4.0 Horizontal and Vertical Control of Dredging Equipment

Horizontal positioning will be accomplished by using GPS positioning with differential GPS and Windows-driven HYPACK software, and assisted by line of sight positioning from the numerous visual reference points in the harbor. This is feasible because all planned dredging will occur within the harbor where reference landmarks (i.e. boat slips, floating and permanent docks) are readily available. Vertical positioning is also accomplished by HYPACK, assisted via a ladder gauge on the dredge. This gauge is to be regularly checked and adjusted with the tide gauge at the Port.

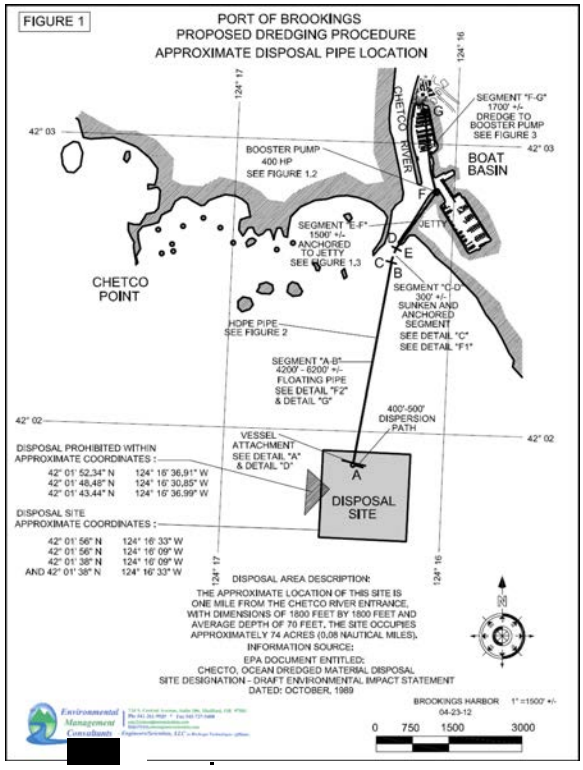
5.0 Dredge Area - Priorities

Description Table – The following table presents the specific sub-areas within the basins and dock more generally named **"Sport Basin" , "Commercial Basin"** and the **"Ice House Inlet"**.

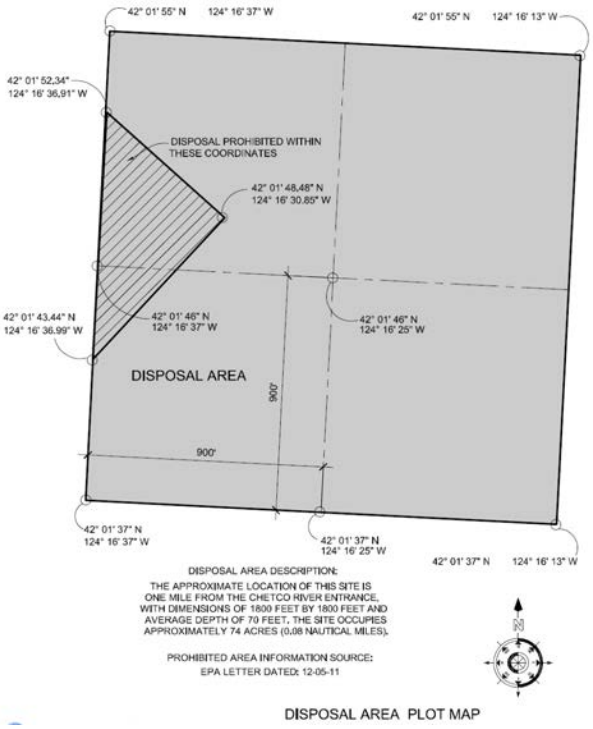
Table A

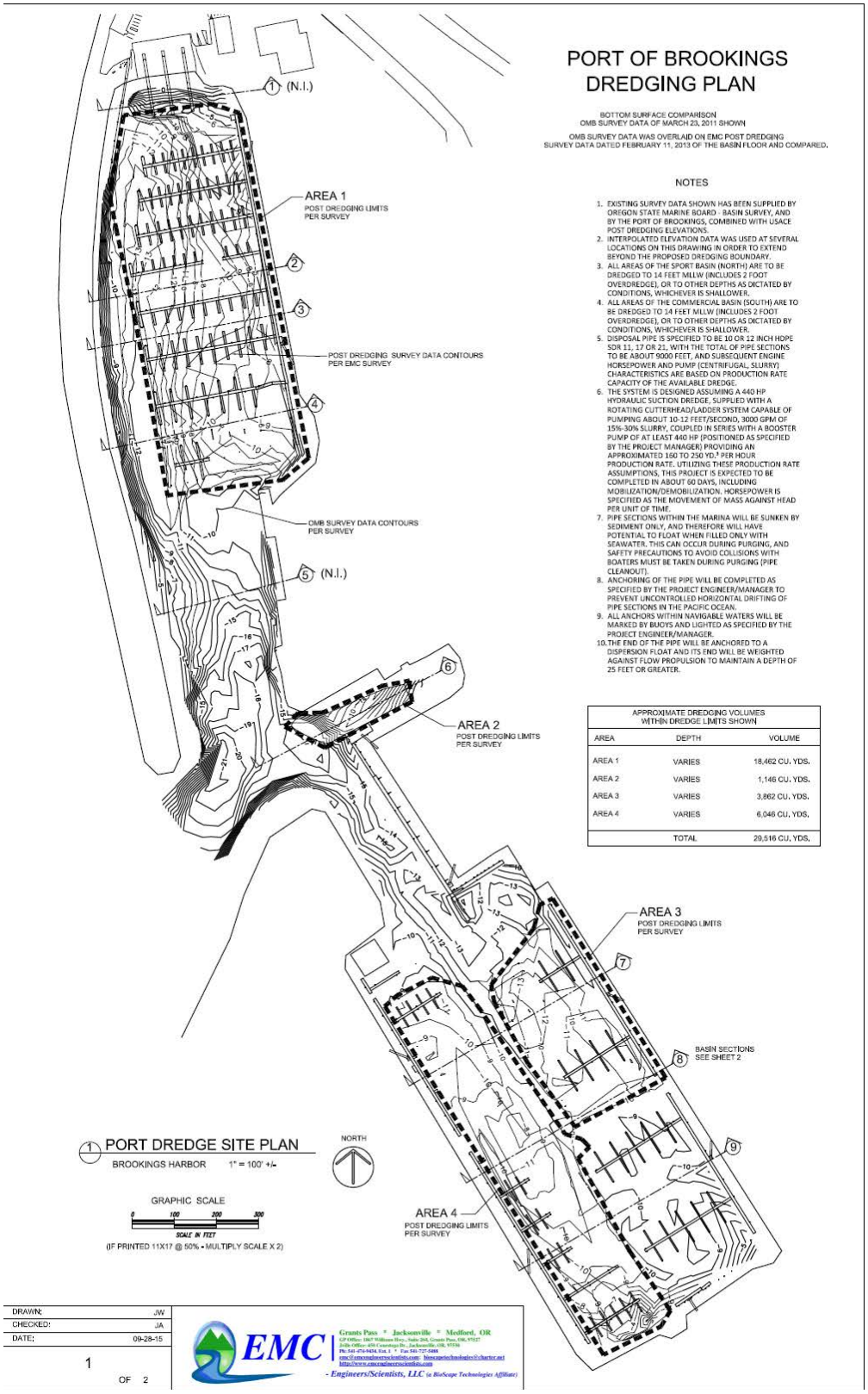
Area	Depth (ft. MLLW)	Maximum Volume Removed (yds.^{3})
Area 1	Not to Exceed 14' MLLW	18462
Area 2	Not to Exceed 14' MLLW	1146
Area 3	Not to Exceed 14' MLLW	3862
Area 4	Not to Exceed 14' MLLW	6046

