Facility Plan Report

Little Bennett Regional Park

Day Use Area

Appendices

Presented by
The Park Development Division
of the Montgomery County
Department of Parks

For the Maryland-National Capital Park and Planning Commission

October 6, 2011

Contents

30% Construction Documents—Site Work

LITTLE BENNETT REGIONAL PARK
DAY USE AREA
30% CONSTRUCTION DOCUMENTS
4TH ELECTION DISTRICT
CLARKSBURG, MARYLAND

VICINITY MAP
SCALE: 1"=±10,000'
MONTGOMERY COUNTY
MAP: 28 GRID: A-4
WSSC GRID: 234NW14
Copyright ADC The Map People
Permitted Use Number 20908173

23701 FREDERICK ROAD
CLARKSBURG, MD 23701

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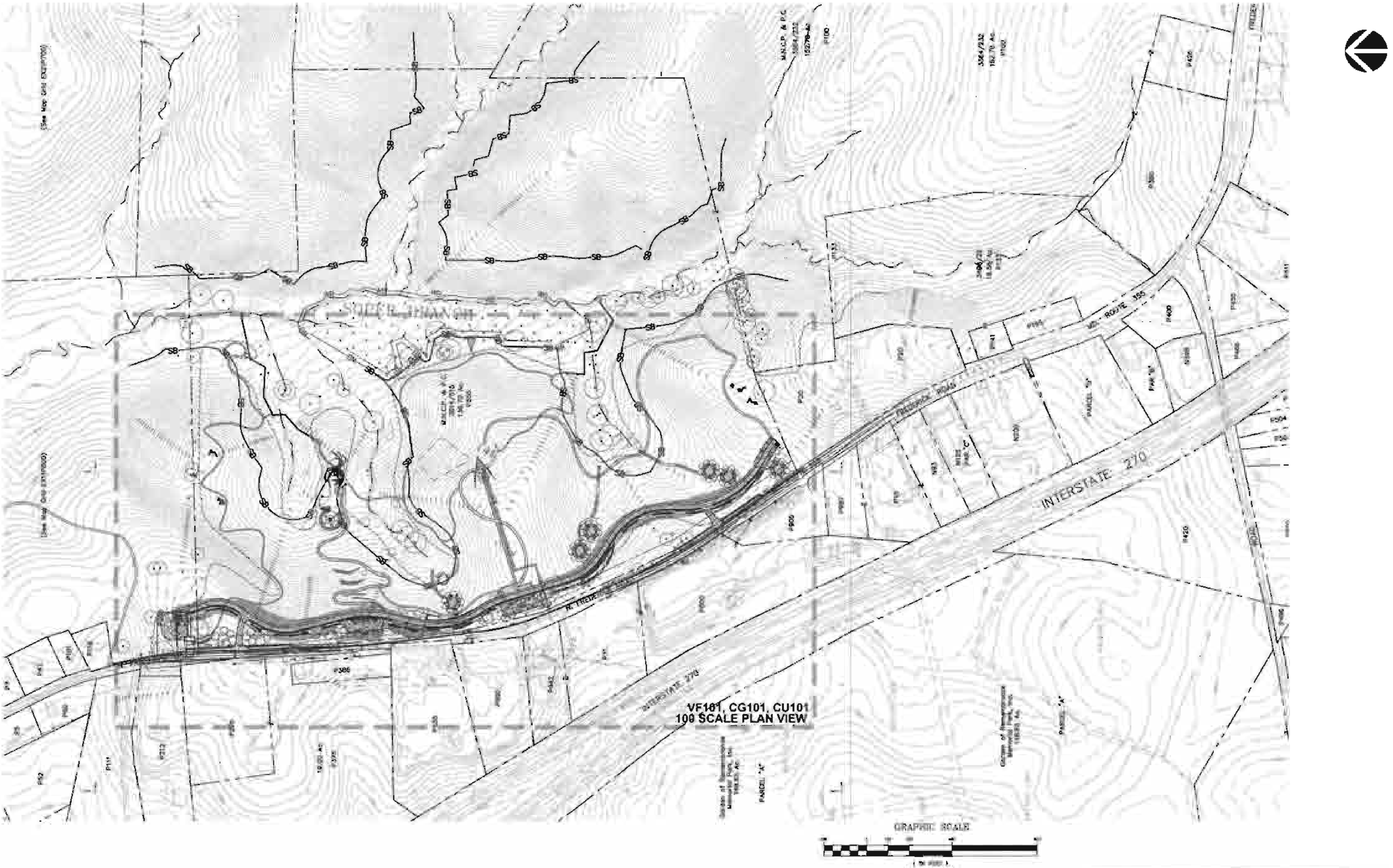
SEPTEMBER 14, 2011

DESIGN
REVIEW AND APPROVAL
REVIEW AND APPROVAL
Park Police

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

Cover Sheet
Little Bennett Regional Park
Day Use Area
WSSC Grid Map
#234NW14

GI100



DESIGN		REVIEW AND APPROVAL	REVIEW AND APPROVAL
M-NCPPC			
Landscape Architect Date	Drawn By	Park Development Date	Superintendent of Parks Date
Architect Date	Checked By	Central Maintenance Date	Park Police Date
AMT Engineer Date	Checked By	Region Date	Date
AMT Drawn By Date	Checked By	Special Programs Date	Date

The Maryland-National Capital Park and Planning Commission

Montgomery County Department of Parks and Planning
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(301) 495-2535

PLANS ISSUED FOR:

REVISIONS

Rev. No.	Date	Description

SEAL

General Overall Plan

Little Bennett Regional Park

Day Use Area

WSSC Grid Map

GI101

DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

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The Maryland-National Capital Park and Planning Commission

Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
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Existing Conditions Plan

Little Bennett Regional Park

Day Use Area

WSSC Grid Map

VF101

SHEET

DESIGN		REVIEW AND APPROVAL	REVIEW AND APPROVAL
Landscape Architect Date	Drawn By	Park Development Date	Superintendent of Parks Date
Architect Date	Drawn By		Park Police Date
Engineer Date	Drawn By		Date
Drawn By Date	Drawn By		Date

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SEAL

Overall Grading Plan

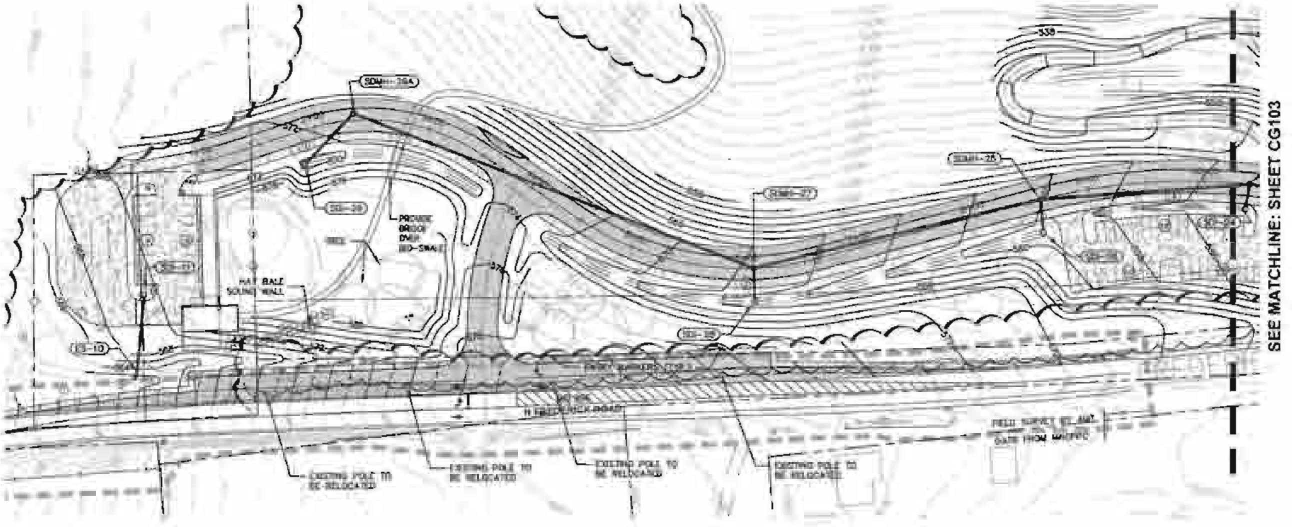
Little Bennett Regional Park
Day Use Area

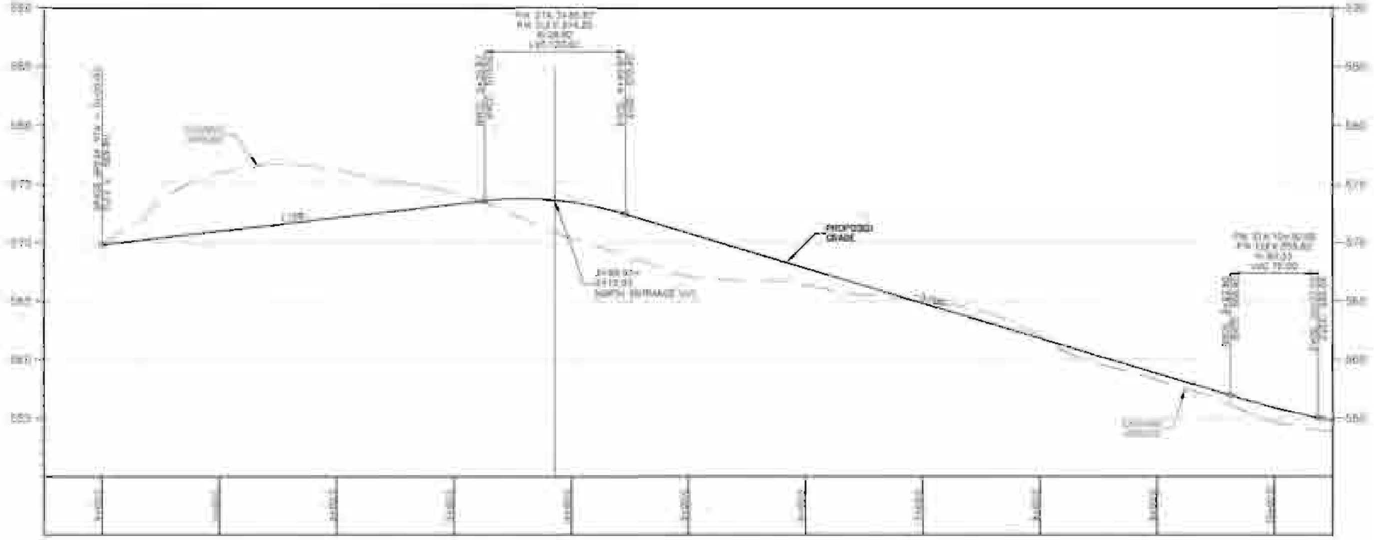
WSSC Grid Map
#234NW14

SCALE: 1" = 100'

CG101

SHEET 4 of 37





LB - Centerline New PROFILE
SCALE: HORIZ. 1" = 50'
VERT. 1" = 5'

MEADOW DRIVE
CUT-FILL ANALYSIS:
(ENTIRE ROADWAY)

CUT:	15,342 Cu. Yd.
FILL:	14,906 Cu. Yd
NET:	436 Cu. Yd

GRAPHIC SCALE
(IN FEET)
1 inch = 50 ft.

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(301) 495-2535

Meadow Drive - Plan & Profile

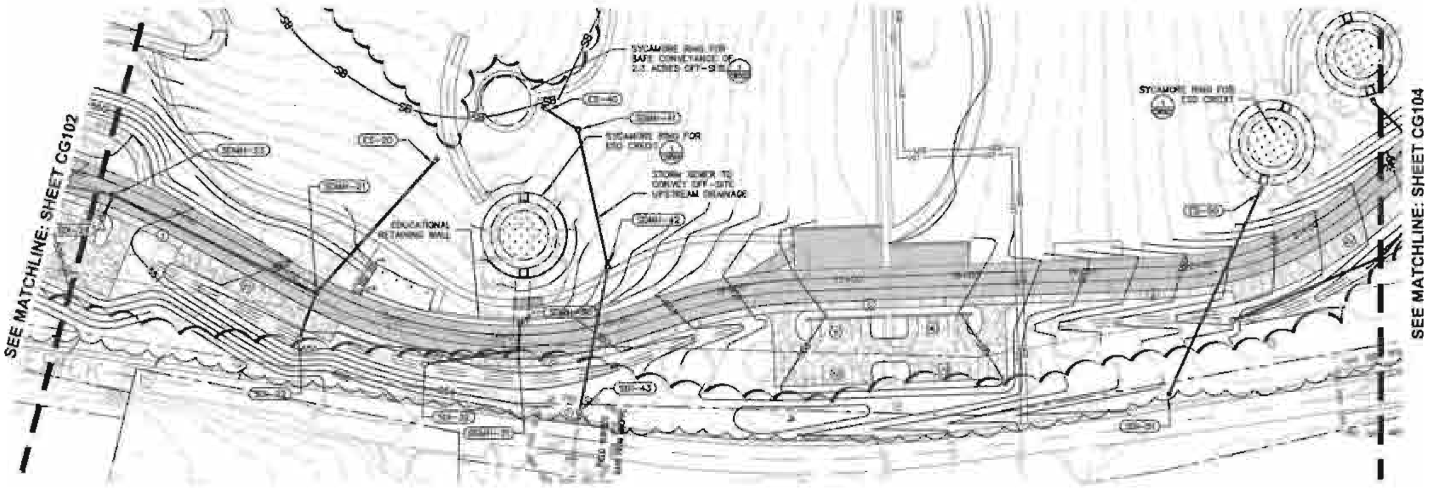
Little Bennett Regional Park
Day Use Area

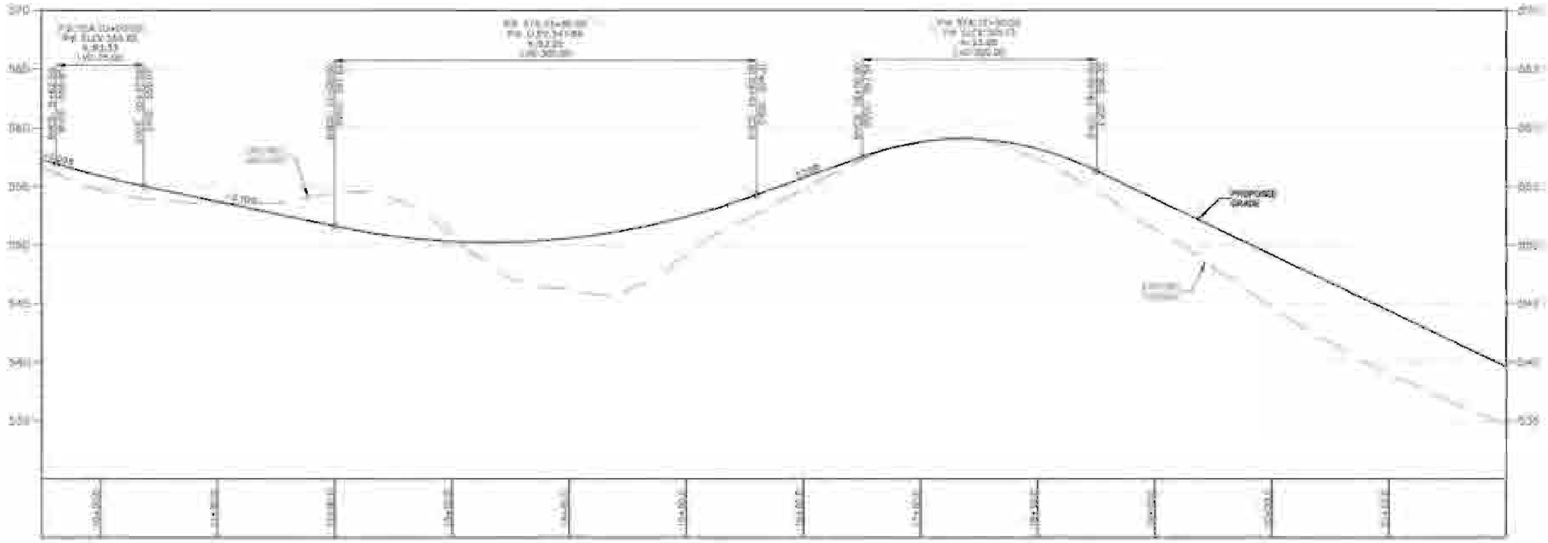
SCALE: 1" = 50'

WSSC Grid Map
[illegible]

CG102

SHEET [illegible]





LB - Centerline New PROFILE

REVIEW AND APPROVAL	REVIEW AND APPROVAL

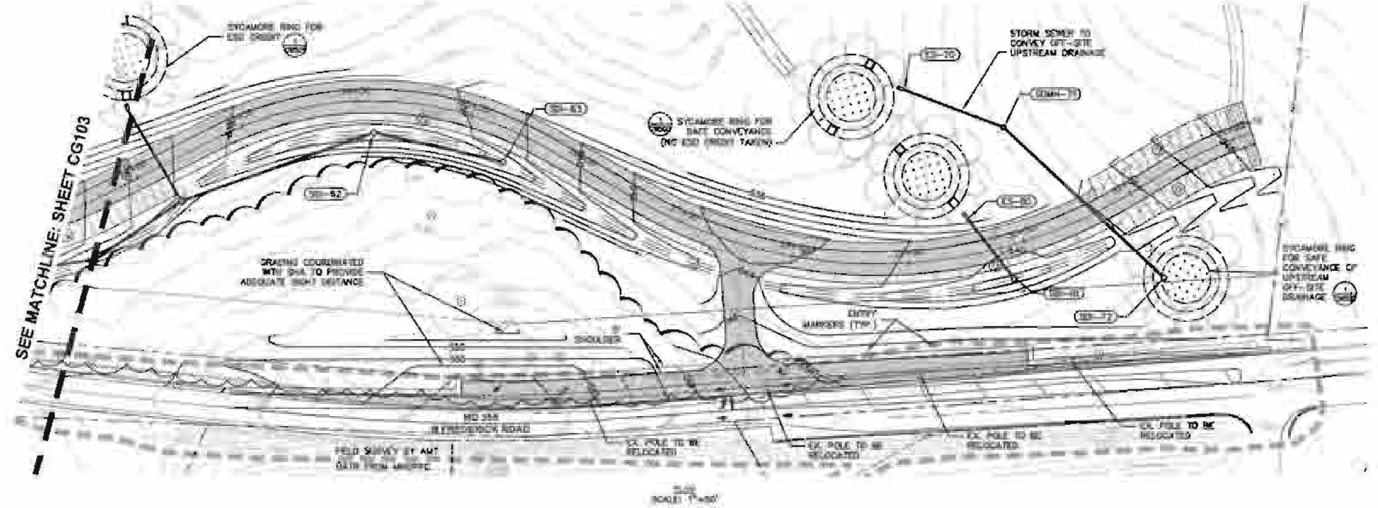
The Maryland-National Capital Park and Planning Commission

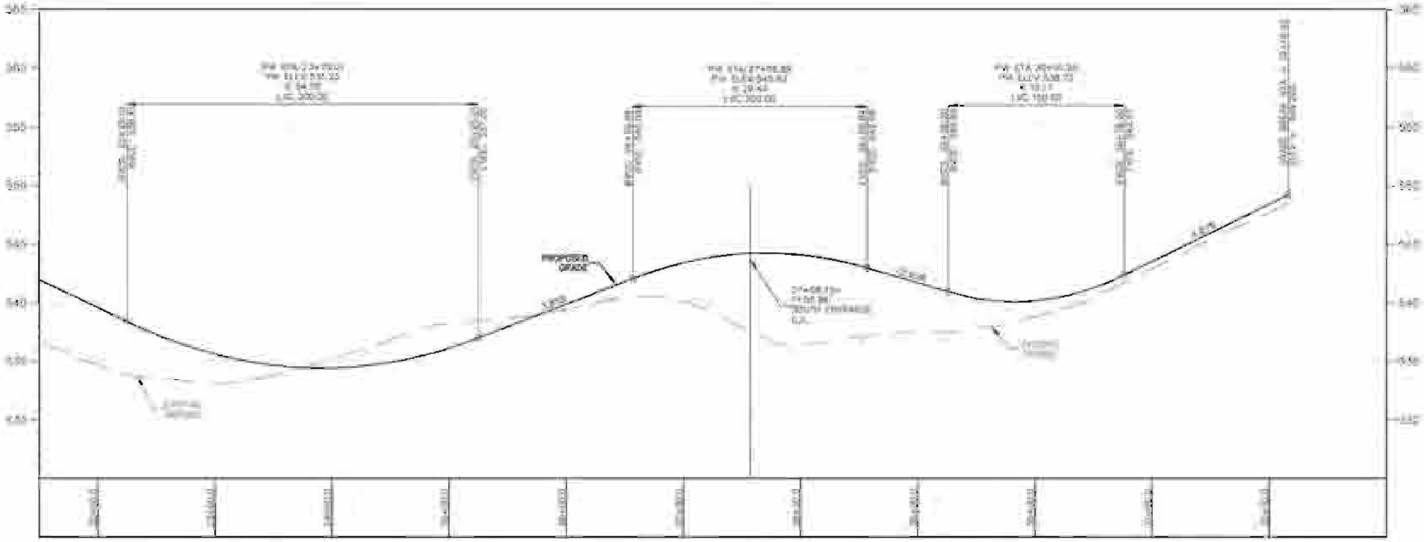
Meadow Drive - Plan & Profile

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CG103





LB - Centerline New PROFILE

SCALE: HORZ 1" = 30'
VERT 1" = 3'

GRAPHIC SCALE

(IN FEET)
1 inch = 30 ft.

DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

The Maryland-National Capital Park and Planning Commission

Montgomery County Department of Parks and Planning
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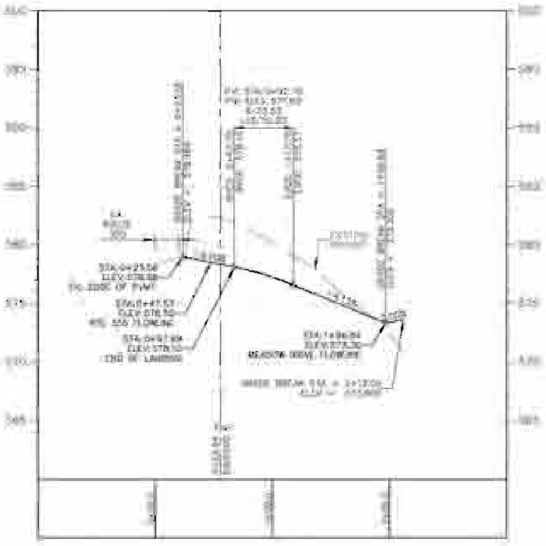
Meadow Drive - Plan & Profile

Little Bennett Regional Park
Day Use Area

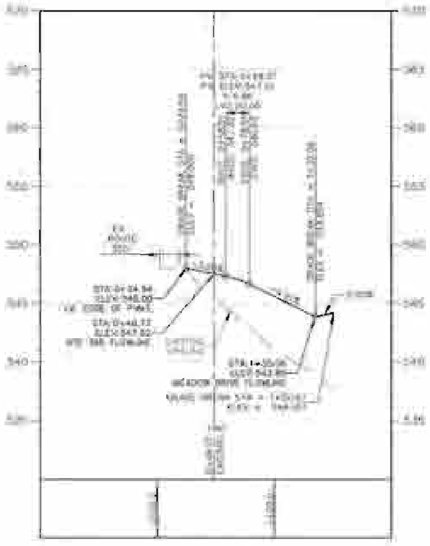
WSSC Grid Map

CG104

SHEET [illegible] 47



North Entrance CL PROFILE



South Entrance CL PROFILE

The Maryland-National Capital Park
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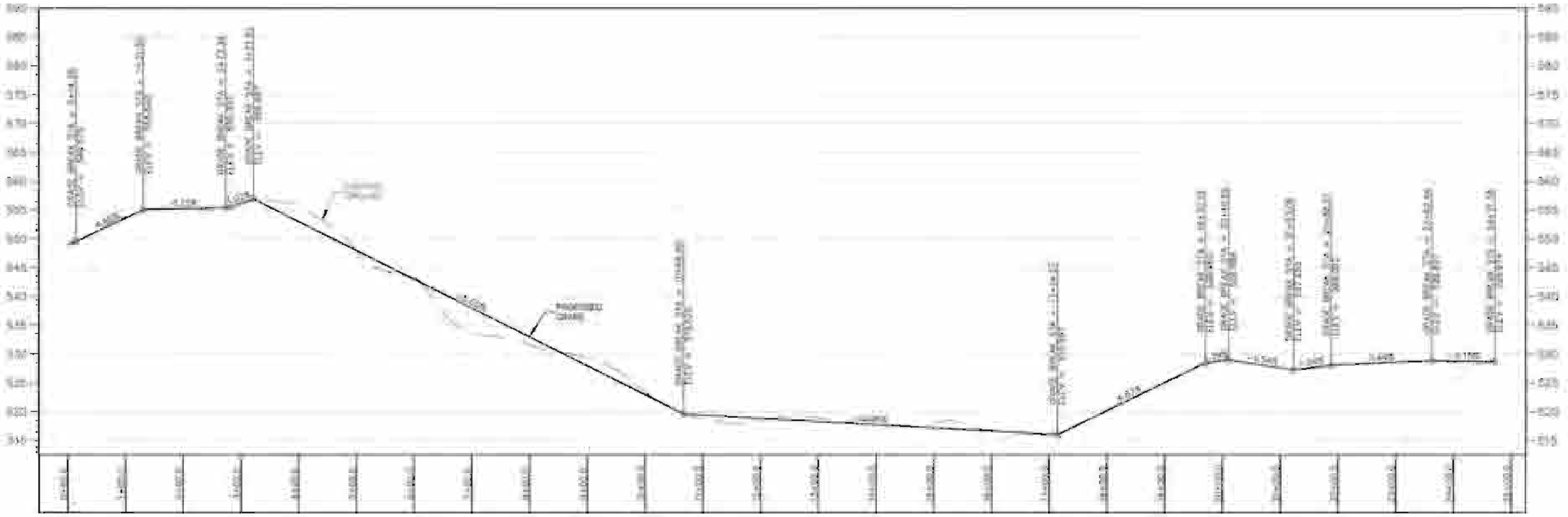
Entrance Profiles

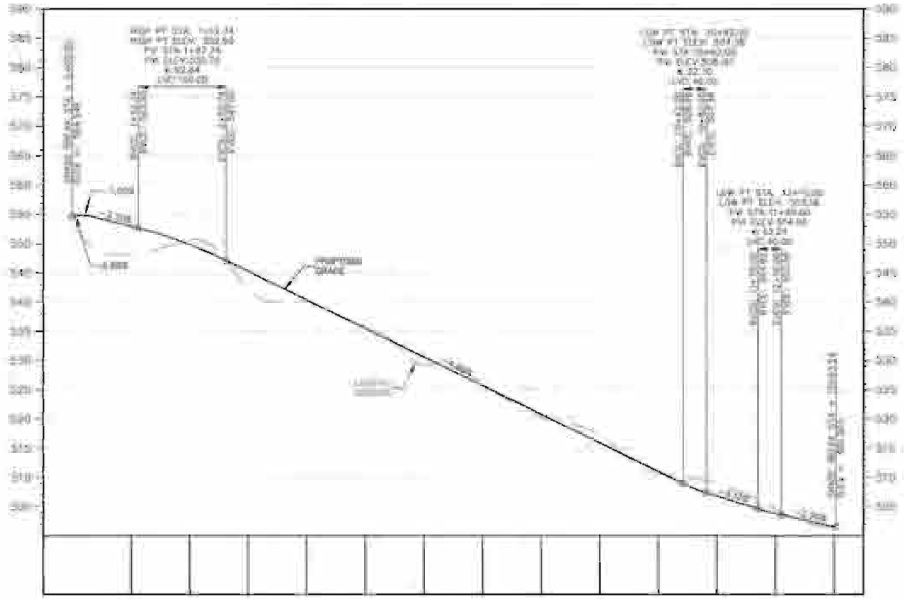
Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CG301



MAINTENANCE TRAIL PROFILE
SCALE: HORZ 1" = 100'
VERT 1" = 10'



Playscape Access PROFILE
SCALE: HORZ 1" = 100'
VERT 1" = 10'

DESIGN | REVIEW AND APPROVAL | REVIEW AND APPROVAL

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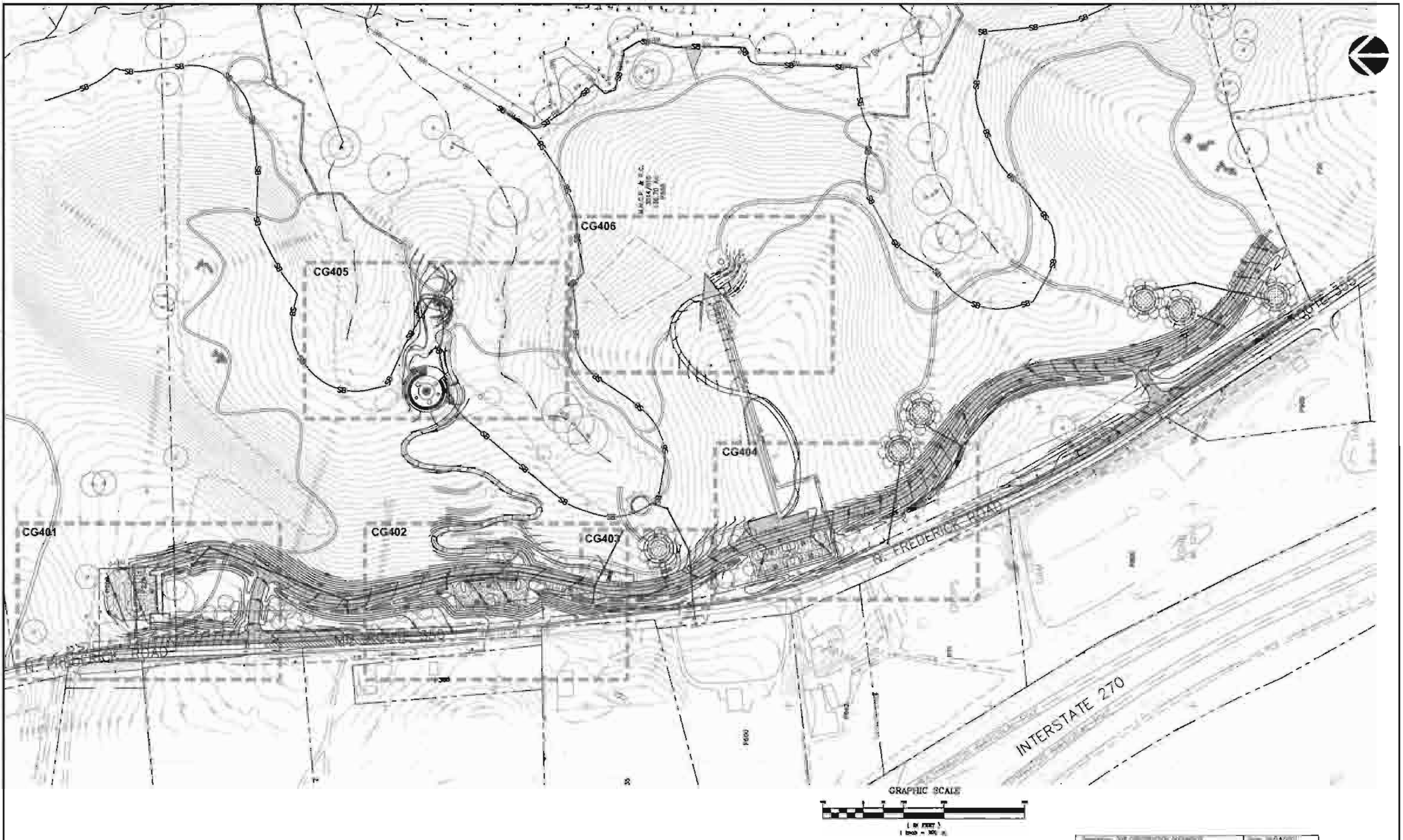
Site Profiles

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

SCALE: AS SHOWN

CG302



DESIGN:

REVIEW AND APPROVAL

REVIEW AND APPROVAL

Superintendent of Parks

Park Police

The Maryland-National Capital Park
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Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901

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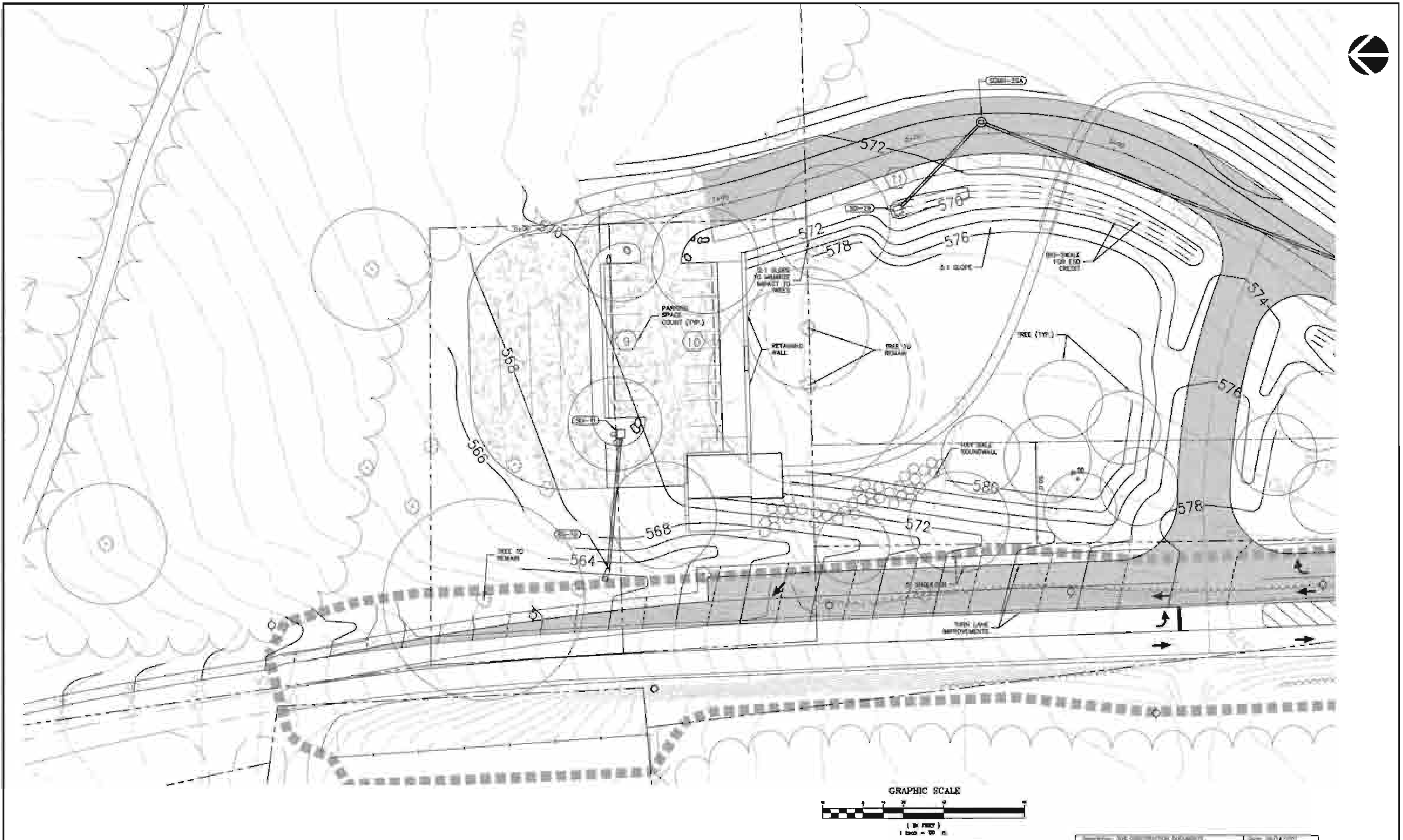
Enlarged Grading Plan Map

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CG400

PARK CODE: A26 PLAN SCANNED: FINAL SCANNED:



DESIGN		REVIEW AND APPROVAL	REVIEW AND APPROVAL
Landscape Architect Date	Drawn By	Park Development Date	Superintendent of Parks Date
Architect Date	Drawn By	Service Maintenance Date	Park Police Date
Engineer Date	Drawn By	Region Date	Date
Drawn By Date	Drawn By	Natural Resources Date	Date

The Maryland-National Capital Park and Planning Commission

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Silver Spring, Maryland 20901
(301) 495-2500

PLANS ISSUED FOR:

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No.	Date	Description

SEAL

Enlarged Grading Plan

Little Bennett Regional Park
Day Use Area

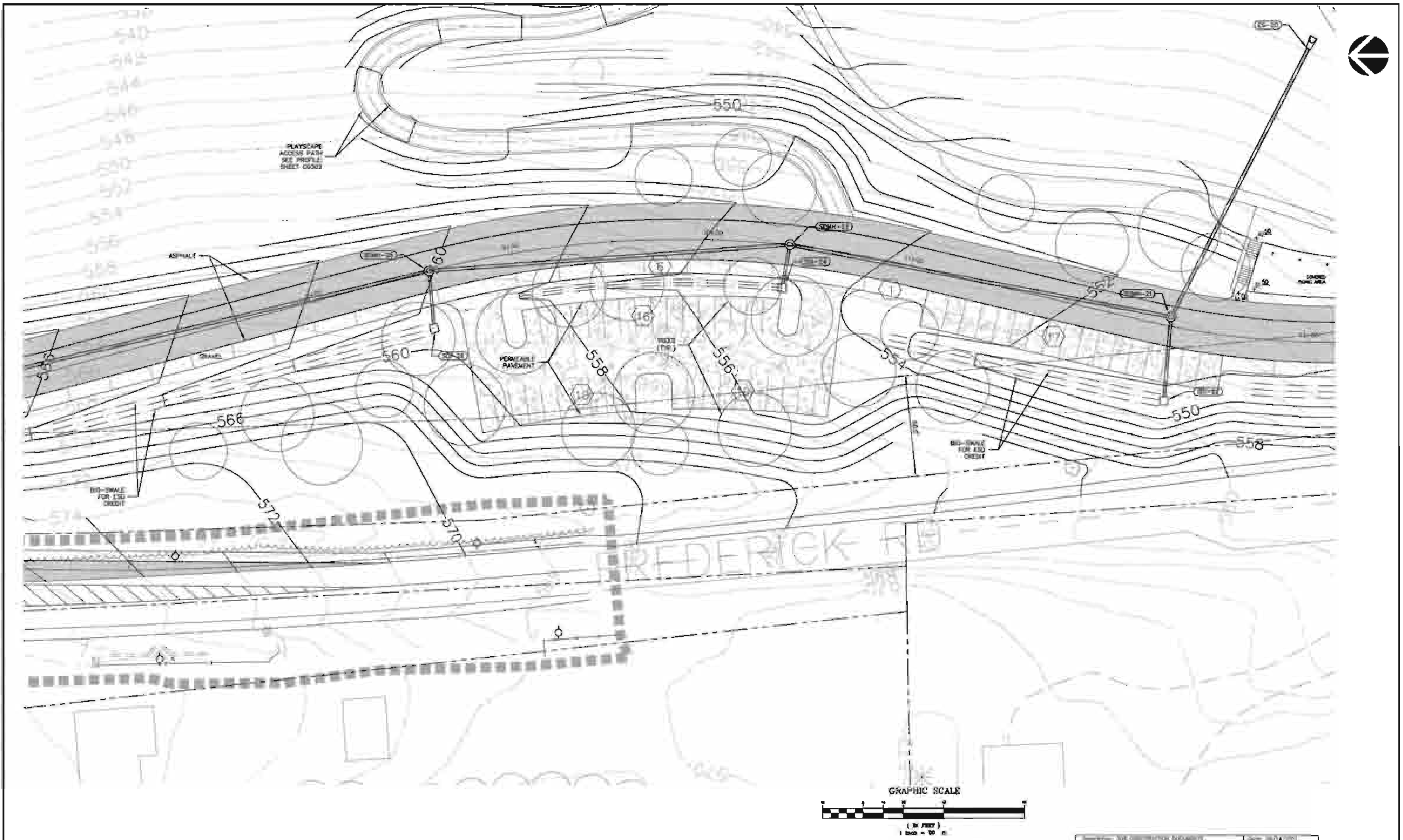
WSSC Grid Map

CG401

FINAL SCANNED:

PLAN SCANNED:

PARK CODE: A26



DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

The Maryland-National Capital Park
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(301) 495-2500

PLANS ISSUED FOR:

REVISIONS

SEAL

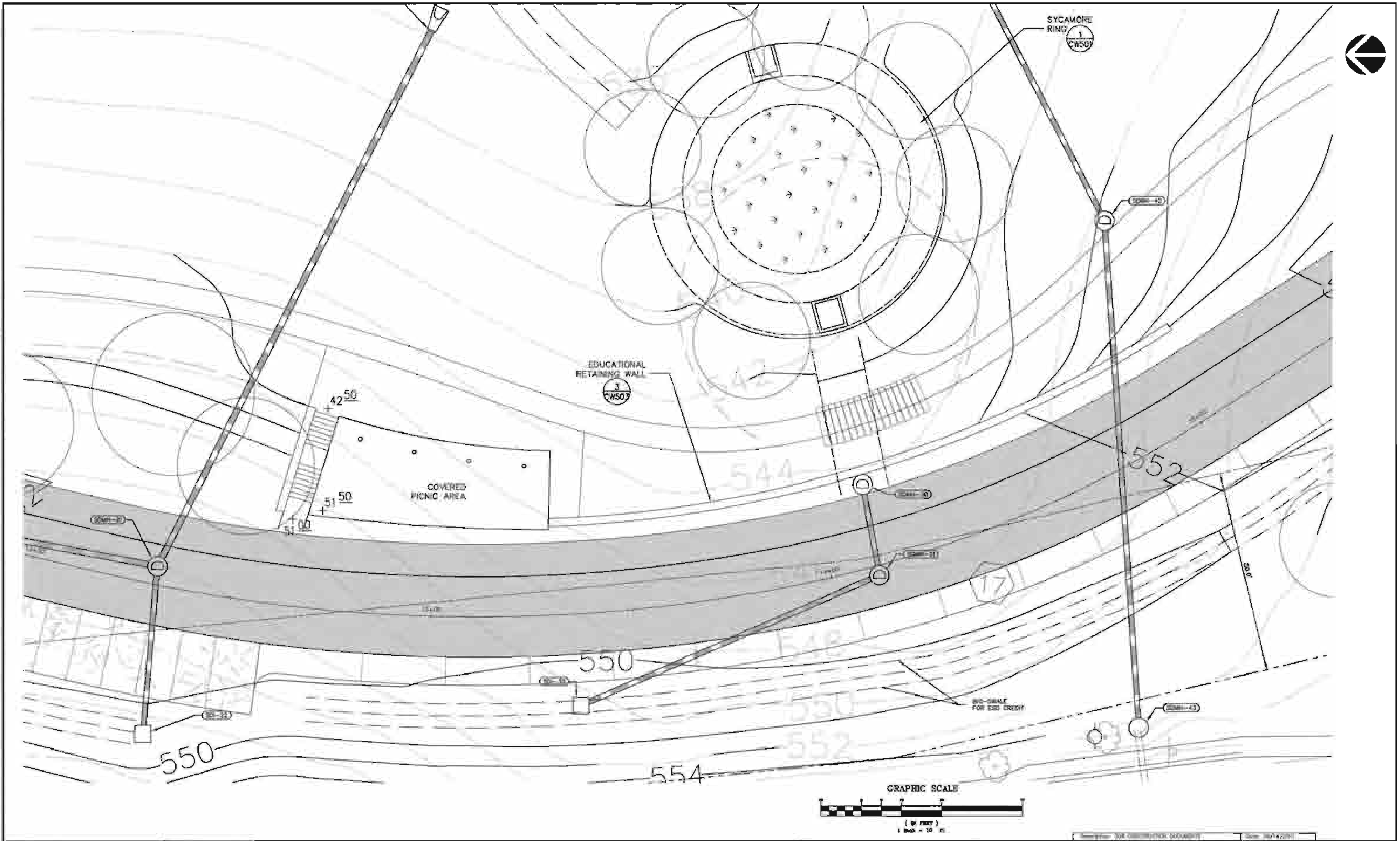
Enlarged Grading Plan

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CG402

SHEET



DESIGN | REVIEW AND APPROVAL | REVIEW AND APPROVAL

The Maryland-National Capital Park and Planning Commission

Montgomery County Department of Park and Planning
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Silver Spring, Maryland 20901

PLANS ISSUED FOR:

REVISIONS

SEAL

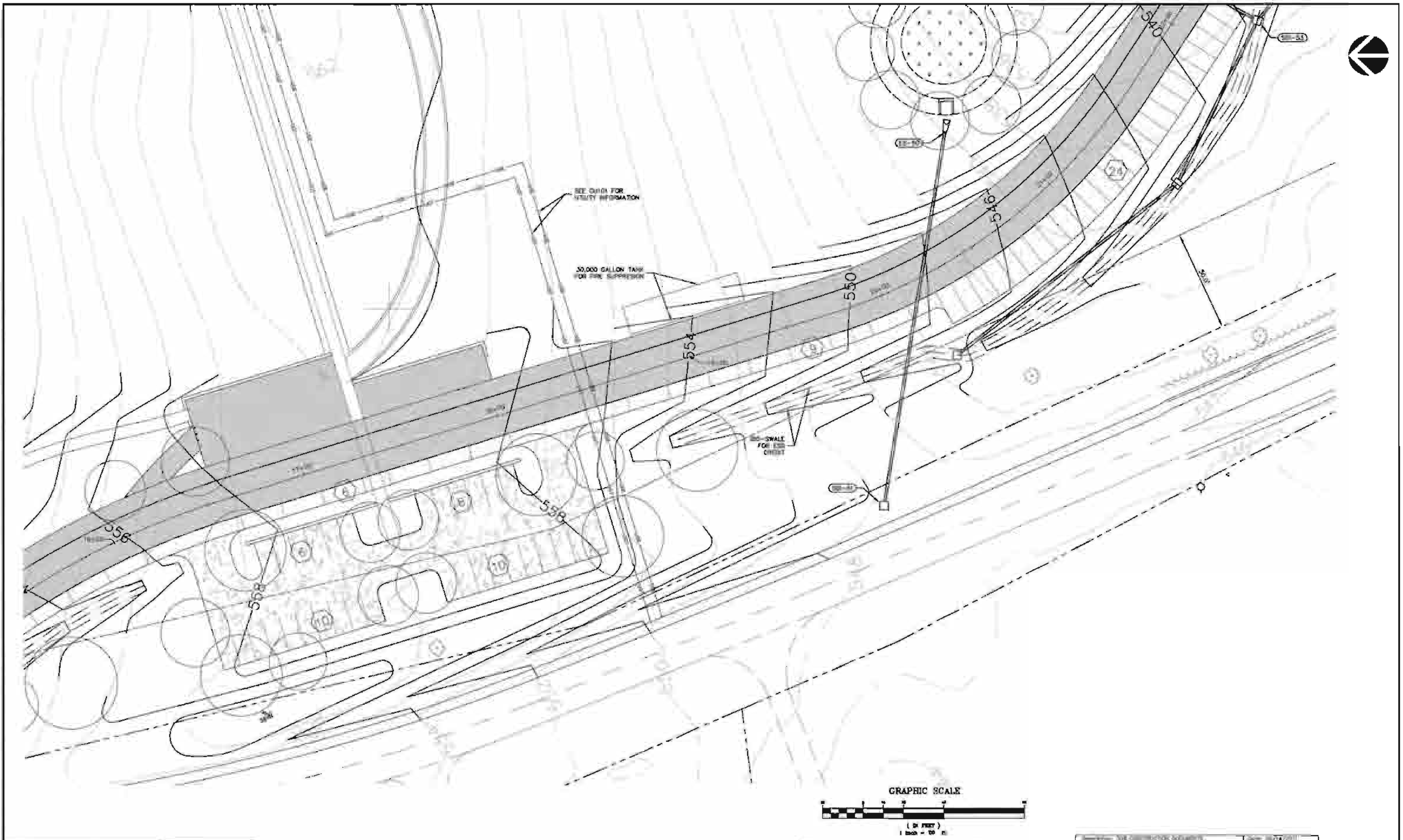
Enlarged Grading Plan

Little Bennett Regional Park

Day Use Area

WSSC Grid Map

CG403



The Maryland-National Capital Park and Planning Commission

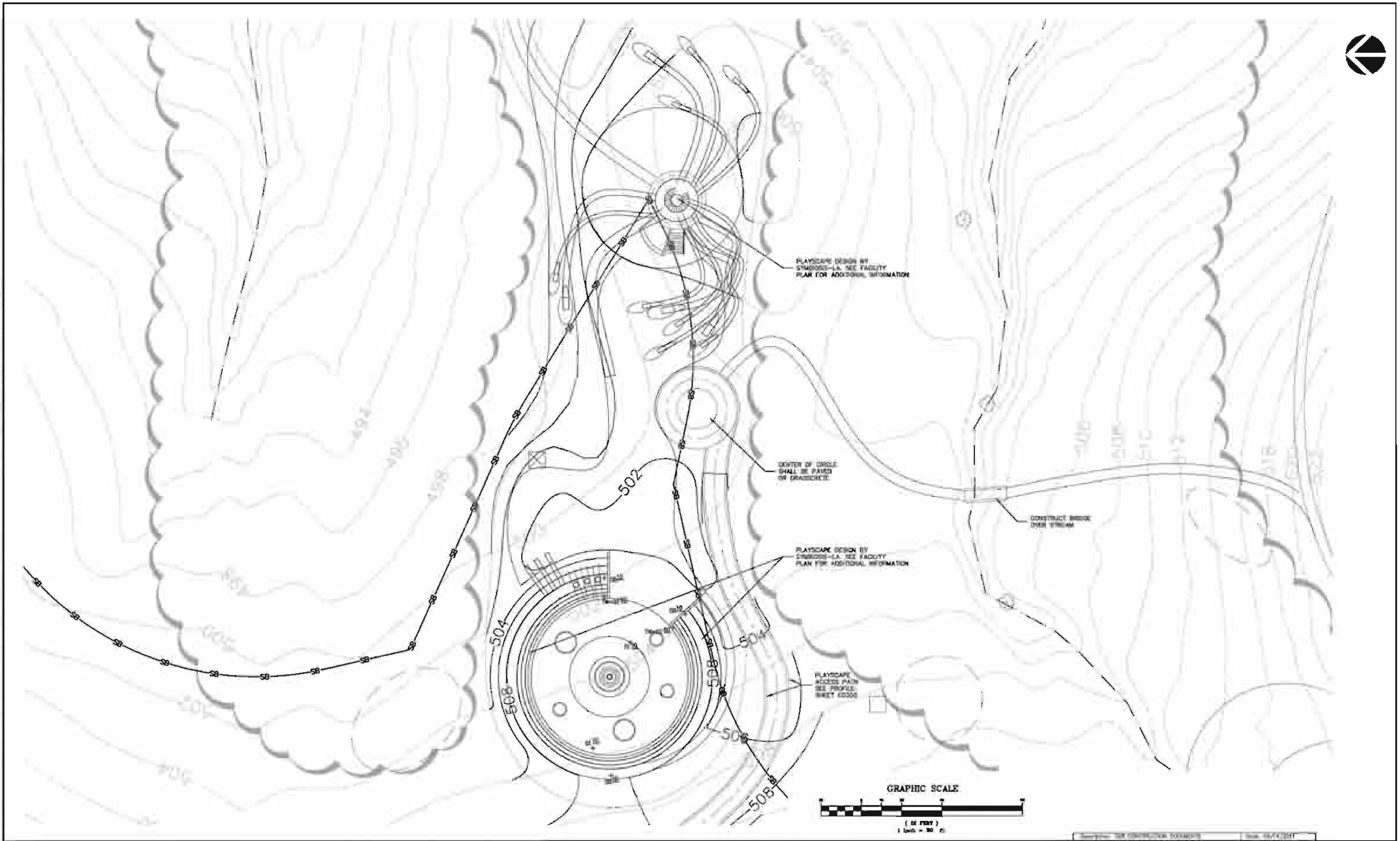
Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901

Enlarged Grading Plan

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CG404



DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

Checked By

The Maryland-National Capital Park
and Planning Commission

Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:

REVISIONS:

No.	Date	Description

SEAL

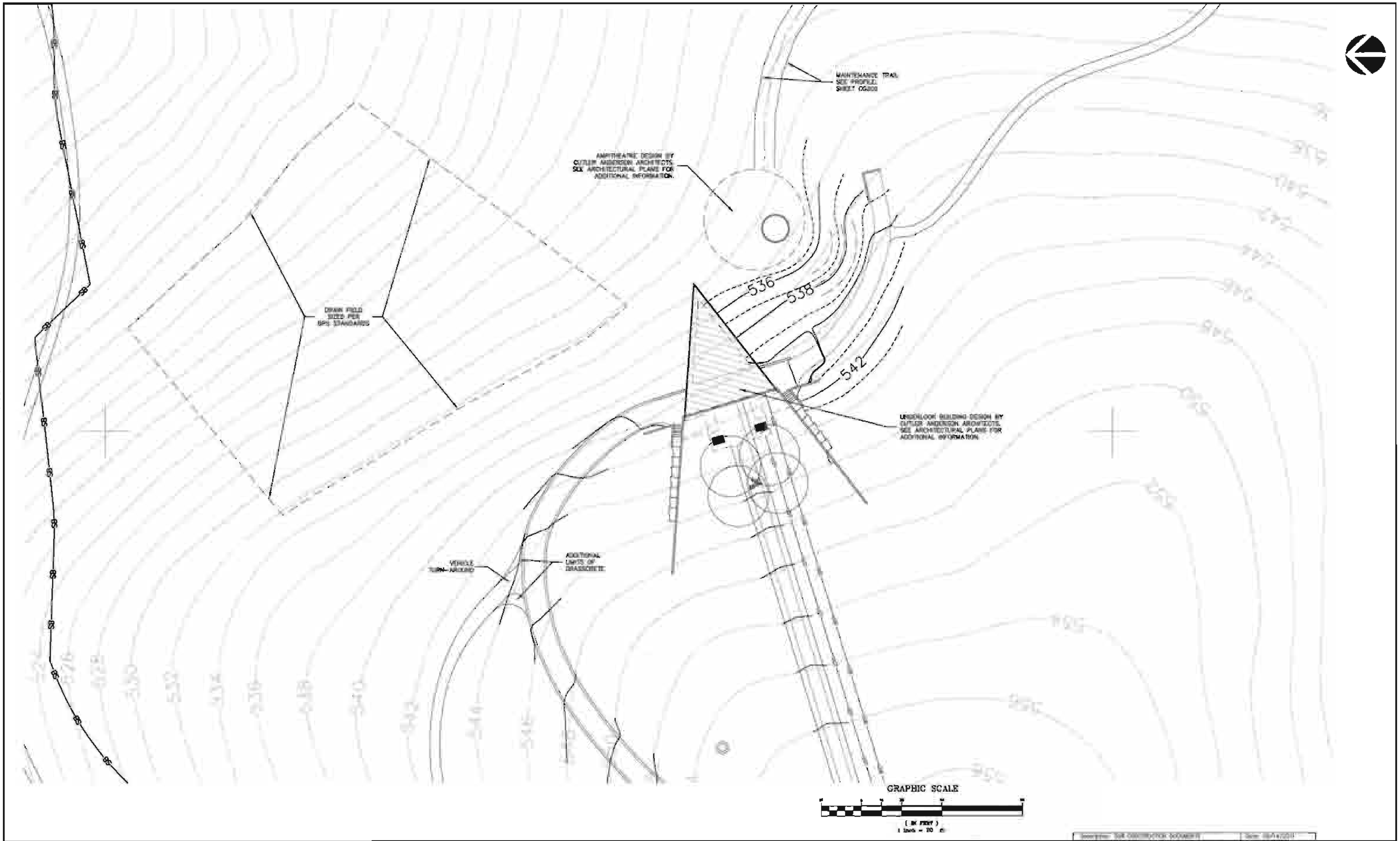
Enlarged Grading Plan

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CG405

SHEET 15 of 47



DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

Park Development

Central Maintenance

Region

Superintendent of Parks

Park Police

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2595

PLANS ISSUED FOR:

REVISIONS

SEAL

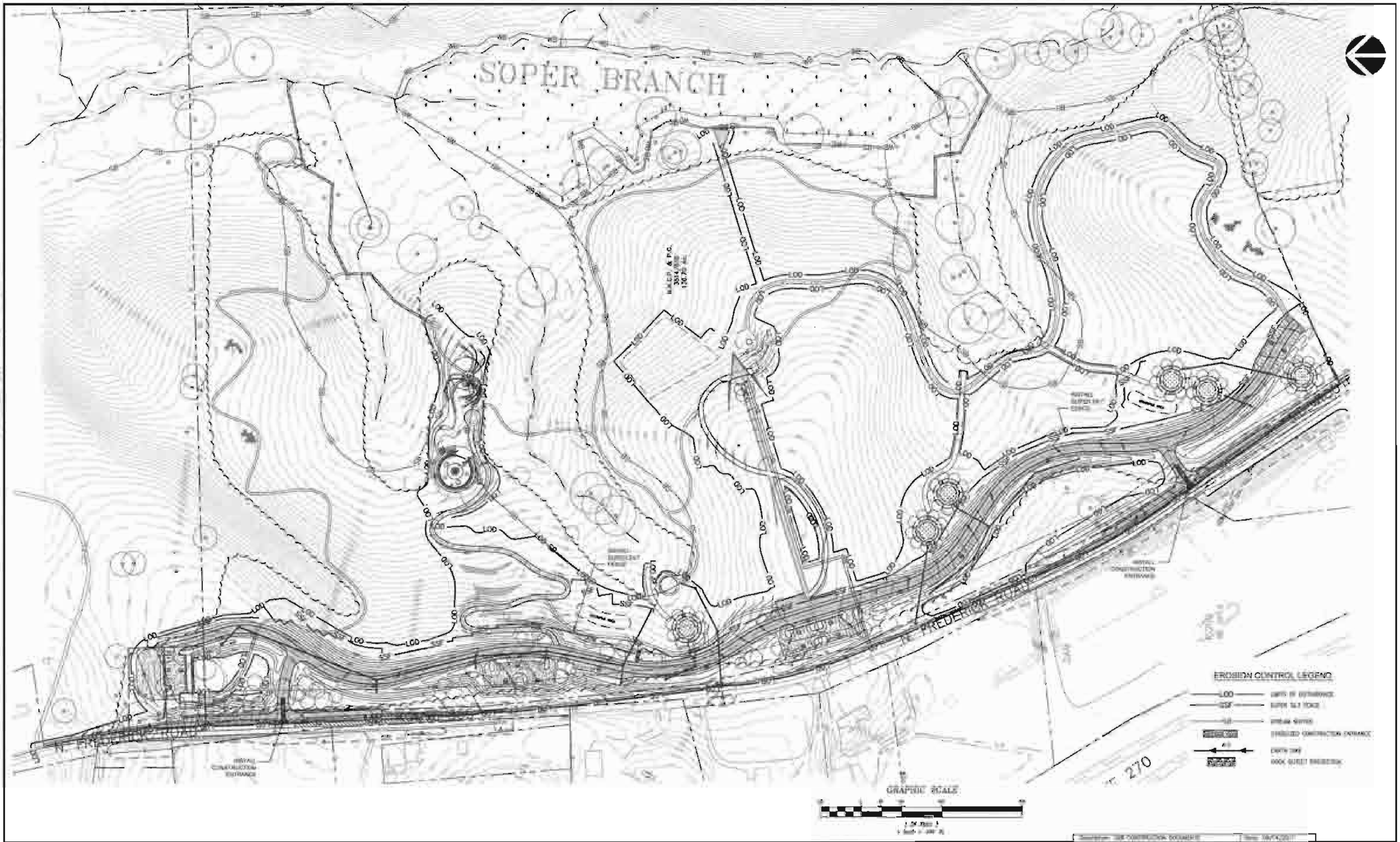
Enlarged Grading Plan

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CG406

SHEET



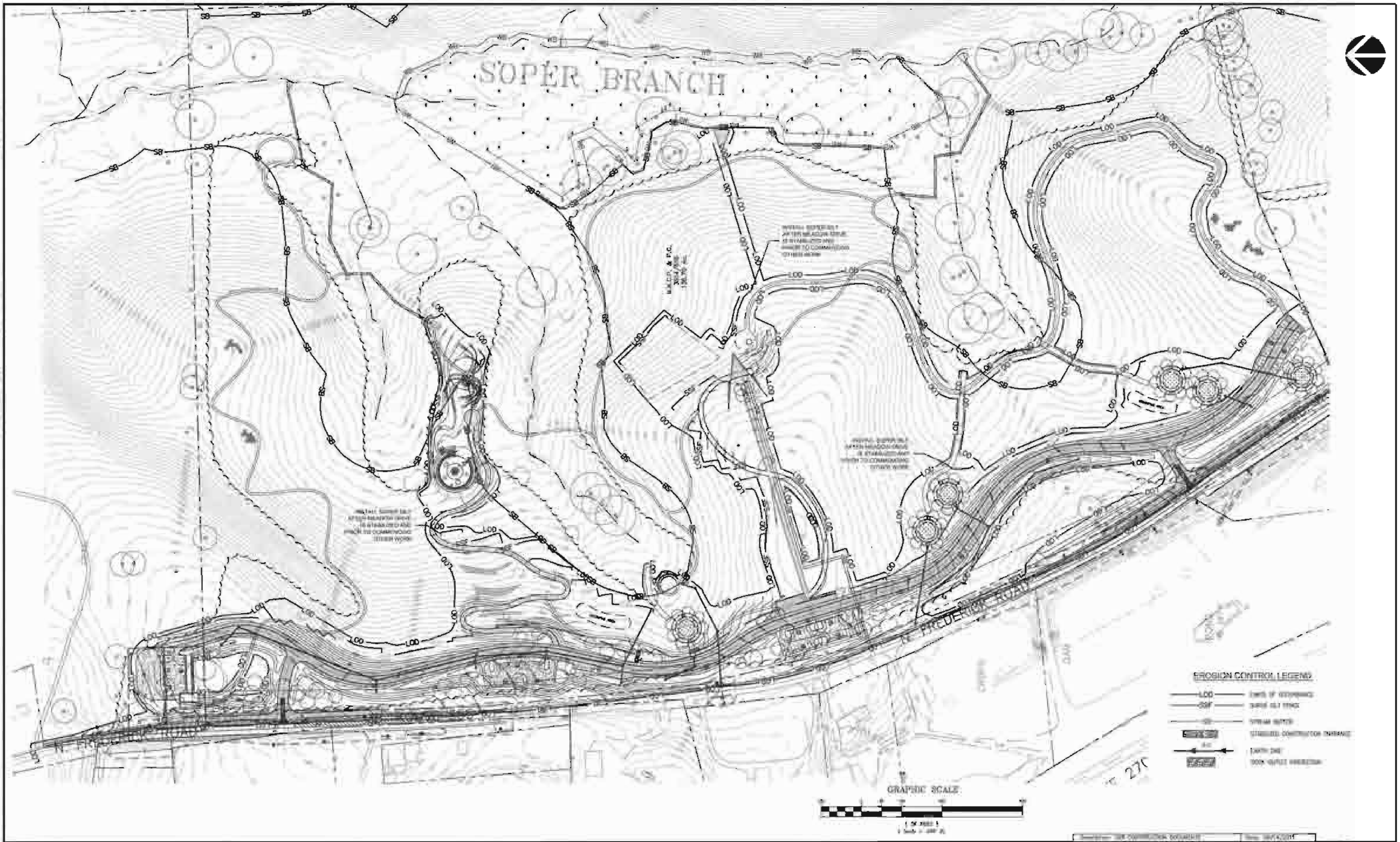
The Maryland-National Capital Park and Planning Commission

Concept Erosion Control Plan - Phase I

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CE101



REVIEW AND APPROVAL

Park Department

Park Police

PLANS ISSUED FOR:

REVISIONS

The Maryland-National Capital Park
and Planning Commission

Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901

Concept Erosion Control Plan- Phase II

Little Bennett Regional Park

Day Use Area

WSSC Grid Map

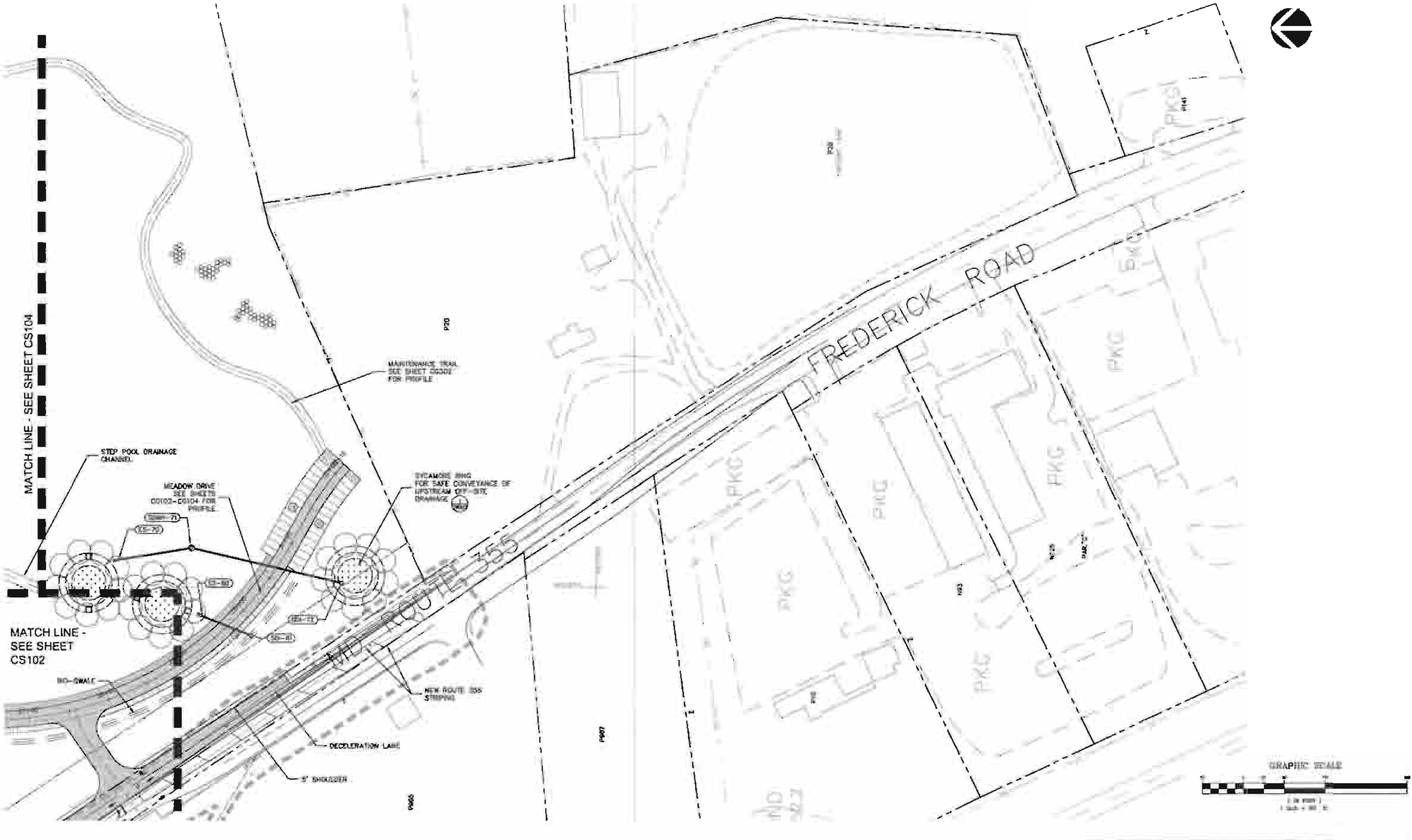
CE102

The Maryland-National Capital Park
and Planning Commission

Overall Site Plan
Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CS100



DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

The Maryland-National Capital Park
and Planning Commission

PLANS ISSUED FOR:

REVISIONS

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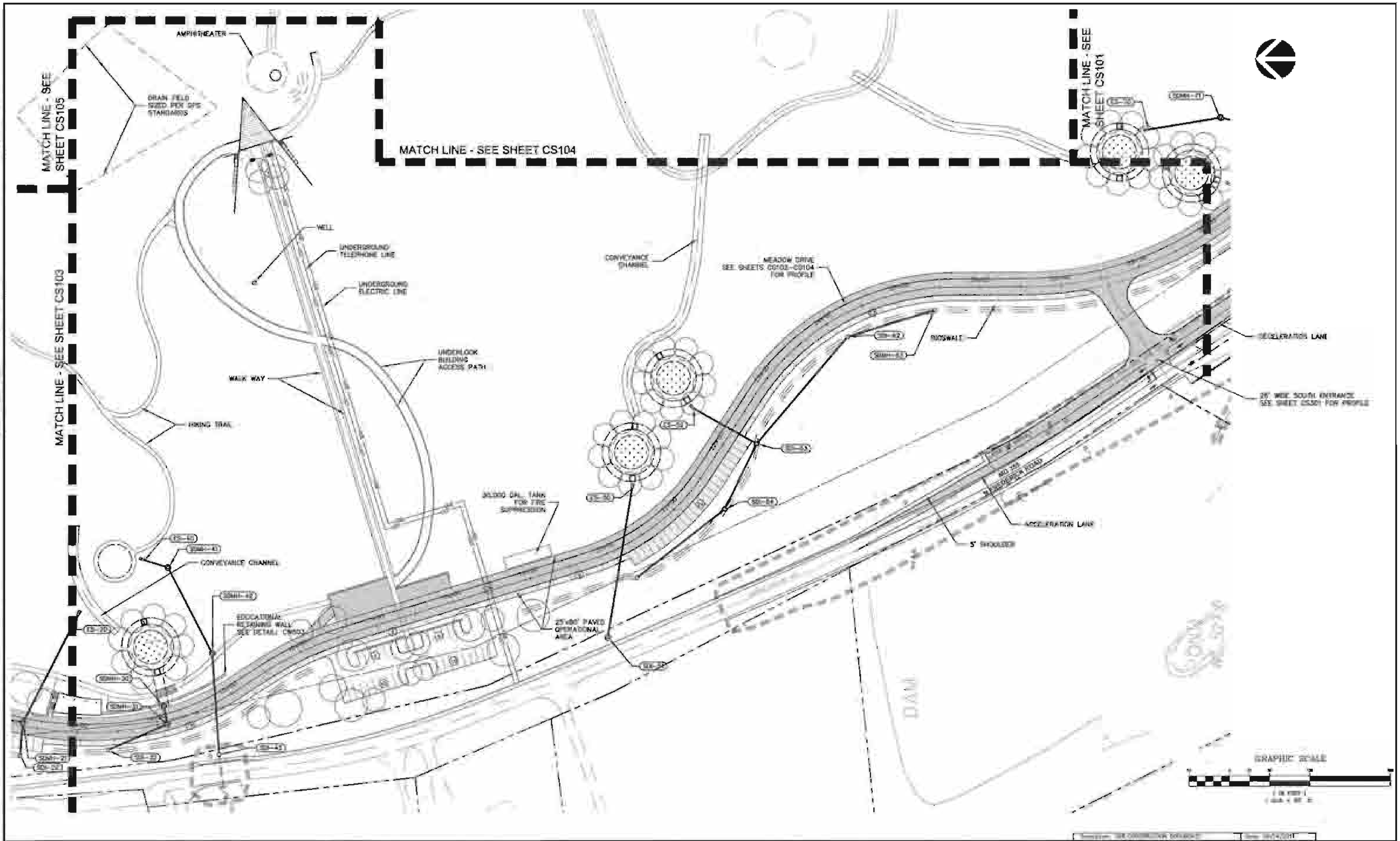
Site Plan

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CS101



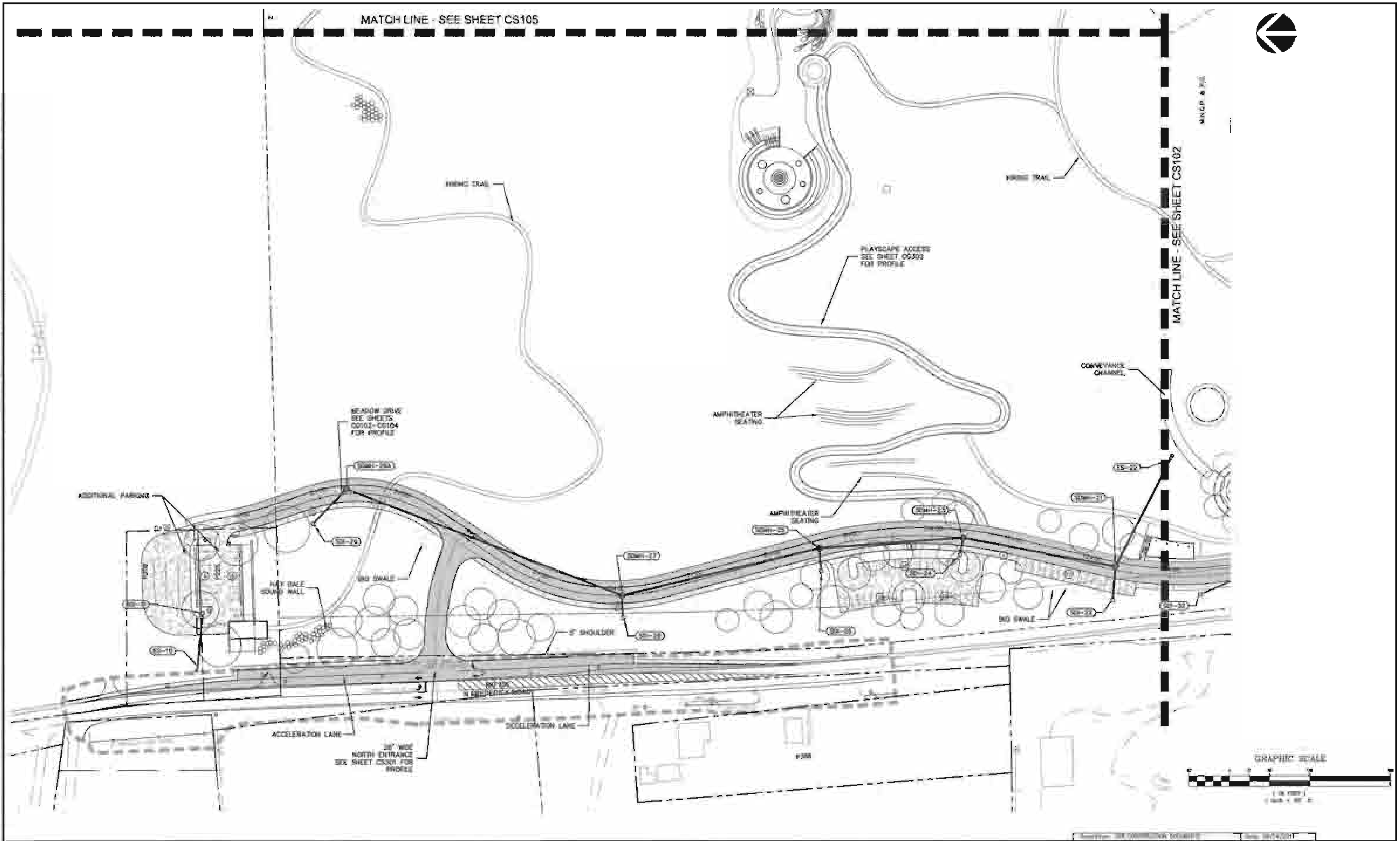
The Maryland-National Capital Park and Planning Commission

Site Plan

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CS102



The Maryland-National Capital Park and Planning Commission

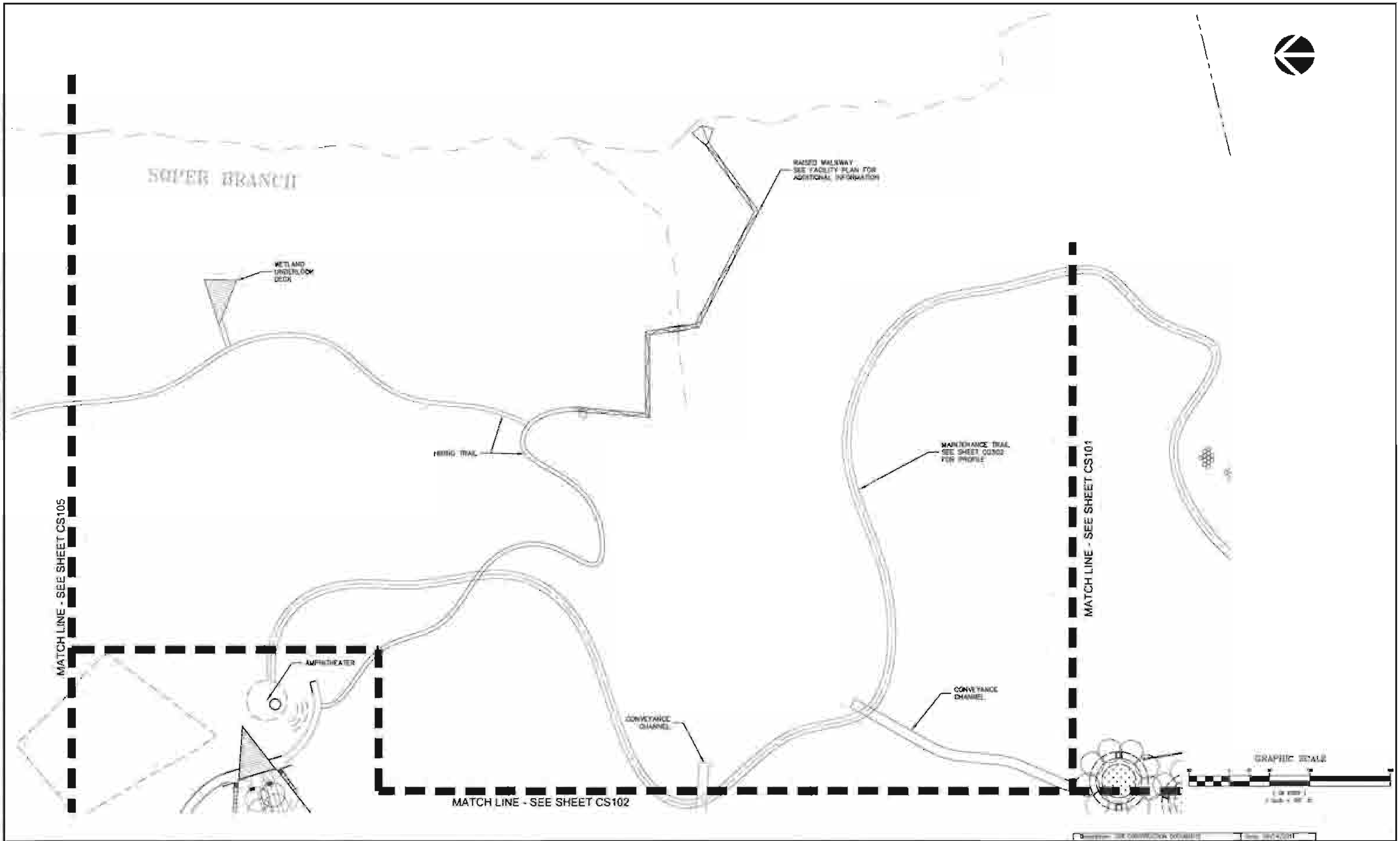
Site Plan

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CS103

SHEET 25 of 47



The Maryland-National Capital Park and Planning Commission

Silver Spring, Maryland 20901

PLANS ISSUED FOR:

REVISIONS

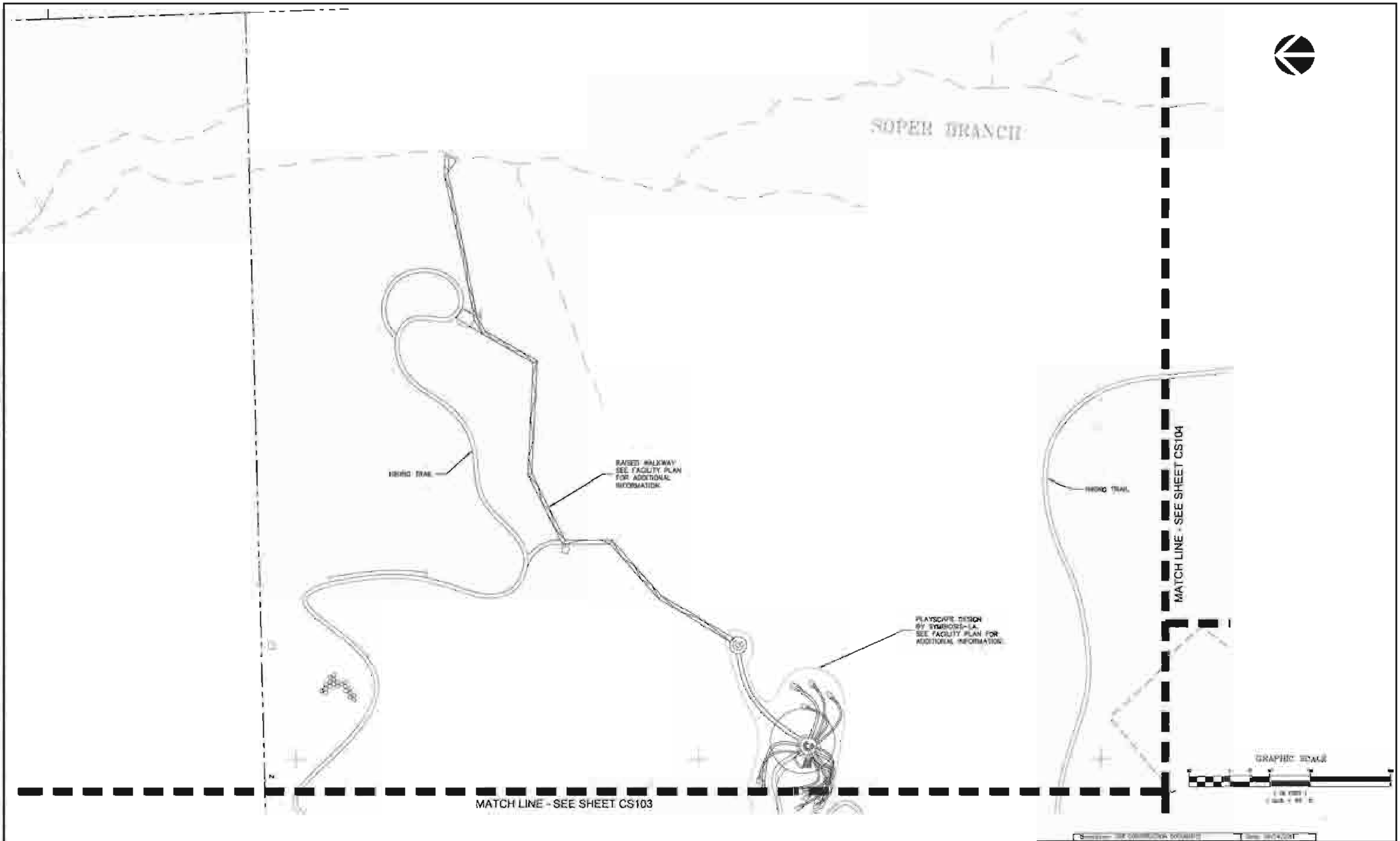
SEAL

Site Plan

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CS104



DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

The Maryland-National Capital Park
and Planning Commission

PLANS ISSUED FOR:

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Site Plan

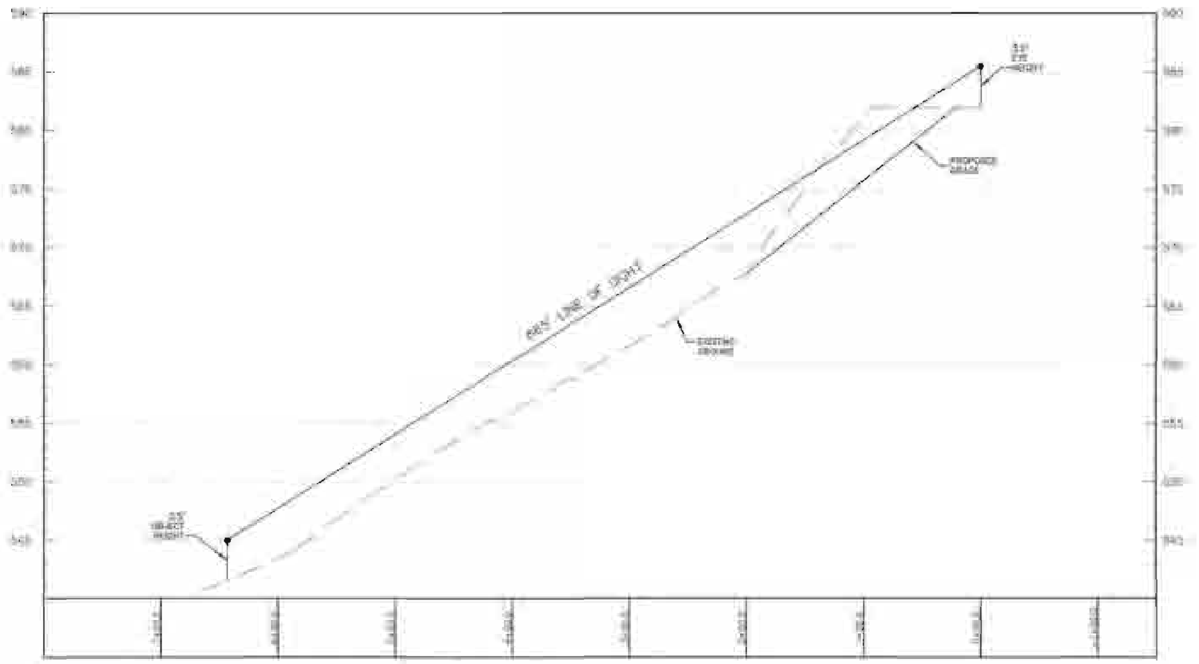
Little Bennett Regional Park

Day Use Area

WSSC Grid Map

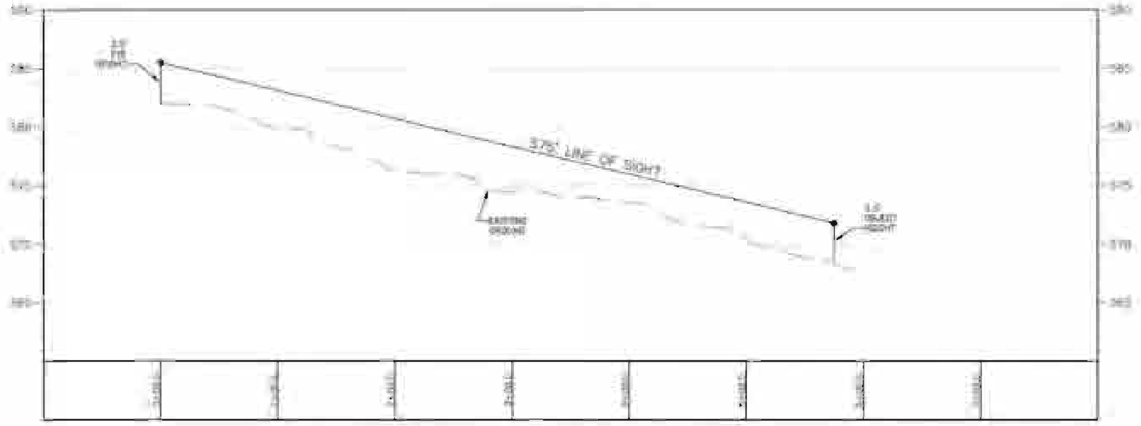
CS105

SHEET [illegible] OF 47



LB - North Entrance Sight Distance LEFT TURN PROFILE

SCALE: HORZ. 1" = 20'
VERT. 1" = 5'



LB - North Entrance Sight Distance RIGHT TURN PROFILE

SCALE: HORZ. 1" = 10'
VERT. 1" = 5'

SIGHT DISTANCE EXHIBITS COORDINATED WITH SHA; NOVEMBER, 2010.

The Maryland-National Capital Park
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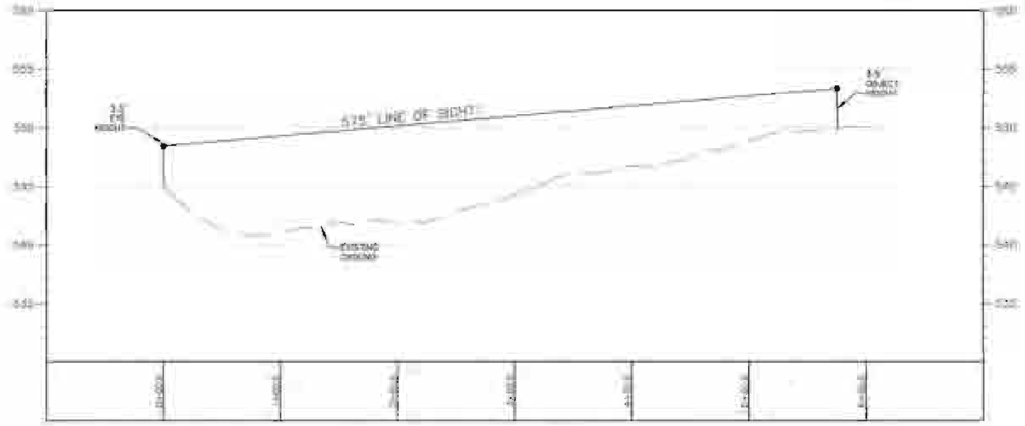
Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

NORTH ENTRANCE
SITE DISTANCE PROFILES
Little Bennett Regional Park
Day Use Area

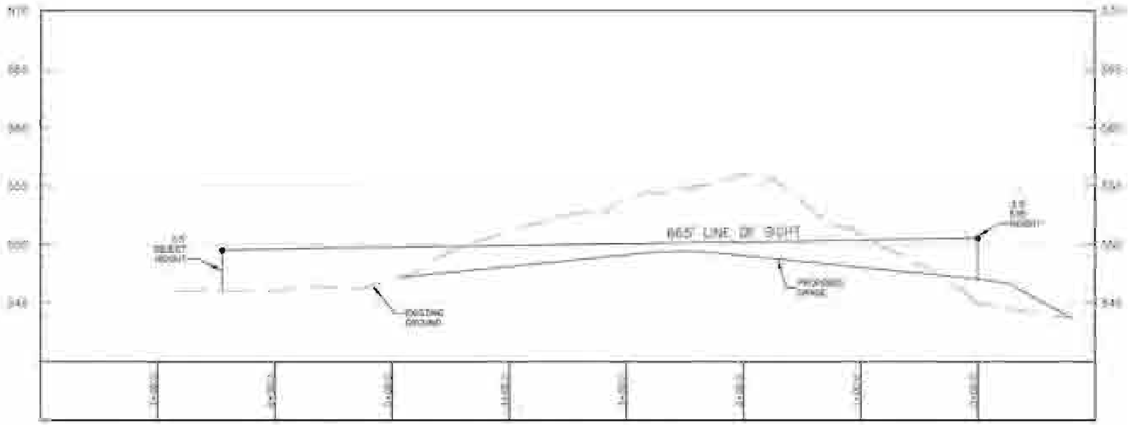
WSSC Grid Map

CS201



LB - South Entrance Sight Distance RIGHT TURN PROFILE

SCALE: HORIZ. 1" = 60'
VERT. 1" = 5'



LB - South Entrance Sight Distance LEFT TURN PROFILE

SCALE: HORIZ. 1" = 30'
VERT. 1" = 5'

SIGHT DISTANCE EXHIBITS COORDINATED WITH SHA; NOVEMBER, 2010.

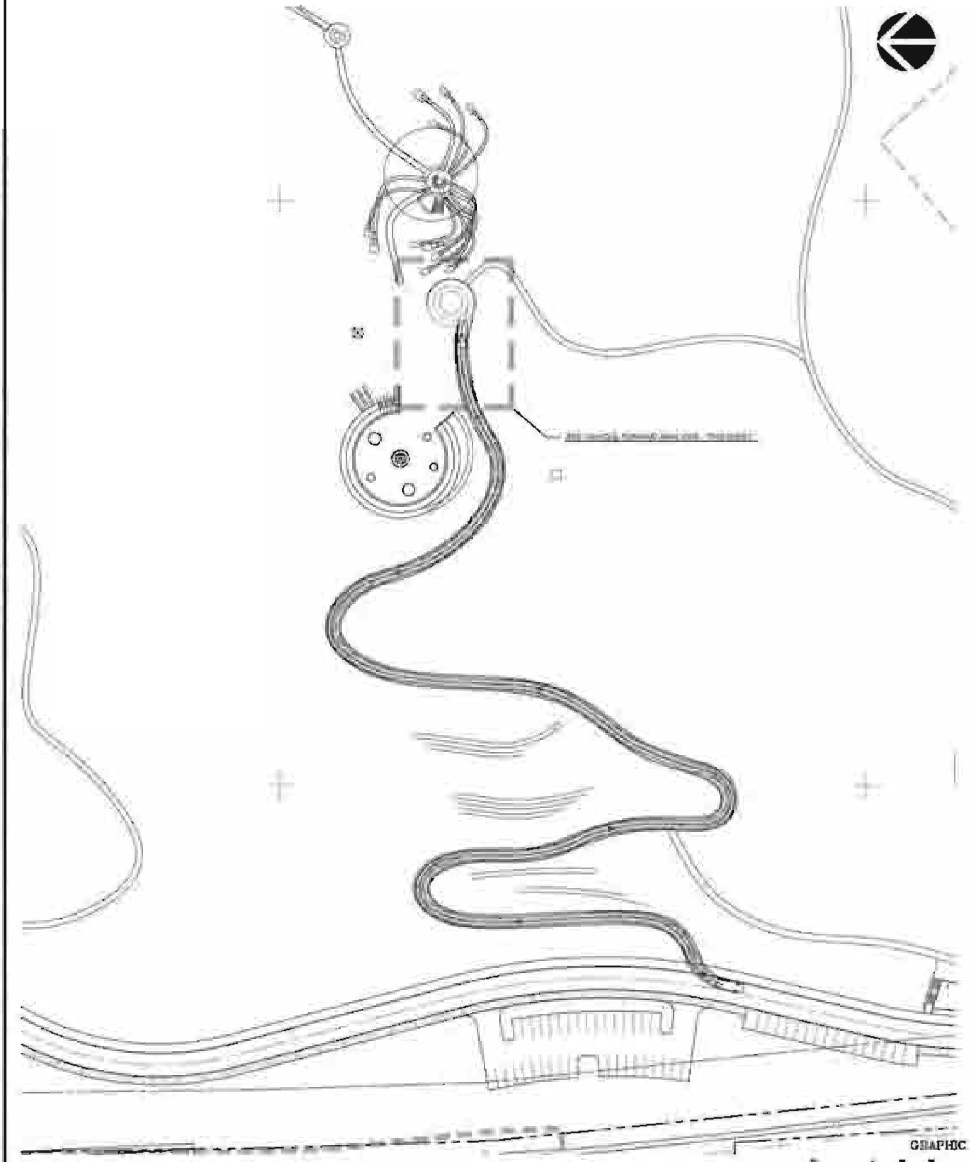
GRAPHIC SCALE

The Maryland-National Capital Park and Planning Commission

SOUTH ENTRANCE
SITE DISTANCE PROFILES
Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CS202

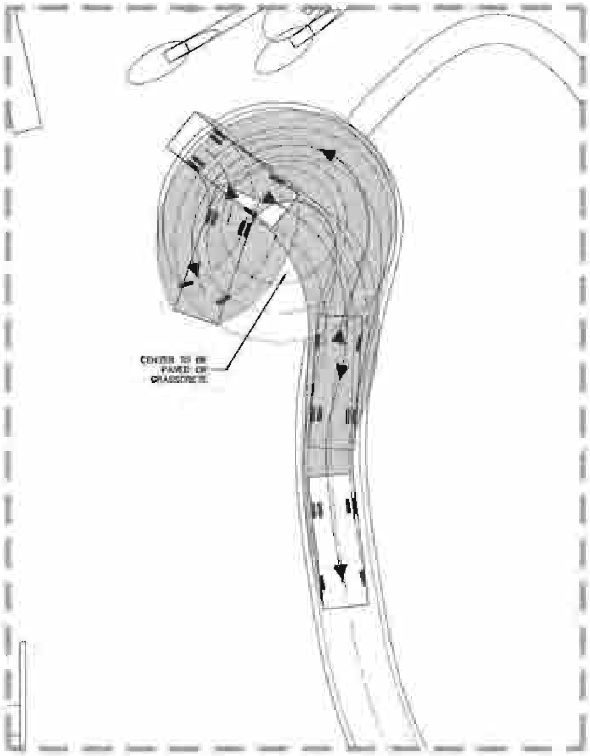


ACCESS VALIDATION OVERVIEW

1"=50'

GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.



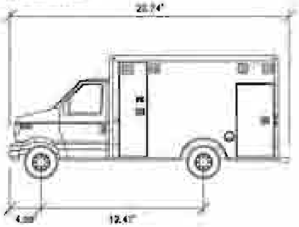
VEHICLE TURNING ANALYSIS

1"=10'

BASIS OF ANALYSIS:

1. VEHICULAR TURNING ANALYSIS BASED ON B-AUTO OF THE CROW 2004 (NL) AUTOTURN LIBRARY (TRANSOFT SOLUTIONS INC.)

VEHICLE DETAILS:



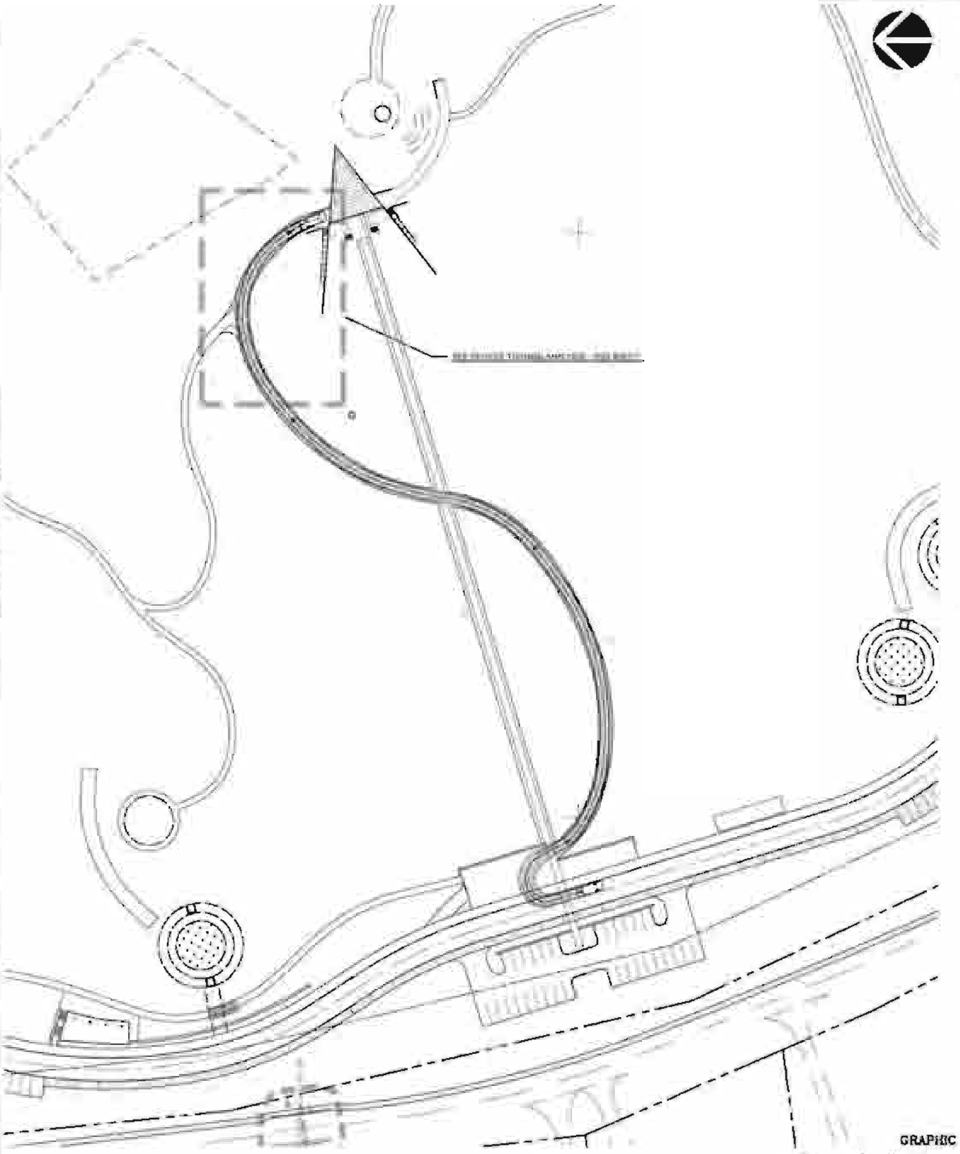
TYPE : AMBULANCE TRUCK
CLASS : EMERGENCY VEHICLE
WIDTH : 7.71'
TRACK : 7.71'
LOCK TO LOCK TIME : 6.0 SEC.
STEERING ANGLE : 47.8 DEG
MIN. RADIUS : 15.53'

The Maryland-National Capital Park
and Planning Commission

EMS ACCESS VALIDATION - PLAYSCAPE
Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CS401

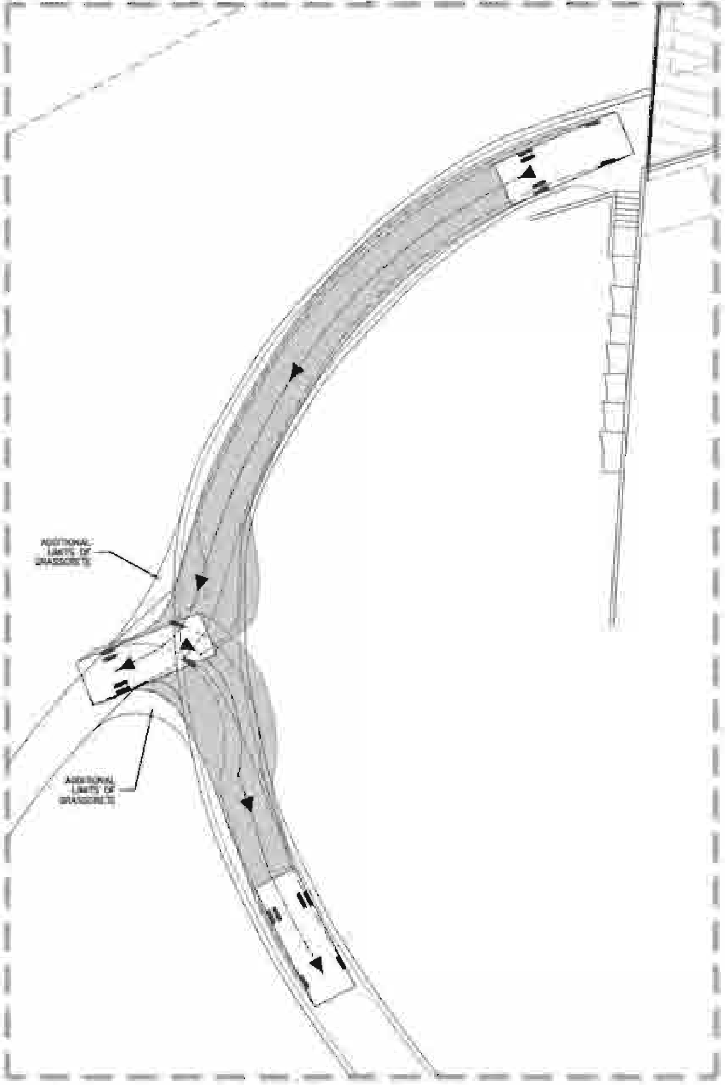


ACCESS VALIDATION OVERVIEW

1"=60'

GRAPHIC SCALE

(IN FEET)
1 inch = 60 ft.



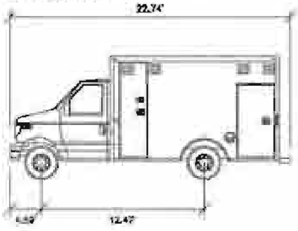
VEHICLE TURNING ANALYSIS

1"=10'

BASIS OF ANALYSIS:

1. VEHICULAR TURNING ANALYSIS BASED ON D-AUTO OF THE CROW 2004 (NL) AUTOTURN LIBRARY (TRANSOFT SOLUTIONS INC.).

VEHICLE DETAILS:



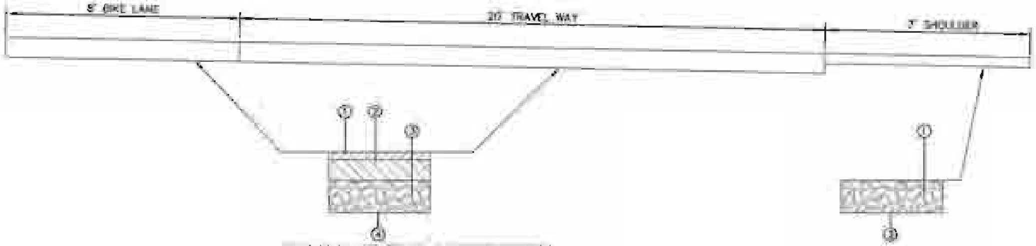
TYPE : AMBULANCE TRUCK
CLASS : EMERGENCY VEHICLE
WIDTH : 7.71'
TRACK : 7.71'
LOCK TO LOCK TIME : 6.0 SEC.
STEERING ANGLE : 47.8 DEG.
MIN. RADIUS : 16.83'

The Maryland-National Capital Park
and Planning Commission

EMS ACCESS VALIDATION -
UNDERLOOK BUILDING
Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CS402



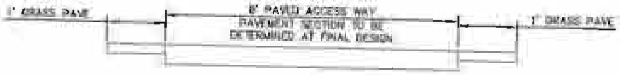
BIKE LANE AND TRAVEL PAVEMENT SECTION

① 1.5" HOT MIX ASPHALT (SUPERPAVE 12.5 MM)
② 3.0" HOT MIX ASPHALT (SUPERPAVE 19.0 MM)
③ 6" GRADED AGGREGATE BASE (CR-6)
④ 9" STABILIZED SUBGRADE SOILS

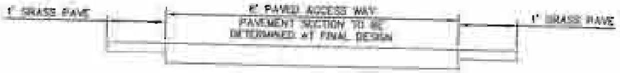
SHOULDER SECTION

① 4" GRADED AGGREGATE
② 9" STABILIZED SUBGRADE SOILS

1
CS501
MEADOW DRIVE TYPICAL SECTION
SCALE: NTS



2
CS501
PLAYSCAPE ACCESS TYPICAL SECTION
SCALE: NTS



3
CS501
UNDERLOOK ACCESS TYPICAL SECTION
SCALE: NTS

DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:

REVISIONS

No.	Date	Description

SEAL

Site Details
Little Bennett Regional Park
Day Use Area

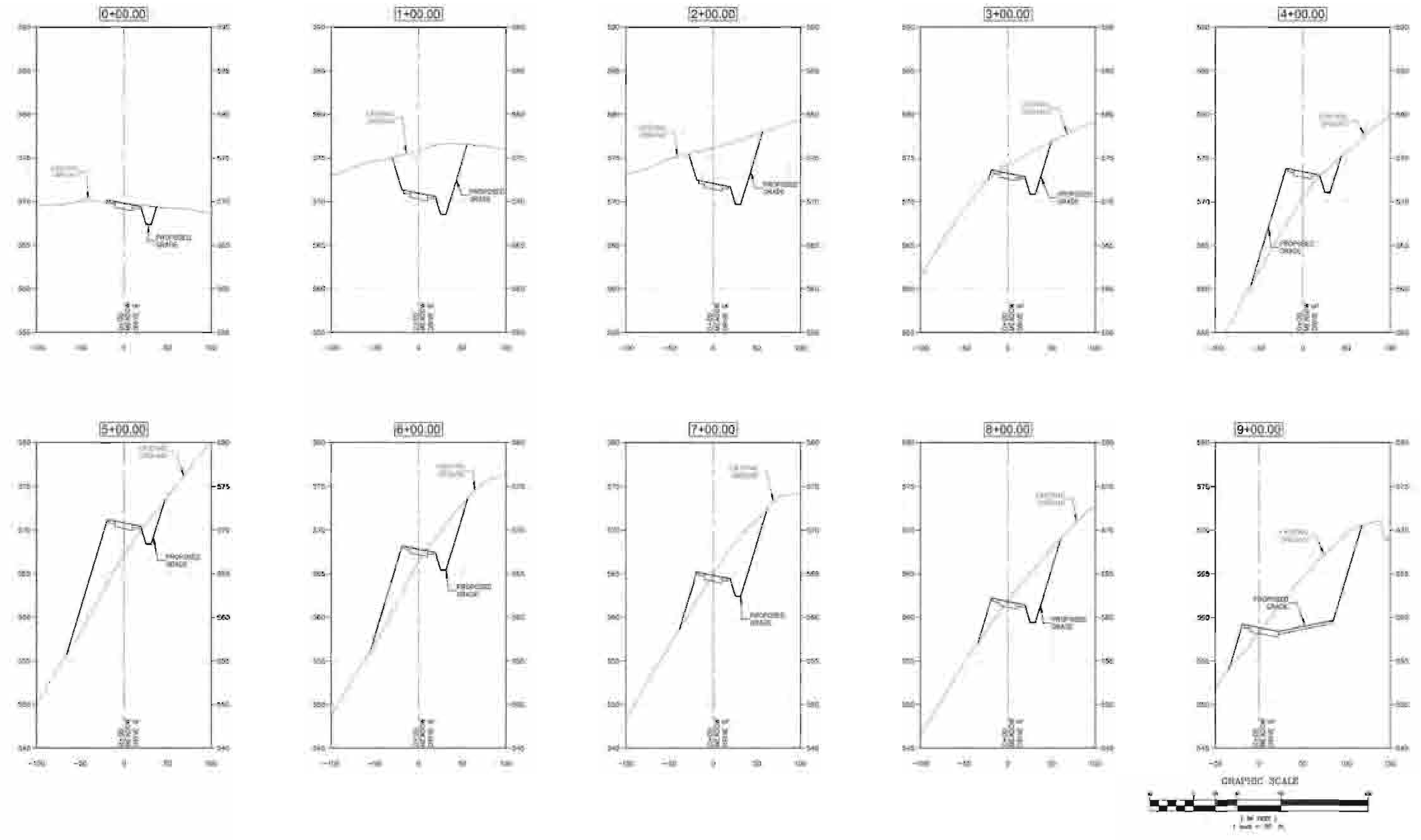
WSSC Grid Map

CS501

FINAL SCANNED

PLAN SCANNED

PARK CODE: A28



REVIEW AND APPROVAL

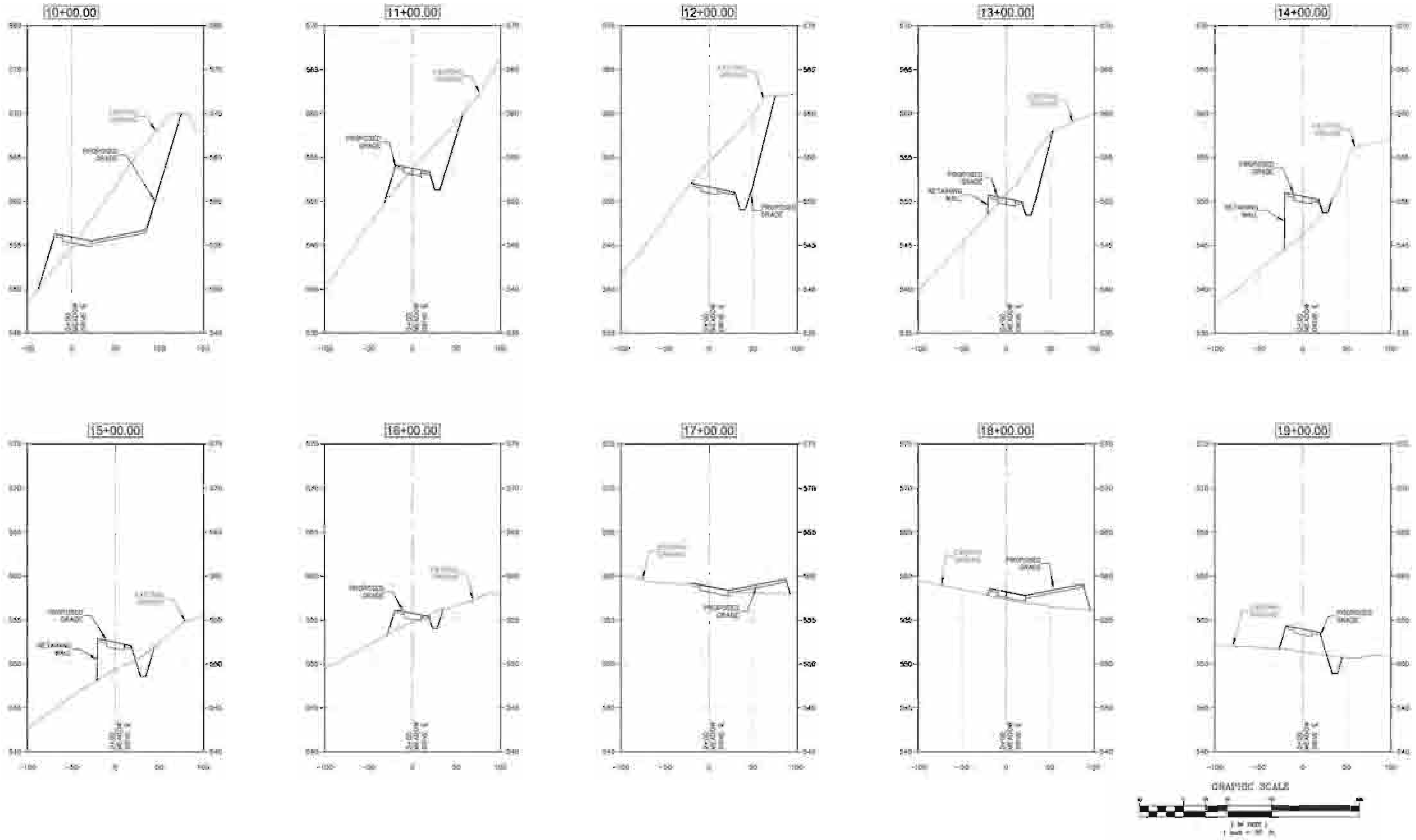
The Maryland-National Capital Park and Planning Commission

Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901

Meadow Drive Cross Sections
Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CS901



PARK CODE: A28
PLAN SCANNED:
FINAL SCANNED:

DESIGN		REVIEW AND APPROVAL		REVIEW AND APPROVAL	
Landscape Architect Date	Checked By	Park Development	Date	Superintendent of Parks	Date
Architect Date	Checked By		Date	Park Police	Date
Engineer Date	Checked By	Region	Date		Date
Drawn By Date	Checked By		Date		Date

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
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No.	Date	Description

SEAL

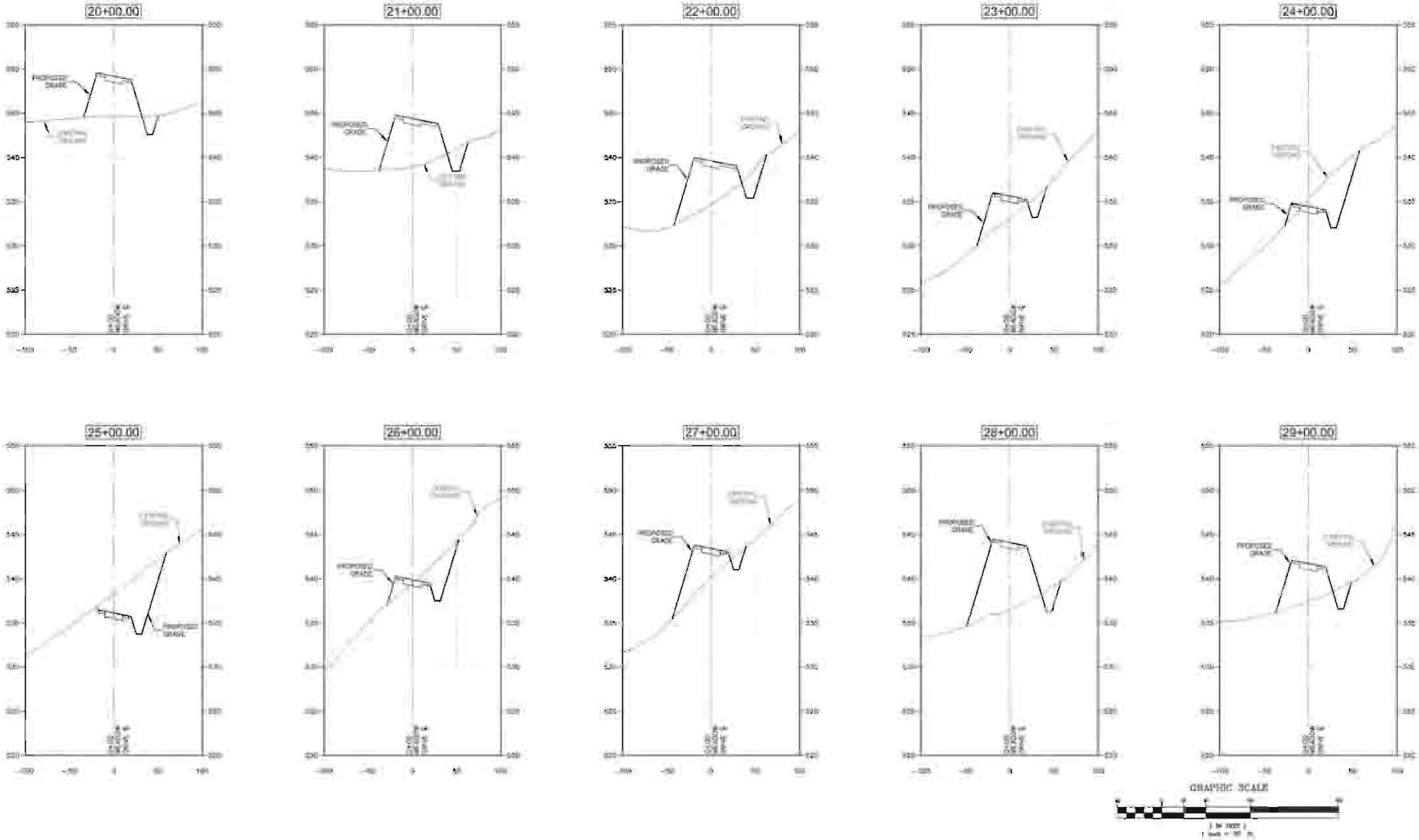
Meadow Drive Cross Sections

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CS902

SHEET 34



DESIGN

REVIEW AND APPROVAL

The Maryland-National Capital Park and Planning Commission

Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:

REVISIONS

SEAL

Meadow Drive Cross Sections

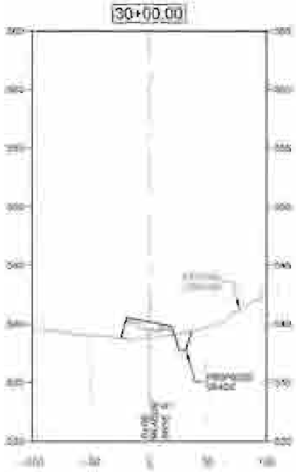
Little Bennett Regional Park

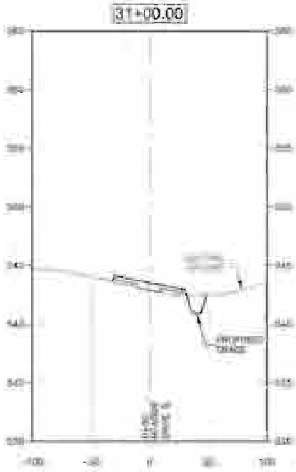
Day Use Area

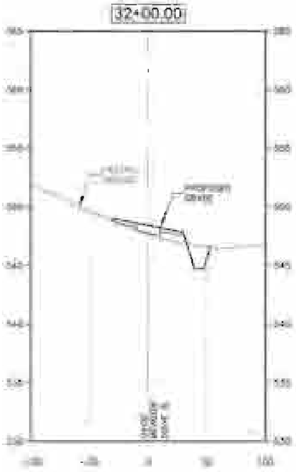
WSSC Grid Map

CS903

SHEET [illegible]







GRAPHIC SCALE

(IN FEET)
1 inch = [illegible] ft.

