Aberdeen Station Square

Master Plan TOD: Area 1

Feasibility Study

Prepared for

CHESAPEAKE SCIENCE AND SECURITY CORRIDOR

HARFORD COUNTY, MARYLAND

CITY OF ABERDEEN, MARYLAND

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EXECUTIVE SUMMARY

The Aberdeen TOD Master Plan, adopted in March 2012, included concept illustrative development plans for three Transit Oriented Development (TOD) areas in the City of Aberdeen. The Concept Illustrative Plan for TOD AREA 1: Station Square and US 40 "Complete Streets" (Green Boulevard), one of the TOD areas, provided proposals for multi-modal development around the Aberdeen railroad station.

The object of this Aberdeen Station Square Feasibility Study was to refine the Concept Illustrative Plan to a pre-preliminary engineering level consistent with the recommendations of the TOD Master Plan and to identify any potential fatal flaws. The feasibility assessment used existing, available information only, field verified where necessary, including a field survey of the immediate area of the existing Amtrak/MARC station. The Study built on the goals and guidelines and evaluation as outlined in the Master Plan to provide the inputs to the pre-preliminary engineering refinement of the Concept Illustrative Plan.

Findings - Summary

At this time, based on the initial engineering and limited environmental analysis conducted in this Feasibility Study, there do not appear to be any fatal flaws to the development of the Concept Plan for TOD Area 1, as defined in the Aberdeen TOD Master Plan, and as further refined in this study. There are, however, some potentially critical findings, as noted in the following, to be considered in the development and implementation as currently proposed.

- **Project Development** - In any design and construction efforts for Station Square and the transportation improvements, close coordination between Amtrak, MDOT, MTA, MARC, SHA, the City of Aberdeen, Harford County, and other Federal, State and Local Agencies will be required and essential.
- **NEPA Process** - Also as part of the project planning, a NEPA analysis will be required to evaluate alternatives and potential impacts on the environment before any capital investments are committed to Station Square.
- **Soil Conditions** - Before proceeding into any design process, access to the US40 Exxon Gas Station site and other key properties, is essential to undertake soil borings and other assessments of underground conditions, not funded as part of this Feasibility Study.
- **Contamination/ Water Table** - The nature and extent of any subsurface conditions found, such as contaminated soils or a high water table, could alter the cost of design and construction, and any construction methods employed particularly for the proposed Pedestrian Underpass.
- **Underpass Structure** – Either of the two Jacking Options – Concrete Box Sections or Steel Pipe Casings --were determined to have the most likely potential to satisfy the planning and design criteria for construction of the Underpass, based on the information available at this time.
- **Cost** - Based on the requirements determined through this Feasibility Study, the estimated cost of implementing the Underpass and related Station Square amenities is approximately $36.0 million. The cost of any High Level Station Platforms is estimated at $8.6 million.
- **Financing** - To proceed further a Collaboratively Developed Financing Plan needs to be developed for Station Square, US 40 "Complete Streets", and TOD Development.

Study Process and Goals

The purpose of the Aberdeen Station Square Feasibility Study is to further refine the Station Square Multi-Modal concept consistent with the recommendations of the TOD Master Plan and the proposed program elements and needs identified in the Multi-Modal Transportation Center (MMTC) Study.

The Study was managed jointly by MTA with MDOT assistance. Coordination and working meetings to discuss and provide input to the Study were held with Aberdeen Planning & Community Development, Chesapeake Science and Security Corridor (CSSC), Harford County Planning and Zoning, Harford County Economic Development, Harford County Transit, Maryland Transit Administration (MTA), State Highway Administration (SHA), Maryland Department of Transportation (MDOT), and the Maryland Department of Planning. Representatives from Amtrak attended most of these meetings but separate meetings were also held with Amtrak to discuss the project.

The Study developed the components proposed in the TOD Master Plan for Station Square as Short-term Phased Development which includes building the Station Square components (East and West Plazas and the Underpass) and transforming US 40 to provide multi-modal parity for the various modes according to Complete Street concepts.

It is important to note that this feasibility study focused on identifying any potential fatal flaws from an engineering perspective related to the design and construction of the proposed improvements. As the potential implementation precedes any preliminary engineer/final design, NEPA and State Environmental requirements will be addressed in more detail. Also a Collaborative Financial Plan will be required on how to fund the next steps.

Findings – Fatal Flaws Analysis

This report presents the findings of the Feasibility Study based on the fatal flaw analysis of the pre-preliminary engineering plans. It documents the physical constraints, engineering considerations, potential impacts, and costs used to assess feasibility and possible fatal flaws. It also identifies further design studies to be prioritized to advance the TOD development and implementation.

Based on the results of this Feasibility Study, at this time there do not appear to be any fatal flaws to the development of the Concept Plan for TOD AREA 1. There are, however, some potentially critical issues, identified as critical findings to be considered in the development and implementation as currently proposed. And while there appear to be no fatal flaws, it might be appropriate to consider in the overall view, in addition to these findings, their cumulative effects to determine the overall feasibility of the project.

Below is a brief summary of the findings identified from the fatal flaw analysis with the critical findings highlighted in **bold**.

Track and Platform Design

- ***Proposed Action*** – The proposed action includes changes to the track and the platforms. The tracks will be relocated to the east as needed to accommodate High Speed Rail (HSR) service. In addition, a fourth track would be added through the Station area to accommodate increased Amtrak, MARC, and freight service. Gauntlet tracks would be added for freight trains. In addition, the current low level platforms, as appropriate, could be replaced by longer high level platforms.

- ***Critical Finding - Tracks*** - The design and ultimate location of the railroad tracks to accommodate High Speed Rail (HSR) service and construction of a fourth track would result in two critical impacts.
- First, the tracks would be relocated from five to 10 feet to the east from the present alignment which would reduce the width of the area available for the Station Square East Plaza. Additionally, the HSR track super elevation, unless confined to the center tracks, might require the high-level platforms to be relocated to the south away from the Station Square Plazas and the Underpass.
- Second, the sequencing and timing of the construction of these improvements may limit or dictate the timing of when the construction of the Station Square Plazas and Underpass can occur.
- *Finding - Platforms* - Construction of any new high level platforms could require relocation or demolition of the existing station and tunnel. If this occurs, its current status as being eligible for listing on the Register of Historic Places would require further analysis since recent information has indicated that a reassessment of this designation is warranted.

Roadway Modifications

- **Redesign of US 40/ West Bel Air Avenue-MD 132 Intersection** *Proposed Action* - Also as part of the project, the US 40/ West Bel Air Avenue-MD 132 intersection is proposed to be reconstructed consistent with SHA urban intersection guidelines. Besides providing improved conditions for pedestrians, this reconstruction would provide sufficient area to allow for the Underpass to align with East Bel Air and provide visual connectivity to the Underpass for those approaching from the east.
- ***Critical Finding – Design Coordination***- SHA planning guidelines and design standards could also potentially limit the extent of this redesign and reconstruction.

Redesign of US 40

- *Proposed Action* - US 40 is proposed to be redesigned according to Complete Street guidelines to create a roadway with multi-modal parity for transit riders, pedestrians, bicyclists, bus transit, and other vehicles.
- ***Critical Finding – Design Coordination*** – As the detailed design proceeds, early coordination with SHA is recommended to balance the needs of pedestrians/bicycles and motor vehicles through the US 40 and West Bel Air Avenue-MD-132 as part of a Complete Streets/Green Boulevard project for the Aberdeen TOD.

Engineering Considerations

- ***Proposed Action*** - The Station Square East and West Plazas and the Underpass would require excavation to a level about 16 feet below the current elevation and construction under the railroad tracks.
- ***Critical Finding- Underpass Structure/Constructability -*** The structural option that offers the most potential to satisfy the planning and design criteria for the Underpass is the Jacking option. This involves jacking either concrete segments or large diameter pipes to form the structure of the Underpass under the active railroad tracks and the existing pedestrian bridge.
- Either of these construction options necessitates extensive excavation on the west side of the Underpass to provide space for the jacking equipment. The length of this area is limited by US 40, which may seriously affect the Underpass's constructability, if sufficient staging area cannot be provided.

Further, construction of the Underpass at a below grade level and under the active freight and passenger tracks and catenaries may further limit the selection of the possible final structural concept.

- *Finding – Costs* - The high estimated cost of construction of the Station Square concept would likely require the development of a collaborative financial plan among various agencies at the local, county, state, and Federal level.

Environmental Considerations

- ***Proposed Action*** - The Station Square East and West Plazas and the Underpass would require excavation to a level about 16 feet below the current elevation and construction under the railroad tracks.
- ***Critical Finding – Water Table Elevation***– A review of available subsurface data for the immediate area of the Underpass indicates that the water table may only be 12 feet below the surface. If this is confirmed by detailed Geotech studies, the feasibility of the Underpass would be seriously affected since the level of the water table would be above the elevation of the floor of the Underpass. This would require extensive pumping equipment operating on a continuous basis.
- *Finding – Hazardous Materials* - Possible hazardous materials and contaminated soils on the Exxon property could impact cost and place constraints on purchase of the property.
- *Finding – Soil Conditions* - Poor soil conditions may further limit design options and affect the overall constructability and feasibility of the Underpass.

Summary

While there are some significant issues to consider in furthering implementation, at the same time there are potentially significant beneficial impacts to the economic development of the City of Aberdeen and the re-connection of the east and west parts of the City. Further investigation is needed to determine how to avoid or mitigate negative issues and increase the beneficial factors.

Implementation – General Next Steps

As noted in the TOD Master Plan, advancing the concepts for the TODs into implementation requires continuing actions on the part of the City, County, State, and other partner agencies. Specific action items and responsibilities for advancing TOD in Aberdeen are presented below. Those listed as **General** are relevant actions generally (with a few additions) carried forward from the TOD Master Plan while the more specific items were developed from the findings of this Feasibility Study.

General from TOD Master Plan

- Undertake a series of small, affordable projects that support the overall vision for Station Square and US 40 “Complete Streets” (Green Boulevard); examples include:
    - Beautification and community “greening” projects around the station.
    - Pedestrian way-finding signs and street furniture.
    - Bike lockers and sheltered bike racks.
    - Shelters for pedestrians and bus passengers; consider adding bicycle changing facilities as suggested by LEED design guidelines.
    - Improved lighting and security features for the pedestrian bridge and in the interior of the existing tunnel.
- As design proceeds, the project guidelines should be developed to pursue LEED accreditation since many of the eligible credits are already included in this feasibility analysis.

- Include the Station Square and Underpass and US 40 as key transportation project priorities in the Harford County annual priority letter submitted to MDOT to continue and emphasize local support and prioritization for funding support and TOD collaboration.
- Actively promote transportation alternatives including the following:
  - More frequent and mid-day shuttle service between downtown, the station, and APG employment zones.
  - Bicycle-friendly measures including shared lane markings (known as sharrows) on US 40 and important connector streets, and bicycle parking racks and/or lockers at the station.
  - Identify and develop bike-sharing destinations at and around the station area, downtown Aberdeen, and at APG.
  - Conduct feasibility analysis of greenway trails along the Amtrak tracks, and the CSX tracks to the west of downtown Aberdeen.
  - Addition of car share programs such as Zip car and/or a rental car facility near the station.
- Organize partner agencies and decision-makers around building TOD in Aberdeen.
- Continue to identify and apply for collaborative funding for the various elements.

Track and Platform Design

- **Critical Next Step – Amtrak/MARC/NS Coordination** - Continue and expand on-going coordination with Amtrak on their development of designs for the fourth track to accommodate Amtrak HSR and regional intercity, MARC and freight service as it would affect the location of the platforms and the design of the Underpass and the East and West Plazas.
- Work with Amtrak and MARC regarding passenger and freight carriers using the Amtrak tracks.
- Assess phasing of development of Station Square East and West Plazas and the Underpass relative to the construction of the realigned tracks (with the fourth track) and high-level platforms to identify possible interim connections to the existing low level platforms.

Roadway Modifications -Redesign of US 40 and US 40 / West Bel Air Avenue- MD 132 Intersection

- **Critical Next Step – SHA Coordination** - Coordinate with SHA on any redesign and reconstruction of the US 40 / West Bel Air Avenue MD 132 intersection to provide space for the Station Plaza West Plaza and the Underpass.
- As a first step in these redesigns to "Complete Streets" guidelines, the City in coordination with and through SHA should refine the classification of West Bel Air Avenue-MD 132 and US 40 through downtown as Village Center Mixed Use Arterials, per the City of Aberdeen's Comprehensive Plan.
- Coordinate with SHA to coordinate the redesign and reconstruction of US 40 to provide for the full multi-modal parity according to Complete Street guidelines.
- Identify SHA streetscaping projects with a focus on developing US 40 into a "Complete Street" (Green Boulevard) incorporating stormwater management elements.

Engineering and Environmental Considerations

- **Critical Next Step – Geotech Studies -** Conduct more detailed Geotech (for soils and water table level) and hazardous materials studies.
- Prioritize and advocate for immediate first steps for engineering and environmental studies focused on the preparation of plans for the Station Square East and West Plazas and the Underpass.
- Evaluate utility relocation and stormwater management options.

Implementation – Detailed Funding and Environmental Studies

- Local and State agencies continue to develop a collaborative financing plan to fund the Station Square, US 40 "Complete Street", and other TOD related improvements. This could include evaluation of alternative funding models, such as value-capture and partnership funding.
- Identify and undertake concrete steps to implement the local land-use/economic development recommendations of the TOD plan, including steps of assemblage, and retention or transfer of development rights.
- Coordinate all suggested Next Steps identified in this study to provide a basis for eventual completion of the NEPA process and preparation of the appropriate environmental document.

1. STUDY BACKGROUND AND PROJECT DEVELOPMENT

1.1 Background

The purpose of the Aberdeen Station Square Feasibility Study is to further refine the Station Square concept consistent with the recommendations of the TOD Master Plan and the proposed program elements and needs identified in the 2009 Harford County Multi-Modal Transportation Center (MMTC) Feasibility Study. Following is a brief summary of the two studies and the program for the current one.

1.1.1 Harford County Multi-Modal Transportation Center – Feasibility Study

In 2009, the Chesapeake Science and Security Corridor (CSSC) Regional BRAC Office and Harford County completed a study to assess the feasibility of a Multi-Modal Transportation Center (MMTC) to serve the anticipated regional growth expected due to additional employment at the Aberdeen Proving Ground (APG) resulting from the 2005 Base Realignment and Closure (BRAC) Act along with continuing Department of Defense (DoD) transformation. This was one of several reports which studied potential development at the Train Station. The MMTC would serve rail transit, commuter and local bus, and future shuttle service to the APG. The purpose of the study was:

- To identify the optimal location of a MMTC in the Aberdeen area to meet future growth and transit needs.
- To determine the optimal facility to accommodate multi-modal transportation and transit oriented development (TOD) around the station area.

The study developed a program for the MMTC and evaluated three sites, one of which was at the existing Aberdeen Train station, located east of downtown Aberdeen at the intersection of US 40 and MD 132. This site was determined to be the recommended site. While the rail commuter function is expected to continue, new development and programs will more than double the work population at the APG and are anticipated to generate new demands at the Aberdeen Train Station.

In 2010, the Aberdeen Station area was designated as a state approved Transit Oriented Development site, and during the development of the Aberdeen TOD Master Plan the MMTC option was further refined and revised based on the previously identified design study needs.

1.1.2 Aberdeen TOD Master Plan

The 2012 Aberdeen TOD Master Plan, prepared by the City of Aberdeen and its community partners with the assistance of the Maryland Department of Transportation (MDOT), proposed three Transit Oriented Development (TOD) areas.

One of these is TOD AREA 1: Station Square and US 40 “Complete Street” (Green Boulevard) which is intended to encourage mixed-use TOD and contribute to the economic vitality of the area around the Aberdeen Railroad Station.

The TOD Master Plan includes both concept plans and programs for each of the three TODs. The programs were included for three phases – Short-, Mid-, and Long-term. The TOD Master Plan also outlines implementation strategies for the City of Aberdeen, Harford County and various State and Federal Agencies to capture the economic development potential associated with an improved passenger rail station.

1.1.3 Aberdeen Station Square Feasibility Study

As noted, the purpose of this Feasibility Study is to further refine the TOD AREA 1 Concept (Figure 1) consistent with the proposals in the Aberdeen TOD Master Plan. The overall process for the feasibility study consisted of the following tasks:

- **Inventory** – Identify the physical characteristics in the Study Area including topography, utilities, and hazardous materials.
- **Refine Station Square Concept** – Refine the TOD program and develop site and structural plans from the Concept plan in the TOD Master Plan.
- **Analysis** – Evaluate the refined plans for fatal flaws, feasibility, impacts, costs, further design studies, and potential phasing priorities and Identify possible next steps to move to implementation.

The results of these tasks are presented in the following chapters.

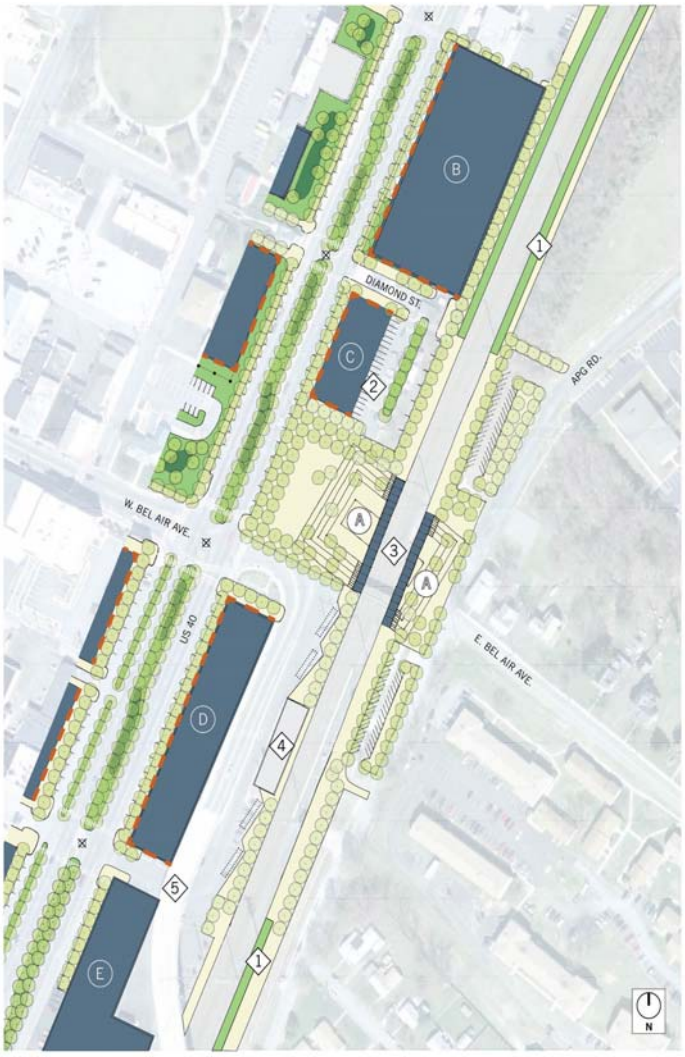

Figure 1 – Concept Illustrative Plan – Station Square
Source: Aberdeen TOD Master Plan

1.1.3.1 Goals and Short-term Program

Station Square

As outlined in the TOD Master Plan, the main goal for the Station Square TOD is to position the train station and platforms so that they connect the two halves of Aberdeen along East and West Bel Air Avenue. At the same time, they would serve as a major announcement of the presence and identity of Aberdeen for travelers along US 40. The development is also intended to improve multi-modal connectivity by improving transit, bicycle, and pedestrian connections to/from APG and "downtown" Aberdeen.

As shown in perspective in Figure 2 from the TOD Master Plan, the design of the Station Square Plazas will provide easy pedestrian access (steps and ramps) to the Underpass under the tracks. This tree filled, landscaped space will become a focal point and amenity featuring amphitheater-like steps, space for food kiosks to branch out from Market/Retail building, etc. Together the plazas and the Underpass will make the whole area inviting and safe by making it highly visible and well lit.

The following are the improvements for the Station Square TOD Area 1 used as the basis for preparing the plans as a basis for the feasibility analysis; the improvements are those proposed for the Short-term Phase of development.

Rail Track and Platform Improvements

- A fourth track is proposed to be added to the current three tracks through the station area to accommodate the planned Amtrak High Speed Rail (HSR) and Regional service through the Northeast Corridor as well as the MARC local commuter service and the Norfolk Southern (NS) freight trains. In addition, Gauntlet tracks would be added for the NS freight service.
- High level platforms would be constructed for north and southbound travelers to replace the existing low level platforms. These would be side platforms on the outside of the eastern and westernmost tracks.
- The TOD Master Plan also proposed that the existing station building could be retained and used in the short-term for continued station operations of Amtrak and MARC services; the station was proposed to include restrooms, a bicycle kiosk and a specialty shop.

Figure 2 – Perspective of West Plaza and Entrance to Pedestrian Underpass Looking Northwest Station Square

Source: Aberdeen TOD Master Plan

Roadway Improvements

- US 40 is proposed to be redesigned to maintain two travel lanes in each direction with left-turn lanes in the median at each intersection together with traffic signals and crosswalks, on-street parking, and separate bicycle facilities (such as cycle tracks and bike boxes). The redesign of US 40

would be according to Complete Streets guidelines to create a roadway with multi-modal parity. The redesign is also intended to create a Green Boulevard as a pleasant tree lined street with rainwater gardens and other sustainable features along the sidewalks and edges, medians and access lanes.

- The US 40 / West Bel Air Avenue-MD 132 intersection west of the station would be reconfigured to urban standards as part of the Complete Streets redesign.

Bus Facilities

- The program would expand on the existing bus stops on the west side of the tracks at the station; improved access and bus bays are provided for Harford Transit and MTA buses and APG shuttles. The program provides for additional drop off areas for all the transit services on the west side of the tracks, and for the APG Shuttle service east of the tracks.

Parking

- The TOD Master Plan proposed increasing parking by 170 spaces from the current 375 spaces to 545 spaces; the existing spaces are in two existing MTA lots on the west side of the tracks along US 40. The new spaces would be on the east side of the tracks along Taft Street and APG Road. However, the current inventory identified only 338 spaces in the immediate area of the station.
- Separate drop off areas for taxies and “kiss and ride” vehicles are proposed on both sides of the tracks.

Pedestrian/ Bicycle Facilities

- New traffic signals are proposed at the intersection of US 40 with Custis Street and Diamond Street extended to provide for convenient pedestrian crossings of US 40 from downtown to the Station Square West Plaza, the Underpass, the station, and other development at and around the station. The crossings would be well-lit to create a pleasant and inviting environment, and to promote driver awareness of pedestrians.
- As part of the redesign of US 40, bike lanes are proposed on both sides with bike boxes for left turns. In addition a hike and bike lane would be constructed adjacent and parallel to the railroad tracks away from vehicular traffic.
- Secure and weather-protected bicycle racks and lockers would be provided at appropriate, visible, and convenient locations to the station and platforms.
- The planning and design of all the facilities along US 40 would be coordinated under the “Complete Street” guidelines and development process with SHA.

2. EXISTING CONDITONS

This section includes a description of the transportation facilities and environmental characteristics of the Study Area obtained from the inventory of the site as well information in other previous studies.

2.1 Study Area – Master Plan TOD AREA 1

The Study Area used for this Feasibility Study is a 35 acre area focused around the Aberdeen Train Station, defined generally by a 10-minute walk or ½ mile. While the outline of the Study Area, shown in Figure 3, generally follow the boundary of the Station Square TOD Area 1 defined in the Aberdeen TOD Master Plan (See Figure 1) the study area is slightly smaller.

The Study Area is east of downtown across US 40. It is bounded by US 40 on the west and Taft Street and APG Road on the east. It extends from Diamond Street on the north to Market Street on the south. It is a developed urban area with minimal natural resources. The majority of uses in the vicinity of the station are residential and commercial.

To the west across US 40, Aberdeen's downtown has a traditional street grid network and relatively dense development grid with a mix of civic, commercial, and residential uses in compact, walkable neighborhoods. The east side of the station area, which is separated from downtown by US 40 and the railroad tracks line, is a residential zone of modest, medium density housing.

In 2009, the state designated Aberdeen and Harford County as one of its BRAC Zones, which provides financial incentives to fund infrastructure improvements. Specific infrastructure investments identified for Aberdeen included water and wastewater management, transportation, a multi-modal transportation center, redevelopment of the US 40 commercial corridor, and other public facility needs.

In 2010, the Aberdeen station area was one of 14 station areas officially designated for transit-oriented development recognition by the state. In keeping with statute, this designation allows MDOT to partner with local leaders to become more active in advancing TOD. The support for the planning process that produced the TOD Master Plan is one outcome of that designation process. The designation also allows local stakeholders to pursue a broader range of grant and local financing mechanisms, which may be leveraged to help implement the plan's recommendations.