Port To Disposal Site



Disposal Site




PORT OF BROOKINGS
DREDGING PLAN
BOTTOM SURFACE COMPARISON
OMB SURVEY DATA OF MARCH 23, 2011 SHOWN
OMB SURVEY DATA WAS OVERLAID ON EMC POST DREDGING SURVEY DATA DATED FEBRUARY 11, 2013 OF THE BASIN FLOOR AND COMPARED.
NOTES
1. EXISTING SURVEY DATA SHOWN HAS BEEN SUPPLIED BY OREGON STATE MARINE BOARD - BASIN SURVEY, AND BY THE PORT OF BROOKINGS, COMBINED WITH USACE POST DREDGING ELEVATIONS.
2. INTERPOLATED ELEVATION DATA WAS USED AT SEVERAL LOCATIONS ON THIS DRAWING IN ORDER TO EXTEND BEYOND THE PROPOSED DREDGING BOUNDARY.
3. ALL AREAS OF THE SPORT BASIN (NORTH) ARE TO BE DREDGED TO 14 FEET MLLW (INCLUDES 2 FOOT OVERDREDGE), OR TO OTHER DEPTHS AS DICTATED BY CONDITIONS, WHICHEVER IS SHALLOWER.
4. ALL AREAS OF THE COMMERCIAL BASIN (SOUTH) ARE TO BE DREDGED TO 14 FEET MLLW (INCLUDES 2 FOOT OVERDREDGE), OR TO OTHER DEPTHS AS DICTATED BY CONDITIONS, WHICHEVER IS SHALLOWER.
5. DISPOSAL PIPE IS SPECIFIED TO BE 10 OR 12 INCH HDPE SDR 11, 17 OR 21, WITH THE TOTAL OF PIPE SECTIONS TO BE ABOUT 9000 FEET, AND SUBSEQUENT ENGINE HORSEPOWER AND PUMP (CENTRIFUGAL, SLURRY) CHARACTERISTICS ARE BASED ON PRODUCTION RATE CAPACITY OF THE AVAILABLE DREDGE.
6. THE SYSTEM IS DESIGNED ASSUMING A 440 HP HYDRAULIC SUCTION DREDGE, SUPPLIED WITH A ROTATING CUTTERHEAD/LADDER SYSTEM CAPABLE OF PUMPING ABOUT 10-12 FEET/SECOND, 3000 GPM OF 15%-30% SLURRY, COUPLED IN SERIES WITH A BOOSTER PUMP OF AT LEAST 440 HP (POSITIONED AS SPECIFIED BY THE PROJECT MANAGER) PROVIDING AN APPROXIMATED 150 TO 250 YD.³ PER HOUR PRODUCTION RATE. UTILIZING THESE PRODUCTION RATE ASSUMPTIONS, THIS PROJECT IS EXPECTED TO BE COMPLETED IN ABOUT 60 DAYS, INCLUDING MOBILIZATION/DEMOBILIZATION. HORSEPOWER IS SPECIFIED AS THE MOVEMENT OF MASS AGAINST HEAD PER UNIT OF TIME.
7. PIPE SECTIONS WITHIN THE MARINA WILL BE SUNKEN BY SEDIMENT ONLY, AND THEREFORE WILL HAVE POTENTIAL TO FLOAT WHEN FILLED ONLY WITH SEAWATER. THIS CAN OCCUR DURING PURGING, AND SAFETY PRECAUTIONS TO AVOID COLLISIONS WITH BOATERS MUST BE TAKEN DURING PURGING (PIPE CLEANOUT).
8. ANCHORING OF THE PIPE WILL BE COMPLETED AS SPECIFIED BY THE PROJECT ENGINEER/MANAGER TO PREVENT UNCONTROLLED HORIZONTAL DRIFTING OF PIPE SECTIONS IN THE PACIFIC OCEAN.
9. ALL ANCHORS WITHIN NAVIGABLE WATERS WILL BE MARKED BY BUOYS AND LIGHTED AS SPECIFIED BY THE PROJECT ENGINEER/MANAGER.
10. THE END OF THE PIPE WILL BE ANCHORED TO A DISPERSION FLOAT AND ITS END WILL BE WEIGHTED AGAINST FLOW PROPULSION TO MAINTAIN A DEPTH OF 25 FEET OR GREATER.
APPROXIMATE DREDGING VOLUMES WITHIN DREDGE LIMITS SHOWN
AREA | DEPTH | VOLUME
AREA 1 | VARIES | 18,462 CU. YDS.
AREA 2 | VARIES | 1,146 CU. YDS.
AREA 3 | VARIES | 3,862 CU. YDS.
AREA 4 | VARIES | 6,046 CU. YDS.
TOTAL | 29,516 CU. YDS.
AREA 1
POST DREDGING LIMITS PER SURVEY
POST DREDGING SURVEY DATA CONTOURS PER EMC SURVEY
OMB SURVEY DATA CONTOURS PER SURVEY
(N.I.)
AREA 2
POST DREDGING LIMITS PER SURVEY
AREA 3
POST DREDGING LIMITS PER SURVEY
BASIN SECTIONS SEE SHEET 2
AREA 4
POST DREDGING LIMITS PER SURVEY
PORT DREDGE SITE PLAN
BROOKINGS HARBOR 1" = 100' +/-
NORTH
GRAPHIC SCALE
0 100 200 300
SCALE IN FEET
(IF PRINTED 11X17 @ 50% - MULTIPLY SCALE X 2)
DRAWN: JW
CHECKED: JA
DATE: 09-28-15
1 OF 2
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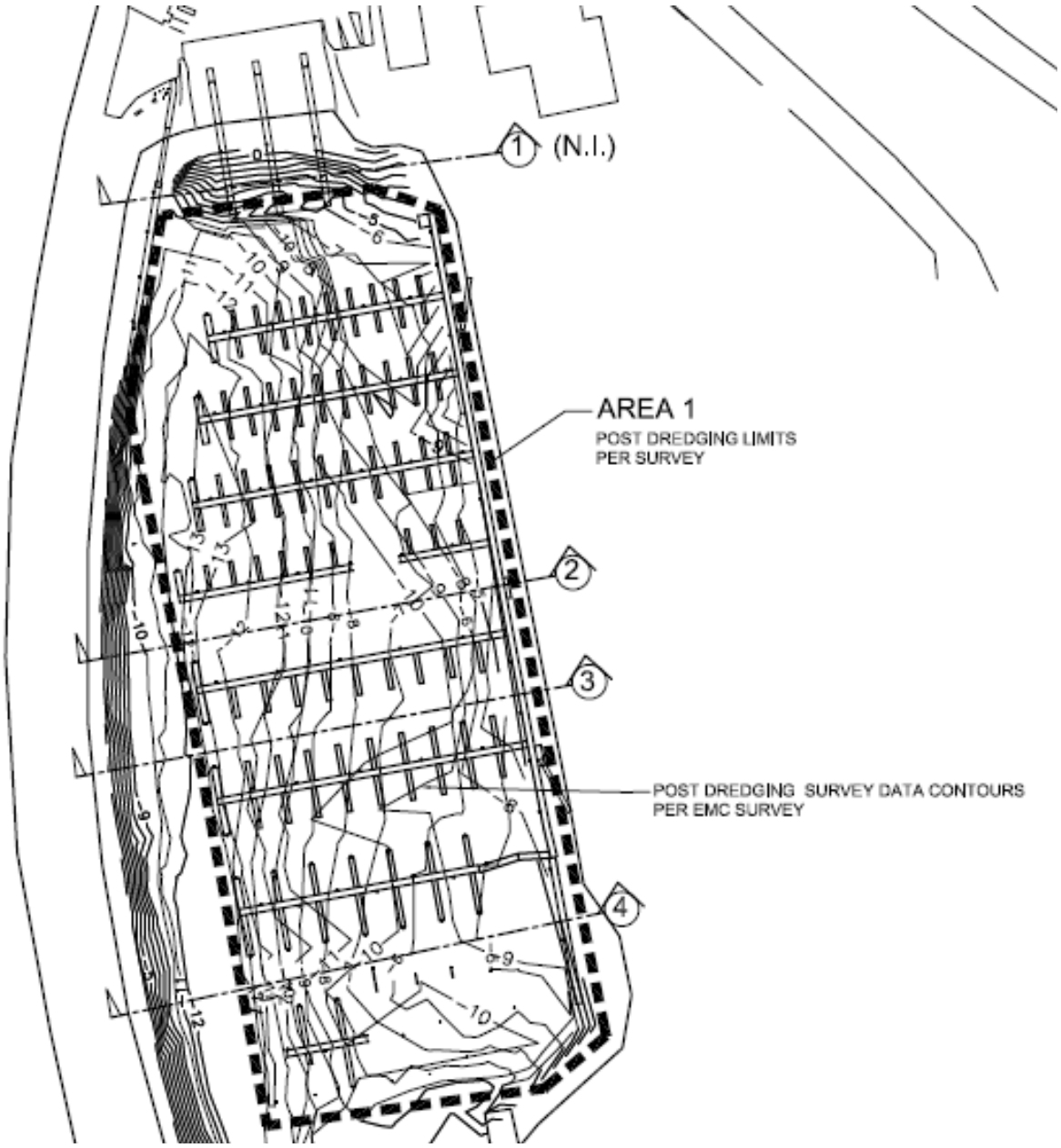
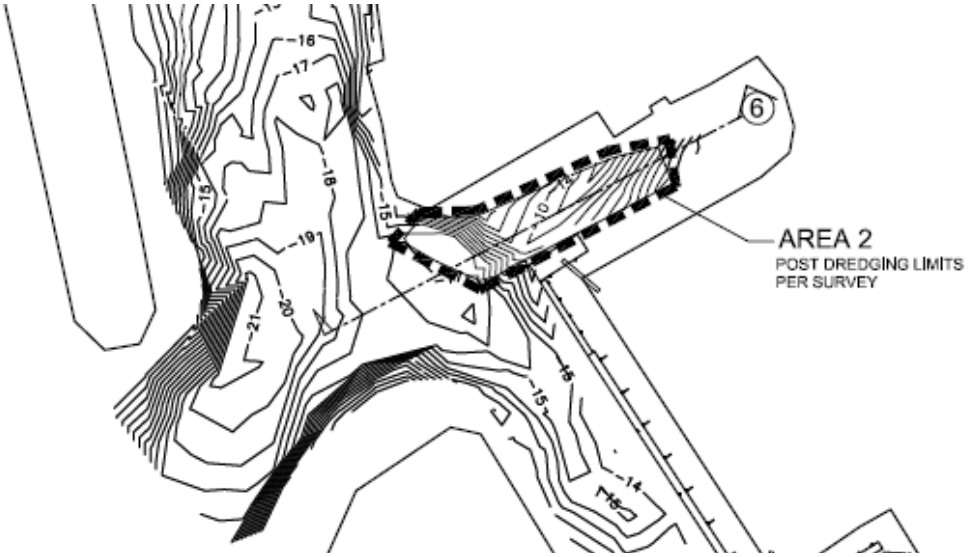
- Engineers/Scientists, LLC (a RiverScape Technologies Affiliate)

