

Structural Condition Survey of City of Pompano Beach Municipal Pier



Prepared for:
City of Pompano Beach



Submitted by:



Lakdas/Yohalem Engineering, Inc.
2211 NE 54th Street
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Ph: (954) 771-0630 Fax: (954) 771-0519

April 30, 2013

May 22, 2013

Mr. Clayton Young
City of Pompano Beach Eng.
1201 NE 5th Avenue
Pompano Beach, Fl 33061

Re: Pompano Beach Municipal Pier Structural Condition Survey

At the request of Mr. Clayton Young, this office has made an onsite evaluation to identify the structural defects in the elements of the above referenced pier.

The existing pier is 20' x 895' long with 70' x 70' hexagon shape hammer head set approximately 565' away from the beach into the ocean. Also the deck of the pier set level with the curb level of the Ocean Blvd.

Condition Survey:

The existing pier structure was constructed as follows:

- 2'-0 wide precast deck beam on each side span 30'-0 from bent to bent.
- 3'-4 wide precast deck beams in between 3'-2" wide wood deck and edge beams.
- Precast deck beams span on to poured in place bent beams, spaced at 30'-0 on center.
- Each bent beam is supported with 4 precast driven piles set at an angle.

The condition survey of the structural elements was categorized into six categories as follows:

1	Damaged Spall Repairs done in the Past
2	Structural Cracks
3	Spall Concrete
4	Hairline Cracks
5	Rusted Metal Embedment
6	Exposed and Corroded Rebars

- Our structural condition survey reveals that there are 12 - 30' x 3'-2 wide precast deck beams that have spalled concrete repair more than 30% of the surface area.
- There are additional 8 precast decks with spalled and cracked concrete 20 to 25% of the surface area.
- Majority of the structural defects are in the deck beams 180' beyond the west end of the pier (from grid 8, refer to drawing sheet S-1).
- All deck supporting structural members have defects over 10% and 8 deck supporting bent beams have cracks with exposed rusted rebars.

Overall, structural defects represent more than 25% of the entire structure and majority of the defects are re-occurrence of the previously repaired defects.

Analysis:

- Our analysis reveals that members with deterioration more than 25%, the cost of repair work far exceeds replacement cost of the members with new.
- Repair only any structural member with defects less than 15% of the surface area.
- Since majority of the structural members have defects exceeding beyond 25%, structural members beyond grid 19, and the majority of the structural member defect exceeds 20%, it is this office considered opinion to not repair any structural element beyond grid 19 and cordon off the pier for public use area beyond grid 19.
- Consider replacing the existing pier, with equivalent foot print pier with more durable material for severe atmospheric conditions, such as aluminum railing dense exterior grade wood deck and concrete with additives for long lasting and additionally protecting for replacement.

Cost Analysis of repair and replacement with new:

Cost of repair work:

- 1) Spall repair 850 sq.ft. @ \$150./ft. = \$127,500.00
(Damaged repair at existing locations)
- 2) Structural crack repair 2,800 sq. ft. @ \$50./ft. = \$140,000.00
- 3) Spalled concrete repair 2,400 sq. ft. @ \$125./ft. = \$300,000.00
- 4) Crack repair 330ft. @ \$40/ft. = \$13,200.00
- 5) Metal embedment 40ft. @ \$500./ft. = \$20,000.00
- 6) Exposed rebar 65ft. @ \$200./ft. = \$13,000.00
- 7) Replace 20 deck units with new \$35,000. per each = \$700,000.00
- 8) Defective and rusted concrete 800 sq.ft. @ \$100./ft. = \$80,000.

Total : \$1,393,700.00

Contingency 10% = 139,370.00

Estimated cost of repair work = \$1,550,000.00

Our evaluation reveals that the bent beam supporting the decks are relatively structurally sound, however there are 15 beams which require more than 15% of the area requires spall concrete repair work.

In life cycle point of view, the structural element which required 10 to 20% repair work will resurface with additional repair work within the next 5 to 7 years

Replace Existing Pier with New:

Equivalent foot print as existing pier:

Cost of new pier with same foot print as the existing 20' x 895' with 70 x 70 hexagon shape hammer head at the end.

Unit cost \$260 per square foot.

1. $20 \times 895 \times 70 \times 70 - 4 \times \frac{1}{2} (25 \times 25) \times 225 = \$4,848,750.$

2. General Condition 15% = \$727,312.

3. Contingency 10% = \$557,606.

Engineering design and inspection and testing service = \$736,040.00

Replacement cost of the new pier would be **\$ 6,869,708.00**

Cost of new pier: Six million, One hundred and Fifty thousand dollars with a 2 year program.

Final cost would be: Six million, Five hundred thousand dollars.

The new pier structure with all new structural elements will have 30 to 40 years of life span with regular maintenance. Therefore it is this office's considered opinion that the exiting pier structure be replaced with a new structure.

6'0 wider than existing pier:

If the pier foot print is to be increased by 3 ft. on each side totaling 26'-0 wide - 26 x 895 with 70' x 70' hammerhead.

1. Construction cost $(26 \times 895 + 70 \times 70 - 2 \times 25 \times 25) 225 = \$6,057,000$.

2. General condition 15% = \$908,550.

3. Contingency 10% = \$696,555.

Engineering design, inspection and testing service 12% = \$835,866.

Replacement cost of the new pier with additional 3'-0" on each side of the length of the pier (total width 26') would be \$7,801,416.

In comparison and the life cycle cost analysis, this office recommends replacing the existing pier with equal size pier for a cost of \$6,870,000.00

Should you require additional information, please do not hesitate to contact me.

Sincerely,

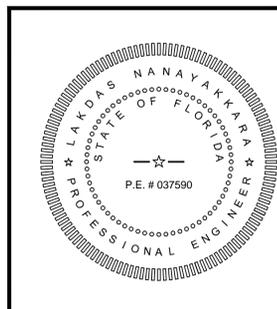
Lakdas Nanayakkara, P.E.
#37590

PROJECT FOR: CITY OF POMPANO BEACH, FLORIDA

PIER STRUCTURAL CONDITION SURVEY

INDEX

SHEET No.	DESCRIPTION
COVER	INDEX OF DRAWING
S-1	PIER DECK PLAN, LEGEND AND KEY PLAN
S-2	PIER DECK PLAN, LEGEND AND KEY PLAN
S-3	PIER DECK PLAN, LEGEND AND KEY PLAN
S-4	PIER DECK PLAN, LEGEND AND KEY PLAN
S-5	UNDERSIDE PLAN, TOP OF BENT, LEGEND AND KEY PLAN
S-6	UNDERSIDE PLAN, TOP OF BENT, LEGEND AND KEY PLAN
S-7	UNDERSIDE PLAN, TOP OF BENT, LEGEND AND KEY PLAN
S-8	UNDERSIDE PLAN, TOP OF BENT, LEGEND AND KEY PLAN
S-9	NORTH BENT ELEVATION CONCRETE DEFECTS
S-10	NORTH BENT ELEVATION CONCRETE DEFECTS
S-11	SOUTH BENT ELEVATION CONCRETE DEFECTS
S-12	SOUTH BENT ELEVATION CONCRETE DEFECTS
S-13	SOUTH BENT ELEVATION CONCRETE DEFECTS
S-14	SOUTH BENT ELEVATION CONCRETE DEFECTS
S-15	SOUTH BENT ELEVATION CONCRETE DEFECTS
S-16	EAST / WEST BENT ELEVATION CONCRETE DEFECTS
S-17	EAST / WEST BENT ELEVATION CONCRETE DEFECTS
S-18	EAST / WEST BENT ELEVATION CONCRETE DEFECTS
S-19	EAST / WEST BENT ELEVATION CONCRETE DEFECTS
S-20	EAST / WEST BENT ELEVATION CONCRETE DEFECTS
S-21	EAST / WEST BENT ELEVATION CONCRETE DEFECTS
S-22	EAST / WEST BENT ELEVATION CONCRETE DEFECTS
S-23	EAST / WEST BENT ELEVATION CONCRETE DEFECTS
S-24	PIER DECK CONCRETE DEFECTS PHOTOS
S-25	UNDERSIDE PIER DECK AND TOP OF BENTS CONCRETE DEFECTS PHOTOS
S-26	UNDERSIDE PIER DECK AND TOP OF BENTS CONCRETE DEFECTS PHOTOS
S-27	EAST / WEST PIER BENT CONCRETE DEFECTS PHOTOS
S-28	NORTH / SOUTH PIER BENT CONCRETE DEFECTS PHOTOS





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Revisions:

Number	Description	Date

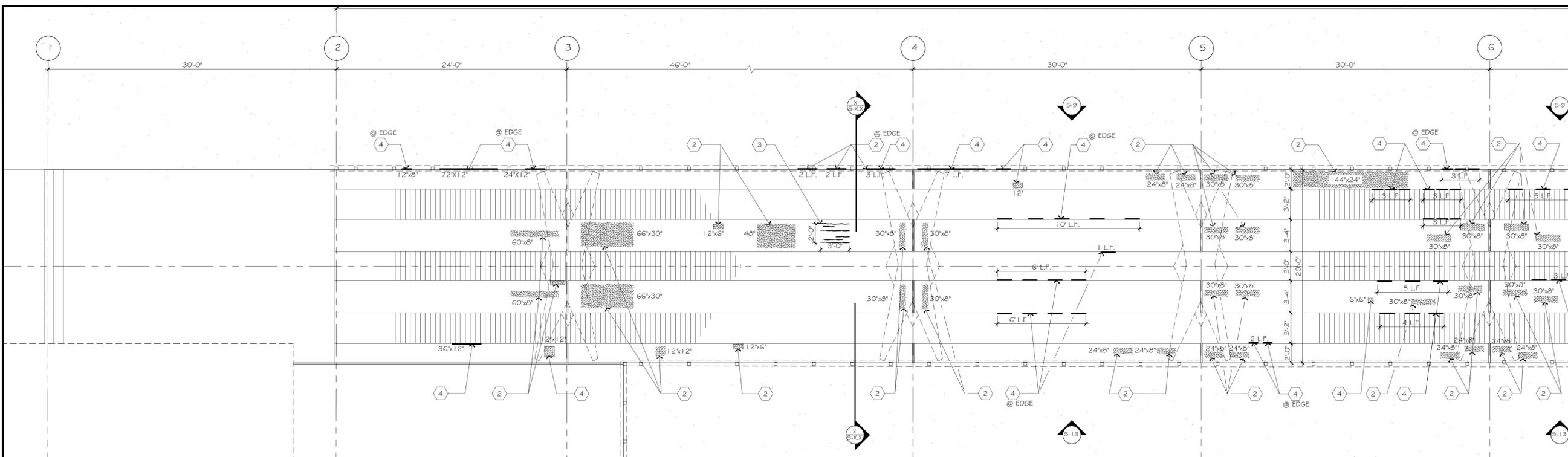
Drawing Title
DECK PLAN

Project Name:
STRUCTURAL CONDITION SURVEY

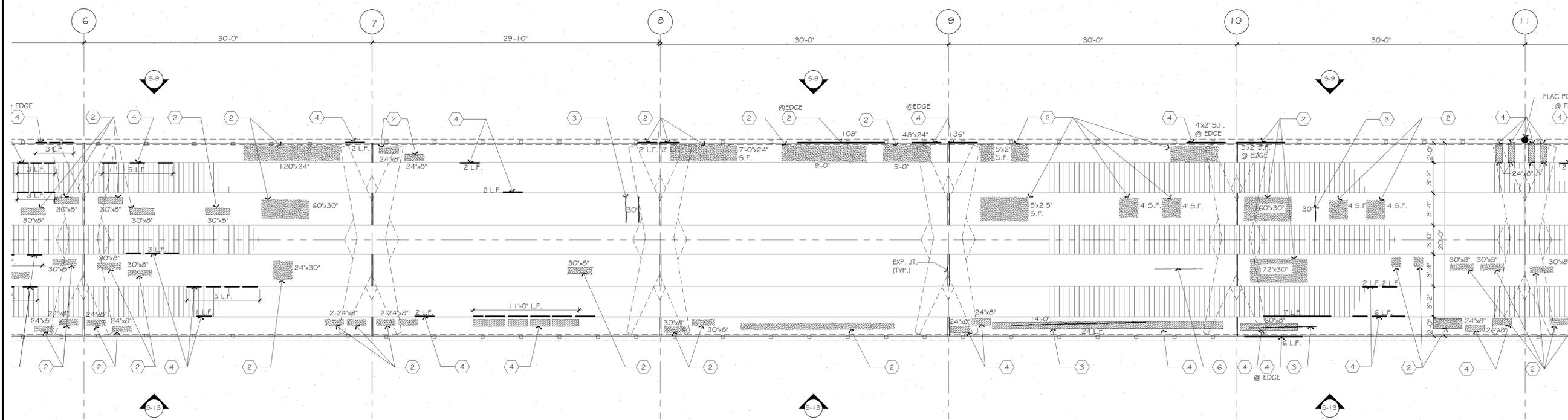
CITY OF POMPANO BEACH
 BROWARD COUNTY, FLORIDA

Job Number: 126311
 Scale: AS SHOWN
 Date: 4/29/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.
 Drawing Number:
S-1

Rev. Number:



1 PIER DECK PLAN
 S-1 SCALE :3/16"=1'-0"

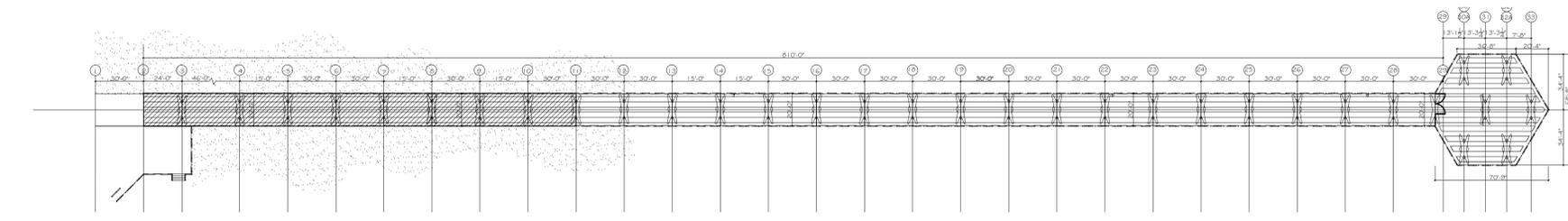


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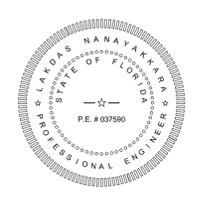
LEGEND

①	INDICATES COLUMN GRID LINE	①	HOLLOW CONCRETE DECK	⑥	HAIRLINE CRACKS
X	INDICATES DEFECT NUMBER	②	SPALLED PATCHWORK	⑦	EDGE REPAIRED
1/5#	INDICATES PICTURE REFERENCE	③	STRUCTURAL CRACK	⑧	DECOMPOSED CONCRETE
		④	SPALL	⑨	REMNANT METAL EMBEDMENT
		⑤	EXPANSION JOINT	⑩	EXPOSED AND CORRODED REBAR, RUST MARK
				⑪	DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED

3 LEGEND
 S-1

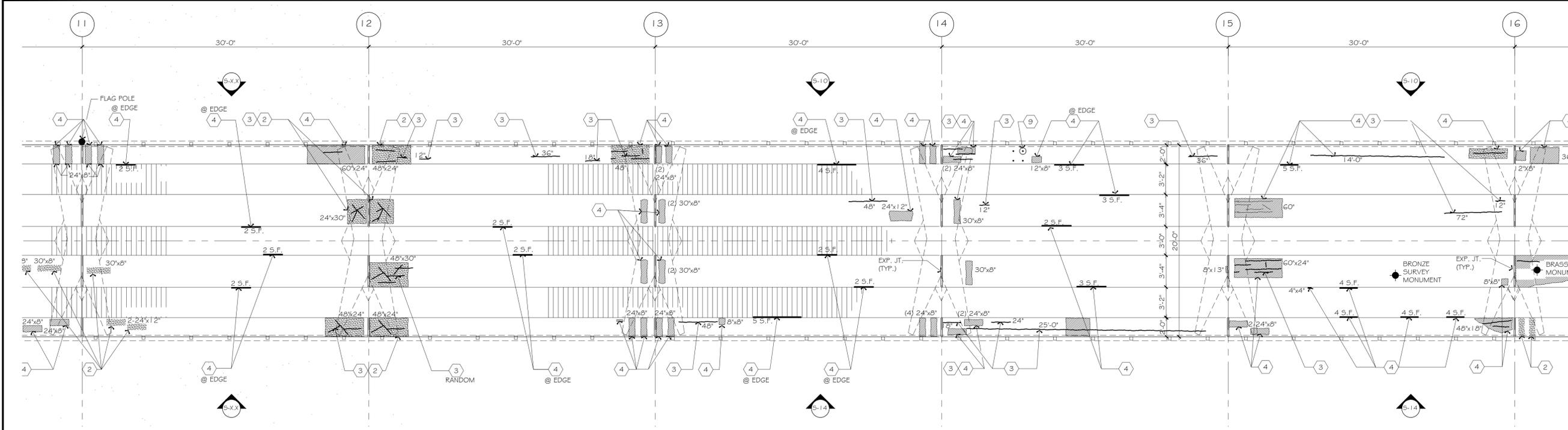


4 PIER KEY PLAN
 S-1 N.T.S.



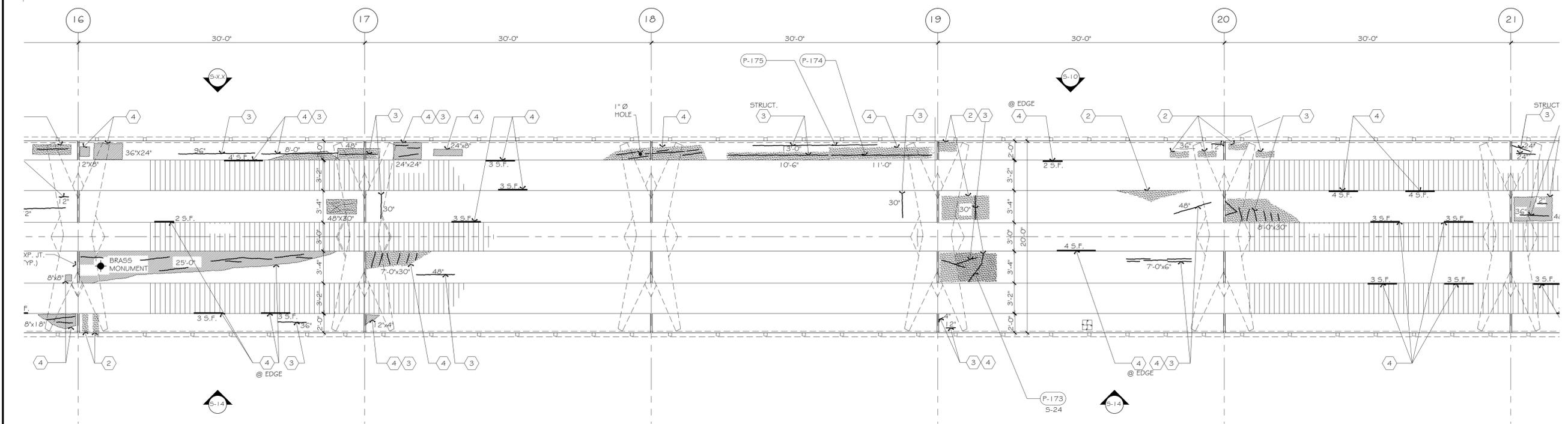
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1 PIER DECK PLAN

S-2 SCALE :3/16"=1'-0"



2 PIER DECK PLAN

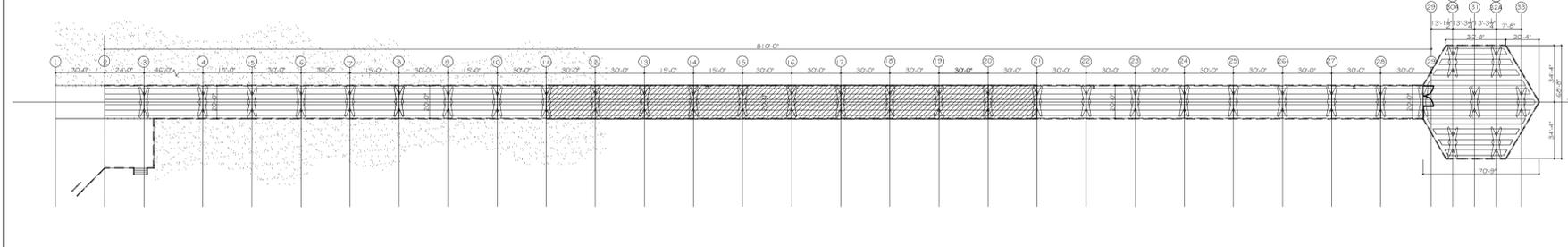
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(1)	HOLLOW CONCRETE DECK
(2)	SPALLED PATCHWORK
(3)	STRUCTURAL CRACK
(4)	SPALL
(5)	EXPANSION JOINT
(6)	HAIRLINE CRACKS
(7)	EDGE REPAIRED
(8)	DECOMPOSED CONCRETE
(9)	REMNANT METAL EMBEDMENT
(10)	EXPOSED AND CORRODED REBAR, RUST MARK
(11)	DEFECTIVE CONCRETE, PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

3 LEGEND

S-2



4 PIER KEY PLAN

S-1 N.T.S.



Revisions:

Number	Description

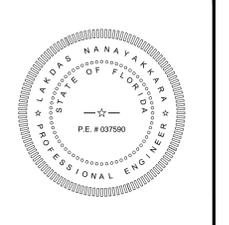
Drawing Title
DECK PLAN

Project Name:
STRUCTURAL CONDITION SURVEY
CITY OF POMPANO BEACH
BROWARD COUNTY, FLORIDA

Job Number: 126311
Scale: AS SHOWN
Date: 4/29/13
Design: L.N.
Drawn: F.G.
Checked: L.N.

