements and how they might be relevant and consistent with present day conditions.
- 5.2. A review of the latest plan, identified as the *Final Site Development Plan – Salem City Pier*, provides the following:
 - Does not address the current proposed use by Excelerate Energy for an LNG offshore supply vessel including the need for substantial office and storage space.
 - Includes non-DPA uses including transient vessel berthing
 - Indicates uses that include headboats, lobster boats, and fishing boats which do not have a defined market
 - Illustrates uses that require parking greater than current site can provide
 - The building program was based on a 1,800 sf footprint for a water transportation terminal and 300 sf fish process building
 - Creation of a separate site access near Webb Street
- 5.3. A review of the current *Salem Harbor Plan* (currently under revision) found the following:
 - Identification of the need for coordination with the ongoing City-wide Transportation Management Plan
 - The identification of numerous non-DPA uses for the project area to assist in the economics for project justification
 - A program of uses that included berthing for transient vessels, maintenance and service for transient vessels and a fuel dock - all which would serve recreational boaters
 - Identification of specific dockage needs for different uses that appear to be without specific market for many of the uses.
- 5.4. The market analysis of the program uses is outdated because it is based on work completed for the 1998 study. New information was not introduced in the 2005 study. (In general, information presented in market analyses and feasibility studies is current for a period at most 2 or 3 years.)
- 5.5. In the area of the Derby Street/Blanney Street/Beckett Street constraints currently exist for both pedestrians and vehicles, including emergency vehicles.

- 5.6. The building program was based on a 1,800 sf footprint for a water transportation terminal and 300 sf fish process building
- 5.7. It provides for the creation of a separate site access near Webb Street

6. PUBLIC PRESENTATIONS AND PARTICIPATION

Public participation during the study occurred at two specific times within the project. One was presented in December 2007 after a review of the existing information and the development of a site program with alternatives. A copy of the PowerPoint presentation can be seen in Appendix A-4. A second public presentation was performed in October 2008 which illustrated the preliminary design of the project including the upland support elements, the commercial pier, berthing for commercial fishing boats and the terminal building. A copy of the PowerPoint presentation has been included in Appendix A-5.

For the first presentation, after initiation of the project, the study team provided a summary of the previous port plans that had been developed for the specific project site, a review of the historic marketing studies performed and the developed alternatives for site development. A maritime program was defined and presented that presented anticipated vessel types and upland support requirements. Upland design guidelines as well as building program were presented for public review and comment. Five alternatives were presented that reflected variations of vessel berthing and building location and included a conceptual estimate of construction cost.

Key points of discussion from the public participation included the desire to incorporate a larger site area, the inclusion of lobster vessel berthing, the opportunity for transient vessel berthing and the ability to handle cruise ships.

The second presentation presented the Salem Wharf Preliminary Design in October 2008. This included the finalized site layout including parking, vehicular travel lanes, building location, public walkways and the final positioning and size of the commercial pier and associated vessel berthing amenities. The Preliminary design also illustrated the commercial fishing boat berthing and the dredging limits. The building presentation was a key element of the site development as a focal point for visitors and its function as a gateway element to the City of Salem. A construction cost estimate was presented for the preliminary design as well as a schedule for permitting and construction of the complete project.

Key points of discussion from the public presentation included significant support of the project and the strong desire of some abutters to protect and preserve the garden area location at the northwest corner of the project site. A special meeting was setup for the City to address the concerns voiced at the public meeting in regard to the garden.

7. RECOMMENDATIONS OF PREFERRED PLAN

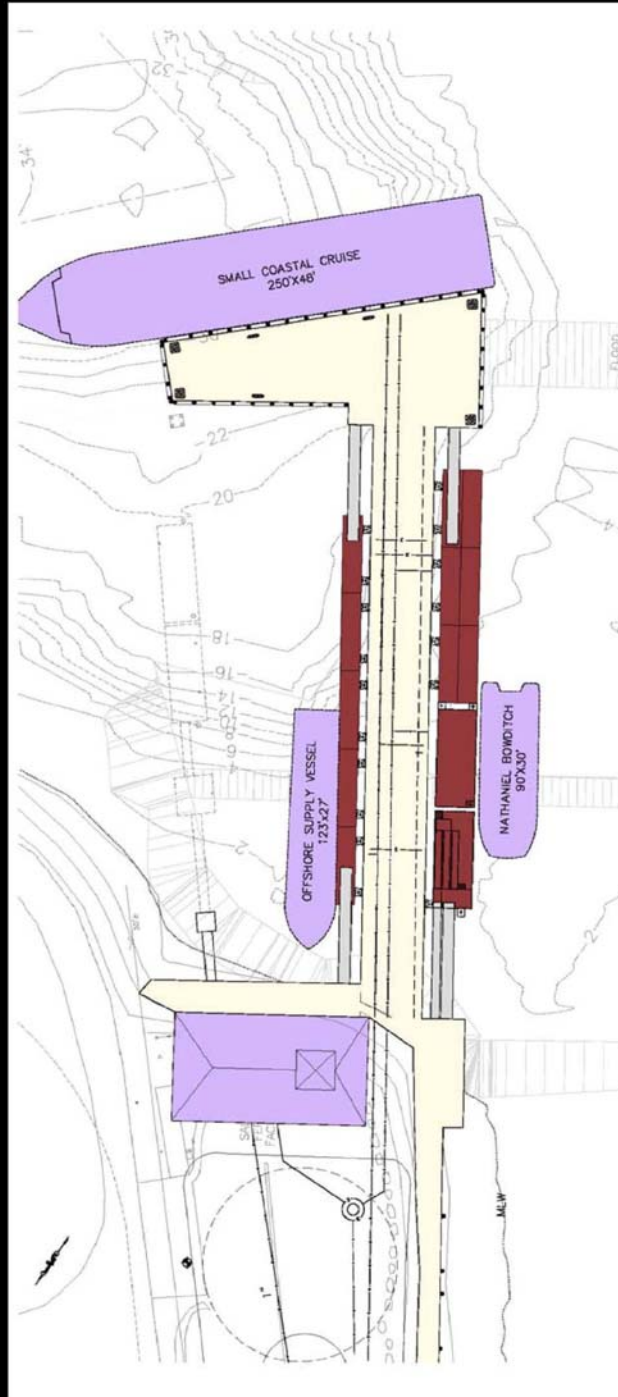
- 7.1. The Market Analysis needed to be updated to reflect current facility program including the site utilization by the LNG offshore supply vessel. This was performed under a separate contract.
- 7.2. The assessment of traffic conditions at the site has identified the following needs:
 - Upgrade the site access, in the area of the Derby Street/Blaney Street/Beckett Street intersection. Implement measures prohibiting parking for 200 feet along both sides of Derby Street from the intersection.
 - Improved signing and pavement markings should also be considered.

- Upgrade the sidewalks on Blaney Street and connect the existing east section with a new sidewalk section that would run the entire length of Blaney Street.
- 7.3. Consider that the revised Salem Harbor Plan should provide for the following:
- Flexible commercial vessel utilization of the site including passenger vessel operations and elimination of defined commercial uses and specific capacities for use
 - Elimination of year round recreational boat slips on the site and small boat fuel dock
 - Maintenance of the site as a public space with pedestrian walkways
 - Incorporate improvement dredging as well as maintenance dredging
- 7.4. Maritime Program Recommendations include:
- Incorporation of existing ADA barge access facility within design
 - Provide for a minimum of two berths (120 ft each) that meet ADA/MAAB requirements to be utilized by Salem Ferry and other passenger vessels
 - Provide for commercial berth for LNG offshore supply vessel (min 130 ft)
 - Provide for berthing for up to 300 foot vessels at fixed pier
 - Provide H-20 truck access to pier face
 - Provide capacity for 10 ton crane at pier face
 - Provide utilities at pier face include power, water, sewage pumpout
 - Provide for a year round berthing of up to 20 commercial fishing vessels
 - Allow for utilization of floats for large transient vessels (>75 feet).
 - Incorporate required dredging to achieve vessel access
- 7.5. Site Program Recommendations include:
- 50 foot turning radius for emergency vehicles and bus/trolley queuing
 - 12 foot harborwalk along shoreline
 - Provide for bus/trolley queuing
 - Provide for clear truck access from the main access road to the new fixed pier
 - Allow for opportunity for upland storage of vessels in offseason
 - Reutilize existing access pier as future public fishing/viewing pier
 - Incorporate the existing public garden into the project development
- 7.6. Building Program Recommendations include:
- Ferry Terminal – waiting, office, workshop and storage area
 - Public facilities
 - LNG Supply Vessel: office, workshop and storage facilities
 - Total building program from Interviews of prospective users needs to be refined.
 - Allow for flexibility and expansion of the initial structure.

EXHIBIT 8 - 1

Marine Elements

• Fixed Pier / Commercial Vessel Berthing



8. PRELIMINARY / SCHEMATIC DESIGN AND PLANS

8.1. Marine Elements

- 8.1.1. Fixed Commercial Pier: A commercial fixed pier (Exhibit 8-1) has been made a key element of the project with 165 foot of berth face. This allows for the pier to have the capacity to berth up to 300 ft vessels. The pier length and vessel limit is dictated by the abutting properties. The pier projects approximately 360 feet from the shoreline to achieve a draft of 26 feet after the proposed dredging. The pier will provide pier-side services including water, sewerage pumpout and power. Refueling would be available from trucks which would have access on the pier. The pier will also be designed to accommodate up to 10 ton mobile cranes.
- 8.1.2. Commercial Berthing and ADA Passenger Access: Along both sides of the access to the fixed pier there will be barges to provide commercial passenger vessel berthing. The existing ferry landing will be relocated to the west side of the pier approach along with additional barges to provide sufficient berthing for 2 passenger vessels one of which would be the Salem Ferry which is currently operating out of the project site. The east side of the approach would be utilized for commercial vessels including the Excelerate offshore supply vessel which currently has a lease agreement with the City. These locations would also be supported with pier side services including water, sewer pumpout and power. Refueling is available for these berths through a direct hose from a fuel truck which would have access on the pier.
- 8.1.3. Commercial Fishing: Commercial fishing berths (Exhibit 8-2) were identified as a critical market and the embayment of the area was utilized to provide safe year round dockage. The marina style floats would have power and water services as well as a pumpout for these and other transient vessels at the entrance of the embayment. The current design (Exhibit 8-2) provides for up to 26 berths although only about 17 slips would be usable for year round dockage due to exposure to winter storms.
- 8.1.4. Public Amenities: With the construction of the marine elements, there will be incorporation of public amenities within the project. This would include retaining the small pier to the west of the new fixed pier which would be used for public access and fishing. A harborwalk would be constructed along the shoreline that would link Derby Street to the waterfront. Access onto the pier would be achieved through a dedicated walkway available to the public except at times when need for security or cruise ship operations.

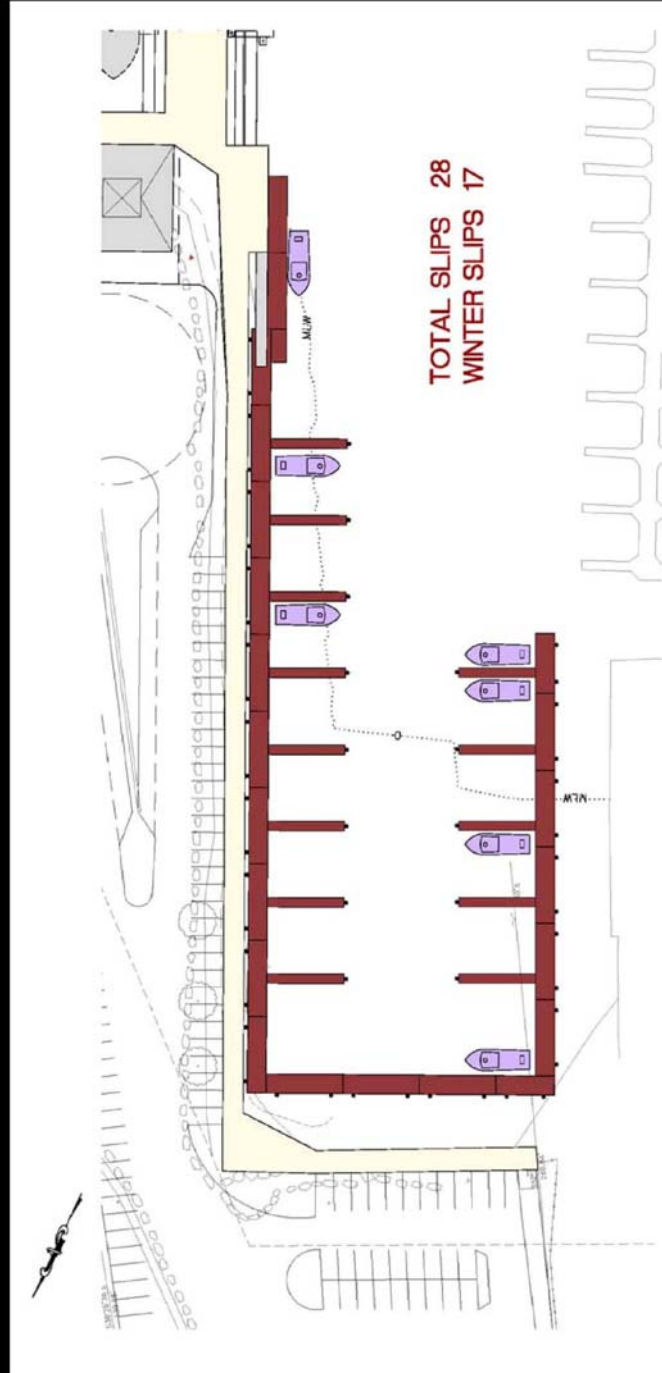
8.2. Site Plan and Terminal Building Context and Design

- 8.2.1. The Salem Wharf Site Plan and Marine Terminal concept design represents the culmination of a decade long process of town planning for an expanded port facility at the Blaney Street site, spearheaded by the City of Salem and the Salem Partnership. The building program and concept design evolved as an integral component of the Salem Wharf Site Plan. The concept designs were presented for multiple reviews and comments by the City of Salem, facility stakeholders, and the Port Advisory Committee, as well as to Salem residents at two public hearings. The final site plan and marine terminal building are also consistent with the 2008 Salem Municipal Harbor Plan, which preceded the final concept designs.
- 8.2.2. Site Plan Context and Design Objectives (Exhibit 8-3): The landside components of the site plan were developed to support and complement the waterside elements for the multi-purpose commercial marine facility. The site plan objectives, summarized on Exhibit 8-3, provide design principles developed to enhance the commercial marine operations for passengers and vessel operation, as well as to meet community and neighborhood needs.

EXHIBIT 8 - 2

Marine Elements

- Commercial Fishing Vessels

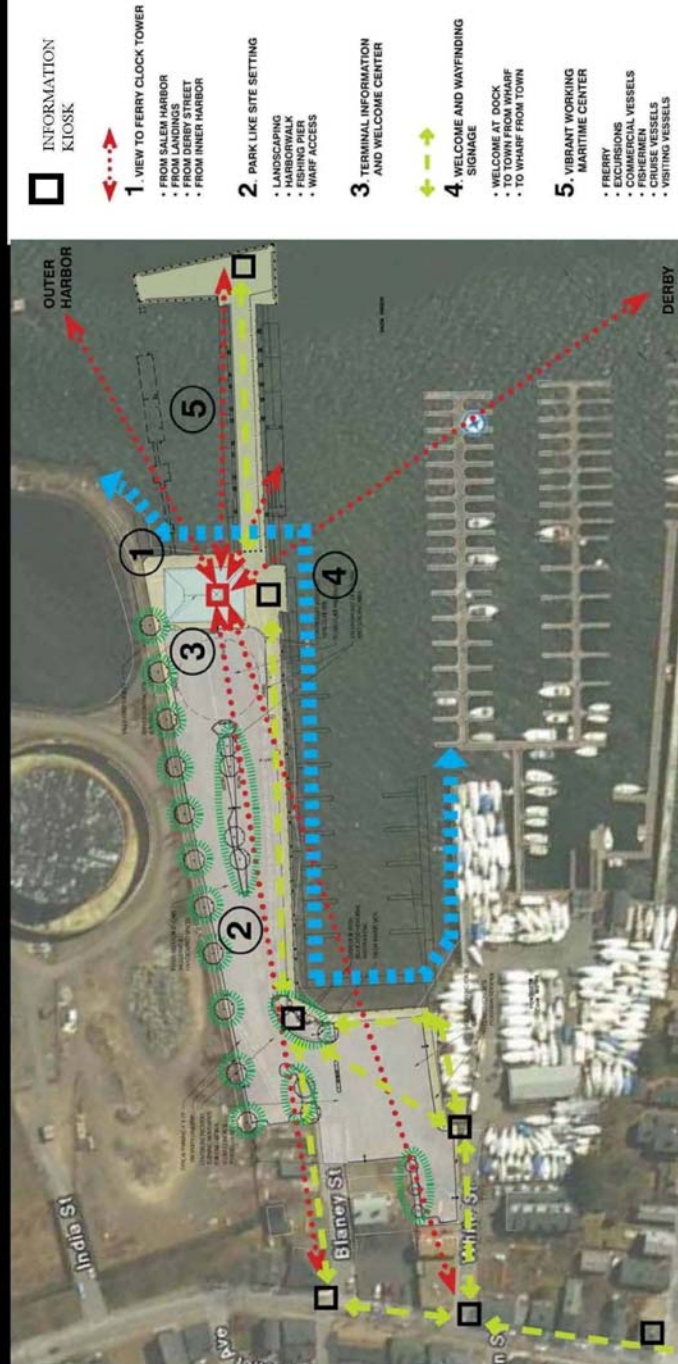


City of Salem

EXHIBIT 8 - 3

Terminal Building & Gateway

• Gateway Elements Plan



City of Salem

- **Park-Like Setting:** Providing a new commercial wharf with a park-like setting which will serve the year round needs as a buffer and recreational amenity for the neighbors, as well as providing an attractive gateway experience for visitors.
 - Landscaping treatments of the edges and planting islands.
 - Retain the current community memorial garden in its current location or an approved new central site.
 - New perimeter Harborwalk
 - Fishing pier
 - Wharf access path
- **Gateway Welcome Center:** The terminal building and site combined will serve as a Gateway for visitors arriving in Salem by ferry and cruise vessel and a departure point for Salem residents and visitors heading for Boston and other destinations by ferry. By creating a positive arrival and departure experience for visitors, they will be more inclined to return to Salem on future trips. Overhead sign arches saying “Salem Wharf” will be located at the end of the wharf and at the top of the ferry ramp.
- **Vibrant Working Port:** The mixture of ferries, cruise vessels, visiting ships, offshore crewboats, commercial fishing boats and general marine activities creates a new visitor attraction at the wharf itself.
- **Ferry Clock Tower as Landmark:** The clock tower, with faces on all four sides, is situated for viewing from many angles on land as well as water. The tower needs to be tall enough and the clock face large enough to be seen against the backdrop of the power plant.
- **Wayfinding Signage System:** Well placed signs and maps will allow visitors to easily find their way from Salem Wharf to Derby Street to the Center of Town and other destinations on foot, as well as to find their way back. Trolley stops and Salem Wharf will also be marked on maps in town.
 - Wayfinding map kiosks located at strategic points along the Harborwalk and on Derby Street (marked by black boxes on Exhibit 8-3).
 - Terminal waiting area information counter with brochures and internet ticketing stations for local activities.
 - Salem Wharf and trolley stops added to in-town maps.

8.3 Site Plan Development

8.3.2 The site plan design (shown in Exhibit 8-4) combines the maritime and landside elements within the constrained Blaney Street site area and incorporates responses to the design objectives. The limited available site surface area was effectively widened by addition of the new 12 foot wide Harborwalk replacing the narrow dirt path along the edge of Hawthorne Cove and covering the existing rip rap edge. The site was lengthened by the location of the terminal building at the squared off southern most edge of the site. These two measures allow for enough width and length to provide a reasonable and compliant two-way vehicle road and loop, as well as increasing the amount of perpendicular parking along the edges.

- **Site Circulation and Parking:** The road loop from Derby to Blaney Street is designed to safely accommodate combinations of private autos, cabs, trolleys, buses, and trucks serving the marine industries. Parking spaces are to be prioritized for in-season weekday use by local ferry commuters and for use by general day-trippers throughout the week. During the late afternoons and evenings, available spaces could be used by excursion and charter ferry operations, but existing off-site parking may also be needed for peak use periods. Handicapped spaces are located closest to the terminal building. The number of parking spaces is estimated to be 142 including 5 handicap spaces. Due to the site's

current MA-DEP Activity Use Limitation (AUL) from metals within the soils, the complete parking lot is anticipated to be paved. As part of the accommodation for buses and trolleys, waiting areas have been incorporated within the parking layout.

- Multi-purpose Harborwalk: The new 12 foot wide harborwalk will provide attractive pedestrian access for arriving ferry and cruise passengers, while also serving as a walking, jogging and bike path for Salem residents. Certain spots will attract fishermen, as they do today, with the new addition of a fish pier on the south section of the walk retaining the inboard portion of the existing fixed pier which accesses the current ferry landing.
- Landscaping: The new plantings will include a line of shade trees along the eastern property line, and several planted islands and edges in the parking area. A special planted overlook will occupy the area along the Harborwalk at the north east corner of Hawthorne Cove, and present an attractive entrance view for pedestrians and motorists approaching the Wharf along Blaney Street.
- Multiple Year Round Uses: Parking areas will have seasonal vehicular markings on impervious surfaces and no curbs, to allow for changing surface uses by season. For example, the winter fishing berths may need an area for staging activities, residents may use site parking during snow events, and some surface boat storage may occur during off peak periods.
- Flexibility for Future Expansion: Expansion of vessel activities during peak periods will require additional parking either on site and/or off site. Similarly, expanded marine activities would benefit from an expanded two way access system. The site should be capable of expansion when and if additional properties become available to the east and towards Derby Street. The terminal building may also need to be enlarged to the east and north if some of the land becomes available, to respond to increased marine support demands.
- Storm Water Management: The upland improvements have also included the collection and treatment of the storm water runoff anticipated at the site. With the presence of the AUL, the stormwater is collected from all upland impermeable surfaces as well as the fixed pier. The stormwater is treated through an oil-water separator as well as a vortex unit to meet the requirements of suspended solids removed prior to discharge into the embayment area. No infiltration or recharge is proposed due to the historic subsurface contamination.
- Sustainable Design: All aspects of the site plan will incorporate best practices for a durable and sustainable design, including appropriate uses of alternative energy, managed storm water run-off, and use of renewable materials.

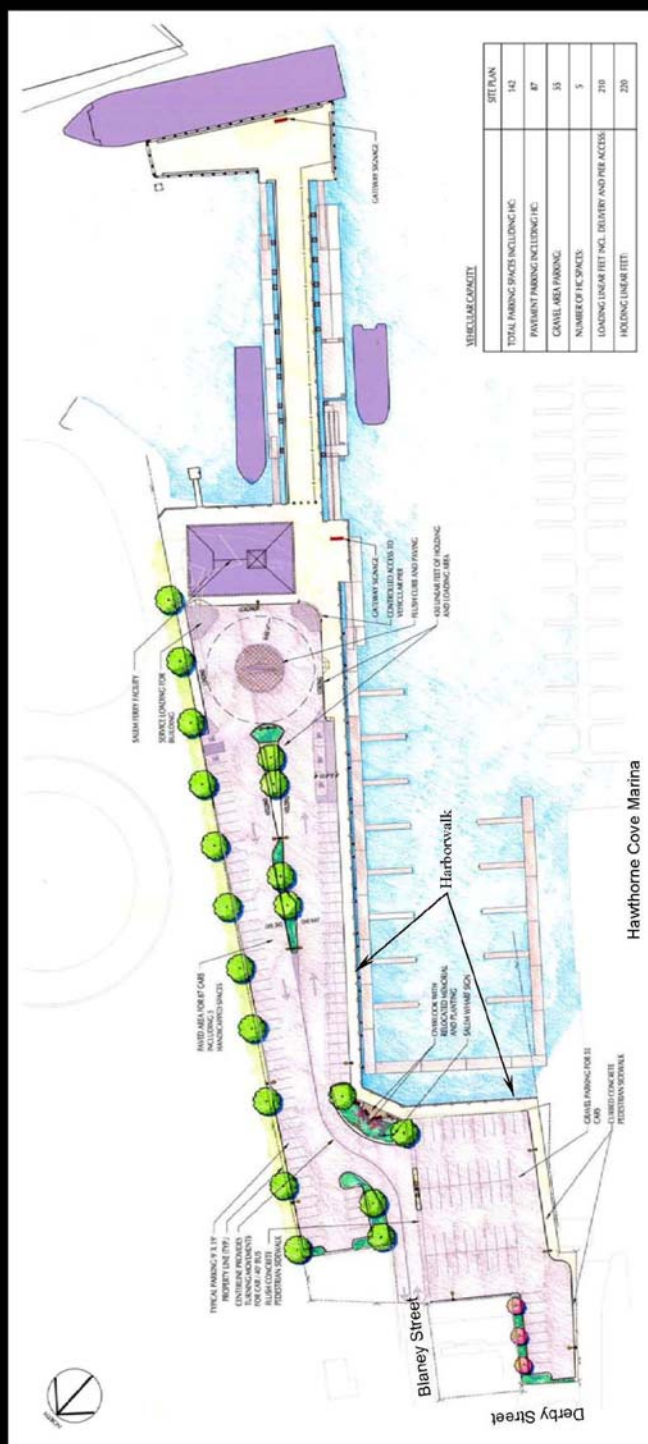
8.4 Terminal Building:

8.4.1 The concept design for the multi-purpose marine terminal was closely integrated with the site plan for water and land elements of Salem Wharf, while also meeting the specific design objectives and program space needs for the building. The siting of the building is shown in site plan, Exhibit 8-4, with the building footprint located at the south eastern end of the Blaney Street site. The Salem Wharf Marine Terminal concept design is shown in the Exhibits 8-5 through 8-8 which include plans, elevations and section of the building.

- Floor Plans and Circulation: The building organization balances the public ferry and cruise terminal uses and circulation needs with those of the commercial marine tenants. The terminal building functions primarily as an intermodal transit terminal, connecting ferry and crewboat passengers to landside transportation through the public waiting and

Site Development

- **Site Plan**



Bourne Consulting Engineering
BCE
NORRIS & NORRIS ASSOCIATES

City of Salem

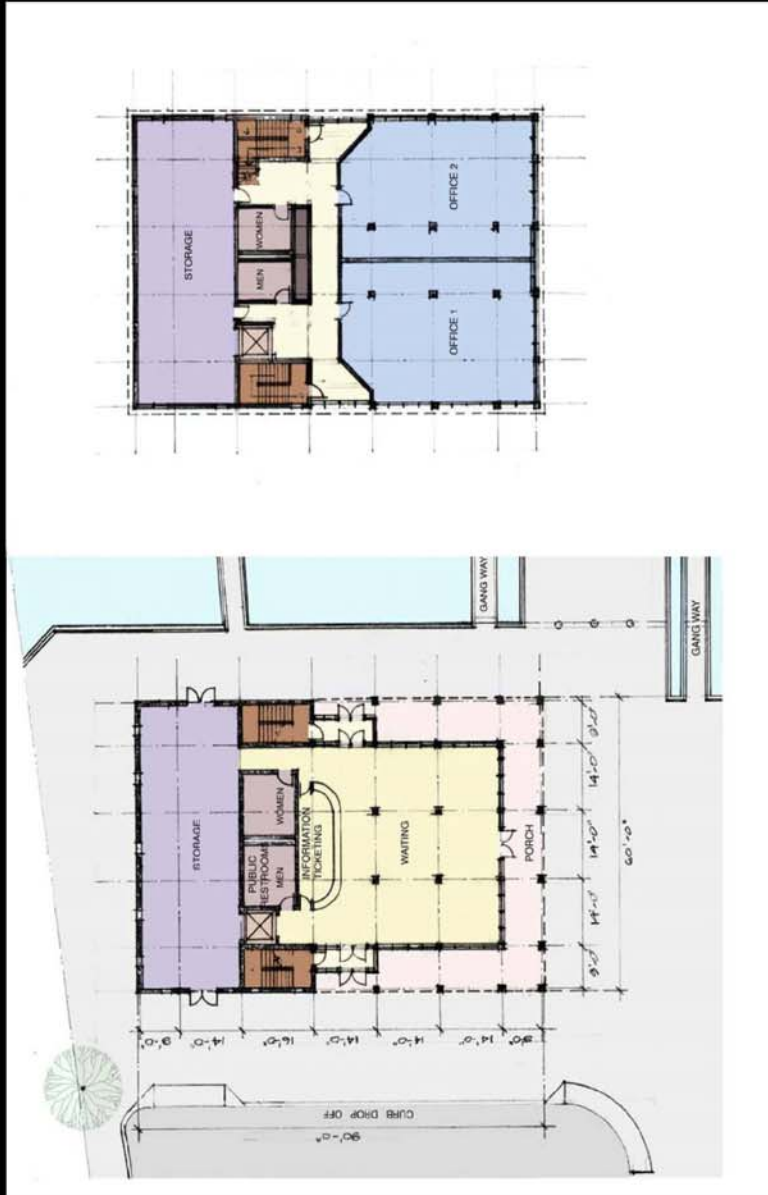
private areas. The interior and exterior circulation paths are organized to provide direct weather protected passage between passenger modes. Ancillary freight connections between terminal storage areas and dockside loading are provided to allow for safe and efficient movement via truck and lift.

- .. Ground Level (Exhibit 8-5): The multi-purpose terminal building consists of an open public waiting area on the western end of the ground level with primary entrances located midway along the north and south facades. The waiting room is surrounded on three sides by windows allowing clear views to the ferry and cruise landings, the vehicular curbside dropoff area, and the harbor. A ticketing and waiting counter is located between the two entrances. Public restrooms are located behind the ticket counter. The 1200 square foot waiting room has an open plan with moveable benches and seating to allow the space to be used for other civic and rental functions during off peak and off season periods. While there is no kitchen or café provided in the terminal plan it is assumed that passenger food service can be provided by vending machines and push carts, while civic events can be catered by truck.
- .. Also located on the ground floor is stair and elevator access to the private second level offices and storage. In addition, a combined ground level storage and workshop area for the LNG crewboat and Salem ferry operators is provided on the east end of the building, accessible by freight doors at the northeast corner of the building.
- .. The interior waiting area is surrounded on three sides by an outdoor porch to provide for sheltered seating and passage from vessel landing to land transportation. The covered bench seating also provides an amenity for neighborhood recreational use of the terminal building.
- .. Level 2 (Exhibit 8-5): The second level is accessed by means of two stairways and an elevator from the public waiting area lobby. The corridor and lobby area connecting the two stairways provides views to the harbor and wharf to the south and to the drop-off circle and parking to the north. Office spaces are located at the west end of the building and may be subdivided depending on final program needs for such commercial marine tenants' occupants as the Salem Ferry and the LNG crewboat operation. Restrooms are provided across the corridor. On the east end of the building, the second level workshop and storage area for marine tenants is served by an elevator to allow ease of movement for stored items.
- .. Level 3: The unfinished loft space under the roof area serves as the mechanical room for the building. Access to the mechanical room is by way of the south stair connecting from the ground and second levels.
- Elevations (Exhibit 8-6 and 8-7): The traditional building materials and architectural elements are intended to blend in with the historic neighborhood that surrounds the site without replicating the predominantly 18th and 19th century residential styles. Cedar shingles and glass are used as infill for the structural concrete building frame, and the clock tower. The hipped roof and clock tower are clad with standing seam metal.
- .. North Elevation (Exhibit 8-6): faces the landside Blaney Street entrance and passenger drop-off circle. The pedestrian entryway is accentuated with an eyebrow window at the roof line. A porch arcade with benches provides a covered outdoor waiting area along the curbside and continues around the west end of the building to the south face on the harbor. The clock tower provides the distinctive visual symbol for the building from landside as well as from the harbor approaches. At the eastern end of the façade, service doors for the storage workshop are located next to the delivery curbside.

