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WATERFRONT FACILITIES INSPECTIONS AND ASSESSMENTS AT

ATLANTIC UNDERSEA TEST AND EVALUATION CENTER (AUTEC)

ANDROS ISLAND, BAHAMAS

VOLUME 1 OF 1

REPORT # _____

By

Halcrow, Inc.
22 Cortlandt Street, 31st Fl.
New York, NY 10007

January 2010

Prepared for

NFESC EAST COAST DET
Washington Navy Yard
720 Kennon Street, Suite 333
Washington DC, 20374

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By:
Halcrow, Inc.
22 Cortlandt St, 31st Fl.
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Under:
Contract No. N62473-06-D-3029
Delivery Order No. 017

Prepared for:
NFESC EAST COAST DETACHMENT

Washington Navy Yard
720 Kennon Street, Suite 333
Washington DC, 20374

EXECUTIVE SUMMARY

Halcrow, Inc. (Halcrow) performed the underwater and above water inspections of the Main Pier, NFA200000PR1902, in October 2009. NFA200000PR1902 is within the Site 1 facilities at the Atlantic Undersea Test and Evaluation Center (AUTEC) on Andros Island, Bahamas. A four-man team, consisting of a Professional Engineer-Diver, a Dive Supervisor, and two Engineer-Divers, performed the inspection. Kirk Riden, P.E., was the Project Manager while Adon Austin P.E. was the Engineer-in-Charge during the inspection.

Main Pier **NFA200000PR1902**

Located in AUTEC Naval Base, Andros Island, NFA200000PR1902, the Main Pier, is within the facility designated 'Marina Fuel Facilities' in the vicinity of the Site 1. The 485 ft by 50 ft structure was originally constructed of concrete and was designated 'PR1902'. The original construction date is unknown.

Operational Rating **C-3** **Structure Partially Operational**

Structure CI Rating **45** **Poor**

Overall, the assets comprising NFA200000PR1902 are in Poor condition, Condition Index 45, with an Operational Capability Rating of C-3 (Structure Partially Operational). The inspection documented 80 Severe defects and 270 Major defects among the structural assets (H1010 to H1030). Furthermore, the assets are deteriorated with 170 Moderate defects and 197 Minor defects. A Condition Index Rating and quantitative defect summary of the recorded deficiencies is provided in Table ES-1.

TABLE ES-1
Quantitative Defect Summary

Asset		Condition Index (CI) Rating		Quantitative Defect Summary			
Uniformat	Type			Minor	Moderate	Major	Severe
H1010	Substructure	45	Poor	131	41	170	43
H1020	Superstructure	60	Fair	8	16	31	14
H1030	Deck Components	60	Fair	58	113	69	23
H1040	Mooring & Berthing System	60	Fair	2	3	2	72
H1050	Appurtenances	60	Fair	4	4	7	2

The Main Pier, NFA200000PR1902, is deteriorated with Minor to Moderate defects throughout the structural assets (H1010 to H1030). These defects result in a reduction between 5 and 15 percent to allowable working loads. In addition, multiple Major defects are present, resulting in isolated reductions of up to 30

percent in the allowable working loads. The deficiencies in the structural assets comprising Main Pier warrant a recommended restriction of the allowable working loads by 20 percent. While collapse is not imminent, significant defects in the structure may continue to deteriorate and overstress critical structural assets, which may result in substantial increases of the repair costs if the Priority repair recommendations are not implemented. In addition to the general load restriction recommendations, Halcrow recommends additional specific vehicle load restrictions. Truck cranes, straddle carriers and commercial truck loading as defined by the American Association of State Highway and Transportation Officials (AASHTO) should be restricted until Priority repairs are completed. In addition, a 4-ton load restriction to forklifts is recommended. Non-commercial vehicles are permitted; however, small trucks should be limited to a 6,000 lb maximum axle load.

Halcrow performed preliminary calculations to determine the allowable load capacity of the structural overlay that is positioned above broken prestressed planks. In order to verify the assumptions in preliminary analysis, Halcrow recommends a comprehensive investigation of the existing structural overlay. Until investigation results are available and a detailed analysis is performed additional local load restrictions are recommended at the locations of severely deteriorated or broken planks. Specifically, Halcrow recommends restricting all vehicle access and limiting the applied uniform loads to less than 200 psf.

<u>General Repair Recommendations:</u>

1. Halcrow recommends repairing 43 Severe defects in the Substructure as Priority repairs. Furthermore, there are 211 defects recommended as Routine repairs.

   Halcrow recommends budgeting $716,000 for the Substructure repair recommendations. This estimate includes encasing the damaged steel H-pile supporting the south mooring dolphin.

2. Halcrow recommends repairing 14 Severe defects in the Superstructure as Priority repairs. Furthermore, there are 47 defects recommended as Routine repairs.

   Halcrow recommends budgeting $151,500 for the Superstructure repair recommendations.

3. Halcrow recommends repairing 23 Severe defects in the Deck Components as Priority repairs. Furthermore, there are 182 defects recommended as Routine repairs.

   Halcrow recommends budgeting $3,158,400 for the Deck Components repair recommendations. This estimate includes replacement of 17 deteriorated prestressed concrete planks, or nearly 1,100 square feet of the

pier deck.

4. Halcrow recommends repairing 72 Severe defects in the Mooring & Berthing System as Priority repairs. Furthermore, there are 5 defects recommended as Routine repairs.

   Halcrow recommends budgeting $59,800 for the Mooring & Berthing System repair recommendations.

5. Halcrow recommends repairing 2 Severe defects in the Appurtenances as Priority repairs. Furthermore, there are 11 defects recommended as Routine repairs.

   Halcrow recommends budgeting $34,000 for the Appurtenances repair recommendations.

The Halcrow recommended budgetary cost estimate to restore the Main Pier to a C-1 rating, Facility Operational, is $4,120,000.

As a general recommendation, deteriorated concrete structures should be re-inspected every six years. However, the significant defects discovered in the deck soffit warrant additional considerations. Halcrow recommends additional bi-annual inspections of the deck and precast planks prior to completion of the repair recommendations.

EXECUTIVE SUMMARY TABLE

Sect. ID	Structure Identification				Original Construction Date	Structure Info				Condition Index	Operating Rating	Recommendations	
	NFA ID	Facility Designation	Name	Facility		Type	Material	Length (ft)	Width (ft)			Action(s) Required to Restore Structure to C-1, Facility Operational	Budgetary Cost Estimate
1.01	NFA200000PR1902	PR1902	Main Pier	Site 1 Fuel Facility	UN	Open Pile	Concrete	485	50	45	C-3	1 Repair 2 Plumb Piles and 26 Pile Encasements. 2 Repair 217 Defects in the Bent Caps. 3 Repair 172 Defects in the Beams/Girders and the Structural Deck. The repairs include replacing 17 deteriorated prestressed concrete planks. 4 Replace Deteriorated Elements Comprising the Fender System. 5 Limit applied working loads to 80 percent of design loads and apply recommended vehicle restrictions. 6 Restrict applied loads to 200 psf above severely deteriorated planks. Restrict all vehicles at these locations. 7 Inspect Structure in 2016. Perform bi-annual inspections of the deck and planks prior to reconstructing elements.	$4,120,000

1.0 INTRODUCTION

This report is prepared as part of the Commander Navy Installations Command (CNIC) Specialized Waterfront Inspection Program administered by the Naval Facilities Engineering Service Center, East Coast Detachment (NFESC-ECDET, Code 55). This program provides inspection, structural analysis, and repair recommendations with order-of-magnitude cost estimates for waterfront facilities. The services, including preparation of this report, were provided by Halcrow, Inc. (Halcrow), in accordance with Delivery Order No. 0017 per Contract N62473-06-D-3029.

Halcrow performed the underwater and above water inspections of the Main Pier, NFA200000PR1902, in October 2009. NFA200000PR1902 is within the Site 1 facilities operating as part of the Atlantic Undersea Test and Evaluation Center (AUTEC) on Andros Island, Bahamas. A four-man team, consisting of a Professional Engineer-Diver, a Dive Supervisor, and two Engineer-Divers, performed the inspection. Kirk Riden, P.E., was the Project Manager while Adon Austin P.E. was the Engineer-in-Charge during the inspection. A list of the inspected structures identified by the facility name and NFA number contained within this section are presented with corresponding Overall Condition Index and Facility Operational Ratings in the Executive Summary.

An exit brief was conducted at AUTEC on October 15, 2009 at 0930, with the following personnel in attendance:

NAME	OFFICE	PHONE	E-MAIL
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The major inspection findings and general conditions that were presented during the exit brief and were detailed further in the Preliminary Report submitted on November 9,

2009. In addition to the observed conditions, the preliminary report presented general recommendations along with an Overall Condition Index and a Facility Operational Rating for each inspected structure.

Overall Condition Rating Criteria

The inspection results scheduled in the Structural Data and Asset Inventory for each NFA number are tabulated in a specific format. This format includes a Defect Recording Nomenclature, an Asset Inventory and a Summary Sheet, where the condition of the various components in their Level 4 and Level 5 UniFormat II designations are presented. These designations follow the H Levels for Waterfront Construction. Waterfront Facility Inspection (WFI) reports will use Facility Operational Ratings and Condition Index (CI) ratings derived in accordance with Tables 1-1 and 1-2.

TABLE 1-1
Condition Index (CI) Summary

ASSESSMENT RATING	CI RATING	DESCRIPTION
Good	90	No problems or only minor problems noted. Structural elements may show some very minor deterioration, but no significant reduction in structural capacity.
Satisfactory	75	Minor to moderate defects and deterioration observed, but no significant reduction in structural capacity.
Fair	60	All primary structural elements are sound, but minor to moderate defects and deterioration observed. Localized areas of moderate to advanced deterioration may be present but do not significantly reduce the structural capacity.
Poor	45	Advanced deterioration or overstressing observed on widespread portions of the structure. Some reduction in structural capacity.
Serious	30	Advanced deterioration, overstressing or breakage may have significantly affected to load bearing capacity of primary structural components. Local failures are possible.
Critical	15	Very advanced deterioration, overstressing, or breakage has resulted in localized failure(s) of primary structural components. More widespread failures are possible or likely to occur.

TABLE 1-2
Operational Capability Rating Summary

OPERATIONAL CAPABILITY RATING		DESCRIPTION
C-1	Facility Operational	These facilities are in good condition, with no limitations on the original live load or berthing capacity. However, routine maintenance repairs may be required.
C-2	Facility Mostly Operational	These facilities typically have moderate deterioration or defects, but the load capacity is unaffected at present. Further deterioration may result in the downgrading of the load capacity in the future, if maintenance repairs are not performed. Facilities that have broken or missing fender systems are also rated as C-2, because vessel berthing is limited.
C-3	Facility Partially Operational	These facilities typically have areas or elements with severe deterioration that have caused load restrictions on the structure.
C-4	Facility Not Operational	These facilities typically have areas or elements with severe deterioration that has dramatically reduced the structural integrity or resulted in localized, partial or total collapse of the structure.

Defect Assessment

The terminology used to describe the observed defects is developed from the Unified Facilities Criteria (UFC) Maintenance and Operation Manual, UFC 4-150-07, 19 June 2001. The manual presents guidelines for the inspection methodology, assessment procedures, and a general report format. The specific investigation techniques used during the inspection require training in the performance of underwater inspections and a general knowledge of structural components. Similarly, the condition assessment of deteriorated components requires an “engineer judgment” from a licensed professional engineer.

The general assessment grades for the observed defects are based on a four point scale generally defined as: Minor, Moderate, Major, and Severe. The actual type and geometry of the assessed defect is dependent upon the base deteriorated material. Every observed defect is assessed in the field by the trained inspector and licensed

engineer. Furthermore, upon completion of the inspection, 100 percent of the defects were re-assessed to maintain conformity between varying inspection teams.

Structural Analysis

A structural analysis determines the factor of safety (FOS) for the assets with five degrees of typical observed deterioration: Minor, Moderate, Advanced, Severe, and Critical. The effective cross-section used in the analysis accounts for the observed material losses along with estimated losses that cannot be identified during a Routine inspection. The interaction coefficient is defined as the relationship between the applied stresses and the allowable stresses, or the reciprocal of the FOS. Portions of the structure with deterioration resulting in an interaction coefficient greater than 1.0 are most-likely over-stressed, or it is probable that the applied stress is greater than the stress that is allowed by governing design codes.

Recommendations

The repair recommendations provided are preliminary and are generated solely for costing purposes. The actual method of repair is not detailed and remains to the discretion of the Engineer of Record. The general repair methods provided in Appendix C summarize typical repair strategies and were used to develop the cost estimates.

Cost Estimates

A conceptual, order-of-magnitude cost estimate is prepared for the summarized repair recommendations provided in Section 2: Facilities inspected. The cost estimate is produced on a per defect basis with associated defect unit prices. The associated unit prices and additional information that further describes the assumed repair methodology for each defect type is provided in the attached task sheets in Appendix C. The planning and estimating data with repair procedures presented on the attached task sheets is produced from NAVFAC P-990, Conventional Underwater Construction and Repair Techniques (May 1995). Additional tasks, which are not presented in NAVFAC P-990, are developed to complete the cost estimate.

The task unit prices presented in the cost estimate are developed for Norfolk, Virginia and include all overhead mark-ups and contingencies. In order to determine the repair unit costs for Andros Island, the Norfolk unit prices are adjusted per the requirements described in Chapter 4 of UFC 3-701-09, Handbook for Construction Cost Estimating.

As described therein, a location adjustment or area cost factor (ACF) is used to adjust unit costs to location-specific costs for the most common military sites. The ACF is derived from data input study conducted in 2008. The study covered 228 locations that included 96 Base Cities in the continental US and 132 additional locations worldwide. The collected data included local costs for a market basket of 8 labor crafts, 17 construction materials, and 4 equipment items. These labor, materials, and equipment (LME) items are representative of the types of products, services, and methods used to construct most military facilities. The LME costs are normalized and then modified by seven matrix factors covering local conditions affecting construction costs including weather, seismic, climatic, labor availability, contractor support rates, and labor productivity. The resultant ACF for each location is normalized again with respect the 96 Base City average to provide a final value that reflects the relative relationship of construction costs between the location and the 96-Base-City average of 1.00.

2.0 FACILITIES INSPECTED

The underwater and above water investigation of the Main Pier, NFA200000PR1902, located in the Atlantic Undersea Test and Evaluation Center (AUTEC), Andros Island, Bahamas was performed in October of 2009. The inspection included a single structure located in the Site 1 Fuel Facility on the west shore of Andros.

TABLE 2-1
Facility Operational Capability Ratings and Condition Indices Summary

FACILITY NAME	TOTAL REPAIR ESTIMATE	OVERALL CONDITION INDEX		FACILITY OPERATIONAL RATING	
Site 1 – Main Pier	$4,120,000	45	Poor	C-3	Facility Partially Operational

The investigation scope included the time, labor and materials required to accurately inspect and subsequently assess the existing condition of the structure. In addition, 100% of the defects rated as Minor (1) or worse were dimensionally recorded and positioned. The vertical position of the defects above the waterline at the time of inspection was documented as either above the high water mark (above water) or in the tidal zone. The vertical positions of defects below the Mean Low Water Elevation were recorded as the distance between the top of deck and the defect centerline. Accessible defects rated at Major (3) or Severe (4) were photographically documented.

The inspection methodology used to assess the structures within AUTEC meets the intent of the procedures defined in the Unified Facilities Criteria (UFC) Maintenance and Operation Manual, UFC 4-150-07, 19 June 2001. The manual presents guidelines for the inspection methodology, assessment procedures, and a general report format.

02.01 Main Pier NFA200000PR1902

Located in AUTEC Naval Base, Andros Island, NFA200000PR1902, Main Pier, is within the facility designated 'Site 1 Fuel Facility'. The 485 ft by 50 ft structure is constructed of concrete and designated as 'PR1902'. The original construction date is unknown.

Latitude 24° 42.464'

Longitude 77° 45.828'

The scope of work for Main Pier included a Design Level Inspection with a subsequent Routine Level Inspection Report per the requirements detailed in UFC 4-150-07, Maintenance of Waterfront Facilities. The fundamental purpose of this Design Inspection was to verify existing drawings (if available) and record the information necessary to assess the condition of the structure. The inspection date and the local conditions encountered during the inspection of Main Pier are indicated below. Subsequent to the inspection, the inspection results provided the basis to assess the structure. The inspection of Main Pier resulted in the identification, description, and assessment of all accessible damage and deterioration of the structure above the waterline and beneath the water surface. Repair and load restriction recommendations, based on preliminary structural analysis of the deteriorated assets, were developed. Load restriction recommendations are presented in terms of the allowable working loads that the structure was originally designed to support. In addition, the documented deficiencies generated budgetary estimates, if required, for restoring the structure to an Operational Rating of C-1, Facility Operational. Finally, an estimate of the expected remaining life of Main Pier and the recommended future inspection date is provided.

Inspection Date	Visibility	Tidal Range	Water Current
2009 October	3 to 6 ft	4 ft	Negligible

The Main Pier is a concrete structure constructed of assets comprising the Substructure (H1010), Superstructure (H1020), Deck Components (H1030), Mooring & Berthing System (H1040), and Appurtenances (H1050).

TABLE 02.01-1
Asset Inventory Summary

Uniformat Asset Definition		Number of Assets	Asset Quantity	Units	Material	Shape	Dimensions		
Uniformat LvL V Designation	Name						Length (ft)	Dim A (in)	Dim B (in)
H1010.01.01	Plumb Pile	209	1	EA	Steel	H-Pile	25		
H1010.01.02	Batter Pile	126	1	EA	Steel	H-Pile	25		
H1010.01.05	Structural Encasement	170	1	EA	Concrete	Round	25		36
H1010.01.05	Structural Encasement	157	1	EA	Concrete	Square	25	26	26
H1010.01.05	Structural Encasement	8	1	EA	Concrete	Square	5	26	26
H1010.02.01	Bent Cap	66	50	LF	Concrete	Square	50	30	30
H1010.02.03	Dolphin Cap	2	1	EA	Concrete	Square	7.5	90	42
H1020.01.03	Edge Beams	2	485	LF	Concrete	Square	485	40	54
H1030.01.03	Structural Deck Overlay	1	19,560	SF	Concrete	Square	15	32	15
H1030.01.04	Suspended Plank	64	1	EA	Concrete	Square	15	32	10
H1030.01.04	Suspended Plank	320	1	EA	Concrete	Square	15	42	10
H1030.02.01	Curbs & Bullrail	1	255	LF	Concrete	Square	82	9	12
H1030.02.03	Mooring Foundation	1	745	LF	Concrete	Square	10	40	12
H1030.02.04	Expansion Joint	1	1020	LF	Rubber	Gap	1020		1
H1040.01.03	Fender Framing	1	70	LF	Timber	Square	20	12	12
H1040.01.13	Panels / Skirt	40	1	EA	Concrete	Square	15	108	12
H1040.03.01	Bollard	2	1	EA	Steel	Round	2		20
H1040.03.02	Double Bitt	12	1	EA	Steel	Round	1		12
H1040.03.03	Cleats	18	1	EA	Steel	Square	3	8	3
H1050.05.03	Utility On-Deck Cover	22	1	EA	Concrete	Square	7	40	36
H1050.05.03	Utility On-Deck Cover	58	1	EA	Concrete	Square	8	38	15

Dimension A is the breadth of the asset, defined as the dimension perpendicular to the length. Dimension B is the depth of the asset, defined as the dimension that resists intended applied bending loads or the diameter of cylindrical assets.

OVERALL ASSESSMENT

Operational Rating **C-3** **Structure Partially Operational**

Structure CI Rating **45** **Poor**

The structure is in overall Poor condition with advanced deterioration or overstressing

observed on widespread portions of the structure. There is some reduction in structural capacity. These facilities typically have areas or elements with severe deterioration that have caused load restrictions on the structure.

Main Pier, NFA200000PR1902, is deteriorated with Minor to Moderate defects throughout the structural assets (H1010 to H1030). These defects result in a reduction between 5 and 15 percent to allowable uniform loading. In addition, multiple Major defects are present. Major defects may result in a reduction of up to 30 percent to the allowable uniform loading. The deficiencies in the structural assets comprising Main Pier warrant an overall recommendation to restrict the applied working loads by 20 percent, or 80 percent of the original design working loads. While collapse is not imminent, significant defects in the structure may continue to deteriorate and overstress critical structural assets, which may result in substantial increases to the repair costs. The current condition of the mooring and berthing system warrants recommended berthing restrictions to the pier. In addition, isolated more significant load restrictions are recommended for isolated portions of the pier. These more stringent restrictions may affect the current crane loading and unloading operations; therefore, should be closely monitored.

02.01.1 OBSERVED CONDITIONS AND ASSESSMENTS

Overall, the assets comprising NFA200000PR1902 are in Poor condition, Condition Index 45, with an Operational Capability Rating of C-3 (Structure Partially Operational). The inspection documented 197 Minor defects, 170 Moderate defects, 270 Major defects, 80 Severe defects in the structural assets (H1010 to H1030). A Condition Index Rating and quantitative defect summary of the recorded deficiencies is provided in Table 02.1.1-1.

TABLE 02.01.1-1
Quantitative Defect Summary

Asset		Condition Index (CI) Rating		Defect Quantity			
Uniformat	Type			Minor	Moderate	Major	Severe
H1010	Substructure	45	Poor	131	41	170	43
H1020	Superstructure	45	Poor	8	16	31	14
H1030	Deck Components	60	Fair	58	113	69	23
H1040	Mooring & Berthing System	60	Fair	2	3	2	72

H1010 SUBSTRUCTURE CONDITION INDEX 45

The assets comprising the Substructure (H1010) include: Plumb Piles (H1010.01.01), Batter Piles (H1010.01.02), Structural Encasements (H1010.01.05), Bent Caps (H1010.02.01), and Dolphin Caps (H1010.02.03). Overall, these assets are in Poor condition (CI-45) with 131 Minor defects and 41 Moderate defects. In addition, there are 170 Major defects and 43 Severe defects in the elements comprising the Substructure.

H1010.01 PILE FOUNDATIONS CI 60

The Pile Foundations include 209 steel plumb piles and 126 steel batter piles. The piles are encased with 170 thirty-six inch diameter concrete Structural Encasements, and 165 twenty-six inch by twenty six inch concrete structural encasements in overall Fair condition. This condition assessment is a result of 23 Minor, 9 Moderate, 8 Major, and 9 Severe defects in the elements. Table 02.1.1-2 further details the types of significant deficiencies (defects rated Moderate, Major, or Severe) in the Pile Foundations.

TABLE 02.01.1-2
H1010.01 - Pile Foundations Defect Summary

Defect		QTY Unit of Measure	Moderate		Major		Severe	
			Number of Defects	QTY	Number of Defects	QTY	Number of Defects	QTY
H1010.01.01	Plumb Pile							
	Deflection	[LF]					1	0.3
H1010.01.05	Structural Encasement							
	Spall	[CF]			2	1.8		
	Crack, Vertical	[LF]	5	2.3				
	Delaminated Area	[SF]						
	Erosion	[CF]	3	0.9	4	1.3	8	6.1
	Void	[CF]			2	0.3		

QTY = Quantity | EA = Each | LF = Linear Feet | SF = Square Feet | CF = Cubic Feet

In addition to documenting all the defects in the Substructure, the plumb piles (H1010.01.01) are graded. The element grade is derived from the loss in structural

capacity resulting from the worst identified defect. A total of 209 plumb piles were inspected. Of these piles, no piles are graded as Minor or Moderate; however, 1, or less than 1 percent, is graded Severe.

H1010.02 PILE CAPS CI 45

The Pile Caps include: 66 concrete bent caps with each of the 30 in. by 30 in. elements being 50 ft long and 2 ninety inch by 42 inch concrete dolphin caps in overall Poor condition. This condition assessment is a result of 108 Minor, 32 Moderate, 162 Major, and 34 Severe defects in the elements. Table 02.1.1-3 further details the types of significant deficiencies (defects rated Moderate, Major, or Severe) in the Pile Caps during the inspection.

TABLE 02.1.1-3
H1010.02 - Pile Caps Defect Summary

Defect		QTY Unit of Measure	Moderate		Major		Severe	
			Number of Defects	QTY	Number of Defects	QTY	Number of Defects	QTY
H1010.02.01	Bent Cap							
	Delaminated Area	[SF]	11	55.9	72	1109.6	19	311.0
	Crack, Horizontal	[LF]	16	66.5	81	770.0	6	33.5
	Spall	[CF]	2	0.3	7	7.3	2	8.7
	Crack, Vertical	[LF]			1	6.0		
	Honeycombing	[CF]					2	1.6
	Void	[CF]	2	0.1	1	0.9	5	4.4

QTY = Quantity | EA = Each | LF = Linear Feet | SF = Square Feet | CF = Cubic Feet

H1020 SUPERSTRUCTURE CONDITION INDEX 60

The assets comprising the Superstructure (H1020) include: Edge Beams (H1020.01.03). Overall, these elements are in Fair condition (CI-60) with 8 Minor defects and 16 Moderate defects. In addition, there are 31 Major defects and 14 Severe defects in the Superstructure.

H1020.01 BEAMS AND GIRDERS CI 60

The Beams and Girders include: 2 x 485 ft long 40 in. by 54 in. Concrete Edge Beams in overall Fair condition. This condition assessment is a result of 8 Minor, 16

Moderate, 31 Major, and 14 Severe defects in the asset. Table 02.1.1-4 further details the types of significant deficiencies (defects rated Moderate, Major, or Severe) discovered in the Beams and Girders during the inspection.

TABLE 02.1.1-4
H1020.01 - Beams and Girders Defect Summary

Defect		QTY Unit of Measure	Moderate		Major		Severe	
			Number of Defects	QTY	Number of Defects	QTY	Number of Defects	QTY
H1020.01.03	Edge Beam							
	Delaminated Area	[SF]	5	27.7	5	79.2	2	37.5
	Spall	[CF]	1	0.2	5	5.5	3	13.2

QTY = Quantity | EA = Each | LF = Linear Feet | SF = Square Feet | CF = Cubic Feet

H1030 DECK COMPONENTS CONDITION INDEX 45

The assets comprising the Deck Components (H1030) include: Structural Deck Overlay (H1030.01.03), Suspended Planks (H1030.01.04), Curbs & Bullrails (H1030.02.01), Mooring Foundations (H1030.02.03), and Expansion Joints (H1030.02.04). Overall, these assets are in Poor condition (CI-45) with 58 Minor defects and 113 Moderate defects. In addition, there are 69 Major defects and 23 Severe defects in the Deck Components.

H1030.01 DECK CI 60

The Deck includes: 19,560 square ft of 15 in. thick concrete structural deck Overlay, 320 concrete 42 in. by 15 ft suspended 10 in. thick planks, and 64 concrete 32 in. by 15 ft suspended 10 in. thick planks in overall Fair condition. This condition assessment is a result of 17 Minor, 75 Moderate, 20 Major, and 16 Severe defects in the elements. Table 02.1.1-5 further details the types of significant deficiencies (defects rated Moderate, Major, or Severe) discovered in the Deck during the inspection.

Halcrow was unable to verify the actual thickness of the concrete overlay, therefore assumed a thickness of 15 inches. This assumption is based on the geometry of the structure and accessible measured components during the inspection.