PARK CODE 420

PLAN SCANNED

FINAL SCANNED

DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
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PLANS ISSUED FOR:

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Rev. No.	Date	Description

Meadow Drive Cross Sections

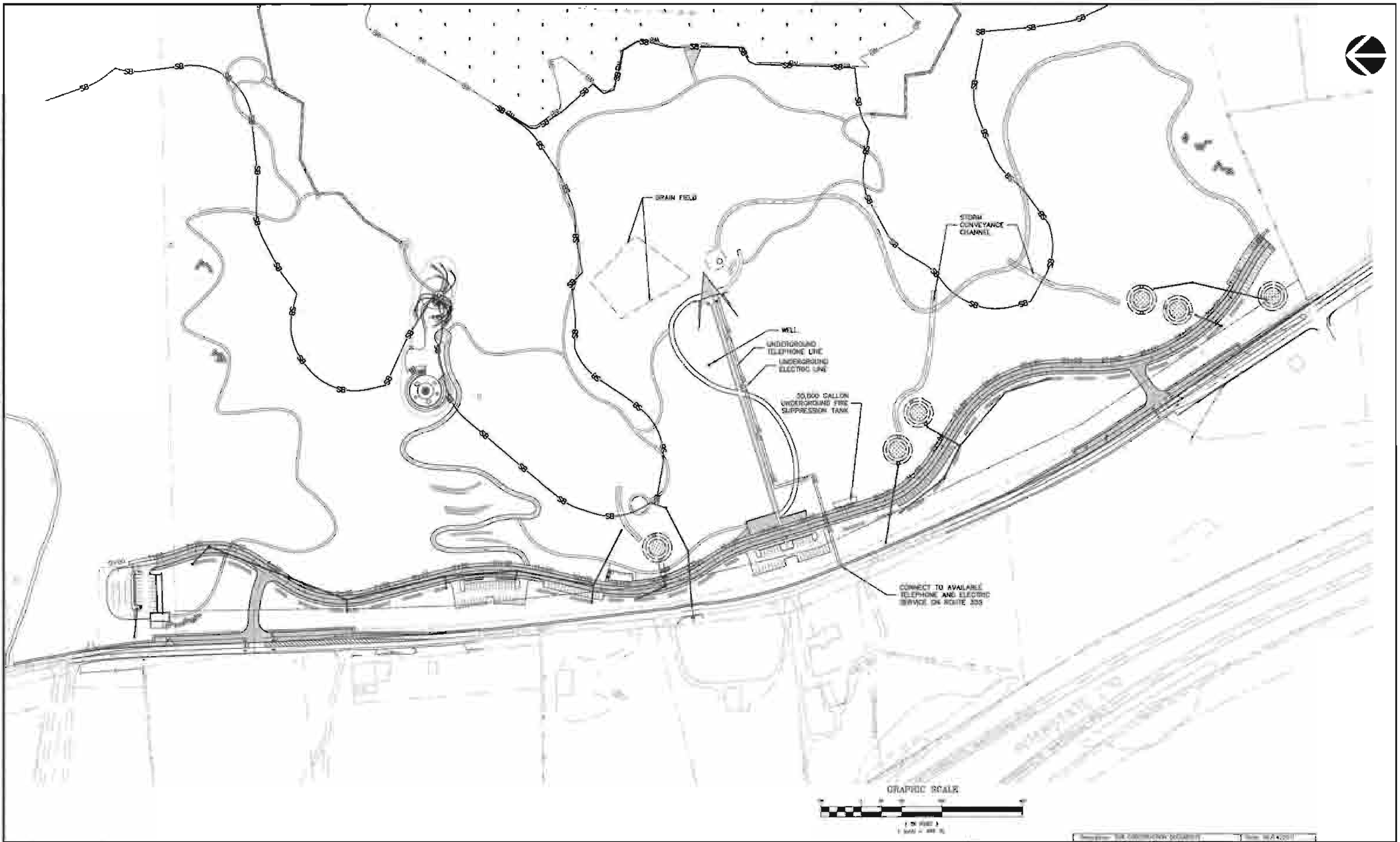
Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CS904

SHEET [illegible]

PARK CODE: A28 PLAN SCANNED FINAL SCANNED



DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

The Maryland-National Capital Park
and Planning Commission

PLANS ISSUED FOR:

REVISIONS

Site Utility Plan

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

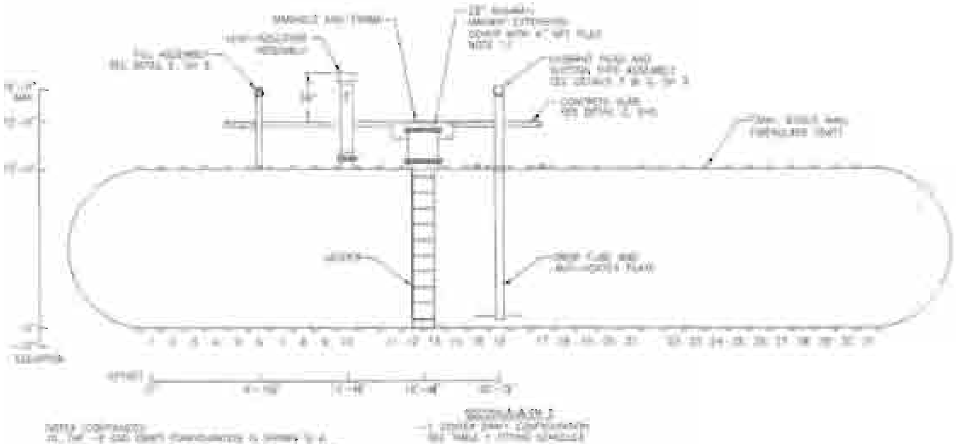
CU101

SHEET

NOTES:

[illegible]

[illegible]



[illegible]

DETAIL PROVIDED BY
MONTGOMERY COUNTY
FIRE MARSHAL: JUNE 2011.

REVIEW AND APPROVAL

REVIEW AND APPROVAL

The Maryland-National Capital Park
and Planning Commission

PLANS ISSUED FOR:

REVISIONS

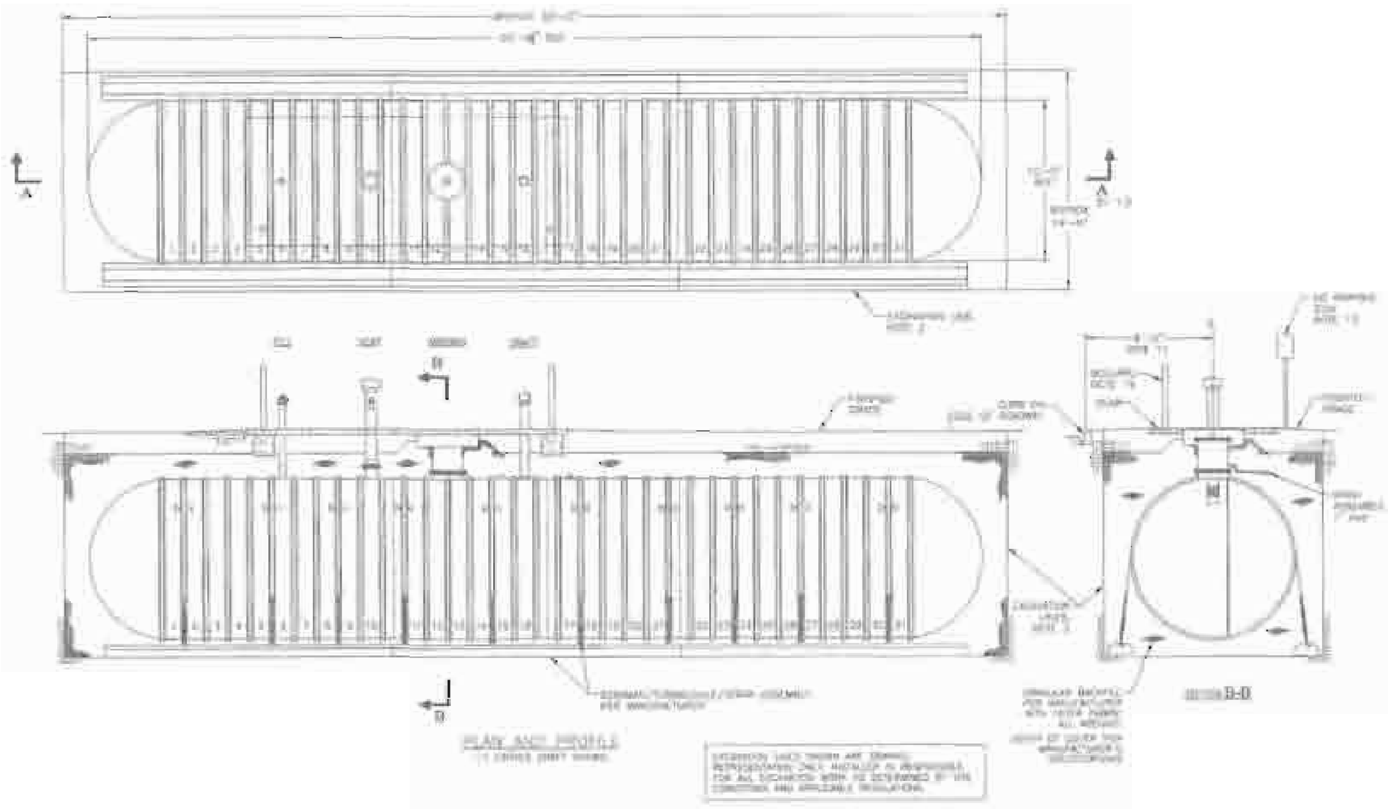
SEAL

Fire Suppression Tank Detail

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CU501



**DETAIL PROVIDED BY
MONTGOMERY COUNTY
FIRE MARSHAL: JUNE 2011.**

DESIGN			REVIEW AND APPROVAL		REVIEW AND APPROVAL	
M-NCPPC Landscape Architect	Date	Checked By	Park Development	Date	Superintendent of Parks	Date
Architect	Date	Checked By	Central Maintenance	Date	Park Police	Date
AM1 Engineer	Date	Checked By	Region	Date		Date
AM1 Drawn By	Date	Checked By	Special Programs	Date		Date

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:

REVISIONS

Rev. By	Date	Description

SEAL

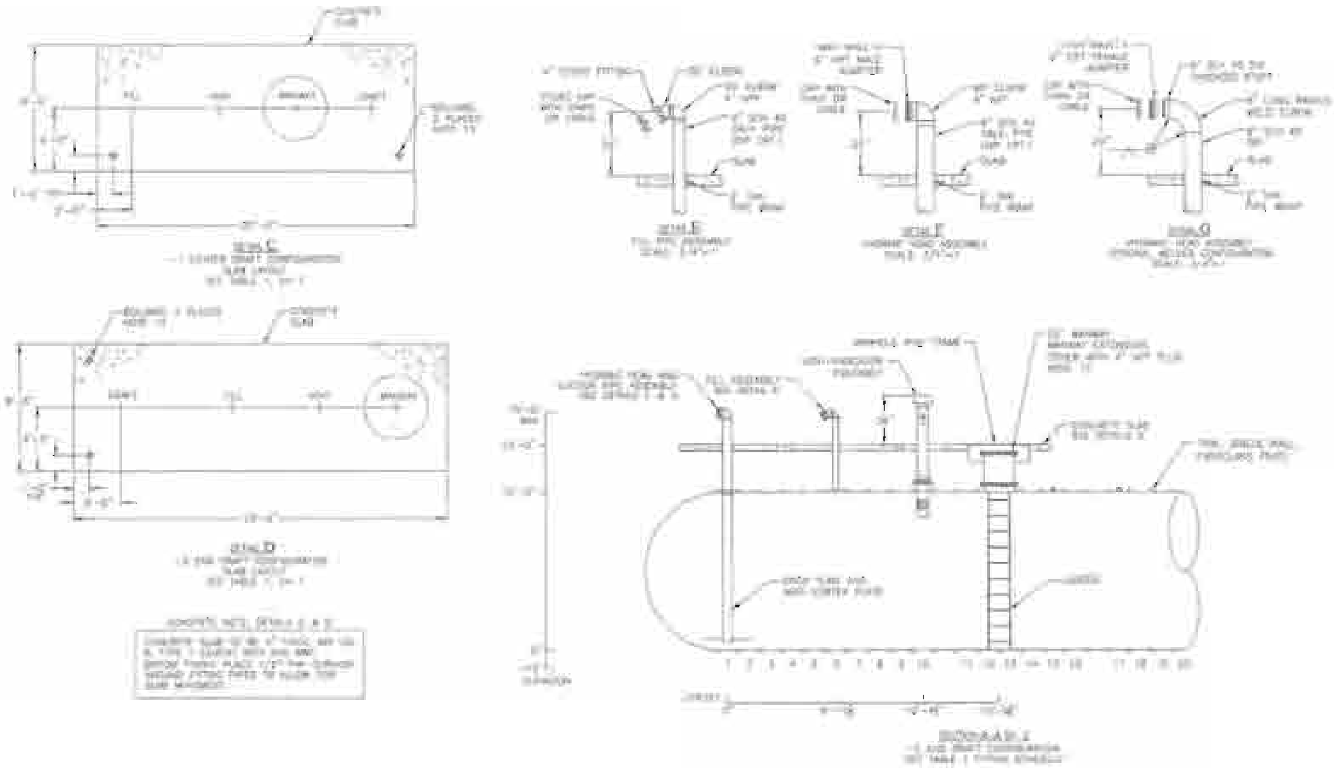
Fire Suppression Tank Detail

Little Bennett Regional Park
Day Use Area

SCALE: AS SHOWN

WSSC Grid Map

CU502



DETAIL PROVIDED BY
MONTGOMERY COUNTY
FIRE MARSHAL: JUNE 2011.

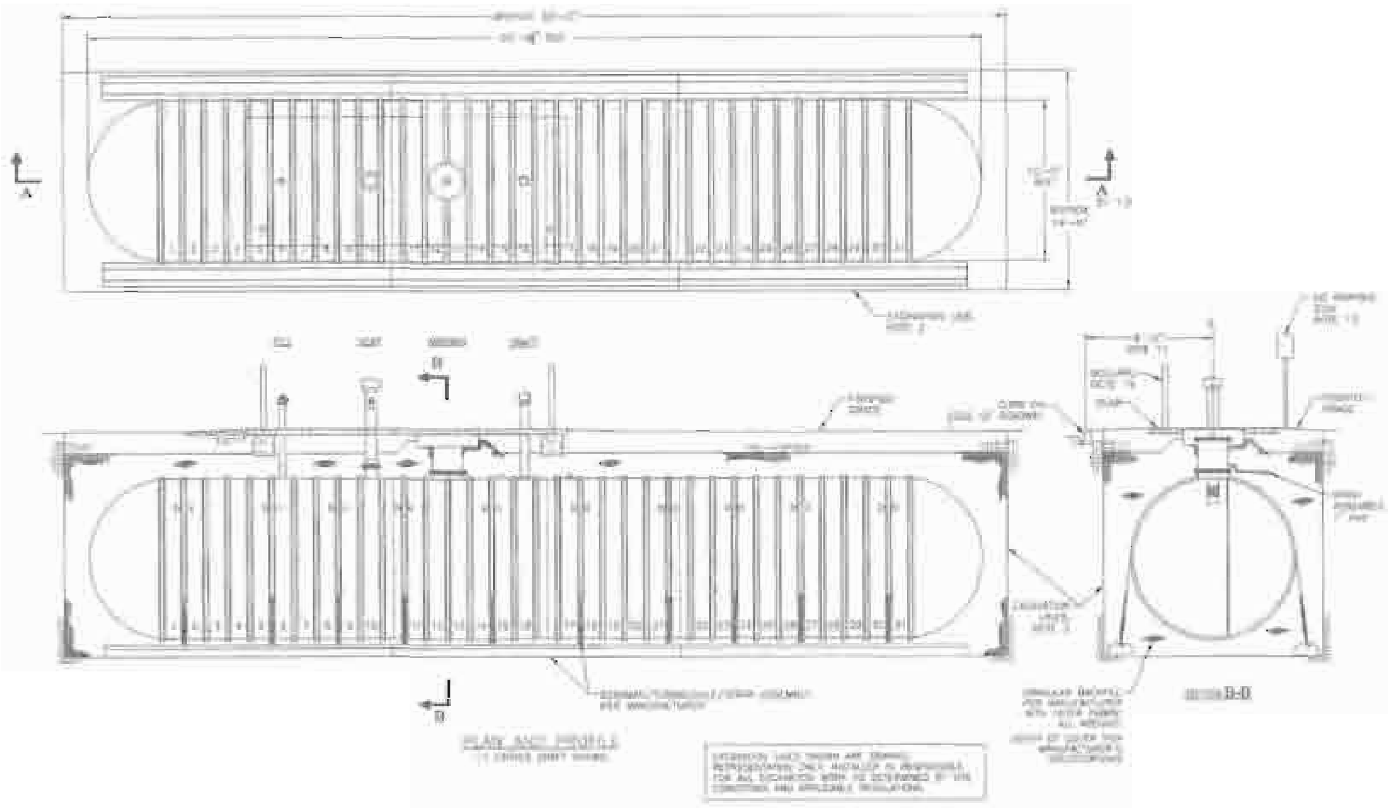
The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

Fire Suppression Tank Detail

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CU503



DETAIL PROVIDED BY
MONTGOMERY COUNTY
FIRE MARSHAL: JUNE 2011.

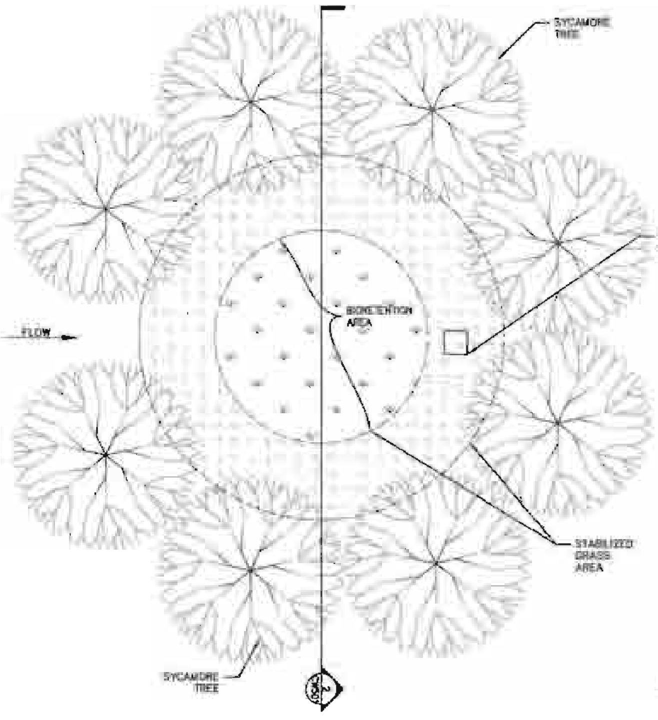
The Maryland-National Capital Park
and Planning Commission

Fire Suppression Tank Detail

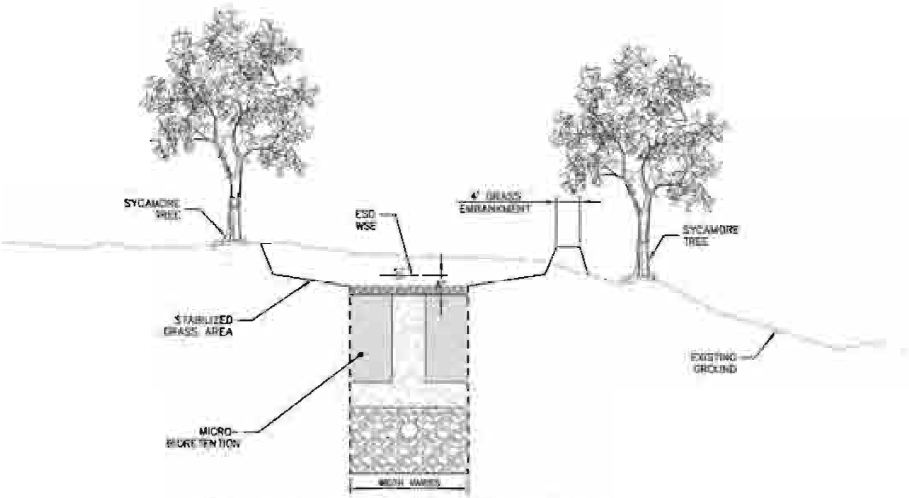
Little Bennett Regional Park
Day Use Area

WSSC Grid Map

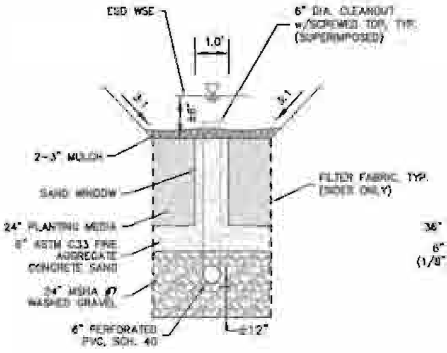
CU504



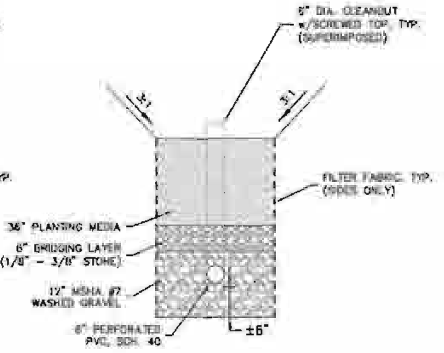
1 CW501 SYCAMORE RING- BIORETENTION AREAS (TYPICAL)
SCALE: 1"=10'
PLAN VIEW



2 CW501 SYCAMORE RING- BIORETENTION AREAS (TYPICAL)
HORIZONTAL SCALE: 1"= 10'
VERTICAL SCALE: 1"= 1'
SECTION VIEW



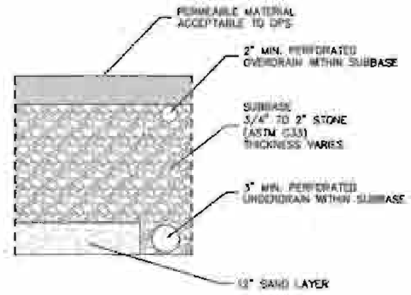
4 CW501 MICRO-BIORETENTION SECTION (TYPICAL)
NOT TO SCALE



5 CW501 BIO-SWALE SECTION (TYPICAL)
NOT TO SCALE

NOTES:

1. THE CHANNEL SLOPE SHALL BE LESS THAN OR EQUAL TO 4.0%.
2. THE MAXIMUM FLOW VELOCITY FOR THE ESDv SHALL BE LESS THAT OR EQUAL TO 1.0 FPS.



6 CW501 PERMEABLE PAVEMENT SECTION (TYPICAL)
NOT TO SCALE

NOTES:

1. THE CHANNEL SLOPE SHALL BE LESS THAN OR EQUAL TO 4.0%.
2. THE MAXIMUM FLOW VELOCITY FOR THE ESDv SHALL BE LESS THAT OR EQUAL TO 1.0 FPS.

DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:

REVISIONS

Rev. No.	Date	Description

SEAL

SWM Details

Little Bennett Regional Park

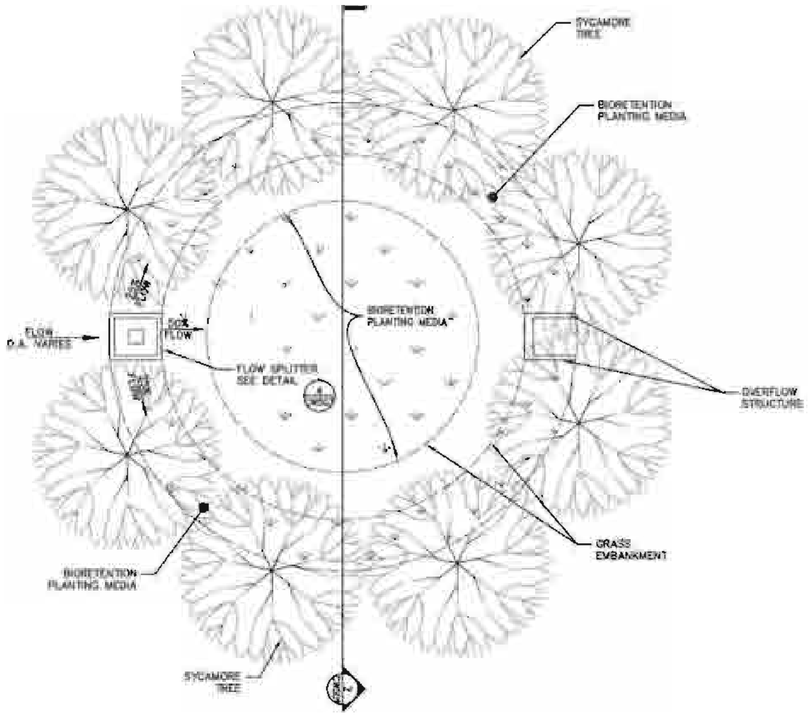
Day Use Area

SCALE: AS SHOWN

WSSC Grid Map

CW501

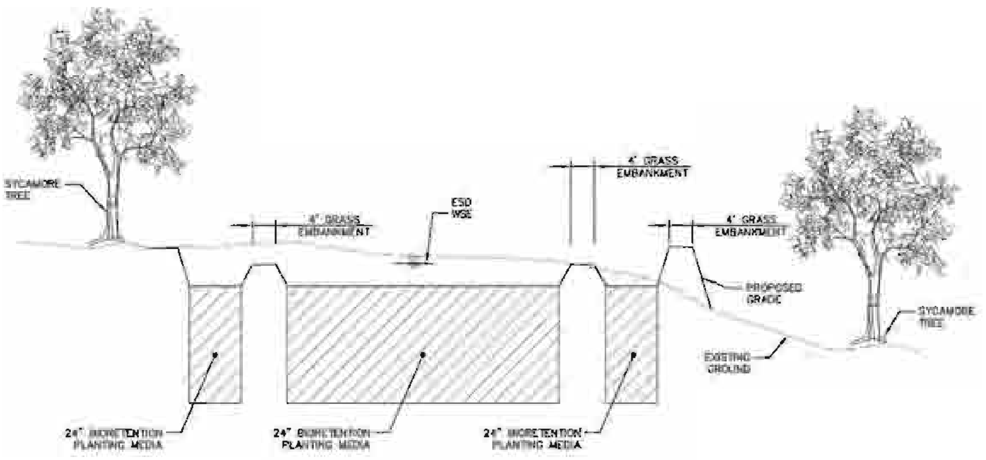
PARK CODE: A28 PLAN SCANNED: FINAL SCANNED:



1 CW502 SYCAMORE RING- SAFE CONVEYANCE (TYPICAL)

SCALE: [illegible]

TOP VIEW



2 CW502 SYCAMORE RING- SAFE CONVEYANCE (TYPICAL)

HORIZONTAL SCALE: 1"= [illegible]
VERTICAL SCALE: 1"= [illegible]

PROFILE VIEW

DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:

REVISIONS

No.	Date	Description

SEAL

SWM Details

Little Bennett Regional Park
Day Use Area

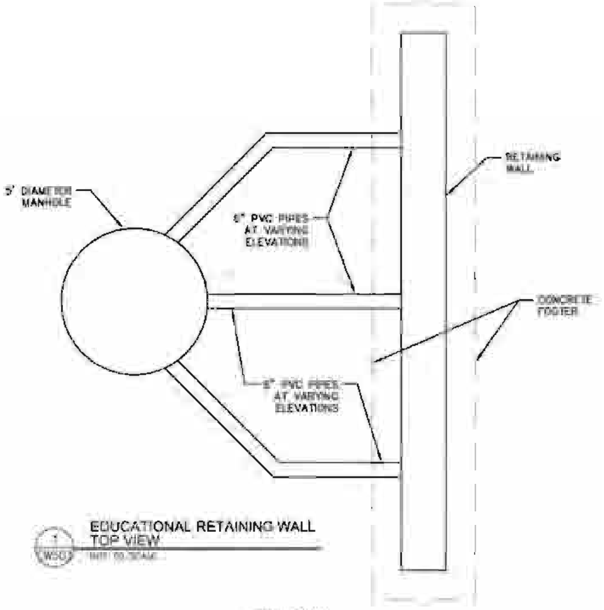
SCALE: AS SHOWN

WSSC Grid Map
[illegible]

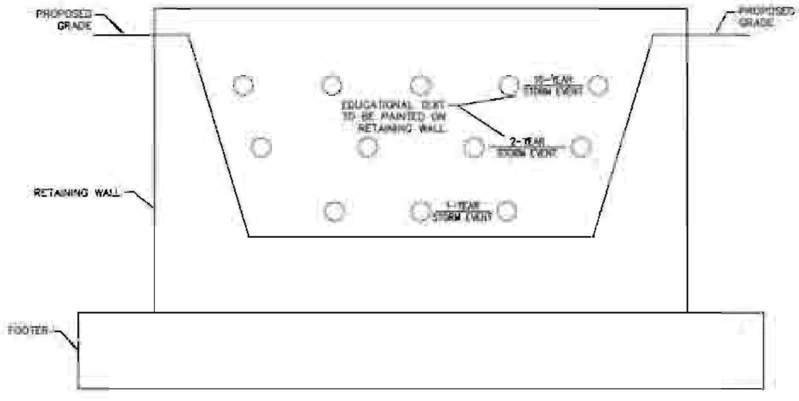
CW502

SHEET [illegible]

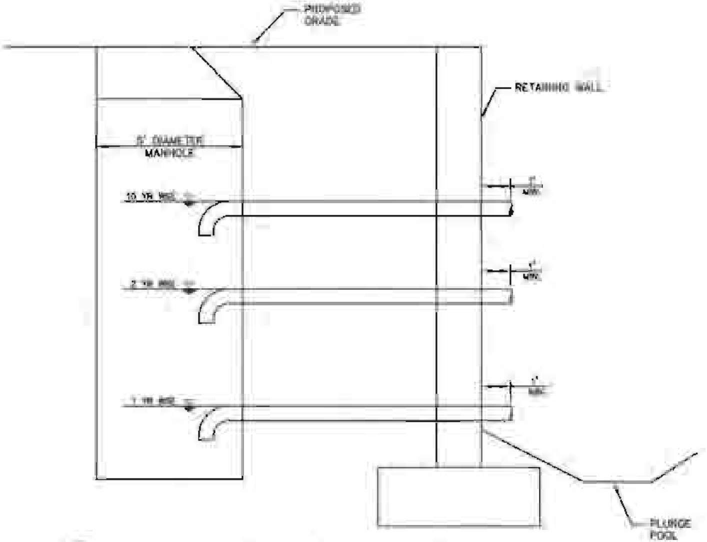
PARK CODE: 420
PLAN SCANNED:
FINAL SCANNED:



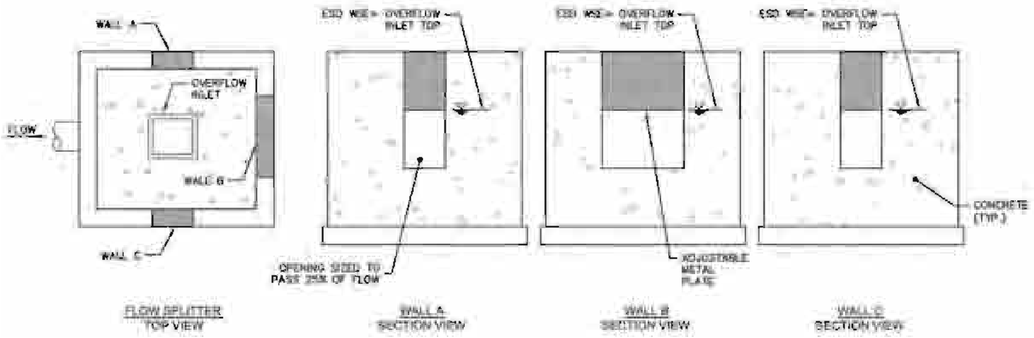
1 / W503 EDUCATIONAL RETAINING WALL TOP VIEW
NOT TO SCALE



3 / W503 EDUCATIONAL RETAINING WALL SECTION VIEW
NOT TO SCALE



2 / W503 EDUCATIONAL RETAINING WALL - PROFILE VIEW
NOT TO SCALE



FLOW SPLITTER TOP VIEW

WALL A SECTION VIEW

WALL B SECTION VIEW

WALL C SECTION VIEW

4 / W503 FLOW SPLITTER DETAIL
[illegible]

DESIGN
Landscape Architect — Date — Checked By
Architect — Date — Checked By
Engineer — Date — Checked By
Drawn By — Date — Checked By

REVIEW AND APPROVAL
Park Development — Date
Natural Resources — Date
Region — Date
M-NCPPC Recreation — Date

REVIEW AND APPROVAL
Superintendent of Parks — Date
Park Police — Date

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:
REVISIONS
Rev. No. — Date — Description

SEAL

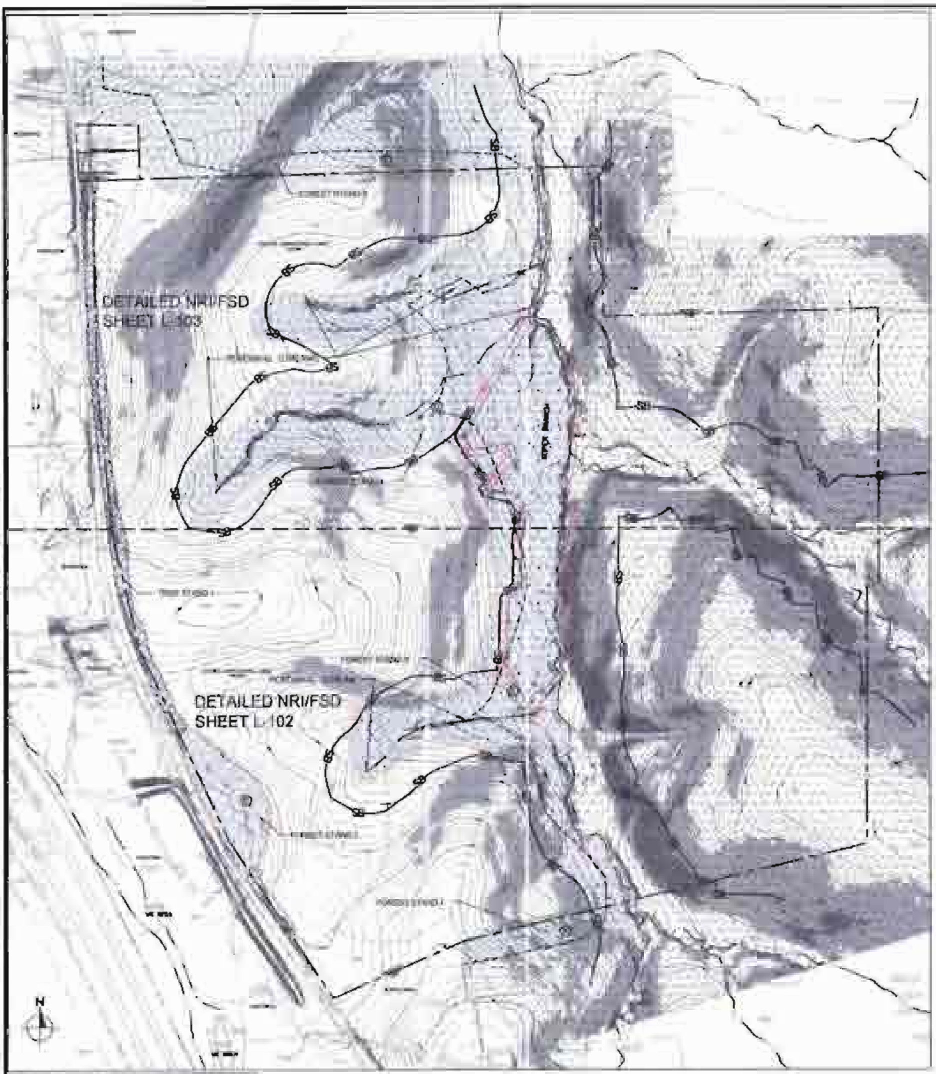
SWM Details

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

SCALE: AS SHOWN

CW503



FOR USE AS PART OF NATURAL RESOURCE INVENTORY/FOREST STAND DELINEATION PLAN PURPOSES ONLY

CERTIFICATION

I CERTIFY THAT THESE DOCUMENTS WERE PREPARED UNDER MY SUPERVISION AND [illegible] A DULY LICENSED LANDSCAPE ARCHITECT [illegible] OF THE STATE OF MARYLAND.

07/19/2010

STEVEN [illegible]
LICENSE [illegible]

LEGEND

- PROPERTY LINE
- CANOPY EDGE
- SOIL LIMITS
- SOIL TYPE
- SB STREAM BUFFER
- TREE STAND ON SITE
- FOREST STAND
- FOREST STAND ON SITE
- WETLAND
- WETLAND EDGE
- WETLAND BUFFER
- ▨ 15%-25% SLOPES
- ■ 25% AND GREATER SLOPES
- CENTER LINE OF STREAM
- ⊙ SIGNIFICANT OR SPECIMEN TREE
- 100' OFFSET FROM FOREST EDGE AREA OF DETAILED NRI/FSD

PROPERTY INFORMATION: [illegible]

MAPPED SOIL TYPES

[illegible]

NARRATIVE DESCRIPTION:

THE PARCEL UNDER CONSIDERATION IS COMPRISED OF THREE PROPERTIES ALL OF WHICH FRONT FREDERICK ROAD JUST NORTH OF THE ENTRANCE TO LITTLE BENNETT REGIONAL PARK IN CLARKSBURG, MD. THE PROPERTIES, ALL OF WHICH ARE OWNED BY M-NCPPC, ARE PROPOSED TO BE ADDED TO AND DEVELOPED AS A DAY USE AREA FOR LITTLE BENNETT REGIONAL PARK. THE PARK BOUNDERS THE PARCEL TO THE NORTH AND EAST. TO THE SOUTH THERE IS AN [illegible] ACRE AGRICULTURAL/RESIDENTIAL PROPERTY. ACROSS FREDERICK ROAD TO THE WEST, ARE NUMEROUS SMALL PARCELS CURRENTLY OCCUPIED BY SMALL INDUSTRIES AND RESIDENCES.

THE LARGEST OF THE PROPERTIES, FORMERLY USED FOR CROP CULTIVATION, IS [illegible] ACRES. THE MAJORITY OF THE PROPERTY IS CURRENTLY IN A MEADOW STATE WITH FESCUE AS THE DOMINANT SPECIES THOUGH MANY NATIVE GRASSES AND WILDFLOWERS CAN BE FOUND IN THE MATRIX. THE PROPERTY IS BORDERED ON ALL SIDES BY FOREST AND TREE STANDS WHICH ARE DESCRIBED IN MORE DETAIL BELOW. SOPER BRANCH RUNS FROM SOUTH TO NORTH ALONG THE EASTERN BOUNDARY OF THE PROPERTY. FORESTED WETLAND OCCURS IN THE CENTRAL EASTERN PORTION OF THE PROPERTY ALONG THE WESTERN BANK OF THE STREAM. SMALLER STREAMS FEED INTO SOPER BRANCH FLOWING WEST TO EAST FROM THE LOWEST POINTS OF THE SITE. THESE PERENNIAL STREAMS ARE SURROUNDED BY FORESTED BUFFER AREAS. THE FORESTED PROTRUSION ON THE NORTHERN EDGE OF THE PROPERTY IS ON THE STEEPEST SLOPES OF THE SITE, 25% AND GREATER. THERE ARE NO STRUCTURES OR BUILDINGS ON THIS PROPERTY.

TREE STAND #1 BOARDERS FREDERICK ROAD AND INCLUDES TYPICAL EARLY SERAL SPECIES INCLUDING ACER SACCHARINUM, MORUS ALBA, ROBINIA PSEUDOACACIA, ACER RUBRUM, AND CELTIS OCCIDENTALIS.

THE TWO SMALLER PROPERTIES, TO THE NORTH, ARE EACH UNDER HALF AN ACRE. IN PRACTICE, THE TWO PROPERTIES ARE TREATED AS ONE. THE SOUTHERN OF THE TWO IS THE SITE OF A SINGLE FAMILY RESIDENCE AND INCLUDES FRONT AND BACK YARDS, SHEDS, PLAY EQUIPMENT AND A DRIVEWAY. THE DRIVEWAY CONTINUES ON TO THE NORTHERN PROPERTY WHICH ALSO INCLUDES A SIDE YARD.

INDIVIDUAL FOREST STANDS ARE DESCRIBED BELOW. STAND DELINEATION WAS MADE BASED ON FIELD OBSERVATION, AERIAL PHOTOGRAPHY, TOPOGRAPHY, AND SPECIES DOMINANCE.

VICINITY MAP
1" = 2000'
MONTGOMERY COUNTY

GENERAL NOTES

1. THE SOURCE OF THE PROPERTY BOUNDARIES ON THIS PLAN IS FROM MONTGOMERY COUNTY GIS.
2. PARCELS ARE ZONED RDT.
3. THE TOPOGRAPHY SHOWN ON THIS PLAN IS FROM MONTGOMERY COUNTY GIS.
4. THE SITE IS LOCATED WITHIN THE LITTLE BENNETT CREEK WATERSHED WHICH IS DESIGNATED USE III.
5. SOPER BRANCH IS DESIGNATED AS A USE CLASS III STREAM.
6. THERE IS NO FLOODPLAIN ON THIS SITE AS DETERMINED FROM FEMA FLOOD MAP [illegible].
7. WETLAND DELINEATION OCCURRED ONSITE ON [illegible] AND WAS SUPPLEMENTED BY THE NWI MAP.
8. THE SITE IS NOT WITHIN A SPECIAL PROTECTION AREA.
9. THERE ARE NO KNOWN RECORDS OR READILY OBSERVABLE ARCHAEOLOGICAL, HISTORICAL OR CULTURAL FEATURES OR SCENIC ROADS ON OR IN THE IMMEDIATE VICINITY OF THIS PROPERTY. THE WESTERN BOUNDARY OF THE PROPERTY IS FORMED BY MD ROUTE 355 (FREDERICK ROAD) WHICH IS CONSIDERED A HISTORIC ROAD.
10. FIELD WORK CONDUCTED BY [illegible] ON MAY [illegible] AND [illegible] 2010. TREES WERE MEASURED USING A D TAPE.
11. THERE ARE NO KNOWN RECORDS NOR READILY OBSERVABLE RARE, THREATENED OR ENDANGERED SPECIES NOR CRITICAL HABITATS ON THE SITE.
12. THE SPECIMEN TREES ON THE SUBJECT PROPERTY ARE SHOWN ON THE DETAILED NRI/FSD (SHEETS L-102 AND L-103).
13. THERE ARE NO MONTGOMERY COUNTY OR STATE CHAMPION TREES ON THIS PARCEL. NO TREES ON THE PARCEL HAVE A DBH ≥ 75% OF THE COUNTY OR STATE CHAMPION.
14. AN APPROVED NRI/FSD IS VALID FOR FIVE YEARS FROM THE DATE OF SIGNATURE BY STAFF, OR UNTIL INFORMATION USED TO PREPARE THE NRI/FSD CHANGES. NRI/FSD'S WILL BE REQUIRED TO BE REVISED AND RE-APPROVED IF THE BASE INFORMATION OR PROJECT LIMITS CHANGE SIGNIFICANTLY.

SUMMARY TABLE (FOR PROJECT LIMITS)

EXISTING FOREST	= 77.41 ACRES
WETLANDS (EXCLUDING THOSE ASSOCIATED WITH SEEPS & STREAMS)	= 0.42 ACRES
FORESTED WETLANDS ( )	= 0.41 ACRES
STREAM BUFFER	= 11.87 ACRES
FORESTED STREAM BUFFER	= 10.58 ACRES
100 YEAR FLOODPLAIN	= 0.00 ACRES

THE MARYLAND-NATIONAL CAPITAL
PARK AND PLANNING COMMISSION

APPROVED

NRI/FSD #: 420110790
Date Approved: 6/15/10
Expiration Date: 6/15/15

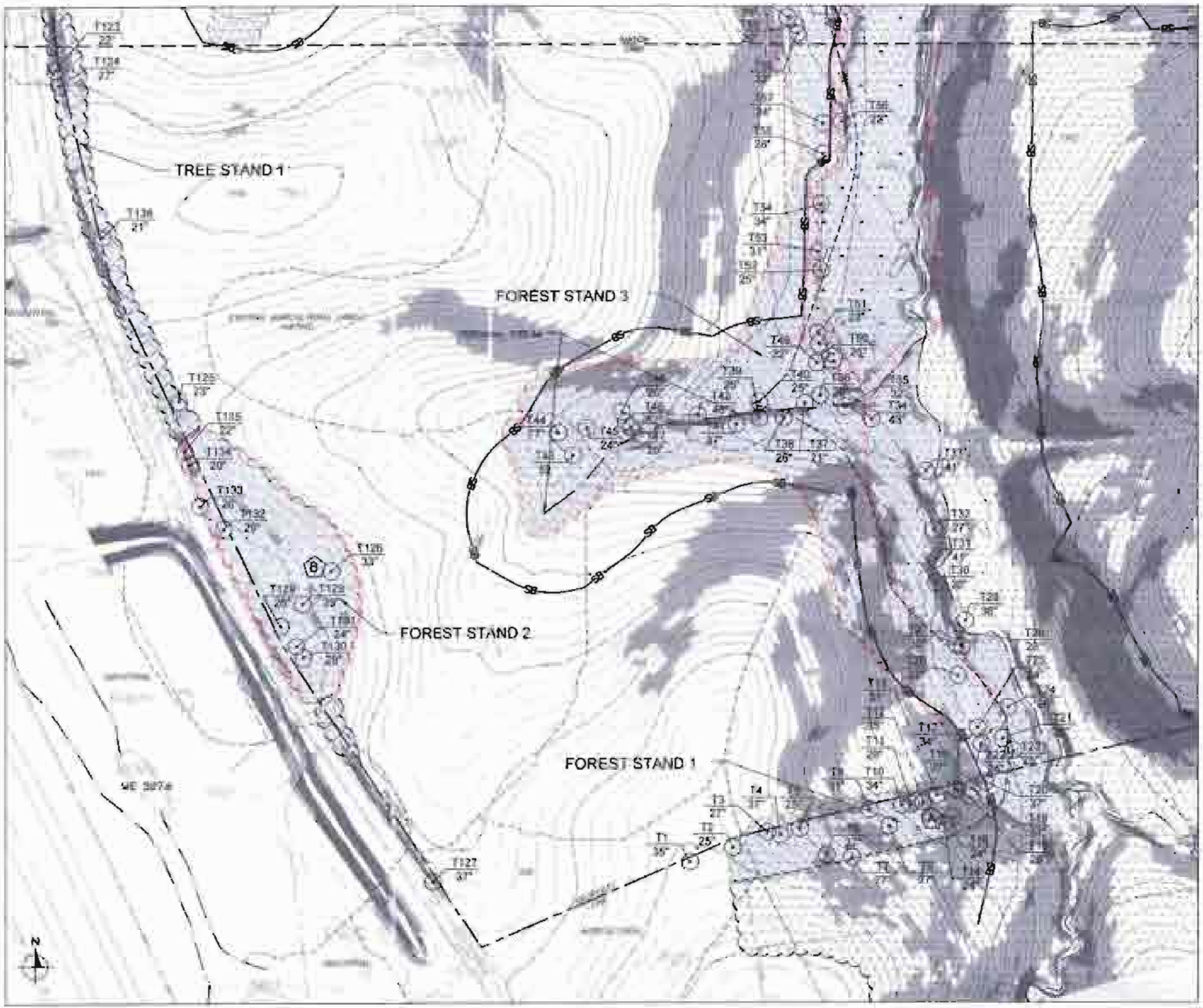
GRAPHIC SCALE

(IN FEET)

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
8787 Georgia Avenue
Silver Spring, Maryland 20910
(301) 495-2500

LITTLE BENNETT REGIONAL PARK
DAY USE AREA

SIMPLIFIED NRI/FSD
L-101



[illegible]

LEGEND

[illegible]

CERTIFICATION

[illegible]

/19/2010

GRAPHIC SCALE

APPROVED

The Maryland-National Capital Park
and Planning Commission

PLANS ISSUED FOR

REVIEW AND APPROVAL

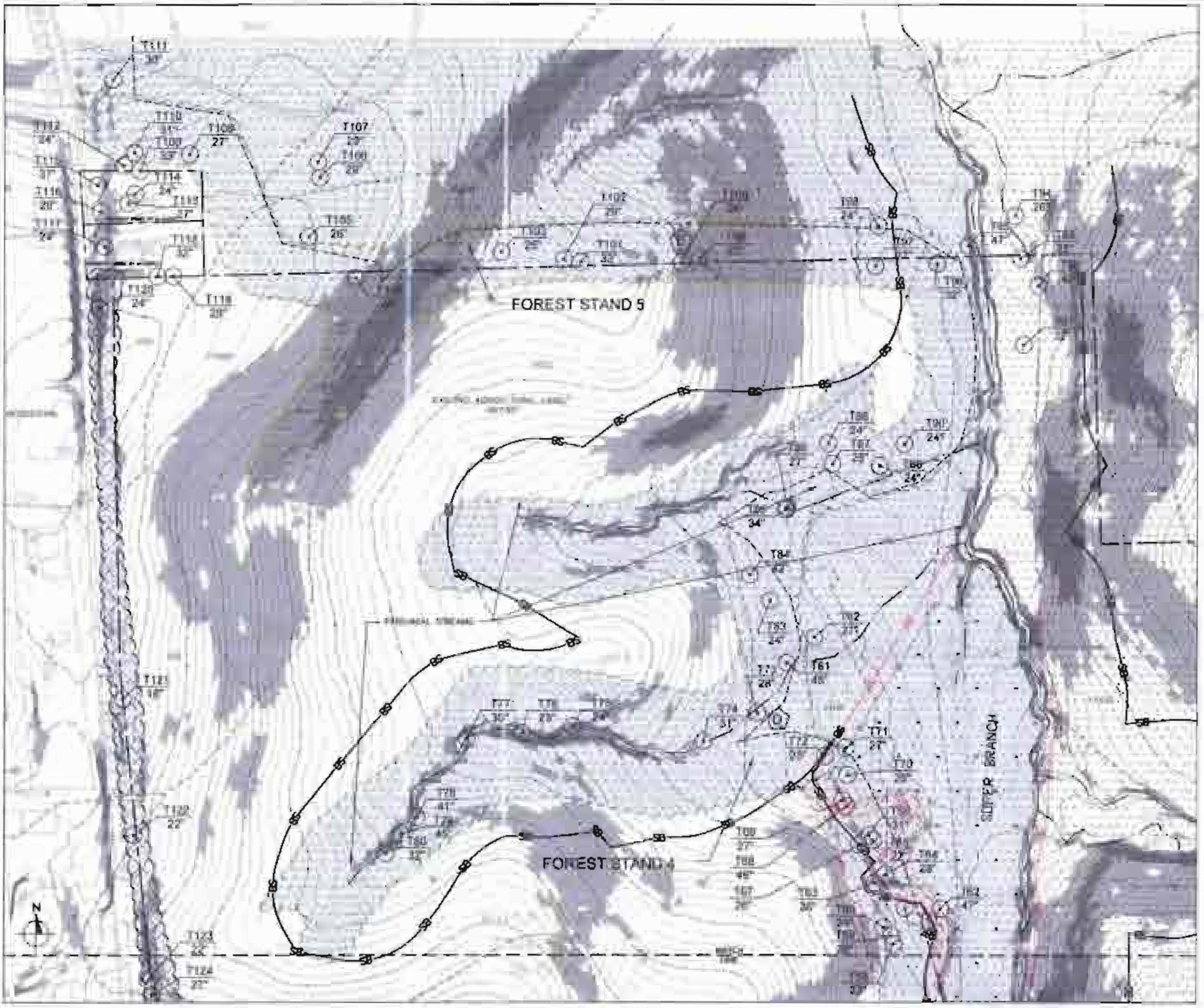
Drawn by

Date

LITTLE BENNETT REGIONAL PARK
DAY USE AREA

SCALE 1" = 100'

DETAILED NRI/FSD
L-102



[illegible]

[illegible] — THIS LOWLAND FOREST HAS A WELL STRATIFIED STRUCTURE WITH A STAND BASAL AREA OF 50 SF/AC. THE FOREST IS PRIMARILY SYCAMORE WITH DOMINANT TREES BETWEEN 24" AND 30" DBH. HOWEVER, LARGER TREES (>18" DBH) ARE NOT WELL REPRESENTED. INTERMEDIATE TREES (12"-18" DBH) ARE WELL REPRESENTED AND SMALLER (<12") UNDERSTORY TREES ARE WELL REPRESENTED. THIS FOREST HAS APPROXIMATELY 35 SIGNIFICANT OR SPECIMEN TREES OF PREDOMINANTLY SYCAMORE. MIXED WITH THE SYCAMORES ARE TULIP POPLARS AND OAKS ON THE HIGHER AREAS AND SILVER MAPLES ALONG THE MEADOW EDGE AND PERENNIAL STREAM BANK. CANOPY COVERAGE IS 70%. THE UNDERSTORY IS DOMINATED BY TULIP POPLAR WITH SOME DOGWOOD AND RIVER BIRCH ALSO REPRESENTED. UNDERSTORY COVERAGE IS 45%. THE SHRUB LAYER IS DOMINATED BY SPICEBUSH WITH SOME MULTIFLORA ROSE, GREENBRIAR AND VIBURNUM ALSO PRESENT. HERBACEOUS GROUND COVER IS DIVERSE, OF NOTE ARE PATCHES THICK WITH TRILLIUM AND SKUNK CABBAGE. HERBACEOUS COVERAGE IS 40%. THE AMOUNT OF DOWNED WOODY DEBRIS IS 70% AND INVASIVE PLANT COVER IS 25%. THE AREA HAS BEEN LABELED PRIORITY AREA 1 (HIGH) FOR RETENTION DUE TO THE PERENNIAL STREAMS AND WETLAND AND STREAM BUFFERS. EFFORTS SHOULD BE MADE TO MINIMIZE THE AREA OF DISTURBANCE.