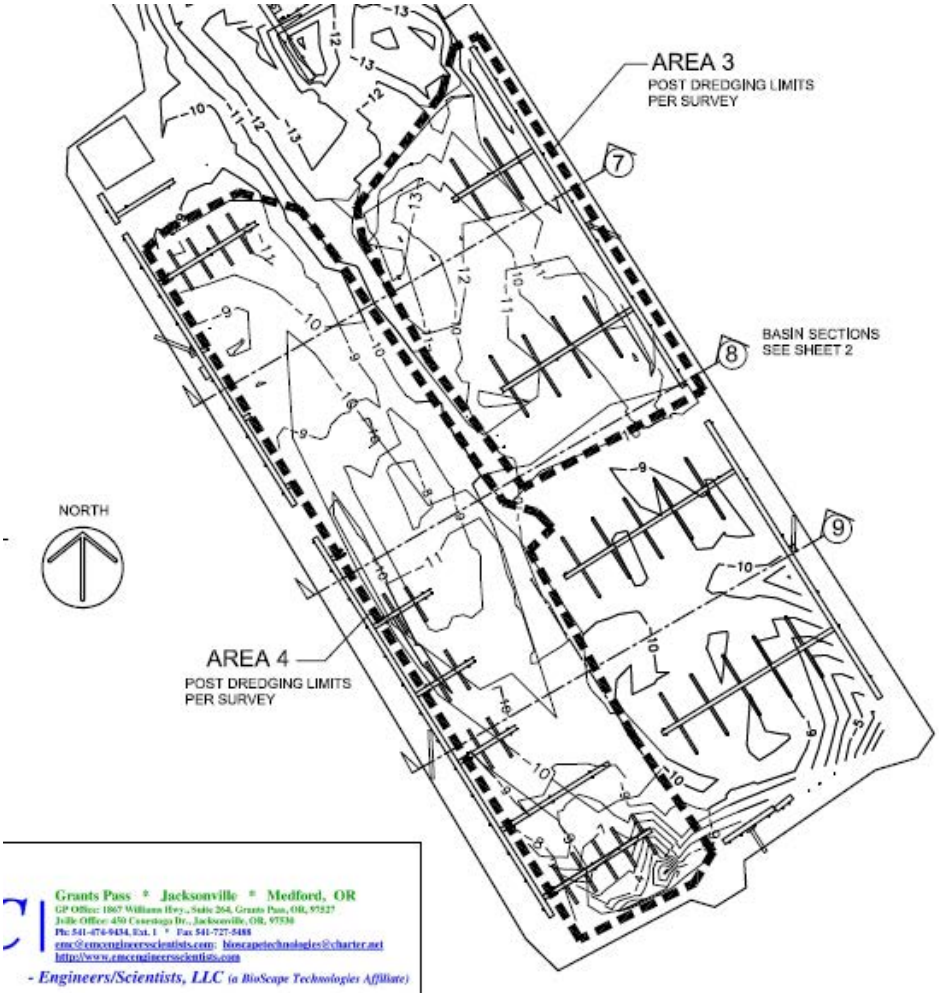
Area 1


1 (N.I.)
AREA 1
POST DREDGING LIMITS
PER SURVEY
2
3
POST DREDGING SURVEY DATA CONTOURS
PER EMC SURVEY
4

Area 2



Areas 3 & 4



Grants Pass * Jacksonville * Medford, OR
GP Office: 1867 Williams Hwy., Suite 264, Grants Pass, OR, 97527
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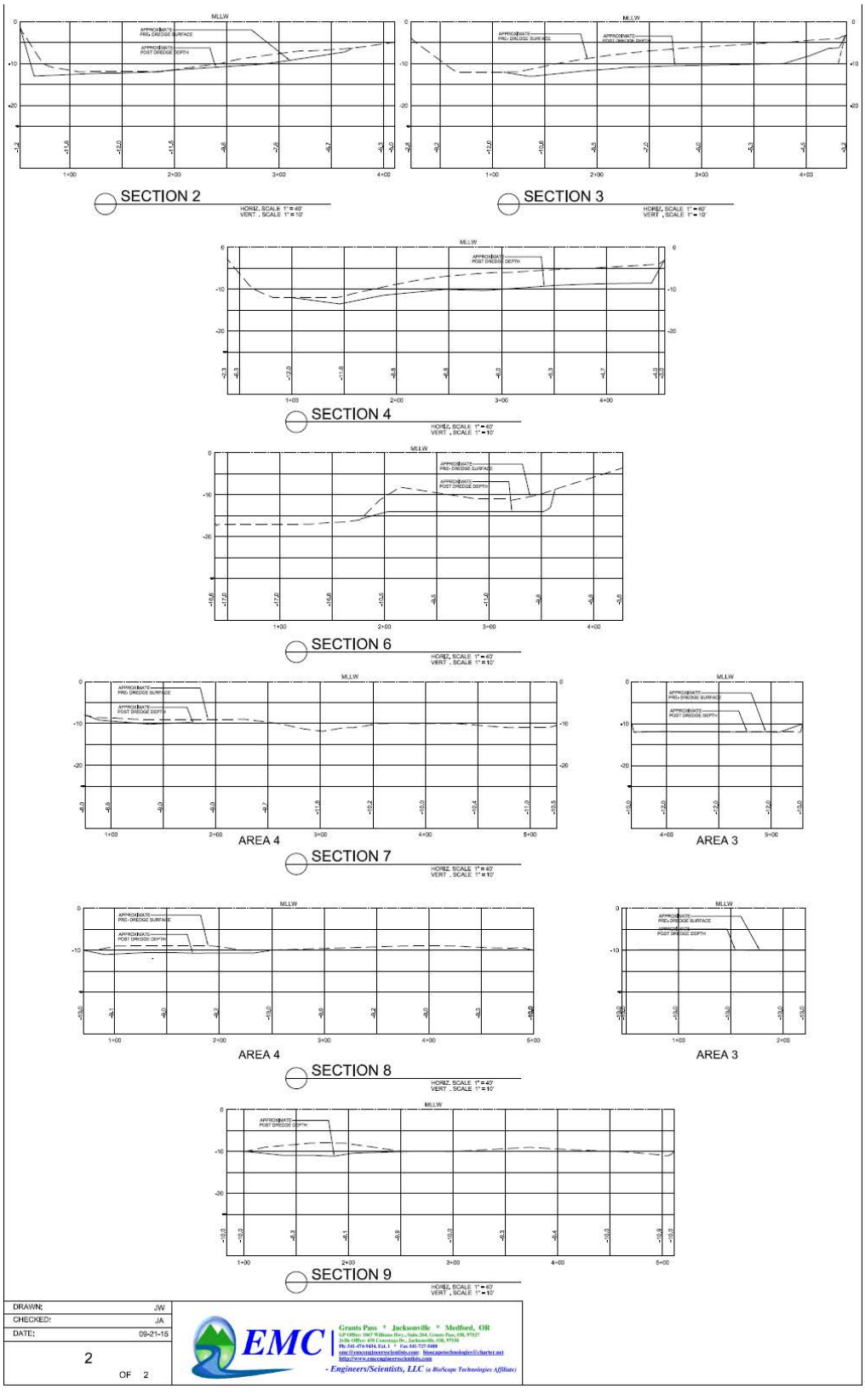
Ph: 541-474-9434, Ext. 1 * Fax 541-727-5488
emc@emcengineersscientists.com; biscapetechnologies@charter.net
http://www.emcengineersscientists.com
- Engineers/Scientists, LLC (a BioScape Technologies Affiliate)

