



**DRAFT**  
**Response Action Plan**  
**Perkins Homes – Block A**  
**Baltimore, Maryland 21231**

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## CONTENTS

	<u>Page</u>
LIST OF APPENDICES .....	ii
LIST OF FIGURES .....	iii
LIST OF TABLES .....	iv
LIST OF ACRONYMS AND ABBREVIATIONS .....	v
1. INTRODUCTION .....	1-1
1.1 PURPOSE AND SCOPE .....	1-1
2. SITE OVERVIEW .....	2-1
2.1 SITE DESCRIPTION .....	2-1
2.2 SITE HISTORY .....	2-1
2.3 ENVIRONMENTAL SETTING .....	2-1
2.4 ENVIRONMENTAL INVESTIGATIONS .....	2-2
2.5 DEVELOPMENT AND FUTURE USE .....	2-5
2.6 RESPONSE ACTIONS .....	2-5
3. ADDITIONAL INVESTIGATORY INFORMATION .....	3-1
3.1 CLEAN FILL CHARACTERIZATION PLAN .....	3-1
4. EXPOSURE ASSESSMENT .....	4-1
4.1 MEDIA OF CONCERN .....	4-1
4.1.1 Soil .....	4-1
4.1.2 Groundwater and Soil to Groundwater .....	4-1
4.1.3 Soil Vapor .....	4-2
4.2 POTENTIAL EXPOSURE PATHWAYS AND RECEPTORS OF CONCERN .....	4-2
4.3 RISK-BASED SCREENING AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN .....	4-2
4.4 COMPLETE EXPOSURE PATHWAYS .....	4-3
5. CLEANUP CRITERIA .....	5-1
6. SELECTED TECHNOLOGIES AND LAND USE CONTROLS .....	6-1
6.1 PAVED ASPHALT, CONCRETE, AND COVERED AREAS .....	6-3
6.2 LANDSCAPED/NATURAL AREAS .....	6-4
6.3 SITE ACCESS AND CONTROL .....	6-5
6.4 INSTITUTIONAL CONTROLS (FUTURE LAND USE CONTROLS) .....	6-6
6.5 POST-REMEDATION REQUIREMENTS .....	6-7

7.	EVALUATION CRITERIA FOR THE SELECTED TECHNOLOGIES .....	7-1
7.1	ANTICIPATED REMEDIAL ACTIONS .....	7-1
7.2	CRITERIA FOR CERTIFICATE OF COMPLETION .....	7-2
7.3	CRITERIA FOR CONTINGENCY MEASURES .....	7-2
8.	PROPOSED RESPONSE ACTION IMPLEMENTATION .....	8-1
8.1	GENERAL HEALTH AND SAFETY PROTOCOLS.....	8-1
8.2	AIR MONITORING REQUIREMENTS .....	8-1
8.3	REPORTING REQUIREMENTS .....	8-5
8.4	MAINTENANCE REQUIREMENTS .....	8-5
8.5	SOIL EXCAVATION, STAGING, SAMPLING, AND DISPOSAL.....	8-5
8.6	GROUNDWATER .....	8-6
8.7	CLEAN FILL.....	8-6
8.8	ASBESTOS, LEAD, AND OIL.....	8-7
9.	PERMITS, NOTIFICATIONS, AND CONTINGENCIES.....	9-1
9.1	IMPLEMENTATION SCHEDULE.....	9-1
9.2	ADMINISTRATIVE REQUIREMENTS .....	9-2
10.	REFERENCES .....	10-1

### **LIST OF APPENDICES**

APPENDIX A: FIGURES

APPENDIX B: CROSS-SECTION DETAILS

APPENDIX C: GEOTEXTILE SPECIFICATION SHEET

APPENDIX D: OPERATIONS AND MAINTENANCE PLAN

APPENDIX E: WRITTEN AGREEMENT

APPENDIX F: CERTIFIED STATEMENT OF ZONING REQUIREMENTS

**LIST OF FIGURES**

<u>Number</u>	<u>Title</u>
2-1	Site Location Map
2-2	Existing Site Details
2-3	Proposed Subdivision Plan
2-4	Area of Concern
6-1	Proposed Site Development Plan

**LIST OF TABLES**

<u>Number</u>	<u>Title</u>
3-1	Potential Contaminants in Fill Material
3-2	Clean Fill Material Characterization Requirements
4-1	Summary of Exposure Pathways and Remedies
5-1	Selected Cleanup Criteria
8-1	Environmental Monitoring Requirements
9-1	Response Action Plan Implementation Schedule
9-2	Activities Covered Under Performance Bond

## LIST OF ACRONYMS AND ABBREVIATIONS

μg/kg	Microgram(s) per kilogram
ACGIH	American Conference of Governmental Industrial Hygienists
ATC	Anticipated Typical Concentration
COC	Certificate of Completion
COPC	Chemical of potential concern
DU	Decision Unit
EA	EA Engineering, Science, and Technology, Inc. PBC
ESA	Environmental Site Assessment
ft	Foot (feet)
GTA	Geo-Technology Associates, Inc.
HABC	Housing Authority of Baltimore City
in.	Inch(es)
mg/kg	Milligram(s) per kilogram
mg/m <sup>3</sup>	Milligram(s) per cubic meter
MDE	Maryland Department of the Environment
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic aromatic hydrocarbon
PEL	Permissible exposure limit
PPE	Personal protective equipment
RAP	Response Action Plan
RCS	Residential Cleanup Standards
SF	Square foot (feet)
SSHASP	Site-Specific Health and Safety Plan
TLV	Threshold limit value
VCP	Voluntary Cleanup Program

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## 1. INTRODUCTION

This document provides the detail of the Response Action Plan (RAP) for the Perkins Homes – Block A site located at 1401 East Pratt Street Baltimore, Maryland 21231 (the “Site”).

The Site is generally located south of East Pratt Street, east of South Eden Street, west of South Caroline Street, and north of Gough Street in the City of Baltimore, Maryland. The Site comprises an existing multifamily apartment complex with multiple addresses within a single city block including 200-228 (even), 230-268 (even), and 201-235 (odd) South Spring Court as well as 200-234 (even), 201-229 (odd), and 231-269 (odd) South Ballou Court. All existing buildings will be demolished for redevelopment.

The proposed redevelopment plan for the Site includes use as a multifamily residential development. Therefore, based on existing conditions at the Site and the proposed future use, Tier 1B (Residential-Restricted) requirements will be applied as part of the RAP.

An application to the Maryland Department of the Environment (MDE) Voluntary Cleanup Program (VCP) was submitted by EA Engineering, Science, and Technology, Inc., PBC (EA) on behalf of the Housing Authority of Baltimore City (HABC) to enroll Perkins Homes – Block A into the MDE VCP on 28 April 2020. A subsequent application was submitted to MDE on behalf of Perkins Homes Phase I, LLC; By: MBS IGP, Inc., its Sole Member, on 26 May 2020.

Ownership of the land will be retained by HABC, through Baltimore Affordable Housing Development Inc., a wholly owned instrumentality of HABC, with a long-term ground lease for building improvements to Perkins Homes Phase I, LLC; By: MBS IGP, Inc., its Sole Member. No fee simple ownership is permitted, all units will be occupied by renters, and the development will be managed by a single private entity established for the management of all Perkins Homes redevelopment.

MDE reviewed the Block A VCP applications and associated reports (Phase I Environmental Site Assessment [ESA] Update Report, Phase II ESA Report, and Report of Geotechnical Exploration) and responded with a request for additional soil characterization on 11 May 2020. In June 2020, EA completed a Supplemental Phase II ESA as directed by MDE (MDE; 11 May 2020) under the VCP which supplemented the findings of the original Phase II ESA. Based on the results of the two Phase II ESAs, MDE recommended a RAP to address the presence of elevated concentrations of metals and polycyclic aromatic hydrocarbons (PAHs) in soil and the presence of elevated concentrations of metals in groundwater. On 4 September 2020 MDE accepted the Perkins Homes Block A site into the VCP and recommended a RAP to address the presence of impacted material at the Site.

### 1.1 PURPOSE AND SCOPE

This RAP has been prepared to evaluate potential migration pathways and potentially exposed populations of each contaminant/medium of concern under the present and future use scenarios. Based on current and future use scenarios, engineering controls and response measures are recommended to mitigate associated risks to human health and the environment.

The property owner will comply with all local, state, and federal laws and regulations by obtaining all necessary approvals and permits to conduct the activities pursuant to an approved RAP. If during the implementation of this RAP, any previously undiscovered contamination, changes to the remediation schedule, previously undiscovered storage tanks and other oil-related issues, or citation from regulatory entities related to health and safety practices are identified, MDE will be verbally notified immediately (within 24 hours) by the property owner. In addition, written notification will be submitted within 3 days.

## 2. SITE OVERVIEW

### 2.1 SITE DESCRIPTION

The Site is situated on approximately 2.9 acres of land within the northern portion of the 4.40-acre parcel identified as Block 1417, Lot 001, Ward 03, Section 020. 1401 East Pratt Street may be used as a property locator. The Site is currently owned by HABC and is utilized for multifamily housing consisting of six three-story brick apartment buildings, which are part of a larger complex known as Perkins Homes.

The Site can be accessed from all sides via East Pratt Street to the north, South Caroline Street to the east, Gough Street to the south, and South Eden Street to the west. Numerous entry points and sidewalks bisect the Site from these streets. The Site location is depicted on Figure 2-1, existing Site conditions can be found on Figure 2-2, and a Proposed Subdivision Plan is provided on Figure 2-3 (Appendix A).

### 2.2 SITE HISTORY

Review of historical resources indicates that the Site has been developed since at least 1890 prior to the construction of Perkins Homes in the early 1940s. Prior to 1938, the Site was developed as typical city blocks with rowhomes and commercial businesses. Between 1938 and 1943, Perkins Homes were constructed. Today, the Site remains the same layout as originally constructed.

### 2.3 ENVIRONMENTAL SETTING

The Site is bounded by East Pratt Street to the north; South Caroline Street to the east; additional multifamily housing units, beyond which is Gough Street to the south; and South Eden Street to the west. Additionally, City Springs School is located directly across East Pratt Street to the north. The partially vacant Lombard Middle School is located northwest of the intersection of East Pratt Street and South Caroline Street to the northeast. Businesses are located directly across South Eden Street to the west. In addition, the Site contains a central paved parking and recreational area.

The Site is located on the U.S. Geological Survey Baltimore West, Maryland 7.5-minute topographic quadrangle map. The elevation of the Site is approximately 20 feet (ft) above mean sea level. The nearest surface water feature as noted on the topographic map is the Jones Falls, located approximately 0.38 mile to the west, and the Baltimore Harbor, located approximately 0.5 mile to the south-southwest. In general, topography in the immediate vicinity of the Site slopes to west towards the Jones Falls and the Harbor. Surface water flows into the City of Baltimore stormwater collection system. Groundwater flow is anticipated to mimic topographic conditions and is anticipated to be to the southwest with some radial flow to the northwest and southeast. Generally, depth to groundwater within Baltimore City averages 15 ft below ground surface.

Based on a monitoring well survey, groundwater occurs at an average depth of 10 ft across the Site. Isolated perched waters were encountered between 5 and 10 ft below grade. The groundwater gradient was determined to be in the southwest direction, consistent with topography.

Review of the Web Soil Survey (Natural Resources Conservation Service, <http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>), indicates that the entirety of the Site is underlain by the Urban Land Complex characterized by a 0 to 15 percent slope. The Urban Land Complex is defined as an area where more than 80 percent of the surface is covered by asphalt, concrete, buildings, or other impervious structures.

According to the Maryland Geological Survey Geologic Map of Baltimore County and City, Maryland, dated 1968, the Site is underlain by the Potomac Group. The Potomac Group is described as:

“Interbedded quartzose gravels; protoquartzitic to orthoquartzitic argillaceous sands; and white, dark gray and multicolored silts and clays; thickness 0 to 800 feet”

The Potomac Group contains the following formations:

- Raritan and Patapsco Formations: “Gray, brown, and red variegated silts and clays; lenticular, cross-bedded, argillaceous, subrounded sands; minor gravels; thickness 0 to 400 ft.”
- Arundel Clay: “Dark gray and maroon lignitic clays; abundant siderite concretions; present only in Baltimore-Washington area; thickness 0 to 100 feet.”
- Patuxent Formation: “White or light gray to orange-brown, moderately sorted, cross-bedded, argillaceous, angular sands and subrounded quartz gravels; silts and clays subordinate, predominately pale gray; thickness 0 to 250 feet.”

It was observed during previous site investigations conducted by EA that the approximate average top 2 ft of soil throughout the Site was comprised of fill consisting of asphalt, brick, concrete, subbase, organics, silt, gravels, and sand. Soil beneath the fill material was native material and primarily consisted of sands, silts, and clays.

## 2.4 ENVIRONMENTAL INVESTIGATIONS

Multiple environmental investigations have been performed across the Site between 2019 and 2020. EA performed a Phase I ESA in April 2019 and a Phase II ESA in October 2019. A Geotechnical Investigation was performed by Geo-Technology Associates, Inc. (GTA) in November 2019. Additionally, EA completed a Phase I ESA Update in March 2020 and a supplemental Phase II ESA in May 2020. The reports are summarized herein:

- The 2019 Phase I ESA was performed by EA in April 2019. The purpose was to determine if the Site had been impacted with environmental contamination by current or historical site activities. The investigation determined the potential for contamination across the Site. The historic use of the property has been urban development since prior to 1890. Due to historic demolition and rebuilding activities it is unknown what site conditions existed below grade throughout the Site. Furthermore, the Site is being demolished and rebuilt under current, more stringent environmental regulations. Additionally, underground storage tanks were formerly located on adjacent properties to the Site and a total of three former drycleaners/laundries were noted as being upgradient of the Site and adjacent (downgradient) to the Site.
- The 2019 Phase II ESA was performed by EA in October 2019. The report evaluated soil, groundwater, and soil vapor within the Site, with the purpose to evaluate the recognized environmental conditions identified in the Phase I ESA of the Site, to evaluate areas of future development, and to provide site-wide comprehensive characterization data. Shallow and subsurface soil samples were collected from strategic locations related to proposed future development and an approximate grid spacing for comprehensive spatial coverage. Groundwater samples were collected from three boring locations converted to permanent monitoring wells to assess upgradient, downgradient, and cross-gradient conditions across the Site as well as potential impacts from contamination associated with adjacent parcels/properties. Soil vapor samples were collected from within the footprint of the five proposed residential buildings.
  - Concentrations of metals, namely aluminum, arsenic, and iron, exceeded both the MDE Residential Cleanup Standards (RCS) and, where applicable, the Anticipated Typical Concentrations (ATCs) in most soil samples across the Site and with depth. Concentrations of antimony, hexavalent chromium, lead, manganese, mercury, and vanadium, though detected in most soil samples, had only isolated exceedances of the MDE RCS and, where applicable, the ATCs. Lead and mercury exceedances were limited to the shallow (1-ft) soil samples, whereas hexavalent chrome exceedances were measured in several shallow (1-ft) samples and several deep (10-ft) samples, all on the east side of the property. PAHs, namely benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, and dibenz[a,h]anthracene, were reported at concentrations in soil that exceed the MDE residential standards. The PAHs were most prevalent in shallow (1-ft) soil samples collected from the eastern side of the Site in the area of proposed Building B and the southern portion in the area of the proposed new street. Two isolated exceedances of PAHs were measured in a central and southwest location. All but one PAH exceedance were limited to a shallow (1-ft) depth; PAHs in the northeast corner of the Site were measured to a 6-ft depth with non-detectable concentrations in the underlying deep (10-ft) sample. Lacking an onsite source, the occurrences of PAHs are believed to be related to fill material and the urban environment. Regardless of origin, the mean concentration of benzo(a)pyrene exceeded the MDE residential standard and would therefore be considered a chemical of potential concern (COPC) for remedial action.

- Several PAHs and hexavalent chrome were identified as non-detect in groundwater samples. However, the analytical laboratory could not achieve sufficiently low detection limits to measure below their respective MDE Groundwater Standard. Because of this limitation, it is only reasonable to determine that gross contamination of groundwater from PAHs and hexavalent chromium is not present at the Site and therefore these compounds would not be considered COPCs. No detections above the laboratory reporting limits were reported for volatile organic compounds. Manganese was detected above the MDE Groundwater Standard in two of the monitoring wells.
- Concentrations of chloroform were detected in all seven soil vapor samples; however, only one concentration exceeded the Tier 1 MDE Residential Soil Gas Target value (in the southeast corner of the Site). Other detections of petroleum-related compounds were measured in soil gas, but all were below the MDE Residential Target standards. The presence of chloroform can often be related to laboratory artifacts or chlorine by-products from treated drinking water (e.g., leaky pipes). The presence of one detection of chloroform above the MDE Tier 1 standard does not indicate a vapor intrusion concern, and therefore chloroform would not be considered a COPC.
- The GTA Geotechnical Report for Perkins Homes, Block A (GTA 2019) identified fill material typically at depths ranging from 2-7 ft below existing grade. However, one area of deeper fill was encountered at up to 22 ft below grade in the northeast corner of the Site. Additionally, existing paving consisting of asphalt, concrete, and gravel subbase was reported in the surficial 6-10 inches (in.) throughout the Site.
- The Supplemental Phase II ESA was directed by MDE (MDE; 11 May 2020) under the VCP and complements the findings of the Phase II ESA, Perkins Homes-Block A, March 2020 by EA. The report presented the results of additional soil sampling targeted at enhancing site-wide characterization based on future-use Decision Units (DUs). Multi-increment composite soil sampling at depth-specific intervals was performed to refine the understanding of metals and PAH impacts in site soils for decision-making pertaining to movement of site soils during redevelopment, further evaluation of risk to human health during construction and for future residents, and long-term property management considerations. Based on the Site development plans and associated soil excavations, the Site was divided into two DUs for further characterization. DU-1 and DU-2 consist of an area of shallow (7-ft) excavation and an area of deep (21-ft) excavation for residential development, respectively. Soil borings were advanced at 25 locations throughout Block A.
- The results of composite multi-increment sampling were consistent with the nature and extent of metals and PAH COPCs identified in the March 2020 Phase II ESA. Similar to the prior results, the metals and PAH exceedances were more prevalent in the shallow soil samples and in the eastern portion of the Site.