EXHIBIT 8 - 5

Terminal Building & Gateway

• Terminal Design - Plans

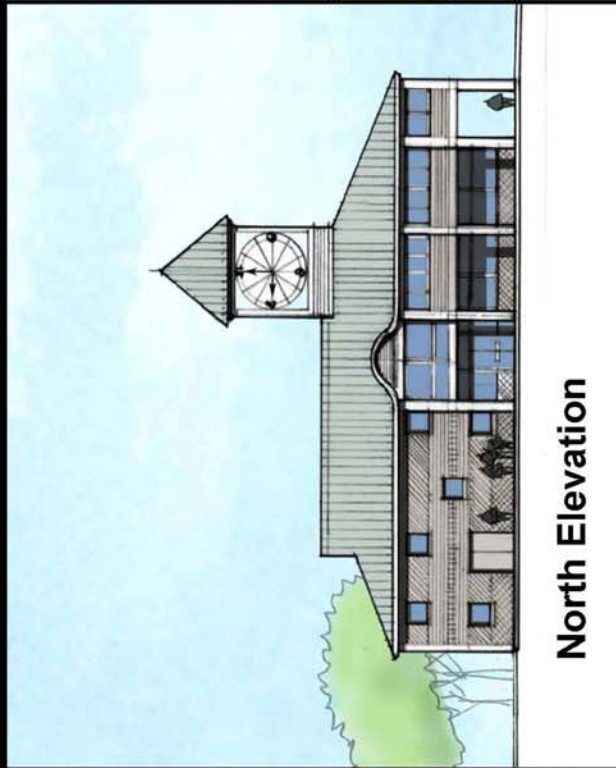


City of Salem

EXHIBIT 8 - 6

Terminal Building & Gateway

• Terminal Design - Elevations



North Elevation



West Elevation



City of Salem

- .. West Elevation (Exhibit 8-6): faces Hawthorne Cove and the inner Salem Harbor. The ramp entrance to the passenger ferry and small cruise vessel landing is just across the harborwalk from the west elevation. A pair of entrance doors is located under the tower for direct access for ferry and cruise passengers. As with the other entrance points, a small eyebrow window is located above the doorway.
- .. South Elevation (Exhibit 8-7): faces the harbor and the south harborwalk. The south entry doorway is located under the third eyebrow window. Ramp access to the crewboat and working landing is just opposite the glass enclosed waiting room across the harborwalk. A second pair of service doors for the storage/workshop area is located at the eastern end of the elevation. As with the other elevations, the clock tower provides a prominent landmark as viewed from the harbor.
- .. East Elevation (Exhibit 8-7): faces the power plant and is the least public face of the terminal building. The more closed east façade includes smaller window openings for daylighting of the storage and workshop spaces on levels 1 and 2.
- .. Roof Plan and Building Section (Exhibit 8-8): The hipped roof and clock tower plans are shown in the roof plan. The building section as cut through the waiting room and offices shows the relationship of the building and waiting porch to the harborwalk and floats.

8.5. Construction Cost Estimate

- 8.5.1. The construction cost estimate has been updated to the preliminary design level for all elements of the project including the dredging. The revised estimate is illustrated in Exhibit 8-9 which provides a breakdown by major construction element as well as a distribution of the construction costs to anticipated users. A detailed unit price and quantity construction cost estimate is provided in Appendix A-7

8.6. Preliminary Design Drawings

- 8.6.1. A set of Salem Wharf Project Preliminary Design Plans has been developed that illustrates the current level of project design including the marine elements, upland site work, dredging and the terminal building. Full size sets have been provided to the City and a reduced size set of drawings has been included in Appendix A-8

9. IMPLEMENTATION PLAN

- 9.1. Based on the preferred plan and the preliminary design, the major steps for implementation of the design and operation of the Salem Wharf Project have been developed. Within the Implementation Plan, it has been assumed that the regulatory process would be split into to phases with all work in Phase I except that associated with the commercial fishing berths. These have been included within a Phase II permitting in order to remove the more difficult regulatory approval process of intertidal dredging that will be required with this portion of the project. The Implementation Plan elements are set out as follows:

9.1.1. Assumptions:

- Preliminary Design Completed
- Regulatory Filings made for Phase I elements
- Funding for final design approved

9.1.2. Implementation Steps:

- | | |
|---------------------------------------------------------------------------|----------|
| 1. Obtain ownership/control of land | Nov 2008 |
| 2. Solicitation/Selection and Award to Design Consultant for Final Design | Mar 2008 |
| ▪ City to have dedicated Project Manager (DCAM requirement) | |
| 3. Confirmation on Building Program | Dec 2008 |
| ▪ Accelerate commitments | |
| ▪ Salem Ferry use determination | |

EXHIBIT 8 - 7

Terminal Building & Gateway

• Terminal Design - Elevations



City of Salem

**SALEM WHARF PROJECT
ANALYSIS OF EXISTING PORT EXPANSION PLANS AND
DEVELOPMENT OF PREFERRED PLAN**

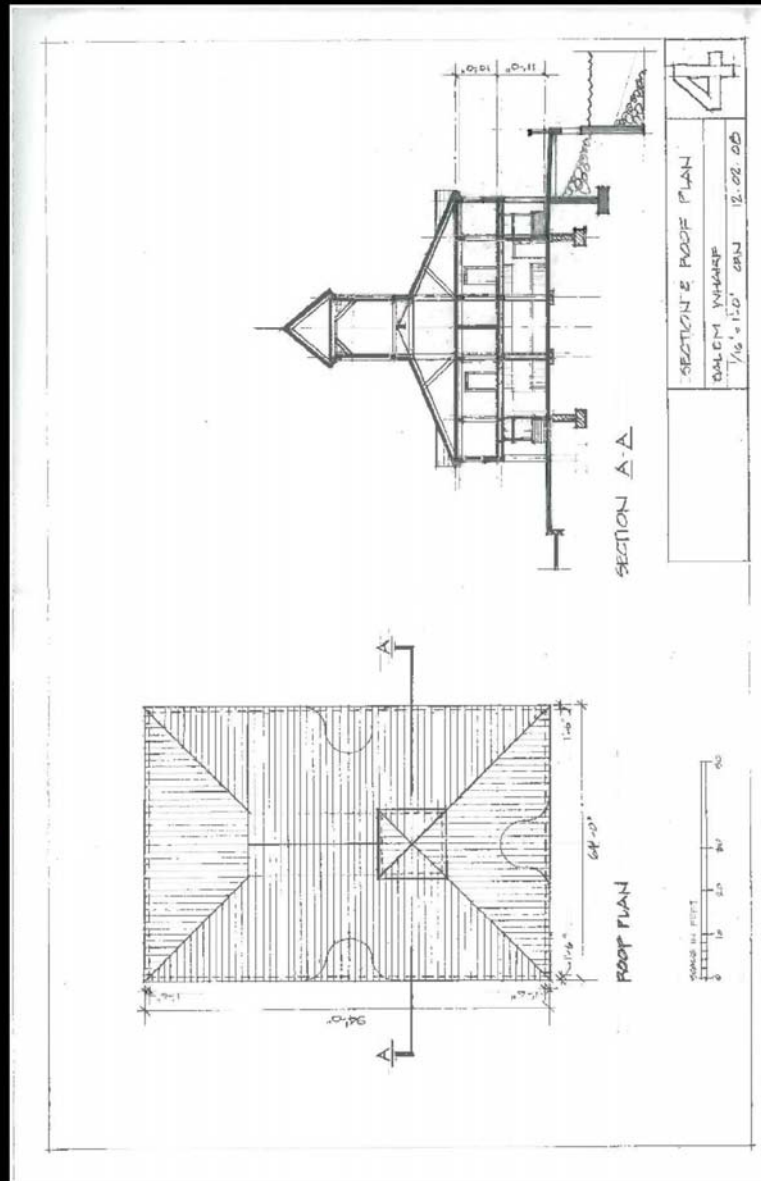
DECEMBER 2008

- | | | |
|-----|--------------------------------------------------------------------------------|-------------------|
| 4. | Submission of Regulatory Filings for Phase II | Dec 2008 |
| | ▪ Identify requirements for resource impacts – Mitigation requirements | |
| | ▪ Initiate mitigation design if required | |
| 5. | Review and approval of 75% of design – Marine/Site/Building | |
| | ▪ Marine Elements | Feb 2009 |
| | ▪ Site Development | Feb 2009 |
| | ▪ Building | Mar 2009 |
| | ▪ Updated construction cost estimate | |
| | ▪ Updated schedule | |
| 6. | Facility review by City Departments for incorporating City services/standards | Mar 2009 |
| 7. | Obtain Salem Conservation Commission approval for final site plan | Mar 2009 |
| 8. | Identify Salem Wharf Marine Advisory Board Structure (SWMAB) | Mar 2009 |
| | ▪ Establish role and guidelines | |
| | ▪ Selection of Members | |
| | ▪ City Council Approval | |
| 9. | Identify Terminal Manager: Begin advertisement/review/selection process | |
| 10. | Identify Facility Manager | |
| 11. | Record Regulatory Approvals | May 2009 |
| 12. | Seaport Council – Seek funding for Construction | |
| | ▪ Port Advisory Group – Funding Request FY 2009 | Spring 2009 |
| | ▪ Seaport Council – Funding Request | Spring 2009 |
| | ▪ Identify City Matching Funds | |
| 13. | Identify Construction Management and Resident Engineering | Jul 2009 |
| 14. | Review/Approve Final Design/Contract Documents – by SWMAB and Terminal Manager | |
| | ▪ Marine Elements – Phase I & II | Jul 2009 |
| | ▪ Dredging – Phase I & II: | Jul 2009 |
| | ▪ Site Work: | Jun 2009 |
| | ▪ Building: | Feb 2010 |
| 15. | Obtain Final Agreements with Building and Pier Users | Sep 2009 |
| | ▪ Salem Ferry | |
| | ▪ Offshore Supply Vessel | |
| | ▪ Commercial Fishing – Lobstermen | |
| 16. | Obtainment of City Approval(s) for Project Construction | Aug 2009 |
| 17. | Construction Award | |
| | ▪ Marine Elements | Aug 2009 |
| | ▪ Dredging | Sep 2009 |
| | ▪ Site Work | Jul 2009 |
| | ▪ Building | Mar 2010 |
| 18. | Initiate Marketing Program for Salem Wharf | Fall 2009 |
| | ▪ Port-of-Call Cruise Lines | |
| | ▪ Commercial Fishing | |
| | ▪ Transient Boaters – yachts - >75 feet | |
| 19. | Construction Completion | |
| | ▪ Marine Elements I / II | Jul 2010/Apr 2011 |
| | ▪ Dredging | Mar 2011 |
| | ▪ Site Work | Jul 2010 |
| | ▪ Building | May 2011 |

EXHIBIT 8 - 8

Terminal Building & Gateway

• Terminal Design – Section and Roof Plan



- 9.2. A schedule illustrating the construction phasing of the project has been included which is consistent with the above implementation plan and is provided in Appendix A-9. The schedule was developed under the Management and Operations Plan for the Salem Wharf Project.

10. SUMMARY

Investigation Phase:

The City of Salem, in its attempt to advance the development of the Blaney Street site for a commercial port facility, retained a multidisciplinary consulting team led by Bourne Consulting Engineering. The consultant team was tasked to review the existing information developed over the last 15 years, including past marketing studies, and to bring the project to the preliminary/conceptual design level.

The results of this investigation included the determination that the existing marketing information was from the 1990s and was outdated and that the markets had now changed to include a commercial maritime user to service the Northeast Gateway Project associated with the offshore natural gas terminal. A new study of the markets was recommended. In addition, a study of the operations and management of the facility was recommended to provide guidance on the management structure and to identify operating and management costs. This additional effort was undertaken during the time period of this study and the results incorporated into the facility layout and design.

Public Participation:

During the project several opportunities were provided for presentation of the findings to the public and to obtain and incorporate public review and comments into the design.

The first public meeting was held in December 2007 and presented the results of the investigation and review of existing studies and design concepts for the site. The presentation also identified the current understanding of facility needs including the maritime facility requirements, the upland support requirements including parking, vehicle access, utilities and services as well as office and storage needs within a terminal building. Several alternatives were presented along with design guidelines.

The second public meeting was held in November of 2008 which presented the preliminary design of the Salem Wharf Project and incorporated the findings of the Operation and Maintenance Plan Report. Public comments made were generally supportive with the exception of the impact on a public garden in the northwest corner of the parking lot by a select group of concerned citizens. A follow up meeting between the City and the concerned citizens resulted in the City's agreement to limit the impact on the public garden area which results in the loss of some parking spaces. The design of changes in this area would be developed and finalized within the overall project's final design phase.

Preliminary Design of Preferred Plan:

A preliminary design was developed of the preferred plan and a copy of reduced size drawings can be found in Appendix A-8. The plan accommodates all the defined uses and provides upland support for those uses. The current upland is limited and is anticipated to result in lack of parking as the project develops. In the leasing of berths and berth utilization, the City, through its facility manager, will need to establish clear limitations on users to prevent negative impacts on priority users like the Salem Ferry and other commercial maritime users.

The construction cost estimate for the project was updated to reflect the current level of design with a detailed cost estimate presented in Appendix A-7. The current estimated construction cost for all the infrastructure is \$16.17 million and when dredging is included the total project construction cost is \$19.75 million. The estimates include a ten percent contingency and a five percent inflation factor.

A project construction schedule has been developed and provided in Appendix A-9. The current schedule indicates that designs would be completed in 2009 and that construction would be completed by the 2011 season

In Section 9 of the report an implementation schedule was developed to assist the City with implementing the overall project.

Based on the above development of a preferred plan, the City of Salem is now in a position to advance the Salem Wharf project. The immediate steps need to be the application of regulatory filings in order to obtain approvals as early as possible and to begin the process of final design for all of the elements of the project. As there is no consultant team selected for the final design services, the City of Salem needs to initiate and complete this process.

SALEM WHARF PROJECT
ANALYSIS OF EXISTING PORT EXPANSION PLANS AND
DEVELOPMENT OF PREFERRED PLAN

DECEMBER 2008

ANALYSIS OF EXISTING PORT PLANS AND
DEVELOPMENT OF PREFERRED PLAN

SALEM WHARF PROJECT

EXHIBIT 8-9
CAPITAL COST USER DISTRIBUTION
SALEM PORT EXPANSION

Item	Total	Salem Ferry	Offshore Supply Vessels	Commercial Vessels	Excursion/Visiting Vessels	Pier Berthing Ships	Lobster Boats	Public Infrastructure
MOBILIZATION	\$ 666,642	\$ 86,663	\$ 126,662	\$ 59,998	\$ 86,664	\$ 86,663	\$ 86,663	\$ 153,328
SITE WORK								
Utilities	\$ 504,500	\$ 100,900	\$ 100,900			\$ 100,900	\$ 100,900	\$ 100,900
Drainage	\$ 176,000	\$ 35,200	\$ 17,600		\$ 7,040	\$ 10,560	\$ 17,600	\$ 88,000
Grading & Paving	\$ 578,587	\$ 115,717	\$ 57,859		\$ 23,143	\$ 34,715	\$ 57,859	\$ 289,283
Site Improvements	\$ 399,405	\$ 79,881	\$ 39,941		\$ 15,976	\$ 23,964	\$ 39,941	\$ 199,703
HARBORWALK	\$ 1,433,750							\$ 1,433,750
SHORELINE STABILIZATION	\$ 210,000							\$ 210,000
PIER STRUCTURE	\$ 4,016,250	\$ 689,375	\$ 669,375	\$ 669,375	\$ 669,375	\$ 1,338,750		
FLOATS W/ MOORING	\$ 684,725						\$ 684,725	
ADA FLOAT RELOCATION	\$ 40,000	\$ 40,000						
FENDER SYSTEMS	\$ 180,000							
BARGE FLOATS	\$ 1,245,875		\$ 415,292	\$ 415,292	\$ 415,292	\$ 18,000	\$ 162,000	
MOORING PILES	\$ 180,000	\$ 45,000	\$ 45,000	\$ 45,000	\$ 45,000			
GANGWAYS	\$ 60,000	\$ 30,000	\$ 15,000				\$ 15,000	
TERMINAL BUILDING	\$ 783,750							\$ 783,750
Public Space	\$ 825,000	\$ 247,500	\$ 495,000		\$ 82,500			
Office	\$ 750,000	\$ 187,500	\$ 562,500					
Storage/Workshop								
WAVE BARRIER - 300 IF	\$ 750,000	\$ 250,000	\$ 250,000				\$ 250,000	
DREDGING								
Embayment Toe Wall - 515 ft	\$ 515,000						\$ 515,000	
Totals	\$ 13,999,484	\$ 1,887,737	\$ 2,795,128	\$ 1,189,664	\$ 1,342,091	\$ 1,757,553	\$ 1,767,698	\$ 3,258,723
Contingency - 10%	\$ 1,399,948	\$ 188,774	\$ 279,513	\$ 118,967	\$ 134,300	\$ 175,756	\$ 176,769	\$ 325,873
Inflation - 5%	\$ 769,972	\$ 103,826	\$ 153,733	\$ 65,432	\$ 73,865	\$ 96,666	\$ 97,223	\$ 179,230
Total Construction Budget	\$ 16,169,405	\$ 2,180,337	\$ 3,228,374	\$ 1,374,063	\$ 1,551,156	\$ 2,029,975	\$ 2,041,680	\$ 3,763,826

Dredging* (w/contingency & inflation) \$ 3,583,203

Total Construction Budget \$ 19,752,607

*Dredging to be paid for by Seaport Council with no distribution of costs

APPENDICES

- A-1. *Evaluation of Market and Financial Analyses from Prior Salem Pier Reports, Memorandum prepared by ConsultEcon, Inc., September 12, 2007*
- A-2. Interviews of Key Stakeholders
- A-3. *Draft Traffic Assessment for Salem Port Expansion, Nitsch Engineering, September 1, 2007*
- A-4. Public Meeting December 12, 2007, PowerPoint Presentation – Site Plan Alternatives
- A-5. Public Meeting October 15, 2008, PowerPoint Presentation – Preliminary Design
- A-6. *Salem Wharf Site Plan and Marine Terminal Building Design – Design Memorandum by Norris & Norris Associates*
- A-7. Preliminary Design Construction Cost Estimate – Salem Wharf Project
- A-8. Salem Wharf Project – Preliminary Design Plans
- A-9. Salem Wharf Project - Project Construction Schedule

APPENDIX A-1

*Evaluation of Market and Financial Analyses from Prior Salem Pier Reports, Memorandum
prepared by ConsultEcon, Inc., September 12, 2007*

Memorandum

To: Ron Bourne, Charles Norris
From: ConsultEcon, Inc.
Date: September 17, 2007
RE: Evaluation of Market and Financial Analyses from Prior Salem Pier Reports

This memorandum provides a review of prior studies of the Salem Pier, evaluates them from a market and financial perspective, and provides recommendations for further market and financial analysis.

Overview of Prior Salem Pier Reports

A number of studies have reviewed the potential for new development at the Salem Pier. The most recent was *Salem City Pier, Salem, MA: Final Site Development Plan* completed by Vine Associates, Inc. in December 2005 ("2005 study"). It built off of work of prior studies; most notably, *Salem Harbor Plan: New Salem Wharf Study* by the Cecil Group dated August 14, 1998 ("1998 study") that evaluated the site's potential to accommodate hotel and retail uses in addition to commercial and recreational marine uses. In the 2005 study, hotel and retail uses were removed from the development plan. The program proposed in the 2005 study included slip and dockage space for the following marine uses:

- ◆ One whale watch boat
- ◆ One passenger ferry
- ◆ One head boat
- ◆ Twenty transient boats
- ◆ Seven lobster / commercial fishing boats
- ◆ One cruise boat

The 2005 plan's landside development included a 1,800 square foot building with public waiting areas, restrooms, ticket office, small chandlery / retail space, and offices and storage. The plan included 231 parking spaces, associated with each of the marine uses listed above. The plan also assumed an expanded site area onto the Dominion property beyond the site area to support included program uses.

Market Assumptions

The market analysis in the 2005 study stated that “demand for the program elements remains positive as identified in the 1998 *New Salem City Pier Study*.”¹ No information was provided in the report as to how the demand was assessed in 2005. For the 1998 study, commercial-use and recreational-use operators in Salem were interviewed in order to assess the market potential that existed in both areas. In addition, the study provided a review of the cruise industry at the time.

Revenue Assumptions

Several rate assumptions from the 1998 study were carried over into the 2005 study. The rate assumptions for whale watch vessels, headboats, commercial fishing boats, and parking spaces remained the same in the 2005 study as in the earlier one. For transient vessels, ferry, and cruise ships, the rate basis changed. Data in **Table 1** compare revenue rate estimates between the two reports.

Table 1
Rates and Rate Bases from Prior Reports

	1998 Rate	1998 Rate Basis	2005 Rate	2005 Rate Basis
Whale Watch	\$0.25	per passenger/season	\$0.25	per passenger/season
Ferry ^{1/}	\$40.00	per linear foot/year	\$0.25	per passenger/year
Headboats	\$40.00	per linear foot/season	\$40.00	per linear foot/season
Transient Dockage ^{2/}	\$85.00	per linear foot/year	\$2.50	per linear foot/day
Commercial Fishing	\$40.00	per linear foot/year	\$40.00	per linear foot/year
Cruise ship ^{3/}	\$3.76	per passenger/year	\$400.00	fee plus per passenger/year
Parking	\$5.00	per space/turn/day	\$5.00	per space/turn/day

1/ The estimated volume of passengers using a ferry service increased considerably from 12,000 per year to 108,000 per year between the two studies. Therefore, the different rate basis may be a function of the volume of passengers. The current ferry operator estimates that the annual number of ferry passengers was 40,000 in 2006. In 2007 and 2008, the ferry is projected to carry 65,000 and over 80,000 passengers, respectively.

2/ 2005 study estimates 120 days per year, which would result in an annual rate of \$300 per linear foot/year.

3/ While not explicitly stated, the 2005 rate per passenger is estimated to be \$2.00 per passenger/year, based on the estimated rate of \$400, 6 days of dockage, \$3,600 total revenue, and 600 total passengers.

Source: Cecil Group, Inc. et al., *Salem Harbor Plan: New Salem Wharf Study*, August 14, 1998; Vine Associates, Inc., *Salem City Pier: Final Site Development Plan*, December 2005; and ConsultEcon, Inc.

Total revenues based on each program use vary between each report based on the amount of space allocated to each use. Data in **Table 2** provide a summary of proposed program uses and associated gross revenues.

¹ This study was requested from the City of Salem. A 1998 report titled *Salem Harbor Plan: New Salem Wharf Study* was returned and taken to be the same report that is referenced in the 2005 study.

Table 2
Program Uses and Annual Revenue Estimates from 1998 and 2005 Studies

	1998 Estimates ^{1/}	2005 Estimates ^{2/}
<i>Marine Uses</i>		
Whale Watch	\$25,000	\$7,500
Ferry	\$4,800	\$27,000
Headboats	\$6,400	\$2,400
Transient Dockage	\$43,350	\$237,600
Commercial Fishing	\$16,800	\$11,200
Cruise ship	\$75,012	\$3,600
Fuel Service	\$35,000	
Subtotal Marine Uses Revenue	\$206,362	\$289,300
Operating Cost as a Percent of Revenue	30%	55%
Marine Uses Operating Cost	\$61,909	\$159,115
<i>Parking</i>		
Parking Revenue	\$84,000	\$161,200
Operating Cost as a Percent of Revenue	30%	30%
Parking Operating Cost	\$25,200	\$48,360
<i>Other Uses ^{3/}</i>		
Retail Revenue	\$252,000	
Hotel Revenue	\$54,720	
Total Gross Revenue	\$597,082	\$450,500
Total Operating Cost	\$87,109	\$207,475
Net Income	\$509,973	\$243,025

1/ The 1998 study evaluated three alternatives. This program is from Alternative C, which was closest to the preferred alternative in the report. The preferred alternative did not include a schedule of revenue and operating costs, but recommended removing the hotel use and replacing it with additional retail. Numbers presented here vary from original report due to calculation errors it contained. Numbers adapted from page 83, Table 36. Alternative C Revenue Potential.

2/ Numbers adapted from page 16, Table 3: Salem City Pier Project: Cost Revenue and Financing Review: Revised Pro Forma.

3/ These uses do not have an associated operating cost and are presented as gross revenue estimates.

Source: Cecil Group, Inc. et al., *Salem Harbor Plan: New Salem Wharf Study*, August 14, 1998; Vine Associates, Inc., *Salem City Pier: Final Site Development Plan*, December 2005; and ConsultEcon, Inc.

Overall, there is a significant reduction in the amount of net income from the 1998 report to the 2005 report due in large part to changes in the physical plan and anticipated uses. In the 1998 study, retail and hotel uses provided a significant portion of the facility's total gross revenue while the primary sources of revenue were transient vessels and parking in the 2005 study. Higher revenues from transient vessels were due to higher rates charged for dockage. Higher revenues from parking were due to an increase in the number of paid parking spots set aside (as opposed to free parking). The increases in paid parking could only be achieved through substantial expansion of the site along Derby Street beyond the area currently leased by the City.

In the current planning process, the program uses and priorities may change from those identified in 2005 based on opportunities that are currently available. The opportunity for a new use as a home port for a supply boat for an off-shore liquid natural gas (LNG) operation has arisen. A ferry service between Salem and Boston began operations in 2006. In its first season, it carried 40,000 passengers according to the ferry operator. It is now projected by the ferry operators that the service is expected to carry 65,000 passengers in 2007, based on ridership to date, and over 80,000 passengers in 2008.

Without adequate market information, other proposed uses are speculative, including cruise ships, whale watch trips, headboats, transient dockage, and commercial fishing dockage. There is little evidence in prior studies that would indicate a market rationale for the viability of these uses. While the existing tourism infrastructure (i.e. attractions, shops, and restaurants) would indicate that Salem could be an attractive port-of-call for cruise ships, market information would help to sort out the potential impact of cruise ships.

An important aspect of the needed market analysis for cruise ships is the type of cruise ship that would call on Salem and the frequency and the market forces that influence those opportunities. Cruise ships could be weekly coastal cruisers, monthly medium size cruise ships or infrequent large cruise ships. Each would have their own needs and impacts.

In addition, the availability of additional upland area has changed due to a new understanding of property boundaries with the adjacent Dominion property. This may dramatically reduce the size and scale of parking on site. Since demand for parking is dictated by site uses and the mix of uses may change, there would be a significant impact on paid parking and its potential as a revenue source under a new program.

Operating Cost Assumptions

Both the 1998 study and the 2005 study estimate operating costs as a percentage of gross revenue for each use identified in the program. In the 1998 study, all uses except for hotel and retail uses used 30 percent of gross revenue as an operating cost for the pier facility. Hotel and retail uses had no associated operating cost. In the 2005 study, all uses were assumed to have operating costs of 55 percent of gross revenue except for parking, which has an operating costs estimate of 30 percent of gross revenue.

This method of estimating operating costs does not provide a realistic assessment of the pier's potential operating costs and thus, its net income potential. If the pier is expected to support

itself through earned revenue, the City should get a more accurate picture of its operating costs. This becomes especially important if the City expects to service any debt incurred for pier development from the pier's net income.

Recommendations for Further Market and Financial Analysis

The following is a list of recommendations based on the above evaluation of prior studies and an understanding of the current planning priorities.

- ◆ The market analysis of program uses is outdated because it is based on work completed for the 1998 study. New information was not introduced in the 2005 study. (In general, information presented in market analyses and feasibility studies is current for a period at most 2 or 3 years.) In addition, the proposed use of the facility as a home port for an LNG operator is a new use that has not been reviewed within a market context. Hence, it is recommended that a new market analysis be conducted in order to ensure that current pier planning, which is intended to lead directly into facility construction, is informed by up-to-date market information. This proposed market analysis would review the demand for other maritime uses from the earlier reports including the cruise industry, whale watch, headboats, commercial fishing fleet, transient marina slips, excursion ferry services, and growth of the Boston ferry ridership. The analysis would also review new site uses including the home port facilities for LNG supply operations. The review would also include the experience of comparable pier operations.
- ◆ It is recommended that the revenue assumptions and revenue potential be revised based on the new market analysis, as well as the documented experience of the new ferry service. The proposed mix and priorities of uses for the Salem pier has changed since the 2005 study, necessitating new revenue assumptions.
- ◆ A plan that estimates operating costs and net income should be prepared in order to develop realistic estimates of the pier's stabilized financial performance. If the City expects the facility to be financially self-sufficient, the plan should include an accurate accounting of personnel, maintenance, utilities, and other operating costs. Moreover, the City should not borrow capital to support the pier's development and construction without due diligence that this plan represents. In addition the City may need to be aware of operations and revenue impacts of proposed users, such as an LNG supply homeport, before capital improvements and lease arrangements are committed.
- ◆ If it is found that the pier does not support the cost of its operations through earned revenue, the economic benefits of pier development should be revisited. The City (or another source) may need to contribute revenue for operating costs. It is recommended that an economic impact evaluation be prepared that estimates the amount of direct and indirect economic activity that results from the construction and operation of the new pier in order to justify any one-time capital and ongoing operational expenses borne by the City.

APPENDIX A-2

Interviews of Key Stakeholders

Person/	Capt. Jeff Havlicek	DATE:	7/19/07
Firm	SPT Offshore LLC	BCE#	PROJECT - BCE #27677
Phone	27 Congress Street, Suite 108 Salem, MA 01970		SALEM PORT EXPANSION
	617-291-5424 (m) 978-744-5970 (o)		RE:
BY:	Ronald R. Bourne. PE	SUBJ.:	Potential User Interviews

TYPE OF BUSINESS: Natural Gas Line Support

GENERAL OPERATION – General Berthing and Support for offshore supply vessels used for servicing LNG tankers utilizing offshore discharge moorings, to include an office Operations Center and warehouse/work space.

OPERATIONS - Current

Seasonal / Year Round Startup – currently using alternative site for limited work
Oct / Nov 2007 - should begin substantial effort – ramp up through 2008.

In-Season Operational Activity:

Operation Frequency: After project ramp up - envision 2 to 4 trips weekly to support LNG vessel regas operations and the Bio-acoustical buoy program.

Limited use other times (seek alternative uses for vessel)

Vessel Berth Needs: Commercial berth – prefer floating barge tie-up for vessel length

Length 150 feet +/-

Active Period of Time Winter Busier Dead Time None

Deck Capacity requirements Truck Access / 10 Ton Crane

Apron Needs: Truck access / provision transfers

Handling Needs Fork Truck Trucking Needs Provisions, parts, and supplies.