TABLE 02.1.1-5
H1030.01 – Deck Defect Summary

Defect		QTY Unit of Measure	Moderate		Major		Severe	
			Number of Defects	QTY	Number of Defects	QTY	Number of Defects	QTY
H1030.01.03	Structural Deck Overlay							
	Crack, Map	[CF]					1	0.2
	Crack, Horizontal	[LF]			1	5.2	6	122.0
	Delaminated Area	[SF]	2	4.4	2	13.3		
	Spall	[CF]			1	0.4	1	0.5
H1030.01.04	Suspended Plank							
	Delaminated Area	[SF]	55	505.9	3	37.3		
	Broken	[EA]					5	5.0
	Spall	[CF]	4	5.3	11	28.5	1	50.0
	Crack, Horizontal	[LF]	14	52.8	2	9.5	2	11.0

QTY = Quantity | EA = Each | LF = Linear Feet | SF = Square Feet | CF = Cubic Feet

H1030.02 DECK COMPONENTS CI 60

The Deck Components include: 316 linear ft of 9 in. by 12 in. concrete curbs & bullrails, 684 linear ft of 40 in. by 12 in. concrete mooring foundations, and 1 x 50 linear ft and 2 x 485 linear ft of 1 in. elastomeric expansion joints in overall Fair condition. This condition assessment is a result of 41 Minor, 38 Moderate, 49 Major, and 7 Severe defects in the asset. Table 02.1.1-6 further details the types of significant deficiencies (defects rated Moderate, Major, or Severe) discovered in the Deck Components during the inspection.

TABLE 02.1.1-6
H1030.02 - Deck Components Defect Summary

Defect		QTY Unit of Measure	Moderate		Major		Severe	
			Number of Defects	QTY	Number of Defects	QTY	Number of Defects	QTY
H1030.02.01	Curbs & Bullrail							
	Delaminated Area	[SF]	1	3.3	6	37.9	1	8.3

TABLE 02.1.1-6 (Cont.)
H1030.02 - Deck Components Defect Summary

Defect		QTY Unit of Measure	Moderate		Major		Severe	
			Number of Defects	QTY	Number of Defects	QTY	Number of Defects	QTY
	Crack, Horizontal	[LF]			4	34.0	1	22.0
H1030.02.03	Mooring Foundation							
	Spall	[CF]	5	1.6	12	3.6		
	Delaminated Area	[SF]	8	38.6	13	117.5	1	1.7

QTY = Quantity | EA = Each | LF = Linear Feet | SF = Square Feet | CF = Cubic Feet

H1040 MOORING & BERTHING SYSTEM CONDITION INDEX 60

The assets comprising the Mooring & Berthing System (H1040) include: Fender Framing (H1040.01.03), Extruded Fender (H1040.01.04), Foam-Filled Fender (H1040.01.06), Panels / Skirt (H1040.01.13), Bollard (H1040.03.01), Double Bitts (H1040.03.02), and Cleats (H1040.03.03). Overall, these assets are in Fair condition (CI-60) with two Minor defects and three Moderate defects. In addition, there are two Major defects and 72 Severe defects in the Mooring & Berthing System.

H1040.01 FENDER SYSTEM CI 60

The Fender System include: 70 linear ft of 12 in. by 12 in. timber fender framing, extruded fenders, foam-filled fender, and 40 concrete 108 in. by 12 in. panels / skirts in overall Fair condition. This condition assessment is a result of 2 Minor, 3 Moderate, 2 Major, and 72 Severe defects in the asset. Table 02.1.1-7 further details the types of significant deficiencies (defects rated Moderate, Major, or Severe) discovered in the Fender System during the inspection.

TABLE 02.1.1-7
H1040.01 - Fender System Defect Summary

Defect		QTY Unit of Measure	Moderate		Major		Severe	
			Number of Defects	QTY	Number of Defects	QTY	Number of Defects	QTY
H1040.01.03	Fender Framing							

TABLE 02.1.1-7 (Cont.)
H1040.01 - Fender System Defect Summary

Defect		QTY Unit of Measure	Moderate		Major		Severe	
			Number of Defects	QTY	Number of Defects	QTY	Number of Defects	QTY
	Section Loss, Overall	[EA]					4	4.0
H1040.01.13	Panels / Skirt							
	Section Loss, Overall	[EA]					54	54.0
	Spall	[CF]	1	0.1	2	0.8		

QTY = Quantity | EA = Each | LF = Linear Feet | SF = Square Feet | CF = Cubic Feet. The Section Loss, Overall scheduled in the Panel / Skirt indicates section loss in the fastening hardware angles resulting from corrosion.

H1040.03 MOORING HARDWARE — CI 90

The Mooring Hardware includes: 2 x 20 in. steel bollards, 12 x 12 in. steel double bitts, and 18 x 8 in. steel cleats in overall Good condition. This condition assessment is a result of no significant defects in the asset. Halcrow maintains records of deficiencies currently not significant for reporting, which are available upon request.

H1050 APPURTENENCES — CONDITION INDEX 60

The assets comprising the Appurtenances (H1050) include: Ladder (H1050.04.01), Life Rings (H1050.04.02), Fire Extinguisher (H1050.04.05), Utility On-Deck Cover (H1050.05.03), Utility On-Deck Cover - Type 1 (H1050.05.03), Utility On-Deck Cover - Type 2 (H1050.05.03), and Utility On-Deck Cover - Type 3 (H1050.05.03. Overall, these assets are in Fair condition (CI-60) with 4 Minor defects and 3 Moderate defects. In addition, there are 6 Major defects and 2 Severe defects in the Appurtenances.

H1050.04 SAFETY — CI 90

The Safety assets include: 2 x 24 in. steel ladders, 6 x 24 in. life rings, and 4 x 6 in. fire extinguishers in overall Good condition. This condition assessment is a result of no significant defects in the asset. Halcrow maintains records of deficiencies currently not significant for reporting, which are available upon request.

Halcrow did not verify the expiration dates or types of the fire extinguishers.

H1050.05 VAULTS — CI 60

The elements comprising the Vaults include: 58 concrete 38 in. by 7 ft Utility On-Deck Covers and the 22 affixed concrete boxes protecting the utility connection points in overall Fair condition. This condition assessment is a result of 4 Minor, 3 Moderate, 6 Major, and 2 Severe defects in the asset.

02.01.2 RECOMMENDATIONS

The structural assets (H1010 to H1030) comprising Main Pier, NFA200000PR1902, are deteriorated with Minor and Moderate defects in widespread portions of the structure. These general defect types reduce the allowable working loads up to 15 percent. Furthermore, there are multiple Major defects that may reduce allowable loads between 15 and 30 percent at portions of the facility. Halcrow recommends restricting the allowable applied working loads to the Main Pier by 20 percent. At this time, collapse is not imminent; however, significant defects in the structure may continue to deteriorate and overstress critical structural assets. This may result in substantial increases to the repair costs if the Priority repair recommendations are not implemented. Prior to completion of the recommended Priority repairs, Halcrow recommends restricting access for truck cranes, straddle carriers and commercial truck loading as defined by the American Association of State Highway and Transportation Officials (AASHTO). Furthermore, forklift loads should be restricted to 4 tons or less. Personal vehicles and small trucks are permitted; however, should be limited to a 6,000 lb maximum axle load.

Halcrow recommends local restrictions to the normal berthing operations along NFA200000PR1902. In addition, the foundations supporting the mooring hardware are deteriorated and should be carefully monitored.

The repair recommendations for NFA200000PR1902 are prioritized as either 'Priority' or 'Routine'. Priority repair recommendations take precedence over Routine repair recommendations and are necessary to restore the structural integrity and eliminate the recommended load restrictions. In addition, the completion of the Priority repairs will restore the structure and prevent the defects from deteriorating to a point where future repairs will be significantly more costly. Routine repairs are recommended in accordance with good engineering and industry practice. These repairs should be implemented as part of a scheduled maintenance program. Postponement of the Routine repair recommendations will not compromise the structural integrity of the assets or significantly increase the repair costs.

Additional information for the recommended Repair Tasks is provided in Appendix C.

H1010 SUBSTRUCTURE

Halcrow recommends repairing 43 Severe defects in the Substructure as Priority repairs. Furthermore, there are 211 defects recommended as Routine repairs.

H1010.01.01 Plumb Pile

The Priority repairs for the Plumb Pile include:

1. Repair/Replace 1 Severe defect, 0.3 linear ft, in the plumb piles (Defect: Deflection). Recommended Repair Task: Concrete Encase Steel Pile.

H1010.01.05 Structural Encasement

The Priority repairs for the Structural Encasement include:

1. Repair/Replace 8 Severe defects, 6.1 cubic ft, in the structural encasements (Defect: Erosion). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.

The Routine repairs for the Structural Encasement include:

1. Repair/Replace 2 defects, 1.8 cubic ft, in the Structural Encasement (Defect: Spall). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
2. Repair/Replace 5 defects, 2.3 linear ft, in the Structural Encasement (Defect: Crack, Vertical). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.
3. Repair/Replace 7 defects, 2.2 cubic ft, in the Structural Encasement (Defect: Erosion). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
4. Repair/Replace 2 defects, 0.3 cubic ft, in the Structural Encasement (Defect: Void). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
5. Repair/Replace 1 defect, 3.2 linear ft, in the Structural Encasement (Defect: Crack, Horizontal). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.

H1010.02.01 Bent Cap

The Priority repairs for the Bent Cap include:

1. Repair/Replace 19 Severe defects, 311 square ft, in the Bent Cap (Defect: Delaminated Area). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
2. Repair/Replace 6 Severe defects, 33.5 linear ft, in the Bent Cap (Defect: Crack, Horizontal). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.
3. Repair/Replace 2 Severe defects, 8.7 cubic ft, in the Bent Cap (Defect: Spall). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
4. Repair/Replace 2 Severe defects, 1.6 cubic ft, in the Bent Cap (Defect: Honey Combing). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.

5. Repair/Replace 5 Severe defects, 4.4 cubic ft, in the Bent Cap (Defect: Void). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.

The Routine repairs for the Bent Cap include:

1. Repair/Replace 83 defects, 1165.5 square ft, in the Bent Cap (Defect: Delaminated Area). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
2. Repair/Replace 97 defects, 836.5 linear ft, in the Bent Cap (Defect: Crack, Horizontal). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.
3. Repair/Replace 9 defects, 7.6 cubic ft, in the Bent Cap (Defect: Spall). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
4. Repair/Replace 1 defect, 6 linear ft, in the Bent Cap (Defect: Crack, Vertical). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.
5. Repair/Replace 3 defects, 1 cubic ft, in the Bent Cap (Defect: Void). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
6. Repair/Replace 1 defect, 0.2 cubic ft, in the Bent Cap (Defect: Crack, Map). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.

H1020 SUPERSTRUCTURE

Halcrow recommends repairing 14 Severe defects in the Superstructure as Priority repairs. Furthermore, there are 47 defects recommended as Routine repairs.

H1020.01.03 Edge Beam

The Priority repairs for the Edge Beam include:

1. Repair/Replace 2 Severe defects, 37.5 square ft, in the Edge Beam (Defect: Delaminated Area). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
2. Repair/Replace 3 Severe defects, 13.2 cubic ft, in the Edge Beam (Defect: Spall). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
3. Repair/Replace 9 Severe defects, 122.7 linear ft, in the Edge Beam (Defect: Crack, Horizontal). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.

The Routine repairs for the Edge Beam include:

1. Repair/Replace 10 defects, 106.9 square ft, in the Edge Beam (Defect: Delaminated Area). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
2. Repair/Replace 6 defects, 5.7 cubic ft, in the Edge Beam (Defect: Spall). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
3. Repair/Replace 31 defects, 219.6 linear ft, in the Edge Beam (Defect: Crack, Horizontal). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.

H1030 DECK COMPONENTS

Halcrow recommends repairing 23 Severe defects in the Deck Components as Priority repairs. Furthermore, there are 182 defects recommended as Routine repairs.

H1030.01.03 Structural Deck Overlay

The Priority repairs for the Structural Deck Overlay include:

1. Repair/Replace 1 Severe defect, 0.2 cubic ft, in the Structural Deck Overlay (Defect: Crack, Map). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.
2. Repair/Replace 6 Severe defects, 122 linear ft, in the Structural Deck Overlay (Defect: Crack, Horizontal). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.
3. Repair/Replace 1 Severe defect, 0.5 cubic ft, in the Structural Deck Overlay (Defect: Spall). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.

The Routine repairs for the Structural Deck Overlay include:

1. Repair/Replace 1 defect, 5.2 linear ft, in the Structural Deck Overlay (Defect: Crack, Horizontal). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.
2. Repair/Replace 4 defects, 17.8 square ft, in the Structural Deck Overlay (Defect: Delaminated Area). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
3. Repair/Replace 1 defect, 0.4 cubic ft, in the Structural Deck Overlay (Defect: Spall). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.

H1030.01.04 Suspended Plank

The Priority repairs for the Suspended Plank include:

1. Repair/Replace 6 Severe defects in the Suspended Plank (Defect: Broken).
2. Repair/Replace 1 Severe defect, 50 cubic ft, in the Suspended Plank (Defect: Spall).
3. Repair/Replace 2 Severe defects, 11 linear ft, in the Suspended Plank (Defect: Crack, Horizontal).

The Routine repairs for the Suspended Plank include:

1. Repair/Replace 58 defects, 543.2 square ft, in the Suspended Plank (Defect: Delaminated Area).
2. Repair/Replace 15 defects, 33.8 cubic ft, in the Suspended Plank (Defect: Spall).
3. Repair/Replace 16 defects, 62.3 linear ft, in the Suspended Plank (Defect: Crack, Horizontal).

The repair of deteriorated precast pre-stressed concrete planks requires the plank be replaced in-kind (Recommended Repair Task: Remove / Replace Prestress Plank) in order to restore the facility to its original capability rating. Therefore, Halcrow recommends removal and replacement of the 17 deteriorated planks with the defects indicated in Table NFA200000PR1902-9. In addition, multiple areas of delaminated concrete and cracks in the planks soffit were observed. Currently, the planks with these defects are not recommended to be replaced; however, it is expected that the concrete will continue to deteriorate and future repairs will be required.

Halcrow performed preliminary calculations to determine the allowable load capacity of the structural overlay that is positioned above broken prestressed planks. The calculations are provided in Appendix D. As indicated in the calculations, Halcrow assumed the material properties and amount of reinforcing steel contained in the deck. The results of the analysis indicate a 15 in. structural slab with the minimum reinforcing steel area required by the American Concrete Institute (ACI) spanning 7 ft 6 in. can safely support significant amounts of uniform load. However, as previously mentioned, Halcrow could not verify the depth of the existing structural overlay. In addition, the actual amount of reinforcing steel and the existing material properties could not be verified. Therefore, Halcrow recommends a comprehensive investigation of the existing structural overlay. Until investigation results are available and a detailed analysis is performed, Halcrow recommends restricting access for truck cranes, straddle carriers and commercial truck loading as defined by the American Association of State Highway and Transportation Officials (AASHTO) in the areas above deteriorated planks. Furthermore, forklift loads and personal vehicles should also be restricted.

TABLE 02.01.2-1
H1030.01- Prestressed Plank Replacement Summary

Defect Center Point Location	Identified Defect	Panel Center Point Location	Identified Defect
01.7 A.0	Severe Spall w/ Corroded Strands	22.2 A.2	Broken Panel
01.3 C.2	Broken Panel	23.5 D.9	Severe Spall w/ Corroded Strands
01.3 D.0	Broken Panel	23.7 A.2	Severe Spall w/ Corroded Strands
04.8 D.9	Broken Panel	25.2 A.2	Severe Spall w/ Corroded Strands
08.6 D.8	Severe Spall w/ Corroded Strands	26.4 D.9	Severe Spall w/ Corroded Strands
11.7 D.8	Severe Spall w/ Corroded Strands	30.2 A.2	Severe Spall w/ Corroded Strands
13.8 D.8	Severe Spall w/ Corroded Strands	31.2 A.2	Broken Panel
17.3 D.9	Broken Panel	31.7 D.9	Broken Panel
20.2 A.2	Severe Spall w/ Corroded Strands		

H1030.02.01 Curbs & Bullrails

The Priority repairs for the Curbs & Bullrails include:

1. Repair/Replace 2 Severe defects, 10 square ft, in the Curbs & Bullrails (Defect: Delaminated Area). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
2. Repair/Replace 1 Severe defect, 0.9 cubic ft, in the Curbs & Bullrails (Defect: Spall). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
3. Repair/Replace 4 Severe defects, 62.7 linear ft, in the Curbs & Bullrails (Defect: Crack, Horizontal). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.

The Routine repairs for the Curbs & Bullrails include:

1. Repair/Replace 28 defects, 197.4 square ft, in the Curbs & Bullrails (Defect: Delaminated Area). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
2. Repair/Replace 20 defects, 7.3 cubic ft, in the Curbs & Bullrails (Defect: Spall). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
3. Repair/Replace 39 defects, 189.1 linear ft, in the Curbs & Bullrails (Defect: Crack, Horizontal). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.

H1040 MOORING & BERTHING SYSTEM

Halcrow recommends repairing 72 Severe defects in the Mooring & Berthing System as Priority repairs. Furthermore, there are 5 defects recommended as Routine repairs.

In addition, Halcrow recommends mechanically cleaning and applying a corrosive resistant coating to the mooring hardware.

H1040.01.03 Fender Framing

The Priority repairs for the Fender Framing include:

1. Repair/Replace 14 Severe defects in the Fender Framing (Defect: Broken).
2. Repair/Replace 3 Severe defects in the Fender Framing (Defect: Section Loss, Overall).
3. Repair/Replace 1 Severe defect in the Fender Framing (Defect: Section Loss, Marine Borer).

Halcrow recommends removing and replacing in-kind the remaining deteriorated portion of the Fender Framing along the outboard portion of the pier and the adjacent mooring dolphins (Recommended Repair Task: Remove / Replace Fender Framing). The total estimated length for removal and replacement is approximately 70 ft.

H1040.01.13 Panels / Skirt

The Priority repairs for the Panels / Skirt include:

1. Repair/Replace 54 Severe defects in the Panels / Skirt (Defect: Section Loss, Overall).

The Routine repairs for the Panels / Skirt include:

1. Repair/Replace 3 defects, 0.8 cubic ft, in the Panels / Skirt (Defect: Spall). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.
2. Repair/Replace 2 defects, 10 linear ft, in the Panels / Skirt (Defect: Crack, Vertical). Recommended Repair Task: Concrete Crack Repair by Epoxy Grout Injection.

H1050 APPURTENENCES

Halcrow recommends repairing 6 defects in the Appurtenances as Routine repairs.

H1050.05.01 Utility Vault

The Routine repairs for the Utility Vault include:

1. Repair/Replace 1 defect, 0.1 cubic ft, in the Utility Vault (Defect: Spall). Recommended Repair Task: Concrete Void Repair Using Concrete

Reconstruction.

H1050.05.03 Utility On-Deck Cover

The Routine repairs for the Utility On-Deck Cover include:

1. Repair/Replace 5 defects, 3.1 cubic ft, in the Utility On-Deck Cover (Defect: Spall). Recommended Repair Task: Concrete Void Repair Using Concrete Reconstruction.

02.01.3 RECOMMENDED REPAIR COSTS

The engineering estimate to perform the described repairs is $3,023,600. This cost is further broken down into Priority and Routine repair recommendations. The estimated cost of the Priority repair recommendations is $2,423,900. The recommend Routine repairs are estimated at $599,700.

A preliminary scenario assessment is included in the analysis that determines the not-to-exceed cost estimates with probabilities of 80 percent. The analysis is designed to allow improved future budget decision-making by allowing consideration of various outcomes and the implication of the outcomes. No variable stress testing is performed. The budgetary not-to-exceed cost estimate for NFA200000PR1902 is $4,120,000.

A complete cost break-down to repair each defect in each asset type is provided in Appendix C.

Photo 001 NFA200000PR1902 Overall
Pier Looking Offshore (East)

Photo 002 NFA200000PR1902 Overall
Pier Looking toward Shoreline (West)

Photo 003 NFA200000PR1902 Overall
Pier Looking Northeast

Photo 004 NFA200000PR1902-Substructure Typical
H1010.01.01 - Plumb Pile, Exposed Steel H Pile

Photo 005 NFA200000PR1902-Substructure Typical
H1010.01.05 - Structural Encasement, Round Concrete Encasement

Photo 006 NFA200000PR1902-Substructure Typical
H1010.01.05 - Structural Encasement, Square Concrete Encasement

Photo 007 NFA200000PR1902-Substructure Typical
H1010.01.01 - Plumb Pile, Steel H-Piles Supporting Offshore Mooring Dolphin

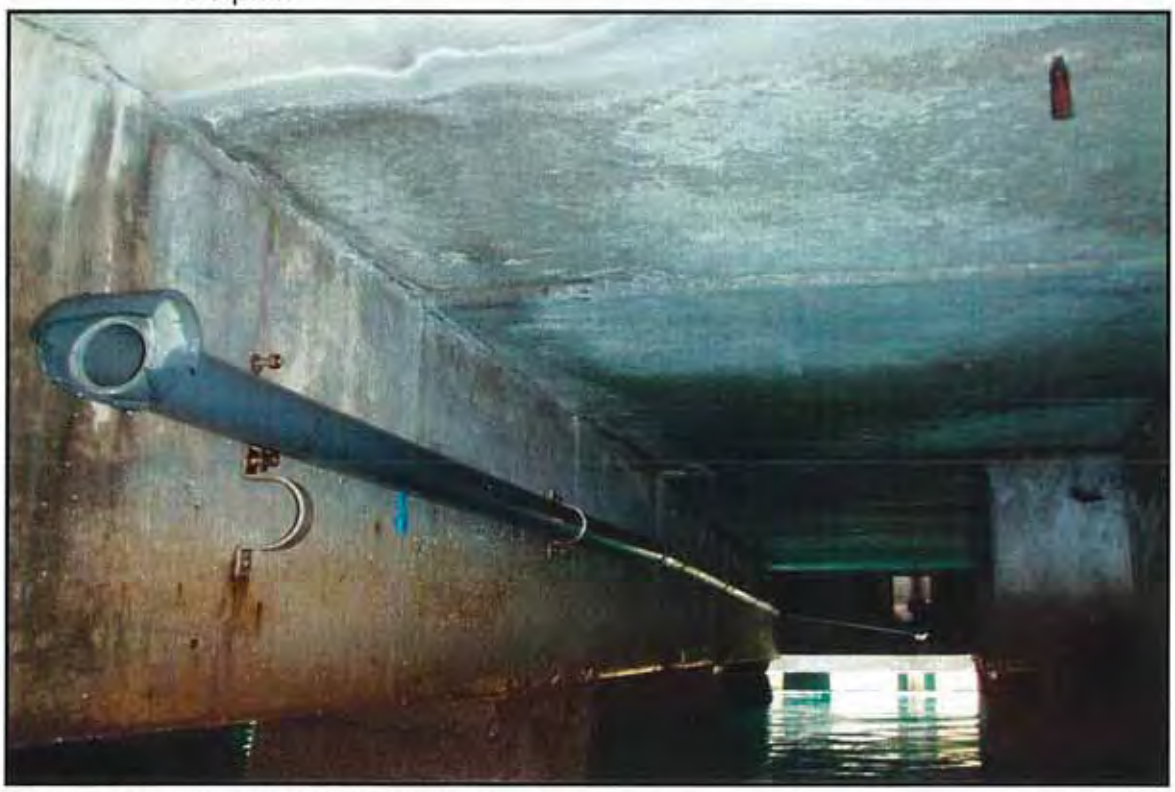


Photo 008 NFA200000PR1902-Substructure Typical
H1010.02.01 - Bent Cap

Photo 009 NFA200000PR1902-Substructure Typical
H1010.02.01 - Bent Cap (Repaired)

Photo 010 NFA200000PR1902-Substructure Defect
31.5 B.5 Encasement Void with Partially exposed steel pile vertically positioned just above the mudline.

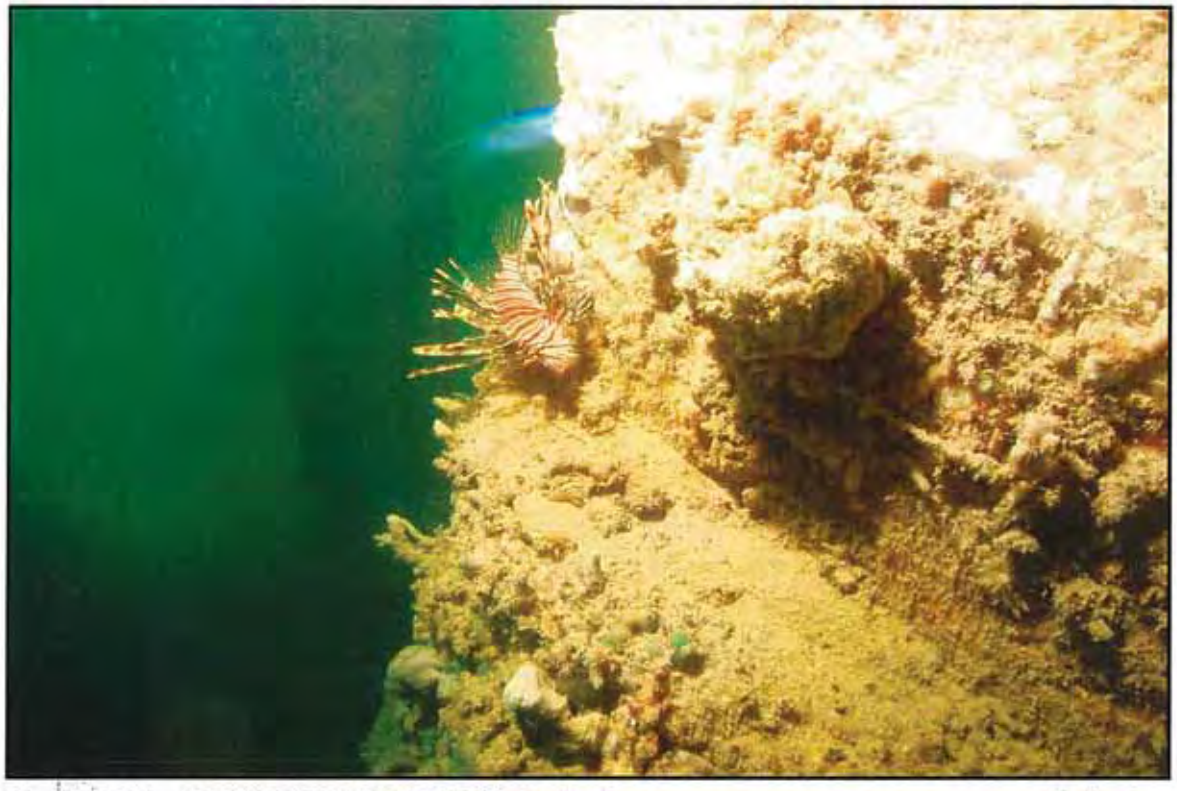


Photo 011 NFA200000PR1902-Substructure Defect
Void in Encasement

Photo 012 NFA200000PR1902-Substructure Defect
Spall in Encasement

Photo 013 NFA200000PR1902-Substructure Defect
Impact Damage in Steel H Pile (Photo 1)

Photo 014 NFA200000PR1902-Substructure Defect
Impact Damage in Steel H Pile (Photo 2)

Photo 015 NFA200000PR1902-Substructure Defect
35.0 A.0 Spall in Encasement

Photo 016 NFA200000PR1902-Substructure Defect
03.0 B.5 Horizontal Crack in Bent Cap

Photo 017 NFA200000PR1902-Substructure Defect
03.0 B.6 Horizontal Crack in Bent Cap

Photo 018 NFA200000PR1902-Substructure Defect
03.0 C.5 Horizontal Crack in Bent Cap

Photo 019 NFA200000PR1902-Substructure Defect
06.2 C.0 Concrete Spall in Bent Cap

Photo 020 NFA200000PR1902-Substructure Defect
08.0 B.5 Vertical Crack in Bent Cap

Photo 021 NFA200000PR1902-Substructure Defect
09.0 D.1 Concrete Spall in Bent Cap

