ATTACHMENT II

Project	I-64 Hampton Roads Bridge-Tunnel, Norfolk, VA
To	Hampton Roads Connector Partners (HRCP)
From	HDR/Mott MacDonald JV
Subject	Addendum to the Baseline Characterization Environmental Sampling and Analysis Plan- Phase I - On Island Source Materials for On-site Reuse and/or Off-site Disposal – DRAFT
Date	July 29, 2019
Attachments	Figure 1- HRBT Design Segment Map, May 2019 Figure 2 through 5- Environmental Sampling Locations per segment Table 1 – Boring Designations, Depths and Quantities Attachment A – HR-SOP-HW-03, Management of Excavated and Imported Soils SOP

1. PROJECT OVERVIEW

The scope of work addressed in this plan outlines the sampling strategy and analysis of materials expected to be encountered during roadway expansion and overland bridges portion of the I-64 Hampton Roads Bridge Tunnel Project (HRBT). This scope covers preliminary characterization of upland soils that may need to be excavated during roadway expansion (cuts), and for stormwater management measures along the alignment. The preliminary soil characterization results will be used as a baseline to determine re-use or off-site disposal requirements in accordance with the Virginia Solid Waste Management Regulations (VSWMR). This plan focuses on the materials that are anticipated to be displaced and /or generated during the highway expansion and bridge construction alone and serves as an Addendum to the Baseline Characterization Environmental Sampling and Analysis Plan (Phase I sampling plan), dated May 2019.

It should be emphasized that this plan is to provide preliminary data to evaluate potential reuse of soils on-site or disposal/reuse off-site and does not cover additional analyses that disposal facilities or regulatory agencies may require for acceptance. Additional analyses, if required, will be performed on excavated soils that are in excess and cannot be reused at the site prior to removal.

2. ENVIRONMENTAL SCOPE OF WORK

Soil excavation activities are anticipated during roadway expansion and for stormwater management plans to be implemented. The purpose of this sampling plan is to characterize soils in proposed excavation areas that have the potential to be re-utilized as fill within the project limits during roadway expansion. The project limits is defined as the I-64 corridor between Settlers Landing in Hampton and I-564 in Norfolk, VA. If any of the excess soils cannot be re-used on site, the characterization testing results will be used to determine off-site disposal at an appropriate permitted facility or landfill, or re-use offsite in accordance with Virginia Department of Environmental Quality (DEQ) guidance document #LPR-SW-02-2012 and #LPR-SW-04-2012. Excavation cuts are identified in the Draft Proposed Impacts to WOUS drawings, dated July 2019.

A geotechnical exploration program will be performed by HDR's subcontracted drillers in accordance with the Geotechnical Exploration Plan (GEP), Landside Program, dated May 2019. The GEP proposes a total of 528 geotechnical boring locations along the design corridor which is divided into five (5) segments. The segments that will be covered during this investigation are highlighted in yellow in Figure 1.

The environmental scope of work includes providing field oversight and collecting environmental soil samples from select geotechnical boring locations. The geotechnical driller will be responsible for all permitting, landowner notifications, boring layout, utility coordination and clearances. The geotechnical

driller will handle any investigation derived waste, and decontamination procedures, as necessary. The geotechnical driller will work with the environmental subcontractor to collect soil samples required for environmental data.

Environmental soil samples will be screened at 71 of the geotechnical boring locations which are identified on Table 1 and located on Figure 2 through Figure 5. Soils will be sampled based on the sample collection plan described in Section 3.0.

The boring locations where environmental data will be collected were selected based on the following:

- Areas of proposed excavation that are located in or adjacent to areas of potential environmental concerns (PECs), identified in the Updated Hazardous Materials Technical Memorandum, dated June 2018.
- All borings located within stormwater management (SWM) ponds to evaluate soil conditions at pond bottom.
- Evaluate soils in significant excavation/cut areas that will generate soil for reuse or off-site disposal.

Soil Characterization Criteria

Soils that will be evaluated to determine the potential suitability for on-site reuse, and reuse or disposal at offsite upland locations will be compared to the following criteria:

- Virginia DEQ state-wide variance criteria to determine management as fill on-site and on appropriate off-site locations (LPR-SW-04-2012)

Groundwater Sampling

No groundwater borings are currently proposed in this plan. Any groundwater sampling as part of dewatering activities during excavation will be performed under an Addendum at a later time.