2.2 Transportation Facilities and Operations

The existing transportation uses in the Study Area provide multi-modal options – rail, roads, and bus transit supported by parking and some limited facilities for pedestrians and bicyclists.

2.2.1 Railroad Facilities and Operations

Service

Both Amtrak and MARC passenger Service is available from Aberdeen. Amtrak operates 85 trains per day through the corridor, and MARC operates 14. Sixteen freight trains move through the station area; with those movements occurring on any of the three (or four) tracks. Acela trains pass through the station, but do not stop.

Weekday Amtrak and MARC commuter trains provide service southbound and northbound primarily in the morning and evening peak periods. Several Amtrak trains serve both Amtrak and MARC passengers. While MARC service is only available Monday through Friday, Amtrak provides service seven days a week. Amtrak service for MARC commuters is restricted to monthly/weekly ticket

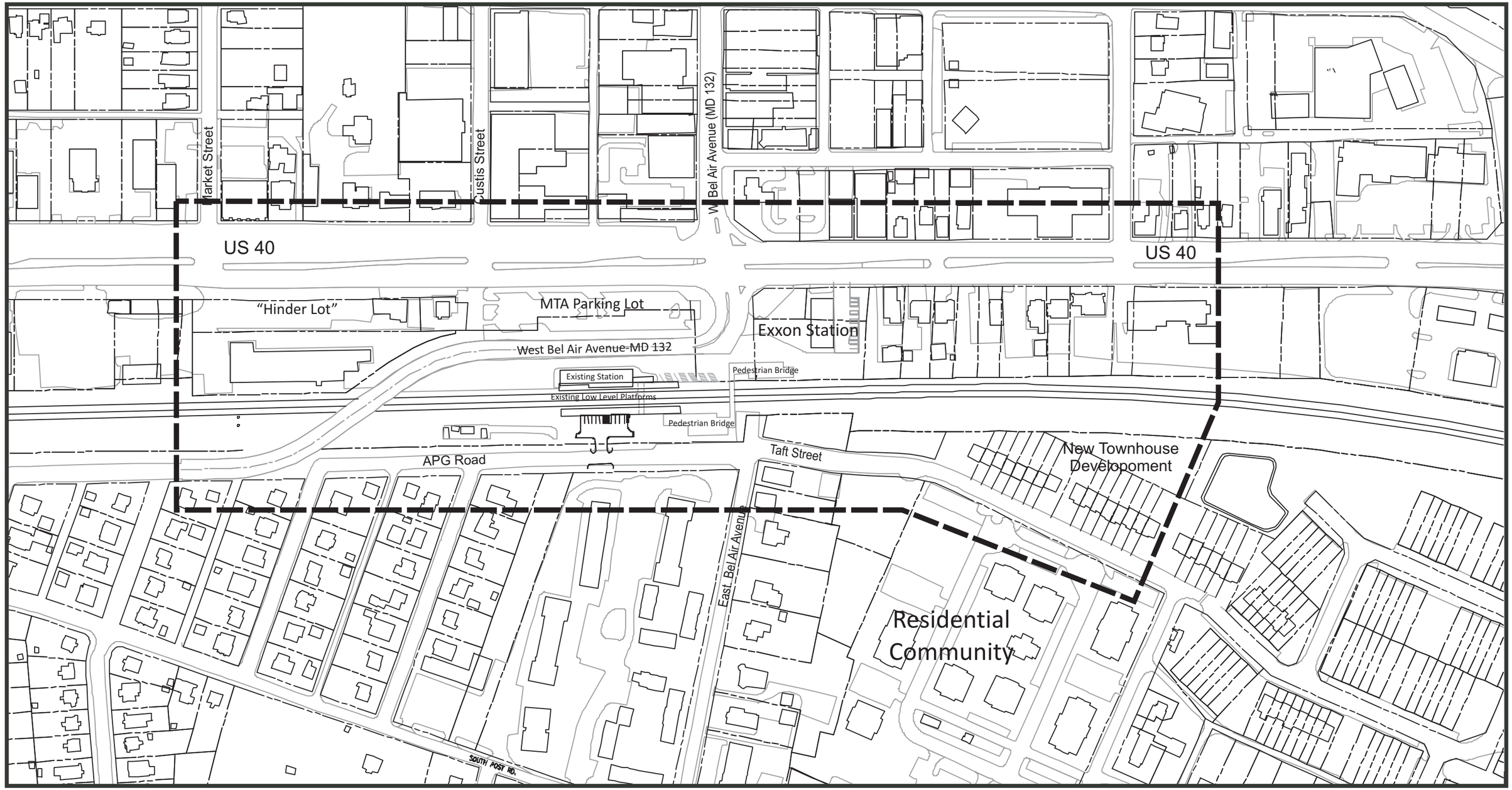

Figure 3

Study Area - Existing Conditions

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend

Scale 1" = 100'
100' 0 100'

Location Map

holders only. Amtrak Northeast Regional trains make seven stops southbound and six stops northbound each weekday and six stops each way on the weekends. MARC commuter trains stop seven times per day northbound and six times southbound at Aberdeen. Existing train service is shown in Table 1.

Amtrak, Acela and MARC trains are electrified with power provided via overhead catenary wires. Pairs of catenary poles supporting those wires are spaced approximately 270 feet apart along the alignment, at a transverse distance between poles of 62 feet, thus providing approximately 60 feet of horizontal clearance. Freight trains are diesel powered, and operate on any of the three tracks, as well as on the fourth track and spur leading to APG.

Table 1 – Existing Commuter Train Service at Aberdeen

Service	Northbound Departures	Southbound Departures
MARC[(1)]	6:06 AM 7:42 AM 1:59 PM 6:02 PM 6:37 PM 8:00 PM 10:40 PM	4:48 AM 5:48 AM 6:38 AM 8:18 AM 2:37 PM 6:33 PM
AMTRAK/ MARC Service [(2)]	4:19 AM 6:34 AM 7:35 AM **4:09 PM** **8:18 PM** 9:52 PM	**6:57 AM** **8:35 AM** 3:00 PM 3:15 PM **5:19 PM** 6:57 PM 7:55 PM

Note (1) – MARC Schedule as of 2 Apr 2012
Note (2) – Trains in **BOLD** serve both Amtrak and MARC passengers.

Amtrak and MARC trains utilize the west platform for southbound trains and the east platform for northbound trains. At Aberdeen, access to the platforms is primarily directly from northbound trains to the east platform and from southbound trains to the west platform. However, northbound trains operating on the center track have access to the east platform via a wooden at-grade walkway. A fence separates this walkway from the west southbound platform. Pedestrians can also move between platforms via the tunnel or pedestrian bridge as further detailed in the next section.

Ridership

Existing and projected ridership are shown in Table 2. Table 2 lists existing and forecasted Amtrak and MARC boardings and alightings at the Aberdeen Station. As illustrated in the table, Amtrak forecasts ridership will increase about 46 percent between now and 2030 and MARC ridership is forecast to increase by 50 percent by 2035.

Table 2 – Existing and Projected Ridership – Amtrak and MARC

Ridership Year and Service	Annual Boardings and Alightings	Average Daily (250 days per year)	AM Boardings
Amtrak			
Existing 2011	39,878	122	61
Forecasted 2030	58,100	178	89
Percent Change	46%	46%	46%
MARC			
Existing 2011	56,250	225	112
Forecasted 2035	84,500	338	168
Percent Change	50%	50%	50%

Source: Amtrak and MTA/MARC Ridership and Forecasts

Facilities

The existing Aberdeen Train Station is located just south of the intersection of Philadelphia Boulevard (US 40) and West Bel Air Avenue-MD 132 in Harford County. The station site is owned by Amtrak and leased and operated by MARC. A description of the existing station facilities is provided below.

Tracks – Currently three tracks go through the station. The two easterly tracks are approximately 12 feet on center. The westerly track is 15 feet on center from the center track. The three tracks are on a tangent alignment through the station area, but north of Bel Air Avenue, the alignments transition to an approximate one degree curve (No. 351 at Milepost 65) toward the northeast. Spirals for that curve start in the vicinity of Bel Air Avenue.

A fourth track that had formally operated through the station area has been removed, leaving an unoccupied space for one track on the east side of the corridor. That fourth track remains in place south of the West Be Air Road-MD 132 overpass; about one half mile south, there is a hand-operated turnout to the east from that fourth track which connects to a spur leading toward Aberdeen Proving Ground. Crossovers allow freight trains to access that turnout from any of the existing tracks.

Platforms – There are two low-level boarding platforms on the east and west side of the three tracks directly in front of the station. While each platform is nominally 15 feet wide, 250 feet long and 8 inches high (above top of rail), the station extends into the southbound platform reducing its width to about seven feet. The platforms include an 18-inch tactile strip along the track side. The platforms are equipped with a manual wheelchair lift for Americans with Disabilities Act (ADA) accessibility.

Station – The Aberdeen Station, which serves Amtrak and MARC passengers, is a one-story building of about 3,000 square feet located on the south-bound platform. It is maintained by MARC and contains a waiting room, ticket vending machine, restrooms, and an Amtrak ticket machine that prints both Amtrak and MARC tickets. While not staffed, it is open to the public waiting for trains between 4:00 am and 10:00 am in the morning and 2:00 pm and 8:30 pm in the afternoon/evening.

The roof of the station extends over the southbound platform providing shelter and protection from the weather. A tunnel and a pedestrian bridge north of the station allow passengers to get from one side of the tracks to the other.

In 2001, the Maryland Historic Trust (MHT) had completed a Maryland Historical Trust National Register Eligibility Review Form for the Aberdeen Station, Inventory number HA-781, dated November 26, 2001, that found that the Aberdeen Station was not eligible for listing on the Register of Historic Places. However, additional information included in library of congress files online indicates that the station, shelters and access to the existing pedestrian tunnel should be re-evaluated for historic status and potential national register eligibility. This would be required even if it is not demolished as part of construction of the new high level platforms. This future investigation should include the preparation of a "determination of eligibility" by a qualified architectural historian for submission to MHT and should be done in accordance with the NHPA Section 106 process as part of a NEPA analysis.

Pedestrian Bridge / Station Tunnel – Since the at-grade Bel Air Avenue crossing was removed and replaced with the West Bel Air Avenue-MD 132 overpass, the east and west sides of Aberdeen have been largely disconnected. To get from one side of the tracks to the other, passengers must use either an overhead pedestrian bridge or the existing station tunnel.

The overhead pedestrian bridge, located at the north end of the station platforms, consists of two 1,000-foot switchback ramps and two sets of stairs connected to a bridge for crossing over the tracks. The current structure is wrapped with chain link fencing and uninviting. Based on the information available at this time, MTA considers the Aberdeen Overpass ADA compliant with respect to the issues of dimensions and slopes for the structures ramp segments and landings. However further assessment is warranted to see if it is in compliance with the most recent ADA standards which address additional requirements of accessibility to and from the structure from arrival and destination points..

The station tunnel is between 10-15 feet wide with shelters covering stairs down to the tunnel on either end. Library of Congress photos suggest that this access may have been part of the original 1940's station design. The tunnel is the quickest way to cross the tracks for an able person but since it is not ADA compliant it is not useable by handicapped persons; in addition, it is in poor condition, not well-lit, narrow and often perceived as unsanitary. Many people perceive the tunnel and unattended

station area as unsafe, adding to perceptions of poor security in the vicinity of the tunnel and reinforcing the tracks as a major barrier to downtown for people living on the east side.

Because of their physical appearance and inconvenience, both the pedestrian bridge and the station tunnel are barriers to connecting the communities east of the tracks to downtown Aberdeen. Their demolition and replacement with an aesthetically pleasing, safe, convenient connection from these communities to downtown Aberdeen and US 40, as proposed by the Underpass in the TOD Master Plan, is considered critical to meeting the Master Plan's overall goals.

2.2.2 Roadways

Two major routes – US 40 and West Bel Air Avenue-MD 132 provide regional access to the Study Area (and the train station). Several local streets provide direct access to the station.

There are no at-grade crossings of the tracks in the Study Area, and only three roadway crossings of the railroad tracks within the Aberdeen city limits – MD 715, West Bel Air Avenue-MD 132 and MD 22. All other streets terminate on either side of the tracks.

US 40 (Philadelphia Boulevard)

Regional vehicular access to the Study Area is provided primarily by US 40, a north-south four lane divided highway located west of and generally parallel to the Amtrak/MARC railroad tracks. Together they bisect the station area and Aberdeen. Other travel modes on US 40, such as bicycling and bus transit, have to use the travel lanes and conflict with the vehicles along US 40. The street is also not pedestrian-friendly in terms of its lack of pedestrian scale and wide un-signalized crossings.

On the west side of US 40, south of West Bel Air Avenue-MD 132, adjacent to local businesses is a wide paved access lane which serves as a service road. It has unmarked angled parking and or marked parallel parking (immediately north of Market Street). This portion of US 40 is currently the subject of an SHA District Design Study for improvement.

The only signalized pedestrian crossing of US 40 is at its intersection with West Bel Air Avenue-MD 132; which continues as overpass over the tracks. Primary auto access to the station from the east and west is via the intersection of Custis Street and MD 40, just south of West Bel Air Avenue-MD 132.

MD 22

While outside the Study Area, MD 22 provides a major connection to the City of Aberdeen and the station. In addition, it is the focus of major BRAC related intersection improvements. The County is also in the process of accepting the final report for the MD Route 22 Corridor Study which addresses improvements needed along the MD 22 corridor from West Bel Air to APG.

West Bel Air Avenue-MD 132

West Bel Air Avenue-MD 132, which crosses over the tracks on an overpass, provides a connection to APG Road for vehicles travelling to/from US 40 and west of the tracks to east of the tracks. West of the tracks it crosses US 40 at a signalized intersection and continues west of US 40 through downtown Aberdeen as its main street. In downtown Aberdeen with lower travel speeds, less traffic, and high network connectivity, it provides a more conducive environment for bicyclists and pedestrians than US 40.

The West Bel Air Avenue-MD 132 overpass limits street access to the station on either side of the tracks. On the west side, it is a physical as well as a visual barrier to the train station for travelers from US 40. On the east side, it touches down several hundred yards south of the station tunnel and northbound platform in the adjacent neighborhood. This access remote from the station together

with the one-way streets and lack of way-finding signage make it difficult to get to and from the station from downtown Aberdeen west of the tracks.

East Bel Air Avenue / Taft Street / APG Road

On the east side, access to the station is possible from Taft Street, East Bel Air Avenue, and APG Road. These roads are two-lane paved roads without curbs. Intersections have stop signs. APG Road and East Bel Air provide access to the Aberdeen Proving Ground. As noted above the APG Road overpass results in circuitous, somewhat difficult access to the east side of the station.

2.2.3 Parking

Commuter parking serving the station includes two surface lots west of the train station – an MTA lot with 188 spaces and the "Hinder Lot", which is leased by MTA, with 90 spaces; east of the station, parking includes a lot with about 15 marked spaces and about 45-50 unmarked spaces along APG Road for a total parking of 338 spaces. (As a note, this is less than the 375 spaces noted in the TOD Master Plan.) Parking at the station is free. While not every day, in high demand periods, overflow parking can spill onto the local streets to the east and south sides of the station.

Also on the west side, a few pick-up/drop-off spaces are available along the curb area adjacent to the station building and north on the curb south of the Exxon Station along West Bel Air Road-MD 132.

2.2.4 Bus Transit Facilities and Service

Bus transit service to the station is provided locally by Harford Transit and the APG Shuttle; in addition MTA commuter bus service is provided from Havre de Grace. The bus stops are located adjacent to the station and on the curb south of the Exxon Station as noted above.

Harford Transit

Harford Transit operates three bus routes through Aberdeen, all of which stop at the Aberdeen station. In 2006, daily ridership for Harford Transit at the Aberdeen Train Station was about 250 passengers.[1]

- Green Line (Route 1/1A) – connects Havre de Grace and Bel Air through Aberdeen with service roughly every hour. There are 10 bus trips in each direction between 6:00 AM and 6:30 PM.
- Purple Line (Route 6/6A) – connects Aberdeen to Edgewood with approximately 45 to 60 minute frequency.
- Yellow Line (Route 4) – also known as the Aberdeen Circulator, or Doodlebug, connects popular origins and destinations throughout Aberdeen, serving five trips daily The Aberdeen Doodlebug provides circulator service around the City of Aberdeen with six bus trips per day between approximately 8:20 AM and 3:30 PM.

APG Shuttle

The APG Shuttle provides service for APG employees between the Aberdeen station and the Aberdeen Proving Ground (APG) with only one trip in the morning and two trips in the afternoon. This

[1] Source – "Aberdeen Station Area Transit Needs Assessment and Market Analysis, Task 1 – Transit Needs Analysis," prepared by Cambridge Systematics with KFH Group, Inc. for Maryland Department of Transportation, March 2009, p 3-3.

schedule limits commuters' flexibility and travel choice and fails to encourage a large portion of employees to travel between APG and downtown Aberdeen on a continuous, daily basis.

The TOD Master Plan proposed that to improve ridership and convenience, the APG Shuttle Service should:

- Provide service timed to meet arriving and departing trains and buses
- Provide sufficient shuttle capacity to meet demand
- Have priority through APG security
- Have convenient stops within APG
- Have train and bus schedules compatible with APG work schedules (7:00 AM to 4:30 PM)

Based on this improved service, the TOD Master Plan suggested it would be reasonable to assume that the demand for an APG shuttle could increase. This increase would necessitate additional facilities on both the east and west side of the tracks.

MTA Service

MTA currently has one commuter bus route that stops at the Aberdeen Train Station. Route 420 provides peak period service on US 40 between Havre de Grace and downtown Baltimore (into Baltimore in the morning and out in the afternoon/evening). Currently, the bus stops on US 40 near the station. In 2008, only about 9-10 riders board or alight at the Aberdeen station which is to be expected since the MARC rail service parallels the MTA bus route to a large extent. [2]

Greyhound Service

Greyhound is currently providing bus service from Baltimore to Wilmington with a stop at the Aberdeen station. There is one trip per day each way.

2.2.5 Bicycle / Pedestrian Facilities

Current bicycle and pedestrian facilities in the Study Area are limited, inconvenient, and unattractive.

Bicycle Routes and Facilities

US 40 is currently signed as a State designated bike route but bicyclists must use active auto travel lanes since there are no bicycle lanes, either marked or separate. Consequently, auto / bicycle conflicts exist on the both sides of US 40 where driveways and parallel parking are plentiful.

As noted by Harford County, one of the County's on-going concerns is to give more attention to improving/maintaining bicycle conditions throughout the County along designated routes, especially along US 40, as they strive for a multi-modal approach to transportation management.

Within the station area, there are no designated bicycle paths to the station on either the east or west side. While not readily visible, a small bicycle rack is located at the station but no lockers.

Pedestrian Sidewalks/ ADA Compliant Connections

The pedestrian environment near the train station is limited by the street network. Crosswalks are present only at the US 40 and West Bel Air Avenue-MD 132 intersection. Overall the scale of the US 40 roadway environment is large with wide setbacks and no designated cross walks makes crossing difficult, especially for the elderly.

[2] Ibid., pg. 3-6.

2.3 Environmental Factors

The existing environmental conditions in the study area have been documented by others through several other previous studies. For this study, these documents were reviewed for relevant information on natural and built resources. The documents included two for the previous MTA parking lot design studies proposed for the east side of the tracks along APG Road and Taft Street and the MMTC Feasibility Study. Below is a summary of the findings noted for the Study Area from these studies.

2.3.1 Natural Resources

As noted earlier, the Study Area is a developed urban area with minimal natural resources; following is a brief summary of these resources.

- **Streams** - There are no streams within the study area. The nearest stream is an unnamed tributary of Swan Creek, located approximately 1,500 ft to the northeast of the proposed Station Square boundary.
- **Floodplains** - According to the Federal Emergency Management Agency (FEMA) floodplain mapping, none of the study area falls within the 100-year floodplain.
- **Wetlands and other Waters of the U.S**. - The National Wetland Inventory (NWI) mapping indicates that there are no wetlands or other Waters of the U.S. within the study area.
- **Chesapeake Bay Critical Area** - The study area does not fall within the 1,000 foot Chesapeake Bay Critical Area.
- **Forest Resources** - No forest resources exist within or immediately adjacent to the proposed Station Square. However, compliance with Maryland's Forest Conservation Act may require afforestation (conversion of bare or cultivated land to forest) on-site. If there are no opportunities to plant in the proposed Station Square, an effort to locate off-site planting opportunities will be required.
- **Rare, threatened, and endangered species** - Mapping for the Aberdeen area indicates that there is no critical habitat within the study area. In addition, according to the U.S. Fish and Wildlife Service and the Maryland Department of Natural Resources, the project would not adversely affect fisheries and other aquatic resources, or federal-listed or state-listed rare, threatened, or endangered species.
- **Agricultural land** - There is no agricultural land in the study area.
- **Public water sources** - One public water supply well is partially within the boundary of the Station Square development. It is well number 99 and supplies water to 37 facilities, which includes residential and non-residential uses.

2.3.2 Community Resources

Land Uses - The majority of the land uses in the vicinity of the Station Square are residential, institutional, and commercial which are supportive of transit and TOD. The site is proximate to downtown Aberdeen and the existing pedestrian and vehicular infrastructure. The combination of the residential and commercial uses and sidewalks and roads provide strong opportunities for TOD.

City zoning within the proposed Station Square boundary is Highway Commercial (B-3). Current land use is generally consistent with the zoning districts. Commercial districts contain a variety of uses, including commercial (primarily small scale retail); civic, including City Hall, a Library, and a post office. Single-family residential dominates the area west of US 40, while the east side of the railroad tracks is split between single-family residential and two- to three-story multi-family residential.

The City is currently evaluating their zoning to implement the TOD Master Plan.

Maryland Priority Funding Areas – The TOD Area 1 is within a Maryland Priority Funding Area.

Parklands - There are no parklands in the study area. The City of Aberdeen contains a limited amount of accessible public green space and there is no open space or parklands in the Study Area. The closest park is Festival Park which is northwest of the study area.

2.3.3 Community Characteristics

Median household income is considerably lower in Aberdeen and both census tracts covering the Study Area than countywide. Similarly, the percent of individuals below the poverty level is also higher in Aberdeen and both census tracts. Preliminary socioeconomic profiles indicate that Environmental Justice Populations may exist within various census blocks in Aberdeen. Future studies will require a more detailed analysis to identify any potential Environmental Justice Populations in the project area. Direct impacts may include property acquisitions; however, improvements to station accessibility would benefit all users.

2.3.4 Cultural / Historic Resources

Two properties in the Study Area have been evaluated as historic properties. The Aberdeen Station and the shelters for the tunnel based on previous studies by the Maryland Historic Trust (MHT) had been identified as not eligible for the listing on the Register of Historic Places. However, as noted earlier, based on new information this will need to be re-evaluated. This would need to be done even if the station is not relocated or demolished because of potential impacts of the construction of the high level passenger platforms.

The second property, at 15 East Bel Air Avenue, is the parcel proposed to be purchased for the realignment of Taft Road. It is east of the station at the corner of East Bel Air and Taft Street; it was evaluated in 2008-09 for the proposed station parking expansion by MTA. A Determination of Eligibility (DOE) was completed for the parcel and the MHT concurred that it was not historic.

2.3.5 Hazardous Materials / Potential Contamination

For the study, a Phase I Environmental Site Assessment (ESA) was performed which included review of existing state and federal records regarding potential hazardous materials and a field visit of the study area to gather information and impacts from the proposed project to adjacent and surrounding properties. This resulted in an identification of the potential contaminated sites in the study area. A summary of the findings is included in Appendix E and the full report is available as a separate document.

The site of particular interest for this study was that of the Exxon Station (designated as 009 in the ESA) which will be the site of the Station Square West Plaza. This gasoline station will be removed in its entirety for the Station Square improvements. The site has been used as a garage since 1926 and as a gas station since 1950.

Four storage tanks for gasoline/diesel are on-site (two 8,000-gallon gasoline Underground Storage Tanks (USTs), one 12,000-gallon gasoline UST, one 8,000-gallon diesel UST), along with two existing and three or more abandoned monitoring wells, a 55-gallon drum storage area, a dumpster, and a dumping area.

There is a Case open (#10-0347HA) related to motor/lube oil. Other cases on this site are closed. The storage tanks on the Exxon site will need to be removed before development of the site along with continued monitoring as identified by the appropriate environmental permitting agencies.

Although a review in the MMTC did not identify the existing railroad right of way as a potentially contaminated site, it should be noted that railroad beds are often contaminated due to leakage from diesel engines and the track areas would need to be investigated further during design of the Station Square Plazas. Due to the makeup of existing commercial uses within the study area, there is a potential for contamination from commonly used hazardous materials and petroleum-based fuels associated with rail travel on several properties.