Special Storage Requirements Office / Warehouse / Work Space

OPERATIONS – Future No Change anticipated in future

Current

SPACE REQUIREMENTS:

Interior – Office **2500**

Interior – Storage Warehouse **1000** Fork lift

Interior - Workshop Workshop **1000** Crane Storage

Year Round/Seasonal/Limited: Year Round

Person/	William Walker	DATE:	August 3, 2007
Firm	WTA	BCE#	PROJECT - BCE #27677
Phone	703 Washington Street Quincy, MA 617-797-1992 (m)	RE:	City of Salem – Port Expansion
BY:	Ronald R. Bourne. PE	SUBJ.:	Potential User Interviews

TYPE OF BUSINESS: Passenger Ferry Service

GENERAL OPERATION – WTA operates a series of passengers ferry services throughout Boston area. Provides ferry service to and from Boston to Salem on a seasonal basis. Now in its 2nd year of operation
Ridership at approx 40,000 per year 2006 – 2007 est. to be over 65,000 – est for 2008 – may be as high as 85,000

OPERATIONS - Current

Seasonal / Year Round Seasonal – May to October

In-Season Operational Activity:

Operation Frequency: One Vessel – 2 hr typ turn around

Vessel Berth Needs: 100 ft at float – needs ADA accessibility

Length 100 ft

Active Period of Time 15 min turnaround Dead Time Limited Service/Overnight Layover

Deck Capacity requirements Public Loading / access

Apron Needs: Mooring

Handling Needs Trucking Needs H-15 @ Pier

Special Storage Requirements Light Provisioning

OPERATIONS - Future

Seasonal / Year Round Always Seasonal

In-Season Operational Activity:

Operation Frequency: Larger vessel or 2nd vessel without layover

Vessel Berth Needs: _____

Length _____

Active Period of Time _____ Dead Time _____

Deck Capacity requirements _____

Apron Needs: _____

Handling Needs _____

Trucking Needs _____ Rail Needs _____

Storage Requirements _____

INTERVIEW

		Existing	5 yrs	10 yrs	20 ??
SPACE REQUIREMENTS:	Interior – Office	500 sf	600 sf		
	Interior – Storage Height <u>1 story</u>		1,000 sf		
	Exterior - Storage Height <u>Trash</u>				
	Year Round/Seasonal/Limited				

VESSELS:

Existing Vessels:	Owned by City of Salem	Name	Length	Beam	Draft	Type	Capacity
		<u>Nathaniel Bowditch</u>	<u>92 ft</u>	<u>32 ft</u>	<u>6 ft</u>	<u>Catamaran</u>	<u>149 pass</u>

Future Vessels:	Name	length	beam	draft	Type	capacity
	<u>None at this time</u>					
	<u>Future Larger vessel possible</u>					

Vessel Services Required: refueling capability
 Water 2" dia Sewer 2-3" dia Elec 100 amp Provisioning Light Prov – ramp access
Pier Side Access / Equipment Needs
 Cranes: 10 ton crane @ pier Forklifts: None Other: H-15 trk access

PERSONNEL: Existing Future Needs
 5 yrs 10 yrs 20 ??

Employees: (At Pier)

Adm	<u>3</u>	<u>5</u>		
Crews	<u>3</u>	<u>6</u>		
Outside Support:				

Parking:

On Site	<u>3</u>	<u>6</u>		
Off Site	<u>6</u>	<u>6</u>		

OTHER COMMENTS: _____
 - Oil Storage / Oil disposal
 - Trash – 6-8 cy dumpster – empty twice weekly

VESSELS:

Existing

Vessels:	Name	Length	Beam	Draft	Type	Capacity
Port Service Vessel (PSV)		130 ft	25 ft +/-	10 ft min	Gulf Crew Boat	Crew 3

Future Vessels: **None Anticipated**

Vessel Services Required

Water: **Yes – 1.5" line** Sewer: **4" dia** Elec. **100 amp/3ph** Provisioning **Yes – Truck Access**

Trash: **6 yd dumpster** **10,000 gal portable tank**

Pier Side Access / Equipment Needs

Cranes: **10 Ton Hydraulic** Store in Building Forklifts: **10 Ton** Store in Building Other: **Slope Truck** Removal of oils/bilge water

PERSONNEL:

Existing

Future Needs – no change anticipated

Employees: (At Pier)

Adm	3-5				
Crews	3				
Outside Support:					

Parking:

On Pier	3-5				
Off Pier					

OTHER COMMENTS: _____

Building needs prioritized:

1. Shop / Parts Storage – 500 sf for Port Service Vessel (PVS)
2. Office Support Space – 2,500 sf - see attached
3. Bio-acoustical Research Program (BRP) – 500 sf Parts & Storage
4. Warehouse Space / Bonded Storage – 1,000 sf with garage storage (Crane/Forklift)

Other Issues:

- Some building uses could be combined
- Night lighting – Separate from rest of facility
- Truck access to pier
- Want floating barge to tie up to and for access with gangway 45'x5'

See attached for additional info

Person/	William Walker	DATE:	August 3, 2007
Firm	WTA	BCE#	PROJECT - BCE #27677
Phone	703 Washington Street Quincy, MA 617-797-1992 (m)	RE:	City of Salem – Port Expansion
BY:	Ronald R. Bourne. PE	SUBJ.:	Potential User Interviews

TYPE OF BUSINESS: Excursion / Whale Watch

GENERAL OPERATION – WTA operates a series of excursion and passengers ferry services throughout Boston area. Currently operates a whale watch vessel out of the Aquarium in Boston on a seasonal basis.

OPERATIONS – Current No existing operation in Salem for Whale Watch/Excursion

Seasonal / Year Round – April to October - typical

In-Season Operational Activity:

Operation Frequency: Morning / Afternoon - typ turn around
 Vessel Berth Needs: 100 ft at float – needs ADA accessorily
 Length 100 ft
 Active Period of Time 60 min turnaround Dead Time Limited Service / Overnight Layover
 Deck Capacity requirements Public Loading / access
 Apron Needs: Mooring
 Handling Needs Trucking Needs H-15 @ Pier
 Special Storage Requirements Light Provisioning

OPERATIONS - Future

Seasonal / Year Round Always Seasonal - April to October - typical

In-Season Operational Activity:

Operation Frequency: 2 trips per day – morning / afternoon for whale watch
Dinner Cruise in Evenings
 Vessel Berth Needs: Same – assuming only one vessel at dock – no overnight berthing
For additional vessels
 Length
 Active Period of Time Same – Apr-Oct Dead Time
 Deck Capacity requirements Light Provisioning /catering
 Apron Needs: H-15 truck access
 Handling Needs
 Storage Requirements
Existing 5 yrs 10 yrs 20 ??

INTERVIEW

SPACE REQUIREMENTS: Interior – Office 200/300 sf _____
 Interior – Storage Height 1 story Limited _____
 Exterior - Storage Height Trash _____
 Year Round/Seasonal/Limited _____ Seasonal _____

VESSELS:

Existing No Existing Service – May be future operation
 Vessels: _____ Name _____ Length _____ Beam _____ Draft _____ Type _____ Capacity _____
None – Est Size 90 ft 28 ft 5-6 ft Mono-hull 149 pass

No vessel at this time, presumed to be a limited size vessel (149 passenger)
Future Larger vessel possible if demand develops – Salem not as accessible as alternative sites

Vessel Services Required Need refueling cabability
 Water 2" dia Sewer 2-3" dia Elec 100 amp Provisioning: Light Prov – ramp access
Catering / food / Entertainment

Pier Side Access / Equipment Needs

Cranes: _____ None for operations Forklifts: _____ Limited Other: H-15 trk access

PERSONNEL: _____ Existing _____ Future Needs
 _____ 5 yrs _____ 10 yrs _____ 20 ??

Employees: (At Pier)

Adm _____ 1 _____
 Crews _____ 5 _____
 Outside Support: _____

Parking:

On Site _____ 2 people/ vech _____
 Off Site _____

OTHER COMMENTS: _____

_____ - No vessel maintenance presumed on site – if so – similar needs as ferry

_____ - Trash – 6-8 cy dumpster – empty twice weekly

Person/	Robert Blair	DATE:	July 17, 2007
Firm	Maritime Partners	BCE#	PROJECT # BCE 27677
Phone	(978) 884-3900	RE:	City of Salem – Port Expansion
BY:	Ronald R. Bourne. PE	SUBJ.:	Stakeholder Interviews

TYPE OF BUSINESS: Harbor Pilot – Salem & Gloucester Harbor

GENERAL DISCUSSION OF OPERATIONS:

Met with Mr. Blair to discuss issues of Salem Port Expansion Project and the project's impacts on harbor. Mr. Blair had also been involved in a previous project to develop the project site.

The proposed project marine structures should not extend outshore beyond the face of the current Dominion Power Plant site. Sees no problem in the berth being in the same line as the power plant ship berth.

The bow of the vessels at Dominion do not extend beyond the existing dolphin closest to the Blaney Street site and there is no anticipation for having larger vessels calling at the power plant.

He strongly recommends that the dredging depth for the channel and turning basin be extended to the City's proposed project to allow greater future flexibility for deep draft vessels calling at the new facility. He indicated that visiting tall-ships and military vessels may have significantly greater drafts than other otherwise identified and need to be considered.

Did not see that proposed project would interfere with current harbor ship operations

APPENDIX A-3

Draft Traffic Assessment for Salem Port Expansion, Nitsch Engineering, September 1, 2007

**TRAFFIC ASSESSMENT
SALEM PORT EXPANSION
NITSCH ENGINEERING #6479
SEPTEMBER 1 2007**

INTRODUCTION

Nitsch Engineering has been retained by Bourne Consulting Engineering to assess the impacts related to the proposed Salem Port expansion project. This proposed expansion would increase the port at Blaney Street in Salem, Massachusetts to accommodate cruise ships and similar vessels. The site currently serves the Salem Ferry service, which connects Salem and Boston by high-speed ferry. The site consists of a stone parking area with access via Blaney Street, south of Derby Street. Blaney Street is approximately 21 feet wide with sidewalks on both sides. A trailer also exists on-site, which serves as the Salem Ferry office.

The site location is shown in Figure 1 (attached).

EXISTING CONDITIONS

Nitsch Engineering attended a meeting with the City of Salem and the project team on Tuesday, June 12, 2007 to discuss key project impacts, limitations, and potential solutions. Following this meeting, Nitsch Engineering collected various documents related to traffic, transportation, and parking in the downtown and waterfront areas within Salem. These documents include:

- *Transportation Improvement Study for Routes 1A, 114, and 107, and Other Major Roadways in Downtown Salem*; Central Transportation Planning Staff (CTPS) for the Boston Region Metropolitan Planning Organization; November 2005.
- *Salem Harbor Plan, City of Salem, Massachusetts*; The Cecil Group, Inc.; May 2000.
- *New Salem Wharf Project, Salem, Massachusetts*; Vine Associates, Inc.; November 2001.
- *The Salem Ferry and New Salem Wharf Project, A Phased Approach to Completion*; The Salem Partnership; October 2001.
- *Traffic Impact Assessment, Proposed Condominiums and Retail Center, Salem, Massachusetts*; McMahon Associates, Inc.; September 14, 2004.

Research of these materials was conducted for traffic and parking data and analysis, and for any proposed roadway improvements that are planned for the area. The Salem Planning Department indicated that the CTPS study was the most reliable and recent document summarizing traffic impacts within the area and should be used as the most reliable data base.

FIELD RECONNAISSANCE

Nitsch Engineering conducted a field reconnaissance on Wednesday, June 27, 2007 to observe traffic and pedestrian activity and conditions, roadway geometry, area land uses, signing, pavement markings, any parking restrictions and review any way-finding measures that are currently in place. The project study area includes the following intersections:

- Derby Street/Blaney Street/Beckett Street
- Derby Street/Webb Street
- Derby Street/Hawthorne Boulevard/Congress Street
- Derby Street/Lafayette Street/New Derby Street

The study area intersections are shown in Figure 1.

Descriptions of the study area intersections are as follows:

Derby Street/Blaney Street/Beckett Street (unsignalized)

Derby Street is 23 to 25 feet wide with one-way traffic flow in the eastbound direction. Sidewalks are present along both sides of Derby Street and parking is permitted along the southern side. Blaney Street is approximately 21 feet wide, approaches from the south, and serves two-way traffic. A 135-foot long sidewalk exists along the west side of Blaney Street and a 60-foot long sidewalk exists along the east side of Blaney Street extending from Derby Street toward the stone-covered parking area at the port. Beckett Street is approximately 17 1/2 feet wide, approaches from the north, and serves one-way southbound traffic. Sidewalks exist along both sides of Beckett Street. An inlaid brick and granite crosswalk exists at the western Derby Street leg of the unsignalized intersection. There are no Stop signs to control traffic at this low volume intersection. Land use in the area is a mix of residential, retail, commercial, and maritime uses.

Derby Street/Webb Street (unsignalized)

Derby Street serves one-way eastbound traffic flow. The roadway is approximately 27 feet wide to the west of the unsignalized intersection and 33 feet wide east of the intersection. On-street parking is permitted along the southern side of Derby Street, west of Webb Street. East of Webb Street, there exists an unpaved parking area along the north side of Derby Street. Webb Street approaches from the north, has two-way traffic flow, and is approximately 28 feet wide. The Webb Street approach operates under Stop sign control and a 'no right turn' exists to enforce the one-way flow on Derby Street. The southern leg of the intersection is a 30-foot wide gated/barricaded driveway to the Dominion Energy supplier property. Sidewalks exist along all legs of the intersection. A granite inlaid crosswalk is located at the western leg of Derby Street. Land use in the area consists of the power supply terminal, residential units, and park/open space.

Derby Street/Hawthorne Boulevard/Congress Street (unsignalized)

Derby Street is a two-way roadway and approaches from the east and the west. The eastbound approach has an exclusive left-turn lane and a shared through/right-turn lane, each are 12 feet wide. The westbound approach has a 10-foot wide exclusive right-turn lane and a 12-foot wide shared left/through lane. The Derby Street approach and departure lanes are separated by raised islands. Congress Street is two-way and approaches from the south with a 12-foot wide approach lane and a 12-foot wide departure lane. Hawthorne Boulevard forms the northern leg of the intersection with a 19-foot wide exclusive right-turn lane, a 10-foot wide shared through/left-turn lane, and a 12-foot wide departure lane. The northbound and southbound legs of the intersection have double yellow centerlines separating travel directions. Sidewalks exist along all sides of the intersection and crosswalks exist on all approaches. The intersection operates under all-way Stop sign control. Land use in the immediate area includes retail, hotel, municipal, religious, and park use. On-street parking is available along the westbound Derby Street departure and the northbound Congress Street approach.

Derby Street/Lafayette Street/New Derby Street (signalized)

Derby Street is two-way and forms the eastern leg of this signalized intersection with an exclusive left-turn lane and a general purpose lane. Lafayette Street approaches from the north and the south, each with exclusive right-turn lanes and general purpose lanes. New Derby Street forms the western leg of the intersection with an exclusive right-turn lane and a general purpose lane. Sidewalks are present along all sides of the intersection, and crosswalks are present across each leg of the intersection. Land use in the area consists of retail, commercial, and the Chief Brennan Fire Headquarters on the northwest corner of the intersection. There do not appear to be provisions for emergency pre-emption at this location, although due to the proximity of the Fire Headquarters driveway, it appears pre-emption is not necessary. On-street parking

is available surrounding the intersection except for along the northbound Lafayette Street approach and along the westbound New Derby Street departure lane.

EXISTING TRAFFIC CONDITIONS

Several study area intersections were included for analysis in the aforementioned documents, including the Derby Street intersections at Lafayette Street/New Derby Street and at Hawthorne Boulevard/Congress Street. Based on the information provided, Derby Street east of Hawthorne Boulevard/Congress Street carries approximately 565 weekday morning peak hour vehicles, 658 afternoon peak hour vehicles, and 6,600 daily vehicles.

Level of service (LOS) analysis, as outlined in the 2000 Highway Capacity Manual³, is the method in which traffic operations are measured and is based solely on average vehicle delay. Generally speaking, LOS A – D are considered acceptable in urban/suburban areas, while LOS E to LOS F are considered unacceptable. Based on the study performed by CTPS, the all-way Stop controlled intersection of Derby Street/Hawthorne Boulevard/Congress Street operates at level of services (LOS) E and F for the eastbound and southbound approaches during both the morning and afternoon peak hours. Our observations at this location indicated that intersection blockage occasionally occurs. The westbound and northbound approaches operate between LOS B and LOS D during the peak periods.

The signalized intersection of Derby Street/Lafayette Street/New Derby Street operates at overall LOS B and C during the morning and afternoon peak hours, respectively, with no approaches operating worse than a LOS D.

The intersection of Derby Street/Hawthorne Boulevard/Congress Street serves as a primary intersection within the study area to access the Salem port site. Consideration should be given to evaluating this location to determine if a traffic signal is warranted at this location to control activity. Besides a signal, other alternatives (round-a-bout, designating one-way roads, etc.) should be explored to enhance operations. The signalization would better accommodate pedestrians traversing this area, which is especially important due to this intersection being located along the Salem Heritage Trail, a pedestrian path connecting sites of historical significance within the downtown and port area of Salem. However, a creative roundabout design with pedestrian amenities could be proposed for this location. Further in-depth analysis for either scenario is recommended.

Observations at the additional study area intersections of Derby Street/Blaney Street/Beckett Street and Derby Street/Webb Street during the field reconnaissance revealed adequate performance with relatively short delays on all approaches.

WAYFINDING AND TRUCK ROUTES

Way-finding signs exist throughout the downtown Salem area, and along roadways entering the downtown area for the Salem Ferry. All key intersections have signage labeled "Salem Ferry" with arrows directing motorists toward the site. The route location of the way-findings signs are shown in Figure 2. This route appears to be adequate for finding the site. With the proposed port expansion project, the City might consider updating these signs to advertise the updated use or to use updated terminology.

The primary truck route through Salem travels along Bridge Street (Route 107) between Webb Street to the east and Summer Street to the west. Signs are posted at these termini directing truck traffic to follow this

³ 2000 Highway Capacity Manual; Transportation Research Board.

route. By following this path, the truck traffic traveling through Salem between points north, avoid the downtown area. The truck routing plan is shown in Figure 2.

EMERGENCY VEHICLE AND BUS ACCESS

As noted above, Derby Street has a varied width and is generally 23-25 feet wide, with parking permitted on the south side of the roadway. With parking permitted on Derby Street in the area of the port entrance via Blaney Street, the usable roadway width serving one-way traffic is 15-17 feet. Since there are sidewalks and utility poles on both sides of the intersecting streets, there are some lateral constraints for tour busses and emergency vehicles. That is, turning geometry is likely inadequate at this location without improvement measures to serve as the primary access to the port. During our field reconnaissance, a trolley bus was observed to be using the entire useable width of Blaney Street, allowing no room for emergency vehicles to pass. Instituting parking restrictions within a selected distance of the Derby Street/ Blaney Street/Beckett Street intersection and along Blaney Street will improve mobility. Thus given the land use in the area, and the direct connection of Derby Street from the downtown area, it is recommended that Derby Street remain one-way.

PEDESTRIAN AMENITIES

As noted in our field reconnaissance, there are sidewalks through out the study area, except along the east section of Blaney Street, where the sidewalk terminates after 60 feet from the intersection. In the study area, sidewalks are generally 5-7 feet wide except in the downtown area of Derby/Hawthorne/Congress Streets where the width is greater to serve the higher pedestrian volumes. In the downtown area, the sidewalk width is in the order of 10-15 feet. With sidewalks present throughout the City, there are numerous opportunities for connections from the downtown area, the port area, historic sites and the waterfront. In the downtown area, the sidewalk design has been developed for a good level of service (greater than 40-60 square feet per person). In the site area along Derby Street, the sidewalk narrows considerably and thus large groups would have difficulty walking unimpeded, thus forcing visitors to walk in the street. The useable sidewalk space in the site area is likely in the order of 8-15 SF per person, an unacceptable condition.

Besides sidewalks, there appear to be adequate crosswalks in the area, with crossings at selected locations along Derby Street and the key intersections in the study area. Most importantly at the signalized intersection of Derby Street/Lafayette Street/New Derby Street, pedestrian push buttons, for exclusive pedestrian crossings, are present at all corners of the intersection along with inlaid brick crosswalks to accommodate pedestrians. At the Derby Street/Blanney Street/Beckett Street intersection, an inlaid brick and granite crosswalk also exists at the western Derby Street leg to accommodate pedestrians. In all areas, pavement markings are worn and would require re-painting.

Possible measures to improve the walking experience from the downtown area would be to widen the sidewalk on the south side, but eliminate a portion of the curbside parking, by narrowing the street. This measure should be explored with the City and be reviewed for conformance with the master plan.

EXISTING TRANSPORTATION SERVICES

The Salem Ferry, located within the project site at 10 Blaney Street, operates between late June and October 31, with up to eight trips during the summer months (June to Labor Day) and up to six trips during the fall months (Labor Day to Halloween). The Ferry capacity accommodates 149 passengers. Access to the Salem Ferry is available by driving and parking in the on-site parking lot at 10 Blaney Street, by way of the Salem Trolley service, or by walking to the site from the downtown area.

The Salem Trolley service travels throughout the downtown Salem area seven times per day, once per hour between 10:00 AM and 4:00 PM. Although the project site is not listed as a scheduled stop along the trolley route, during the field reconnaissance, the trolley was observed entering and exiting the site parking lot, and awaiting a ferry arrival. The ferry route travels along Derby Street and enters the site via Blaney Street. Despite the on-street parking adjacent to Blaney Street, the trolley is able to maneuver between Derby Street and Blaney Street; however, busses or trolleys larger than this might experience difficulty with this operation.

The Massachusetts Bay Transit Authority (MBTA) operates commuter rail via the Newburyport/Rockport line with one stop in Salem and bus service in and around the downtown area via Routes 450, 451, 455, 459 and the ABC route. Pedestrian connections between the commuter rail station and various bus stops are within one mile and one-half mile, respectively. The Salem Trolley also provides connections between these points.

SAFETY ANALYSIS

Nitsch Engineering performed accident data research for the study area intersections from data obtained from the MassHighway database for the three most recent years (2003-2005). A summary of the accidents are shown in Table 1 below. It can be seen of the four locations noted in Table 1, the unsignalized location of Derby Street/Hawthorne Boulevard/Congress Street has the highest accident total, averaging over 8 accidents a year for the 3-year period summarized.

It can be seen that for Derby Street/Hawthorne Boulevard/Congress Street and the Derby Street/Lafayette Street/New Derby Street intersections, the accident rates are higher than both the average State-wide crash rates for 2003 of 0.87 accidents per million entering vehicles for signalized intersections and 0.66 accidents per million entering vehicles for unsignalized intersections. It is evident that from the traffic analysis noted earlier, these locations warrant improvement or upgrade (signalization, safety enhancements, etc.) to better serve area traffic, particularly visitor-related traffic that enters the area for the first time.

Table 1 Accident Data Summary ¹												
Year	Total	Angle	Rear End	Side Swipe	Head On	Single Vehicle	Other/ Unknown	Property Damage Only	Injury	Fatal	Crash Rate	
Derby Street/Blanney Street/Beckett Street												
2003	1	1						1			NA	
2004	0											
2005	0											
Total	1	1						1				
Derby Street/Webb Street												
2003	1	1						1			NA	
2004	0											
2005	0											
Total	1	1						1				
Derby Street/Hawthorne Boulevard/Congress Street												
2003	9	7	1	1				8	1		1.38 ²	
2004	3	2				1		1	2			
2005	14	6	5	1	1	1		12	2			
Total	26	15	6	2	1	2		21	5			
Derby Street/Lafayette Street/New Derby Street												
2003	2	1				1			2		1.60 ²	

Table 1 Accident Data Summary ¹											
Year	Total	Angle	Rear End	Side Swipe	Head On	Single Vehicle	Other/ Unknown	Property Damage Only	Injury	Fatal	Crash Rate
2004	5		2	1		1	1	3	2		
2005	4	3					1	4			
Total	11	4	2	1		2	2	7	4		
¹ Source: MassHighway; NA = not available; 2 Computed for 2003 data from CTPS report											

RECOMMENDATIONS

Based on our assessment of traffic, pedestrian, and traffic conditions in the area, there are a few measures that should be explored prior to the port being developed to mitigate traffic and accommodate pedestrians in the area. At a minimum, the following:

- Conduct a traffic feasibility study of the Derby Street/Hawthorne Boulevard/Congress Street intersection to determine the likely improvement that is necessary at this location. This is critical given the nature of the Salem Port development. In 2005, the CTPS study recommended signalization with an estimated cost of \$150,000 at that time. Besides signalization, other improvement alternatives may include geometric changes and circulation, circulation changes to minimize vehicle and pedestrian conflicts. Consideration may also be given to constructing a round-a-bout at this location. This measure would also help calm traffic in the area.
- Upgrade the signalized intersection of Derby Street/Lafayette Street/New Derby Street near the Chief Brennan Fire Headquarters. Consideration may be given to signal pre-emption for emergency vehicles, upgraded pavement markings and signing, and enhancement for pedestrian accommodations.
- Improve the way-finding signing in the Salem downtown area by including new retro-reflective signing at strategic locations and upgrading existing signing.
- Maintain the existing truck route around the downtown area.
- Upgrade the pavement markings and signing in the study area.
- Develop a consistent plan for crosswalk design in the study area.
- To improve site access, in the area of the Derby Street/Blaney Street/Beckett Street intersection, prohibit parking for 200 feet along Derby Street from the intersection and along both sides of Blaney Street.
- Upgrade the sidewalks on Blaney Street and connect the existing east section with a new sidewalk section that would run the entire length of Blaney Street.
- Widen the sidewalks in the site access area to better accommodate pedestrian flow which would also improve turning radii for tour busses, emergency vehicles and trolleys and
- Maintain one-way traffic flow on Derby Street.

CONCLUSION

This assessment has been developed to provide an assessment of some preliminary findings for improving pedestrian and traffic conditions in the port study area. With further study, more specific details can be included on parking, truck routing, pedestrian pathways and flows, bus access and appropriate signing to guide visitors in the area and provide a safe environment for all users.

Traffic Assessment – Salem Port Expansion, Salem, Massachusetts: Nitsch #6479
September 2007
Page 7 of 7

G:\Project Correspondence\NN18009.doc

APPENDIX A-4

Public Meeting December 12, 2007, PowerPoint Presentation – Site Plan Alternatives

Port of Salem Expansion



Presentation of Site Plan Concept Alternatives

Bourne Consulting Engineering

Port of Salem Expansion

PRESENTATION

- **Review and Analysis of Existing Port Plans**
- **Site Program Requirements/Considerations**
 - *Marine*
 - *Upland*
 - *Building*
- **Presentation of Site Plan Alternatives**
 - 5 Alternatives
 - Construction Costs
- **Gateway Challenges And Opportunities**
- **Regulatory Process**
- **Next Steps**
 - *Project Schedule*
- **Questions**

Bourne Consulting Engineering

Port of Salem Expansion

REVIEW AND ANALYSIS OF EXISTING PORT PLANS

FINAL SITE DEVELOPMENT PLAN - 2005

- Incorporated much greater upland area
 - Buildings: 1,800 sf terminal and 300 sf fishing support building
 - Indicated a 2nd access and parking near Webb Street
 - The demands of the waterside matched the upland program
 - Included non-DPA uses within DPA
- **Current site not capable of supporting the same marine elements:**
- Site is now limited to original 2 acre site – insufficient upland
 - Does not address current conditions
 - Potential for offshore supply vessel
 - Marketing analysis out dated – based on 1998 information

REVIEW AND ANALYSIS OF EXISTING PORT PLANS

Salem Harbor Plan – 2000 vs. 2007 Draft

- **Provided Detailed Program for Larger Site**
 - Based on Proposed Plan at time of Harbor Plan Development
 - Incorporated Non-DPA uses to assist in the economics for project revenue.
 - Difficult site development from change approved Harbor Plan
 - Some commercial uses not based on market data
- **Proposed Draft 2007 Harbor Plan has incorporated changes**
 - Site development is to be more flexible
 - Focus on DPA uses
 - Allows flexibility for growth if added upland support area becomes available

Site Program Requirements/Considerations

- Marine
- Upland
- Building



Bourne Consulting Engineering

Port of Salem Expansion

MARINE PROGRAM

Maritime Program

- Incorporate existing ADA facility into program
- Provide 2 berths meeting ADA accessibility
- Provide 2 berths for commercial vessels at floating docks (200 lf)
- Provide 200 foot fixed pier berth
- Dredging will be required to support use
 - 26-28 feet at face of fixed pier
 - 16-18 for 2 berths
 - 10-12 for ferry and embayment area
- Provide utilities for vessels at pier & floats
- Truck access to the pier face
- Capacity to handle a 10 ton crane
- Adaptable for future berth expansion

Bourne Consulting Engineering

Port of Salem Expansion

MARINE PROGRAM

Preliminary Marine Program Elements

Offshore Supply Vessel	130 ft berth	12 ft	at floating barge	Home Port
Salem Ferry	120 ft berth	8 ft	at ADA barge	Home Port
Coastal Cruise Vessels	250 ft berth	10 ft	at ADA Barge	Day Use
Small / Med. Cruise Ships	up to 400 ft	12 ft	at pier face	Day Use
Medium Cruise Ships At Anchorage	up to 800 ft		Tenders to ADA barge	Day Use
Visiting Vessels/Tall Ships	up to 400 ft	18 ft	at pier face	Day/Overnight
Excursion Vessels	120 ft berth	8 ft	at ADA Barge	Live Berth
Water Taxi	50 ft berth	6 ft	Float at ADA Barge	
Military Vessels				
- USCG Cutter	270 ft berth	16 ft	at pier face	Day/Overnight
- Naval Patrol	180 ft berth	12 ft	at pier face	Day/Overnight
- Naval Mine Sweepers	225 ft berth	17 ft	at pier face	Day/Overnight
- Destroyers	376 ft berth	30 ft	at pier face	Day/Overnight

Bourne Consulting Engineering

Port of Salem Expansion

UPLAND

- Site Context
- Urban Design Guidelines
- Terminal Building Program



Bourne Consulting Engineering

Port of Salem Expansion

SITE CONTEXT

- **Site area limited to current City leased area of 2 acres**
- **Limited vehicular and pedestrian access from Derby Street**
- **Irregular perimeter of rubble rip-rap**
- **Irregular site shape limits circulation, parking and building location**
- **Future options for improved circulation and parking**
- **Maintain operation of Salem Ferry through construction**

URBAN DESIGN GUIDELINES

- **Pleasant and seamless visitor experience**
- **Separate pedestrian and vehicular circulation**
- **Commercial maritime focus within a park-like setting with year round community uses**
- **Linear pier extension along Hawthorne Cove**
- **Gateway view corridors from Derby Street and Harbor**
- **Terminal building with clock tower as view corridor Focus**
- **Historic Salem character and port historic interpretation**

TERMINAL BUILDING PROGRAM

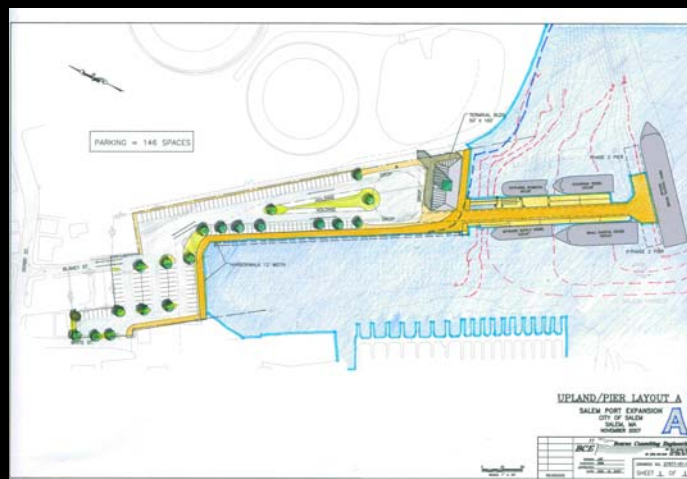
- **Multi-purpose Terminal Waiting Area**
 - Ferry & Excursion
 - Cruise Ships
 - Public Function Space
- **Ferry Offices and Storage**
- **Commercial Maritime Office and Storage**
- **Public Information and Restrooms**
- **Outdoor Covered Seating and Viewing Areas**

Bourne Consulting Engineering

Port of Salem Expansion

SITE PLAN ALTERNATIVES

- **Alternative A : Long “T” Pier with Diagonal Terminal**



Bourne Consulting Engineering

Port of Salem Expansion

SITE PLAN ALTERNATIVES

Alternative A:

- Diagonal terminal footprint following existing shoreline
- Central clock tower on Terminal
- 12 foot pile supported Harborwalk over rip-rap widens useable site; includes head of cove
- Long pier extension to Dominion pier line
- Expandable "T" pier end
- Ferry landing on east face
- 146 Parking spaces