3. SAMPLE COLLECTION PLAN

Hollow-stem auger drilling (up to 3.25-inch inner diameter) or mud-rotary drilling (up to 4-inch inner diameter), will be utilized by the geotechnical driller. Hand auger drilling techniques may also be used for specific locations where drilling rig access is difficult and shallow explorations are specified (less than approximately five feet).

Samples will be cut open and field screened for lithology, and evidence of contamination. Multi-point composite samples will be collected from each soil strata encountered to generate a representative sample. All samples will be collected in accordance with the applicable Virginia DEQ and USEPA regulations.

All analysis, methods, sample collection and frequency, etc. shall be conducted in accordance with EPA SW-846 Test Methods for Evaluating Solid Waste, Physical/ Chemical Methods. Soil samples will be transported to a Virginia Environmental Laboratory Accreditation Program (VELAP) certified laboratory.

The environmental subcontractor will observe drilling at 71 geotechnical boring locations (Figure 2 through 5) and field screen soils from the top of the boring to the groundwater table. Soil cores will be field screened with a photoionization detector (PID) and logged by the environmental subcontractor. Soils will be observed for visual and olfactory characteristics to determine the potential presence of contamination. Soils will be described by the environmental subcontractor and all observations of soil/fill characteristics and sample collection will be recorded in a field logbook.

Borings will be installed by the geotechnical subcontractor to depths ranging from 6 feet below surface grade to 35 feet below surface grade (bgs) (Table 1**,** attached). Groundwater is anticipated to be encountered at around 10 feet bgs. The borings will be advanced in 5-foot intervals. These depths correspond to the maximum depth of excavations for cut/fill and stormwater plans and/or based on potential impacts from environmental concerns identified adjacent to the alignment. The final locations and depths of the borings, are subject to change depending on design progress, field conditions/obstructions, and as approved by the agencies. Schedules will be coordinated with the geotechnical driller so that the environmental subcontractor is on site only for environmental sampling locations. A project contact list is provided on page 8 of this plan.

On-site/Off-site Beneficial Reuse and Off-site Upland Disposal Sampling

Disposal of excavated roadway material is expected to be minimal. Based on preliminary estimates, it is anticipated that approximately 30,000 cubic yards of soil may need to be excavated as part of roadway improvements. This preliminary sampling of soils during the geotechnical investigation is to anticipate future soil handling requirements and is by no means considered definitive. It is likely that for any petroleum contaminated soils (if encountered) or excess soils that cannot be reused at the site, disposal facilities will require additional analytical parameters not covered in this plan prior to removal from the site.

Only if visual/olfactory contamination and/or elevated PID readings (greater than 10 ppm) are observed, discrete soil samples will be collected in order to identify areas of contamination. One discrete soil sample per boring will be collected only if visual/olfactory contamination and/or elevated PID readings (greater than 10 ppm) are observed. The soil samples will be biased toward the interval displaying the highest degree of contamination based on visual and olfactory contamination and/or PID readings. Field personnel will be prepared to collect an estimated 71 discrete soil samples for TCL VOCs analysis in order to determine the presence of petroleum contamination in the vicinity of the alignment. In the absence of any indication of contamination, no discrete soil samples will be collected.

For any excess soil anticipated to be generated during construction activities from the HRBT project within Naval Station Norfolk, soils will be characterized in accordance with the August 2017 Standard Operating Procedure (SOP) for management of excavated and imported soils (HR-SOP-HW-03). As per the SOP, soils shall be analyzed as per Virginia DEQ guidance #LPR-SW-02-012.

Based on Virginia DEQ guidance document (#LPR-SW-02-2012), a minimum of one composite sample shall be analyzed for each required test for every 250 cubic yards of soil to be disposed. Additionally, for quantities of soil greater than 2,500 cubic yards the sampling rates may be adjusted with approval from Virginia DEQ. Since this investigation is meant to pre-characterize soils that may need to be excavated as part of the roadway improvement plans and does not necessarily reflect actual quantities that will need re-use or disposal, the following sampling frequency and analyses are proposed:

At a minimum, three composite samples will be collected in segment 1, seven composite samples will be collected in segment 3, three samples will be collected in segment 4, and two samples will be collected in segment 5 of the alignment. Refer Figure 1 for segments. One composite soil sample will be collected from each boring location identified in Table 1, which will assist in identifying potential end uses of the excavated material (reuse, offsite upland placement or disposal). Composite samples will consist of a whole core composite of the entire boring, which will be representative of the materials encountered during excavation activities. It is estimated that a total of 15 composite soil samples will be collected and analysed for a full list of analytical parameters to provide preliminary data. Table 1 provides the sampling quantities, and analytical groups covered in this investigation. No soil samples will be collected below the water table.