Photo 022 NFA200000PR1902-Substructure Defect
10.0 C.1 Vertical Crack/Spall in Bent Cap

Photo 023 NFA200000PR1902-Substructure Defect
10.0 C.2 Vertical Crack in Bent Cap

Photo 024 NFA200000PR1902-Substructure Defect
22.0 D.7 Concrete Spall in Bent Cap

Photo 025 NFA200000PR1902-Substructure Defect
23.5 D.9 Void (Construction Defect) in Bent Cap

Photo 026 NFA200000PR1902-Substructure Defect
28.0 B.4 Horizontal Crack in Bent Cap

Photo 027 NFA200000PR1902-Substructure Defect
28.0 B.5 Horizontal Crack in Bent Cap

Photo 028 NFA200000PR1902-Substructure Defect
29.0 B.4 Horizontal Crack in Bent Cap

Photo 029 NFA200000PR1902-Substructure Defect
29.0 B.5 Horizontal Crack in Bent Cap

Photo 030 NFA200000PR1902-Substructure Defect
32.0 B.5 Concrete Spall in Bent Cap

Photo 031 NFA200000PR1902-Substructure Defect
Typical Void (Construction Defect) in Bent Cap (Photo 1)

Photo 032 NFA200000PR1902-Substructure Defect
Typical Void (Construction Defect) in Bent Cap (Photo 1)

Photo 033 NFA200000PR1902-Substructure Defect
05.7 E.0 Horizontal Crack in Edge Beam

Photo 034 NFA200000PR1902-Substructure Defect
11.0 E.0 Horizontal Crack in Edge Beam

Photo 035 NFA200000PR1902-Substructure Defect
13.7 A.0 Concrete Spall in Edge Beam

Photo 036 NFA200000PR1902-Substructure Defect
13.8 A.0 Concrete Spall in Edge Beam

Photo 037 NFA200000PR1902-Substructure Defect
14.3 A.0 Concrete Spall in Edge Beam

Photo 038 NFA200000PR1902-Substructure Defect
19.7 A.0 Concrete Spall in Edge Beam with Exposed Skirt Anchor

Photo 039 NFA200000PR1902-Substructure Defect
20.5 A.0 Horizontal Crack in Edge Beam

Photo 040 NFA200000PR1902-Substructure Defect
30.5 A.0 Concrete Spall in Edge Beam with Exposed Skirt Anchor

Photo 041 NFA200000PR1902-Substructure Defect
31.2 A.0 Concrete Spall in Edge Beam with Exposed Skirt Anchor

Photo 042 NFA200000PR1902-Substructure Defect
32.5 E.0 Concrete Spall in Edge Beam with Exposed Skirt Anchor

Photo 043 NFA200000PR1902-Substructure Defect
32.6 A.0 Concrete Spall in Edge Beam with Exposed Skirt Anchor

Photo 044 NFA200000PR1902-Substructure Defect
32.6 E.0 Concrete Spall in Edge Beam with Exposed Skirt Anchor

Photo 045 NFA200000PR1902-Substructure Defect
34.5 A.0 Horizontal Crack in Dolphin Cap

Photo 046 NFA200000PR1902-Substructure Defect
35.0 A.0 Concrete in Dolphin Cap

Photo 047 NFA200000PR1902-Substructure Defect
34.0 A.0 Concrete in Dolphin Cap

Photo 048 NFA200000PR1902-Substructure Defect
35.0 A.0 Concrete in Dolphin Cap (Photo 1)

Photo 049 NFA200000PR1902-Substructure Defect
35.0 A.0 Concrete in Dolphin Cap (Photo 2)

Photo 050 NFA200000PR1902-Substructure Defect
34.5 A.5 Concrete Spall in Dolphin Cap Soffit

Photo 051 NFA200000PR1902-Substructure Defect
35.0 B.0 Concrete Spall in Dolphin Cap

Photo 052 NFA200000PR1902-Superstructure Typical
H1030.01.03 - Structural Deck Overlay

Photo 053 NFA200000PR1902-Superstructure Typical
H1030.01.04 - Prestress Plank (Repaired)

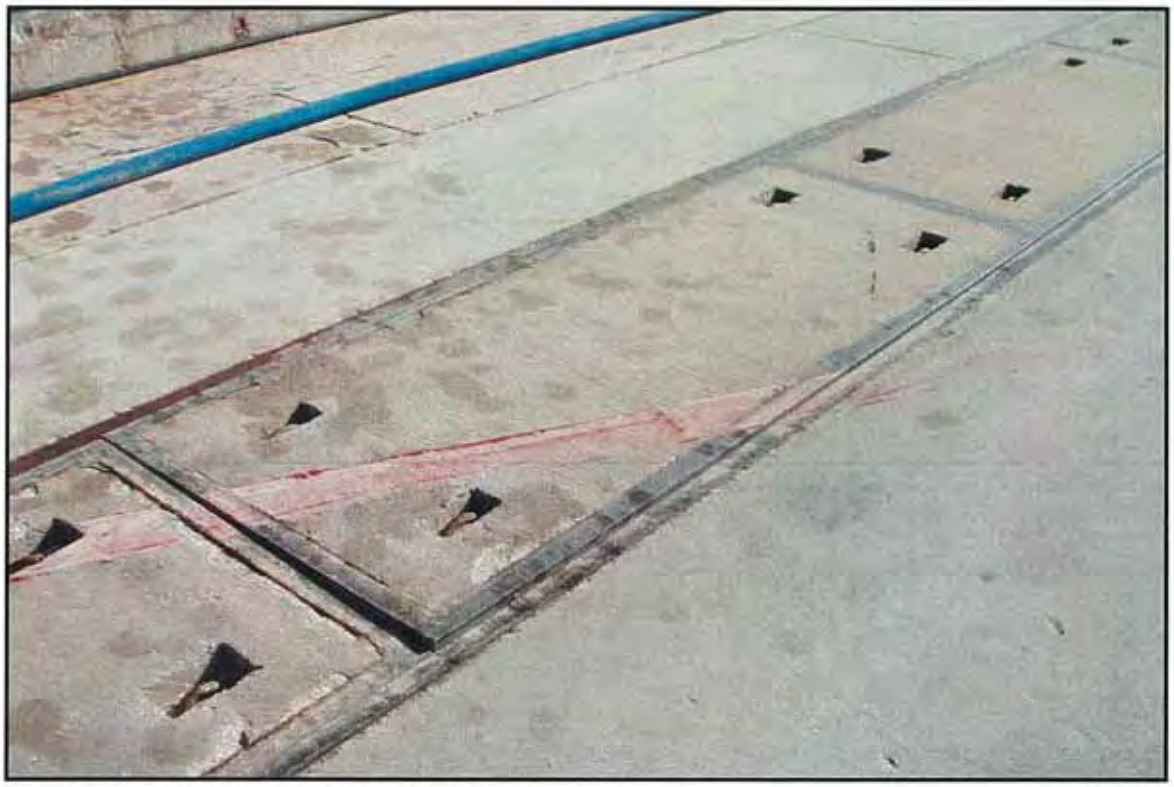


Photo 054 NFA200000PR1902-Superstructure Typical
H1050.05.03 - Utility On-Deck Cover

Photo 055 NFA200000PR1902-Superstructure Typical
H1030.02.01 - Curbs & Bullrails

Photo 056 NFA200000PR1902-Superstructure Typical
H1010.02.03 - Dolphin Cap

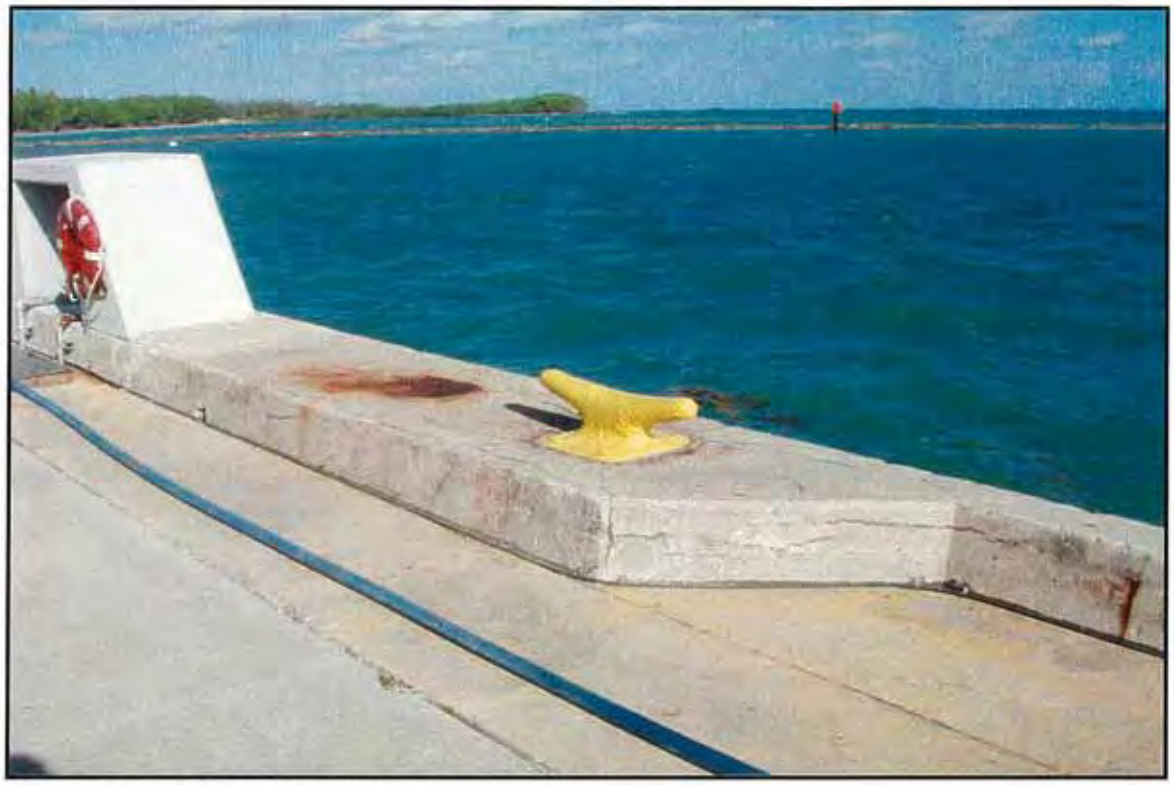


Photo 057 NFA200000PR1902-Superstructure Typical
H1030.02.02 - Mooring Foundation

Photo 058 NFA200000PR1902-Superstructure Defect
01.3 C.2 Broken Prestressed Concrete Plank

Photo 059 NFA200000PR1902-Superstructure Defect
01.3 D.0 Broken Prestressed Concrete Plank

Photo 060 NFA200000PR1902-Superstructure Defect
01.7 A.0 Spall in Prestressed Concrete Plank

Photo 061 NFA200000PR1902-Superstructure Defect
04.8 D.9 Broken Prestressed Concrete Plank

Photo 062 NFA200000PR1902-Superstructure Defect
08.8 D.8 Spall in Prestressed Concrete Plank

APPENDIX A
STRUCTURAL DATA

APPENDIX A STRUCTURAL DATA

The information with in Appendix A provides an Asset Inventory and documents the observed defects in the Structural Data.

Asset Inventory

The assets comprising the structure were documented during the inspection and categorized with corresponding Level V Uniformat Codes in the attached inventory. Table A-1 presents the adopted Uniformat hierarchy. The characteristics of each asset documented include material type, shape, length, and geometry. In addition, dimensional information for each geometry type was recorded.

TABLE A-1
Uniformat Hierarchy

UniFormat Level				
LvL2	**LvL3**	**LvL4**	**LvL5**	
H10	Waterfront Structures			
	H1010	Substructures		
		H1010.01	Pile Foundations	
			H1010.01.01	Plumb Pile
			H1010.01.02	Batter Pile
			H1010.01.03	Sheet Pile
			H1010.01.04	Caisson
			H1010.01.05	Structural Encasement
			H1010.01.06	Spread Footing
		H1010.02	Pile Caps	
			H1010.02.01	Bent Cap
			H1010.02.02	Bulkhead Cap
			H1010.02.03	Dolphin Cap
		H1010.03	Pontoons	
			H1010.03.01	Pontoon
		H1010.04	Abutments & Piers	
			H1040.04.01	Abutment
			H1040.04.02	Piers
		H1010.05	Structural Walls	
			H1010.05.01	Structural Wall

TABLE A-1 (Cont.)
Uniformat Hierarchy

UniFormat Level				
LvL2	**LvL3**	**LvL4**	**LvL5**	
	H1020	Superstructure		
		H1020.01	Beams and Girders	
			H1020.01.01	Girder
			H1020.01.02	Stringer
			H1020.01.03	Edge Beam
		H1020.02	Lateral-Load Bracing	
			H1020.02.01	Horizontal Brace
			H1020.02.02	Vertical Brace
			H1020.02.03	Sheet Pile Waling
	H1030	Deck Components		
		H1030.01	Deck	
			H1030.01.01	Suspended Deck
			H1030.01.02	Deck On-Grade
			H1030.01.03	Structural Deck Overlay
			H1030.01.04	Suspended Plank
		H1030.02	Deck Components	
			H1030.02.01	Curbs & Bullrail
			H1030.02.02	Utility Foundation
			H1030.02.03	Mooring Foundation
			H1030.02.04	Expansion Joint
	H1040	Mooring & Berthing System		
		H1040.01	Fender System	
			H1040.01.01	Fender Pile
			H1040.01.02	Fender Pile Cluster
			H1040.01.03	Fender Framing
			H1040.01.04	Extruded Fender
			H1040.01.05	Molded Fender
			H1040.01.06	Foam-Filled Fender
			H1040.01.07	Hydro-Pneumatic Fender
			H1040.01.08	Pneumatic Fender
			H1040.01.09	Camel

TABLE A-1 (Cont.)
Uniformat Hierarchy

UniFormat Level				
LvL2	**LvL3**	**LvL4**	**LvL5**	
			H1040.01.10	Separator
			H1040.01.11	Rubbing Strip
			H1040.01.12	Vertical Buffer
			H1040.01.13	Panels / Skirt
		H1040.02	Dolphins	
			H1040.02.01	Fender Pile
			H1040.02.02	Wire Wrap
		H1040.03	Mooring Hardware	
			H1040.03.01	Bollard
			H1040.03.02	Double Bitt
			H1040.03.03	Cleat
			H1040.03.04	Quick-Release Hook
			H1040.03.05	Capstans & Windlass
	H1050	Appurtenances		
		H1050.01	Handrails & Guard Posts	
			H1050.01.01	Handrail
			H1050.01.02	Guard Post
		H1050.02	Brows	
			H1050.02.01	Brow
			H1050.02.02	Wear Plate
			H1050.02.03	Gangway Platform
			H1050.02.04	Roller Guide
			H1050.02.05	Gangway Roller
		H1050.03	Cable Booms	
			H1050.03.01	Cable Boom
		H1050.04	Safety	
			H1050.04.01	Ladder
			H1050.04.02	Life Ring
			H1050.04.03	Eyewash Station
			H1050.04.04	MOB Hook
			H1050.04.05	Fire Extinguisher

TABLE A-1 (Cont.)
Uniformat Hierarchy

UniFormat Level				
LvL2	**LvL3**	**LvL4**	**LvL5**	
		H1050.05	Vaults	
			H1050.05.01	Utility Vault
			H1050.05.02	Drainage Vault
			H1050.05.03	Utility On-Deck Cover
		H1050.06	Panels	
			H1050.06.01	Firewall

In addition, each element comprising the asset was designated a unique six digit code indicating the element type, system, material and geometry. The first three letters abbreviate the element type and system as shown in Figure A-1. The fourth digit, or first numeral, indicates the material type. The final two digits indicate the element geometry and are unique to each element type and material, summarized in Figure A-1. Finally, every element was positioned from the structures local origin with X, Y, and Z coordinates (See Table A-3). The local origin is the located at the inboard face corner in quadrant 2, See Figure A-1.

Structural Data

The structural data documents the deficiencies in the elements recorded during the inspection. The defect type, size, and location are documented and entered into the attached structural data table. The observed defect types were documented with a unique three letter abbreviation, shown below.

NIL: No Defect
%SL: Section Loss, Overall
%CL: Coating Loss, Overall
%BK: Broken
MIA: Missing
OCS: Spall
DEL: Delaminated Area
ERS: Erosion
CKV: Crack, Vertical
CKH: Crack, Horizontal
CKM: Crack, Map
SCL: Surface Scaling
HCM: Honey Combing
VOD: Void
%MG: Missing Joint Grout
%BR: Section Loss, Marine Borer
%LM: Section Loss, Limnoria
%TR: Section Loss, Teredo
%BL: Bearing Loss
SPL: Split
ROT: Rot
DFL: Deflection

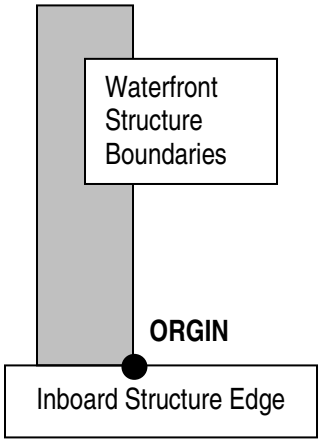
Figure A-1
Uniformat Hierarchy

XXXMGG.AD

XXX	Asset Abbreviation
M	Material Type
GG	Asset Geometry

Material Type

0	Unknown
1	Concrete
2	Timber
3	Steel
4	Rubber
5	Plastic
6	Fiberglass
7	
8	Iron
9	NA

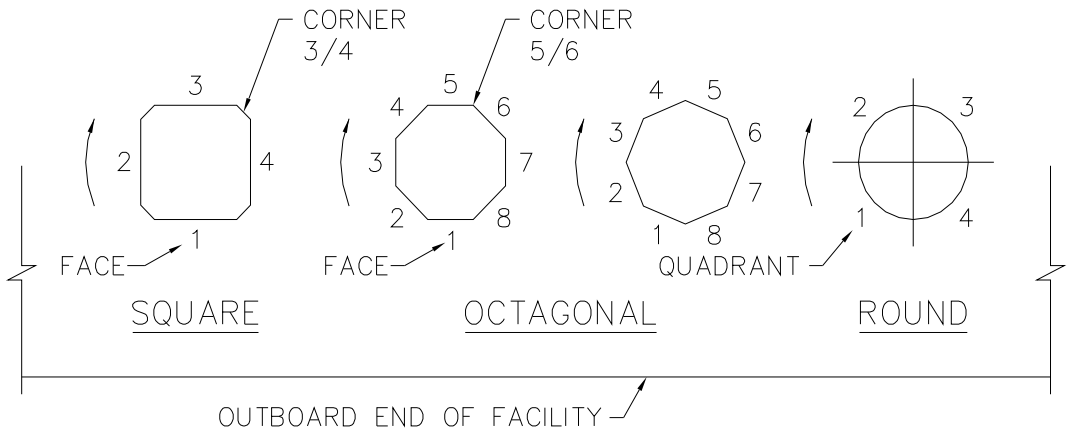


Asset Abbreviation Definitions

FBF	Framing	Berthing	Fender
FEF	Fenders	Extruded	Fender
FFF	Fenders	Foam-Filled	Fender
FPF	Fenders	Pneumatic	Fender
BHM	Bollard	Hardware	Mooring
CHM	Cleat	Hardware	Mooring
THM	Bitt	Hardware	Mooring
FPM	Foundation	Pedestal	Mooring
CBS	Cap	Bent	Structural
CDS	Curb	Deck	Structural
DOS	Deck	Overlay	Structural
EPS	Encasement	Pile	Structural
JES	Joint	Expansion	Structural
PBS	Pile	Batter	Structural
PPS	Pile	Plumb	Structural
WWS	Wall	Wing	Structural
DPS	Deck	Prestress Plank	Structural
CDU	Cover	On-Deck	Utilities
VMU	Vault	Utility	Utilities
ENC	Pile	Encasement	Structural
WRS	Wall	Retaining	Structural
SCF	Skirt	Wall	Fender
SFF	Skirt	Fastener	Fender
JEA	Joint	Expansion	Appurtenance
CFS	Cap	Dolphin	Structural
LRG	Life Ring	Safety	Appurtenance
FSA	Extinguisher	Safety	Appurtenance
LSA	Ladder	Safety	Appurtenance
BES	Beam	Edge	Structural

The defect position on the deteriorated element is recorded using the orientation key shown in Figure A-2. In addition, the bottom face, or soffit, of an element is recorded as Face 5 and the top face of the element is recorded as Face 6. Similarly, the corner between the bottom and vertical faces of a element are documented as Corners 1/5, 2/5, 3/5, and 4/5 while the corners between the top and vertical faces of a element are documented as Corners 1/6, 2/6, 3/6, and 4/6. The faces and corners are further abbreviated as F01 to F06 and C15 to C16, with F indicating that the defect is in the face of the element and C indicated the corner of the element between the two indicated faces is deteriorated.

Figure A-2
Orientation Key



ASSET INVENTORY SUMMARY TABLE

FACILITY: NFA200000PR1902 INSPECTION DATE: 2008-2009

Overall Facility Condition Index: CI = **Facility Operational Capability Rating: =**

UniFormat II Code	UniFormat II Description	Asset Type	Facility Section	Criticality Factor1	No. of Assets	Quantity of Units	Unit Type	Current CI	Approximate Repair Costs
Level 2 Group Elements									
H10	Waterfront Structures	-	-	-	-	-	-	**45**	**$4,120,000**
Level 3 Individual Elements									
H1010	Substructure	-	-	-	-	-	-	**45**	**$716,400**
H1020	Superstructure	-	-	-	-	-	-	**60**	**$151,500**
H1030	Deck Components	-	-	-	-	-	-	**45**	**$3,158,400**
H1040	Mooring and Berthing Systems	-	-	-	-	-	-	**60**	**$59,800**
H1050	Appurtenances	-	-	-	-	-	-	**60**	**$34,000**
Level 4 & 5 Sub-Elements and Minority Elements									
H1010.01	**Pile Foundations**								**$ 38,232**
H1010.01.01	Plumb Pile	PPS301	-	-	209	1	EA		
H1010.01.02	Batter Pile	PBS301	-	-	126	1	EA		
H1010.01.05	Structural Encasement	EPS101	-	-	170	1	EA		
H1010.01.05	Structural Encasement	EPS102	-	-	157	1	EA		
H1010.01.05	Structural Encasement	EPS102	-	-	157	1	EA		
H1010.02	**Pile Caps**								**$ 607,500**
H1010.02.01	Bent Cap	CBS101	-	-	66	50	LF		
H1010.02.03	Dolphin Cap	CFS101	-	-	2	1	EA		
H1020.01	**Beams and Girders**								**$ 151,470**
H1020.01.03	Edge Beams	BES101	-	-	2	485	LF		
H1030.01	**Deck**								**$ 2,953,260**
H1030.01.03	Structural Deck Overlay	DOS101	-	-	64	40	SF		
H1030.01.03	Structural Deck Overlay	DOS102	-	-	32	156.25	SF		
H1030.01.03	Structural Deck Overlay	DOS103	-	-	32	168.75	SF		
H1030.01.03	Structural Deck Overlay	DOS104	-	-	32	200	SF		
H1030.01.03	Structural Deck Overlay	DOS105	-	-	1	50	SF		
H1030.01.03	Structural Deck Overlay	DOS106	-	-	1	150	SF		
H1030.01.04	Suspended Plank	DPS101	-	-	64	1	EA		
H1030.01.04	Suspended Plank	DPS102	-	-	320	1	EA		
H1030.02	**Deck Components**								**$ 205,092**
H1030.02.01	Curbs & Bullrail	CDS101	-	-	2	82	LF		

ASSET INVENTORY SUMMARY TABLE

FACILITY: NFA200000PR1902 INSPECTION DATE: 2008-2009

Overall Facility Condition Index: CI = **Facility Operational Capability Rating: =**

UniFormat II		Asset	Facility	Criticality	No. of	Quantity	Unit	Current	Approximate
Code	Description	Type	Section	Factor1	Assets	of Units	Type	CI	Repair Costs
H1030.02.01	Curbs & Bullrail	CDS102	-	-	2	30	LF		
H1030.02.01	Curbs & Bullrail	CDS103	-	-	2	15	LF		
H1030.02.03	Mooring Foundation	FPM101	-	-	4	10	LF		
H1030.02.03	Mooring Foundation	FPM102	-	-	2	157	LF		
H1030.02.03	Mooring Foundation	FPM103	-	-	2	165	LF		
H1030.02.03	Mooring Foundation	FPM104	-	-	2	31	LF		
H1030.02.04	Expansion Joint	JEA401	-	-	1	50	LF		
H1030.02.04	Expansion Joint	JEA402	-	-	2	485	LF		
H1040.01	**Fender System**								**$ 50,544**
H1040.01.03	Fender Framing	FBF201	-	-	-	20	LF		
H1040.01.13	Panels / Skirt	SCF101	-	-	40	1	EA		
H1040.01.04	Extruded Fender	FEF401	-	-	-	-	EA		
H1040.01.06	Foam-Filled Fender	FFF401	-	-	-	-	EA		
H1040.03	**Mooring Hardware**								
H1040.03.01	Bollard	BHM301	-	-	2	1	EA		
H1040.03.02	Double Bitt	THM301	-	-	12	1	EA		
H1040.03.03	Cleats	CHM301	-	-	18	1	EA		
H1050.05	**Vaults**								**$ 34,117**
H1050.05.03	Utility On-Deck Cover	CDU101	-	-	12	1	EA		
H1050.05.03	Utility On-Deck Cover	CDU102	-	-	6	1	EA		
H1050.05.03	Utility On-Deck Cover	CDU103	-	-	4	1	EA		
H1050.05.03	Utility On-Deck Cover	CDU104	-	-	58	1	EA		
H1050.04	**Safety**								
H1050.04.02	Life Rings	LRG401	-	-	6	1	EA		
H1050.04	**Safety**								
H1050.04.05	Fire Extinguisher	FSA301	-	-	4	1	EA		
H1050.04.01	Ladder	LSA301	-	-	2	1	EA		

ASSET INVENTORY SUMMARY TABLE

FACILITY: NFA200000PR1902 INSPECTION DATE: 2008-2009

Overall Facility Condition Index: CI = **Facility Operational Capability Rating: =**

UniFormat II		Asset Type	Facility Section	Criticality Factor1	No. of Assets	Quantity of Units	Unit Type	Current CI	Approximate Repair Costs
Code	Description								