2.4 Utilities

Utilities are generally available to serve development in the Study Area. Electricity, wastewater and communications are available in sufficient quantities to fully serve any development. To document the utilities, existing utility record drawings were obtained from the following groups - BGE, Verizon Business, Verizon, and the City of Aberdeen. GIS information for the utilities for the Study Area was obtained from Harford County.

In addition, a site visit was made to identify surface utility structures and overhead lines. The available existing data and drawings obtained have been incorporated in the existing condition plan. Here is a synopsis of the existing utilities at the site.

Sanitary Sewer System - City records show that there are two parallel separate sanitary sewer systems crossing the site from west to east perpendicular to the existing railroad track along West Bel Air Avenue-MD 132. The two systems combine on the west side of the tracks into an eight-inch terra cotta pipe. From the connecting manhole, another eight-inch terra cotta pipe conveys the combined sanitary sewer load eastward to the downstream pipes which then cross under the tracks.

Water Distribution System / Water Resources - City records show an existing eight-inch main water pipe in West Bel Air Avenue between the two parallel sanitary sewer systems described above. This main water pipe continues east where it crosses under the existing tracks; it continues under East Bel Air Avenue on the east side of the tracks.

In addition to the above mentioned main line, there are two existing fire hydrants and several valves/meters at the site. One of the fire hydrants is located at the west corner of the US 40 and West Bel Air Road-MD 132 intersection. The other one is located a couple hundred feet south of the US 40 / West Bel Air Avenue-MD132 intersection in an existing island in the MTA station parking lot.

Verizon - There are two separate communication components at the site. The first consists of a couple of Verizon manholes and a connecting duct bank. One manhole is at the west end of East Bel Air Avenue and the second is at the north corner of West Bel Air Avenue MD 132 and US 40. From Verizon record drawings, it appears that there is a duct bank connecting these two manholes. The manholes and duct banks would have to be relocated since they would conflict with the proposed Underpass.

The second system, located parallel to the tracks, is believed to be associated with Verizon Business Service. This system runs from south to north on the east side of the tracks and has three structures at the Amtrak station.

Gas - It appears from the site visit that there are existing gas lines in the site both on the west and the east side of the tracks. BGE record drawings have confirmed the site visit observation. From the available drawings, it is apparent that a two-inch gas line would likely have to be relocated to prevent future conflict with the site of the West Plaza.

Overhead lines - Overhead lines are present at the site. Both BGE and communication companies are using shared poles. Existing overhead lines and associated poles are located along US 40 and APG Road. If the width of the road is modified, the utility poles would have to be relocated.

2.5 Geotech - Soil Characteristics / Water Table

2.5.1 Soil Characteristics

The Study Area is located in the City of Aberdeen in Harford County, Maryland. It is mapped within the Western Shore Lowlands Region of the Coastal Plains Physiographic Province according to the Maryland Geologic Survey. Natural soils in the region are classified as sedimentary material deposited in marine and coastal environments. According to the Geologic Map of Harford County the surficial soils are mapped as the Talbot Formation consisting mainly of gray and dark brown silt and clay mixed with some fine sand. Iron oxide staining and weak cementation is also common in this formation.

The soil conditions depicted on the existing soil boring logs in the two MTA reports for the previous design studies for parking along APG Road and Taft Street are consistent with the area geology. The data indicate the presence of fine grained soil layer at shallow depths. The fine grained soil layer consists of silty clay or silt material with variable amounts of fine sands. This layer is found below a man-made fill layer of variable thickness. Coarser grained deposits are encountered below the fine grained layer.

The coarse grained deposits are sands with variable amounts of silt and clay. This material is typically medium dense to very dense. The soil borings drilled for the rail station parking expansion were the closest data available to the project site. However, these borings extended only to a depth of 12 to 16 feet below existing grade. The groundwater level was noted during drilling or at the completion of the soil boring. Observation well data are not available at the project site.

2.5.2 Water Table

Existing groundwater data near the project site is limited and therefore not conclusive. Review of existing groundwater data from two previous MTA parking lot design studies indicated that the groundwater level may be within 12 feet of natural ground. This was indicated in one boring from the MTA study for parking along APG Road on the east side of the tracks. The borings for the other MTA study for parking along Taft Street only went to 10 feet below natural ground

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3. REFINED DESIGN CONCEPTS

3.1 Design Development

3.1.1 Program Refinement – Short-term Program

The train station and supporting Station Square Plazas and Underpass are at the heart of the Station Square Concept shown in the aerial perspective in Figure 4. The TOD Master Plan identified programs for Short, Mid, and Long-term Phases for the land uses and associated program to enhance all transportation modes at the station to provide for a multi-modal facility. The Short-term Phase program was used as the basis to develop plans for this feasibility study.

The following summarizes the program and discussions from the TOD Master Plan that details this Short-term Phase and its goals. However, this program has been modified and refined to incorporate some of the findings of this Feasibility Study. It should be noted that the Rail Improvements in the following program would be designed and constructed by others and would not be a part of the TOD Station Square development.

- **Rail Improvements**
  - Redesign and reconstruction of the tracks to provide for Amtrak HSR and regional service, MARC commuter service, and Norfolk and Southern (NS) freight service. This includes increasing center-to-center track distances, and adding a fourth track and Gauntlet tracks through the station area.
  - Construction of two high level ADA compliant platforms 1,050 feet long, 15 feet wide desired, (12 feet wide acceptable), and 4 feet high with railings and ADA accessible ramps from ground level to high level platforms.
  - Providing platform shelters 650 feet for each platform with associated benches, shelters, ticketing machines, CCTV, and lighting.
- **Roadway Improvements**
  - Reconstruction of US 40 through downtown Aberdeen in conjunction with MDSHA based on Complete Streets guidelines to provide for multi-modal parity and include appropriate landscaping to establish it as a Green Boulevard.
  - Extension of Diamond Street east of US 40 to provide connections between downtown Aberdeen and station area and community east of the railroad tracks via the Underpass.
  - Redesign and reconstruction of the US 40-West Bel Air Avenue-MD 132 intersection, in conjunction with MDSHA, to urban design standards to reduce pedestrian / vehicle conflicts and to provide more direct access for pedestrians and bicyclists to the train station, bus stops, bicycle facilities, and the Underpass.
  - Redesign and reconstruction of the US 40 intersections at Diamond Street and Custis Street to urban standards with traffic signals, and crosswalks to provide for direct, convenient pedestrian crossings between downtown Aberdeen and the train station, bus stops, bicycle facilities the Underpass.

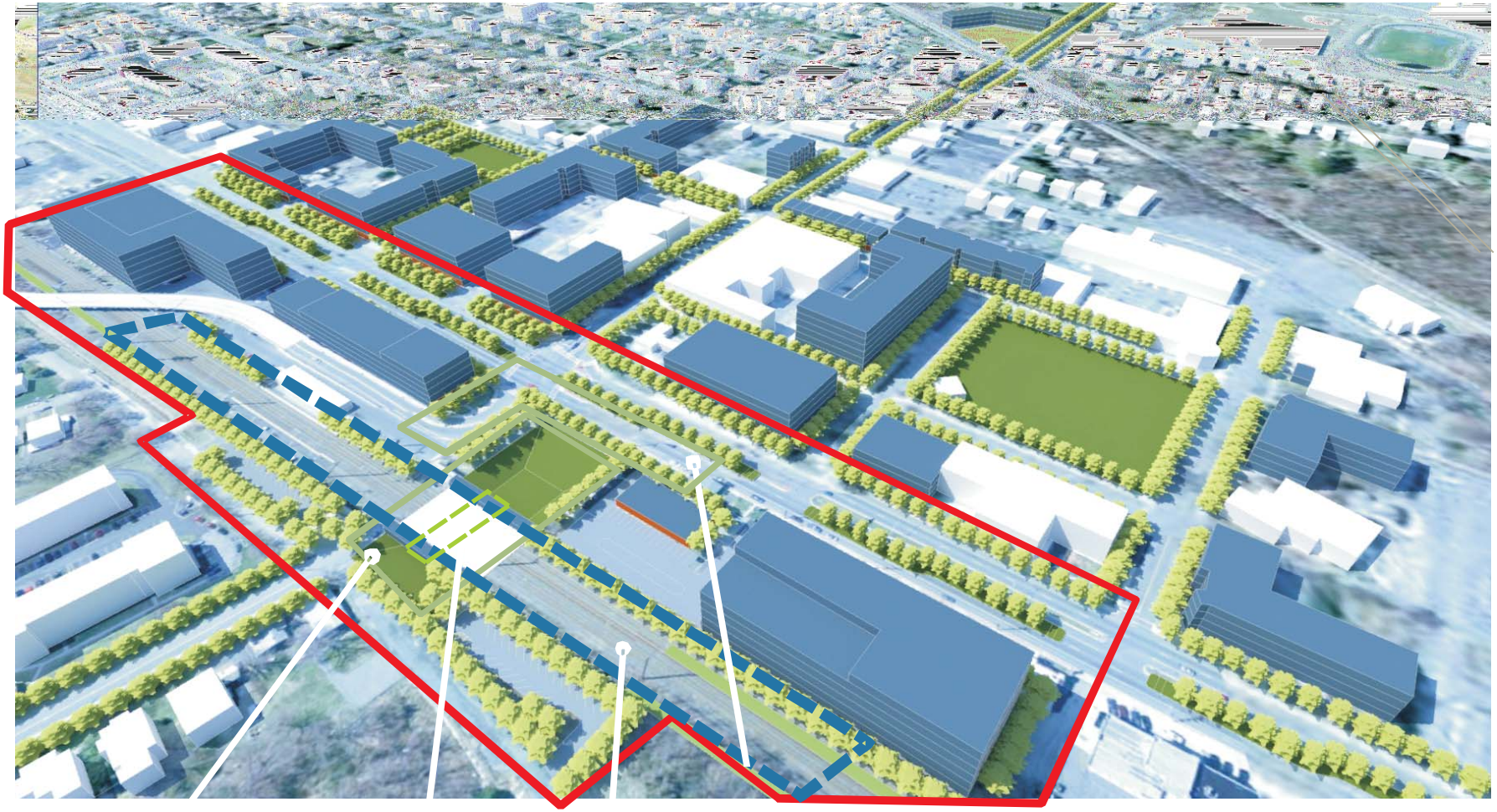


Figure 4

Aerial Perspective of Station Square Concept Improvements Looking Southwest

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend

Not to Scale

- **Parking – Commuter / Long Term**
  - Increase the number of parking spaces from 375 to 545 spaces and provide for handicapped parking.
  - Install a new traffic signal at the entrance to the MTA parking lot at the US 40 / Custis Street intersection. (See above).
  - Provide a total of 20 on-site and 9 curbside Kiss and Ride/Drop-off/Taxi spaces on the east and west sides of the tracks to serve the north and southbound travelers.
- **Bus Facilities**
  - Provide 4-5 bus bays to accommodate Harford Transit, MTA, APG Shuttle buses with bus shelters on west side.
  - Provide bus drop off / pick up area for APG Shuttle buses on the east side with shelters.
- **Bicycle / Pedestrian Facilities**
  - Provide ADA compliant sidewalks and ramps from the adjacent communities and downtown Aberdeen to and through the Station Square Plazas and Underpass; construct curbs with curb cuts for the handicapped. (See intersection redesign noted above.)
  - Provide bicycle lanes (such as cycle tracks and bike boxes) and sidewalk along US 40 as part of Complete Street redesign.
  - Install bicycle storage rack and lockers for up to 25 bikes at the station.
  - Incorporate location for Bike Share Program bicycles / pick up at the Station and at destinations in Aberdeen and APG.
  - –Construct Hike/bike trails along railroad tracks with connections to local communities.

3.1.2 Concept Plan Development

Following is a discussion of the process and steps followed to refine and develop the Concept Illustrative Plan for the Short-Term Phase program for the Station Square to a pre-preliminary engineering level. This included obtaining data on existing conditions, and developing site plans, cross sections, and required calculations needed to refine the designs of the Station Square East and West Plazas, the Underpass, and US 40 and to address the layout of the track and platforms. These refined designs were used in the assessment and identification of any potential fatal flaws. The data on existing conditions was, as noted, obtained primarily from other studies or sources conducted by MTA or MDOT for the area, supplemented by some limited field investigation.

Plan Development

The pre-preliminary engineering civil site plans were developed by translating the Concept Illustrative Plan - Station Square from the TOD Master Plan onto a topographic map of the same area. These pre-engineering civil site plans were then used to develop site plan of the Station Square Plazas and Underpass in relation to the new track and platform layouts.

At the same time, conceptual site plans were prepared for the improvements to US 40 including the redesign of the intersection of US 40 / West Bel Air Avenue-MD 132. Other pre-engineering plans were prepared for the streets on both the east and west sides of the station to accommodate parking, bus bays, and pedestrian and bicycle facilities.

Sections

Cross sections were developed though the tracks and the Underpass. The sections for the Underpass were developed as part of the technical assessment of the type of structure and its constructability for the Underpass below the railroad tracks. The design of the Underpass generated the elevation of the floor of the Underpass and lowest level of the East and West Plazas.

3.1.3 Phasing Possibilities

As noted, the pre-engineering site plan was developed using the Short-term Phase development program. This included the Station Square West and East Plazas, the Underpass, and multi-modal improvements for buses, pedestrians, and bicyclists and the addition of the fourth track and the high-level platforms.

However, it is anticipated that the Short-term land use and transportation modal improvements may be constructed before the fourth track and the high-level platforms. Figure 5 illustrates a rendered conceptual site plan with the Station Square Plazas, the Pedestrian Underpass, and other transportation improvements constructed but with the existing track, platforms and station. With this sequencing, while the Pedestrian Underpass would be somewhat separated from the platforms it would still serve as the pathway between the north and southbound platforms since the existing pedestrian bridge would be demolished.

A conceptual plan was also developed to show the rail roadway improvements. The rendered site plan in Figure 6 shows the Station Square area with the four rails and new longer, ADA compliant platforms. With this layout, the Pedestrian Underpass connects directly to the platforms and provides convenient access for passengers from the bus and taxi drop off areas and the parking lots to the platforms.

3.2 Refined Concept Layout Plans

3.2.1 Introduction/ Overview

Using the program elements and concept plan noted above, the various components included in the TOD AREA 1: Station Square and US 40 Boulevard were transferred and developed into a pre-preliminary engineering level design. These plans were developed in an iterative process with members of the design team that prepared the Aberdeen TOD Master Plan. The plans were also presented to the local planning Core Team that had directed the Master Plan to insure a close coordination with concepts in the TOD Master Plan.

3.2.2 Station Square Plaza

The core concepts in the TOD AREA 1 were the two Station Square Plazas (East and West) and the connecting Underpass below the railroad tracks. As shown in the TOD Master Plan, the concept for the West Plaza was more developed than the East Plaza.

As the design process progressed, it was determined that the designs for the various elements were inter-related, in particular the design for the Underpass and the two Plazas. The key factor was the height for the Underpass that was considered appropriate from aesthetic and safety considerations. .

- West Plaza - The layout of the West Plaza is consistent with the Concept Plan. (Figure 7.) It is aligned with the Underpass and East Bel Air Avenue; this was made possible by the redesign of intersection of US 40 and West Bel Air Avenue-MD 132. It includes Green Terraces on three sides

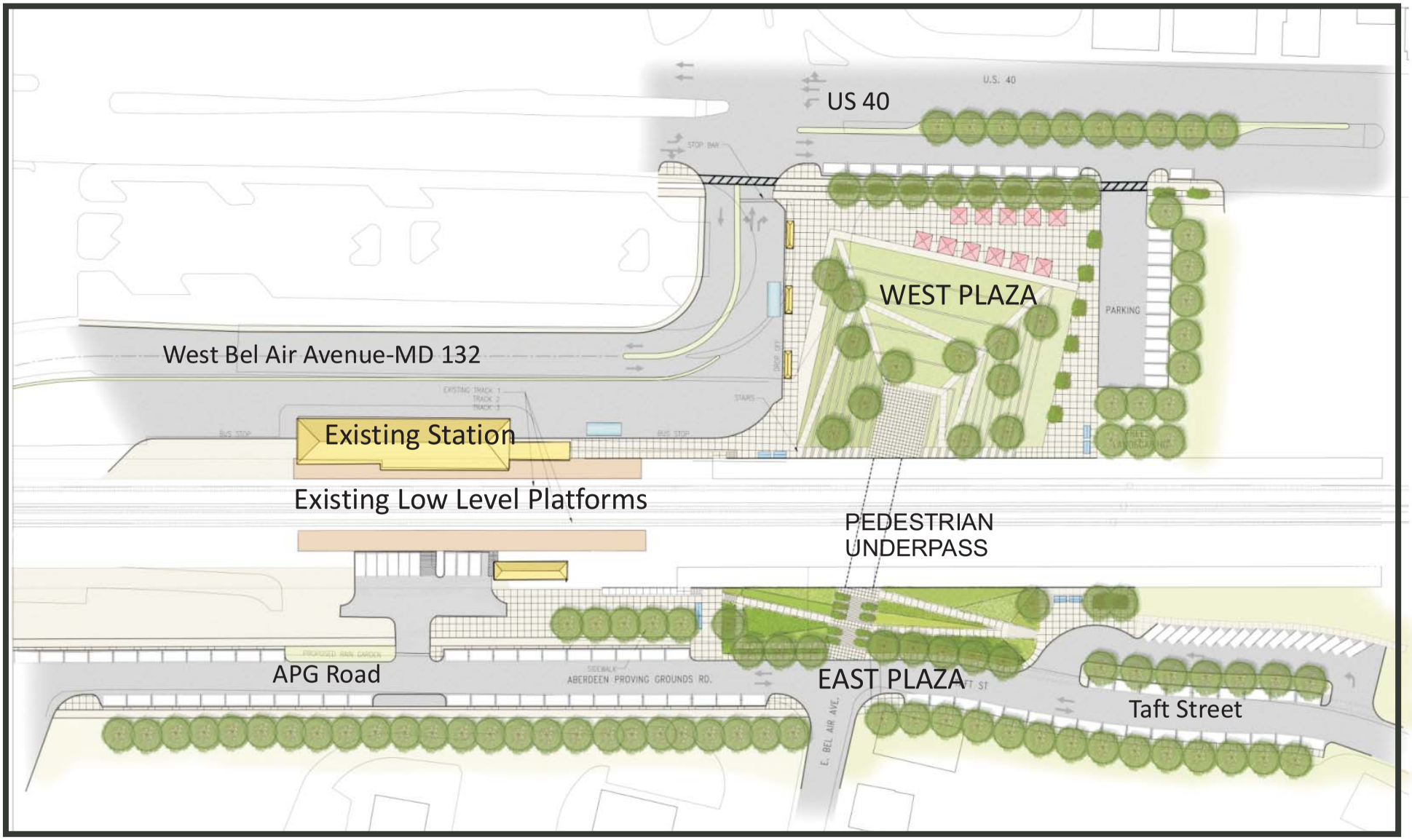


Figure 5

Rendered Plan of Proposed Station Square Improvements with Existing Platforms

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend

Not to Scale

Location Map

Figure 6

Rendered Plan of Proposed Station Square Improvements with High Level Platforms

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend

Not to Scale

Location Map

Figure 7

Perspective of West Plaza and Entrance to Pedestrian Underpass Looking Northwest

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend

Not to Scale

Location Map

and stairs on the fourth side along a retaining wall supporting the railroad. All ramps are designed to be ADA compliant handicapped ramps with less than five percent grades to minimize the need for railings. In addition, the side along US 40 includes the streetscape, sidewalks, and bike lanes that were proposed in the TOD Master Plan for the entire length of US 40 in TOD 1 Area.

- East Plaza – The layout for the East Plaza, has been refined from the Concept Plan, due to limited distance between the new edge of the tracks and the new high-level train passenger platforms and Taft Street. This reduced space did not allow for the gentle terracing that was originally proposed. To provide more space, the parcel at the northeast corner of Taft Street and East Bel Air Avenue was identified for acquisition to provide for realignment of this intersection and Taft Street. However, even this still did not provide enough space for the terraced concept. So an alternative, shown in Figure 8, was developed consisting of a wide stairway and a series of ADA ramps was developed; the stairway is aligned with East Bel Air Avenue which incorporated the visual connection proposed in the TOD Master Plan.
- Land Acquisition – To build the Plazas, two parcels would need to be acquired – the site of the Exxon Station for the West Plaza and the vacant structure on the parcel (Taft and East Bel Air Avenue) for the East Plaza. Other property transfers or easements that might be needed include:
    - MTA Property for proposed parking.
    - SHA Property for current site of pedestrian overpass.
    - SHA Property currently part of the intersection of US 40 and MD 132.
    - Possible easement from Amtrak for Underpass and other improvements depending on extent of construction on Amtrak property.

3.2.3 Underpass Structure

The design and evaluation of options of the potential structural concepts for the Underpass was an iterative process considering design and constructability. The options varied by structural design concept and method of construction. Each option has its benefits as well as its challenges particularly considering constructability. For each option, a temporary steel structure would provide support for the existing overhead pedestrian bridge until the Underpass is completed and the bridge is demolished.

Dimensions

The Underpass's horizontal and vertical alignments are interconnected with the two Plazas as shown in Figure 9. Horizontally it is aligned with East Bel Air Avenue to provide a direct view for users arriving from the east. After several iterations in the design process, it was agreed that the dimensions for the Pedestrian Underpass opening would be 10 foot high by 30 feet wide.

Vertically the Underpass's floor elevation is determined by three factors– its clear height (10 feet), depth of structure (2 feet), and the backfill and ballast (4 feet) for a total of 16 feet below grade. Its length would be +/- 100 feet to accommodate the future track layout with the addition of a fourth track, increase from 15-foot to 16-foot on-centers for the new track, increase of six feet for gauntlet tracks to accommodate freight service, and the new high level platforms. This is about 28 feet wider than the current track cross section.