Analytical Parameters and Sample Labelling

Each sample will have a unique identification and will correspond to the geotechnical boring designation shown on Figures 2 through 5. Refer Table 1 for sample identification numbers to be used for the environmental samples.

Any discrete soil samples collected based on field screening results will be analysed for TCL VOCs. Sample depths will be provided in field notes, sample labels and on the chain of custody.

The following full list of analytical parameters were identified in accordance with Virginia DEQ guidance document (#LPR-SW-02-2012), Naval Station provided SOP (HR-SOP-HW-03) and minimum requirements by off-site disposal facilities/landfills. It should be noted that disposal facilities may require additional analytical parameters not covered by the DEQ guidance and this sampling plan prior to acceptance.

Site composite samples from boring locations identified in Table 1 will be analysed for a preliminary list of parameters including TAL metals, TCL VOCs (includes BTEX), TCL SVOCs, TCL pesticides/PCBs, dioxins/furans (2,3,7,8-TCDD and 2,3,7,8-TCDF only), TPH (DRO/GRO), and TOX. These results will be evaluated against Virginia DEQ state-wide variance criteria to determine management as fill on-site and on appropriate off-site locations (#LPR-SW-04-2012).

Since waste characterization sampling for parameters including but not limited to TCLP, and RCRA hazardous waste are driven by offsite disposal facility requirements and volume of soil that needs disposal, these analyses will be performed prior to removal of excavated soils. Any additional sampling required by regulatory agencies or offsite disposal facilities that are not covered in this plan will be provided in an Addendum and performed on excavated soils prior to removal/reuse.

Quality Control Samples and Blanks

Quality control samples will be collected and analyzed as presented in the following table:

QC Sample	Frequency	Analysis
Sample Duplicates	1 per every 20 samples analysed (total 4 duplicates estimated)	TCL VOCs (includes BTEX), TCL SVOCs, TCL pesticides/PCBs, and TAL metals
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	1 per every 20 samples analysed or 1 per sample delivery group (total 4 MS/MSDs estimated)	TAL Metals

Collection of duplicate samples provides for the evaluation of the laboratory's and sampler's performance by comparing the analytical results of two samples from the same location. The sample name must not indicate which sample has been duplicated. Duplicate requirements may be waived or expanded depending on the particular regulatory program or remedial phase involved.

A matrix spike/matrix spike duplicate is an aliquot of a field sample that is fortified with the analyte(s) of interest and analyzed to monitor matrix effects associated with a particular sample. Samples to be spiked will be determined in advance to allow for collection and submittal of additional volume samples. Note that additional volume shall be collected for MS/MSD samples and samples will be identified as such.

3.1. Sampling Equipment Decontamination

Sample collection and compositing equipment must be decontaminated if it will be reused to maintain the integrity of the sample and avoid cross-contamination between samples. In the majority of the instances, stainless-steel trowels and mixing bowls will be dedicated per sample. Larger mixing devices will be decontaminated as follows:

- Rinse with deionized (DI) water
- Rinse with 10 percent nitric acid (HNO_3)
- Rinse with distilled or DI water
- Rinse with methanol followed by hexane
- Rinse with DI water
- Air dry (area away from decontamination area)

All sample collection devices/storage containers will be laboratory cleaned, packaged, and dedicated for exclusive use at one sampling location for that day.

3.2. Documentation

Field notebooks will be bound with numbered pages. Any pertinent information regarding the site and the sampling procedures will be documented. Entries made in these notebooks must note the date and time. Information recorded in these notebooks will include:

- Name of the individual making the entry;
- Date and time of arrival and departure at the site;
- Location of the samples taken;
- The method of collection;
- Numbers of samples taken;
- Date and time of collection;
- Sample identification number(s);
- Any field instrument calibration performed and/or instrument readings; and,
- Weather conditions on the day of sampling and any field observations.

For soil sampling, the following additional information will be entered into the field book:

- Boring ID number;
- Sample depth intervals;
- Photo-ionization detector (PID) readings for volatile organic compounds; and,
- Description of lithology.

Photo documentation will be made of grossly contaminated soils and others as applicable with photo description, time and date photo was taken, photo location, and direction (as applicable) of photo all to be recorded in the field notebook.

3.3. Field Instrumentation

Field instrumentation will be operated in accordance with the manufacturer's instructions for PID. Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications. The calibration and internal standards shall meet all criteria specified in the referenced analytical method.