STRUCTURAL ASSET INVENTORY

FACILITY: NFA200000PR1902 INSPECTION DATE: 2009

DEPTH: 0 - 35 ft VISIBILITY: 3 - 5 feet CURRENT: Negligible WATER TEMP: 60 deg F

CONDITION INDICES: MDI= _____ RR= _____ FR= _____ SCI= _____

UniFormat II		Asset	Facility	Criticality	No. of Assets	Quantity of	Unit			Piles & Fittings		Caps, Beams, Girders			Deck	
Code	Negligible	Type	Section	Factor	(Count)	Units	Type	Material	Age	Size (in.)	Shape	Depth (in.)	Width (in.)	Length (ft)	Depth (in.)	Area (sf)
H1010.01.01	Plumb Pile	PPS301			209	1	EA	Steel			HPS			25		
H1010.01.02	Batter Pile	PBS301			126	1	EA	Steel			HPS			25		
H1010.01.05	Structural Encasement	EPS101			170	1	EA	Concrete			RND	36		25		
H1010.01.05	Structural Encasement	EPS102			157	1	EA	Concrete			SQR	26	26	25		
H1010.01.05	Structural Encasement	EPS102			157	1	EA	Concrete			SQR	26	26	5		
H1010.02.01	Bent Cap	CBS101			66	50	LF	Concrete			SQR	30	30	50		
H1010.02.03	Dolphin Cap	CFS101			2	1	EA	Concrete			SQR	42	90	7.5		
H1020.01.03	Edge Beams	BES101			2	485	LF	Concrete			SQR	54	40	485		
H1030.01.03	Structural Deck Overlay	DOS101			64	40	SF	Concrete			SQR	15	32	15		
H1030.01.03	Structural Deck Overlay	DOS102			32	156.25	SF	Concrete			SQR	15	125	15		
H1030.01.03	Structural Deck Overlay	DOS103			32	168.75	SF	Concrete			SQR	15	135	15		
H1030.01.03	Structural Deck Overlay	DOS104			32	200	SF	Concrete			SQR	15	160	15		
H1030.01.03	Structural Deck Overlay	DOS105			1	50	SF	Concrete			SQR	15	600	1		
H1030.01.03	Structural Deck Overlay	DOS106			1	150	SF	Concrete			SQR	15	600	3		
H1030.01.04	Suspended Plank	DPS101			64	1	EA	Concrete			SQR	10	32	15		
H1030.01.04	Suspended Plank	DPS102			320	1	EA	Concrete			SQR	10	42	15		
H1030.02.01	Curbs & Bullrail	CDS101			2	82	LF	Concrete			SQR	12	9	82		
H1030.02.01	Curbs & Bullrail	CDS102			2	30	LF	Concrete			SQR	12	9	30		
H1030.02.01	Curbs & Bullrail	CDS103			2	15	LF	Concrete			SQR	12	9	15		
H1030.02.03	Mooring Foundation	FPM101			4	10	LF	Concrete			SQR	12	40	10		
H1030.02.03	Mooring Foundation	FPM102			2	157	LF	Concrete			SQR	12	9	157		
H1030.02.03	Mooring Foundation	FPM103			2	165	LF	Concrete			SQR	12	40	165		
H1030.02.03	Mooring Foundation	FPM104			2	31	LF	Concrete			SQR	12	9	31		
H1030.02.04	Expansion Joint	JEA401			1	50	LF	Rubber			GAP	1		50		
H1030.02.04	Expansion Joint	JEA402			2	485	LF	Rubber			GAP	50		485		
H1040.01.03	Fender Framing	FBF201				20	LF	Timber			SQR	12	12	20		
H1040.01.04	Extruded Fender	FEF401					EA									
H1040.01.06	Foam-Filled Fender	FFF401					EA									
H1040.01.13	Panels / Skirt	SCF101			40	1	EA	Concrete			SQR	12	108	15		
H1040.03.01	Bollard	BHM301			2	1	EA	Steel			RND	20		2		
H1040.03.02	Double Bitt	THM301			12	1	EA	Steel			RND	12		1		
H1040.03.03	Cleats	CHM301			18	1	EA	Steel			SQR	3	8	3		
H1050.04.01	Ladder	LSA301			2	1	EA	Steel			SQR	6	24	5		

STRUCTURAL ASSET INVENTORY

FACILITY: NFA200000PR1902 INSPECTION DATE: 2009

DEPTH: 0 - 35 ft VISIBILITY: 3 - 5 feet CURRENT: Negligible WATER TEMP: 60 deg F

CONDITION INDICES: MDI= _____ RR= _____ FR= _____ SCI= _____

UniFormat II		Asset	Facility	Criticality	No. of Assets	Quantity of	Unit			Piles & Fittings		Caps, Beams, Girders			Deck	
Code	Negligible	Type	Section	Factor	(Count)	Units	Type	Material	Age	Size (in.)	Shape	Depth (in.)	Width (in.)	Length (ft)	Depth (in.)	Area (sf)
H1050.04.02	Life Rings	LRG401			6	1	EA	Rubber			RND	24		1		
H1050.04.05	Fire Extinguisher	FSA301			4	1	EA	Steel			RND	6		2		
H1050.05.03	Utility On-Deck Cover	CDU101			12	1	EA	Concrete			SQR	36	40	7		
H1050.05.03	Utility On-Deck Cover	CDU102			6	1	EA	Concrete			SQR	30	40	11		
H1050.05.03	Utility On-Deck Cover	CDU103			4	1	EA	Concrete			SQR	36	40	20		
H1050.05.03	Utility On-Deck Cover	CDU104			58	1	EA	Concrete			SQR	15	38	8		

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
001	ENC Encasement Pile	03.0-A.0	NFA200000PR1902	003	OCS Spall						001			00 FT2		004	
002	ENC Encasement Pile	03.0-C.0	NFA200000PR1902	002	CKV Crack, Vertical						001				0.12		
003	ENC Encasement Pile	03.0-D.0	NFA200000PR1902	002	CKV Crack, Vertical						001				0.12		
004	ENC Encasement Pile	03.0-D.0	NFA200000PR1902	002	CKV Crack, Vertical						001				0.12		
005	ENC Encasement Pile	04.0-D.0	NFA200000PR1902	002	CKV Crack, Vertical						00				0.12		
006	ENC Encasement Pile	09.5-B.5	NFA200000PR1902	003	ERS Erosion						001			003 FT2		004	
007	ENC Encasement Pile	09.5-C.5	NFA200000PR1902	003	ERS Erosion						001			00 FT2		003	001
008	ENC Encasement Pile	10.0-D.0	NFA200000PR1902	002	CKV Crack, Vertical						00				0.12		
009	ENC Encasement Pile	12.0-B.0	NFA200000PR1902	002	ERS Erosion						001			001 FT2		003	
010	ENC Encasement Pile	15.0-D.0	NFA200000PR1902	002	ERS Erosion						001			001 FT2		003	
011	ENC Encasement Pile	16.5-B.0	NFA200000PR1902	003	ERS Erosion						001			00 FT2		004	
012	ENC Encasement Pile	16.5-D.5	NFA200000PR1902	003	VOD Void						001			00 FT2		004	
013	ENC Encasement Pile	17.0-E.0	NFA200000PR1902	003	ERS Erosion						001			001 FT2		004	
014	ENC Encasement Pile	25.5-C.5	NFA200000PR1902	003	VOD Void						001			001 FT2		004	
015	ENC Encasement Pile	31.5-B.5	NFA200000PR1902	004	ERS Erosion						00			001 FT2		006	
016	ENC Encasement Pile	31.5-B.5	NFA200000PR1902	004	ERS Erosion						00			001 FT2		006	
017	ENC Encasement Pile	31.5-B.5	NFA200000PR1902	004	ERS Erosion						00			001 FT2		006	
018	ENC Encasement Pile	31.5-B.5	NFA200000PR1902	004	ERS Erosion						00			001 FT2		006	
019	CBS Bent Cap	02.0-B.5	NFA200000PR1902	004	DEL Delaminated Area					014	011			013 FT2			
020	CBS Bent Cap	02.0-C.0	NFA200000PR1902	003	DEL Delaminated Area				020		010			017 FT2			
021	CBS Bent Cap	02.0-C.5	NFA200000PR1902	004	DEL Delaminated Area					012	011			011 FT2			
022	CBS Bent Cap	02.0-D.5	NFA200000PR1902	004	DEL Delaminated Area					012	011			011 FT2			
023	CBS Bent Cap	02.0-D.7	NFA200000PR1902	003	DEL Delaminated Area				010		006			005 FT2			
024	CBS Bent Cap	02.5-B.7	NFA200000PR1902	004	CKH Crack, Horizontal				032		002			005 FT2	0.03		
025	CBS Bent Cap	03.0-B.5	NFA200000PR1902	004	DEL Delaminated Area				030		011			028 FT2			
026	CBS Bent Cap	03.0-C.5	NFA200000PR1902	004	DEL Delaminated Area				030		011			028 FT2			
027	CBS Bent Cap	03.0-D.3	NFA200000PR1902	002	DEL Delaminated Area					008	004			002 FT2			
028	CBS Bent Cap	03.0-D.5	NFA200000PR1902	003	DEL Delaminated Area				010		006			005 FT2			
029	CBS Bent Cap	04.0-B.5	NFA200000PR1902	004	DEL Delaminated Area				024		011			022 FT2			
030	CBS Bent Cap	04.0-B.5	NFA200000PR1902	004	DEL Delaminated Area				010		011			009 FT2			
031	CBS Bent Cap	04.0-C.5	NFA200000PR1902	002	DEL Delaminated Area					009	005			004 FT2			
032	CBS Bent Cap	04.0-C.5	NFA200000PR1902	004	DEL Delaminated Area				024		011			022 FT2			
033	CBS Bent Cap	04.0-D.3	NFA200000PR1902	002	DEL Delaminated Area					012	004			004 FT2			
034	CBS Bent Cap	04.0-D.5	NFA200000PR1902	004	DEL Delaminated Area				024		011			022 FT2			

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
035	CBS Bent Cap	05.0-B.5	NFA200000PR1902	004	DEL Delaminated Area					014	011			013 FT2			
036	CBS Bent Cap	05.0-C.0	NFA200000PR1902	002	DEL Delaminated Area				018		005			007 FT2			
037	CBS Bent Cap	05.0-C.5	NFA200000PR1902	004	DEL Delaminated Area					014	011			013 FT2			
038	CBS Bent Cap	05.0-D.5	NFA200000PR1902	004	DEL Delaminated Area				008		011			007 FT2			
039	CBS Bent Cap	06.0-B.5	NFA200000PR1902	003	DEL Delaminated Area				024		010			020 FT2			
040	CBS Bent Cap	06.0-C.5	NFA200000PR1902	004	DEL Delaminated Area				024		011			022 FT2			
041	CBS Bent Cap	06.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				024		010			020 FT2			
042	CBS Bent Cap	06.0-D.5	NFA200000PR1902	004	DEL Delaminated Area				018		011			017 FT2			
043	CBS Bent Cap	06.2-C.0	NFA200000PR1902	003	CKH Crack, Horizontal						003				0.25		
044	CBS Bent Cap	07.0-A.1	NFA200000PR1902	002	CKH Crack, Horizontal						003				0.06		
045	CBS Bent Cap	07.0-A.5	NFA200000PR1902	004	DEL Delaminated Area					012	011			011 FT2			
046	CBS Bent Cap	07.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				024		010			020 FT2			
047	CBS Bent Cap	07.0-C.5	NFA200000PR1902	003	DEL Delaminated Area						010						
048	CBS Bent Cap	07.0-D.2	NFA200000PR1902	003	DEL Delaminated Area				018		007			011 FT2			
049	CBS Bent Cap	07.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						007				0.12		
050	CBS Bent Cap	07.2-C.0	NFA200000PR1902	002	CKH Crack, Horizontal						003				0.12		
051	CBS Bent Cap	08.0-B.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
052	CBS Bent Cap	08.0-B.8	NFA200000PR1902	002	DEL Delaminated Area					010	004			003 FT2			
053	CBS Bent Cap	08.0-C.2	NFA200000PR1902	002	DEL Delaminated Area					008	004			003 FT2			
054	CBS Bent Cap	08.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				014		010			012 FT2			
055	CBS Bent Cap	08.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
056	CBS Bent Cap	08.0-D.5	NFA200000PR1902	003	DEL Delaminated Area				012		008			008 FT2			
057	CBS Bent Cap	09.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
058	CBS Bent Cap	09.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
059	CBS Bent Cap	09.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
060	CBS Bent Cap	09.0-B.7	NFA200000PR1902	002	CKH Crack, Horizontal						004				0.06		
061	CBS Bent Cap	09.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					012	009			009 FT2			
062	CBS Bent Cap	09.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				010		009			008 FT2			
063	CBS Bent Cap	09.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				010		010			008 FT2			
064	CBS Bent Cap	09.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				012		010			010 FT2			
065	CBS Bent Cap	09.0-D.1	NFA200000PR1902	004	OCS Spall				012		002			002 FT2		016	002
066	CBS Bent Cap	10.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.03		
067	CBS Bent Cap	10.0-C.0	NFA200000PR1902	002	DEL Delaminated Area				032		005			012 FT2			
068	CBS Bent Cap	10.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
069	CBS Bent Cap	10.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
070	CBS Bent Cap	10.0-D.3	NFA200000PR1902	003	DEL Delaminated Area				018		008			012 FT2			
071	CBS Bent Cap	10.0-D.5	NFA200000PR1902	003	DEL Delaminated Area				018		010			015 FT2			
072	CBS Bent Cap	11.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
073	CBS Bent Cap	11.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
074	CBS Bent Cap	11.0-D.5	NFA200000PR1902	004	DEL Delaminated Area				010		011			009 FT2			
075	CBS Bent Cap	11.0-D.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
076	CBS Bent Cap	12.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.03		
077	CBS Bent Cap	12.0-B.5	NFA200000PR1902	002	CKH Crack, Horizontal						004				0.06		
078	CBS Bent Cap	12.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
079	CBS Bent Cap	12.0-C.5	NFA200000PR1902	004	DEL Delaminated Area				024		011			022 FT2			
080	CBS Bent Cap	12.0-D.5	NFA200000PR1902	003	DEL Delaminated Area				024		010			020 FT2			
081	CBS Bent Cap	12.0-D.5	NFA200000PR1902	004	DEL Delaminated Area				028		011			026 FT2			
082	CBS Bent Cap	13.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.03		
083	CBS Bent Cap	13.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						007				0.06		
084	CBS Bent Cap	13.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
085	CBS Bent Cap	13.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				028		010			023 FT2			
086	CBS Bent Cap	13.0-D.3	NFA200000PR1902	002	CKH Crack, Horizontal						004				0.06		
087	CBS Bent Cap	13.0-D.5	NFA200000PR1902	003	DEL Delaminated Area				024		008			016 FT2			
088	CBS Bent Cap	14.0-A.5	NFA200000PR1902	002	CKH Crack, Horizontal						005				0.03		
089	CBS Bent Cap	14.0-B.5	NFA200000PR1902	003	DEL Delaminated Area					018	006			009 FT2			
090	CBS Bent Cap	14.0-B.5	NFA200000PR1902	003	DEL Delaminated Area				024		010			020 FT2			
091	CBS Bent Cap	14.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
092	CBS Bent Cap	14.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
093	CBS Bent Cap	14.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				028		010			023 FT2			
094	CBS Bent Cap	14.0-D.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
095	CBS Bent Cap	14.0-D.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
096	CBS Bent Cap	14.0-D.5	NFA200000PR1902	003	DEL Delaminated Area				024		010			020 FT2			
097	CBS Bent Cap	15.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.03		
098	CBS Bent Cap	15.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
099	CBS Bent Cap	15.0-B.5	NFA200000PR1902	003	DEL Delaminated Area				018		010			015 FT2			
100	CBS Bent Cap	15.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
101	CBS Bent Cap	15.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				030		010			025 FT2			
102	CBS Bent Cap	15.0-D.5	NFA200000PR1902	003	DEL Delaminated Area				012		010			010 FT2			

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
103	CBS Bent Cap	15.0-D.5	NFA200000PR1902	003	DEL Delaminated Area				014		010			012 FT2			
104	CBS Bent Cap	15.7-E.0	NFA200000PR1902	002	CKH Crack, Horizontal						005				0.06		
105	CBS Bent Cap	16.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
106	CBS Bent Cap	16.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
107	CBS Bent Cap	16.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
108	CBS Bent Cap	16.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
109	CBS Bent Cap	16.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						006				0.06		
110	CBS Bent Cap	16.0-B.5	NFA200000PR1902	003	DEL Delaminated Area				018		007			011 FT2			
111	CBS Bent Cap	16.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				024		010			020 FT2			
112	CBS Bent Cap	16.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
113	CBS Bent Cap	16.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
114	CBS Bent Cap	16.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
115	CBS Bent Cap	17.0-B.5	NFA200000PR1902	002	CKH Crack, Horizontal						005				0.06		
116	CBS Bent Cap	17.0-B.5	NFA200000PR1902	002	CKH Crack, Horizontal						005				0.06		
117	CBS Bent Cap	17.0-B.5	NFA200000PR1902	003	DEL Delaminated Area					018	008			012 FT2			
118	CBS Bent Cap	17.0-C.5	NFA200000PR1902	002	DEL Delaminated Area					020	005			008 FT2			
119	CBS Bent Cap	17.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						006				0.06		
120	CBS Bent Cap	17.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						006				0.06		
121	CBS Bent Cap	18.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
122	CBS Bent Cap	18.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
123	CBS Bent Cap	18.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
124	CBS Bent Cap	18.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				032		010			027 FT2			
125	CBS Bent Cap	18.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				018		006			009 FT2			
126	CBS Bent Cap	18.0-D.5	NFA200000PR1902	003	DEL Delaminated Area					018	010			015 FT2			
127	CBS Bent Cap	19.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
128	CBS Bent Cap	19.0-B.0	NFA200000PR1902	004	DEL Delaminated Area				006		013			007 FT2			
129	CBS Bent Cap	19.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
130	CBS Bent Cap	19.0-B.5	NFA200000PR1902	003	DEL Delaminated Area					012	010			010 FT2			
131	CBS Bent Cap	19.0-C.5	NFA200000PR1902	003	CKH Crack, Horizontal						006				0.06		
132	CBS Bent Cap	19.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				024		008			016 FT2			
133	CBS Bent Cap	19.0-D.5	NFA200000PR1902	003	DEL Delaminated Area					007	010			006 FT2			
134	CBS Bent Cap	20.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
135	CBS Bent Cap	20.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
136	CBS Bent Cap	20.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
137	CBS Bent Cap	20.0-B.5	NFA200000PR1902	003	DEL Delaminated Area				016		010			013 FT2			
138	CBS Bent Cap	20.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				018		007			011 FT2			
139	CBS Bent Cap	20.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					018	009			014 FT2			
140	CBS Bent Cap	21.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
141	CBS Bent Cap	21.0-B.7	NFA200000PR1902	002	DEL Delaminated Area				008		004			002 FT2			
142	CBS Bent Cap	21.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					016	009			012 FT2			
143	CBS Bent Cap	21.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					012	010			010 FT2			
144	CBS Bent Cap	21.0-D.5	NFA200000PR1902	004	CKH Crack, Horizontal					012	010			010 FT2			
145	CBS Bent Cap	21.0-D.5	NFA200000PR1902	004	CKH Crack, Horizontal					012	010			010 FT2			
146	CBS Bent Cap	22.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				024		006			012 FT2			
147	CBS Bent Cap	22.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
148	CBS Bent Cap	22.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
149	CBS Bent Cap	22.0-D.7	NFA200000PR1902	003	OCS Spall					016	003			004 FT2		005	
150	CBS Bent Cap	22.5-D.9	NFA200000PR1902	004	HCM Honey Combing					014	003			003 FT2		004	
151	CBS Bent Cap	22.5-D.9	NFA200000PR1902	002	VOD Void					004	00			00 FT2		003	
152	CBS Bent Cap	23.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
153	CBS Bent Cap	23.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
154	CBS Bent Cap	23.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
155	CBS Bent Cap	23.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					012	010			010 FT2			
156	CBS Bent Cap	23.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					018	009			014 FT2			
157	CBS Bent Cap	23.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
158	CBS Bent Cap	23.0-D.5	NFA200000PR1902	002	CKH Crack, Horizontal						005				0.06		
159	CBS Bent Cap	23.5-D.9	NFA200000PR1902	004	VOD Void					016	003			003 FT2		006	
160	CBS Bent Cap	24.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
161	CBS Bent Cap	24.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
162	CBS Bent Cap	24.0-C.3	NFA200000PR1902	003	DEL Delaminated Area					024	006			012 FT2			
163	CBS Bent Cap	24.0-C.5	NFA200000PR1902	003	OCS Spall				008		002			001 FT2		004	
164	CBS Bent Cap	24.0-D.3	NFA200000PR1902	003	CKH Crack, Horizontal						006				0.06		
165	CBS Bent Cap	24.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
166	CBS Bent Cap	24.5-D.9	NFA200000PR1902	004	VOD Void				003		001			00 FT2		026	
167	CBS Bent Cap	25.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
168	CBS Bent Cap	25.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
169	CBS Bent Cap	25.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
170	CBS Bent Cap	25.0-C.0	NFA200000PR1902	002	CKH Crack, Horizontal						004				0.06		

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
171	CBS Bent Cap	25.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					018	010			015 FT2			
172	CBS Bent Cap	25.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				018		010			015 FT2			
173	CBS Bent Cap	25.0-D.7	NFA200000PR1902	002	OCS Spall					009	001			001 FT2		003	
174	CBS Bent Cap	25.5-D.9	NFA200000PR1902	004	VOD Void					006	003			001 FT2		006	
175	CBS Bent Cap	26.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
176	CBS Bent Cap	26.0-C.1	NFA200000PR1902	002	OCS Spall				012		00			00 FT2		003	
177	CBS Bent Cap	26.0-D.5	NFA200000PR1902	004	CKH Crack, Horizontal					006	010			005 FT2			
178	CBS Bent Cap	26.0-D.5	NFA200000PR1902	004	CKH Crack, Horizontal					006	010			005 FT2			
179	CBS Bent Cap	26.5-A.0	NFA200000PR1902	003	OCS Spall					012	003			003 FT2		004	
180	CBS Bent Cap	26.5-D.9	NFA200000PR1902	004	VOD Void					006	003			001 FT2		006	
181	CBS Bent Cap	27.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
182	CBS Bent Cap	27.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
183	CBS Bent Cap	27.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
184	CBS Bent Cap	27.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
185	CBS Bent Cap	27.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
186	CBS Bent Cap	27.0-B.5	NFA200000PR1902	002	DEL Delaminated Area				010		004			003 FT2			
187	CBS Bent Cap	27.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					024	010			020 FT2			
188	CBS Bent Cap	27.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				018		010			015 FT2			
189	CBS Bent Cap	27.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
190	CBS Bent Cap	27.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
191	CBS Bent Cap	27.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
192	CBS Bent Cap	27.5-D.9	NFA200000PR1902	002	VOD Void					004	001			00 FT2		003	
193	CBS Bent Cap	28.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
194	CBS Bent Cap	28.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
195	CBS Bent Cap	28.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
196	CBS Bent Cap	28.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.25		
197	CBS Bent Cap	28.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					012	010			010 FT2			
198	CBS Bent Cap	28.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					012	010			010 FT2			
199	CBS Bent Cap	28.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
200	CBS Bent Cap	28.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
201	CBS Bent Cap	28.5-D.9	NFA200000PR1902	004	HCM Honey Combing					009	003			002 FT2		004	
202	CBS Bent Cap	28.5-D.9	NFA200000PR1902	004	VOD Void					009	003			002 FT2		006	
203	CBS Bent Cap	29.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
204	CBS Bent Cap	29.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
205	CBS Bent Cap	29.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.25		
206	CBS Bent Cap	29.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.25		
207	CBS Bent Cap	29.0-B.5	NFA200000PR1902	003	DEL Delaminated Area					012	008			008 FT2			
208	CBS Bent Cap	29.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					012	008			008 FT2			
209	CBS Bent Cap	29.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
210	CBS Bent Cap	29.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
211	CBS Bent Cap	30.0-A.2	NFA200000PR1902	002	CKH Crack, Horizontal						005				0.06		
212	CBS Bent Cap	30.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
213	CBS Bent Cap	30.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
214	CBS Bent Cap	30.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					018	010			015 FT2			
215	CBS Bent Cap	30.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				012		009			009 FT2			
216	CBS Bent Cap	30.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
217	CBS Bent Cap	30.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
218	CBS Bent Cap	31.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
219	CBS Bent Cap	31.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
220	CBS Bent Cap	31.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
221	CBS Bent Cap	31.0-B.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
222	CBS Bent Cap	31.0-C.5	NFA200000PR1902	002	DEL Delaminated Area				018		005			008 FT2			
223	CBS Bent Cap	31.0-C.5	NFA200000PR1902	003	DEL Delaminated Area				018		010			015 FT2			
224	CBS Bent Cap	31.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						006				0.06		
225	CBS Bent Cap	31.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
226	CBS Bent Cap	31.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
227	CBS Bent Cap	31.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
228	CBS Bent Cap	31.5-D.9	NFA200000PR1902	003	VOD Void					010	003			002 FT2		005	
229	CBS Bent Cap	32.0-B.5	NFA200000PR1902	003	OCS Spall					012	004			004 FT2		005	001
230	CBS Bent Cap	32.0-C.5	NFA200000PR1902	003	DEL Delaminated Area					012	010			010 FT2			
231	CBS Bent Cap	32.0-D.3	NFA200000PR1902	002	CKH Crack, Horizontal						004				0.06		
232	CBS Bent Cap	32.5-A.9	NFA200000PR1902	003	DEL Delaminated Area					006	009			004 FT2			
233	CBS Bent Cap	33.0-A.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
234	CBS Bent Cap	33.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
235	CBS Bent Cap	33.0-D.5	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
236	BES Edge Beam	01.3-E.0	NFA200000PR1902	003	DEL Delaminated Area					016	006			008 FT2			
237	BES Edge Beam	02.3-A.0	NFA200000PR1902	002	OCS Spall					009	001			001 FT2		003	
238	BES Edge Beam	02.3-E.0	NFA200000PR1902	003	DEL Delaminated Area					048	007			028 FT2			

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
239	BES Edge Beam	03.3-E.0	NFA200000PR1902	003	DEL Delaminated Area					032	007			019 FT2			
240	BES Edge Beam	03.8-E.0	NFA200000PR1902	003	DEL Delaminated Area					012	007			007 FT2			
241	BES Edge Beam	04.5-E.0	NFA200000PR1902	004	CKH Crack, Horizontal						015				0.12		
242	BES Edge Beam	04.7-A.0	NFA200000PR1902	002	CKH Crack, Horizontal						004				0.12		
243	BES Edge Beam	05.3-A.0	NFA200000PR1902	002	CKH Crack, Horizontal						004				0.06		
244	BES Edge Beam	05.7-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						007				0.25		
245	BES Edge Beam	06.3-A.0	NFA200000PR1902	002	CKH Crack, Horizontal						004				0.06		
246	BES Edge Beam	06.5-E.0	NFA200000PR1902	004	CKH Crack, Horizontal						015				0.12		
247	BES Edge Beam	06.7-A.0	NFA200000PR1902	002	DEL Delaminated Area					022	004			007 FT2			
248	BES Edge Beam	07.3-A.0	NFA200000PR1902	002	DEL Delaminated Area					020	004			007 FT2			
249	BES Edge Beam	07.5-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
250	BES Edge Beam	08.3-E.0	NFA200000PR1902	003	DEL Delaminated Area				030		007			018 FT2			
251	BES Edge Beam	08.5-A.0	NFA200000PR1902	002	CKH Crack, Horizontal						005				0.12		
252	BES Edge Beam	08.5-E.0	NFA200000PR1902	004	CKH Crack, Horizontal						015				0.12		
253	BES Edge Beam	09.3-E.0	NFA200000PR1902	002	DEL Delaminated Area					010	004			003 FT2			
254	BES Edge Beam	09.5-A.0	NFA200000PR1902	003	CKH Crack, Horizontal						006				0.06		
255	BES Edge Beam	09.5-A.0	NFA200000PR1902	003	CKH Crack, Horizontal						006				0.06		
256	BES Edge Beam	10.5-A.0	NFA200000PR1902	002	DEL Delaminated Area					020	005			008 FT2			
257	BES Edge Beam	11.0-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						007				0.25		
258	BES Edge Beam	11.0-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						007				0.25		
259	BES Edge Beam	12.5-A.6	NFA200000PR1902	002	CKH Crack, Horizontal						005				0.12		
260	BES Edge Beam	12.5-E.0	NFA200000PR1902	004	CKH Crack, Horizontal						013				0.12		
261	BES Edge Beam	12.5-E.0	NFA200000PR1902	004	OCS Spall					012	015			015 FT2		004	001
262	BES Edge Beam	13.5-E.0	NFA200000PR1902	004	DEL Delaminated Area				014		015			018 FT2			
263	BES Edge Beam	13.7-A.0	NFA200000PR1902	004	OCS Spall					010	004			003 FT2		006	
264	BES Edge Beam	14.3-A.0	NFA200000PR1902	003	OCS Spall					007	003			002 FT2		004	
265	BES Edge Beam	14.5-E.0	NFA200000PR1902	004	DEL Delaminated Area				016		015			020 FT2			
266	BES Edge Beam	16.4-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
267	BES Edge Beam	16.4-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
268	BES Edge Beam	16.4-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
269	BES Edge Beam	16.5-A.0	NFA200000PR1902	004	CKH Crack, Horizontal						013				0.06		
270	BES Edge Beam	18.2-E.0	NFA200000PR1902	002	CKH Crack, Horizontal						003				0.12		
271	BES Edge Beam	18.5-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
272	BES Edge Beam	18.7-E.0	NFA200000PR1902	002	CKH Crack, Horizontal						004				0.12		