- The presence of elevated concentrations of metals and PAHs in the shallow (0-2 ft) sampling interval in both DU-1 and DU-2 indicates a strong correlation with fill material identified within the shallow zone. PAH exceedances were not reported in any of the deeper sampling intervals. Metals concentrations in the DU-1 and DU-2 deeper sampling intervals appeared relatively similar in concentration with a few exceptions, indicating the distribution of the metals exceedances is likely not the result of site-related releases but rather is related to local background conditions and/or typical urban environments.
- Regardless of the origin, the concentrations of PAHs (benzo[a]anthracene, benzo[a]pyrene, benzo[b]fluoranthene, dibenzo[a,h]anthracene, and ideno[1,2,3-cd]pyrene) and metals (aluminum, arsenic, iron, lead, manganese, vanadium, and hexavalent chrome) exceed the MDE RCS and, therefore, these PAHs and metals are considered COPCs.

The Area of Concern is considered the entire subdivided parcel. Figure 2-4 (Appendix A) depicts the Area of Concern and soil analytical results from the Supplemental Phase II ESA.

## 2.5 DEVELOPMENT AND FUTURE USE

The proposed redevelopment plan for the Site includes use as a multifamily residential development. Block 1417 will be subdivided into two lots: Lot 1 – 1.9797 acres (“Block A”), and Lot 2 – 1.98 acres (not part of current development). The Block A development will consist of three buildings: two buildings as townhomes and one building as apartments. The eastern portion of the apartment building will include a subgrade parking garage beneath the building. Additional site amenities and features include surface level parking, a playground area, bioretention basins, and planting areas for various types of vegetation. A majority of the Site will be hardscape surface (86 percent) and the remainder will be softscape (14 percent). The redeveloped area will be serviced by municipal water, sewer, and utilities. Additionally, a new street totaling approximately 0.43 acre will bisect Block 1417 between Lot 1 and Lot 2 but is not considered part of the Site nor is it included in this RAP.

Based on existing conditions at the Site and the proposed future use, Tier 1B (Residential-Restricted) requirements will be applied as part of the RAP. Future exposed populations at the Site include child, youth, and adult resident users, construction workers, and commercial workers.

## 2.6 RESPONSE ACTIONS

The entire property will be subject to this proposed RAP. This proposed RAP is a method of development that the participant has selected to eliminate the potential for unacceptable levels of environmental risk to future residential, construction worker, commercial worker, and onsite visitor populations. The RAP will be implemented by demolishing all existing site features including buildings, foundations, and paved surfaces. The Site will be regraded to accommodate proposed site features. A containment remedy will be constructed to eliminate the exposure pathway between site soil and potential receptors and will consist of an engineered cap. In

planned hardscape areas the surface will be covered by asphalt or concrete. The cap in softscape areas will consist of at least 2 ft of clean fill material with consideration to the depth of future plantings. The engineered cap will affect all portions of the property.

Following implementation of the containment remedy, institutional controls include groundwater use restriction, excavation restriction/notification, soil disposal requirements, and annual cap inspections and maintenance for the engineered cap. These will be recorded for the Site to maintain the integrity of the containment remedy and mitigate exposure to human health and the environment.

### 3. ADDITIONAL INVESTIGATORY INFORMATION

#### 3.1 CLEAN FILL CHARACTERIZATION PLAN

Clean fill brought onto the Site must be characterized to determine that it meets engineering specifications for particular use and passes screening analysis to ensure that it is not impacted in accordance with the MDE *Facts About... VCP – Clean Imported Fill Material*. It is necessary to verify through documentation that the fill source is clean. Documentation should include detailed information on the previous use of land where clean fill is obtained, whether an ESA was performed and any findings of the assessment, and the results of any testing performed. It is recommended that the documentation be signed by an environmental professional.

Clean fill material should be analyzed based on the source of the fill and knowledge of the prior land use. MDE recommends using the following analytical methods in Table 3-1, to determine whether potential contaminants are present in fill source areas.

**Table 3-1 Potential Contaminants in Fill Material**

Fill Source	Target Compounds / Recommended Analysis*
Land near an existing highway	Lead and PAHs
Land near a mining area or rock quarry	Heavy metals, asbestos, and pH
Agricultural land	Pesticides, herbicides, and heavy metals
Residential/acceptable commercial land	Volatile organic compounds, semivolatile organic compounds, total petroleum hydrocarbons, polychlorinated biphenyls, heavy metals including lead, and asbestos
* The recommended analyses should be performed in accordance with the most current U.S. Environmental Protection Agency SW-846 methods. Other possible analyses include hexavalent chromium.	

Representative samples should be collected while the clean fill material is still in place and analyzed prior to removal. An appropriate number of samples should be determined based on the approximate volume or area of the soil to be used as clean fill material. MDE recommends using the following guide in Table 3-2, to determine the number of samples needed to adequately characterize the clean fill material.

**Table 3-2 Clean Fill Material Characterization Requirements**

Area of Individual Borrow Area	Sampling Requirements
2 acres or less	Minimum of 4 samples
2 to 4 acres	Minimum of 1 sample every ½ acre
4 to 10 acres	Minimum of 8 samples
Greater than 10 acres	Minimum of 8 locations with 4 subsamples per location
Volume of Borrow Area Stockpile	Samples per Volume
Up to 1,000 cubic yards	1 sample per 250 cubic yards
1,000 to 5,000 cubic yards	4 samples for first 1,000 cubic yards + 1 sample per each additional 500 cubic yards
Greater than 5,000 cubic yards	12 samples for first 5,000 cubic yards + 1 sample per each additional 1,000 cubic yards

If the clean fill contains detectable amounts of COPCs, they should be evaluated for risk in accordance with the *MDE Cleanup Standards for Soil and Groundwater Interim Final Guidance (Update No. 3)* dated October 2018. A standard laboratory package, including a summary of the quality assurance/quality control sample results should accompany all analytical reports.

## 4. EXPOSURE ASSESSMENT

To mitigate future exposure to COPCs, as part of RAP activities, onsite soils will be capped with either an MDE-approved clean material or new pavement/concrete materials. The property is currently improved with three-story multifamily housing units associated with Perkins Homes. Future property use will be Tier 1B (Residential-Restricted). Existing buildings are planned for demolition and will be replaced with multiple-story, multifamily housing.

### 4.1 MEDIA OF CONCERN

#### 4.1.1 Soil

Soil is considered to be a potential medium of concern at the Site. Future construction, commercial/industrial workers, and residential users are likely to contact surface soil at the Site. Construction workers are likely to contact surface and subsurface soil during earth-movement activities associated with demolition and construction activities. Construction workers have the potential to be exposed to COPCs in the subsurface soils, particularly through inhalation of dust. The proposed health and safety controls outlined in Section 8.1 and the Site-Specific Health and Safety Plan (SSHASP) will mitigate the potential risk to construction workers from contacting impacted soil at the Site.

The proposed containment remedy and institutional controls will mitigate the potential for future receptors (commercial/industrial workers and residential users) from contacting impacted soil at the Site. Both commercial/industrial workers and future residents will be protected from COPCs through the implementation of an engineered cap. An Operations and Maintenance (O&M) Plan (Appendix D) will provide additional protections to commercial/industrial workers that may have to access subsurface soil for maintenance activities. Potential human exposure pathways are summarized in Section 4.2.

#### 4.1.2 Groundwater and Soil to Groundwater

Groundwater is considered to be a potential medium of concern at the Site. However, groundwater is not used as a potable water supply at the Site or in the surrounding area; further, the Participant will file a deed restriction prohibiting the use of groundwater at the Site in the future. As such, groundwater is not considered to be a potential medium of concern for future receptors (residential users, and construction, commercial/industrial workers).

Groundwater is considered to be a potential medium of concern for construction workers. Due to the planned development having subgrade parking garages and building areas, and groundwater is situated at depths ranging from 5-10 ft below ground surface, it is considered an exposure pathway for construction workers. Potential contact with groundwater by construction workers will be handled through health and safety protocols addressed in the SSHASP.

### 4.1.3 Soil Vapor

Soil vapor is not considered to be a potential medium of concern at the Site. However, a vapor barrier system is proposed for newly constructed buildings at this Site to address radon. The vapor barrier will be capable of blocking any spurious, unexpected vapor intrusion issues. The radon vapor barrier is not required to meet MDE-VCP requirements and therefore the design is not included as a part of the RAP.

## 4.2 POTENTIAL EXPOSURE PATHWAYS AND RECEPTORS OF CONCERN

The Site currently consists of six three-story multifamily housing units, asphalt covered areas, and sparse areas of grass and trees. Under the proposed future use, potential human receptors include future construction workers, future commercial/industrial workers, and future residents. Potential exposure pathways include incidental ingestion, dermal contact of metals/PAH-impacted soils, and dermal contact/incidental ingestion of groundwater.

Future residential and commercial/industrial users are likely to contact impacted soils unless a containment remedy that eliminates the exposure pathway is applied to the Site.

Construction workers are likely to contact groundwater and impacted soils during earth-movement activities associated with future construction activities.

In the absence of the containment remedy, the following potential human exposure pathways were identified for evaluation at the Site:

- **Future Construction Worker:** Incidental ingestion of soil; dermal contact with soil; inhalation of fugitive dust; incidental ingestion of groundwater; dermal contact with groundwater.
- **Future Onsite Commercial/Industrial Worker (Maintenance Activities):** Incidental ingestion of soil; dermal contact with soil; inhalation of fugitive dust.
- **Future Resident (Adults and Children):** Incidental ingestion of soil; dermal contact with soil; inhalation of fugitive dust.

## 4.3 RISK-BASED SCREENING AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN

Risk-based screening was conducted by comparing the maximum detected chemical concentrations for soil and groundwater to the MDE Cleanup Standards for Residential Soil and the MDE Cleanup Standards for Groundwater (MDE 2018). Soil vapor concentrations were compared against the Tier 1 MDE Residential Soil Gas Target value. Given the future use of the Site (Tier 1B Residential-Restricted), maximum concentrations for analytes in any sample medium that were above the applicable MDE Cleanup Standard were considered a COPC. Analytes detected above the applicable MDE Cleanup Standards consist of the following:

- Surface Soil:
  - Metals
  - PAH
  
- Subsurface Soil:
  - Metals
  - PAH
  
- Groundwater:
  - Metals
  
- Soil Vapor:
  - No COPCs identified.

The above analytes in soil and groundwater are considered COPCs.

#### 4.4 COMPLETE EXPOSURE PATHWAYS

The following complete exposure pathways have been identified at the Site:

- **Future Construction Worker:** Incidental ingestion of soil and groundwater; dermal contact with soil and groundwater; inhalation of soil particles.
  
- **Future Onsite Commercial/Industrial Worker (Maintenance Activities):** Incidental ingestion of soil; dermal contact with soil; inhalation of soil particles.
  
- **Future Resident (Adults and Children):** Incidental ingestion of soil; dermal contact with soil; inhalation of soil particles.

Table 4-1 provides a summary of exposure pathways and remedies.

**Table 4-1 Summary of Exposure Pathways and Remedies**

<b>Exposure Pathway</b>	<b>Population</b>	<b>Response Action</b>
Ingestion of Subsurface and Surface Soil	Future Resident (all)	<i>Engineering Control</i> – Placement of cap over the entire property will prevent unacceptable risks to future residential populations. <i>Institutional Control</i> – Deed Restriction requiring the scheduled inspection and maintenance of the cap, in perpetuity.
	Commercial/Industrial (all)	<i>Engineering Control</i> – Placement of cap over the entire property will prevent unacceptable risks to future commercial populations. <i>Institutional Control</i> – Deed Restriction requiring the scheduled inspection and maintenance of the cap, in perpetuity. <i>Administrative Control</i> – O&M Plan requiring procedures for accessing subsurface soil.
	Construction Workers	<i>Administrative Control</i> – A written Health and Safety Plan will control worker exposures by specifying appropriate personal protective equipment and hygiene practices.
Ingestion of Groundwater	Future Resident (all)	<i>Institutional Control</i> – Deed Restriction prohibiting the use of groundwater, in perpetuity.
	Construction Workers	<i>Administrative Control</i> – A written Health and Safety Plan will control potential worker exposure by specifying appropriate work practices, personal protective equipment, and hygiene practices.
Inhalation of Fugitive Dust	Future Resident (all)	<i>Engineering Control</i> – Placement of cap over the entire property will prevent unacceptable risks to future residential populations. <i>Institutional Control</i> – Deed Restriction requiring the scheduled inspection and maintenance of the cap, in perpetuity.
	Commercial/Industrial (all)	<i>Engineering Control</i> – Placement of cap over the entire property will prevent unacceptable risks to future commercial populations. <i>Institutional Control</i> – Deed Restriction requiring the scheduled inspection and maintenance of the cap, in perpetuity. <i>Administrative Control</i> – O&M Plan requiring procedures for accessing subsurface soil.
	Construction Workers	<i>Administrative Control</i> – A written Health and Safety Plan will control worker exposures by specifying an airborne dust Action Level, and by requiring routine dust monitoring and the use of dust suppression techniques as appropriate.
Dermal Contact with Subsurface and Surface Soil	Future Resident (all)	<i>Engineering Control</i> – Placement of cap over the entire property will prevent unacceptable risks to future residential populations. <i>Institutional Control</i> – Deed Restriction requiring the scheduled inspection and maintenance of the cap, in perpetuity.
	Commercial/Industrial (all)	<i>Engineering Control</i> – Placement of cap over the entire property will prevent unacceptable risks to future commercial populations. <i>Institutional Control</i> – Deed Restriction requiring the scheduled inspection and maintenance of the cap, in perpetuity. <i>Administrative Control</i> – O&M Plan requiring procedures for accessing subsurface soil.
	Construction Workers	<i>Administrative Control</i> – A written Health and Safety Plan will control worker exposures by specifying appropriate personal protective equipment and hygiene practices.
Dermal Contact with Groundwater	Construction Workers	<i>Administrative Control</i> – A written Health and Safety Plan will control potential worker exposure by specifying appropriate work practices, personal protective equipment, and hygiene practices.

## 5. CLEANUP CRITERIA

The containment remedy presented herein is a presumptive remedy as outlined by the MDE VCP in the *MDE Cleanup Standards for Soil and Groundwater Interim Final Guidance (Update No. 3)*, dated October 2018, and will eliminate the exposure pathway from the media of concern (surface/subsurface soil and groundwater) to the potential receptors (construction worker, future onsite commercial/industrial worker, and future residents). Soil analytical results from previous investigations at Perkins Homes – Block A were compared to the RCS and the Eastern Maryland ATC<sup>1</sup>. For purposes of this RAP, the greater of the RCS or the ATC was used to establish the Cleanup Standard. In the absence of an ATC value, the MDE RCS value was used.

The future use of this property will be classified as Tier 1B (Residential-Restricted) land use. A clean fill characterization plan (referenced in Section 3.1) will be used to verify that only appropriate clean soil and materials are brought onto the Site. The soil cleanup criteria selected for the Site are presented in Table 5-1. Cleanup standards are based upon the MDE Residential Soil Screening Criteria referenced above.

**Table 5-1 Selected Cleanup Criteria**

COPC	Cleanup Standard
Aluminum	11,000 mg/kg
Arsenic	3.6 mg/kg
Hexavalent chromium (Hex Chrome)	0.3 mg/kg
Iron	15,000 mg/kg
Lead	200 mg/kg
Manganese	480 mg/kg
Mercury	1.1 mg/kg
Vanadium	39 mg/kg
Benzo[a]anthracene	1,100 µg/kg
Benzo[a]pyrene	110 µg/kg
Benzo[b]fluoranthene	1,100 µg/kg
Dibenz[a,h]anthracene	110 µg/kg
ideno[1,2,3-cd]pyrene	1,100 µg/kg
mg/kg = Milligram(s) per kilogram.	
µg/kg = Microgram(s) per kilogram.	

<sup>1</sup> MDE has established Anticipated Typical Concentrations (ATCs) as background levels for naturally occurring substances (such as metals) that may be present in the environment from natural degradation processes and not necessarily as a result of man-made impacts. When an ATC concentration for a given province exceeds the “Proposed Maryland Cleanup Standards (Residential)”, the ATC value for the appropriate province may be proposed as an acceptable alternative to the risk-derived value presented in the State of Maryland Department of the Environment Cleanup Standards for Soil and Groundwater, Interim Final Guidance (MDE 2018).

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## 6. SELECTED TECHNOLOGIES AND LAND USE CONTROLS

Future use of the Site is Tier 1B (Residential-Restricted).

The Site will be redeveloped by demolishing existing three-story multifamily housing units and constructing new multifamily mixed-use housing. Site redevelopment plans include building footprints as well as surface level and subgrade parking areas, recreational areas, greenspaces, and bioretention ponds. A Proposed Site Development Plan is provided as Figure 6-1 (Appendix A).

The proposed redevelopment plan includes construction of the following:

- three residential buildings,
- paved areas,
- micro-bioretention facilities,
- vegetation planting areas, and
- a playground, as described below.

A majority of the Site will be covered by building slabs or pavement/hardscape surfaces (approximately 84 percent), while landscape areas are limited to small lawn areas, landscape islands and micro-bioretention facilities (approximately 16 percent).

### Residential Buildings: (35,713 square feet [SF] or 41.41 percent)

**Building A – Building A** is a multifamily residential apartment building consisting of two distinct sections. The western section of the building is slab-on-grade construction. Geotechnical considerations require 4-ft excavation of existing soil and re-compaction with additional excavation for areas below the footer bearing elevation to a maximum depth of 6.6 ft. Excavated material will be re-used in other areas of the Site.