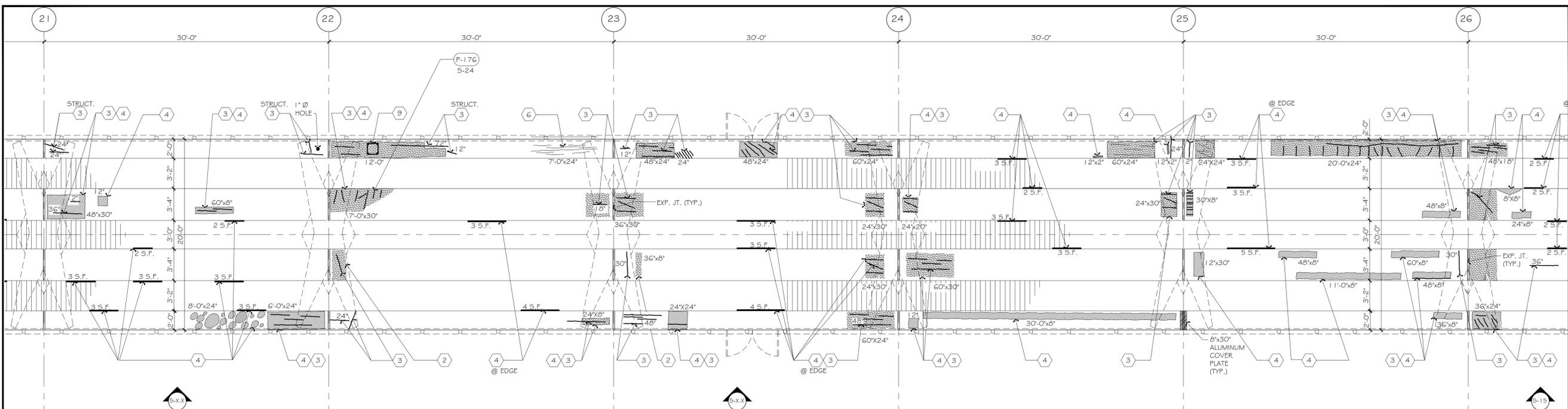
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Rev. Number:



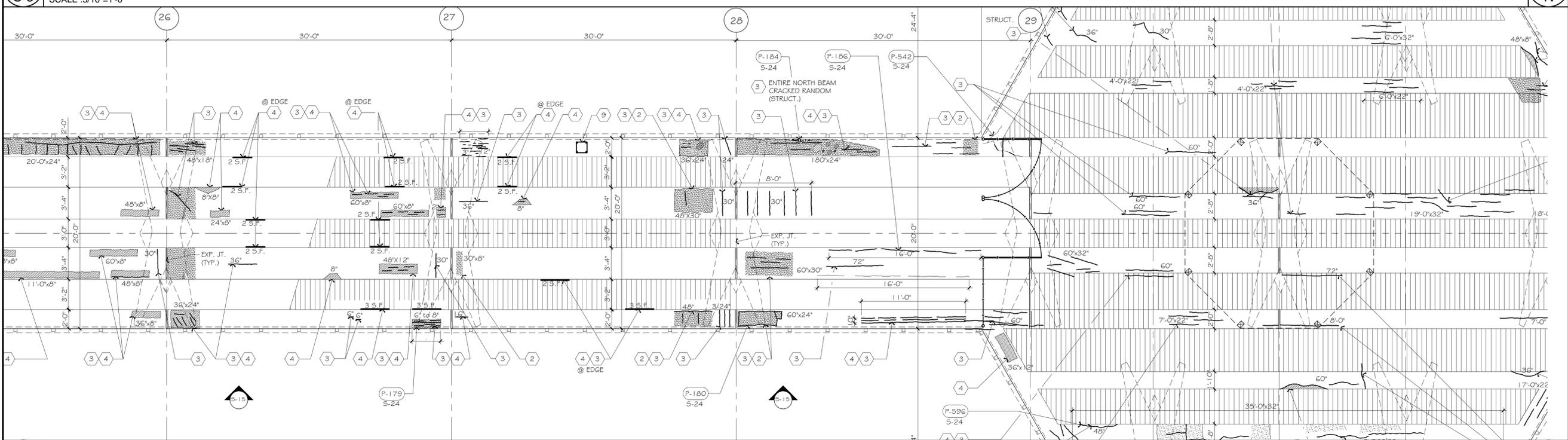
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1 PIER DECK PLAN

S-3 SCALE :3/16"=1'-0"



2 PIER DECK PLAN

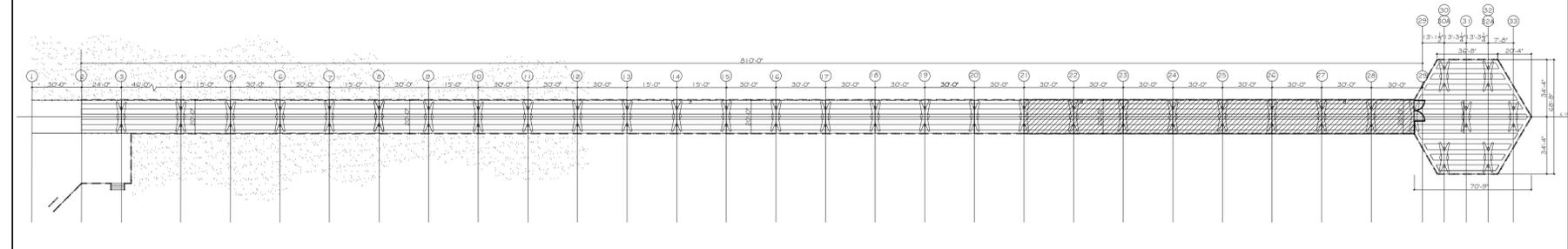
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LEGEND

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(X)	INDICATES DEFECT NUMBER	(2)	SPALLED PATCHWORK	(7)	EDGE REPAIRED
(1/5#)	INDICATES PICTURE REFERENCE	(3)	STRUCTURAL CRACK	(8)	DECOMPOSED CONCRETE
		(4)	SPALL	(9)	REMNANT METAL EMBEDMENT
		(5)	EXPANSION JOINT	(10)	EXPOSED AND CORRODED REBAR, RUST MARK
				(11)	DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

3 LEGEND

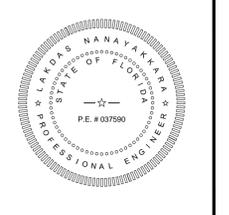
S-3



4 PIER KEY PLAN

S-3 N.T.S.

Description	
Drawing Title	DECK PLAN
Project Name	STRUCTURAL CONDITION SURVEY
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Job Number:	126311
Scale:	A5 SHOWN
Date:	4/29/13
Design:	L.N.
Drawn:	F.G.
Checked:	L.N.
Drawing Number:	S-3
Rev. Number:	



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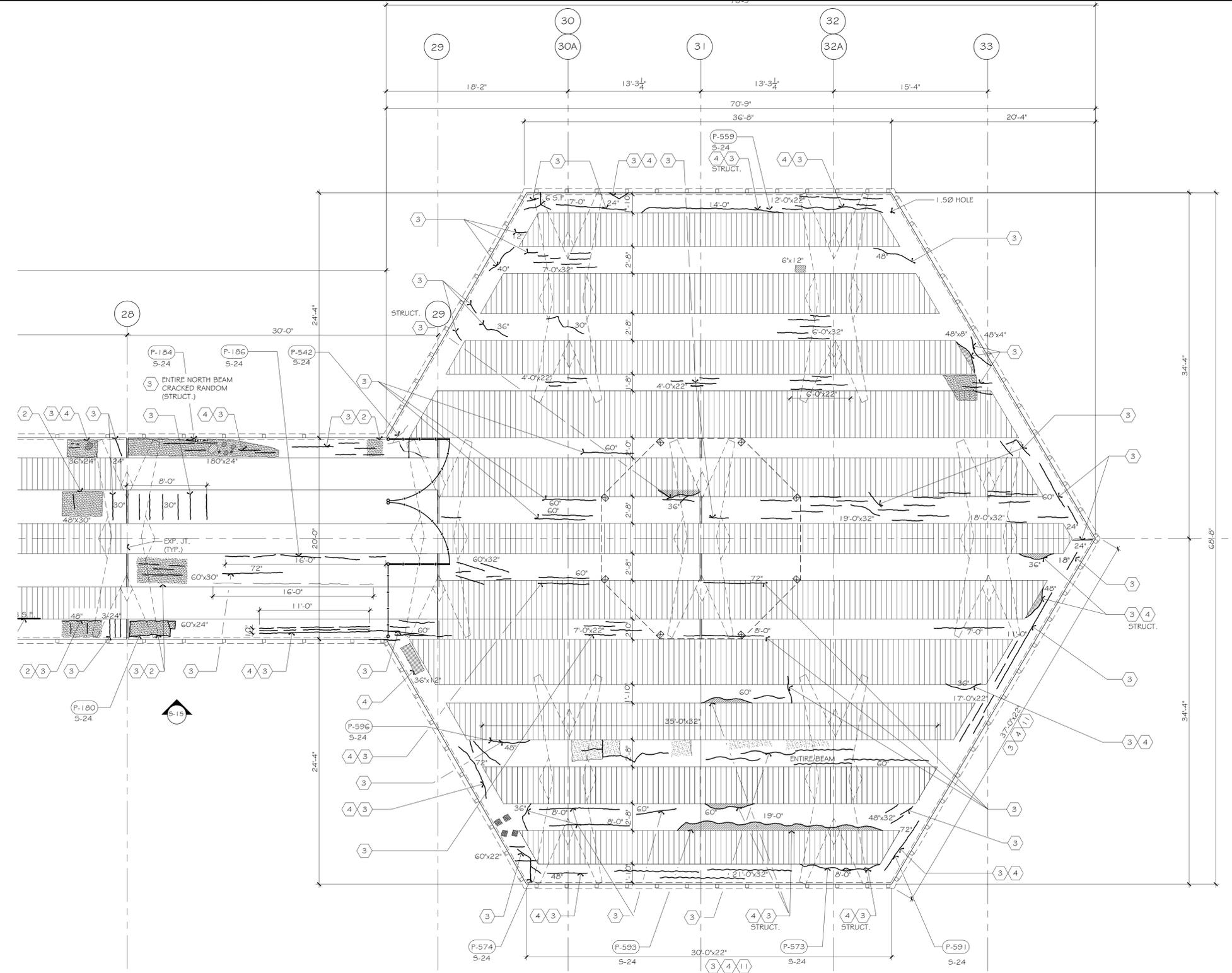
Number	Description

Drawing Title
DECK PLAN
 Project Name:
STRUCTURAL CONDITION SURVEY
 CITY OF POMPANO BEACH
 BROWARD COUNTY, FLORIDA

Job Number: 126311
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 Date: 4/29/13
 Design: L.N.
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 Checked: L.N.
 Drawing Number:

S-4

Rev. Number:



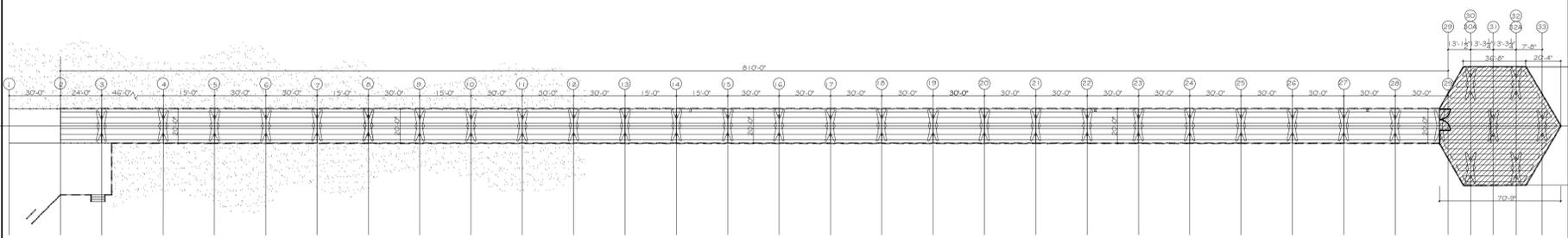
☉ OF DECK

1 DECK PLAN
S-4

LEGEND

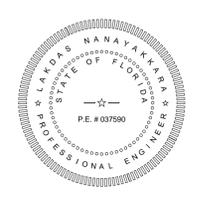
(I) INDICATES COLUMN GRID LINE	(1) HOLLOW CONCRETE DECK	(6) HAIRLINE CRACKS
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	(4) SPALL	(9) REMNANT METAL EMBEDMENT
	(5) EXPANSION JOINT	(10) EXPOSED AND CORRODED REBAR, RUST MARK
		(11) DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

2 LEGEND
S-4



3 PIER KEY PLAN
S-3 N.T.S.





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Revisions:

Number	Description	Date

Drawing Title
PIER UNDERSIDE AND TOP BENT VIEW

Project Name:
STRUCTURAL CONDITION SURVEY

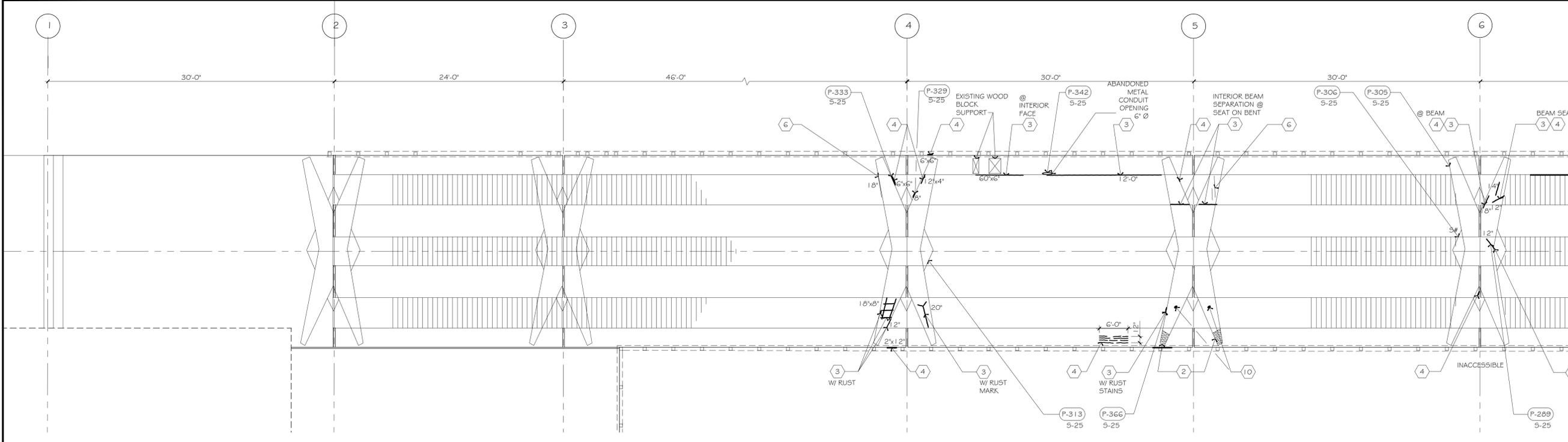
CITY OF POMPANO BEACH
 BROWARD COUNTY, FLORIDA

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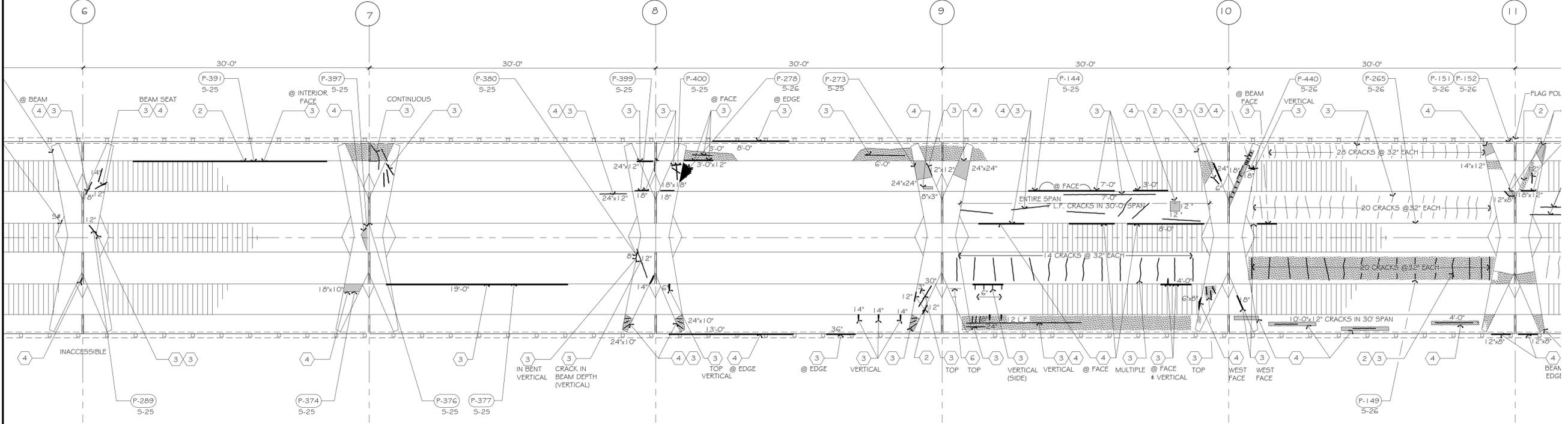
Drawing Number:

S-5

Rev. Number:



1 PIER UNDERSIDE PLAN AND BENT TOP VIEW
 S-5 SCALE :3/16"=1'-0"
 N

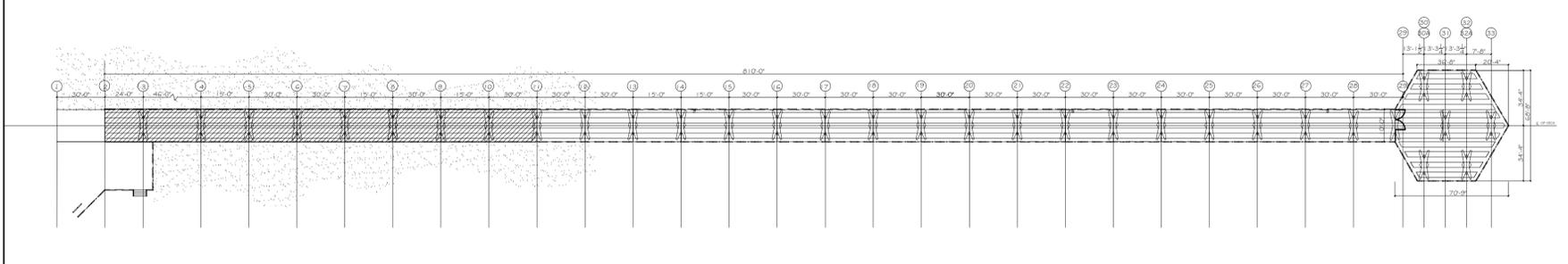


2 PIER UNDERSIDE PLAN, BEAM SIDE FACE AND BENT TOP VIEW
 S-5 SCALE :3/16"=1'-0"
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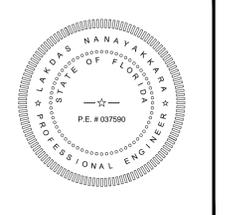
LEGEND

1	INDICATES COLUMN GRID LINE	1	HOLLOW CONCRETE DECK	6	HAIRLINE CRACKS
2	INDICATES DEFECT NUMBER	2	SPALLED PATCHWORK	7	EDGE REPAIRED
1/S#	INDICATES PICTURE REFERENCE	3	STRUCTURAL CRACK	8	DECOMPOSED CONCRETE
		4	SPALL	9	REMNANT METAL EMBEDMENT
		5	EXPANSION JOINT	10	EXPOSED AND CORRODED REBAR, RUST MARK
				11	DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

3 LEGEND
 S-5

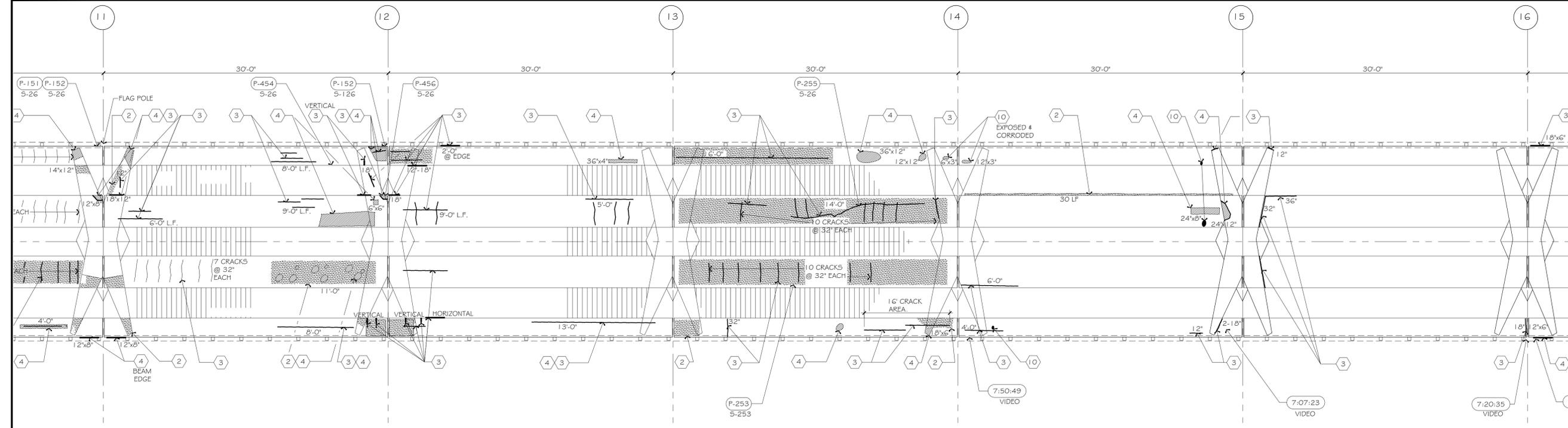


4 KEY PLAN
 S-5 N.T.S.
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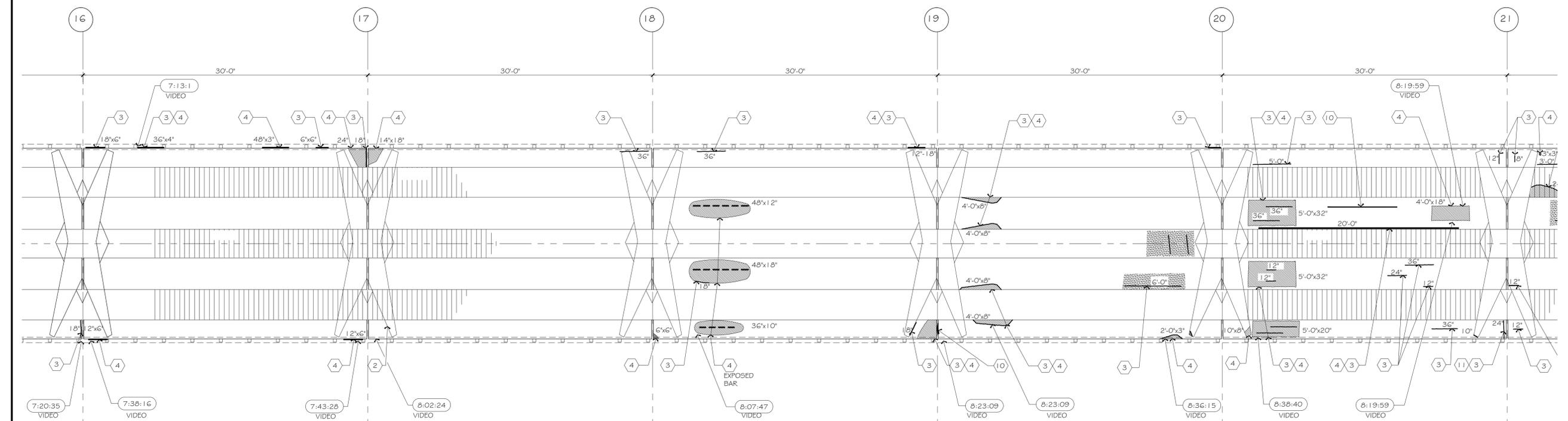


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1 PIER UNDERSIDE PLAN
 S-6 SCALE :3/16"=1'-0"



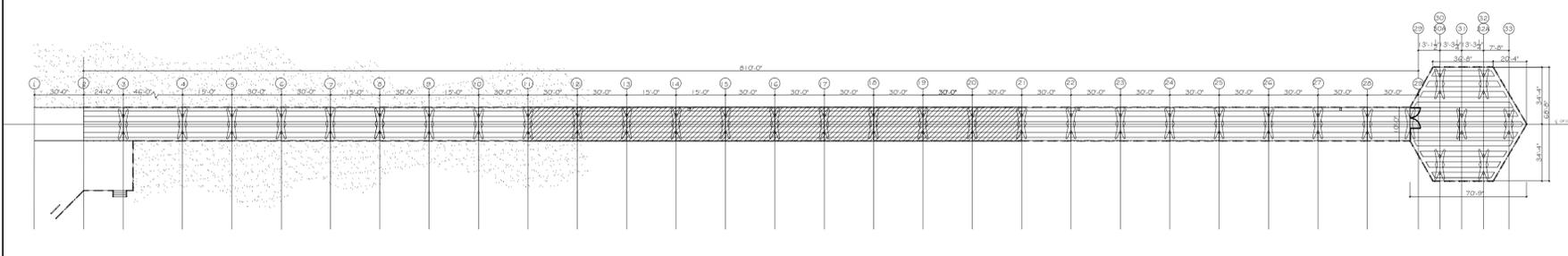
2 PIER UNDERSIDE PLAN
 S-6 SCALE :3/16"=1'-0"



LEGEND

(I)	INDICATES COLUMN GRID LINE	(1)	HOLLOW CONCRETE DECK	(6)	HAIRLINE CRACKS
(X)	INDICATES DEFECT NUMBER	(2)	SPALLED PATCHWORK	(7)	EDGE REPAIRED
(1/5#)	INDICATES PICTURE REFERENCE	(3)	STRUCTURAL CRACK	(8)	DECOMPOSED CONCRETE
		(4)	SPALL	(9)	REMNANT METAL EMBEDMENT
		(5)	EXPANSION JOINT	(10)	EXPOSED AND CORRODED REBAR, RUST MARK
				(11)	DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

3 LEGEND
 S-6



3 KEY PLAN
 S-6 N.T.S.



Revisions:

Number	Description

Drawing Title
PIER UNDERSIDE AND TOP BENT VIEW

Project Name:
STRUCTURAL CONDITION SURVEY
 CITY OF POMPANO BEACH
 BROWARD COUNTY, FLORIDA

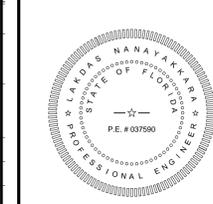
Job Number: 126311
 Scale: AS SHOWN
 Date: 4/29/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.