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
273	BES Edge Beam	19.5-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
274	BES Edge Beam	19.5-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
275	BES Edge Beam	19.7-A.0	NFA200000PR1902	003	OCS Spall					012	003			003 FT2		004	
276	BES Edge Beam	20.5-A.0	NFA200000PR1902	004	CKH Crack, Horizontal						015				0.25		
277	BES Edge Beam	20.5-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
278	BES Edge Beam	21.5-A.0	NFA200000PR1902	004	CKH Crack, Horizontal						012				0.06		
279	BES Edge Beam	21.5-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
280	BES Edge Beam	22.3-E.0	NFA200000PR1902	002	CKH Crack, Horizontal						004				0.06		
281	BES Edge Beam	22.3-E.0	NFA200000PR1902	002	CKH Crack, Horizontal						004				0.06		
282	BES Edge Beam	23.5-A.0	NFA200000PR1902	004	CKH Crack, Horizontal						013				0.06		
283	BES Edge Beam	23.5-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.12		
284	BES Edge Beam	25.0-A.0	NFA200000PR1902	002	DEL Delaminated Area					006	004			002 FT2			
285	BES Edge Beam	25.5-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
286	BES Edge Beam	26.7-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						006				0.12		
287	BES Edge Beam	28.2-A.0	NFA200000PR1902	002	CKH Crack, Horizontal						001				0.12		
288	BES Edge Beam	28.5-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
289	BES Edge Beam	28.5-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						010				0.06		
290	BES Edge Beam	29.5-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						006				0.06		
291	BES Edge Beam	29.5-E.0	NFA200000PR1902	003	CKH Crack, Horizontal						006				0.06		
292	BES Edge Beam	30.5-A.0	NFA200000PR1902	004	CKH Crack, Horizontal						012				0.06		
293	BES Edge Beam	30.5-A.0	NFA200000PR1902	003	OCS Spall					006	010			005 FT2		004	
294	BES Edge Beam	31.2-A.0	NFA200000PR1902	003	OCS Spall					012	004			004 FT2		004	001
295	BES Edge Beam	32.5-E.0	NFA200000PR1902	004	OCS Spall					013	012			013 FT2		006	
296	BES Edge Beam	32.6-A.0	NFA200000PR1902	003	OCS Spall					010	003			003 FT2		004	001
297	DOS Overlay Deck	01.5-E.0	NFA200000PR1902	004	CKM Crack, Map						015	015	003	038 FT2	0.06		
298	DOS Overlay Deck	08.6-A.0	NFA200000PR1902	003	CKH Crack, Horizontal						005				0.12		
299	DOS Overlay Deck	10.7-A.0	NFA200000PR1902	003	OCS Spall						003	003	001	003 FT2		002	002
300	DOS Overlay Deck	11.1-A.0	NFA200000PR1902	003	DEL Delaminated Area						010	010	001	008 FT2			
301	DOS Overlay Deck	15.2-A.0	NFA200000PR1902	004	OCS Spall						002	002	001	001 FT2		006	
302	DOS Overlay Deck	15.6-A.0	NFA200000PR1902	002	DEL Delaminated Area						004	004	001	002 FT2			
303	DOS Overlay Deck	16.5-A.0	NFA200000PR1902	004	CKH Crack, Horizontal						030				0.12		
304	DOS Overlay Deck	16.5-A.0	NFA200000PR1902	004	CKH Crack, Horizontal						030				0.12		
305	DOS Overlay Deck	17.5-A.0	NFA200000PR1902	004	CKH Crack, Horizontal						020				0.12		
306	DOS Overlay Deck	17.5-A.0	NFA200000PR1902	004	CKH Crack, Horizontal						020				0.12		

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
307	DOS Overlay Deck	17.8-A.0	NFA200000PR1902	002	DEL Delaminated Area						004	004	001	003 FT2			
308	DOS Overlay Deck	26.7-A.0	NFA200000PR1902	004	CKH Crack, Horizontal						011				0.06		
309	DOS Overlay Deck	26.7-A.0	NFA200000PR1902	004	CKH Crack, Horizontal						011				0.06		
310	DOS Overlay Deck	28.6-A.0	NFA200000PR1902	003	DEL Delaminated Area						010	010	001	005 FT2			
311	DPS Prestress Plank Deck	31.2-A.2	NFA200000PR1902	004	%BK Broken									100 %			
312	DPS Prestress Plank Deck	01.3-A.1	NFA200000PR1902	002	DEL Delaminated Area						004			006 FT2			
313	DPS Prestress Plank Deck	01.3-C.2	NFA200000PR1902	004	%BK Broken						005			%			005
314	DPS Prestress Plank Deck	01.3-D.0	NFA200000PR1902	003	OCS Spall						005			012 FT2		005	
315	DPS Prestress Plank Deck	01.7-A.0	NFA200000PR1902	003	OCS Spall						004			005 FT2		003	002
316	DPS Prestress Plank Deck	01.7-D.8	NFA200000PR1902	002	DEL Delaminated Area						004			008 FT2			
317	DPS Prestress Plank Deck	02.3-A.0	NFA200000PR1902	002	DEL Delaminated Area						004			003 FT2			
318	DPS Prestress Plank Deck	02.5-D.8	NFA200000PR1902	003	DEL Delaminated Area						005			010 FT2			
319	DPS Prestress Plank Deck	02.7-A.0	NFA200000PR1902	002	CKH Crack, Horizontal						004				0.12		
320	DPS Prestress Plank Deck	02.7-D.7	NFA200000PR1902	002	DEL Delaminated Area						005			006 FT2			
321	DPS Prestress Plank Deck	02.7-D.8	NFA200000PR1902	002	DEL Delaminated Area						005			013 FT2			
322	DPS Prestress Plank Deck	03.2-D.8	NFA200000PR1902	002	DEL Delaminated Area						005			013 FT2			
323	DPS Prestress Plank Deck	03.7-E.0	NFA200000PR1902	002	DEL Delaminated Area						005			005 FT2			
324	DPS Prestress Plank Deck	04.7-A.1	NFA200000PR1902	002	DEL Delaminated Area						004			007 FT2			
325	DPS Prestress Plank Deck	04.8-D.8	NFA200000PR1902	002	DEL Delaminated Area						004			012 FT2			
326	DPS Prestress Plank Deck	04.8-D.8	NFA200000PR1902	003	OCS Spall						004			001 FT2		004	001
327	DPS Prestress Plank Deck	05.3-A.1	NFA200000PR1902	002	DEL Delaminated Area						004			005 FT2			
328	DPS Prestress Plank Deck	05.3-D.8	NFA200000PR1902	002	DEL Delaminated Area						004			012 FT2			
329	DPS Prestress Plank Deck	05.7-A.1	NFA200000PR1902	002	DEL Delaminated Area						004			005 FT2			
330	DPS Prestress Plank Deck	05.8-D.8	NFA200000PR1902	002	DEL Delaminated Area						004			012 FT2			
331	DPS Prestress Plank Deck	06.3-D.7	NFA200000PR1902	002	DEL Delaminated Area						004			004 FT2			
332	DPS Prestress Plank Deck	06.3-D.8	NFA200000PR1902	002	DEL Delaminated Area						004			007 FT2			
333	DPS Prestress Plank Deck	06.7-D.8	NFA200000PR1902	002	DEL Delaminated Area						004			012 FT2			
334	DPS Prestress Plank Deck	07.3-A.1	NFA200000PR1902	002	CKH Crack, Horizontal						003				0.03		
335	DPS Prestress Plank Deck	07.3-D.8	NFA200000PR1902	002	DEL Delaminated Area						004			012 FT2			
336	DPS Prestress Plank Deck	07.8-D.8	NFA200000PR1902	002	DEL Delaminated Area						004			011 FT2			
337	DPS Prestress Plank Deck	08.3-D.7	NFA200000PR1902	002	DEL Delaminated Area						004			012 FT2			
338	DPS Prestress Plank Deck	08.3-D.8	NFA200000PR1902	002	DEL Delaminated Area						004			012 FT2			
339	DPS Prestress Plank Deck	08.8-A.1	NFA200000PR1902	002	DEL Delaminated Area						004			006 FT2			
340	DPS Prestress Plank Deck	08.8-D.8	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
341	DPS Prestress Plank Deck	08.8-D.8	NFA200000PR1902		OCS Spall						4.33			15.17 FT2		4	2
342	DPS Prestress Plank Deck	09.2-D.8	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
343	DPS Prestress Plank Deck	09.7-C.7	NFA200000PR1902		CKH Crack, Horizontal						4.33				0.06		
344	DPS Prestress Plank Deck	09.8-D.8	NFA200000PR1902		DEL Delaminated Area						2.67			11.56 FT2			
345	DPS Prestress Plank Deck	10.3-D.7	NFA200000PR1902		DEL Delaminated Area						4.33			2.17 FT2			
346	DPS Prestress Plank Deck	10.3-D.8	NFA200000PR1902		DEL Delaminated Area						2.67			11.56 FT2			
347	DPS Prestress Plank Deck	10.7-D.8	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
348	DPS Prestress Plank Deck	11.1-A.1	NFA200000PR1902		DEL Delaminated Area						4.17			6.94 FT2			
349	DPS Prestress Plank Deck	11.2-D.8	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
350	DPS Prestress Plank Deck	11.7-D.8	NFA200000PR1902		OCS Spall						4.33			8.67 FT2		2.5	4
351	DPS Prestress Plank Deck	12.0-A.0	NFA200000PR1902		OCS Spall						0.58			0.34 FT2		3	
352	DPS Prestress Plank Deck	12.2-D.8	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
353	DPS Prestress Plank Deck	12.7-D.8	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
354	DPS Prestress Plank Deck	13.3-A.1	NFA200000PR1902		OCS Spall						2.50			1.04 FT2		3	
355	DPS Prestress Plank Deck	13.3-D.8	NFA200000PR1902		DEL Delaminated Area						4.33			13.00 FT2			
356	DPS Prestress Plank Deck	13.7-D.7	NFA200000PR1902		DEL Delaminated Area						4.33			2.89 FT2			
357	DPS Prestress Plank Deck	13.7-D.8	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
358	DPS Prestress Plank Deck	13.8-D.8	NFA200000PR1902		OCS Spall						2.00			50.00 FT2			3
359	DPS Prestress Plank Deck	14.3-D.8	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
360	DPS Prestress Plank Deck	14.7-D.7	NFA200000PR1902		DEL Delaminated Area						4.33			2.17 FT2			
361	DPS Prestress Plank Deck	14.7-D.8	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
362	DPS Prestress Plank Deck	15.2-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
363	DPS Prestress Plank Deck	15.3-D.7	NFA200000PR1902		DEL Delaminated Area						4.33			3.61 FT2			
364	DPS Prestress Plank Deck	15.3-D.8	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
365	DPS Prestress Plank Deck	16.2-A.2	NFA200000PR1902		OCS Spall						4.33			5.06 FT2		1.5	
366	DPS Prestress Plank Deck	16.3-D.6	NFA200000PR1902		CKH Crack, Horizontal						5.00				0.50		
367	DPS Prestress Plank Deck	16.7-A.2	NFA200000PR1902		OCS Spall						4.33			4.33 FT2			
368	DPS Prestress Plank Deck	17.3-D.8	NFA200000PR1902		CKH Crack, Horizontal						4.00				0.03		
369	DPS Prestress Plank Deck	17.3-D.9	NFA200000PR1902		CKH Crack, Horizontal						3.00				0.12		
370	DPS Prestress Plank Deck	17.7-A.2	NFA200000PR1902		CKH Crack, Horizontal						4.33				0.06		
371	DPS Prestress Plank Deck	17.7-D.3	NFA200000PR1902		CKH Crack, Horizontal						4.00				0.03		
372	DPS Prestress Plank Deck	19.7-D.9	NFA200000PR1902		DEL Delaminated Area						4.00			6.00 FT2			
373	DPS Prestress Plank Deck	20.2-A.2	NFA200000PR1902		OCS Spall						4.33			11.56 FT2		3	15
374	DPS Prestress Plank Deck	20.7-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
375	DPS Prestress Plank Deck	21.7-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			5.06 FT2			
376	DPS Prestress Plank Deck	22.2-A.2	NFA200000PR1902		OCS Spall						4.33			11.56 FT2		3	7
377	DPS Prestress Plank Deck	22.3-D.9	NFA200000PR1902		CKH Crack, Horizontal						5.00				0.12		
378	DPS Prestress Plank Deck	22.7-D.9	NFA200000PR1902		CKH Crack, Horizontal						4.00				0.06		
379	DPS Prestress Plank Deck	22.9-D.9	NFA200000PR1902		CKH Crack, Horizontal						4.00				0.06		
380	DPS Prestress Plank Deck	23.2-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
381	DPS Prestress Plank Deck	23.3-D.9	NFA200000PR1902		%BK Broken									100.00 %			
382	DPS Prestress Plank Deck	23.7-A.2	NFA200000PR1902		OCS Spall						4.33			8.67 FT2		2	1
383	DPS Prestress Plank Deck	24.2-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
384	DPS Prestress Plank Deck	24.7-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
385	DPS Prestress Plank Deck	25.2-A.2	NFA200000PR1902		OCS Spall						4.33			11.56 FT2		3	8
386	DPS Prestress Plank Deck	25.7-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
387	DPS Prestress Plank Deck	26.2-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
388	DPS Prestress Plank Deck	26.4-D.9	NFA200000PR1902		OCS Spall						2.50			4.17 FT2		3	3
389	DPS Prestress Plank Deck	26.7-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
390	DPS Prestress Plank Deck	26.7-D.9	NFA200000PR1902		DEL Delaminated Area						4.00			6.00 FT2			
391	DPS Prestress Plank Deck	27.3-D.9	NFA200000PR1902		CKH Crack, Horizontal						3.50				0.12		
392	DPS Prestress Plank Deck	27.7-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			8.67 FT2			
393	DPS Prestress Plank Deck	29.7-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
394	DPS Prestress Plank Deck	30.2-A.2	NFA200000PR1902		OCS Spall						4.33			11.56 FT2		4	17
395	DPS Prestress Plank Deck	30.7-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
396	DPS Prestress Plank Deck	30.7-D.9	NFA200000PR1902		DEL Delaminated Area						4.00			4.00 FT2			
397	DPS Prestress Plank Deck	31.3-D.2	NFA200000PR1902		CKH Crack, Horizontal						3.50				0.25		
398	DPS Prestress Plank Deck	31.7-D.3	NFA200000PR1902		%BK Broken									100.00 %			
399	DPS Prestress Plank Deck	31.7-D.9	NFA200000PR1902		%BK Broken									100.00 %			
400	DPS Prestress Plank Deck	32.2-A.2	NFA200000PR1902		DEL Delaminated Area						4.33			11.56 FT2			
401	DPS Prestress Plank Deck	32.6-B.0	NFA200000PR1902		CKH Crack, Horizontal						2.67				0.12		
402	DPS Prestress Plank Deck	32.6-D.5	NFA200000PR1902		CKH Crack, Horizontal						3.50				0.12		
403	DPS Prestress Plank Deck	32.6-D.8	NFA200000PR1902		CKH Crack, Horizontal						3.00				0.12		
404	DPS Prestress Plank Deck	32.7-B.8	NFA200000PR1902		CKH Crack, Horizontal						6.00				0.06		
405	DPS Prestress Plank Deck	32.7-C.6	NFA200000PR1902		CKH Crack, Horizontal						6.00				0.50		
406	DPS Prestress Plank Deck	32.7-C.8	NFA200000PR1902		DEL Delaminated Area						6.00			15.00 FT2			
407	DPS Prestress Plank Deck	32.7-D.0	NFA200000PR1902		DEL Delaminated Area						6.00			12.00 FT2			
408	CDS Deck Curb	01.4-E.0	NFA200000PR1902		DEL Delaminated Area					8.00	12.50			8.33 FT2			

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
409	CDS Deck Curb	01.5-A.0	NFA200000PR1902		DEL Delaminated Area					8.00	10.00			6.67 FT2			
410	CDS Deck Curb	02.4-E.0	NFA200000PR1902		OCS Spall					9.00	7.67			5.75 FT2		1.5	
411	CDS Deck Curb	03.4-E.0	NFA200000PR1902		OCS Spall					5.00	10.83			4.51 FT2		2.5	
412	CDS Deck Curb	03.7-A.0	NFA200000PR1902		DEL Delaminated Area				10.00		4.00			3.33 FT2			
413	CDS Deck Curb	03.9-A.0	NFA200000PR1902		DEL Delaminated Area					15.00	6.00			7.50 FT2			
414	CDS Deck Curb	04.2-A.0	NFA200000PR1902		DEL Delaminated Area					15.00	6.00			7.50 FT2			
415	CDS Deck Curb	04.5-A.0	NFA200000PR1902		DEL Delaminated Area					15.00	6.00			7.50 FT2			
416	CDS Deck Curb	04.6-E.0	NFA200000PR1902		DEL Delaminated Area					7.00	7.25			4.23 FT2			
417	CDS Deck Curb	05.0-E.0	NFA200000PR1902		DEL Delaminated Area					7.00	6.50			3.79 FT2			
418	CDS Deck Curb	05.0-E.0	NFA200000PR1902		DEL Delaminated Area					14.00	3.42			3.99 FT2			
419	CDS Deck Curb	06.0-A.0	NFA200000PR1902		CKH Crack, Horizontal						22.00				0.12		
420	CDS Deck Curb	06.8-E.0	NFA200000PR1902		DEL Delaminated Area					21.00	6.50			11.38 FT2			
421	CDS Deck Curb	07.0-A.0	NFA200000PR1902		CKH Crack, Horizontal						4.50				0.06		
422	CDS Deck Curb	07.0-A.0	NFA200000PR1902		OCS Spall					6.00	4.00			2.00 FT2		3	
423	CDS Deck Curb	07.1-A.0	NFA200000PR1902		CKH Crack, Horizontal						3.00				0.12		
424	CDS Deck Curb	07.1-A.0	NFA200000PR1902		CKH Crack, Horizontal						3.00				0.12		
425	CDS Deck Curb	07.1-A.0	NFA200000PR1902		CKH Crack, Horizontal						3.00				0.12		
426	CDS Deck Curb	08.8-A.0	NFA200000PR1902		CKH Crack, Horizontal						6.00				0.12		
427	CDS Deck Curb	08.9-A.0	NFA200000PR1902		CKH Crack, Horizontal						2.00				0.12		
428	CDS Deck Curb	09.0-A.0	NFA200000PR1902		CKH Crack, Horizontal						17.00				0.06		
429	CDS Deck Curb	09.0-A.0	NFA200000PR1902		DEL Delaminated Area					24.00	6.00			12.00 FT2			
430	CDS Deck Curb	09.1-A.0	NFA200000PR1902		CKH Crack, Horizontal						2.08				0.12		
431	CDS Deck Curb	09.2-A.0	NFA200000PR1902		CKH Crack, Horizontal						9.83				0.06		
432	CDS Deck Curb	10.4-A.0	NFA200000PR1902		OCS Spall					8.00	1.50			1.00 FT2		3	1
433	CDS Deck Curb	10.8-A.0	NFA200000PR1902		CKH Crack, Horizontal						5.00				0.06		
434	CDS Deck Curb	10.8-A.0	NFA200000PR1902		CKH Crack, Horizontal						5.00				0.06		
435	CDS Deck Curb	10.8-A.0	NFA200000PR1902		CKH Crack, Horizontal						4.00				0.06		
436	CDS Deck Curb	11.1-A.0	NFA200000PR1902		CKH Crack, Horizontal						12.00				0.06		
437	CDS Deck Curb	11.1-A.0	NFA200000PR1902		CKH Crack, Horizontal						4.00				0.06		
438	CDS Deck Curb	11.2-A.0	NFA200000PR1902		CKH Crack, Horizontal						5.00				0.06		
439	CDS Deck Curb	11.9-A.0	NFA200000PR1902		OCS Spall					7.00	5.00			2.92 FT2		2	
440	CDS Deck Curb	12.4-A.0	NFA200000PR1902		CKH Crack, Horizontal						6.67				0.06		
441	CDS Deck Curb	12.5-A.0	NFA200000PR1902		DEL Delaminated Area					12.00	3.50			3.50 FT2			
442	CDS Deck Curb	12.8-A.0	NFA200000PR1902		CKH Crack, Horizontal						11.67				0.06		

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
443	CDS Deck Curb	12.8-A.0	NFA200000PR1902		DEL Delaminated Area					26.00	8.08			17.51 FT2			
444	CDS Deck Curb	12.9-A.0	NFA200000PR1902		CKH Crack, Horizontal						3.67				0.06		
445	CDS Deck Curb	13.1-A.0	NFA200000PR1902		CKH Crack, Horizontal						2.50				0.12		
446	CDS Deck Curb	15.1-A.0	NFA200000PR1902		CKH Crack, Horizontal						1.50				0.12		
447	CDS Deck Curb	15.1-A.0	NFA200000PR1902		CKH Crack, Horizontal						1.50				0.12		
448	CDS Deck Curb	16.0-A.0	NFA200000PR1902		OCS Spall					7.00	3.25			1.90 FT2		2	2
449	CDS Deck Curb	16.3-A.0	NFA200000PR1902		CKH Crack, Horizontal						2.08				0.12		
450	CDS Deck Curb	16.7-A.0	NFA200000PR1902		CKH Crack, Horizontal						5.00				0.06		
451	CDS Deck Curb	16.7-A.0	NFA200000PR1902		CKH Crack, Horizontal						9.00				0.12		
452	CDS Deck Curb	16.7-A.0	NFA200000PR1902		CKH Crack, Horizontal						9.00				0.12		
453	CDS Deck Curb	16.9-A.0	NFA200000PR1902		OCS Spall					14.00	2.00			2.33 FT2		3	2
454	CDS Deck Curb	17.1-A.0	NFA200000PR1902		CKH Crack, Horizontal						2.00				0.12		
455	CDS Deck Curb	17.4-A.0	NFA200000PR1902		CKH Crack, Horizontal						6.50				0.06		
456	CDS Deck Curb	17.4-A.0	NFA200000PR1902		CKH Crack, Horizontal						7.50				0.06		
457	CDS Deck Curb	17.4-A.0	NFA200000PR1902		CKH Crack, Horizontal						10.00				0.12		
458	CDS Deck Curb	17.8-A.0	NFA200000PR1902		CKH Crack, Horizontal						10.00				0.12		
459	CDS Deck Curb	18.3-A.0	NFA200000PR1902		OCS Spall					7.00	0.50			0.29 FT2		2	1
460	CDS Deck Curb	18.6-A.0	NFA200000PR1902		OCS Spall					14.00	3.00			3.50 FT2		4.5	1
461	CDS Deck Curb	19.0-A.0	NFA200000PR1902		CKH Crack, Horizontal						7.50				0.06		
462	CDS Deck Curb	20.8-A.0	NFA200000PR1902		CKH Crack, Horizontal						6.00				0.06		
463	CDS Deck Curb	20.9-A.0	NFA200000PR1902		CKH Crack, Horizontal						3.33				0.03		
464	CDS Deck Curb	21.2-A.0	NFA200000PR1902		DEL Delaminated Area					16.00	3.50			4.67 FT2			
465	CDS Deck Curb	21.4-A.0	NFA200000PR1902		CKH Crack, Horizontal						6.00				0.12		
466	CDS Deck Curb	22.5-A.0	NFA200000PR1902		OCS Spall					12.00	1.25			1.25 FT2		3	1
467	CDS Deck Curb	22.8-A.0	NFA200000PR1902		CKH Crack, Horizontal						2.50				0.12		
468	CDS Deck Curb	22.8-A.0	NFA200000PR1902		CKH Crack, Horizontal						2.50				0.12		
469	CDS Deck Curb	22.9-A.0	NFA200000PR1902		DEL Delaminated Area					21.00	5.67			9.92 FT2			
470	CDS Deck Curb	23.0-A.0	NFA200000PR1902		OCS Spall					4.00	5.00			1.67 FT2		2	
471	CDS Deck Curb	23.7-A.0	NFA200000PR1902		DEL Delaminated Area				10.00		3.33			2.78 FT2			
472	CDS Deck Curb	24.0-A.0	NFA200000PR1902		OCS Spall					7.00	5.00			2.92 FT2		2.5	5
473	CDS Deck Curb	24.4-A.0	NFA200000PR1902		OCS Spall					2.00	2.50			0.42 FT2		1	3
474	CDS Deck Curb	24.7-A.0	NFA200000PR1902		CKH Crack, Horizontal						5.83				0.12		
475	CDS Deck Curb	25.1-A.0	NFA200000PR1902		CKH Crack, Horizontal						5.00				0.06		
476	CDS Deck Curb	27.0-A.0	NFA200000PR1902		DEL Delaminated Area					18.00	4.00			6.00 FT2			