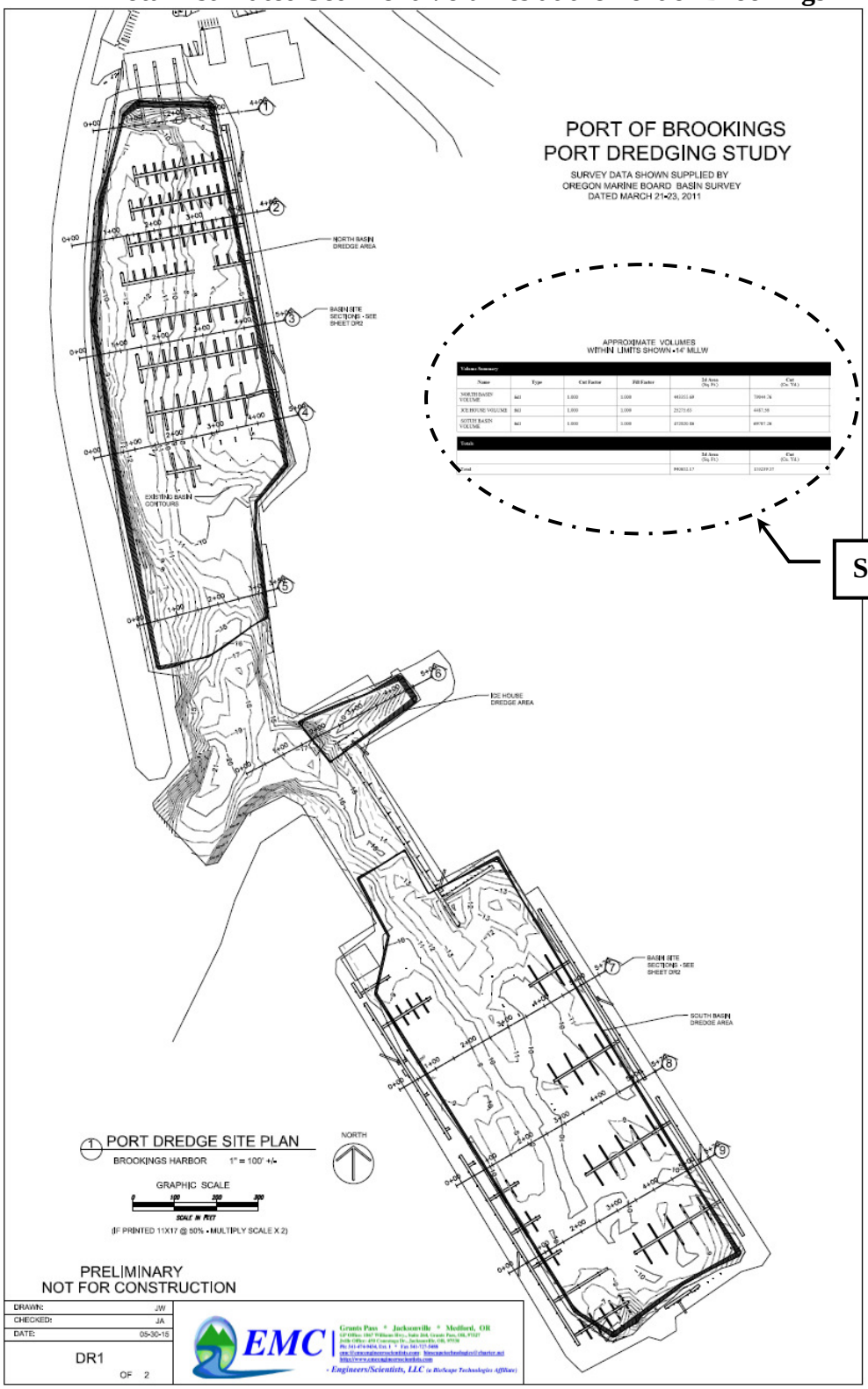
Prisms 2 - 9



9

9-20-15

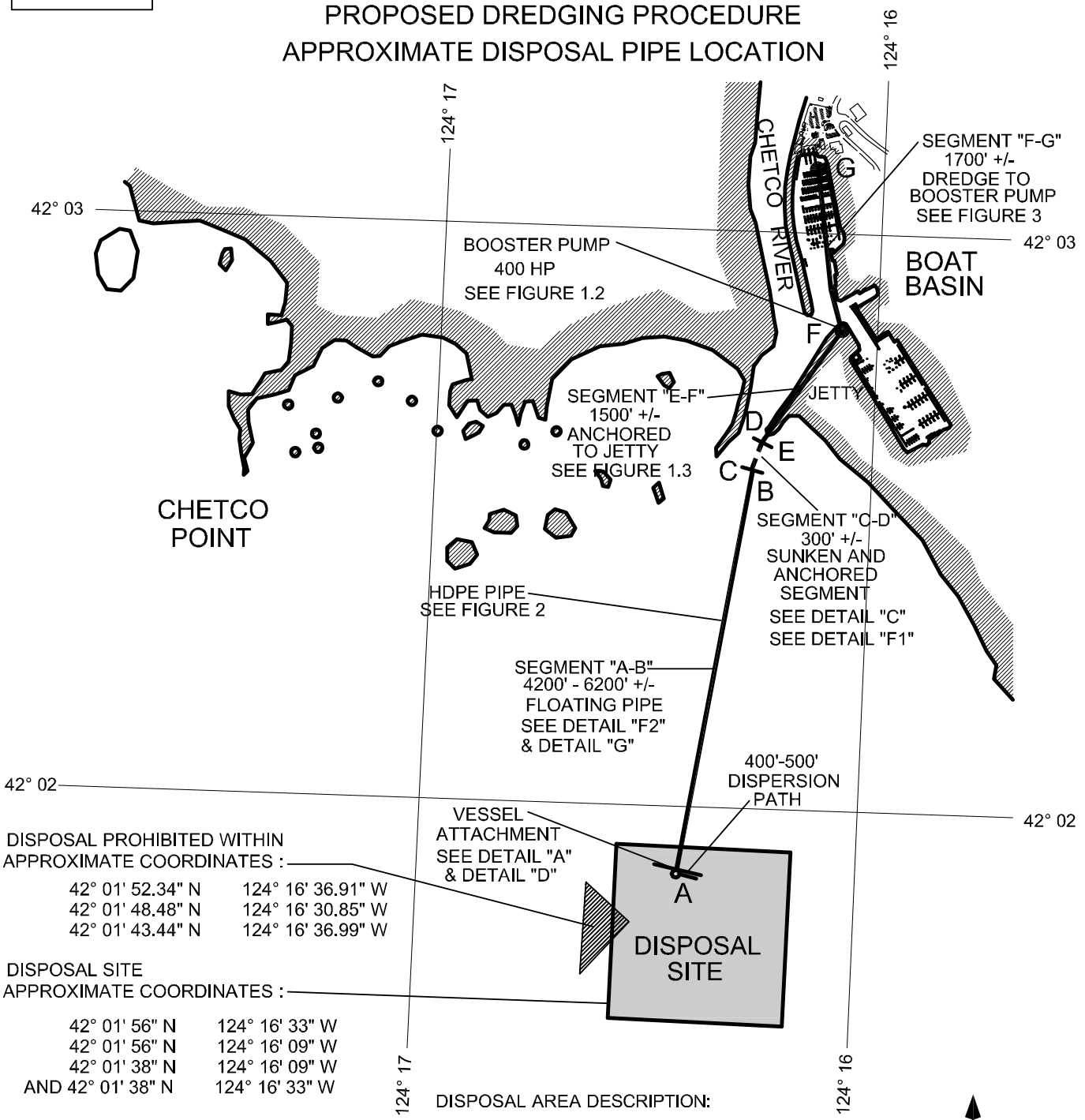
Total Estimated Sediment Volumes at the Port of Brookings



See Page 11

FIGURE 1

PORT OF BROOKINGS
PROPOSED DREDGING PROCEDURE
APPROXIMATE DISPOSAL PIPE LOCATION



DISPOSAL PROHIBITED WITHIN
APPROXIMATE COORDINATES :

42° 01' 52.34" N	124° 16' 36.91" W
42° 01' 48.48" N	124° 16' 30.85" W
42° 01' 43.44" N	124° 16' 36.99" W

DISPOSAL SITE
APPROXIMATE COORDINATES :

42° 01' 56" N	124° 16' 33" W
42° 01' 56" N	124° 16' 09" W
