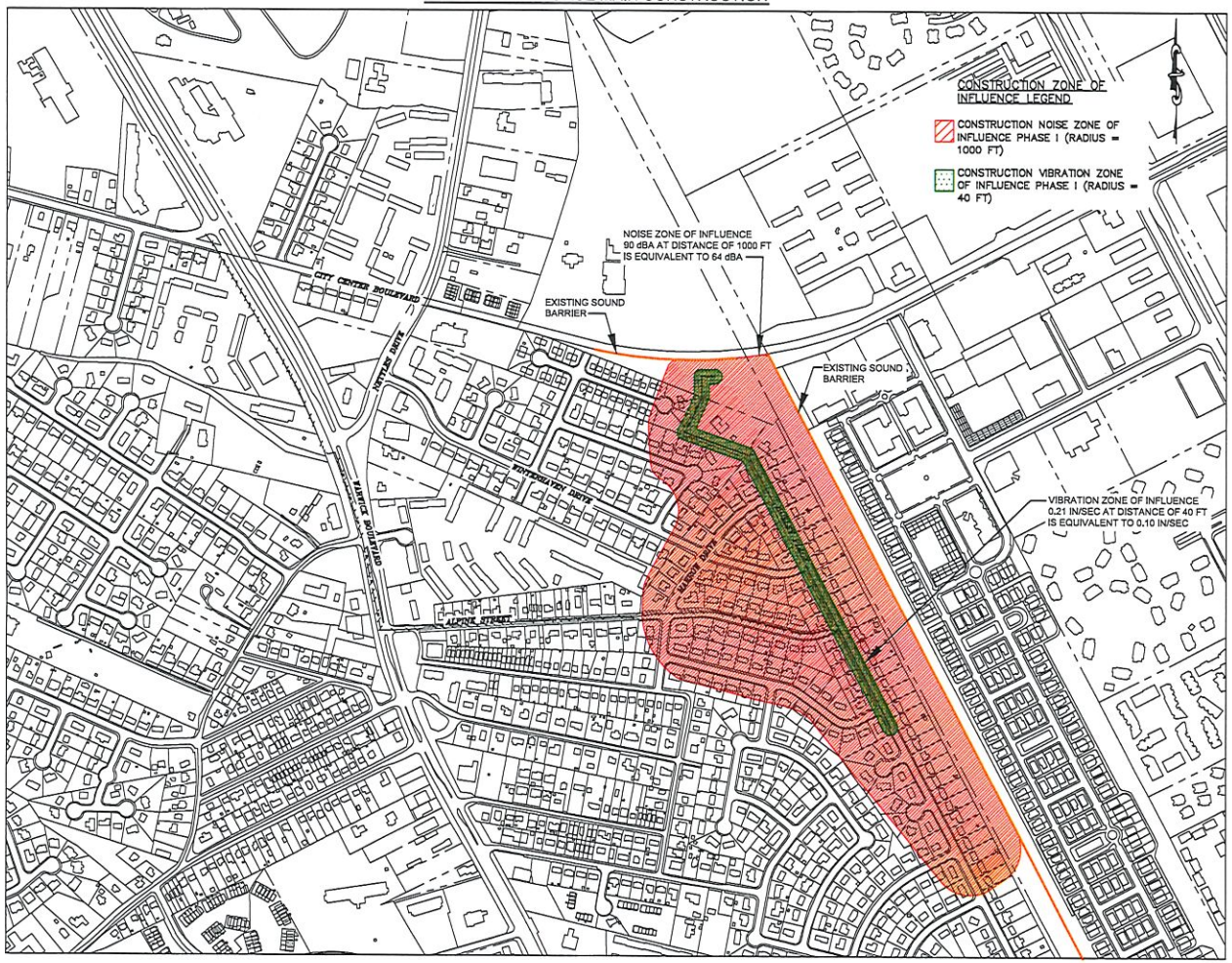
Attachment 12-A

CONSTRUCTION ZONE OF INFLUENCE
PHASE I - NEW FORCE MAIN CONSTRUCTION



PHASE I ZONE OF INFLUENCE NOTES:

1. PHASE I CONSTRUCTION ACTIVITY INCLUDES INSTALLATION OF NEW 36" FORCE MAIN ALONG HUXLEY PLACE AND REPLACEMENT OF GRAVITY SANITARY SEWER ALONG HUXLEY PLACE AND WINTERHAVEN DRIVE.
2. PHASE I CONSTRUCTION IMPACTS RESIDENTIAL BUILDINGS CONSTRUCTED IN THE 1960'S AND 1970'S. THERE ARE NO HISTORICALLY SIGNIFICANT BUILDINGS, STRUCTURES, OR SITES LOCATED IN THE PHASE I ZONE OF INFLUENCE.
3. SCHNABEL ENGINEERING PROVIDED GEOTECHNICAL ENGINEERING REPORT: HUXLEY PLACE FORCE MAIN EXTENSION DATED JULY 16, 2018. THIS REPORT CLASSIFIED THE SOILS FROM THE BORINGS ALONG HUXLEY PLACE AS SC, SM, SP, SP-SM, AND SC-SM. THE SOIL BORINGS INDICATE THAT ASPHALT THICKNESS RANGES FROM 3 INCHES TO 4 INCHES AND CRUSHED STONE BASE RANGES FROM 10 INCHES TO 11.5 INCHES
4. ANTICIPATED CONSTRUCTION DURATION OF 10 MONTHS IN PHASE I ZONE OF INFLUENCE. CONSTRUCTION WILL OCCUR DURING DAYLIGHT HOURS WITH THE EXCEPTION OF NIGHT TIME WORK REQUIRED DURING SHUTDOWNS.
6. CONSTRUCTION ACTIVITIES PRODUCING THE HIGHEST NOISE EMISSIONS INCLUDE: INSTALLING SHEET PILES AND TRENCH BOXES FOR SHORING, DUMP TRUCK GATES, CUTTING DUCTILE IRON PIPE, AND SAWCUTTING ROAD. THESE ACTIVITIES WILL OCCUR ALONG THE ENTIRE NEW FORCE MAIN ALIGNMENT.
7. CONSTRUCTION ACTIVITIES PRODUCING THE HIGHEST VIBRATION INCLUDE: INSTALLING SHEET PILES AND TRENCH BOXES FOR SHORING, VIBRATORY COMPACTION EQUIPMENT, MOVING TRUCKS AND HEAVY CONSTRUCTION EQUIPMENT.
8. NOISE ZONE OF INFLUENCE RADIUS BASED ON CONSTRUCTION EQUIPMENT EMITTING 90 DBA 50 FEET AWAY FROM EQUIPMENT. THE NOISE ANNOYANCE THRESHOLD WAS ASSUMED TO BE 64 DBA BASED ON INFORMATION PROVIDED FROM THE FEDERAL TRANSIT ADMINISTRATION OFFICE OF PLANNING AND ENVIRONMENTAL TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT MAY 2006 IN SECTION 11 OF THE HRSD DESIGN AND CONSTRUCTION STANDARDS. AT 1000 FT DISTANCE FROM EQUIPMENT THE NOISE EMISSION IS APPROXIMATELY 64 DBA. THE NOISE ZONE OF INFLUENCE HAS A RADIUS OF 1000 FT SHOWN IN THE FIGURE. IN AREAS WHERE THE NOISE ZONE OF INFLUENCE DOES NOT EXTEND 1000 FT BEYOND THE CONSTRUCTION AREA IT WAS ASSUMED THAT THE HOMES, VEGETATION, OR SOUND BARRIER WOULD BUFFER THE CONSTRUCTION NOISE. CALCULATIONS OF NOISE LEVELS AT DISTANCES AWAY FROM THE NOISE PRODUCING ACTIVITY WERE CALCULATED USING THE FOLLOWING FORMULA FROM THE FTA'S ASSESMENT:

$L_{EQ}(EQUIP)=E.L. + 10\ LOG\ (U.F.) - 20\ LOG\ (D/50) - 10\ G\ LOG\ (D/50)$

WHERE:

- L_{EQ} (EQUIP) IS THE L_{EQ} AT A RECEIVER RESULTING FROM THE OPERATION OF A SINGLE PIECE OF EQUIPMENT OVER A SPECIFIED TIME PERIOD
- E.L. IS THE NOISE EMISSION LEVEL OF THE PARTICULAR PIECE OF EQUIPMENT AT THE REFERENCE DISTANCE OF 50 FT.
- G IS A CONSTANT THAT ACCOUNTS FOR TOPOGRAPHY AND GROUND EFFECTS
- D IS THE DISTANCE FROM THE RECEIVER TO THE PIECE OF EQUIPMENT, AND
- U.F. IS A USAGE FACTOR THAT ACCOUNTS FOR THE FRACTION OF TIME THAT THE EQUIPMENT IS IN USE OVER THE SPECIFIED TIME PERIOD.

9. VIBRATION ZONE OF INFLUENCE RADIUS BASED ON CONSTRUCTION EQUIPMENT WITH PPV OF 0.21 IN/SEC AT 25 FT DISTANCE FROM EQUIPMENT. THE VIBRATION THRESHOLD OF 0.10 IN/SEC WAS ASSUMED BASED ON FIGURE C-2 FROM SECTION 11 OF THE HRSD DESIGN AND CONSTRUCTION STANDARDS. CALCULATIONS OF PEAK PARTICLE VELOCITY AT DISTANCES AWAY FROM EQUIPMENT WERE CALCULATED USING THE FOLLOWING FORMULA FROM THE FTA'S ASSESMENT:

$PPV_{EQUIP}=PPV_{REF}X(25/D)^{1.5}$

WHERE:

- PPV (EQUIP) IS THE PEAK PARTICLE VELOCITY IN IN/SEC OF THE EQUIPMENT ADJUSTED FOR DISTANCE.
- PPV (REF) IS THE REFERENCE VIBRATION IN IN/SEC AT 25 FEET FROM EQUIPMENT
- D IS THE DISTANCE FROM THE EQUIPMENT TO THE RECIEVER

TABLE 1: CONSTRUCTION NOISE EMISSION

Distance From Equipment	dBA
25	96.0
50	90.0
75	86.5
100	84.0
200	78.0
300	74.4
400	71.9
500	70.0
600	68.4
700	67.1
800	65.9
900	64.9
1000	64.0

*BASED ON DATA FROM THE FEDERAL TRANSIT ADMINISTRATION OFFICE OF PLANNING AND ENVIRONMENTAL TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT MAY 2016, TABLE SHOWS DBA FOR CONSTRUCTION EQUIPMENT WITH TYPICAL NOISE LEVEL OF 90 DBA 50 FT FROM EQUIPMENT.

TABLE 2: CONSTRUCTION EQUIPMENT VIBRATION

PPV [in/sec]	Distance From Equipment [ft]
0.210	25
0.160	30
0.127	35
0.104	40

*BASED ON DATA FROM THE FEDERAL TRANSIT ADMINISTRATION OFFICE OF PLANNING AND ENVIRONMENTAL TRANSIT NOISE AND VIBRATION IMPACT ASSESSMENT MAY 2016, TABLE SHOWS PPV FOR CONSTRUCTION EQUIPMENT WITH TYPICAL VIBRATION LEVEL OF 0.21 IN/SEC 25 FT FROM EQUIPMENT.

NOT FOR CONSTRUCTION

1" = 300'

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NO	DATE	BY	REVISION

PHASE I ZONE OF INFLUENCE

HAMPTON ROADS SANITATION DISTRICT
HUXLEY PLACE TO MIDDLE GROUND BOULEVARD INTERCEPTOR FORCE MAIN EXTENSION

DESIGNED BY:	DSW	DATE:	DECEMBER 2018
DRAWN BY:	DSW	FILE NO.:	815191
CHECKED BY:	MVG	DRAWING NO.:	
SCALE:	AS NOTED	SHEET NO.:	of