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
477	CDS Deck Curb	27.2-A.0	NFA200000PR1902		OCS Spall					18.00	1.50			2.25 FT2		4	2
478	CDS Deck Curb	27.3-A.0	NFA200000PR1902		OCS Spall					4.00	4.00			1.33 FT2		2	
479	CDS Deck Curb	27.4-A.0	NFA200000PR1902		CKH Crack, Horizontal						4.00				0.12		
480	CDS Deck Curb	28.9-A.0	NFA200000PR1902		CKH Crack, Horizontal						3.67				0.18		
481	CDS Deck Curb	29.1-A.0	NFA200000PR1902		CKH Crack, Horizontal						2.50				0.12		
482	CDS Deck Curb	29.1-A.0	NFA200000PR1902		OCS Spall					7.00	1.25			0.73 FT2		3	1
483	CDS Deck Curb	29.5-A.0	NFA200000PR1902		DEL Delaminated Area				9.00		6.00			4.50 FT2			
484	CDS Deck Curb	30.3-A.0	NFA200000PR1902		DEL Delaminated Area					18.00	7.00			10.50 FT2			
485	CDS Deck Curb	30.3-A.0	NFA200000PR1902		DEL Delaminated Area				9.00		6.00			4.50 FT2			
486	CDS Deck Curb	30.6-A.0	NFA200000PR1902		DEL Delaminated Area				9.00		6.00			4.50 FT2			
487	CDS Deck Curb	30.9-A.0	NFA200000PR1902		DEL Delaminated Area						1.67					0.14	
488	CDS Deck Curb	31.2-A.0	NFA200000PR1902		DEL Delaminated Area					12.00	7.00			7.00 FT2			
489	CDS Deck Curb	31.3-A.0	NFA200000PR1902		CKH Crack, Horizontal						6.92				0.12		
490	CDS Deck Curb	32.6-A.0	NFA200000PR1902		DEL Delaminated Area				12.00		6.00			6.00 FT2			
491	CDS Deck Curb	33.0-A.0	NFA200000PR1902		DEL Delaminated Area					12.00	4.33			4.33 FT2			
492	CDS Deck Curb	33.0-A.0	NFA200000PR1902		DEL Delaminated Area					22.00	3.50			6.42 FT2			
493	CDS Deck Curb	33.0-B.5	NFA200000PR1902		OCS Spall				4.00		0.33			0.11 FT2		2	1
494	CDS Deck Curb	33.0-B.5	NFA200000PR1902		OCS Spall				4.00		0.33			0.11 FT2		2	1
495	CDS Deck Curb	33.0-C.1	NFA200000PR1902		OCS Spall					11.00	1.00			0.92 FT2		4	1
496	CDS Deck Curb	33.0-C.3	NFA200000PR1902		OCS Spall					6.00	1.00			0.50 FT2		3	
497	CDS Deck Curb	33.0-D.5	NFA200000PR1902		DEL Delaminated Area				10.00		6.00			5.00 FT2			
498	CDS Deck Curb	03.0-A.0	NFA200000PR1902		OCS Spall					7.00	5.33			3.11 FT2		1	
499	CDS Deck Curb	15.0-A.0	NFA200000PR1902		DEL Delaminated Area					18.00	9.17			13.75 FT2			
500	CDS Deck Curb	19.0-A.0	NFA200000PR1902		DEL Delaminated Area					20.00	4.17			6.94 FT2			
501	CDS Deck Curb	30.7-A.0	NFA200000PR1902		DEL Delaminated Area					20.00	7.00			11.67 FT2			
502	FBF Berthing Framing	33.0-A.0	NFA200000PR1902		%BK Broken									100.00 %			
503	FBF Berthing Framing	33.0-A.5	NFA200000PR1902		%BK Broken									100.00 %			
504	FBF Berthing Framing	33.0-A.5	NFA200000PR1902		%SL Section Loss, Overall						11.00			15.00 %			
505	FBF Berthing Framing	33.0-B.0	NFA200000PR1902		%BK Broken									100.00 %			
506	FBF Berthing Framing	33.0-B.5	NFA200000PR1902		%BK Broken									100.00 %			
507	FBF Berthing Framing	33.0-B.5	NFA200000PR1902		%BK Broken						11.00			100.00 %			
508	FBF Berthing Framing	33.0-C.0	NFA200000PR1902		%BK Broken									100.00 %			
509	FBF Berthing Framing	33.0-C.5	NFA200000PR1902		%BK Broken									100.00 %			
510	FBF Berthing Framing	33.0-C.5	NFA200000PR1902		%BK Broken						11.00			100.00 %			

STRUCTURAL DATA

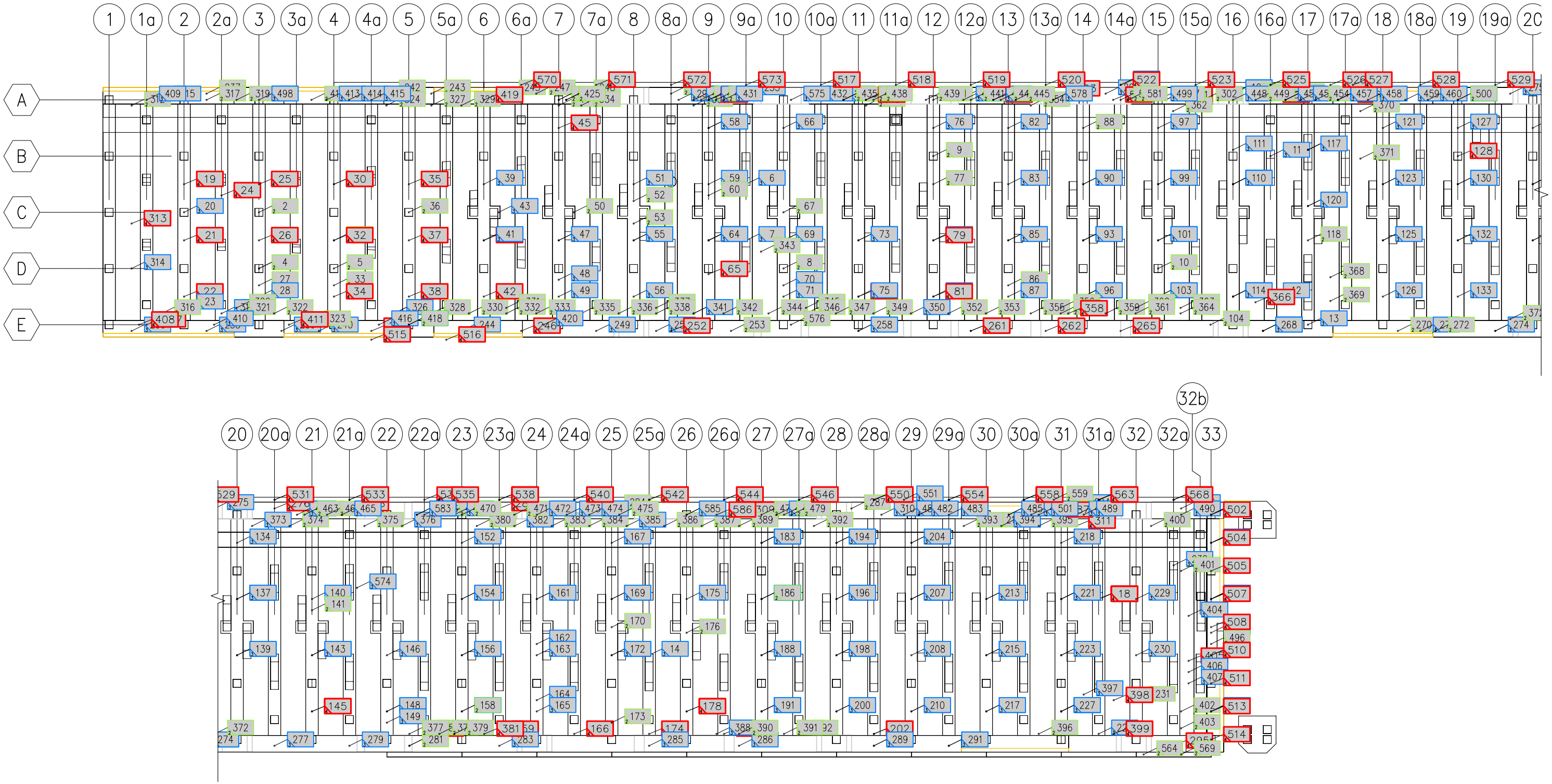
Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
511	FBF Berthing Framing	33.0-D.0	NFA200000PR1902		%BK Broken									100.00 %			
512	FBF Berthing Framing	33.0-D.5	NFA200000PR1902		%BK Broken									100.00 %			
513	FBF Berthing Framing	33.0-D.5	NFA200000PR1902		%BK Broken						11.00			100.00 %			
514	FBF Berthing Framing	33.0-E.0	NFA200000PR1902		%BK Broken									100.00 %			
515	SFF Fastener Skirt	04.5-E.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			60.00 %			
516	SFF Fastener Skirt	05.5-E.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			60.00 %			
517	SFF Fastener Skirt	10.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
518	SFF Fastener Skirt	11.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
519	SFF Fastener Skirt	12.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
520	SFF Fastener Skirt	13.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
521	SCF Wall Skirt	14.5-A.0	NFA200000PR1902		OCS Spall						1.17			1.17 FT2		4	
522	SFF Fastener Skirt	14.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
523	SFF Fastener Skirt	15.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
524	SFF Fastener Skirt	16.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
525	SFF Fastener Skirt	16.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
526	SFF Fastener Skirt	17.3-A.0	NFA200000PR1902		%SL Section Loss, Overall						10.00			70.00 %			
527	SFF Fastener Skirt	17.6-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			25.00 %			
528	SFF Fastener Skirt	18.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
529	SFF Fastener Skirt	19.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
530	SFF Fastener Skirt	20.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						3.00			60.00 %			
531	SFF Fastener Skirt	20.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
532	SFF Fastener Skirt	21.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						4.00			60.00 %			
533	SFF Fastener Skirt	21.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
534	SFF Fastener Skirt	22.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
535	SFF Fastener Skirt	22.7-A.0	NFA200000PR1902		%SL Section Loss, Overall						4.67			60.00 %			
536	SFF Fastener Skirt	23.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			60.00 %			
537	SFF Fastener Skirt	23.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
538	SFF Fastener Skirt	23.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
539	SFF Fastener Skirt	24.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						1.00			60.00 %			
540	SFF Fastener Skirt	24.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
541	SFF Fastener Skirt	25.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						4.00			60.00 %			
542	SFF Fastener Skirt	25.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
543	SFF Fastener Skirt	26.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						3.00			60.00 %			
544	SFF Fastener Skirt	26.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
545	SFF Fastener Skirt	27.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						13.00			60.00 %			
546	SFF Fastener Skirt	27.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
547	SFF Fastener Skirt	28.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
548	SFF Fastener Skirt	28.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
549	SFF Fastener Skirt	28.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
550	SFF Fastener Skirt	28.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
551	SCF Wall Skirt	28.9-A.0	NFA200000PR1902		OCS Spall						1.67			1.11 FT2		4	
552	SFF Fastener Skirt	29.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
553	SFF Fastener Skirt	29.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
554	SFF Fastener Skirt	29.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
555	SFF Fastener Skirt	30.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
556	SFF Fastener Skirt	30.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
557	SFF Fastener Skirt	30.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
558	SFF Fastener Skirt	30.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
559	SCF Wall Skirt	30.9-A.0	NFA200000PR1902		OCS Spall						0.83			0.42 FT2		2.5	
560	SFF Fastener Skirt	31.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
561	SFF Fastener Skirt	31.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
562	SFF Fastener Skirt	31.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
563	SFF Fastener Skirt	31.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
564	SCF Wall Skirt	32.1-E.0	NFA200000PR1902		CKV Crack, Vertical						5.00				0.03		
565	SFF Fastener Skirt	32.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
566	SFF Fastener Skirt	32.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
567	SFF Fastener Skirt	32.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						5.00			60.00 %			
568	SFF Fastener Skirt	32.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
569	SCF Wall Skirt	32.6-E.0	NFA200000PR1902		CKV Crack, Vertical						5.00				0.06		
570	SFF Fastener Skirt	6.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
571	SFF Fastener Skirt	7.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
572	SFF Fastener Skirt	8.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
573	SFF Fastener Skirt	9.5-A.0	NFA200000PR1902		%SL Section Loss, Overall						15.00			70.00 %			
574	VCU	21.6-B.3	NFA200000PR1902		OCS Spall						0.42			0.42 FT2		0.5	1
575	CDU On-Deck Cover	10.1-A.0	NFA200000PR1902		OCS Spall						3.00			1.50 FT2		3	1
576	CDU On-Deck Cover	10.1-E.0	NFA200000PR1902		CKM Crack, Map						5.00			12.50 FT2	0.12		
577	CDU On-Deck Cover	13.6-A.0	NFA200000PR1902		CKM Crack, Map						2.50			6.25 FT2	0.12		
578	CDU On-Deck Cover	13.6-A.0	NFA200000PR1902		OCS Spall						0.83			0.97 FT2		3	1

STRUCTURAL DATA

Defect ID No.	Asset Name	Defect Center	Fac Sec	Criticality Factor	Defect Type	Check If Repaired	Pile		Beam		Length	Deck		Area	Crack	Depth	Exposed Bars N (#)
							Side	Position	H (in)	V (in)	L (ft)	X (ft)	Y (ft)	SF or %	W (in.)	D (in.)	
579	CDU On-Deck Cover	14.4-A.0	NFA200000PR1902		%SL Section Loss, Overall						2.50			70.00 %			
580	CDU On-Deck Cover	14.5-A.0	NFA200000PR1902		OCS Spall						2.25			1.13 FT2		3	
581	CDU On-Deck Cover	14.6-A.0	NFA200000PR1902		OCS Spall						4.00			2.00 FT2		3	
582	CDU On-Deck Cover	22.4-A.0	NFA200000PR1902		CKM Crack, Map						6.33			15.83 FT2	0.03		
583	CDU On-Deck Cover	22.4-A.0	NFA200000PR1902		CKM Crack, Map						7.50			18.75 FT2	0.06		
584	CDU On-Deck Cover	26.0-A.0	NFA200000PR1902		CKM Crack, Map						8.50			21.25 FT2	0.06		
585	CDU On-Deck Cover	26.0-A.0	NFA200000PR1902		OCS Spall						5.25			5.69 FT2		3.5	3
586	CDU On-Deck Cover	26.4-A.0	NFA200000PR1902		%SL Section Loss, Overall						1.67			70.00 %			


A-30
GRAPHIC SCALE
1"=40'
0
40
80 FT.
DATE
JANUARY 2010
Halcrow
Contract Number
N62473-06-D-3029
NAVFAC
NAVAL FACILITIES ENGINEERING SERVICE CENTER
EAST COAST DETACHMENT
WASHINGTON D.C.
AUTEC ANDROS ISLAND
ANDROS ISLAND BAHAMAS
APPENDIX B: FACILITY CAPABILITY REPORT
CURRENT FACILITY OPERATING CONDITION
FIG. NO.
B-3

APPENDIX B
FACILITY CAPABILITY REPORT

B.1 INTRODUCTION

This report is prepared as part of the Commander Navy Installations Command (CNIC) Specialized Waterfront Inspection Program administered by the Naval Facilities Engineering Service Center, East Coast Detachment (NFESC-ECDET, Code 55). This program provides inspection, structural analysis, and repair recommendations with order-of-magnitude cost estimates for waterfront facilities. The services, including preparation of this report, were provided by Halcrow, Inc. (Halcrow), in accordance with Delivery Order No. 0017 per Contract N62473-06-D-3029.

Halcrow performed the underwater and above water inspections of the Main Pier, NFA200000PR1902, in October 2009. NFA200000PR1902 is within the Site 1 facilities operating as part of the Atlantic Undersea Test and Evaluation Center (AUTEC) on Andros Island, Bahamas. A four-man team, consisting of a Professional Engineer-Diver, a Dive Supervisor, and two Engineer-Divers, performed the inspection. Kirk Riden, P.E., was the Project Manager while Adon Austin P.E. was the Engineer-in-Charge during the inspection. A list of the inspected structures identified by the facility name and NFA number contained within this section are presented with corresponding Overall Condition Index and Facility Operational Ratings in the Executive Summary.

B.2 REPORT DESCRIPTION

The facility capability report presents operational assessments of the inspected facilities in a color-coded visual format. It is intended to describe the overall operational condition in a rapid and precise manner. The report addresses specific areas of the facility using colors to identify the damage or deficiencies and the repair urgency. The report includes the following:

<u>Executive Summary</u>

A brief summary of the facility, locations of major structural damage, and recommend repairs.

<u>Location and Vicinity Maps</u>

Maps depicting the general geographical location of the facilities.

<u>Operational Capability Plans</u>

The figures indicate the present and estimated five and ten year future operational capabilities of the waterfront structures comprising the facility. The operational

capability incorporates the structural deficiencies and the deteriorated condition of the mooring and fender systems. The colors shown on the Operational Capability Plans illustrate the degree of the observed deficiencies and corresponding repair urgency.

The colors applied within the structure boundaries indicate the Facility Operational Rating as defined OPNAVINST 3501.167B, summarized in Table B-1 and further defined herein. The ratings are allocated assuming the scheduled repair recommendations are not completed.

TABLE B-1
Operational Capability Rating Summary

Operational Capability Rating		Description
C-1	Facility Operational	These facilities are in good condition, with no limitations on the original live load or berthing capacity. However, routine maintenance repairs may be required.
C-2	Facility Mostly Operational	These facilities typically have moderate deterioration or defects, but the load capacity is unaffected at present. Further deterioration may result in the downgrading of the load capacity in the future, if maintenance repairs are not performed. Facilities that have broken or missing fender systems are also rated as C-2, because vessel berthing is limited.
C-3	Facility Partially Operational	These facilities typically have areas or elements with severe deterioration that have caused load restrictions on the structure.
C-4	Facility Not Operational	These facilities typically have areas or elements with severe deterioration that has dramatically reduced the structural integrity or resulted in localized, partial or total collapse of the structure.

<u>Facility Operational (C-1)</u>

Impact to Facility Operations:

- Less than 5 percent increase in evolution time for ship loading/off-loading or ship maintenance resulting from limiting of facility.
- Limitations to cold iron support weapons systems testing, degaussing or deperming occur less than 5 percent of ship berthing time.

Berth Depths:

- Bottom surveys and maintenance dredging performed at regular intervals guarantee unhindered operations. Depth at facility is adequate to eliminate fouling or shoaling.

Facility Condition:

- Structural Capacity. No limitations on design structural live load or fendering capacity. Structure is well maintained and in good condition.
- Safety Conditions. Safety surveys are performed at regular time intervals. Unsafe conditions of structure and appurtenances are not present.
- Environmental Hazards. Environmental compliance surveys are performed at regular time intervals. No conditions exist leading to environmental contamination under normal facility use.

<u>Facility Mostly Operational (C-2)</u>

Impact to Facility Operations:

- Between 5 and 10 percent increase in evolution time for ship loading/off-loading or ship maintenance resulting from facility limitations.
- Limitations to cold iron support weapons systems testing, degaussing or deperming occur between 5 and 10 percent of ship berthing time.

Berth Depths:

- Maintenance dredging performed only after indications of shoaling or siltation. Depth at facility is 1 to 2 ft less than that required for designated vessels.
- Facility use is somewhat limited by tidal cycles and/or draft of loaded vessels.

Facility Condition:

- Structural Capacity. Design live load capacity is unaffected at present time. Some damage of deteriorations of structural members and/or finder systems exists, possibly resulting in reducing the allowable load capacity in the next three years.
- Safety Conditions. Safety surveys performed on a “hit a miss” basis. Present condition of structure and appurtenances indicates maintenance is necessary.
- Environmental Hazards. Environmental compliance surveys performed on a “hit and miss” basis. Lack of an environmental program and present condition of the facility might lead to environmental contamination during futures use of the facility.

<u>Facility Partially Operational (C-3)</u>

Impact to Facility Operations:

- Between 10 and 20 percent increase in evolution time for ship loading/off-loading or ship maintenance resulting from facility limitations.
- Limitations to cold iron support weapons systems testing, degaussing or deperming occur between 10 and 20 percent of ship berthing time.

Berth Depths:

- Maintenance dredging not performed. Definite indications of shoaling or siltation. Facility depth is 3 to 4 ft less than required depths for designated vessels.
- Facility use is often limited by tidal cycles and/or draft of loaded vessels.

Facility Condition:

- Structural Capacity. Design live load capacity is limited for portions of the structure. Damage or deterioration of structural members is present resulting in limitations in berthing, crane loading, and material handling.
- Safety Conditions. Safety surveys indicate violations that pose hazards limiting operations.
- Environmental Hazards. Environmental surveys indicate conditions exist that contributing to environmental contamination during facility operation.

<u>Facility Not Operational (C-4)</u>

Impact to Facility Operations:

- More than 20 percent increase in evolution time for ship loading/off-loading or ship maintenance resulting from facility limitations.
- Limitations to cold iron support weapons systems testing, degaussing or deperming occur more than 20 percent of ship berthing time.

Berth Depths:

- Maintenance dredging not performed. Definite indications of shoaling or siltation. Facility depth is more than 4 f less than that required for designated vessels.
- Facility use is continuously limited by tidal cycles and/or draft of loaded vessels.

Facility Condition:

- Structural Capacity. Damage or deterioration to structural members results in allowable load restrictions that prevent safe facility operations. Major structural repairs are required prior to restoring the original allowable applied loads.

- Safety Conditions. Safety surveys indicate violations pose hazards to personnel and equipment. Repairs are necessary prior to the facility becoming operational.
- Environmental Hazards. Environmental surveys indicate conditions contributing to environmental contamination during facility operation. Mitigation of adverse conditions is required prior the facility becoming operational.

The mooring hardware and supporting mooring pedestals are color-coded on a four point rating system, specifically:

Green — Mooring hardware and foundations are in good condition.

Blue — Mooring hardware and foundations have minor defects and are recommended for repair on a routine basis. In addition, applied loads to the mooring position should be monitored.

Yellow — Mooring hardware and foundations have moderate defects and are recommended for repair on a priority basis. In addition, applied loads to the mooring position are recommended.

Red — Mooring hardware and foundations have severe defects and require immediate repairs. In addition, use of the mooring position should be restricted until repairs are completed.

Load restrictions to the deteriorated mooring position are estimated by comparison to similar sized fittings presented in UFC 4-150-08, 01 April 2001, "Table 2-1 Commonly Used U.S. Navy Pier Mooring Fittings." The recommended applied loads for various types of mooring hardware are indicated in Table B-2.

The fender system condition is indicated with a dashed line along the outboard edge of the structure. The condition is color-coded on a four point rating system, specifically:

Green — The elements comprising the fender system are in good condition.

Blue — The elements comprising the fender system are weathered and have minor defects and damage. The fastening hardware is deteriorated; however, there is no measurable section loss. There are no recommended restrictions to the berthing operations; however, the deteriorated portions should be monitored.

Yellow — The elements comprising the fender system are damaged and/or deteriorated with moderate defects. In addition, isolated elements of the

fender system are missing or severely deteriorated. Local restrictions to berthing operations are recommended.

Red The elements comprising the fender system are severely damaged or deteriorated. Restrictions to berthing operations are recommended.

TABLE B-2
Deteriorated Mooring Hardware Allowable Load Summary

Description	Height	Recommended Working Capacity (kips)			
	Base Size	Rated 1	Rated 2	Rated 3	Rated 4
Special Mooring Bollard "A"	48 inches 48 in. by 48 in.	450	400	225	0
Special Mooring Bollard "B"	44 ½ inches 39 in. by 39 in.	200	175	100	0
Large Bollard with Horn	44 ½ inches 39 in. by 39 in.	70	60	35	0
Large Double Bitt with Lipp	26 inches 73 ½ in. by 28 in.	75	65	35	0
Low Double Bitt with Lipp	18 inches 57 ½ in. by 21 ½ in.	60	50	30	0
42 inch Cleat	13 inches 26 in. by 14 ¼ in.	40	30	20	0
30 inch Cleat	13 inches 16 in. by 16 in.	20	15	10	0

Hydrographic Survey Plan

Figures illustrating the approximate depth below the defined datum of the mudline adjacent to the structures comprising the facility. The dredge depth are rated on a four point scale and color coded appropriately.

The current depth is assumed as the required dredge depth for cases where original dredge depth or berthed vessels required depth is unavailable.

Crane Loading Plan

Figures indicating allowable crane loads and permissible crane placements during loading and unloading operations.

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

Located in AUTEC Naval Base, Andros Island, NFA200000PR1902, the Main Pier, is within the facility designated 'Marina Fuel Facilities' in the vicinity of the Site 1. The 485 ft by 50 ft structure was originally constructed of concrete and was designated 'PR1902'. The original construction date is unknown.

Operational Rating	**C-3**	**Structure Partially Operational**
Structure CI Rating	**45**	**Poor**

Overall, the assets comprising NFA200000PR1902 are in Poor condition, Condition Index 45, with an Operational Capability Rating of C-3 (Structure Partially Operational). The inspection documented 197 Minor defect(s) and 170 Moderate defect(s) in the structural assets (H1010 to H1030). Furthermore, the assets are deteriorated with 270 Major defect(s) and 80 Severe defect(s). A Condition Index Rating and quantitative defect summary of the recorded deficiencies is provided in Table ES-1.

The Main Pier, NFA200000PR1902, is deteriorated with Minor to Moderate defects throughout the structural assets (H1010 to H1030). These defects result in a reduction between 5 and 15 percent to allowable working loads. In addition, multiple Major defects are present, resulting in isolated reductions of up to 30 percent in the allowable working loads. The deficiencies in the structural assets comprising Main Pier warrant a recommended restriction of the allowable working loads by 20 percent. While collapse is not imminent, significant defects in the structure may continue to deteriorate and overstress critical structural assets, which may result in substantial increases to the repair costs if the Priority repair recommendations are not

implemented. In addition to the general load restriction recommendations, Halcrow recommends additional specific vehicle load restrictions. Truck cranes, straddle carriers and commercial truck loading as defined by the American Association of State Highway and Transportation Officials (AASHTO) should be should be restricted until priority repairs are completed. In addition, a 4-ton load restriction to forklifts is recommended. Non-commercial vehicles are permitted; however, small trucks should be limited to a 6,000 lb maximum axle load.

Halcrow performed preliminary calculations to determine the allowable load capacity of the structural overlay that is positioned above broken prestressed planks. In order to verify the assumptions in preliminary analysis, Halcrow recommends a comprehensive investigation of the existing structural overlay. Until investigation results are available and a detailed analysis is performed additional local load restrictions are recommended at the locations of severely deteriorated or broken planks. Specifically, Halcrow recommends restricting all vehicle access and limiting the applied uniform loads to less than 200 psf.

<u>General Repair Recommendations:</u>

1. Halcrow recommends repairing 43 Severe defect(s) in the Substructure as Priority repairs. Furthermore, there is/are 211 defect(s) recommended as Routine repairs.

   Halcrow recommends budgeting $716,000 for the Substructure repair recommendations. This estimate includes encasing the damaged steel H-pile supporting the south mooring dolphin.

2. Halcrow recommends repairing 14 Severe defect(s) in the Superstructure as Priority repairs. Furthermore, there is/are 47 defect(s) recommended as Routine repairs.

   Halcrow recommends budgeting $151,500 for the Superstructure repair recommendations.

3. Halcrow recommends repairing 23 Severe defect(s) in the Deck Components as Priority repairs. Furthermore, there is/are 182 defect(s) recommended as Routine repairs.

   Halcrow recommends budgeting $3,158,400 for the Deck Components repair recommendations. This estimate includes replacement of 17 deteriorated prestressed concrete planks, or nearly 1,100 square feet of the pier deck.

4. Halcrow recommends repairing 72 Severe defect(s) in the Mooring & Berthing System as Priority repairs. Furthermore, there is/are 5 defect(s) recommended as Routine repairs.

   Halcrow recommends budgeting $59,800 for the Mooring & Berthing System

repair recommendations.

5. Halcrow recommends repairing 2 Severe defect(s) in the Appurtenances as Priority repairs. Furthermore, there is/are 11 defect(s) recommended as Routine repairs.

   Halcrow recommends budgeting $34,000 for the Mooring & Berthing System repair recommendations.

The engineering estimate to perform the described repairs is $3,023,600. This cost is further broken down into Priority and Routine repair recommendations. The estimated cost of the Priority repair recommendations is $2,423,900. The recommend Routine repairs are estimated at $599,700.

A preliminary scenario assessment is included in the analysis that determines the not-to-exceed cost estimates with probabilities of 80 percent. The analysis is designed to allow improved future budget decision-making by allowing consideration of various outcomes and the implication of the outcomes. No variable stress testing is performed. The budgetary not-to-exceed cost estimate for NFA200000PR1902 is $4,120,000.