Calibration of field instruments and equipment will be performed as specified by the manufacturer or more frequently as conditions dictate. The minimum calibration of field instrumentation is once at the beginning of each day, as necessary.

Records of calibration, repair or replacement will be filed and maintained by the designated personnel performing quality control activities. Calibration records of the assigned laboratory will be filed and maintained at the laboratory location where the work is performed and subject to QA audit.

Calibration procedures, calibration check procedures, proper usage, data recording, preventative maintenance are provided in the specified manufacturer's operation manual.

Instrument	Activity	Frequency	Accuracy	Corrective Action
RAE Systems MiniRAE 3000 Photo Ionization Detector (PID)	Calibration on-site	Beginning and end of day, and as needed.	±3%	Re-calibrate using manufacturer's instructions and recheck with isobutylene gas; replace if faulty

Field sampling data will be evaluated by the Field Team Leader and or the Project Manager Coordinator, based on their judgment of the representativeness of sample, maintenance and cleanliness of the sampling equipment and adherence to the approved collection procedure.

3.4. Sample Quality Assurance and Deliverables

The purpose of sample quality assurance is to document the identity of the sample and its handling from collection until delivery to the laboratory, at which point the laboratory's internal quality assurance procedures are implemented. All materials such as field logbooks, boring logs with field screening results, sample locations, laboratory data records, reports, chain of custody records and instrument printouts will be clearly labelled and provided to HDR.

Sample Identification

Each sample will be identified using a sample label marked on the container in permanent marker containing the following information:

- Project name and number;
- Sample number;
- Sample depth;
- Analysis;
- Preservative;
- Date;
- Time; and,
- Sampler's name / initials.

Prior to going into the field, this sample identification procedure will be further refined (if needed), so that a sample is accurately and easily identified.

The sample label contains the authoritative information for the sample. Inconsistencies with other documents will be settled in favor of the vial or container label unless otherwise corrected in writing by the person who collected the samples.

Sample Handling

Sample containers will be placed in a secured refrigerated cooler (cooled to 4°C) immediately following collection and labelling. Samples will be packed to prevent containers from breaking.

Chain-of-Custody

The objective of the chain-of-custody procedure is to document the history of each sample and its handling. Custody records trace a sample from its collection through all transfers of custody until it is transferred to the laboratory. Samples are considered to be in custody if they are within sight of the individual responsible for their security or locked in a secure location. Each person who takes possession of the samples is responsible for sample integrity and safekeeping.

Chain-of-custody procedures are provided below:

- The chain-of-custody form is completed at the time of sample collection. The sample identification number, sampling location, depth, date, time and analysis requested are recorded on the form;
- The sampling team will check the sample numbers on the individual jars against the chain of custody form; and,
- Field samplers are responsible for the care and custody of the samples collected until the samples are transferred to another party.

Samples are packaged for shipment and delivered to the Virginia DEQ-certified laboratory within two days of sampling. A copy of the chain-of-custody form is retained by the sampling team for the project file and the original is sent with the samples. Internal laboratory records then document the custody of the sample through its final deposition.

Sample Storage

Standard procedures are employed both in the field and in the laboratory to maintain the integrity of the sample custody. Such procedures include the tagging of all sample containers, the use of custody seals where applicable, the use of chain of custody forms and standard schedule, and control and security procedures within the laboratory.

4. LABORATORY OPERATIONS AND DATA DELIVERABLES

All samples will be analysed by a Virginia Environmental Laboratory Accreditation Program (VELAP) certified laboratory.

The laboratory will report all non-conformance results and the reason for the non-conformance so that a determination may be made as to the reliability of the data. Subcontractor will confirm that deliverables from the laboratory will be sufficient for data validation at another date, if needed. The data packages will be reviewed for completeness.

Validation may be performed on the data but will be limited to holding times and QC results, as summarized on the forms from the laboratory. If required, validation actions will be in accordance with the EPA Region III data validation protocol.

5. KEY STAFF

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Waste characterization for soil sampling on the Naval Station property will be coordinated with the Waste Media Manager, Candice Sylvan (at 757-341-0659 or at candice.sylvan1@navy.mil).