[illegible] — THIS HILLSIDE/UPLAND FOREST HAS A WELL STRATIFIED STRUCTURE WITH A STAND BASAL AREA OF 80 SF/AC. THE FOREST IS PRIMARILY MIXED OAKS INCLUDING WHITE, RED AND CHESTNUT WITH DOMINANT TREES BETWEEN 24" AND 30" DBH. LARGER TREES (>18" DBH) ARE SOMEWHAT REPRESENTED. INTERMEDIATE TREES (12"-18" DBH) ARE FAIRLY WELL REPRESENTED AND SMALLER (≤12") UNDERSTORY TREES ARE ABUNDANT. THE STAND IS LOCATED ON MODERATELY STEEP AND STEEP SLOPES. THE CANOPY AND SUBCANOPY LAYERS ALSO INCLUDE HICKORIES, BLACK WALNUT, BEECH, RED MAPLE, BLACK CHERRY, TULIP POPLAR AND, ALONG THE MEADOW EDGE, SILVER MAPLE. CANOPY COVERAGE IS 90%. THE UNDERSTORY CONSISTS OF BLACK CHERRY, RED MAPLE, HICKORIES AND OAKS. UNDERSTORY COVERAGE IS 30%. COMMON SHRUB SPECIES ARE THE VIBURNUM, SPICEBUSH AND MULTIFLORA ROSE. INVASIVE COVER IS 15%. HERBACEOUS GROUND COVER IS 80% AND THE AMOUNT OF DOWNED WOODY DEBRIS (LOGS) AND STANDING DEADWOOD IS AVERAGE. THIS FOREST HAS APPROXIMATELY 25 SIGNIFICANT OR SPECIMEN TREES ON SITE WHICH ARE PRIMARILY OAKS. THE AVERAGE SIZE IS BETWEEN 24" AND 33" DBH. THE AREA HAS BEEN LABELED PRIORITY AREA 1 (HIGH) DUE TO THE STEEP SLOPES, ERODIBLE SOILS AND THE PREVALENCE OF SPECIMEN TREES. EFFORTS SHOULD BE MADE TO MINIMIZE THE AREA OF DISTURBANCE.

LEGEND

- PROPERTY LINE
- CANOPY EDGE
- [illegible]
- [illegible]
- STREAM BUFFER
- [illegible]
- FOREST STAND
- [illegible]
- WETLAND
- WETLAND EDGE
- WETLAND BUFFER
- [illegible]
- [illegible]
- [illegible]
- SIGNIFICANT OR SPECIMEN TREE
- [illegible]
- SAMPLE POINT

THIS PLAN IS FOR NATURAL RESOURCE INVENTORY/FOREST STAND DELINEATION PLAN PURPOSES ONLY

GRAPHIC SCALE

CERTIFICATION

I CERTIFY THAT THESE DOCUMENTS WERE PREPARED BY ME OR UNDER MY SUPERVISION AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.

07/19/2016

STEVEN E. TORGERSON
LICENSE NUMBER [illegible]

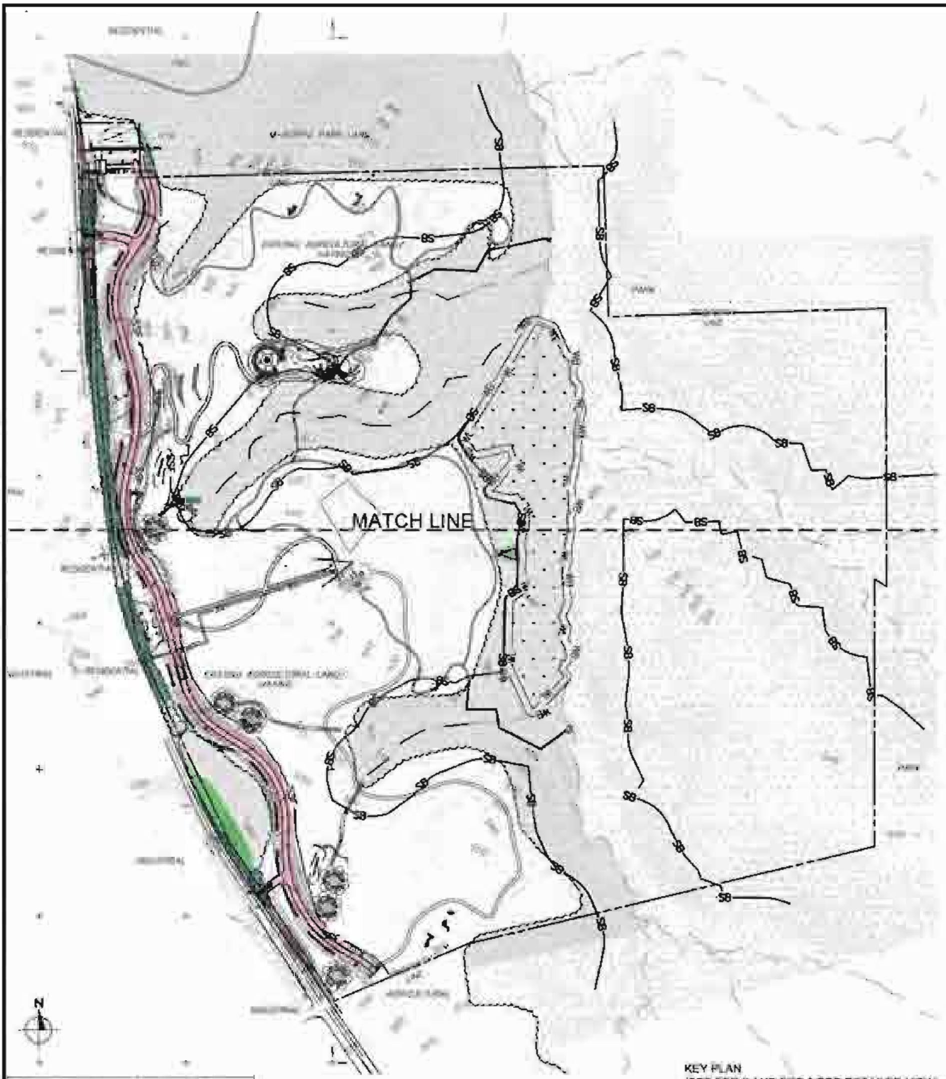
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

APPROVED

The Maryland-National Capital Park and Planning Commission
Montgomery County Department of Parks and Planning
[illegible]
Silver Spring, Maryland [illegible]

LITTLE BENNETT REGIONAL PARK
DAY USE AREA

DETAILED NRI/FSD
L-103



KEY PLAN
(SEE FCP-2 AND FCP-3 FOR DETAILED VIEW)

GRAPHIC SCALE

(IN FEET)

FOREST CONSERVATION WORKSHEET	[illegible]
NET TRACT AREA	[illegible]
A. Total tract area	[illegible]
B. [illegible]	[illegible]
C. [illegible]	[illegible]
D. [illegible]	[illegible]
E. [illegible]	[illegible]
F. Net Tract Area	[illegible]
LAND USE CATEGORY	[illegible]
G. Afforestation Threshold	[illegible]
H. Conservation Threshold	[illegible]
EXISTING FOREST COVER	[illegible]
I. Existing forest cover	[illegible]
J. [illegible]	[illegible]
K. [illegible]	[illegible]
L. [illegible]	[illegible]
M. [illegible]	[illegible]
N. [illegible]	[illegible]
O. [illegible]	[illegible]
PLANTING REQUIREMENTS	[illegible]

SUMMARY TABLE (all values in acres, unless noted otherwise)

Total area of tract		137.82
Acreage of tract remaining in agriculture		0.00
Acreage of road and utility ROWs which will not be cleared		0.00
Total acreage of existing forest		77.41
	Forest retained	76.59
	Forest cleared	0.82
Land use category: IDA		
	Afforestation threshold (15%)	0.00
	Conservation threshold (20%)	0.00
Acreage of forest within wetlands:		
	Retained	5.40
	Cleared	0.00
	Planted	0.00
Acreage of forest within 100 year floodplains:		
	Retained	0.00
	Cleared	0.00
	Planted	0.00
Acreage within stream buffers:		
	Retained	45.03
	Cleared	0.13
	Planted	0.00
Acreage within priority areas:		
	Retained	45.03
	Cleared	0.13
	Planted	0.00
Stream buffer	Length = 1310 feet Average width 175 feet	

VICINITY MAP
1" = 2000'
MONTGOMERY COUNTY

PROPERTY INFORMATION: [illegible]

LEGEND

——LOD——	[illegible]
——SSF——	[illegible]

CERTIFICATION

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STEVEN G. TORGERSON
LICENSE NUMBER MD SLA #[illegible]

DESIGN	REVIEW AND APPROVAL	REVIEW AND APPROVAL
Landscape Architect / Date / Checked By	Park Development / Date	Superintendent of Parks / Date
Architect / Date / Checked By	[illegible] / Date	Park Police / Date
Engineer / Date / Checked By	Region / Date	
Drawn By / Date / Checked By	Natural Resources / Date	

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) [illegible]

PLANS ISSUED FOR: [illegible]

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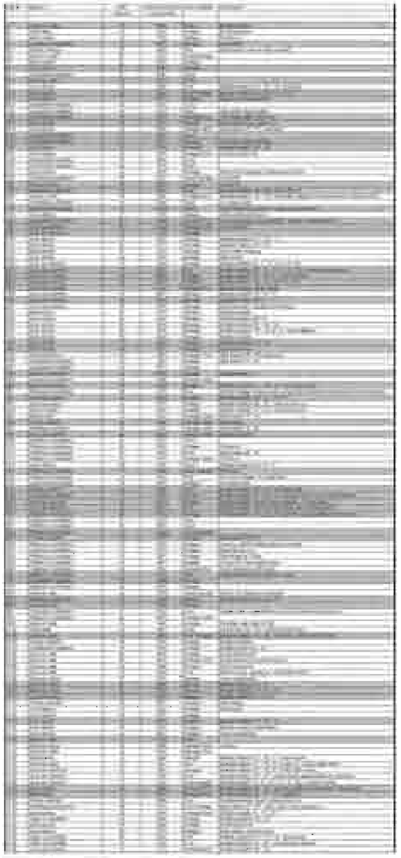
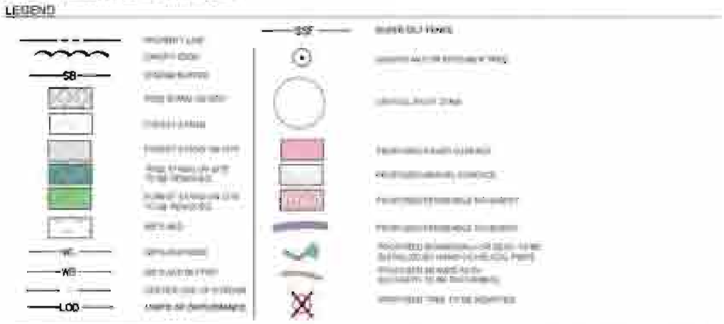
LITTLE BENNETT REGIONAL PARK
DAY USE AREA

SCALE: 1" = 200'

PRELIMINARY FCP
FCP – 1





GRAPHIC SCALE

1 inch = 100 ft.

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STEVEN S. [illegible]
LICENSE NUMBER [illegible]

DESIGN		REVIEW AND APPROVAL		REVIEW AND APPROVAL	
Landscape Architect	Date	Park Development	Date	Superintendent of Parks	Date
Architect	Date	Central Maintenance	Date	Park Police	Date
Engineer	Date	Region	Date		Date
Drawn by	Date	Special Resources	Date		Date

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(301) 495-2535

PLANS ISSUED FOR: [illegible]

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LITTLE BENNETT REGIONAL PARK
DAY USE AREA

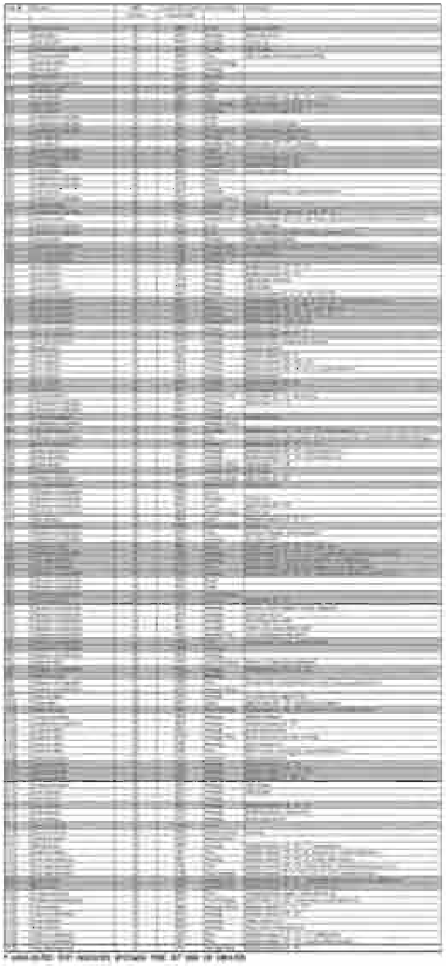
SCALE: 1" = 200'

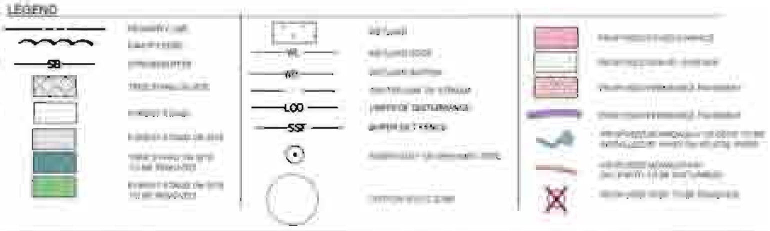
PRELIMINARY FCP
FCP-2

FINAL SCANNED

PLAN SCANNED

PARK CODE: A28





GRAPHIC SCALE

CERTIFICATION

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LICENSE NUMBER MD RLA #[illegible]

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M-NCPPC					
Landscape Architect Date	Checked By	Park Development	Date	Superintendent of Parks	Date
Architect Date	Checked By	Central Maintenance	Date	Park Police	Date
Engineer Date	Checked By	Region	Date		Date
Drawn By Date	Checked By	Natural Resources	Date		Date

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[illegible]

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LITTLE BENNETT REGIONAL PARK
DAY USE AREA

PRELIMINARY FCP
FCP-3

SCALE: 1" = 200'

30% Construction Documents—Architecture

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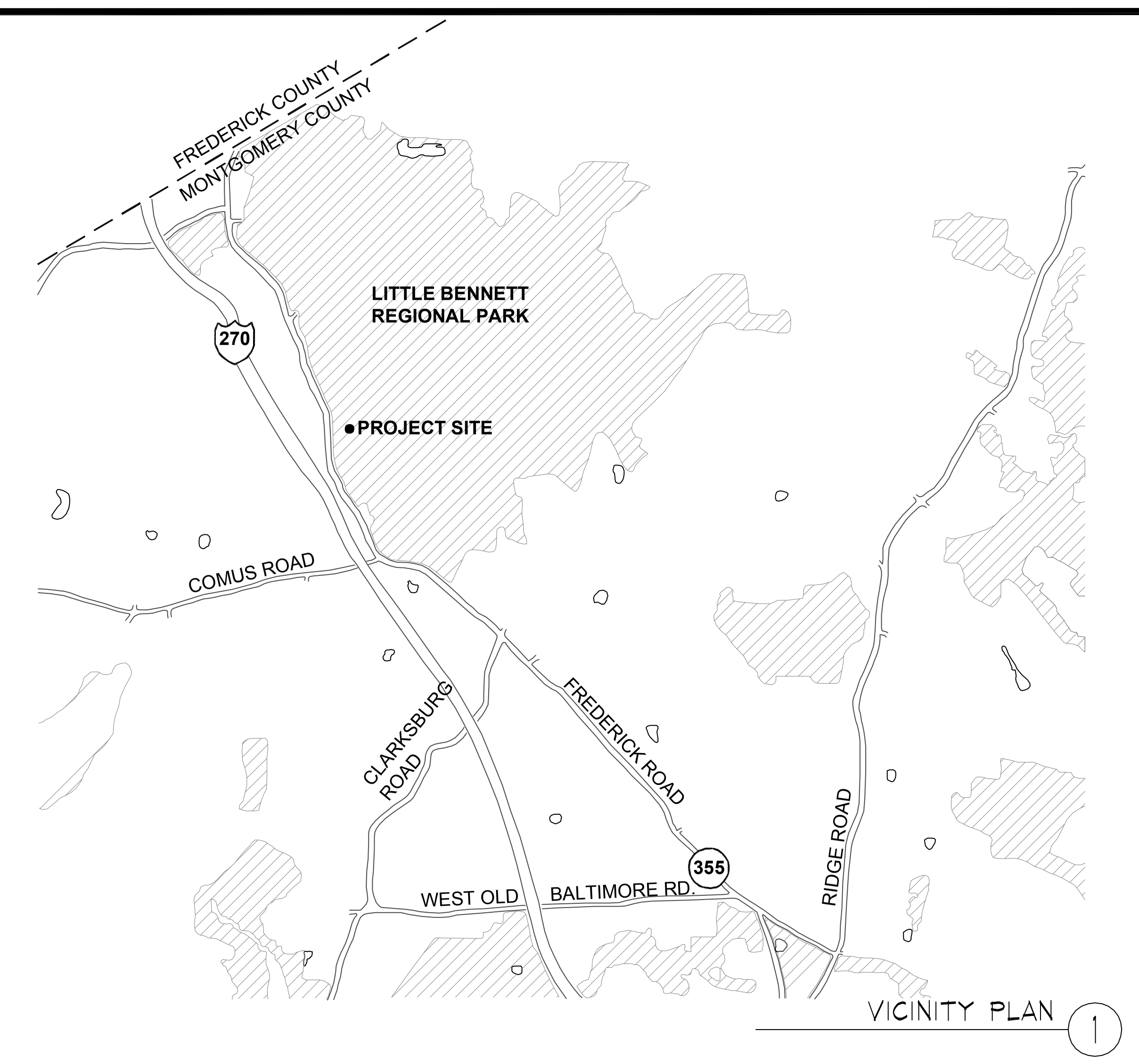

VICINITY PLAN 1

Legend

▬	2X6 WALL
▭	2X4 WALL
▭	CONCRETE
▨	MASONRY
△	SHEAR WALL
3	DOOR NO.
3	ROOM NO.
A3	DETAIL
3 / A7	SECTION — DWG. NO. / SHT. NO.
3 / A8	ELEVATION — DWG. NO. / SHT. NO.
4 A8 2 / 3	INTERIOR ELEVATION DWG. NO. / SHT. NO.
+000.00	ELEVATION
◐	MATCHLINE
T	TEMPERED GLASS
◉	SMOKE DETECTOR W/ BATTERY BACKUP
HB	HOSE BIB
⊗	VENT FAN

Sheet Index

A1	Vicinity Plan, Property Plan, Site Plan, Project Data, Index, Legend, Legal Description
A2	Foundation/Framing Plan
A3	Floor Plan
A4	Roof Plan
A5	Roof Framing Plan
A6	Sections
A7	Sections
A8	Elevations
A9	Enlarged Site Plan
ME1	Electrical Plan

Project Data

ZONING:

Setbacks
Front Yard: '
Side Yards: '
Rear Yards: '
Max. Ht: '

Dead Load	Floor Roof	-- PSF
Live Load	Floor Roof Deck	100 PSF 100 PSF
Snow/Roof Load		30 PSF
Frost Line Depth		30 inches
Wind Load	Speed	90 mph
Seismic Zone		
FLOOR AREA:	Main Floor	1,250 SF

Owner

The Maryland - National Capital Park And Planning Commission
9500 Brunett Avenue
Silver Springs, MD 20901

Contact: Ching-Fing Chen
Phone: 301.495.2557

Architect

Cutler-Anderson Architects
135 Parfitt Way SW
Bainbridge Island, WA 98110

Contact: Pat Munter
Ph: 206-842-4710
Fax: 206-842-4420

Structural Engineer

Madden & Baughman Engineering
2632 SE 25th, Suite G
Portland, OR 97202

Contact: Jerome Madden
Phone: 503.236.7611

Civil Engineer

A. Morton Thomas & Assoicates, Inc.
12750 Twinbrook Parkway
Rockville, MD 20852

Contact: Matthew Ernest
Phone: 301.881.2545
Fax: 301.881.0814

SITE PLAN LEGEND

—— E ——	ELECTRICAL
—PH——PH—	TELEPHONE
—— W ——	WATER
——D——D——	4" ϕ CORRUGATED FILTER WRAPPED PERF. PIPE
—— P ——	PROPANE
—— T ——	4" ϕ CORRUGATED TIGHTLINE
—— S.S. ——	SANITARY SEWER
556	FINISH GRADE
556	EXISTING GRADE

SITE PLAN 2
1" = 30' - 0"

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DESIGN		REVIEW AND APPROVAL		REVIEW AND APPROVAL	
M-NCPPC					
Landscape Architect Date	Checked By:	Park Development	Date	Superintendent of Parks	Date
Architect Date CUTLER ANDERSON ARCHITECTS	Checked By:	Central Maintenance	Date	Park Police	Date
Engineer Date AMT	Checked By:	Region	Date		Date
Drawn by Date	Checked By:	Natural Resources	Date		Date

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SEAL:

Drawing Index, General Notes, Legend, Site Plan

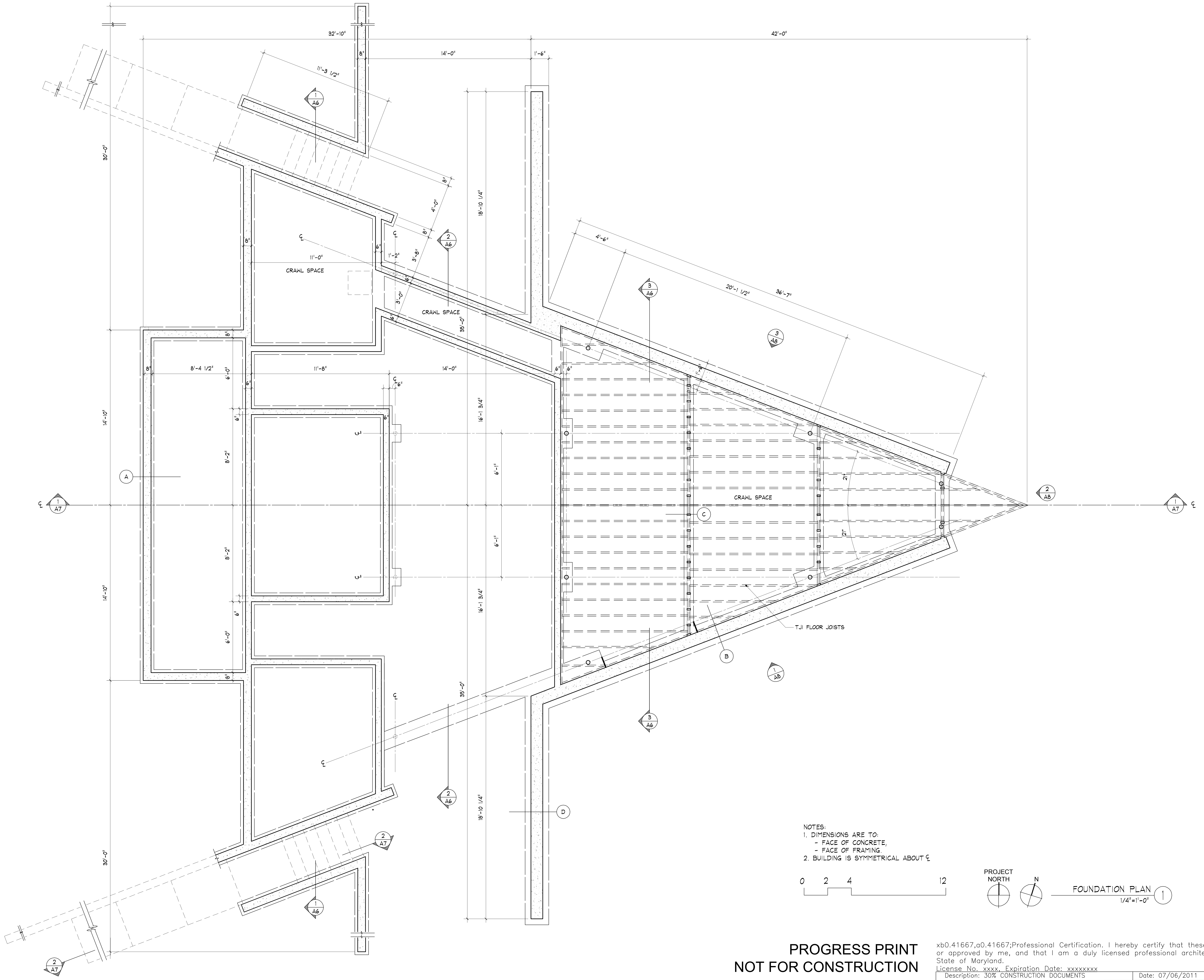
Little Bennett Regional Park
Day Use Area

SCALE: AS SHOWN

WSSC Grid Map
#234NW14

A1

SHEET1 of 10



NOTES:
1. DIMENSIONS ARE TO:
- FACE OF CONCRETE,
- FACE OF FRAMING
2. BUILDING IS SYMMETRICAL ABOUT ℄

0 2 4 12

PROJECT NORTH N

FOUNDATION PLAN ①
1/4"=1'-0"

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Foundation Plan / Floor Framing Plan

Little Bennett Regional Park
Day Use Area

SCALE: AS SHOWN

WSSC Grid Map
#234NW14

A2

SHEET2 of 10

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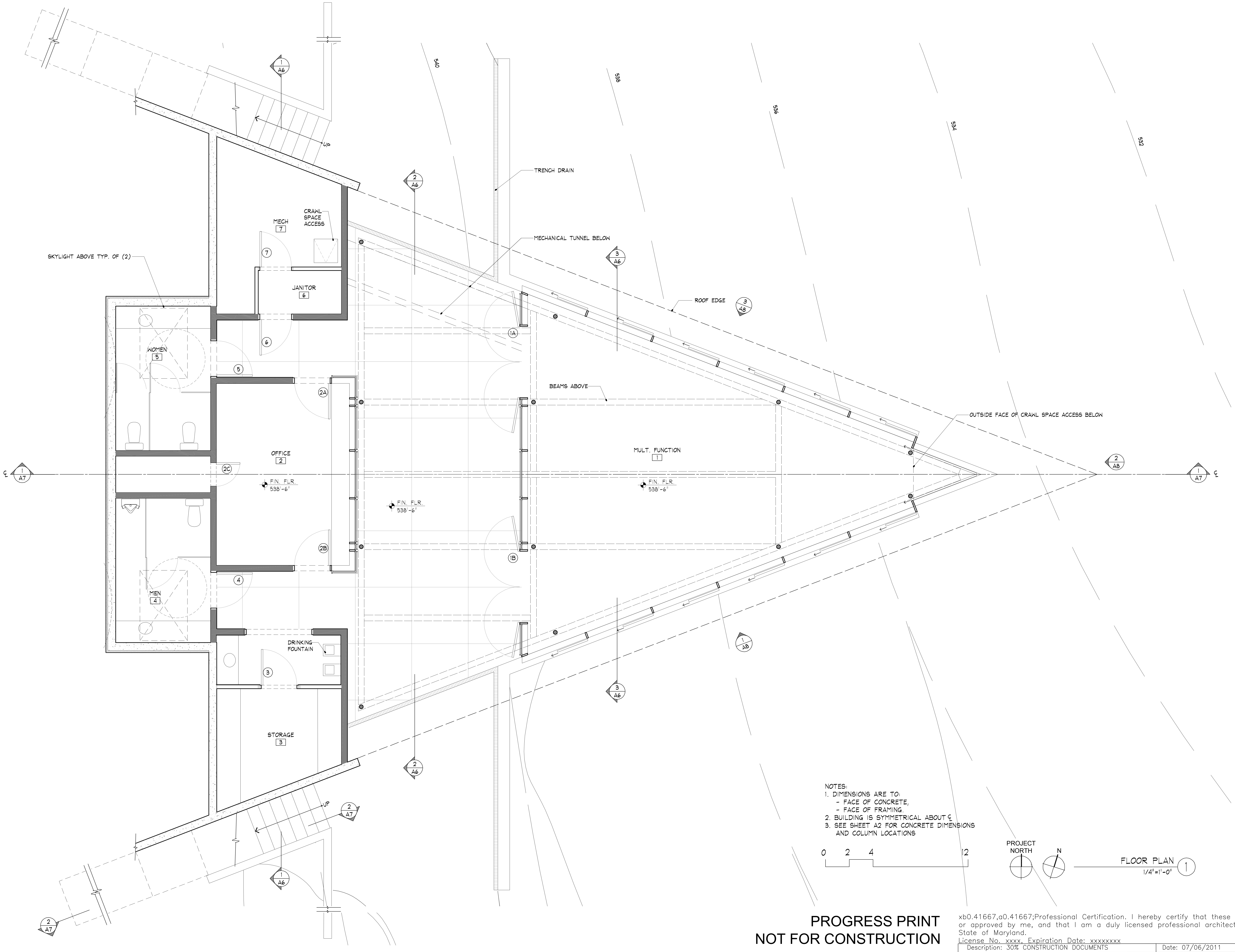

NOTES:
1. DIMENSIONS ARE TO:
   - FACE OF CONCRETE,
   - FACE OF FRAMING
2. BUILDING IS SYMMETRICAL ABOUT ℄
3. SEE SHEET A2 FOR CONCRETE DIMENSIONS AND COLUMN LOCATIONS

FLOOR PLAN ①
1/4"=1'-0"

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Engineer AMT	Date	Checked By:	Region	Date		Date
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SEAL:

Floor Plan
Little Bennett Regional Park
Day Use Area
SCALE: AS SHOWN
WSSC Grid Map
#234NW14

A3
SHEET3 of 10

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PARK CODE: A26 PLAN SCANNED: FINAL SCANNED:

NOTES:
1. DIMENSIONS ARE TO:
- FACE OF CONCRETE,
- FACE OF FRAMING
2. BUILDING IS SYMMETRICAL ABOUT ℄

ROOF PLAN ①
1/4"=1'-0"

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SEAL:

Roof Plan
Little Bennett Regional Park
Day Use Area
SCALE: AS SHOWN

WSSC Grid Map
#234NW14

A4

SHEET4 of 10

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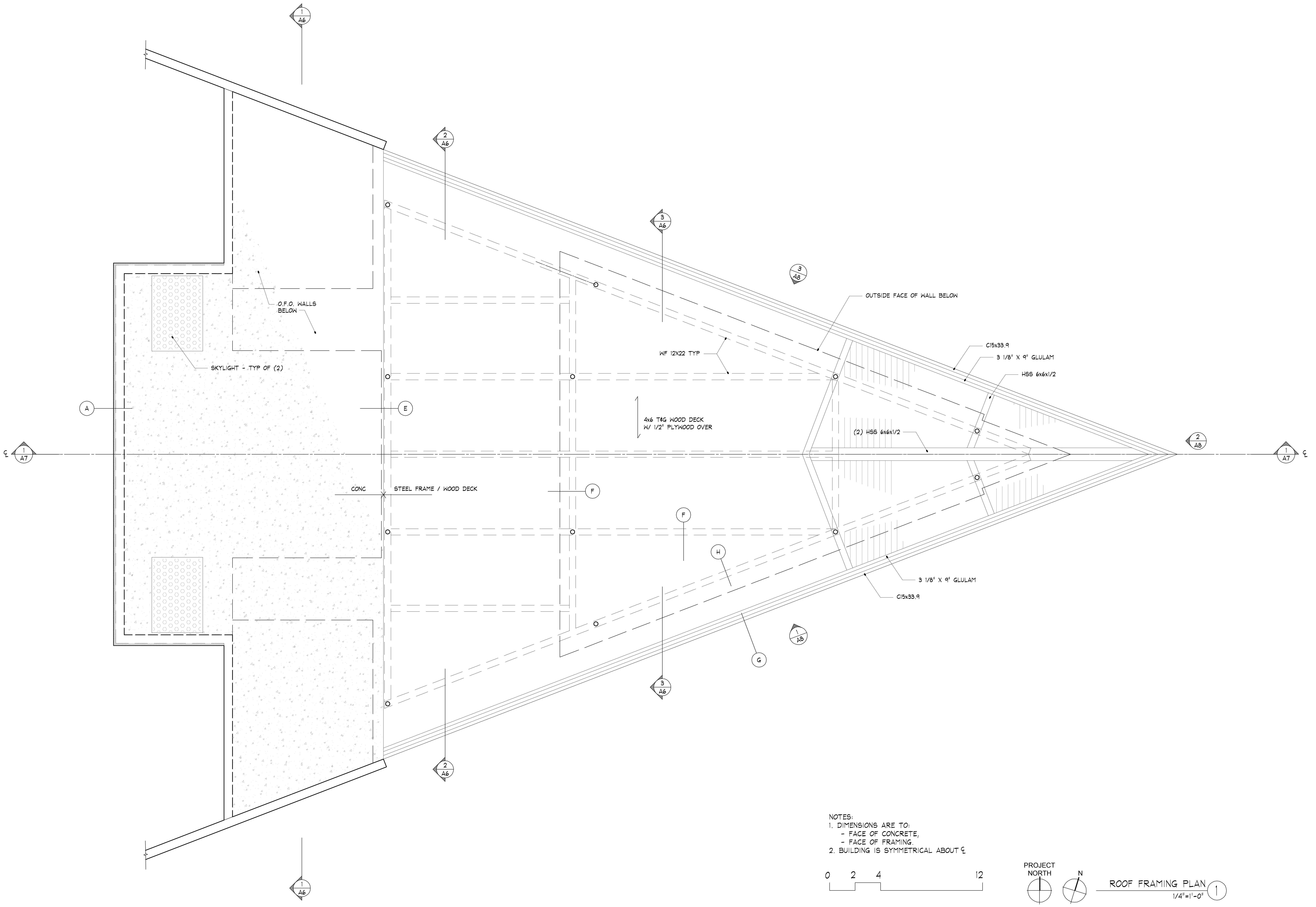

NOTES:
1. DIMENSIONS ARE TO:
   - FACE OF CONCRETE,
   - FACE OF FRAMING
2. BUILDING IS SYMMETRICAL ABOUT ℄

ROOF FRAMING PLAN ①
1/4"=1'-0"

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Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

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Rev. No.	Date	Description

SEAL:

Roof Framing Plan

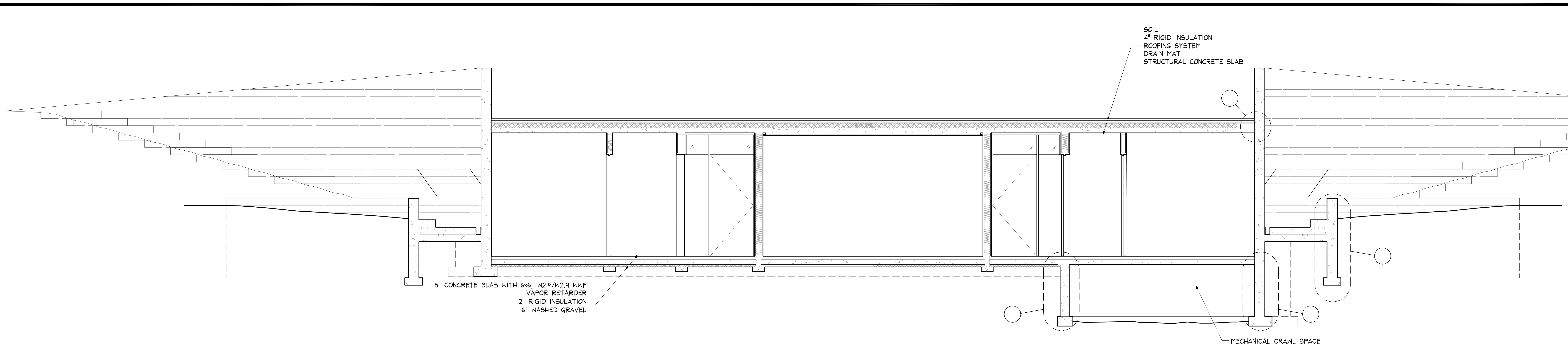
Little Bennett Regional Park
Day Use Area

SCALE: AS SHOWN

WSSC Grid Map
#234NW14

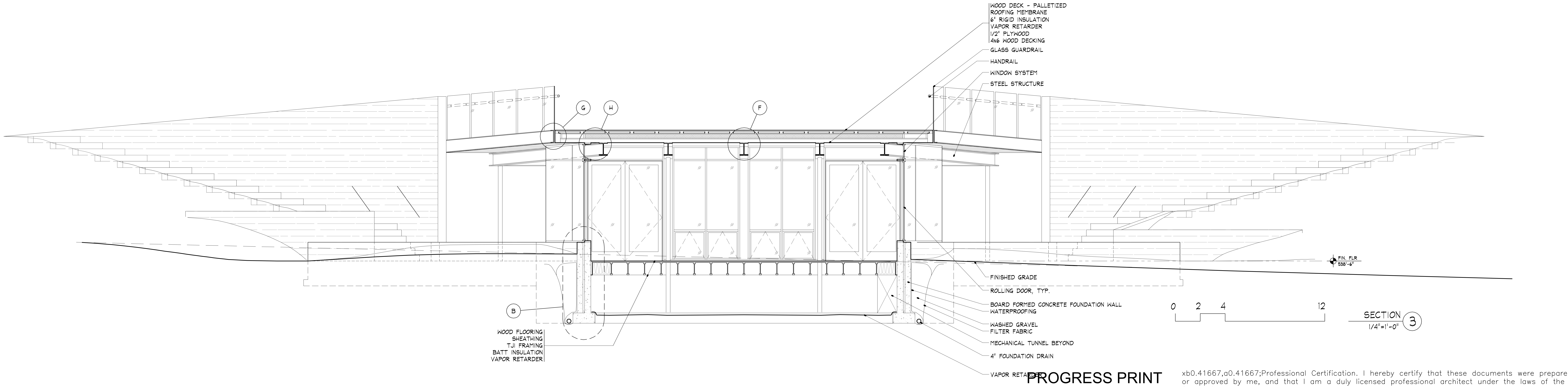
A5

SHEET5 of 10



SECTION 1
1/4"=1'-0"

SECTION 2
1/4"=1'-0"



SECTION 3
1/4"=1'-0"

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SEAL:

Sections
Little Bennett Regional Park
Day Use Area
SCALE: AS SHOWN
WSSC Grid Map
#234NW14

A6

SHEET6 of 10

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SECTION ①
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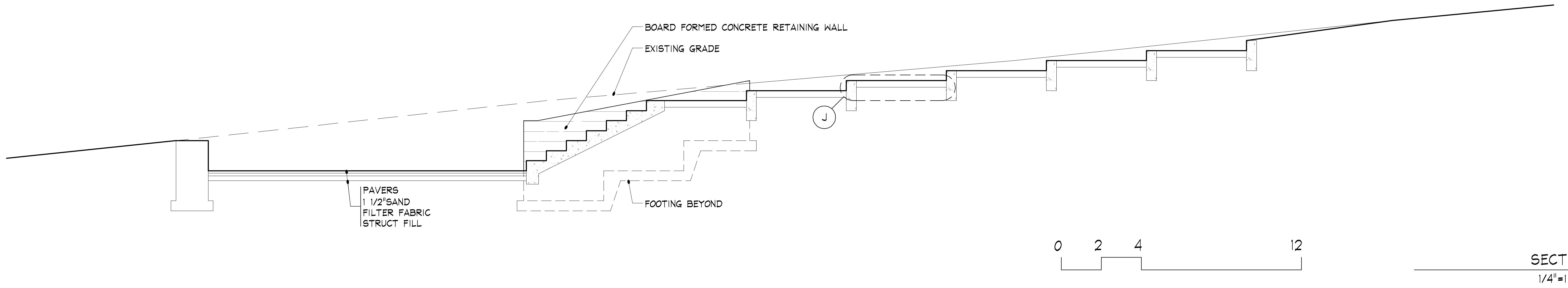

SECTION ②
1/4"=1'-0"

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NOT FOR CONSTRUCTION

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License No. xxxx, Expiration Date: xxxxxxxx

Description: 30% CONSTRUCTION DOCUMENTS Date: 07/06/2011

DESIGN			REVIEW AND APPROVAL		REVIEW AND APPROVAL	
M–NCPPC						
Landscape Architect	Date	Checked By:	Park Development	Date	Superintendent of Parks	Date
Architect CUTLER ANDERSON ARCHITECTS	Date	Checked By:	Central Maintenance	Date	Park Police	Date
Engineer AMT	Date	Checked By:	Region	Date		Date
Drawn by	Date	Checked By:	Natural Resources	Date		Date

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:

REVISIONS

Rev. No.	Date	Description

SEAL:

Sections

Little Bennett Regional Park
Day Use Area

WSSC Grid Map
#234NW14

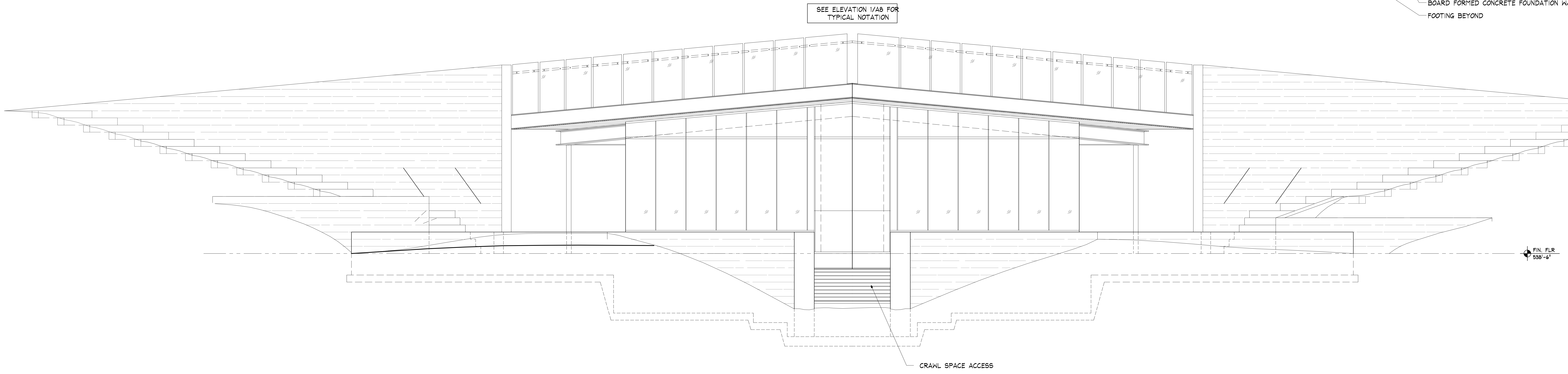
SCALE: AS SHOWN

A7

SHEET7 of 10

PARK CODE: A26 PLAN SCANNED: FINAL SCANNED:

ELEVATION - SOUTH ①
1/4"=1'-0"



ELEVATION - EAST ②
1/4"=1'-0"

0 2 4 12

ELEVATION - NORTH ③
1/4"=1'-0"

PROGRESS PRINT
NOT FOR CONSTRUCTION

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License No. xxxx, Expiration Date: xxxxxxxx
Description: 30% CONSTRUCTION DOCUMENTS Date: 07/06/2011

DESIGN
M-NCPPC
Landscape Architect Date Checked By:
Architect Date Checked By:
CUTLER ANDERSON ARCHITECTS
Engineer Date Checked By:
AMT
Drawn by Date Checked By:

REVIEW AND APPROVAL
Park Development Date
Central Maintenance Date
Region Date
Natural Resources Date

REVIEW AND APPROVAL
Superintendent of Parks Date
Park Police Date
Date
Date

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:
REVISIONS

Rev. No.	Date	Description

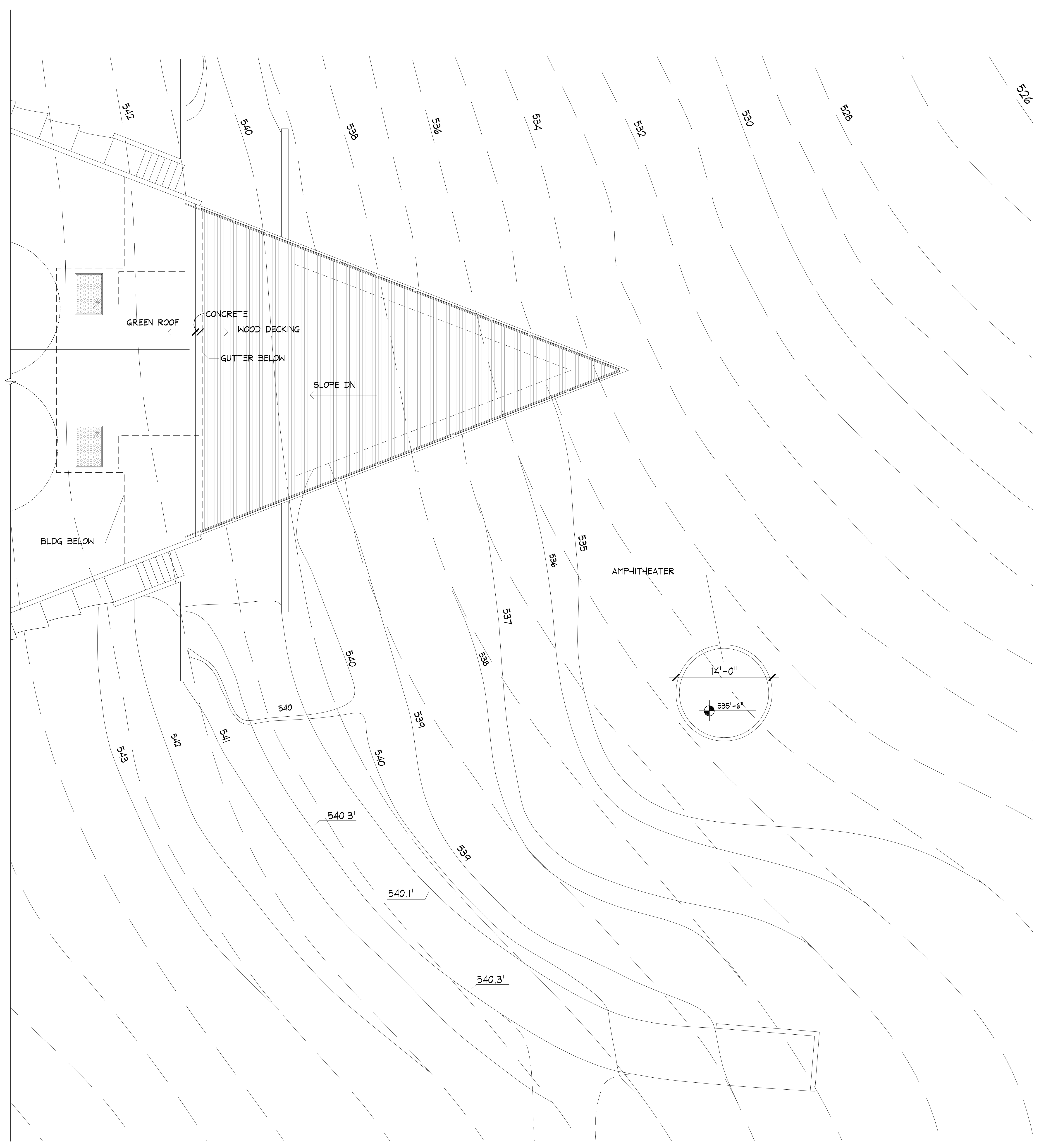
SEAL:

Elevations
Little Bennett Regional Park
Day Use Area
SCALE: AS SHOWN
WSSC Grid Map
#234NW14

A8

SHEET8 of 10

PROJECT NORTH
N
ENLARGED PLAN ②
1/16"=1'-0"



0 2 4 12

PROJECT NORTH
N
ENLARGED PLAN ①
1/16"=1'-0"

PROGRESS PRINT
NOT FOR CONSTRUCTION

xb0.41667,a0.41667;Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional architect under the laws of the State of Maryland.
License No. xxxx, Expiration Date: xxxxxxxx

Description: 30% CONSTRUCTION DOCUMENTS
Date: 07/06/2011

DESIGN
M–NCPPC
Landscape Architect Date Checked By:
Architect Date Checked By:
CUTLER ANDERSON ARCHITECTS
Engineer Date Checked By:
AMT
Drawn by Date Checked By:

REVIEW AND APPROVAL
Park Development Date
Central Maintenance Date
Region Date
Natural Resources Date

REVIEW AND APPROVAL
Superintendent of Parks Date
Park Police Date
Date
Date

The Maryland-National Capital Park and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:

REVISIONS

Rev. No.	Date	Description

SEAL:

Enlarged Site Plan

Little Bennett Regional Park
Day Use Area

WSSC Grid Map
#234NW14

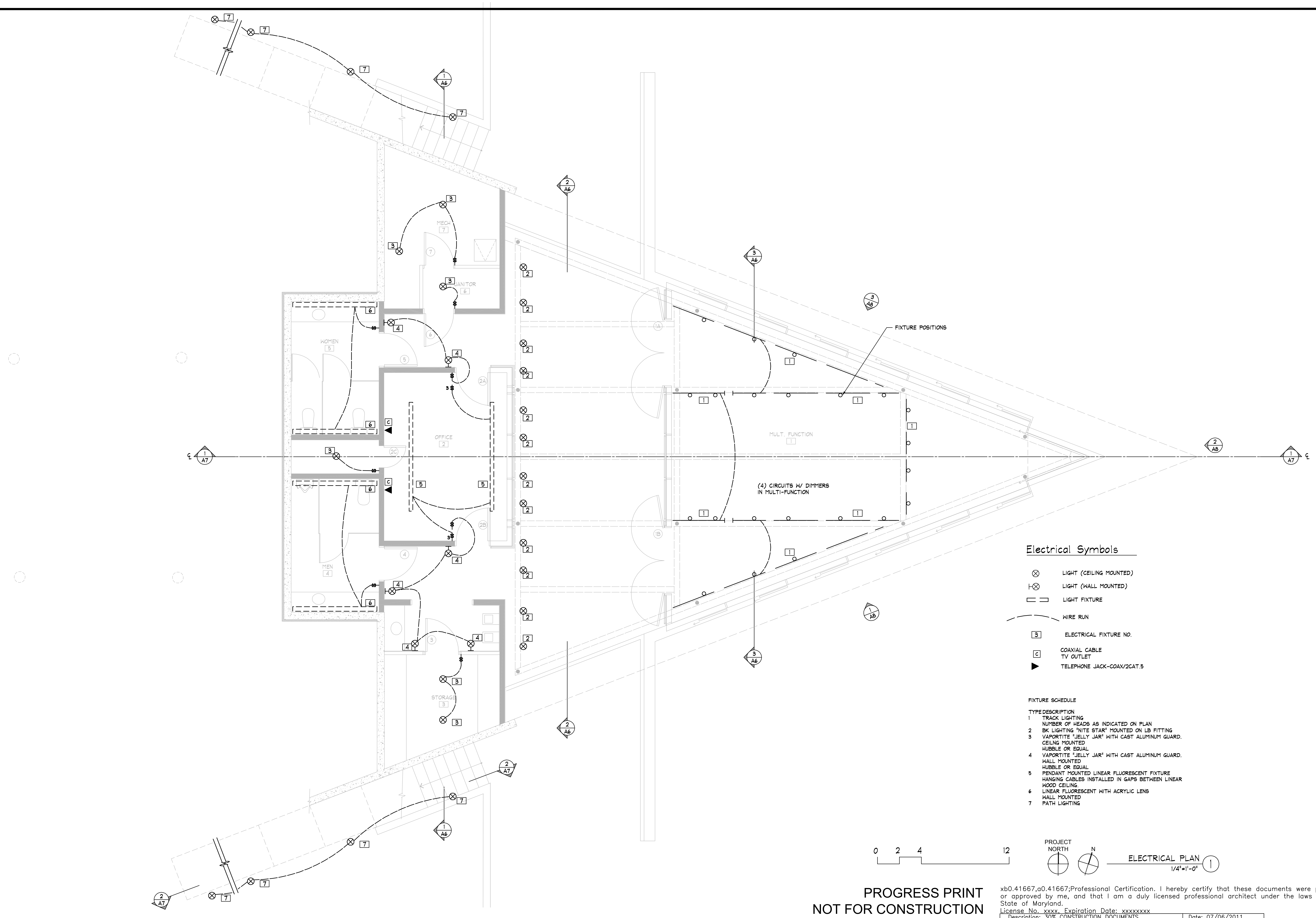
SCALE: AS SHOWN

A9

SHEET9 of 10

X:\Rockville\108-157.008 – Little Bennett Park\09-Communications\CAD\2011-06-28 CAD to Cutler Anderson\ACAD2007-XBO-01-108157008.dwg Model Plotted By: Harper, Chuck, 6/13/2006 4:46 PM, ----

PARK CODE: A26 PLAN SCANNED: FINAL SCANNED:



Electrical Symbols

⊗	LIGHT (CEILING MOUNTED)
⊢⊗	LIGHT (WALL MOUNTED)
▭ ▭	LIGHT FIXTURE
– – –	WIRE RUN
3	ELECTRICAL FIXTURE NO.
C	COAXIAL CABLE TV OUTLET
▶	TELEPHONE JACK-COAX/2CAT.5

FIXTURE SCHEDULE

TYPE	DESCRIPTION
1	TRACK LIGHTING NUMBER OF HEADS AS INDICATED ON PLAN
2	BK LIGHTING "NITE STAR" MOUNTED ON LB FITTING
3	VAPORTITE "JELLY JAR" WITH CAST ALUMINUM GUARD. CEILNG MOUNTED HUBBLE OR EQUAL
4	VAPORTITE "JELLY JAR" WITH CAST ALUMINUM GUARD. WALL MOUNTED HUBBLE OR EQUAL
5	PENDANT MOUNTED LINEAR FLUORESCENT FIXTURE HANGING CABLES INSTALLED IN GAPS BETWEEN LINEAR WOOD CEILING.
6	LINEAR FLUORESCENT WITH ACRYLIC LENS WALL MOUNTED
7	PATH LIGHTING

0 2 4 12

PROJECT NORTH N

ELECTRICAL PLAN ①
1/4"=1'-0"

PROGRESS PRINT
NOT FOR CONSTRUCTION

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The Maryland-National Capital Park
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Montgomery County Department of Park and Planning
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Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:

REVISIONS

Rev. No.	Date	Description

SEAL:

Electrical Plan

Little Bennett Regional Park
Day Use Area

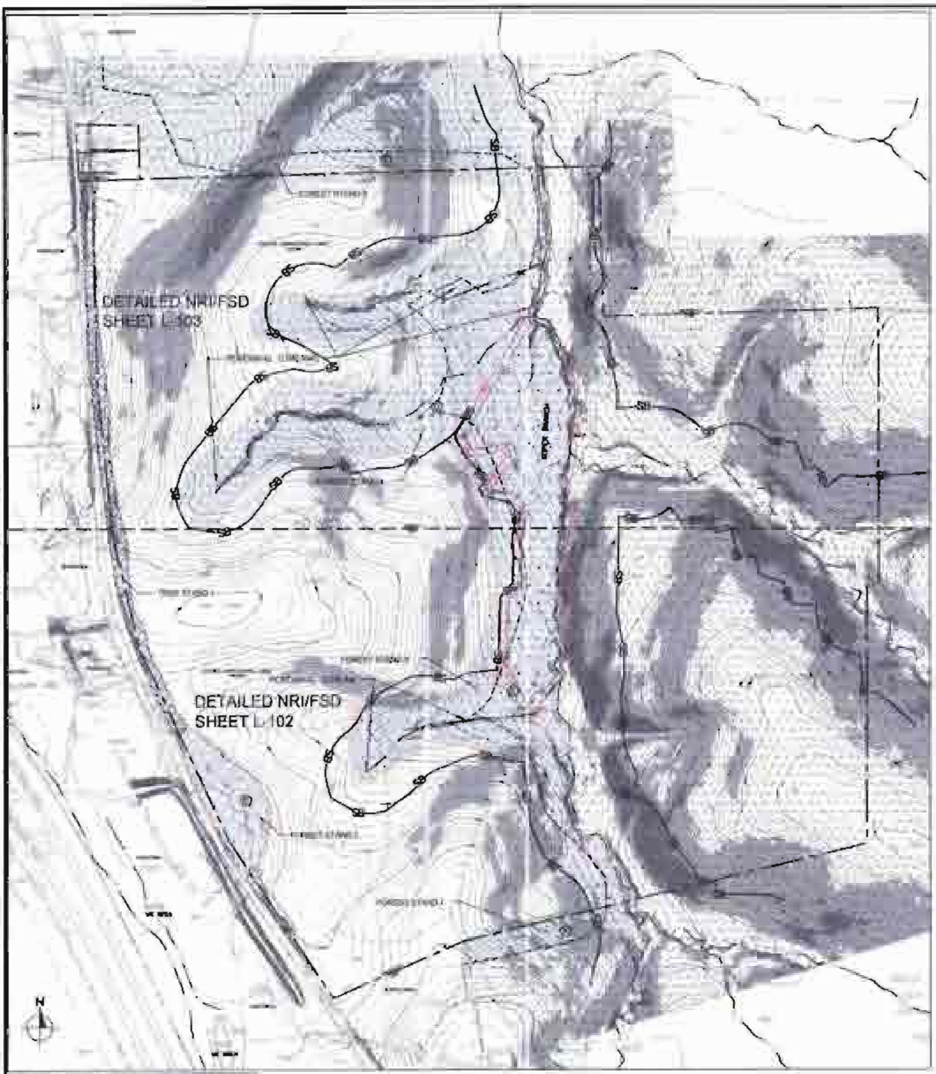
SCALE: AS SHOWN

WSSC Grid Map
#234NW14

ME1

SHEET10 of 10

NRI / FSD



LEGEND

	[illegible]
	[illegible]
	[illegible]
	[illegible]
SB	[illegible]
▭	[illegible]
▭	FOREST STAND
▭	FOREST STAND ON SITE
▭	[illegible]
	[illegible]
	[illegible]
▨	[illegible] SLOPES
■	25% AND GREATER SLOPES
	[illegible]
⊙	[illegible]
	[illegible]

PROPERTY INFORMATION: [illegible]

VICINITY MAP

1" = 2000'

MONTGOMERY COUNTY

MAPPED SOIL TYPES

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

NARRATIVE DESCRIPTION:

THE PARCEL UNDER CONSIDERATION IS COMPRISED OF THREE PROPERTIES ALL OF WHICH FRONT FREDERICK ROAD JUST NORTH OF THE ENTRANCE TO LITTLE BENNETT REGIONAL PARK IN CLARKSBURG, MD. THE PROPERTIES, ALL OF WHICH ARE OWNED BY M-NCPPC, ARE PROPOSED TO BE ADDED TO AND DEVELOPED AS A DAY USE AREA FOR LITTLE BENNETT REGIONAL PARK. THE PARK BOUNDERS THE PARCEL TO THE NORTH AND EAST. TO THE SOUTH THERE IS AN [illegible] ACRE AGRICULTURAL/RESIDENTIAL PROPERTY. ACROSS FREDERICK ROAD, TO THE WEST, ARE NUMEROUS SMALL PARCELS CURRENTLY OCCUPIED BY SMALL INDUSTRIES AND RESIDENCES.