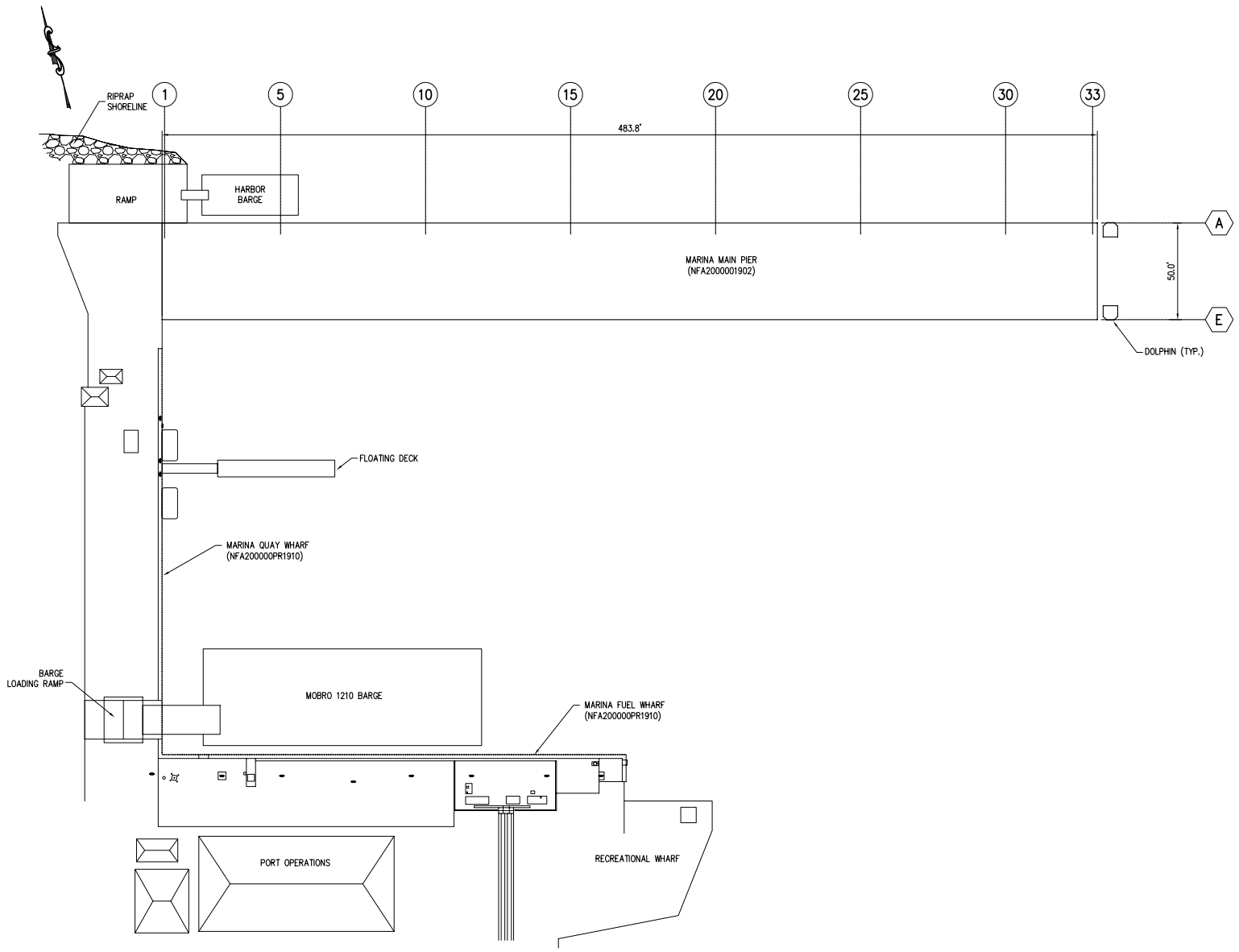
As a general recommendation, deteriorated concrete structures should be re-inspected every six years. However, the significant defects discovered in the deck soffit warrant additional considerations. Halcrow recommends additional bi-annual inspections of the deck and precast planks prior to completion of the repair recommendations.

VICINITY MAP

LOCATION PLAN

GRAPHIC SCALE	DATE	Halcrow	NAVAL FACILITIES ENGINEERING SERVICE CENTER EAST COAST DETACHMENT WASHINGTON, D.C.	
NOT TO SCALE		Contract Number N62473-06-D-3029	NAVAL STATION Atlantic Undersea Test and Evaluation Center (AUTEC)	FIG. NO. B-1

S:\VINAVG400\Figure\REPORT\DWG\Naval Station\Appendix A\Electrical Asset Inventory\Xref\N85x11.dwg Model Jan 12, 2010 1:58pm by: PortalaVinA



FACILITY PLAN

SITE 1: MARINA FUEL FACILITY

LEGEND

FACILITY OVERALL CONDITION

- **C1** — GOOD CONDITION WITH NO LIMITATIONS ON THE ORIGINAL LIVE LOAD OR BERTHING CAPACITY. ROUTINE MAINTENANCE REPAIRS MAY BE REQUIRE (C–1)
- **C2** — MODERATE DEFECTS IN THE STRUCTURAL COMPONENTS, BUT THE LOAD CAPACITY IS UNAFFECTED AT PRESENT. MAINTENANCE REPAIRS ARE REQUIRED. VESSEL BERTHING MAY BE LIMITED DUE TO EXTENDED LENGTHS OF BROKEN OR MISSING FENDER SYSTEM. (C–2)
- **C3** — ISOLATED AREAS WITH SEVERE DEFECTS IN THE STRUCTURAL COMPONENTS THAT HAVE RESULTED IN LOAD RESTRICTIONS. (C–3)
- **C4** — SEVERE DEFECTS IN THE STRUCTURAL COMPONENTS THAT HAVE REDUCED THE INTEGRITY RESULTING IN PARTIAL OR TOTAL COLLAPSE. (C–4)

LOAD RESTRICTIONS

RESTRICT ALL CRANE LOADS. PROHIBIT SUPERIMPOSED LOADING GREATER THAN 200 PSF

HYDROGRAPHIC CONDITIONS SURVEY

X = MEASURED WATER DEPTH (FT.)
Y = ORIGINAL DESIGN DREDGE DEPTH (FT.), BELOW MEAN LOWER LOW WATER (DATUM EL. 0.00).

- EXISTING DEPTH (FT.) IS EQUAL TO, OR EXCEEDS THE ORIGINAL DESIGN DEPTH
- EXISTING DEPTH (FT.) BETWEEN 90–100% OF THE ORIGINAL DESIGN DEPTH
- EXISTING DEPTH (FT.) BETWEEN 80–90% OF THE ORIGINAL DESIGN DEPTH
- EXISTING DEPTH (FT.) LESS THAN 80% OF THE ORIGINAL DESIGN DEPTH
- (10) DEPTH (FT) PER NOAA NAUTICAL SEE CONDITION FIGURE FOR ADDITIONAL INFORMATION
- [10] DEPTH (FT) PER EXPLORER NAUTICAL CHART SEE CONDITION FIGURE FOR ADDITIONAL INFORMATION

DEFECTS RECOMMENDED FOR REPAIRS

SEE DEFECT RATING CRITERIA FOR ADDITIONAL DEFECT RATING INFORMATION. XXX INDICATES STRUCTURAL DEFECT ID, SEE STRUCTURAL DEFECT TABLE.

XXX (2) MODERATE — XXX (3) MAJOR — XXX (4) SEVERE

FENDER SYSTEM CONDITION

- F1 — FENDER SYSTEM IN GOOD OPERATIONAL CONDITION WITH NO DEFECTS.
- F2 — FENDER SYSTEM WITH MINOR DEFICIENCIES.
- F3 — FENDER SYSTEM WITH MODERATE OR MAJOR DEFICIENCIES. LOCALIZED BERTHING RESTRICTIONS MAY BE RECOMMENDED.
- F4 — FENDER SYSTEM WITH SEVERE DEFICIENCIES. BERTHING LIMITATIONS ARE RECOMMENDED.

MOORING HARDWARE CONDITION

- FITTING IN GOOD OPERATIONAL CONDITION WITH NO DEFECTS (RATED 1)
- FITTING WITH MINOR DEFICIENCIES (RATED 2)
- FITTING WITH MODERATE OR MAJOR DEFICIENCIES. MOORING LOAD(S) MAY BE RESTRICTED (RATED 3)
- FITTING WITH SEVERE DEFICIENCIES. MOORING LOAD(S) ARE RESTRICTED (RATED 4)

MOORING PEDESTAL CONDITION

- FITTING PEDESTAL IN GOOD OPERATIONAL CONDITION WITH NO DEFECTS (RATED 1)
- FITTING PEDESTAL WITH MINOR DEFICIENCIES (RATED 2)
- FITTING PEDESTAL WITH MODERATE OR MAJOR DEFICIENCIES. MOORING LOAD(S) MAY BE RESTRICTED (RATED 3)
- FITTING PEDESTAL WITH SEVERE DEFICIENCIES. MOORING LOAD(S) ARE RESTRICTED (RATED 4)

X = MOORING HARDWARE RATING
Y = MOORING PEDESTAL RATING

B-11

DETERIORATED MOORING HARDWARE RECOMMENDED RESTRICTED LOADING

Description	Height / Base Size	Recommended Working Capacity: Rated	Rated	Rated	Rated
Special Mooring Bollard "A"	48 inches / 48 in. by	450	400	225	0
Special Mooring Bollard "B"	44 ½ / 39 in. by	200	175	100	0
Large Bollard with Horn	44 ½ / 39 in. by	70	60	35	0
Large Double Bitt with Lipp	26 inches / 73 ½ in.	75	65	35	0
Low Double Bitt with Lipp	18 inches / 57 ½ in.	60	50	30	0
42 inch Cleat	13 inches / 26 in. by	40	30	20	0
30 inch Cleat	13 inches / 16 in. by 16	20	15	10	0

NAVFAC

GRAPHIC SCALE
1"=40' 0 — 40 — 80 FT.

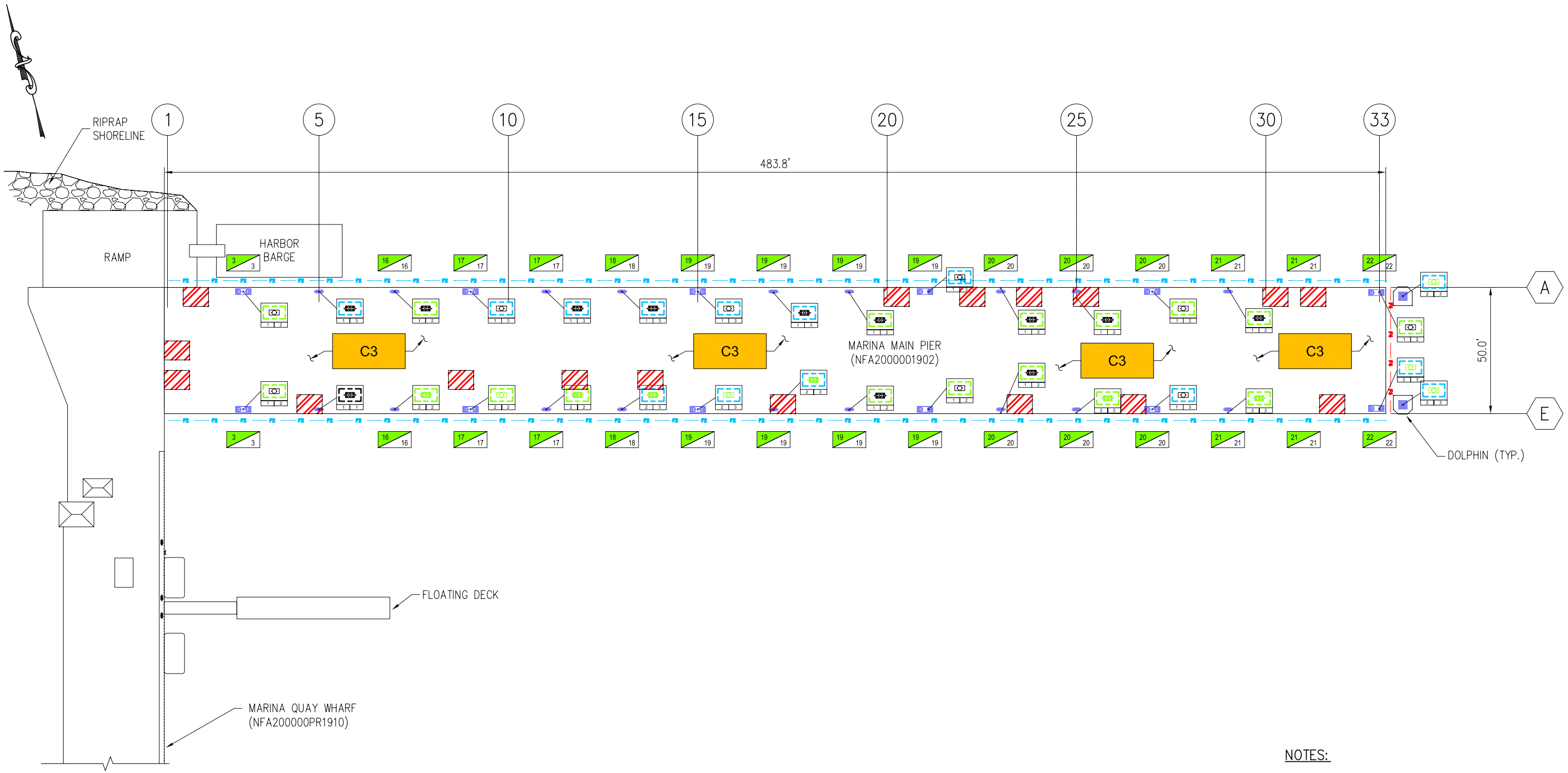
DATE
JANUARY 2010

Halcrow
Contract Number N62473–06–D–3029

NAVAL FACILITIES ENGINEERING SERVICE CENTER
EAST COAST DETACHMENT
WASHINGTON D.C.

AUTEC ANDROS ISLAND — ANDROS ISLAND BAHAMAS
APPENDIX B: FACILITY CAPABILITY REPORT
FACILITY PLAN AND LEGEND

FIG. NO. B–2

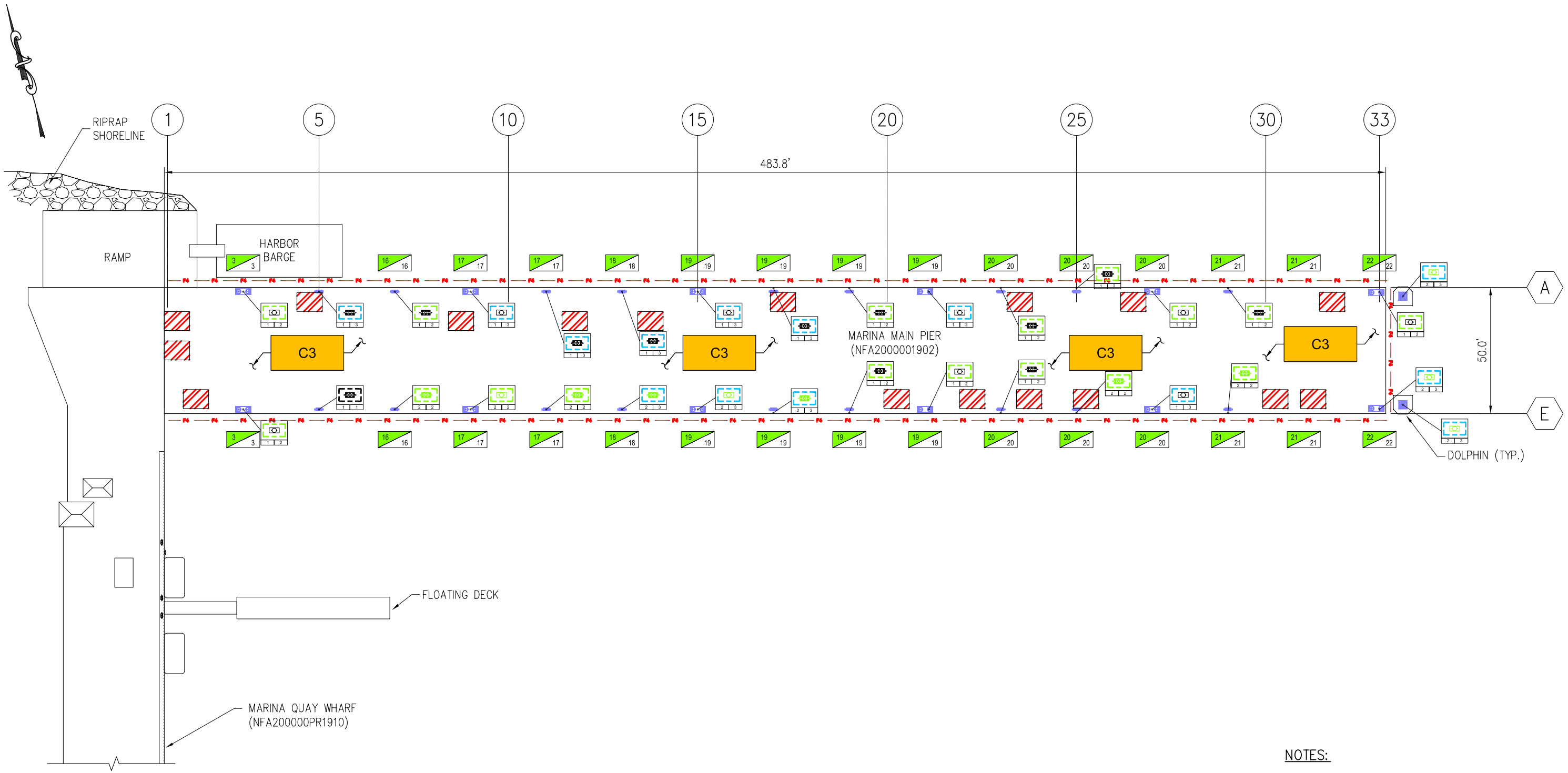


B-12

NOTES:

1. ORIGINAL DESIGN WATER DEPTHS ARE NOT AVAILABLE. MEASURED VALUES USED AS ORIGINAL DEPTHS.
2. NOAA & EXPLORER NAUTICAL CHART DATA NOT AVAILABLE.

NAVFAC	GRAPHIC SCALE 1"=40' 0 40 80 FT.	DATE JANUARY 2010	Halcrow Contract Number N62473-06-D-3029	NAVAL FACILITIES ENGINEERING SERVICE CENTER EAST COAST DETACHMENT WASHINGTON D.C.
				AUTEC ANDROS ISLAND ANDROS ISLAND BAHAMAS APPENDIX B: FACILITY CAPABILITY REPORT CURRENT FACILITY OPERATING CONDITION — FIG. NO. B-3

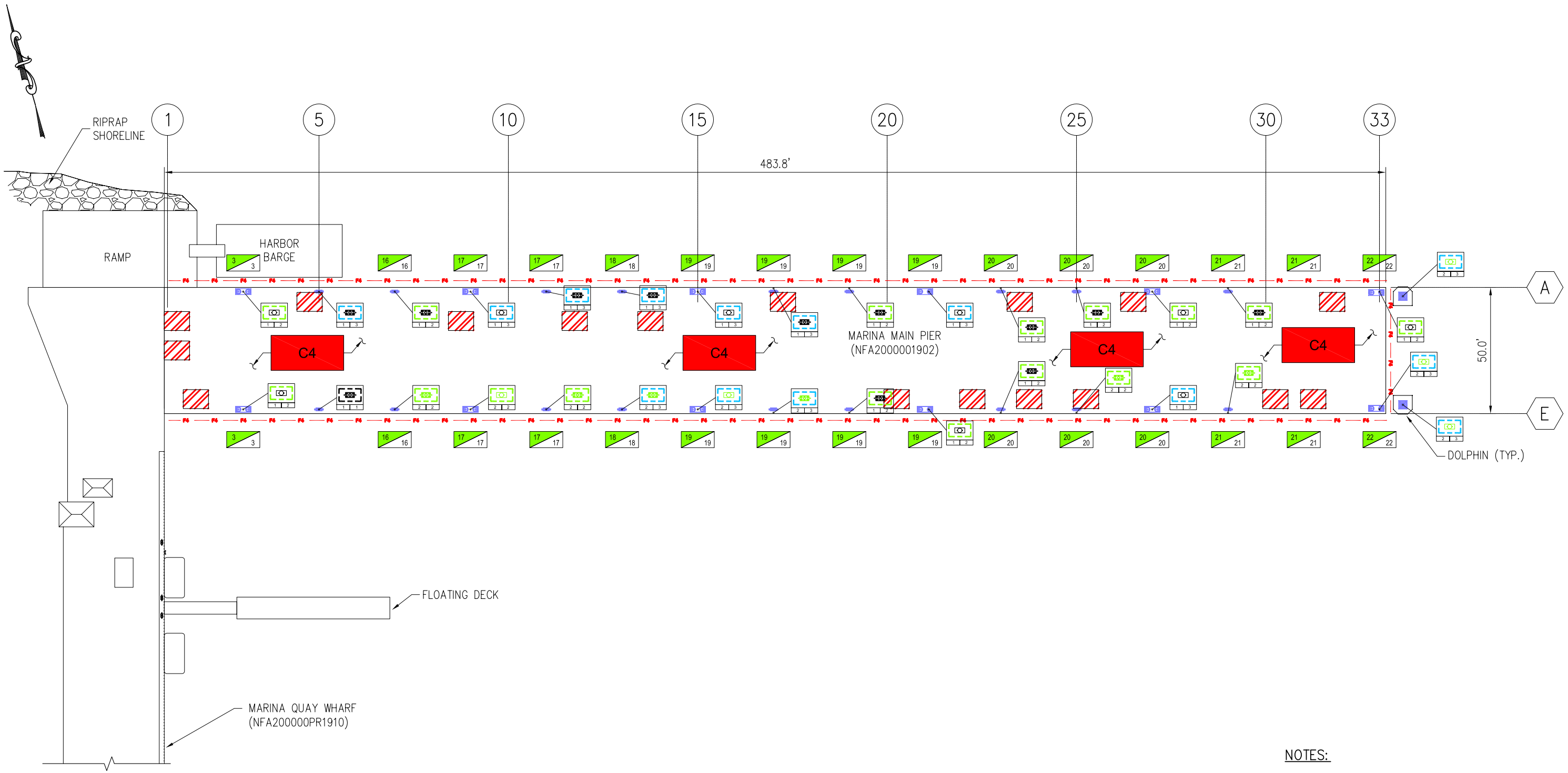


B-13

NOTES:

1. ORIGINAL DESIGN WATER DEPTHS ARE NOT AVAILABLE. MEASURED VALUES USED AS ORIGINAL DEPTHS.
2. NOAA & EXPLORER NAUTICAL CHART DATA NOT AVAILABLE.

NAVFAC	GRAPHIC SCALE 1"=40' 0 40 80 FT.	DATE JANUARY 2010	Halcrow Contract Number N62473-06-D-3029	NAVAL FACILITIES ENGINEERING SERVICE CENTER EAST COAST DETACHMENT WASHINGTON D.C.
				AUTEC ANDROS ISLAND ANDROS ISLAND BAHAMAS APPENDIX B: FACILITY CAPABILITY REPORT 5 YEARS FACILITY OPERATING CONDITION
				FIG. NO. B-4



B-14

NOTES:

1. ORIGINAL DESIGN WATER DEPTHS ARE NOT AVAILABLE. MEASURED VALUES USED AS ORIGINAL DEPTHS.
2. NOAA & EXPLORER NAUTICAL CHART DATA NOT AVAILABLE.

NAVFAC	GRAPHIC SCALE 1"=40' 0 40 80 FT.	DATE JANUARY 2010	Halcrow Contract Number N62473-06-D-3029	NAVAL FACILITIES ENGINEERING SERVICE CENTER EAST COAST DETACHMENT WASHINGTON D.C.
				AUTEC ANDROS ISLAND ANDROS ISLAND BAHAMAS APPENDIX B: FACILITY CAPABILITY REPORT 10 YEARS FACILITY OPERATING CONDITION — FIG. NO. B-5

Photo 001 NFA200000PR1902 Overall
Pier Looking Offshore (East)

Photo 002 NFA200000PR1902 Overall
Pier Looking Northeast

Photo 003 NFA200000PR1902 Overall
Pier Looking east along north face.

Photo 004 NFA200000PR1902 Overall
Pier Looking west at offshore edge of pier.

EXECUTIVE SUMMARY TABLE

Sect. ID	Structure Identification				Original Construction Date	Structure Info				Condition Index	Operating Rating	Recommendations	
	NFA ID	Facility Designation	Name	Facility		Type	Material	Length (ft)	Width (ft)			Action(s) Required to Restore Structure to C-1, Facility Operational	Budgetary Cost Estimate
1.01	NFA200000PR1902	PR1902	Main Pier	Site 1 Fuel Facility	UN	Open Pile	Concrete	485	50	45	C-3	1 Repair 2 Plumb Piles and 26 Pile Encasements. 2 Repair 217 Defects in the Bent Caps. 3 Repair 172 Defects in the Beams/Girders and the Structural Deck. The repairs include replacing 17 deteriorated prestressed concrete planks. 4 Replace Deteriorated Elements Comprising the Fender System. 5 Limit applied working loads to 80 percent of design loads and apply recommended vehicle restrictions. 6 Restrict applied loads to 200 psf above severely deteriorated planks. Restrict all vehicles at these locations. 7 Inspect Structure in 2016. Perform bi-annual inspections of the deck and planks prior to reconstructing elements.	$4,120,000

APPENDIX C
COST ESTIMATES

APPENDIX C COST ESTIMATES

A conceptual order-of-magnitude cost estimate is prepared for the summarized repair recommendations provided in Section 2: Facilities inspected. The cost estimate is produced on a per defect basis with associated defect unit prices. The associated unit prices and additional information that further describes the assumed repair methodology for each defect type is provided in the attached task sheets. The planning and estimating data with repair procedures presented on the attached task sheets is produced from NAVFAC P-990, Conventional Underwater Construction and Repair Techniques (May 1995). Additional tasks, which are not presented in NAVFAC P-990, are developed to complete the cost estimate.

The task unit prices presented in the cost estimate are developed for Norfolk, Virginia and include all overhead mark-ups and contingencies. In order to determine the repair unit costs for Andros Island, the Norfolk unit prices are adjusted per the requirements described in Chapter 4 of UFC 3-701-09, Handbook for Construction Cost Estimating. As described therein, a location adjustment or area cost factor (ACF) is used to adjust unit costs to location-specific costs for the most common military sites. The ACF is derived from data input study conducted in 2008. The study covered 228 locations that included 96 Base Cities in the continental US and 132 additional locations worldwide. The collected data included local costs for a market basket of 8 labor crafts, 17 construction materials, and 4 equipment items. These labor, materials, and equipment (LME) items are representative of the types of products, services, and methods used to construct most military facilities. The LME costs are normalized and then modified by seven matrix factors covering local conditions affecting construction costs including weather, seismic, climatic, labor availability, contractor support rates, and labor productivity. The resultant ACF for each location is normalized again with respect the 96 Base City average to provide a final value that reflects the relative relationship of construction costs between the location and the 96-Base-City average of 1.00.

ACF – Norfolk, Virginia	0.97
ACF – Andros Island, Bahamas	1.57

A Relative Cost Adjustment Factor (RACF) of 1.62 is used to adjust the Norfolk unit prices to equivalent unit prices for Andros Island. The RACF is the quotient of the Andros Island ACF (1.57) and the Norfolk ACF (0.97).

In addition to the direct engineering cost estimate, a preliminary scenario assessment is included in the analysis. The preliminary scenario assessment determines the not-to-exceed cost estimates with an 80-percent probability. The analysis is designed to allow improved future budget decision-making by allowing consideration of various outcomes and the implication of the outcomes. No variable stress testing is performed. Halcrow cost estimates provided in the report text are conservative; therefore, the not-to-exceed cost with an 80 percent probability is provided.

The results of the cost assessment are provided in Table C-1. All presented estimates are present values shown in US dollars.