As previously noted throughout this document, sampling proposed in this Addendum to the Phase I sampling plan is being performed to obtain preliminary soil characterization data from material that will be excavated as part of the construction of the roadway expansion and bridge installations. The data will be utilized to identify potential end uses for the material which could include, but may not be limited to, onsite reuse, offsite upland placement or disposal at a landfill. This plan is solely meant to assist in future planning and based on the results, may require additional sampling to fulfil regulatory requirements. The August 2017 SOP for management of excavated and imported soils (HR-SOP-HW-03) in the Commonwealth of Virginia is included in Attachment A and will be used as a reference to determine soil end-use. Upon the receipt of the data, and once an end use is selected, a meeting with the regulatory agencies will be held to provide the background data generated and to obtain guidance from those agencies for the need for additional sampling, associated sample frequency and required analyses.

Table 1
Boring Designations, Depths, and Quantities

Geotechnical Boring Information			Quantities					
Segment	**Geotech Boring ID[1, 2]**	**Boring Depth (ft bgs)**	**Discrete Soil Analyticals**	**Composite Soil Analyticals[3]**	**Composite Samples for Full list of analyticals**	**Duplicate Samples**	**MS/MSDs**	**Total Estd Samples**
1	1B-SWMMBO-001	25	One Discrete soil sample per boring will be sampled only for TCL VOCs if visual/olfactory contamination and PID readings > 10 ppm.	TAL metals, TCL VOCs (includes BTEX), TCL SVOCs, TCL Pesticides/PCBs, TPH (DRO/GRO), Dioxins/Furans (2,3,7,8-TCDD and 2,3,7,8-TCDF) and TOX	3 samples (1B-SWMWBO-002, 1B-RWWBR-010, 1B-SWWBO-024)	1 per 20 samples (1)	1 per 20 samples (1)	5
1	**1B-SWMMBO-002/CS**	25						
1	1B-RWEBR-006	25						
1	1B-WEBO-029F	10						
1	1B-RWWBR-008	25						
1	1B-WEBR-030A	6						
1	1B-WSBI-031A	6						
1	**1B-RWWBR-010/CS**	25						
1	1B-WEBR-036A	6						
1	1B-WEBR-038A	6						
1	**1B-SWWBO-024/CS**	35						
1	1B-WEBI-042C	10						
1	1B-WWBO-044F	6						
1	1B-WEBO-043C	10						
1	1B-WWBI-045C	8						
3	**3B-WEBO-049F/CS**	15	One Discrete soil sample per boring will be sampled only for TCL VOCs if visual/olfactory contamination and PID readings > 10 ppm.	TAL metals, TCL VOCs (includes BTEX), TCL SVOCs, TCL Pesticides/PCBs, TPH (DRO/GRO), Dioxins/Furans (2,3,7,8-TCDD and 2,3,7,8-TCDF) and TOX	7 samples (3B-WEBO-049F, 3B-WEBI-065F, 3B-RWEBO-027, 3B-WEBI-077A, 3B-WEBO-188A, 3B-SWMEBO-006, 3B-WEBI-104A)	1 per 20 samples (estd 1)	1 per 20 samples (estd 1)	9
3	3B-SWEBO-026	35						
3	3B-WWBI-062F	10						
3	3B-WWBI-064F	10						
3	**3B-WEBI-065F/CS**	10						
3	3B-WWBI-066F	10						
3	**3B-RWEBO-027/CS**	25						
3	3B-RWEBO-032	25						
3	3B-WEBI-072A	6						
3	3B-RWEBO-036	25						
3	3B-WWBI-073A	6						
3	3B-RWEBO-040	25						
3	3B-WEBO-076A	6						
3	**3B-WEBI-077A/CS**	6						
3	3B-WWBI-078A	6						
3	3B-WEBI-079A	6						
3	3B-WEBO-187F	6						
3	**3B-WEBO-188A/CS**	6						
3	3B-WEBO-082A	6						
3	3B-WEBI-084A	6						
3	3B-WWBI-085F	10						
3	3B-WEBI-089A	6						
3	3B-WWBI-092C	10						
3	3B-WEBI-094A	6						
3	3B-WWBI-095C	10						
3	**3B-SWMEBO-006/CS**	25						
3	3B-SWMEBO-003	25						
3	3B-WEBI-098A	6						
3	3B-WWBI-099F	10						
3	3B-WEBI-101A	6						
3	3B-WWBI-103F	10						
3	3B-WEBI-106A	6						
3	3B-WWBI-105F	10						
3	**3B-WEBI-104A/CS**	6						
3	3B-WEBI-108A	6						
3	3B-WWBI-109F	10						
3	3B-WWBI-112F	10						
3	3B-WWBI-116F	10						