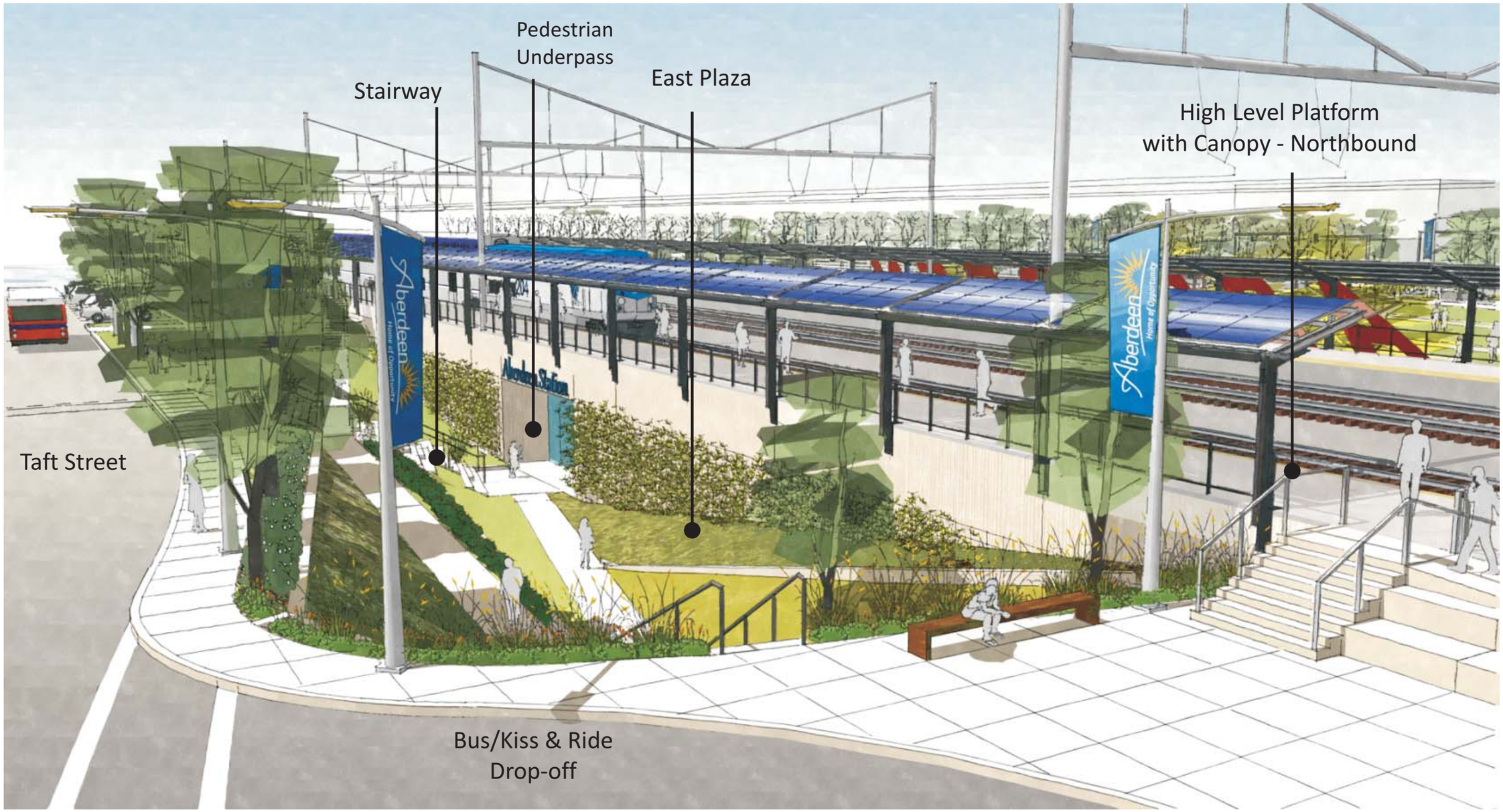


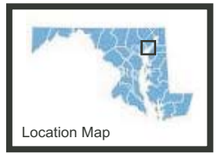
Figure 8

Station Square - East Plaza and Entrance to Pedestrian Underpass - Perspective looking Southeast

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend

Not to Scale



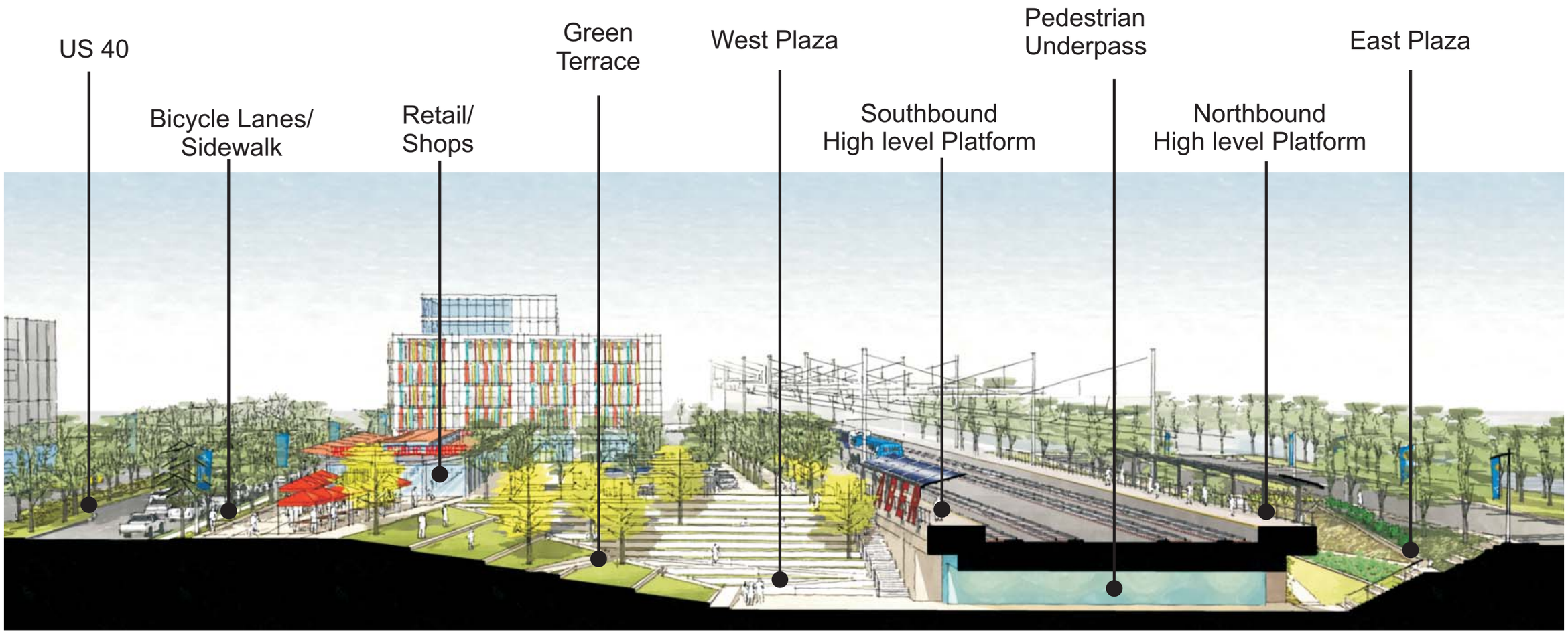


Figure 9

Perspective Cross Section of the Proposed Pedestrian Underpass and East and West Plazas Looking North

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend

Not to Scale

Structural Options

Based on these planning parameters, three structural options were evaluated for the construction of the Underpass – Mined, Jacked and Cut and Cover; two alternates were evaluated for the Jacked option but only one for the other two options as discussed below.

- Option A – Mined with Temporary Support
- Option B1 – Jacked Alternate / Precast Concrete Box Sections
- Option B2 – Jacked Alternate / Drilled Steel Pipe Casings
- Option C – Precast Segments / Cut and Cover

Another approach of using a Tunnel Boring Machine (TBM) was also reviewed.

Following is a summary of the evaluation of the options; see Appendix D for the full analysis. From this analysis it is considered that either of the Jacked Options B1 or B2 have the most likely potential to satisfy all the planning and design criteria. Construction of Options A, B1, and B2 is estimated to take between 12-18 months. Option C is estimated to take 3-6 months longer.

Option A – Mined with Temporary Support

This options uses a temporary steel framing system to support track and train loads together with conventional excavation and tunnel construction underneath such as shotcrete or cast-in-place structural tunnel. This option requires greater depth over the structure to allow area for the temporary structure and to construct the Underpass which requires deeper excavation. This would result in the floor of the Underpass and the Plazas being 22-25 feet deep at about elevation +/- 50 feet. In addition, the deeper excavation and extensive temporary steel framing system would add to the overall cost of the Underpass.

Option B1 - Jacked Alternate / Precast Concrete Box Sections

This option uses standard precast concrete box sections, jacked under the railroad tracks; it requires construction of a jacking pit and a receiving pit to accommodate the jacking equipment. For the Underpass, two rectangular concrete box sections would be jacked– side by side -- one section at a time. Lubricants would be used to facilitate jacking. To ensure grade is maintained during jacking, leveling steel would be installed under the box sections. After construction, knock-out panels provided in the center walls between the side-by-side sections would be removed to create some shared space between the two box sections.

A possible alternate to the concrete box sections are custom designed Conspan single arched sections similar to those proposed in Option C; they would provide a more open feel since they would eliminate the center wall. This option is estimated to require less overburden and thus possibly the floor of the Underpass could be less than 16 feet deep.

Option B2 – Jacked Alternate / Drilled Steel Pipe Casings

Option B2 uses individually drilled horizontal steel pipes supported by steel ribs and a cast-in-place concrete base slab to create the Underpass. The pipes would be interlocked to ensure that they are adjacent to each other during drilling. Hand mining using pneumatic spades and jackhammers would be used to remove soil from the interior as construction proceeds. After the soil excavation, steel ribs would be installed sequentially to hold up the steel pipes.

A possible sub-option would be to design the cross section to be more rectangular; the cross section would still have rounded walls and ceiling but with increased usable space. This option would also only require a 16-foot depth.

Option C - Precast Segments / Cut and Cover

Option C would install standard precast sections like those manufactured by Contech for its Conspan product installed with cut and cover construction. The construction sequence would consist of two phases – one with construction from the east and one from the west. This requires open access from both sides of the railroad and access from the east side is considered questionable. Construction would begin on the east side before the fourth track was constructed but would allow two tracks to be in operation at all times. This sequence would probably require some short-term closures of Taft Street and APG Road. Because of the potential for lower overburden, however, this option may only require a 15-foot depth.

This option requires extensive support of excavation at the end of the Underpass in the transition of construction between phases from the east and west sides. This would likely require installation of sheet pile or a soil nail wall. Construction duration would be increased due to the phasing and the potential need for cranes. However, after discussions with Amtrak the cut and cover option was eliminated because of the interference the use of cranes would have with overhead power lines, signals, and catenaries.

Tunnel Boring Machine

Use of the Tunnel Boring Machine (TBM) approach was also suggested but has the following major limitations:

- The lay down area needed to set up, position and align TBM equipment at the face of the excavation is extensive, usually several hundred feet space that is not available between Amtrak and US 40 for a west side to east side construction.
- Costs to mobilize, assemble, and use TBM equipment are significant, and could be prohibitive; typical applications are for half mile long (and longer) excavations where the equipment costs distributed over the entire length help justify the cost on a per foot basis.
- The initial depth of excavation needed to support use of the TBM could be twice that anticipated for other alternatives being considered (even though the resulting usable depth may still match those accomplished using other methods).
- The TBM system requires more specialized expertise than most other options being considered, making it less likely to be bid by local / regional contractors.

Based on these limitations, it is considered that this technique would not be applicable to the Aberdeen Underpass project.

3.2.4 Railroad Facilities and Operations

Service

Ultimate plans for passenger service through Aberdeen will include upgrades to Amtrak and MARC service. Daily for the overall corridor, Amtrak trains are proposed to increase to 130 – 160 trains per day, and MARC trains could increase to 40. High Speed Rail (HSR) service will move through the corridor, but will not stop in Aberdeen. In addition, there will be increases in the freight trains through the area.

The MARC Growth and Investment Plan (MTA, September 2007) identifies service expansion on the Penn Line to Aberdeen and beyond. Following is a summary of MARC planned service expansions:

- 2015 Plan - Expansion of peak service and limited off-peak service to Aberdeen and service extended to Elkton and Newark.
- 2020 Plan - Extension of core service to Aberdeen to 20-30 minute peak service and hourly off-peak.
- 2035 Plan - Extension of the fourth track through Aberdeen and Perryville.

Facilities

Improvements and changes to the tracks, platforms, and station are proposed to accommodate these projected changes in service.

Tracks – To accommodate such service, a four track alignment would be restored throughout this section of the corridor. Figure 10 shows the existing and proposed cross sections for the track layout. Changes to the track would include:

- A new fourth track to accommodate Amtrak, MARC, and freight trains; based on analysis of the entire corridor this track will be located east of the existing three tracks. The two inside tracks are being designed to accommodate HSR operations along the Northeast Corridor.
- Bypass tracks (i.e. gauntlet tracks) will be included on the two outside tracks to provide clearance for freight trains operating next to the High Level Platforms.

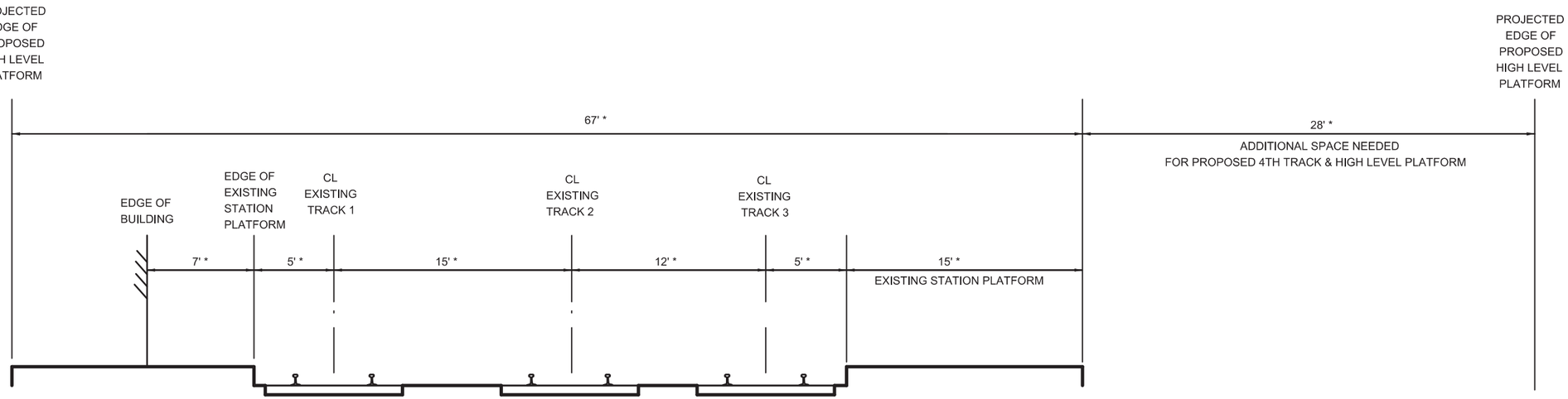
The center tracks will "predominantly" be occupied by HSR operations running on Class 8 track designed for 160 mph speeds. Amtrak regional trains and MARC trains would predominantly operate on the outside tracks on Class 6 or 7 tracks at design speeds of 110 to 125 mph. Freight operations (Norfolk Southern) would predominantly run on the exterior-gauntlet tracks at maximum 60 mph speeds, but would need to maintain their ability to access the APG turnout south of the station from any of the four tracks. Passenger service tracks would be 16 feet on center to accommodate HSR operational clearance requirements.

When this curve is redesigned for HSR Track curvature to the north would be reduced to near 20 minute curves, and have spirals of nearly seven hundred feet on both ends. The alignment through the curve would shift several feet to the east. In addition, the southern end of the curve (and its spiral would shift several hundred feet south of the station. Tracks in the vicinity of the proposed Underpass would shift approximately eight feet east.

Future build out of the four track alignment is proposed to include provision for a maintenance road on each side of the four tracks except through the station area. The total width of the future track bed alone would be approximately 72 feet from toe to toe of ballast section. Even assuming that maintenance roads could be located outside catenary poles, even on tangent sections of track that remain in place but get realigned for HSR, the existing clearances between catenary poles would be inadequate, thus new catenary poles will be required at all locations.

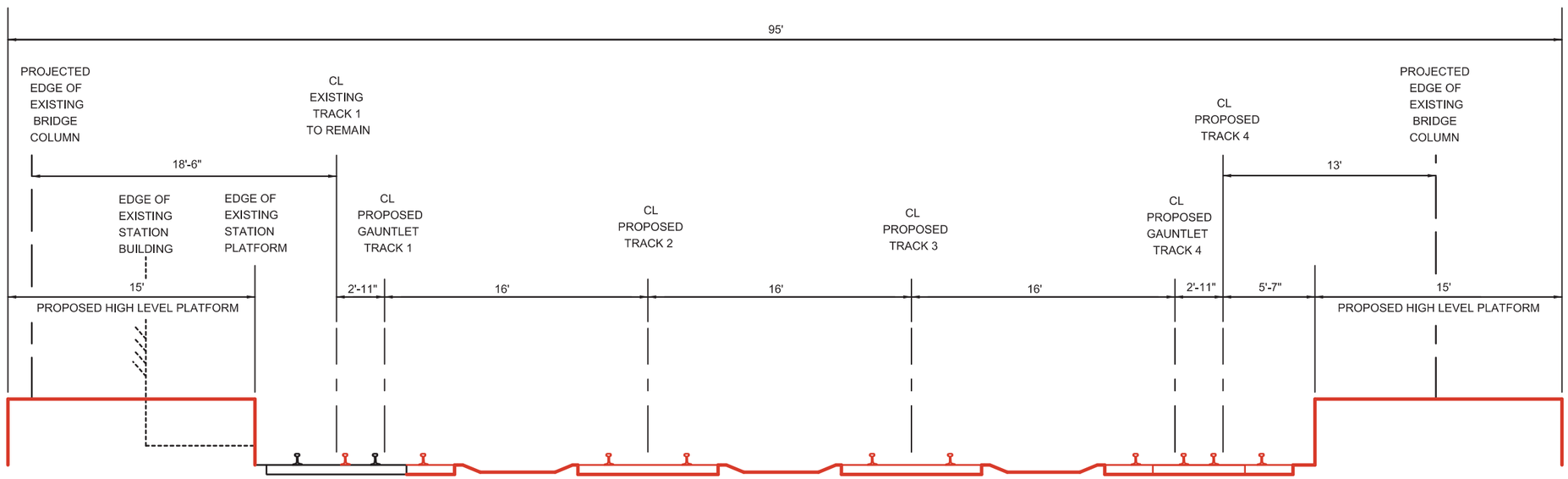
In the curved sections, the shift in track due to speed upgrades, coupled with increased numbers of tracks and spacing between, would also require replacement of all catenary poles. This shift would also require replacement of the MD 22 overpass that crosses the tracks about a mile north of the station. In addition, the existing clearance between piers supporting the West Bel Air Avenue-MD 132 overpass would also likely be inadequate to accommodate the shifted tracks, and thus may require its modification or complete replacement.

Amtrak standards based on the proposed design speeds for the HSR limit the degree of curve and super elevation for high level platforms. Using these standards would preclude platforms in the



TYPICAL SECTION EXISTING CONDITION - LOOKING NORTH

NOTE: VALUES NOTED WITH * ARE APPROXIMATE.



TYPICAL SECTION PROPOSED CONDITION WITH 4TH TRACK, GAUNTLET TRACKS AND HIGH LEVEL PLATFORMS - LOOKING NORTH

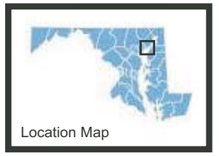
Figure 10

Cross Section of Existing Track Layout with Low Level Platforms and Proposed Track Layout with High Level Platforms

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend

Not to Scale



currently proposed location and require their relocation several hundred feet to the south. This would result in the north end of the platform being near the south end of the existing station away from the Underpass.

These design speed, curvature, and super elevation criteria, however would apply only to the HSR tracks, the center two of four. The outer tracks would serve Amtrak Regional and MARC trains, both of which have lower operating speeds (as noted above) and stop at the station. Freight trains also have lower speed and would also typically use those outer gauntlet tracks to minimize potential interface with HSR operations. So while the two outer tracks would generally parallel the interior HSR alignments, they would not be subject to the lower super elevation requirements as for HSR tracks. (See note on Figure 11) thereby reducing super elevation requirements to within Amtrak's tolerance for accommodating platforms and permit the platforms in the preferred location. Freight operations would not tolerate excessive super elevation either, that being further justification for the allowance of platforms in the preferred location.

Platforms – An important criterion in future station design is the Americans with Disabilities Act (ADA). The U.S. Department of Transportation (USDOT) has determined that to comply with ADA, all train station platforms must provide level boarding to all passenger cars. To accommodate Amtrak 12-car trains, this means providing boarding platforms 4-foot high, 15 feet wide and 1,050 feet long.

Ramps, no more than a 7.5 percent grade, and stairs would provide access from ground level. Based on Amtrak guidelines, each platform will have a 650-foot long shelter. One platform would be located on the outside of the west most track for southbound travelers and the other would be outside of the new fourth track on the east for northbound travelers. Amtrak indicated that at present they do not anticipate any center platforms between tracks.

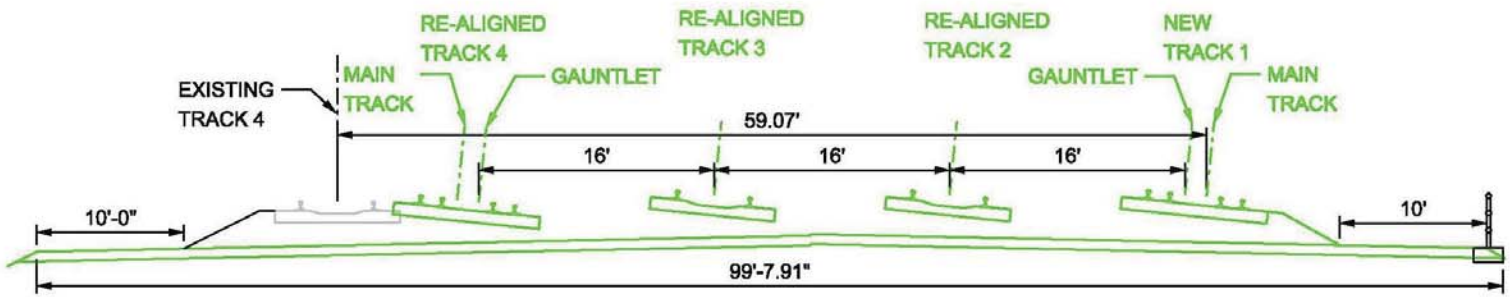
Also as part of the station and platform design, Passenger Information Display System (PIDS) equipment for audio and visual announcements will be required to be included in the design of both the platforms and the station, consistent with the existing systems. Static platform signage will be required in accordance with the Amtrak Signage Standards and the ADA.

Station – Based on current and projected ridership, no improvements beyond the current station are proposed by Amtrak. However, construction of new high level platforms will require either relocation or demolition of the existing station building. Given current ridership and operations, Amtrak has indicated it would not rebuild a station. Rather they would rely on ticketing kiosks and electronic reservations together with some shelters to supplement the platform canopies to provide some protection from rain and snow.

Underpass - Construction of the proposed Underpass as part of the Station Square may occur before construction of the new tracks and platforms. However, it would be designed to accommodate both the existing track alignments as well as future track configurations. This would require a total tunnel length of approximately 100 feet.

3.2.5 Roads

Roadway improvements are proposed on the roadways around the Station Square Site, including modifications to intersections and revised roadway sections with parking, sidewalks, and bike lanes as shown in Figure 12. At this time, the proposed improvements noted below are developed to only a conceptual level and no traffic analysis has been conducted. Thus the future planning and design of all these roadway and other modal improvements should be conducted with on-going review by and coordination with the Maryland State Highway Administration (MDSHA).



PROPOSED TRACK CENTERS AT
ABERDEEN, MD PEDESTRIAN WALKWAY
LOOKING RAILROAD NORTH

TRACKS RE-ALIGNED FOR
160 MPH OPERATION

Note - Based on current information it may be possible to design the outside tracks to 110- 130 mph. This would reduce the super-elevation and allow the new high-level platforms to be located per the TOD Master Plan AREA 1 Concept Plan.

Figure 11

Cross Section of Proposed Track Layout Re-aligned for High Speed Rail Operations

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend

Not to Scale

Location Map

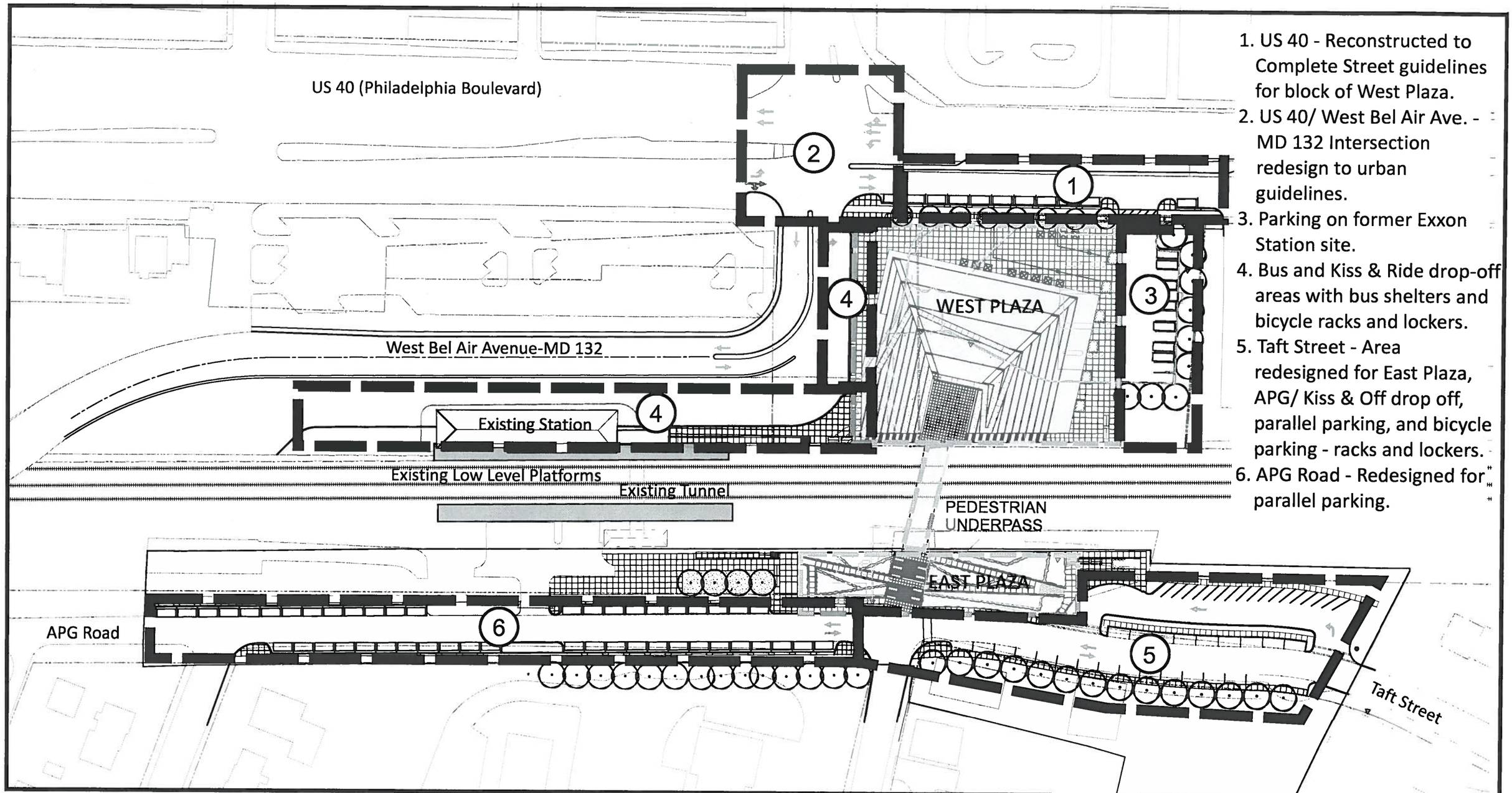


Figure 12

Conceptual Site Plan of Proposed Station Square East and West Plazas and Pedestrian Underpass with Existing Platforms

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Station Access

Generally vehicular access to the station and north and south bound platforms would be the same as existing. Primary access from the west is provided at the intersection of Custis Street and MD 40, which would be signalized. The curb areas adjacent to the station and along the south side of the West Plaza would serve as pick-up/drop-off areas for buses and taxis. On the east side, curb-side access to the station would still be possible from Taft Street, East Bel Air Avenue, and APG Road.