Drawing Number:
S-6

Rev. Number:



LAKDAS/YOHALEM ENGINEERING, INC.
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Revisions:

Number	Description

Drawing Title
PIER UNDERSIDE AND TOP BENT VIEW

Project Name:
STRUCTURAL CONDITION SURVEY

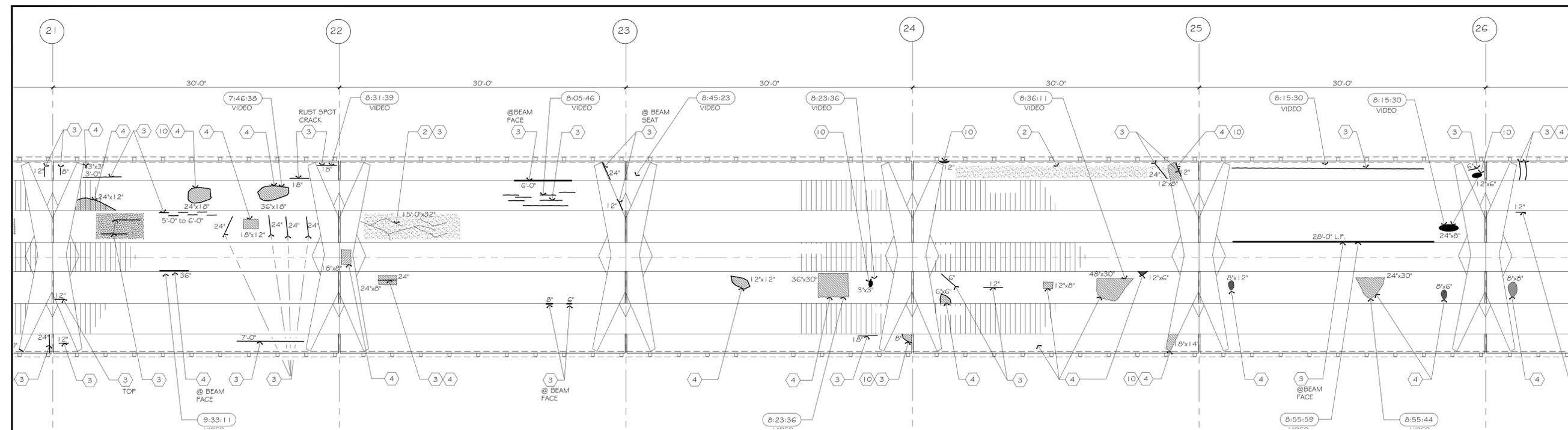
CITY OF POMPANO BEACH
BROWARD COUNTY, FLORIDA

Job Number: 126311
Scale: AS SHOWN
Date: 4/29/13
Design: L.N.
Drawn: F.G.
Checked: L.N.

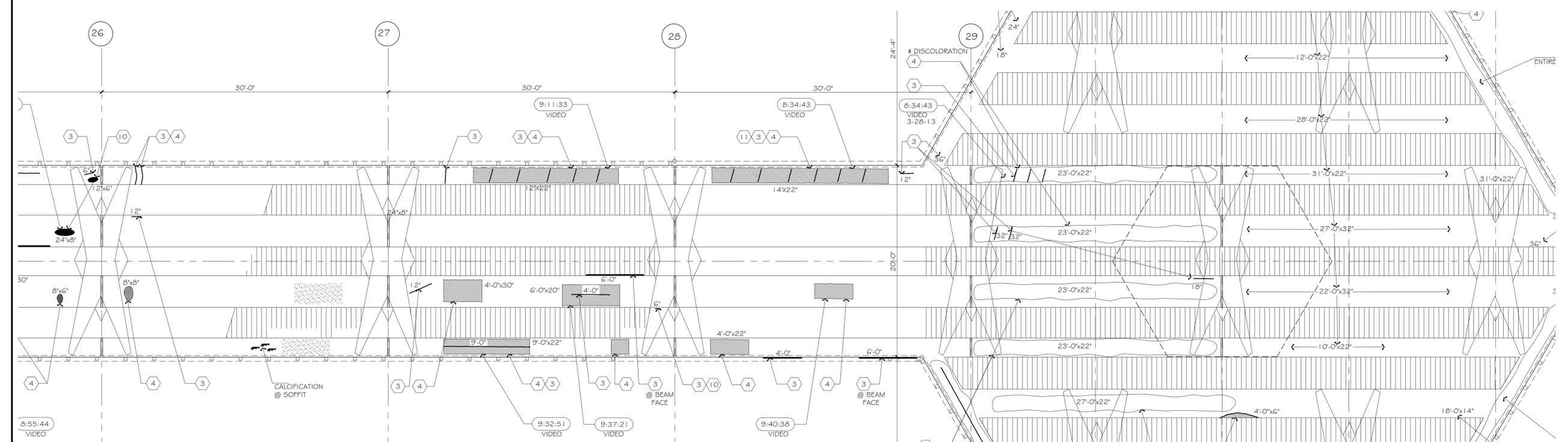
Drawing Number:

S-7

Rev. Number:



1 PIER UNDERSIDE PLAN
SCALE :3/16"=1'-0"
N

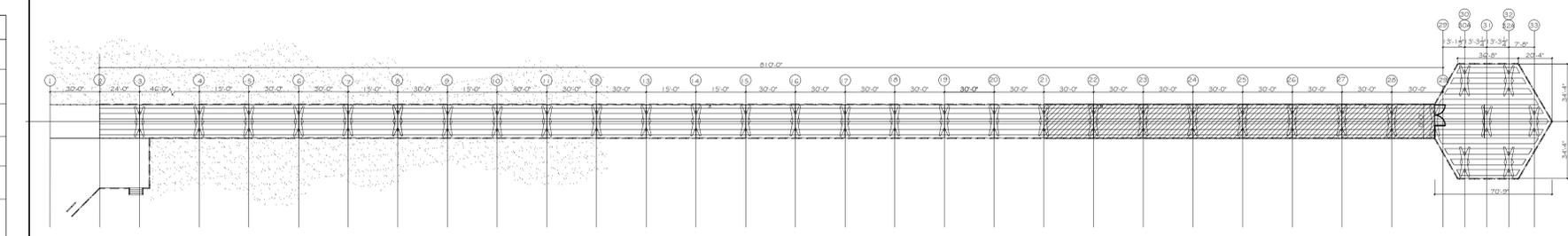


2 PIER UNDERSIDE PLAN
SCALE :3/16"=1'-0"
N

LEGEND

(I)	INDICATES COLUMN GRID LINE	(1)	HOLLOW CONCRETE DECK	(6)	HAIRLINE CRACKS
(X)	INDICATES DEFECT NUMBER	(2)	SPALLED PATCHWORK	(7)	EDGE REPAIRED
(1/5#)	INDICATES PICTURE REFERENCE	(3)	STRUCTURAL CRACK	(8)	DECOMPOSED CONCRETE
		(4)	SPALL	(9)	REMNANT METAL EMBEDMENT
		(5)	EXPANSION JOINT	(10)	EXPOSED AND CORRODED REBAR, RUST MARK
				(11)	DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

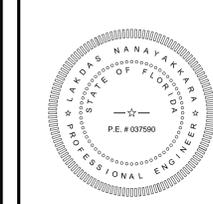
3 LEGEND
SCALE :3/16"=1'-0"
S-7



4 KEY PLAN
N.T.S.
N



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Revisions:

Number	Description

Drawing Title
PIER UNDERSIDE AND TOP BENT VIEW

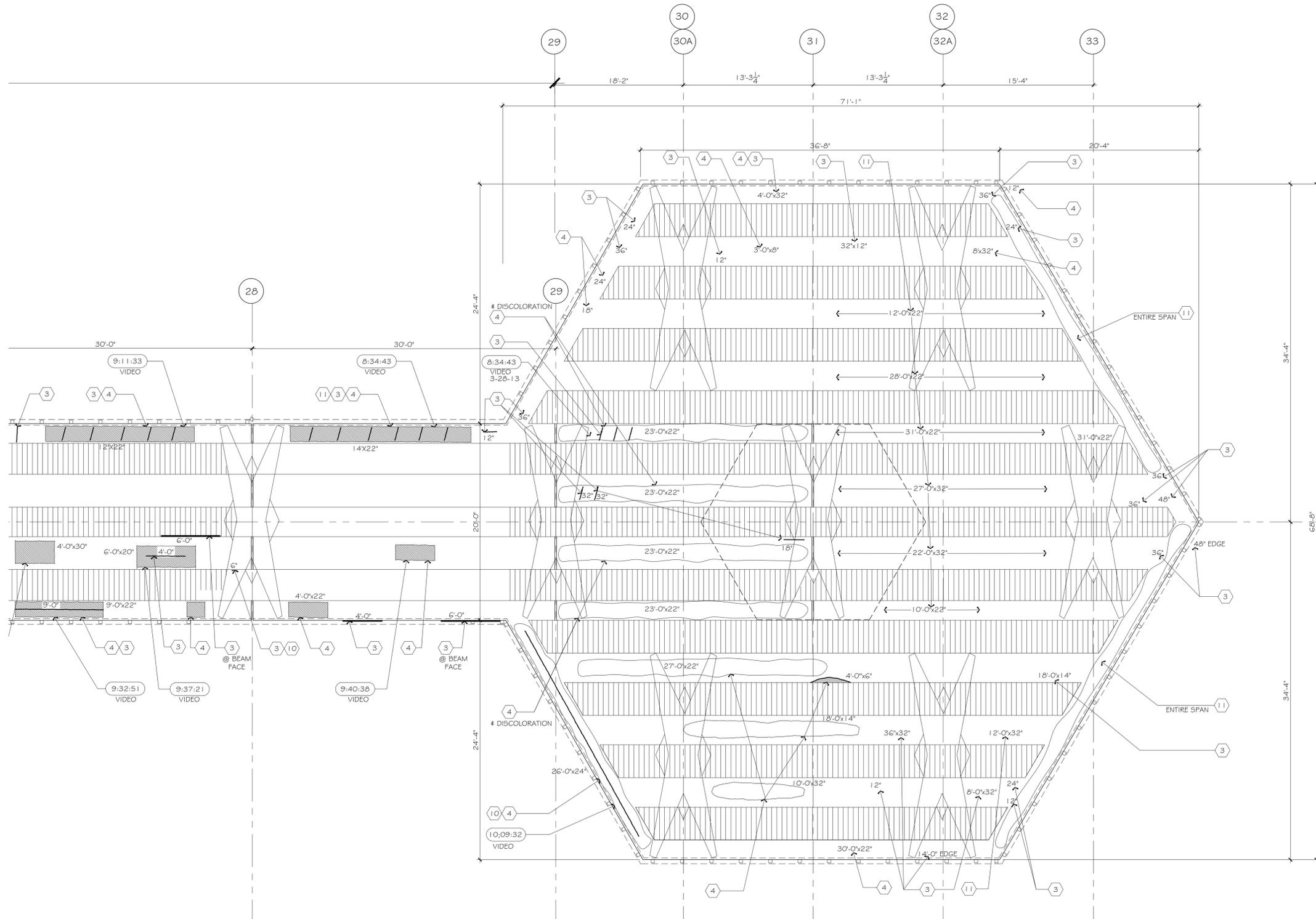
Project Name:
STRUCTURAL CONDITION SURVEY

CITY OF POMPANO BEACH
 BROWARD COUNTY, FLORIDA

Job Number: 126311
 Scale: AS SHOWN
 Date: 4/29/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.

Drawing Number:
S-8

Rev. Number:

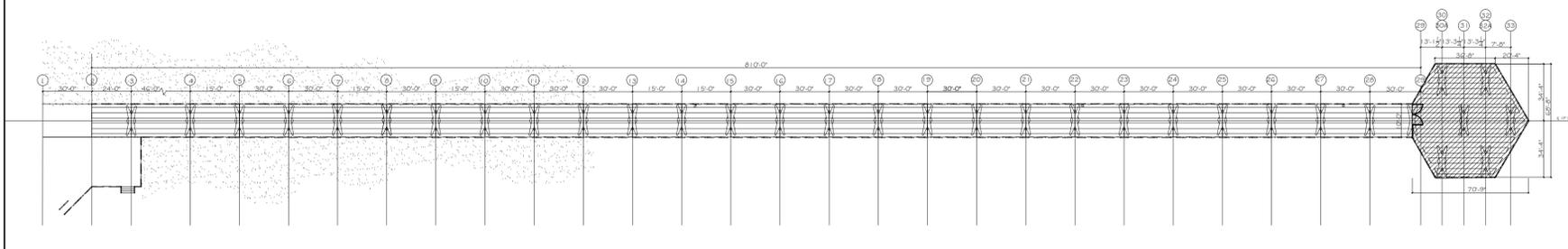


1 PIER UNDERSIDE PLAN
 S-8 SCALE :3/16"=1'-0"

LEGEND

(I)	INDICATES COLUMN GRID LINE	(1)	HOLLOW CONCRETE DECK	(6)	HAIRLINE CRACKS
(X)	INDICATES DEFECT NUMBER	(2)	SPALLED PATCHWORK	(7)	EDGE REPAIRED
(1/5#)	INDICATES PICTURE REFERENCE	(3)	STRUCTURAL CRACK	(8)	DECOMPOSED CONCRETE
		(4)	SPALL	(9)	REMNANT METAL EMBEDMENT
		(5)	EXPANSION JOINT	(10)	EXPOSED AND CORRODED REBAR, RUST MARK
				(11)	DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

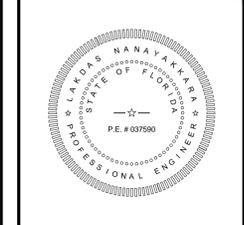
2 LEGEND
 S-8



3 KEY PLAN
 S-8 N.T.S.



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Revisions:

Number	Description	Date

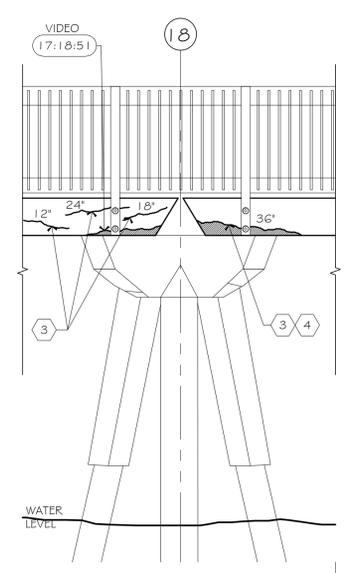
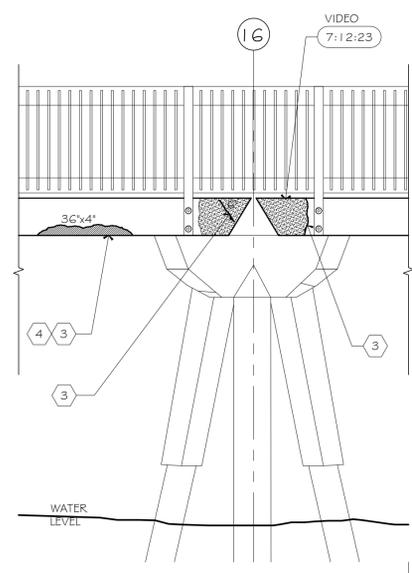
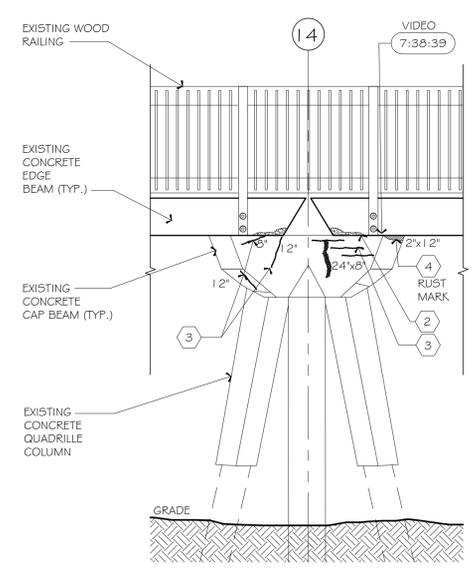
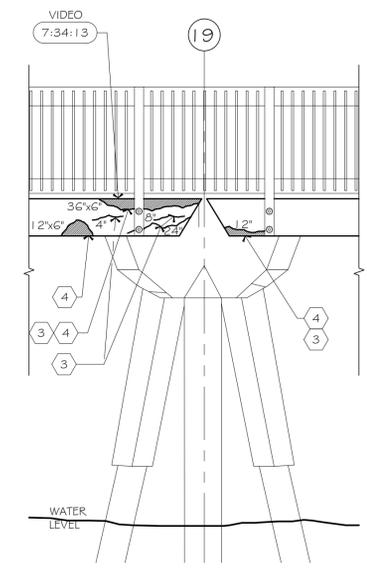
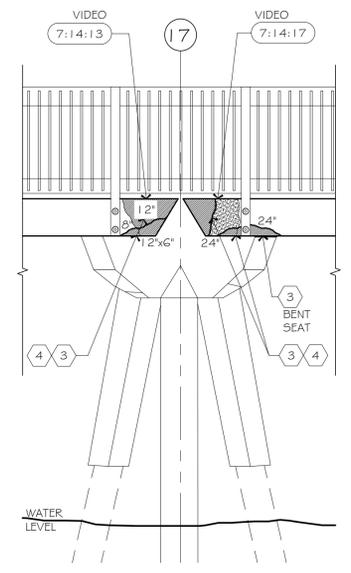
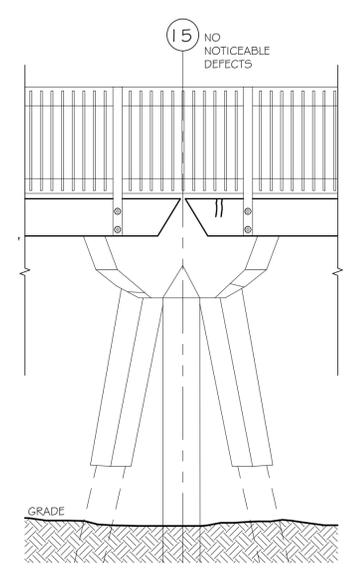
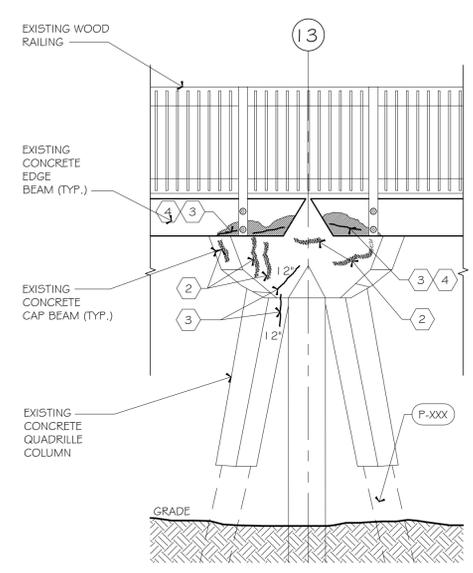
Drawing Title
NORTH BENT VIEW
 Project Name:
STRUCTURAL CONDITION SURVEY
 CITY OF POMPANO BEACH
 BROWARD COUNTY, FLORIDA

Job Number:	126311
Scale:	AS SHOWN
Date:	2/20/13
Design:	L.N.
Drawn:	F.G.
Checked:	L.N.