Table 1
Boring Designations, Depths, and Quantities

Geotechnical Boring Information			Quantities					
Segment	**Geotech Boring ID[1, 2]**	**Boring Depth (ft bgs)**	**Discrete Soil Analyticals**	**Composite Soil Analyticals[3]**	**Composite Samples for Full list of analyticals**	**Duplicate Samples**	**MS/MSDs**	**Total Estd Samples**
Geotechnical Boring Information								
Segment	**Geotech Boring ID[1]**	**Boring Depth (ft bgs)**	**Analyte/Analytical Group**	**Full List of Analytes for Select Samples**	**Composite Samples for Full list of analyticals[5]**	**Duplicate Samples**	**MS/MSDs**	**Total Estd Samples**
4	4B-WWBI-119F	10	One Discrete soil sample per boring will be sampled only for TCL VOCs if visual/olfactory contamination and PID readings > 10 ppm.	TAL metals, TCL VOCs (includes BTEX), TCL SVOCs, TCL Pesticides/PCBs, TPH (DRO/GRO), Dioxins/Furans (2,3,7,8-TCDD and 2,3,7,8-TCDF) and TOX	3 samples (4B-WWBI-123A, 4B-WEBI-133A, 4B-WEBI-150F)	1 per 20 samples (1)	1 per 20 samples (1)	5
4	**4B-WWBI-123A/CS**	6						
4	4B-WWBI-129F	10						
4	4B-WEBI-130A/CS	6						
4	4B-WEBI-132A	6						
4	**4B-WEBI-133A/CS**	6						
4	4B-WEBI-135A	6						
4	4B-WEBI-136A	6						
4	4B-WEBI-139A	6						
4	4B-WEBI-149A	6						
4	**4B-WEBI-150F/CS**	10						
5	5B-WEBI-151A	6	One Discrete soil sample per boring will be sampled only for TCL VOCs if visual/olfactory contamination and PID readings > 10 ppm.	TAL metals, TCL VOCs (includes BTEX), TCL SVOCs, TCL Pesticides/PCBs, TPH (DRO/GRO), Dioxins/Furans (2,3,7,8-TCDD and 2,3,7,8-TCDF) and TOX	2 samples (5B-WEBO-189A, 5B-WEBR-172F)	1 per 20 samples (1)	1 per 20 samples (1)	4
5	5B-WWBO-152F	10						
5	5B-WWBI-157F	10						
5	**5B-WEBO-189A/CS**	10						
5	5B-WEBI-158F	10						
5	5B-WWB0-168F	10						
5	**5B-WEBR-172F/CS**	10						

Notes:
1. Geotechnical Boring IDs and depths referenced from May 2019 Geotechnical Exploration Plan
2. CS designations for composite soil samples. Discrete soil samples (if collected) shall be identified with boring designation and sampling depth interval.
3. Disposal facilities may require additional analyses not covered in this plan prior to off-site disposal.