US 40

US 40 is proposed to be reconstructed according to Complete Street guidelines to provide for multi-modal parity for autos, buses, pedestrians, and bicyclists. This is proposed to retain the four existing travel lanes with parking on both sides and add pedestrian friendly sidewalks and bike lanes separated from the travel lanes. There will also be landscaping provided according to Green Boulevard guidelines, which includes a wide grassed median with trees and trees along the sidewalks. There will also be bio-retention areas to provide additional green space as well as providing for stormwater management. Depending on the final design, some additional Right-of-Way may be needed for the proposed US 40.

US 40 / West Bel Air Avenue-MD 132 Intersection

The intersection of West Bel Air Avenue-MD 132 with US 40 would be reconfigured according to more urban criteria. In particular, the east and west approaches would be realigned to eliminate their offset, the free right turns eliminated, and the turning radii reduced. This would result in a tighter intersection and the relocation of the west approach to US 40 a short distance to the south which provides addition area for the West Plaza. The tighter intersection would benefit pedestrians by reducing the crossing distances (and times) across the approaches to the intersection, as shown in Figure 12. As noted earlier continued coordination with MDSHA is warranted.

Taft Street

Taft Street is proposed to be shifted to the east slightly north of East Bel Air Avenue, to make room for the East Plaza. This proposed roadway realignment will require acquisition and removal of a vacant structure in the northeast quadrant of the Taft Street – East Bel Air Avenue intersection. Also, the current MTA proposed parking layout would be redesigned to accommodate parallel parking on both sides to be more consistent with the character of the adjacent residential community. This redesign will have to be coordinated with the developer of the housing development to the north who is responsible for reconstructing Taft Road to the East Bel Air Avenue intersection. (See Figure 12.)

APG Road

Based on the final design for the East Plaza, APG Road at the East Bel Air Avenue/Taft Street intersection may also need to be shifted slightly to the east. The current MTA proposed head-in parking layout along APG Road would also need to be redesigned. It would have parallel parking on both sides similar to Taft Street to be more responsive to the residential character of the adjacent community. (See Figure 12.)

3.2.6 Parking

Based on current demand for parking, the Short-term program proposed increasing parking in the station area by 170 spaces from a total of the 375 spaces to 545 spaces. However, a current inventory found only 338 spaces in the immediate area of the station as noted in Table 3. The current MTA plans proposed an additional 110 parking spaces but because of some revisions the current plans

would now add 91 spaces as noted in Table 3. Additional spaces as identified in the TOD Master Plan are proposed to be provided as the area redevelops through shared structured parking in appropriate Station Square TOD multi-use buildings.

On the east side of the Station the current MTA designs for parking along APG Road and Taft Street have been modified for two reasons. Portions of the parking area provided along Taft Street are used for the design of the East Plaza, which removed approximately 25 spaces. Additionally, along both APG Road and Taft Street the parking layout was changed from head in to parallel parking with associated sidewalk, street trees and storm water improvements to be consistent with neighborhood characteristics. Additional parking was included by extending parking along APG Road further to the south. The redesign of the parking along APG Road, which is currently owned by the APG, may require APG approval before the road is transferred to the City. These modifications result in a reduction in the parking design of approximately 14 spaces. These modifications to the parking expansion plans on the east side of the tracks reduce the current parking design plans by approximately 39 spaces.

The parking would be coordinated with the grading for the current street layouts in both areas. The design and construction of the Taft Street parking will need to be coordinated with the developer of housing to the north who is responsible for building this road. MTA will need to update the current design of the parking proposed in both areas to reflect these modifications.

Table 3 – Existing and Projected Parking

Location	Existing	MTA Plan	Revised
East Side of Tracks			
Taft Street	0	67	42
Station	10	10	10
APG Road	50	93	79
Subtotal	**60**	**170**	**131**
West Side of Tracks			
MTA Lot	188	188	188
Hinder Lot	90	90	90
Street	0	0	10
Exxon Site	0	0	13
Subtotal	**278**	**278**	**301**
Total	**338**	**448**	**432**
Change from Existing	**0**	**110**	**91**

On the west side, the changes in parking occur because of construction of the Station Square West Plaza. About 10 on-street spaces would be provided along the east side of the one block of redesigned US 40 next to the Plaza. An additional 13 spaces would be provided on the remaining pieces of the Exxon site that would not be needed at this time for the West Plaza. Overall with the new layout at the Station Square, there would be an increase of 91 spaces to 432 spaces. And as needed, on each side, some spaces would be designated as handicapped spaces.

3.2.7 Bus Transit Facilities and Service

The *Aberdeen Station Area Transit Needs Assessment and Market Analysis – Task 1 Transit Needs Assessment, March 2009* identified a number of transit service improvements to serve the APG BRAC expansion. Based on the maximum expansion of high priority routes, reverse commuter services for the MTA 420, expanded APG Shuttle service, and the timed transfer of Harford Transit buses, the report assumed one bus per route per hour. This generated a demand of 14 buses converging on the station concurrently with the resultant need for 14 bus bays.

However, while the report indicated a full build-out of 14 bus bays should be considered, it noted that in reality the number would be lower because of the challenges in scheduling. [3] The MMTC report assumed the full 14 bus bays. During this current study which used the Short-term Phase program, Harford County Transit agreed that 4-5 bays would be more appropriate for this location and ridership demand.

These 4-5 bus bays are located generally where they are today – next to the station and at the drop off area at the US 40/ West Bel Air Avenue-MD 132 intersection south of the West Plaza. The bays are designed to allow for a pull through action so that buses do not have to back up. These spaces will serve the Harford Transit and APG shuttle buses. It is anticipated at this time that the MTA Route 420 commuter bus will continue to stop on US 40.

A drop off area is provided on the east side of the tracks at the pull off parking area for a potential APG Shuttle stop; this could accommodate either the existing or increased service at peak or off-peak periods. An east side stop for the APG shuttle would provide for more convenient connection for passengers to APG from the Amtrak and MARC trains, from Baltimore and Washington, particularly if the rail service and APG shuttles are extended to the off-peak hours.

Overall, it is proposed to provide bus shelters at the bus stops on both the east and west sides of the tracks. At present, no driver layover or welfare facilities are proposed for the site.

3.2.8 Bicycle/Pedestrian Access / Connectivity

New and wider sidewalks would be part of the new Station Square area. These would be coordinated with the proposed bicycle facilities (such as cycle tracks and bike boxes) along US 40. Crosswalks and traffic signals would be provided at Custis Street and at the Diamond Street extension to provide for convenient and protected access for pedestrians to and from the station and the communities to the east of the tracks to downtown Aberdeen. Following are some of the key components of the improvements.

- The redesign of the US 40/ West Bel Air Avenue-MD132 intersection as an urban intersection (complete streets/green boulevard) to provide more direct and convenient paths for pedestrians with less distance to traverse.
- The new intersections and sidewalks from downtown Aberdeen would be coordinated with the new ramps and stairs through the East and West Plazas to the Underpass, with the new bus bays / stops, and with the ramps to the new high-level platforms.
- A variety of bicycle facilities would be provided as part of the Station Square development. These would include:
    - Separate bicycle lanes (such as cycle tracks and bike boxes) located along both sides of US 40 coordinated with the sidewalks, parking, and streetscape components.
    - Covered bicycle parking racks and lockers for up to 25 bikes located at convenient and visible locations at the station and destination points in Aberdeen and APG as part of both the East and West Plazas.

[3] Op.cit., pg. 9-1.

  - As the program is developed, Bicycle-Share facilities would also be provided on both sides of the station associated with the drop off areas and new ramps.
  - In the future, possible improvements include hiker-biker routes along both sides of the railroad coordinated with the improvements along the parallel roads in the station area.
- ADA compliant ramps are provided to/from the platforms via ramps in the East and West Plazas. They will be less than five percent grade to eliminate the need for railings.
- All curbs will have ADA compliant curb cut ramps.

3.3 Drainage and Stormwater Management

The drainage and stormwater management requirements resulting from the Short-term Station Square development (the East and West Plazas and the Underpass) were evaluated. Preliminary concepts have been developed for both a drainage system and a stormwater management plan, 'fatal flaws' have been identified and cost implications have been considered. The evaluation considers the latest Maryland Department of the Environment's (MDE) regulations. The following section presents results of the concept level assessment.

3.3.1 Stormwater Management

In addressing stormwater management, the latest MDE regulations (updated 2009) require the designer to first consider low-impact Environmental Site Design (ESD) practices such as Micro-Bioretention and Permeable Pavers. The practices need to be developed to the Maximum Extent Practicable (MEP) before proposing structural controls downstream such as stormwater management basins. Following are the steps followed for the stormwater management analysis.

- ESDv Requirements – To find the Environmental Site Design Volume (ESDv) requirements based on the impacts of the proposed development, the project was divided into two areas, west and east of the tracks. Table 4 provides a summary of the ESDv required and provided by the conceptual plan. Calculations in Appendix C provide a more detailed preliminary assessment.

Table 4 – ESDv in Cubic Feet Second (cfs) Required vs. Provided (Conceptual)

Location	ESDv Required	ESDv Provided (Conceptual)	Delta
West of the Tracks	2,123	4,728	+2,605
East of the Tracks	5,332	9,876	+4,544
Total	**7,455**	**14,604**	**+7,149**

- ESDv Provided (Conceptual) – Based on the given site constraints, the recommended proposed ESD practices include Micro-Bioretention, Permeable Pavers, and a submerged gravel wetland. Figure 13 provides a graphical representation of the preliminary layout of these practices. The following provides a brief explanation of the preliminary calculations used to correlate the area of the facility to the conceptual ESDv provided. It is noted that these calculations are conceptual.

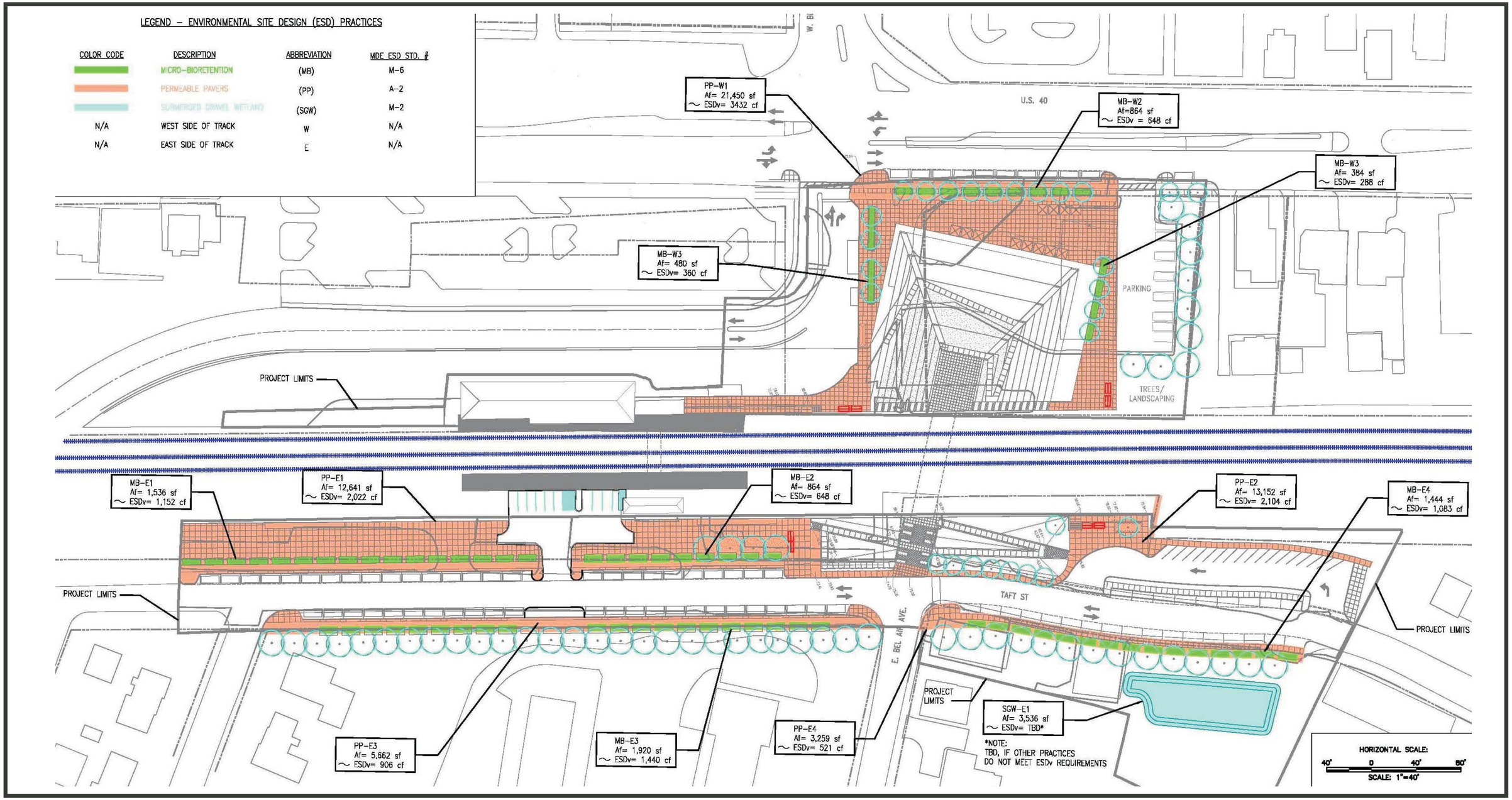
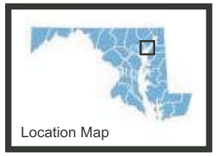


Figure 13

Plan of Proposed Stormwater Management Improvements
Proposed Plan with Existing Station and Platforms

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend



- *Micro-Bioretention – Conceptual Formula: ESDv (cf) = 0.75 * Af (sf)*
  Ratio is the result of compiling the results of two recent Jacobs's projects with multiple Bio-Swales as well as considering the ratio from the July 2010 ESD Process and Computations Manual, Example 2, page 27.
- *Permeable Pavers – Conceptual Formula: ESDv (cf) = 0.16 * Af (sf)*
  Ratio is from the July 2010 ESD Process and Computations Manual, page 6. Project assumes Hydrologic Soil Group C with a 12" Sub base.
- *Submerged Gravel Wetland – Conceptual Formula TBD*
  The July 2010 ESD Process and Computations Manual does not provide a ratio for submerged gravel wetlands. The approximate location of a potential site is shown to provide an alternative approach if the final design of the Micro-Bioretention and Permeable Pavers are not feasible due to final design constraints or cost effectiveness.

- In general, it is noted that:
  - Micro-Bioretention facilities will require more significant maintenance, particularly at the slot drain connections between the street and the facility. However, it is also noted that they make use of needed landscaping elements that are required due to the aesthetic needs of the project.
  - Permeable Pavers are relatively expensive as compared to other ESD practices. However, the pedestrian and aesthetic requirements of the project called for pavers; therefore the proposed Storm water Management (SWM) approach proposes to simply add the additional subgrade to gain ESDv credit.

Table 4 shows a surplus of ESDv Provided (Conceptual) as compared to the ESDv Requirements of 7,149 cfs. This surplus is recommended at a conceptual level because as final design of the SWM features progresses, many factors, such as water table elevations, impervious area available to drain to the facilities, existing storm system elevations, and cost effectiveness, could reduce the ESDv provided considerably.

If the surplus exists as the design progresses, it may be used as a quality credit to address the needs of adjacent projects to the Station Square site. The emphasis of landscaping and pavers for the Station Square site lends itself well to ESD practices. This may not be the case for the adjacent development and a quality credit bank may be the best option for the overall master plan.

3.3.2 Preliminary Drainage Concept

The proposed Underpass creates a large low lying area approximately 16 to 20 feet below the existing top of rail. A system of trench grates and/or inlets with storm water piping will be required to drain the low lying area. Given the elevations of the existing storm systems in the area, it is unlikely that a gravity system will be feasible. This creates the need for a submersible pump station and related discharge pipes (see Appendix C, Figure C-1).

A 24-inch pipe would drain flow from the east to the west side of the tracks; a 36-inch pipe will drain the flow north toward the submersible pump. The pump would lift the flow approximately 25-28 feet and outfall to the west into a 36-inch pipe. This 36-inch pipe will convey the flow via gravity into a proposed storm system that will eventually connect to the existing storm system on the southeast corner of the West Plaza at the intersection of US 40 and West Bel Air Avenue-MD 132. The existing storm system in this area would require reconstruction to accommodate the connections. The

proposed system has been sized for the 25 to 50 year storm event where approximately 21 cubic feet/second (cfs) would be generated by the entire Station Square development.

The conceptual design of the pump made a series of assumptions to provide a preliminary cost. A more detailed pump analysis will be needed to develop the design and may potentially bring down the cost.

3.4 Cost Estimate

A preliminary "order-of-magnitude" cost estimate for the total development for the Railroad Station improvements and those for the Station Square was generated. This "order-of-magnitude" estimate is based on current (2012) dollars and includes very preliminary estimates of right-of-way requirements. It is an approximate cost based on averaged unit costs and should be used for planning purposes only. A breakdown of the costs is included in Appendix B, Cost Estimates. **However, this should not be assumed to be a complete estimate or be used as an engineering estimate for construction. It was developed for planning purposes only.**

3.4.1 Summary

The capital costs for construction have been estimated at a very preliminary level based on the concept site plans and include all site and intersection improvements shown on the plans. The quantities of various construction elements were estimated based on the concept plans and applied unit costs from similar projects. Some of the key assumptions that were incorporated into the cost estimates include:

- All estimates include several contingency factors as noted on the breakdowns to account for additional design services and other unknowns at this conceptual level of design development.
- Separate estimates are included for the Station Square components and for the Rail Road related improvements to the platforms and other station elements since these were included in the Multi-modal Transit Center study. This estimate does not include any costs for railroad track improvements such as new or realigned track or catenary. An allowance has been made for maintenance of traffic for work within the Amtrak right-of-way.
- Right-of-way costs were estimated based on last sale price, adjusted as necessary depending on how recent the sale occurred.

The resulting cost estimate for the Station Square development is approximately $36.0 million. This includes costs for the East and West Plazas, the Underpass, the proposed surface parking, and roadway and associated transportations improvements along US 40 and West Bel Air Avenue/ MD 132 at the West Plaza. This included costs for bus shelters and bike rack shelters and bike lockers.

It also includes cost for the purchase of the Exxon Station and the parcel on the east side of the tracks at the corner of East Bel Air Road and Taft Street. The former will be the site of the West Plaza and the latter will be used to provide additional area for the East Plaza.

A separate cost estimate was also prepared for the Rail Road improvements anticipated just for the new high level railroad platforms. This is about $8.6 million for the platforms, canopies, shelters, ticket machines, etc. and is distinct from the costs noted for the Station Square development.

3.4.2 Comparison of Costs

At the beginning of the project, two objectives relative to the costs were identified. First it was anticipated that the cost estimate could be developed based on the FTA format. It was also proposed

to develop the cost estimate to be able to compare it to the cost estimate in the Multi-modal Transportation Center (MMTC) Feasibility Study. As the costs were developed, however, neither of these objectives could be realized.

In reviewing the FTA Grant Application cost format, it was found that most of the items listed were related to the service and vehicle elements and minimal amounts to the station and any associated station related improvements. If we had used this format, the costs for the non-railroad items would have ended up as line items in a single category.

Trying to compare the cost with those of the MMTC also had limited usefulness. The MMTC proposal cost estimates had similar summary categories but the components, program, and unit costs within each category were so different from the current proposed Station Square improvements that it was determined that the comparison was difficult, could be misinterpreted, and had limited value.

4. FATAL FLAW ANALYSIS

4.1 Introduction

This section outlines key aspects of the refined pre-preliminary engineering plans and summarizes the assessment according to relevant planning, environmental, and engineering factors to identify fatal flaws. This analysis did not identify any fatal flaws but did find some critical findings that warrant more in depth analysis as part of more detailed studies. These are then noted in the following.

4.2 Station Square – Plazas and Underpass

- ***Proposed Action*** - The TOD components consist of the construction of the Station Square East and West Plazas on each side of the tracks and the connecting Underpass. Construction is anticipated to take between 12 to 18 months depending on soil conditions and other unknowns. The two plazas and the Underpass would improve access from either side of the railroad for passengers and local residents. The West Plaza would provide an attractive open space for people to gather. The construction of the Plazas and the Underpass would require significant excavation and their design and construction would be impacted by the soil conditions, possible hazardous materials, and the elevation of the water table.

- ***Critical Finding – Plaza and Underpass Design/Constructability***- The design and constructability considerations for the Station Square Plazas and the Underpass are interconnected. Construction of both is anticipated to require excavation of the entire Exxon site for the West Plaza and to allow room for the construction equipment and staging and storage areas for construction of the Underpass. Excavation may be required anyway, if the soil in the site of the Exxon Station Is found to be contaminated.

  Construction of the Underpass under active tracks and catenaries limits the design structural concepts. Based on the availab*l*e information, it is considered that a Jacked option offers the potential to most likely satisfy the planning and design criteria as the structural concept for the Underpass. Further studies need to be completed considering the soil conditions, water table level, strength, and constructability to assess this option to confirm or contradict this initial finding.

  As noted, the construction of the Station Square Plazas and the Underpass would require significant excavation. The Underpass would require construction under the active railroad tracks. Construction of both would require large earth moving equipment which would be noisy and disruptive to the vehicular and present safety issues for pedestrians in the area – both rail and bus passengers and local residents. However, based on the pre-preliminary analysis, it is not anticipated that it would require taking any of the existing tracks out of service.

- *Finding - Work in Rail ROW* - Construction of the Underpass and demolition of the existing pedestrian bridge would involve work in the railroad right-of-way which will require careful coordination with all rail carriers including Amtrak, MARC, and NS. A variety of complicating issues can arise when working in the railroad right-of-way, including maintenance of service, safety, hazardous materials, access, and timing.

  Amtrak has indicated that they will require that two tracks remain in operation at all times. Amtrak has also indicated they may allow construction 24/7 to reduce the construction time frame.

- *Finding – Passenger Service* - The construction of the Plazas and the Underpass are not anticipated to have direct impact on the passenger service. A temporary steel support structure to support the existing pedestrian bridge is proposed to provide continued access from one side of the tracks to other.

  However, if this proves unfeasible passengers would have to use the existing station tunnel to get from one side of the tracks to the other until the Underpass is complete. Since this tunnel is not ADA compliant some alternate method for the handicapped would need to be found during the period when the pedestrian bridge is demolished and the Underpass is complete. One option is a van, shuttle or taxi service for commuters where service can be provided to meet the scheduled trains supplemented with a call for service at other times.

- *Finding – Construction of Other Facilities* - The construction of the other facilities will generally be those typical of roadway on-grade projects. The exception would be the reconstruction of the US 40 / West Bel Air Avenue-MD 132 intersection which may require changes to its touch down area as it connects to US 40 which will result in sharper turning radii to and from the roadway overpass.

  Overall, while the construction impacts are not considered fatal flaws, the construction will require close monitoring of construction to insure that all environmental and safety regulations and requirements are adhered to.

4.3 Railroad - Track Work / Operations

Tracks and Platforms

- ***Proposed Action*** – The proposed action include changes to the track and the passenger platforms. The tracks will be relocated to the east as needed to accommodate High Speed Rail (HSR) service. In addition, a fourth track would be added through the Station area to accommodate increased Amtrak, MARC, and NS freight service. Gauntlet tracks would be added for freight trains. In addition, the current low level platforms are proposed to be replaced by longer high level platforms.