The eastern portion of Building A is also a multifamily residential apartment building; however, it also contains below-grade parking. Construction plans for the eastern portion of the building require 12 ft of existing soil excavated to facilitate parking garage construction and compaction of soil at completion depth. Excavated soil may be re-used in other areas of the Site.

**Building B – Townhomes South** – seven townhome units constructed on slab-on-grade foundations. Geotechnical considerations require 4-ft excavation of existing soil and re-compaction with additional excavation for areas below the footer bearing elevation to a maximum depth of 6.6 ft. Excavated material will be re-used in other areas of the Site.

**Building C – Townhomes West** – seven townhome units constructed on slab-on-grade foundations. Geotechnical considerations require 4-ft excavation of existing soil and re-compaction with additional excavation for areas below the footer bearing elevation to a maximum depth of 6.6 ft. Excavated material will be re-used in other areas of the Site.

Pavements/Hardscapes (32,245 SF or 37.39 percent):

Asphalt driveways and parking areas are planned for vehicle traffic and resident parking. Concrete sidewalks and surfaces will be installed for pedestrian traffic and an outdoor amenity area. Geotechnical considerations require excavation of 18 in. of existing soil and re-compaction.

Micro-Bioretenion Facilities (1,595 SF or 1.84 percent):

Micro-bioretenion facilities are planned in four areas of the Site to accommodate stormwater management. Construction plans require 6 ft of excavation of existing soil to accommodate construction and placement of subgrade bioretention soil mix and underdrains.

Vegetation Planting Areas (12,751 SF or 14.78 percent)

Vegetation planting areas are limited to small lawn areas and landscape islands. Lawn areas will be planted with grass and a variety of shrubs and trees. Construction plans require 2-3 ft of excavation to allow for placement of new clean fill that is also suitable planting soil. The total area of lawns is 2,530 SF. Landscape islands will be planted with ornamental trees and shrubs and account for 10,221 SF.

Playground (3,930 SF or 4.55 percent):

One playground area is planned for the northwest corner of the Site. The playground will be constructed of a poured-in-place rubber surfacing over compacted crushed aggregate base, in addition to a central concrete walkway. The entire playground area will be covered; no lawn or exposed soil areas are planned in this location. Playground features will be installed above the rubber surface coating.

Finally, because of existing historical soil impacts, site redevelopment will include a 2-ft cap of clean soil in all greenscape areas and an associated O&M Plan. This is a common practice at all MBS development sites for added future resident and investor protections, and environmental insurance requirements.

The rationale for selecting the containment remedy is to effectively mitigate the threat to human health by eliminating potential contact of the onsite receptors with the impacted media (soil and groundwater). The capping technologies presented in this section will provide an adequate cap and eliminate these potential exposure pathways. Institutional controls presented herein will be placed on the Site to ensure that the potential exposure pathways are mitigated in the future.

Stormwater management systems will be onsite during construction activities to reduce potentially contaminated runoff from the property. Adequate measures will also be taken to prevent potentially contaminated sediments from being discharged from the property during construction.

The institutional controls proposed herein will provide an effective means of mitigating potential exposure to impacted media. Specifically, a restriction will be placed on the deed to prevent excavation activities at depths greater than 24 in. below the ground surface without prior approval of MDE and implementation of approved O&M procedures. All excess soil will be removed from the Site, categorized, and properly disposed in accordance with applicable local, state, and federal laws and regulations.

MDE will be verbally or electronically notified within 24 hours following the discovery of unplanned emergency conditions at the Site that will penetrate the cap and will be provided with written documentation within 10 days of the repair. In addition, MDE will be provided written notice a minimum of 5 business days prior to planned activities at the Site that will penetrate the cap, with the repairs completed within 15 days, and written documentation submitted to MDE within 10 days of the repair. Written notice of planned excavation activities will include the proposed date(s) for the excavation, location of the excavation(s), health and safety protocols (as required), clean fill source and documentation (as required), and proposed characterization and disposal requirements (as required).

Lastly, an SSHASP will identify the means and methods to protect construction workers engaged in intrusive activities at the Site. A copy of the SSHASP will be provided to MDE and will also be present onsite during all RAP construction activities.

The Site will be serviced by municipal water, municipal sewer, natural gas, and electric. Because the Site is serviced by municipal water, groundwater will not be used as a potable water supply, nor is it planned for use as a non-potable water supply. To ensure and maintain this use, a groundwater restriction will be placed on the Site prior to occupancy.

This containment remedy has been incorporated into the development plans for the Site. The response actions proposed for the Site are detailed in the following sections:

## **6.1 PAVED ASPHALT, CONCRETE, AND COVERED AREAS**

During development, the Site will be regraded and certain areas will be paved with asphalt or concrete in accordance with the following procedures:

- Demolition of existing Site features
- Rough grading the Site, offsite disposal of excess soil
- Placement of asphalt pavement and certified clean imported fill subbase, or placement of a concrete slab and certified clean imported fill subbase over areas to be hardscaped
- Deed restriction to maintain the cap and require future excavations at the Site to be approved by MDE prior to any disturbance to the subsurface.

Cross-sections detailing the composition of the impervious surface layers for asphalt, concrete, and playground areas are presented on Figure CS-1 in Appendix B and described below. For any areas requiring a geotextile marker fabric, the Design Team has selected Mirafi® 140N geotextile, consistent with MDE requirements. A technical specification sheet for Mirafi® 140N is presented in Appendix C.

#### Asphalt Covered Areas (Figure CS-1):

New asphalt parking areas and driveways will be capped using placement of 4.5 in. of super pave asphalt mix atop a 6-in. aggregate subbase mix (CR-6) for a total thickness of 10.5 in.

#### Concrete Paving (Figure CS-1):

Concrete sidewalks will be constructed by placing 5 in. of concrete mix over 4 in. of approved aggregate subbase above the compacted subgrade material for a total of 9 in. of concrete pavement and subbase.

Concrete vehicular pavement will be constructed by placing an 8-in. layer of cement concrete pavement atop a 6-in. layer of crusher run material over compacted subgrade for a total of 14 in. of concrete pavement and crusher material.

#### Playground Safety Surfacing (Figure CS-1):

The playground safety surface will be constructed by placing a geotextile marker fabric atop compacted subgrade. Above the marker fabric, a minimum 2-ft soil cap will be placed. Above the soil cap, compacted crushed aggregate will be placed per manufacturer requirements. A 2-in.-thick concrete cap will be placed above the crushed aggregate, and above the concrete cap 1.5 in. of poured-in-place rubber surfacing will be applied.

## **6.2 LANDSCAPED/NATURAL AREAS**

The current development plans include the creation of a publicly accessible greenspaces and bioretention basins. In landscaped areas, construction will adhere to the following protocols:

- Demolition of existing Site features
- Rough grading the Site, offsite disposal of excess soil
- Placement of an MDE-approved geotextile fabric as a marker/warning barrier
- Placement of a minimum 24-in. certified clean imported fill layer and topsoil
- Deed restriction to maintain the cap and require future excavations at the Site to be approved by MDE prior to any disturbance to the subsurface.

A cross-section detailing the composition of the landscaped areas is presented on Figures CS-2 through CS-4 in Appendix B and are described below. For any areas requiring a geotextile marker fabric, the Design Team has selected Mirafi® 140N geotextile (or similar specification product), consistent with MDE requirements. A technical specification sheet for Mirafi® 140N is presented in Appendix C. Landscape plants will be limited to those with root systems that will not penetrate the geotextile/marker barrier. The thickness of the cap will be a minimum of 2 ft, however, will be adjusted thicker to accommodate the planting of different species in order to ensure the root systems do not disturb the cap/soil interface. All excess soil will be removed from the Site, categorized, and properly disposed in accordance with applicable local, state, and federal laws and regulations.

#### Landscape – Lawn, Shrub, and Perennial Planting Areas (Figure CS-2):

A geotextile fabric will be placed atop a compacted subgrade. Above the geotextile marker fabric, a 2-ft layer of clean fill will be placed.

#### Deciduous and Ornamental Tree Planting Areas (Figure CS-3):

A geotextile fabric will be placed atop a compacted subgrade. Above the geotextile marker fabric, a 3-ft layer of clean fill will be placed.

#### Micro-Bioretenion (Figure CS-4):

Micro-bioretenion facilities will be constructed to manage and treat stormwater after development. The facilities will include installation of geotextile marker fabric over prepared subgrade. Above the fabric, a 12-in. layer of gravel will be placed with polyvinyl chloride piping to provide a drainage layer. Pea gravel will be placed above the gravel drainage layer, and above the pea gravel, 3 ft of clean fill (bioretention soil mix) will be installed. The surface will be completed with 3 in. of mulch.

### **6.3 SITE ACCESS AND CONTROL**

Prior to and during implementation of the response action, Site access will be limited through Site perimeter fencing, which will be installed prior to commencing demolition and construction activities. In addition, the development team will comply with all local, state, and federal laws and regulations by obtaining all necessary approvals and permits to conduct the activities pursuant to an approved RAP.

In addition, as previously discussed in Chapter 4, during construction and development, the potential exists for exposure to COPCs by construction workers through incidental ingestion, inhalation, and dermal contact. Therefore, future construction contractors must comply with all requirements of the SSHASP (to be developed prior to implementation of the RAP) and the health and safety protocols described herein. The primary actions taken to mitigate potential exposures to future construction workers will be environmental monitoring and the appropriate use of personal protective equipment (PPE) during construction activities.

## 6.4 INSTITUTIONAL CONTROLS (FUTURE LAND USE CONTROLS)

Long-term conditions will be placed on the RAP approval and the Certificate of Completion (COC) regarding future uses of the Site, which will be restricted to Tier 1B: Residential-Restricted. These conditions are expected to include the following:

1. Restrictions prohibiting the use of groundwater at the Site.
2. Notice to MDE prior to any future planned soil disturbance activities at the Site below areas designated for engineering controls. This written notice will be submitted a minimum of 5 days prior to any planned excavation activities at the Site that will penetrate the cap.
3. Complete appropriate characterization and disposal of any future material excavated from beneath the cap in accordance with applicable local, state, and federal requirements.

Per the MDE Residential Redevelopment and Land Use Controls Policy (MDE 2020) for Rental Properties (i.e., townhomes, multifamily apartment buildings with or without units on the first floor) the following criteria apply:

1. The property must meet, at a minimum, the Tier 1B residential land use as defined in the Cleanup Standards for Soil and Groundwater Interim Final Guidance (October 2018).
2. Properties that have a residential restricted use or have a projected future residential restricted use are required to remedy hazardous substances in soil to the applicable residential soil standard. Removal of hazardous substances in the soil to the applicable soil standard, other remedial measures/treatment technologies, or engineering controls as approved by MDE is required for this land use. Attainment of the soil standard must be demonstrated following the remedial action. A residential restricted land use may use one or more land use controls imposed as a condition of residential use to mitigate potential exposures to hazardous substances in soils.
3. A single building owner must be responsible for operating and maintaining the land use controls in perpetuity to protect public health and safety.
4. The COC and environmental covenant must include:
  - Requirement for the property owner to follow an approved O&M plan, which is incorporated into the COC and environmental covenant. The owner must retain an environmental consultant to conduct all inspections and submit all reports required by the operation and maintenance plan.
  - Requirement for leases to include notification of the environmental cap and prohibition on disturbing the environmental cap unless the property owner

- demonstrates that the environmental cap and/or vapor mitigation system is physically inaccessible to tenants.
- Requirement for leases to include access provisions for property owner and MDE inspection of all areas necessary to maintain the environmental cap, including inside units if necessary.
  - Requirement for the property owner to retain an environmental consultant to conduct annual inspections of the environmental cap and submit to MDE an annual report with the results of the inspections.

HABC will file deed restrictions as defined in the COC. HABC will maintain ownership and control of the Site during all phases of redevelopment and after completion. All exterior areas of the Site are subject to the proposed response action, a containment remedy (engineered cap), and institutional controls (deed restrictions). Restrictions on the future use and maintenance of the Site cap will be subject to the control of the property owner and management entity.

## **6.5 POST-REMEDATION REQUIREMENTS**

Post-remediation care requirements will include compliance with the conditions placed on the COC and the deed restrictions recorded for the Site. In accordance with the MDE VCP guidance, deed restrictions will be recorded within 30 days of issuance of the COC. The participant will send a copy of the COC determination to the public utility one-call system.

Physical maintenance requirements will include maintenance of the capped areas to prevent degradation of the environmental cap and unacceptable exposure to the underlying soil.

Physical maintenance requirements will include maintenance of the capped areas to prevent degradation of the cap and exposure to the underlying soil. As part of the Site redevelopment, the O&M Plan for MDE VCP is included in Appendix D. The O&M Plan includes a maintenance schedule and inspection protocols. The property owner will update and revise the plan accordingly as Site-specific utilization and development plans are finalized and implemented. A RAP Addendum will be submitted if the final development plans change.

Annual inspections of the cap will be conducted each year in the spring, targeting April. The property owner will be responsible for onsite cap maintenance inspections, performing maintenance to the cap, and maintaining all cap inspection records. Maintenance records will include, at a minimum, the date of the inspection, name of the inspector, any noted issues, and subsequent resolution of the issues. Areas of the cap that have degraded to a Pavement Condition Index of 4.0 or greater will be repaired within 15 business days of discovery. MDE shall be notified within 10 business days of any repairs that are the result of a Pavement Condition Index of 4.0 or greater or if damage to the landscaped capped area(s) exceeds 1 ft in diameter and/or 2 ft in depth. The notification will include documentation of the conditions being repaired and the location of the repair. In addition, MDE will be provided written notice at least 15 days prior to any planned excavation activities at the Site that will penetrate through the

cap. Written notice of planned excavation activities will include the proposed date(s) for the excavation, location of the excavation, health and safety protocols (as required), clean fill source (as required), and proposed characterization and disposal requirements. Cap maintenance requirements are also described in Section 8.4.

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## **7. EVALUATION CRITERIA FOR THE SELECTED TECHNOLOGIES**

### **7.1 ANTICIPATED REMEDIAL ACTIONS**

Based on the information evaluated from the various characterization events, the remedial options for the Site are limited. The concentrations and distribution of metals and PAHs require the removal of exposure pathways to the proposed future Site user. Considering that future Site residential users will have unrestricted access to the Site, the entire Site must be addressed. Remedial alternatives are considered for the surface soil only, as future users are not anticipated to have access to soils at depths greater than 2 ft below ground surface or below pavement. Subsurface soil exposure will be addressed through construction worker Health and Safety Protocols. Three remedial alternatives are presented below:

#### ***Option 1 – No Action***

This alternative involves allowing the Site to remain in its current condition for future Site access and use. Considering the identified human health risks associated with the environmental impacts, it is unlikely that this alternative would be considered successful by regulatory agencies and therefore is not considered a viable option at this time.

#### ***Option 2 – Full Impacted Material Removal***

The removal of impacted material would remove the exposure pathway to future Site users. However, this option has considerable drawbacks when evaluating the soil and chemical composition of the Site. Historically, the Site has been urban residential since the late 1800s with numerous demolition and rebuild projects. Subsurface results are similar to surface results at the Site with exceedances of metals and PAHs, and both shallow and deep soils represent unacceptable human health risk scenarios. As such, in order to remove the impacted materials from the Site, it is anticipated that the entire soil column would need to be excavated from surface to approximately 10-15 ft below ground surface. In the absence of proper engineering controls, the total excavation, removal, and transportation of impacted material from the developed parcel could expose construction workers to unsafe work conditions. In addition, the removal of material may have structural implications for the adjacent properties. Clean replacement material would need to be brought in to recreate these areas, resulting in an unrealistic expense to the development team.

When considering the anticipated removal, disposal, and replacement cost for removing impacted material; worker safety; and structural concerns with removing material from the Site, the full removal option is not considered a viable option at this time.

#### ***Option 3 – Site Capping with Clean Fill***

Capping the Site with certified clean imported fill material would remove the exposure pathway for future Site users. This option involves placing certified clean fill to a depth of 2 ft over areas determined to be impacted once buildings are demolished and subgrade parking areas are excavated. A geotextile marker fabric will be placed between the clean imported fill and

native material. Results from the Site indicate that there are impacts to surface soils and therefore the entire surface area would need to be addressed through a clean fill cap. Once the impacted areas are addressed, the risk criteria fall below acceptable levels and the remainder of the Site can be accessed by future Site users. Surplus soil will likely be generated under this option due to the depth of planned excavation activities associated with the subgrade parking areas. Any surplus soil being exported for offsite disposal will be disposed at a facility licensed to accept this type of waste

Both Options 2 and 3 require that clean fill be imported to the Site. Option 3 would require much less material placement and earthwork than Option 2 and provides a more realistic alternative. The placement of a certified clean imported fill cap over impacted material has been demonstrated to be a cost-effective method of removing the exposure pathways on development Sites and presents the best alternative for the project.

## **7.2 CRITERIA FOR CERTIFICATE OF COMPLETION**

A COC will be issued when all of the following criteria have been met:

1. Completion of capping activities that protect future populations from the existing contamination at the Site.
2. The design team will notify MDE VCP that the RAP has been completed and requests issuance of the COC from the MDE VCP.
3. A RAP Completion report will be submitted that documents that the RAP activities have been completed to the specification of the approved RAP. The RAP Completion report will include all field visit documentation, photo-documentation of each completed RAP milestone (i.e., clean fill capping, landscaping and paving,), health and safety monitoring during RAP implementation, Site plans illustrating paved areas, landscaped areas, building footprints, and final elevations of the capped Site. The RAP Completion report will also include copies of certificates of disposal, manifests, or bills of lading for all media and solid waste generated during implementation of the RAP, and proper documentation regarding any clean fill material brought onto the Site.

## **7.3 CRITERIA FOR CONTINGENCY MEASURES**

MDE will be notified immediately of any previously undiscovered contamination, changes to the RAP schedule, previously undiscovered storage tanks and other oil-related issues, and citations from regulatory entities related to health and safety practices. Any significant change to the implementation schedule will be submitted in writing to the MDE VCP within 7 days of the change. Notifications will be provided to the MDE VCP at the following address:

MDE Land Restoration Program  
Voluntary Cleanup Program  
c/o Division Chief  
1800 Washington Boulevard, Suite 625  
Baltimore, Maryland 21230  
Phone: 410-537-3493

In addition to verbal notifications, the MDE VCP will be provided with all documentation and analytical reports generated as a result of newly identified conditions. This includes manifests for contaminated material disposed offsite.