Drawing Number:

S-10

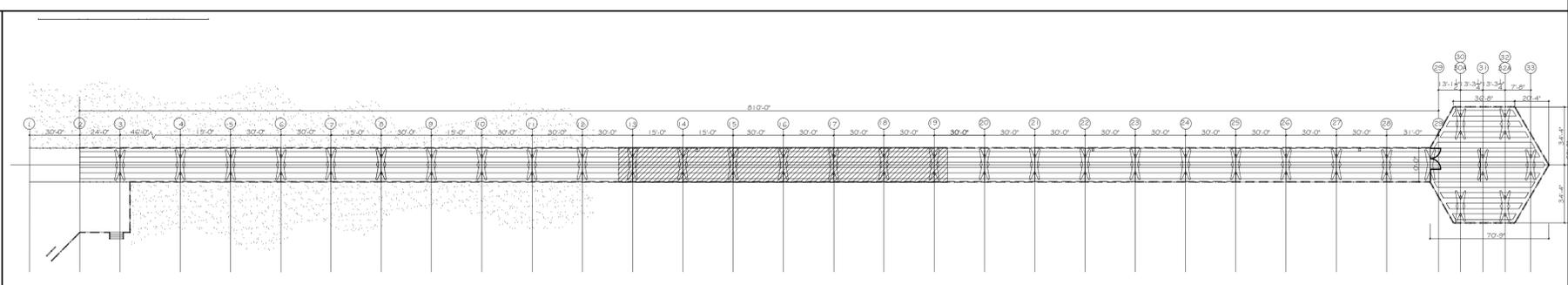
Rev. Number:



1 NORTH BENTS FRONT VIEW
 S-10 SCALE :3/8"=1'-0"

LEGEND			
	INDICATES COLUMN GRID LINE		HOLLOW CONCRETE DECK
	SPALLED PATCHWORK		HAIRLINE CRACKS
	STRUCTURAL CRACK		EDGE REPAIRED
	SPALL		DECOMPOSED CONCRETE
	EXPANSION JOINT		REMANANT METAL EMBEDMENT
	INDICATES DEFECT NUMBER		EXPOSED AND CORRODED REBAR, RUST MARK
	INDICATES PICTURE REFERENCE		DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

2 LEGEND
 S-10



3 KEY PLAN
 S-10





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Revisions:

Number	Description

Drawing Title

NORTH BENT VIEW

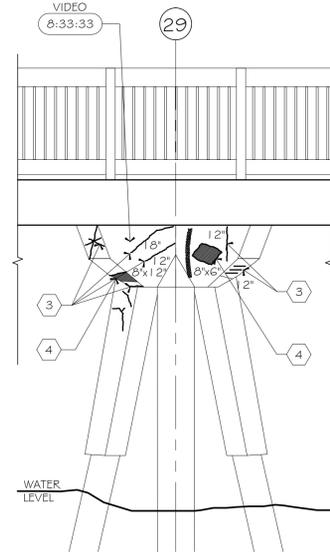
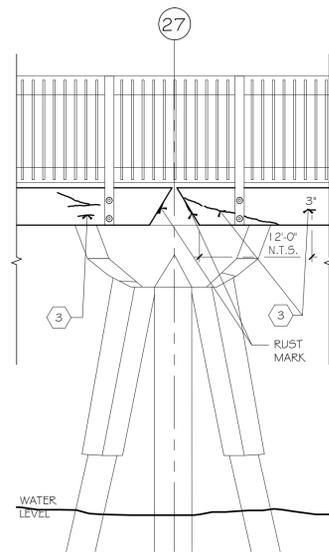
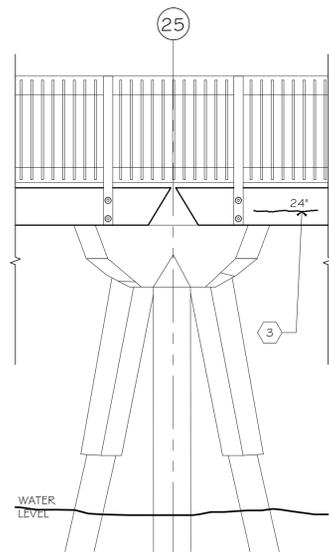
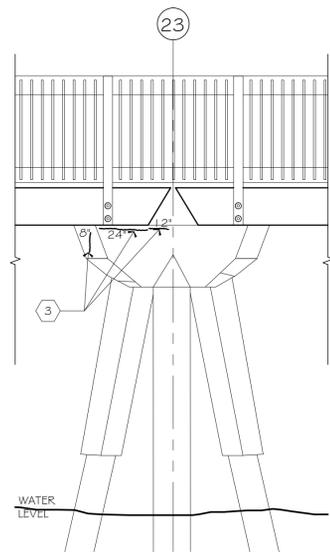
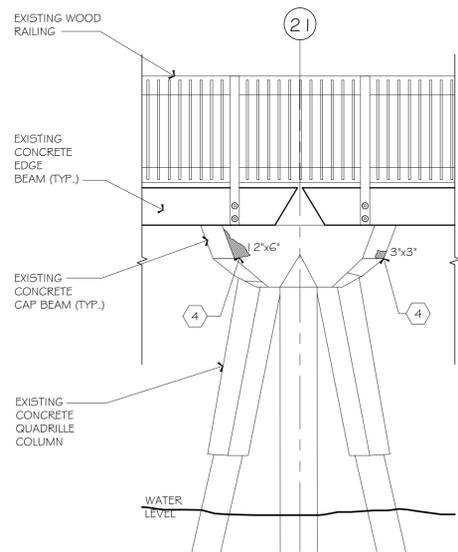
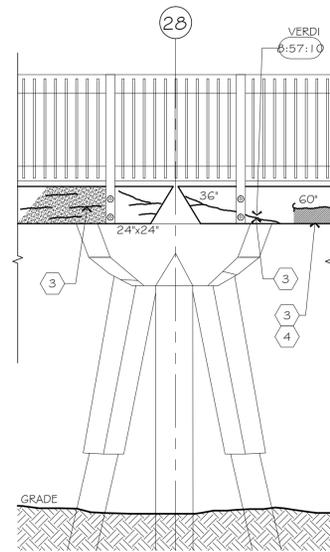
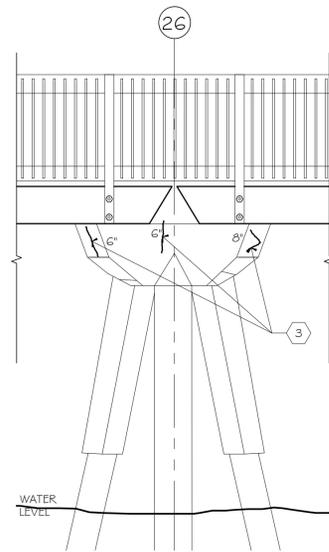
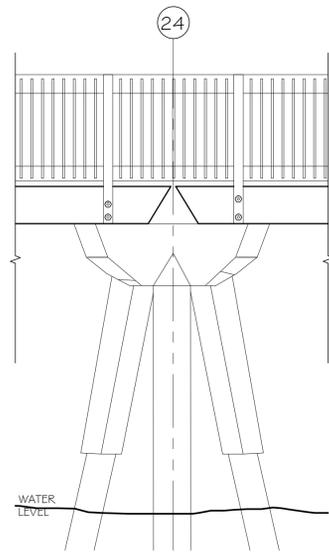
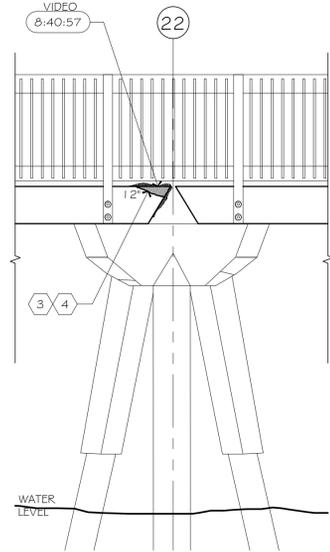
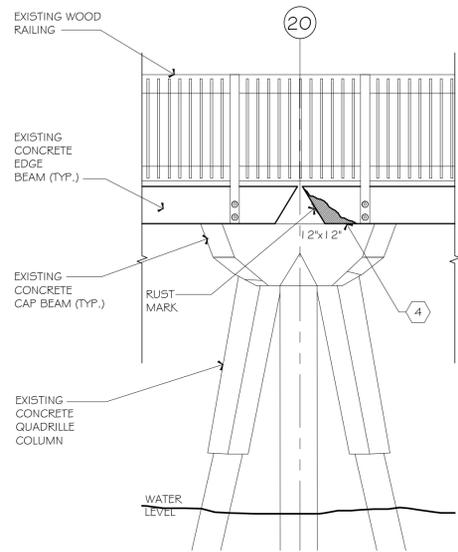
Project Name:
STRUCTURAL CONDITION SURVEY
 CITY OF POMPAÑO BEACH
 BROWARD COUNTY, FLORIDA

Job Number: 126311
 Scale: AS SHOWN
 Date: 2/20/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.

Drawing Number:

S-11

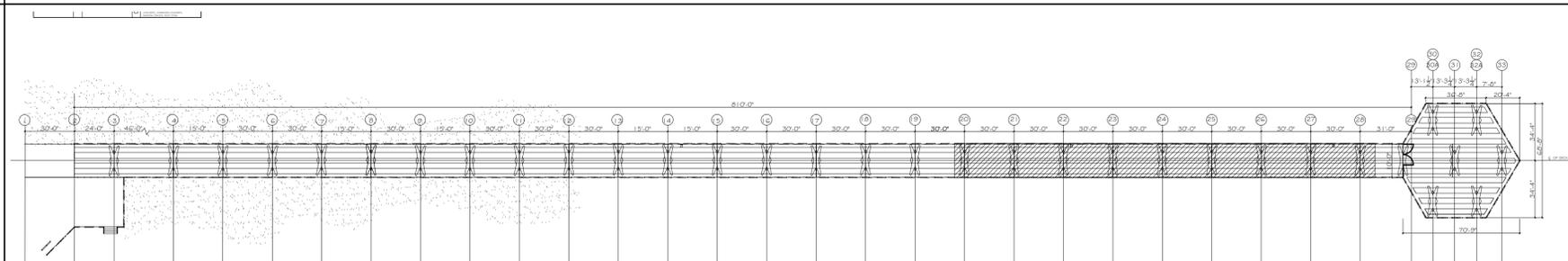
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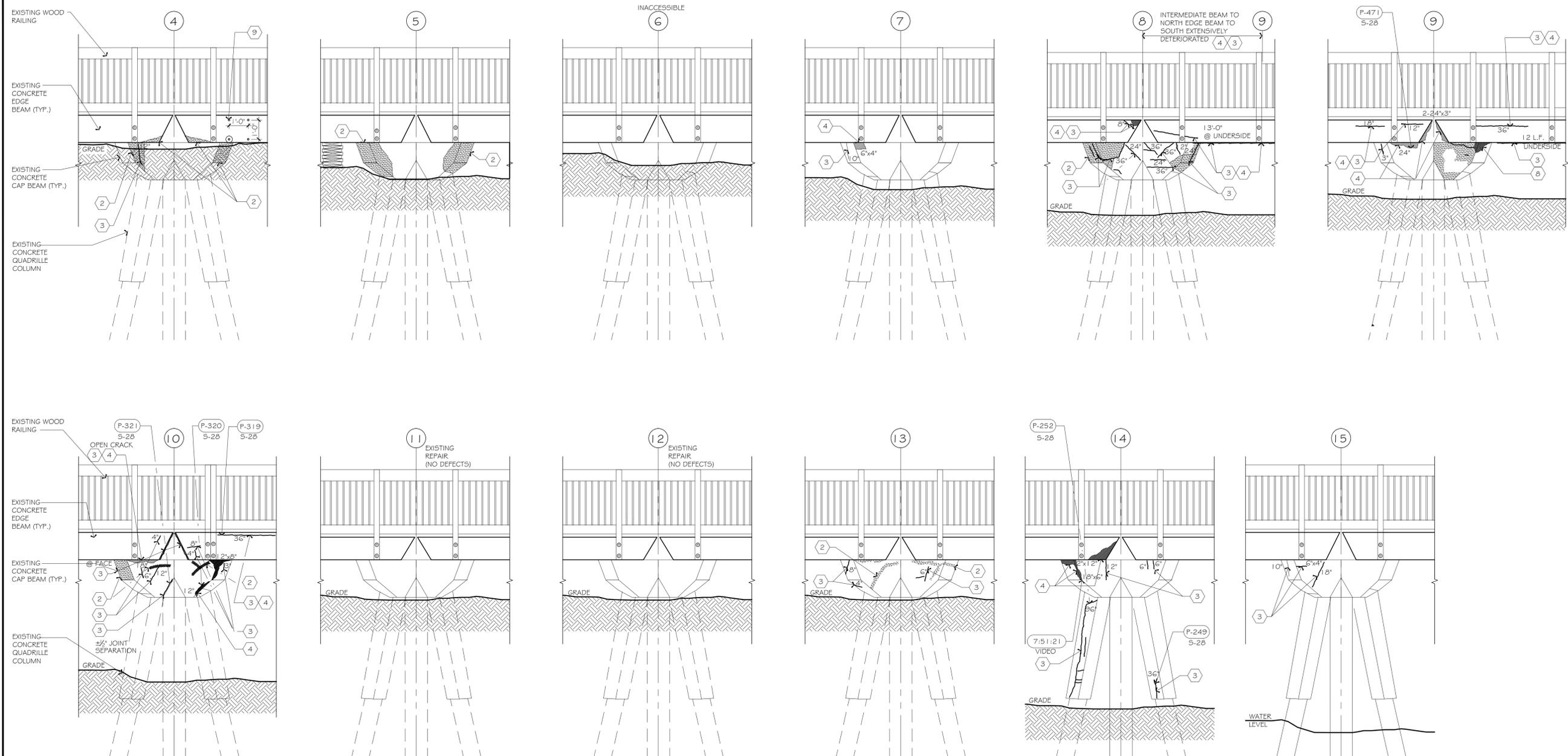
1 NORTH BENTS FRONT VIEW
 S-11 SCALE :3/8"=1'-0"

LEGEND			
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	SPALLED PATCHWORK		HAIRLINE CRACKS
	STRUCTURAL CRACK		EDGE REPAIRED
	SPALL		DECOMPOSED CONCRETE
	EXPANSION JOINT		REMNANT METAL EMBEDMENT
	INDICATES DEFECT NUMBER		EXPOSED AND CORRODED REBAR, RUST MARK
	INDICATES PICTURE REFERENCE		DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

2 LEGEND
 S-11 N.T.S.



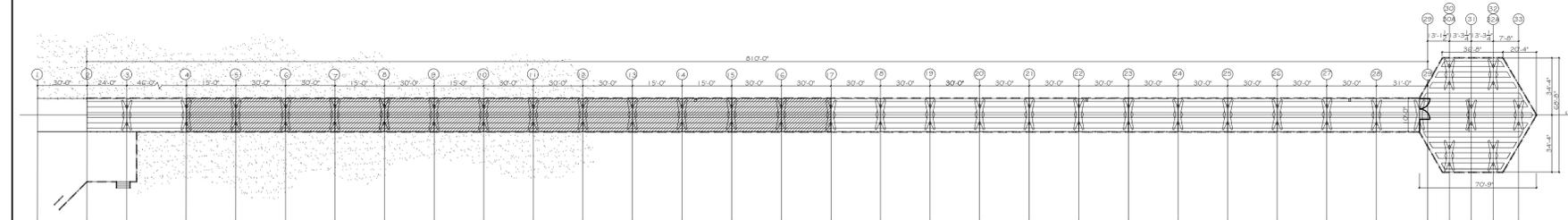
3 KEY PLAN
 S-11



1 SOUTH BENTS FRONT VIEW
S-13 SCALE :3/8"=1'-0"

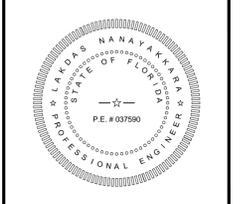
LEGEND			
	INDICATES COLUMN GRID LINE		HOLLOW CONCRETE DECK
	INDICATES DEFECT NUMBER		SPALLED PATCHWORK
	INDICATES PICTURE REFERENCE		STRUCTURAL CRACK
			SPALL
			EXPANSION JOINT
			HAIRLINE CRACKS
			EDGE REPAIRED
			DECOMPOSED CONCRETE
			REMNANT METAL EMBEDMENT
			EXPOSED AND CORRODED REBAR, RUST MARK
			DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

2 LEGEND
S-13



3 KEY PLAN
S-13

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Revisions:

Number	Description

Drawing Title
SOUTH BENT VIEW

Project Name:
STRUCTURAL CONDITION SURVEY
 CITY OF POMPANO BEACH
 BROWARD COUNTY, FLORIDA

Job Number: 126311
 Scale: AS SHOWN
 Date: 2/20/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.

Drawing Number:

S-13

Rev. Number:



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Revisions:

Number	Description

Drawing Title

SOUTH BENT VIEW

Project Name:

**STRUCTURAL
CONDITION
SURVEY**

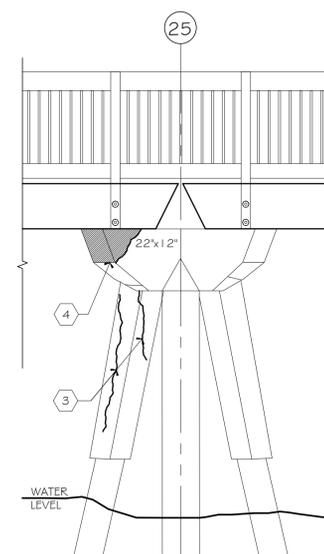
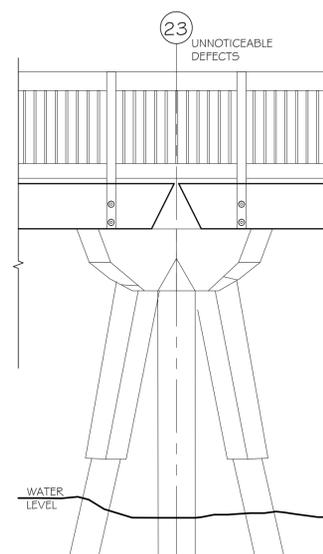
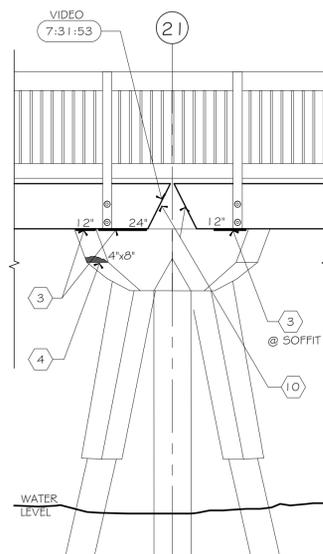
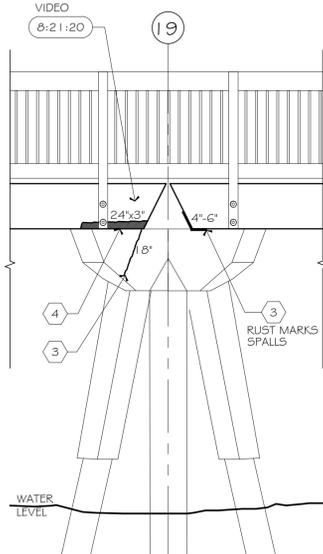
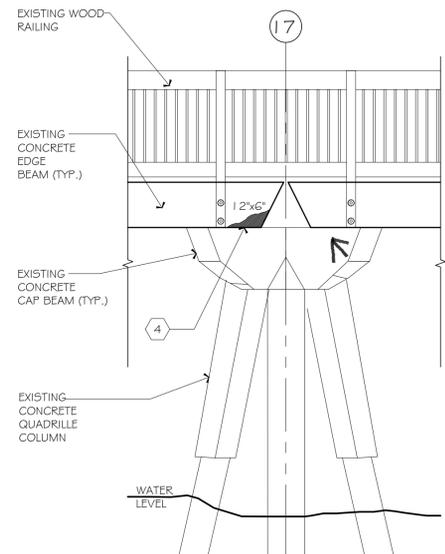
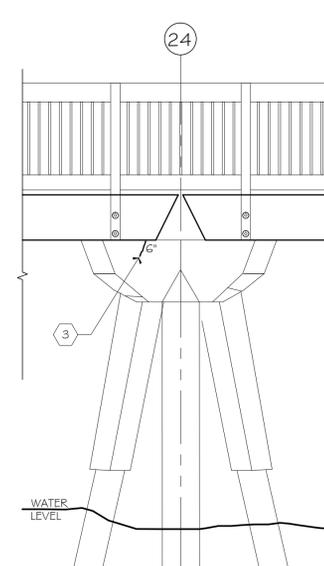
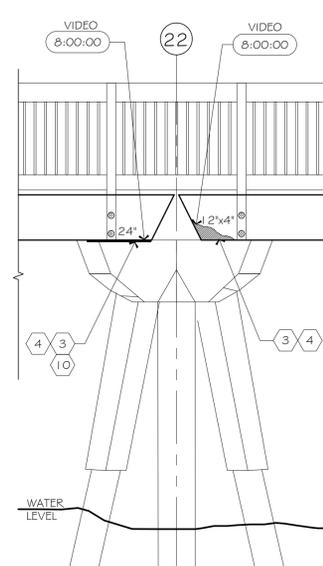
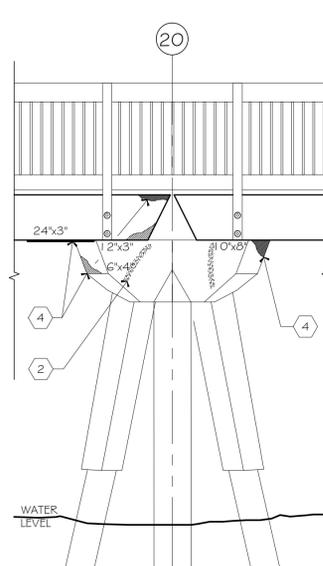
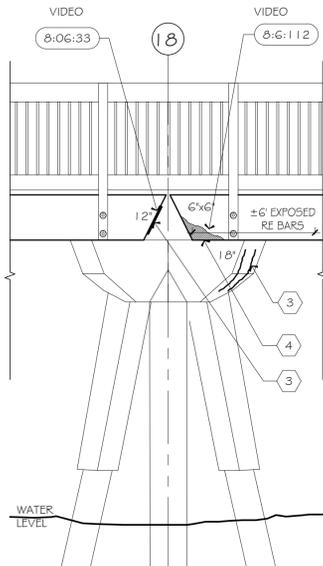
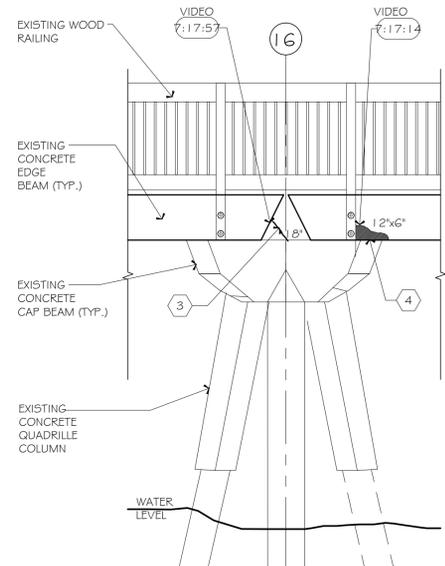
CITY OF POMPANO BEACH
BROWARD COUNTY, FLORIDA

Job Number: 126311
 Scale: AS SHOWN
 Date: 2/20/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.