  The new 1,050-foot long, 15-foot wide, and 4-foot high-level platforms would provide ADA compliant access to a full length passenger train as may be required. Stairs and ADA ramps will provide access to the new 4-foot high platforms. As per the Concept Plan, the new high-level platforms are proposed to be located next to the Station Square and Underpass to provide access for passengers between both sides of the tracks.

- ***Critical Finding – Track Design and Location*** - The design and ultimate location of the railroad tracks to accommodate HSR service and construction of a fourth track would result in two critical impacts.

  First, in the vicinity of the station the tracks would be relocated from five to 10 feet to the east from the present alignment which would reduce the width of the area available for the Station Square East Plaza. Additionally, the HSR track super elevation, unless confined to the center tracks, might require the high-level platforms to be relocated to the south away from the Station Square Plazas and the Underpass.

  Second, the sequencing and timing of the construction of these improvements may limit or dictate the timing of when the construction of the Station Square Plazas and Underpass can occur.

- ***Critical Finding- Platform Location*** - Because of the design requirements for HSR, the track curvature north of the station would need to be reduced and its super elevation increased. These

changes could potentially require that the platforms be moved to the south away from their current proposed location at the Station Square and Underpass. In addition, the new southbound high-level platform would require the existing station and tunnel to be relocated or demolished.

- *Finding – Track Cross Section* - Three factors would result in the increase of the track cross section. The fourth track would increase the width of the railroad cross section. In addition, the new tracks would be 16 feet on center compared to current 12 and 15 feet. And finally the addition of the two gauntlet tracks would add about 10 feet. Together these would increase the track cross section from 67 feet to about 100 feet which would set the length of the Pedestrian Underpass.

Station Building

- ***Proposed Action*** – The new high-level southbound passenger platform would require the existing station to be relocated or demolished. The existing tunnel would also need to be extended since the new northbound platform would conflict with the eastern tunnel entrance.
- ***Critical Finding – No Station Building***- The demolition or relocation of the existing station may result in no replacement station building at Aberdeen. Amtrak has indicated they would not need a station at this location because of low ridership but would rely on ticket machines and kiosks. Without a station building, passenger convenience would be reduced. However, the proposed canopies, shelters with benches, kiosks, and ticket machines would provide some shelter for passengers to wait for the train in inclement or cold weather and to find information on train arrivals/departures. It is anticipated that any future updates and revision at the Aberdeen Station address basic passenger needs in addition to shelter waiting areas etc.
- ***Critical Finding – Section 106 Eligibility Review*** - Either relocation or demolition of the existing station and tunnel would necessitate review of its current status as being eligible for listing on the Register of Historic Places. Recent information has indicated that a reassessment of this designation is warranted. This reassessment would need to occur, however, even without the station's relocation or demolition as required by the Section 106 of the National Historic Preservation Act.

Service

- ***Proposed Action*** - The new track layout would provide service for the HSR trains, the regional Amtrak and MARC trains, and the NS freight trains. Each set of tracks would be assigned predominate usage by one of the services. The two center tracks would be assigned for HSR service while the Amtrak regional, MARC commuter, and NS freight trains would be assigned to the outside tracks. However, in the station area the freight trains would switch to the gauntlet tracks to avoid possible impact to the high-level platforms. They would not use the HSR tracks because of their heavier loads and impacts to the rails.
- *Finding – Passengers/ Short-term* - Short term impact to passenger service would result construction of new tracks and high level platforms and subsequent demolition of the station, the station tunnel, and the pedestrian bridge. Depending on the construction sequencing it would appear from the addition of the fourth track and high level platform on the east side that the northbound service would be most impacted.

  Construction is anticipated to have some but limited affect on passenger service. While Amtrak has indicated they would keep two tracks in operation at all times and thus likely provide continued service to Aberdeen passengers, the construction would affect the platform layouts as

well as getting from one side of the tracks to the other via either the pedestrian bridge or the station tunnel.

As noted above, it is anticipated at this time that the pedestrian bridge would be demolished before the start of construction of the tracks and platforms. However if demolition of both the pedestrian bridge and station tunnel occurs at the same this would require provision of an alternate way for passengers to get from one side of the tracks to the other until the Underpass was complete.

Also, the improvements in the Short Term phase for station square are likely to improve the overall experience of the MARC and Amtrak Aberdeen riders as well as the Aberdeen Community and potentially encourage an increase in MARC and Amtrak ridership

- *Finding – Passengers/ Long term* – The proposed long-term service at Aberdeen for Amtrak regional and MARC commuter passengers could change and would improve if proposed expansion in service for both carriers during peak and off-peak periods is warranted.

4.4 Transportation Facilities and Multi-Modal Services

Following is a discussion of the proposed actions related to the roads and associated transportation facilities and the resulting key impacts and findings.

4.4.1 Roads

- ***Proposed Action –*** US 40 would be redesigned to Complete Street guidelines to achieve multi-modal parity that would provide parking, sidewalks, bicycle lane, and landscaping to provide for a Green Boulevard.

  As part of the redesign, the US 40/ West Bel Air Avenue-MD 132 intersection is proposed to be reconstructed as an urban intersection with improved transportation facilities for bicyclists and pedestrians, this may require reduced automobile turning radii and possibly capacity. This redesign would also provide land for the Station Square West Plaza.

  Other intersections would be modified as well and traffic signals would be installed. These would provide for improved roadway operation as well as more convenient crossing of US 40 for pedestrians and bicyclists.

- ***Critical Finding – Coordination with MDSHA*** – The roadway redesigns of the US 40/ West Bel Air Avenue-MD 132 intersection and US 40 according to the Complete Street guidelines will need to be developed in conjunction with MDSHA.

  As part of this process, a traffic study based on MDSHA / FHWA design criteria and future traffic volume will be prepared to determine the impact of the modifications on the roadway operations. Any changes identified to the intersection could reduce the amount of land available for the Station Square West Plaza.

4.4.2 Parking

- ***Proposed Action*** – On-street parallel parking is proposed on US 40 on the west side of the tracks and along Taft Street and APG Road on the east side. There are also a few Kiss & Ride spaces on the east side.

- *Finding – Parking Layout/ East Side* - The new parking layouts along APG Road and Taft Road on the east side of the tracks could require that MTA incorporate the design modifications into the current plans for parking expansion design on these two streets.

  In addition, Taft Street is proposed to be relocated to provide space for the East Plaza. This relocation and redesign would have to be coordinated with the developer of the housing to the north along Taft Street who is responsible for building this portion of Taft Street. The relocated road would stay mainly within the current right-of-way but some realignment would be required at its intersection with East Bel Air Avenue. This could not occur until after the parcel at the northeast corner is purchased, which is presently being pursued by the City of Aberdeen.

- *Finding – Parking Layout/ West Side* - On the west side, expanded parking is proposed along the one block of the Station Square West Plaza along US 40. This would be the first step in the reconstruction of the several blocks of US40 in the downtown area of Aberdeen incorporating the Complete Street concept of providing movement for all modes of transportation. Parking would also be provided on the northern portion of the Exxon Station site that is not needed for the West Plaza. On street parking on US 40 currently exists just north of the Exxon site on both the eastbound and westbound sides of US 40.

4.4.3 Bus Transit Facilities and Service

- ***Proposed Action*** - New bus stop areas with bus shelters would be provided on both sides of the tracks associated with the plazas and along the existing station.

- *Finding – Bus Facilities* - On the west side, a general drop off area with bus shelters will be provided next to the south side of the West Plaza for MTA and Harford County Transit buses and the APG shuttle. A drop off area would also be provided as part of the East Plaza; this would include kiss & ride parking spaces and an area for APG Shuttles.

- *Finding - Service/ Routes* - These proposed developments would not require any transit route diversions. The Harford Transit Routes 1, 4, and 6 that currently service the train station would follow the same routes and stop at the same locations. The MTA Route 420 is anticipated to continue to stop along US 40 but may be diverted to the new bus stops next to the train station in the future. The new APG Shuttle Bus stop on the east side together with improved service would increase the Shuttle's convenience and ridership.

4.4.4 Pedestrian/ Bicycle Connectivity

- ***Proposed Action*** - A new coordinated system of bicycle components (separate routes, secure parking facilities and bicycle rental) would be provided on both sides of the tracks. In addition, the new Station Square Plazas and connecting Underpass would provide access for both train passengers and local residents with ADA compliant, attractive, and convenient facilities.

  Finding – Pedestrian Facilities - Convenient pedestrian routes and facilities would be provided to and through the two Plazas, to the new platforms, and to the new bus facilities; these would improve overall accessibility to the station and platforms. They include provision of improved intersection crossings along US 40, and comfortable and convenient stairs and ADA compliant ramps in the Station Square Plazas.

  In addition, it is suggested to evaluate the possible addition of blue light security posts equipped with intercoms that are connected to the local police especially in the new Underpass. Final

design of all bicycle and pedestrian areas should include features that provide essential safety elements and are based on Crime Prevention through Environmental Design (CPTED).

- *Finding – Bicycle Facilities* - New bicycle facilities would provide for a convenient additional mode for rail passengers to get to and from the station. These would include new separated bicycle paths along US 40, connections to proposed bicycle routes through Aberdeen, new conveniently located sheltered bicycle racks and lockers in visible locations on both sides of the tracks, and Bike Share bicycle drop off/ pick up areas at the station and locations through Aberdeen and the APG.

4.5 Environmental and Engineering Findings

The environmental and engineering related resources in the Study Area were assessed to identify resources of the natural and human environment that may be impacted by the proposed project. At the same time, they were evaluated to determine which resources might affect the proposed improvements. The following impacts within the study area were identified

4.5.1 Community Resources

Displacement - The Station Square Short-term development would have minimal impacts on land uses. It would displace one business (Exxon) and one vacant building. The business is the Exxon station along US 40. This site, which is the location of the West Plaza, may be a potentially contaminated site with several underground (UG) tanks.

The vacant two story frame building is at the northeast quadrant of the Taft Street-East Bel Air Avenue. The site and building are needed to provide additional area for the East Plaza by moving the intersection to the east.

Maryland Priority Funding Areas - The area is within a Maryland Priority Funding Area.

Community Findings - The Proposed Action (the Station Square TOD project) would serve as a catalyst for revitalization in the Study Area west of the tracks and improve the station integration and connection to the existing neighborhood east of the tracks. The Underpass would connect the residential community of Aberdeen on the east side of the train tracks to the commercial and retail properties on the west side. Overall the improvements to station accessibility would benefit all users.

Environmental Justice - Preliminary socioeconomic profiles indicate that Environmental Justice Populations may exist within various census blocks in Aberdeen. The proposed improvements will provide access to minority communities on the east side of Aberdeen. While it may have some short-term negative impacts during construction, it will not have any long-term adverse impacts on the surrounding community and will improve access to the station and downtown Aberdeen.

4.5.2 Cultural/ Historic Resources

- ***Proposed Action*** – The new southbound high-level platform would require that the existing station be relocated or demolished. It should be noted that this is not a Proposed Action associated with the Station Square development.
- *Finding – Historic Resources* - As noted earlier, further evaluation and study is needed to confirm whether the station building and the existing associated pedestrian tunnel should be designated as a historic site. The findings from this evaluation will determine the level of mitigation that will be required to document either its relocation or demolition. This would be required with or without the new platforms.

4.5.3 Hazardous Materials / Potential Contamination

- ***Proposed Action*** – The Station Square West Plaza will be located on the site of the Exxon Station. The East Plaza would require excavation on the east side of the tracks and the Underpass would require excavation under the tracks.
- ***Critical Finding - Hazardous Materials*** - There are potentially hazardous materials on the Exxon Site as well as on and adjacent to and under the railroad tracks. These could affect the cost and the purchase of the Exxon site and the overall construction cost to remain and dispose of contaminated materials. While not a fatal flaw the need to remove contaminated soils could affect the cost to purchase the Exxon Site which would likely affect the time for design and construction of the overall Station Square development.

4.6 Utilities

- ***Proposed Action*** – The construction of the Station Square East and West Plazas and the Underpass would require significant excavation and relocation of some utilities. In addition, the reconstruction of the block of US 40 and the parking along APG Road would require relocation of some overhead utilities.
- *Finding - Utilities* - While several utilities would require relocation by the construction of the Proposed Actions none appear significant. The excavation would impact the existing sanitary sewer system, water distribution main, medium pressure gas line and Verizon infrastructure located on the east side of the tracks. The roadway modifications would only require minimum relocation of the overhead utilities.

  However, a test pit would be needed to further evaluate the construction impact to Verizon business ductbanks which are located parallel to the tracks to make sure it would clear the bore and jacked tunnel. The relocated utilities would need to be evaluated in more detail in the next phase of study.

4.7 Geotech - Soil Characteristics/ Water Table

4.7.1 Water Table

- ***Proposed Action*** – The construction of the Station Square East and West Plazas and the Underpass require significant excavation down about 16 feet to an elevation of +/- 58 feet.
- ***Critical Finding – Water Table*** - Review of existing groundwater data indicated that the groundwater level may be within 12 feet of natural ground (from one boring near the project site conducted by MTA). This would be above the projected floor of the Underpass and the two Plazas. Existing groundwater data is limited and therefore not conclusive.

  Thus it is critical that additional geotechnical information on soil characteristics should be obtained in future studies to confirm actual groundwater levels. Depending on the water level, dewatering features may need to be added to the Underpass to maintain water level below excavated and proposed grades. This could involve continuing pumping which would affect the overall long-term operating costs.

4.7.2 Future Subsurface Investigation/ Testing Program

- ***Proposed Action*** – The construction of the Station Square East and West Plazas and the Underpass will require significant excavation down about 16 feet to an elevation of +/- 58 feet. Also the Underpass design and construction is impacted by the soil conditions.
- *Finding – Soil* - In the next phase of the project, a subsurface investigation program will need to be performed to define the soil conditions as it relates to the proposed construction. The soil boring program will need to address the following:
  - The physical characteristics of the excavated soil material.
  - The depth to the ground water table.
  - The soil properties of the various soil layers as it relates to the design of retaining walls and the foundations of the Underpass structure.
  - The characteristics of soil within the influence zone of the proposed structures.

  Based on the above, the following presents an outline of a subsurface investigation program for the project site based on the current concept plans:

  - One soil boring at the east and west portals of the Underpass.
  - Soil borings along proposed retaining walls at a spacing not to exceed 80 feet.
  - One observation well each on the east and west sides of the rail tracks.

  The soil borings for the Underpass and the retaining walls should be drilled to a minimum depth of 100 feet and 60 feet, respectively. The soil borings should be continuously sampled to the proposed excavation level or to a minimum depth of 20 feet. Split-spoon sampling should continue at intervals of five feet thereafter to the completion depth of the boring.

  The majority of the laboratory testing is anticipated to be classification tests on split spoon samples. Classification and strength tests should be performed on undisturbed tube samples as necessary. The testing schedule is typically assigned to the soil samples after they are recovered and classified in the field. It is anticipated that the majority of testing will consist of Atterberg Limits and Sieve and Hydrometer testing on selected split spoon samples.

  The above presents an outline of a future subsurface investigation program. The program will need to be refined as the design elements of the project progress. Soil excavation is also proposed in an existing gas station property. Environmental site assessment and testing should also be performed to determine potential presence of contaminated soil.

4.8 Constructability

Construction will be needed for the two main components – those related to the local improvements for the Station Square Plazas, the Underpass, and the associated elements and those for the railroad. These may occur concurrently or sequentially depending on a variety of factors.

It is anticipated for each that there will be some localized construction impacts associated with the proposed improvements, such as noise from construction equipment and activities, along with temporary shifts or reductions in vehicular, pedestrian and train movements to allow for construction activities. However, while none of these are considered fatal the impacts are anticipated to vary somewhat for construction of the Station Square components and the railroad improvements.

4.9 Summary of Findings and Next Steps

4.9.1 Fatal Flaw Findings - Next Steps

Based on the results of this Feasibility Study, there do not appear to be any fatal flaws to the development of the Concept Plan for the Station Square. There are, however, some potentially critical issues to be considered in the development and implementation as currently proposed. And while there are no fatal flaws, it might be appropriate in the long view to consider, in addition to these findings, their cumulative effects to determine the overall feasibility of the project.

Below is a brief summary of the next steps proposed to address the critical issues findings identified from the fatal flaw analysis and to provide for further design development.

Track and Platform Design

- ***Proposed Action*** - The ultimate location and design of the railroad tracks to accommodate High Speed Rail (HSR) service and construction of a fourth track have two important impacts. First the tracks would be relocated to the east which would reduce the width of the area available for the East Plaza. Second, the super elevation might require the high-level platforms to be relocated to the south away from the Station Square and the Underpass
- *Next Step – Track Design Coordination with Amtrak* – Work with Amtrak on the track design to provide independent super elevation for the two interior HSR tracks and the two outside tracks. This will allow for the platforms to be in the preferred location next to the Underpass rather than having to be relocated south of the existing station.
- *Next Step – Coordination with Amtrak/ MARC/ NS* – Coordinate with Amtrak/ MARC/ and NS the design and construction sequencing and timing of the construction of these improvements with that of the Station Square Plazas and Pedestrian Underpass.
- *Next Step – NHPA Section 106 Review* – Initiate the update of the Section 106 Review of the station and tunnel. Construction of the new high level platforms would require relocation or demolition of the existing station and tunnel. If this occurs, its current status as being eligible for listing on the Register of Historic Places will require additional analysis as part of the NEPA Section 106 process.

Roadway Redesign - US 40 and US 40/ West Bel Air Avenue-MD 132 Intersection

- *Proposed Action* - US 40 is proposed to be redesigned according to Complete Street guidelines to create a roadway with multi-modal parity for vehicles, bus transit, pedestrians and bicyclists.

  Also as part of the project, the US 40/ West Bel Air Avenue-MD 132 intersection is proposed to be reconstructed to urban intersections guidelines. In addition to providing improved convenience for pedestrians, this reconstruction would provide sufficient area to allow for the Underpass to align with East Bel Air and provide visual connectivity to the Underpass for those approaching from the east.
- *Next Step – Coordination with SHA* – Initiate coordination on the planning and redesign according to SHA planning guidelines and design standards facilitate a design that reflects to the extent possible the concepts for US 40 contained in the TOD Master Plan.

Engineering and Environmental Issues

- ***Proposed Action*** - The Station Square East and West Plazas and the Underpass would require excavation to a level about 16 feet below the current elevation and under the railroad tracks.

- *Next Step – Geotech Investigation* – Conduct Geotech soil investigation to identify soil conditions, location of hazardous materials, and the water table. Poor soil conditions might limit design options and affect the overall constructability and feasibility of the Underpass. In addition, the feasibility of the Underpass could be affected if the elevation/ level of the water table is above the elevation of the floor of the Underpass. Possible hazardous materials and contaminated soils on the Exxon property could impact cost and place constraints on purchase by State of Maryland.
- *Next Step – NEPA Studies* – Identify possible NEPA document required.
- *Next Step – Underpass Design* – Initiate more detailed assessments of the constructability of the Underpass under the active freight and passenger tracks and catenaries. Since these elements will limit the structural concepts possible it is critical to take the analysis and design of the Pedestrian Underpass to the next step as soon as possible.
- *Next Step – Financial Plan* - The high estimated cost of construction of the Station Square concept would likely require the development of a collaborative financial plan among various agencies at the local, county and state level.

Summary

While there are some significant issues to consider in furthering implementation, there are potentially significant beneficial impacts to the economic development of the City of Aberdeen, the re-connection of the east and west parts of the City and overall enhancement of the transit and multi-modal travelers in this area. Further investigation is needed to determine how to avoid or mitigate any negative issues and increase the benefits.

4.9.2 Public Involvement

A public meeting was held on August 6, 2012 in the City Hall Council Chambers. The purpose of this open house style meeting was to present the findings of the development of the pre-preliminary engineering development of the Station Square TOD Area 1 concept plan, and analysis of transit oriented development (TOD) potential and to solicit public feedback through discussions with project staff and comment cards. The meeting was held from 4:00 PM to 6:30 PM and included a formal presentation at 4:00 PM. Approximately 50 people attended the meeting.

In addition to the presentations, large display boards were set up for the public to review. Project team members were on hand to answer questions about each aspect of the project. The boards contained the perspectives and rendered plans of the developed concepts.

4.9.3 Implementation Strategies – Near Term Next Steps

As noted in the TOD Master Plan, advancing the concepts for the TODs into implementation requires continuing actions on the part of the City, County, State, and other partner agencies. Specific action items and responsibilities for advancing TOD in Aberdeen are presented below. Those listed as **General** are relevant actions mostly (with a few additions) carried forward from the TOD Master Plan while the more specific items were developed from the findings of this Feasibility Study.

General from TOD Master Plan -

- Undertake a series of small, affordable projects that support the overall vision for Station Square and US 40; examples include:
  - Beautification and community "greening" projects around the station
  - Pedestrian way-finding signs and street furniture

  - Bus lockers and sheltered bus racks; also evaluate possible addition of bicycle changing facilities as suggested by LEED design guidelines.
  - Shelters for pedestrians and bus passengers
  - Improved lighting, and security features for the pedestrian overpass and the Amtrak tunnel
- Include the Station Square and Underpass and US 40 as key transportation project priorities in the Harford County annual priority letter submitted to MDOT to continue to emphasize local support and prioritization for funding and TOD collaboration.
- Actively promote transportation alternatives including the following:
  - More frequent and mid-day shuttle service between downtown, the station, and APG employment zones.
  - Bicycle-friendly measures including shared lane markings (known as sharrows) on US 40 and important connector streets, and bicycle parking racks and/or lockers at the station.
  - Identify and develop bike-sharing destinations at and around the station area, downtown Aberdeen, and at APG
  - Conduct feasibility analysis of greenway trails along Amtrak and CSX lines.
  - Addition of car share programs such as Zip car and/or a rental car facility near the station.
- Organize partner agencies and decision-makers around building TOD in Aberdeen.
- Continue to identify and apply for funding for the various elements.

Track and Platform Design

- Continue and expand on-going coordination with Amtrak on their development of plans and designs for the fourth track and High Speed Rail Service as it could affect the location of the platforms and the design of the Underpass and the East and West Plaza.
- Work with Amtrak, MARC, and NS regarding passenger and freight carriers using the Amtrak tracks.
- Assess phasing of development of Station Square East and West Plazas and the Underpass relative to the construction of the realigned tracks (with the fourth track) and high-level platforms to identify possible interim connections to the existing low level platforms.

Roadway Redesign - US 40 including US 40 / MD 132 Intersection

- Conduct ongoing meetings with MDSHA to coordinate the design and reconstruction of US 40 to provide for the full multi-modal parity according to Complete Street guidelines.
- Coordinate with SHA to coordinate the redesign and reconstruction of US 40 to provide for the full multi-modal parity according to Complete Street guidelines.
- Identify SHA streetscaping projects with a focus on developing US 40 into a green boulevard incorporating stormwater management elements.
- Work with SHA to reclassify US 40 through downtown Aberdeen as a Village Center Mixed Use Arterial, per the City of Aberdeen's Comprehensive Plan.

Engineering and Environmental Considerations

- Prioritize and advocate for immediate first steps for engineering and environmental studies focused on the preparation of plans for the Station Square East and West Plazas and the Underpass.
- In conjunction with Amtrak Real Estate locate utilities along the tracks in the Station Square are and evaluate utility relocation and stormwater management options.
- Conduct more detailed Geotech (for soils and water table level) and hazardous materials studies.

APPENDIX A – LIST OF PREVIOUS STUDIES

PREVIOUS STUDIES

1.Aberdeen TOD Master Plan, March 2012 (Adopted May 7, 2012). Aberdeen, Maryland. Prepared by Maryland Department of Transportation, with the assistance of Kittelson & Associates Inc, and Cho Benn Holback & Associates.

http://www.mdot.maryland.gov/Office%20of%20Planning%20and%20Capital%20Programming/TOD/Aberdeen_TOD/Final_Master%20Plan_Aberdeen_Report.pdf

1. Aberdeen MARC Feasibility Study (Evaluation of Relocation to Catherine V. Mitchell Property). Maryland Transit Administration, February 2008. http://mdot.maryland.gov/Planning/TOD/Aberdeen_TOD/Aberdeen_Station_Relocation_Feasibility_Summary11.pdf

2. *Harford County MultiModal Transportation Center Feasibility Study*. Prepared by URS for Harford County and the Chesapeake Science &Security Corridor, August 2009. http://mdot.maryland.gov/Planning/TOD/Aberdeen_TOD/HarfordCountyMulti_ModalTransportationCenter Final Report 08 09.pdf

3. *Aberdeen Station Area Transit Needs Assessment and Market Analysis: Task 1 Transit Needs Assessment.* Prepared by Cambridge Systematics with KFH Group, Inc for Maryland Department of Transportation, March 2009. http://www.mdot.maryland.gov/Planning/BRAC/Documents/aber_Market_Analysis.pdf

4. *Aberdeen Station Area Transit Needs Assessment and Market Analysis: Task 2 Market Analysis.* Prepared by Cambridge Systematics with Bay Area Economics for Maryland Department of Transportation, March 2009. http://www.mdot.maryland.gov/Planning/BRAC/Documents/aber_Transit%20_Needs_Analysis. pdf

APPENDIX B – COST ESTIMATE BACKUP

APPENDIX C – DRAINAGE ANALYSIS

STATION SQUARE – DRAINAGE AND STORMWATER MANAGEMENT PRELIMNARY EVALUATION

Jacobs has been tasked with evaluating the existing drainage system potentially impacted by the development of the station square site. The preliminary concept has been assessed while identifying the 'fatal flaws' and cost implications associated with stormwater management. The following is our concept level evaluation which also considers the Maryland Department of the Environment's (MDE) regulations.