**\$ 11.6 Million Construction
plus dredging**

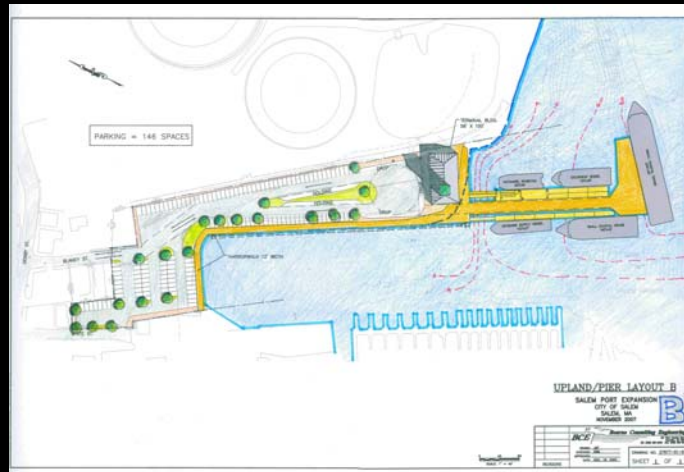


Bourne Consulting Engineering

Port of Salem Expansion

SITE PLAN ALTERNATIVES

- **Alternative B: Long "L" Pier, Perpendicular Terminal with Extended Harborwalk**



Bourne Consulting Engineering

Port of Salem Expansion

SITE PLAN ALTERNATIVES

Alternative B:

- Long pier extension to Dominion pier line
- Fixed “L” pier end
- Ferry landing on east face
- Perpendicular terminal footprint following existing shoreline
- Clock tower at west end of terminal
- 12 foot pile supported Harborwalk over rip-rap
 - widens useable site;
 - includes head of cove.
- 146 Parking spaces

**\$ 13.0 Million Construction
plus dredging**

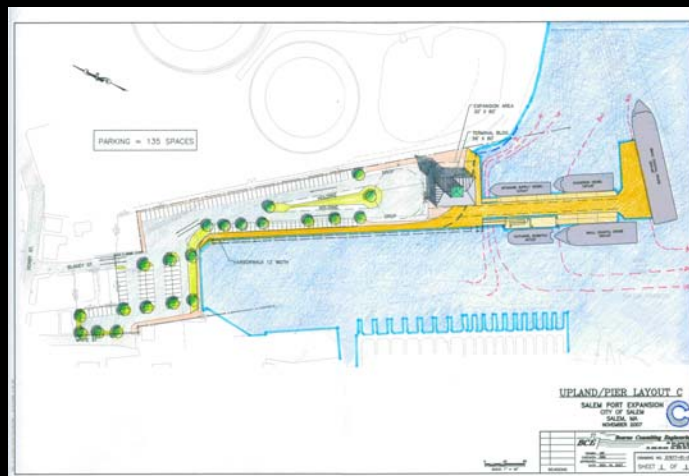


Bourne Consulting Engineering

Port of Salem Expansion

SITE PLAN ALTERNATIVES

• Alternative C : Long “L” Pier, Linear Terminal with Extended Harborwalk



Bourne Consulting Engineering

Port of Salem Expansion

SITE PLAN ALTERNATIVES

Alternative C:

- Long pier extension to Dominion pier line
- Fixed "L" pier end
- Ferry landing on west face
- Linear terminal footprint allowing for future expansion;
 - requires extended pier platform
- Clock tower at center of terminal
- 12 foot pile supported Harborwalk over rip-rap
 - widens useable site - except at head of cove.
- 135 Parking spaces

**\$ 12.7 Million Construction
plus dredging**

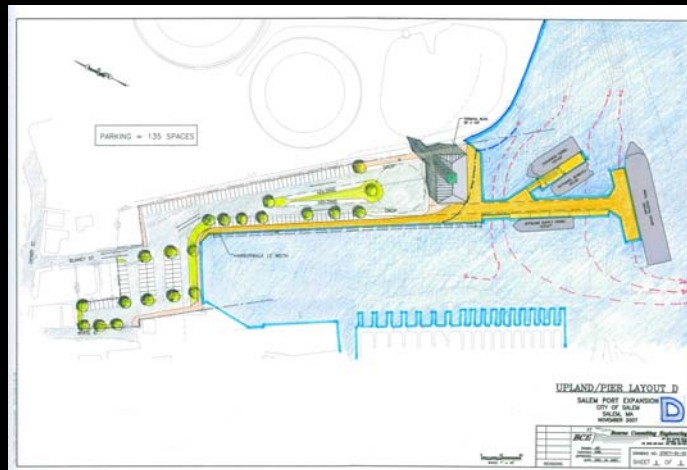


Bourne Consulting Engineering

Port of Salem Expansion

SITE PLAN ALTERNATIVES

- **Alternative D: Shorter "T" Pier, Perpendicular Terminal with Diagonal Ferry Landing**



Bourne Consulting Engineering

Port of Salem Expansion

SITE PLAN ALTERNATIVES

Alternative D:

- Shorter pier extension inside Dominion pier line
- Fixed “T” pier end
- Diagonal ferry landing on east face
- Perpendicular terminal footprint with clock tower at center
- 12 foot pile supported Harborwalk over rip-rap
 - widens useable site - excludes head of cove.
- 135 Parking spaces

**\$ 11.8 Million Construction
plus dredging**



Bourne Consulting Engineering

Port of Salem Expansion

SITE PLAN ALTERNATIVES

- **Alternative E: Long “T” Pier, Diagonal Terminal with Narrow Harborwalk**



Bourne Consulting Engineering

Port of Salem Expansion

SITE PLAN ALTERNATIVES

Alternative E:

- Long pier extension to Dominion pier line
- Fixed “L” pier end
- Ferry landing on east face
- Diagonal terminal footprint following existing shoreline
- Clock tower at center of terminal
- 8 foot wide Harborwalk inside rip-rap
 - narrows useable site
- 115 Parking spaces

**\$ 10.7 Million Construction
plus dredging**



Bourne Consulting Engineering

Port of Salem Expansion

Gateway Challenges: Upland Site

**Limited vehicular and pedestrian
access to current site**

Improved Links to Historic Salem

**Limited View Corridors from Derby
Street to Site**

**Site Area, Capacity and Narrow
Shape Limit Land and Water Uses**

**Flexible Site Plan to Adapt to
Future Expansion Opportunities**

**Compatibility with current
residential neighborhood**



Bourne Consulting Engineering

Port of Salem Expansion

Gateway Challenges: Site as Intermodal Transportation Center

- Terminal Curbside to Ferry Like an Airport
- Pedestrian, Trolley/Bus Drop-off and Stacking Priority; Parking more remote
- Kiss and Ride Auto Drop-off
- Truck and bus turning circle of 100 foot diameter
- Harborwalk Link to White Street
- Blaney Street for Vehicular Access
- Derby Street improvements needed



Bourne Consulting Engineering

Port of Salem Expansion

Gateway Challenges: Commercial Port / Park Setting

- Multiple Year Round Uses of Site and Terminal Building public spaces
- Off- Peak and Off- Season Recreational Uses of Site and Harborwalk
- Separate Perimeter Harborwalk / Bikeway
- Off- Season Neighborhood Residential Parking Opportunity
- Gateway Port Park as New Community Asset



Bourne Consulting Engineering

Port of Salem Expansion

Terminal Building as Gateway

Terminal Building Design to Reflect Historic and New Salem

- Compatible Building Materials
- Multipurpose public terminal waiting and function space
- Compatible Scale and Massing
- Circulation and Wayfinding
- Public Art Options
- Distinctive Design: Clock Tower



Bourne Consulting Engineering

Port of Salem Expansion

REGULATORY - Environmental Approvals Required

- MEPA – Environmental Notification Form
- MA DEP – Waterways Chapter 91 License
- MA DEP – WPC – Water Quality Certificate
- USACE – Section 10 Permit
- Salem Conservation Commission



Bourne Consulting Engineering

Port of Salem Expansion

NEXT STEPS - - -

- **Develop Refined Concept Plan Following Public Meeting**
- **City to Perform Management and Operations Study**
- **Define Final Facility Development Program and Phasing**
- **Submit Environmental Notification Form (MEPA)**
- **Submit Remaining Regulatory Filings**
- **Obtain Final Design Funding from Seaport Council**



Bourne Consulting Engineering

Port of Salem Expansion

COMMENTS & QUESTIONS



Bourne Consulting Engineering

Port of Salem Expansion

APPENDIX A-5

Public Meeting October 15, 2008, PowerPoint Presentation – Preliminary Design

Salem Wharf Project



Preliminary Design Presentation

City of Salem



PRESENTATION

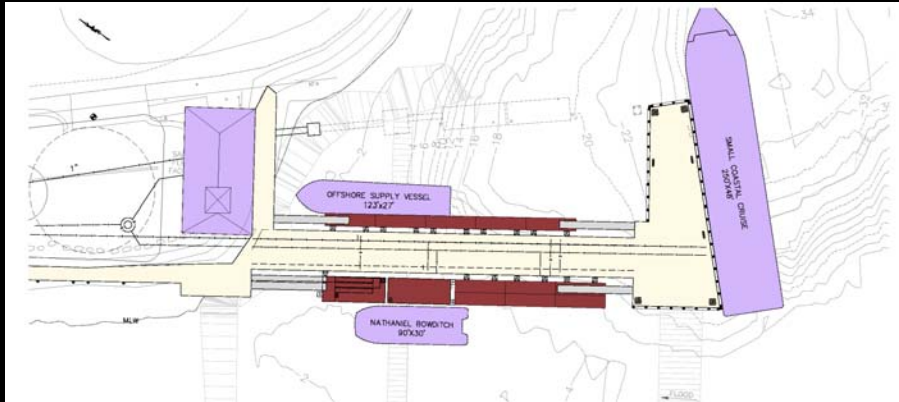
- Purpose of Presentation - Project Status
- Project Presentation
 - Marine Elements –
 - Bourne Consulting Engineering
Ronald R. Bourne, PE
 - Site Development –
 - Shadley Associates
Pamela Shadley, ASLA
 - Terminal Building & Gateway –
 - C7A / Norris & Norris
Timothy Mansfield, AIA
Charles Norris, RA
 - Construction Cost Estimate
 - Schedule
- Next Steps

City of Salem



Marine Elements

• Fixed Pier / Commercial Vessel Berthing

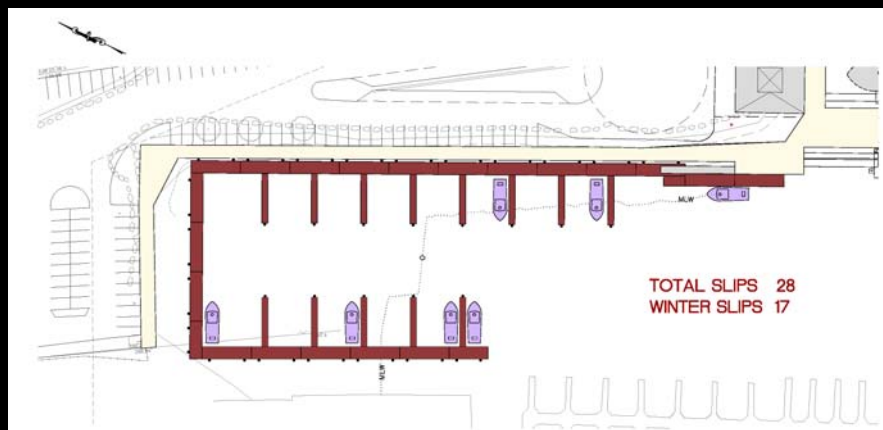


City of Salem



Marine Elements

• Commercial Fishing Vessels

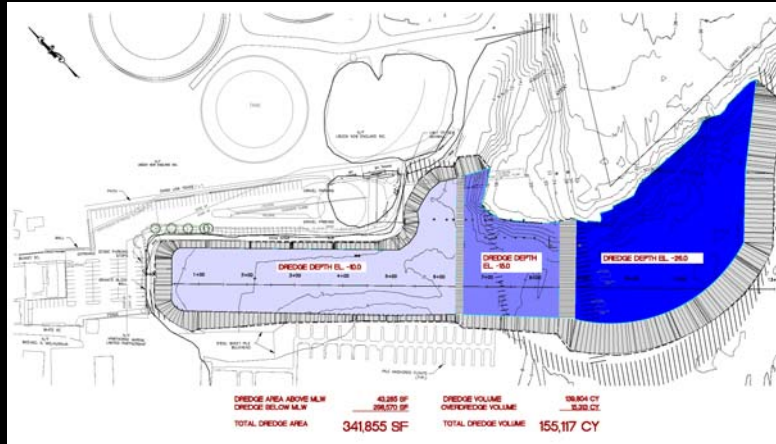


City of Salem



Marine Elements

• Dredging

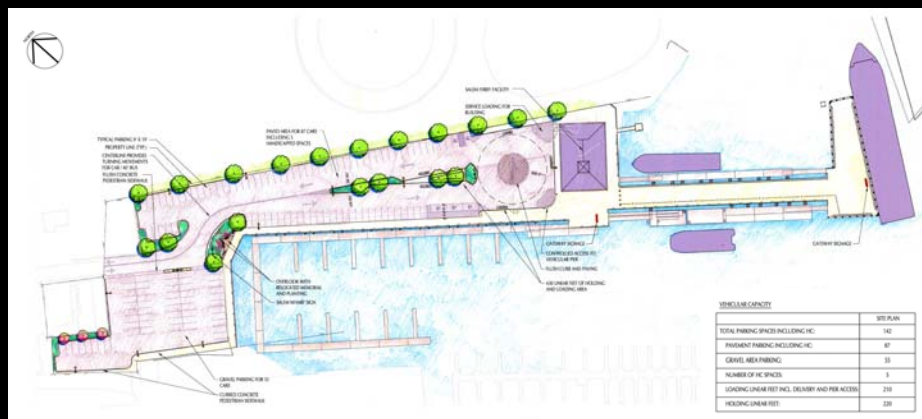


City of Salem



Site Development

• Site Plan



City of Salem



Terminal Building & Gateway

• Terminal Design - Plans



City of Salem



Terminal Building & Gateway

• Terminal Design - Elevations



City of Salem



Terminal Building & Gateway

• Terminal Design - Elevations



North Elevation



West Elevation

City of Salem



Terminal Building & Gateway

• Comparative Designs – Bayshore Terminal (NJ)



City of Salem



Terminal Building & Gateway

- Comparative Designs - Bayshore Terminal (NJ)



City of Salem



Terminal Building & Gateway

- Comparative Designs – Forest Hills MBTA Station



City of Salem



Terminal Building & Gateway

- Comparative Designs – Forest Hills MBTA Station



City of Salem



Terminal Building & Gateway

- Comparative Designs – Robins Nature and Visitor Center



City of Salem



Terminal Building & Gateway

• Comparative Designs – Tabor Arts Center



City of Salem



Terminal Building & Gateway

• Gateway Elements Plan



- 1** VIEW TO FERRY CLOCK TOWER
 - FROM SALEM HARBOR
 - FROM LANDINGS
 - FROM DERBY STREET
 - FROM INNER HARBOR
- 2** PARK LIKE SITE SETTING
 - LANDSCAPING
 - HARBORWALK
 - FISHING PIER
 - WHARF ACCESS
- 3** TERMINAL INFORMATION AND WELCOME CENTER
- 4** WELCOME AND WAYFINDING SIGNAGE
 - WELCOME AT DOCK
 - TO TOWN FROM WHARF
 - TO WHARF FROM TOWN
- 5** VIBRANT WORKING MARITIME CENTER
 - FERRY
 - EXCURSIONS
 - COMMERCIAL VESSELS
 - FISHERMEN
 - CRUISE VESSELS
 - VISITING VESSELS

City of Salem



Terminal Building & Gateway

- Gateway Elements – Clock Tower View from Derby Wharf



City of Salem



Terminal Building & Gateway

- Gateway Elements – Terminal View from Harbor



City of Salem



Terminal Building & Gateway

- Gateway Elements – Terminal Welcome Center



City of Salem



Terminal Building & Gateway

- Gateway Elements – Salem Wayfinding Signage



City of Salem



Terminal Building & Gateway

- Gateway Elements – Salem Wayfinding Signage

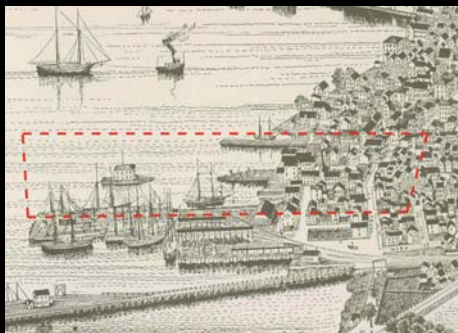


City of Salem



Terminal Building & Gateway

- Gateway Elements – Lively Year Round Maritime Center

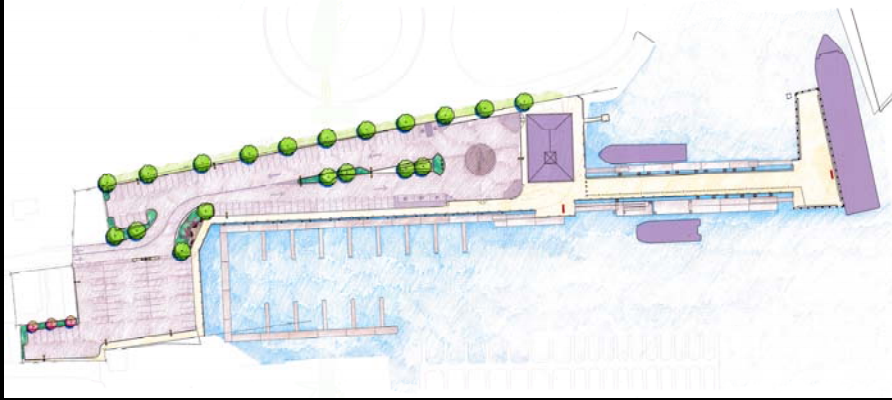


City of Salem



Terminal Building & Gateway

• Gateway Elements – Park-like Setting



City of Salem



SALEM WHARF – Construction Cost Estimate

• Projected Cost Estimate

• Fixed Pier Structure	\$ 5.98 mil
• Commercial Berths	\$ 1.85
• Commercial Fishing	\$ 0.58
• Site Development	\$ 5.03
• Terminal Building	\$ 2.56
	<hr/>
Subtotal	\$16.00 mil
Dredging	3.53
	<hr/>
Total	\$19.53 mil

City of Salem



SALEM WHARF – Project Schedule

• Projected Construction Schedule

- Regulatory Approvals May 2009
- Construction Start
 - Site Work July 2009
 - Marine Elements August 2009
 - Building March 2010
- Construction Completion
 - Site Work August 2010
 - Marine Elements May 2011
 - Building March 2011

City of Salem



SALEM WHARF PROJECT - Next Steps

- Obtain Regulatory Approvals
- Finalize Management and Operations Report
- Submit Preliminary Design Plans
- Select Project Final Design Team(s)
- Prepare Final Design / Construction Documents

City of Salem



COMMENTS & QUESTIONS



City of Salem



APPENDIX A-6

Salem Wharf Site Plan and Marine Terminal Building Design – Design Memorandum by
Norris & Norris Associates

Appendix A-6

SALEM WHARF SITE PLAN AND MARINE TERMINAL BUILDING DESIGN **DESIGN MEMORANDUM**

Salem Wharf Expansion Project **Norris & Norris Associates**

Introduction:

The Salem Wharf Site Plan and Marine Terminal concept design represents the culmination of a decade long process of town planning for an expanded port facility at the Blaney Street site, spearheaded by the City of Salem and the Salem Partnership. The building program and concept design evolved as an integral component of the Salem Wharf Site Plan. The concept designs were presented for multiple reviews and comments by the City of Salem, facility stakeholders, and the Port Advisory Committee, as well as to Salem residents at two public hearings. The final site plan and marine terminal building are also consistent with the 2008 Salem Municipal Harbor Plan, which preceded the final concept designs.

Site Plan Context and Design Objectives (Figure 8.1): The landside components of the site plan were developed to support and compliment the waterside elements for the multi-purpose commercial marine facility. The site plan objectives are summarized in Figure 8.1; Site Context. These design principles were developed to enhance the commercial marine operations for passengers and vessel operation, as well as to meet community and neighborhood needs.

- **Park-Like Setting:** The Blaney Street site lies between the residential context of the Derby Street neighborhood and the industrial character of the power plant. The site is currently used as waterfront walk and fishing resource for neighbors. Providing a new commercial wharf with a park-like setting will serve the year round needs as a buffer and recreational amenity for the neighbors, as well as providing an attractive gateway experience for visitors.
 - Landscaping treatments of the edges and planting islands.
 - Retain the current community memorial garden in its current location or an approved new central site.
 - New perimeter Harborwalk
 - Fishing pier
 - Wharf access path
- **Gateway Welcome Center:** The terminal building and site combined will serve as a Gateway for visitors arriving in Salem by ferry and cruise vessel and a departure point for Salem residents and visitors heading for Boston and other destinations by ferry. By creating a positive arrival and departure experience for visitors, they will be more inclined to return to Salem on future trips.
 - Clock Tower on terminal building as the primary Salem Wharf landmark
 - Overhead sign arches saying “Salem Wharf” will be located at the end of the wharf and at the top of the ferry ramp.

- **Vibrant Working Port:** The mixture of ferries, cruise vessels, visiting ships, offshore crewboats, commercial fishing boats and general marine activities creates a new visitor attraction at the wharf itself.
- **Ferry Clock Tower as Landmark:** The clock tower, with faces on all four sides, is situated for viewing from many angles on land as well as water. The tower needs to be tall enough and the clock face large enough to be seen against the backdrop of the power plant.
 - From Massachusetts Bay and outer harbor approaches by ferries, coastal cruisers, and other visiting vessels.
 - From the end of the wharf for mid-sized cruise and other visiting vessels.
 - From Derby and Pickering wharves, and other inner harbor locations.
 - From Derby Street at Blaney and White Streets.
- **Wayfinding Signage System:** Well placed signs and maps will allow visitors to easily find their way from Salem Wharf to Derby Street to the Center of Town and other destinations on foot, as well as to find their way back. Trolley stops and Salem Wharf will also be marked on maps in town. With the ample curb frontage area for trolleys, buses, rickshaws and cabs, there will be multiple vehicular access options.
 - Wayfinding map kiosks located at strategic points along the Harborwalk and on Derby Street (marked by black boxes on Figure 8.1).
 - Terminal waiting area information counter with brochures and internet ticketing stations for local activities.
 - Salem Wharf and trolley stops added to intown maps.

Site Plan Description (Figure 8.2): The site plan design combines the maritime and landside elements within the constrained Blaney Street site area and incorporates responses to the design objectives. A primary challenge for the site plan was the irregular shape and narrow width of the parking area extending from the head of the cove to the south. The limited available site surface area was effectively widened by addition of the new 12 foot wide Harborwalk replacing the narrow dirt path along the edge of Hawthorne Cove and covering the existing rip rap edge. The site was lengthened by the location of the Terminal building at the squared off southern most edge of the site. These two measures allow for enough width and length to provide a reasonable and compliant two-way vehicle road and loop, as well as increasing the amount of perpendicular parking along the edges.

- **Site Circulation and Parking:** The road loop from Derby to Blaney Street is designed to safely accommodate combinations of private autos, cabs, trolleys, buses, and trucks serving the marine industries. Most circulation activities will not directly overlap, since the vessel arrivals and departures are spaced during the active season, and commercial maritime uses are likely to be more active in the off –season. Parking spaces are to be prioritized for in-season weekday use by local ferry commuters and for use by general day-trippers throughout the week. During the late afternoons and evenings, available spaces could be used by excursion and charter ferry operations, but existing off-site parking may also be needed for peak use periods. Handicapped spaces are located closest to the terminal building.
- **Multi-purpose Harborwalk:** The new 12 foot wide harborwalk will provide attractive pedestrian access for arriving ferry and cruise passengers, while also serving as a walking, jogging and bike path for Salem residents. Certain spots will attract fishermen,

as they do today, with the new addition of a fish pier on the south section of the walk retaining the inboard portion of the existing fixed pier which accesses the current ferry landing.

- **Landscaping:** The new plantings will include a line of shade trees along the eastern property line, and several planted islands and edges in the parking area. A special planted overlook will occupy the area along the Harborwalk at the north east corner of Hawthorne Cove, and present an attractive entrance view for pedestrians and motorists approaching the Wharf along Blaney Street. .
- **Multiple Year Round Uses:** Parking areas will have seasonal vehicular markings on pervious and impervious surfaces and no curbs, to allow for changing surface uses by season. For example, the winter fishing berths may need a an area for staging activities, residents may use site parking during snow events, and some surface boat storage may occur during off peak periods.
- **Flexibility for Future Expansion:** Expansion of vessel activities during peak periods will require additional parking either on site and/or off site. Similarly, expanded marine activities would benefit from an expanded two way access system. The site should be capable of expansion when and if additional properties become available to the east and towards Derby Street. The terminal building may also need to be enlarged to the east and north if some of the land becomes available, to respond to increased marine support demands.
- **Sustainable Design:** All aspects of the site plan will incorporate best practices for a durable and sustainable design, including appropriate uses of alternative energy, managed storm water run-off, and use of renewable materials.

Marine Terminal Building Design Objectives:

The Marine Terminal Building is intended to meet a variety of design objectives as determined through the project planning workshops and reviews with the City, stakeholders and residents.

- **New Harbor Gateway:** First and foremost the terminal would serve as a new ocean Gateway to and from Salem for visitors and other commercial port users. At the outer reaches of the harbor by water, but near the many historic attractions on land, the terminal structure at Blaney Street would provide a small but distinctive new addition to the at the edge of the harbor. The clock tower would add stature to the building and be visible from other harbor viewpoints such as Darby Wharf as well as from Darby Street.
- **Welcoming Orientation Center:** In addition to the usual passenger ticketing and shelter functions the waiting area would serve as an initial orientation experience for the many first time visitors to Salem, by ferry or cruise vessel. The ticketing counter and orientation maps and signage would provide visitors with all necessary information to enjoy historic Salem. The nearby bus and trolley boarding area, combined with the harborwalk pedestrian path leading to Darby Street, would provide immediate links to historic and commercial attractions.
- **Contextual Building Style and Materials:** The terminal building needs to fit in with its historic Salem neighborhood context by use of familiar building materials and forms. The terminal should also provide an open, public image as it will be used as a civic space during the off season for ferry and cruise operations.
- **Views to the Harbor and Massachusetts Bay:** The building site at the waters edge provides excellent views to the active Salem Harbor and to the ocean for visitors and

residents alike. The new perimeter harborwalk is expected to be used actively by both Salem visitors and residents, and the indoor and outdoor benches can be used by all..

- **Multi-modal Transportation Center:** The building and surrounding site need to function as an efficient transit center allowing visitors to safely and comfortably transfer from water to land transportation modes through and around the terminal building. Similarly for efficient and safe movement of maritime goods and services from land to water, the site and building elements need to make good use of a limited upland site area.
- **Separation of Pedestrian and Commercial Activities:** At the same time, the building organization and surrounding site needs to reduce conflicts between pedestrian flow to the ferries and cruise vessels, and commercial equipment movements such as the LNG supply operations and other periodic commercial maritime activities on the Wharf. The building should be organized to have public activities concentrated nearest to the vessel boarding areas and the more private commercial activities concentrated away from pedestrian activities.
- **Flexibility for Multiple Public and Private Uses:** The building public and private spaces should accommodate the primary user needs, but also be capable of flexible use during different seasons. For example, the central waiting area will be most actively used by ferry and cruise vessels during summer and fall months, but can serve as a civic meeting or rental function space during the winter and spring months.
- **Green and Energy Efficient Building:** Every effort should be made in the siting of the building, selection of materials and building systems to create an environmentally friendly and energy efficient structure. The building design shall conform to all City and State energy and sustainability guidelines.

Building Program Summary: (C.Norris revised final description (based on ENF) 111208)

The Building Program for a multi-purpose marine operations center was derived through interviews with current and prospective Salem Wharf occupants, as well as through analysis of comparable port facilities in the region. Building user needs are to be housed in a single structure in close proximity to the dock area as shown in the final concept site plan (Figure 8.2). The multi-purpose building facility is to be known as the Salem Wharf Marine Terminal.

Primary User Needs: The primary tenants of the Salem Marine Terminal would include current seasonal tenants such as the Salem Ferry operator, and year round tenants such as the LNG supply boat operation which currently leases berthing space at Blaney Street from the City.

Salem to Boston Ferry: The Salem to Boston ferry completed its third year of operation in 2008 following its inaugural season of 2006. The ferry is operated by Water Transportation Alternatives (WTA), a private ferry company, which provides all services under agreement with the City of Salem. Passenger service is provided on the *Nathaniel Bowditch*, a 149 passenger catamaran which is owned by the City. The seasonal route serves Salem commuters to Boston and visitors in both directions from May through October. The City owned vessel is homeported at the current interim Salem Wharf during the operating season, and will continue to reside seasonally at the new pier. As many ferry passengers are first time visitors to Salem, the new pier and terminal building will serve as a gateway to the City. Interior building facility needs to support the ferry operations include:

- Public waiting area; including ticketing and visitor information: The area would be climate controlled and provide ticketing, seating, information, and other amenities. There would be views from the waiting area to both the boarding dock and the curbside drop-off area, which is afforded by the siting and layout of the terminal building. The waiting area is programmed to accommodate existing and future ridership growth of the Salem Ferry, as well as other passenger vessel needs such as future cruise vessel port of call visits, future excursion ferry, and whale watch operations. Covered outdoor waiting and seating areas would serve as an overflow and fair weather extension of the waiting room. Flexibility may be needed for expanding the ticketing area for future excursion and whalewatch operators.
- Public rest rooms and vending area: Located in close proximity to the waiting area, the restrooms will serve the ferry and other passenger vessel functions. Depending on City policy and terminal operating hours these facilities would also be open to the general public. A small vending area would be provided for newspapers, beverages, and snacks.
- Operator's office space: Located adjacent to the ticketing and information area, the offices would serve the operators' administrative needs. Flexibility for adding work stations may be needed for future service expansion. . A separate restroom would be provided on the second level.
- Storage and workshop: The workshop and storage area would be located in a different part of the building and accessed from the exterior. The WTA workshop would not need to be fully climate controlled, since it would be used on a seasonal basis.

Whale Watch and Excursion Ferry Operator: Public space needs would be similar to the passenger needs as for the Salem Ferry. Such services might be operated by WTA or by other ferry operators in the area. Excursion and whale watch ferries would also be seasonal with schedules coordinated with the Salem to Boston ferry operations. No additional office space needs are anticipated.

- Waiting and ticketing. Would use the same counter space as the Salem Ferry. An additional ticketing window might be needed if either ferry is operated by a different company.
- Restrooms, visitor information, vending area; All would be shared in the waiting space with the Salem Ferry.

LNG Supply and Crewboat Operation: Based on interviews with Excelerate Energy and its designated marine operator, who currently leases berthing space at the City owned landing, a list of year round building use space needs was identified.

- Office and Administration Space: The offices, crew waiting and other functions related to crew and administration of the LNG landside supply center would be housed in a separate part of the terminal building, away from the public waiting area. The space would be located on an upper level based on the terminal building layout. While the operation will be continuous throughout the year, the busiest periods for movement of supplies and crew are projected to be during the fall and winter months. Two small restrooms would be included adjacent to the office space.

- Workshop: The workshop area would be used by Excelerate for supply boat and buoy repair needs, stores, and equipment. A portion of the space would also be devoted to an environmental buoy monitoring program to be administered by Excelerate. A portion of the workshop and storage area would need to be at grade with truck delivery access.
- Storage: An additional storage area is needed for purposes of short term storing of supplies and equipment to be delivered to the offshore LNG ships. Proximity to the departure berth and transfer cranes are needed. Upper level storage and workshop would be connected to the grade level delivery dock by a freight elevator.