Drawing Number:

S-14

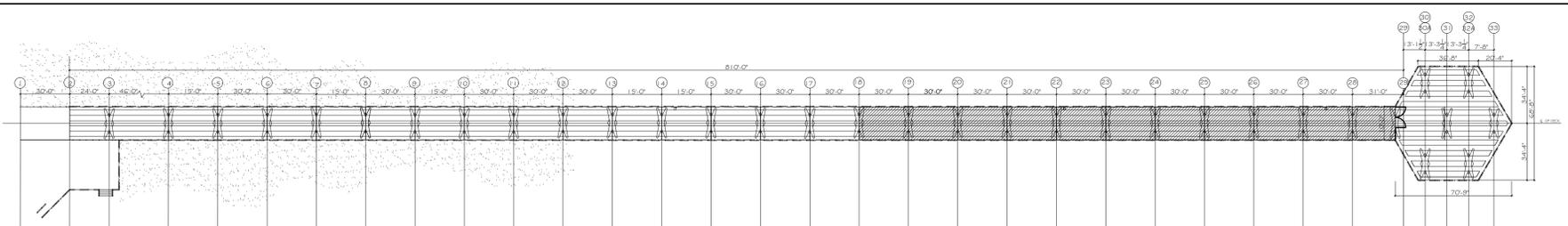
Rev. Number:



1 SOUTH BENTS FRONT VIEW

S-14 SCALE :3/8"=1'-0"

LEGEND	
⊙	INDICATES COLUMN GRID LINE
X	INDICATES DEFECT NUMBER
1/5#	INDICATES PICTURE REFERENCE
1	HOLLOW CONCRETE DECK
2	SPALLED PATCHWORK
3	STRUCTURAL CRACK
4	SPALL
5	EXPANSION JOINT
6	HAIRLINE CRACKS
7	EDGE REPAIRED
8	DECOMPOSED CONCRETE
9	REMNANT METAL EMBEDMENT
10	EXPOSED AND CORRODED REBAR, RUST MARK
11	DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN



2 LEGEND

S-14

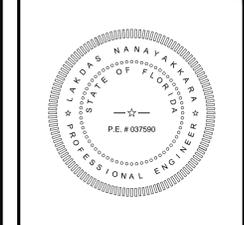
3 KEY PLAN

S-14





LAKDAS/YOHALEM ENGINEERING, INC.
CONSULTING ENGINEERS
2211 NORTHEAST 54TH STREET
FORT LAUDERDALE, FLORIDA 33308
(954)771-0630 FAX:(954)771-0519
e-mail: lakdas22@bellsouth.net
FL. LIC.: CA-5458



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Revisions:

Number	Description

Drawing Title

SOUTH BENT VIEW

Project Name:

STRUCTURAL CONDITION SURVEY

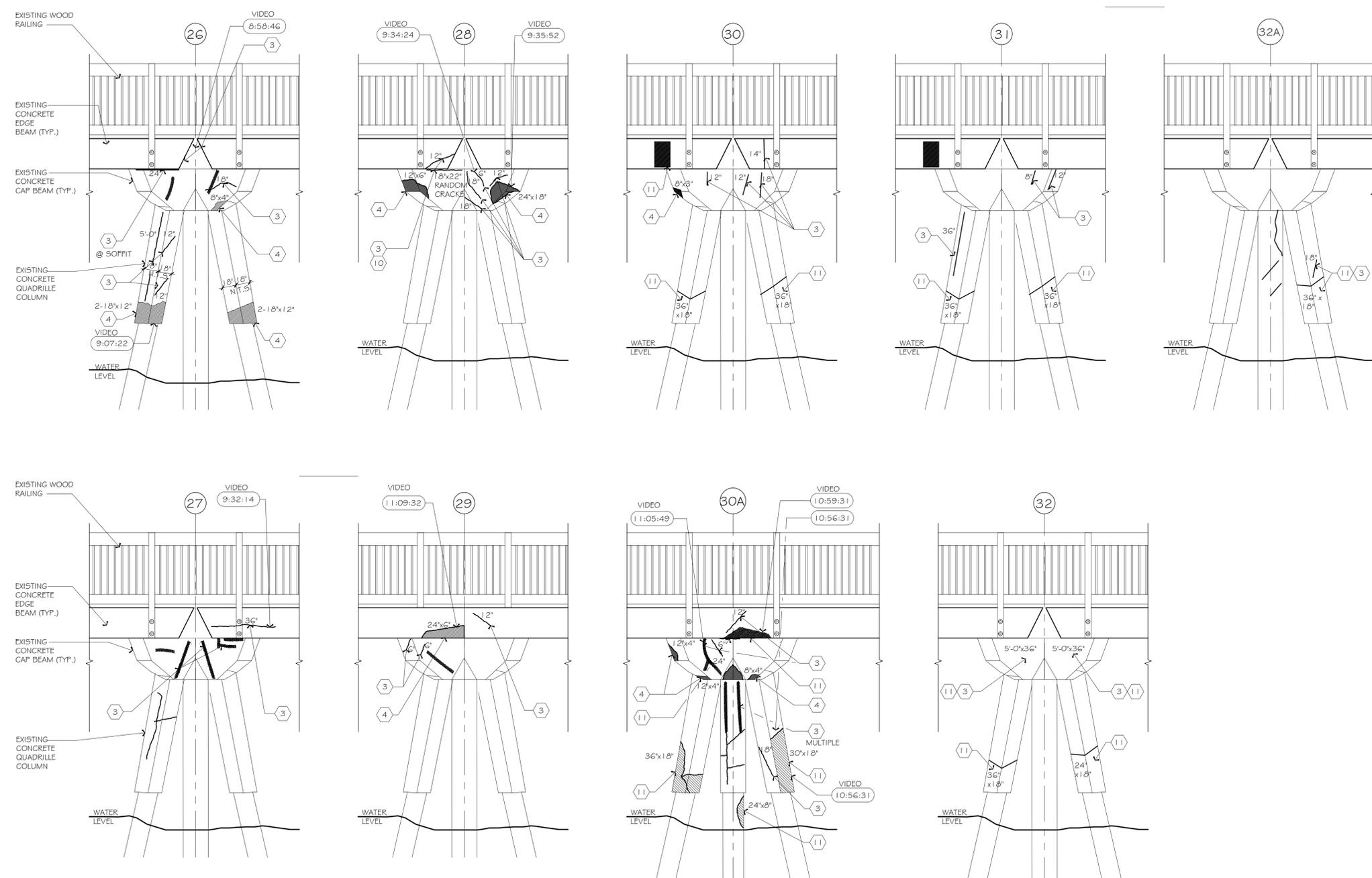
CITY OF POMPANO BEACH
BROWARD COUNTY, FLORIDA

Job Number: 126311
Scale: AS SHOWN
Date: 2/20/13
Design: L.N.
Drawn: F.G.
Checked: L.N.

Drawing Number:

S-15

Rev. Number:

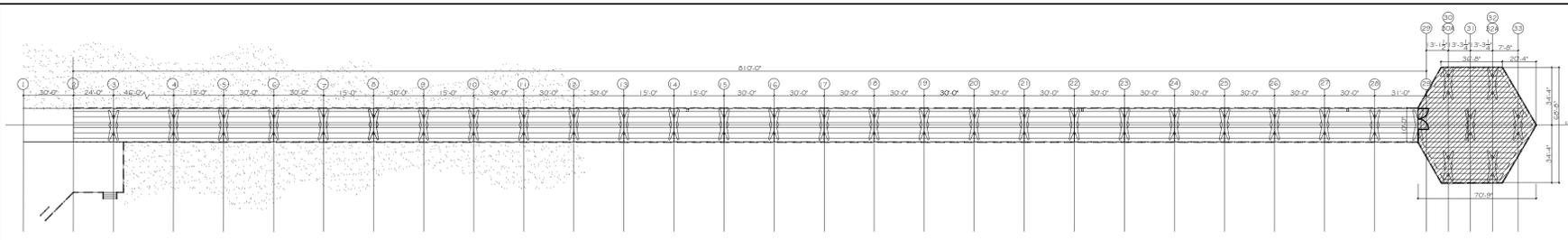


1 SOUTH BENTS FRONT VIEW
S-15 SCALE :3/8"=1'-0"

LEGEND

	INDICATES COLUMN GRID LINE		HOLLOW CONCRETE DECK		HAIRLINE CRACKS
	SPALLED PATCHWORK		STRUCTURAL CRACK		EDGE REPAIRED
	INDICATES DEFECT NUMBER		SPALL		DECOMPOSED CONCRETE
	INDICATES PICTURE REFERENCE		EXPANSION JOINT		REMNANT METAL EMBEDMENT
					EXPOSED AND CORRODED REBAR, RUST MARK
					DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

2 LEGEND
S-15

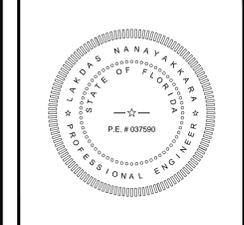


3 KEY PLAN
S-15





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Revisions:

Number	Description

Drawing Title
EAST / WEST BENTS VIEW

Project Name:
STRUCTURAL CONDITION SURVEY

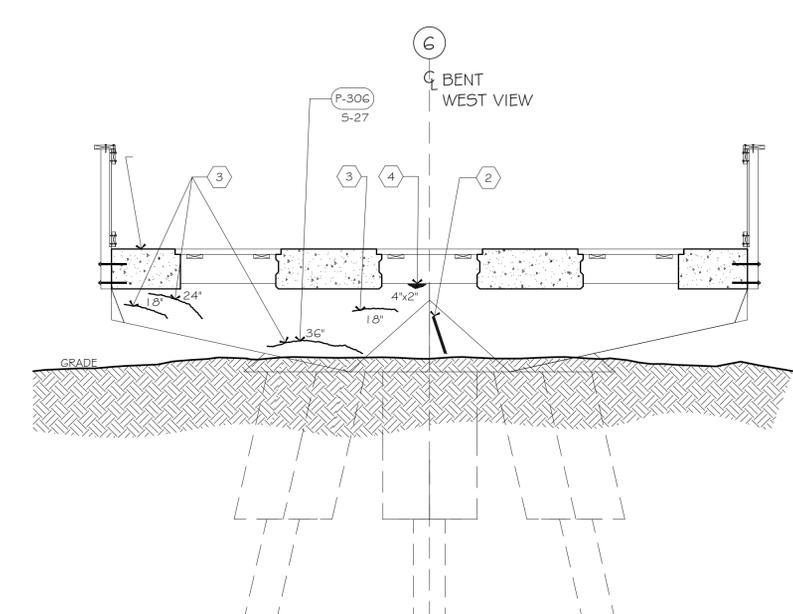
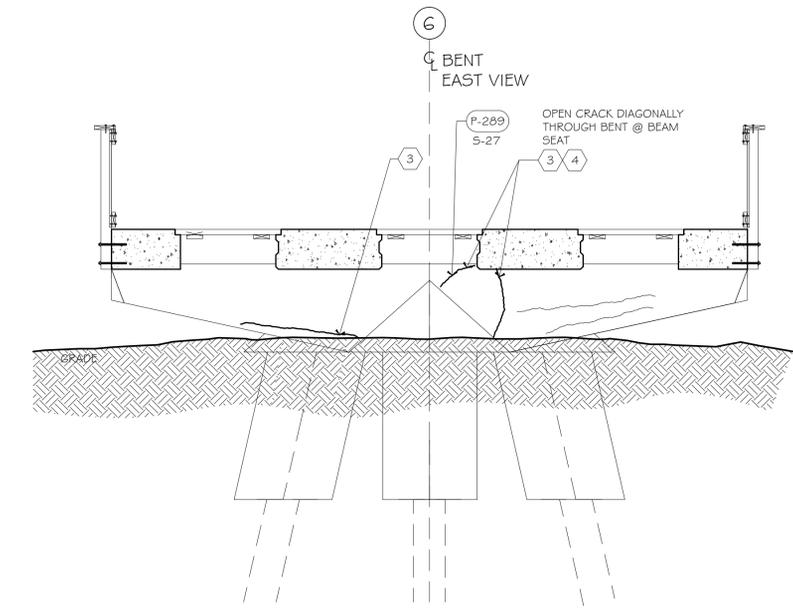
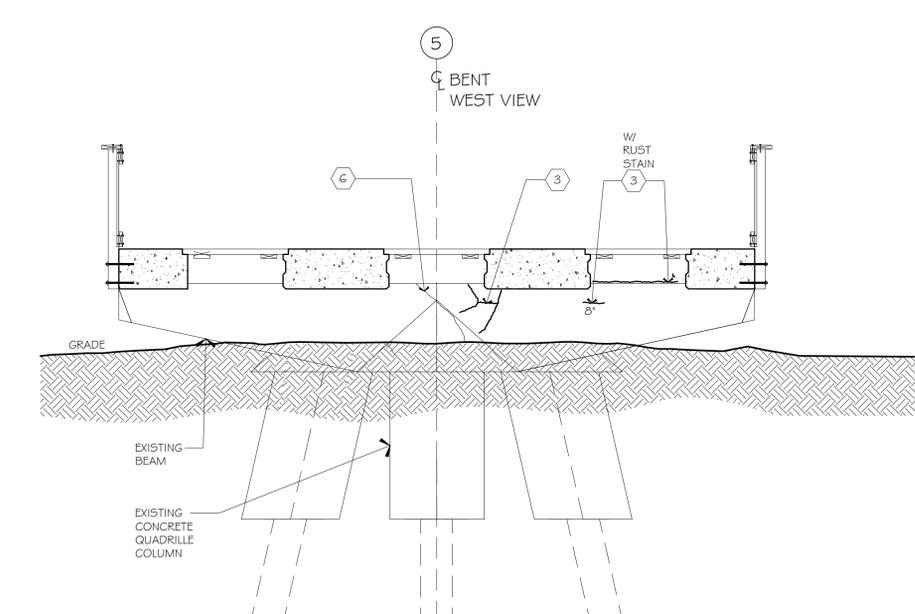
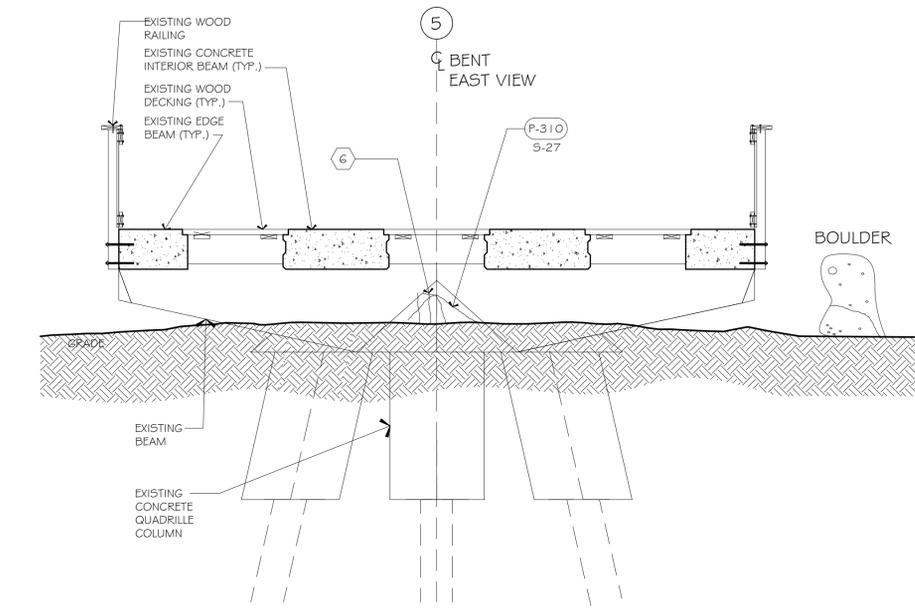
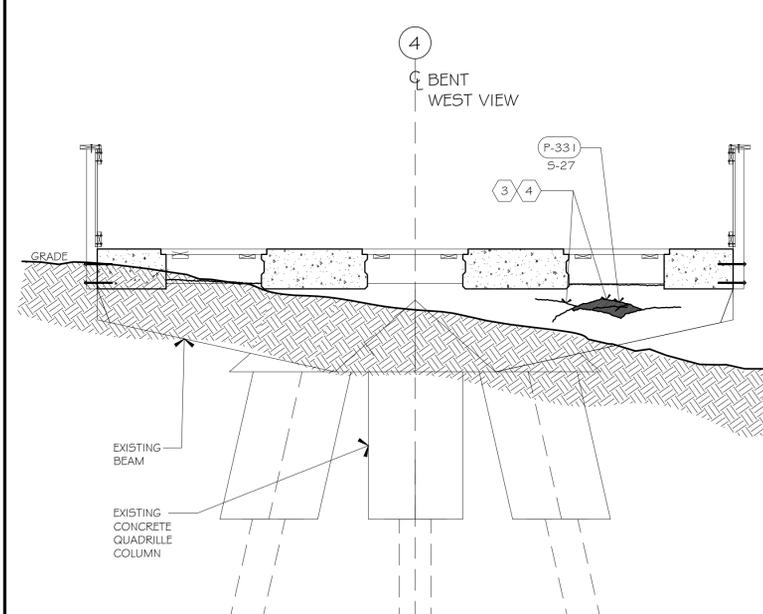
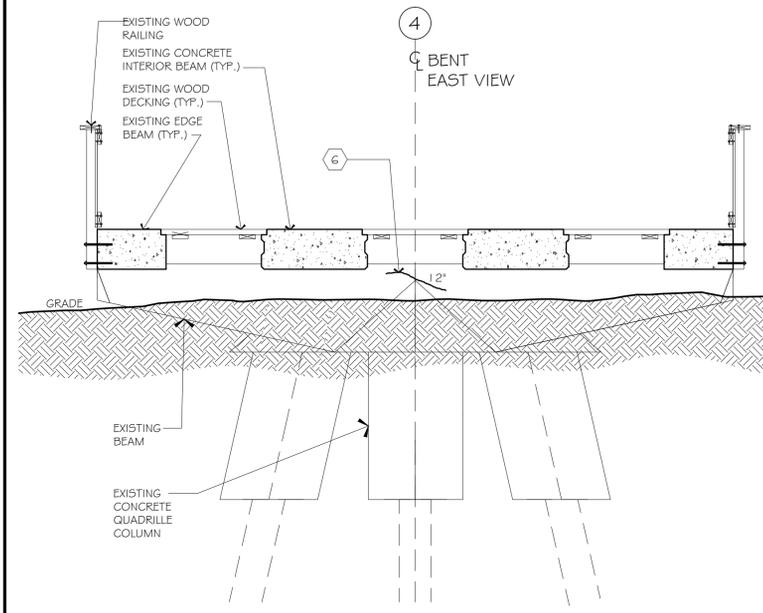
CITY OF POMPANO BEACH
BROWARD COUNTY, FLORIDA

Job Number: 126311
Scale: AS SHOWN
Date: 4/29/13
Design: L.N.
Drawn: F.G.
Checked: L.N.

Drawing Number:

S-16

Rev. Number:



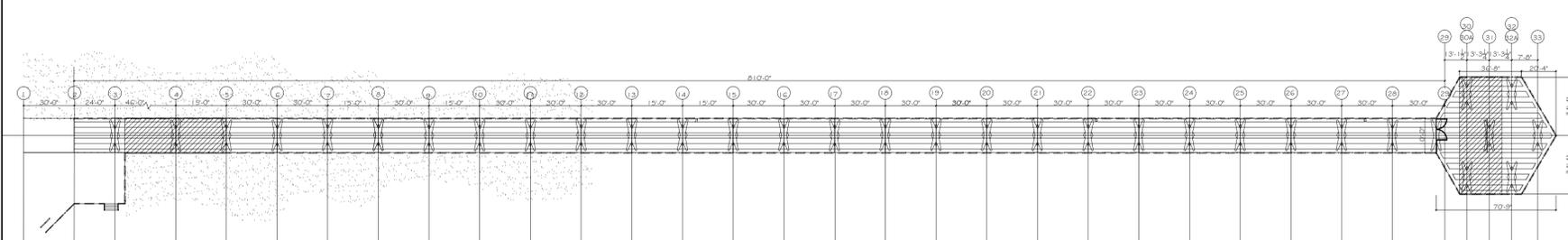
1 EAST/WEST BENTS VIEW

S-12 SCALE :3/8"=1'-0"

LEGEND	
1	INDICATES COLUMN GRID LINE
X	INDICATES DEFECT NUMBER
1/5#	INDICATES PICTURE REFERENCE
1	HOLLOW CONCRETE DECK
2	SPALLED PATCHWORK
3	STRUCTURAL CRACK
4	SPALL
5	EXPANSION JOINT
6	HAIRLINE CRACKS
7	EDGE REPAIRED
8	DECOMPOSED CONCRETE
9	REMNANT METAL EMBEDMENT
10	EXPOSED AND CORRODED REBAR, RUST MARK
11	DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

2 LEGEND

S-12



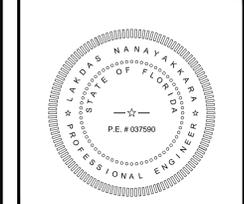
3 KEY PLAN

S-12





LAKDAS/YOHALEM ENGINEERING, INC.
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Revisions:

Number	Description	Date

Drawing Title

NORTH BENT VIEW

Project Name:

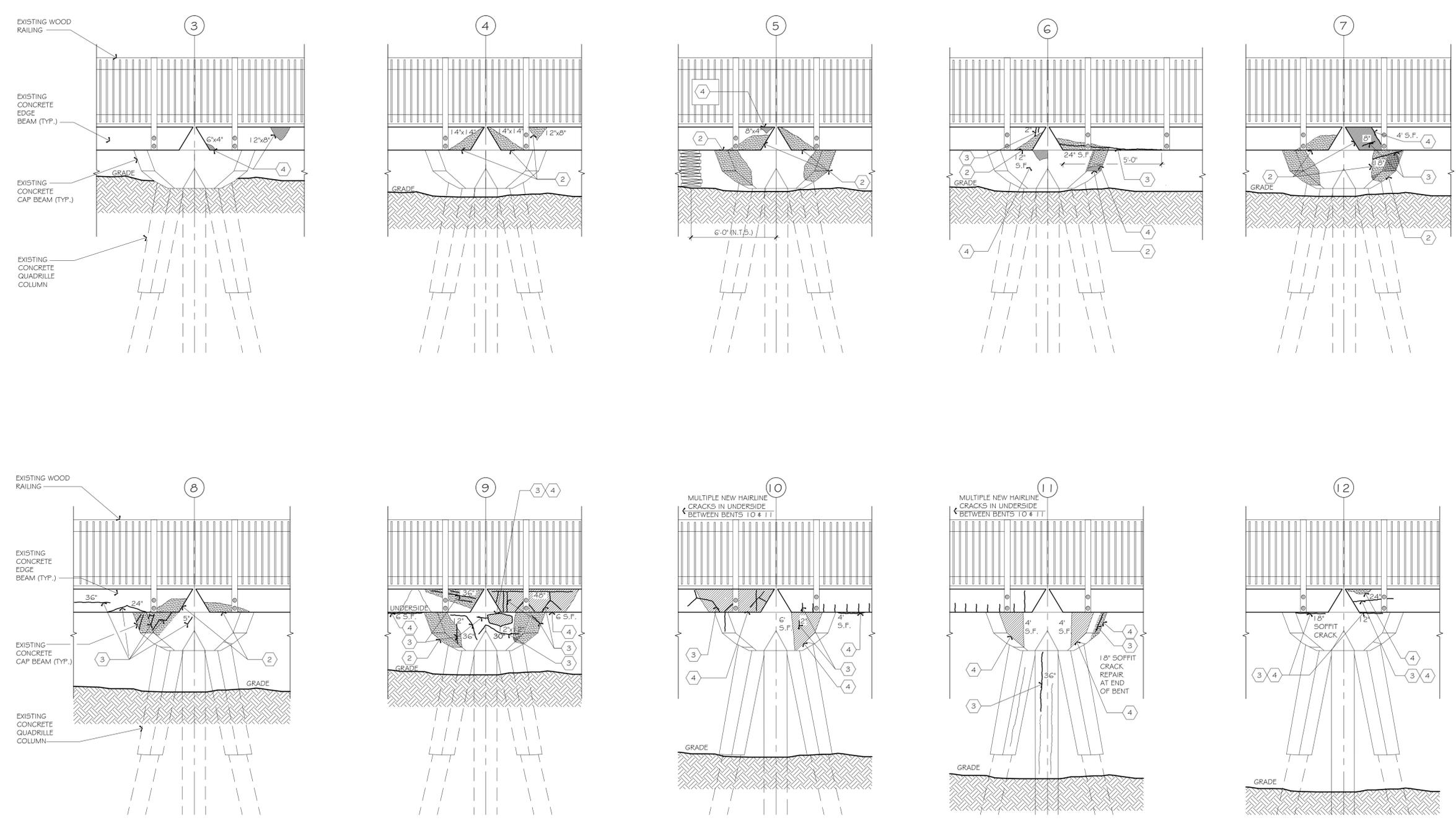
STRUCTURAL CONDITION SURVEY
 CITY OF POMPAÑO BEACH
 BROWARD COUNTY, FLORIDA

Job Number: 126311
 Scale: AS SHOWN
 Date: 2/20/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.