THE LARGEST OF THE PROPERTIES, FORMERLY USED FOR CROP CULTIVATION, IS [illegible] ACRES. THE MAJORITY OF THE PROPERTY IS CURRENTLY IN A MEADOW STATE WITH FESCUE AS THE DOMINANT SPECIES THOUGH MANY NATIVE GRASSES AND WILDFLOWERS CAN BE FOUND IN THE MATRIX. THE PROPERTY IS BORDERED ON ALL SIDES BY FOREST AND TREE STANDS WHICH ARE DESCRIBED IN MORE DETAIL BELOW. SOPER BRANCH RUNS FROM SOUTH TO NORTH ALONG THE EASTERN BOUNDARY OF THE PROPERTY. FORESTED WETLAND OCCURS IN THE CENTRAL EASTERN PORTION OF THE PROPERTY ALONG THE WESTERN BANK OF THE STREAM. SMALLER STREAMS FEED INTO SOPER BRANCH FLOWING WEST TO EAST FROM THE LOWEST POINTS OF THE SITE. THESE PERENNIAL STREAMS ARE SURROUNDED BY FORESTED BUFFER AREAS. THE FORESTED PENINSULAS ON THE NORTHERN EDGE OF THE PROPERTY IS ON THE STEEPEST SLOPES OF THE SITE, 25% AND GREATER. THERE ARE NO STRUCTURES OR BUILDINGS ON THIS PROPERTY.

TREE STAND #1 BORDERS FREDERICK ROAD AND INCLUDES TYPICAL EARLY SERAL SPECIES INCLUDING ACER SACCHARINUM, MORUS ALBA, ROBINIA PSEUDOACACIA, ACER RUBRUM, AND CELTIS OCCIDENTALIS.

THE TWO SMALLER PROPERTIES, TO THE NORTH, ARE EACH UNDER HALF AN ACRE. IN PRACTICE, THE TWO PROPERTIES ARE TREATED AS ONE. THE SOUTHERN OF THE TWO IS THE SITE OF A SINGLE FAMILY RESIDENCE AND INCLUDES FRONT AND BACK YARDS, SHEDS, PLAY EQUIPMENT AND A DRIVEWAY. THE DRIVEWAY CONTINUES ON TO THE NORTHERN PROPERTY WHICH ALSO INCLUDES A SIDE YARD.

INDIVIDUAL FOREST STANDS ARE DESCRIBED BELOW. STAND DELINEATION WAS MADE BASED ON FIELD OBSERVATION, AERIAL PHOTOGRAPHY, TOPOGRAPHY, AND SPECIES DOMINANCE.

GENERAL NOTES

1. THE SOURCE OF THE PROPERTY BOUNDARIES ON THIS PLAN IS FROM MONTGOMERY COUNTY GIS.
2. PARCELS ARE ZONED RDT.
3. THE TOPOGRAPHY SHOWN ON THIS PLAN IS FROM MONTGOMERY COUNTY GIS.
4. THE SITE IS LOCATED WITHIN THE LITTLE BENNETT CREEK WATERSHED WHICH IS DESIGNATED USE III.
5. SOPER BRANCH IS DESIGNATED AS A USE CLASS III STREAM.
6. THERE IS NO FLOODPLAIN ON THIS SITE AS DETERMINED FROM FEMA FLOOD MAP [illegible].
7. WETLAND DELINEATION OCCURRED ONSITE ON [illegible] AND WAS SUPPLEMENTED BY THE NWI MAP.
8. THE SITE IS NOT WITHIN A SPECIAL PROTECTION AREA.
9. THERE ARE NO KNOWN RECORDS OR READILY OBSERVABLE ARCHAEOLOGICAL, HISTORICAL OR CULTURAL FEATURES OR SCENIC ROADS ON OR IN THE IMMEDIATE VICINITY OF THIS PROPERTY. THE WESTERN BOUNDARY OF THE PROPERTY IS FORMED BY MD ROUTE 355 (FREDERICK ROAD) WHICH IS CONSIDERED A HISTORIC ROAD.
10. FIELD WORK CONDUCTED BY [illegible] OF A. MORTON THOMAS AND ASSOCIATES ON [illegible] 2010. TREES WERE MEASURED USING A D TAPE.
11. THERE ARE NO KNOWN RECORDS NOR READILY OBSERVABLE RARE, THREATENED OR ENDANGERED SPECIES NOR CRITICAL HABITATS ON THE SITE.
12. THE SPECIMEN TREES ON THE SUBJECT PROPERTY ARE SHOWN ON THE DETAILED NRI/FSD (SHEETS L-102 AND L-103).
13. THERE ARE NO MONTGOMERY COUNTY OR STATE CHAMPION TREES ON THIS PARCEL. NO TREES ON THE PARCEL HAVE A DBH ≥ 75% OF THE COUNTY OR STATE CHAMPION.
14. AN APPROVED NRI/FSD IS VALID FOR FIVE YEARS FROM THE DATE OF SIGNATURE BY STAFF, OR UNTIL INFORMATION USED TO PREPARE THE NRI/FSD CHANGES. NRI/FSD'S WILL BE REQUIRED TO BE REVISED AND RE-APPROVED IF THE BASE INFORMATION OR PROJECT LIMITS CHANGE SIGNIFICANTLY.

SUMMARY TABLE (FOR PROJECT LIMITS)

EXISTING FOREST	= 77.41 ACRES
WETLANDS (EXCLUDING THOSE ASSOCIATED WITH SEEPS & STREAMS)	= 0.42 ACRES
FORESTED WETLANDS ([illegible])	= 0.41 ACRES
STREAM BUFFER	= 51.87 ACRES
FORESTED STREAM BUFFER	= 45.58 ACRES
100 YEAR FLOODPLAIN	= 0.00 ACRES

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

APPROVED

[illegible] 420010790

Date Approved: [illegible]

Expiration Date: [illegible]

GRAPHIC SCALE

(IN FEET)

CERTIFICATION

I CERTIFY THAT THESE DOCUMENTS WERE PREPARED UNDER MY SUPERVISION AND THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND.

07/19/2010

STEVEN [illegible]

The Maryland-National Capital Park and Planning Commission

Montgomery County Department of Parks and Planning

PLANS ISSUED FOR

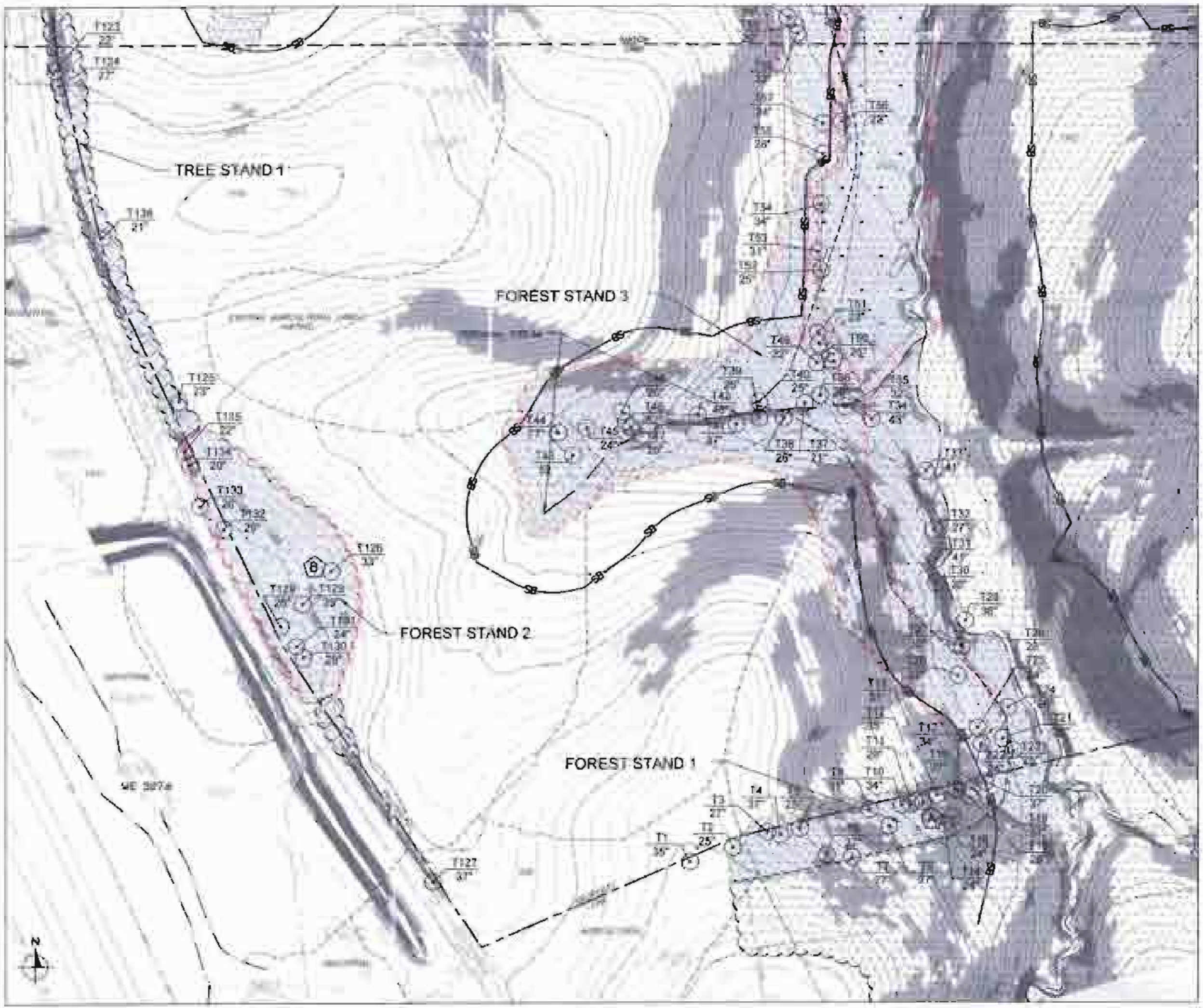
REVISIONS

DESIGN		REVIEW AND APPROVAL		REVIEW AND APPROVAL	
Landscape Architect	Checked By	Park Development	Date	Superintendent of Parks	Date
Architect	Checked By	[illegible]	Date	[illegible]	Date
Engineer	Checked By	Region	Date		Date
Drawn by	Checked By	[illegible]	Date		Date

LITTLE BENNETT REGIONAL PARK
DAY USE AREA

SIMPLIFIED NRI/FSD

L-101



LEGEND

☐ 15%-25% SLOPES

■ 25% AND GREATER SLOPES

CERTIFICATION

GRAPHIC SCALE

1 inch = 200 ft.

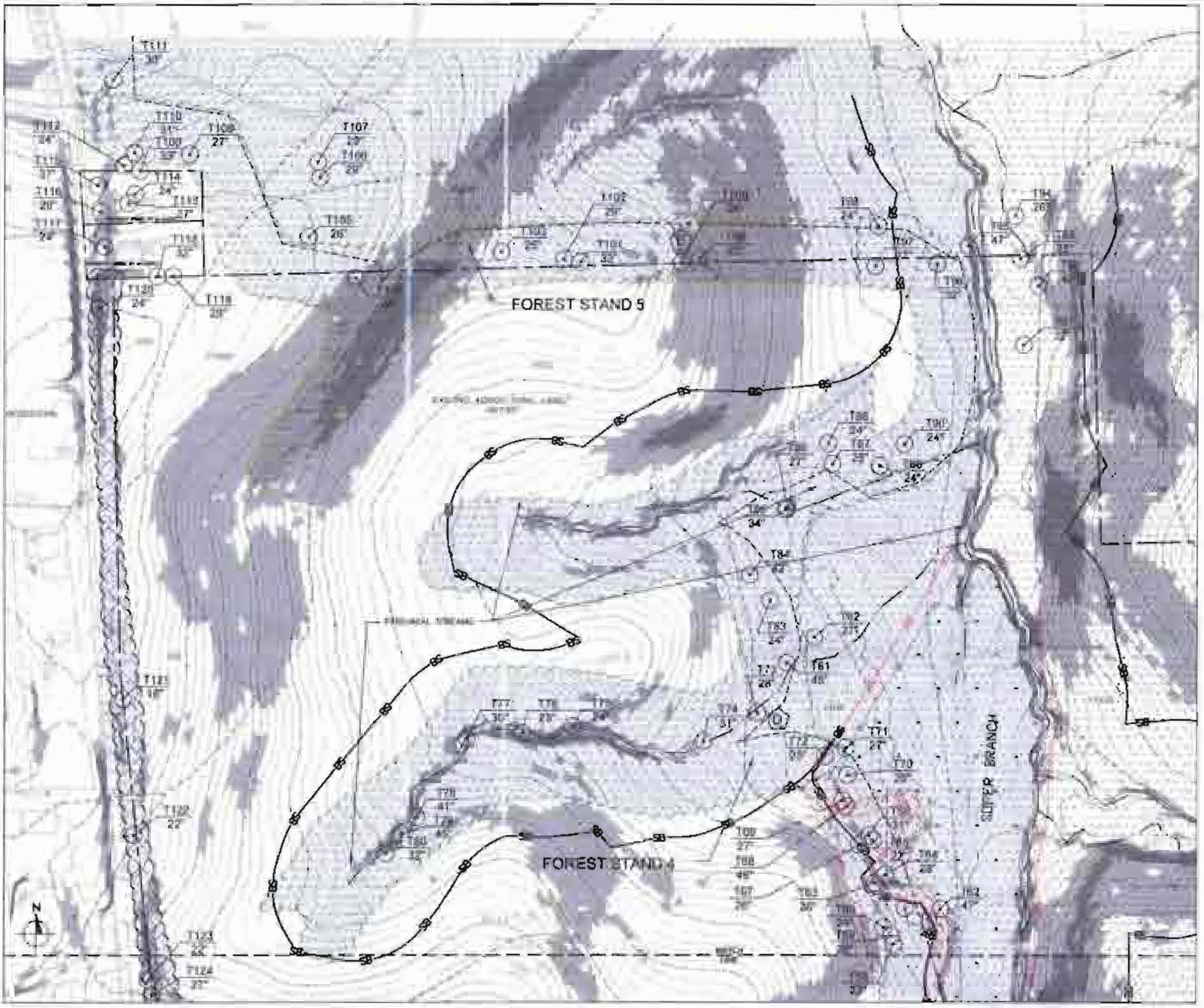
APPROVED

The Maryland-National Capital Park
and Planning Commission

LITTLE BENNETT REGIONAL PARK
DAY USE AREA

SCALE: 1" = 100'

DETAILED NRI/FSD
L-102



[illegible] — LOWLAND FOREST HAS A WELL STRATIFIED STRUCTURE WITH A STAND BASAL AREA OF [illegible] SF/AC. THE FOREST IS PRIMARILY SYCAMORE WITH DOMINANT TREES BETWEEN 24" AND 30" DBH. HOWEVER, LARGER TREES (>30" DBH) ARE NOT WELL REPRESENTED. INTERMEDIATE TREES (12"-18" DBH) ARE WELL REPRESENTED AND SMALLER (<12") UNDERSTORY TREES ARE WELL REPRESENTED. THIS FOREST HAS APPROXIMATELY [illegible] SIGNIFICANT OR SPECIMEN TREES OF PREDOMINANTLY SYCAMORE. MIXED WITH THE SYCAMORES ARE TULIP POPLARS AND OAKS ON THE HIGHER AREAS AND SILVER MAPLES ALONG THE MEADOW EDGE AND PERENNIAL STREAM BANK. CANOPY COVERAGE IS [illegible]. THE UNDERSTORY IS DOMINATED BY TULIP POPLAR WITH SOME DOGWOOD AND RIVER BIRCH ALSO REPRESENTED. UNDERSTORY COVERAGE IS [illegible]. THE SHRUB LAYER IS DOMINATED BY SPICEBUSH WITH SOME MULTIFLORA ROSE, GREENBRIAR AND VIBURNUM ALSO PRESENT. HERBACEOUS GROUND COVER IS DIVERSE; OF NOTE ARE PATCHES [illegible] WITH TRILLIUM AND SKUNK CABBAGE. HERBACEOUS COVERAGE IS [illegible]. THE AMOUNT OF DOWNED WOODY DEBRIS IS [illegible] AND INVASIVE PLANT COVER IS [illegible]. THE AREA HAS BEEN LABELED PRIORITY AREA 1 (HIGH) FOR RETENTION DUE TO THE PERENNIAL STREAMS AND WETLAND AND STREAM BUFFERS. EFFORTS SHOULD BE MADE TO MINIMIZE THE AREA OF DISTURBANCE.

[illegible] — HILLSIDE/UPLAND FOREST HAS A WELL STRATIFIED STRUCTURE WITH A STAND BASAL AREA OF [illegible] SF/AC. THE FOREST IS PRIMARILY MIXED OAKS INCLUDING WHITE, RED AND CHESTNUT WITH DOMINANT TREES BETWEEN 24" AND 30" DBH. LARGER TREES (>30" DBH) ARE SOMEWHAT REPRESENTED. INTERMEDIATE TREES (12"-18" DBH) ARE FAIRLY WELL REPRESENTED AND SMALLER (≤12") UNDERSTORY TREES ARE ABUNDANT. THE STAND IS LOCATED ON MODERATELY STEEP AND STEEP SLOPES. THE CANOPY AND SUBCANOPY LAYERS ALSO INCLUDE HICKORIES, A BLACK WALNUT [illegible], RED MAPLE, BLACK CHERRY, TULIP POPLAR AND, ALONG THE MEADOW EDGE, SILVER MAPLE. CANOPY COVERAGE IS [illegible]. THE UNDERSTORY CONSISTS OF BLACK CHERRY, RED MAPLE, HICKORIES AND OAKS. UNDERSTORY COVERAGE IS [illegible]. COMMON SHRUB SPECIES ARE THE VIBURNUM, SPICEBUSH AND MULTIFLORA ROSE. INVASIVE COVER IS [illegible]. HERBACEOUS GROUND COVER IS [illegible] AND THE AMOUNT OF DOWNED WOODY DEBRIS AND STANDING DEADWOOD IS AVERAGE. THIS FOREST HAS APPROXIMATELY 25 SIGNIFICANT OR SPECIMEN TREES ON SITE WHICH ARE PRIMARILY OAKS. THE AVERAGE SIZE IS BETWEEN 24" AND [illegible] DBH. THE AREA HAS BEEN LABELED PRIORITY AREA 1 (HIGH) DUE TO THE STEEP SLOPES, ERODIBLE SOILS AND THE PREVALENCE OF SPECIMEN TREES. EFFORTS SHOULD BE MADE TO MINIMIZE THE AREA OF DISTURBANCE.

LEGEND

[illegible]

FOREST STAND

WETLAND

SAMPLE POINT

THIS PLAN IS FOR NATURAL RESOURCE INVENTORY/FOREST STAND DELINEATION PLAN PURPOSES ONLY

CERTIFICATION

I CERTIFY THAT THESE DOCUMENTS WERE [illegible] MY SUPERVISION AND THAT I AM A DULY [illegible] ARCHITECT UNDER THE LAWS OF THE ST[illegible]

07/19/2016

GRAPHIC SCALE

APPROVED

6/22/16

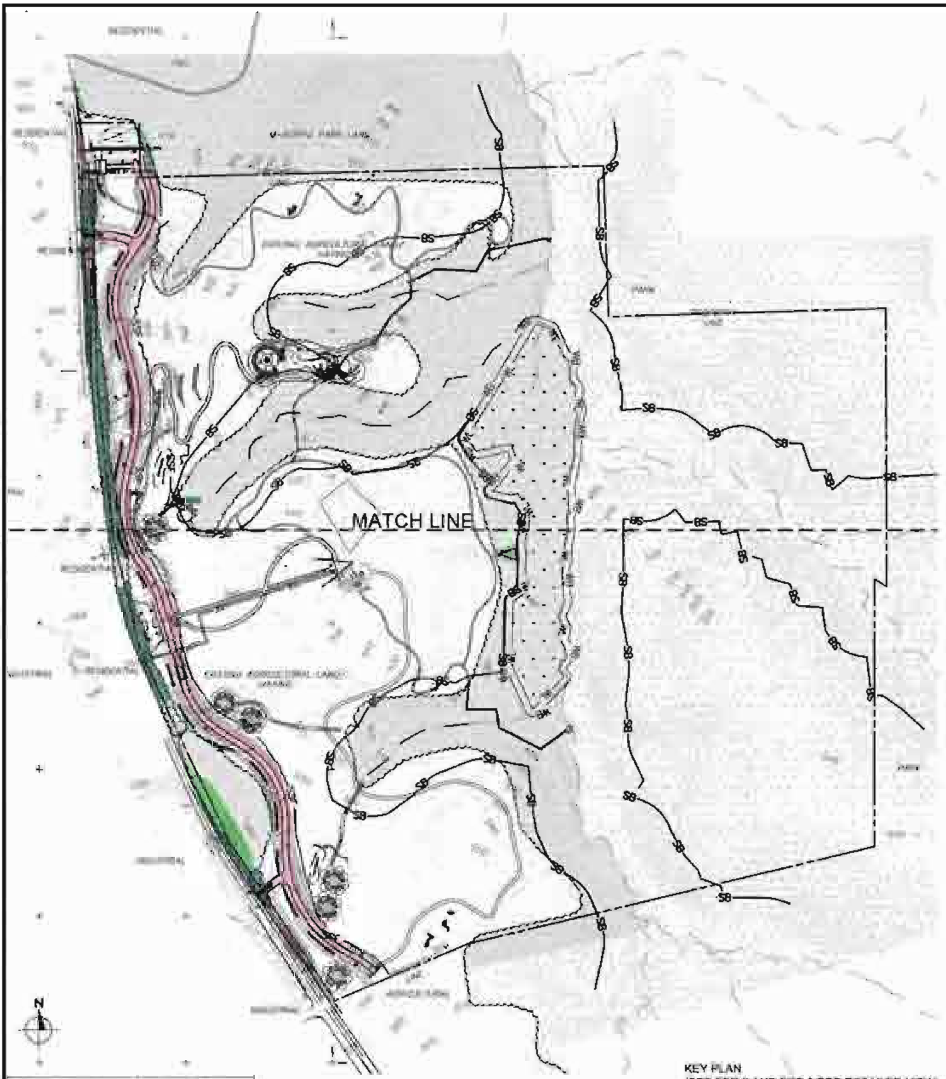
The Maryland-National Capital Park and Planning Commission

Montgomery County Department of Parks and Planning
[illegible]
Silver Spring, Maryland [illegible]

LITTLE BENNETT REGIONAL PARK
DAY USE AREA

DETAILED NRI/FSD
L-103

Preliminary Forest Conservation Plan



SUMMARY TABLE [illegible]

Total area of tract		137.82
Acreage of tract remaining in agriculture		0.00
Acreage of road and utility ROWs which will not be improved		0.00
Total acreage of existing forest		77.41
	Forest retained	76.59
	Forest cleared	0.82
Land use category: IDA		
	Afforestation threshold (15%)	0.00
	Conservation threshold (20%)	0.00
Acreage of forest within wetlands:		
	Retained	5.40
	Cleared	0.00
	Planted	0.00
Acreage of forest within 100 year floodplains:		
	Retained	0.00
	Cleared	0.00
	Planted	0.00
Acreage within stream buffers:		
	Retained	45.03
	Cleared	0.13
	Planted	0.00
Acreage within priority areas:		
	Retained	45.03
	Cleared	0.13
	Planted	0.00
Stream buffer		
	Length = 1310 feet	
	Average width 175 feet	

VICINITY MAP

1" = 2000'

MONTGOMERY COUNTY

PROPERTY INFORMATION: [illegible]

LEGEND

	[illegible]
	[illegible]
—LOD—	[illegible]
—SSF—	[illegible]

KEY PLAN
(SEE FCP-2 AND FCP-3 FOR DETAILED VIEW)

GRAPHIC SCALE

CERTIFICATION

I CERTIFY THAT I AM A DULY LICENSED LANDSCAPE ARCHITECT UNDER THE LAWS OF THE STATE OF MARYLAND, AND THAT THESE DOCUMENTS WERE PREPARED UNDER MY SUPERVISION AND IN COMPLIANCE WITH THE FOREST CONSERVATION LAW REQUIREMENTS.

STEVEN G. TORGERSON
LICENSE NUMBER MD. SLA #3520

DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Parks and Planning
8100 Brunett Avenue
Silver Spring, Maryland 20910
(301) 495-2535

PLANS ISSUED FOR:
REVISIONS

LITTLE BENNETT REGIONAL PARK
DAY USE AREA

PRELIMINARY FCP
FCP – 1

SCALE: 1" = 200'

LEGEND

SSF

SB

WL

WB

LOD

CERTIFICATION

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STEVEN S. TORGERSON
LICENSE NUMBER MD RLA #3320

DESIGN		REVIEW AND APPROVAL		REVIEW AND APPROVAL	
Landscape Architect	Date	Park Development	Date	Superintendent of Parks	Date
Architect	Date	Central Maintenance	Date	Park Police	Date
Engineer	Date	Region	Date		Date
Drawn By	Date	Special Resources	Date		Date

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR: 08/10/2011

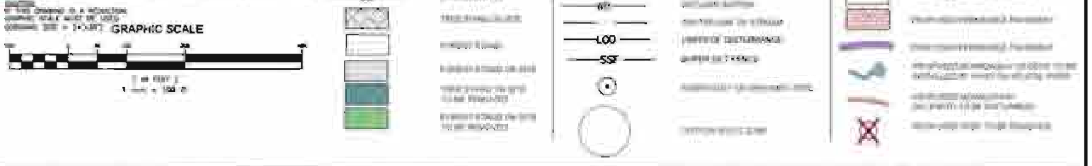
REVISIONS

Rev. No.	Date	Description

LITTLE BENNETT REGIONAL PARK
DAY USE AREA

SCALE: 1" = 200'

PRELIMINARY FCP
FCP-2



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STEVEN D. TORGERSON
LICENSE NUMBER MD RLA #

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Drawn By Date	Checked By	Natural Resources	Date		Date

The Maryland-National Capital Park and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:

REVISIONS		
Rev. No.	Date	Description

LITTLE BENNETT REGIONAL PARK
DAY USE AREA

Property information:

SCALE: 1" = 200'

PRELIMINARY FCP
FCP-3

Geotechnical Report

GEOTECHNICAL REPORT

LITTLE BENNETT REGIONAL PARK
MONTGOMERY COUNTY, MARYLAND

Prepared for:

A. MORTON THOMAS & ASSOCIATES, INC.
12750 Twinbrook Parkway
Rockville, MD 20852

Attn: Mr. Jerry C. Kavadias, PE

Prepared by:

T.L.B. Associates, Inc.
7280 Baltimore-Annapolis Blvd.
Glen Burnie, Maryland 21061

September 7, 2011

TLB
T.L.B. ASSOCIATES, INC.

7280 BALTIMORE ANNAPOLIS BOULEVARD
GLEN BURNIE, MARYLAND 21061
VOICE: 443-577-1600 / 301-621-0990
FAX: 443-577-1601 / 301-621-9737
www.tlbinc.net

Subsurface Explorations &
Geotechnical Engineering Consultants

THOMAS L. BROWN, CWD, P.E., President

September 7, 2011

A. Morton Thomas & Associates, Inc.
12750 Twinbrook Parkway
Rockville, MD 20852

Attn: Mr. Jerry C. Kavadias, PE
Vice President/Principal

RE: Little Bennett Regional Park
Proposed Day Use Area
Clarksburg, Montgomery County, MD
TLB Reference No. 10-030-A

Dear Mr. Kavadias,

Pursuant to your request, we have performed a geotechnical study in support of your design efforts on the referenced project. The following report summarizes the results of our subsurface explorations and laboratory testing and presents geotechnical recommendations for the planned park renovations to include roadways, aesthetic structures and stormwater management facilities.

If you have any questions regarding this report or when we can be of further assistance on this or other projects, please do not hesitate to call us.

Yours very truly,

T. L. B. ASSOCIATES, INC.

SOMBA NDETI
No. 26816

for Khadija Ngozi-Bullock
Project Engineer

Somba Ndeti, P.E.
Vice President

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ATTACHMENTS

1.0 PROJECT DESCRIPTION

The **Maryland-National Capital Park and Planning Commission** (M-NCPPC), and the Park Development Division of the Montgomery County Department of Parks is planning to renovate the Little Bennett Regional Park in Clarksburg, Maryland. **A. Morton Thomas and Associates, Inc**. (AMT) of Rockville, MD has been requested to perform engineering services for the project. AMT engaged **T.L.B. Associates, Inc.** (TLB) of Glen Burnie, Maryland to provide geotechnical input in support of the design and construction.

1.1 Existing Conditions

Little Bennett Regional Park is a 3,700-acre park which is bisected by Little Bennett Creek in Clarksburg, Maryland, Montgomery County, Maryland. Little Bennett Park is the largest park in the county with 11 historic sites, a 91-site campground, an 18-hole golf course and driving range, and over 23 miles of natural surface trails. The Site Location is indicated in the site location map denoted as Drawing No. 1. The park is bounded by North Frederick Road (MD Rte 355) to the west, Lewisdale Road to the north, and Burnt Hill Road to the east. Beyond the adjacent roadways, the park is surrounded by commercial properties to the west, and farmland and residential properties to the north, west and south.

The portion of the park that will be renovated as part of this project scope is located adjacent to North Frederick Road and consists of fields previously used as farmland, now overgrown with grass, intermittently bisected by wooded areas.

1.2 Existing Grades and Proposed Grading Plan

Existing topography is comprised of rolling grassy hills. Based on the topographic information provided, the site varies in elevation from a low of 502 feet near the northeast portion of the site (in tree-lined areas) to a high of about Elevation 580 feet in areas adjacent to North Frederick Road, on the northeast portion of the site.

The proposed grades will be similar to that existing with planned localized cut and fill depths on the order of -4 to +4 feet for planned roadway/parking construction.

1.3 Proposed Development

Information regarding the proposed development is based on plans provided by and discussions held with AMT. The project will consist of developing an undeveloped area of the park adjacent to North Frederick Road as a Day Use Area. The planned development will include the following:

- Entrance/Exit roadways via North Frederick Road (MD Rt. 355).
- Roadway with parking adjacent to North Frederick Road that will traverse the proposed entrance/exits. Proposed parking lots and portions of the proposed roadways leading to parking lot areas will be constructed of permeable pavement. The remainder of the

roadways, particularly entrance/exits will consist of asphalt pavement and/or gravel. Drawing No. 2 presents the proposed roadway to include the permeable/impermeable areas.

- A playground will be located on the northeast section of the site. The surface of the playground is planned to consist of recycled rubber.
- A triangular shaped building is proposed on the eastern portion of the site and is proposed to be bunkered into the hill side with the roof at grade (from east to west). Details regarding building construction and design loads were not known during the preparation of this report.
- Immediately southeast of the triangular shaped building is an area proposed to be used as an amphitheatre.
- Leading to and away from the proposed amphitheatre, playground, and throughout the Day Use Area will be walking trails consisting of compacted at-grade areas.
- A wooden bridge is proposed where planned walking trails cross existing streams.
- Group picnic areas will be dispersed throughout the park along the planned roadway and parking areas.
- The remaining site will include green space and/or native groundcover plantings.
- A septic field is preliminarily planned in the eastern, middle portion of the property.

Stormwater management facilities incorporating infiltration techniques are planned throughout the site consisting of permeable pavements.

Pavements are planned extending from and adjacent to North Frederick Road. Based on information provided by AMT from M-NPCPPC in coordination with SHA, typical volumes anticipated at each entrance are 29 trips per day. Two entrances are proposed along North Frederick Road, meaning a total of 58 trips per day for the site. The trips will predominantly consist of passenger vehicles with heavy truck traffic limited to less than once per day.

1.4 Scope of Services

TLB’s scope of services comprised of the following:

- Meetings and Coordination with the Design Team.
- Formulation of Field Investigation Program. Borings to be field located via instrumented survey by AMT.
- Mobilizing an All Terrain Vehicle (ATV) mounted drill rig to perform field exploratory studies at discrete locations.
- Drilling Borings B-1 through B-20 and IT-1, IT-2, IT-4, IT-6, IT-8, IT-9, and IT-10 located at the project site and as shown in Drawing No. 2, Site Exploration Plan.
- Performing infiltration tests in boreholes for ‘IT’ series borings (with the exception of IT-10) at approximate anticipated SWM facility depths.

- Perform informal percolation test at location of P-1 for planning purposes prior to the performance of the actual test by Montgomery County.

- Performing visual classification of the retrieved soil samples during the field explorations.
- Performing laboratory tests on representative samples.
- Analyzing soil and groundwater conditions encountered as they pertain to the design of proposed facilities and structures.
- Preparing this report describing the conditions encountered, providing recommendations for storm water management analysis and geotechnical-related aspects of the proposed infrastructure improvement.

The following paragraphs summarize the activities, conclusions, and recommendations resulting from TLB's efforts.

2.0 FIELD INVESTIGATIONS

2.1 Soil Borings

TLB's field explorations included:

- Notifying Miss Utility of the intent to excavate at the proposed boring locations prior to TLB's mobilization to the field to commence any intrusive explorations. TLB coordinated utility clearances with the relevant utility locators to confirm where the underground utilities were marked in the field.
- Mobilizing an All Terrain Vehicle (ATV) mounted drill rig to perform the planned field explorations. Borings were marked in the field via instrumented survey performed by AMT.
- Drilling twenty-six (26) soil test borings denoted in Drawing No. 3 – Site Exploration Plan - as B-1 through B-20 and IT-1, IT-2, IT-4, IT-6, IT-8, IT-9, and IT-10 to collect geotechnical information for design and construction of the proposed facilities. Boring IT-1 was combined with Boring B-1 due to the close proximity of the borings. The borings were drilled to depths of 10 to 15 feet.
- Performing standard penetration testing (SPT) in accordance with ASTM D 1586. SPT sampling was performed continuously in Boring B-1 and 'IT' series borings and at 2.5 feet intervals in the remaining 'B' series borings.
- Determining depth to groundwater table during and upon completion of drilling.
- Following the completion of geotechnical explorations, each of the borings was backfilled with auger cuttings and the site restored.

The approximate boring locations are shown in the attached Drawing No. 3.

2.2 Collecting Topsoil Samples

TLB obtained twenty (20) samples of topsoil throughout the site for textural and chemical analysis for lawn and planting areas. The topsoil samples were taken at or adjacent to Borings B-1, B-3 through B-7, B-9, B-11, B-14 through B-20, IT-2, IT-3, IT-5, IT-6, and IT-10.

2.3 Infiltration Testing

Field infiltration testing was performed per guidelines published by Montgomery County Maryland, Department of Permitting Services, Water Resources Section. Those guidelines are also in line with the Appendix D1 of the Maryland Department of Environment (MDE) 2009 Stormwater Design Manual**.**

TLB's exploration included:

- Drilling seven (7) borings with continuous SPT sampling denoted as IT-1, IT-2, IT-4, IT-6, IT-8, IT-9, and IT-10 to characterize the soil and groundwater conditions. The 'IT' series borings were drilled to depths of 10 feet. Boring IT-1 was combined with B-1 due to their close proximity. Infiltration testing was omitted from IT-10 at the client's request.
- Drilling boreholes without SPT sampling at locations adjacent to 'IT' series borings to infiltration test depth, and inserting a 4 inch PVC casing.
- The PVC casing was filled with water to a depth of 2 feet above the bottom of the bole and allowed to pre-soak for 24 hours.
- Performing infiltration tests twenty four hours later, by refilling the PVC pipe to a depth of 2 feet and monitoring water level for 4 hours on the hour.
- Infiltration tests performed in all designated 'IT' series boring locations (with the exception of Boring IT-10).

2.4 Informal Percolation Testing

By the time the field testing was being conducted, the County Percolation testing season had passed. The client desired to get an idea of the percolation capability of the site for planning purposes, in anticipation of performing the official testing during the County stipulated season, hence use of the term 'informal testing'.

Informal percolation testing was conducted at P-1 near planned septic field location. The informal percolation testing involved excavating a 15-foot test pit for assessment of soil strata and groundwater conditions. After leaving the test pit open overnight to observe dry conditions, five (5) additional test pits were excavated adjacent to the deep pit. Logs of the test pits are presented in Appendix A. At the bottom of each test pit, a test hole was dug using a post-hole digger. The test holes were approximately 8 to 10 inches in diameter and 24 to 30 inches in depth. Five gallons of water was put in each test hole as a presoak. The following day percolation test measurements were taken, which consisted of maintaining a known level of water in each test hole and measuring the water drop every 30 minutes for a total of 4 hours.

- Test pit, P1-G was excavated to 15 feet to assess groundwater conditions.
- Six test pits denoted as P-1A through P-1E and P-1G were performed in the area of P-1 for the purpose of informal field percolation testing.
- Informal percolation tests were performed in test pits P-1A through P-1E at test depths of 2.25 feet to 16 feet.

3.0 EXISTING INFORMATION

3.1 Geologic Setting

According to the Geologic Map of Maryland, Maryland Geologic Survey, dated 1968, the site is underlain by the Western Piedmont Metasedimentary Rocks, more specifically the Ijamsville Formation and the Marburg Schist. As mapped in this area, the formation consists of:

Ijamsville Formation – blue, green, or purple phyllite and phyllitic slate, with interbedded metasiltstone and metagraywacke.

Marburg Schist – bluish-gray to silvery-green, fine-grained quartz schist; intensely cleaved and closely folded, contains interbedded quartzites.

Above the parent rock is highly weathered rock or **Saprolite**, a soil byproduct of the weathering or decomposition of the parent rock. The Saprolite is usually reddish brown or grayish white and contains some structure that was present in the parent rock.

4.0 SUBSURFACE CONDITIONS

Logs describing the subsurface conditions encountered in each boring are presented as "Records of Soil/Rock Exploration" in Appendix A. The descriptive terminology used to classify the soils encountered during this study is summarized on the first page of Appendix A. A Generalized Subsurface Profile illustrating the soil and groundwater conditions that were encountered are presented as Drawings No. 4.

4.1 Soil Conditions

As indicated on the Records of Soil Exploration and the generalized subsurface profile, the following soil conditions were observed at the site:

The borings encountered 4 to 7 inches of topsoil. Beneath the topsoil, the borings encountered variable natural soils comprised of sandy clay and clayey sand soils with varying amount of gravel and quartzite at near surface grades overlying silty sand, silt and/or clay soils with varying amounts of quartz, mica and Saprolite.

The near surface (0.3 to 3 feet below grade) sandy clay and clayey sand soils were generally soft to stiff or loose to medium dense based on SPT N-values ranging from 3 to 11 blows per foot (bpf). Below a depth of 3 to 4 feet, the SPT N-values increased with depth to reflect medium stiff to hard or medium dense to dense soils based on N-values ranging from 7 bpf to over 51 blows for 4 inches of penetration.

Saprolite, soft, thoroughly decomposed rock, was found at depths extending below 4 to 6 feet, and extended to the termini of the borings. This material often contained quartzites and fractures of the less weathered parent rock. Saprolite was primarily encountered in the northern portion of the site below Elevations 569.7 to 485.7 feet.

4.2 Groundwater

Groundwater was not encountered during drilling and test pit operations in any of the locations. After drilling, the borings remained dry above cave-in depths on the order of 6 to 12.3 feet. Seasonal and/or long-term fluctuations of the site's groundwater levels should be anticipated.

4.3 Infiltration Tests

As described in Section 2.3. infiltration tests were conducted at six locations near planned SWM facilities (permeable pavements incorporating infiltration techniques). The infiltration test results are summarized as follows.

Table No. 1
Summary of Infiltration Test Results

Boring No.	Infiltration Test Depth (ft)	Soil at Test Depth	Average Infiltration Rate (in/hr)
B-1 / IT-1	4.0	Silty SAND	26.01
IT-2	5.0	SAPROLITE	0.93
IT-4	6.0	Silty SAND	<0.12
IT-6	5.0	Silty SAND	3.78
IT-8	4.0	Sandy SILT	1.35
IT-9	4.0	Sandy SILT	3.51

The low infiltration rate at IT-4 is likely attributed to large rock fragments near test depth.

4.4 Informal Percolation Test

As described in Section 2.4, informal percolation testing was conducted at P-1 near planned septic field location. The results are summarized as follows:

Table No. 2
Informal Percolation Test Measurements

Test Location	Test Depth from Surface (ft)	Measured Drop in Inches (Measured in 30-Minute Intervals)							
		1st Reading	2nd Reading	3rd Reading	4th Reading	5th Reading	6th Reading	7th Reading	8th Reading
P-1A	2.25	7.0	4.0	4.0	4.0	2.5	2.5	1.0	1.0
P-1B	2.50	3.0	4.5	4.5	6.0	3.0	3.0	1.5	1.5
P-1C	5.65	10.2	5.7	11.7	5.7	4.2	5.7	5.7	5.7
P-1D	16.00	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
P-1E	6.15	9.3	6.9	7.5	4.8	5.1	4.8	4.8	4.8

During the informal percolation test, caving conditions were observed in test holes P-1C and P-1E after the 5th and 3rd readings, respectively. Fractured rock was observed in the bottom 15 inches of test hole P-1D, no caving conditions were observed. Test holes P-1A and P-1B (near surface tests) were observed to experience caving conditions after the 6th reading. Based on the field measurements, the following results were tabulated.

Table No. 3

Summary of Informal Percolation Test Results

Test Location	Test Depth from Surface (ft)	Measured Drop in 30-Minute Intervals (in)								
		1st Reading	2nd Reading	3rd Reading	4th Reading	5th Reading	6th Reading	7th Reading	8th Reading	Stabilized Percolation Rate (Min/In)
P-1A	2.25	7.0	4.0	4.0	4.0	2.5	2.5	1.0	1.0	30.00
P-1B	2.50	3.0	4.5	4.5	6.0	3.0	3.0	1.5	1.5	20.00
P-1C	5.65	10.2	5.7	11.7	5.7	4.2	5.7	5.7	5.7	5.26
P-1D	16.00	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	3.57
P-1E	6.15	9.3	6.9	7.5	4.8	5.1	4.8	4.8	4.8	6.25

Decreasing percolation rates are likely attributable to caving conditions.

5.0 LABORATORY TESTS

5.1 Geotechnical Testing

Laboratory testing was conducted to develop geotechnical parameters to provide recommendations on the geotechnical related issues of the site. Representative soil samples retrieved from each of the SPT split spoons were preserved in glass jars. Bulk bag samples were obtained from select borings. All of the soil samples were visually classified by an engineer/geologist, and then representative SPT samples were subjected to a laboratory testing program which included the general index tests:

- Natural moisture content (ASTM D 2216)
- Atterberg limits (ASTM D 4318)
- Gradation analysis with hydrometer (ASTM D 422)
- Moisture-Density Relationship (ASTM D 1557)
- California Bearing Ratio (ASTM D 1883)

Laboratory test results are summarized as follows:

Table No. 4
Summary of Laboratory Test Results

Test	**Silty Sand**		**Sandy Clay/Silt**	
	Range	**Average**	**Range**	**Average**
Moisture Content (%)	7.8 to 17.0	11.7	4.4 to 33.9	18
Liquid limit (%)	34 to 40	36	31 to 42	36
Plasticity Index (%)	4 to 7	6	6 to 12	9
Passing #4 Seive (%)	23 to 83	61	76 to 100	92
Passing #200 Seive (%)	8 to 36	24	50 to 72	60
Passing 0.02mm Sieve (%)	13 to 26	20	40 to 56	46

The gradation analysis with hydrometer and the Atterberg limits test results were used to determine the Unified Soil Classification System (USCS) and the United States Department of Agriculture (USDA) textural soil classification for the soils. The classifications are summarized in the following table.

Table No. 5
Summary of Soil Classification at Infiltration Test Depths

Boring No.	Depth of Test (ft)	Soil Classification (USCS;USDA)	Average Infiltration Rate (in/hr)
B-1 / IT-1	4.0	silty Sand (SM; SANDY LOAM)	26.01
IT-2	6.0	*silty Gravel (GM; SANDY LOAM)	0.93
IT-4	4.0	silty Sand (SM; LOAM)	<0.12
IT-6	4.0	silty Sand (SM; SANDY LOAM)	3.78
IT-8	4.0	sandy Silt (ML; LOAM)	1.35
IT-9	2.0	sandy Silt (ML; SILT LOAM)	3.51

*Note – Classification of Gravel due to high rock content.

Two bulk bag samples obtained from Borings B-2 and B-17 were also tested for moisture density relationship (modified proctor) in accordance with ASTM D 1557 and California Bearing Ratio (CBR) in accordance with ASTM D 1883. The modified proctor results indicate a maximum dry density of 129.2 pcf corresponding to an optimum moisture content of 11 percent (%) for the clay soils tested from B-2. The bulk bag collected from Boring B-17 had a maximum dry density of 118.2 and corresponding optimum moisture content of 13.5 for the silt soils. Soaked CBR values of 0.4% and 0.8 % were obtained after a maximum swell of 16% and 11.1% for the soils from Borings B-2 and B-17, respectively.

The first part of Appendix B presents a compilation of the geotechnical laboratory tests results that were completed during this study. Included in that appendix is Summary of Laboratory Test Results and Atterberg Limits' Results, followed by plots of the gradation analysis, modified proctor, and CBR.

The remaining soil samples are being temporarily stored in our Glen Burnie, Maryland laboratory and are available for review. Forty-five (45) days following the submittal of this report, however, those samples may be discarded unless other arrangements are made.

5.2 Chemical Testing of Topsoil

Topsoil samples were obtained throughout the site and submitted for chemical analyses and grain size distribution with hydrometer to determine proper chemical components and textural classification of the soil to promote healthy lawn and shrubs. The topsoil test results are summarized below.

Table No. 6
Summary of Topsoil Chemical Analyses

Topsoil Sample No.	Soil pH	Phosphorus (P) (ppm)	Potassium (K) (ppm)	Calcium (Ca) (ppm)	Magnesium (Mg) (ppm)	Boron (B) (ppm)	Soluble Salts (mmhos/cm)	Organic Matter (%)	Organic Matter (ENR)*
B-1	5.1	140	167	717	97	0.1	0.19	2	79
B-3	5.5	40	43	712	81	0.1	0.08	2.3	88
B-4	5.9	40	39	828	113	0.2	0.16	2.8	97
B-5	5.7	29	42	634	98	0.1	0.09	2	83
B-6	6.2	17	30	805	86	0.1	0.05	1.9	80
B-7	7.6	16	51	3751	118	1	0.28	2.3	72
B-9	6.2	19	43	2066	97	0.4	0.36	2.1	74
B-11	5.9	26	65	1387	110	0.4	0.2	2.4	84
B-14	6.3	27	115	1335	154	0.5	0.18	2.6	89
B-15	5.9	24	64	889	115	0.3	0.15	2.3	86
B-16	7.4	31	74	3652	132	1	0.33	2.9	84
B-17	6.2	41	68	2136	131	0.4	0.29	2.9	89
B-18	5.6	27	40	785	106	0.2	0.13	2	81
B-19	5.1	20	29	548	50	0.1	0.11	1.7	77
B-20	5.3	75	47	402	63	0.1	0.1	1.9	82
IT-2	5.4	32	36	654	82	0.1	0.12	1.6	74
IT-3	6.2	22	48	1013	100	0.3	0.1	2.1	82
IT-5	5.9	31	45	751	80	0.2	0.08	1.9	80
IT-6	5.6	27	40	636	73	0.1	0.08	2.1	85
IT-10	7.8	28	55	3650	111	1	0.6	3	86

*Note: ENR denotes Estimated Nitrogen Removal

The majority of the topsoil samples classified as Loam with the exception of B-15 and B-16 which classified as Silt Loam and IT-10 which classified at Clay based on the USDA textural classification system. Topsoil test results are presented in Appendix B.

6.0 ENGINEERING ANALYSIS

The recommendations of the 1993 AASHTO Guide for Design of Pavement Structures were adopted to develop the pavement subgrade support conditions for the proposed paved roadway in the proposed Day Use Area. Subgrade soils will consist of low to medium plasticity sandy clay, sandy silt, clayey sand, or silty sand soils.

CBR tests were conducted on representative bag samples from Borings B-2 and B-17. Those results are presented in Appendix B, and indicate that the soaked CBR values for the natural subgrade soils are less than 1 percent. The amount of swelling in the CBR samples was very high and ranged from 11 to 16 percent.

6.1 Existing Drainage Conditions

Groundwater was not identified at any boring locations. However, the majority of the subgrade materials are anticipated to be comprised primarily of natural sandy clays, silty sand, sandy silt and clayey sands. Therefore, localized poor support conditions and frost susceptibility of the subgrade is a concern. The tendency of these types of materials to hold moisture can create support problems for the pavement during wet or freezing weather. Poor support conditions / frost susceptibility and high swell potential of the subgrade material would require undercutting and replacing the subgrade with good quality select fill material having good drainage characteristics. Due to the extent of poor support conditions along the full extent of the proposed roadway, thought should be given to thickening the gravel layer beneath pavements and the use of a geotextile fabric between the gravel layer and the natural, fine-grained soils. Please refer to the subsequent sections for additional information.

6.2 Frost Susceptibility

The subgrade materials encountered as described in Section 4.0 –Subsurface Conditions, were classified using Soil Frost Groups as recommended by the AASHTO Guide for Design of Pavement Structures. Based on the hydrometer test results from representative samples, and the unified soil classification, the percent by weight of tested material finer than 0.02 mm for the subgrade soils ranged between approximately 40 and 56 percent. Atterberg limit test results indicate that the Plasticity Index (PI) for the clay soils is between 6 and 12. Accordingly, these subgrade material fall within frost susceptibility Group F4 for the lean clays, corresponding to medium to high frost heave rate. The subgrade soils are thus prone to frost susceptibility. Those values indicate poor support conditions for the onsite soils.

For the project site, the depth to frost penetration is about 30 inches. Non-frost susceptible material should thus be provided to at least this depth. Based on the results of this investigation, and laboratory tests performed on representative soil samples, frost susceptible materials were encountered within the proposed roadway subgrades and throughout the site. As a result, non-frost susceptible material will be required for pavement construction. However, the subgrade soils in those sections are somewhat uniform. Therefore, if granular material is provided below the pavement section, the layer acts as a capillary break and lessens and/or eliminates the frost/heave effect on the pavement.

6.3 Asphalt Pavement Analysis

The project calls for construction of new pavements for parking and a bus loop. A concrete pavement section is desired in bus parking lanes, and all other areas are anticipated to consist of full depth asphalt pavement. TLB has provided a pavement analysis to determine the minimum pavement section that will be adequate to support the anticipated traffic loads.

The CBR values obtained from the laboratory test program were assigned to similar materials encountered in the various borings within the project limits. The average CBR value computed using this method was estimated to be 0.4 percent. Using the recommended correlation in the

1993 AASHTO Pavement Design Guide, a design CBR of 0.4 translates to a design subgrade resilient modulus of 540 psi.

Traffic data is needed for performing the engineering analysis to develop the pavement design recommendations. The recommendations of the 1993 AASHTO Pavement Design Guide are based on cumulative expected 18-kip equivalent single-axle load (ESAL). In order to complete this analysis, traffic information provided by M-NCPPC was used to predict the future traffic and cumulative ESALs. The provided traffic information indicates a volume of 58 trips per day with heavy truck traffic limited to once per day as summarized in Section 1.3

Axle classifications of the traffic data were not available. TLB reviewed traffic information from the Federal Highway Administration's (FHWA) Long Term Pavement Performance Program to develop the likely truck loadings. Based on the review, a truck factor of 1.1 was considered for design of the pavements. Using the available data, the calculated minimum design ESALs was were less than 10. Therefore, minimum 50,000 18-kip ESALs were used for design analysis, as summarized in Table below.

Table No. 7
Pavement Design Parameters

Design Pameter	**Asphalt Pavement Section**
Average Daily Traffic	58
Percent Heavy Trucks	1
Reliability Level	75%
Truck Factor (ESALs/Truck)	1.1
Flexible Pavement Design	
18-kip ESALs - 20-years life	*50,000
Initial Serviceability	4.2
Terminal Serviceability	2.4
Overall Standard Deviation	0.45
Subgrade Resilient Modulus	540

*Minimum design ESALs (calculated ESALs of less than 10)

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the subsurface conditions encountered, the site is considered moderately suitable for the planned development. The planned stormwater management facilities incorporating infiltration techniques are considered feasible, and subgrades are suitable for foundations for lightly loaded structures without major subgrade preparation.

The near surface soils are not considered suitable for support of pavements. Subgrade preparation will be required due to the moisture sensitive, and frost susceptible on-site soils with very low CBR values. Subgrade preparation will consist of the use of a thickened granular aggregate base layer in conjunction with a geotextile fabric for separation.

7.1 Pavement Design

There are two areas of different pavement sections desired, namely:

- ***Flexible pavement:*** The flexible pavement design and analysis was performed with the assistance of DARWin v.3.1 software program in conjunction with the 1993 AASHTO Pavement Design Guide.

- ***Permeable Pavement:*** As of writing of this report, the client did not know exactly the type of permeable pavement that was to be featured in the areas slated for permeable pavement. Accordingly, TLB assumed permeable pavers for the sake of providing some idea what thickness of pavement section to be anticipated in the permeable pavement areas. The Permeable Pavement design was accomplished by use of algorithms developed by Interlocking Concrete Pavement Institute (ICPI).

Due to the existing field conditions and the susceptibility of the material to moisture and frost effects as discussed in Section 6.3, a **maximum design CBR value of 0.4** is recommended. The recommended CBR value and subgrade modulus are based on the top 12 inches of subgrade material being compacted to 95 percent of their maximum dry unit weight as determined by AASHTO T-180 (ASTM D-1557). Upon stripping the exposed subgrade soil in areas to receive flexible pavement should be densified in place and then proof rolled using a loaded dump truck. Any yielding sections that cannot be densified in place should be undercut and constructed in strict adherence of the earthworks section of this report. Compaction is not recommended in areas to receive permeable pavers.

The analysis of the traffic data provided by the client indicated an average daily traffic volume of 58 vehicles per day and less than one heavy truck per day. The anticipated traffic corresponds to less than 10 18-kip ESALs. A minimum design value of 50,000 18-kip ESALs is recommended in the AASHTO Guide for Design of Pavement Structures. The results of the flexible pavement and of permeable pavement design are summarized in Appendix C. Based on those results, recommendations for the pavement sections are as follows.

7.1.1 Flexible Pavement Section

Based on the assumed minimum design ESALs and given the very low CBR values representing the in-situ soils, a very thick pavement section would be required necessitating expensive excavation and removal of materials. Consequently, we considered stabilizing the in-situ soil as a cost cutting measure alternative. We have presented two pavement sections for the flexible pavement, and we recommend that consideration be given to the stabilized subgrade section in lieu of the more than 2 feet of excavation.

The pavement sections are as follows for the Flexible Pavement:

Unstabilized Pavement Section

- 2.0 inches Hot Mix Asphalt Superpave 12.5mm, - PG 70-22 for Surface
- 3.0 inches Hot Mix Asphalt Superpave 19.0 mm, - PG 70-22 for Base course
- 26.0 inches Dense Graded Aggregate Base conforming to Table 901 A of Section 901.01 of the 2008 MD SHA Standard Specifications for Construction and Materials.
- Geotextile Class "ST" conforming to Section 921.09 of the MD SHA Standard Specifications should be placed on top of the existing subgrade for separation.

The recommended pavement section is total 31 inches.

Stabilized Subgrade Soils mixed with Aggregate Base

- 1.5 inches Hot Mix Asphalt Superpave 12.5mm, - PG 70-22 for Surface
- 3.0 inches Hot Mix Asphalt Superpave 19.0 mm, - PG 70-22 for Base course
- 15.0-inch Stabilized Subgrade soils/Aggregate Mixture (6 inches gravel and 9 inches of subgrade soils). The gravels could be asphalt millings or recycled concrete of CR-6 gradation.

The recommended pavement section is total 19.5 inches.

7.1.2 Permeable Pavement Section

Subgrade preparation for permeable pavement sections should be performed in accordance with the Earthworks section of this report. Permeable pavements should be constructed by contractors familiar with paver installation. For design purposes the following criteria should be met:

- Concrete pavers should be interlocking pavers with a minimum of 3 1/8 inch in thickness with No. 8 aggregate in openings overlying
- A minimum 2-inch bedding course consisting of no. 8 aggregate over
- 8 inches of No. 57 stone over
- 15 inches of No. 2 stone subbase
- Geotextile Class "ST" conforming to Section 921.09 of the MD SHA Standard Specifications should be placed on top of the existing subgrade for separation.

The recommended pavement section is total of 28 inches

A typical cross section showing permeable pavement above the recommended aggregate is attached as Drawing No. 5.

7.2 Earthworks

Based on existing and planned grades minor fill and cut on the order of ±4 feet is anticipated in localized areas of the site. Deeper excavations may be required to construct the proposed building on the eastern portion of the site. TLB understands that the excavated material is scheduled to be reused in fill areas across the site.

Subgrade Preparation

Prior to the placement of new fill, the construction area should be stripped to remove pavements, topsoil, and organic matter. Topsoil on the order of 4 to 7 inches in thickness was encountered within the borings.