42° 01' 38" N	124° 16' 09" W
AND 42° 01' 38" N	124° 16' 33" W

DISPOSAL AREA DESCRIPTION:

THE APPROXIMATE LOCATION OF THIS SITE IS ONE MILE FROM THE CHETCO RIVER ENTRANCE, WITH DIMENSIONS OF 1800 FEET BY 1800 FEET AND AVERAGE DEPTH OF 70 FEET. THE SITE OCCUPIES APPROXIMATELY 74 ACRES (0.08 NAUTICAL MILES).

INFORMATION SOURCE:

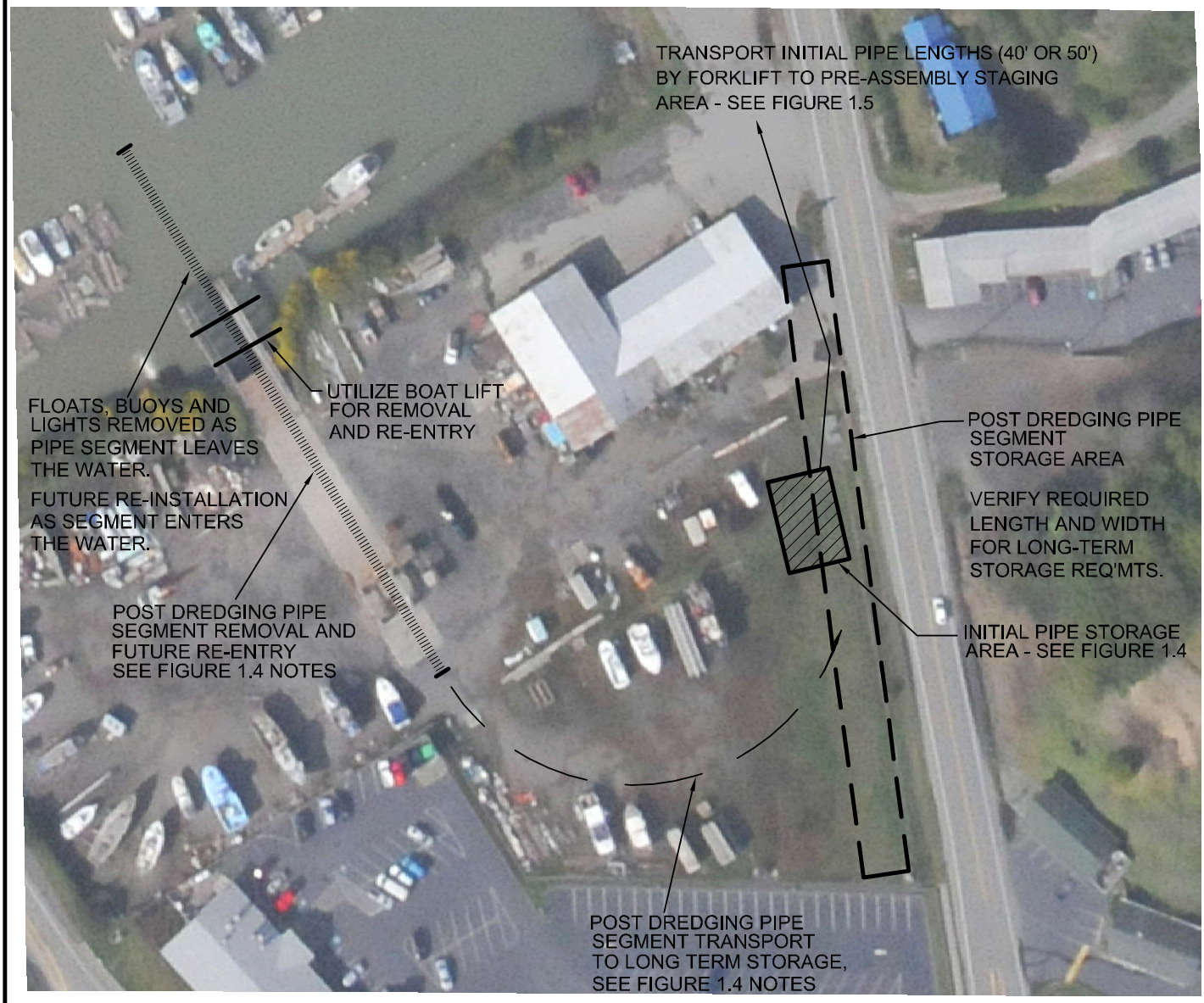
EPA DOCUMENT ENTITLED:
CHECTO, OCEAN DREDGED MATERIAL DISPOSAL SITE DESIGNATION - DRAFT ENVIRONMENTAL IMPACT STATEMENT
DATED: OCTOBER, 1989