Drawing Number:

S-9

Rev. Number:



1 NORTH BENTS FRONT VIEW

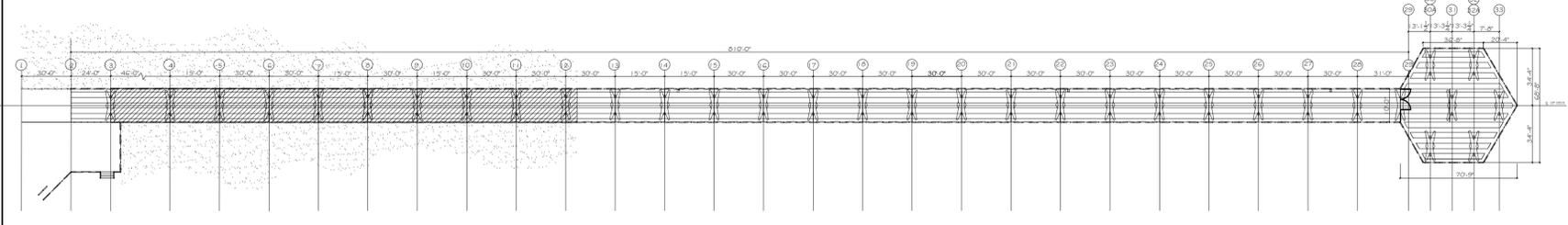
S-9 SCALE :3/8"=1'-0"

LEGEND

⊕	INDICATES COLUMN GRID LINE	1	HOLLOW CONCRETE DECK	6	HAIRLINE CRACKS
X	INDICATES DEFECT NUMBER	2	SPALLED PATCHWORK	7	EDGE REPAIRED
1/5#	INDICATES PICTURE REFERENCE	3	STRUCTURAL CRACK	8	DECOMPOSED CONCRETE
		4	SPALL	9	REMNANT METAL EMBEDMENT
		5	EXPANSION JOINT	10	EXPOSED AND CORRODED REBAR, RUST MARK
				11	DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

2 LEGEND

S-9



3 KEY PLAN

S-9





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Revisions:

Number	Description

Drawing Title

EAST / WEST BENTS VIEW

Project Name:

STRUCTURAL CONDITION SURVEY

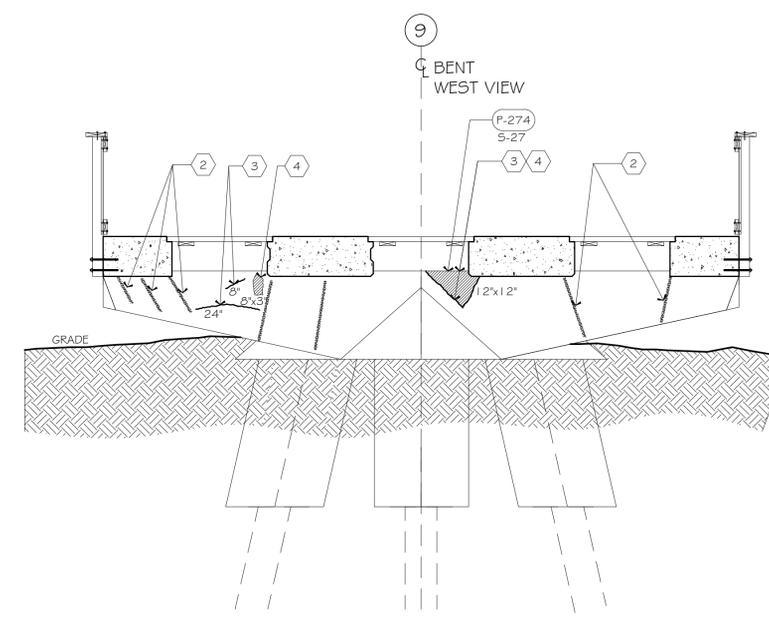
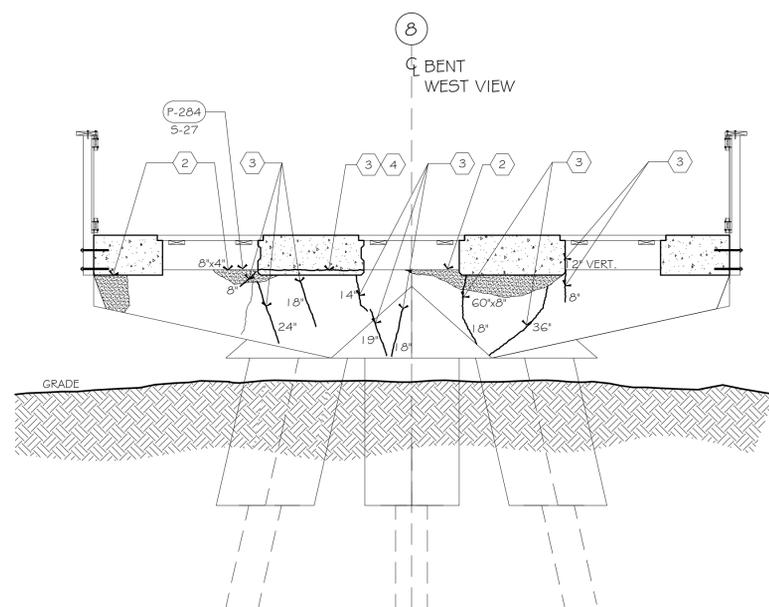
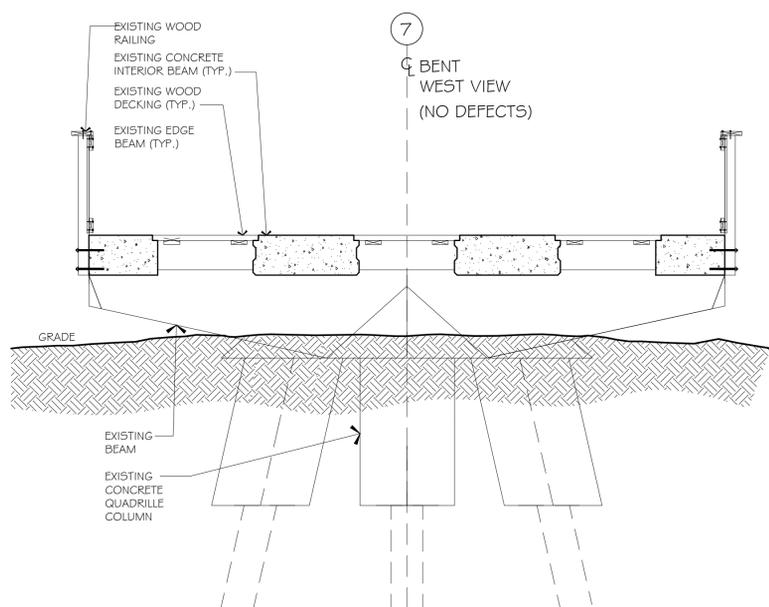
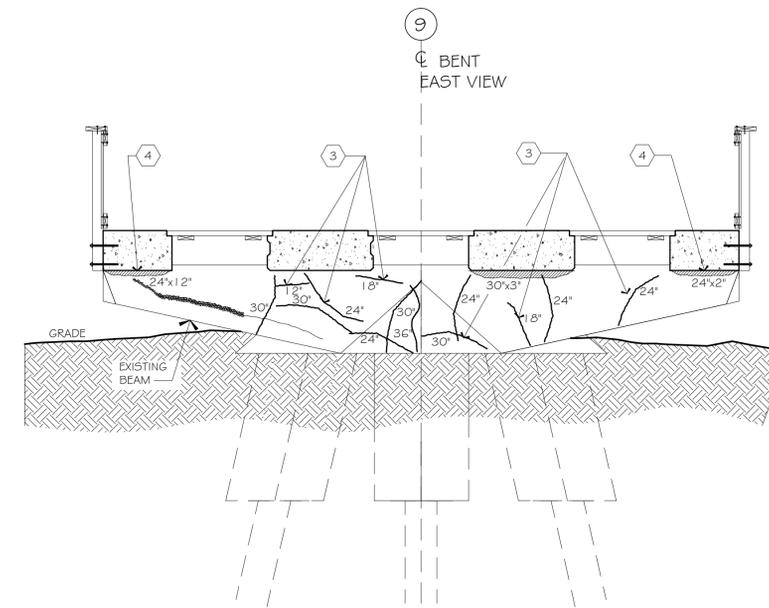
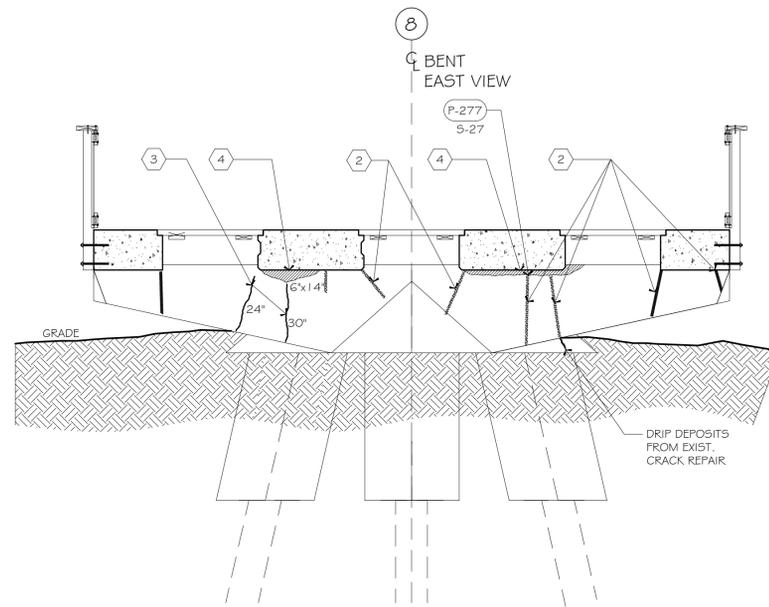
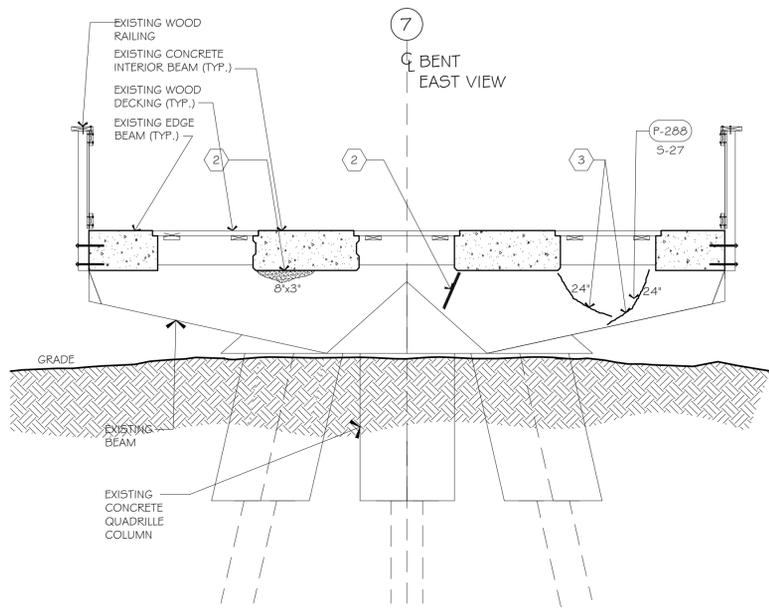
CITY OF POMPANO BEACH
 BROWARD COUNTY, FLORIDA

Job Number: 126311
 Scale: AS SHOWN
 Date: 4/29/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.

Drawing Number:

S-17

Rev. Number:



1 EAST/WEST BENTS VIEW

S-13 SCALE :3/8"=1'-0"

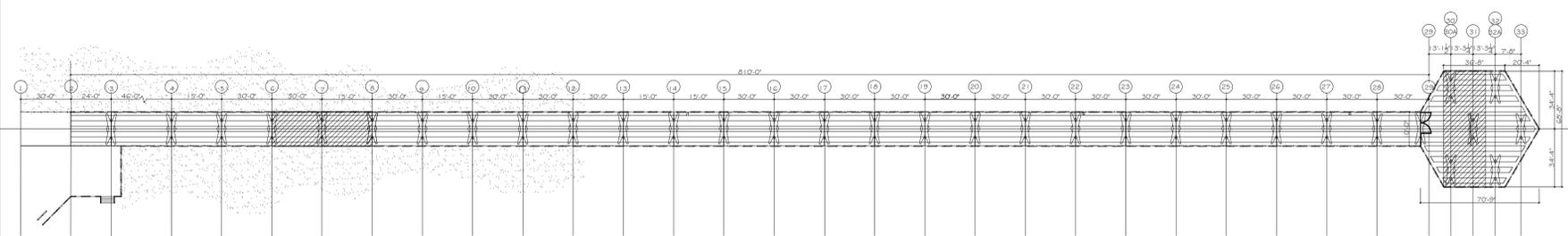
LEGEND	
1	INDICATES COLUMN GRID LINE
2	INDICATES DEFECT NUMBER
1/5#	INDICATES PICTURE REFERENCE
1	HOLLOW CONCRETE DECK
2	SPALLED PATCHWORK
3	STRUCTURAL CRACK
4	SPALL
5	EXPANSION JOINT
6	HAIRLINE CRACKS
7	EDGE REPAIRED
8	DECOMPOSED CONCRETE
9	REMNANT METAL EMBEDMENT
10	EXPOSED AND CORRODED REBAR, RUST MARK
11	DEFECTIVE CONCRETE: PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

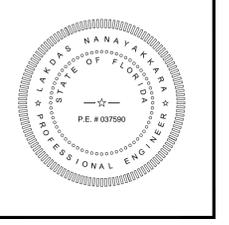
2 LEGEND

S-13

3 KEY PLAN

S-13





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Revisions:

Number	Description

Drawing Title

EAST / WEST BENTS VIEW

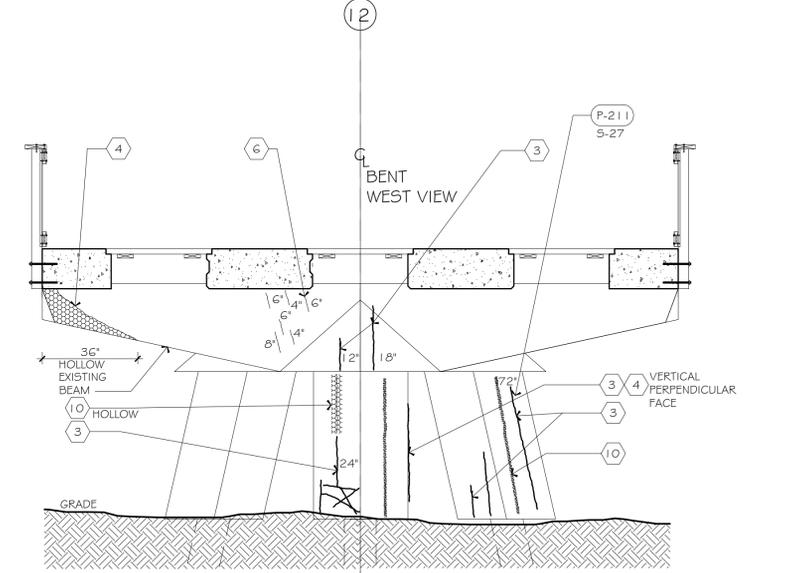
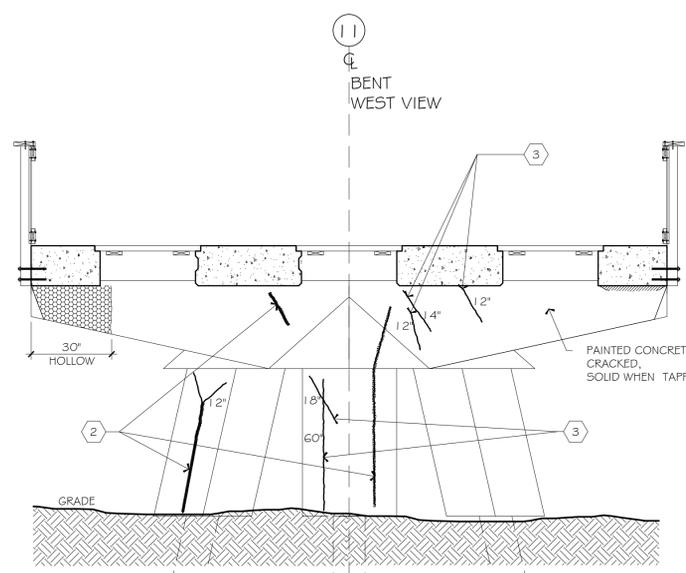
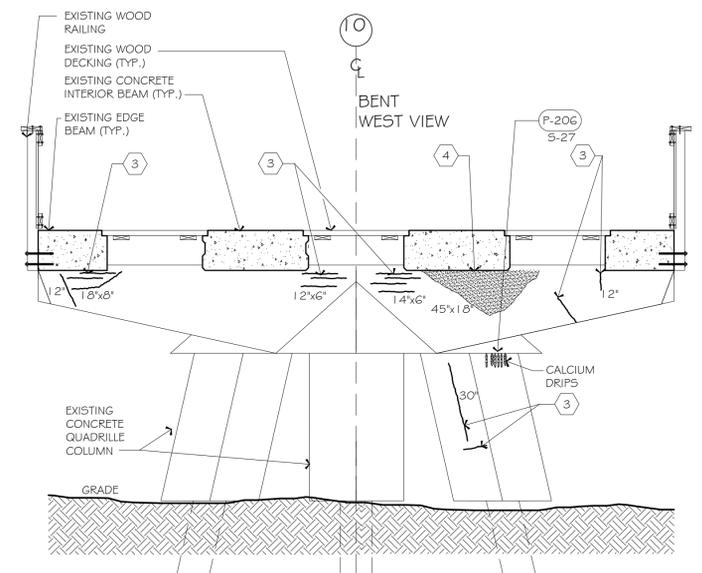
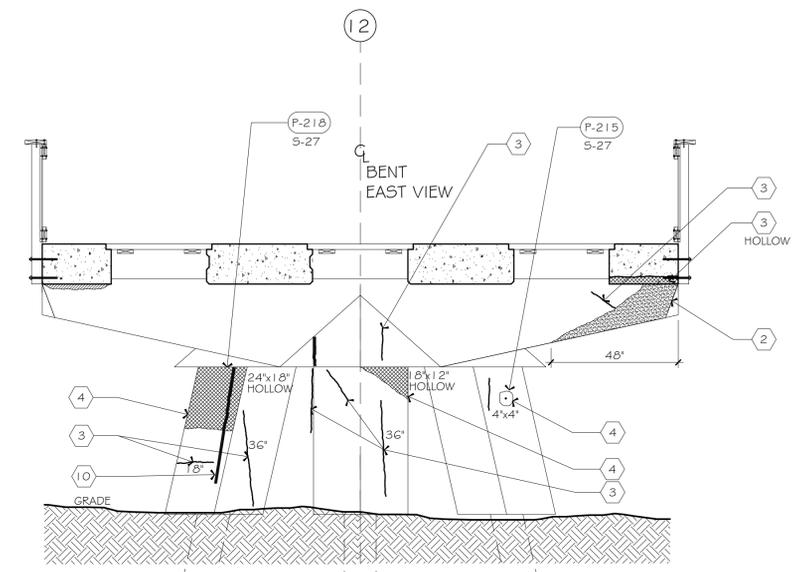
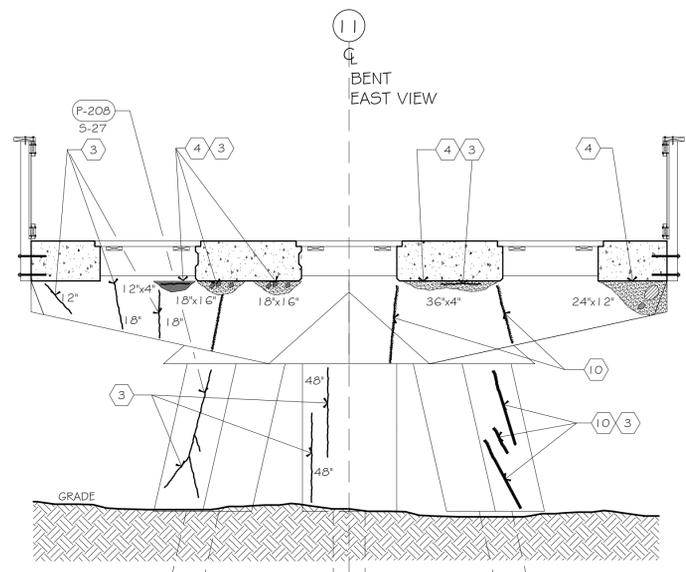
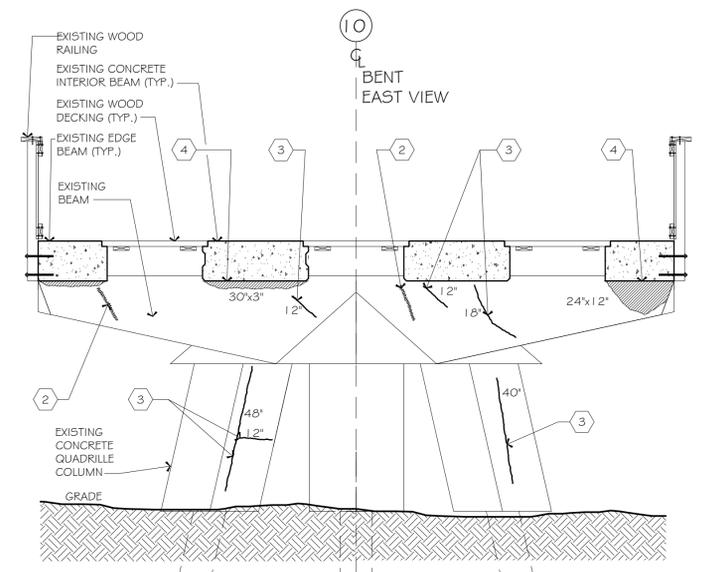
Project Name:
STRUCTURAL CONDITION SURVEY
 CITY OF POMPANO BEACH
 BROWARD COUNTY, FLORIDA

Job Number: 126311
 Scale: AS SHOWN
 Date: 4/29/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.