It is estimated there will be approximately 16' to 20' of excavation from the existing top of rail down to the lowest area of the station square site. Given this relatively deep excavation, a large low laying area is created which may be subject to flooding during rain events and routine groundwater seepage.

To address, a system of trench grates and/or inlets with storm sewer piping will be necessary for drainage purposes. Given the approximate proposed elevation of 58 feet at the bottom of the station square site, it does not appear feasible to connect via gravity into an existing system along US Route 40 or West Bel Air Avenue. Therefore, a submersible pump station will likely be needed. The system of trench grating and/or inlets will discharge via storm piping by gravity into the submersible pump station. The pump station's location is such that its depth is over 33 feet, and therefore, may need to be cast-in-place concrete. Its approximate cost is $1.6 million which may be found in Appendix B. This system has been sized for the 25 year storm event where approximately 21cfs will be generated by the station square site. Analysis of the existing storm system along US Route 40 and West Bel Air Avenue will be required as it is possible this system may not be adequate to accept 21 cfs discharging from the pump station. Furthermore, the realignment of the intersection, West Bel Air Avenue and US Route 40, and the work associated with US Route 40, will require both removal of existing storm sewer appurtenances and installation of new storm sewer appurtenances in this vicinity.

United States Department of Agriculture (USDA) soil maps indicate this area consists of soil, BeA - Hydrologic Soil Group (HSG) C. HSG C soils have a slow infiltration rate when thoroughly wet and consist mainly of soils having a layer that impedes downward movement of water or soils of moderately fine texture or fine texture. Considering both soil characteristics and topographic constraints, some Environmental Site Design (ESD) measures may be inadequate in satisfying MDE's criteria as ESD measures typically require well draining soils for infiltration. This may result in alternate (structural) measures proposed to meet MDE requirements.

However, as MDE requires ESD practices first be implemented to the maximum extent possible (MEP), Jacobs has evaluated potential ESD measures which may be suitable in C soils. These measures include, but are not limited to, micro-bioretention and permeable pavement. It is recommended these practices be located at the higher elevations of the station square site. Approximate locations for these practices are shown on the sketch provided in Figure 15.

West of Railroad – SWM Requirements

Jacobs has performed an analysis of the existing impervious area within the project limits shown in Figure 15. For analysis purposes, these project limits are considered to be the limits of disturbance (LOD). As the existing site imperviousness within these limits is greater than 40%, redevelopment requirements apply. A computation provided in Appendix C indicates approximately 2123cf is required for water quality treatment. As previously discussed, and in accordance with MDE requirements stipulated in Chapter 5 of the Maryland Stormwater Design Manual, ESD to the MEP

must first be implemented prior to utilizing alternate (structural) measures. It is noted, recharge volume requirements do not typically apply to 'redevelopment' sites.

Based upon USDA soil maps, these limits consist of HSG C soils. Therefore, applicable ESD measures (outside of the immediate station square area) may be, rooftop disconnects, permeable pavement, rainwater harvesting, submerged gravel wetlands, and micro-bioretention. Similar to the station square site, ESD measures may be limited by the existing soil conditions and site topography. Therefore, alternate (structural) measures may be necessary to treat any remaining water quality volume.

East of Railroad – SWM Requirements

Jacobs has performed an analysis of the existing impervious area within the project limits shown in Figure 15. Similar to the west side of the rail, these project limits are considered to be the LOD. As the existing site imperviousness within these limits is greater than 40%, redevelopment requirements apply. However, it appears there is a net increase in impervious area with the post developed condition. Therefore, new development requirements discussed in Chapter 5 apply to this net increase in impervious area. Computations provided in Appendix C indicate approximately 2479cf of water quality treatment is required for redevelopment. ESD to the MEP must first be implemented prior to utilizing alternate (structural) measures to treat any remaining required water quality volume. It is noted, recharge volume requirements do not typically apply to 'redevelopment' sites.

For the net increase in impervious area, approximately 2853cf shall be treated for water quality. As previously mentioned, this net increase in impervious area is subject to new development criteria which require a minimum of 1.0" of runoff to be treated by ESD practices. Therefore, of this 2853cf, an absolute minimum of 1297cf shall be treated by ESD practices. In total, approximately 5332cf shall be treated for water quality, with a minimum of 1297cf treated by ESD practices.

Based upon USDA soil maps, this area consists of HSG C soils. Therefore, applicable ESD measures may be permeable pavements, submerged gravel wetlands, micro-bioretention, and enhanced filters. Some ESD measures may be limited by existing soil conditions and site topography. Therefore, alternate (structural) measures may be necessary to treat any remaining water quality volume. A potential location for a structural measure may be at the northeastern most portion of the site.

It is important to note, if ESD to the MEP is implemented to capture and treat 2853 cf of runoff, then water quality, recharge, and channel protection requirements are addressed for the net increase in impervious area.

Conclusions

In summary, developments on either side of the rail appear to fall under redevelopment requirements. However, the eastern side of the rail will also be subject to new development requirements. These new development requirements apply only to the net increase in impervious area. Although not discussed in detail, channel protection requirements must be met for both new and redevelopment sites, unless a waiver is granted in accordance with section 3.3 of the Maryland Stormwater Management Guidelines for State & Federal Projects. Channel protection and recharge obligations are met when ESD measures are designed in accordance with new development criteria to treat the required water quality volume (for the net increase in impervious area). The recharge volume criterion does not apply to any site considered as redevelopment.

It may be difficult for the developers to meet the overbank flood protection volume. This typically requires controlling the peak discharge rate from the ten-year storm event to the pre development

rate. It is our recommendation the developer consults with Harford County, Maryland to determine if a waiver to control the peak discharge rate may be granted. The MDE manual specifically states this is optional and that the appropriate review authority should be consulted. Lastly, it is also our recommendation the developer consult with Harford County with regard to control of the extreme flood volume. Normally, control of the extreme flood volume is not needed if the development is excluded from the 100 year floodplain and downstream conveyance is adequate.

Location: Aberdeen East **County:** Hartford County, Maryland
Watershed: Upper Western Shore **Stream Use:** I

See Maryland Department of Environment (MDE), 2000 (rev. 2009) Maryland Stormwater Management Design Manual Volumes I & II for referenced equations, acronyms, and definitions.

Site (LOD): 3.230 acres Existing Impervious Area = 1.438 acres 44.5 % Existing Impervious Area.
If existing site imperviousness is greater than 40%, then **'Redevelopment'** requirements apply.

Total Impervious Area (Post) = 1.814 acres
Percent Impervious (Post); I = 56.2 % I =Total Impervious Area (Post) / Site (LOD)

Rv = 0.05 + (0.009)I = 0.95 Eq. Ref. Vol. I, Sec. 2.0, Table 2.1
In this case, I (%) = 100

$$ESDv = \frac{(Pe)(Rv)(A)}{12}$$

P_E= 1 in (target)

REDEVELOPMENT:

* Provide impervious area reduction and/or water quality treatment for 50% of existing impervious area within project LOD
(50% of 1.438 acres = 0.719)
* Water Quality treatment required for: **0.719 acres**

ESD_v = 2479 cf ----> Required Water Quality Volume
$ESD_{v\,(min)}$ = 0 cf

Implement ESD practices to the MEP to capture and treat: 2479 cf of runoff from 0.719 acres of impervious area.
Only after ESD practices have been implemented to the MEP may alternative practices be utilized to treat the remaining required water quality volume.

NEW DEVELOPMENT (New development requirements apply for net increase in impervious area):

HSG= C
I (%) = 100
P_E= 2.2 in (target from Table 5.3)

* Project increases impervious area by: 0.376 acres (1.814 - 1.438)
* Water Quality treatment required for: **0.376 acres**

ESD_v = 2853 cf ----> Required Water Quality Volume for impervious area increase

Implement ESD practices to the MEP to capture and treat: 2853 cf of runoff from 0.376 acres of impervious area to address water quality, recharge, and channel protection requirements. Only after ESD practices have been implemented to the MEP may alternate practices be utilized to treat the remaining required water quality volume. According to Chapter 5, new development requirements specify that a minimum of 1.0 inch of runoff shall be treated by ESD practices.

$ESD_{v\,(min)}$ = 1297 cf-----> Minimum Water Quality Volume to be treated by ESD practices

SUMMARY (Aberdeen East):

	REDEV. Volume (cf)	NEW DEV. Volume (cf)	Total (cf)	REDEV. Imp. Area (ac)	NEW DEV. Imp. Area (ac)	Total (ac)
ESDv	2479	2853	5332	0.719	0.376	1.095
$ESD_{v(min)}$	0	1297	1297	---	0.376	0.376

Location: Aberdeen West **County:** Hartford County, Maryland
Watershed: Upper Western Shore **Stream Use:** I

See Maryland Department of Environment (MDE), 2000 (rev. 2009) Maryland Stormwater Management Design Manual Volumes I & II for referenced equations, acronyms, and definitions.

Site Area (LOD): 2.210 acres Existing Impervious Area = 1.557 acres 70.5 % Existing Impervious Area.
If existing site imperviousness is greater than 40%, then **'Redevelopment'** requirements apply.

Total Impervious Area (Post) = 1.394 acres
Percent Impervious (Post); I = 63.1 % I =Total Impervious Area (Post) / Site Area (LOD)

0.163 = Reduction in impervious area.

Rv = 0.05 + (0.009)I = 0.95 Eq. Ref. Vol. I, Sec. 2.0, Table 2.1
In this case, I (%) = 100

$$ESDv = \frac{(Pe)(Rv)(A)}{12}$$

P_E= 1 in (target)

* Provide impervious area reduction and/or water quality treatment for 50% of existing impervious area within the project LOD
(50% of 1.557 acres = 0.7785)
* Project reduces impervious area by: 0.163 acres
* Water Quality treatment required for: 0.616 acres (0.7785 - 0.163)

ESD_v = 2123 cf ----> Required Water Quality Volume
$ESD_{v\,(min)}$ = 0 cf

Implement ESD practices to the MEP to capture and treat: 2123 cf of runoff from 0.616 acres of impervious area. Only after ESD practices have been implemented to the MEP may alternate (structural) practices be utilized to treat the remaining required water quality volume.

There is a net decrease in impervious area, therefore, new development criteria do not apply to this project.

SUMMARY (Aberdeen West):

	REDEV. Volume (cf)	NEW DEV. Volume (cf)	Total (cf)	REDEV. Imp. Area (ac)	NEW DEV. Imp. Area (ac)	Total (ac)
ESDv	2123	0	2123	0.616	0.000	0.616
$ESD_{v(min)}$	0	0	0	---	---	---

APPENDIX D – EVALUATION OF STRUCTURAL OPTIONS

D-1 Introduction

The Underpass will be located under an operating railroad tracks connecting Plazas on either sides with stairs and ADA compliant ramps connecting to the upper level. Construction of the proposed Underpass beneath an operating railroad presents numerous challenges to the designer and construction contractor. Constraints imposed by the operation of the railroads include on the Underpass design and construction include the:

- A requirement to keep two tracks in operation at all times.
- Potential interference with existing catenary lines.
- Difficulty in installing support of excavation.
- Shallow tunnel with minimal cover over the top of tunnel.
- Excavation below the water table.
- Limited staging area on the east side of tracks.
- Potential settlement or uplift to existing tracks due to tunnel construction.
- Conflict with existing pedestrian bridge structure.
- Coordination with multiple stakeholders including AMTRAK, CSX Railroad, FRA, and local jurisdictions.
- Contaminated soils at the west tunnel entrance and beneath the tracks.
- Complicated track alignment in vicinity of project site.
- The existing elevation and soil conditions are the same on both sides of the tracks.
- The existing pedestrian overhead bridge conflicts with the location of the Underpass.
- Soft ground presents tunneling problems/challenges; also need to mediate hazardous materials from excavated soil on site of Exxon Station.
- Water (seasonal high water table potentially located 12 feet below ground level.
- Need to maintain adequate ground and ballast cover over structure to rail tracks.

D-2 Descriptions of Options and Construction Sequence

Three general engineering options have been proposed for the construction of the Underpass under the tracks; two alternates were evaluated for the jacked options.

- Option A – Mined w/ Temporary Support
- Option B1 – Jacked Alternate / Box
- Option B2 – Jacked Alternate / Drilled Steel Casing
- Option C – Precast Segments/ Cut and Cover

These varied by structural options and method of construction. Each option has its benefits as well as its challenges to construction. The objective is to consider each of the proposed schemes and present the constructability implications in order to develop a comparison based on key challenges.

Use of the tunnel boring machine (TBM) approach was also reviewed.

Option A – Mined w/ Temporary Support

Option A, hand mining a tunnel beneath the tracks, has much less impact on rail operations, but carries its own set of challenges. Hand mining is a fairly straightforward technique for tunnel construction and is commonplace for short tunnels. The construction techniques are partly depended

on the load carried by the tunnel and by the soil type encountered. Figure D-1 illustrates the key structural components of this option.

Two support systems have been investigated

- Option A-1 - Steel beam framing above the tunnel used to underpin the tracks
- Option A-2 - Bored pipes installed around the perimeter of the tunnel

For the construction of a mined tunnel, a staging area must be constructed at each end of the tunnel, consisting of an excavated area the bottom elevation matching the elevation of the tunnel invert. Support of excavation for the staging areas may utilize soldier pile and lagging techniques, however significant restrictions are imposed on construction due to the presence of the catenary. Pile driving equipment must remain several feet away from the energized catenary; therefore coordination with Amtrak to de-energize the system during pile driving is essential. In lieu of using driven piles, a soil nail wall can be constructed which would not require the restricted equipment.

Before the mining operation begins, a temporary support system must be installed. Option A-1 utilizes a steel frame system that carries the train loads during mining. Beams are located directly below the railroad ties. Loads from the trains are carried through the steel beams and transferred to temporary columns/shafts.

Option A-2 presents a different technique. Horizontal shafts are drilled along the perimeter of the tunnel allowing the installation of steel pipes. Pipes are installed tangent to one another along the axis of the tunnel and completely around the circular perimeter of the proposed tunnel, offering temporary support of the train load.

Once the support system has been installed, the mining process begins using small excavation equipment. Under support Option A- 1, soil is completely removed between the proposed tunnel invert up to and including the ballast beneath the track. The vertical sides of the excavation can be temporarily supported by Shotcrete or soil nailed walls.

Option B1 – Jacked Alternate / Box

Jacked box tunneling is a method of construction that enables engineers to create underground space at shallow depth in a manner that avoids disruption of valuable infrastructure and reduces impact on the operations. See a typical installation with two boxes in Figure D-2.

Option B2 – Jacked Alternate / Drilled Steel Casing

Jacked construction of drilled steel casing is another way of tunneling that provides a non-intrusive technique for creating underground space at shallow depth beneath existing infrastructure where it is either impractical or inconvenient to undertake construction from the surface. See a typical installation in Figure D-3.

Option C – Precast Segments/ Cut and Cover

Option C (Figure D-4) may be considered the most conventional of the three. Precast tunnel segments are installed into an open, shored cut and then backfilled with select material. This option requires that the track is temporarily disassembles to accommodate the open cut. Therefore, the construction requires a two phased approach, whereby the east half of the tunnels is constructed first while maintaining rail operations on the west side of the corridor. Since the third track will be demolished for approximately a thousand feet at the project site during Phase 1, special track in the