Prior to placing any granular subbase, base course materials, or select backfill materials we recommend the exposed subgrades be densified in place and then proof-rolled. The exposed subgrades shall be inspected by a Geotechnical Engineer or a Technician working under his direction. Depending on the space constraints of the excavation, the exposed subgrades shall be proof-rolled with an approved roller. Proof-rolling shall be inspected by the Geotechnical Engineer or an experienced engineering technician. Upon completion of proof-rolling, the following criteria and remedial measures shall be adopted to confirm the adequacy of the subgrades:

➢ No yielding in the subgrades:	Subgrade is acceptable and ready to receive pavement layers.
➢ Yield of 1.0-inch or less:	Undercut 6 inches of the subgrade and replace with select fill material.
➢ Yield between 1.0 and 6.0 inches:	Undercut 12 inches of the subgrade and replace with select fill material.
➢ Yield of 6.0 inches or more:	Undercut 24 inches of the subgrade and replace with select fill material.

Compaction

All fill materials must be compacted in a controlled manner. Unless otherwise approved by the engineer based on in-situ tests of the compacted fill, we recommend the following compaction categories:

- Subgrade Fills -- All fills placed directly below foundations, slabs, or within the zone of influence - 95% AASHTO T-99 (ASTM D-698).

- Pavement subgrade and Trench Backfills should be compacted to at least 95% of AASHTO T-180 (ASTM D-1557).

Regardless of the category, we recommend that all site fills be placed in essentially horizontal layers or lifts having a minimum loose lift thickness commensurate with the equipment being utilized to perform the compaction. In no case however, should those lifts exceed eight (8) inches. Each lift should be uniformly compacted to equal or exceed the specified minimum percentage of the maximum dry unit weight.

Care should be taken not to over-compact subgrade soils in areas that will be used for infiltration techniques. Over-compaction of the soils will result in low infiltration rates.

On-Site Soils

As previously discussed, the on-site silty and clayey sand soils are expected to be excavated in some locations during subgrade preparation. These soils are generally considered suitable for use as backfill, and may be used as structural fill with approval by the Geotechnical Engineer. The contractor should refrain from using excavated clay/silt soils as backfill beneath and/or around the proposed structures and utilities.

It should be noted that the on-site soils are very moisture-sensitive as exhibited by the swelling on the CBR test results. Construction during 'dry' season such as the summer months is highly recommended. ***Construction during 'wet' seasons will result in poor workability and poor subgrade support of the existing soils. If construction during 'wet' season cannot be avoided, a contingency should be put in place for offsite borrow material.***

Borrow Material

Offsite materials **will** be required for use as structural fill. Imported material may be borrow material, select fill or other approved material. Fill material shall contain no rocks or stones larger than 3 inches. These material shall meet Unified Soil Classification System (USCS) of SC or coarser (i.e. SC through GW). Material used in backfill shall have a Liquid Limit (LL) not greater than 40 and a maximum Plasticity Index (PI) of 10. In addition, swell tests should be performed on the potential borrow material to ensure low swell potential. The swell tests should be performed in accordance with ASTM D 4546 or determined from soaked CBR tests.

All soil materials that fall within the USCS type ML, CL, CL-ML, OL, MH, CH, OH, PT, as well as material containing organic matter, ashes, cinders, refuse, frozen or other unsuitable materials are prohibited for use as backfill for subgrades. Soils classified as CL and ML are anticipated in large quantities on site. Therefore, the contractor should be prepared to bring in offsite granular material for use as backfill.

Removal and replacement is expensive, and stabilization of such materials in-situ with appropriate additives, their engineering and construction properties can be improved. Subgrades can be stabilized by the addition of lime, cement, or a combination of these materials with flyash. A mixture design is required to determine the optimum percentage of additive or combination of additives to be used. TLB would be glad to assist in the mixture design to provide a stabilized subgrade.

Where the amount of swell is less than about 3 percent, special consideration will not normally be needed. However, where a subgrade includes interspersed patches of soil with different swell characteristics, even amounts of swell less than 3 percent may require special consideration, such as removal and replacement with non-swelling soils, or stabilization in-situ with additives as mentioned previously.

Specifications should require slopes of exposed surfaces be maintained to facilitate surface runoff away from load bearing areas and to prevent ponding of surface water. If ponding of surface water does occur, it should be removed by pumping, ditching or as otherwise directed by the inspecting geotechnical engineer. During periods of anticipated inclement weather, exposed surfaces shall be graded and sealed to preclude infiltration of surface water. Subgrades, which become disturbed due to inclement weather or construction traffic and require over-excavation, should be reworked at no additional cost to the project.

Use of Existing Topsoil Material

Based on the chemical test results and analyses the existing topsoil is considered suitable for use in lawn/low shrub areas with improvements. Improvements would consist of bringing the existing pH levels, which range from 5.5 to 7.8 to the recommended level of 6.2 with the use of lime to increase pH or ammonium sulfate to decrease pH. However, if localized area pH value is equal to or lower than 7.2 it is not recommended to add ammonium sulfate to decrease pH. Recommended amounts of lime range from 0 to 80 pounds, but should be limited to 50 pounds per 1,000 square feet. Recommended amounts of ammonium sulfate to decrease pH are 2.5 pounds of elemental sulfur per 1,000 square feet for every 0.1 of pH unit above 7.2. Recommended amounts of lime or sulfur based on the individual pH levels are reported for each test result attached in Appendix B. In addition to raising/lowering the pH levels, a recommended fertilization program is outlined for each topsoil sample tested. These recommendations should be used for planning purposes only. The existing topsoil should be stockpiled and mixed thoroughly during stripping and grubbing procedures. At that time a composite sample of topsoil should be tested and analyzed to provide a more accurate depiction of the composite topsoil stockpile and necessary improvements for use in lawn areas.

7.3 Groundwater Considerations

Groundwater was not encountered in any of the borings during drilling operations. Subsequent to drilling, boreholes remained dry above cave-in depths of 6.0 to 12.3 feet below existing grades. Groundwater is not expected to impact construction. However the contractor should be prepared to manage/divert run-off away from construction areas, as the on-site soils are moisture sensitive and will require increased effort to compact, or remove and replace if allowed to get wet.

7.4 Support of Foundations

As previously discussed, a triangular shaped building is proposed on the eastern portion of the site and is proposed to be bunkered into the hill side with the roof at grade (from east to west). Details regarding the building construction to include type of construction and anticipated building loads were not known during the preparation of this report.

Boring B-19 was performed in the area of the proposed building. The soils anticipated to support foundations at the anticipated foundation depth will consist of very stiff to hard sandy clay soils.

The triangular building may be supported on **shallow spread footings with an allowable bearing capacity of 2,500 psf.** The recommended maximum allowable bearing pressure is based on total settlements being limited to less than 1.0 inch. Differential settlements are anticipated to be less than 0.5 inch. Footings should be founded within natural soils or within structural fill prepared in accordance with the Earthwork Section of this report. Care shall be exercised to ensure that the soils encountered at the founding grade remain dry.

Foundation Construction

Stepped down and/or adjacent column footings should be positioned outside of a 3H:1V slope line extending outward from the underside of the nearest adjacent footings. Competent undisturbed natural soil and/or compacted structural fill should exist everywhere within this zone of footing influence. Strict adherence to the 'Earthwork' section of this report is recommended with regard to structural fill. Regardless of the computed footing sizes, we recommend all continuous footings have a minimum width of 18 inches. Isolated footings should be a minimum of 24 inches in least dimension. It is recommended that the footings be founded a minimum 30 inches below final exterior grades and within the natural material or structural fill.

We recommend that surface runoff be directed away from footings.

7.5 Slab-on-Grade

It is our recommendation to support the at-grade floors of the triangular building on proof-rolled exposed subgrades and/or new structural fill. In regard to subgrade preparation, strict adherence to Earthwork section of this report is recommended.

We recommend that a minimum 5.0-inch layer of porous stone, consisting of gravel or crushed stone, be placed immediately beneath the at-grade slabs. A polyethylene membrane or similar vapor barrier should be used to separate the concrete from porous stone or subgrade. It is recommended that the heavily loaded at-grade concrete slabs/pads should be designed based on a **modulus of subgrade reaction of 75 psi/in.**

Where at-grade slabs of the building will be placed below the finished exterior grades and of the potential for water to rise seasonally, it is recommended to install perimeter footing drains. Exterior perimeter drains should be provided adjacent to the lowest subgrade wall or isolated foundations. The drainage trenches and the perimeter drains should have a positive slope and should discharge into sump pump pits. Pumps should be installed unless the drains will be provided with a gravity discharge to the proposed drainage fields or daylighting at the ground surface. The discharge pipe for sump pumps, should discharge at least ten feet away from any foundation, to an area of positive drainage away from the foundation.

7.6 Below Grade Walls

Based on the provided information, the triangular building will be bunkered into the existing slope so that the roof is at grade looking from east to west. Based on Boring B-19, drilled in the vicinity of the proposed building, the soils anticipated behind the building walls will consist of medium dense silty sand soils. For design of lateral pressures the following soil parameters are recommended:

Table No. 8
Recommended Parameters for Below Grade Walls and Temporary Support of Structures

Soil Type	Friction Angle (°)	Ka	Ko	Kp	Unit Wt. (pcf)	Maximum Equivalent Fluid Wt. (pcf)		
						Active	At-Rest	Passive
On-site Silty Sand	30	0.33	0.50	3.0	125	42	63	375
On-site Sandy Clay	26	0.39	0.56	2.6	125	49	70	320
Off-site Structural Fill	32	0.31	0.47	3.3	130	40	61	423

These recommendations are for walls backfilled with granular soils. The onsite silty or clayey sand soils are suitable for use as backfill material behind the walls in non-load bearing areas. The at-rest pressure coefficient (Ko) should be used if the wall is restrained from lateral movement prior to backfilling. Otherwise, if the wall is unbraced and free to move laterally, the active pressure coefficient (Ka) should be used.

The recommended earth pressure coefficients and unit weights assume drained conditions will exist behind the walls during construction and after final grading. If undrained conditions are to be designed for, then hydrostatic pressure should be superimposed on the lateral earth pressure that is computed using effective unit weight of the supported soils. Prefabricated vertical drains such as Miradrain G100W or equal, together with perimeter drains below the subgrade elevation may be installed in lieu of the free-draining material. The drains should daylight at approved locations or be connected to approved stormdrains. Additional recommendations may be necessary if submerged conditions are to be included in the design.

Surcharge, dead or live loads occurring within a horizontal distance equal to the height of the wall should be superimposed on the earth pressure loads over the entire height of the wall. The surcharge should be computed as uniform lateral pressure equal to the appropriate lateral earth pressure coefficient provided hereinbefore times the magnitude of the surcharge.

7.7 Temporary Support of Excavation

Excavation for the planned building and utilities will likely require temporary slopes or support of excavation (SOE). Soils expected to be supported are predominantly clay and silts although sands and gravels (to include fractured rock and quartzites) were occasionally logged. Where unsupported, we believe temporary slopes for excavations are feasible based on available space, and we recommend they be no steeper than 1.5H:1.0V. As for installation of utilities, a trench mule or other approved movable structures could suffice in the support of the excavation trenches as long as they can support the subgrade materials to the invert depths of the planned utilities.

Because of the planned construction of the triangular building, temporary support of excavation may be required. We recommend all temporary excavation supports be designed for the appropriate active and/or passive earth pressure conditions. The temporary support system should be designed using the design parameters shown in the table above. Soldier piles and lagging, sheet piles, soils nails, or other approved methods could be considered for temporary support, if deep excavations are contemplated.

A unit weight of 125 pcf is recommended for the determination of the lateral forces. Surcharge loads occurring within a horizontal distance equal to the height of the excavation should also be superimposed on the recommended earth pressure loads. It is recommended that the contractor should be required to engage a professional engineer registered in the State of Maryland to design and seal the plans and drawings for all of his temporary structures.

7.8 Stormwater Management

The planned **stormwater management facilities** will incorporate infiltration techniques and will consist of permeable pavements.

As discussed, infiltration tests were performed at ‘IT’ series boring locations to assess the viability for infiltration techniques to be incorporated into the SWM design.

Based on Maryland Department of the Environment (MDE) guidelines, a vertical buffer of 2 to 4 feet should exist between the infiltration invert and groundwater or rock. In addition, the minimum acceptable average infiltration rate for stormwater management and water quality applications, as indicated by borehole infiltration testing, is 0.52 inches per hour. Soils meeting this criterion are generally classified in accordance with the United States Department of Agriculture (USDA) textural classification as Loam or more granular.

Based on the subsurface investigation, USDA classifications of Sandy Loam, Loam, and Silt Loam were commonly encountered throughout the site with infiltration rates ranging from less than 0.12 inch per hour to over 26 inches per hour. Infiltration rates were generally between 0.93 in/hr to 3.78 in/hr. We have reviewed the field infiltration data vis-à-vis soil texture and opine the results of B-1/IT-1 are anomalous. The results are markedly higher than those from the other tests performed in similar soils, Sandy Loam. Whereas published data indicates minimum infiltration rate for Sandy Loan is 1.02 inches per hour, the recorded rate is way higher than anticipated for Sandy Loam. This may lead one to believe material tested at the offset location from the SPT boring was a lot coarser than the soils observed in the SPT boring, thus exhibiting a condition that is not representative of the site. Therefore, the results of Boring B-1/IT-1 should be disregarded and this location should be treated no different than the other locations with Sandy Loam soils.

The site has infiltration potential. Because of the variable infiltration rates obtained in the infiltration tests, TLB recommends that SWM facilities incorporating ***infiltration techniques be designed using an infiltration rate of 0.52 in/hr***. Infiltration techniques may not be feasible in localized areas due to cementation, or the presence of significant amounts of rock, silt and/or clay.

7.9 Percolation Test Results

As narrated in Section 4.4, informal percolation testing was conducted at multiple locations at P-1 near planned septic field location. Stabilized Percolation rates were calculated from the field tests and are summarized as follows:

Table No. 9

Stabilized Percolation Rates

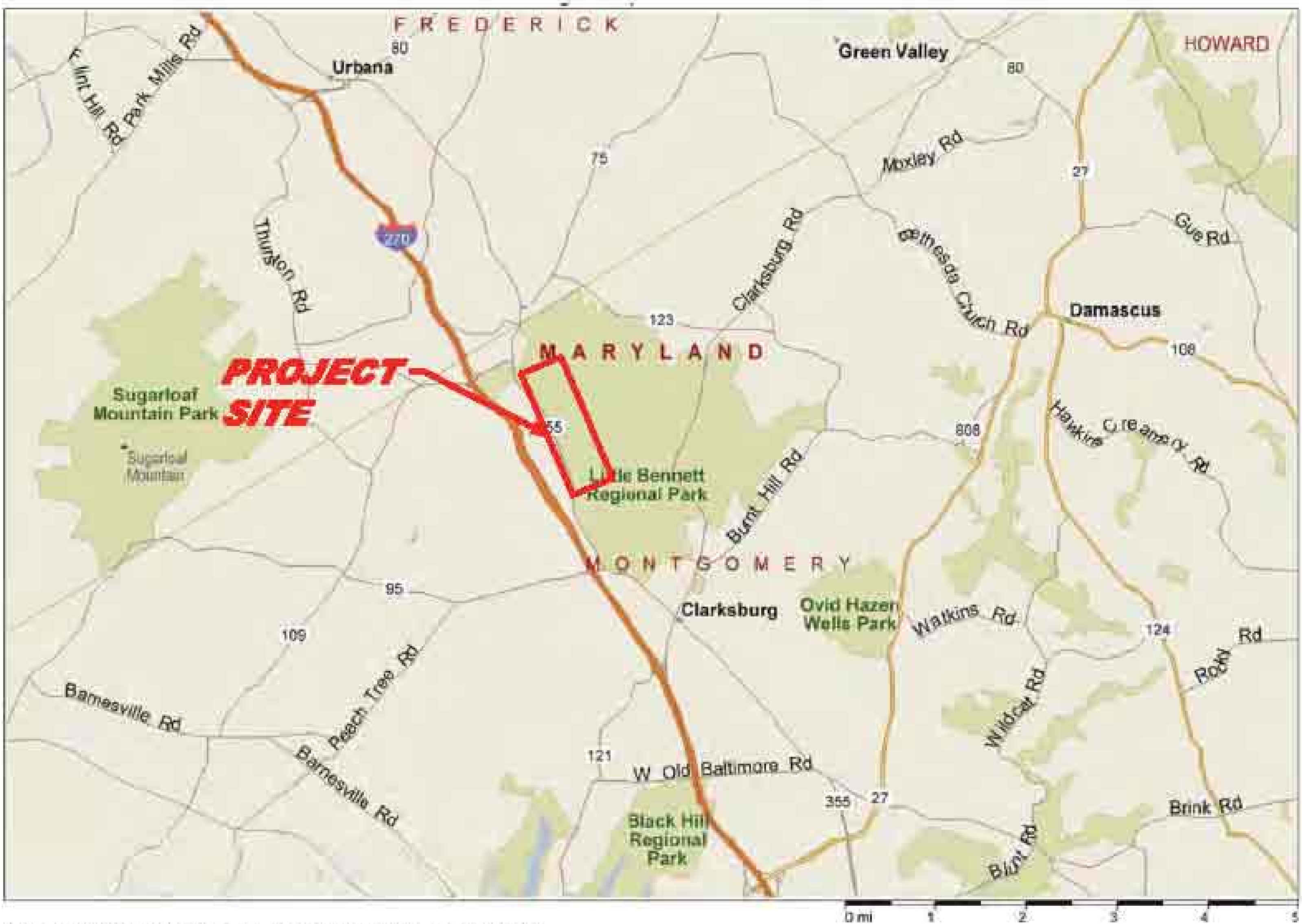
Test Location	Rate (Min/In)
P-1A	30.00
P-1B	20.00
P-1C	5.26
P-1D	3.57
P-1E	6.25

It is recommended to use these rates for planning purposes and confirm the rates during the County stipulated testing period.

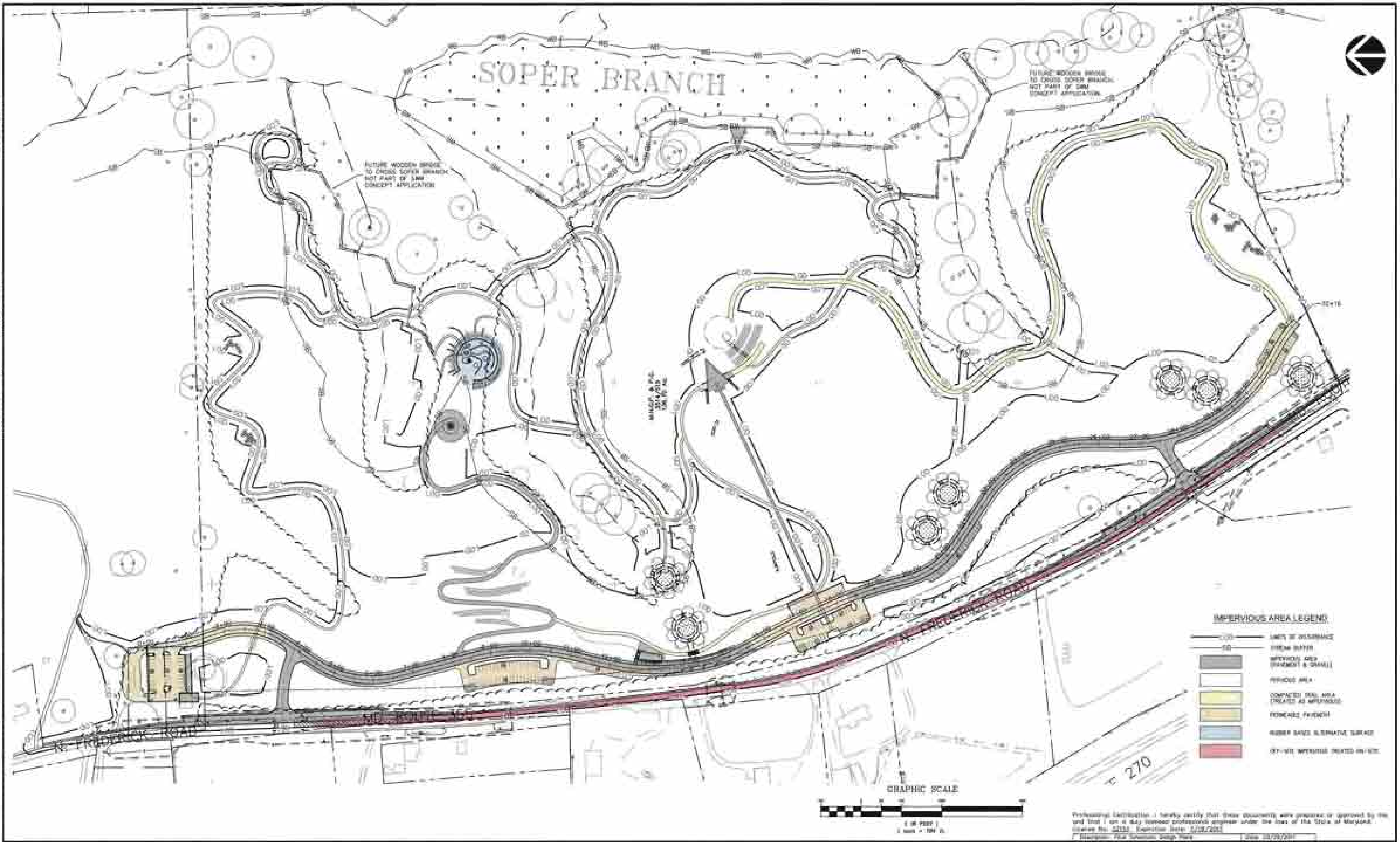
8.0 LIMITATIONS

All subsurface and field investigations require the extrapolation of limited amounts of data based on general geologic knowledge. This report has been prepared to aid in the evaluation of the site. This report is intended to assist **Maryland-National Capital Park and Planning Commission** and **A. Morton Thomas and Associates, Inc**. with the design aspects of the proposed renovations together with the earthwork related portions of the project based upon our understanding of the design details, criteria, and utilization of the planned facilities as outlined herein. The water level observations and geologic descriptions presented on the accompanying logs have been made with reasonable care and accuracy, but must be considered only an approximate representation of subsurface conditions to be encountered beyond a particular exploratory location.

We recommend that a Geotechnical Engineer or a technician under his direction be retained during construction to monitor subgrade preparation and construction and to evaluate general construction techniques as they may affect existing and planned facilities at the site. The Engineer or Technician should be instructed to monitor subsurface conditions encountered during construction to see that those conditions are compatible with the findings of this study. If significant variations are encountered or if the proposed locations or designs are altered, we should be contacted and provided the opportunity to appropriately review and/or modify these recommendations.



T. L. B. ASSOCIATES, INC ***GLEN BURNIE, MD***	***LITTLE BENNETT REGIONAL PARK*** ***DAY USE AREA*** ***CLARKSBURG, MD***	***SITE LOCATION PLAN***		
		DATE: 7/24/11 ***SCALE: NTS***	***DRAWN BY: KNB*** ***CHECKED BY: SN***	***APPROVED BY: TLB*** ***DRAWING NO.:1***



Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 32551 Expiration Date: 1/18/2017

Description: Final Schematic Design Plans | Date 10/20/2017

DESIGN				REVIEW AND APPROVAL		REVIEW AND APPROVAL	
M-NCPPC							
Landscape Architect	Date	Checked By	Date	Park Development	Date	Superintendent of Parks	Date
Architect	Date	Checked By	Date	District Maintenance	Date	Park Police	Date
Engineer	Date	Checked By	Date	Region	Date		Date
Drawn By	Date	Checked By	Date	Natural Resources	Date		Date

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:

REVISIONS

Rev. No.	Date	Description

SEAL

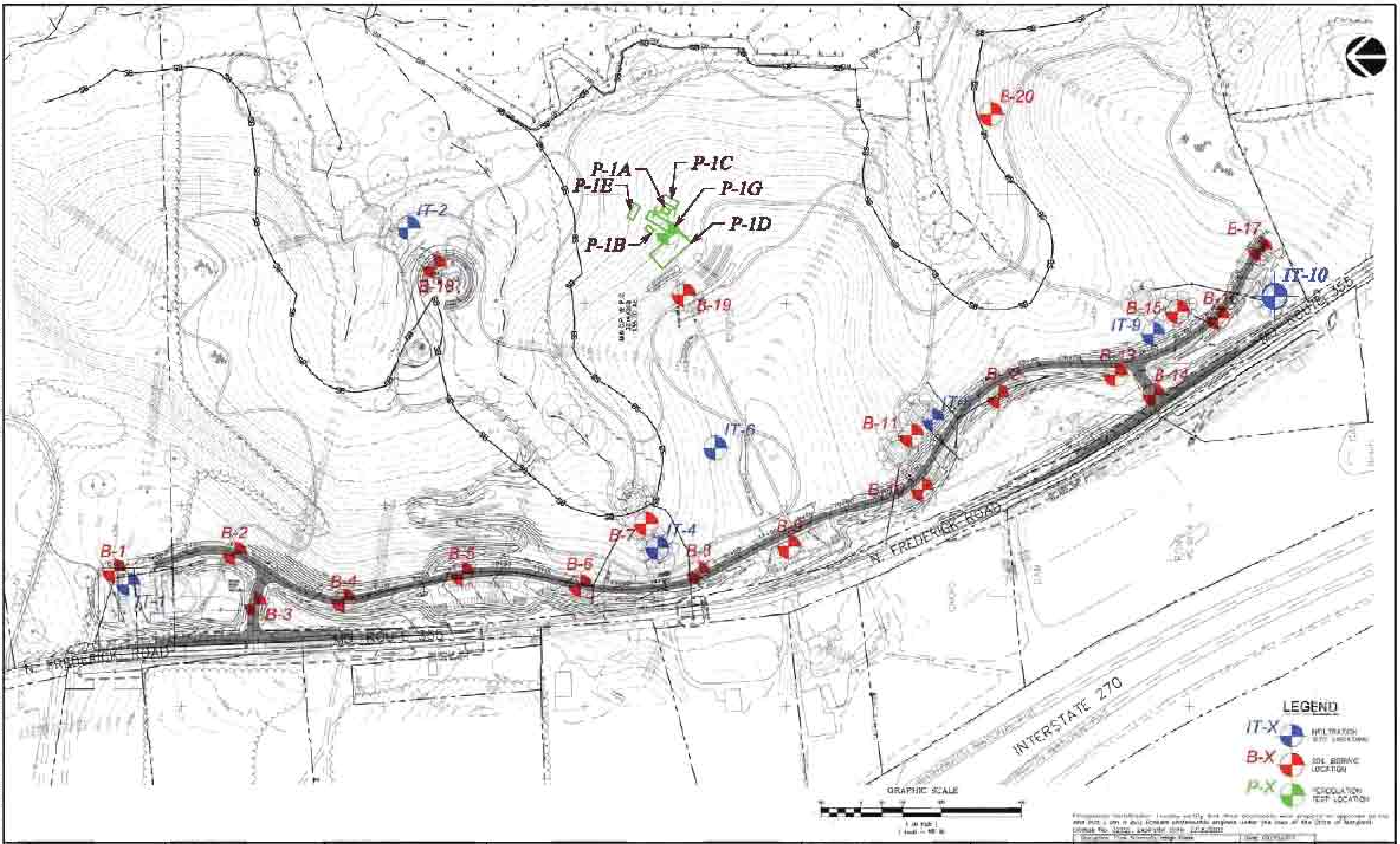
IMPERVIOUS AREA MAP
Little Bennett Regional Park
Day Use Area

SCALE 1" = 100'

WSSC Grid Map
S234NW14

SHEET of 27

FINAL SCANNED
PLAN SCANNED
PARK CODE #26



The Maryland-National Capital Park and Planning Commission

Montgomery County Department of Parks and Planning

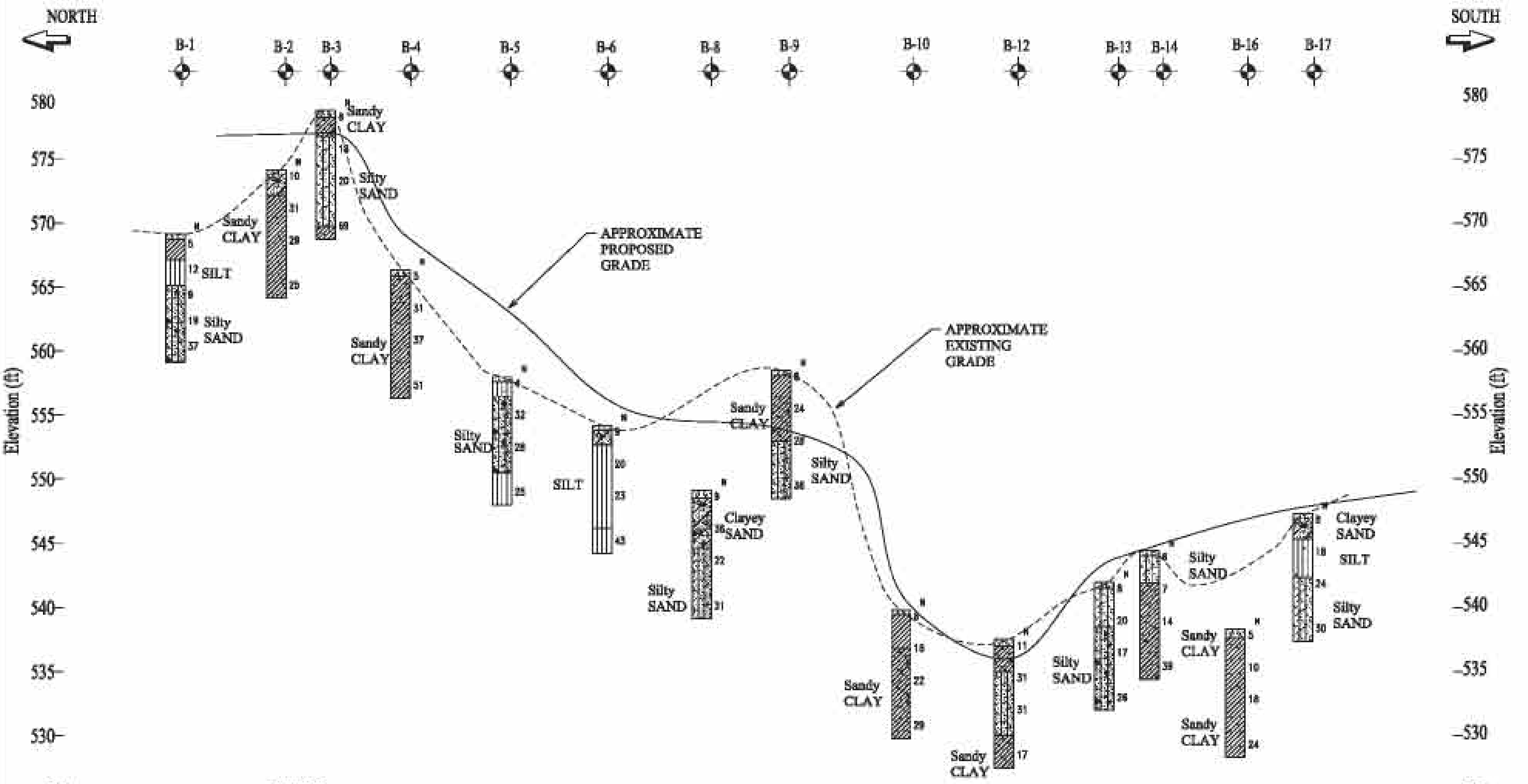
Soil Boring Plan- Prop. Cond.

Little Bennett Regional Park

Day Use Area

WSSC Grid Map

SOIL-2



LEGEND

∇ – Depth water was encountered during drilling.

▼ – Groundwater depth monitored after boring completion or after 24 hours.

N – Standard Penetration test. Resistance in Blows per foot

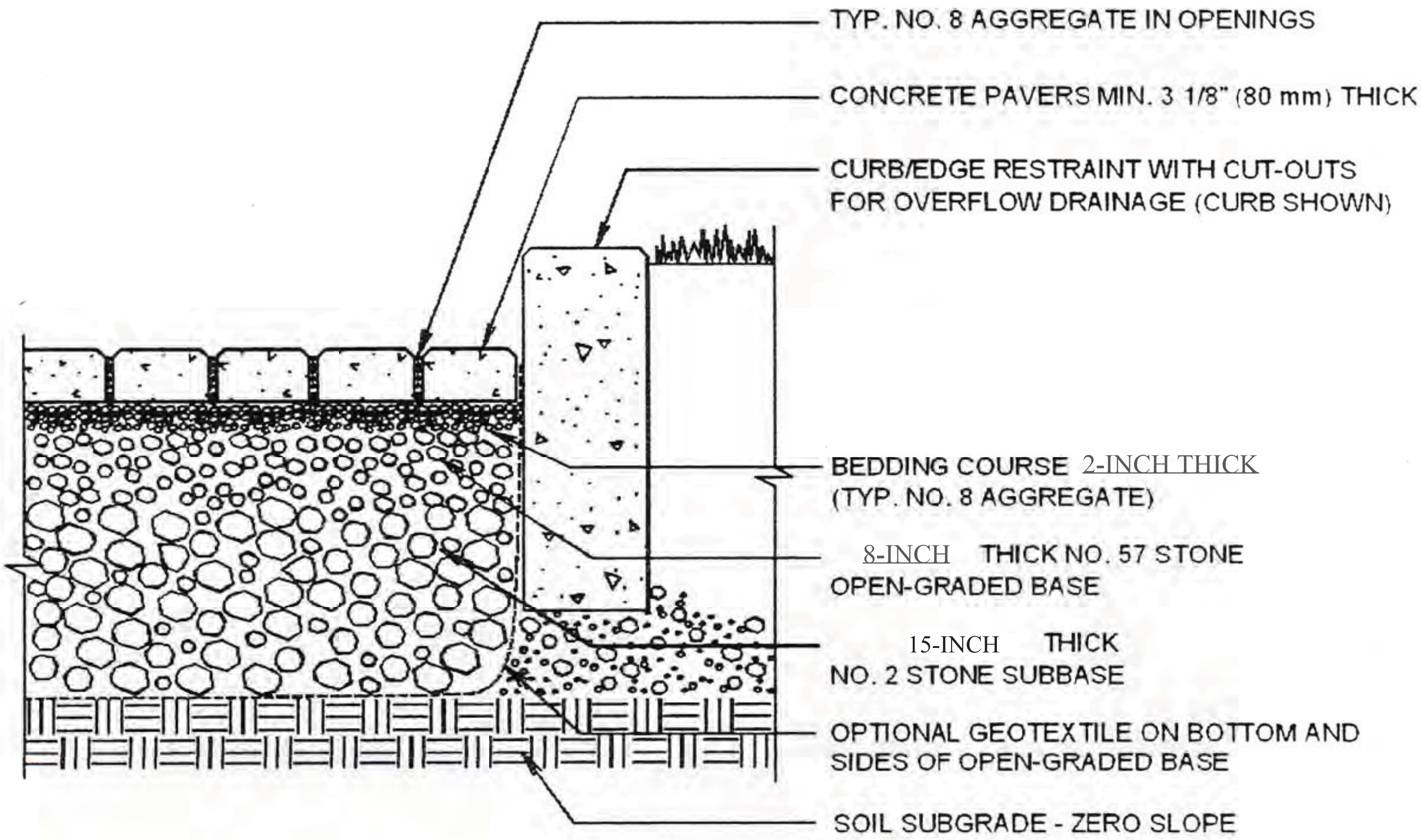
Note: Strata changes shown on this profile represent generalizations based on average conditions indicated by final test borings.

T. L. B. ASSOCIATES, INC.
GLEN BURNIE, MD

LITTLE BENNETT REGIONAL PARK
DAY USE AREA
CLARKSBURG, MARYLAND

GENERALIZED ROADWAY PROFILE

DATE: 7/22/11
SCALE: 1H = 37.9V
DRAWN BY: KNB
CHECKED BY: SN
APPROVED BY: TLB
DRAWING NO.: 4



TYPICAL SECTION BY INTERLOCKING CONCRETE PAVEMENT INSTITUTE

T. L. B. ASSOCIATES, INC
GLEN BURNIE, MD

LITTLE BENNETT REGIONAL PARK
DAY USE AREA
CLARKSBURG, MD

TYPICAL PERMEABLE PAVEMENT SECTION

DATE: 7/27/11
SCALE: NTS

DRAWN BY: KNB
CHECKED BY: SN

APPROVED BY: TLB
DRAWING NO.: 5

APPENDIX A

RESULTS OF FIELD TESTING

GENERAL CLASSIFICATION SUMMARY FOR SOIL & ROCK EXPLORATION

SOIL

Particle Size Identification

Boulders		- 12 inch diameter or more
Cobbles		- 3 to 12 inch diameter
Gravel	- Coarse	- 3/4 to 3 inches
	- Fine	- 4.75mm to 3/4 inch
Sand	- Coarse	- 2.00mm to 4.75 mm [Sieve #10 to #4]
	- Medium	- 0.4mm to 2.00mm [Sieve #40 to #10]
	- Fine	- 0.075mm to 0.4mm [Sieve #200 to #40]
Silt/Clay		- less than 0.075mm (Cannot see particles)
Silt		- Atterberg limits plot below "A" line
Clay		- Atterberg limits plot above "A" line

Relative Proportions

Descriptive Term	Percent

In accordance with ASTM D 2487 and ASTM D 2488

COHESIONLESS SOILS

Density	*N-Value*
Very loose	0-4 blows/ft.
Loose	5-10 blows/ft.
Medium Dense	11-30 blows/ft.
Dense	31-50 blows/ft.
Very Dense	>50 blows/ft.

COHESIVE SOILS

Consistency	*N-Value*
Very Soft	0-1 blows/ft.
Soft	2-4 blows/ft.
Medium Stiff	5-8 blows/ft.
Stiff	9-15 blows/ft.
Very Stiff	16-30 blows/ft.
Hard	>30 blows/ft.

Classifications on logs are made by visual inspection.

Standard Penetration Test - Driving a 2.0" O.D., 1 3/8" I.D., sampler a distance of 1.0 foot into undisturbed soil with a 140 pound hammer free falling a distance of 30.0 inches. It is customary for us to drive the spoon 6.0 inches of penetration to seat into undisturbed soil, and then perform the test. The number of hammer blows for seating the spoon and making the tests are recorded for each 6.0 inches of penetration on the drill log (Example: 6-8-9). The standard penetration test resistance or "N"-value can be obtained by adding the last two figures (i.e., 8 + 9 = 17 blows/ft.).

Strata Changes - In the column "Soil Descriptions" on the drill log, the horizontal lines represent estimated strata changes.

Groundwater observations were made at the times indicated. Porosity of soil strata, weather conditions, site topography, etc., may cause changes in the water levels indicated on the logs.

ROCK

Rock Quality Designation (RQD) - The sum of the lengths of pieces of recovered core which are greater than four inches in length, expressed as a percentage of the total length of the core run. If the core has been broken by the drilling process, it is considered to be intact provided the broken fragments are cumulatively greater than 4 inches in length. For this investigation, vertical separations which split the core have not been considered discontinuities when determining RQD.

Recovery (REC) - The total length of core recovered expressed as a percentage of the total length of that coring run.

ROCK CLASSIFICATION

Fresh- No visible signs of discoloration or decomposition.
Slightly weathered - Slightly discolored. Lower in strength than fresh rock. Dull under hammer.
Moderately weathered - Significant portions show discoloration and weakening (softening, lighter color). Shows loss of weight. Rock fabric evident.
Highly weathered - Almost all of the rock shows severe discoloration and weathering. Rock fabric evident in majority of the rock.
Completely weathered (Saprolite) - Rock fabric discernible in a few scattered locations. Effectively reduced to soil and can be broken by hand.
Residual Soil- Reduced to soil. Rock fabric not discernible. Can be easily broken by hand.

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-1
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum	Hammer Wt. 140 lb	Hole Diameter 8 in	Foreman W. Seward
Surf. Elev. 569.1 ft	Hammer Drop 30 in	Rock Core Dia. N/A	Inspector K. Bullock
Date Started 5/25/11	Spoon Size 2 in	Boring Method HSA	Date Completed 5/25/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec (in)
568.7	5" of **TOPSOIL**	0.4							
567.1	Brown, moist, medium stiff, lean **CLAY**, trace sand and topsoil	2.0			I/D	1-2-3-3	1	DS	12
565.1	Brown, moist, stiff, **SILT**, trace mica	4.0			I/D	4-5-7-6	2	DS	20
	Tan and gray, moist, medium stiff to hard, silty **SAND**, with rock fragments, trace mica, **(USCS:SM; USDA: SANDY LOAM)** **Average Infiltration Rate = 26.01 in/hr**			5	I/D	4-4-5-7	3	DS	18
	(SAPROLITE)				I/D	6-9-10-11	4	DS	13
					I	13-15-22-41	5	DS	18
559.1		10.0		10					
	Bottom of Boring at 10.0 ft			15					
				20					

BORING & SAMPLE NOTES

1. No water encountered.
2. Grab bag of topsoil taken.
3. 4-inch PVC pipe installed in offset borehole at a depth of 4.0 ft. for infiltration test.
4. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
5. Boring Coordinates:
N: 580668.6918
E: 1226836.3347

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 8.0 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

Page 1 of 1

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-2
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum	Hammer Wt. 140 lb	Hole Diameter 8 in	Foreman W. Seward
Surf. Elev. 574.1 ft	Hammer Drop 30 in	Rock Core Dia. N/A	Inspector K. Bullock
Date Started 5/25/11	Spoon Size 2 in	Boring Method HSA	Date Completed 5/25/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
573.8	4" of **TOPSOIL**	0.3								1. No water encountered. 2. 1 bag sample collected from 1.0 - 5.0 ft. 3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer. 4. Boring Coordinates: N: 580369.1963 E: 1226879.1958
572.1	Grayish-brown, moist, loose, clayey **SAND**, trace gravel and organics	2.0			I	5-5-5	1	DS	8	
	Gray, moist, hard to very stiff, sandy, lean **CLAY**, trace mica, **(USCS: CL; USDA: LOAM)**				I/D	11-7-24	2	DS	18	
				5	I/D	10-16-13	3	DS	12	
564.1		10.0		10	D	9-13-12	4	DS	10	
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 7.0 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-3
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum	Hammer Wt. 140 lb	Hole Diameter 8 in	Foreman W. Seward
Surf. Elev. 578.7 ft	Hammer Drop 30 in	Rock Core Dia. N/A	Inspector K. Bullock
Date Started 5/25/11	Spoon Size 2 in	Boring Method HSA	Date Completed 5/25/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec (in)	BORING & SAMPLE NOTES
578.2	6" of **TOPSOIL**	0.5								1. No water encountered. 2. Grab bag of topsoil taken. 3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer. 4. Boring Coordinates: N: 580320.9693 E: 1226750.5609
576.7	Brown, moist, medium stiff, sandy, lean **CLAY**, trace gravel and organics	2.0			I/D	1-3-5	1	DS	12	
	Brown, moist, medium dense to very dense, silty, fine **SAND**				D	8-13-5	2	DS	14	
				5	D	10-10-10	3	DS	12	
569.7		9.0								
568.7	Gray, moist, hard, sandy lean **CLAY**, trace rock fragments and mica, **(SAPROLITE)**	10.0		10	D	13-32-37	4	DS	18	
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE	**SAMPLE CONDITIONS**	**GROUNDWATER DEPTH**	**BORING METHOD**
DS - DRIVEN SPLIT SPOON	D - DISINTEGRATED	AT COMPLETION dry ft	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER ______ HRS. ______ ft	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER 24 HRS. ______ ft	DC - DRIVING CASING
RC - ROCK CORE	L - LOST	CAVED AT 7.5 ft	MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-4
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum
Surf. Elev. 566.3 ft
Date Started 5/26/11
Hammer Wt. 140 lb
Hammer Drop 30 in
Spoon Size 2 in
Hole Diameter 8 in
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Seward
Inspector K. Bullock
Date Completed 5/26/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
565.8	6" of **TOPSOIL**	0.5								1. No water encountered. 2. Grab bag of topsoil taken. 3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer. 4. Boring Coordinates: N: 580099.6747 E: 1226760.3946
	Brown, moist, medium stiff, sandy lean **CLAY**, trace organics				I/D	1-2-3	1	DS	12	
563.8	Gray with brown, moist, hard, sandy lean **CLAY**, some rock fragments, trace mica, **(SAPROLITE)**	2.5			D	7-15-16	2	DS	13	
				5	D	9-16-21	3	DS	14	
556.3		10.0		10	D	10-22-29	4	DS	18	
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 6.3 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-5
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum	Hammer Wt. 140 lb	Hole Diameter 8 in	Foreman W. Seward
Surf. Elev. 558.0 ft	Hammer Drop 30 in	Rock Core Dia. N/A	Inspector K. Bullock
Date Started 5/26/11	Spoon Size 2 in	Boring Method HSA	Date Completed 5/26/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
557.6	5" of **TOPSOIL**	0.4								1. No water encountered. 2. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer. 3. Boring Coordinates: N: 579807.3579 E: 1226828.4320
	Brown, moist, loose, silty **SAND**, trace gravel and organics				I/D	1-2-2	1	DS	18	
556.5		1.5								
	Brown, moist, dense to medium dense, silty **SAND**, trace gravel				I/D	16-16-16	2	DS	16	
				5	D	15-13-15	3	DS	18	
550.5		7.5								
	Tan, moist, very stiff, **SILT**, trace rock fragments, **(SAPROLITE)**				D	7-12-13	4	DS	16	
548.0		10.0		10						
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE	SAMPLE CONDITIONS	GROUNDWATER DEPTH	BORING METHOD
DS - DRIVEN SPLIT SPOON	D - DISINTEGRATED	AT COMPLETION dry ft	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER ___ HRS. ___ ft	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER 24 HRS. ___ ft	DC - DRIVING CASING
RC - ROCK CORE	L - LOST	CAVED AT 6.5 ft	MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

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RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-6
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum
Surf. Elev. 554.2 ft
Date Started 5/25/11
Hammer Wt. 140 lb
Hammer Drop 30 in
Spoon Size 2 in
Hole Diameter 8 in
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Seward
Inspector K. Bullock
Date Completed 5/25/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
553.8	5" of **TOPSOIL**	0.4								1. No water encountered.
552.7	Brown, moist, stiff, sandy lean **CLAY**, trace organics	1.5			D	2-5-4	1	DS	8	2. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
	Brown, moist, very stiff, **SILT**, some sand				D	6-9-11	2	DS	14	3. Boring Coordinates: N: 579511.5123 E: 1226798.9983
	Quartzites observed at 5 ft			5	D	11-12-11	3	DS	18	
546.2		8.0								
544.2	Tan, moist, hard, **SILT**, some rock fragments, **(SAPROLITE)**	10.0		10	D	21-23-20	4	DS	18	
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 7.5 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-7
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum	Hammer Wt. 140 lb	Hole Diameter 8 in	Foreman W. Seward
Surf. Elev. 534.2 ft	Hammer Drop 30 in	Rock Core Dia. N/A	Inspector K. Bullock
Date Started 5/24/11	Spoon Size 2 in	Boring Method HSA	Date Completed 5/24/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE				
					Cond	Blows/6"	No.	Type	Rec (in)
533.8	4" of **TOPSOIL**	0.3							
532.2	Brown, moist, medium stiff, lean **CLAY**, with sand, trace organics in top foot	2.0			I	2-3-3	1	DS	12
	Tan with gray, moist, medium dense to very dense, silty, fine to medium **SAND**, trace gravel and quartzites				I/D	5-9-11	2	DS	15
				5	D	21-32-26	3	DS	15
524.2		10.0		10	D	15-15-13	4	DS	10
	Bottom of Boring at 10.0 ft								
				15					
				20					

BORING & SAMPLE NOTES

1. No water encountered.
2. Grab bag of topsoil taken.
3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
4. Boring Coordinates:
N: 579349.6995
E: 1226951.8956

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 8.0 ft

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-8
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum	Hammer Wt. 140 lb	Hole Diameter 8 in	Foreman W. Seward
Surf. Elev. 549.1 ft	Hammer Drop 30 in	Rock Core Dia. N/A	Inspector K. Bullock
Date Started 5/24/11	Spoon Size 2 in	Boring Method HSA	Date Completed 5/24/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec (in)	BORING & SAMPLE NOTES
548.5	7" of **TOPSOIL**	0.6								1. No water encountered. 2. 1 bag sample collected from 1.0 - 5.0 ft. 3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer. 4. Boring Coordinates: N: 579219.9220 E: 1226831.3011
	Brown, moist, loose to medium dense, clayey **SAND**, trace organics in top foot				I/D	2-5-4	1	DS	10	
					I/D	9-16-20	2	DS	18	
544.6		4.5								
	Reddish brown, moist, medium dense to dense, silty, fine to medium **SAND**, trace gravel and quartzites			5	I	12-12-10	3	DS	14	
					D	14-11-20	4	DS	10	
539.1		10.0		10						
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 6.0 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-9
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum		Hammer Wt.	140 lb	Hole Diameter	8 in	Foreman	W. Seward
Surf. Elev.	558.5 ft	Hammer Drop	30 in	Rock Core Dia.	N/A	Inspector	K. Bullock
Date Started	5/24/11	Spoon Size	2 in	Boring Method	HSA	Date Completed	5/24/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
558.1	5" of **TOPSOIL**	0.4								1. No water encountered.
	Red, moist, medium stiff, lean **CLAY**		▨		I	2-4-4	1	DS	10	2. Grab bag of topsoil taken.
556.5		2.0								
	Red, moist, very stiff, sandy, lean **CLAY**, trace gravel		▨		I/D	8-11-13	2	DS	12	3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
				5						4. Boring Coordinates: N: 578993.9963 E: 1226895.8472
553.0		5.5								
	Red, moist, medium dense to dense, silty, fine to medium **SAND**, trace gravel and mica		░		D	10-13-15	3	DS	12	
			░		I	11-16-20	4	DS	10	
548.5		10.0		10						
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 8.5 ft

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-10
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum	Hammer Wt. 140 lb	Hole Diameter 8 in	Foreman W. Seward
Surf. Elev. 539.8 ft	Hammer Drop 30 in	Rock Core Dia. N/A	Inspector K. Bullock
Date Started 5/24/11	Spoon Size 2 in	Boring Method HSA	Date Completed 5/24/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
539.5	4" of **TOPSOIL**	0.3								1. No water encountered. 2. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer. 3. Boring Coordinates: N: 578665.6501 E: 1227037.9422
	Reddish-brown, moist, medium stiff to stiff, lean **CLAY**, trace organics in top 6-inches				I	2-2-4	1	DS	10	
536.8	Reddish-brown, moist, very stiff, sandy, lean **CLAY**	3.0			I	3-7-9	2	DS	14	
				5	I/D	9-12-10	3	DS	12	
					D	12-14-15	4	DS	10	
529.8		10.0		10						
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 7.0 ft

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-11
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum
Surf. Elev. 533.0 ft
Date Started 5/24/11
Hammer Wt. 140 lb
Hammer Drop 30 in
Spoon Size 2 in
Hole Diameter 8 in
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Seward
Inspector K. Bullock
Date Completed 5/24/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
532.5	6" of **TOPSOIL**	0.5								1. No water encountered. 2. Grab bag of topsoil taken. 3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer. 4. Boring Coordinates: N: 578692.7561 E: 1227171.5647
	Brown to red, moist, medium stiff to very stiff, lean **CLAY**, trace organics				I	2-3-5	1	DS	10	
					I/D	5-8-9	2	DS	18	
528.0		5.0		5						
	Red, moist, very stiff to hard, sandy **SILT**, with quartzites				I/D	7-8-11	3	DS	18	
					D	18-21-18	4	DS	16	
523.0		10.0		10						
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE
- DS - DRIVEN SPLIT SPOON
- PT - PRESSED SHELBY TUBE
- CA - CONTINUOUS FLIGHT AUGER
- RC - ROCK CORE

SAMPLE CONDITIONS
- D - DISINTEGRATED
- I - INTACT
- U - UNDISTURBED
- L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 7.0 ft

BORING METHOD
- HSA - HOLLOW STEM AUGERS
- CFA - CONTINUOUS FLIGHT AUGERS
- DC - DRIVING CASING
- MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-12
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum		Hammer Wt.	140 lb	Hole Diameter	8 in	Foreman	W. Seward
Surf. Elev.	537.5 ft	Hammer Drop	30 in	Rock Core Dia.	N/A	Inspector	K. Bullock
Date Started	5/18/11	Spoon Size	2 in	Boring Method	HSA	Date Completed	5/19/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec (in)	BORING & SAMPLE NOTES
537.0	6" of **TOPSOIL**	0.5								1. No water encountered. 2. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer. 3. Boring Coordinates: N: 578475.6091 E: 1227266.9725
535.0	Reddish brown with gray, moist, stiff, sandy, lean **CLAY**, with wood fragments	2.5			I/D	2-3-8	1	DS	12	
	Reddish brown, moist, dense, silty, fine to medium **SAND**, trace gravel				D	9-19-12	2	DS	18	
530.0		7.5		5	D	14-17-14	3	DS	18	
527.5	Reddish brown, moist, very stiff, **CLAY**, with sand, trace mica	10.0		10		8-8-9	4	DS	18	
	Bottom of Boring at 10.0 ft			15						
				20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 8.3 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-13
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum
Surf. Elev. 542.0 ft
Date Started 5/17/11
Hammer Wt. 140 lb
Hammer Drop 30 in
Spoon Size 2 in
Hole Diameter 8 in
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Seward
Inspector K. Bullock
Date Completed 5/17/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
541.5	6" of **TOPSOIL**	0.5								1. No water encountered.
	Reddish-brown, moist, loose to medium dense, silty, fine **SAND**, with organics				I	1-3-5	1	DS	15	2. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
538.5		3.5			D	7-9-11	2	DS	15	3. Boring Coordinates: N: 578184.9968 E: 1227321.3083
	Reddish-brown to tan, moist, medium dense, **SAND**, with some silt and gravel, quartzites			5	I	8-8-9	3	DS	18	
					I	10-12-14	4	DS	18	
532.0		10.0		10						
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE

DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS

D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH

AT COMPLETION dry ft
AFTER _____ HRS. _____ ft
AFTER 24 HRS. _____ ft
CAVED AT 7.0 ft

BORING METHOD

HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-14
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum		Hammer Wt.	140 lb	Hole Diameter	8 in	Foreman	W. Seward
Surf. Elev.	544.4 ft	Hammer Drop	30 in	Rock Core Dia.	N/A	Inspector	K. Bullock
Date Started	5/17/11	Spoon Size	2 in	Boring Method	HSA	Date Completed	5/17/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec (in)	BORING & SAMPLE NOTES
544.0	5" of **TOPSOIL**	0.4								1. No water encountered.
541.9	Reddish-brown, moist, loose, silty, fine **SAND**, with organics	2.5			I	2-3-3	1	DS	15	2. Grab bag of topsoil taken. 3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
	Reddish-brown, moist, medium stiff to hard, **CLAY**, with fine sand				I	2-3-4	2	DS	15	4. Boring Coordinates: N: 578090.2502 E: 1227271.3937
				5	I/D	5-6-8	3	DS	6	
534.4		10.0		10	I/D	11-17-22	4	DS	18	
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 7.0 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

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RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-15
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum		Hammer Wt.	140 lb	Hole Diameter	8 in	Foreman	W. Seward
Surf. Elev.	535.7 ft	Hammer Drop	30 in	Rock Core Dia.	N/A	Inspector	K. Bullock
Date Started	5/16/11	Spoon Size	2 in	Boring Method	HSA	Date Completed	5/16/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
535.3	5" of **TOPSOIL**	0.4								1. No water encountered.
	Brown, moist, medium stiff, lean **CLAY**, trace organics				I	1-3-4	1	DS	12	2. 2 jars of topsoil taken.
533.2	Gray with white, moist, stiff to very stiff, sandy **CLAY**, trace quartzites	2.5								3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
					I	5-5-7	2	DS	16	4. Boring Coordinates: N: 578029.3701 E: 1227479.5631
				5	I	7-8-10	3	DS	15	
					I	7-11-16	4	DS	16	
525.7		10.0		10						
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 7.5 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-16
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum	Hammer Wt. 140 lb	Hole Diameter 8 in	Foreman W. Seward
Surf. Elev. 538.3 ft	Hammer Drop 30 in	Rock Core Dia. N/A	Inspector K. Bullock
Date Started 5/16/11	Spoon Size 2 in	Boring Method HSA	Date Completed 5/16/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec (in)	BORING & SAMPLE NOTES
537.6	8" of **TOPSOIL**	0.7								1. No water encountered.
	Brown, moist, medium stiff to very stiff, lean **CLAY**, with sand and organics				I	1-2-3	1	DS	8	2. 2 jars of of topsoil taken.
					I	2-4-6	2	DS	8	3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
										4. Boring Coordinates: N: 577929.5411 E: 1227463.8440
	To gray with white, trace mica and quartzites			5	I	7-8-10	3	DS	18	
528.3		10.0		10	I	8-11-13	4	DS	18	
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 7.0 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

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RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-17
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum
Surf. Elev. 547.3 ft
Date Started 5/16/11
Hammer Wt. 140 lb
Hammer Drop 30 in
Spoon Size 2 in
Hole Diameter 8 in
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Seward
Inspector K. Bullock
Date Completed 5/16/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
546.9	5" of **TOPSOIL**	0.4								1. No water encountered. 2. Grab bag of topsoil taken. 3. 1 bag sample collected from 1.5 - 5.0 ft. 4. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer. 5. Boring Coordinates: N: 577823.3396 E: 1227632.7622
545.3	Brown, moist, loose, clayey **SAND**, with silt and organics	2.0			D	2-3-5	1	DS	14	
542.3	Tan, moist, very stiff, **SILT**, with sand, trace mica, **(USCS: ML; USDA: SILT LOAM)**	5.0		5	D	6-9-9	2	DS	18	
	White, moist, medium dense, silty, fine **SAND**, with gravel and quartzites				I/D	8-12-12	3	DS	18	
537.3	Calcium staining observed	10.0		10	I	11-15-15	4	DS	12	
	Bottom of Boring at 10.0 ft			15 20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 7.0 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