Acronyms:
ID- identification
bgs- below grade surface
CS- composite soil sample

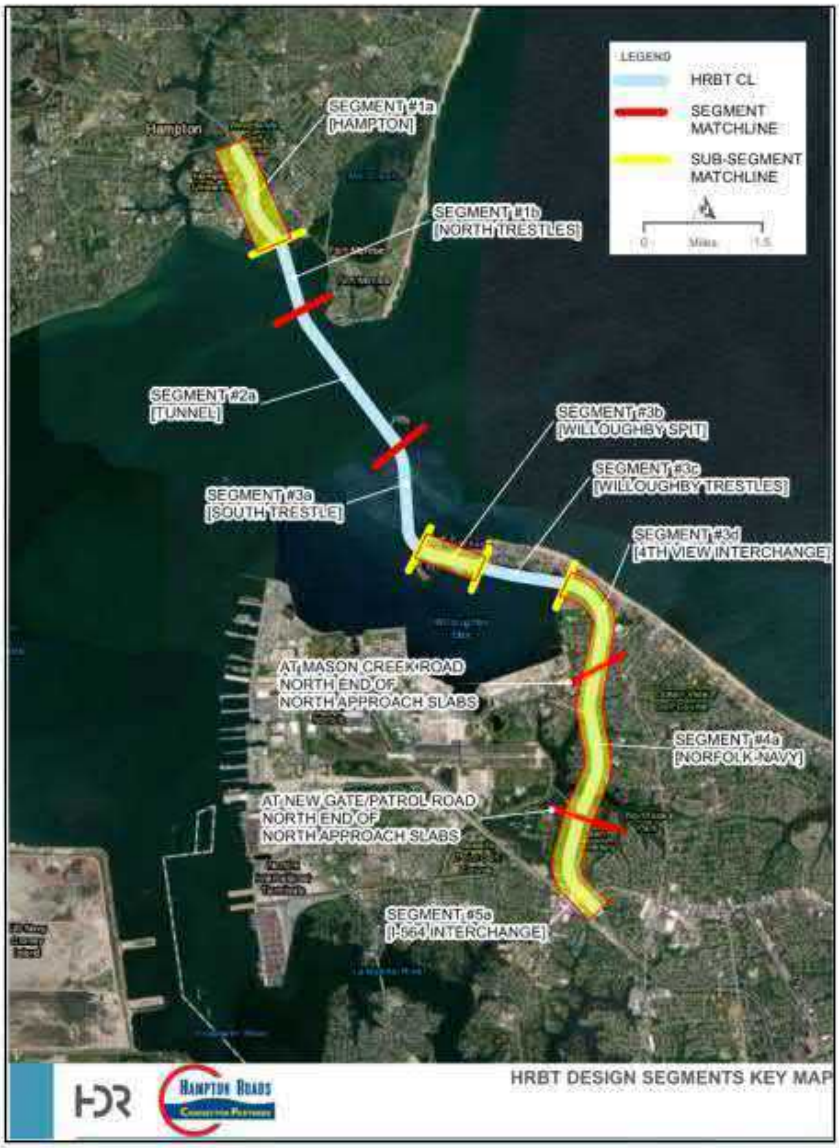
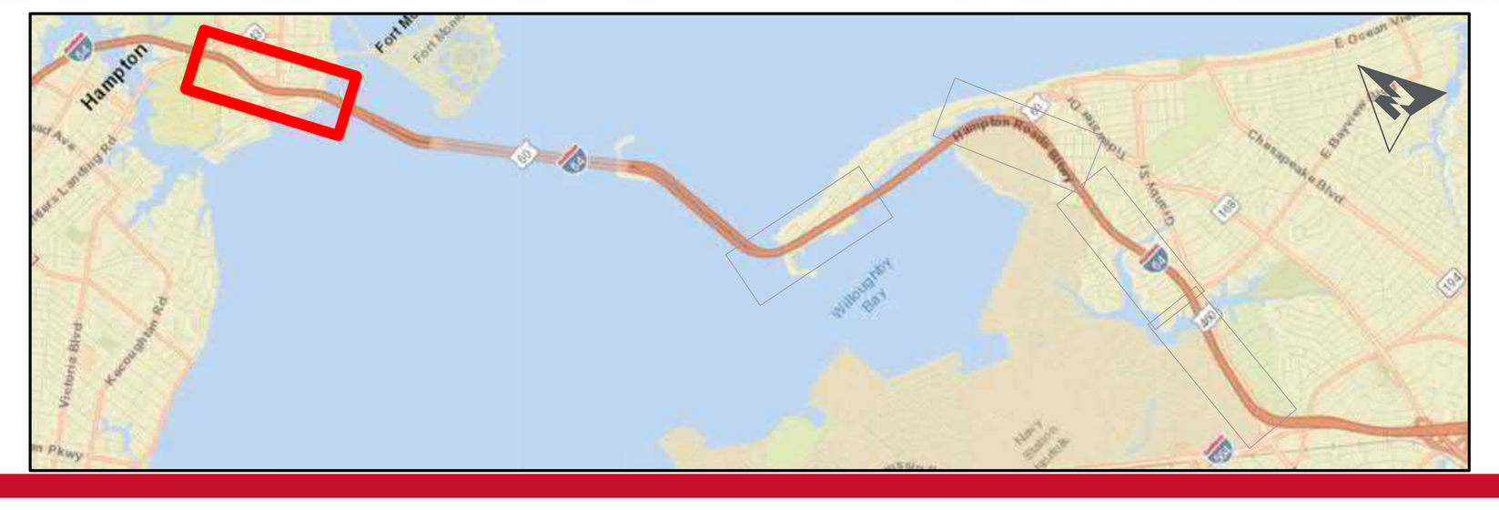


Figure 1: HRBT Design Segment Map

Reference: Geotechnical Exploration Plan, Landside Program for the Hampton Roads Bridge-Tunnel Expansion Project, May 29, 2019



Road and Bridge Design

- Bridges
- Marine Piers
- Lane Lines
- Paved Shoulder
- SWM Basin
- ITS
- Retaining Walls
- Sound Walls