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## 8. PROPOSED RESPONSE ACTION IMPLEMENTATION

The following section includes plans and protocols for implementation of the proposed Response Action, including general health and safety protocols, reporting requirements, maintenance, excavation protocols, and specifications for clean fill characterization. Adequate measures will be taken to prevent potentially contaminated sediments from being discharged from the property during construction. A sediment and erosion control plan will be approved by the City of Baltimore.

### 8.1 GENERAL HEALTH AND SAFETY PROTOCOLS

During construction and redevelopment, the potential exists for exposure to COPCs (incidental ingestion, dermal contact, inhalation) by construction workers. Therefore, construction contractors will comply with all requirements of the RAP health and safety protocols, Occupational Safety and Health Administration (OSHA) guidelines for managing contaminated materials, and the SSHASP. A copy of the SSHASP will be maintained onsite in the construction trailer.

The primary actions to mitigate potential exposure to future construction workers will be environmental air monitoring and the appropriate use of PPE (e.g., hard hats and steel-toed boots) during construction activities. Construction workers will be informed on the proper measures (e.g., PPE) and protocols upon incidental contact with groundwater according to the SSHASP. A summary of the procedures for addressing potential exposure to airborne dust or soil is provided in the following section.

### 8.2 AIR MONITORING REQUIREMENTS

Air monitoring requirements are included in the SSHASP. To evaluate risks associated with dust emissions generated during general construction operations and cap construction activities relative to the COPC identified in Site soils, site-specific dust action levels were calculated for each of the identified COPC at the Site. These values were calculated using the highest concentration of each COPC in soil (and assuming the concentration in soil was equal to the concentration in air) and the OSHA permissible exposure limits (PELs) for each COPC and for particulates not otherwise regulated (nuisance dust) to provide a conservative estimate of potential construction worker exposure.

To evaluate risks associated with dust emissions generated during construction activities relative to the COPCs identified in Site soils (metals and PAHs), a total site-specific dust action level was calculated for the Site by using the PELs for airborne concentrations of the COPCs at the Site. The action level was calculated using the highest concentration of each COPC in soil (and assuming the concentration in soil was equal to the concentration in air) to provide a conservative estimate of potential worker exposure. The calculated site-specific permissible dust levels ranged from 20 to greater than 1,000 milligrams per cubic meter ( $\text{mg}/\text{m}^3$ ). These concentrations are greater than the OSHA PELs for total dust ( $15 \text{ mg}/\text{m}^3$ ), and the OSHA and American Conference of Governmental Industrial Hygienists (ACGIH) PEL and threshold limit

value (TLV) for respirable “nuisance” particulates not otherwise specified of 5.0 mg/m<sup>3</sup> and 3.0 mg/m<sup>3</sup>, respectively.

The action level for the purposes of determining the need for dust suppression techniques (e.g., misting) and/or continuous monitoring during future construction activities completed at the Site will be 3 mg/m<sup>3</sup>. The action level is based on the lowest of the site-specific dust action levels, OSHA PELs, and ACGIH TLV. Refer to Table 8-1 for environmental dust monitoring requirements.

Environmental dust monitoring (within the construction zones) is proposed for approximately 40 hours per week. This monitoring frequency shall continue throughout the duration of Site grading and environmental capping activities. Following completion of the initial primary Site grading activities, and once the majority (greater than 95 percent) of the environmental cap has been completed, an alternative frequency may be considered. If an alternative frequency is proposed, this frequency will be submitted to the MDE VCP for review and approval prior to implementing.

Air monitoring will be implemented as follows:

- At the start of intrusive Site activities
- Periodically during intrusive Site activities (30-minute intervals)
- When contaminants other than those previously identified are being handled
- When a different type of operation is initiated, or conditions change
- If personnel are working in areas with obvious particulate contamination
- If a sufficient reasonable interval has passed so that exposures may have significantly changed.

Air monitoring will be performed using a ThermoElectron Corporation Personal Data RAM 1000AN dust monitor or equivalent, or equivalent real time air monitoring device. If the 3 mg/m<sup>3</sup> action level is exceeded, operations will be shut down and dust suppression implemented. Operations may be resumed only once monitoring indicates that dust concentrations are below the 3 mg/m<sup>3</sup> action level.

As applicable, air monitoring will be conducted during RAP excavation activities in the immediate work zones and surrounding areas to assess levels of exposure to Site workers, establish that the work zone designations are valid, and verify that the respiratory protection being worn by personnel is adequate.

In addition to the above, as a precautionary measure to ensure that dust and/or sediment from onsite grading, excavation, and earthmoving activities does not migrate beyond the Site

boundary, a wheel wash station shall be present at the construction entrance(s) to the Site, a street sweeper shall be engaged on an on-call basis to ensure that appreciable soil is not tracked onto the surrounding rights-of-way, and a water truck will be engaged to perform site-wide wetting/dust suppression on a daily basis.

As specified in the SSHASP, air monitoring will be conducted initially and at interval frequencies of 30 minutes. If the action level is exceeded, operations will be shut down, and dust suppression will be implemented. Operations will be resumed only once retesting shows that dust concentrations are below the action level.

**Table 8-1 Environmental Monitoring Requirements**

<b>Instrument</b>	<b>Location of Monitoring</b>	<b>Frequency</b>	<b>Action Level</b>	<b>Response</b>
Dust Monitor	Breathing Zone	Initially and every 30 minutes	Above 3.0 mg/m <sup>3</sup>	Implement dust suppression.
<u>Dust Monitoring</u>				
Calculations assume that the concentration in the soil is the same as the concentration in the air. Arsenic and PAHs are present at a concentration such that the nuisance dust level (or particulates not otherwise classified) of 3 mg/m <sup>3</sup> would be exceeded prior to reaching the contaminant-specific OSHA action levels or PELs. Therefore, the action level for dust particles will be established at 3 mg/m <sup>3</sup> . Also, the PEL is based upon an 8-hour time-weighted average, and any visible dust exposure or dust at significant levels would be for a very short time period (matter of seconds in the breathing zone) prior to being suppressed.				

### **8.3 REPORTING REQUIREMENTS**

Reporting required during implementation of the RAP will consist of RAP addenda, including construction documents, the initial written notification and construction schedule, City of Baltimore permits, monthly progress reporting, and submission of the Response Action Completion Report. Any significant changes to the implementation schedule will be submitted immediately in writing to MDE.

The RAP implementation schedule, construction documents, and City of Baltimore permits will be forwarded to MDE prior to beginning RAP activities. Monthly progress reports will be submitted to MDE documenting the RAP implementation. At the completion of RAP activities, a Response Action Completion Report will be submitted to MDE for review and approval. The Response Action Completion Report will include documentation regarding field visits, photo-documentation as each RAP milestone is completed (i.e., clean fill capping, landscaping, and paving), health and safety monitoring during RAP implementation activities, and as-built site plans illustrating all paved areas, open landscaped areas, and final elevations of the capped Site. Copies of certificates of disposal or manifests, as applicable, for environmental media and solid waste generated during the performance of the RAP will be included in the Response Action Completion Report.

### **8.4 MAINTENANCE REQUIREMENTS**

Physical maintenance requirements will include maintenance of the capped areas to prevent degradation of the environmental cap and unacceptable exposure to the underlying soil. Annual inspections will be scheduled, targeting early spring. As discussed above in Section 6.4, the owner must retain an environmental consultant to conduct all inspections and submit all reports required by the O&M Plan. Any degraded areas of the cap will be repaired within 15 business days of discovery. MDE will be provided with written documentation of the repair within 10 business days after completion of the repair. In addition, MDE will be provided written notice within 15 days prior to any planned excavation activities at the Site that will penetrate the cap. Written notice of planned excavation activities will include the proposed date(s) for the excavation, location of the excavation, health and safety protocols (as required), clean fill source (as required), and proposed characterization and disposal requirements.

### **8.5 SOIL EXCAVATION, STAGING, SAMPLING, AND DISPOSAL**

Except for soils removed to accommodate any subgrade features or building components, soils excavated during redevelopment of the Site are anticipated to be placed under an environmental cap.

If there is “excess” soil such that offsite disposal is necessary, this “excess” soil will be placed in a designated stockpile area of the Site and/or live-loaded for transport to an MDE-approved disposal facility. Stockpiled soil will be placed on plastic or impervious surfaces, covered completely with 6-mil plastic so that the entire stockpile is encapsulated, and anchored to prevent the elements from affecting the integrity of the plastic containment. The number of representative samples for analysis will be selected using the criteria from an appropriate

disposal facility. Each composite sample must be submitted to a fixed laboratory for the following analyses: PAHs and Priority Pollutant List metals, and any additional analysis required by the selected disposal facility.

Based on the results of waste characterization, an appropriate hazardous or non-hazardous disposal facility will be selected for the transport and offsite disposal of the “excess” soil. Upon receipt of the waste characterization analytical results, an addendum to this RAP requesting approval of the selected disposal methodology and the selected disposal facility will be submitted to MDE. All waste manifests generated during the implementation of the RAP will be incorporated in the RAP Completion report for submittal to MDE.

All excess soil, rubble, or debris excavated from the Site will be disposed in accordance with applicable local, state, and federal laws and regulations.

## **8.6 GROUNDWATER**

Short-term groundwater dewatering may be required in one area of the Site. Specifically, it is anticipated that groundwater dewatering may be required within the planned deep excavation area on the eastern portion of the Site associated with the apartment building and below-grade parking garage.

Groundwater dewatering, if required, will be performed in compliance with all local, state, and federal laws and regulations and will be accomplished by obtaining the necessary discharge permits.

At this time, the applicants are evaluating several discharge alternatives, including the following:

- Pre-treatment filtration, as required, and discharge to the municipal sanitary sewer under City of Baltimore Department of Public Works Wastewater Discharge Permit.
- Pre-treatment filtration and discharge to the stormwater system via a general National Pollutant Discharge Elimination System permit.

Regardless of the discharge alternative selected, the discharge will be performed in accordance with City of Baltimore and State of Maryland regulations.

## **8.7 CLEAN FILL**

In general, the RAP proposes containment remedies to mitigate exposure to impacted soil. In order to implement this remedy, certified clean fill materials from a designated offsite location(s) will be utilized for construction of the cap in paved areas and landscaped areas.

If another clean fill source is to be used at the Site which has not already been identified, a certification letter will be submitted to MDE for review and approval. If a certification letter cannot be obtained from the supplier, a clean fill sampling and analysis plan, outlining the source and quantity of clean fill proposed, and the protocols for sampling frequency, analysis, and

quantification of the material as clean fill, will be submitted for MDE review and approval in accordance with Section 3.1. All MDE clean fill requirements (i.e., MDE Cleanup Standard for Residential Soil) will be met prior to transporting on the Site. Clean fill documents will be submitted to MDE for review and approval, and will also be included in the RAP Completion report.

If gravel or stone, including stone dust, is proposed for use as clean fill, the Applicants will provide certification from the quarry, on the generating quarry's company letterhead, that the material is not recycled, is derived from a virgin source mined at their facility, and that no controlled hazardous substances or oil were used in the extraction, production, or loading processes of the material.

As clean fill materials are transported to the Site they will be compacted in place or placed in designated stockpile areas. Clean fill material stockpiles will be maintained and secured separately onsite from impacted soils during RAP activities. Further, clean fill materials will be stockpiled on asphalt/concrete paved areas, 6-mil plastic, or capped areas. Prior to transport of clean fill to the Site, a Site plan, designating the proposed temporary stockpile area(s), as applicable will be submitted to the MDE VCP for review and approval.

## **8.8 ASBESTOS, LEAD, AND OIL**

RAP activities would require demolition of existing buildings. Asbestos-containing material and lead-based paint will be removed or managed prior to and during demolition. Asbestos-containing material removal will be coordinated with the MDE - Division of Asbestos Licensing and Enforcement. Lead-based paint will be addressed through OSHA Construction Worker compliance and notification.

If any undocumented underground storage tank or other oil storage container or any unanticipated environmental condition or hazard is discovered during excavation and intrusive Site activities, or a release of petroleum occurs at the Site, the Applicants will notify the MDE Oil Control Program at 410-537-3442 or the MDE VCP at 410-537-3493, as applicable.

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## 9. PERMITS, NOTIFICATIONS, AND CONTINGENCIES

The development team will comply with all federal, state, and local laws and regulations by obtaining all necessary approvals and permits to conduct the activities and implement the RAP. If, during the implementation of this RAP, any previously undiscovered contamination, changes to the remediation schedule, previously undiscovered storage tanks and other oil-related issues, or citation from regulatory entities related to health and safety practices are identified, MDE will be verbally notified within 24 hours by the Participant. Written notification will be provided to MDE within 3 days. Notifications will be provided to the following, as applicable:

MDE Land Restoration Program  
Voluntary Cleanup Program  
c/o Division Chief  
1800 Washington Boulevard  
Baltimore, Maryland 21230  
410-537-3493

MDE Oil Control Program (storage tanks and oil-related issues only)  
1800 Washington Boulevard  
Baltimore, Maryland 21230  
410-537-3442

In addition to verbal and written notifications, the MDE VCP will be provided with all documentation and analytical reports generated as a result of newly identified conditions. This includes manifests for contaminated material transported for offsite disposal. The development team understands that previously undiscovered contamination, previously undiscovered storage tanks or other oil-related issues may require an addendum to the approved RAP.

Through the proper use of approved sediment and erosion control techniques, adequate measures will be taken to prevent potentially contaminated sediments from being discharged from the property during construction.

### 9.1 IMPLEMENTATION SCHEDULE

Initial Site preparation activities are scheduled to commence in December 2020 and completion of construction is projected for June 2022.

In general, development activities include regrading the Site and construction of the planned containment remedy as outlined in Chapter 6. RAP activities will include demolition of existing structures, general regrading, excavation and utility installation, foundation installation (including excavation for building footers, concrete slabs, and any subgrade building features such as parking garages), and installation of the containment remedy within landscaped (geotextile and clean fill) and asphalt paved areas of the Site. Please note that throughout the implementation of the Response Action, access to the Site will continue to be restricted and will be controlled by construction fencing.

The development team understands that a detailed implementation schedule must be provided to MDE for review and approval prior to initiating RAP activities on all or any portion of the Site. Table 9-1 provides the initial construction schedule.

**Table 9-1 Remedial Action Plan Implementation Schedule**

Work Element	Month/Year	Comments
RAP Approval	10/2020	
Bond/Letter of Credit issued to MDE	11/2020	Within 10 days of RAP Approval
Demolition	12/2020–4/2021	
Construction/RAP Implementation	4/2021–6/2022	
Closure report and COC Request	7/2022–8/2022	
COC Received	9/2022	
COC Recorded in Land Records	10/2022	Within 30 days of Receipt of COC
Proof of COC Recording Provided to MDE	11/2022	Within 15 days of Recording

Progress Reports will be provided to MDE throughout the course of construction activities at the Perkins Homes – Block A Site. As the construction schedule progresses, any changes will be forwarded to MDE for review and approval as a RAP addendum. Materials prepared as part of the RAP addendum(s) (final development plans, deed restrictions, etc.) will be forwarded to MDE. Furthermore, RAP addenda prepared prior to initiating RAP activities will be compiled into one RAP addendum document for submittal to MDE. Lastly, it is also understood that any proposed clean fill material or receiving disposal facilities must be submitted to the MDE VCP for review and approval as addenda to the approved RAP. In summary, the following RAP addenda are anticipated:

- RAP Addendum #1: Final Construction Schedule
- RAP Addendum #2: Baltimore City Permits
- RAP Addendum #3: Clean fill Certification Letters

## 9.2 ADMINISTRATIVE REQUIREMENTS

A copy of the written agreement and certified zoning statement are included with this RAP as provided in Appendix E and Appendix F. The written agreement is in accordance with Section 7-512 of the Environmental Article, Annotated Code of Maryland, and states that the Participant will comply with the provisions of this RAP. Further, the Participant acknowledges that there are significant penalties for falsifying any information required by MDE under Title 7, Subtitle 5 of the Environmental Article, Annotated Code of Maryland. The certified zoning statement is required to be included in the RAP for the MDE VCP pursuant to Title 7, Subtitle 5 of the Environmental Article, Annotated Code of Maryland.

The applicants will provide a copy of the Public Notice sign and newspaper notice to MDE for review and approval. Upon approval, the sign will be posted on the Site for the 30-day public notice period. The newspaper notice will be published for 2 consecutive weeks during the same 30-day period. A public meeting will be held within 40 days after the first newspaper notice.

The Participant will file a performance bond or other security with MDE in the amount of \$20,000 within 10 days of RAP approval. The performance bond costs are determined based on the items needed to secure and stabilize the Site should the RAP activities not be completed. Table 9-2 summarizes the activities to be covered under the bond.

**Table 9-2 Activities Covered Under Performance Bond**

<b>Action</b>	<b>Estimated Cost</b>
Restrict access to the property by perimeter fencing and signage	\$17,000
Closure of three existing monitoring wells	\$3,000

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## 10. REFERENCES

- EA Engineering, Science, and Technology, Inc., PBC 2020a. *Phase I Environmental Site Assessment Report Perkins Homes – Block A, Baltimore City, Maryland 21231*. March.
- . 2020b. *Phase II Environmental Site Assessment Report Perkins Homes – Block A, Baltimore City, Maryland 21231*. March.
- . 2020c. *Supplemental Phase II Environmental Site Assessment Report Perkins Homes – Block A, Baltimore City, Maryland 21231*. July.
- Maryland Department of the Environment (MDE). Undated. Facts About VCP – Clean Imported Fill Material.  
[https://mde.maryland.gov/programs/land/marylandbrownfieldvcp/pages/vcp\\_info.aspx](https://mde.maryland.gov/programs/land/marylandbrownfieldvcp/pages/vcp_info.aspx).
- . 2018. *Cleanup Standards for Soil and Groundwater Interim Final Guidance (Update No. 3)*.
- . 2020. *Residential Redevelopment and Land Use Controls Policy*. August.
- Maryland Geological Survey. 2001. *Physiographic Provinces and Their Subdivisions in Maryland Map*.
- U.S. Geological Survey. 1974. *Baltimore, Maryland 7.5-Minute Topographic Quadrangle*. July.

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# **Appendix A**

## **Figures**

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Reference: US Geological Survey Baltimore East 7.5-Minute Quadrangle Topographic Map, dated 2014 obtained from EDR, Inc. ®

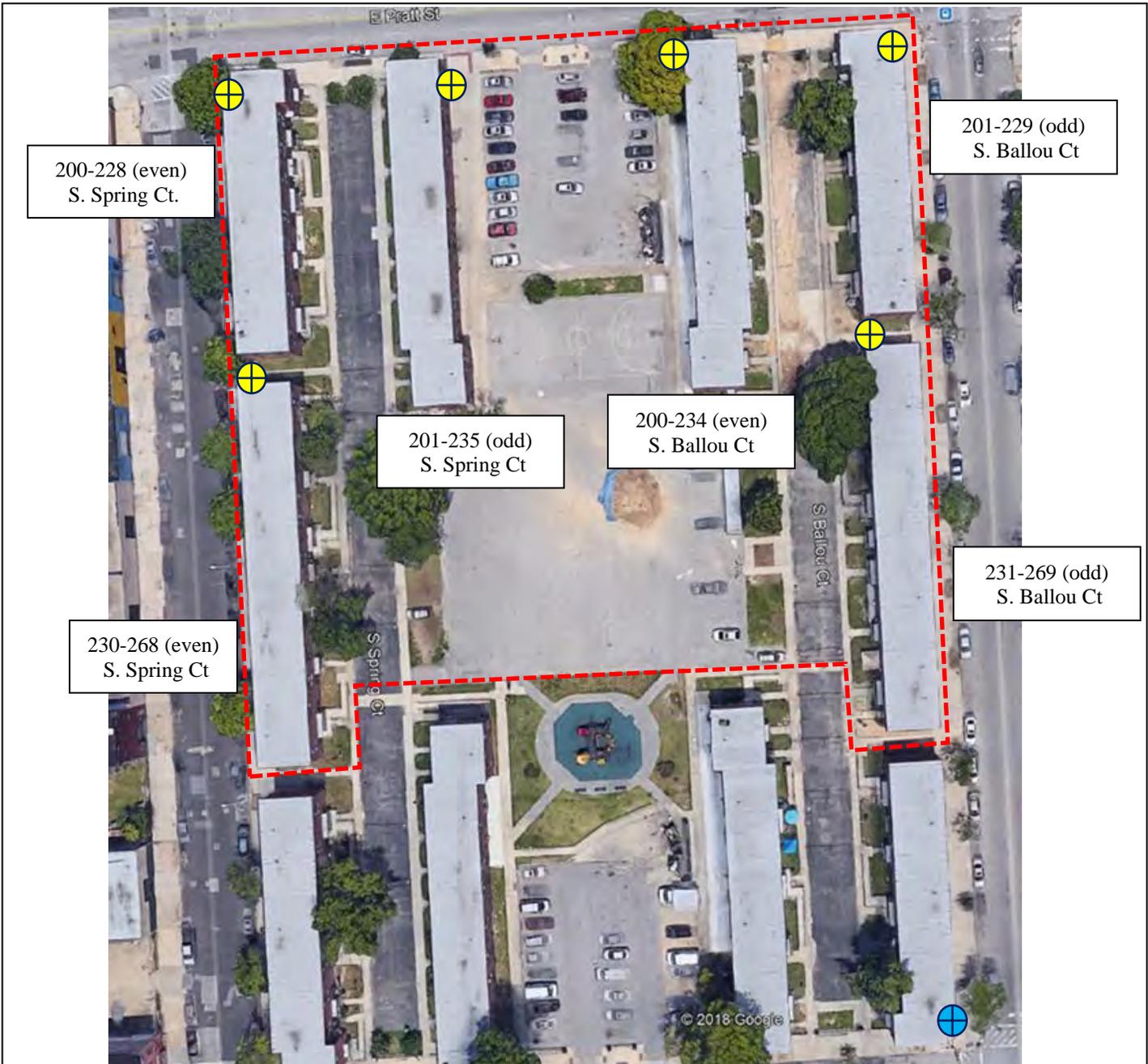
**Perkins Homes  
Block A  
Baltimore, MD 21231**

**EA**® EA Engineering, Science, and  
Technology, Inc., PBC  
225 Schilling Circle, Suite 400  
Hunt Valley, Maryland 21031

**Figure 2-1  
Site Location Map**

**Scale:  
1:24,000  
(original map)**

**EA Project  
No. 6355301**



**Legend**

Approximate Site Boundary



Hot Water Supply Room/Tanks



Crawlspace Entrance



Reference: Aerial dated 2017, obtained from Google Earth

**Perkins Homes - Block A  
Baltimore, MD 21231**

**Figure 2-2  
Existing Site Details**



**EA Engineering, Science, and  
Technology, Inc., PBC  
225 Schilling Circle, Suite 400  
Hunt Valley, Maryland 21031**

**Scale:  
Not to Scale**

**EA Project No.  
6355301**

# General Notes

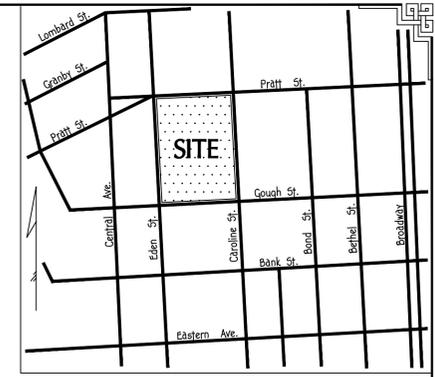
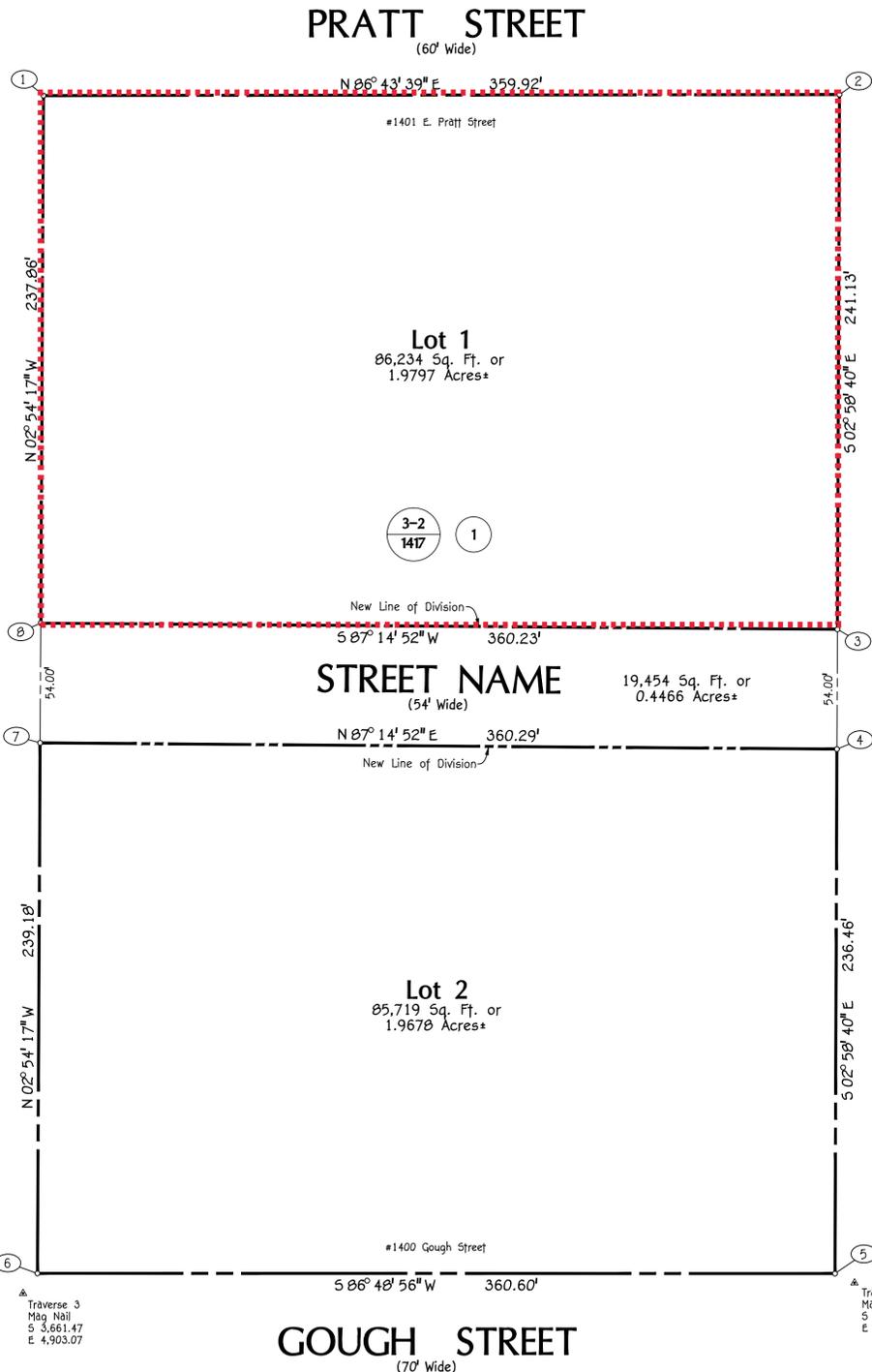
- Coordinates and bearings shown on this plat are referred to the system of coordinates established in the Baltimore City Survey Control System and based on the following station and bearing:  
35435 S 3,505.076 E 6,106.002  
Bearing to 35434: South 02°29'20" East
- Site Data:  
Area of Lots:.....171,953 Sq. Ft. or 3.9475 Acres\*  
Area of Road:.....19,454 Sq. Ft. or 0.4466 Acres\*  
Total Area of Property:.....191,407 Sq. Ft. or 4.3941 Acres\*  
Current Zoning: C-2
- Current Owner & Deed Reference:  
Housing Authority of Baltimore City  
Being a portion of the firstly described parcel in M.L.P. 0722/592
- #1401 - Denotes street address.

▲ Baltimore City  
Traverse Station  
34005  
S 3,252.03  
E 4,550.57

Traverse 2  
Mag Nail  
S 3,067.31  
E 4,072.27

Traverse 1  
Mag Nail  
S 3,044.36  
E 5,247.17

Baltimore City  
Traverse Station  
33655  
S 3,120.37  
E 4,821.61

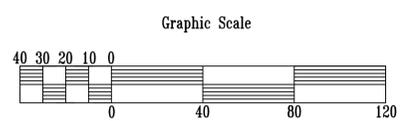


**Vicinity Map**  
Scale: 500 feet to 1 inch

COORDINATES		
	South	East
1	3,121.73	4,002.14
2	3,101.19	5,241.40
3	3,341.99	5,254.00
4	3,395.92	5,256.01
5	3,632.06	5,269.09
6	3,652.09	4,909.05
7	3,413.22	4,096.93
8	3,359.29	4,094.19

**Perkins Homes - Block A**  
**Baltimore, MD 21231**  
**Figure 2-3**  
**Proposed Subdivision Plan**

**Legend**  
Proposed Site Property Line .....



*S. J. Martenet and Co. Inc.*  
Land Surveyors since 1849  
14 West Franklin Street  
Baltimore, Maryland 21201  
Telephone: 410-539-4263  
www.martenet.com

**Owner**  
Housing Authority of Baltimore City  
417 East Fayette Street  
Baltimore, Maryland 21202  
Attn: Janet Abrahams

**Developer**  
Perkins Homes Phase I, LLC  
c/o McCormack Baron Salazar  
720 Olive Street, Suite 2500  
St. Louis, MO 63101  
Attn: Sasha Gaye Angus

**OWNERS CERTIFICATE**

The undersigned, owner of the land shown hereon, hereby certifies that, to the best of its knowledge, the requirements of Subsection (C) of Section 3-108 of the Real Property Article of the Annotated Code of Maryland have been complied with, insofar as same concerns the making of the plat and setting of the markers.

Housing Authority of Baltimore City

By: Janet Abrahams, President/Chief Executive Officer Housing Authority of Baltimore City

**SURVEYOR'S CERTIFICATE**

The undersigned, a Registered Property Line Surveyor of the State of Maryland, does hereby certify that he is the surveyor that prepared this plat and that the land shown on this plat has been laid out and the plat thereof has been prepared in compliance with Subsection (C) of Section 3-108 of the Real Property Article of the Annotated Code of Maryland, particularly insofar as same concerns the making of the plat and setting of the markers.

I further certify that this plat and the surveying work upon which it is based were prepared under my responsible charge, in accordance with the requirements set forth in C.O.M.A.R. Section 09.13.06.12. My license expires on December 30, 2020.

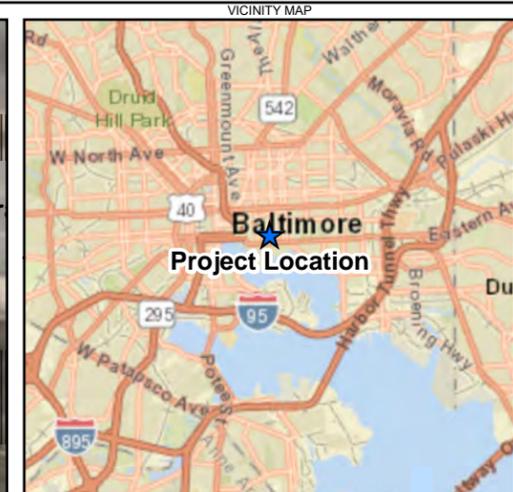
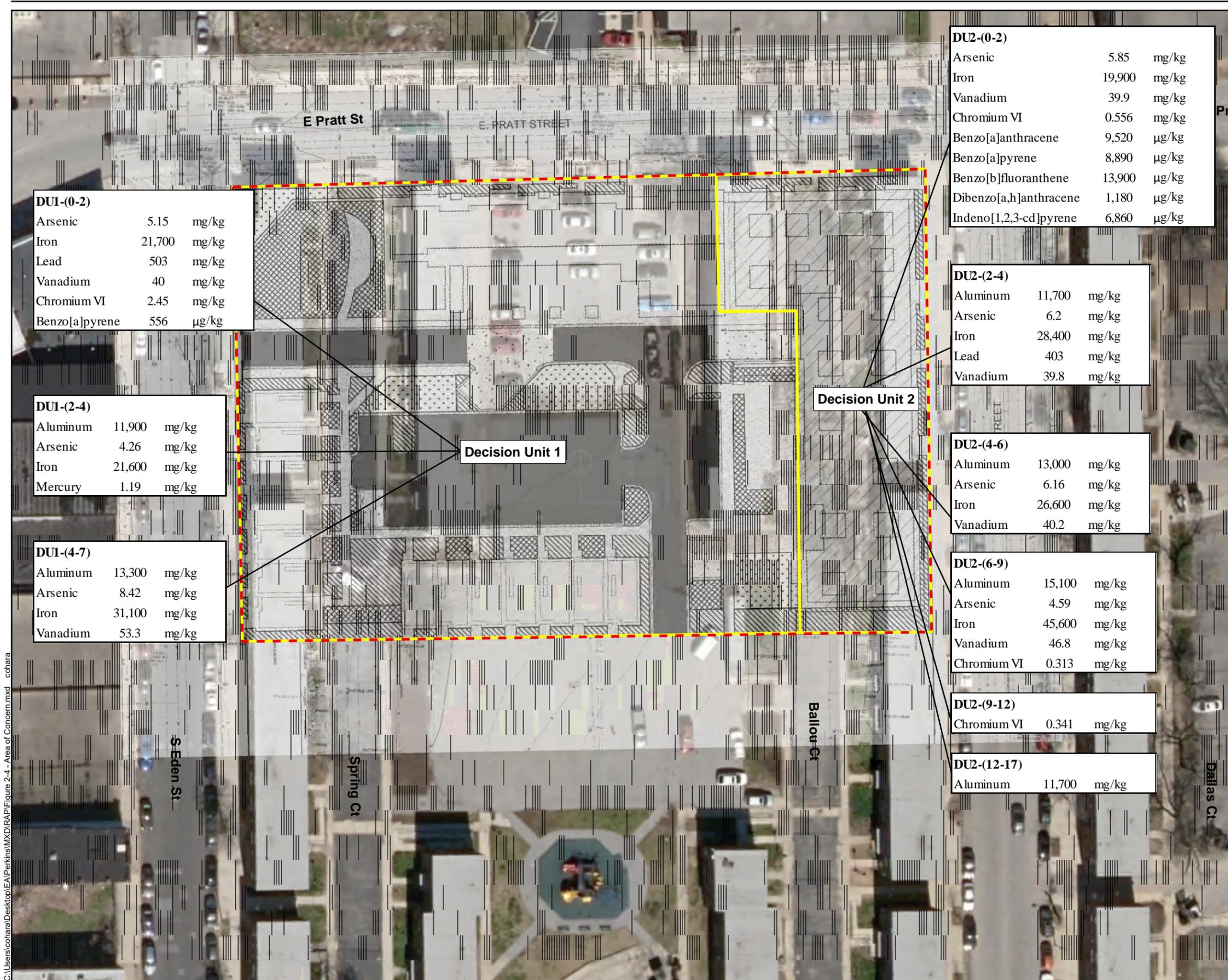
Joel M. Leininger, Registered Property Line Surveyor No. 467

**PRELIMINARY SUBDIVISION PLAT**

**PERKINS HOMES REDEVELOPMENT**

Ward 3 Section 2 Block 1417 Lot 1  
Baltimore City, Maryland

Scale: 40 feet to 1 inch Date: January 16, 2020

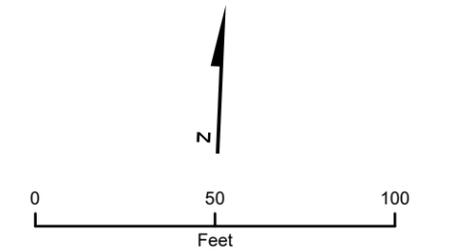


**Legend**

- Decision Unit
- Property Line / Area of Concern

**DU2-(2-4) - Decision Unit - (Sample Depth)**

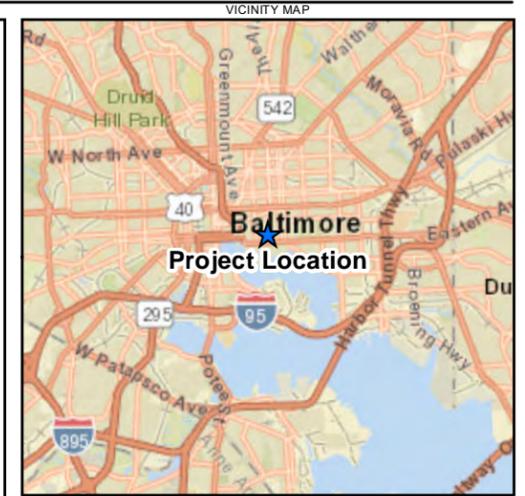
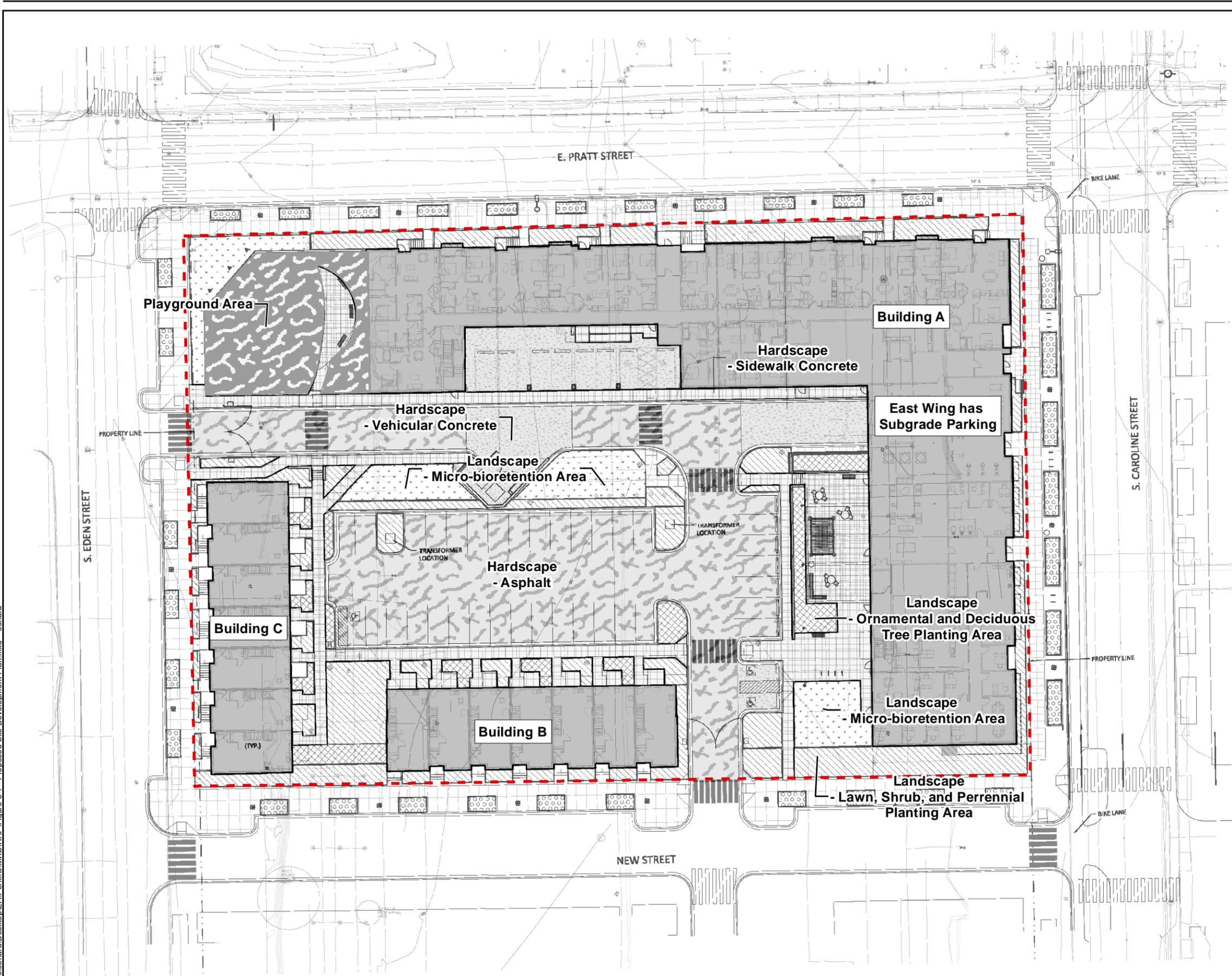
Acronyms:  
 µg/kg = micrograms per kilogram  
 mg/kg = milligrams per kilogram  
 Map Date: 9/9/2020  
 Source: MD iMap, 2017



**Figure 2-4**  
**Area of Concern**  
 Perkins Homes - Block A  
 Baltimore, MD

C:\Users\cochara\Desktop\EA\Perkins\MXD\RAP\Figure 2-4 - Area of Concern.mxd cochara

C:\Users\cochara\Desktop\EA\Perkins\MXD\RAP\Figure 6-1 - Proposed Site Development Plan.mxd cochara



- Legend**
- Property Line / Area of Concern
  - Hardscape**
    - Asphalt
    - Concrete - Sidewalk
    - Concrete - Vehicular
    - Playground Area
    - Building
  - Landscape**
    - Lawn, Shrub, and Perennial Planting Area
    - Ornamental and Deciduous Tree Planting Area
    - Micro-bioretention Area

Map Date: 9/22/2020  
 Source: MD iMap, 2017  
 RK&K, July 30, 2020

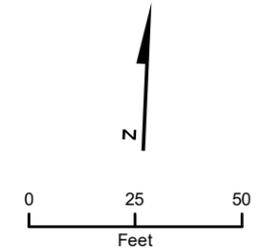


Figure 6-1  
 Proposed Site Development Plan  
 Perkins Homes - Block A  
 Baltimore, MD

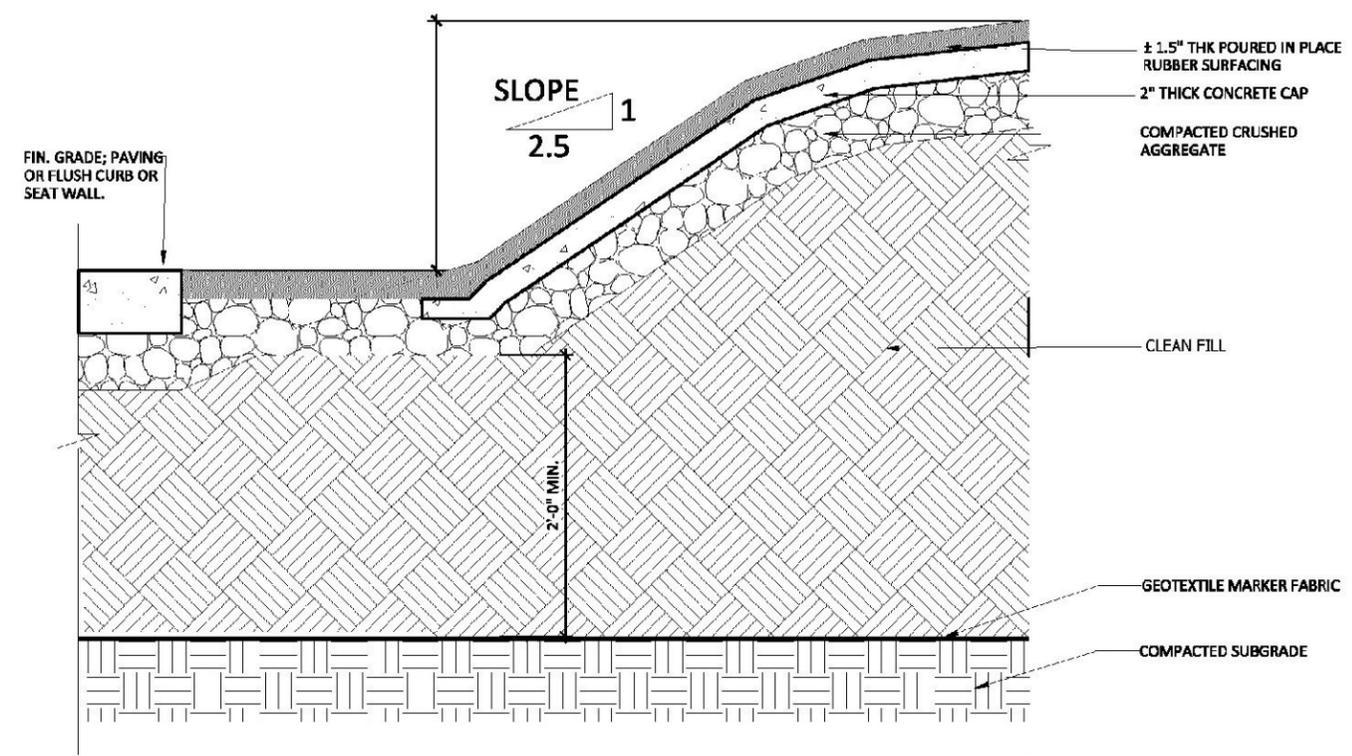
# **Appendix B**

## **Cross-Section Details**

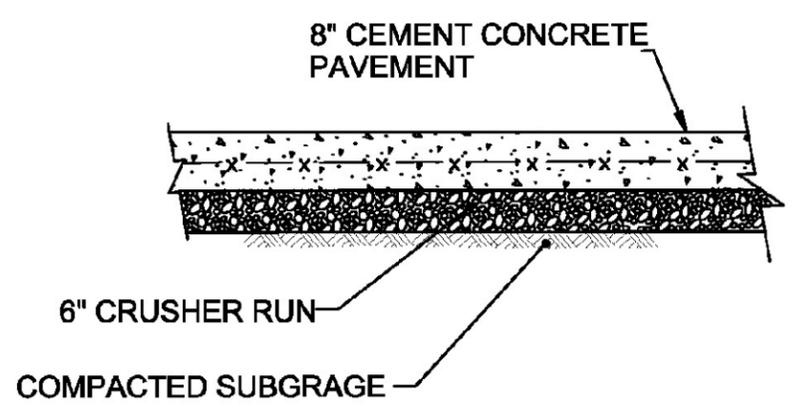
- CS-1 Cross Section – Hardscape
- CS-2 Cross Section – Landscape: Lawn, Shrub, Perennial
- CS-3 Cross Section – Landscape: Tree Planting
- CS-4 Cross Section – Stormwater: Micro-bioretenion

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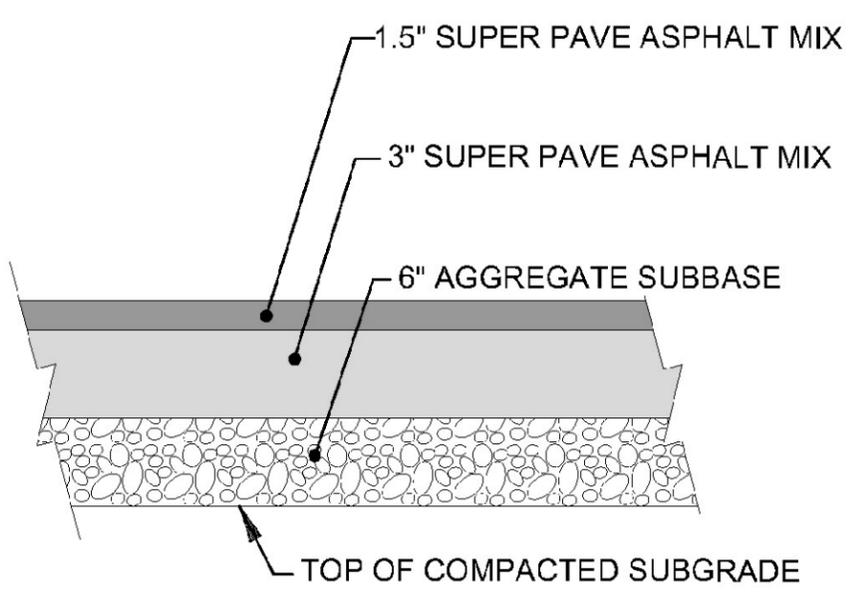
### PLAYGROUND SAFETY SURFACING



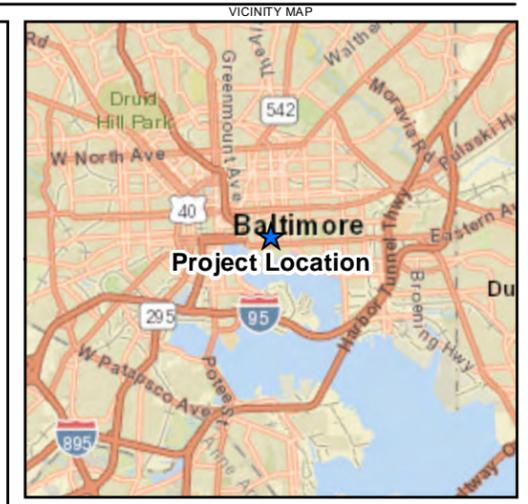
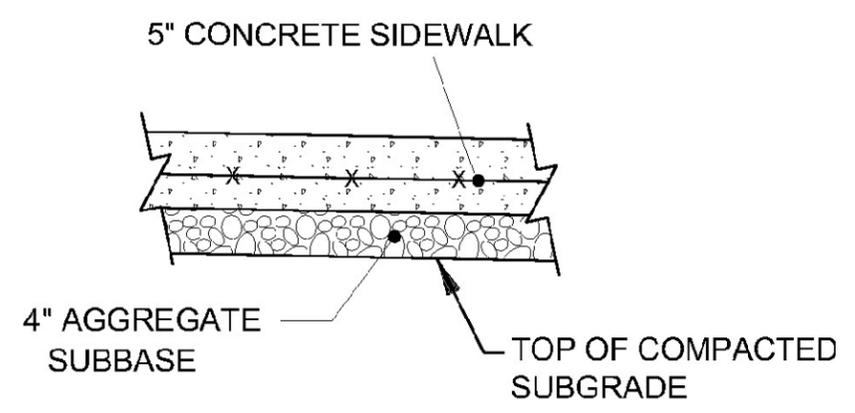
### CONCRETE VEHICULAR PAVEMENT



### ASPHALT PAVEMENT



### CONCRETE SIDEWALK

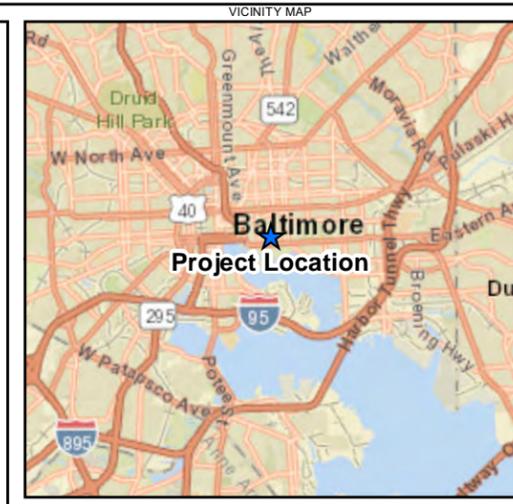


C:\Users\coharal\Desktop\EA\Perkins\W\DRAP\Figure\_CS-1 - Cross Section - Hardscape.mxd\_cohara

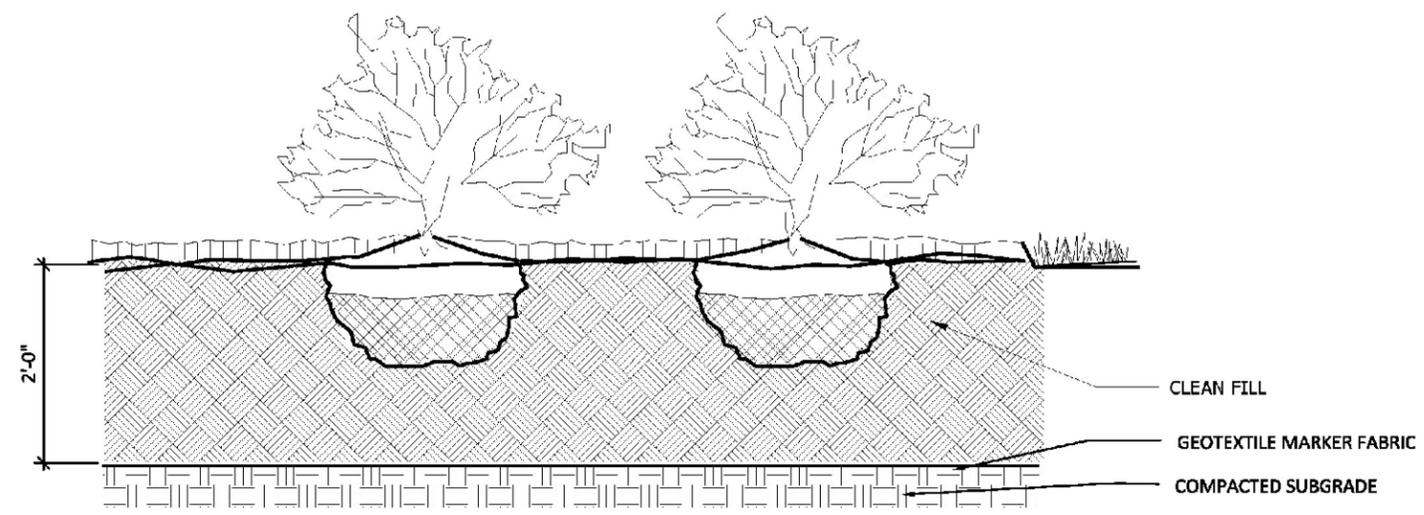
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Source: RK&K, July 30, 2020



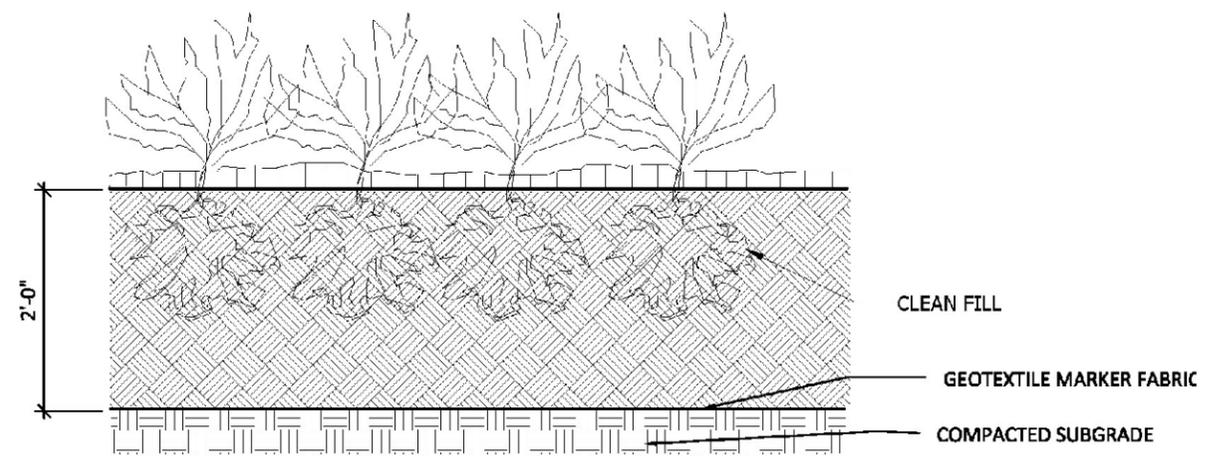
Figure CS-1  
Hardscape Cross Sections  
Perkins Homes - Block A  
Baltimore, MD



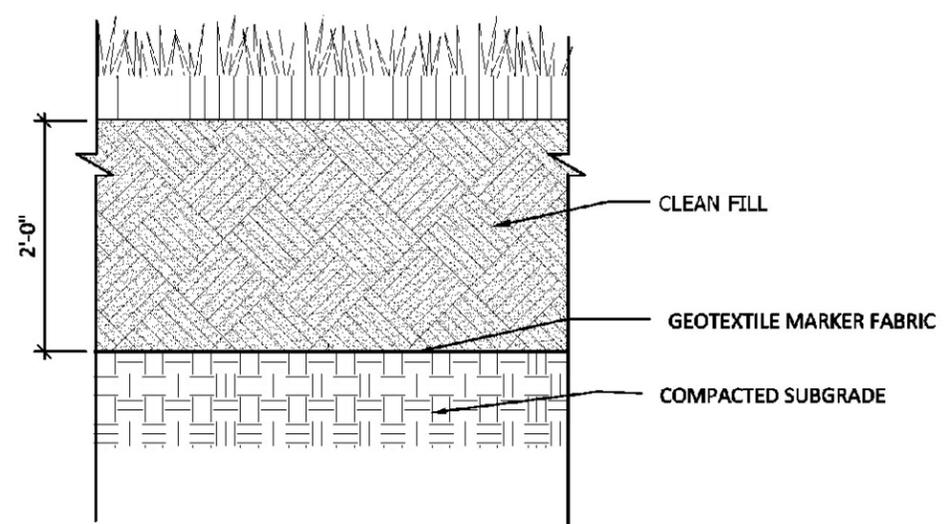
**TYPICAL SHRUB PLANTING**



**PERENNIAL PLANTING**



**LAWN AREA - BED PREPARATION**



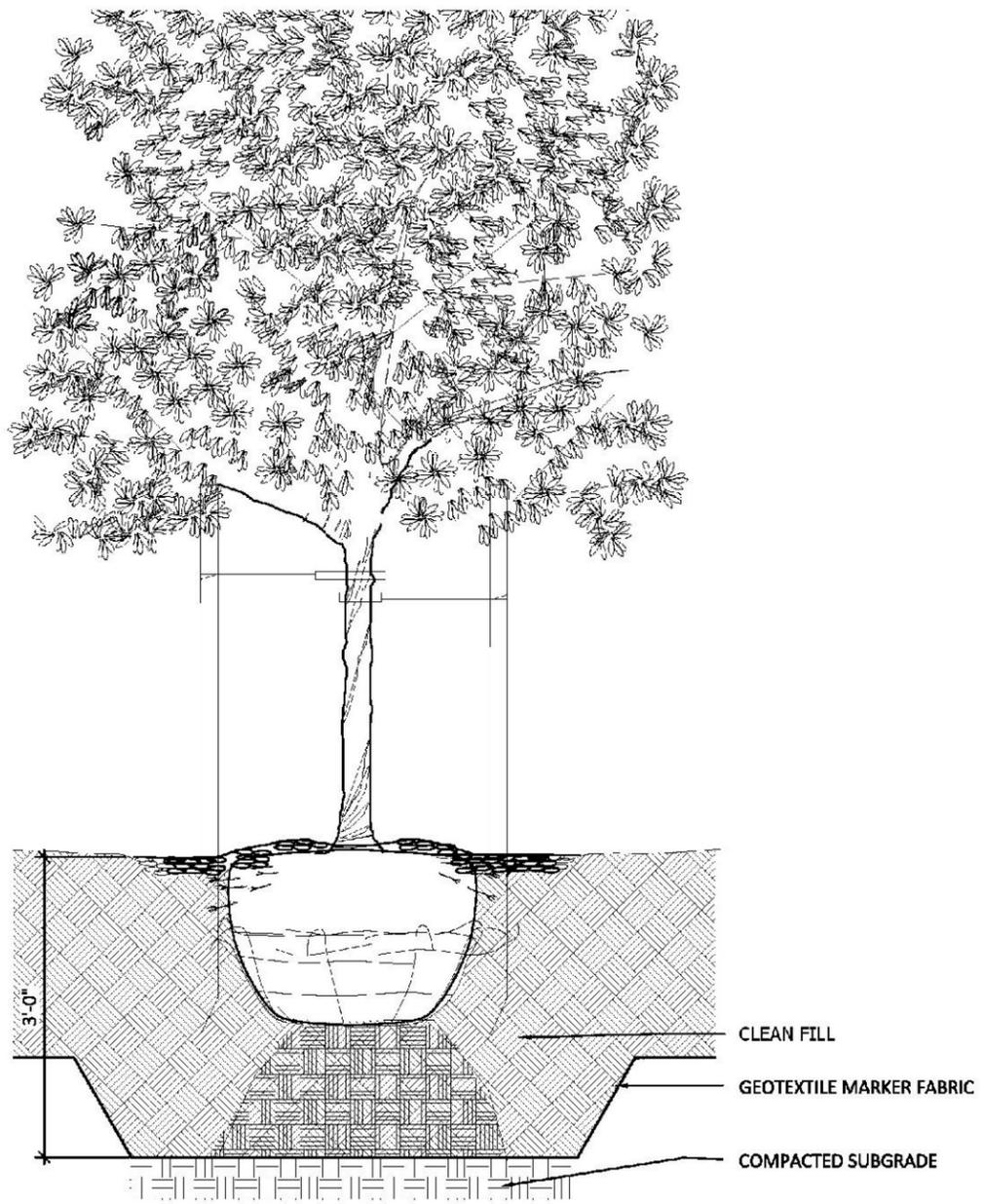
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Source: RK&K, July 30, 2020



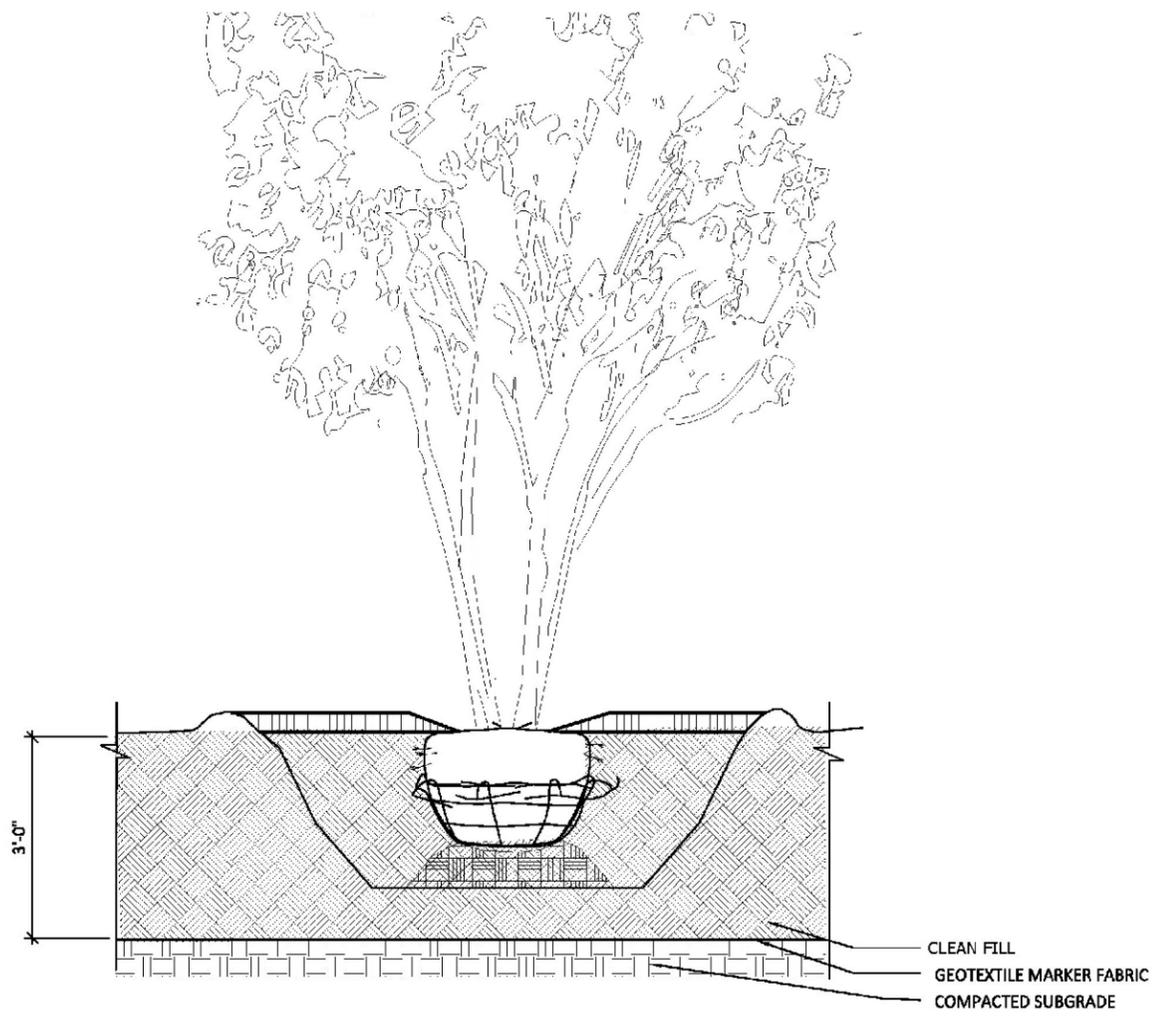
Figure CS-2  
Landscape - Lawn, Shrub, and  
Perennial Planting Cross Sections  
Perkins Homes - Block A  
Baltimore, MD

C:\Users\cochara\Desktop\EA\Perkins\MXDRAP\Figure CS-2 - Cross Section - Landscape - Lawn, Shrub, Perennial.mxd cochara

# DECIDUIOUS TREE PLANTING



# ORNAMENTAL TREE PLANTING

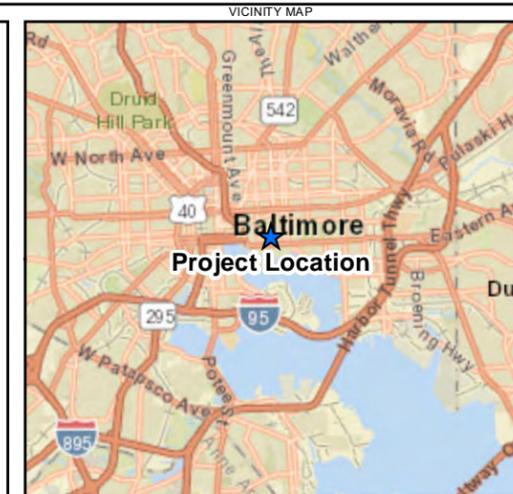


Map Date: 9/11/2020  
Source: RK&K, July 30, 2020

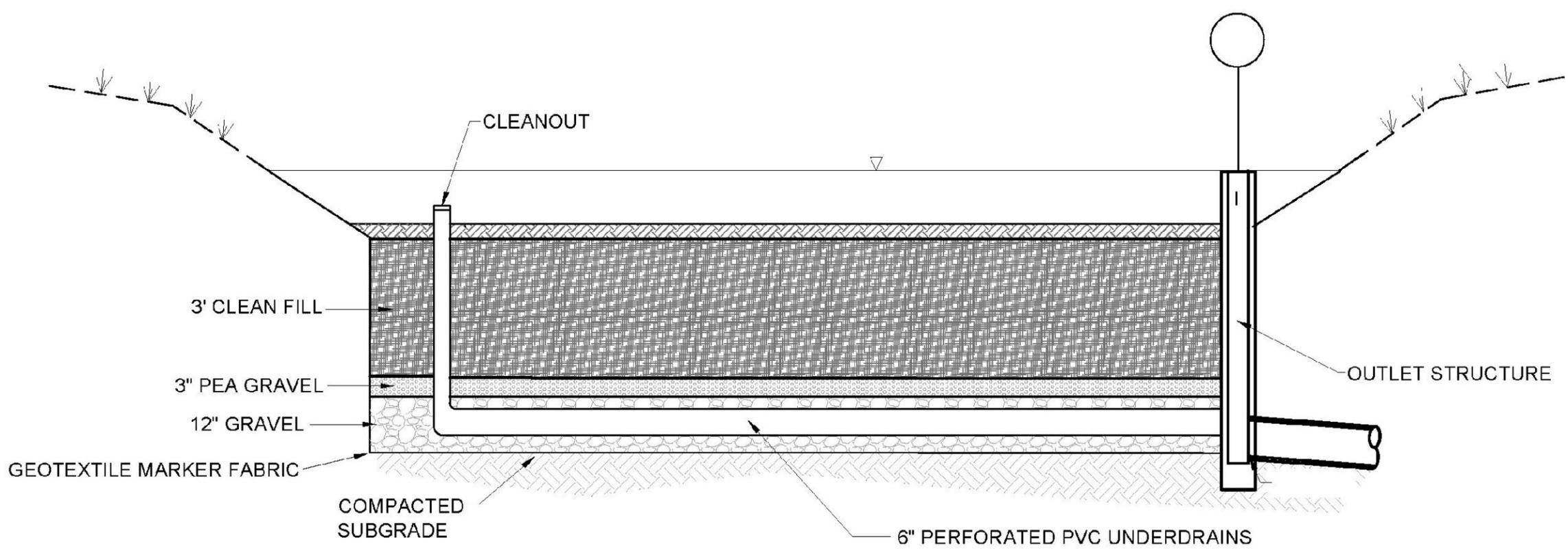


Figure CS-3  
Landscape - Tree Planting Cross Sections  
Perkins Homes - Block A  
Baltimore, MD

C:\Users\cochara\Desktop\EA\Perkins\MXDRAP\Figure CS-3 - Cross Section - Landscape - Tree Planting.mxd cochara



### MICRO-BIORETENTION



C:\Users\cochara\Desktop\EA\Perkins\MXD\RAP\Figure CS-4 - Cross Section - Stormwater.mxd cochara

Map Date: 9/22/2020  
Source: RK&K, July 30, 2020



Figure CS-4  
Stormwater Management -  
Micro-bioretentation Cross Section  
Perkins Homes - Block A  
Baltimore, MD

## **Appendix C**

### **Geotextile Specification Sheet**

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# Mirafi® 140N



Mirafi® 140N is a nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 140N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids. Mirafi® 140N meets AASHTO M288 Class 3 for Elongation > 50%.

TenCate Geosynthetics Americas Laboratories are accredited by Geosynthetic Accreditation Institute – Laboratory Accreditation Program ([GAI-LAP](#)). [NTPEP Listed](#)

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	120 (534)	120 (534)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	50 (223)	50 (223)
CBR Puncture Strength	ASTM D6241	lbs (N)	310 (1380)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	70 (0.212)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec <sup>-1</sup>	1.7	
Flow Rate	ASTM D4491	gal/min/ft <sup>2</sup> (l/min/m <sup>2</sup> )	135 (5500)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Sizes	
Roll Dimensions (width x length)	ft (m)	12.5 x 360 (3.8 x 110)	15 x 360 (4.5 x 110)
Roll Area	yd <sup>2</sup> (m <sup>2</sup> )	500 (418)	600 (502)

**Disclaimer:** TenCate assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. TenCate disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, materials, or information furnished herewith. This document should not be construed as engineering advice.

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## **Appendix D**

### **Operations and Maintenance Plan**

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CONCEPTUAL OPERATIONS AND MAINTENANCE PLAN  
Perkins Homes – Block A (Perkins I)  
Baltimore, MD

D.1 CONTAINMENT REMEDY OPERATIONS AND MAINTENANCE OVERVIEW

In accordance with the Approved RAP, post remediation care requirements include compliance with the conditions placed on the Certificate of Completion and deed restriction(s) recorded for the Site. In addition, physical maintenance requirements must be performed throughout the life of the containment surface of the capped areas to prevent degradation of the cap and exposure to the underlying soil. Inspections of the cap must be conducted annually, targeting early spring. The property owner must retain an environmental consultant to conduct all inspections and submit all reports required by this operation and maintenance plan. The property owner is responsible for performing maintenance of the cap, documenting maintenance activities, and maintaining all cap inspection records. Maintenance records must include the date of the inspection, name of the inspector, any noted issues and subsequent resolution of the issues. Maintenance records will be maintained in a designated area at the Site for Maryland Department of the Environment (MDE) inspection and review.

The containment remedy (environmental cap) must be constructed as described in the Approved RAP. The following outlines the operations and maintenance plan (O&M Plan) inspection procedures to be followed at Perkins Homes – Block A to determine when maintenance of the capped areas is required.

In addition, and in accordance with the Approved RAP, maintenance of the cap is required in the event of any breaches which would impair the integrity of the cap. In the event of discovery of such breach, the MDE shall be verbally notified within 24 hours and maintenance shall begin within 72 hours.

D.2 HARDSCAPE COVERED AREA INSPECTIONS

The hardscaped areas of the Site shall include asphalt, concrete, and playground surface (rubberized coating and concrete). As documented in the approved RAP, the hardscaped areas of the site will meet the following specifications:

Asphalt Covered Areas

New asphalt parking areas and driveways will be capped using placement of 4.5 in. of super pave asphalt mix atop a 6-in. aggregate subbase mix (CR-6) for a total thickness of 10.5 in.

Concrete Paving:

Concrete sidewalks will be constructed by placing 5 in. of concrete mix over 4 in of approved aggregate subbase above the compacted subgrade material for a total of 9 in. of concrete pavement and subbase.

Concrete vehicular pavement will be constructed by placing an 8-in. layer of cement concrete pavement atop a 6-in. layer of crusher run material over compacted subgrade for a total of 14 in. of concrete pavement and crusher material.

#### Playground Safety Surfacing:

The playground safety surface will be constructed by placing a geotextile marker fabric atop compacted subgrade. Above the marker fabric, a minimum 2-ft soil cap will be placed. Above the soil cap, compacted crushed aggregate will be placed per manufacturer requirements. A 2-in.-thick concrete cap will be placed above the crushed aggregate, and above the concrete cap 1.5 in. of poured-in-place rubber surfacing will be applied.

This aggregate base and asphalt/concrete/rubber surfacing material must be maintained to ensure the integrity of the cap.

Pavement covered area inspections are required at a minimum of an annual basis (targeting early spring) to document that the environmental cap integrity is being maintained. During the inspection, the environmental cap surface shall be observed for the following conditions:

1. Differential settlement and significant surface-water ponding
2. Erosion or cracking of the cap materials
3. Obstruction or blocking of drainage facilities

The property owner must retain an environmental consultant to conduct all inspections and submit all reports required by the operation and maintenance plan and submit an annual report to the MDE. The inspection shall note any areas where repairs are necessary, and provide a written description, including photo documentation, of any cap defect to be repaired.

Inspection forms and any resulting repair records are required to be maintained by the property owner.

Where the inspections recommend that cap maintenance and repair be completed, such repairs will be completed as soon as practically possible, and in compliance with any recorded deed restriction(s). If an action is required and completed, documentation of the response action is required, and shall include the name of the company completing the work, a description of the work, and the date the work was completed. An example pavement inspection form is provided to document the results of each inspection, the recommended maintenance responses, and the actual response.

#### *Pavement Inspection Protocol*

A pavement management system (pavement condition index) shall be implemented at the Site. The purpose of this system will be to plan and prioritize future pavement maintenance needs. The system is based on a numerical rating of pavement distresses as published by the US Army Corps of Engineers. This system is based on professional assessment and judgment of the

environmental consultant. Inspections are to be performed by driving slowly over the asphalt paved or vehicular concrete areas and observing the surface conditions. A by foot field inspection should then be performed on all concrete or rubber pavement surfaces inaccessible to vehicles and any asphalt/vehicular concrete areas judged to be in need of maintenance. The following table will be used to provide an index of the pavement condition. The physical characteristics (i.e. color, texture, cracking, and settling) on the following table will also be used to inspect the concrete paved and playground surfacing areas of the Site.

**TABLE D.1 PAVEMENT/HARDSCAPE CONDITION INDEX (PCI)**

<b>PCI</b>	<b>Characterization</b>	<b>Description</b>
1	New crack-free surface	Black in color, smooth texture
2	Oxidation has started	Short hairline cracks start to develop. Dark gray color.
3	Oxidation in advanced state	Hairline cracks are longer and wider. Gray in color.
4	Oxidation complete	Crack area 0.25-inch-wide and crack lines have found base faults
5	Moisture penetrating through 0.25-inch cracks.	Texture of surface becoming rough.
6	Loose material, stone and sand, evident	Preventative maintenance.
7	Cracks widen and join	Cracks and shrinkage evident at curb and gutter lines.
8	Potholes develop in low spots	Gatoring areas begin to break up. Overall texture very rough.
9	Potholes developing	Pavement breaking up
10	Heaving due to excessive moisture in base	

Any inspection indicating a PCI of 4 or greater for any portion of the Site shall require maintenance activities, including milling and resurfacing of the pavement. The intent is that repairs should be completed before the pavement degrades beyond a PCI of 4. *MDE shall be notified in a timely manner of any repairs that are the result of a PCI of 4.0 or greater; the notification shall include documentation of the conditions being repaired and the location of the repair.*

An example pavement inspection form is attached to document the results of each inspection, the recommended maintenance responses, and the actual response implemented.

### D.3 LANDSCAPED COVERED AREA INSPECTIONS

The Site redevelopment includes limited vegetated and grassed areas, primarily along the site perimeter. These areas shall be graded and filled with approved clean fill to provide a minimum 24-inch vertical buffer zone consisting of (from bottom to top): MDE-approved geotextile and a minimum buffer thickness of 24 inches. This landscaping must be maintained to ensure the integrity of the environmental cap.

## *Landscape Inspection Protocol*

Inspections are to be performed by traversing the landscaped areas and observing the surface conditions. Landscaped areas shall be inspected to evaluate the health and condition of plants, signs or mortality, animal burrows, erosion, or other features that may compromise the cap integrity. Of particular importance would be any feature such as an uprooted tree or excess erosion that would compromise the thickness of the remedial cap or would contravene the purpose of the cap.

If plants need to be replaced, they must be replaced with shallow-rooted species whose root systems will not penetrate beyond the cap thickness. Alternatively, an excavation notification may be submitted to the MDE VCP for review and approval to extend the cap thickness in the area of the plants to allow for deeper rooted species. The extended cap thickness must encompass the maximum anticipated root depth of the plant.

The property owner must retain an environmental consultant to conduct all inspections and submit all reports required by the operation and maintenance plan. The inspection shall note any areas where repairs are necessary, and provide a written description, including photo documentation, of any cap defect to be repaired.

Inspection forms and any resulting repair records are required to be maintained by the property owner. MDE shall be notified in a timely manner if damage to the capped area(s) exceeds one foot in diameter and/or two feet in depth.

Where the inspections recommend that cap maintenance and repair be completed, such repairs will be completed as soon as practically possible, and in compliance with the MDE deed restriction. If an action is required and completed, documentation of the response action is required, and shall include the name of the company completing the work, a description of the work, and the date the work was completed. An example pavement summary form is provided to document the results of each inspection, the recommended maintenance responses, and the actual response.

An example landscape inspection form is attached to document the results of each inspection, the recommended maintenance responses, and the actual response implemented.

Inspector Name: \_\_\_\_\_

Firm: \_\_\_\_\_

PAVEMENT INSPECTION FORM		Perkins Homes – Block A 1401 Pratt Street Baltimore, Maryland 21231	
<u>Date:</u>		<u>Time:</u>	
<u>Weather Condition:</u>			
<u>Pavement Type and Location:</u>			
<u>General Pavement Conditions:</u>			
PAVEMENT CONDITIONS INDEX (PCI) <sup>1</sup>			
PCI	Characterization	Description	
1	New crack-free surface	Black in color, smooth texture.	
2	Oxidation has started	Short hairline cracks start to develop. Dark gray color.	
3	Oxidation in advanced state	Hairline cracks are longer and wider. Gray in Color.	
<b>Response Required</b>	4	Oxidation complete	Crack area 0.25 inch wide and crack lines have found base faults.
	5	Moisture penetrating through 0.25 inch cracks. Loose material, stone and sand, evident.	Texture of surface becoming rough. Preventative maintenance.
	6	Cracks widen and join	Cracks and shrinkage evident at curb and gutter Lines.
	7	Potholes develop in low spots	Gatoring areas begin to break up. Overall texture very rough.
	8	Potholes developing	Pavement breaking up.
	9	Heaving due to excessive moisture in base	Distorts entire surface.
	10	General breakup of surface	
CURB CONDITION		<input type="checkbox"/> Exists <input type="checkbox"/> Sound <input type="checkbox"/> Cracked <input type="checkbox"/> Root Intrusion	

<sup>1</sup> The above system is based on a numerical rating of pavement distresses as published by the US Army Corps of Engineers (USACE). This system is based on professional assessment and judgment. Inspections are performed by viewing the paved area (either on foot or via vehicle) and observing the surface condition. A field inspection is then performed on areas judged to be in need of maintenance.

Inspector Name: \_\_\_\_\_

Firm: \_\_\_\_\_

<b>PAVEMENT INSPECTION FORM</b>		<b>Perkins Homes – Block A 1401 Pratt Street Baltimore, Maryland 21231</b>
	<input type="checkbox"/> Deteriorated Comments: _____ _____	
SIDEWALK CONDITION	<input type="checkbox"/> Exists <input type="checkbox"/> Sound <input type="checkbox"/> Cracked <input type="checkbox"/> Root Intrusion <input type="checkbox"/> Deteriorated Comments: _____ _____	
RESPONSE REQUIRED		
WORK COMPLETED <sup>2</sup>		
PHOTOGRAPHS / FIGURES ATTACHED		
RESPONSE CONTRACTOR	Work Completed By: _____ Date: _____ Signature: _____	

<sup>2</sup> Any paved areas of the cap that have degraded to a PCI of 4.0 will be repaired in a timely manner. MDE shall be notified if damage to the cap is a PCI of 4.0 or greater.

Inspector Name: \_\_\_\_\_

Firm: \_\_\_\_\_

<b>LANDSCAPE INSPECTION FORM</b>		<b>Perkins Homes – Block A 1401 Pratt Street Baltimore, Maryland 21231</b>
<u>Date:</u> _____		<u>Time:</u> _____
<u>Weather Condition:</u>		
<u>Landscape Location:</u>		
<u>General Landscaping Description:</u>		
GENERAL LANDSCAPE CONDITION	<input type="checkbox"/> Exists <input type="checkbox"/> Sound <input type="checkbox"/> Erosion <input type="checkbox"/> Root Intrusion <input type="checkbox"/> Healthy Plan Condition <input type="checkbox"/> Signs of Mortality <input type="checkbox"/> Animal Burrows Comments: _____ _____ _____	
GROUND COVER	<input type="checkbox"/> Dry <input type="checkbox"/> Damp <input type="checkbox"/> Wet Comments: _____ _____	

Inspector Name: \_\_\_\_\_

Firm: \_\_\_\_\_

<p>TREES</p>	<p><input type="checkbox"/> Exists <input type="checkbox"/> Healthy <input type="checkbox"/> Poor Health <input type="checkbox"/> Dead <input type="checkbox"/> Fallen  Comments: _____  _____</p>
<p>SHRUBS</p>	<p><input type="checkbox"/> Exists <input type="checkbox"/> Healthy <input type="checkbox"/> Poor Health <input type="checkbox"/> Dead <input type="checkbox"/> Fallen  Comments: _____  _____</p>
<p>EROSION</p>	<p><input type="checkbox"/> Exists <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Significant  Comments: _____  _____</p>
<p>HOLES</p>	<p><input type="checkbox"/> Exists <input type="checkbox"/> Depth of Holes: _____  Comments: _____  _____</p>
<p>BIO-RETENTION</p>	<p><input type="checkbox"/> Exists <input type="checkbox"/> Erosion <input type="checkbox"/> Depth/Thickness: _____  Comments: _____  _____</p>
<p>WORK COMPLETED</p>	
<p>PHOTOGRAPHS / FIGURES ATTACHED</p>	
<p>RESPONSE CONTRACTOR</p>	<p>Work Completed By: _____  Date: _____  Signature: _____</p>

**Appendix E**  
**Written Agreement**

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**Written Agreement**  
*Perkins Homes - Block A*  
*1401 E. Pratt Street*  
*Baltimore, Maryland 21231*

The participant agrees that this response action plan, if approved by the Maryland Department of the Environment, becomes a binding agreement pursuant to Title 7, Subtitle 5 of the Environment Article, Annotated Code of Maryland. Subject to the withdrawal provisions of the Voluntary Cleanup Program, the participant agrees to perform the actions identified herein by the dates specified. Participant understands that if it fails to perform the actions identified herein by the dates specified, the Maryland Department of the Environment may withdraw approval of the response action plan.

<b>Printed Name:</b>	<u>Janet Abrahams</u>	<b>Title:</b>	<u>President/CEO</u>
<b>Signature:</b>	<u></u>	<b>Date:</b>	<u>9/24/2020</u>

*Document: Response Action Plan, Perkins Homes – Block A, Baltimore, Maryland 21231 prepared by EA Engineering, Science, and Technology Inc., PBC.*

**Written Agreement**

***Perkins Homes - Block A  
1401 E. Pratt Street  
Baltimore, Maryland 21231***

The participant agrees that this response action plan, if approved by the Maryland Department of the Environment, becomes a binding agreement pursuant to Title 7, Subtitle 5 of the Environment Article, Annotated Code of Maryland. Subject to the withdrawal provisions of the Voluntary Cleanup Program, the participant agrees to perform the actions identified herein by the dates specified. Participant understands that if it fails to perform the actions identified herein by the dates specified, the Maryland Department of the Environment may withdraw approval of the response action plan.

**Perkins Homes Phase I, LLC;  
By: MBS IGP, Inc., its Sole Member**

Printed Name: Gary M. Buechler Title: Vice President  
Signature:  Date: 9/21/2020

*Document: Response Action Plan, Perkins Homes – Block A, Baltimore, Maryland 21231 prepared by EA Engineering, Science, and Technology Inc., PBC.*

## **Appendix F**

### **Certified Statement of Zoning Requirements**

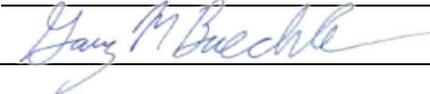
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**Certified Statement Re: Municipal Zoning Requirements**

*Perkins Homes - Block A  
1401 E. Pratt Street  
Baltimore, Maryland 21231*

The participant hereby certifies under penalty of law that the current use and proposed use of the eligible property upon which the response action plan is based, are in conformance with all applicable zoning requirements.

The participant acknowledges that there are significant penalties for falsifying any information required by the Department under Title 7, Subtitle 5 of the Environment Article, Annotated Code of Maryland, and that this certification is required to be included in a response action plan for the Voluntary Cleanup Program pursuant to Title 7, Subtitle 5 of the Environment Article, Annotated Code of Maryland.

<b>Printed Name:</b>	<u>Gary M. Buechler</u>	<b>Title:</b>	<u>Vice President</u>
<b>Signature:</b>	<u></u>	<b>Date:</b>	<u>9/21/2020</u>

Document(s):

*Baltimore City Department of Housing & Community Development. Re: Perkins-Somerset-Oldtown (PSO) Transformation Land Use Approval Letter. 06 November 2017.*

*Response Action Plan, Perkins Homes – Block A, Baltimore, Maryland 21231 prepared by EA Engineering, Science, and Technology Inc., PBC.*

**Certified Statement Re: Municipal Zoning Requirements**

*Perkins Homes - Block A  
1401 E. Pratt Street  
Baltimore, Maryland 21231*

The participant hereby certifies under penalty of law that the current use and proposed use of the eligible property upon which the response action plan is based, are in conformance with all applicable zoning requirements.

The participant acknowledges that there are significant penalties for falsifying any information required by the Department under Title 7, Subtitle 5 of the Environment Article, Annotated Code of Maryland, and that this certification is required to be included in a response action plan for the Voluntary Cleanup Program pursuant to Title 7, Subtitle 5 of the Environment Article, Annotated Code of Maryland.

Printed Name:	<u>Janet Abrahams</u>	Title:	<u>President/CEO</u>
Signature:	<u></u>	Date:	<u>9/24/2020</u>

Document(s):

*Baltimore City Department of Housing & Community Development. Re: Perkins-Somerset-Oldtown (PSO) Transformation Land Use Approval Letter. 06 November 2017.*

*Response Action Plan, Perkins Homes – Block A, Baltimore, Maryland 21231 prepared by EA Engineering, Science, and Technology Inc., PBC.*



Baltimore City Department of  
**HOUSING & COMMUNITY  
DEVELOPMENT**

November 06, 2017

Ms. Janet Abrahams  
Executive Director, Housing Authority of Baltimore City  
417 E. Fayette Street, Ste. 1320  
Baltimore, MD 21202

Re: Perkins-Somerset-Oldtown (PSO) Transformation Plan Land Use Approval

Dear Ms. Abrahams:

The Office of the Zoning Administrator is responsible for the review and approval of permit applications and plans for zoning compliance, and administers zoning and land use approvals for development projects within the City of Baltimore.

This letter is in response to your request for a certification of land use approvals for the planned housing development under the Choice Neighborhoods program. Our office has reviewed the proposed Housing Plan and other related materials submitted. The proposed housing plan complies with all applicable zoning regulations. No further zoning or land use approvals are required at this time, pending the formal submission and review of the development plans and the required approvals for permitting and construction under the applicable provisions of the Baltimore City Zoning Code.

Please feel free to contact me at 410-396-4126 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Geoffrey Veale".

Geoffrey Veale  
Zoning Administrator