TABLE C-1
Cost Assessment Summary

ASSET TYPE		ESTIMATED COST (2009 US Dollars)					
UniFormat Code	Description	Norfolk, Virginia			Andros Island, Bahamas		
		Routine Repairs	Priority Repairs	Budgetary Cost	Routine Repairs	Priority Repairs	Budgetary Cost
H1010	Substructure	$221,300	$88,800	$442,200	$358,500	$143,900	$716,400
H1020	Superstructure	$42,700	$26,600	$93,500	$69,200	$43,000	$151,500
H1030	Deck Components	$86,350	$1,357,800	$1,949,600	$139,900	$2,199,600	$3,158,400
H1040	Mooring & Berthing System	$4,200	$23,100	$36,900	$6,800	$37,400	$59,800
H1050	Appurtenances	$15,600	--	$21,000	$25,300	--	$34,000
TOTAL		$370,150	$1,496,300	$2,543,200	$599,700	$2,423,900	$4,120,000

As indicated, the estimated engineering cost to restore the facility to an Operational Rating of C-1, Facility Operational, is $3,023,600. Halcrow recommend a future budget of $4,120,000. The probability of the actual cost being greater than the Halcrow recommended future budgeted cost is 20 percent.

Project Location	Recommendation and Cost Estimate Summary			
Atlantic Undersea Test and Evaluation Center, Andros Island, Bahamas	Contract Number N62473-06-D-3029	Delivery Order 0017	Funding Source CNIC	
	Estimate Prepared By	Reviewed By	Prepared For A. Austin / Halcrow	Date 15 October 2009
Cost Estimate Scope	x Inspection	30% Document	100% Document	Other

Structure: NFA200000PR1902 Main Pier		Reported Defects / Structural Foundation Overall Grade				Engineering Cost Estimate		Budgetary Cost Estimate
		Minor	Moderate	Major	Severe	Routine	Priority	
Total Estimated Cost Anaysis						**$ 370,100.00**	**$ 1,513,800.00**	**$ 2,543,265.00**
Foundation Analysis								
H1010.01.01	Plumb Pile	0	0	0	1	$ -	$ 17,500.00	$ 23,625.00
H1010.01.05	Structural Encasement							
Asset Analysis								
H1010	Substructures							
H1010.01.01	Plumb Pile							
DFL	Deflection				1	$ -	$ -	$ -
H1010.01.05	Structural Encasement							
OCS	Spall	2		2		$ 2,700.00	$ -	$ 3,645.00
CKV	Crack, Vertical	12	5			$ 2,500.00	$ -	$ 3,375.00
DEL	Delaminated Area	2						
ERS	Erosion	3	3	4	8	$ 6,975.00	$ 17,400.00	$ 32,906.25
VOD	Void	4		2		$ 2,700.00	$ -	$ 3,645.00
ABS								
CKH	Crack, Horizontal		1					
H1010.02.01	Bent Cap							
DEL	Delaminated Area	61	11	72	19	$ 102,975.00	$ 41,325.00	$ 194,805.00
CKH	Crack, Horizontal	33	16	81	6	$ 89,000.00	$ 10,500.00	$ 134,325.00
OCS	Spall	5	2	7	2	$ 10,500.00	$ 4,350.00	$ 20,047.50
CKV	Crack, Vertical	7		1		$ 1,000.00	$ -	$ 1,350.00
HCM	Honey Combing				2	$ -	$ 4,350.00	$ 5,872.50
VOD	Void	2	2	1	5	$ 2,400.00	$ 10,875.00	$ 17,921.25
CKM	Crack, Map		1			$ 525.00	$ -	$ 708.75
H1020	Superstructure							
H1020.01.03	Edge Beam							

Project Location	Recommendation and Cost Estimate Summary						
Atlantic Undersea Test and Evaluation Center, Andros Island, Bahamas	Contract Number	N62473-06-D-3029	Delivery Order	0017		Funding Source	CNIC
	Estimate Prepared By		Reviewed By		Prepared For A. Austin / Halcrow	Date 15 October 2009	
Cost Estimate Scope	x	Inspection		30% Document		100% Document	Other

Structure:	NFA200000PR1902	Reported Defects / Structural Foundation Overall Grade				Engineering Cost Estimate		Budgetary Cost
Main Pier		Minor	Moderate	Major	Severe	Routine	Priority	Estimate
DEL	Delaminated Area	2	5	5	2	$ 9,375.00	$ 4,350.00	$ 18,528.75
OCS	Spall	1	1	5	3	$ 7,275.00	$ 6,525.00	$ 18,630.00
CKH	Crack, Horizontal	5	10	21	9	$ 26,000.00	$ 15,750.00	$ 56,362.50
H1030	Deck Components							
H1030.01.03	Structural Deck Overlay							
CKM	Crack, Map				1	$ -	$ 2,175.00	$ 2,936.25
CKH	Crack, Horizontal			1	6	$ 1,000.00	$ 10,500.00	$ 15,525.00
DEL	Delaminated Area	1	2	2		$ 3,750.00	$ -	$ 5,062.50
OCS	Spall			1	1	$ 1,350.00	$ 2,175.00	$ 4,758.75
%BK	Broken				1	$ -	$ -	$ -
H1030.01.04	Suspended Plank				17	$ -	$ 1,329,400.00	$ 1,794,690.00
DEL	Delaminated Area	10	55	3		$ -	$ -	$ -
%BK	Broken				4	$ -	$ -	$ -
OCS	Spall	2	4	11	1	$ -	$ -	$ -
CKH	Crack, Horizontal	4	14	2	2	$ -	$ -	$ -
H1030.02.01	Curbs & Bullrail							
DEL	Delaminated Area	1	1	6	1	$ 8,625.00	$ 2,175.00	$ 14,580.00
OCS	Spall	3		3	1	$ 4,050.00	$ 2,175.00	$ 8,403.75
CKH	Crack, Horizontal			4	1	$ 4,000.00	$ 1,750.00	$ 7,762.50
H1030.02.03	Mooring Foundation							
OCS	Spall	6	5	12		$ 18,825.00	$ -	$ 25,413.75
DEL	Delaminated Area	4	8	13	1	$ 21,750.00	$ 2,175.00	$ 32,298.75
CKH	Crack, Horizontal	24	24	11	3	$ 23,000.00	$ 5,250.00	$ 38,137.50
CKV	Crack, Vertical	2				$ -	$ -	$ -
CKM	Crack, Map	1				$ -	$ -	$ -
H1040	Mooring & Berthing System							
H1040.01.03	Fender Framing						$ 23,100.00	$ 31,185.00
%BK	Broken				14	$ -	$ -	$ -

Project Location	Recommendation and Cost Estimate Summary			
Atlantic Undersea Test and Evaluation Center, Andros Island, Bahamas	Contract Number N62473-06-D-3029	Delivery Order 0017	Funding Source CNIC	
	Estimate Prepared By	Reviewed By	Prepared For A. Austin / Halcrow	Date 15 October 2009
Cost Estimate Scope	x Inspection	30% Document	100% Document	Other

Structure:	NFA200000PR1902	Reported Defects / Structural Foundation Overall Grade				Engineering Cost Estimate		Budgetary Cost Estimate
Main Pier		Minor	Moderate	Major	Severe	Routine	Priority	
%SL	Section Loss, Overall				3	$ -	$ -	$ -
%BR	Section Loss, Marine Borer				1	$ -	$ -	$ -
H1040.01.13	Panels / Skirt							
%SL	Section Loss, Overall				54	$ -	$ -	$ -
OCS	Spall	2	1	2		$ 3,225.00	$ -	$ 4,353.75
CKV	Crack, Vertical		2			$ 1,000.00	$ -	$ 1,350.00
H1050	Appurtenances							
H1050.05.01	Utility Vault							
OCS	Spall			1		$ 1,350.00	$ -	$ 1,822.50
H1050.05.03	Utility On-Deck Cover							
OCS	Spall	2	2	3		$ 5,100.00	$ -	$ 6,885.00
CKM	Crack, Map	1	2	3		$ 5,100.00	$ -	$ 6,885.00
%SL	Section Loss, Overall				2	$ 4,050.00	$ -	$ 5,467.50
DEL	Delaminated Area	1				$ -	$ -	$ -

TASK Concrete Void Repair Using Concrete Reconstruction

Description of Task

Repair a deteriorated concrete element by reconstructing the deteriorated portion with cast-in-place concrete. Access to the asset is assumed below deck.

Crew Estimate

Dive station, two laborers

Equipment Requirements

High-pressure water blaster, hydraulic grinder with Barnacle Buster attachment, high-pressure pump for water blaster, hydraulic power unit, hydraulic drill with bits, hydraulic chipping hammer, hydraulic hammer drill with bits, oxygen arc cutting equipment, rigging equipment, float stage or work platform.

Crew Productivity

40 hours per 10 ft^2 patch.

Materials

Concrete Form Material

The concrete form is required for casting the repair section. The formwork must exist on both the front and back of the repair section and should extend a minimum of 3 inches over the existing sound concrete. The frontal plus the rear area of the repair plus the form overlap is the required area of formwork.

Steel Reinforcing Bars

Steel reinforcing bars must be placed in the repair section to replace those bars that were removed. Estimates can be made by measuring the gaps between sections of sound reinforcing steel. Sufficient lap of new bars with existing bars is provided for.

Concrete

Concrete quantity is determined by the volume of the area to be filled. A conservative estimate should include an allowance of 10 percent extra concrete over the theoretically calculated quantity for waste and overfill.

Description of Repairs

Defective section of element is removed, surfaces and reinforcing steel are prepared, formwork constructed, and element is restored with cast-in-place concrete.

01. Prepare surface by removing unsound concrete to 3/4-inch minimum depth and ensuring 1 in. clearance around all exposed reinforcing steel. Clean all surfaces to bond to new concrete with wet sandblasting and water jet. Clean exposed steel with abrasive blasting. Epoxy coat steel where possible. Parallel splice-weld new steel where 25 percent or more of original diameter

is lost.

02. Construct forms for patches so the concrete can be placed. Ensure forms are mortar tight at all joints between adjacent sections, between the forms and concrete, and at the tie-bolt holes to prevent the loss of mortar. Twisted or stranded caulking cotton, folded canvas strips, or similar material should be placed between the joints as the forms are assembled.

03. Immediately before placing new concrete, coat the surface of the old concrete with a 1/8-inch-thick layer of mortar. This mortar should have the same sand and cement content and the same water-cement ratio as the new concrete. The surface should be damp, but not wet. The mortar can be applied with an air-suction gun, by brushing, or being rubbed into the surface by hand encased in a rubber glove.

04. Place concrete immediately. Ensure thorough compaction by vibration/tamping.

Project Specific Assumptions

01. The cost is determined on a per defect basis with the defect rating determined by the length of crack.

Minor	No estimate required.
Moderate	The void length or breadth is greater than 36 in. but less than 60 in or the void depth is between 2 and 3 inches. The estimated repair dimensions per defect are 36 in long by 12 in. wide and 3 in. deep. Replacement of reinforcing steel is not required.
Major	The void length or breadth is greater than 60 in. but less than 120 in. or the void depth is between 3 and 5 inches. The estimated repair dimensions per defect are 84 in long by 24 in. wide and 4 in. deep. In addition, replacement of 36 in. of steel reinforcing is required.
Severe	The void length or breadth is greater than 120 in or the void depth is greater than 5 in. The estimated repair dimensions per defect are 120 in long by 36 in. wide and 5 in. deep. In addition, replacement of 60 in. of steel reinforcing is required.

Measured Units

Each

Unit Cost

Minor $350.00

Moderate	$525.00
Major	$1,350.00
Severe	$2,175.00

TASK Concrete Crack Repair by Epoxy Grout Injection

Description of Task

Repair a 6-inch-deep crack in a concrete pile by injecting low-viscosity neat epoxy grout into the crack. Total length of crack to be repaired is variable based on defect rating.

Crew Estimate

Dive station, one laborer.

Equipment Requirements

High-pressure water blaster, hydraulic grinder with Barnacle Buster attachment, hydraulic impact wrench with masonry bits, high-pressure pump for water blaster, hydraulic power unit, protective clothing for personnel handling the epoxy compound, epoxy pump, float stage or work platform.

Crew Productivity

15 min per linear foot of crack.

Materials

Low-Viscosity Epoxy Grout

Commercially available injectable epoxy grouts are usually purchased in two-component kits. Mixing proportions will vary, so manufacturers' instructions should be followed. The volume of the crack must be estimated by taking its length, average width, and average depth. An additional 25 percent should be added to allow for overfilling of the cracks and inaccuracies in estimating the size of the cracks.

Description of Repairs

The technique involves forcing a suitable grout to fill voids in cracks. Small cracks can be filled using hand-operated grout gun applicators and large cracks would require pressure grouting. Some epoxy grouts are hand molded into balls and then hand forced into the crack. Epoxy grouts adhere better to rough and clean surfaces.

01. Thoroughly clean crack and adjacent surface by using water blaster and mechanical tools - wire brush and scrapers, which will fit into the void. Remove loose material and organic growth. Clean any exposed reinforcing.
02. Seal the full length of the surface of the crack using sealing tape or epoxy or similar grout pressed into the crack to form a dam. Use a fiberglass tape with a suitable setting epoxy grout to seal the surface. Allow the seal to cure completely before proceeding.
03. After the crack dam has cured, drill one 1/2-inch or larger injection holes in the bottom of the crack and along the crack at 6-inch intervals. Size of hole

is dependent on injector tip.

04. Insert nozzle of grout injector/dispenser into lowest drilled hole and inject flowable grout until it comes out the next higher hole. Proceed up the crack until all holes are filled.

Project Specific Assumptions

01. The cost is determined on a per defect basis with the defect rating determined by the length of crack.

Minor	No estimate required.
Moderate	The crack length is greater than 36 in. but less than 60 in and is between 1/16 and 1/8 in. wide. The estimated repair dimensions per defect are 48 in long and 1/8 in. wide.
Major	The length is greater than 60 in. but less than 120 in and is between 1/8 and ¼ in. wide. The estimated repair dimensions per defect are 84 in long and 1/4 in. wide.
Severe	The length is greater than 120 in. The estimated repair dimensions per defect are 120 in long and 5/16 in. wide.

Measured Units

Each

Unit Cost

Minor	$300.00
Moderate	$500.00
Major	$1,000.00
Severe	$1.750.00

TASK Remove Replace Prestressed Concrete Plank

Description of Task

Remove and replace 12 ft long by 4 ft wide prestressed concrete plank supporting existing structural deck overlay. The structural deck, supported by the plank, is between 8 and 12 inches thick and is partially removed as required to replace the plank. Work required includes drill and grout of new bars into adjacent non-demolished structural deck.

Crew Estimate

** Data Required

Equipment Requirements

** Data Required

Crew Productivity

** Data Required

Materials

Prestressed Plank

12 ft long by 4 ft wide Precast prestressed concrete plank with manufacturer recommended bearing pads.

Reinforcement Anchors

Epoxy adhesive anchoring system with two-directional anchors installed at 12 in. on-center.

Concrete Form Material

The concrete form is required for casting the repair section. The formwork must exist on both the front and back of the repair section and should extend a minimum of 3 inches over the existing sound concrete. The frontal plus the rear area of the repair plus the form overlap is the required area of formwork.

Steel Reinforcing Bars

Steel reinforcing bars must be placed in the repair section to replace those bars that were removed. Estimate assumes area of steel required for balanced steel ratio allowing for sufficient lap of new bars with existing bars.

Concrete

Concrete quantity is determined by the volume of the area to be filled. A conservative estimate should include an allowance of 10 percent extra concrete over the theoretically calculated quantity for waste and overfill.

Description of Repairs

Defective section of element is removed, surfaces and reinforcing steel are prepared, formwork constructed, and element is restored with cast-in-place concrete.

01. Locate deteriorated planks for removal. Drill small hole in the center point of the plank from the panel soffit as required determining the plank location from the top of deck. Measure and mark out structural overlay removal area; equivalent to the sum of the panel geometry and 12 in. on all sides.
02. Drill and insert lifting anchors into structural deck overlay in the area to be removed.
03. Saw cut the existing structural overlay and remove portion positioned directly over deteriorated plank.
04. Drill and insert new lifting anchors into deteriorated prestressed plank to be removed.
05. Remove deteriorated plank and clean all surfaces.
06. Replace or install plank bearing pads positioned over bent caps.
07. Install prestressed plank and fill end voids with grout. Insert backer rods between the new and existing adjacent planks.
08. Drill and grout new anchors into adjacent non-demolished structural overlay. Estimates can be made by measuring the gaps between sections of sound reinforcing steel. Allow for sufficient lap of new bars with existing bars.
09. Prep area and pump concrete. Ensure thorough compaction by vibration/tamping.

Project Specific Assumptions

01. None.

Measured Units

Each

Unit Cost

$78,200

TASK Remove Replace Timber Fender Framing

Description of Task

Remove and replace timber fender framing affixed to existing concrete elements. The fender framing is comprised of 14 in. by 14 in. wales and 12 in. chocks positioned at three (3) vertical elevations.

Crew Estimate

** Data Required

Equipment Requirements

** Data Required

Crew Productivity

** Data Required

Materials

Timber

** Data Required

Fastening Hardware

** Data Required

Description of Repairs

** Data Required

01. Remove the existing deteriorated fender framing system by burning off anchor bolts.
02. Drill and epoxy anchors into concrete with a vertical timber 4 in. by 12 in. spacer at each anchor location.
03. Pre-drill and counter sink all timber chocks.
04. Install the timber chocks.
05. Counter sink and install all timber wales to chocks fastening with steel lag bolts.
06 Counter sink and install 6 in. by 6 in. timber vertical stiffeners to chocks between the wales.
07. Install tar coating at all cut ends or counter drilled timber.

Project Specific Assumptions

01. None.

Measured Units

Linear Feet

Unit Cost

$330.00

TASK Concrete Reconstruction At Mooring Hardware

Description of Task

Repair a deteriorated 36 in. wide by 12 in. high concrete mooring pedestal by reconstructing the deteriorated offshore portion with cast-in-place concrete.

Crew Estimate

Dive station, two laborers

Equipment Requirements

High-pressure water blaster, hydraulic grinder with Barnacle Buster attachment, high-pressure pump for water blaster, hydraulic power unit, hydraulic drill with bits, hydraulic chipping hammer, hydraulic hammer drill with bits, oxygen arc cutting equipment, rigging equipment, float stage or work platform.

Crew Productivity

40 hours per pedestal

Materials

Concrete Form Material

The concrete form is required for casting the repair section. The formwork must exist on both the front and back of the repair section and should extend a minimum of 3 inches over the existing sound concrete. The frontal plus the rear area of the repair plus the form overlap is the required area of formwork.

Steel Reinforcing Bars

Steel reinforcing bars must be placed in the repair section to replace those bars that were removed. Estimates can be made by measuring the gaps between sections of sound reinforcing steel. Sufficient lap of new bars with existing bars is provided for.

Concrete

Concrete quantity is determined by the volume of the area to be filled. A conservative estimate should include an allowance of 10 percent extra concrete over the theoretically calculated quantity for waste and overfill.

Description of Repairs

Defective section of element is removed, surfaces and reinforcing steel are prepared, formwork constructed, and element is restored with cast-in-place concrete.

01. Prepare surface by removing a 24 in. wide area on both sides of the element parallel to the offshore anchor bolts. In addition, remove the offshore corner of the element with minimum depth of 6 in. or until sound concrete. Ensure 1 in. clearance around all exposed reinforcing steel. Clean all surfaces to bond to new concrete with wet sandblasting and water jet. Clean exposed steel

with abrasive blasting. Epoxy coat steel where possible. Parallel splice-weld new steel where 25 percent or more of original diameter is lost.

02. Construct forms for patches so the concrete can be placed. Ensure forms are mortar tight at all joints between adjacent sections, between the forms and concrete, and at the tie-bolt holes to prevent the loss of mortar. Twisted or stranded caulking cotton, folded canvas strips, or similar material should be placed between the joints as the forms are assembled.

03. Immediately before placing new concrete, coat the surface of the old concrete with a 1/8-inch-thick layer of mortar. This mortar should have the same sand and cement content and the same water-cement ratio as the new concrete. The surface should be damp, but not wet. The mortar can be applied with an air-suction gun, by brushing, or being rubbed into the surface by hand encased in a rubber glove.

04. Place concrete immediately. Ensure thorough compaction by vibration/tamping.

Project Specific Assumptions

01. None.

Measured Units

Each

Unit Cost

$7,750.00

TASK Mooring Hardware Mechanically Clean and Coat

Description of Task

Mechanically clean and apply a corrosive resistant coating to an existing piece of mooring hardware.

Crew Estimate

** Data Required

Equipment Requirements

** Data Required

Crew Productivity

** Data Required

Materials

Coating

Corrosive resistant primer and polyurethane or epoxy base top coat.

Description of Repairs

** Data Required

01. Mechanically remove existing abraded coating.
02. Apply coating of rust preventative primer and polyurethane or epoxy base paint top coat.

Project Specific Assumptions

01. None.

Measured Units

Each

Unit Cost

$750.00

APPENDIX D
CALCULATIONS FOR STRUCTURAL ASSESSMENT

Project Number: DINAVI100

Project Name:

Atlantic Undersea Test and Evaluation Center (AUTEC)

PURPOSE

Determine the allowable applied uniform load of a concrete element.

METHODOLOGY

A structural analysis was performed to determine the approximate allowable load of a deteriorated concrete element with known geometry and unknown steel reinforcement. The analysis determines original section capacity. Furthermore, the original capacity is compared against a deteriorated section capacity.

The analysis assumes the original concrete element is reinforced with the minimum allowed reinforcing ratio.

DESIGN CONSTANTS

Unit Variables

Definitions of unit variables that are used within the analysis.

$kips := 1000 \cdot lb$	$k := kips$	$kip := kips$	$tons := 2000 \cdot lb$	$t := tons$
$plf := \frac{lb}{ft}$	$psf := \frac{lb}{ft^2}$	$psi := \frac{lb}{in^2}$	$pcf := \frac{lb}{ft^3}$	$pci := \frac{lb}{in^3}$
$klf := \frac{kips}{ft}$	$ksf := \frac{kips}{ft^2}$	$ksi := \frac{kips}{in^2}$	$kcf := \frac{kips}{ft^3}$	$kci := \frac{kips}{in^3}$
$tlf := \frac{tons}{ft}$	$tsf := \frac{tons}{ft^2}$	$tsi := \frac{tons}{in^2}$	$tcf := \frac{tons}{ft^3}$	$tci := \frac{tons}{in^3}$

Reference File

Input and ouput files referenced within the analysis.

None.

Programmed Function

General programmed functions used within the analysis.

Range Function: Creates an array with a user defined maximum, minimum, and rate of change.

$$A(Amin, Amax, \Delta A) := \left| \begin{array}{l} \text{for } j \in 1 .. \text{floor}\left(\frac{Amax - Amin}{\Delta A}\right) + 1 \\ \quad v_j \leftarrow Amax - [(j-1) \cdot \Delta A] \\ \text{return } v \end{array} \right.$$

ANALYSIS

Assumptions

MATERIAL PROPERTIES

Material testing was not within the scope of the investigation; therefore, values are assumed.

Concrete Compression Stress $f'c := 4000 \cdot psi$

Reinforcing Steel, Tensile Stress $fy := 60000 \cdot psi$

Calculations

SECTION PROPERTIES

The section properties are determined for the original concrete element and the deteriorated sections. A range element depths is defined with an 1/2 in. interval.

Deteriorated variable properties;

Original Depth, $bd_o := 15.00 \cdot in$

Minimum Analyzed Depth, $bd_{min} := 9.00 \cdot in$

The effective depth is defined as the distance between the top of the element and the reinforcing steel. In cases where the concrete element is deteriorated greater than the embeddment, the effective depth is defined as the remaining depth.

Assumed Embeddment $Eo := 3.00 \cdot in$

Analyzed Interval, $\Delta bd := 1.00 \cdot in$

$$bd := A\left(bd_{min}, bd_o, \Delta bd\right)$$

Number of Analyzed Intervals,

$$i := 1 .. ceil\left(\frac{bd_o - bd_{min}}{\Delta bd}\right) + 1$$

Analyzed Concrete Element Width, $bw_o := 12.00 \cdot in$

Concrete Area, Ac;

Original, $Ac_o := bw_o bd_o$ $\quad Ac_o = 180.00 \cdot in^2$

Deteriorated, $Ac := bw_o \cdot bd$

Section Modulus, Sx

Original, $Sx_o := \frac{bw_o bd_o^2}{6}$ $\quad Sx_o = 450.00 \cdot in^3$

Deteriorated, $Sx := \frac{bw_o bd^2}{6}$

STRUCTURE GEOMETRY

Element Span, $Span := 7.50 \cdot ft$

ANALYSIS

The calculation assumes the concrete element is reinforced with the minimum allowable reinforcing ratio. Furthermore, the reinforcing steel is reduced at regular defined intervals until 100% corroded;

Assumed Original Steel Reinforcing Area,

$$As_o := \frac{3.0 \cdot \sqrt{\frac{f'c}{psi}} \cdot psi}{fy} \cdot bw_o \cdot bd_o \qquad As_o = 0.569 \cdot in^2$$

Minimum Steel Reinforcing Area, $As_{min} := 0.00 \cdot in^2$

Analyzed Corrosion Rate, $\Delta As := 0.10 \cdot (As_o - As_{min})$

$$As := A(As_{min}, As_o, \Delta As)$$

Program Function:

Program Mu determines the Allowable Moment Capacity of the original and deteriorated sections.

The Factor of Safety used within this calculation is; $FOSo := 1.60$

$$Wu(bw_o, bd_o, As_o, bd, As) := \left| \begin{array}{l} \text{for } i \in 1..rows(bd) \\ \quad \text{for } j \in 1..rows(As) \\ \quad \left| \begin{array}{l} \rho_o \leftarrow \frac{As_o}{bw_o \cdot bd_o} \\ Ro \leftarrow \rho_o \cdot fy \cdot \left(1 - 0.588 \cdot \frac{\rho_o \cdot fy}{f'c}\right) \\ Mu_o \leftarrow \frac{0.90 \cdot Ro \cdot bw_o \cdot bd_o^2}{FOSo} \\ \rho_{i,j} \leftarrow \frac{As_j}{bw_o \cdot bd_i} \\ R_{i,j} \leftarrow \rho_{i,j} \cdot fy \cdot \left(1 - 0.588 \cdot \frac{\rho_{i,j} \cdot fy}{f'c}\right) \\ Mu_{i,j} \leftarrow 0.90 \cdot R_{i,j} \cdot bw_o \cdot (bd_i)^2 \\ Wu_{i,j} \leftarrow \frac{10 \cdot Mu_{i,j}}{Span^2 \cdot bw_o \cdot FOSo} \end{array} \right. \\ Wu \end{array} \right.$$

RESULTS

The caculations are summarized in Figure S1.

Figure S1
Total Allowable Uniform Load, PSF

		Concrete Element Depth, in.						
		15.00	**14.00**	**13.00**	**12.00**	**11.00**	**10.00**	**9.00**
Area of Steel, sq. in.	**0.57**	4150.00	3865.40	3580.79	3296.19	3011.58	2726.98	2442.37
	0.51	3745.72	3489.58	3233.43	2977.29	2721.14	2465.00	2208.85
	0.46	3339.06	3111.37	2883.69	2656.00	2428.32	2200.64	1972.95
	0.40	2930.01	2730.78	2531.56	2332.34	2133.11	1933.89	1734.67
	0.34	2518.58	2347.82	2177.05	2006.29	1835.53	1664.76	1494.00
	0.28	2104.77	1962.47	1820.16	1677.86	1535.56	1393.26	1250.95
	0.23	1688.58	1574.74	1460.89	1347.05	1233.21	1119.37	1005.53
	0.17	1270.01	1184.62	1099.24	1013.86	928.48	843.10	757.72
	0.11	849.05	792.13	735.21	678.29	621.37	564.45	507.53
	0.06	425.72	397.26	368.80	340.34	311.87	283.41	254.95
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The anaylsis indicates the non-deteriorated structural overlay can resist an applied allowable uniform load of nearly 3,300 psf. Furthermore, assuming 160 pcf unit weight of concrete, the non-deteriorated structural overal can resist an applied allowable uniform load of approximately 3,000 psf.