RECORD OF SOIL EXPLORATION LOGS.GPJ PROJECT.GDT 7/27/11

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-18
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum
Surf. Elev. 503.4 ft
Date Started 5/26/11
Hammer Wt. 140 lb
Hammer Drop 30 in
Spoon Size 2 in
Hole Diameter 8 in
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Seward
Inspector K. Bullock
Date Completed 5/26/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
502.9	6" of **TOPSOIL**	0.5								1. No water encountered. 2. Grab bag of topsoil taken. 3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer. 4. Boring Coordinates: N: 579873.4144 E: 1227589.8721
500.9	Brown, moist, loose, silty **SAND**, trace organics and mica, some cementation observed	2.5			I	2-3-4	1	DS	10	
	Reddish-brown, moist, medium dense to very dense, silty **SAND**, with rock fragments, trace mica				D	9-9-11	2	DS	12	
				5	D	12-12-12	3	DS	18	
					I/D	16-15-21	4	DS	18	
491.4	**(SAPROLITE)**	12.0		10	D	20-34-51/4"	5	DS	10	
488.4	Reddish-brown, moist, hard, **CLAY**, trace rock fragments, **(SAPROLITE)**	15.0		15	D	40-51/4"	6	DS	10	
	Bottom of Boring at 15.0 ft			20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 11.4 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-19
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum
Surf. Elev. 535.9 ft
Date Started 5/26/11
Hammer Wt. 140 lb
Hammer Drop 30 in
Spoon Size 2 in
Hole Diameter 8 in
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Seward
Inspector K. Bullock
Date Completed 5/26/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
535.4	6" of **TOPSOIL**	0.5								1. No water encountered.
	Brown, moist, loose, silty **SAND**, trace gravel and organics				D	2-2-3	1	DS	18	2. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
533.9		2.0								
	Tan to brown, moist, medium dense, silty **SAND**, minor cementation observed				D	9-8-9	2	DS	16	3. Boring Coordinates: N: 579256.6527 E: 1227520.9029
	Some quartzites at 5 ft.			5	D	11-9-10	3	DS	14	
528.9		7.0								
	Brown, moist, very stiff to hard, **CLAY**, some sand, trace rock fragments, **(SAPROLITE)**				D	12-14-18	4	DS	18	
				10	D	25-22-18	5	DS	18	
					D	20-21-24	6	DS	18	
520.9		15.0		15						
	Bottom of Boring at 15.0 ft									
				20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 12.3 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

RECORD OF SOIL EXPLORATION LOGS.GPJ PROJECT.GDT 7/27/11

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

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RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # B-20
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum
Surf. Elev. 512.3 ft
Date Started 5/17/11
Hammer Wt. 140 lb
Hammer Drop 30 in
Spoon Size 2 in
Hole Diameter 8 in
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Seward
Inspector K. Bullock
Date Completed 5/17/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
511.8	6" of **TOPSOIL**	0.5								1. No water encountered. 2. Grab bag of topsoil taken. 3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer. 4. Boring Coordinates: N: 578495.3516 E: 1227970.7900
510.8	Brown, moist, medium stiff, lean **CLAY**, with organics	1.5			D	2-4-3	1	DS	8	
	Reddish-brown, moist, stiff to hard, **CLAY**, with sand, trace quartzites				I	4-6-9	2	DS	18	
				5	I	8-9-10	3	DS	18	
					I/D	10-12-13	4	DS	12	
				10	D	13-21-23	5	DS	8	
497.3		15.0		15	I/D	19-23-29	6	DS	18	
	Bottom of Boring at 15.0 ft									
				20						

SAMPLER TYPE
- DS - DRIVEN SPLIT SPOON
- PT - PRESSED SHELBY TUBE
- CA - CONTINUOUS FLIGHT AUGER
- RC - ROCK CORE

SAMPLE CONDITIONS
- D - DISINTEGRATED
- I - INTACT
- U - UNDISTURBED
- L - LOST

GROUNDWATER DEPTH

AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 7.5 ft

BORING METHOD
- HSA - HOLLOW STEM AUGERS
- CFA - CONTINUOUS FLIGHT AUGERS
- DC - DRIVING CASING
- MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

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RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # IT-2
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum
Surf. Elev. 493.2 ft
Date Started 5/25/11
Hammer Wt. 140 lb
Hammer Drop 30 in
Spoon Size 2 in
Hole Diameter 8 in
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Seward
Inspector K. Bullock
Date Completed 5/25/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
492.8	5" of **TOPSOIL**	0.4								1. No water encountered.
	Reddish brown, moist, medium stiff, sandy, lean **CLAY**, trace organics				D	2-3-5-6	1	DS	16	2. Grab bag of topsoil taken.
490.7		2.5								3. 4-inch PVC pipe installed in offset borehole at a depth of 5.0 ft. for infiltration test.
	Tan and gray-brown and red, moist, medium dense, silty, fine to medium **SAND**, trace gravel				I/D	7-10-10-13	2	DS	18	
489.2		4.0								4. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
	Reddish brown, moist, medium dense, silty **ROCK FRAGMENTS**, with sand, **(USCS: GM; USDA: SANDY LOAM)** **Average Infiltration Rate = 0.93 in/hr**			5	D	12-12-11-12	3	DS	20	
	(SAPROLITE)				D	4-7-7-6	4	DS	24	5. Boring Coordinates: N: 579938.5781 E: 1227685.5524
485.7		7.5								
	Red and tan, moist, medium dense, silty **SAND**, **(SAPROLITE)**				D	9-10-10-16	5	DS	18	
483.2		10.0		10						
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 8.5 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

RECORD OF SOIL EXPLORATION LOGS.GPJ PROJECT.GDT 7/27/11

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # IT-4
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum
Surf. Elev. 538.4 ft
Date Started 5/24/11
Hammer Wt. 140 lb
Hammer Drop 30 in
Spoon Size 2 in
Hole Diameter 8 in
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Seward
Inspector K. Bullock
Date Completed 5/24/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
537.9	6" of **TOPSOIL**	0.5								1. No water encountered.
	Brown, moist, soft to very stiff, lean **CLAY**, trace sand and organics in top foot				I	3-3-6-5	1	DS	13	2. 4-inch PVC pipe installed in offset borehole at a depth of 6.0 ft. for infiltration test.
					I/D	0-1-2-2	2	DS	10	3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
				5	I/D	5-12-10-15	3	DS	16	4. Boring Coordinates: N: 579322.0863 E: 1226893.2995
532.4		6.0								
	Tan and gray, moist, medium dense, silty, fine **SAND**, with rock fragments, **(USCS: SM; USDA: LOAM)** **Average Infiltration Rate = <0.12 in/hr**				D	5-9-11-9	4	DS	16	
					D	10-10-11-20	5	DS	17	
528.4		10.0		10						
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 7.0 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc. Boring # IT-6
Project Name Little Bennett Regional Park Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum	Hammer Wt. 140 lb	Hole Diameter 8 in	Foreman W. Seward
Surf. Elev. 551.1 ft	Hammer Drop 30 in	Rock Core Dia. N/A	Inspector K. Bullock
Date Started 5/24/11	Spoon Size 2 in	Boring Method HSA	Date Completed 5/24/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
550.7	5" of **TOPSOIL**	0.4								1. No water encountered.
	Reddish-brown, moist, loose, silty, fine **SAND**, trace organics				I/D	3-4-5-8	1	DS	14	2. 4-inch PVC pipe installed in offset borehole at a depth of 5.0 ft. for infiltration test.
549.1		2.0								
	Red, moist, medium dense, silty **SAND**, with rock fragments, **(USCS: SM; USDA: SANDY LOAM)**				I/D	7-10-11-10	2	DS	22	3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
	Average Infiltration Rate = 3.78 in/hr			5	I/D	7-10-10-11	3	DS	24	4. Boring Coordinates: N: 579177.0651 E: 1227140.6428
					D	9-13-14-14	4	DS	20	
543.1		8.0								
	Red, moist, hard, **CLAY**, some rock fragments				D	11-20-32-37	5	DS	24	
541.1		10.0		10						
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE	SAMPLE CONDITIONS	GROUNDWATER DEPTH	BORING METHOD
DS - DRIVEN SPLIT SPOON	D - DISINTEGRATED	AT COMPLETION dry ft	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER ______ HRS. ______ ft	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER 24 HRS. ______ ft	DC - DRIVING CASING
RC - ROCK CORE	L - LOST	CAVED AT 8.0 ft	MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # IT-8
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum	Hammer Wt. 140 lb	Hole Diameter 8 in	Foreman W. Seward
Surf. Elev. 529.9 ft	Hammer Drop 30 in	Rock Core Dia. N/A	Inspector K. Bullock
Date Started 5/24/11	Spoon Size 2 in	Boring Method HSA	Date Completed 5/24/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec (in)	BORING & SAMPLE NOTES
529.6	4" of **TOPSOIL**	0.3								1. No water encountered. 2. 4-inch PVC pipe installed in offset borehole at a depth of 4.0 ft. for infiltration test. 3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer. 4. Boring Coordinates: N: 578636.9381 E: 1227209.4095
527.4	Brown, moist, medium stiff to stiff, lean **CLAY**, with sand	2.5			I	2-3-4-5	1	DS	18	
525.9	Reddish brown, moist, medium dense, clayey **SAND**, with silt, trace gravel	4.0			I	2-8-6-8	2	DS	16	
	Reddish brown, moist, stiff to very stiff, sandy **SILT**, **(USCS: ML; USDA: LOAM)** **Average Infiltration Rate = 1.35 in/hr**			5	I	4-5-6-8	3	DS	13	
521.9	Trace gravel and quartzites at 5.0 ft	8.0			I/D	8-11-13-14	4	DS	24	
519.9	Reddish brown, moist, hard, **CLAY**, with fine sand	10.0		10	I	15-18-20-25	5	DS	24	
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE	SAMPLE CONDITIONS	GROUNDWATER DEPTH	BORING METHOD
DS - DRIVEN SPLIT SPOON	D - DISINTEGRATED	AT COMPLETION dry ft	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER ______ HRS. ______ ft	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER 24 HRS. ______ ft	DC - DRIVING CASING
RC - ROCK CORE	L - LOST	CAVED AT 8.0 ft	MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # IT-9
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum	Hammer Wt. 140 lb	Hole Diameter 8 in	Foreman W. Seward
Surf. Elev. 534.5 ft	Hammer Drop 30 in	Rock Core Dia. N/A	Inspector K. Bullock
Date Started 5/16/11	Spoon Size 2 in	Boring Method HSA	Date Completed 5/16/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE Cond	Blows/6"	No.	Type	Rec (in)	BORING & SAMPLE NOTES
534.0	6" of **TOPSOIL**	0.5								1. No water encountered.
	Brown, moist, medium stiff, sandy **SILT**, trace organics in top 1.5 ft., **(USCS: ML; USDA: SILTY LOAM)**				I	1-2-3-2	1	DS	20	2. 4-inch PVC pipe installed in offset borehole at a depth of 4.0 ft. for infiltration test.
					I	1-3-2-2	2	DS	18	3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
530.0	**Average Infiltration Rate = 3.51 in/hr**	4.5								
529.0	Reddish-brown, moist, loose, clayey **SAND**	5.5		5	I	3-3-4-5	3	DS	24	4. Boring Coordinates: N: 578090.6041 E: 1227424.0709
	Brown, moist, stiff to very stiff, lean **CLAY**				I	2-5-5-5	4	DS	12	
526.0		8.5								
524.5	Reddish-brown, moist, medium dense, silty, fine **SAND**, iron staining observed	10.0		10	I	9-9-10-12	5	DS	24	
	Bottom of Boring at 10.0 ft									
				15						
				20						

SAMPLER TYPE	SAMPLE CONDITIONS	GROUNDWATER DEPTH	BORING METHOD
DS - DRIVEN SPLIT SPOON	D - DISINTEGRATED	AT COMPLETION dry ft	HSA - HOLLOW STEM AUGERS
PT - PRESSED SHELBY TUBE	I - INTACT	AFTER ______ HRS. ______ ft	CFA - CONTINUOUS FLIGHT AUGERS
CA - CONTINUOUS FLIGHT AUGER	U - UNDISTURBED	AFTER 24 HRS. ______ ft	DC - DRIVING CASING
RC - ROCK CORE	L - LOST	CAVED AT 8.0 ft	MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF SOIL / ROCK EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Boring # IT-10
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, MD

SAMPLER

Datum
Surf. Elev. 543.2 ft
Date Started 5/16/11
Hammer Wt. 140 lb
Hammer Drop 30 in
Spoon Size 2 in
Hole Diameter 8 in
Rock Core Dia. N/A
Boring Method HSA
Foreman W. Seward
Inspector K. Bullock
Date Completed 5/16/11

ELEV. (ft)	SOIL DESCRIPTION Color, Moisture, Density, Plasticity, Size Proportions	STRA DEPTH (ft)	SOIL SYMBOL	DEPTH SCALE	SAMPLE					BORING & SAMPLE NOTES
					Cond	Blows/6"	No.	Type	Rec (in)	
542.7	6" of **TOPSOIL**	0.5								1. No water encountered.
	Tan, moist, medium stiff, lean **CLAY**, trace sand				I	2-2-4-5	1	DS	20	2. Grab bag of topsoil taken.
541.2	Gray with white, moist, stiff to very stiff, lean **CLAY**, with mica	2.0			I	3-5-7-7	2	DS	24	3. Boring drilled using a Simco 2800 All Terrain Vehicle (ATV) mounted drill rig with safety hammer.
				5	I/D	4-6-8-8	3	DS	18	4. Boring Coordinates: N: 577793.5967 E: 1227517.3757
					I	3-5-7-8	4	DS	24	
					I	6-9-16-16	5	DS	20	
533.2	Bottom of Boring at 10.0 ft	10.0		10						
				15						
				20						

SAMPLER TYPE
DS - DRIVEN SPLIT SPOON
PT - PRESSED SHELBY TUBE
CA - CONTINUOUS FLIGHT AUGER
RC - ROCK CORE

SAMPLE CONDITIONS
D - DISINTEGRATED
I - INTACT
U - UNDISTURBED
L - LOST

GROUNDWATER DEPTH
AT COMPLETION dry ft
AFTER ______ HRS. ______ ft
AFTER 24 HRS. ______ ft
CAVED AT 7.0 ft

BORING METHOD
HSA - HOLLOW STEM AUGERS
CFA - CONTINUOUS FLIGHT AUGERS
DC - DRIVING CASING
MD - MUD DRILLING

STANDARD PENETRATION TEST DRIVING 2" OD SAMPLER 1' WITH 140# HAMMER FALLING 30": COUNT MADE AT 6" INTERVALS

SUMMARY OF INFILTRATION TEST RESULTS

LITTLE BENNETT REGIONAL PARK
CLARKSBURG, MARYLAND
JOB NO. 10-030-A

Boring Number	**Casing Depth (ft)**	**Water Reading After 24 hours Presoak (ft)**	**1st Hour Infiltration Rate (in./hr)**	**2nd Hour Infiltration Rate (in./hr)**	**3rd Hour Infiltration Rate (in./hr)**	**4th Hour Infiltration Rate (in./hr)**	**Average Infiltration Rate (in./hr)**
IT-1/B-01	4.0	Dry	20.52	33.12	30.24	20.16	*26.01*
IT-2	5.0	0.12	1.44	0.72	0.84	0.72	*0.93*
IT-4	6.0	0.66	<0.12	<0.12	<0.12	<0.12	*<0.12*
IT-6	5.0	Dry	5.76	4.20	2.76	2.40	*3.78*
IT-8	4.0	Dry	1.56	0.96	1.32	1.56	*1.35*
IT-9	4.0	Dry	3.96	4.20	3.60	2.28	*3.51*

T. L. B. ASSOCIATES, INC.
Clarksburg, Maryland

Test Pit Logs

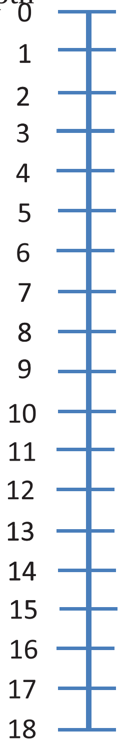
T.L. B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF TEST PIT EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc. Test Pit # P-1A
Project Name Little Bennett Regional Park Job # 10-030-A
Location Clarksburg, Maryland

Date 6/29/2011 Groundwater No water observed
Inspector Khadija Bullock

Depth



Soil Description

6 inches of topsoil

test hole

Test depth at 2.25 ft

Percolation test performed at near surface grade on 6/30/11 after presoak

Percolation Test Data

Original Water Level (from ground surface) 1.167 ft

Measured Drop from Original Water Level (ft)

1st Reading	1.75
2nd Reading	1.5
3rd Reading	1.5
4th Reading	1.5
5th Reading	1.375
6th Reading	1.25
7th Reading	1.25
8th Reading	1.25

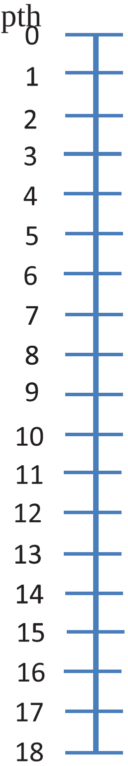
T.L. B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF TEST PIT EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc. Test Pit # P-1B
Project Name Little Bennett Regional Park Job # 10-030-A
Location Clarksburg, Maryland

Date 6/29/2011 Groundwater No water observed
Inspector Khadija Bullock

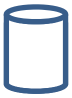
Depth



Soil Description

6 inches of topsoil

test hole



Test depth at 2.5 ft

Test performed at near surface grade
on 6/30/11 after presoak

Percolation Test Data

Original Water Level (from ground surface) 1.250 ft

Measured Drop from Original Water Level (ft)

1st Reading	1.5
2nd Reading	1.625
3rd Reading	1.625
4th Reading	1.75
5th Reading	1.5
6th Reading	1.5
7th Reading	1.375
8th Reading	1.375

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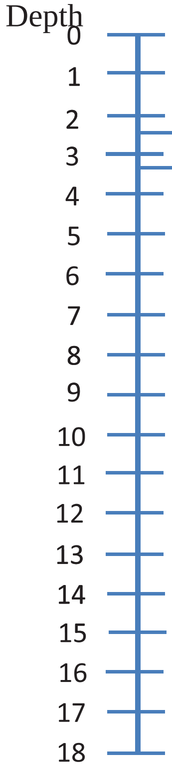
Glen Burnie, Maryland 21061

RECORD OF TEST PIT EXPLORATION

Contracted With: A. Morton Thomas & Associates, Inc.
Test Pit #: P-1C
Project Name: Little Bennett Regional Park
Job #: 10-030-A
Location: Clarksburg, Maryland

Date: 6/29/2011
Groundwater: No water observed
Inspector: Khadija Bullock

Depth



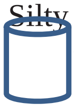
Soil Description

7 inches of TOPSOIL

Root mat observed to extend to 17 inches / 1.4 ft

Grayish-brown, Silty SAND with gravel — 2.4 ft

Reddish Brown, Silty SAND trace clay and rock fragments — 3.15 ft



test hole

Bottom of pit at 3.15 ft

Test depth at 5.65 ft

Test performed on 6/30/11 after presoak

Percolation Test Data

Original Water Level (from ground surface) 4.4 ft

Measured Drop from Original Water Level (ft)

1st Reading	5.25
2nd Reading	4.875
3rd Reading	5.375
4th Reading	4.875
5th Reading	4.75
6th Reading	4.875
7th Reading	4.875
8th Reading	4.875

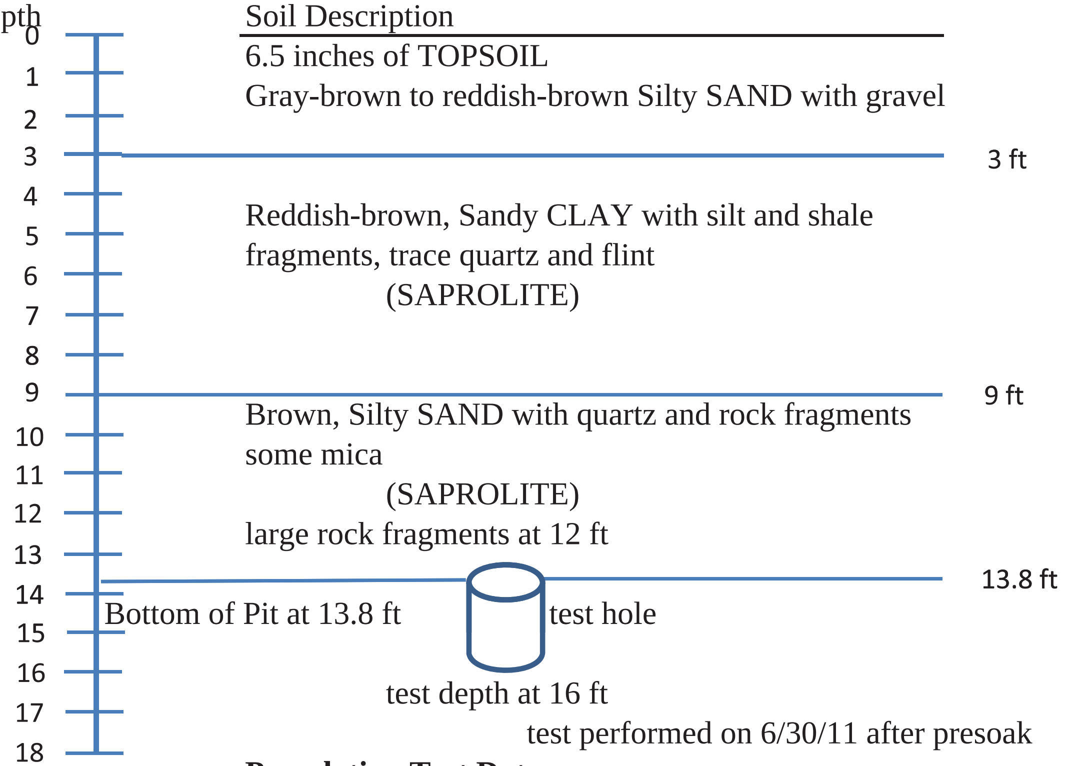
T.L. B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF TEST PIT EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc. Test Pit # P-1D
Project Name Little Bennett Regional Park Job # 10-030-A
Location Clarksburg, Maryland

Date 6/29/2011 Groundwater No water observed
Inspector Khadija Bullock

Depth Soil Description



6.5 inches of TOPSOIL
Gray-brown to reddish-brown Silty SAND with gravel

Reddish-brown, Sandy CLAY with silt and shale fragments, trace quartz and flint
(SAPROLITE)

Brown, Silty SAND with quartz and rock fragments some mica
(SAPROLITE)
large rock fragments at 12 ft

Bottom of Pit at 13.8 ft test hole

test depth at 16 ft

test performed on 6/30/11 after presoak

Percolation Test Data

Original Water Level (from ground surface) 15.05 ft

Measured Drop from Original Water Level (ft)

1st Reading	15.75
2nd Reading	15.75
3rd Reading	15.75
4th Reading	15.75
5th Reading	15.75
6th Reading	15.75
7th Reading	15.75
8th Reading	15.75

T.L. B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

RECORD OF TEST PIT EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc. Test Pit # P-1E
Project Name Little Bennett Regional Park Job # 10-030-A
Location Clarksburg, Maryland

Date 6/29/2011 Groundwater No water observed
Inspector Khadija Bullock

Depth

Soil Description

8 inches of TOPSOIL, Gray-brown silty SAND with gravel

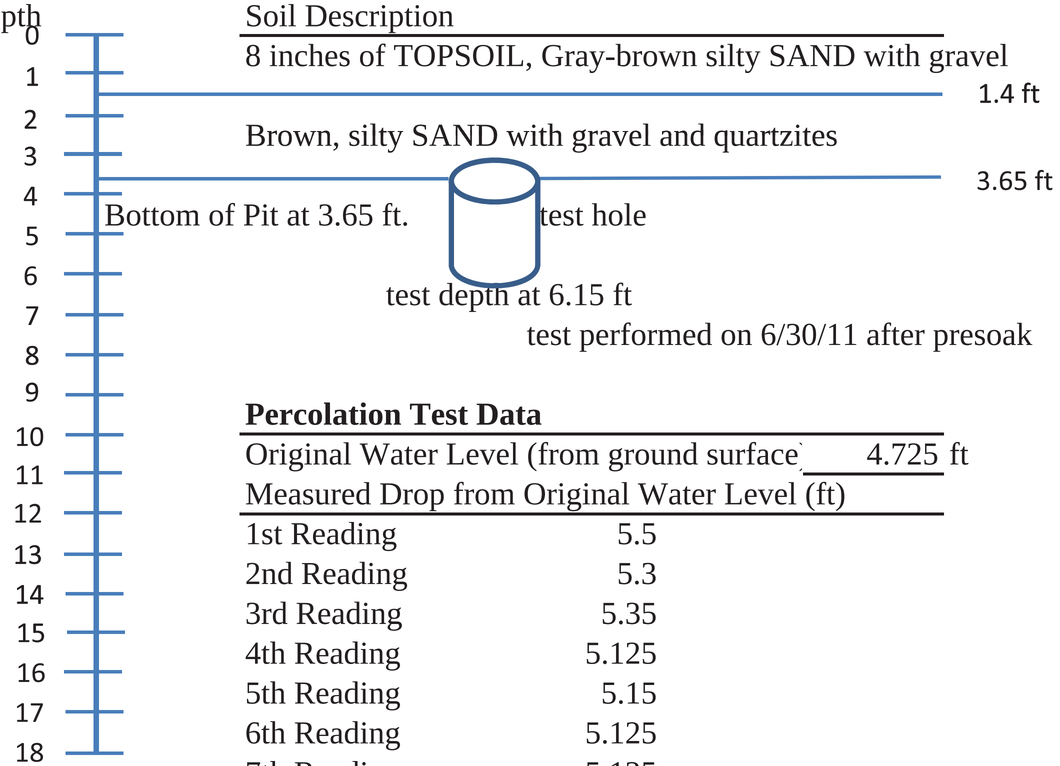
Brown, silty SAND with gravel and quartzites

Bottom of Pit at 3.65 ft.

test hole

test depth at 6.15 ft

test performed on 6/30/11 after presoak



Percolation Test Data

Original Water Level (from ground surface) 4.725 ft

Measured Drop from Original Water Level (ft)	
1st Reading	5.5
2nd Reading	5.3
3rd Reading	5.35
4th Reading	5.125
5th Reading	5.15
6th Reading	5.125
7th Reading	5.125
8th Reading	5.125

T.L. B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

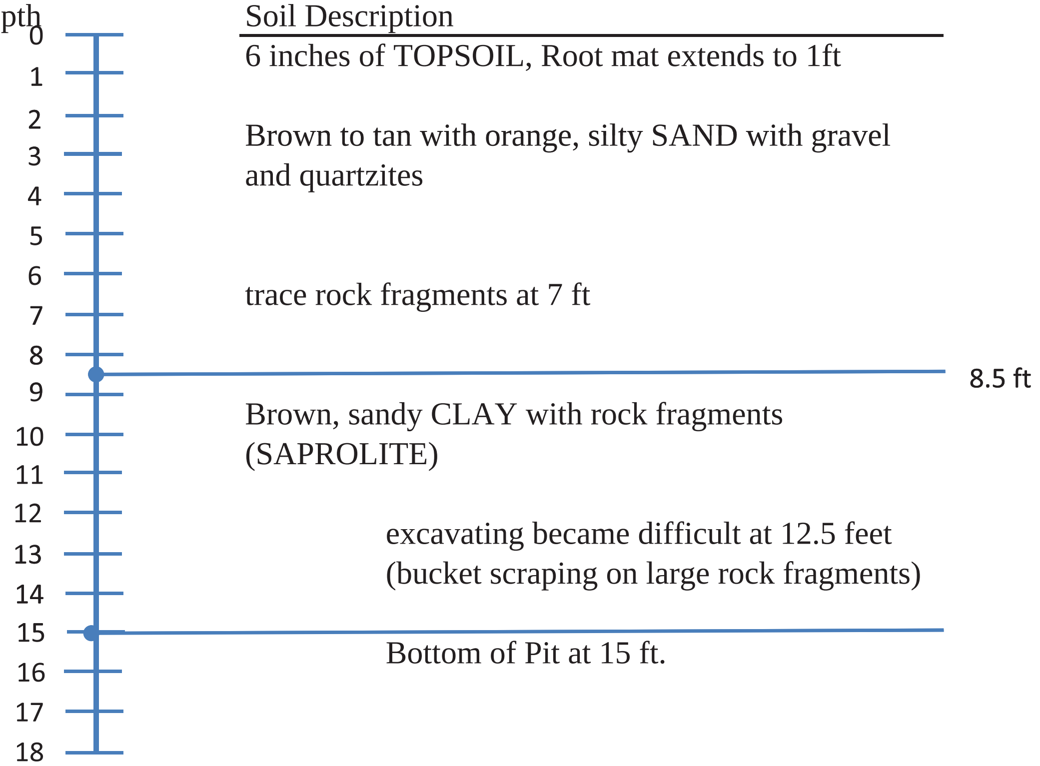
RECORD OF TEST PIT EXPLORATION

Contracted With A. Morton Thomas & Associates, Inc.
Test Pit # P-1G
Project Name Little Bennett Regional Park
Job # 10-030-A
Location Clarksburg, Maryland

Date 6/29/2011
Inspector Khadija Bullock
Groundwater No water observed during excavation or 24-hours after

Depth

Soil Description



6 inches of TOPSOIL, Root mat extends to 1ft

Brown to tan with orange, silty SAND with gravel and quartzites

trace rock fragments at 7 ft

Brown, sandy CLAY with rock fragments (SAPROLITE)

excavating became difficult at 12.5 feet (bucket scraping on large rock fragments)

Bottom of Pit at 15 ft.

Little Bennet Regional Park
Summary of Informal Percolation Test Data

Test Location	Test Depth from Surface (ft)	Original Water Level (from surface in ft)	1st Reading	2nd Reading	3rd Reading	4th Reading	5th Reading	6th Reading	7th Reading	8th Reading
P-1A	2.250	1.167	1.750	1.500	1.500	1.500	1.375	1.375	1.250	1.250
P-1B	2.500	1.250	1.500	1.625	1.625	1.750	1.500	1.500	1.375	1.375
P-1C	5.650	4.400	5.250	4.875	5.375	4.875	4.750	4.875	4.875	4.875
P-1D	16.000	15.050	15.750	15.750	15.750	15.750	15.750	15.750	15.750	15.750
P-1E	6.150	4.725	5.500	5.300	5.350	5.125	5.150	5.125	5.125	5.125

Note: Caving conditions observed in Test Holes P-1C and P-1E at 3rd Reading

Summary of Informal Percolation Test Results

Test Location	Test Depth from Surface (ft)	Measured Drop in 30-Minute Intervals (in)								
		1st Reading	2nd Reading	3rd Reading	4th Reading	5th Reading	6th Reading	7th Reading	8th Reading	Percolation Rate (Min/Inch)
P-1A	2.25	7.0	4.0	4.0	4.0	2.5	2.5	1.0	1.0	30.00
P-1B	2.50	3.0	4.5	4.5	6.0	3.0	3.0	1.5	1.5	20.00
P-1C	5.65	10.2	5.7	11.7	5.7	4.2	5.7	5.7	5.7	5.26
P-1D	16.00	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	3.57
P-1E	6.15	9.3	6.9	7.5	4.8	5.1	4.8	4.8	4.8	6.25

APPENDIX B

LABORATORY TEST RESULTS

Boring	Depth (ft)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% < #4 Sieve	% < #200 Sieve	Classification	Water Content (%)	Dry Density (pcf)	Optimum Water Content (%)	Soaked CBR @ 95% Density @ 0.1 in (%)	Swelling (%)
B-1	4.0-6.0	40	34	6	69	22	SM	10.3				
B-17	1.5-5.0	34	26	8	97	72	ML	7.9	118.2	13.5	0.8	11.1
B-18	5.0-6.5				61	21		10.8				
B-19	7.5-9.0				23	8		10.3				
B-2	1.0-5.0	35	23	12	94	52	CL	4.4	129.2	11.0	0.4	16.0
IT-2	4.0-6.0	34	30	4	58	22	GM	7.8				
IT-4	6.0-8.0	36	29	7	73	36	SM	13.8				
IT-6	4.0-6.0	34	28	6	83	34	SM	17.0				
IT-8	4.0-6.0	42	34	8	76	50	ML	24.4				
IT-9	2.0-4.0	31	25	6	100	65	ML	33.9				

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Glen Burnie, Maryland 21061

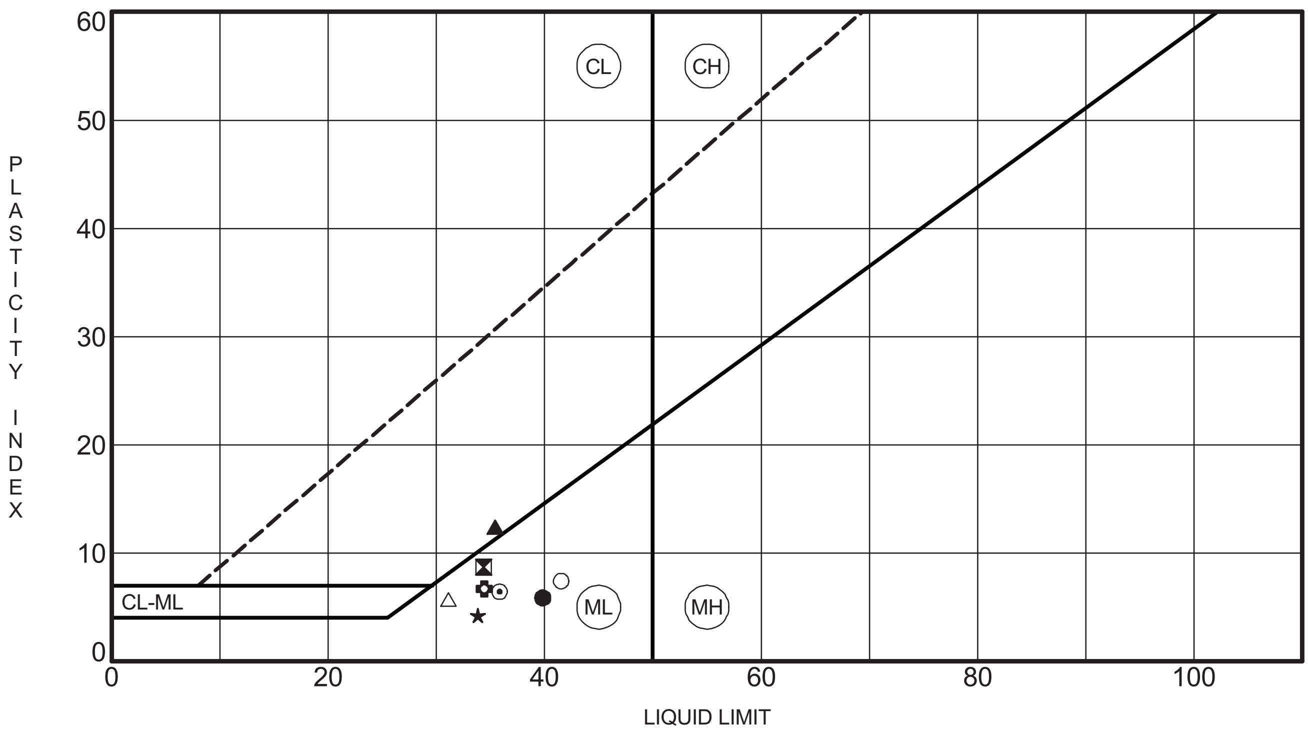
Summary of Laboratory Results

Little Bennett Regional Park

Clarksburg, MD

Project Number: 10-030-A

Atterberg Limits’ Results



	Boring	Depth	LL	PL	PI	Fines	Classification
●	B-1	4.0-6.0	40	34	6	22	Tan, silty **SAND** with gravel (rock fragments) **[USCS: SM; USDA: Sandy Loam]**
⧗	B-17	1.5-5.0	34	26	8	72	Tan, **SILT** with sand **[USCS: ML; USDA: Silt Loam]**
▲	B-2	1.0-5.0	35	23	12	52	Gray, sandy lean **Clay [USDA: CL; USCS: Loam]**
★	IT-2	4.0-6.0	34	30	4	22	Reddish brown, silty **GRAVEL**(rock fragments) with sand **[USCS: GM; USDA: Sandy Loam]**
⊙	IT-4	6.0-8.0	36	29	7	36	Tan, silty **SAND** with gravel (rock fragments) **[USCS: SM; USDA: Loam]**
✿	IT-6	4.0-6.0	34	28	6	34	Reddish brown, silty **SAND** with gravel (rock fragments) **[USCS: SM; USDA: Sandy Loam**
○	IT-8	4.0-6.0	42	34	8	50	Reddish brown, sandy **SILT** with gravel **[USCS: ML; USDA: Loam]**
△	IT-9	2.0-4.0	31	25	6	65	Dark brown, sandy **SILT [USCS: ML; USDA: Silty Loam]**

Test Method: ASTM D4318

Tested By: MG

Date: 6/7/2011

ATTERBERG LIMITS' RESULTS

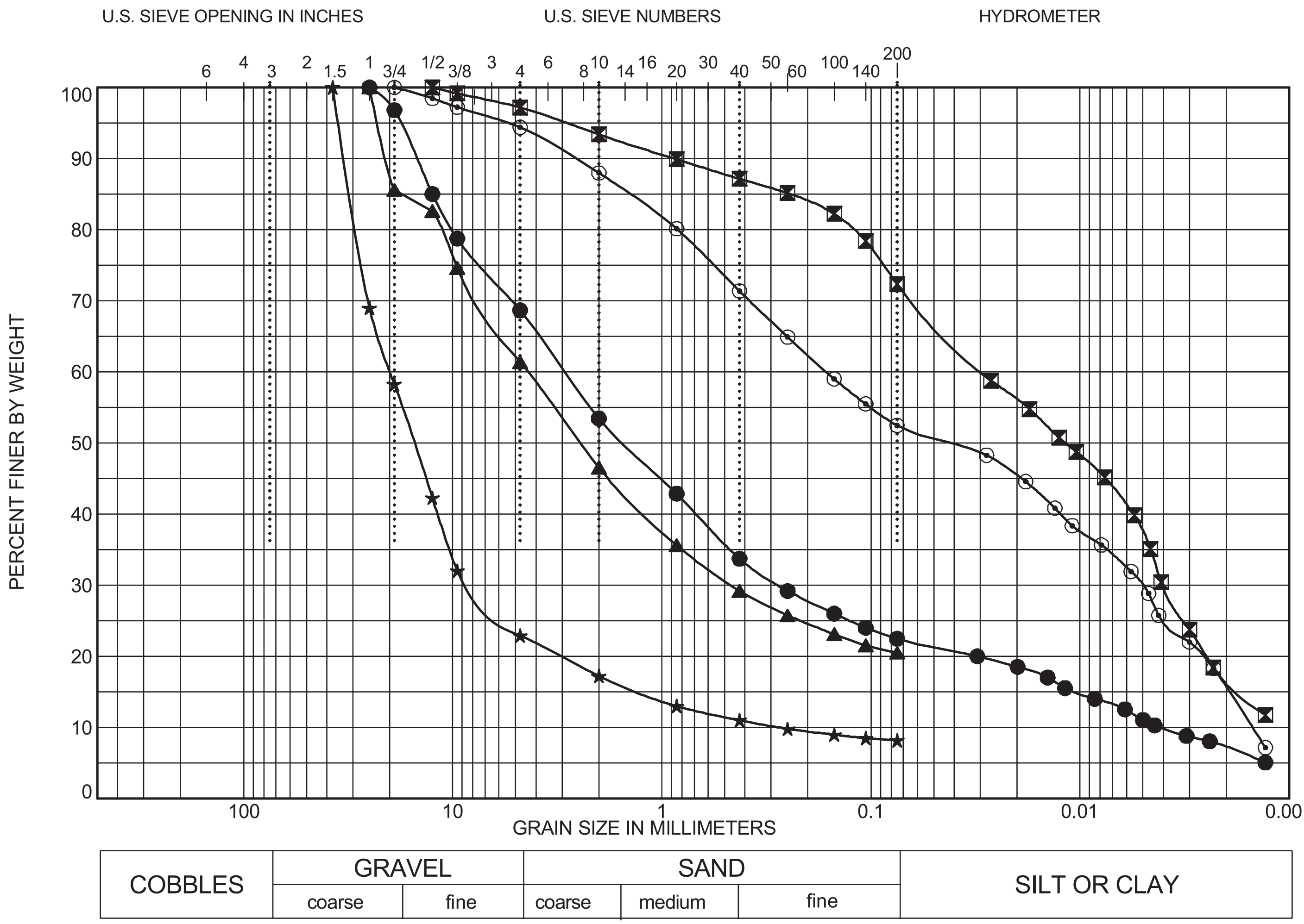
Project: Little Bennett Regional Park

Location: Clarksburg, MD

Project Number: 10-030-A

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

Gradation Analysis Curves



	D10	D30	D60	D100
●	0.004	0.275	2.907	25
☒		0.004	0.029	12.5
▲		0.464	4.386	25
★	0.274	8.15	19.862	37.5
⊙	0.002	0.005	0.164	19

Test Method: ASTM D422

Tested By: MG Date: 6/13/2011

	Boring	S No.	Depth	%Gravel	%Sand	%Silt	%Clay	LL	PI	MC(%)	Classification
●	B-1	3	4.0-6.0	31.4	46.1	11.4	11.0	40	6	10.3	Tan, silty **SAND** with gravel (rock fragments) **[USCS: SM; USDA: Sandy Loam]**
☒	B-17	Bag	1.5-5.0	2.8	24.8	35.1	37.3	34	8	7.9	Tan, **SILT** with sand **[USCS: ML; USDA: Silt Loam]**
▲	B-18	3	5.0-6.5	38.6	40.9	20.5				10.8	Reddish brown, silty **SAND** with gravel (rock fragments)
★	B-19	4	7.5-9.0	77.1	14.7	8.2				10.3	Reddish brown, poorly graded **GRAVEL**(rock fragments) with silt
⊙	B-2	Bag	1.0-5.0	5.6	41.9	22.6	29.8	35	12	4.4	Gray, sandy lean **Clay [USDA: CL; USCS: Loam]**

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

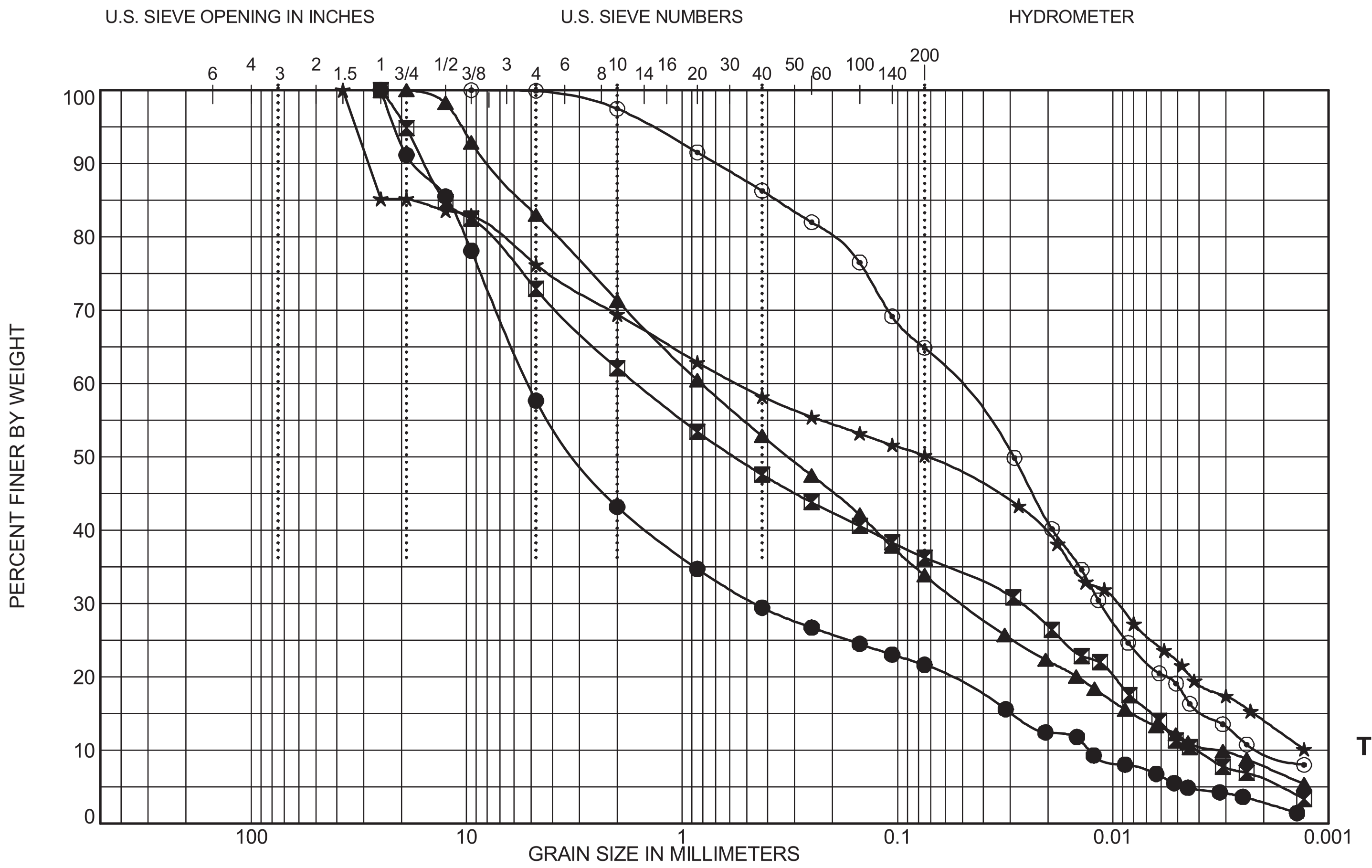
GRAIN SIZE DISTRIBUTION

Little Bennett Regional Park

Clarksburg, MD

Project Number: 10-030-A

Sheet 1 of 2



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	D10	D30	D60	D100
●	0.013	0.458	5.152	25
☒	0.004	0.027	1.622	25
▲	0.003	0.05	0.814	19
★		0.01	0.553	37.5
⊙	0.002	0.011	0.055	9.5

Test Method: ASTM D422

Tested By: MG

Date: 6/13/2011

	Boring	S No.	Depth	%Gravel	%Sand	%Silt	%Clay	LL	PI	MC(%)	Classification
●	IT-2	3	4.0-6.0	42.4	36.0	16.3	5.3	34	4	7.8	Reddish brown, silty **GRAVEL**(rock fragments) with sand **[USCS: GM; USDA: Sandy Loam]**
☒	IT-4	4	6.0-8.0	27.1	36.6	25.1	11.2	36	7	13.8	Tan, silty **SAND** with gravel (rock fragments) **[USCS: SM; USDA: Loam]**
▲	IT-6	3	4.0-6.0	17.0	49.1	21.9	12.0	34	6	17.0	Reddish brown, silty **SAND** with gravel (rock fragments) **[USCS: SM; USDA: Sandy Loam]**
★	IT-8	3	4.0-6.0	23.8	26.0	28.2	22.0	42	8	24.4	Reddish brown, sandy **SILT** with gravel **[USCS: ML; USDA: Loam]**
⊙	IT-9	2	2.0-4.0	0.1	35.0	46.2	18.7	31	6	33.9	Dark brown, sandy **SILT [USCS: ML; USDA: Silty Loam]**

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

GRAIN SIZE DISTRIBUTION

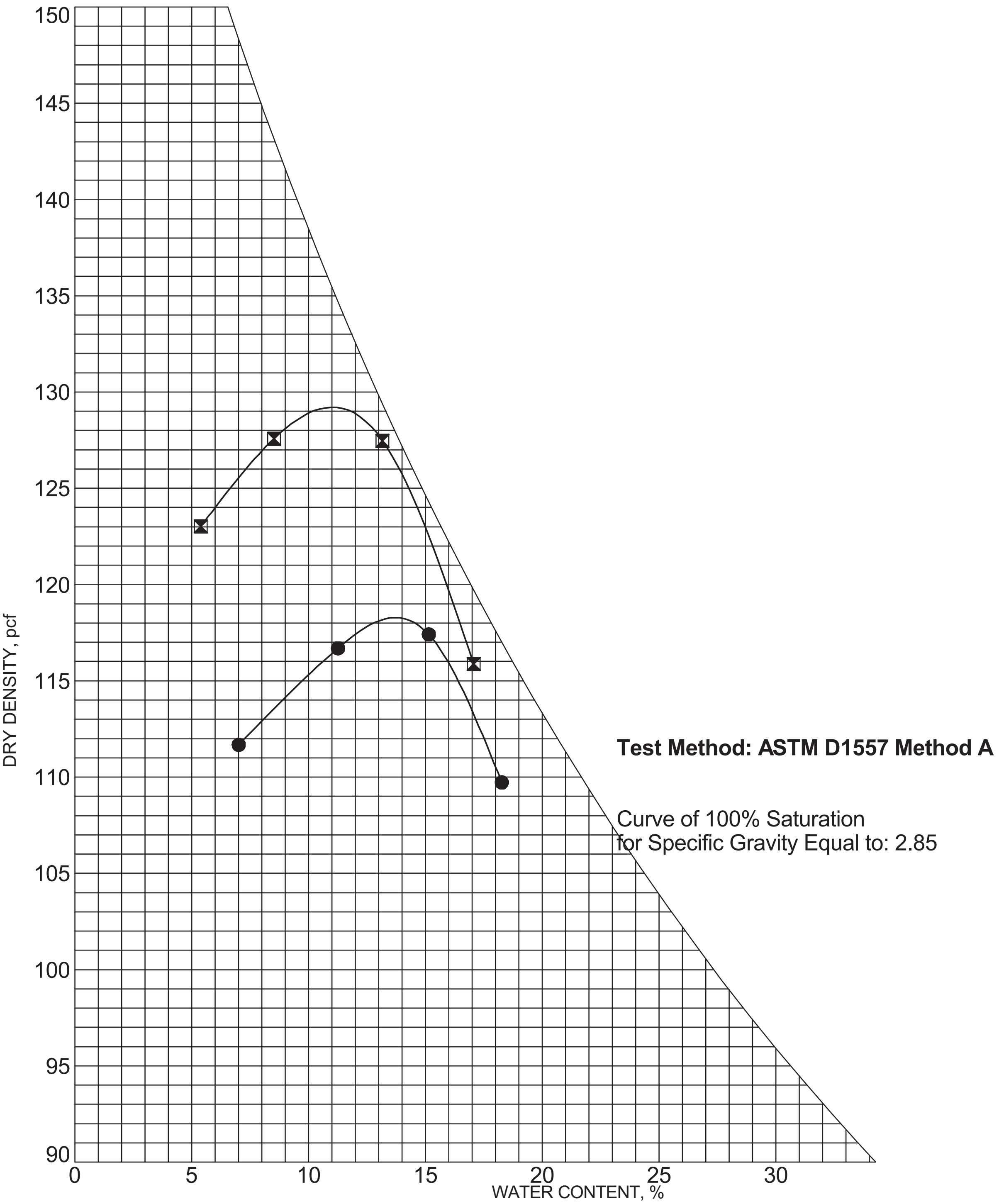
Little Bennett Regional Park

Clarksburg, MD

Project Number: 10-030-A

TLB GRAIN SIZE LANDSCAPE LOGS.GPJ TLB2009.GDT 7/28/11

Modified Proctor Test Result(s)



Test Method: ASTM D1557 Method A

Curve of 100% Saturation
for Specific Gravity Equal to: 2.85

	Boring	Sample No.	Depth, Ft	Classification	Max. Dry Density (pcf)	Opt. MC %	LL	PI
●	B-17	Bag	1.5-5.0	Tan, **SILT** with sand **[USCS: ML; USDA: Silt Loam]**	118.2	13.5	34	8
☒	B-2	Bag	1.0-5.0	Gray, sandy lean **Clay [USDA: CL; USCS: Loam]**	129.2	11.0	35	12

Tested By: MG Date: 6/9/2011

MOISTURE-DENSITY RELATIONSHIP

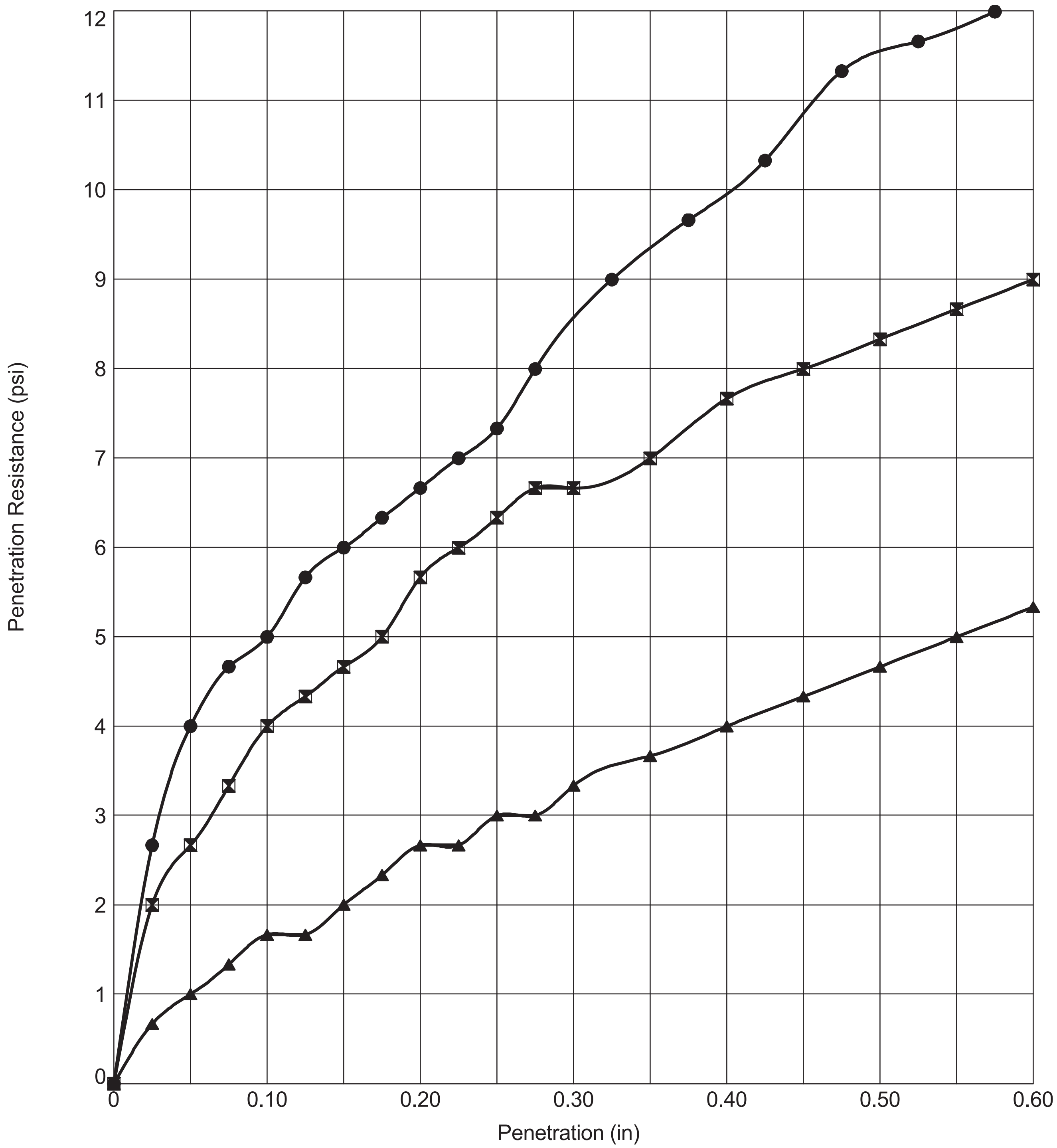
Project: Little Bennett Regional Park

Location: Clarksburg, MD

Project Number: 10-030-A

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

California Bearing Ratio (CBR) Test Results



Sample Ident: B-2 (Bag) Tested By: MG Date: 6/13/2011

Material Description: Gray, sandy lean **Clay [USDA: CL; USCS: Loam]**

	Molded			Soaked			CBR			
	Density (pcf)	% Max Density	% Moisture	Density (pcf)	% Max Density	% Moisture	0.1 in	0.2 in	Pen. Surcharge (lbs)	% Swell
●	127.86	98.99	9.5	124.75	96.55	22.2	0.5	0.4	10.0	16.0
☒	121.59	94.12	9.5	118.63	91.82	23.8	0.4	0.4	10.0	15.0
▲	119.85	92.72	9.5	117.18	90.70	24.1	0.2	0.2	10.0	13.3