Drawing Number:

S-18

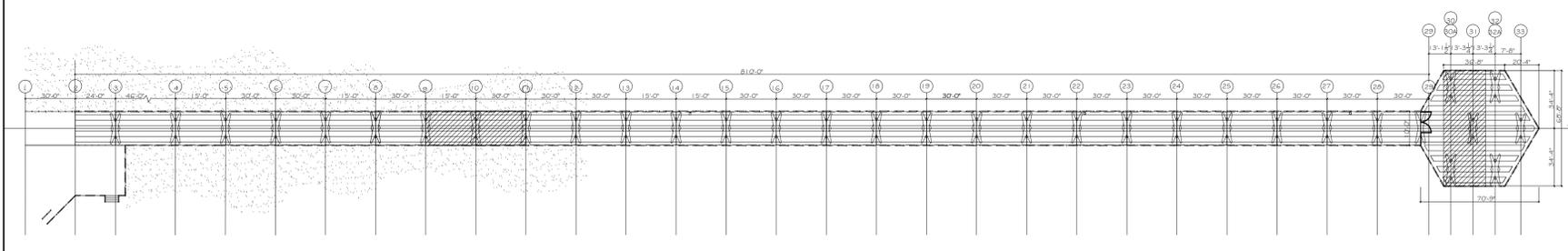
Rev. Number:



1 EAST/WEST BENTS VIEW
 S-14 SCALE :3/8"=1'-0"

LEGEND

—	INDICATES COLUMN GRID LINE	1	HOLLOW CONCRETE DECK	6	HAIRLINE CRACKS
X	INDICATES DEFECT NUMBER	2	SPALLED PATCHWORK	7	EDGE REPAIRED
1/5#	INDICATES PICTURE REFERENCE	3	STRUCTURAL CRACK	8	DECOMPOSED CONCRETE
		4	SPALL	9	REMNANT METAL EMBEDMENT
		5	EXPANSION JOINT	10	EXPOSED AND CORRODED REBAR, RUST MARK
				11	DEFECTIVE CONCRETE, PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN



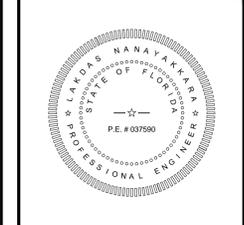
2 EAST/WEST BENTS VIEW
 S-14 SCALE :3/8"=1'-0"

3 KEY PLAN
 S-14



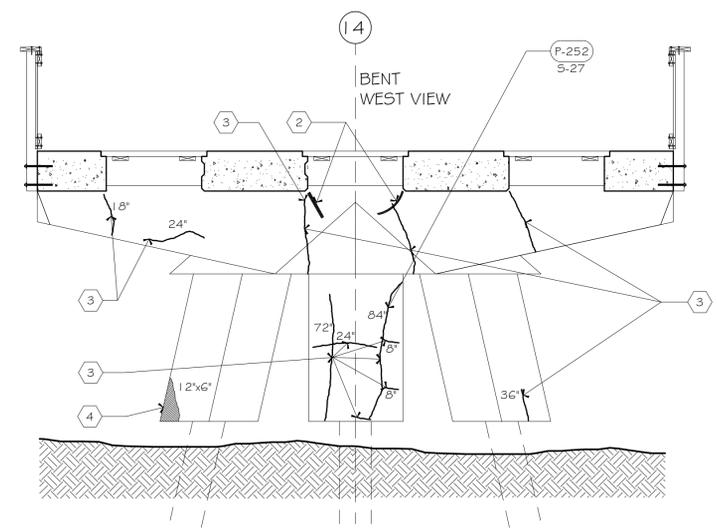
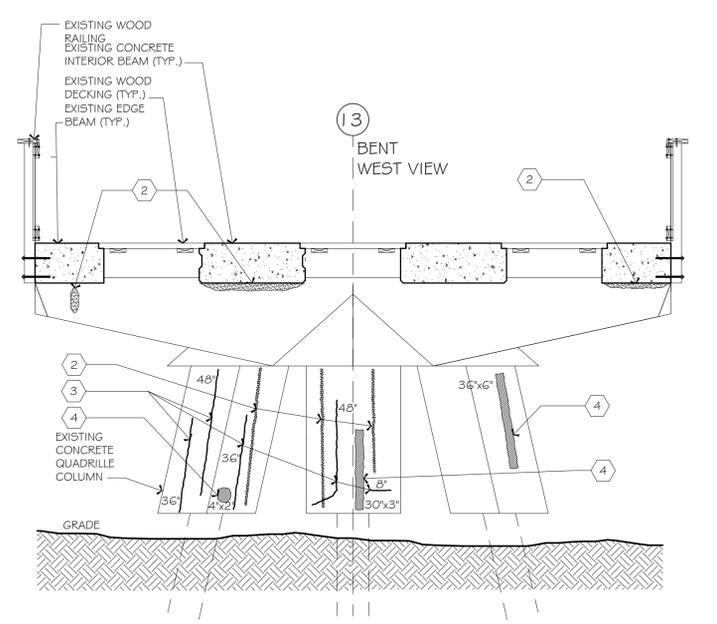
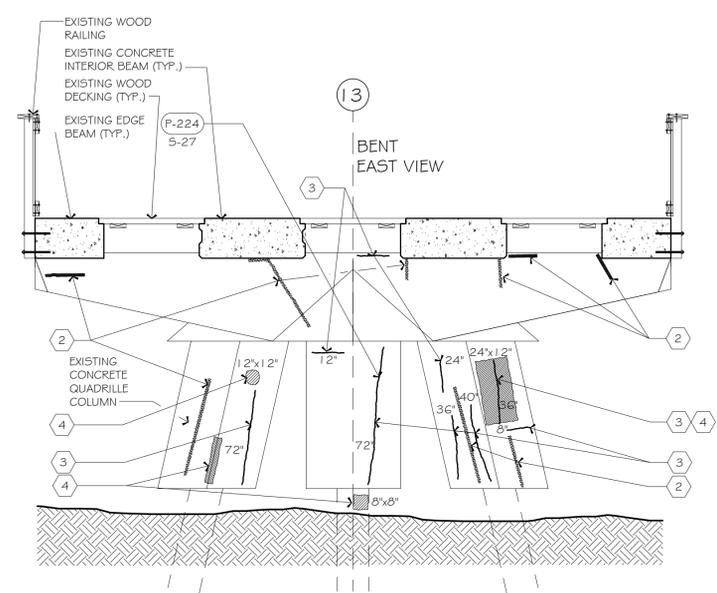


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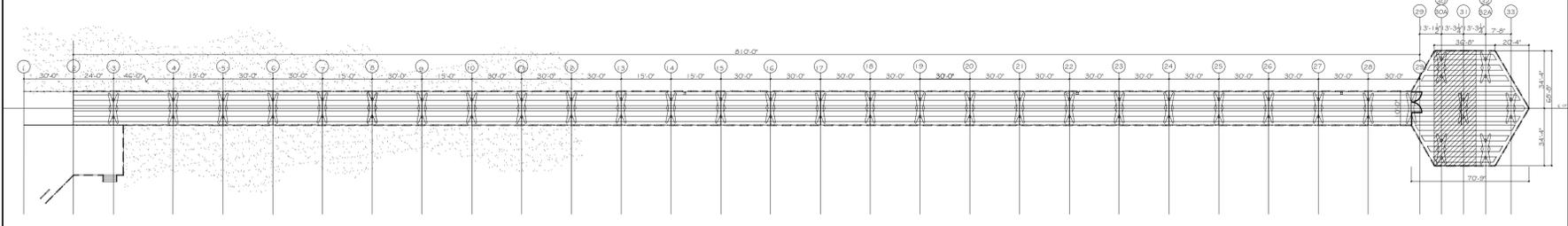
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1 EAST/WEST BENTS VIEW
 S-19 SCALE : 3/8"=1'-0"

LEGEND	
—	INDICATES COLUMN GRID LINE
(X)	INDICATES DEFECT NUMBER
(1/5#)	INDICATES PICTURE REFERENCE
①	HOLLOW CONCRETE DECK
②	SPALLED PATCHWORK
③	STRUCTURAL CRACK
④	SPALL
⑤	EXPANSION JOINT
⑥	HAIRLINE CRACKS
⑦	EDGE REPAIRED
⑧	DECOMPOSED CONCRETE
⑨	REMNANT METAL EMBEDMENT
⑩	EXPOSED AND CORRODED REBAR, RUST MARK
⑪	DEFECTIVE CONCRETE, PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

2 LEGEND
 S-19



3 KEY PLAN
 S-19 N.T.S.

Revisions:

Number	Description

Drawing Title
EAST / WEST BENTS VIEW

Project Name:
STRUCTURAL CONDITION SURVEY
 CITY OF POMPAHO BEACH
 BROWARD COUNTY, FLORIDA

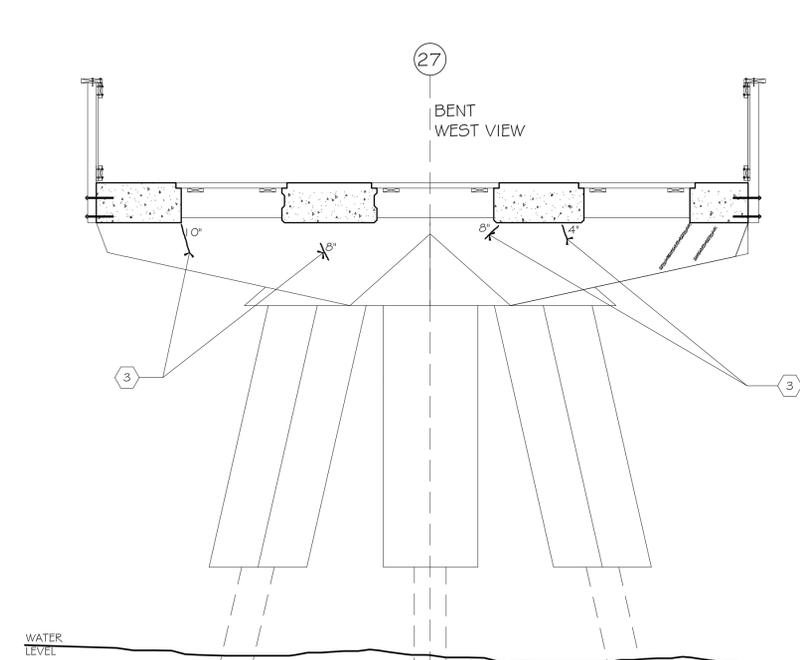
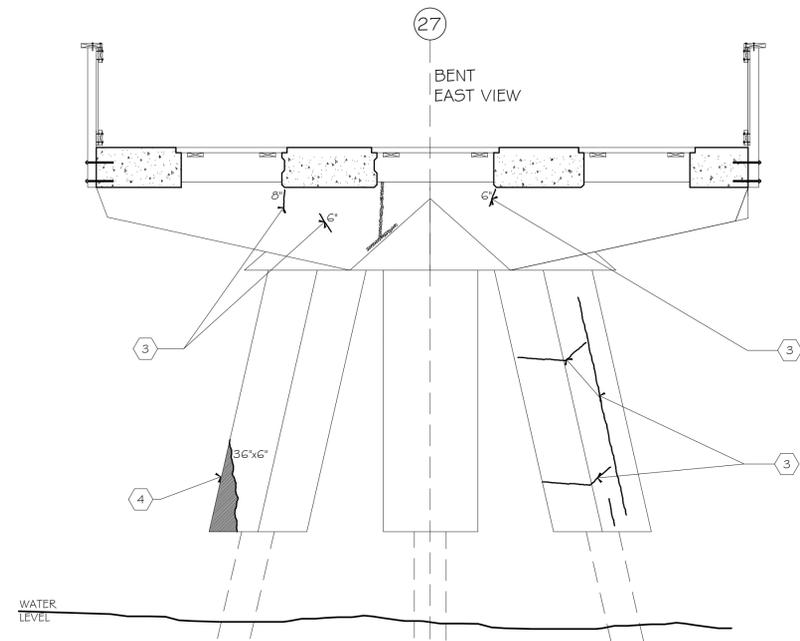
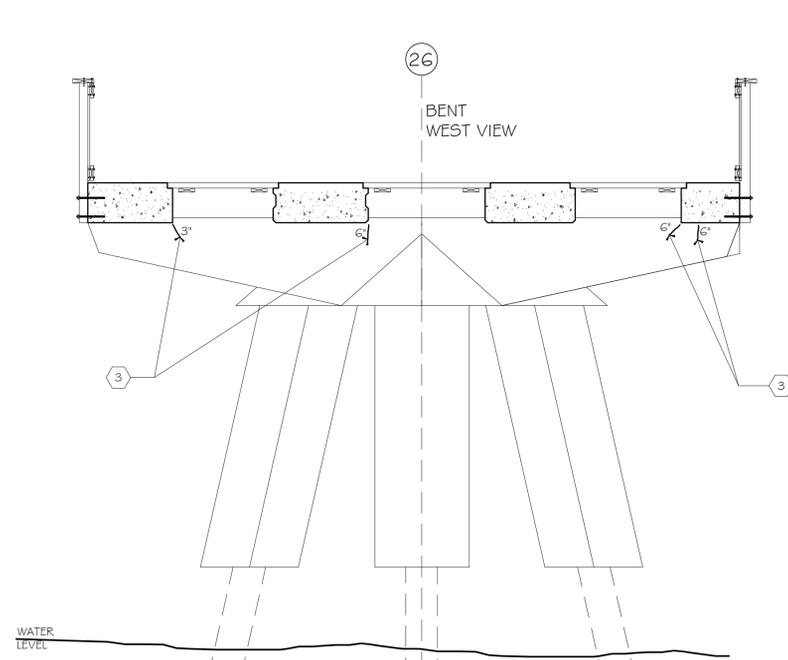
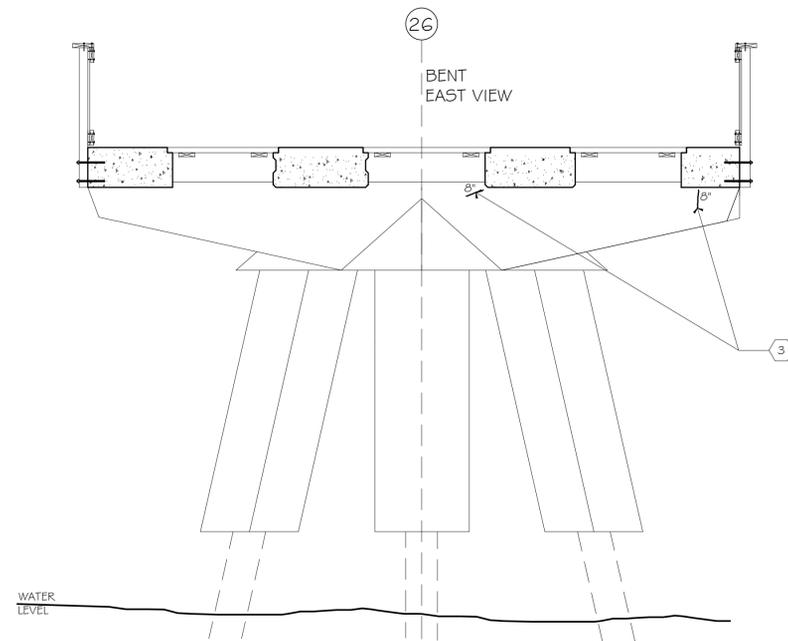
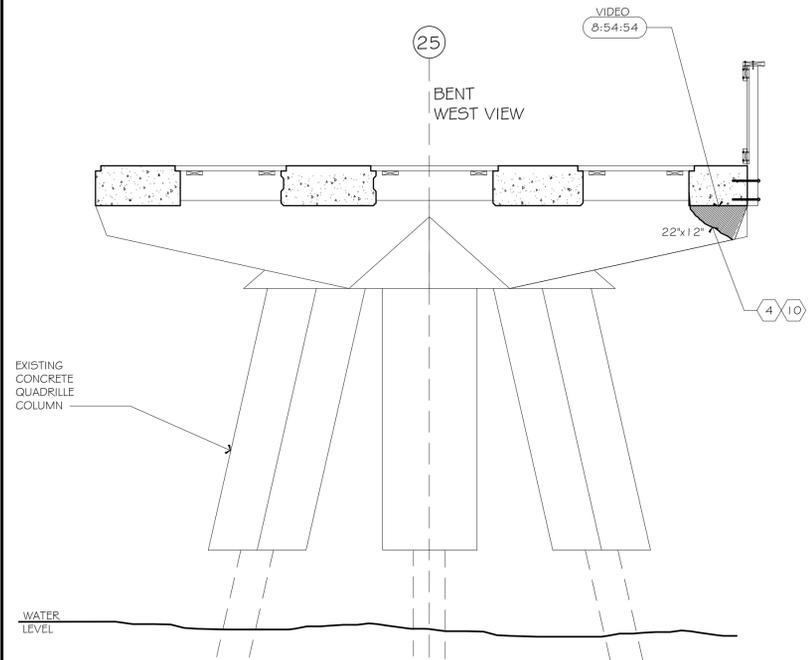
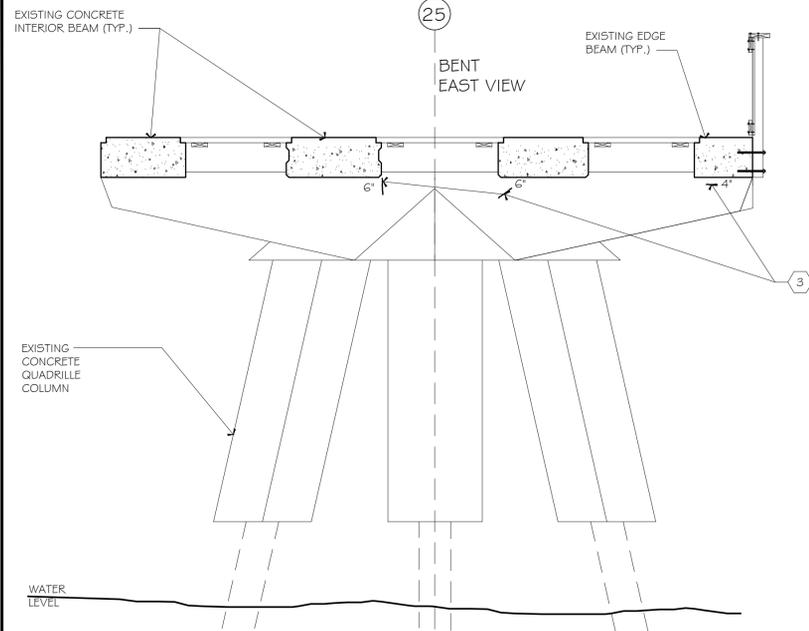
Job Number: 126311
 Scale: AS SHOWN
 Date: 4/29/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.

Drawing Number:

S-19

Rev. Number:





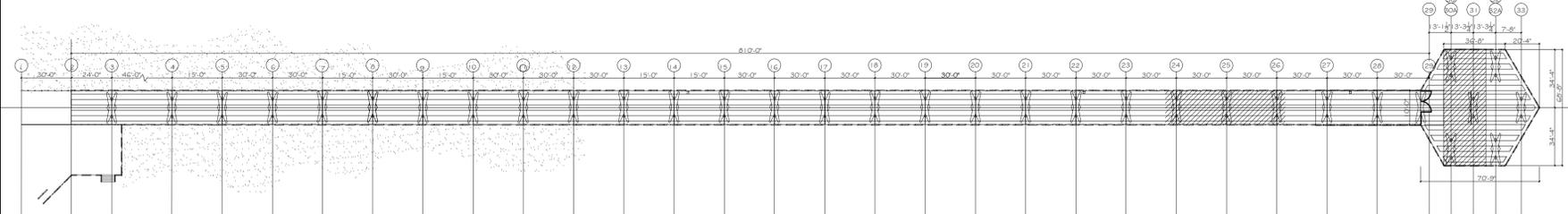
1 EAST/WEST BENTS VIEW

S-20 SCALE : 3/8"=1'-0"

LEGEND					
—	INDICATES COLUMN GRID LINE	①	HOLLOW CONCRETE DECK	⑥	HAIRLINE CRACKS
⊗	INDICATES DEFECT NUMBER	②	SPALLED PATCHWORK	⑦	EDGE REPAIRED
1/5#	INDICATES PICTURE REFERENCE	③	STRUCTURAL CRACK	⑧	DECOMPOSED CONCRETE
		④	SPALL	⑨	REMNANT METAL EMBEDMENT
		⑤	EXPANSION JOINT	⑩	EXPOSED AND CORRODED REBAR, RUST MARK
				⑪	DEFECTIVE CONCRETE, PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

2 LEGEND

S-20



3 KEY PLAN

S-20 N.T.S.

LAKDAS/YOHALEM ENGINEERING, INC.
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 e-mail: lakdas22@bellsouth.net
 FL. LIC.: CA-5458



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Revisions:

Number	Description

Drawing Title

EAST / WEST BENTS VIEW

Project Name:
STRUCTURAL CONDITION SURVEY
 CITY OF POMPANO BEACH
 BROWARD COUNTY, FLORIDA

Job Number: 126311
 Scale: AS SHOWN
 Date: 4/29/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.