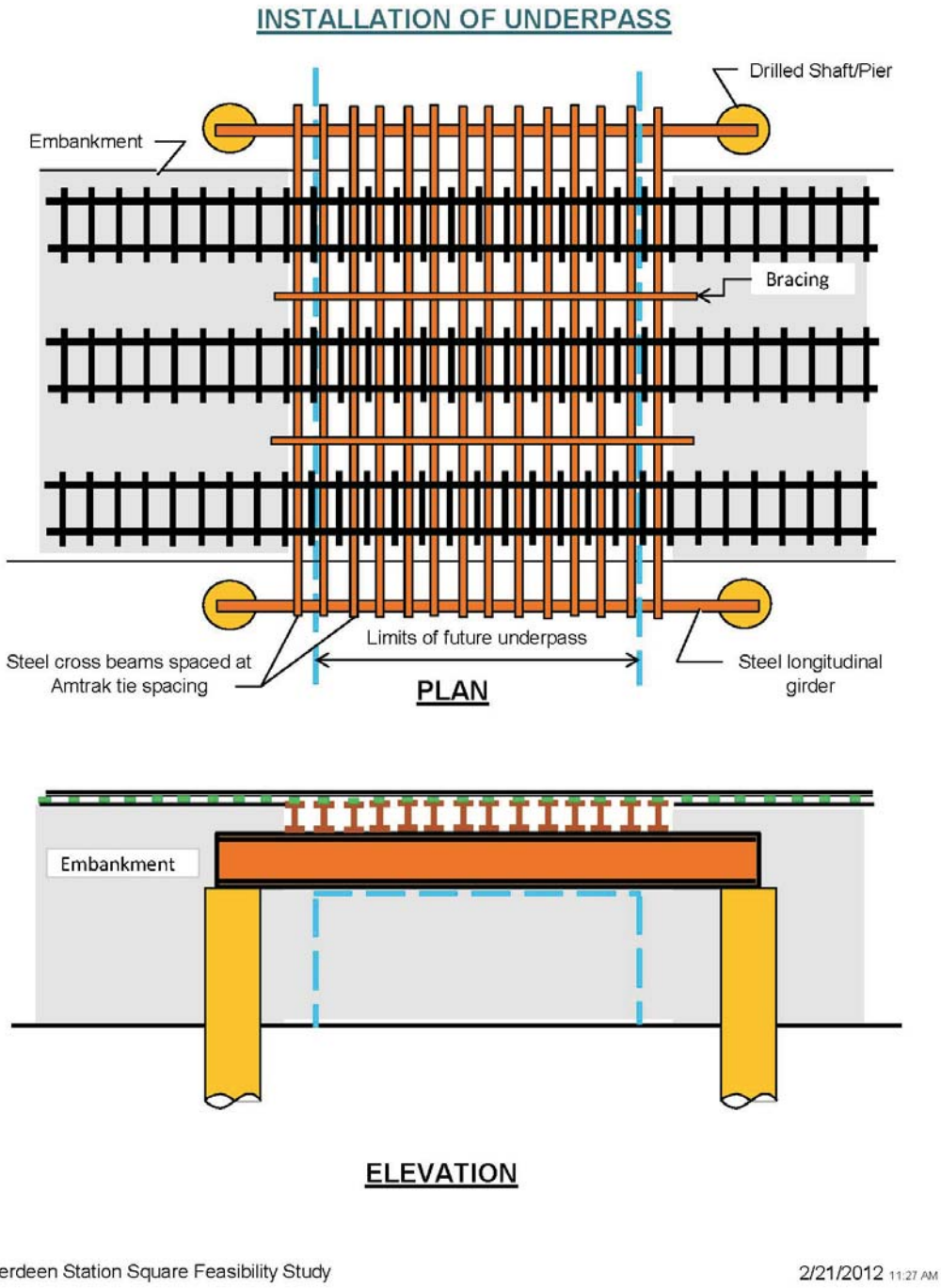


Figure D-1

Legend

Option A - Mined with Temporary Support - Key Elements

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Not to Scale

Location Map

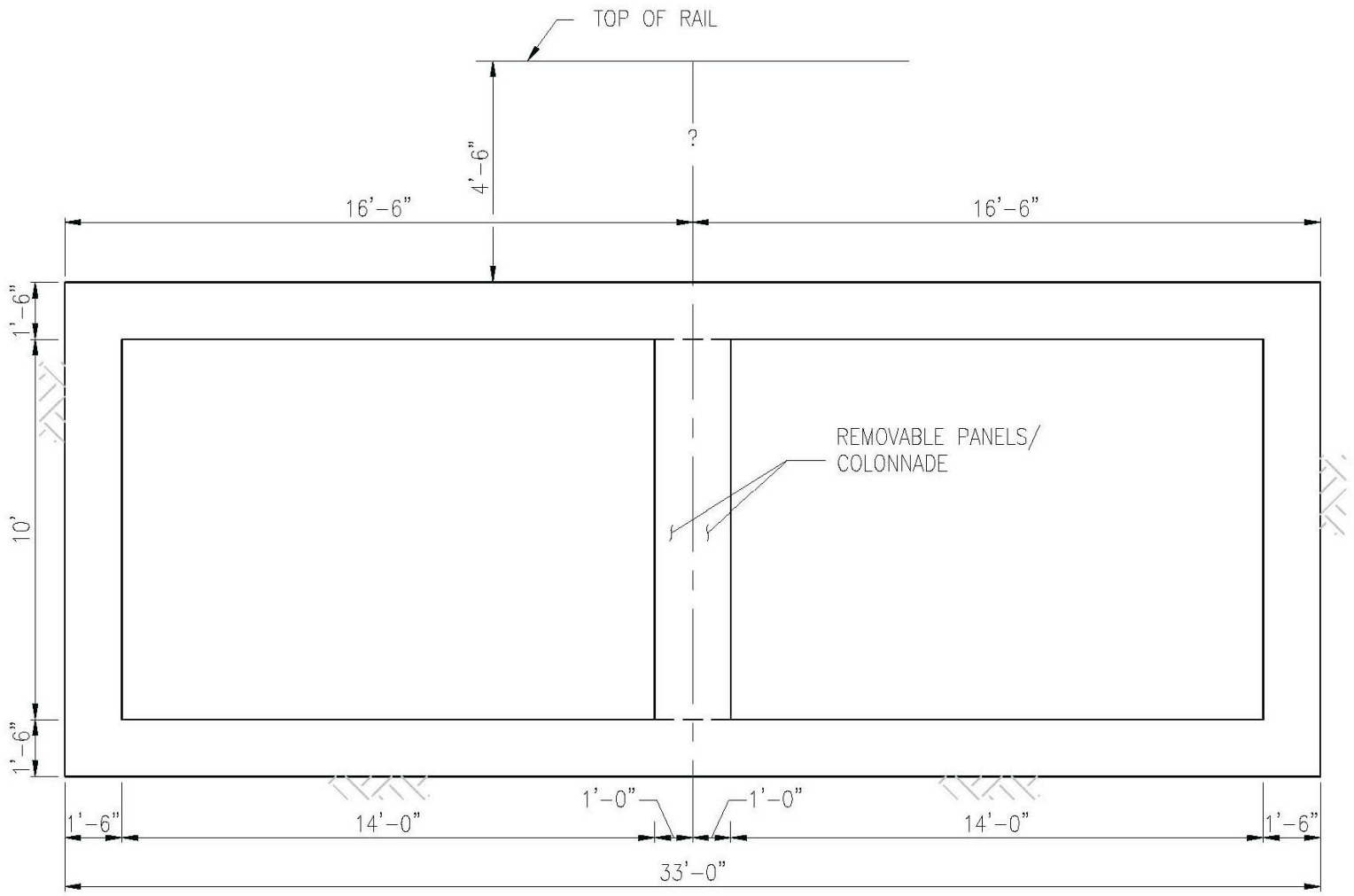


Figure D-2

Option B-1 - Jacked Alternate / Boxes - Cross Section

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend

Not to Scale

Location Map

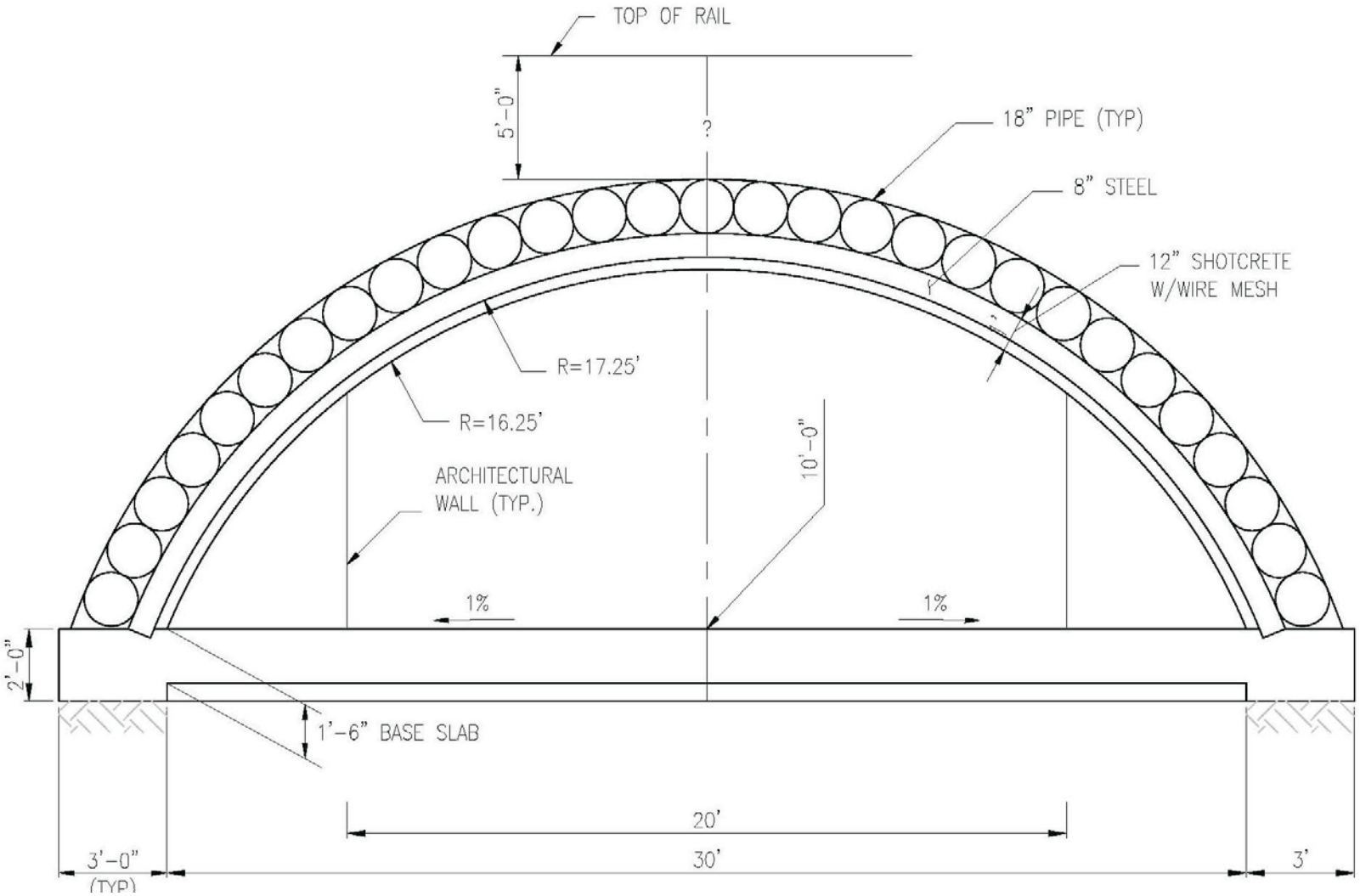


Figure D-3

Option B-2 - Jacked Alternate / Drilled Steel Casing - Cross Section

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend

Not to Scale

Location Map

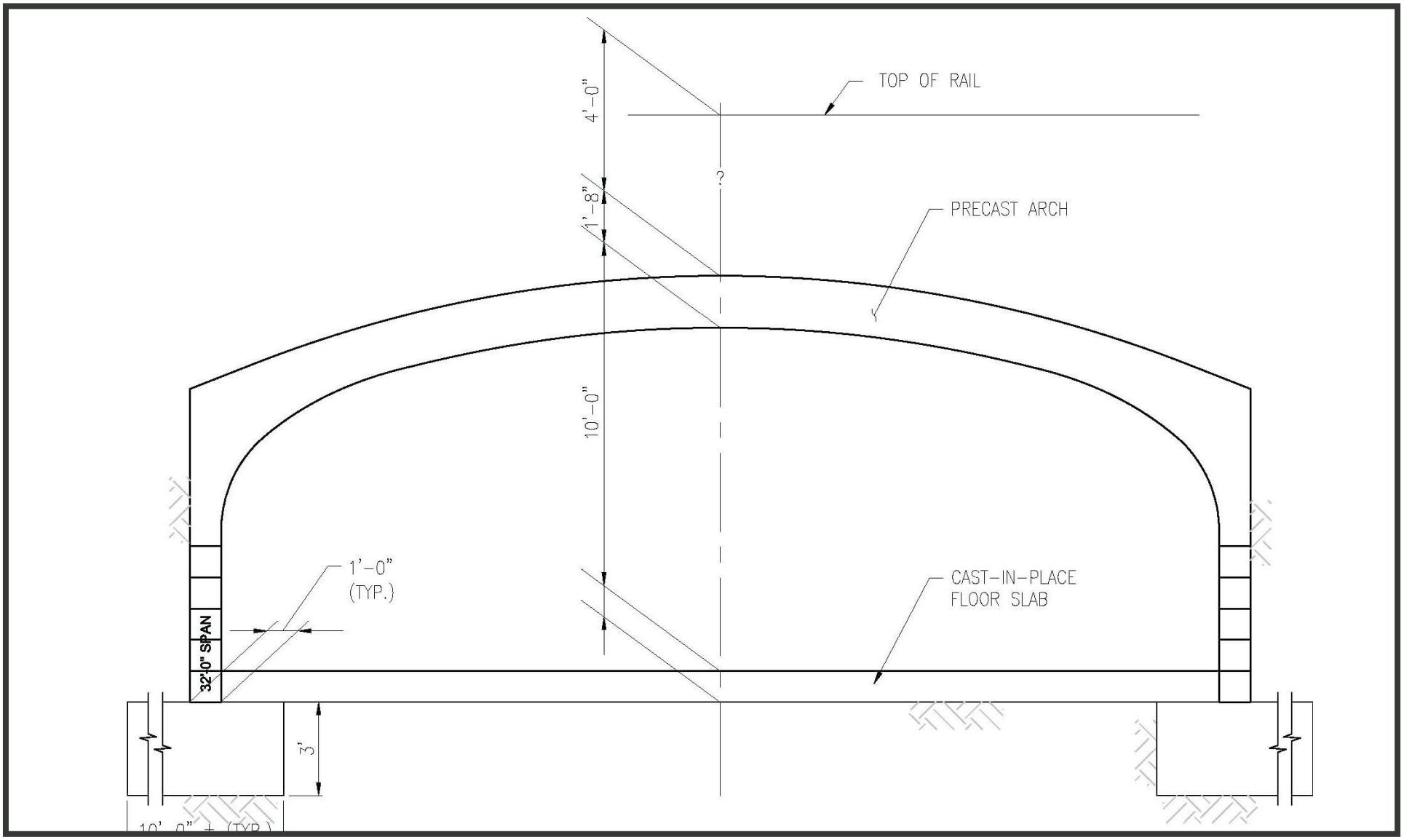


Figure D-4

Option C - Conspan Arch - Cross Section

Aberdeen Station Square Feasibility Study
City of Aberdeen, Harford County, Maryland

Legend

Not to Scale

Location Map

form of cross-over's must be installed at each end of the work zone to allow rail traffic to switch from the third track to the first and second tracks.

The catenary poles and wires must be temporarily relocated so that excavation and installation of the precast segments can utilize cranes and other high level equipment. The support of excavation must be installed between tracks 2 and 3, therefore it is expected that driven sheet piles will be utilized. Driving sheet piles between the tracks presents challenges including access by pile driving equipment, interference with the existing catenary, potential effects on the vertical and horizontal alignments of the operating rail and impacts to railroad operations.

Once the sheet piling is installed, the excavation process can begin. Soldier piles are driven around the perimeter of the excavation and soil is removed with heavy equipment. Lagging is installed between soldier piles as the excavation progresses downward to the proposed elevation of the invert of the tunnel. Dewatering operations will be required. After the Phase 1 site has been excavated, the precast segments may be installed on a cast in place foundation as prescribed by the tunnel design. The cast-in-place headwall will be constructed above the precast tunnel. Once the tunnel is installed, the site is backfilled and the third track is reconstructed in its ultimate location.

Keeping two tracks in operation will require that a segment of the proposed 4th track is constructed during Phase 2 of the project. Train traffic will be shifted to tracks 3 and 4, catenary must be reconstructed, and Tracks 1 and 2 will be demolished. Excavation and tunnel installation procedures will be conducted similarly to Phase 1. During the second phase, the existing pedestrian bridge will require temporary support, since it is in conflict with the location of the proposed tunnel excavation. At the conclusion of Phase 2, all track work and catenary will be restored to operating condition.

D-3 Sequence of Construction

Sequence of construction - Option A – Mined w/ Temporary Support

Step 1 - Install soldier pile and lagging wall as the support of excavation around perimeter of staging areas at each end of proposed tunnel. Excavate from the top down to the proposed elevation of the tunnel invert.

Step 2 - Construct headwall and wing walls at both ends of tunnel using top down construction techniques.

Step 3 - Install drilled shaft/columns as supports for the longitudinal girder.

Step 4 - Install steel longitudinal girders supported by drilled shafts/columns.

Step 5 - Install steel cross beams and bracing spaced to match Amtrak tie spacing.

- Excavate trench between ties.
- Install timber sheeting support of excavation braced at top and bottom as required.
- Install cross beam and ties, shim as required.
- Alternate location of installation of beams.

Step 6 - Excavate tunnel below steel support structure. Support vertical walls with soil nails or other techniques. Construct cast in place concrete box tunnel within excavation.

Step 7 - Backfill area over tunnel structure. Remove steel support beams. Reset ballast and ties to correct elevation.

Step 8 - Remove longitudinal beam and demolish columns.

Step 9 - Install all architectural finishes.

Sequence of Construction - Option B1 – Jacked Alternate / Box

Step 1 - Create a jacking pit on the east side of the rail corridor using soldier pile and lagging as support of excavation. Construct a headwall on the east side of the proposed tunnel using top down construction techniques. Construct a receiving pit on the west end using sheet piles or soldier piles and lagging.

Step 2 - Construct the Concrete box structure as required by design. Rigidly attach an engineered steel cellular shield to the leading edge of the concrete box. The shield shall be designed to be thrust into the face to ensure face stability while also permitting safe working access for miners to carry out the excavation.

Step 3 - Assemble a jacking rig capable of exerting sufficient pressure to the end of the box. Begin jacking operation, thrusting box into embankment. Closely monitor the path of the jacked box.

Step 4 - Continue jacking the box while excavating the soil through the interior of the box. Lubricate exterior surfaces of the box to reduce friction and drag effects.

Step 5 - Daylight jacked tunnel at receiving pit at west end of tunnel. Construct wingwalls and head walls around precast box structure. Install architectural finishes as required.

The jack and bore tunnel option has the advantage of causing little impact to the operating rail lines. With careful installation and proper monitoring, the tunnel construction will result in minimal impact to the service for Amtrak, MARC, and NS.

Sequence of Construction - Option B2 – Jacked Alternate/ Drilled Steel Casing

Step 1 - Install soldier pile and lagging wall as the support of excavation around perimeter of staging areas at each end of proposed tunnel. Excavate from the top down to the proposed elevation of the tunnel invert.

Step 2 - Construct headwall and wing walls at both ends of tunnel using top down construction techniques.

Step 3 - Drill a series of holes around perimeter of proposed tunnel and install horizontal pipes oriented tangent to one another.

Step 4 - Begin excavation at east end of proposed tunnel. Install steel support rings at intervals required by design.

Step 5 - Continue hand excavation of circular tunnel adjacent to inside perimeter of horizontal pipe piles. Extend construction to location of next support ring. Remove soil from site. When tunnel excavation reached daylight at west end of tunnel, install last support ring at tunnel end.

Step 6 - Install welded wire fabric around exterior of tunnel; offset approximately 6 inches from pipe piles. Apply shotcrete coating to entire perimeter of tunnel, to a depth of approximately 12 inches.

Step 7 - Install all architectural finishes.

Sequence of Construction – Option C – Precast Segments/ Cut and Cover

<u>Phase 1</u>

Step 1 - Install soldier pile and lagging wall as the support of excavation around perimeter of staging areas at each end of proposed tunnel. Excavate from the top down to the proposed elevation of the tunnel invert.

Step 2 - Install new cross over switches between outside tracks and center track to allow trains to shift to the west through the construction zone. During Phase 1 construction, trains will use the existing tracks 1 and 2. Adjust all train signals as required to run trains on western most tracks. Reconfigure catenary supports as required to accommodate phasing.

Step 3 - Demolish the existing east tracks (tracks 3) through the construction zone. Remove rail and ballast. Install sheet piles between tracks 2 and three. Begin excavating the east side of trackway, utilizing sheet piles to support the excavation. Excavate to the proposed tunnel invert elevation.

Step 4 - Install segments of precast tunnels into permanent location according to manufacturer's recommendations. Follow OSHA regulation regarding construction adjacent to power lines. Use of cranes for installation will be restricted.

Step 5 - Construct wingwalls and headwall on east end of tunnel.

Step 6 - Backfill over the newly constructed segmental tunnel. At the same time as backfilling, install the support of excavation needed for phase 2 construction.

Step 7 - Reconstruct the east tracks (track 3) in its ultimate location. Install ballast, ties and rail. Replace all signals as required.

<u>Phase 2</u>

Step 1 - Construct the new fourth track for a distance of 1000 linear feet within the existing right-of-way in its ultimate configuration. Install new cross over switches between outside tracks and center track to allow trains to shift to the east through the construction zone. During Phase 1 construction, trains will use the existing east track (Track 3) and the proposed 4th track. Adjust all train signals as required to run trains on the eastern most tracks. Shift rail traffic onto newly constructed tracks.

Step 2 - Demolish the existing tracks 1 and 2 through the construction zone. Remove rail and ballast. Begin excavating the west side of trackway, utilizing the support the excavation that was installed during the backfill operation on Phase 1. Excavate to the proposed tunnel invert elevation.

Step 3 - Install segments of precast tunnels into permanent location according to manufacturer's recommendations as done in Phase 1.

Step 4 - Construct wingwalls and headwall on west end of tunnel.

Step 5 - Backfill over the newly constructed segmental tunnel.

Step 6 - Reconstruct tracks 1 and 2 in their ultimate location2. Install ballast, ties and rail. Replace all signals as required.

D-4 Summary of Options – Descriptions and Constructability

Option A – Mined with Temporary Support

- Uses temporary steel framing system to support track and train loads
- Conventional excavation and tunnel construction underneath such as Shotcrete or cast-in-place structural tunnel.
- Risk: New technology – not yet used.
    - Mitigation: none.
- This option requires deeper excavation, which would result in the floor of the Underpass and the Plazas to be 22-25 feet deep.

- The deeper excavation and extensive temporary steel framing system are expected to likely make this the most expensive option.

Option B1 - Jacked Alternate/ Box

- Head wall + Wing walls + Bulkhead.
- Uses standard precast sections, jacked under the railroad requiring construction of a jacking pit and a receiving pit to accommodate the jacking equipment.
- Two boxes would be jacked (one at a time).
- As the boxes are jacked the soil in the interior of the boxes is excavating out.
- Leveling steel would be installed under the boxed first to ensure grade is maintained during jacking.
- Lubricants would be used to facilitate jacking.
- Center wall would have knock-out panels to create some shared space between the two boxes.
- Risk: Railroad displacement during jacking including uplift and heaving.
    - Mitigation: Survey and instrumentation.
- Risk: Loss of ground at face of excavation.
    - Mitigation: Leave enough material to stabilize face; stockpile face supports during jacking operation.
- Possible alternate: Conspan (see Option C) would supply a custom designed single section to be jacked which would eliminate the center wall.

Option B2 – Jacked Alternate/ Drilled Steel Casing

- Uses individually drilled horizontal steel pipes supported by steel ribs and a cast-in-place concrete base slab.
- Pipe can be interlocked to ensure that they are adjacent to each other during drilling.
- Steel ribs are installed sequentially as the face is excavated.
- Hand mining using pneumatic spades and jackhammers used to remove soil from interior of the structure as the construction proceeds under the tracks.
- Risk: Railroad displacements during excavation.
    - Mitigation: Survey and instrumentation, shorter rib spacing if required, temporary support of roof during excavation if required.
- Possible Improvement: Modify shape of tunnel structure to be more rectangular (still with rounded walls). This would increase usable space. Steel ribs would act more as a frame and would need to be increased in size from the currently proposed 8-inch depth.
- Possible Improvement: Modify steel/concrete connection detail for improved constructability (final design item).

Option C - Precast Segments/ Cut and Cover

- Uses standard precast sections like those manufactured by Contech for its Conspan product installed with cut and cover construction.

- Construction sequence would consist of two phases – one with construction from the east and one from the west which requires open access from both sides of the railroad – space from east side is questionable.
- Assumes construction from the east before the 4th track is constructed with two tracks in operation at all times.
- Requires extensive support of excavation at end of tunnel between phases such as Installation of sheet pile or soil nail wall.
- Construction duration is expected to be increased due to the phasing and the potential need for cranes.
- The cut and cover construction limited because of crane restrictions regarding interference with overhead power, signals, and catenary.
- Head wall construction.
- Wing wall construction.

Tunnel Boring Machine

Use of the tunnel boring machine (TBM) approach was also suggested but has certain limitations:

- The lay down area needed to set up, position and align TBM equipment at the face of the excavation is extensive, usually several hundred feet (space that is not available between Amtrak and the adjacent street).
- costs to mobilize, assemble, and use TBM equipment are significant, and could be prohibitive; typical applications are for half mile long (and longer) excavations where the equipment costs distributed over the entire length help justify the cost on a per foot basis.
- The initial depth of excavation needed to support use of the TBM could be twice that anticipated for other alternatives being considered (even though the resulting usable depth may still match those accomplished using other methods).
- The TBM system requires more specialized expertise than most other options being considered, making it less likely to be bid by local / regional contractors.

Based on these limitations, it is considered that this technique would not be applicable to the Aberdeen Underpass project.

APPENDIX E – PHASE 1 ENVIRONMENTAL SITE ASSESSMENT

Maryland Transit Administration (referred to as "MTA") is in the process of acquiring the Aberdeen Square parcel (referred to as "study area") located along US Route 40, Philadelphia Road in Aberdeen, Maryland. Chesapeake Environmental Management, Inc. (CEM) performed a Phase I Environmental Site Assessment (ESA) of the study area to provide MTA with the documentation that is required to qualify for Landowner Liability Protections under CERCLA.

Following is a summary of the results of the ESA. The full ESA is available as a separate document.

Executive Summary

The study area is 21.2 acres in size, and consists of an active railroad utilized by the Maryland Area Regional Commuter (MARC) and Amtrak trains, the Aberdeen train station, an Exxon gas station, and several other commercial and residential properties.

CEM performed this ESA in conformance with the scope and limitations of the standard processes described in ASTM E 1527-05 (Standard Practice for ESAs: Phase I ESA Process). Any exceptions to, or deletions from, this practice are described in Section 11 (Deviations).

This assessment has identified evidence of the following recognized environmental conditions (RECs) in connection with the study area.

- Potential surficial and sub-surface contamination associated with the unregulated dumping observed at Sites 009 and 013.
- Potential sub-surface contamination associated with one UST tank field observed at Site 009.
- Potential sub-surface contamination associated with the dry-cleaning facility observed at Site 023.
- Potential surficial contamination associated with the heating oil ASTs observed at Sites 013, 015, 018, 022, 023 and 025.
- Potential surficial contamination associated with the lube and waste oil ASTs observed at Sites 002 and 017.
- Potential surficial contamination associated with the pad-mounted transformers observed at Sites 002, 005, 018 and 028.

This assessment has identified evidence of the following *de minimis* conditions in connection with the study area.

- Multiple areas of non-hazardous roadside debris observed across the study area.

This assessment has identified evidence of the following historical RECs identified at the study area.

- Due to the history of the study area, there is a potential for contamination from commonly used hazardous materials and petroleum-based fuels associated with rail travel. During the site reconnaissance, there were minimal signs of staining detected.
- One 3,000-gallon used oil UST was reported as being permanently out of use at Site 005. An OCP case was opened due to a release and tank closure, but no cleanup was reported. Although the associated OCP case has been listed as closed, there is a potential for residual soil contamination related to the operation and closure of the UST.
- One 12,000-gallon gasohol UST, two 8,000-gallon gasohol USTs, one 6,000-gallon diesel UST, and two 1,000-gallon USTs containing used oil and gasoline were reported as being

permanently out of use at Site 009. Three OCP cases were opened due to releases, and cleanups were reported. Although the associated OCP cases have been listed as closed, there is a potential for residual soil contamination related to the operation and closure of the USTs.

- Two 500-gallon heating oil ASTs were reported as being currently in use at Site 013. There is a potential for residual soil contamination related to the AST operation. One 20,000-gallon diesel UST was reported as being permanently out of use and two 1,000gallon gasoline USTs were reported as being currently out of use at Site 016. There is a potential for residual soil contamination related to the UST operation. The property has been entered into the Voluntary Cleanup Program and further investigation by Maryland Department of the Environment (MDE) is ongoing.
- Two 2,000-gallon gasoline USTs and one 2,000-gallon UST of an unidentified substance were reported as being permanently out of use at Site 017. An OCP case was opened for a motor/lube oil tank closure; however, no release or cleanup was reported. Although the associated OCP case has been listed as closed, there is a potential for residual soil contamination related to the operation and closure of the UST.
- One 1,000-gallon heating oil UST was reported to be permanently out of use at Site 023. An OCP case was opened reporting a release, and subsequent cleanup was documented. Although the associated OCP case has been listed as closed, there is a potential for residual soil contamination related to the operation and closure of the UST.
- One 1,000-gallon heating oil UST was reported to be permanently out of use at Site 025. An OCP case was opened for the property; however, it is not clear if an issue with the heating oil UST was the reason for opening the case since there was no cleanup or tank removal reported. Although the associated OCP case has been listed as closed, there is a potential for residual soil contamination related to the operation and closure of the UST.
- One 4,000-gallon heating oil UST was reported as being currently out of use at Site 027. An OCP case was opened for the property; however, no release or cleanup was reported. Although the associated OCP case has been listed as closed, there is a potential for residual soil contamination related to the operation and removal of the UST.
- One 1,000-gallon gasoline UST was reported as being permanently out of use at Site 032. An OCP case was opened due to a release and cleanup activities were reported. Although the associated OCP case has been listed as closed, there is a potential for residual soil contamination related to the operation and closure of the UST.

Based on the results of the ESA performed at the study area, CEM recommends the following.

- Surficial soil sampling should be performed in the vicinity of the unregulated dumping observed at Sites 009 and 013. All collected soils should be screened in the field and submitted to a laboratory for analyses. All samples should be analyzed for priority pollutant metals according to EPA Method 6020, VOCs according to EPA Method 8260B, PCBs according to EPA Method 8082, DRO according to EPA Method 8015B, and GRO according to EPA Method 8015B.
- Sub-surface soil sampling should be performed to confirm or deny the presence of residual petroleum contamination associated with the previously removed USTs at Sites; 005, 009, 013, 016, 017, 023, and 025. All collected soils should be screened in the field and submitted to a laboratory for analyses. All samples should be analyzed for VOCs according to EPA Method 8260B,

diesel range organics (DRO) according to EPA Method 8015B, and gasoline range organics (GRO) according to EPA Method 8015B.

- Sub-surface soil sampling should be performed to confirm or deny the presence of residual hazardous material contamination associated with the dry-cleaning facility at Site 023. All collected soils should be screened in the field and submitted to a laboratory for analyses. All samples should be analyzed for VOCs according to EPA Method 8260B, and SVOCs according to EPA Method 8270.
- Surficial soil sampling should be performed in the vicinity of the heating oil ASTs located at Sites 013, 022, and 023. All collected soils should be screened in the field and submitted to a laboratory for analyses. All samples should be analyzed for priority pollutant metals according to EPA Method 6020, and DRO according to EPA Method 8015B.
- Surficial soil sampling should be performed in the vicinity of the lube and waste oil ASTs located at Sites 002 and 017. All collected soils should be screened in the field and submitted to a laboratory for analyses. All samples should be analyzed for priority pollutant metals according to EPA Method 6020, and DRO according to EPA Method 8015B.
- If the proposed construction will impact any of the pad-mounted transformers identified within the study area, additional information requests should be made to regulatory agencies and local utility companies to confirm or deny the presence of PCBs in the unlabeled electrical transformers. If the PCB content cannot be determined, surficial soil sampling should be performed in the vicinity of the unlabeled electrical transformers and submitted to a laboratory for PCB analysis.