Borings

- Segment 1
- Segment 3
- Segment 4
- Segment 5

0 Feet 300

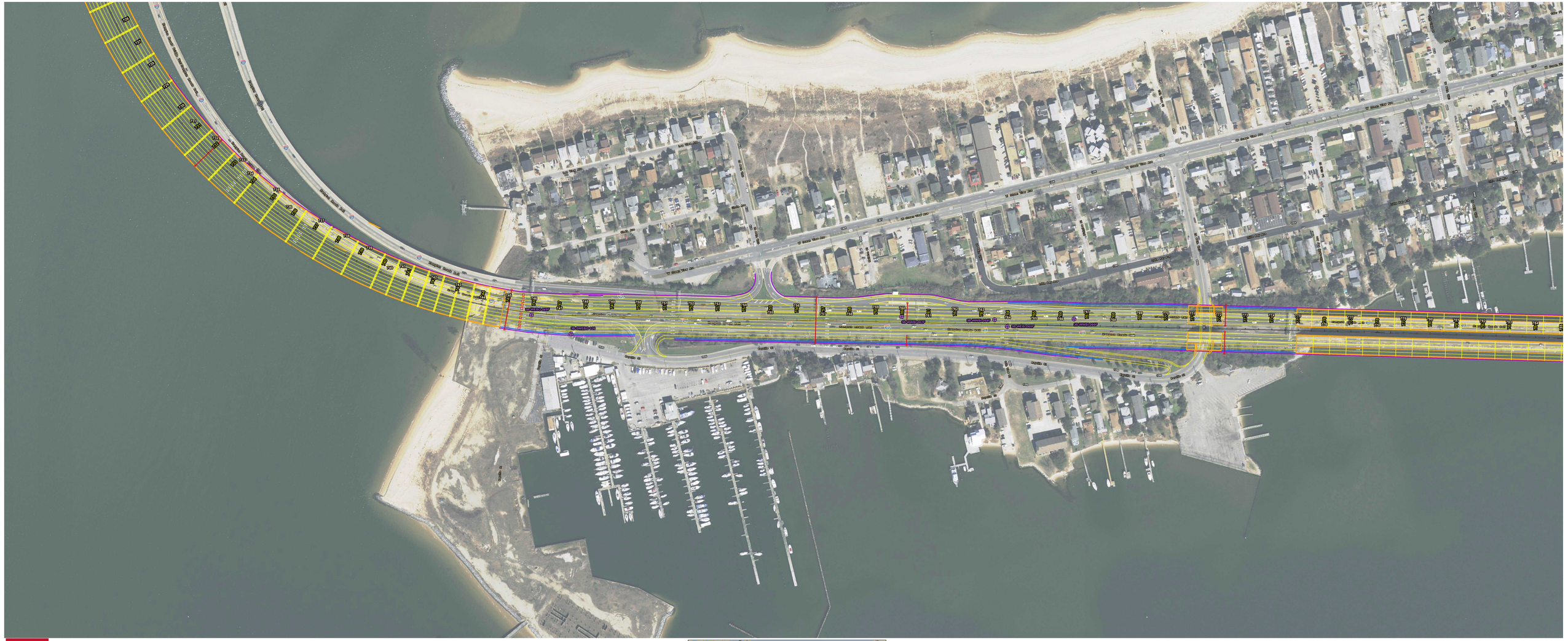
DATA SOURCE:
VGIN Aerial Imagery,
ESRI World Transportation

I-64 HAMPTON ROADS BRIDGE-TUNNEL EXPANSION PROJECT
BORING LAYOUT PLAN - ENVIRONMENTAL SAMPLING

SEGMENT 1 - HAMPTON LANDSIDE

HRBT EXPANSION

HAMPTON ROADS CONNECTOR PARTNERS



HDR | MOTT MACDONALD
Design Joint Venture

Road and Bridge Design

- Bridges
- Marine Piers
- Lane Lines
- Paved Shoulder
- SWM Basin
- ITS
- Retaining Walls
- Sound Walls

Borings

- Segment 1
- Segment 3
- Segment 4
- Segment 5

0 Feet 300

DATA SOURCE:
VGIN Aerial Imagery,
ESRI World Transportation

I-64 HAMPTON ROADS BRIDGE-TUNNEL EXPANSION PROJECT
BORING LAYOUT PLAN - ENVIRONMENTAL SAMPLING
SEGMENT 3 - WILLOUGHBY SPIT