Other User Needs: For the other projected wharf users including seasonal cruise vessels, visiting small ships, and other small commercial vessels, building program needs were derived from a comparable analysis of similar port facilities in the region.

Cruise Vessels: It is projected that seasonal cruise calls could include either coastal cruise vessels (up to 300 feet in length) berthed at the pier, or medium sized cruise vessels anchored off shore with tender connections to the landing and building. Both would be seasonal uses that overlap with ferry operations. Cruise passengers would share public waiting facilities with the ferry operations

Visiting Tall Ships and Other Vessels: Occasional visits of tall ships, research vessels or military vessels may also occur periodically at the new Salem Pier. The vessels would also share the public waiting facilities of the terminal building

Other Small Commercial Vessels: For such intermittent users as visiting fishing vessels, marine construction or other small commercial vessels, needs may vary depending on the business. While the public areas would be open to such vessel crews, most support activity would be by truck. Proximity to the terminal building is not necessary and separation is preferred.

General Utilities and Building Support: Specific service requirements will be determined when the building size and loads are identified. The building utility needs would be connected to the City system on Derby Street and would include the following,

- Water and Sewer:
- Electric;
- Communications

Energy efficiency measures will be incorporated into the design in a variety of ways to reduce greenhouse emissions and make use of alternative sustainable, energy sources: Supplemental solar, thermal and/or wind energy sources will be considered as to their efficiency and appropriateness to the site, and may be used to reduce building and site dependence on conventional commercial energy sources. Building materials will be selected to minimize environmental impacts.

Building Program Summary Table: The Salem Marine Terminal Building program based on the interviews and comparable analysis is shown in the table below. A comparison of the total gross square footage required is estimated at the bottom of the table. Based on site constraints reflected in the proposed site plan, the multi-storey building program was found to be necessary, to provide the needed space within the building footprint of 60 by 100 feet. A total of 2 public and three private restrooms would be provided in the building.

Summary of Building Program Interior Space Needs:

Table – Final Terminal Building Program

Tenant/User	Function	Net Area Needs	Gross Area Needs	Notes/ Needs/Equipment
1. Salem Ferry	(subtotal)	3,370sf		Seasonal space needs at present, April through October
Waiting/Ticketing/Info	Public	1200sf		Multi-purpose civic space in off-season
Office	Private	850sf		
Workshop/Storage	Private	1000sf		
Public Restrooms	Public (2 @ 160sf)	320sf		
Outdoor covered waiting porch	Public	400sf*		
3. Cruise Vessels		-0-		Seasonal use; can share waiting and public space with ferry
Waiting/Info	Shared w/ Ferry	-0-		
4. Visiting Vessels		-0-		Can share waiting and public space with ferry
Waiting/Info	Shared w/ Ferry	-0-		
5. LNG Supply Center		4,700sf		Year round use; heavier activity during fall and winter months
Office	Private	2500sf		
Workshop	Private	1000sf		Combined with storage space
Storage	Private	1000sf		Some portion on ground floor
Private Restrooms	Private; 2 @ 100	200sf		
6. Other Shared Areas		250sf		General building needs
Utilities	Common	150sf		
Maintenance/Storage	Common	100sf		
<u>Total Net Square Feet</u>		<u>8,070sf</u>		Area without circulation, walls etc.
<u>Total Gross Square Feet</u>	Two Storey Building @ 1.3 x nsf		<u>10,491sf</u>	2 Storey building would require circulation space; footprint of approximately 5, 250 sf

- Exterior space; Not included in net building square footage

Building Design Description (Appendix Figures 8.1 to 8.4):

The concept design for the multi-purpose marine terminal was closely linked to the site plan for water and land elements of the Salem Wharf, while also meeting the design objectives and including the program space needs. The siting of the building is shown in Figure 1.1, with the building footprint located at the south eastern end of the land area. The Salem Wharf Marine Terminal concept design is shown in Figures 1.2 through 1.7, which include plans, section and elevations of the building.

Site Plan Context (Figure 8.1): The building is sited at the south end of the Blaney Street site in close proximity to the vessel landings. The building is sited to accommodate passenger pedestrian access needs as well as commercial vessel services and vehicle access to the pier and landings. A pedestrian harborwalk surrounds the building on the west and south sides, while the pedestrian curbside sidewalk skirts the north side.

For the ferry and cruise passengers, the building is oriented parallel to the new south face harborwalk the harbor end of the site to allow for direct and safe access from the landings to the waiting area to the curbside drop-off area. The curbside area and traffic turnaround allows for holding and loading of buses, trolleys, taxis, rickshaws, bicycles and other conveyances. The perimeter harborwalk provides a pleasant and direct pedestrian link to the parking areas and to the city sidewalks along Derby Street connecting to the historic areas and neighborhoods. Wayfinding signage and interpretive signage will be located at strategic points to provide orientation for visitors.

The commercial vessel users of the pier including the homeported LNG crewboat and other visiting commercial vessels using the pier and landings would share pedestrian access, but also have a truck access lane directly from the turning circle to the fixed pier along the west face of the building.

In addition to the wayfinding signage, visitors and residents will be able to locate Salem Wharf easily by the prominent clock tower at the west end of the terminal building which will provide a highly visible landmark from the land and the harbor.

Floor Plans and Circulation: The building organization balances the public ferry and cruise terminal uses and circulation needs with those of the commercial marine tenants. The terminal building functions primarily as an intermodal transit terminal, connecting ferry and crewboat passengers to landside transportation through the public waiting and private areas. The interior and exterior circulation paths are organized to provide direct weather protected passage between passenger modes. Ancillary freight connections between terminal storage areas and dockside loading are provided to allow for safe and efficient movement via truck and lift.

Ground Level (Figure 8.2): The multi-purpose terminal building consists of an open public waiting area on most of the ground level with primary entrances located midway along the north and south facades. The waiting room is surrounded on three sides by windows allowing clear views to the ferry and cruise landings, the vehicular curbside dropoff area, and the harbor. A ticketing and waiting counter is located between the two entrances. Public restrooms are located behind the ticket counter. The 1200 square foot waiting room has an open plan with moveable benches and seating to allow the space to be used for other civic and rental functions during off peak and off season periods. While there is no kitchen or café provided in the terminal plan it is assumed that passenger food service can be provided by vending machines and push carts, while civic events can be catered by truck.

Also located on the ground floor is stair and elevator access to the private second level offices and storage. In addition, a combined ground level storage and workshop area for the LNG

crewboat and Salem ferry operators is provided on the east end of the building, accessible by freight doors at the northeast corner of the building.

The interior waiting area is surrounded on three sides by an outdoor porch to provide for sheltered seating and passage from vessel landing to land transportation. The covered bench seating also provides an amenity for neighborhood recreational use of the terminal building.

Level 2 (Figure 8.2): The second level is accessed by means of two stairways and an elevator. The corridor and lobby area connecting the two stairways provides views to the harbor and wharf to the south and to the drop-off circle and parking to the north. The office spaces for marine tenants are located at the west end of the building and may be subdivided depending on final program needs for such occupants as the Salem Ferry and the LNG crewboat operators. Restrooms are provided across the corridor. On the east end of the building, the second level workshop and storage area for marine tenants is served by the combination passenger and service elevator.

Level 3: The unfinished loft space under the roof area serves as the mechanical room for the building. Access to the mechanical room is by way of the south stair connecting from the ground and second levels.

Elevations (Appendix Figures 8.3, 8.4): The traditional building materials and architectural elements are intended to blend in with the historic neighborhood that surrounds the site without replicating the predominantly 18th and 19th century residential styles. Cedar shingles and glass are used as infill for a structural concrete building frame, and clock tower. The hipped roof and clock tower are clad with standing seam metal.

The north elevation (Figure 8.3) faces the landside Blaney Street entrance and passenger drop-off circle. The pedestrian entryway is accentuated with an eyebrow window at the roof line. A porch arcade with benches provides a covered outdoor waiting area along the curbside and continues around the west end of the building to the south face on the harbor. The clock tower provides the distinctive visual symbol for the building from landside as well as from the harbor approaches. At the eastern end of the façade, the service doors for the storage workshop are located next to the delivery curbcut.

The west elevation (Figure 8.3) faces Hawthorne Cove and the inner Salem Harbor. The ramp entrance to the passenger ferry and small cruise vessel landing is just across the harborwalk from the west elevation. A set of entrance doors is located under the tower for direct access for ferry and cruise passengers. As with the other entrance points, a small eyebrow window is located above the doorway.

The south elevation (Figure 8.4) faces the harbor and the south harborwalk. The south entry doorway is located under the third eyebrow window. Ramp access to the crewboat and working landing is just opposite the glass enclosed waiting room across the harborwalk. A second pair of service doors for the storage/workshop area is located at the eastern end of the elevation. As with the other elevations the clock tower provides a prominent landmark as viewed from the harbor.

The east elevation (Figure 8.4) faces the power plan and is the least public face of the terminal building. The more closed façade includes smaller window openings for daylighting of the storage and workshop spaces on levels 1 and 2.

Building Construction Cost Estimate:

Methodology: At the time the concept building design cost estimates were conducted (December 2008) the construction market cost guidelines were in a state of instability, with a trend down in a recessionary period. An average cost for the relative small but simple construction of the two storey terminal building with a slab on grade base was calculated at \$250.00 per square foot for areas taken from the plans. It was expected that new estimates would be needed as later design milestones were achieved.

Estimate:

Program Space	Public Area, s.f.	Tenant/Lease Area, s.f.	Building SubTotal	Estimated Cost (unit cost based on sf)
<u>Level 1</u>				
- Waiting Room	1200			
- Circulation	531			
- Restrooms	312			
- Exterior Porch (25%)	288			
- Ticket Counter/Office		300		
- Storage/Workshop		1500		
<u>Level 2</u>				
- Circulation	604			
-Restrooms	200			
- Office		2700		
Storage/Workshop		1500		
<u>Level 3 – Attic</u>				
- Mechanical (25%)	300			
TOTALS	<u>3435 sf</u>	<u>6000 sf</u>	<u>9435 sf</u>	\$2,358,750.00
Cost Sub-Total				

Total Building Cost Estimate in \$2009

Building Base Cost (without mark-ups or contingency) = \$2,358,750

APPENDIX A-7

Preliminary Design Construction Cost Estimate – Salem Wharf Project

SALEM PORT EXPANSION**PREFERRED UPLAND / PIER LAYOUT
Construction Cost Estimate****December 2, 2008**

Mobilization			
Mobilization	1 ls	\$ 666,642.08	\$ 666,642
			\$ 666,642
Utilities			
Water	1 ea	\$ 66,300.00	\$ 66,300
Sewer	1 ea	\$ 75,100.00	\$ 75,100
Electrical	1 ea	\$ 363,100.00	\$ 363,100
			\$ 504,500
Site Work			
Storm Drainage	1 ea	\$ 176,000.00	\$ 176,000
Grading	1 ls	\$ 85,000.00	\$ 85,000
Granite curb	2243 LF	\$ 55.00	\$ 123,365
Cement concrete pavement	8406 SF	\$ 8.00	\$ 67,248
Bituminous concrete pavement	52169 SF	\$ 4.00	\$ 208,676
Vehicular unit pavers	1385 SF	\$ 22.00	\$ 30,470
Pedestrian unit pavers	190 SF	\$ 18.00	\$ 3,420
Gravel pavement	20883 SF	\$ 2.50	\$ 52,208
Line striping	1 LS	\$ 4,000.00	\$ 4,000
Curb ramps	7 EA	\$ 600.00	\$ 4,200
Site Improvements	1 LS	\$ 68,400.00	\$ 68,400
Lighting	1 LS	\$ 235,405.00	\$ 235,405
Landscaping - Budget	1 LS	\$ 95,600.00	\$ 95,600
			\$ 1,153,992
Harborwalk			
Harborwalk	11470 sf	\$ 125.00	\$ 1,433,750
			\$ 1,433,750
Shoreline Stabilization			
Shoreline Stabilization	840 lf	\$ 250.00	\$ 210,000
			\$ 210,000
Pier Structure			
Electrical	17000 sf	\$ 3.00	\$ 51,000
Water/sewer	1 ls	\$ 21,250.00	\$ 21,250
Pier Structure	17000 sf	\$ 232.00	\$ 3,944,000
			\$ 4,016,250
Floats w/ Mooring			
Electrical	1 ls	\$ 173,300.00	\$ 173,300
Water/sewer	1 ls	\$ 10,625.00	\$ 10,625
Floats	11280 sf	\$ 35.00	\$ 394,800
Float Mooring Piles	53 ea	\$ 2,000.00	\$ 106,000
			\$ 684,725
ADA Float Relocation			
ADA Float Relocation	1 ls	\$ 40,000.00	\$ 40,000
			\$ 40,000
Fender System			
Fender System	360 lf	\$ 500.00	\$ 180,000
			\$ 180,000
Barge Floats			
Electrical	1 ls	\$ 154,500.00	\$ 154,500
Water/sewer	1 ls	\$ 10,625.00	\$ 10,625
Barge Floats	6550 sf	\$ 165.00	\$ 1,080,750
			\$ 1,245,875
Mooring Piles			
Mooring Piles	24 ea	\$ 7,500.00	\$ 180,000
			\$ 180,000
Gangways			
Gangways	60 ft 4 ea	\$ 15,000.00	\$ 60,000
			\$ 60,000
Terminal Building			
Public Space	9435 sf		
Office	3135 sf	\$ 250.00	\$ 783,750
Storage/Workshop	3300 sf	\$ 250.00	\$ 825,000
	3000 sf	\$ 250.00	\$ 750,000
			\$ 2,358,750
Wave Barrier			
Wave Barrier	300 lf	\$ 2,500.00	\$ 750,000
			\$ 750,000
Dredging			
Embayment Toe Wall	515 ft	\$ 1,000.00	\$ 515,000
Dredging	155117 cy	\$ 20.00	\$ 3,102,340
			\$ 3,617,340
Total Estimated Construction Cost			\$ 17,101,824
Contingency - 10%			\$ 1,710,182
Inflation - 5%			\$ 940,601
Preferred Site Plan Construction Budget			\$ 19,752,607

APPENDIX A-8

Salem Wharf Project – Preliminary Design Plans

SALEM WHARF PROJECT SALEM, MA

PRELIMINARY DESIGN

Project Owner:

CITY OF SALEM
CITY HALL ANNEX
120 WASHINGTON STREET
SALEM, MA 01970

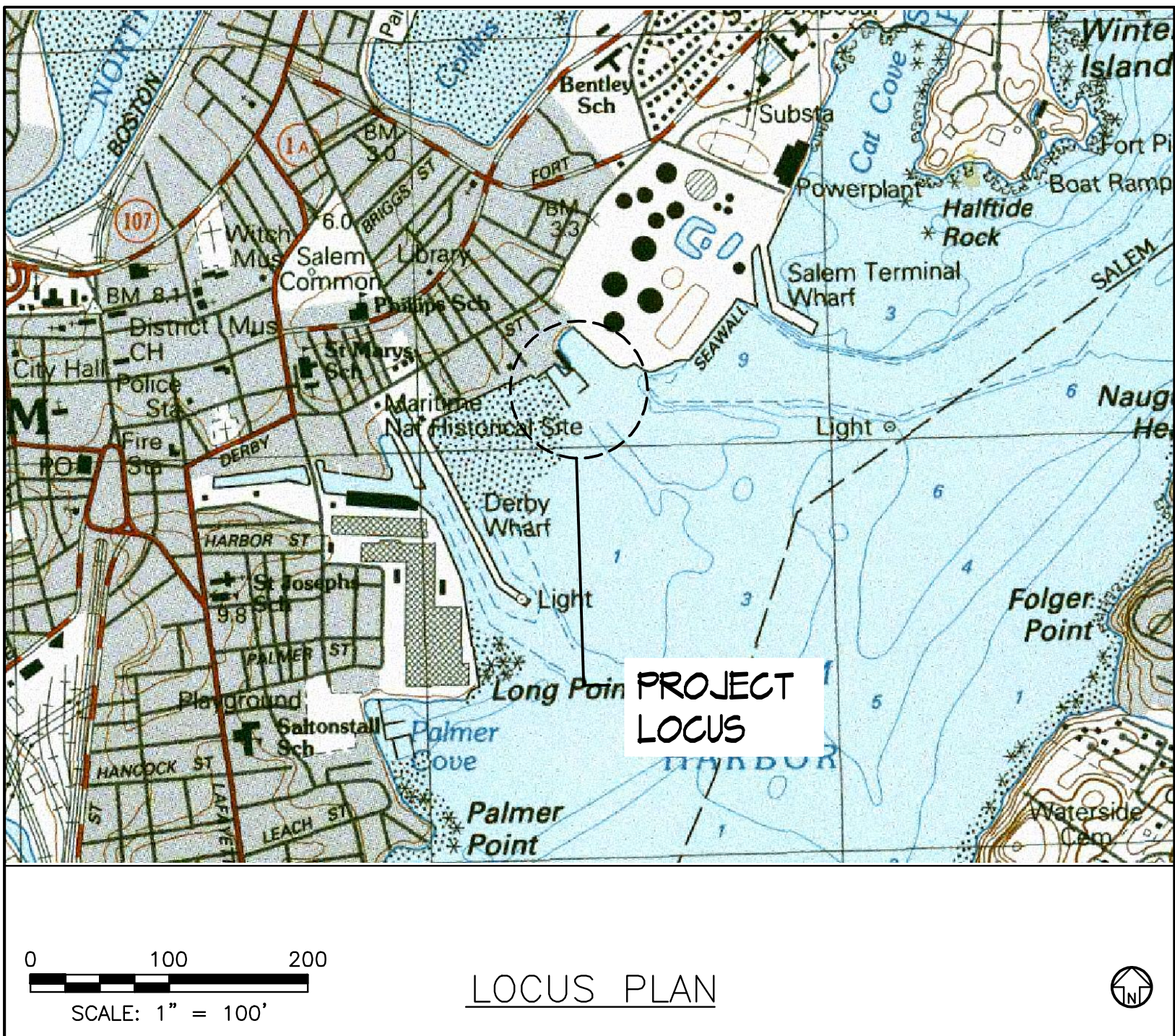
September, 2008

LIST OF DRAWINGS:

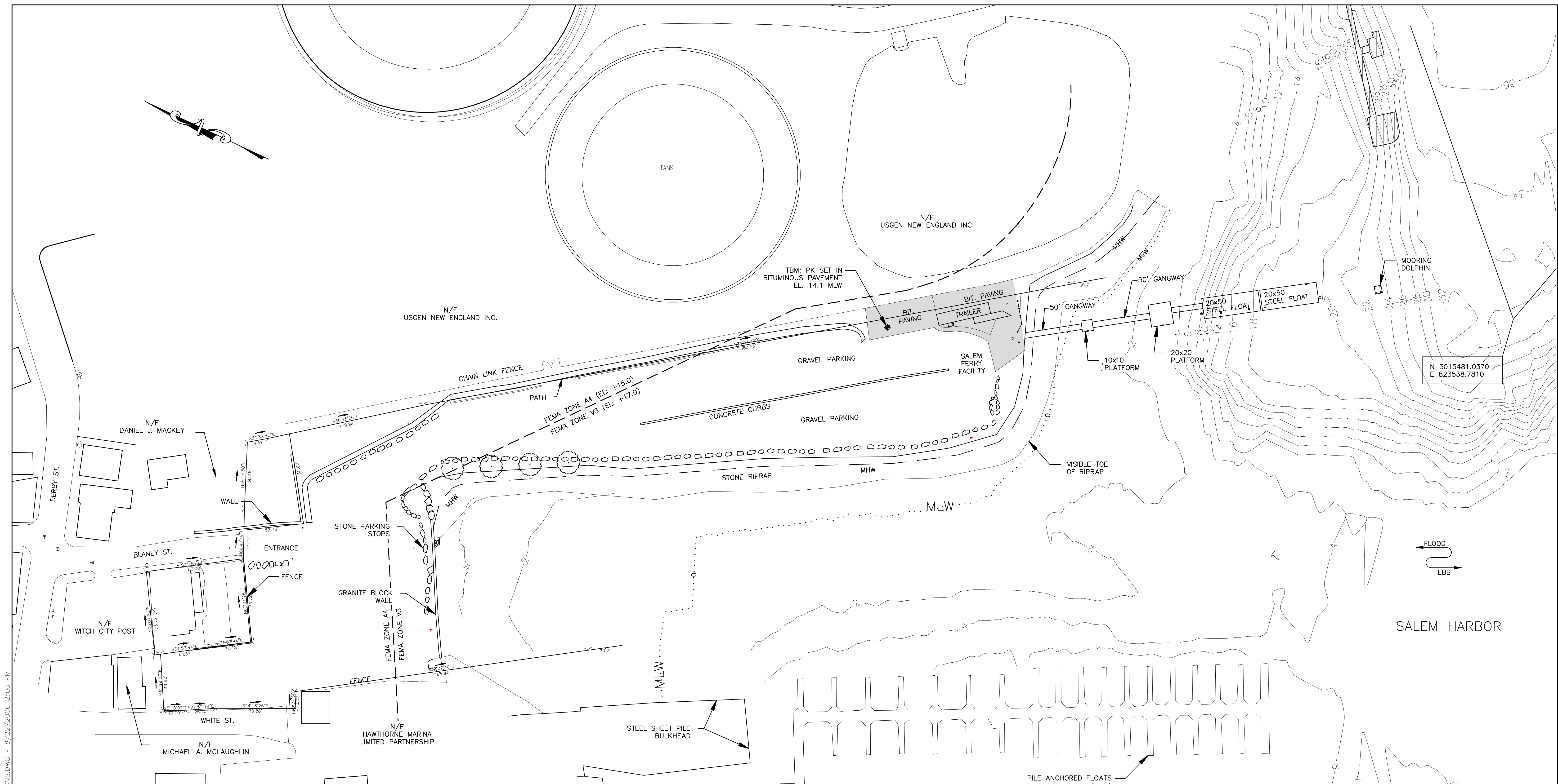
- 1 Existing Condition Plan
- 2 Proposed Site Plan
- 3 Landscape Architect Plan
- 4 Site Utility Plan
- 5 Site Drainage Plan
- 6 Pier Plan
- 7 Pier Sections
- 8 Pile/ Pile Cap Plan
- 9 Dredge Plan
- 10 Electrical Power Plan
- 11 Electrical Lighting Plan
- 12 Electrical Details
- 13 Terminal Building - Elevations
- 14 Terminal Building - Plans

Design Team:

BOURNE CONSULTING ENGINEERING
WATERFRONT ENGINEERS
3 BENT STREET
FRANKLIN, MA 02038



File: X:\27652-27677\PRELIM DESIGN\SHIT-01 EXISTING CONDITIONS.DWG - 8/22/2006 2:06 PM



EXISTING CONDITIONS
SCALE: 1"=40'-0"

NOTES:


- DATUM: MLW = 0.0, MHW = +8.9, HTL = +12.2
- THIS PLAN HAS BEEN COMPILED FROM VARIOUS PLANS INCLUDING:
 - TOPOGRAPHIC SURVEY DATA TAKEN FROM PLAN ENTITLED "EXISTING SITE PLAN, SALEM FERRY TERMINAL CITY OF SALEM" PREPARED BY VINE ASSOC. DATED AUGUST 2007.
 - PROPERTY BOUNDARY DATA TAKEN FROM PLAN ENTITLED "ALTA/ACSM LAND TITLE SURVEY, PREPARED FOR FIRST MASS LAND COMPANY LLC." BY CULLINAN ENGINEERING CO., INC. DATED JANUARY 4, 2001 AND HAVE NOT BEEN VERIFIED AS PART OF THIS PROJECT.
- COORDINATES ARE BASED ON MASSACHUSETTS (MAINLAND) STATE PLANE COORDINATE SYSTEM (NAD83).

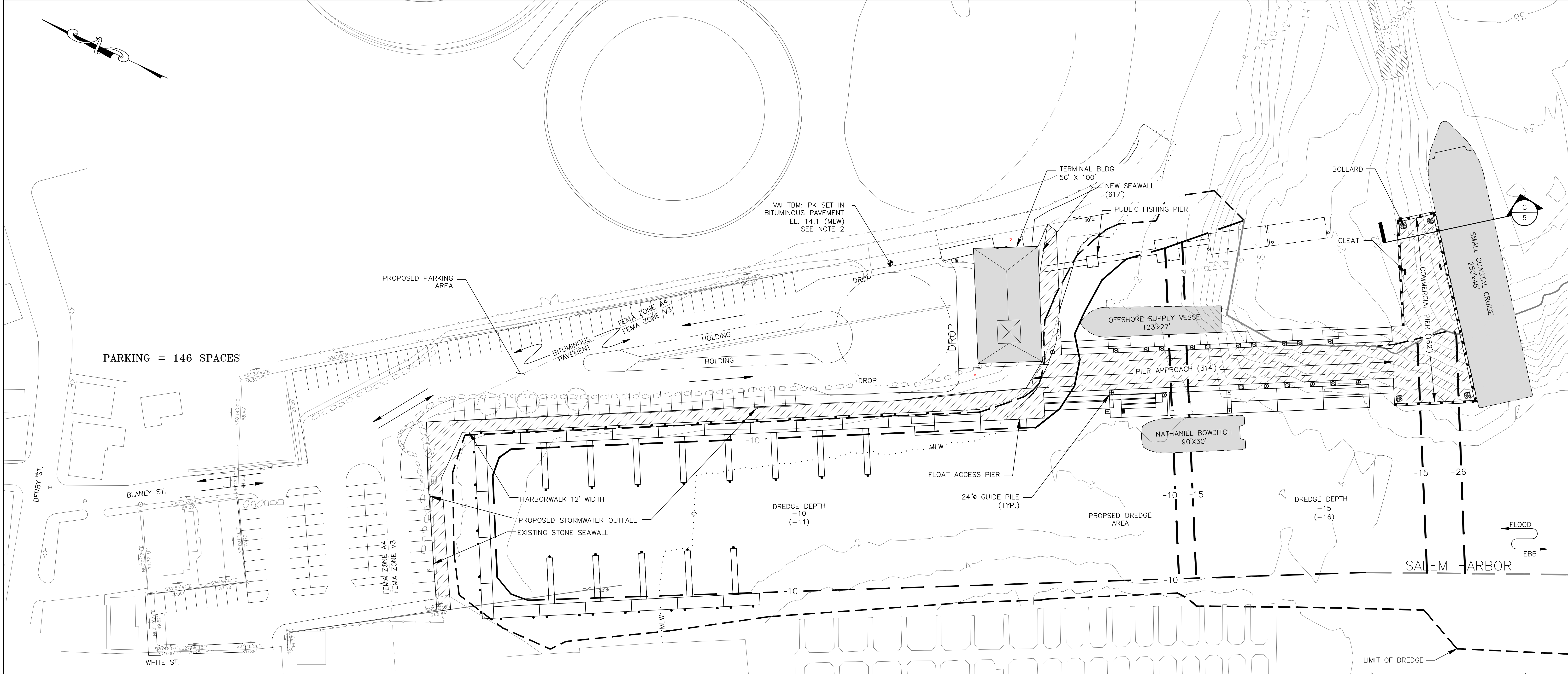
PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

DATUM: Mean Low Water MLW
100 YR FLOOD +17.0
HTL +11.0
MHHW +9.4
MHW +8.9
NGVD +4.2
MLW 0.0
MLLW -0.3

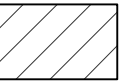
EXISTING CONDITIONS

SALEM PORT EXPANSION
CITY OF SALEM
SALEM, MA
AUGUST 2008

			Bourne Consulting Engineering	
			3 Bent Street Franklin, MA 01938 PH. (508) 533-0866 FAX. (508) 533-0800	
			DRAWN: JC/JSF	
			CHECKED: ADP	
REVISIONS			APPROVED:	
			DATE: 08/19/08	
DRAWING NO. 27677-01-01			SHEET <u>1</u> OF <u>14</u>	



- NOTES:
- DATUM: MLW = 0.0, MHW = +8.9, HTL = +11.0
 - TOPOGRAPHIC SURVEY DATA TAKEN FROM PLAN ENTITLED "EXISTING SITE PLAN, SALEM FERRY TERMINAL CITY OF SALEM" PREPARED BY VINE ASSOC. (VAI) DATED AUGUST 2007.
 - PROPERTY BOUNDARY DATA TAKEN FROM PLAN ENTITLED "ALTA/ACSM LAND TITLE SURVEY, PREPARED FOR FIRST MASS LAND COMPANY LLC." BY CULLINAN ENGINEERING CO. INC. DATED JANUARY 4, 2001 AND HAVE NOT BEEN VERIFIED AS PART OF THIS PROJECT.
 - COORDINATES ARE BASED ON MASSACHUSETTS (MAINLAND) STATE PLANE COORDINATE SYSTEM (NAD83).