Environmental Management Consultants - Engineers/Scientists, LLC (a BioScape Technologies Affiliate)
724 S. Central Avenue, Suite 106, Medford, OR 97501
Ph: 541-261-9929 * Fax 541-727-5488
emc@emcengineersscientists.com
http://www.emcengineersscientists.com

BROOKINGS HARBOR 1" =1500' +/-
04-23-12

0 750 1500 3000

FIGURE 1.4



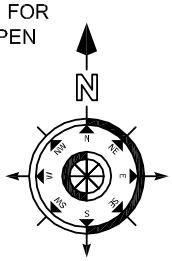
PROJECT CLOSURE NOTES:

1. DISCONNECT 2 X (?) 400' LENGTHS ?, INCLUDING ANCHORS AND BUOYS, AND PULL THEM TO THE BOAT LIFT.
2. DISCONNECT THE FLOATS, PICK UP PIPE END WITH BOAT LIFT, AND DRAG 400' LENGTHS TO A STORAGE AREA IN THE BOAT YARD, PERHAPS ALONG SOUTH BOUNDING FENCE LINE - BEGIN WITH THE HARBOR LINE, FIRST DISCONNECTING THE PIPE FROM THE BOOSTER PUMP INLET, THEN THE OPEN OCEAN LINE.
3. DISCONNECT 400' LENGTHS AT JETTY.
4. DISCONNECT BOOSTER PUMP OUTLET PIPE CONNECTION.
5. TALK ABOUT TRANSPORTING METHODS (CUT UP TO LENGTHS FOR FORKLIFTING, OR DRAG EASTWARD ALONG TOP OF JETTY INTO HARBOR AFTER BOOSTER PUMP REMOVAL, WE'LL HAVE TO DISCUSS...WE MAY WANT TO REDUCE SECTION SIZES BY USING MORE FLANGES.
6. REMOVE BOOSTER PUMP AND PLACE IN BOAT YARD.

FUTURE PROJECT NOTES:

1. DRAG 400' SECTION ACROSS YARD AND PUT IN WATER WEST OF OUTFALL AND BOAT LIFT (MAY REDUCE DRAG DISTANCE BY STORING PIPE CLOSER TO HARBOR), OR MIGHT DRAG AND PUT IN WATER WITH HELP OF BOAT LIFT, AND FINISH THE DRAGGING WITH A BOAT VESSEL.

2. REPEAT INSTALLATION PROCEDURES FOR BOOSTER PUMP, HARBOR LINE AND OPEN OCEAN LINE.



INITIAL PIPE STAGING AREA
POST DREDGING PIPE SEGMENT REMOVAL / STORAGE AREA
PORT OF BROOKINGS

BROOKINGS HARBOR 1" = 100' +/-
04-25-12

0 50 100 200

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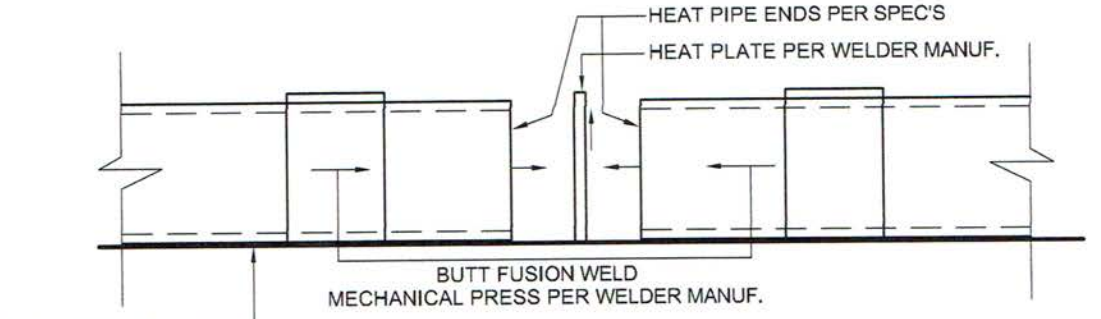
http://www.emcengineersscientists.com

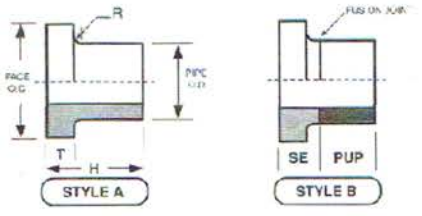
FIGURE A

PIPE SEGMENT ASSEMBLY DETAIL



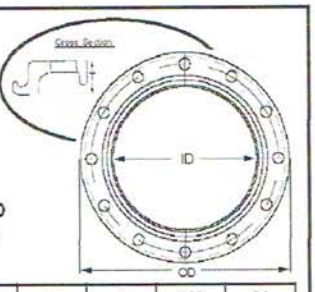
PIPE WELDING DETAIL

CONSULT WELDER MANUAL
FOR EXAMPLE OPERATIONS AND DETAILS.



- T must be at least 1.25 times pipe wall thickness for full pressure rating.
- The face diameter fits inside bolt circle to promote alignment and concentricity with sealing.
- H must be long enough to allow butt-fus on in applicable fusion machines, size on size or larger. Consult fusion machine manufacturers for their required minimum length.
- R must be matched to the radius of the metal bolting.
- Corrosion protected convoluted Bolt Rings for HDPE are recommended.
- Meet dimensions and requirements of ASTM F 2206, ASTM F 714, ASTM D 3035, AWWA C901/C906 and NEMA 61 standards as applicable.
- Flange adapters may be fused to same DR and to one standard DR higher. (i.e., DR-17 to DR-21)

DESIGN-FLOW®
Convoluted - Ductile Iron
IPS Bolt Rings
Designed Specifically for use with HDPE Flange Adapters*
ASME / ANSI B16.5, B16.47 Ser.A CL150
B16.1 CL125 AWWA C207 B,D & E
(Dimensions in Inches)
U.S. Patent # 7,401,821



12"	1.25 1.50	19.00	13.00	17.00	12	1"	150 275	24 25
14"	1.38 1.63	21.00	14.38	18.75	12	1-1/8"	150 275	29 35

WPR (working pressure rating) is for free-floating rings on HDPE flange adapters and includes a 2:1 safety factor. These are cast convoluted ductile iron metal bolt rings with 150# bolt-hole pattern; the material is in compliance with ASTM A536 GR 65/45/12 and surfaced in Bright Red oil based enamel paint.