Drawing Number:

S-20

Rev. Number:



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Revisions:

Number	Description

Drawing Title
EAST / WEST BENTS VIEW

Project Name:
STRUCTURAL CONDITION SURVEY

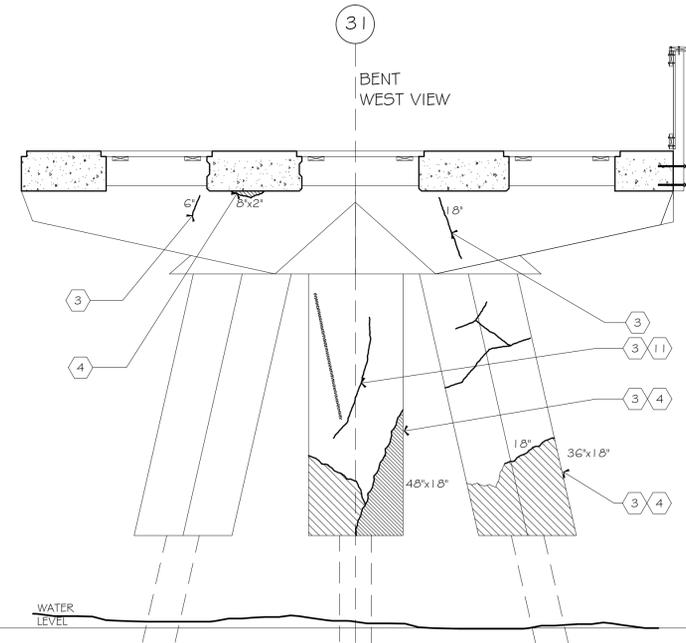
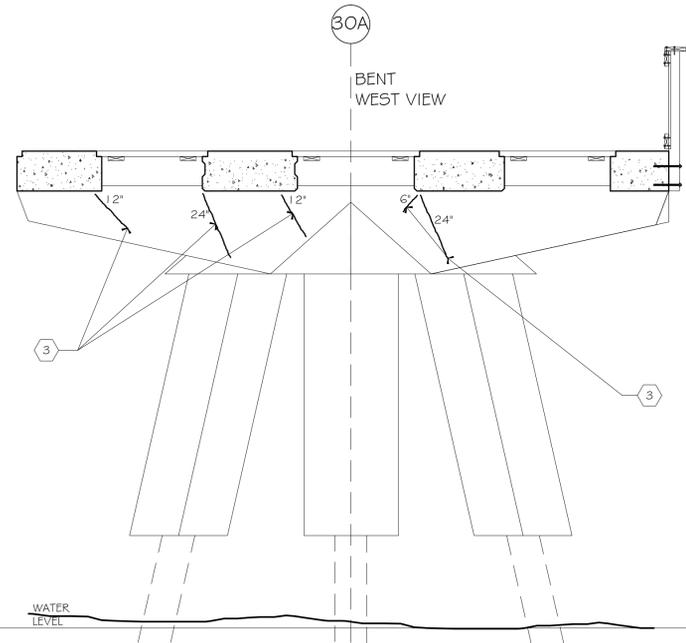
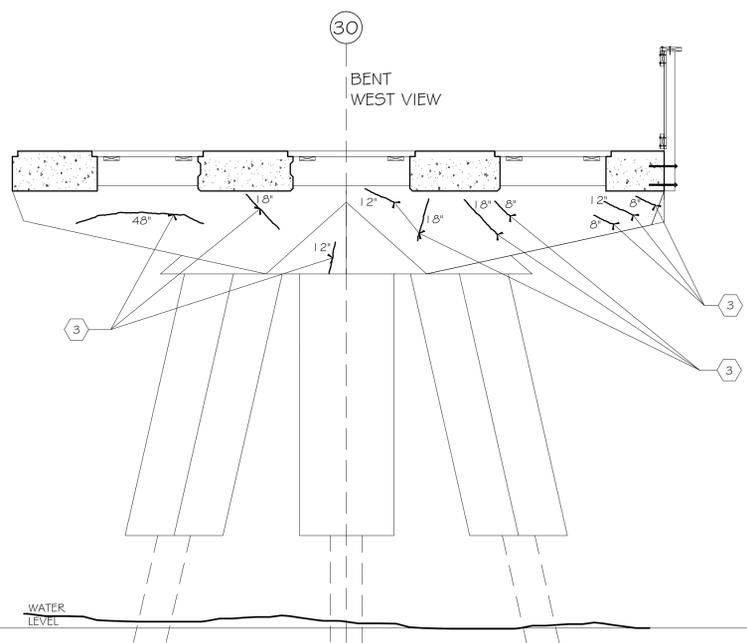
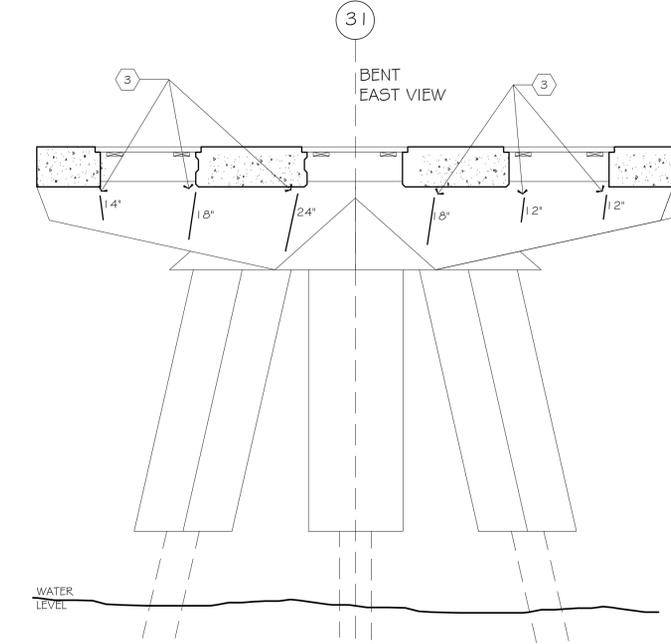
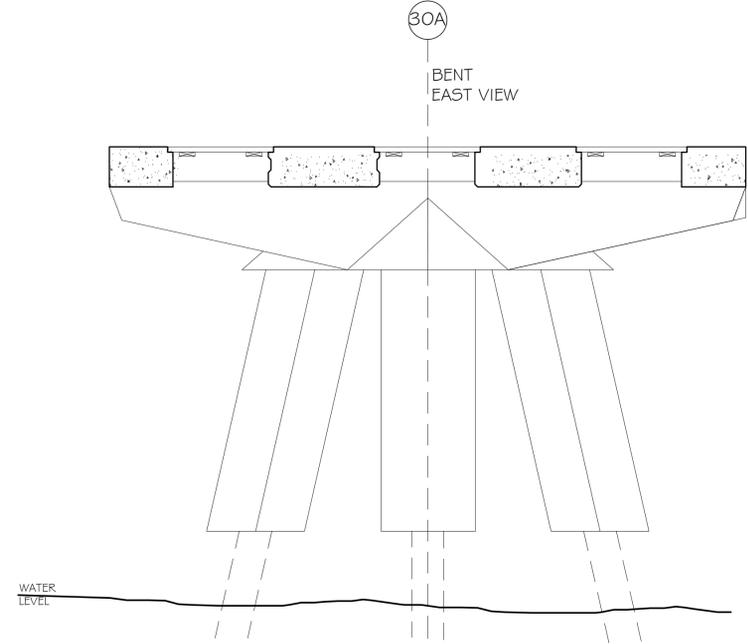
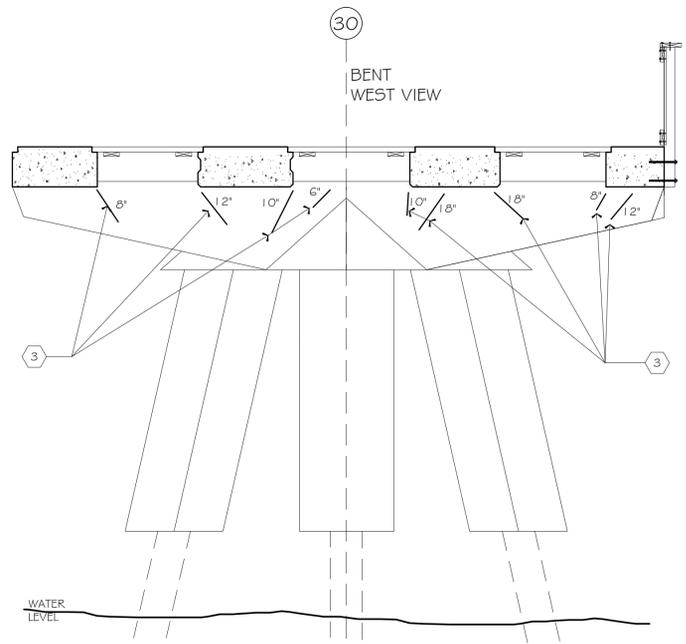
CITY OF POMPANO BEACH
 BROWARD COUNTY, FLORIDA

Job Number: 126311
 Scale: AS SHOWN
 Date: 4/29/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.

Drawing Number:

S-22

Rev. Number:



1 EAST/WEST BENTS VIEW

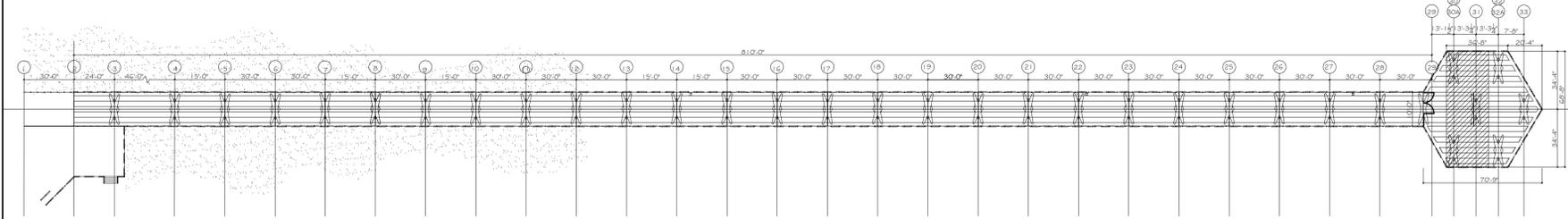
S-22 SCALE :3/8"=1'-0"

LEGEND

—	INDICATES COLUMN GRID LINE	①	HOLLOW CONCRETE DECK	⑥	HAIRLINE CRACKS
X	INDICATES DEFECT NUMBER	②	SPALLED PATCHWORK	⑦	EDGE REPAIRED
1/5#	INDICATES PICTURE REFERENCE	③	STRUCTURAL CRACK	⑧	DECOMPOSED CONCRETE
		④	SPALL	⑨	REMNANT METAL EMBEDMENT
		⑤	EXPANSION JOINT	⑩	EXPOSED AND CORRODED REBAR, RUST MARK
				⑪	DEFECTIVE CONCRETE, PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

2 LEGEND

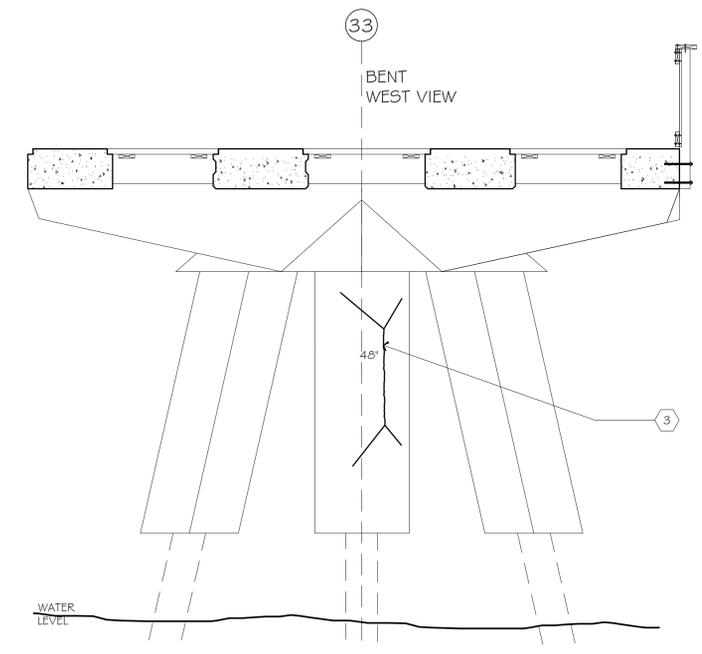
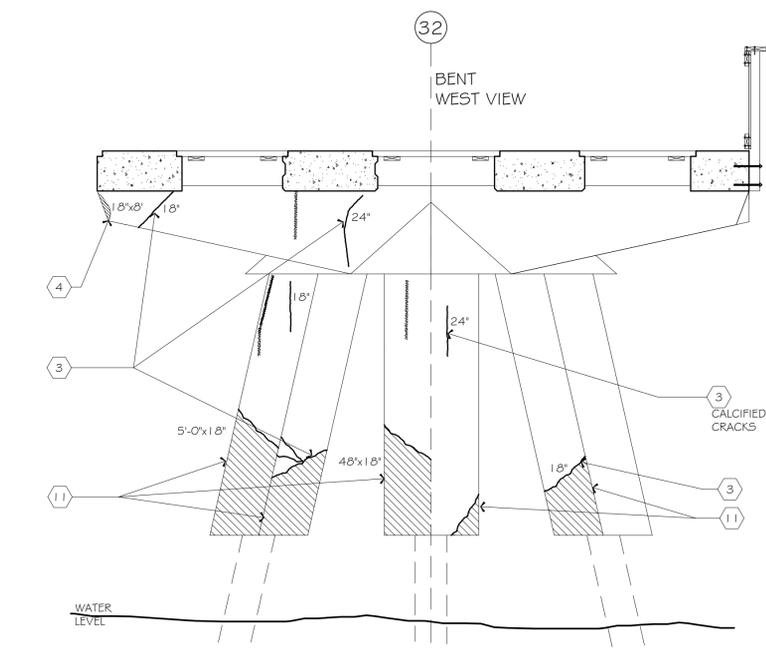
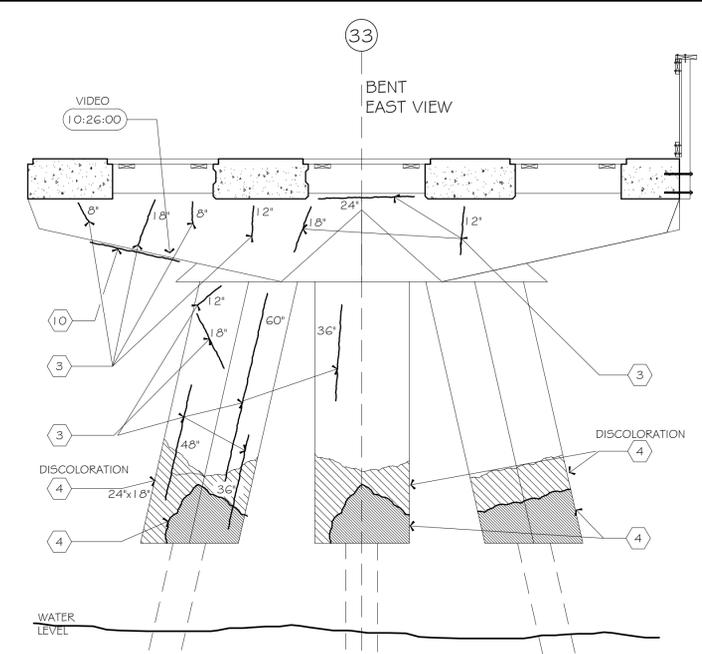
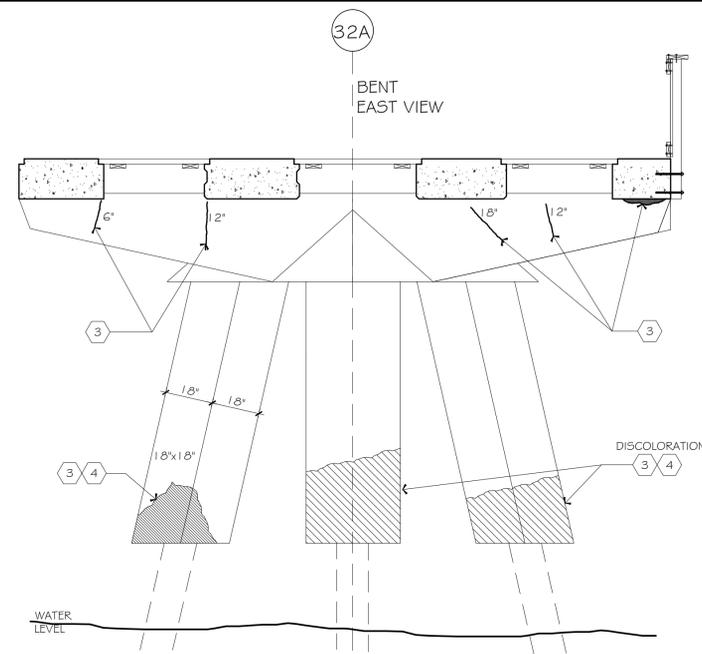
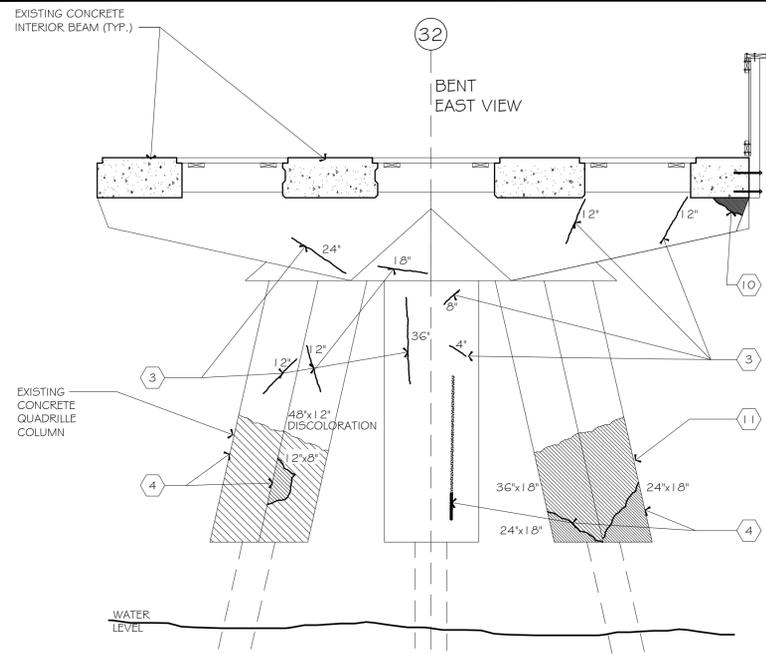
S-22



3 KEY PLAN

S-22 N.T.S.



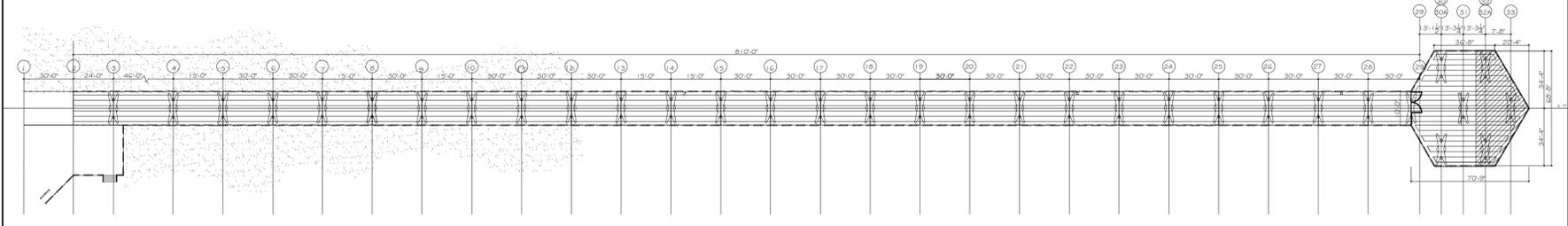


1 EAST/WEST BENTS VIEW
S-23 SCALE : 3/8"=1'-0"

LEGEND

INDICATES COLUMN GRID LINE	1 HOLLOW CONCRETE DECK	6 HAIRLINE CRACKS
INDICATES DEFECT NUMBER	2 SPALLED PATCHWORK	7 EDGE REPAIRED
INDICATES PICTURE REFERENCE	3 STRUCTURAL CRACK	8 DECOMPOSED CONCRETE
	4 SPALL	9 REMNANT METAL EMBEDMENT
	5 EXPANSION JOINT	10 EXPOSED AND CORRODED REBAR, RUST MARK
		11 DEFECTIVE CONCRETE, PHOSPHOROUS DEPOSIT, DARKENED CONCRETE, CORRODED CONCRETE, RANDOM CRACKS, RUST STAIN

2 LEGEND
S-23

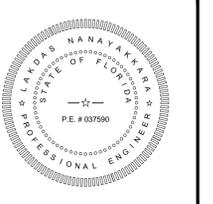


3 KEY PLAN
S-23 N.T.S.

PROGRESS SET

1 N

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FL. LIC.: CA-5458



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Revisions:

Number	Description

Drawing Title
EAST / WEST BENTS VIEW

Project Name:
STRUCTURAL CONDITION SURVEY
CITY OF POMPANO BEACH
BROWARD COUNTY, FLORIDA

Job Number: 126311
Scale: AS SHOWN
Date: 4/29/13
Design: L.N.
Drawn: F.G.
Checked: L.N.

Drawing Number:

S-23

Rev. Number:



P-173 BAY 19-20-DECK SURFACE



P-174 BAY 18-19-DECK SURFACE



P-175 BAY 18-19-DECK SURFACE



P-176 BAY 19-20-DECK SURFACE



P-179 BAY 19-20-DECK SURFACE



P-185 BAY28-29-EDGE BEAM-N.



P-186 BAY28-29-INTERIOR BEAM



P-180 BAY 28-29-DECK SURFACE



P-542 BAY 28-29-DECK SURFACE



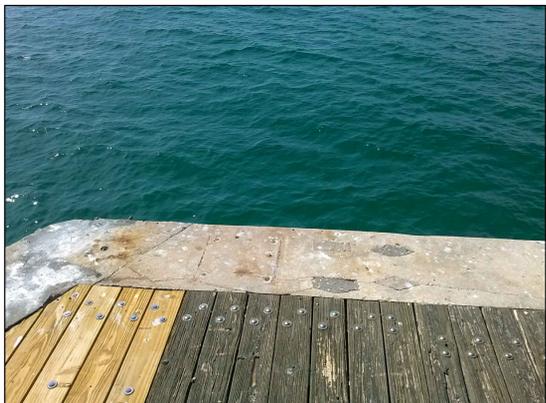
P-596 BAY 29-30-DECK SURFACE



P-574 BAY 29-30A DECK SURFACE



P-593 BAY 30-31-DECK SURFACE



P-573 BAY 31-32-DECK SURFACE



P-591 BAY 28-29-DECK SURFACE



P-559 BAY 31-32-DECK SURFACE



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Revisions:	
Number	Description

Drawing Title

DEFECTS PHOTO

Project Name:
**STRUCTURAL
CONDITION
SURVEY**

CITY OF POMPANO BEACH
BROWARD COUNTY, FLORIDA

Job Number: 126311
Scale: AS SHOWN
Date: 4/29/13
Design: L.N.
Drawn: F.G.
Checked: L.N.

Drawing Number:

S-24

Rev. Number:





P-278 BENT- 8-EAST



P-265 BAY 9-10-INTERIOR BEAM



P-440 BENT-10-EAST



P-456 BENT-12-INTERIOR BEAMS



P-149 BAY 10-11-INTERIOR BEAM



P-151 BAY 11-NORTH BENT



P-152 BAY 11-NORTH BENT



P-454 BAY 13-14-INTERIOR BEAM



P-253 BAY 13-14-INTERIOR BEAM



P-255 BAY 13-14-INTERIOR BEAM

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 FL. LIC.: CA-5456



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Revisions:

Number	Description

Drawing Title
EAST / WEST BENTS AND TOP VIEW PHOTOS

Project Name:
STRUCTURAL CONDITION SURVEY

CITY OF POMPANO BEACH
 BROWARD COUNTY, FLORIDA

Job Number: 126311
 Scale: AS SHOWN
 Date: 4/29/13
 Design: L.N.
 Drawn: F.G.
 Checked: L.N.

Drawing Number:
S-26

Rev. Number:



P-331 BENT-4-WEST



P-313 BENT-4-EAST



P-289 BENT-6-EAST



P-306 BENT-6-WEST



P-288 BENT-7-EAST



P-277 BENT-8-EAST



P-284 BENT-8-WEST



P-274 BENT-9-WEST



P-206 BENT-10-WEST



P-208 BENT-11-EAST



P-220 BENT-12-WEST



P-211 BENT-12-WEST



P-218 BENT-12-EAST



P-215 BENT-12-EAST



P-224 BENT-13-EAST



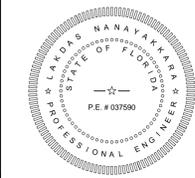
P-252 BENT-14-WEST



P-310 BENT-5-EAST



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KEY PLAN

Revisions:

Number	Description

Drawing Title

BENTS
PHOTOGRAPHS

Project Name:

STRUCTURAL
CONDITION
SURVEY

CITY OF POMPANO BEACH
BROWARD COUNTY, FLORIDA

Job Number: 126311
Scale: AS NOTED
Date: 4-29-2013
Design: LN
Drawn: FG
Checked: LN

Drawing Number:

S-27

Rev. Number:



P-319 BENT-10-SOUTH



P-321 BENT-10-SOUTH



P-320 BENT-10-SOUTH



P-252 BENT-14-SOUTH



13/S-6 P-249 BENT-14-SOUTH



P-471 BENT-9-SOUTH

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KEY PLAN

Revisions:

Number	Description

Drawing Title

BENTS
PHOTOGRAPHS

Project Name:
**STRUCTURAL
CONDITION
SURVEY**

CITY OF POMPANO BEACH
BROWARD COUNTY, FLORIDA

Job Number: 126311
 Scale: AS NOTED
 Date: 4-29-2013
 Design: LN
 Drawn: FG
 Checked: LN

Drawing Number:

S-28

Rev. Number:

