

ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES US EPA BROWNFIELD CLEAN UP GRANT

SOUTHSIDE TRAIL SEGMENTS 2, 3, and 4/5

PROJECT INFORMATION

The Atlanta BeltLine is a comprehensive economic development and urban redevelopment effort in the City of Atlanta (COA). The Atlanta BeltLine is envisioned as a combination of greenspace, trails, transit, and new development along 22-miles of freight rail corridor that encircle the urban core of the City of Atlanta. The project is one of the largest efforts underway to remediate and redevelop environmentally impacted properties for the long-term benefit of the community.

The Atlanta BeltLine – Southside Trail (SST) Segments 2, 3, and 4/5 (“site”) runs along an abandoned railroad corridor generally starting just west of the I-75/I-85 Downtown Connector and extending approximately 3-miles east to Glenwood Avenue in Atlanta, Georgia. Segment 2 starts just west of the I-75/I-85 Downtown Connector with Segment 3 ending at Milton Avenue. Segment 4 starts at Milton Avenue with Segment 5 ending at Glenwood Avenue. The site varies in width, with an average of approximately 100 feet. The site covers a total of approximately 36-acres and is currently undeveloped with the exception of a railroad bed, which runs the length of the site; the rail infrastructure (with the exception of bridges) had been removed in 2019. City right-of-ways cross the rail corridor at-grade, as well as above and below corridor grade. The general location of the site is illustrated on Figure 1.

Invest Atlanta (IA) has ownership of the approximate 3-mile site; Atlanta BeltLine, Inc. (ABI) is a subsidiary of Invest Atlanta and is the implementation agent of this grant request. ABI and IA are interested in moving forward with the corrective action measures described in the May 2010 Addendum to the Brownfield Corrective Action Plan (CAP), as later amended for the site. The CAP was approved by the Georgia Environmental Protection Division (GA EPD) on May 18, 2010. More particularly, the corrective measures for the site are included in the June 7, 2019 Appendix F to Corrective Action Plan Amendment #2, which was approved by the GA EPD on July 11, 2019. A portion of the funding to implement corrective actions will be provided through a local Tax Allocation District (TAD) dedicated to the Atlanta BeltLine.

The following scope of services describes the effort required to implement the corrective actions to meet the requirements of the EPD-approved Brownfield CAP, as amended.

SCOPE OF SERVICES

The corrective action scope of work as approved by the GA EPD includes a combination of pre-excavation confirmation/verification soil sampling and analysis, soil remediation, and post construction Type 5 risk reduction standards (RRS) sampling. The intent of the work is to remove soil that exceeds the selected soil non-residential RRS for constituents of concern (COCs) in order to reduce the potential soil exposure pathway in relation to end users of the Atlanta BeltLine.

Across the site, ABI has already addressed non-arsenic impacted soil with concentrations above non-residential RRS via existing funding, to the extent possible. The planned remedial actions included under

the awarded cleanup grant are for addressing the known impacted areas with arsenic above the selected non-residential RRS. These remedial actions are considered interim measures under the EPD approved CAP, as amended. These hot spot remedial efforts will include, at a minimum, Segments 2 and 3. However, the goal is to remediate the known hot spot areas at each of SST Segments 2, 3, and 4/5, to the extent that the awarded funding will cover the costs. The final Segments for actual remediation will be based on the forthcoming bids from remedial contractors.

Final corrective measures for the site will include the application of a Type 5 RRS approach during the construction of the final Atlanta BeltLine trail. The final Type 5 RRS approach helps with the inability to locate and remove all of the arsenic impacted soils along the Atlanta BeltLine Corridor, while still eliminating the potential soil exposure pathway in relation to end users of the Atlanta BeltLine. These final corrective measures are outside the scope of the awarded grant.

CONTAMINATION ISSUES

To assess potential environmental liabilities on the site and the larger adjoining Southside Trail, Wood (under the company name MACTEC) performed a Phase I Environmental Site Assessment (ESA) in November 2010. The November 2010 assessment included a site reconnaissance, and a regulatory and historical review to identify suspect on-site or off-site environmental conditions that could potentially impact the site, and to guide the development of a program of sampling and testing of soil and groundwater. Potential environmental concerns identified in proximity to the site included:

- The use of the site for approximately 100 years as a major railroad corridor; and
- Off-site facilities in close proximity and/or in up-gradient locations such that they present a material threat of a release which could adversely affect the property.

Subsequent to the Phase I ESA, United Consulting performed soil and groundwater assessment activities in 2018 to assess site impacts from the identified environmental concerns. A total of 108 initial borings were advanced on the site to facilitate soil sampling and/or groundwater sampling. Following is a summary of the sampling per Segment:

- Segment 2; 21 borings for soil sampling designated EB-27 to EB-47 and/or groundwater sampling designated MW-6, MW-7A, MW-8, MW-10, MW-11, and MW-12;
- Segment 3; 30 borings for soil sampling designated EB-48 to EB-77 and/or groundwater sampling designated MW-13, MW-14, MW-15, and MW-16; and,
- Segment 4/5; 57 borings for soil sampling designated EB-49 to EB-105.

The results of that assessment, including assessment of other adjoining Southside Trail property (at Segment 1), were documented in the "Phase II Environmental Assessment/Initial Brownfield Site Characterization Sampling" (Phase II) report, dated September 19, 2018.

Based on the EPD approved CAP for the Atlanta BeltLine, the soil and groundwater COCs that were analyzed as part of the Phase II included a specific target analytic list of select volatile organic compounds

(VOCs), semi-VOCs (SVOCs), Resource Conservation and Recovery Act (RCRA) 8 metals, and/or polychlorinated biphenyls (PCBs). Based on previous results across other portions of the Atlanta BeltLine, arsenic was considered the primary COC.

Eighty soil samples were collected from drilled borings and submitted for laboratory analysis. This included one shallow sample from each of borings EB-27 to EB-105, and an additional deep sample at EB-34. Various VOCs, SVOCs, and/or RCRA 8 metals were detected in the soil samples collected from the site. PCBs were not detected in soil samples collected from the site. The concentrations detected were compared to the Hazardous Site Response Act (HSRA) non-residential RRS that were previously established and approved by EPD as part of Amendment #2 to the approved CAP for the Atlanta BeltLine properties. For constituents without EPD-approved RRS, comparison was made to the non-residential RRS calculated according to the pre-September 25, 2018 RRS methods. Based on this comparison, concentrations of benzene, benzo(a)pyrene, benzo(b)fluoranthene, lead, and arsenic were detected above their non-residential RRS, including:

- Benzene was detected above its non-residential RRS in the soil samples collected from 0 to 2 ft. bgs in borings EB-59 and EB-64;
- Benzo(a)pyrene was detected above its non-residential RRS in the soil samples collected from 0 to 2 ft. bgs in borings EB-44, EB-46, EB-57, EB-65, and EB-102;
- Benzo(b)fluoranthene was detected above its non-residential RRS in the soil sample collected from 0 to 2 ft. bgs in borings EB-44 and EB-65;
- Lead was detected above its non-residential RRS in the soil sample collected from 0 to 2 ft. bgs in boring EB-103; and
- Arsenic was detected above its Type 3 non-residential RRS (38 mg/kg) in the soil samples collected from 0 ft. bgs to 2 ft. bgs in 39 of the borings.

The locations of these borings are illustrated on Figure 2a (overview). On Figure 2a, the borings with soil constituent concentrations above the non-residential RRS are color coded. Figures 2b through 2h show the boring locations in more detail, along with the constituent and its concentration that exceeded the RRS per location.

Ten groundwater monitoring wells were installed and sampled. The groundwater samples were submitted for analysis of VOCs, SVOCs, total and dissolved RCRA 8 metals, and/or PCBs depending on the temporary monitoring well location. Based on the total and dissolved metals analysis, a groundwater release of metals was not detected. VOCs, SVOCs, and PCBs were not detected in the groundwater samples collected. The locations of the temporary monitoring wells are illustrated in Figure 3.

The Phase II showed that a common on-site condition consisted of arsenic in shallow soils with concentrations above the non-residential RRS. More isolated PAH, benzene, and lead impacted soils were also detected with concentrations above the non-residential RRS. The PAH impacted soils were isolated to two locations on the site (at EB-44 and EB-46). In 2019, these non-arsenic impacted areas were subsequently delineated in accordance with the CAP, as amended, and remediated via excavation and landfill disposal as possible. The results of the Phase II assessment and the PAH remedial activities

were documented with EPD in the Appendix F to Corrective Action Plan Amendment #2. This EPD approved document also included the site-specific corrective action approach for the site relative to arsenic impacts plus potentially remaining PAH impacts in utility conflicted areas (at EB-46).

United Consulting has recently conducted delineation sampling of the arsenic hot spots. Such was conducted following the requirements outlined in the EPD approved CAP, as amended, including Appendix F to Amendment #2. Initially an attempt was made to delineate the arsenic impacts to below the Type 3 RRS of 38 mg/Kg. The delineation was conducted to:

- The extent that the percent complete construction plans (for the final trail) show a minimum of 1-foot of materials (i.e. fill or concrete) will be placed to meet final grades;
- If the above was not possible in an area (conservatively, each area had delineation borings advanced regardless of the above), pre-excavation confirmation/delineation sampling included two iterations of borings (two step-outs of three borings each, with the step outs being approximately 5-feet apart), as well as a vertical delineation boring as outlined in the Atlanta BeltLine CAP, as amended. For this, United Consulting installed approximately 249 soil borings (2 step-outs of 3 borings around each of the 12, plus 1 at center for vertical delineation). Initially, soil samples from each of the inner three step-out borings and the center boring was tested for arsenic. Additional samples were placed on hold, pending the initial step-out testing results. Those additional samples were released as needed. The goal of the sampling program was to define the arsenic impact removal areas prior to the actual remediation activities, as possible. This was to assist with increasing the efficiency of the remediation process. The borings were drilled using hand auger techniques.
- If the above delineation sampling was unsuccessful, remediation will include excavation to a maximum of 10-feet laterally from the last boring with arsenic concentrations above 38 mg/Kg. Vertical excavation will only be conducted to the depth to allow for a minimum of 1 foot of material (i.e. fill or concrete) to be placed on top of the excavation to meet final grades. This was approved in the EPD approved CAP, as amended.

Through the above sampling, following is a summary of the needed remedial areas per segment:

- Segment 2; 12 remedial areas, with an estimated 702 tons of impacted soils requiring removal and landfill disposal.
- Segment 3; 13 remedial areas, with an estimated 418 tons of impacted soils requiring removal and landfill disposal; and
- Segment 4/5; 14 remedial areas, with an estimated 342 tons of impacted soils requiring removal and landfill disposal.

The results of the above delineation activities were documented in three separate delineation reports (Segments 2, 3, and 4/5 separately), dated October 23, 2021. The locations and limits of the remedial areas in accordance with the EPD approved CAP, as amended, are illustrated on Figure 4. There are 39 remedial areas, with an estimated total tonnage of 1,462 tons.

ANALYSIS OF BROWNFIELD CLEANUP ALTERNATIVES

Under the approved Brownfield CAP, as amended, ABI is required to remediate soil to applicable non-residential RRS. Alternatives for cleanup include the following three options for identified impacted soil areas:

1. Treatment in-place;
2. Excavation, transport and proper disposal off-site; or
3. No action.

Based on previous clean-up efforts along the Atlanta BeltLine Corridor, which had similar heavy freight rail and adjacent industrial uses, and the above Phase II results, United Consulting has found numerous areas of arsenic impacted soil that exceed the approved non-residential Type 3 RRS. This included arsenic in the soil samples collected from 0 ft. bgs to 2 ft. bgs in 39 of the borings. Twelve of these are located along Segment 2, thirteen along Segment 3, and fourteen along Segment 4/5. Non-arsenic impacted areas were also previously identified, but subsequently remediated to the extent possible in accordance with the CAP.

Arsenic cannot be destroyed in the environment; it can only change its form or become attached to, or separated, from particles. It may change its form by reacting with oxygen or other molecules present in air, water, or soil, or through metabolic action of plants or animals. For arsenic impacted soils, in-place treatment may reduce the mobility of arsenic by changing it to less soluble forms (i.e. to reduce its leaching pathway from soil to groundwater), but this does not remove the arsenic. To meet the CAP requirements, the arsenic impacted soil must meet the non-residential RRS. In-place treatment is not an effective approach for arsenic, and therefore is considered impracticable. As such, a cost estimate for this alternative is not warranted.

The most common approach for cleanup of arsenic impacted soils is excavation, transport and proper landfill disposal off-site. Its effectiveness is proven via delineation/confirmation sampling either prior to, or during, the excavation process. Implementation is often achieved via backhoe excavations, with excavated soils placed directly into a roll-off box or trucks, which is then transported to the appropriately licensed landfill. Based on previous conversations with EPD personnel, this is the most widely used remediation method on Brownfield sites. This is the remediation approach that has been previously used on other finished portions of the Atlanta BeltLine. It is a rapid process, which assists with maintaining project schedules. Extreme weather conditions in this area could include heavy rains. Such rains could impact the project schedule, like any other general construction project. Such can also present erosion and sedimentation issues. To deal with this potential issue, the remedial actions will include erosion and sedimentation control mechanisms, following Best Management Practices (BMPs).

Based on the conditions at the site, type of impact requiring remediation, and past experience with EPD, excavation, transport and proper landfill disposal off-site is the only feasible and practical approach for the arsenic hot spot areas and the non-arsenic impacted soils, followed by a Type 5 RRS approach for the remaining arsenic conditions. This is the corrective action approach already approved by EPD and is the recommended cleanup alternative.

As indicated above, the awarded grant funding will be used to remediate the known hot spot areas at Segments 2 and 3, at a minimum. However, the goal is to remediate the known hot spot areas at each

of SST Segments 2, 3, and 4/5, to the extent that the awarded funding will cover the costs. The final Segments for actual remediation will be based on the forthcoming bids from remedial contractors. An estimated budget is included in the **Estimated Cost and Schedule for Proposed Cleanup** section on page 7. The final Type 5 RRS corrective measures will be completed later, with funding other than the EPA grant.

To meet the existing CAP requirements, the impacted soil at the site must meet the non-residential RRS. Therefore, the no action alternative is not an option.

RECOMMENDED CLEANUP ALTERNATIVE

The recommended approach for cleanup is a two-step process. First, and the step that will be completed to the extent possible with the grant dollars, known boring locations with arsenic soil impact concentrations above the Type 3 RRS will be excavated and transported off-site for proper landfill disposal to the extent required under the approved CAP.

Second, concurrent with the final trail construction, a Type 5 RRS will be implemented relative to the remaining arsenic conditions. This will be done later, using alternative funding. The same applies to any areas that cannot be completed due to existing utility conflicts, where those utilities are later removed during the final trail construction.

These methods were selected based on their past proven effectiveness, ease of implementation and cost on previously built Atlanta BeltLine sections. To support landfill disposal, metals-impacted soils may be chemically stabilized prior to disposal.

United Consulting, a qualified Georgia environmental consulting firm, will oversee the cleanup process completed under this grant. This firm will be retained by a separate procurement process.

EFFECTIVENESS AND IMPLEMENTABILITY OF PROPOSED CLEANUP

The impacted soils will be remediated to the extents established during the previous delineation sampling activities. Excavated material that requires off-site disposal will be placed directly into roll-off boxes or dump trucks or stockpiled with appropriate cover and erosion and sedimentation control. BMPs will be followed. The adequate treatment or removal of impacted soil areas will be confirmed through verification sampling in accordance with the EPD approved CAP, as outlined above. All work will be conducted under a site-specific Health and Safety Plan (HASP) and a soil management plan. Disposal manifests will be obtained and documented.

Following the above remedial actions, an interim remediation report will be prepared to document the completed activities.

Later, outside the current scope of this awarded grant, the site work for the construction of the final trail will be conducted in accordance with a separate soil and groundwater management plan. Following grading of a sufficient acreage for the construction of the final trail, the available 0.5-acre sampling areas per the Type 5 RRS will be evaluated using the 5-point composite sampling methodology. The total site acreage is estimated at 16 acres, so we estimate up to approximately 160 sampling locations, with samples being collected from approximately 0-6 inch and 6-12 inch intervals. Samples will be collected

with an auger or shovel. This includes up to approximately 64 composite samples for arsenic analysis. Grab samples will also be collected at each sample location and depth interval for possible arsenic analysis. This sampling will be conducted before the final landscaping is installed. Since arsenic is the only identified COC that will be remaining at that time, the composite soil samples will be analyzed for arsenic only. The sampling areas or sub-areas which exceed the statistically determined exposure point concentration of no greater than the target concentration of 63 mg/Kg of arsenic as a default will be excavated and disposed of under manifest in an appropriately regulated landfill, based on laboratory analysis. Once the final paved trail on the site is constructed and the Type 5 RRS sampling is complete and demonstrated to be in compliance, an Interim Compliance Status Report (CSR) will be submitted to EPD.

An Environmental Covenant was previously drafted for the entire Atlanta BeltLine corridor. This Environmental Covenant has not yet been filed. The filing of such would not be completed until after the entire Atlanta BeltLine is constructed in the distant future. Until such time as a final environmental covenant is drafted, interim corrective measures along the site will be maintained through a Monitoring and Maintenance Plan (MMP) that may be amended as redevelopment progresses.

The implementation of corrective actions will be performed in the sequence described above as funding for corrective action is available.

ESTIMATED COST AND SCHEDULE FOR PROPOSED CLEANUP

The table below summarizes the task, estimated budget, schedule and deliverables for this proposed cleanup and corrective action.

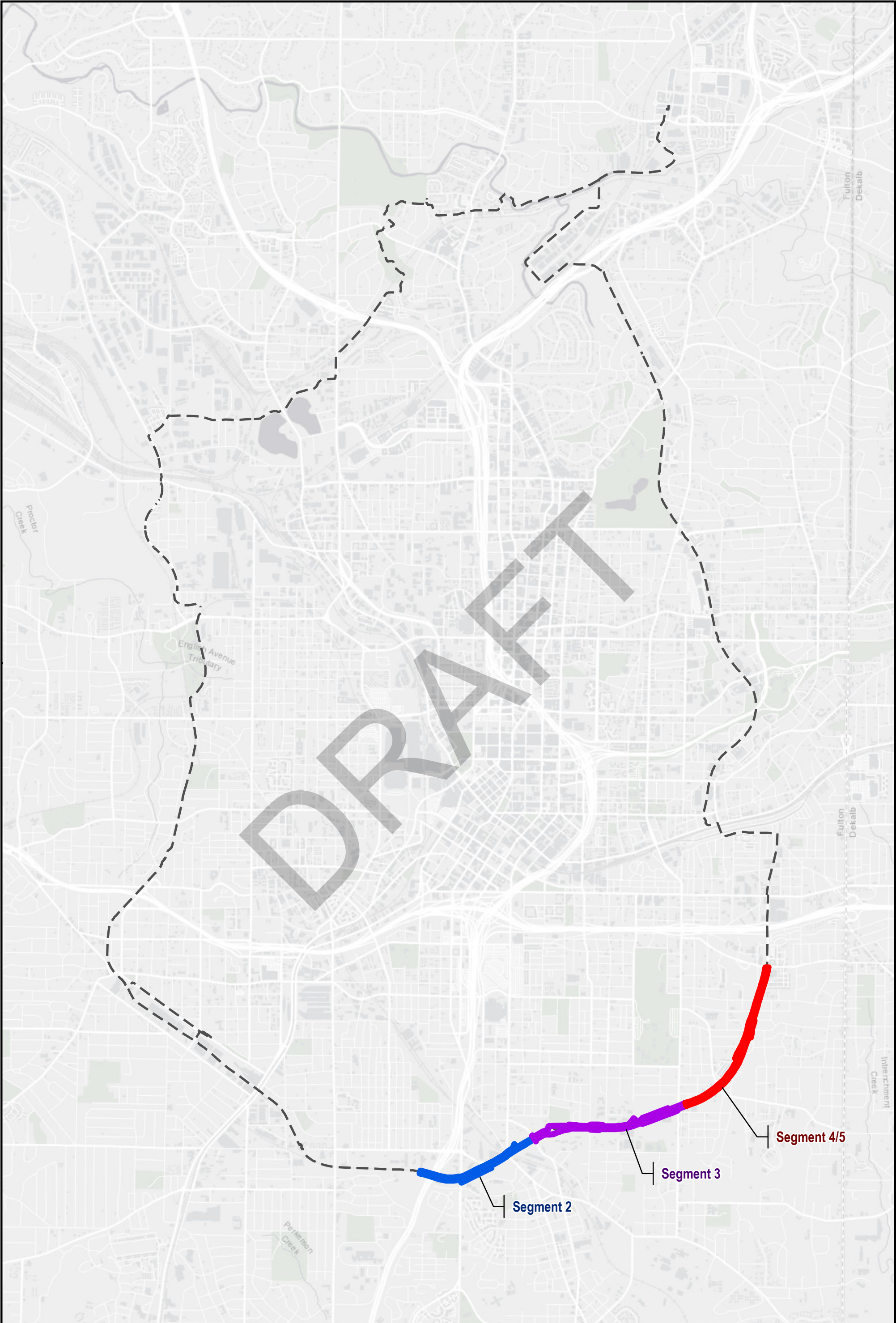
IMPLEMENTATION OF APPROVED CAP



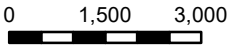
Task Description	Estimated Budget	Estimated Schedule	Deliverable
Hot Spot Soil Remediation	\$300,000	Within 2 years	Interim Remediation Report
Total	\$300,000		

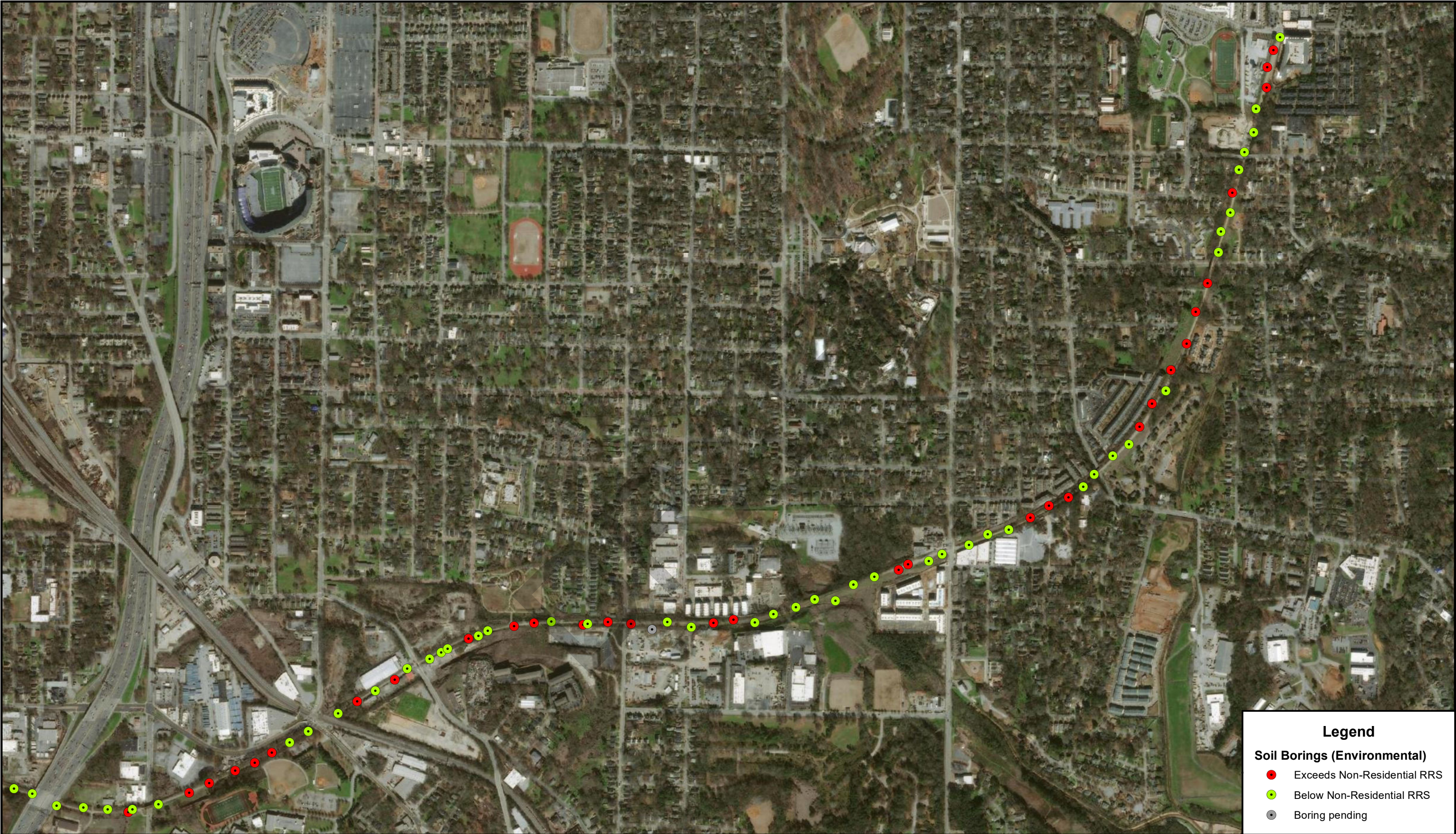
The cost to address soils impacted above applicable non-residential RRS (i.e. soil remediation), is an estimate at this time.

Attachments

- Figure 1 Segment Location Overview – Street Map
- Figure 2a-2f Soil Sample Location Map Overview (a) and Detailed (b-f)
- Figure 3 Temporary Monitoring Well Location Map
- Figure 4 Remediation Areas Overview Aerial



 UNITED CONSULTING	  1 inch = 3,000 feet	Prepared:	SCC	Title:	Segment Location Overview - Street Map	FIG. 1
		Checked:	BWS	Project:	Atlanta BeltLine – Southside Trail	
		Date:	01/14/21	Project No.:	20-GA-01192-13	
				Client:	Kimley-Horn	






Legend

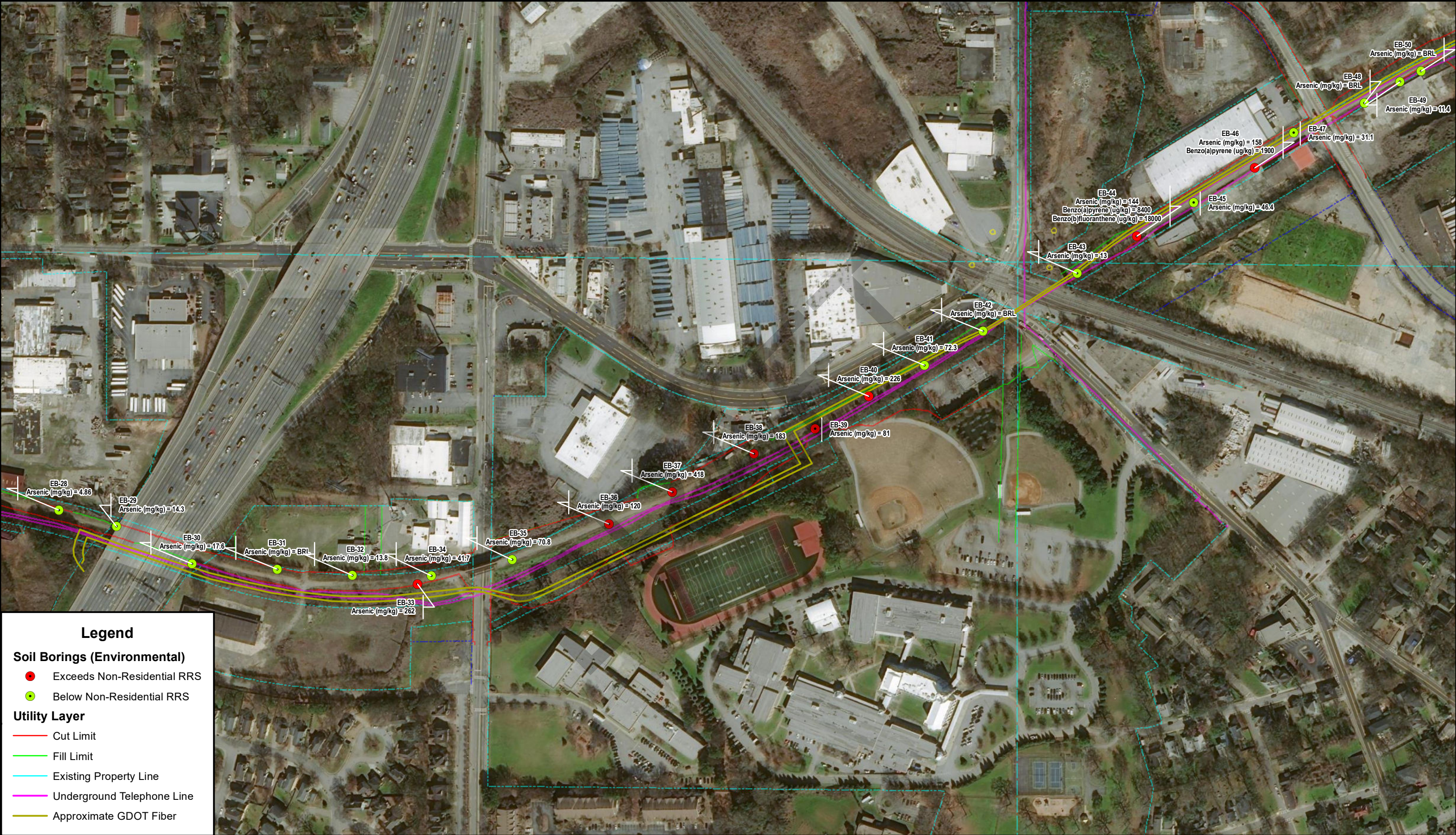
Soil Borings (Environmental)

Exceeds Non-Residential RRS

Below Non-Residential RRS

Boring pending

	Figure Scale		Prepared:	MJF	Title:	Soil Sample Location Map - Overview	Figure 2a
		 0 200 400 800 1,200 1 inch = 840 feet	Checked:	RCG	Project:	Atlanta Beltline Southside Trail	
			Date:	August 27, 2018	Project No.	KMHRN-17-GA-01191-02	
					Client:	Kimley Horn	

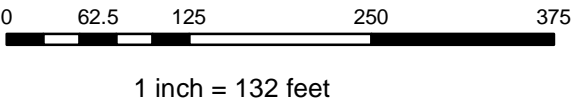
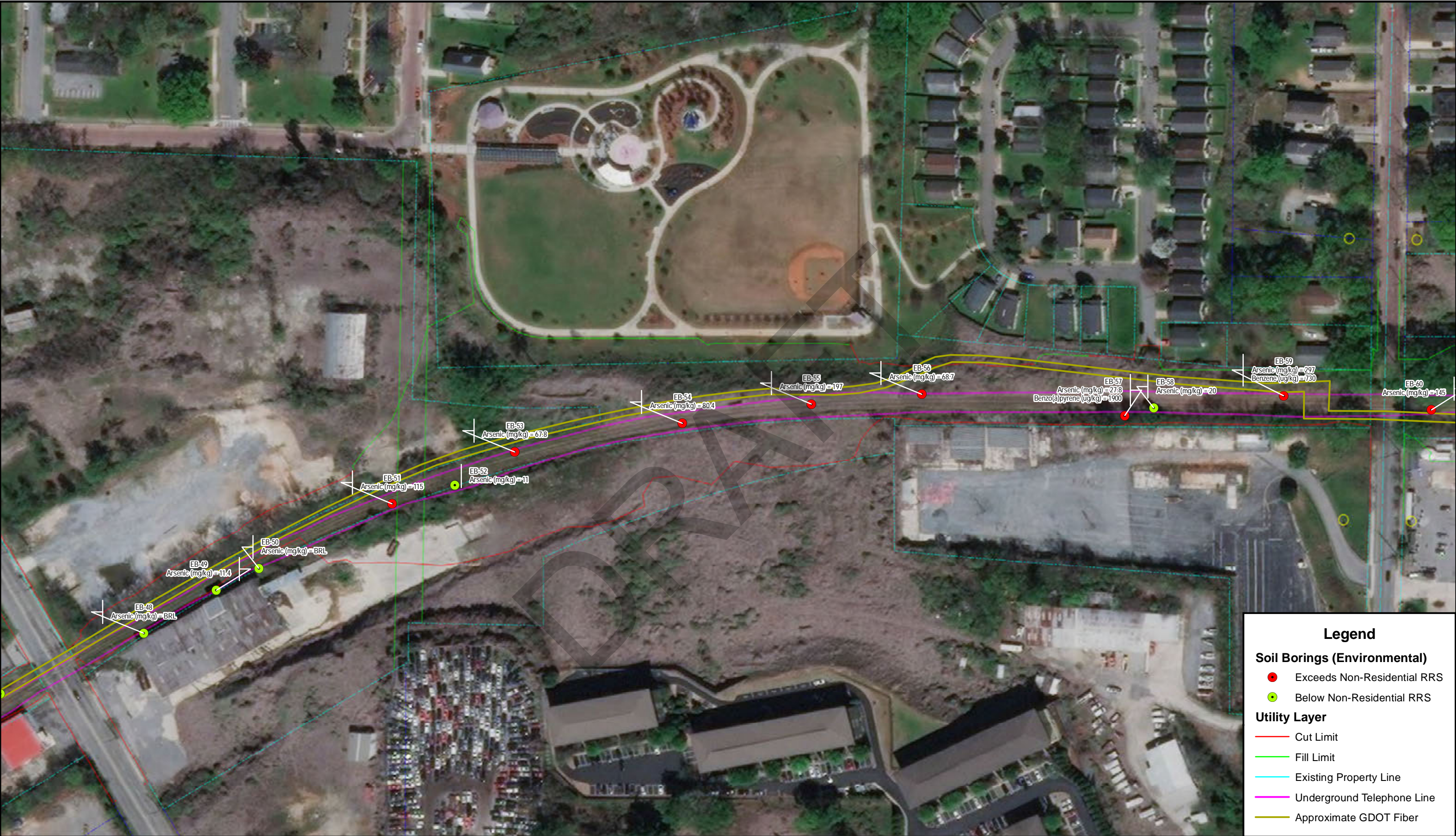


1 inch = 268 feet

Prepared: MJF
Checked: RCG
Date: August 27, 2018

Title: I-75 to Milton Soil Sample Location
Project: Atlanta Beltline Southside Trail
Project No. KMHRN-17-GA-01191-02
Client: Kimley Horn

Figure 2b


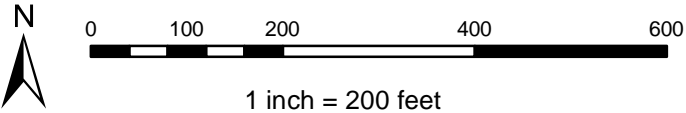


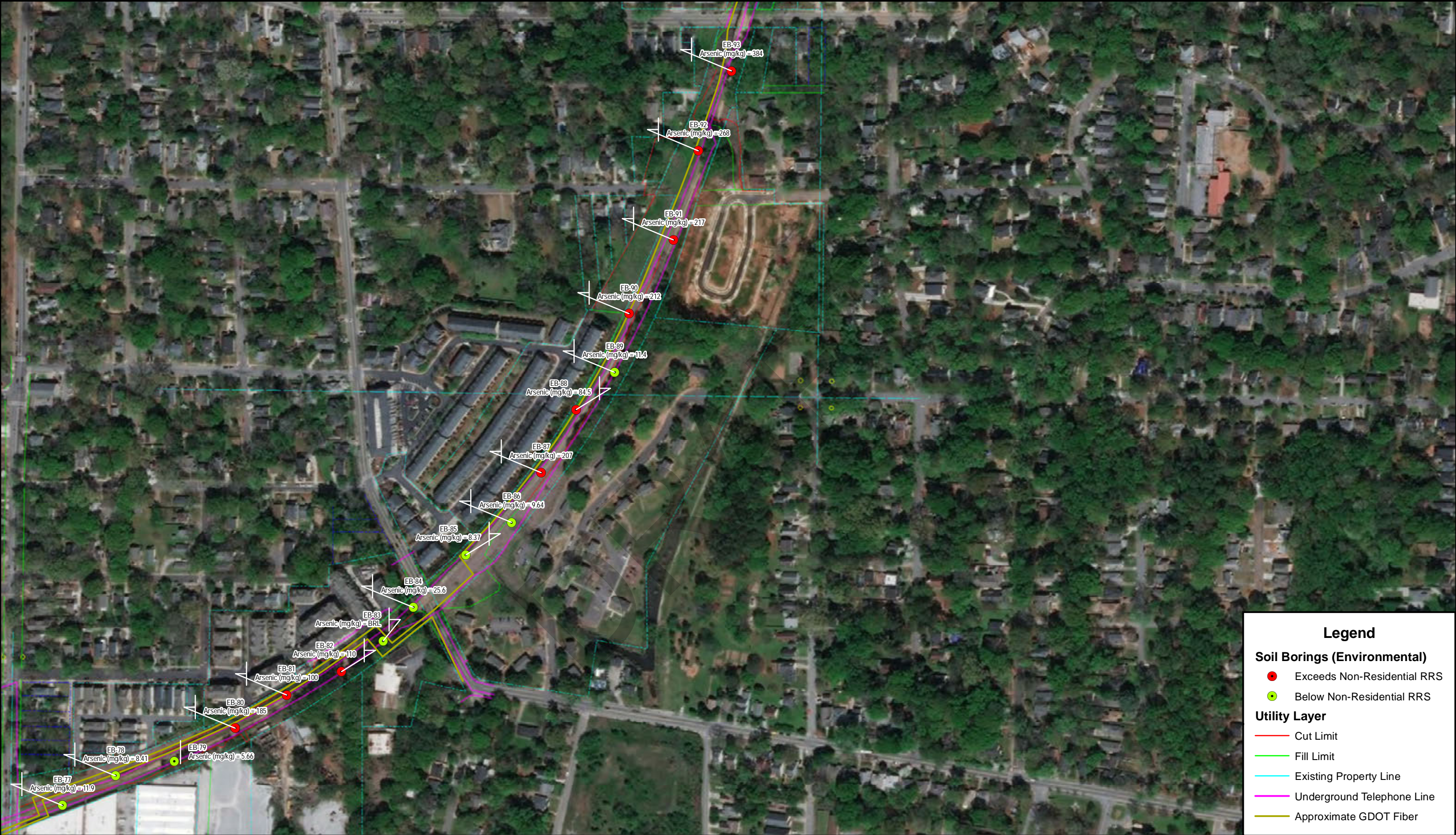
Prepared:	MJF
Checked:	RCG
Date:	September 17, 2018

Title:	Milton to Hill Soil Sample Locations
Project:	Atlanta Beltline Southside Trail
Project No.	KMHRN-17-GA-01191-02
Client:	Kimley Horn

Figure 2c



	Figure Scale		Prepared:	MJF	Title:	Hill to Boulevard Soil Sample Locations	Figure 2d
			Checked:	RCG	Project:	Atlanta Beltline Southside Trail	
	1 inch = 200 feet		Date:	September 17, 2018	Project No.:	KMHRN-17-GA-01191-02	
					Client:	Kimley Horn	






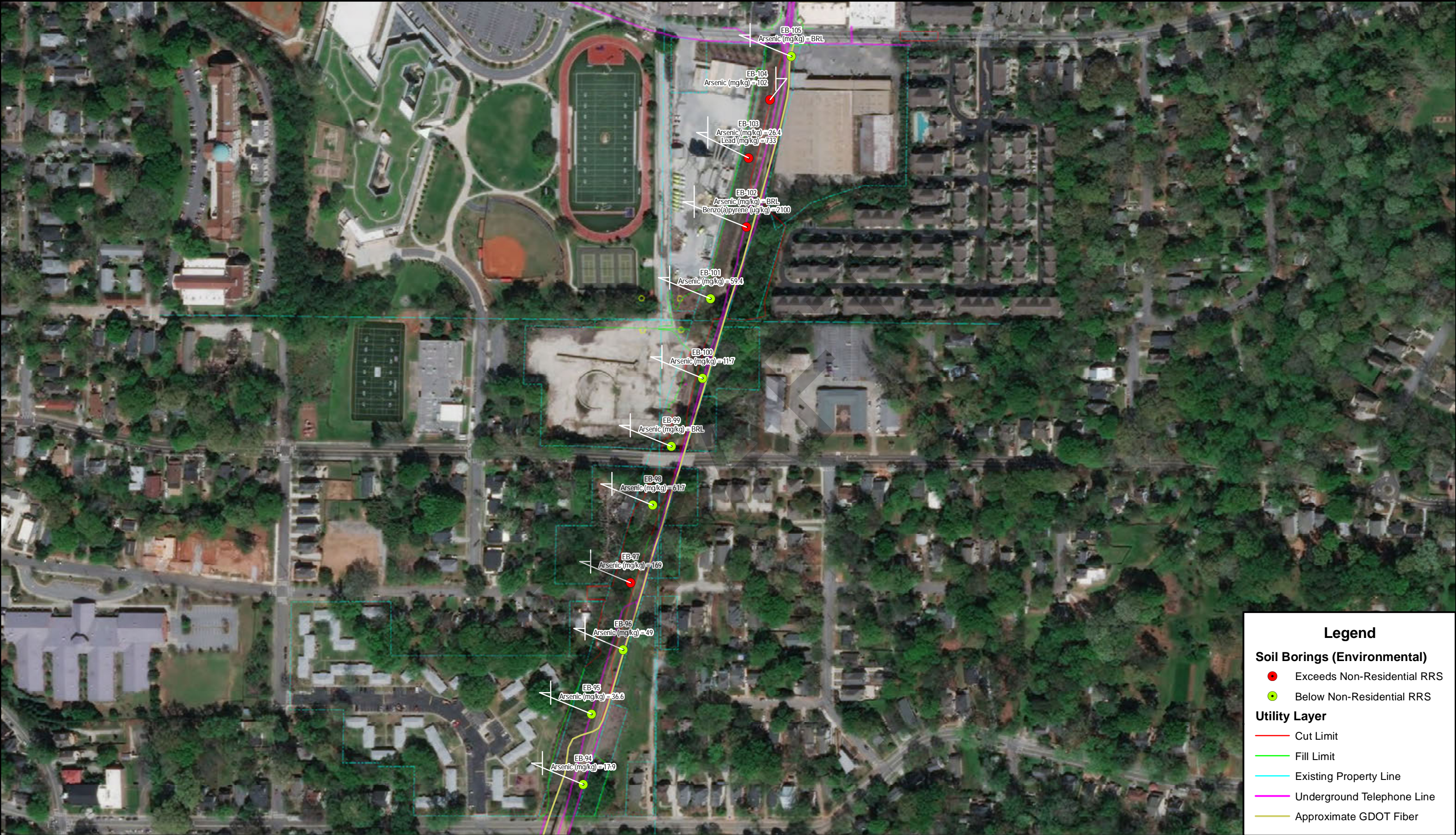
Figure Scale

0 150 300 600 900

1 inch = 300 feet

Prepared:	MJF	Title:	Boulevard to Ormewood Soil Sample Locations
Checked:	RCG	Project:	Atlanta Beltline Southside Trail
Date:	August 27, 2018	Project No.:	KMHRN-17-GA-01191-02
		Client:	Kimley Horn

Figure 2e






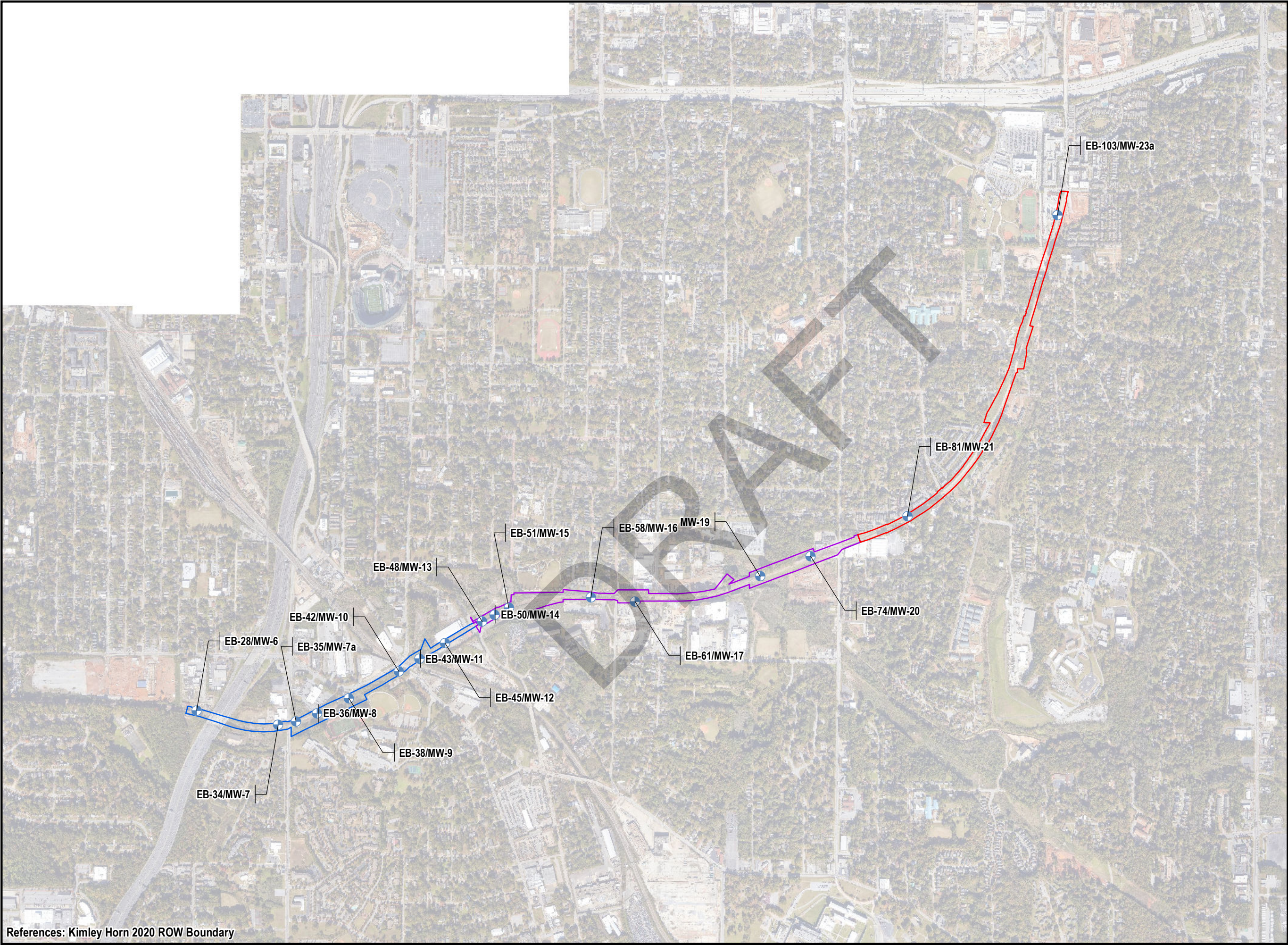
Figure Scale

0 125 250 500 750

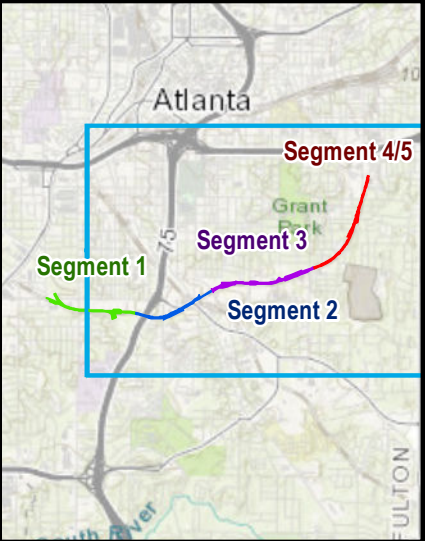
1 inch = 248 feet

Prepared:	MJF	Title:	Boulevard to Ormewood Soil Sample Locations
Checked:	RCG	Project:	Atlanta Beltline Southside Trail
Date:	September 17, 2018	Project No.	KMHRN-17-GA-01191-02
		Client:	Kimley Horn





Figure 2f



Map Index



Legend


-  Temporary Monitoring Well
-  Segment 2 Boundary
-  Segment 3 Boundary
-  Segment 4-5 Boundary



Project:
Atlanta BeltLine - SST

Client:
ABI

Sheet Title: Temporary Monitoring Well Location Map

Scale:  0 250 500 1,000
1 inch = 1,250 feet

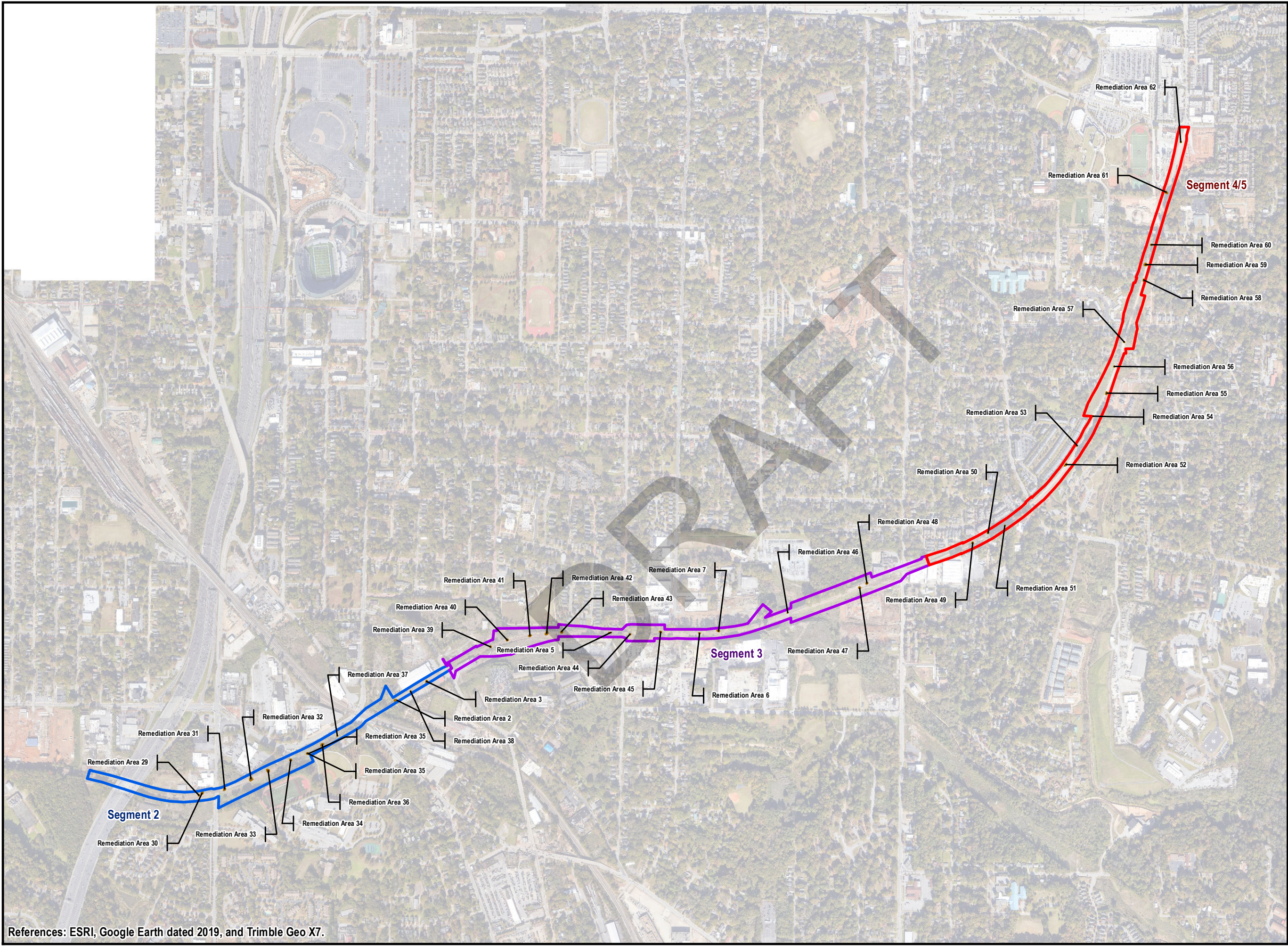
Prepared: SCC

Checked: RG

Date: Mar 12, 2021

Project No. 21-GA-01192-14

Figure 3



Map Index

Legend

- Segment 2
- Segment 3
- Segment 4-5
- Proposed Remedial Area

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Project:
Atlanta BeltLine – Southside Trail

Client:
Kimley-Horn

Sheet Title: Remediation Areas Overview Aerial

Scale: 0 250 500 1,000
1 inch = 1,000 feet

Prepared:	S. Cox
Checked:	B. Sharp
Date:	Jan 14, 2021
Project No.	20-GA-01192-11

Figure 4

References: ESRI, Google Earth dated 2019, and Trimble Geo X7.