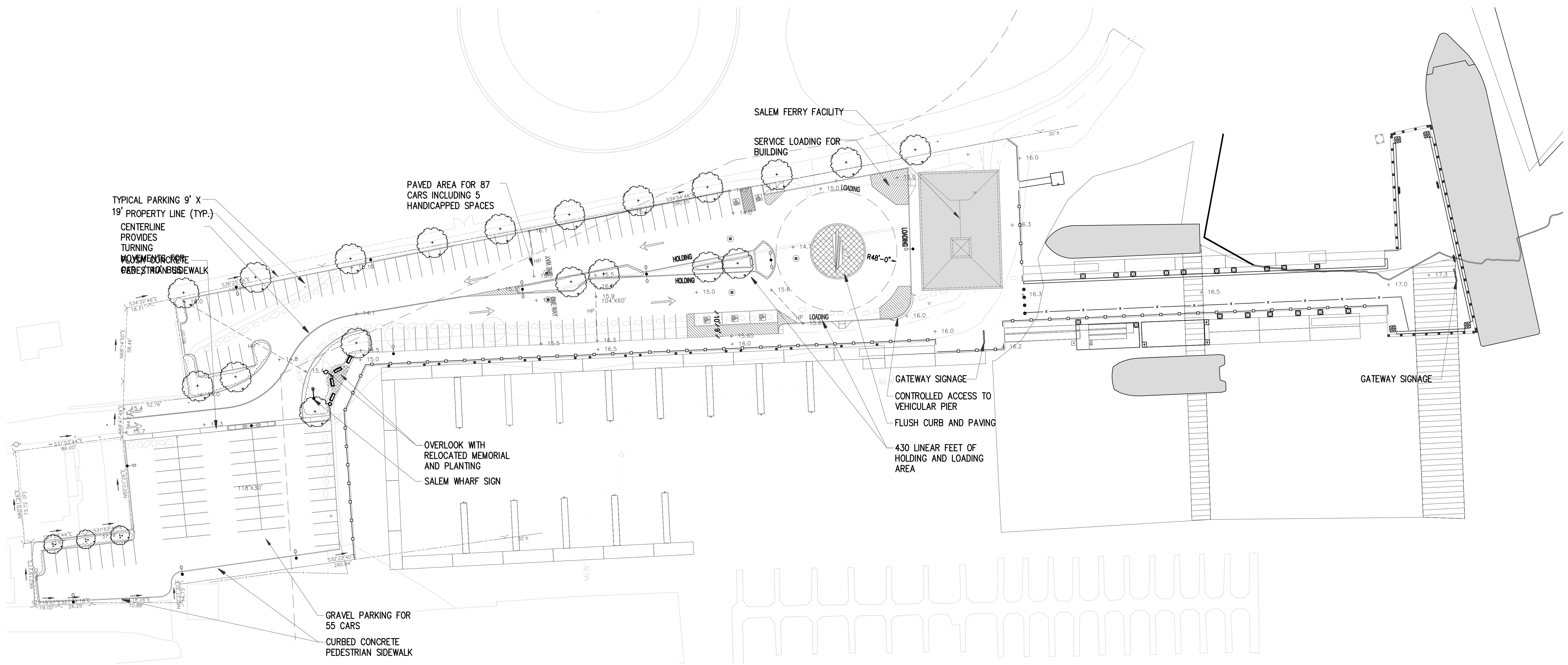
PROPOSED CONDITIONS
SCALE: 1"=40'

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

DATUM: Mean Low Water MLW	
100 YR FLOOD	+17.0
HTL	+11.0
MHHW	+9.4
MHW	+8.9
NGVD	+4.2
MLW	0.0
MLLW	-0.3

<div>3/24/08</div> <div>FINGER FLOATS</div>	<div><div><div>BCE</div><div>Bourne Consulting Engineering</div><div>3 Bent Street Franklin, MA 02059 PH. (508) 533-6666 FAX. (508) 533-0600</div></div></div>	
	DRAWN: JJC	
	CHECKED: ADP	
	APPROVED: DATE: 08/19/08	
REVISIONS		DRAWING NO. 27677-01-02
		SHEET 2 OF 14

File: X:\27652-1\27677\PRELIM DESIGN\SHIT-03 LANDSCAPE ARCHITECT PLAN.DWG - 8/22/2006 2:06 PM

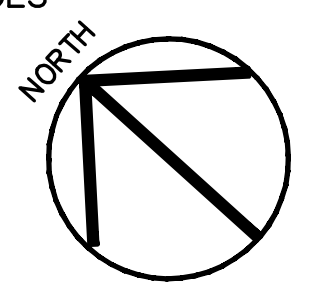
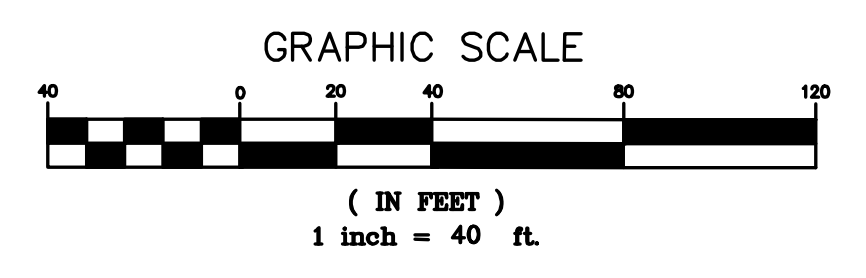


VEHICULAR CAPACITY

	SITE PLAN
TOTAL PARKING SPACES INCLUDING HC:	142
PAVEMENT PARKING INCLUDING HC:	87
GRAVEL AREA PARKING:	55
NUMBER OF HC SPACES:	5
LOADING LINEAR FEET INCL. DELIVERY AND PIER ACCESS:	210
HOLDING LINEAR FEET:	220

NOTES:

1. PARKING SPACES ARE 9' X 19' TYPICAL
2. ACCESS AISLES VARY BETWEEN 20' (NORTHWEST CORNER OF GRAVEL) TO 24' (TWO-WAY TRAFFIC)
3. 40' BUS OUTSIDE TURNING RADIUS IS 45.5'
39' PUMPER FIRE TRUCK OUTSIDE TURNING RADIUS IS 41'
4. PER AAB, PARKING AREAS WITH 101-150 SPACES REQUIRE A MINIMUM OF 5 ACCESSIBLE SPACES




LEGEND

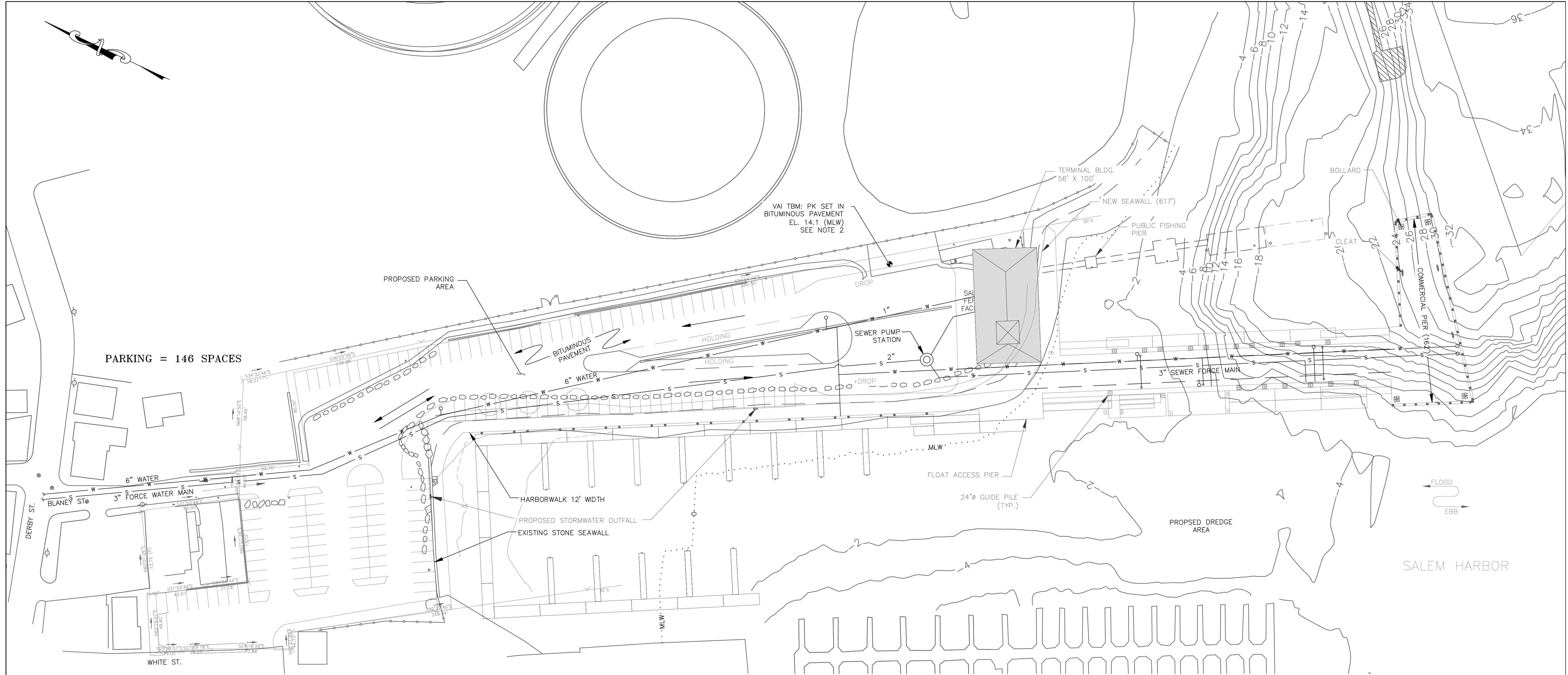
- CURB RAMP
- SINGLE AND DOUBLE HEADED LIGHT
- EDGE RAILING, MAX. 4" OPENINGS
- PEDESTRIAN RAILING
- VERTICAL CURB
- BENCH AND TRASH RECEPTACLE
- PROPOSED FLOWERING TREE
- PROPOSED SHADE TREE
- PROPOSED SHRUB/ PERENNIAL PLANTING

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

LANDSCAPE PLAN
SALEM WHARF PROJECT
CITY OF SALEM
SALEM, MA
AUGUST 2008

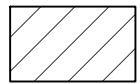
Shadley Associates, P.C.
Landscape Architects / Site Planning Consultants
1730 Massachusetts Ave. • P 781.652.8809
Lexington, MA 02420-5301 • F 781.862.2687
www.shadleyassociates.com

REVISIONS	 Bourne Consulting Engineering <small>3 Beal Street Franklin, MA 02038 PH. (508) 533-0886 FAX. (508) 533-0800</small>	DRAWING NO. 27677-01-04 SHEET 3 OF 14
	DRAWN: JRB	
	CHECKED: RRB	
	APPROVED: RRB	
	DATE: 11/11/08	



NOTES:

- DATUM: MLW = 0.0, MHW = +8.9, HTL = +11.0
- TOPOGRAPHIC SURVEY DATA TAKEN FROM PLAN ENTITLED "EXISTING SITE PLAN, SALEM FERRY TERMINAL CITY OF SALEM" PREPARED BY VINE ASSOC. (VAI) DATED AUGUST 2007.
- PROPERTY BOUNDARY DATA TAKEN FROM PLAN ENTITLED "ALTA/ACSM LAND TITLE SURVEY, PREPARED FOR FIRST MASS LAND COMPANY LLC." BY CULLINAN ENGINEERING CO., INC. DATED JANUARY 4, 2001 AND HAVE NOT BEEN VERIFIED AS PART OF THIS PROJECT.
- COORDINATES ARE BASED ON MASSACHUSETTS (MAINLAND) STATE PLANE COORDINATE SYSTEM (NAD83).




PROPOSED UTILITY PLAN
SCALE: 1"=40'

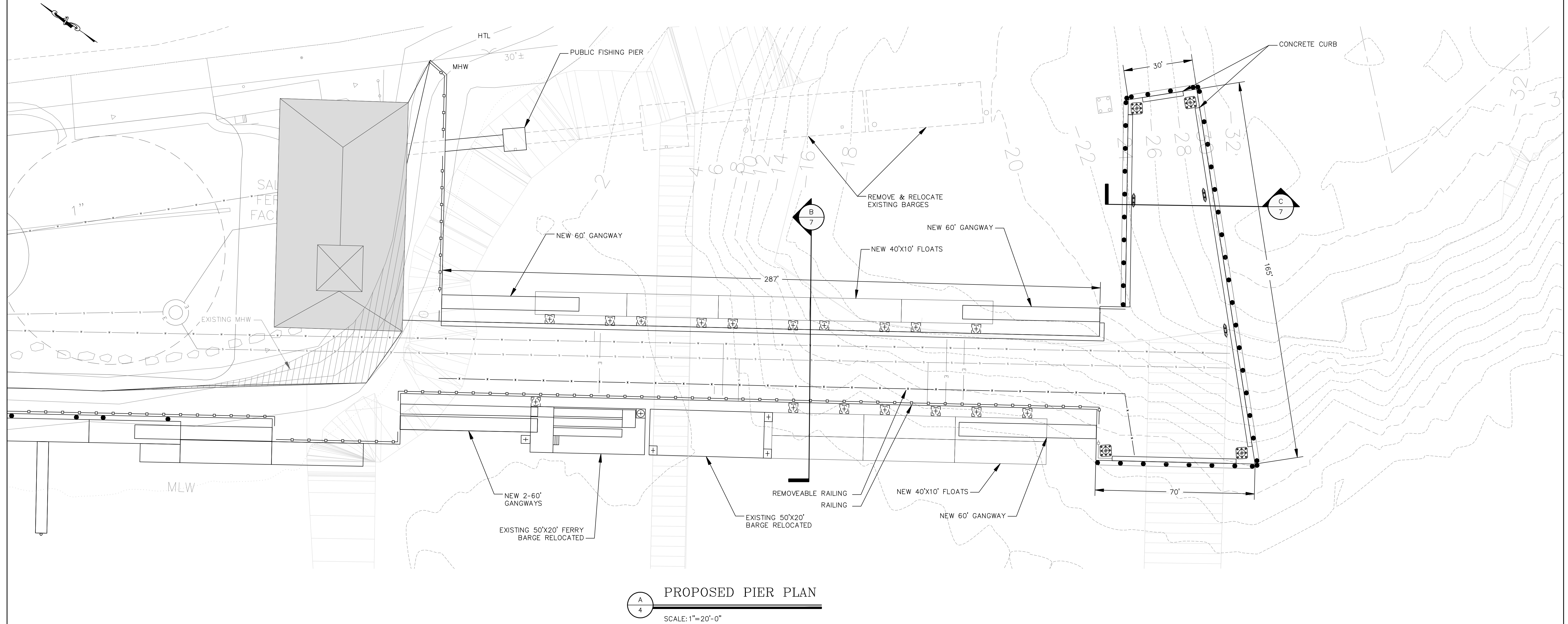
PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

SITE UTILITY PLAN
SALEM PORT EXPANSION
CITY OF SALEM
SALEM, MA
AUGUST 2008

DATUM: Mean Low Water MLW
100 YR FLOOD +17.0
HTL +11.0
MHHW +9.4
MHW +8.9
NGVD +4.2
MLW 0.0
MLLW -0.3


		<div><div>Bourne Consulting Engineering</div><div>3 Bent Street Franklin, MA 02038 PH: (508) 533-6666 FAX: (508) 533-0600</div></div>	
3/24/08	FINGER FLOATS	DRAWN: JJC CHECKED: ADP APPROVED: _____ DATE: 08/19/08	DRAWING NO. 27677-01-05 SHEET 4 OF 14
REVISIONS			

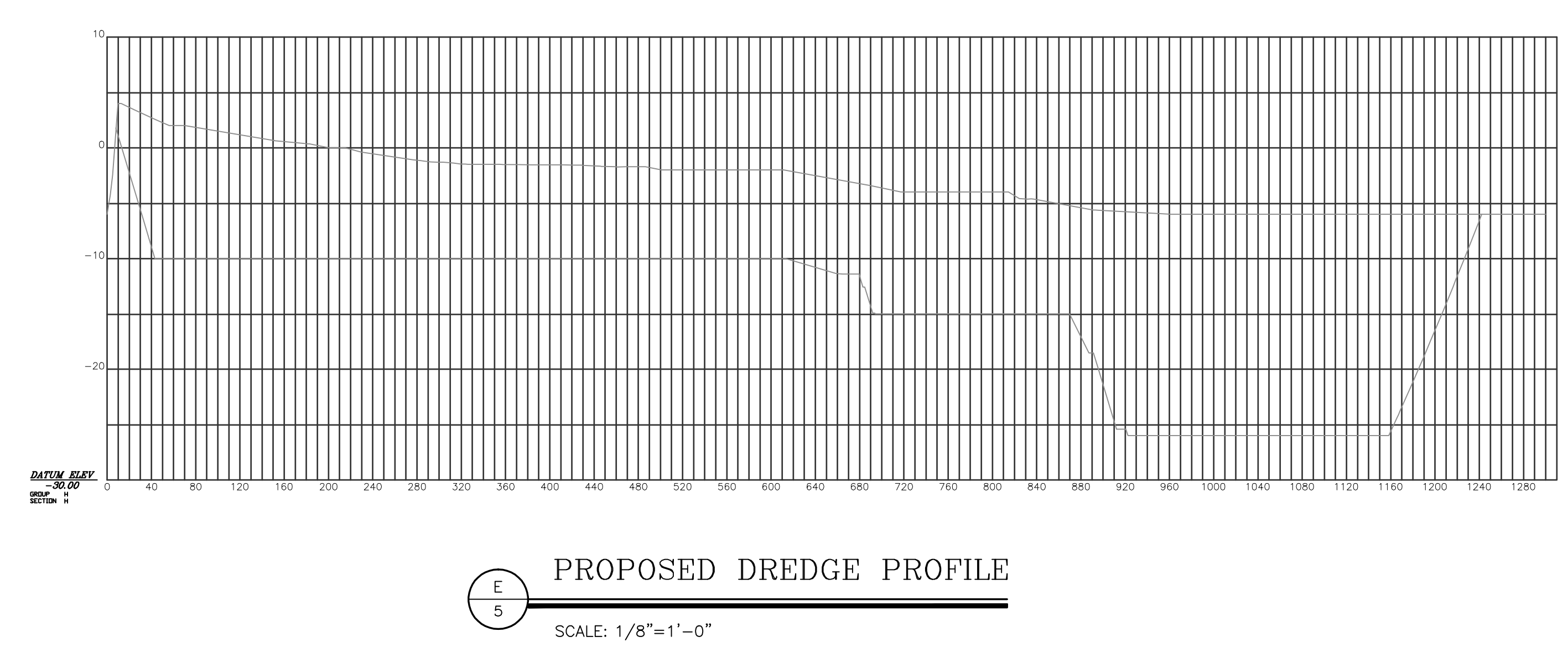
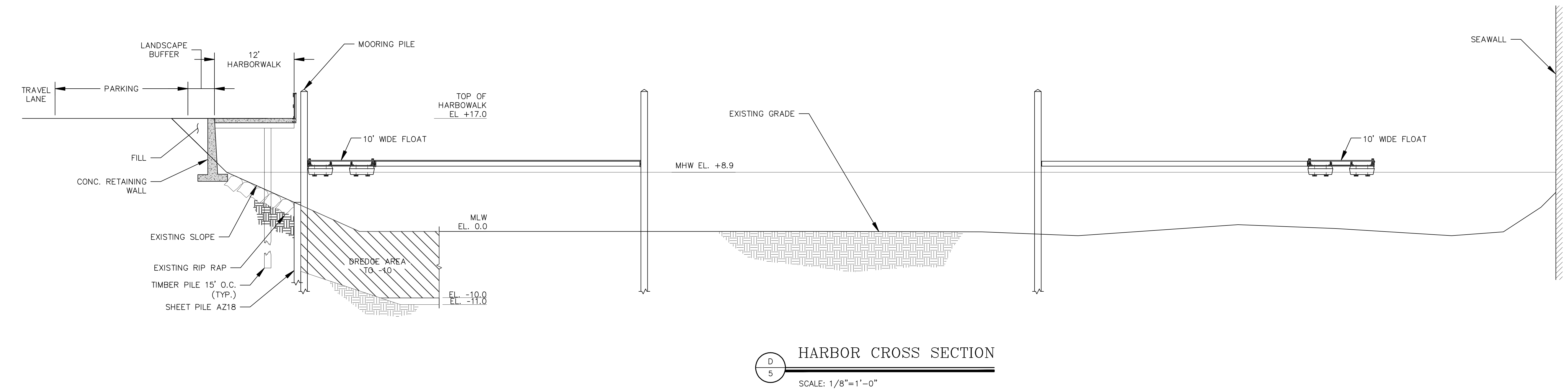
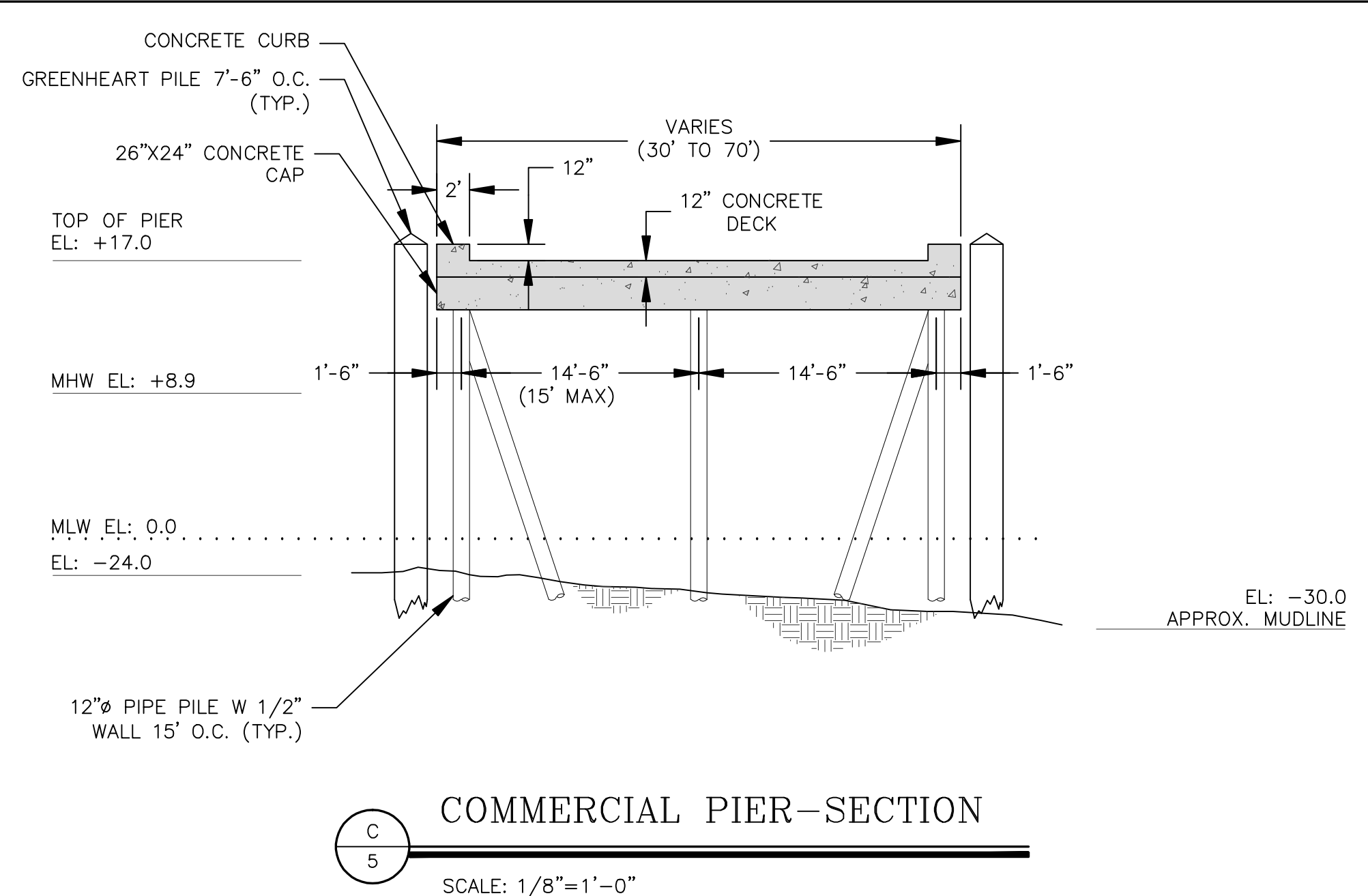
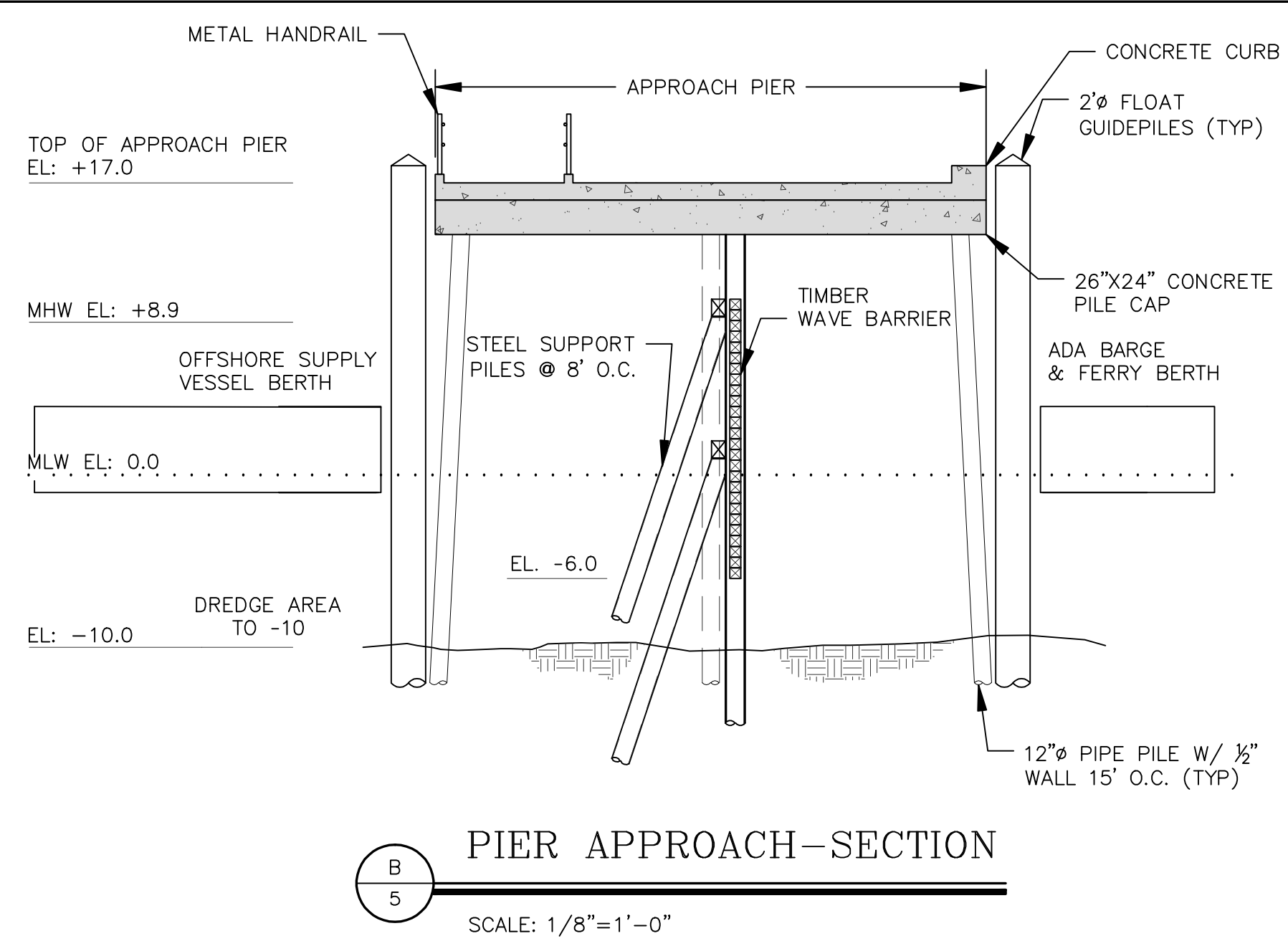
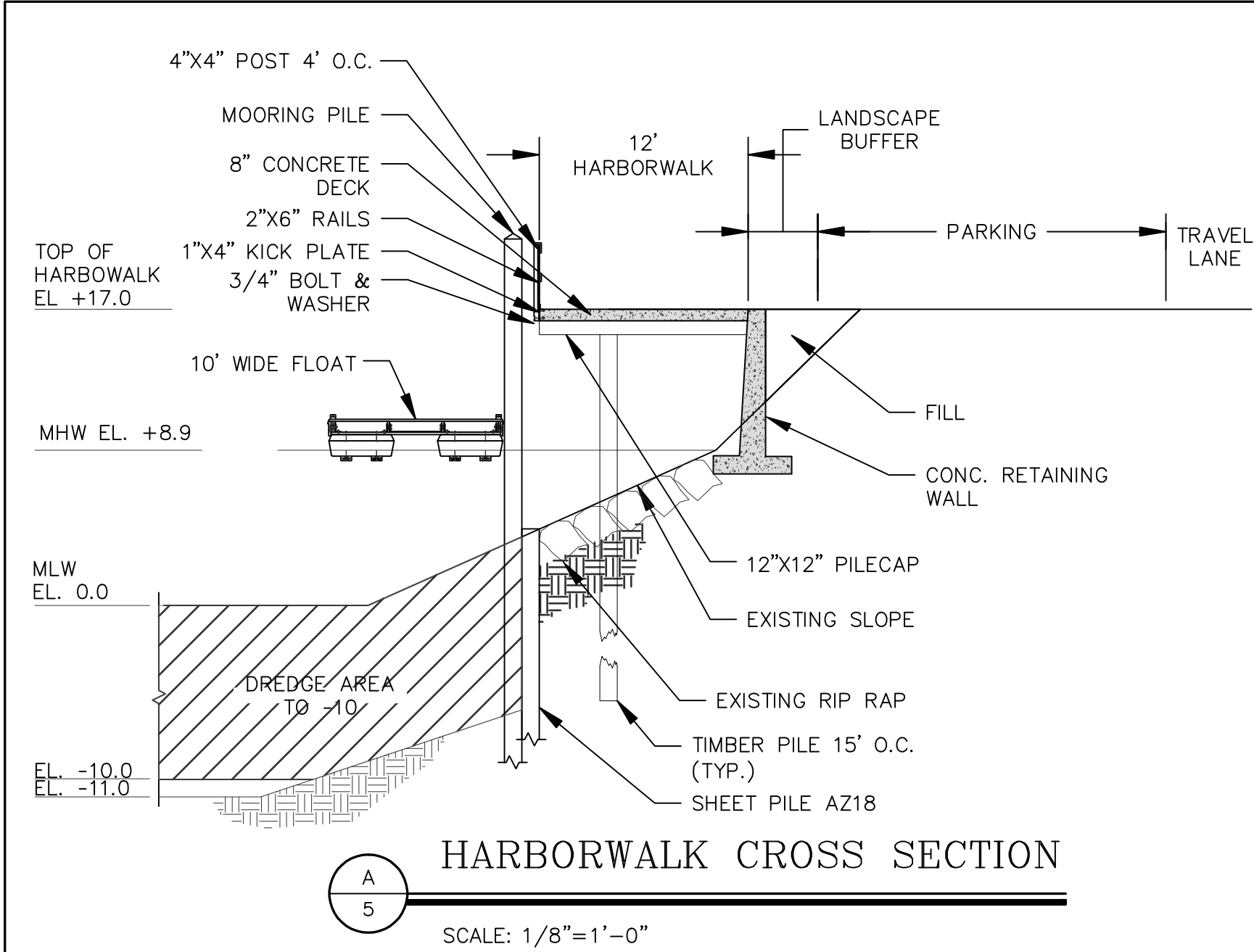
File: X:\27652-1\27677\PRELIM DESIGN\SHIT-06 PIER PLAN.DWG -- 8/22/2006 2:06 PM



PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

PIER PLAN
SALEM WHARF PROJECT
CITY OF SALEM
SALEM, MA
AUGUST 2008

REVISIONS	 Bourne Consulting Engineering	
	3 Bent Street Franklin, MA 02038 TEL. (508) 533-6666 FAX. (508) 533-0600	
	DRAWN: JSF CHECKED: _____ APPROVED: _____ DATE: 08/27/08	
	DRAWING NO. 27677-01-06 SHEET 6 OF 14	



**PRELIMINARY DESIGN
NOT FOR CONSTRUCTION**

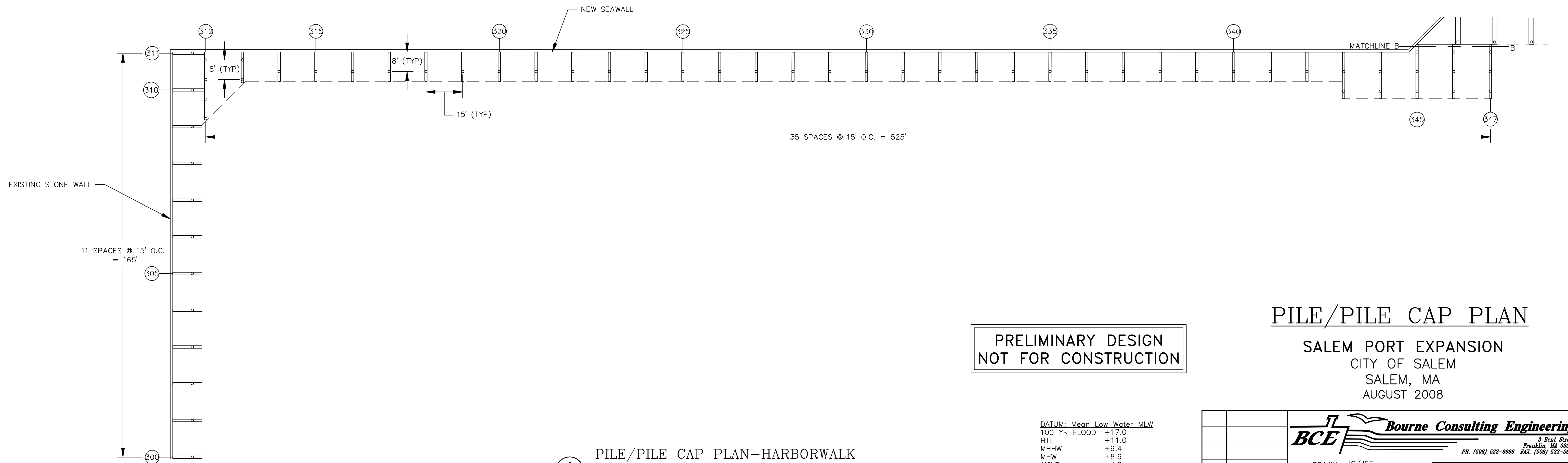
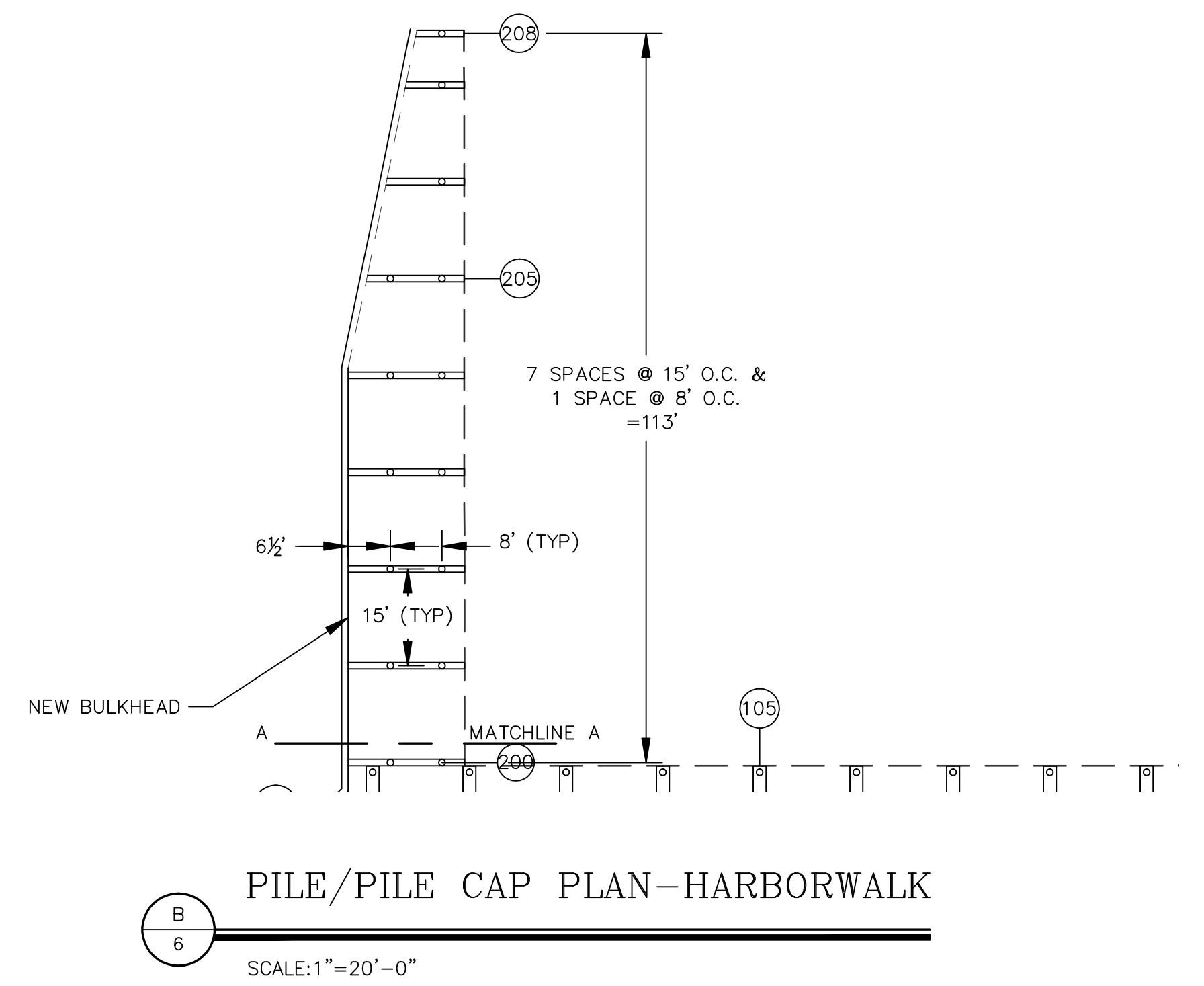
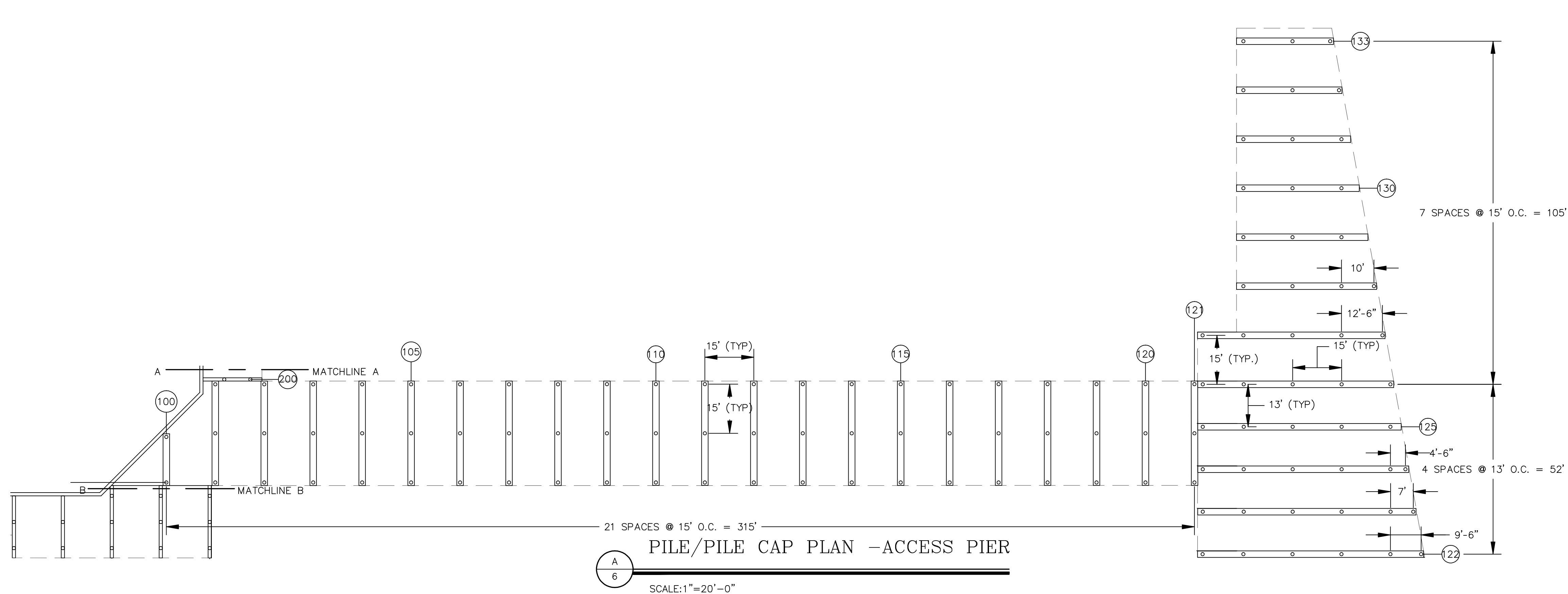
PIER SECTIONS
SALEM PORT EXPANSION
 CITY OF SALEM
 SALEM, MA
 AUGUST 2008

DATUM: Mean Low Water MLW
 100 YR FLOOD +17.0
 HTL +11.0
 MHHW +9.4
 MHW +8.9
 NGVD +4.2
 MLW 0.0
 MLLW -0.3

REVISIONS	Bourne Consulting Engineering 3 Bent Street Franklin, MA 02038 PH. (508) 533-6666 FAX. (508) 533-0600	
	DRAWN: _JC CHECKED: _ADP APPROVED: _____ DATE: 08/19/08	
	DRAWING NO. 27677-01-07	
	SHEET 7 OF 14	

File: X:\27652-127677\PRELIM DESIGN\SHIT-07-PIER SECTIONS.DWG

File: X:\27652-1\27677\PRELIM DESIGN\SHIT-08-PILE CAP PLAN.DWG



PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

PILE/PILE CAP PLAN

SALEM PORT EXPANSION
CITY OF SALEM
SALEM, MA
AUGUST 2008

DATUM: Mean Low Water MLW
100 YR FLOOD +17.0
HTL +11.0
MHHW +9.4
MHW +8.9
NGVD +4.2
MLW 0.0
MLLW -0.3

BCE Bourne Consulting Engineering
3 Bent Street
Franklin, MA 02038
PH. (508) 533-6666 FAX. (508) 533-0600

DRAWN: JJC/JSF
CHECKED: ADP
APPROVED:
DATE: 08/19/08

DRAWING NO. 27677-01-08

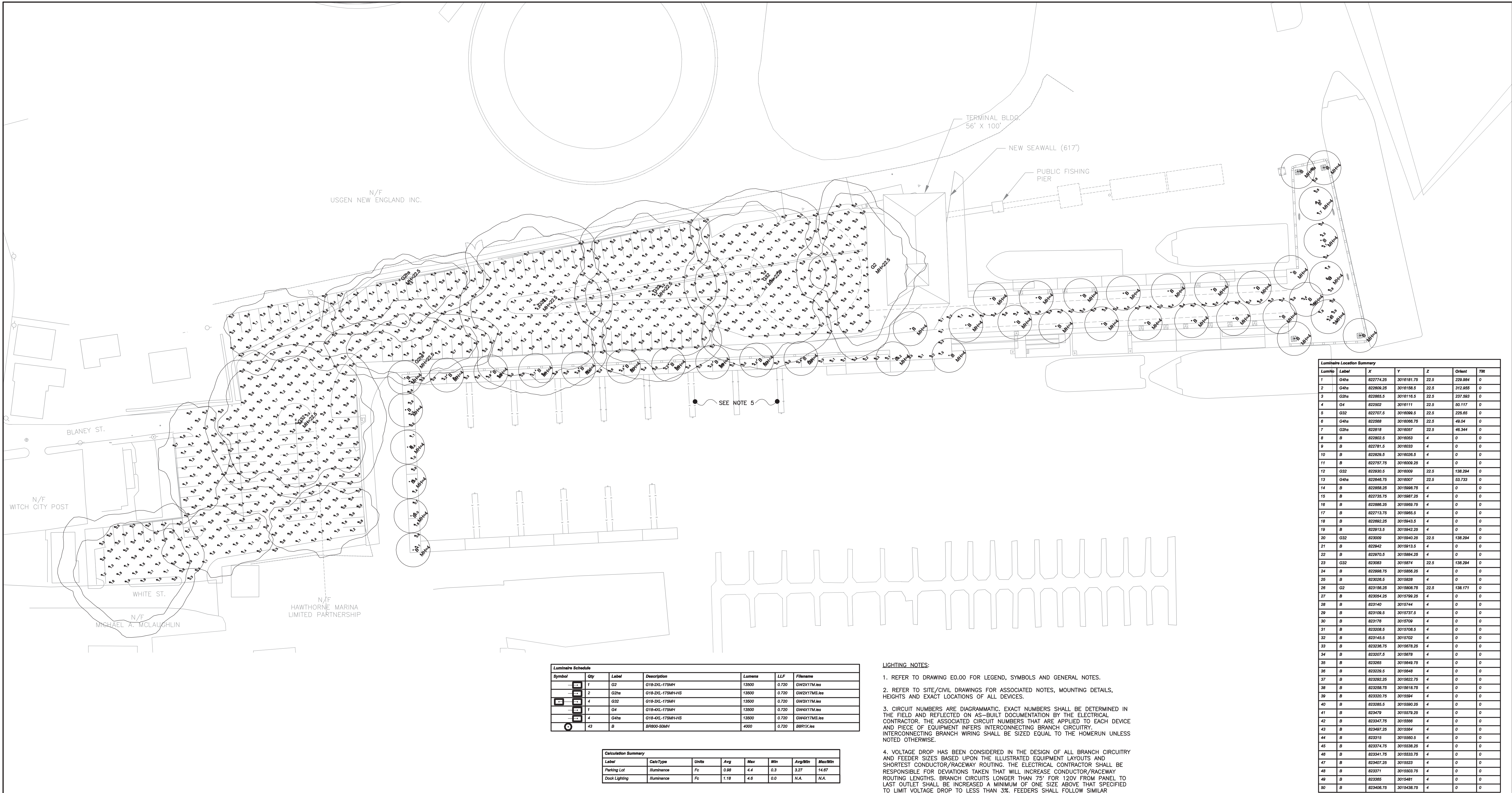
SHEET 8 OF 14

REVISIONS



PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

[illegible]SHEET 9 OF 14



Luminaire Schedule						
Symbol	Qty	Label	Description	Lumens	LLF	Filename
	1	G2	G16-30L-175MH	13500	0.720	GW2K17M.lvs
	2	G2h	G16-30L-175MH-HS	13500	0.720	GW2K17MS.lvs
	4	G4	G16-30L-175MH	13500	0.720	GW2K17M.lvs
	1	G4h	G16-40L-175MH	13500	0.720	GW4K17M.lvs
	4	G4h	G16-40L-175MH-HS	13500	0.720	GW4K17MS.lvs
	43	B	BR800-SLM1	4000	0.720	BR81X.lvs

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Parking Lot	Illuminance	Fc	0.98	4.4	0.3	3.27	14.67
Dock Lighting	Illuminance	Fc	1.18	4.8	0.0	N.A.	N.A.

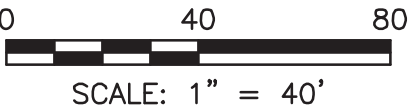
LIGHTING NOTES:

- REFER TO DRAWING E0.00 FOR LEGEND, SYMBOLS AND GENERAL NOTES.
- REFER TO SITE/CIVIL DRAWINGS FOR ASSOCIATED NOTES, MOUNTING DETAILS, HEIGHTS AND EXACT LOCATIONS OF ALL DEVICES.
- CIRCUIT NUMBERS ARE DIAGRAMMATIC, EXACT NUMBERS SHALL BE DETERMINED IN THE FIELD AND REFLECTED ON AS-BUILT DOCUMENTATION BY THE ELECTRICAL CONTRACTOR. THE ASSOCIATED CIRCUIT NUMBERS THAT ARE APPLIED TO EACH DEVICE AND PIECE OF EQUIPMENT INFERS INTERCONNECTING BRANCH CIRCUITRY. INTERCONNECTING BRANCH WIRING SHALL BE SIZED EQUAL TO THE HOMERUN UNLESS NOTED OTHERWISE.
- VOLTAGE DROP HAS BEEN CONSIDERED IN THE DESIGN OF ALL BRANCH CIRCUITRY AND FEEDER SIZES BASED UPON THE ILLUSTRATED EQUIPMENT LAYOUTS AND SHORTEST CONDUCTOR/RACEWAY ROUTING. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR DEVIATIONS TAKEN THAT WILL INCREASE CONDUCTOR/RACEWAY ROUTING LENGTHS. BRANCH CIRCUITS LONGER THAN 75' FOR 120V FROM PANEL TO LAST OUTLET SHALL BE INCREASED A MINIMUM OF ONE SIZE ABOVE THAT SPECIFIED TO LIMIT VOLTAGE DROP TO LESS THAN 3%. FEEDERS SHALL FOLLOW SIMILAR GUIDELINES AND BE LIMITED TO 2% DROP.
- ELECTRICAL CONTRACTOR SHALL WIRE ALL LIGHTING FIXTURES WITH 2#8, 1#8C., 1-1/4"C. TO THE NEAREST LIGHTING HANDHOLE, INDICATED ON DRAWING E3.00

Luminaire Location Summary						
LumId	Label	X	Y	Z	Orient	FW
1	G4h	822774.25	3016181.75	22.5	228.984	0
2	G4h	822809.25	3016158.5	22.5	312.955	0
3	G2h	822885.5	3016116.5	22.5	237.563	0
4	G4	822502	3016111	22.5	50.117	0
5	G32	822707.5	3016098.5	22.5	225.65	0
6	G4h	822588	3016086.75	22.5	49.04	0
7	G2h	822818	3016057	22.5	45.344	0
8	B	822802.5	3016053	4	0	0
9	B	822781.5	3016033	4	0	0
10	B	822826.5	3016026.5	4	0	0
11	B	822757.75	3016008.25	4	0	0
12	G32	822930.5	3016009	22.5	138.294	0
13	G4h	822946.75	3016007	22.5	53.733	0
14	B	822858.25	3015998.75	4	0	0
15	B	822735.75	3015987.25	4	0	0
16	B	822886.25	3015959.75	4	0	0
17	B	822713.75	3015955.5	4	0	0
18	B	822892.25	3015943.5	4	0	0
19	B	822913.5	3015942.25	4	0	0
20	G32	823009	3015940.25	22.5	138.294	0
21	B	822942	3015913.5	4	0	0
22	B	822970.5	3015884.25	4	0	0
23	G32	823083	3015874	22.5	138.294	0
24	B	822998.75	3015856.25	4	0	0
25	B	823026.5	3015829	4	0	0
26	G2	823186.25	3015808.75	22.5	138.171	0
27	B	823054.25	3015799.25	4	0	0
28	B	823140	3015744	4	0	0
29	B	823106.5	3015737.5	4	0	0
30	B	823178	3015709	4	0	0
31	B	823208.5	3015708.5	4	0	0
32	B	823145.5	3015702	4	0	0
33	B	823236.75	3015678.25	4	0	0
34	B	823207.5	3015678	4	0	0
35	B	823285	3015649.75	4	0	0
36	B	823228.5	3015649	4	0	0
37	B	823292.25	3015622.75	4	0	0
38	B	823258.75	3015618.75	4	0	0
39	B	823320.75	3015594	4	0	0
40	B	823285.5	3015590.25	4	0	0
41	B	823479	3015578.25	4	0	0
42	B	823477.75	3015566	4	0	0
43	B	823497.25	3015554	4	0	0
44	B	823315	3015550.5	4	0	0
45	B	823374.75	3015538.25	4	0	0
46	B	823341.75	3015533.75	4	0	0
47	B	823407.25	3015523	4	0	0
48	B	823371	3015503.75	4	0	0
49	B	823385	3015481	4	0	0
50	B	823406.75	3015438.75	4	0	0

ELECTRICAL LIGHTING PLAN

SALEM PORT EXPANSION
CITY OF SALEM
SALEM, MA
JUNE 2008



SCHEMATIC DESIGN
NOT FOR CONTRSTUCTION

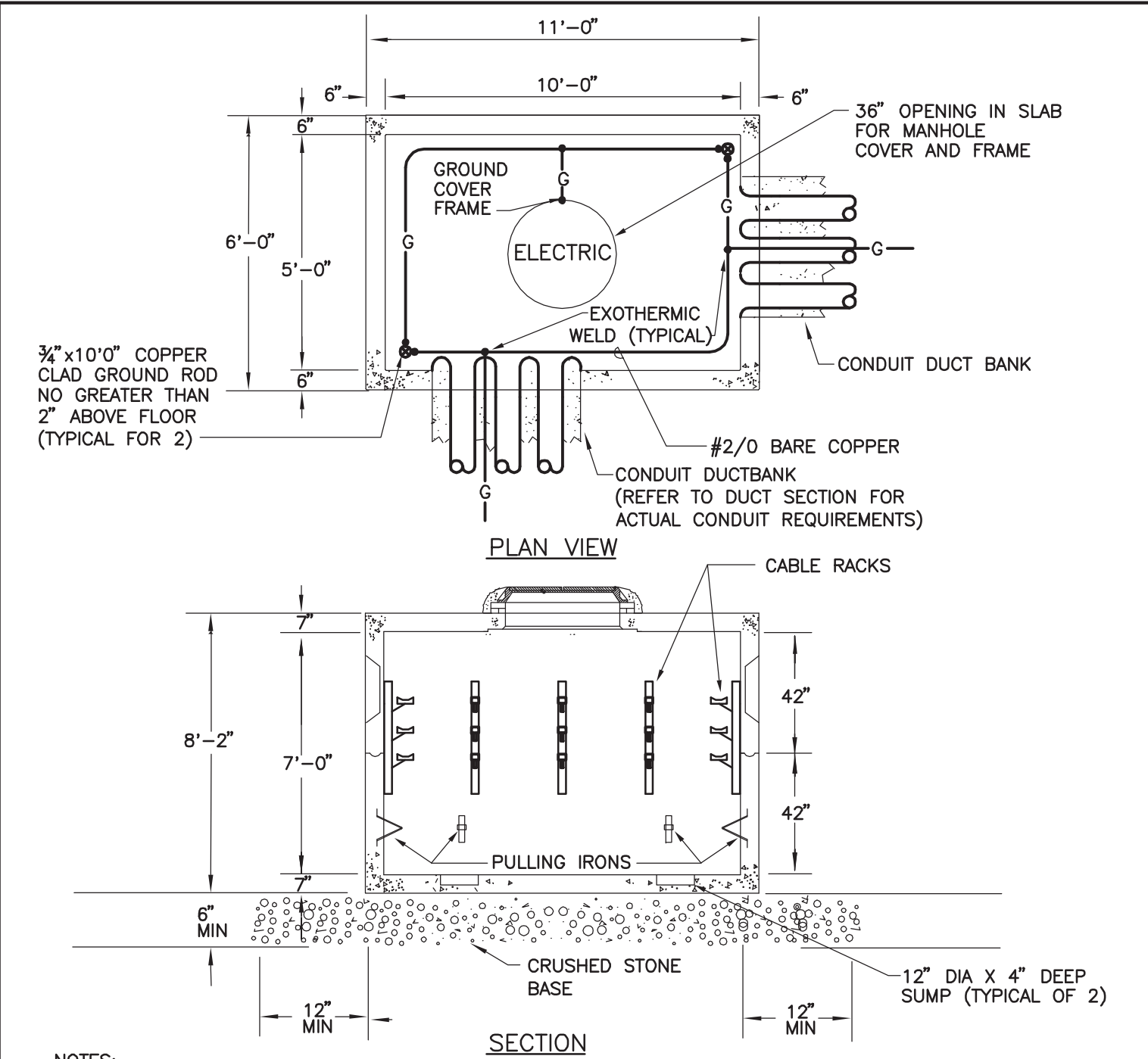
RDK
ENGINEERS
RDK Engineers
Support Center
70 Fargo Street Suite 801
Boston, MA 02210-1964
T: 617-345-9880
F: 617-345-4226
W: www.rdkengineers.com

REVISIONS	
3/21/08	FINGER FLOATS

Bourne Consulting Engineering
3 Bent Street
Franklin, MA 02038
PH. (508) 533-8866 FAX. (508) 533-0000

DRAWN: AIM
CHECKED: SC
APPROVED: SJ
DATE: 08/08/08

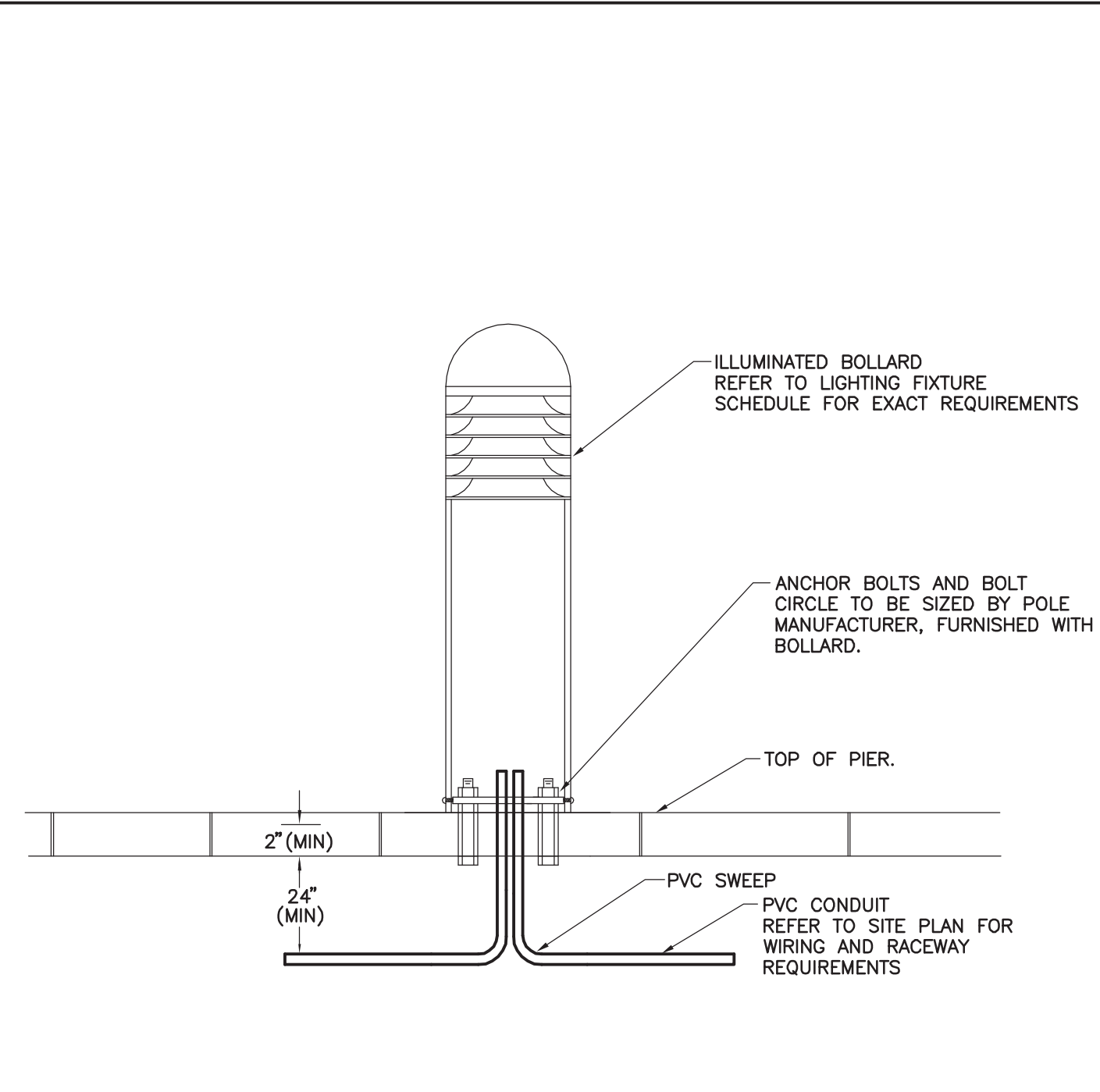
DRAWING NO. 20070498_E2.00
SHEET **11** OF **14**



NOTES:

1. FRAME AND COVER SHALL BE CAST IRON BY BOSTON FOUNDRY OR EQUAL BY LEBARON OR NEENAH. COVER SHALL BE CAST WITH 1 1/2" HIGH LETTERS IDENTIFYING THE SERVICE (PRIMARY, SECONDARY ELECTRIC OR TELEPHONE).
2. DESIGN LOAD SHALL ACCOMMODATE UP TO AASH TO HS20-44.
3. CONCRETE ENCASED DUCT SHALL BE TIED INTO THE HANDHOLE WALL WITH REBAR TO MINIMIZE DIFFERENTIAL SETTLEMENT. REFER TO SPECIFICATION FOR ADDITIONAL INFORMATION.
4. REFER TO SPECIFICATION FOR PULLING IRONS AND CABLE RACK REQUIREMENTS.
5. BOND ALL METAL COMPONENTS WITHIN MANHOLE INCLUDING COVER FRAME TO 2/0 GROUND LOOP WITH #6 BARE COPPER CONDUCTOR.

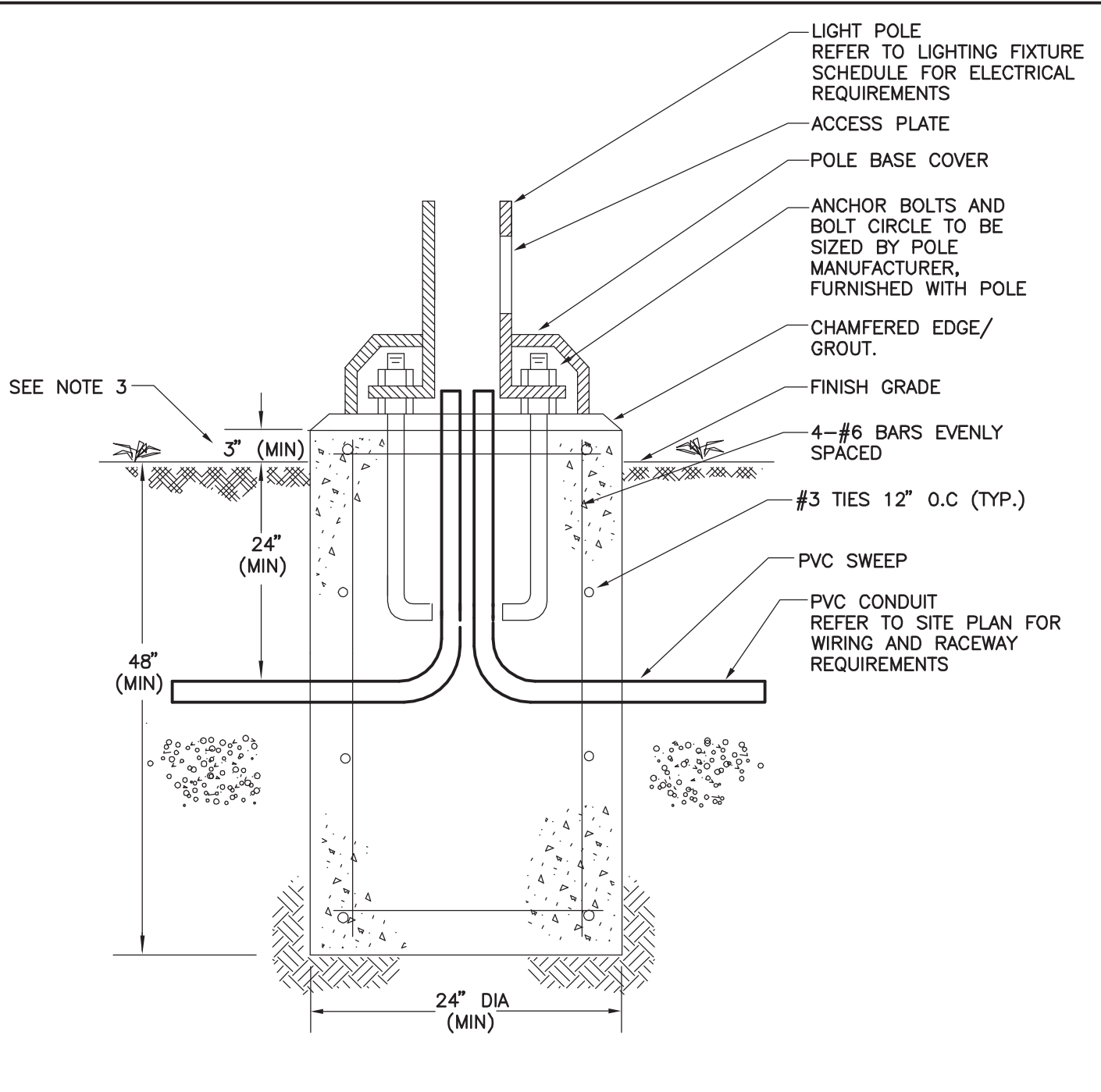
NDK TYPICAL PRECAST ELECTRIC MANHOLE DETAIL ES007



NOTES:

1. BASE DETAIL PROVIDED TO INDICATE GENERAL INTENT OF THE ELECTRICAL INSTALLATION. MODIFY BASE DEPTH AND DIAMETER TO ACCOMMODATE BOLLARD AND SOIL CHARACTERISTICS.
2. COORDINATE ANCHOR BOLT PLACEMENT WITH GENERAL CONTRACTOR. BOLLARD BASE EXCAVATION FORMING, REBAR AND CONCRETE BY G.C.