INITIAL PIPE SEGMENT ASSEMBLY

NO SCALE

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- Engineers/Scientists, LLC a RiteScope Technologies Affiliate

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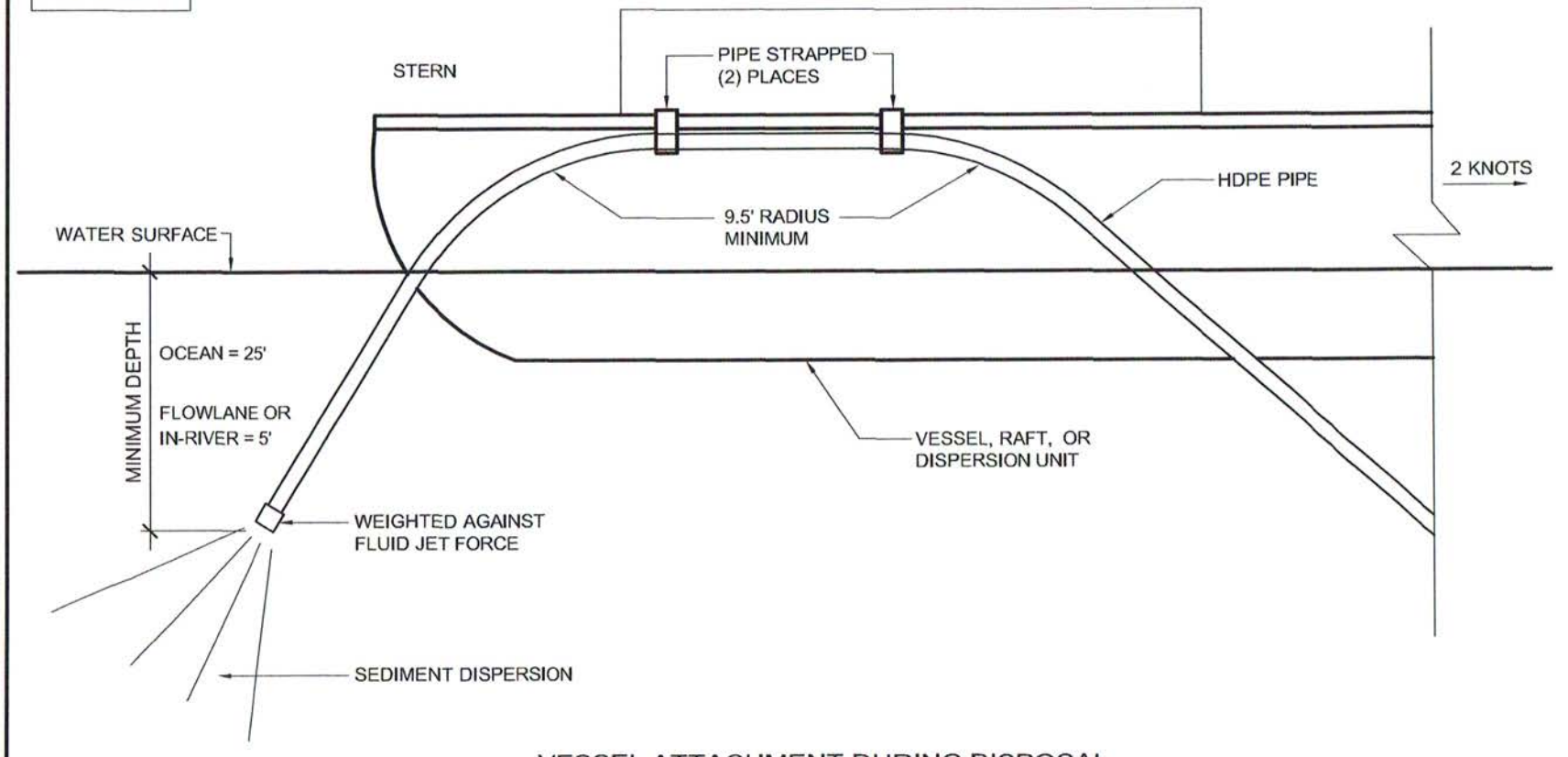
FIGURE B



VESSEL ATTACHMENT DURING DISPOSAL

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- Engineers/Scientists, LLC (a BioScape Technologies Affiliate)

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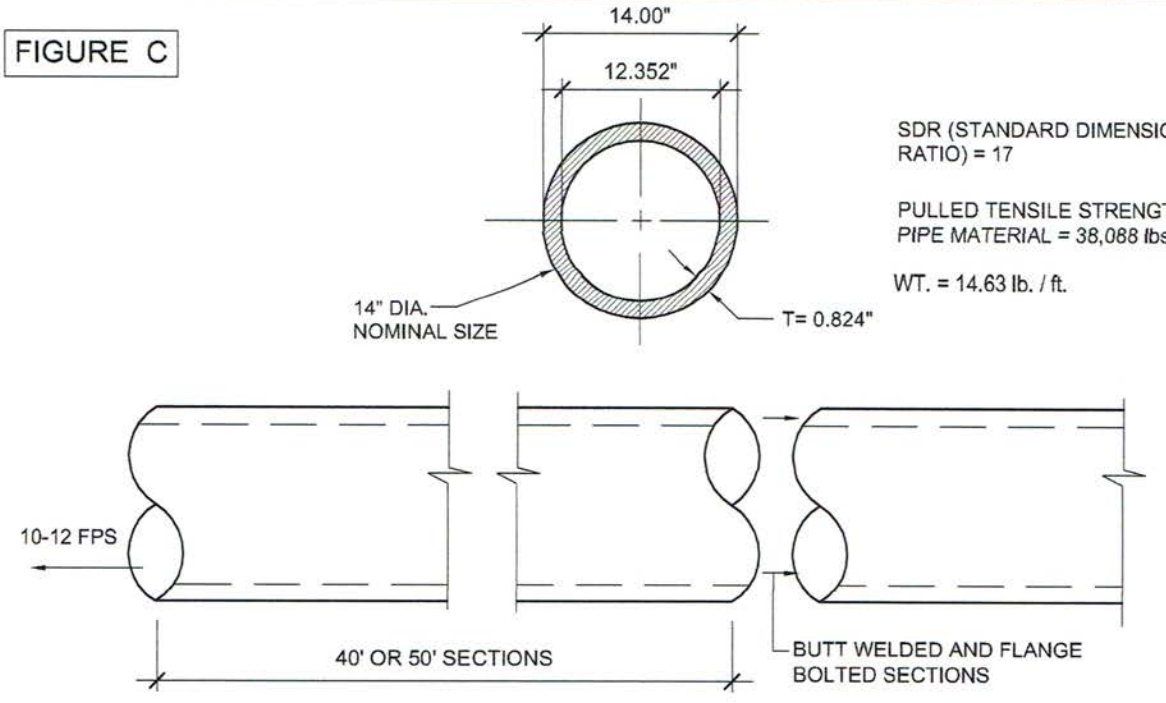
FIGURE C



PIPE DETAILS

PORT OF BROOKINGS

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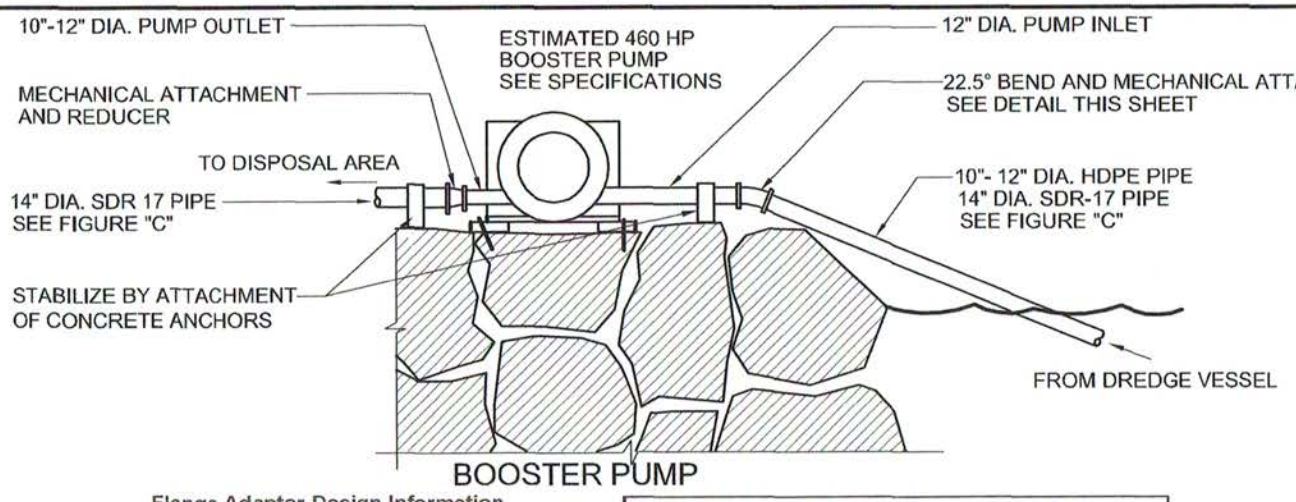
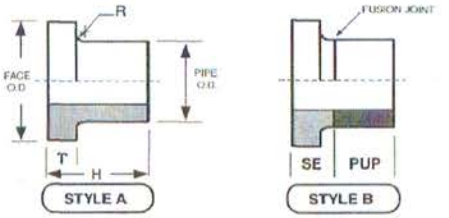
FIGURE D

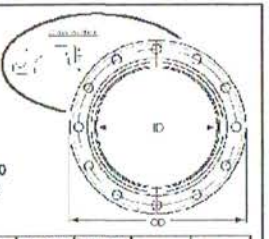


Flange Adapter Design Information



- T must be at least 1.25 times pipe wall thickness for full pressure rating.
- The face diameter fits inside bolt circle to promote alignment and concentricity, with sealing.
- H must be long enough to allow butt-fusion in all applicable fusion machines, size on size or larger. Consult fusion machine manufacturers for their required minimum length.
- R must be matched to the radius of the metal bolting.
- Corrosion protected convoluted Bolt Rings for HDPE are recommended.
- Meet dimensions and requirements of ASTM F 2206, ASTM F 714, ASTM D 3035, AWWA C901/C906 and NSF 61 standards as applicable.
- Flange adapters may be fused to same DR and to one standard DR higher. (i.e., DR-17 to DR-21)

DESIGN-FLOW
Convoluted - Ductile Iron
IPS Bolt Rings
Designed Specifically for use with HDPE Flange Adapters*
ASME / ANSI B16.5, B16.47 Sec.A CL150
B16.1 CL125 AWWA C207 B,D & E
(Dimensions in Inches)
U.S. Patent # 7,681,921



IPS Nominal Size	T (Thickness)	OD	ID	Bolt Hole Circle	Number Of Bolt Holes	Diameter Of Bolt Holes	WPR (psig)	Weight (lbs)
3/4"	53	3.88	1.11	2.75	4	5/8"	275	1.3
1"	53	4.25	1.38	3.13	4	5/8"	275	1.2
1 1/4"	65	4.63	1.72	3.50	4	5/8"	275	1.5
1 1/2"	69	5.00	1.97	3.88	4	5/8"	275	1.8
2"	75	6.00	2.50	4.69	4	3/4"	275	2.7
3"	94	7.50	3.63	6.00	4	3/4"	275	4.0
4"	84	9.00	4.63	7.50	8	3/4"	275	5.5
6"	84	10.00	6.65	8.50	8	7/8"	275	6.3
8"	120	11.20	8.70	9.50	8	7/8"	275	7.5
8"	119	13.50	8.75	11.75	8	7/8"	275	12
10"	119	16.00	10.94	14.25	12	1"	275	15
12"	125 -.06	19.00	13.00	17.00	12	1"	160 275	24 25
14"	138 -.06	21.00	14.56	18.75	12	1 1/8"	160 275	29 35

WPR (working pressure rating) is for free-floating rings on HDPE flange adapters and includes a 2.1 safety factor. These are cast convoluted ductile iron metal bolt rings with 150# bolt hole pattern; the material is in compliance with ASTM A536 GR 65-45-12 and surfaced in Bright Red calbased enamel paint

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BOOSTER PUMP DETAILS
PORT OF BROOKINGS

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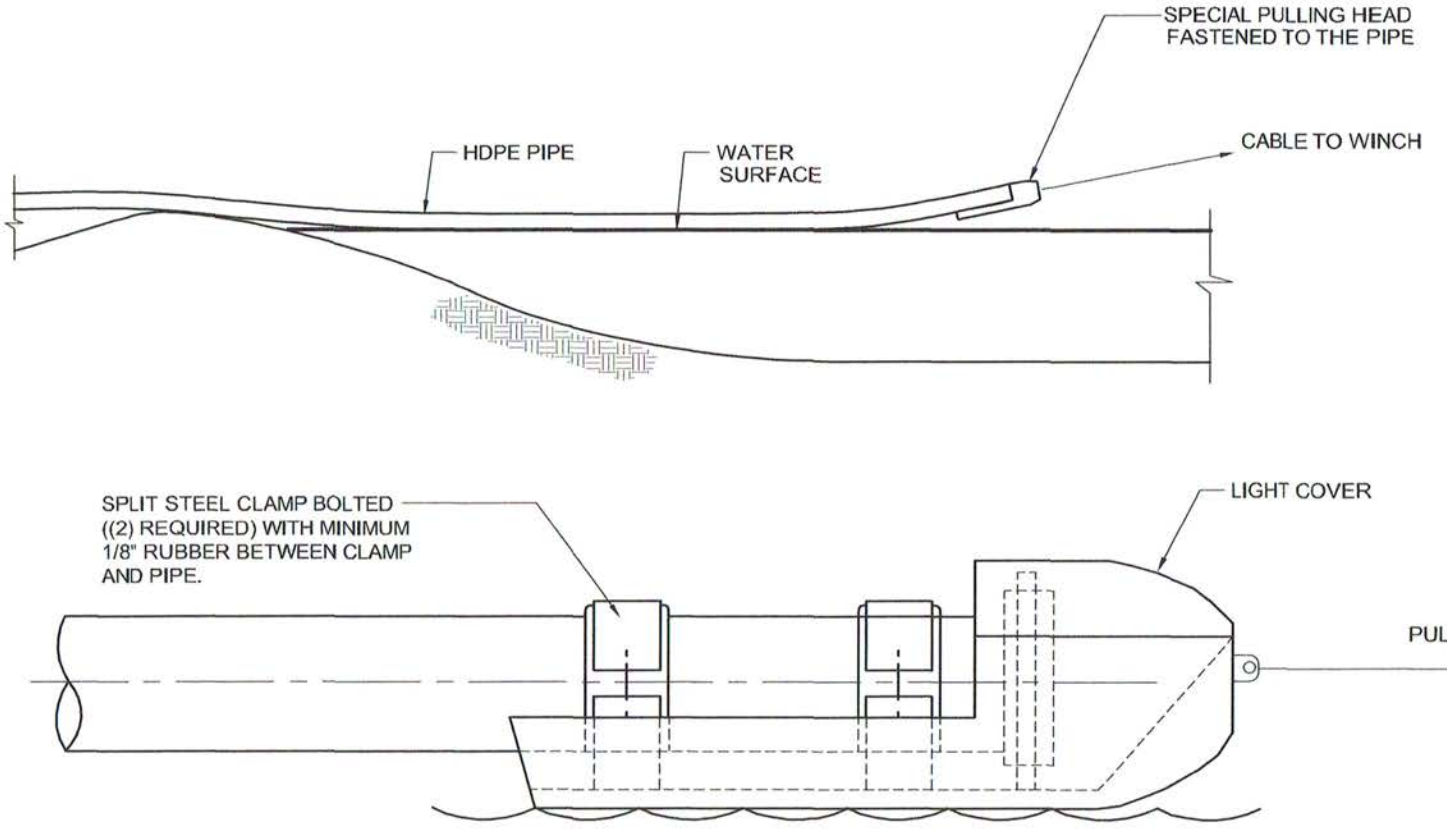
FIGURE F



FLOATING PULL INSTALLATION OF HDPE PIPE

(TO BE USED USED AS NECESSARY)

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