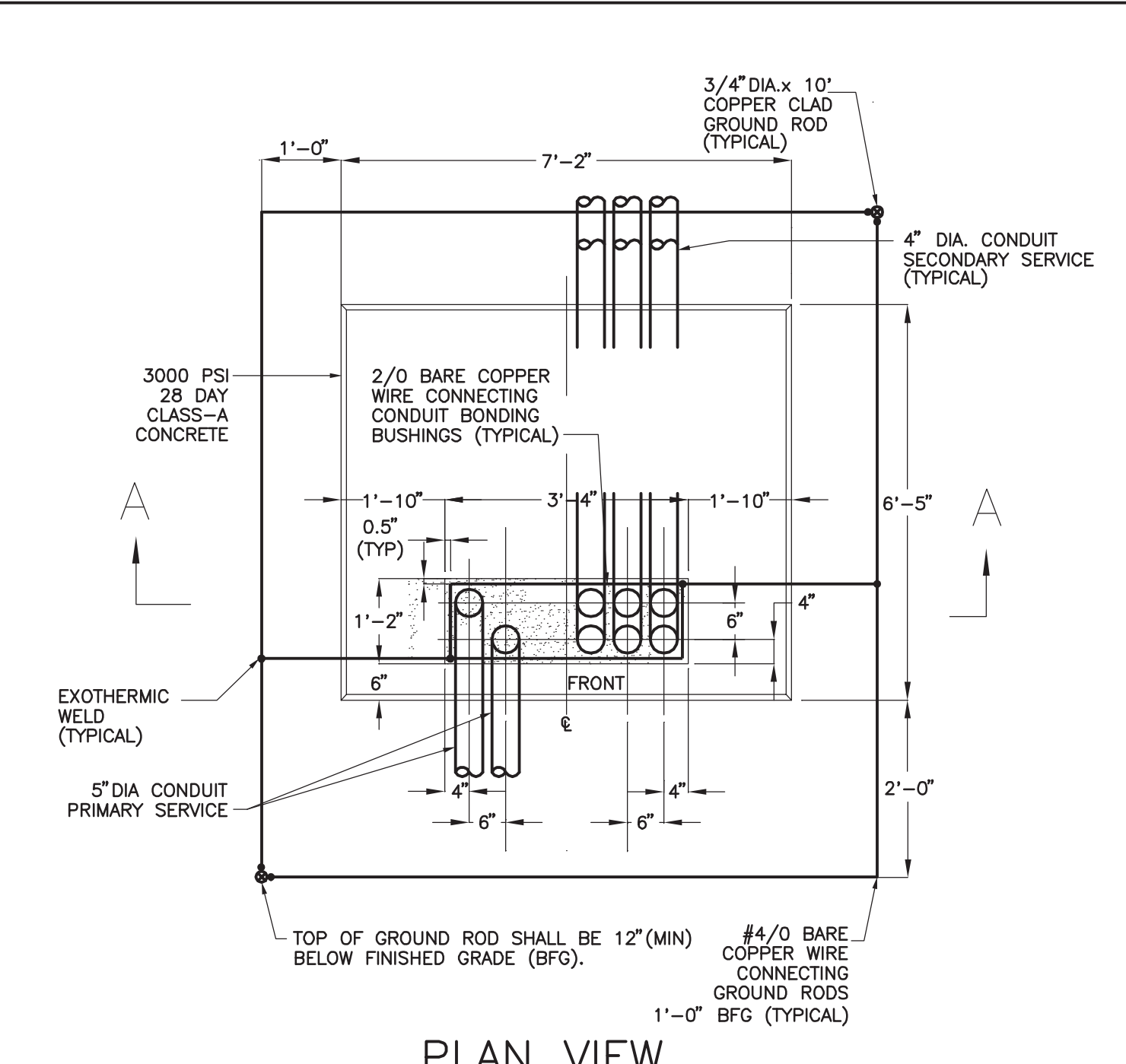
NDK BOLLARD POLE BASE DETAIL ES015



NOTES:

1. BASE DETAIL PROVIDED TO INDICATE GENERAL INTENT OF THE ELECTRICAL INSTALLATION. MODIFY BASE DEPTH AND DIAMETER TO ACCOMMODATE LIGHTING FIXTURE AND SOIL CHARACTERISTICS.
2. COORDINATE ANCHOR BOLT PLACEMENT WITH GENERAL CONTRACTOR. POLE BASE EXCAVATION FORMING, REBAR AND CONCRETE BY G.C.
3. ELEVATION ABOVE FINISH GRADE SHALL BE 3" FOR INSTALLATIONS IN ISLANDS/PERIMETERS AND 3'0" IN PAVED AREA UNLESS OTHERWISE NOTED.

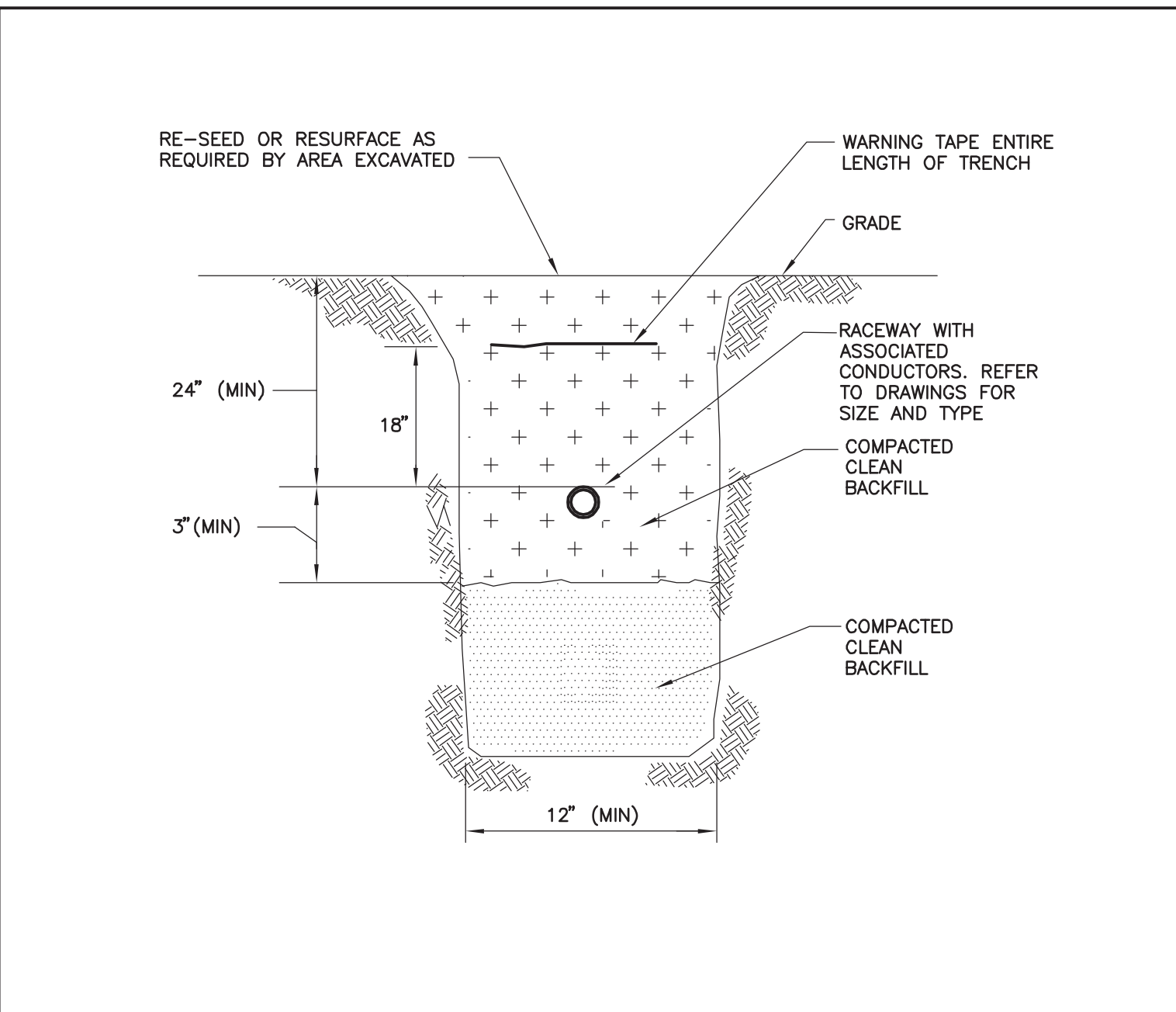
NDK SITE LIGHTING POLE BASE DETAIL ES014



NOTES:

1. REFER TO EXACT UTILITY COMPANY REQUIREMENTS FOR MODIFICATIONS THAT MAY BE REQUIRED TO THIS PAD LAYOUT.
2. ALL GROUND GRID CONNECTIONS SHALL BE EXOTHERMIC WELD.
3. DO NOT ALLOW PRIMARY AND SECONDARY CONDUITS TO CROSS EACH OTHER INSIDE OR OUTSIDE THE PAD. LOCATE SECONDARY CONDUITS AS FAR TO THE RIGHT AS POSSIBLE IN THE PAD OPENING.
4. ALL QUARTER BENDS (PRIMARY AND SECONDARY) SHALL BE GALVANIZED STEEL SCHEDULE 40 WITH GROUNDING BUSHINGS. CAP ALL CONDUIT ENDS TO PREVENT MOISTURE AND DEBRIS FROM ENTERING CONDUITS PRIOR TO TRANSFORMER INSTALLATION.
5. PRIMARY DUCT GROUND SHALL BE CONNECTED TO PAD GROUND GRID.

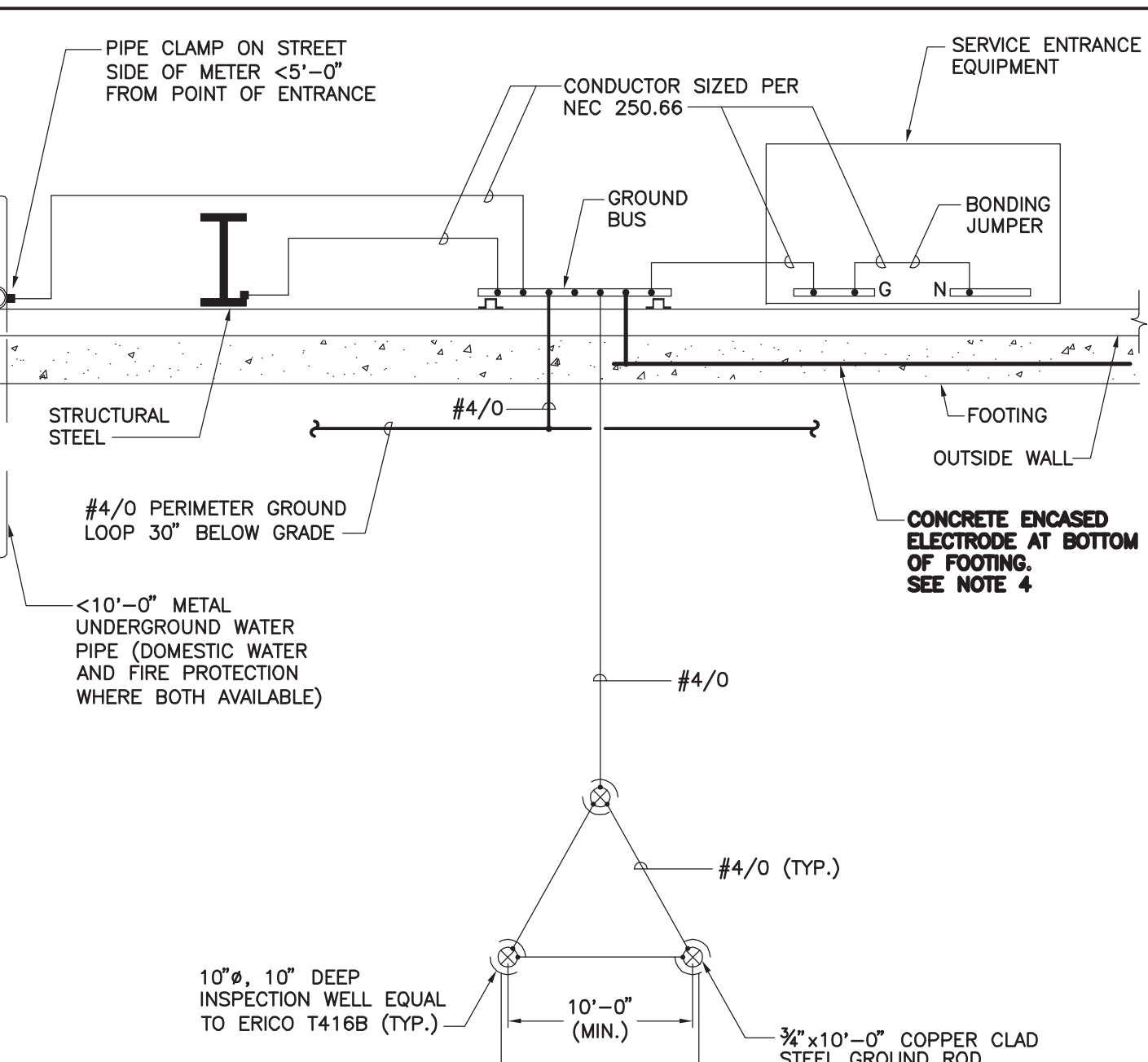
NDK TRANSFORMER PAD DETAIL THREE PHASE 112.5 THRU 750 KVA ES008



NOTES:

1. THIS DETAIL IS INTENDED TO ILLUSTRATE REQUIREMENTS WHICH EXCEED THOSE REQUIRED BY NEC TABLE 300-5.
2. WARNING TAPE SHALL BE DETECTABLE TYPE FOIL BACKED 4MIL POLYETHYLENE WITH FADE RESISTANT "BURIED ELECTRIC LINE BELOW" A MINIMUM OF 18 INCHES ABOVE THE BURIED SERVICE. TAPE SHALL BE EQUAL TO T&B NAF-0708.
3. ALL ROADWAY CROSSING SHALL BE ENCASED WITH A MINIMUM OF 2 INCHES OF CONCRETE (TOP BOTTOM AND SIDES) EXTENDING A MINIMUM OF 2 FEET BEYOND EACH SIDE OF CROSSING.
4. ALL CONDUIT RISERS SHALL UTILIZE LONG RADIUS GALVANIZED RIGID STEEL SWEEPS.

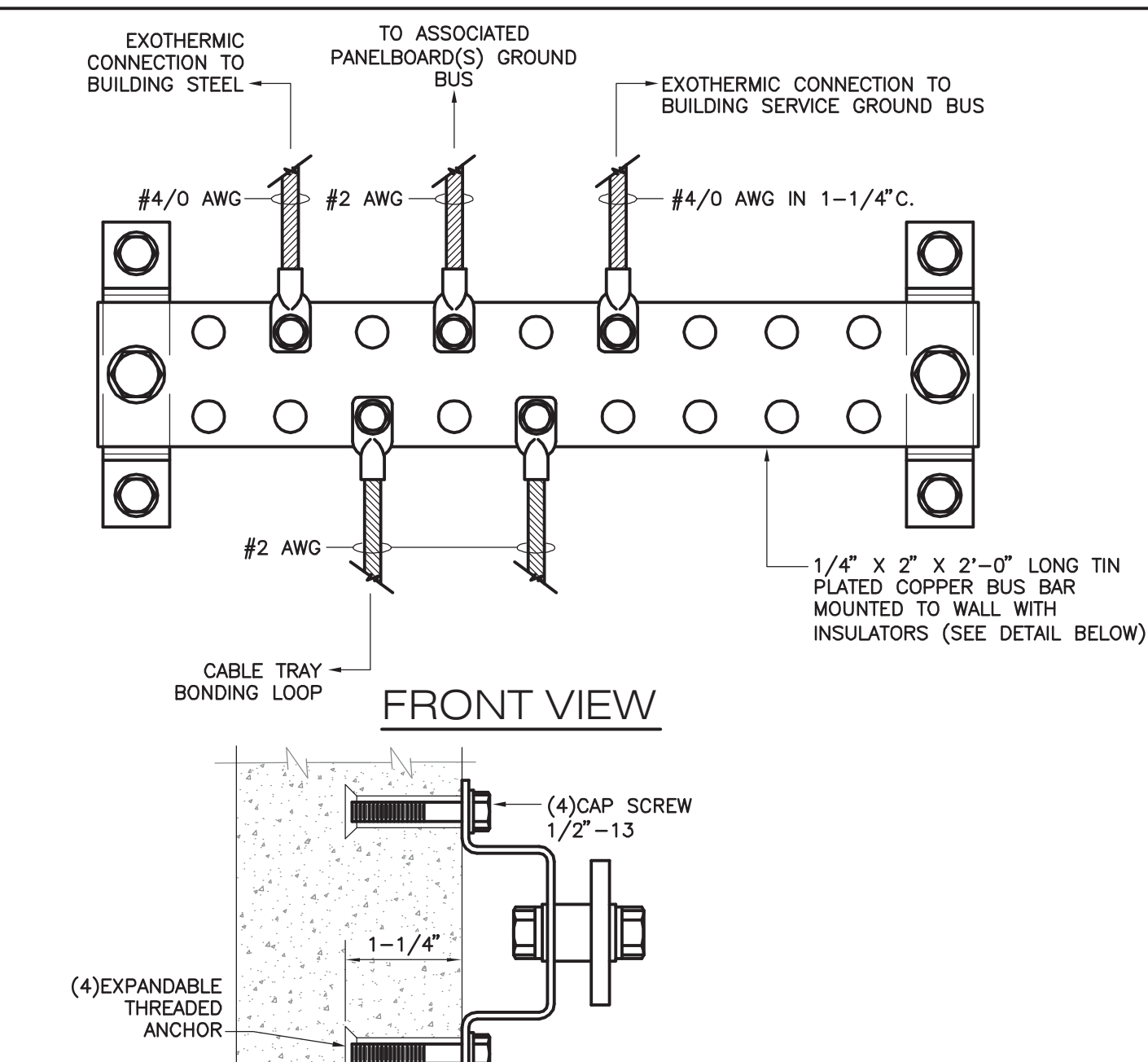
NDK BURIED CONDUIT DETAIL ES013



NOTES:

1. THIS DRAWING IS INTENDED TO ILLUSTRATE THE SERVICE GROUNDING REQUIREMENTS. REFER TO NEC ARTICLE 250 FOR ADDITIONAL DETAILS.
2. ALL CONNECTIONS SHALL BE EXOTHERMIC WELDS WITH THE EXCEPTION OF MECHANICAL LUGS IN THE SERVICE ENTRANCE EQUIPMENT.
3. WALL MOUNTED COPPER 4"x24"x1/4" GROUND BUS SHALL BE EQUAL TO ERICO EGB-A14424BB.
4. PROVIDE 20' #4 AWG BARE COPPER IN LIEU OF BONDING TO REBAR WHERE 20' OF BARE REBAR IS NOT INSTALLED.

NDK ELECTRIC SERVICE GROUNDING ELECTRODE DETAIL EG001



NOTES:

1. BUS BAR ASSEMBLY SHALL BE EQUAL TO ERICO #TGB-A25L14P.
2. BOND PANELBOARD(S) WHICH SERVICES EQUIPMENT WITHIN ROOM GROUND BUS IS LOCATED.
3. REFER TO DETAIL EC003 FOR ADDITIONAL INFORMATION.
4. CONDUCTORS ILLUSTRATED REPRESENT MINIMUM SIZES. CONDUCTORS SHALL BE INCREASED AS REQUIRED TO MATCH SOURCE PANELBOARD FEEDER GROUNDING CONDUCTOR SIZE.

NDK EQUIPMENT ROOM GROUND BUS BAR INSTALLATION DETAIL EG005

SCHEMATIC DESIGN
NOT FOR CONTRSTUCTION

NDK
ENGINEERS
RDK Engineers
Support Center
70 Fargo Street Suite 801
Boston, MA 02210-1964
T 617-345-9800
F 617-345-4226
W www.ndkengineers.com

BCE Bourne Consulting Engineering
3 Bent Street
Franklin, MA 02038
PH. (508) 533-8866 FAX. (508) 533-0000
DRAWN: AIM
CHECKED: SC
APPROVED: SJ
DATE: 08/08/08
DRAWING NO. 20070498_E8.01
SHEET 12 OF 14

ELECTRICAL DETAILS
SALEM PORT EXPANSION
CITY OF SALEM
SALEM, MA
JUNE 2008
0 40 80
SCALE: 1" = 40'



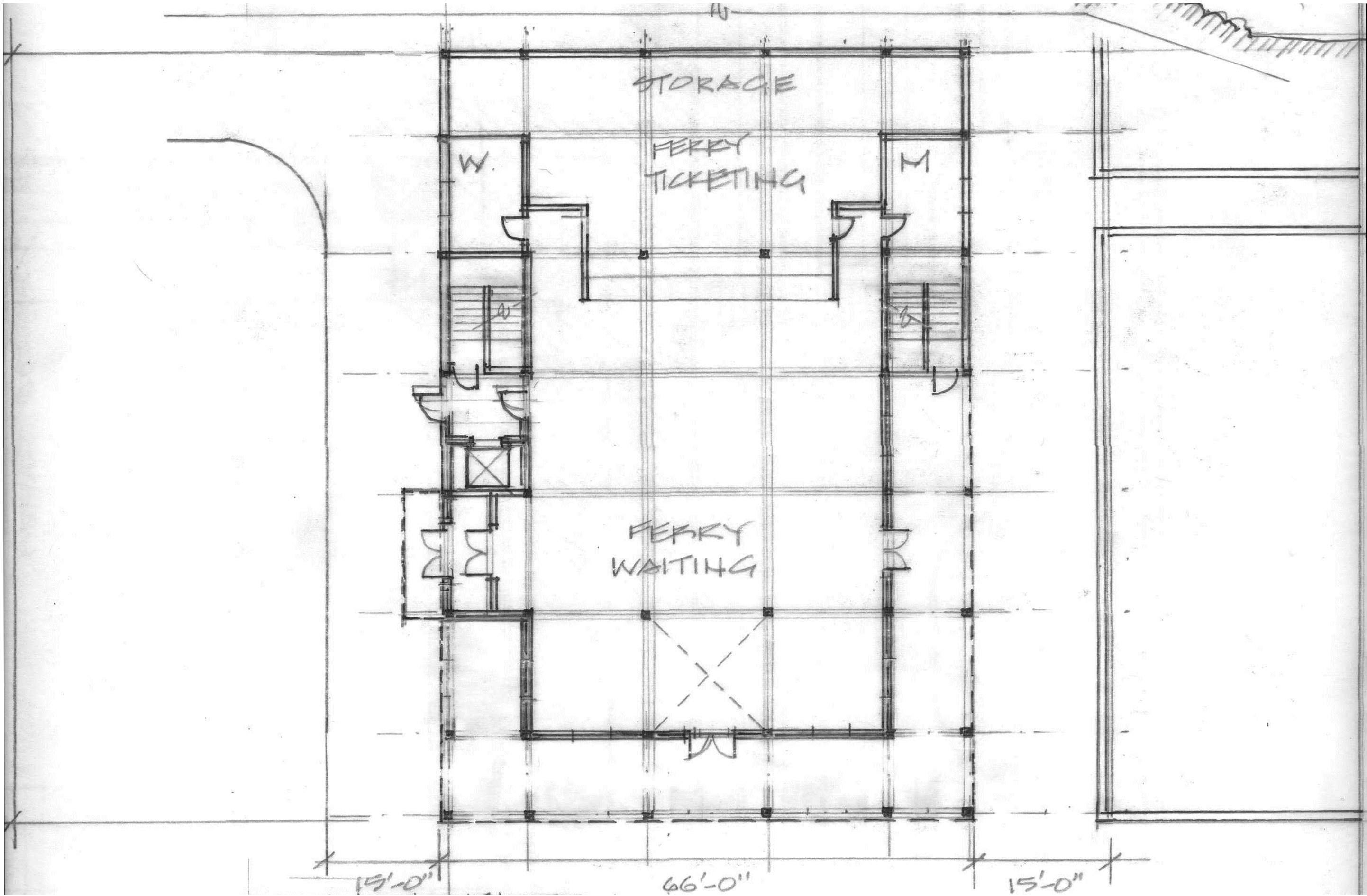
BUILDING ELEVATIONS

SALEM PORT EXPANSION
CITY OF SALEM
SALEM, MA
AUGUST 2008

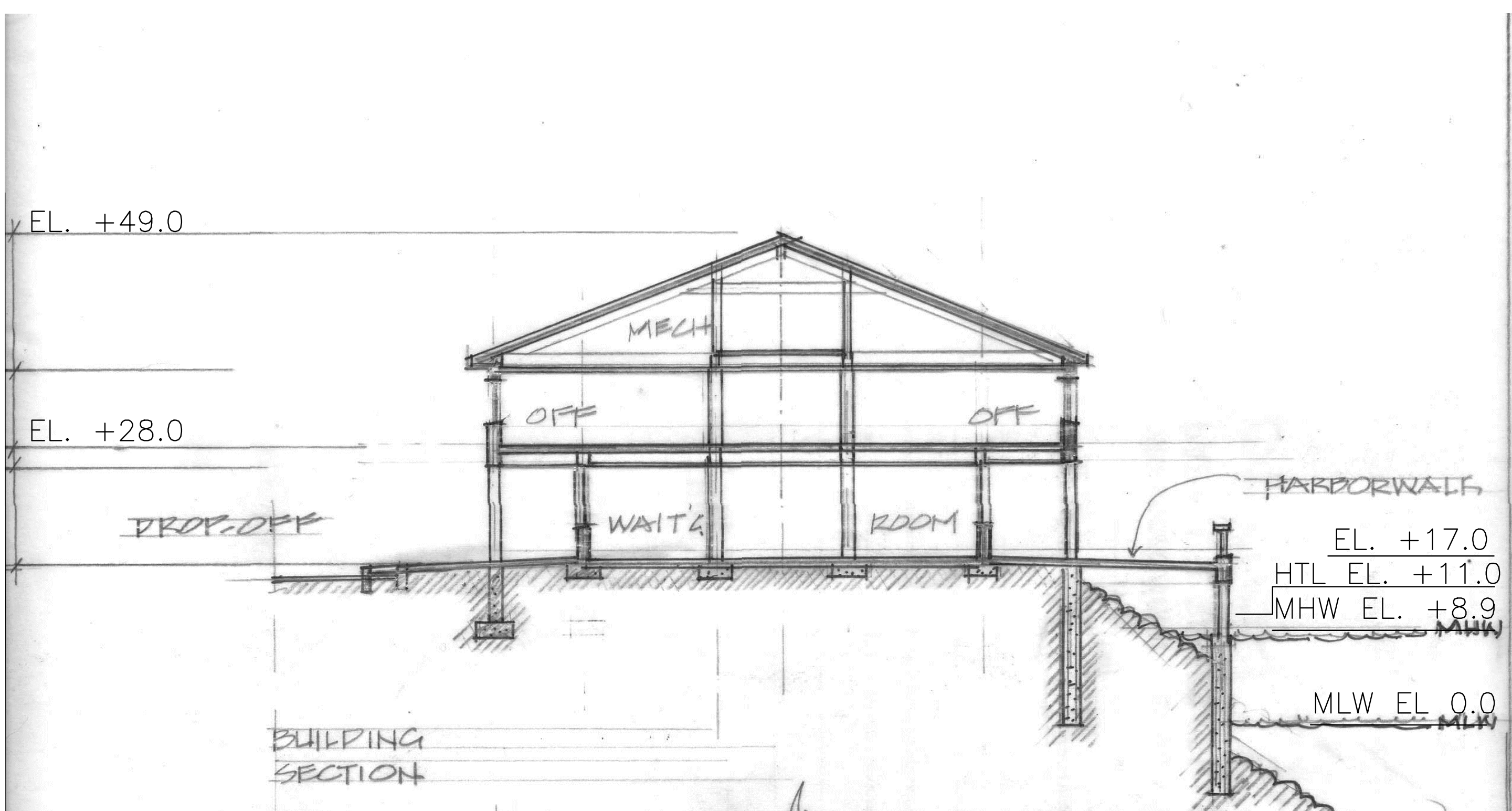
PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

REVISIONS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 1045 1046 1047 1048 1049 1050 1051 1052 1053 1054 1055 1056 1057 1058 1059 1060 1061 1062 1063 1064 1065 1066 1067 1068 1069 1070 1071 1072 1073 1074 1075 1076 1077 1078 1079 1080 1081 1082 1083 1084 1085 1086 1087 1088 1089 1090 1091 1092 1093 1094 1095 1096 1097 1098 1099 1100 1101 1102 1103 1104 1105 1106 1107 1108 1109 1110 1111 1112 1113 1114 1115 1116 1117 1118 1119 1120 1121 1122 1123 1124 1125 1126 1127 1128 1129 1130 1131 1132 1133 1134 1135 1136 1137 1138 1139 1140 1141 1142 1143 1144 1145 1146 1147 1148 1149 1150 1151 1152 1153 1154 1155 1156 1157 1158 1159 1160 1161 1162 1163 1164 1165 1166 1167 1168 1169 1170 1171 1172 1173 1174 1175 1176 1177 1178 1179 1180 1181 1182 1183 1184 1185 1186 1187 1188 1189 1190 1191 1192 1193 1194 1195 1196 1197 1198 1199 1200 1201 1202 1203 1204 1205 1206 1207 1208 1209 1210 1211 1212 1213 1214 1215 1216 1217 1218 1219 1220 1221 1222 1223 1224 1225 1226 1227 1228 1229 1230 1231 1232 1233 1234 1235 1236 1237 1238 1239 1240 1241 1242 1243 1244 1245 1246 1247 1248 1249 1250 1251 1252 1253 1254 1255 1256 1257 1258 1259 1260 1261 1262 1263 1264 1265 1266 1267 1268 1269 1270 1271 1272 1273 1274 1275 1276 1277 1278 1279 1280 1281 1282 1283 1284 1285 1286 1287 1288 1289 1290 1291 1292 1293 1294 1295 1296 1297 1298 1299 1300 1301 1302 1303 1304 1305 1306 1307 1308 1309 1310 1311 1312 1313 1314 1315 1316 1317 1318 1319 1320 1321 1322 1323 1324 1325 1326 1327 1328 1329 1330 1331 1332 1333 1334 1335 1336 1337 1338 1339 1340 1341 1342 1343 1344 1345 1346 1347 1348 1349 1350 1351 1352 1353 1354 1355 1356 1357 1358 1359 1360 1361 1362 1363 1364 1365 1366 1367 1368 1369 1370 1371 1372 1373 1374 1375 1376 1377 1378 1379 1380 1381 1382 1383 1384 1385 1386 1387 1388 1389 1390 1391 1392 1393 1394 1395 1396 1397 1398 1399 1400 1401 1402 1403 1404 1405 1406 1407 1408 1409 1410 1411 1412 1413 1414 1415 1416 1417 1418 1419 1420 1421 1422 1423 1424 1425 1426 1427 1428 1429 1430 1431 1432 1433 1434 1435 1436 1437 1438 1439 1440 1441 1442 1443 1444

File: X:\27652-27677\PRELIM DESIGN\SH-14 BUILDING.DWG -- 8/22/2006 2:06 PM



PROPOSED TERMINAL SECTION
SCALE: 1"=10'-0"




PROPOSED TERMINAL SECTION
SCALE: 1"=10'-0"

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

**TERMINAL BUILDING
PLANS**

SALEM PORT EXPANSION
CITY OF SALEM
SALEM, MA
AUGUST 2008

REVISIONS	 Bourne Consulting Engineering	
	3 Bent Street Franklin, MA 02038 TEL (508) 533-0866 FAX (508) 533-0800	
	DRAWN: JSF CHECKED: _____ APPROVED: _____ DATE: 08/27/08	
	DRAWING NO. 27677-01-03 SHEET 14 OF 14	

APPENDIX A-9

Salem Wharf Project - Project Construction Schedule

APPENDIX A-9

SALEM WHARF - PROJECT CONSTRUCTION SCHEDULE