TEST METHOD: ASTM D1883

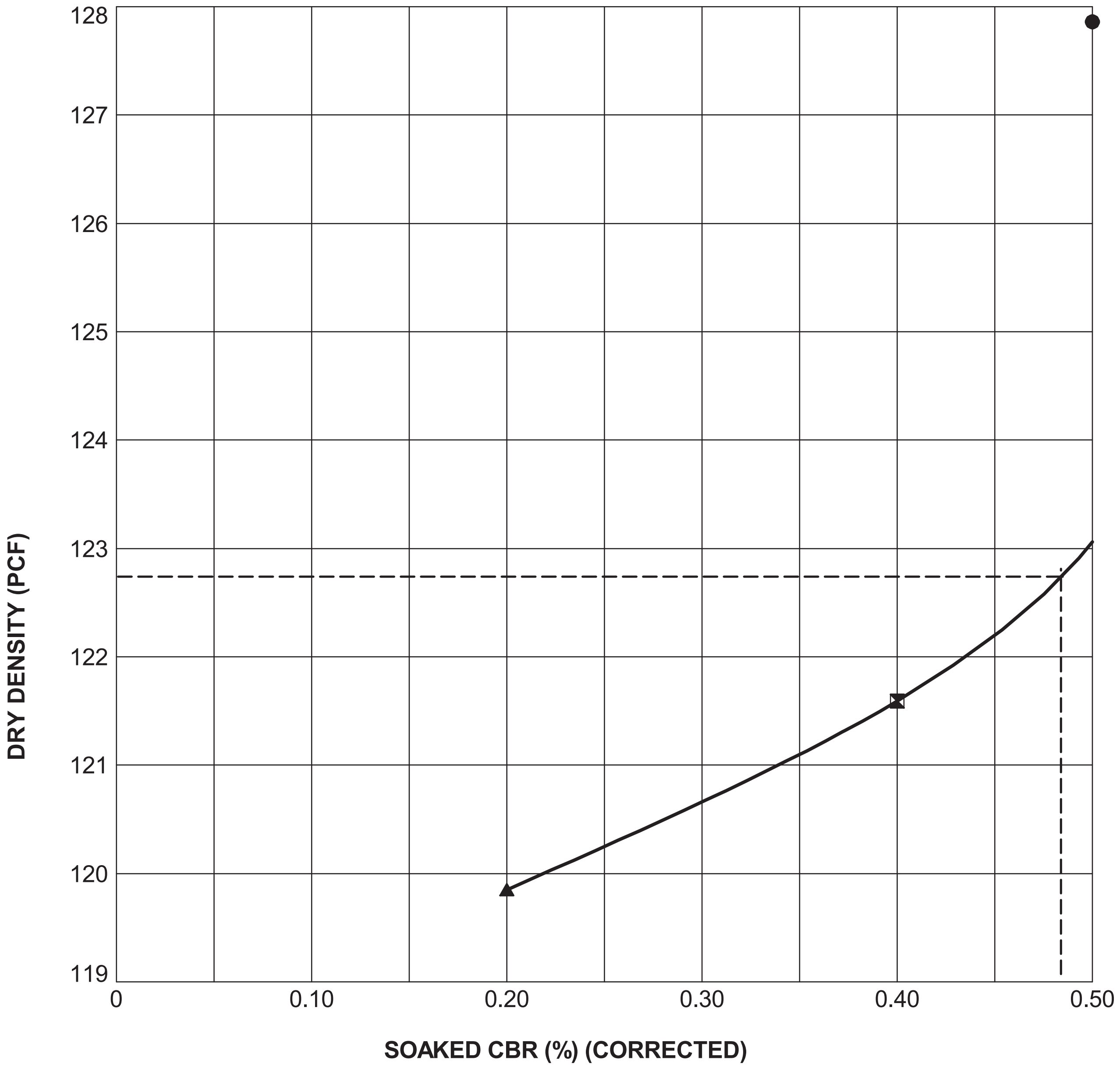
PENETRATION VS STRESS

Project: Little Bennett Regional Park

Location: Clarksburg, MD

Project Number: 10-030-A

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061



Remark: Soaked CBR values based on % of Modified Proctor (ASTM D1557 Method A)

Sample Ident: B-2 (Bag) Tested By: MG Date: 6/13/2011

Material Description: Gray, sandy lean **Clay [USDA: CL; USCS: Loam]**

Dry Density @ 95% 122.7 pcf CBR @ 95% Density 0.5 LL 35 PL 23 PI 12

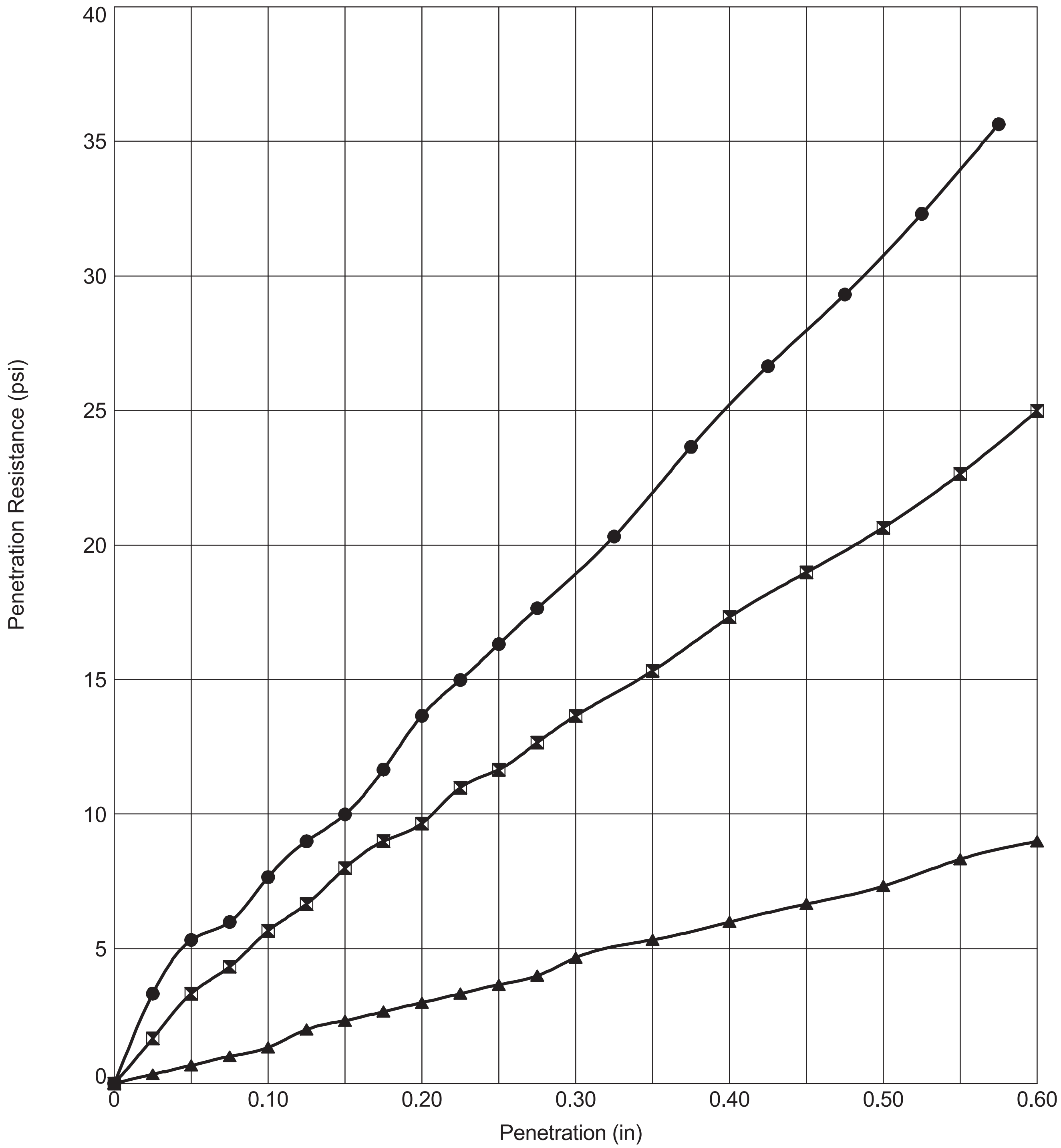
	% Compaction	Dry Density (pcf)	CBR 0.1 in	 0.2 in	% Swell
●	99.0	127.9	0.5	0.4	16.0
☒	94.1	121.6	0.4	0.4	15.0
▲	92.7	119.8	0.2	0.2	13.3

TEST METHOD: ASTM D1883

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

DRY DENSITY VS SOAKED CBR

Project: Little Bennett Regional Park
Location: Clarksburg, MD
Project Number: 10-030-A



Sample Ident: B-17 (Bag) Tested By: MG Date: 6/13/2011

Material Description: Tan, **SILT** with sand **[USCS: ML; USDA: Silt Loam]**

	Molded			Soaked			CBR		Pen. Surcharge (lbs)	% Swell
	Density (pcf)	% Max Density	% Moisture	Density (pcf)	% Max Density	% Moisture	0.1 in	0.2 in		
●	113.86	96.36	13.3	111.00	93.91	25	0.8	0.9	10.0	11.1
☒	105.98	89.68	13.3	104.79	88.65	26.3	0.6	0.6	10.0	7.9
▲	93.89	79.44	13.3	94.87	80.26	28.3	0.1	0.2	10.0	4.6

TEST METHOD: ASTM D1883

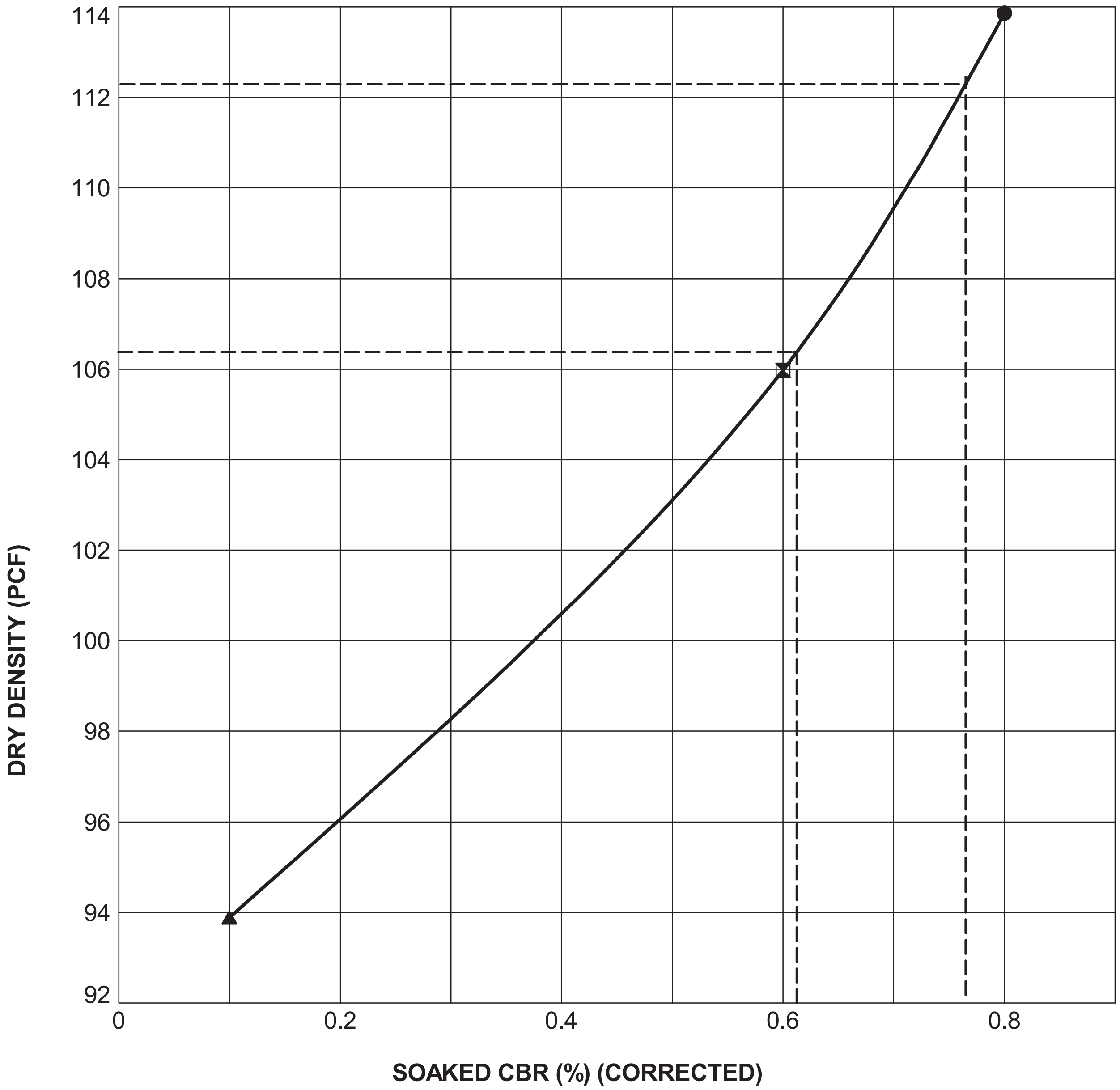
T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

PENETRATION VS STRESS

Project: Little Bennett Regional Park

Location: Clarksburg, MD

Project Number: 10-030-A



Remark: Soaked CBR values based on % of Modified Proctor (ASTM D1557 Method A)

Sample Ident: B-17 (Bag) Tested By: MG Date: 6/13/2011

Material Description: Tan, **SILT** with sand **[USCS: ML; USDA: Silt Loam]**

Dry Density @ 95% 112.3 pcf CBR @ 95% Density 0.8 LL 34 PL 26 PI 8

	% Compaction	Dry Density (pcf)	CBR 0.1 in	 0.2 in	% Swell
●	96.4	113.9	0.8	0.9	11.1
⊠	89.7	106.0	0.6	0.6	7.9
▲	79.4	93.9	0.1	0.2	4.6

TEST METHOD: ASTM D1883

T.L.B. ASSOCIATES, INC.
Glen Burnie, Maryland 21061

DRY DENSITY VS SOAKED CBR

Project: Little Bennett Regional Park
Location: Clarksburg, MD
Project Number: 10-030-A

Topsoil Test Results

A&L Eastern Laboratories, Inc.
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TEXTURE ANALYSIS

Client :
T.L.B. ASSOCIATES INC
7280 BALTIMORE ANNAPOLIS BLVD

GLEN BURNIE, MD 21061

Grower :
T.L.B. ASSOCIATES INC

Farm:

Report No : 11-159-0530
Cust No : 02323
Date Printed : 06/10/2011
Page : 1 of 1
Submitted By : K BULLOCK
Date Received : 06/08/2011

Lab No	Field ID	Sample Identification	Percent Sand	Percent Silt	Percent Clay	Textural Classification
19368		B-1	36.0	42.8	21.2	Loam
19369		B-3	44.0	38.8	17.2	Loam
19370		B-4	38.0	38.8	23.2	Loam
19371		B-5	42.0	40.8	17.2	Loam
19372		B-6	44.6	39.1	16.1	Loam
19373		B-7	40.0	42.8	17.2	Loam
19374		B-9	34.0	48.8	17.2	Loam
19375		B-11	32.0	46.8	21.2	Loam
19377		B-14	30.0	48.8	21.2	Loam
19378		B-15	26.0	50.8	23.2	Silt Loam
19379		B-16	18.0	58.8	23.2	Silt Loam
19380		B-17	26.0	48.8	25.2	Loam
19381		B-18	38.0	44.8	17.2	Loam
19382		B-19	40.3	43.5	16.2	Loam
19383		B-20	44.0	44.8	11.2	Loam
19384		IT-2	44.0	42.8	13.2	Loam
19385		IT-3	42.0	42.8	15.2	Loam
19386		IT-5	48.0	36.8	15.2	Loam
19387		IT-6	34.0	44.8	21.2	Loam
19388		IT-10	32.0	16.8	51.2	Clay

Analysis prepared by: A&L Eastern Laboratories, Inc.

A&L Eastern Laboratories, Inc.
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www.aleastern.com

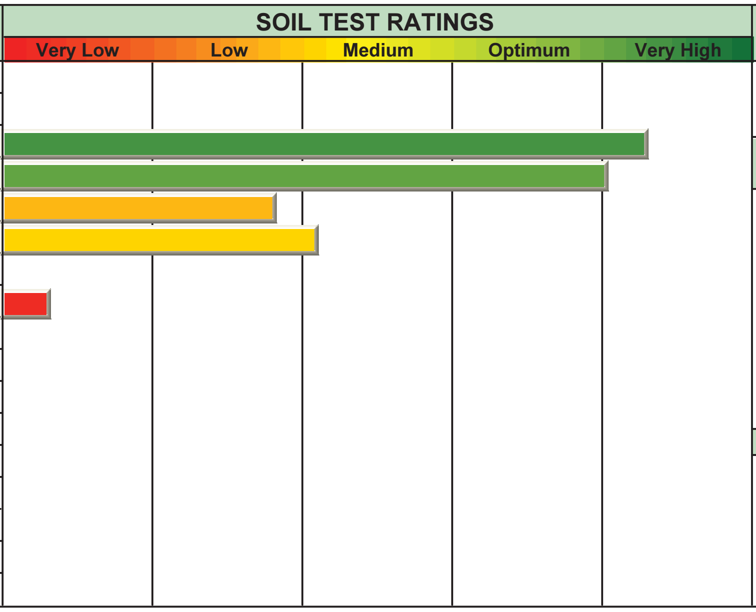
Submitted By: K BULLOCK

SOIL ANALYSIS

Client :	Grower :		
T.L.B. ASSOCIATES INC THOMAS BROWN 7280 BALTIMORE ANNAPOLIS BLVD GLEN BURNIE MD 21061	T.L.B. ASSOCIATES INC	Report No: Cust No: Date Printed: Date Received : PO: Page :	11-159-0530 02323 06/10/2011 06/08/2011 1 of 20

Lab Number : 19368 **Field Id :** **Sample Id :** B-1

Test	Method	Results
Soil pH	1:1	5.1
Buffer pH		6.64
Phosphorus (P)	M3	140 ppm
Potassium (K)	M3	167 ppm
Calcium (Ca)	M3	717 ppm
Magnesium (Mg)	M3	97 ppm
Sulfur (S)		
Boron (B)	M3	0.1 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.19 mmhos/cm
Organic Matter	WB	2.0 % ENR 79
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

7.7
meq/100g

Calculated Cation Saturation

%K	**5.6**
%Ca	**46.6**
%Mg	**10.5**
%H	**37.7**
Hmeq	**2.9**

K : Mg Ratio

0.53 🟥

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
80		2.5	0	2.0	0		0.50				

Crop : **Rec Units:**

Comments :

CUSTOMERS NOT LISTED ON SUBMITTAL FORM

Bedding Plants

Limestone application is targeted to bring soil pH to 6.2.

- Apply dolomitic lime to raise pH and improve the magnesium level.
- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- For best result, if there are no existing plants, broadcast all lime then till and mix 6 inches into the soil. Limit the lime application to 50 pounds per 1000 sq. ft. for existing plants, apply every 4-6 months until the recommended amount is fulfilled.
- Apply the amount of lime recommended in first page to raise pH
- For more in depth explanation, go to our website www.al-labs-eastern.com and select the "Lawn and Garden" tab at the top of home page. At the bottom of the "Lawn and Garden" page, you find information explaining a soil test report and fertilizer recommendations. http://al-labs-eastern.com/forms/LawnGardenSoilTestExplained.pdf

M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

A&L Eastern Laboratories, Inc.

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www.aleastern.com

Submitted By: K BULLOCK

SOIL ANALYSIS

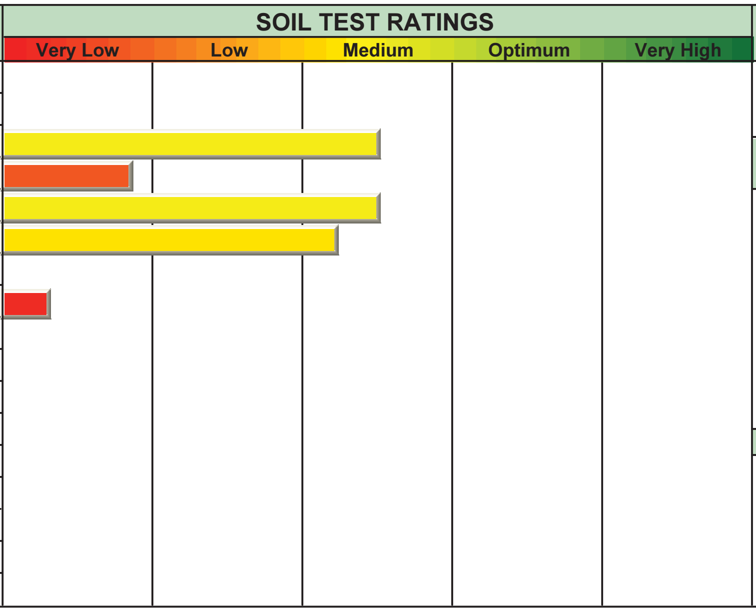
Client :
T.L.B. ASSOCIATES INC
THOMAS BROWN
7280 BALTIMORE ANNAPOLIS BLVD
GLEN BURNIE MD 21061

Grower :
T.L.B. ASSOCIATES INC

Report No: 11-159-0530
Cust No: 02323
Date Printed: 06/10/2011
Date Received : 06/08/2011
PO:
Page : 2 of 20

Lab Number : 19369 **Field Id :** **Sample Id :** B-3

Test	Method	Results
Soil pH	1:1	5.5
Buffer pH		6.78
Phosphorus (P)	M3	40 ppm
Potassium (K)	M3	43 ppm
Calcium (Ca)	M3	712 ppm
Magnesium (Mg)	M3	81 ppm
Sulfur (S)		
Boron (B)	M3	0.1 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.08 mmhos/cm
Organic Matter	WB	2.3 % ENR 88
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

5.9

meq/100g

Calculated Cation Saturation

%K	**1.9**
%Ca	**60.3**
%Mg	**11.4**
%H	**25.6**
Hmeq	**1.5**

K : Mg Ratio

0.16 🟨

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
41		2.5	1.0	6.0	0		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

Limestone application is targeted to bring soil pH to 6.2.

- Apply dolomitic lime to raise pH and improve the magnesium level.
- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- For best result, if there are no existing plants, broadcast all lime then till and mix 6 inches into the soil. Limit the lime application to 50 pounds per 1000 sq. ft. for existing plants, apply every 4-6 months until the recommended amount is fulfilled.
- Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
- Apply the amount of lime recommended in first page to raise pH
- For more in depth explanation, go to our website www.al-labs-eastern.com and select the "Lawn and Garden" tab at the top of home page. At the bottom of the "Lawn and Garden" page, you find information explaining a soil test report and fertilizer recommendations. http://al-labs-eastern.com/forms/LawnGardenSoilTestExplained.pdf

M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

Analysis prepared by: A&L Eastern Laboratories, Inc.

A&L Eastern Laboratories, Inc.
7621 Whitepine Road Richmond, Virginia 23237 (804) 743-9401 Fax (804) 271-6446
www.aleastern.com

Submitted By: K BULLOCK

SOIL ANALYSIS

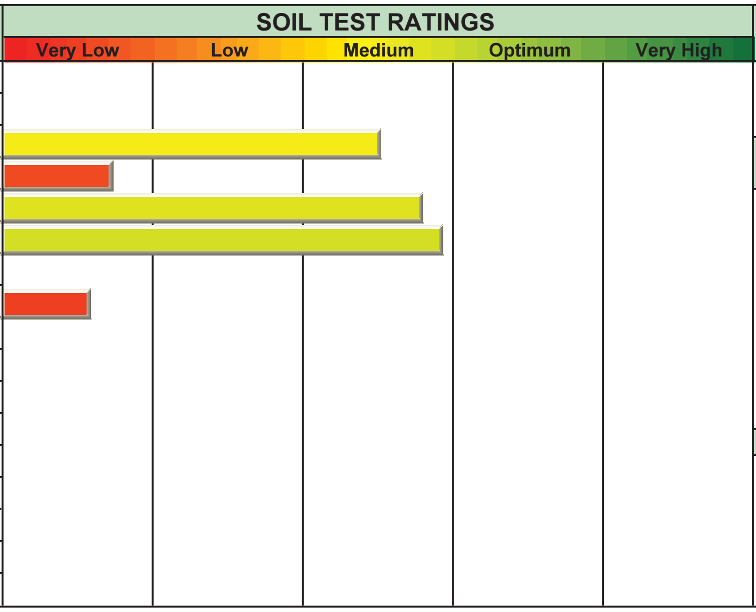
Client :
T.L.B. ASSOCIATES INC
THOMAS BROWN
7280 BALTIMORE ANNAPOLIS BLVD
GLEN BURNIE MD 21061

Grower :
T.L.B. ASSOCIATES INC

Report No: 11-159-0530
Cust No: 02323
Date Printed: 06/10/2011
Date Received : 06/08/2011
PO:
Page : 3 of 20

Lab Number : 19370 **Field Id :** **Sample Id :** B-4

Test	Method	Results
Soil pH	1:1	5.9
Buffer pH		6.82
Phosphorus (P)	M3	40 ppm
Potassium (K)	M3	39 ppm
Calcium (Ca)	M3	828 ppm
Magnesium (Mg)	M3	113 ppm
Sulfur (S)		
Boron (B)	M3	0.2 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.16 mmhos/cm
Organic Matter	WB	2.8 % ENR 97
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

6.3
meq/100g

Calculated Cation Saturation

%K	**1.6**
%Ca	**65.7**
%Mg	**14.9**
%H	**17.0**
Hmeq	**1.1**

K : Mg Ratio

0.11 🟧

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

LIME (lbs)	LIME (tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
25		2.5	1.0	6.0	0		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

Limestone application is targeted to bring soil pH to 6.2.

- Apply dolomitic lime to raise pH and improve the magnesium level.
- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- For best result, if there are no existing plants, broadcast all lime then till and mix 6 inches into the soil. Limit the lime application to 50 pounds per 1000 sq. ft. for existing plants, apply every 4-6 months until the recommended amount is fulfilled.
- Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

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Submitted By: K BULLOCK

SOIL ANALYSIS

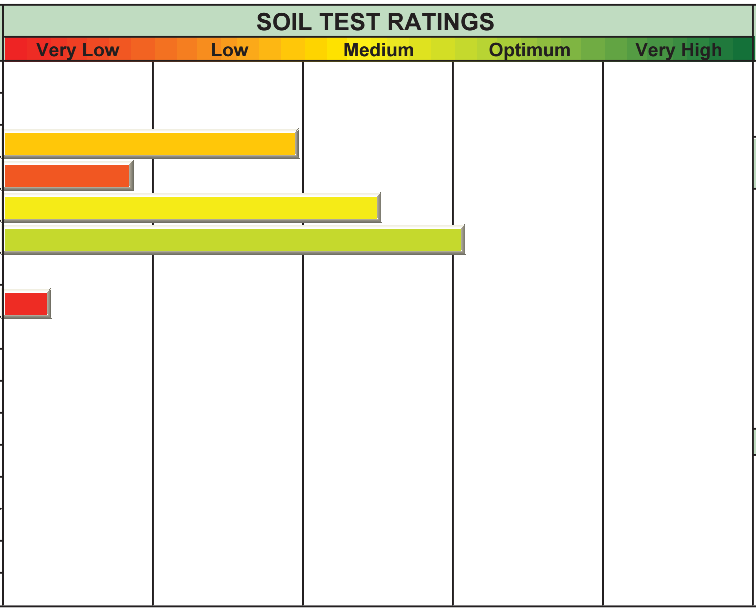
Client :
T.L.B. ASSOCIATES INC
THOMAS BROWN
7280 BALTIMORE ANNAPOLIS BLVD
GLEN BURNIE MD 21061

Grower :
T.L.B. ASSOCIATES INC

Report No: 11-159-0530
Cust No: 02323
Date Printed: 06/10/2011
Date Received : 06/08/2011
PO:
Page : 4 of 20

Lab Number : 19371 **Field Id :** **Sample Id :** B-5

Test	Method	Results
Soil pH	1:1	5.7
Buffer pH		6.82
Phosphorus (P)	M3	29 ppm
Potassium (K)	M3	42 ppm
Calcium (Ca)	M3	634 ppm
Magnesium (Mg)	M3	98 ppm
Sulfur (S)		
Boron (B)	M3	0.1 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.09 mmhos/cm
Organic Matter	WB	2.0 % ENR 83
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

5.2
meq/100g

Calculated Cation Saturation

%K	**2.1**
%Ca	**61.0**
%Mg	**15.7**
%H	**21.0**
Hmeq	**1.1**

K : Mg Ratio

0.13 🟧

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
35		2.5	2.0	6.0	0		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

Limestone application is targeted to bring soil pH to 6.2.

- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- For best result, if there are no existing plants, broadcast all lime then till and mix 6 inches into the soil. Limit the lime application to 50 pounds per 1000 sq. ft. for existing plants, apply every 4-6 months until the recommended amount is fulfilled.
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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

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7621 Whitepine Road Richmond, Virginia 23237 (804) 743-9401 Fax (804) 271-6446
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Submitted By: K BULLOCK

SOIL ANALYSIS

Client :
T.L.B. ASSOCIATES INC
THOMAS BROWN
7280 BALTIMORE ANNAPOLIS BLVD
GLEN BURNIE MD 21061

Grower :
T.L.B. ASSOCIATES INC

Report No: 11-159-0530
Cust No: 02323
Date Printed: 06/10/2011
Date Received : 06/08/2011
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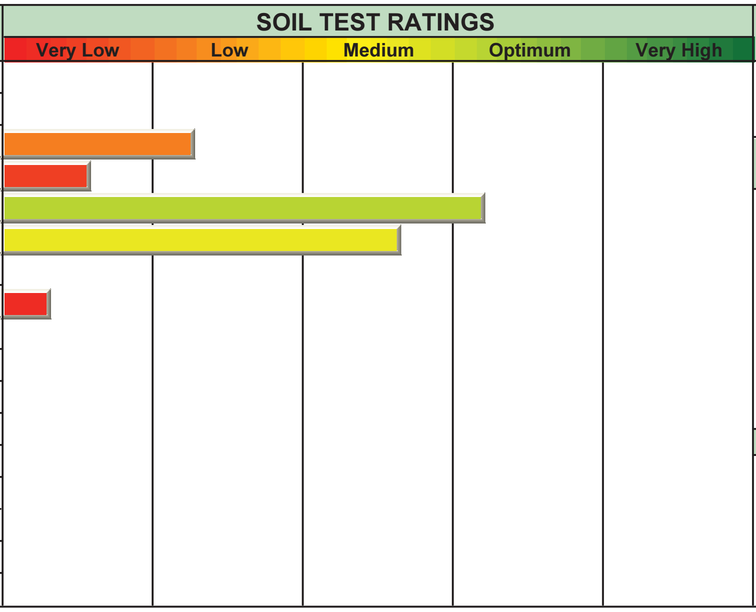
Lab Number : 19372 **Field Id :** **Sample Id :** B-6

Test	Method	Results
Soil pH	1:1	6.2
Buffer pH		6.86
Phosphorus (P)	M3	17 ppm
Potassium (K)	M3	30 ppm
Calcium (Ca)	M3	805 ppm
Magnesium (Mg)	M3	86 ppm
Sulfur (S)		
Boron (B)	M3	0.1 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.05 mmhos/cm
Organic Matter	WB	1.9 % ENR 80
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

5.5
meq/100g

Calculated Cation Saturation

%K	**1.4**
%Ca	**73.2**
%Mg	**13.0**
%H	**12.1**
Hmeq	**0.7**

K : Mg Ratio

0.11 🟧

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
0		2.5	3.5	6.0	0		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
- For more in depth explanation, go to our website www.al-labs-eastern.com and select the "Lawn and Garden" tab at the top of home page. At the bottom of the "Lawn and Garden" page, you find information explaining a soil test report and fertilizer recommendations. http://al-labs-eastern.com/forms/LawnGardenSoilTestExplained.pdf

M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

A&L Eastern Laboratories, Inc.

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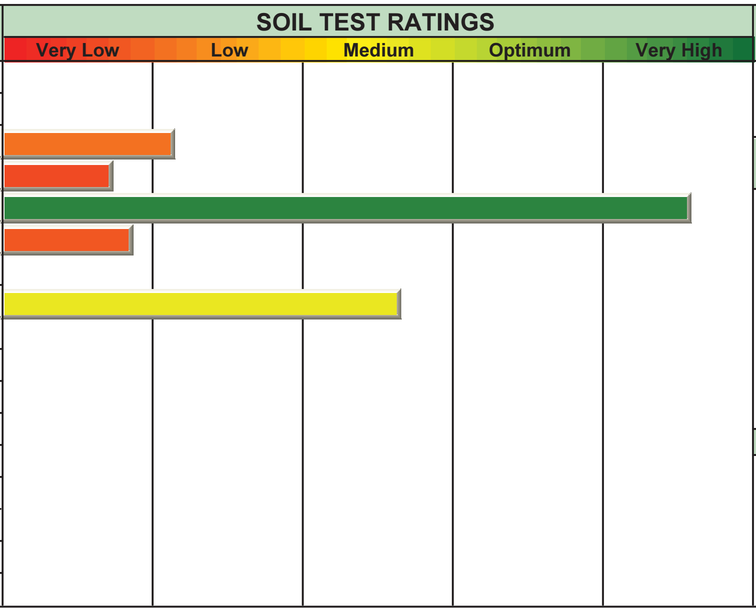
Submitted By: K BULLOCK

SOIL ANALYSIS

Client :	Grower :		
T.L.B. ASSOCIATES INC THOMAS BROWN 7280 BALTIMORE ANNAPOLIS BLVD GLEN BURNIE MD 21061	T.L.B. ASSOCIATES INC	Report No: Cust No: Date Printed: Date Received : PO: Page :	11-159-0530 02323 06/10/2011 06/08/2011 6 of 20

Lab Number : 19373 **Field Id :** **Sample Id :** B-7

Test	Method	Results
Soil pH	1:1	7.6
Buffer pH		
Phosphorus (P)	M3	16 ppm
Potassium (K)	M3	51 ppm
Calcium (Ca)	M3	3751 ppm
Magnesium (Mg)	M3	118 ppm
Sulfur (S)		
Boron (B)	M3	1.0 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.28 mmhos/cm
Organic Matter	WB	2.3 % ENR 72
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

19.9
meq/100g

Calculated Cation Saturation

%K	**0.7**
%Ca	**94.2**
%Mg	**4.9**
%H	**0.0**
Hmeq	**0.0**

K : Mg Ratio

0.13 🟧

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
0		2.5	3.5	5.5	0		0				
Crop :						**Rec Units:**					

Comments :

Bedding Plants

· Cation Exchange Capacity may be over-estimated due to high pH and free lime in the soil.

· All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.

· Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.

· Soil pH will come down naturally, it is not necessary to reduce pH if it is below 7.2. To reduce pH, apply 2.5 pounds of elemental sulfur per 1000 square feet for every 0.1 of pH unit above 7.2. For example, pH 7.4 requires 5 pounds. Sulfur should be thoroughly mix 6 inches into the soil.

· Use ammonium sulfate as all or portion of the N requirement to reduce pH.

· For more in depth explanation, go to our website www.al-labs-eastern.com and select the "Lawn and Garden" tab at the top of home page. At the bottom of the "Lawn and Garden" page, you find information explaining a soil test report and fertilizer recommendations. http://al-labs-eastern.com/forms/LawnGardenSoilTestExplained.pdf

M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

Analysis prepared by: A&L Eastern Laboratories, Inc.

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Grower :
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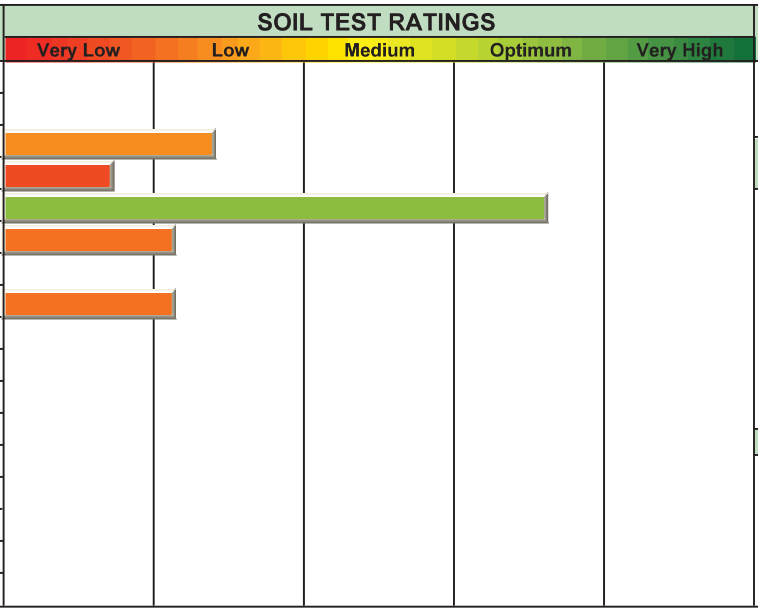
Lab Number : 19374 **Field Id :** **Sample Id :** B-9

Test	Method	Results
Soil pH	1:1	6.2
Buffer pH		6.77
Phosphorus (P)	M3	19 ppm
Potassium (K)	M3	43 ppm
Calcium (Ca)	M3	2066 ppm
Magnesium (Mg)	M3	97 ppm
Sulfur (S)		
Boron (B)	M3	0.4 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.36 mmhos/cm
Organic Matter	WB	2.1 % ENR 74
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

12.8
meq/100g

Calculated Cation Saturation

%K	**0.9**
%Ca	**80.7**
%Mg	**6.3**
%H	**12.1**
Hmeq	**1.6**

K : Mg Ratio

0.14 🟧

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
0		2.5	3.0	6.0	0		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

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SOIL ANALYSIS

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THOMAS BROWN
7280 BALTIMORE ANNAPOLIS BLVD
GLEN BURNIE MD 21061

Grower :
T.L.B. ASSOCIATES INC

Report No:	11-159-0530
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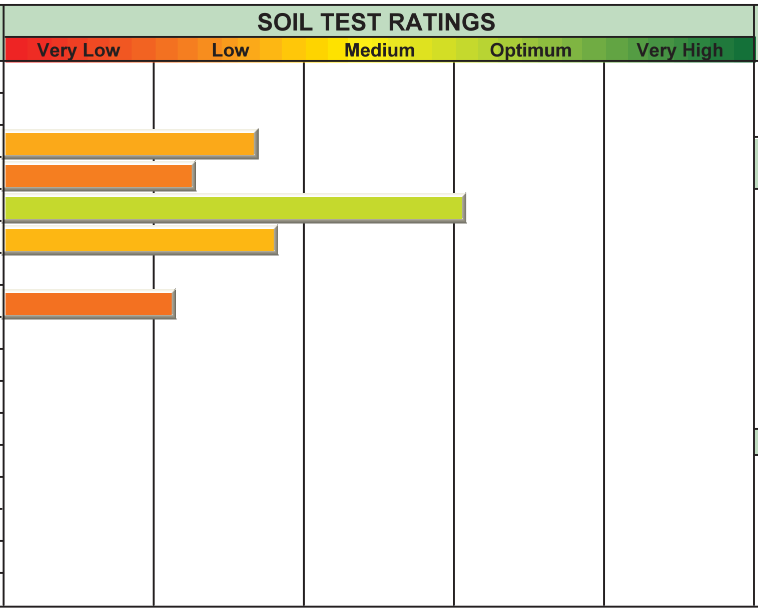
Lab Number : 19375 **Field Id :** **Sample Id :** B-11

Test	Method	Results
Soil pH	1:1	5.9
Buffer pH		6.76
Phosphorus (P)	M3	26 ppm
Potassium (K)	M3	65 ppm
Calcium (Ca)	M3	1387 ppm
Magnesium (Mg)	M3	110 ppm
Sulfur (S)		
Boron (B)	M3	0.4 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.2 mmhos/cm
Organic Matter	WB	2.4 % ENR 84
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

9.7
meq/100g

Calculated Cation Saturation

%K	**1.7**
%Ca	**71.5**
%Mg	**9.5**
%H	**17.1**
Hmeq	**1.7**

K : Mg Ratio

0.18 🟨

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
30		2.5	2.5	5.5	0		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

Limestone application is targeted to bring soil pH to 6.2.

- Apply dolomitic lime to raise pH and improve the magnesium level.
- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- For best result, if there are no existing plants, broadcast all lime then till and mix 6 inches into the soil. Limit the lime application to 50 pounds per 1000 sq. ft. for existing plants, apply every 4-6 months until the recommended amount is fulfilled.
- Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
- Apply the amount of lime recommended in first page to raise pH
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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

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SOIL ANALYSIS

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7280 BALTIMORE ANNAPOLIS BLVD
GLEN BURNIE MD 21061

Grower :
T.L.B. ASSOCIATES INC

Report No: 11-159-0530
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Date Printed: 06/10/2011
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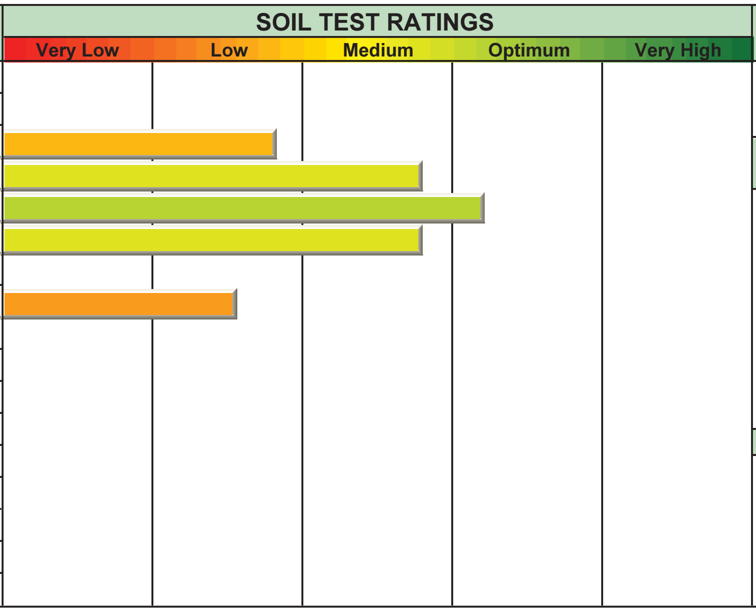
Lab Number : 19377 **Field Id :** **Sample Id :** B-14

Test	Method	Results
Soil pH	1:1	6.3
Buffer pH		6.83
Phosphorus (P)	M3	27 ppm
Potassium (K)	M3	115 ppm
Calcium (Ca)	M3	1335 ppm
Magnesium (Mg)	M3	154 ppm
Sulfur (S)		
Boron (B)	M3	0.5 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.18 mmhos/cm
Organic Matter	WB	2.6 % ENR 89
Nitrate Nitrogen		
Soil Classification		0

SOIL TEST RATINGS



Calculated Cation Exchange Capacity

9.2
meq/100g

Calculated Cation Saturation

%K	**3.2**
%Ca	**72.6**
%Mg	**13.9**
%H	**10.6**
Hmeq	**1.0**

K : Mg Ratio

0.23 🟨

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
0		2.5	2.0	4.0	0		0				

Crop : **Rec Units:**

Comments :

Bedding Plants

· All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.

· Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.

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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

Analysis prepared by: A&L Eastern Laboratories, Inc.

Submitted By: K BULLOCK

SOIL ANALYSIS

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T.L.B. ASSOCIATES INC
THOMAS BROWN
7280 BALTIMORE ANNAPOLIS BLVD
GLEN BURNIE MD 21061

Grower :
T.L.B. ASSOCIATES INC

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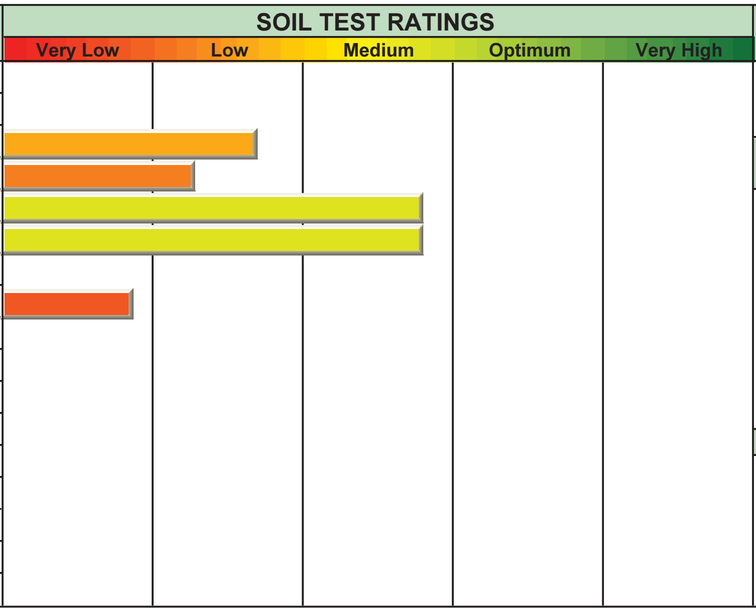
Lab Number : 19378 **Field Id :** **Sample Id :** B-15

Test	Method	Results
Soil pH	1:1	5.9
Buffer pH		6.81
Phosphorus (P)	M3	24 ppm
Potassium (K)	M3	64 ppm
Calcium (Ca)	M3	889 ppm
Magnesium (Mg)	M3	115 ppm
Sulfur (S)		
Boron (B)	M3	0.3 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.15 mmhos/cm
Organic Matter	WB	2.3 % ENR 86
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

6.7
meq/100g

Calculated Cation Saturation

%K	2.4
%Ca	66.3
%Mg	14.3
%H	17.2
Hmeq	1.2

K : Mg Ratio

0.17 🟨

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

LIME		N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
(lbs)	(tons)										
25		2.5	2.5	5.5	0		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

Limestone application is targeted to bring soil pH to 6.2.

- Apply dolomitic lime to raise pH and improve the magnesium level.
- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- For best result, if there are no existing plants, broadcast all lime then till and mix 6 inches into the soil. Limit the lime application to 50 pounds per 1000 sq. ft. for existing plants, apply every 4-6 months until the recommended amount is fulfilled.
- Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
- Apply the amount of lime recommended in first page to raise pH
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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

Submitted By: K BULLOCK

SOIL ANALYSIS

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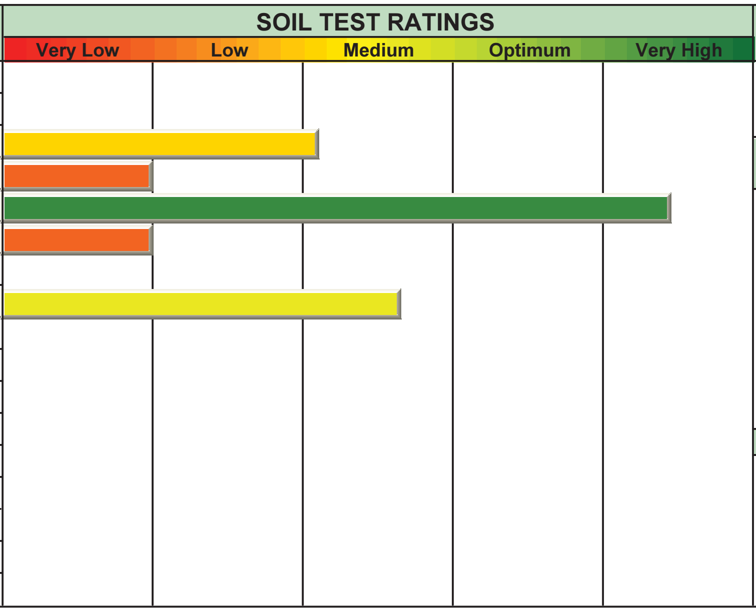
Lab Number : 19379 **Field Id :** **Sample Id :** B-16

Test	Method	Results
Soil pH	1:1	7.4
Buffer pH		
Phosphorus (P)	M3	31 ppm
Potassium (K)	M3	74 ppm
Calcium (Ca)	M3	3652 ppm
Magnesium (Mg)	M3	132 ppm
Sulfur (S)		
Boron (B)	M3	1.0 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.33 mmhos/cm
Organic Matter	WB	2.9 % ENR 84
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

19.5
meq/100g

Calculated Cation Saturation

%K	**1.0**
%Ca	**93.6**
%Mg	**5.6**
%H	**0.0**
Hmeq	**0.0**

K : Mg Ratio

0.17 🟨

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
0		2.5	2.0	5.5	0		0				

Crop : **Rec Units:**

Comments :

Bedding Plants

- Cation Exchange Capacity may be over-estimated due to high pH and free lime in the soil.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
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- Use ammonium sulfate as all or portion of the N requirement to reduce pH.
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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

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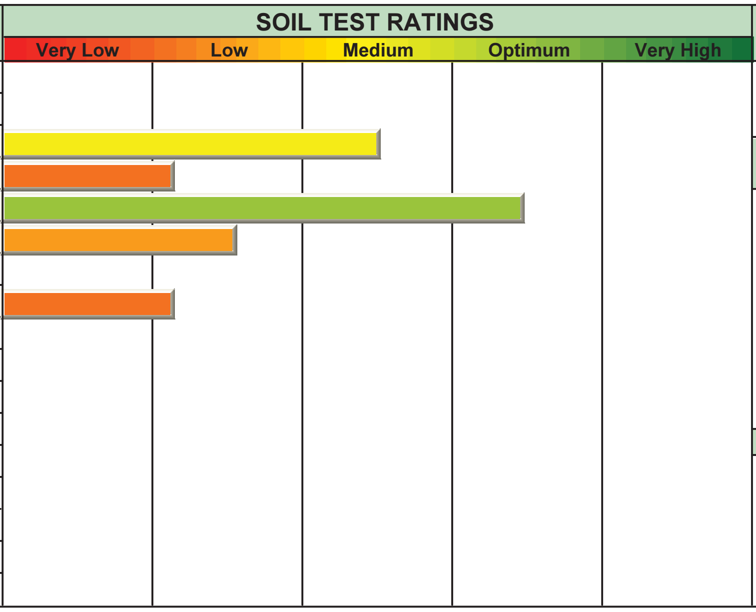
Lab Number : 19380 **Field Id :** **Sample Id :** B-17

Test	Method	Results
Soil pH	1:1	6.2
Buffer pH		6.77
Phosphorus (P)	M3	41 ppm
Potassium (K)	M3	68 ppm
Calcium (Ca)	M3	2136 ppm
Magnesium (Mg)	M3	131 ppm
Sulfur (S)		
Boron (B)	M3	0.4 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.29 mmhos/cm
Organic Matter	WB	2.9 % ENR 89
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity
13.6
meq/100g

Calculated Cation Saturation

%K	**1.3**
%Ca	**78.5**
%Mg	**8.0**
%H	**12.1**
Hmeq	**1.6**

K : Mg Ratio
0.16 🟨

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
0		2.5	1.0	5.5	0		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

· Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.

· All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.

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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

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Submitted By: K BULLOCK

SOIL ANALYSIS

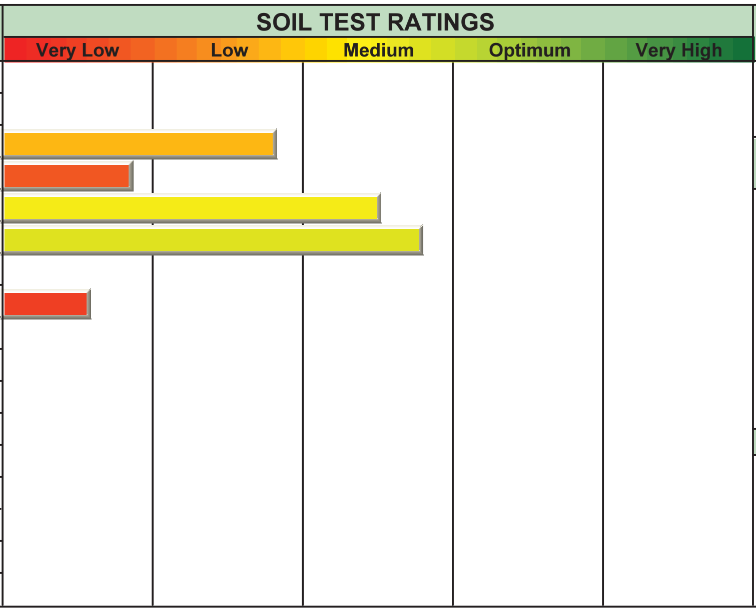
Client :
T.L.B. ASSOCIATES INC
THOMAS BROWN
7280 BALTIMORE ANNAPOLIS BLVD
GLEN BURNIE MD 21061

Grower :
T.L.B. ASSOCIATES INC

Report No:	11-159-0530
Cust No:	02323
Date Printed:	06/10/2011
Date Received :	06/08/2011
PO:	
Page :	13 of 20

Lab Number : 19381 **Field Id :** **Sample Id :** B-18

Test	Method	Results
Soil pH	1:1	5.6
Buffer pH		6.78
Phosphorus (P)	M3	27 ppm
Potassium (K)	M3	40 ppm
Calcium (Ca)	M3	785 ppm
Magnesium (Mg)	M3	106 ppm
Sulfur (S)		
Boron (B)	M3	0.2 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.13 mmhos/cm
Organic Matter	WB	2.0 % ENR 81
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity
6.4
meq/100g

Calculated Cation Saturation

%K	1.6
%Ca	61.3
%Mg	13.8
%H	23.3
Hmeq	1.5

K : Mg Ratio
0.12 🟧

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
35		2.5	2.0	6.0	0		0.50				
Crop :							**Rec Units:**				

Comments :

Bedding Plants

Limestone application is targeted to bring soil pH to 6.2.
- Apply dolomitic lime to raise pH and improve the magnesium level.
- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- For best result, if there are no existing plants, broadcast all lime then till and mix 6 inches into the soil. Limit the lime application to 50 pounds per 1000 sq. ft. for existing plants, apply every 4-6 months until the recommended amount is fulfilled.
- Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
- Apply the amount of lime recommended in first page to raise pH
- For more in depth explanation, go to our website www.al-labs-eastern.com and select the "Lawn and Garden" tab at the top of home page. At the bottom of the "Lawn and Garden" page, you find information explaining a soil test report and fertilizer recommendations. http://al-labs-eastern.com/forms/LawnGardenSoilTestExplained.pdf

M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

A&L Eastern Laboratories, Inc.

7621 Whitepine Road Richmond, Virginia 23237 (804) 743-9401 Fax (804) 271-6446

www.aleastern.com

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SOIL ANALYSIS

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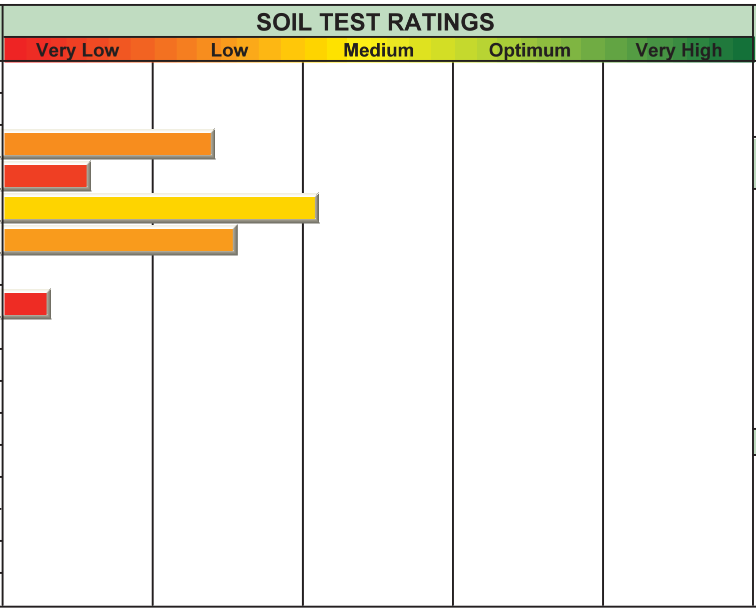
Lab Number : 19382 **Field Id :** **Sample Id :** B-19

Test	Method	Results
Soil pH	1:1	5.1
Buffer pH		6.74
Phosphorus (P)	M3	20 ppm
Potassium (K)	M3	29 ppm
Calcium (Ca)	M3	548 ppm
Magnesium (Mg)	M3	50 ppm
Sulfur (S)		
Boron (B)	M3	0.1 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.11 mmhos/cm
Organic Matter	WB	1.7 % ENR 77
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

5.2

meq/100g

Calculated Cation Saturation

%K	**1.4**
%Ca	**52.7**
%Mg	**8.0**
%H	**37.4**
Hmeq	**1.9**

K : Mg Ratio

0.18 🟨

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
60		2.5	3.0	6.0	0.69		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

Limestone application is targeted to bring soil pH to 6.2.

- Apply dolomitic lime to raise pH and improve the magnesium level.
- If dolomitic lime is not used, apply required magnesium with magnesium oxide. Epsom Salts, K-Mag or Sul-PO-Mag.
- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- For best result, if there are no existing plants, broadcast all lime then till and mix 6 inches into the soil. Limit the lime application to 50 pounds per 1000 sq. ft. for existing plants, apply every 4-6 months until the recommended amount is fulfilled.
- Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

Analysis prepared by: A&L Eastern Laboratories, Inc.

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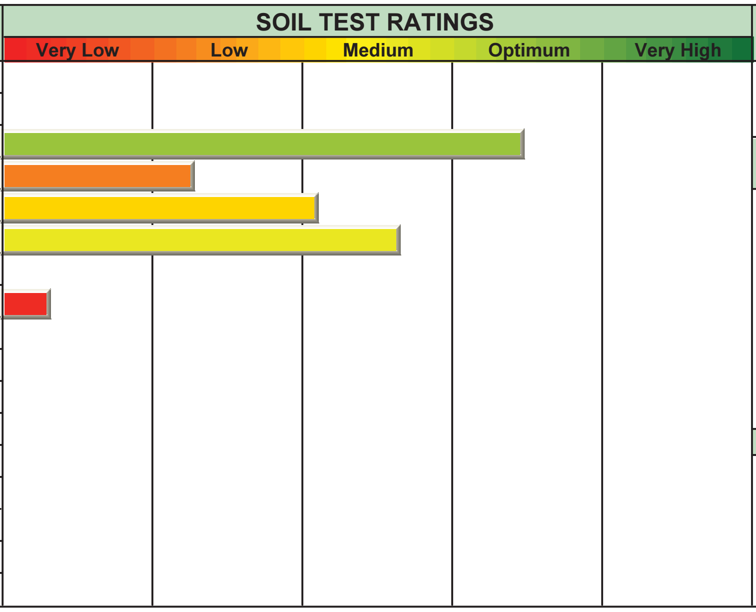
Lab Number : 19383 **Field Id :** **Sample Id :** B-20

Test	Method	Results
Soil pH	1:1	5.3
Buffer pH		6.81
Phosphorus (P)	M3	75 ppm
Potassium (K)	M3	47 ppm
Calcium (Ca)	M3	402 ppm
Magnesium (Mg)	M3	63 ppm
Sulfur (S)		
Boron (B)	M3	0.1 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.1 mmhos/cm
Organic Matter	WB	1.9 % ENR 82
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

3.9
meq/100g

Calculated Cation Saturation

%K	**3.1**
%Ca	**51.5**
%Mg	**13.5**
%H	**30.6**
Hmeq	**1.2**

K : Mg Ratio

0.23 🟨

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
35		2.5	0.5	6.0	0.39		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

Limestone application is targeted to bring soil pH to 6.2.

- Apply dolomitic lime to raise pH and improve the magnesium level.
- If dolomitic lime is not used, apply required magnesium with magnesium oxide. Epsom Salts, K-Mag or Sul-PO-Mag.
- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- For best result, if there are no existing plants, broadcast all lime then till and mix 6 inches into the soil. Limit the lime application to 50 pounds per 1000 sq. ft. for existing plants, apply every 4-6 months until the recommended amount is fulfilled.
- Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

Analysis prepared by: A&L Eastern Laboratories, Inc.

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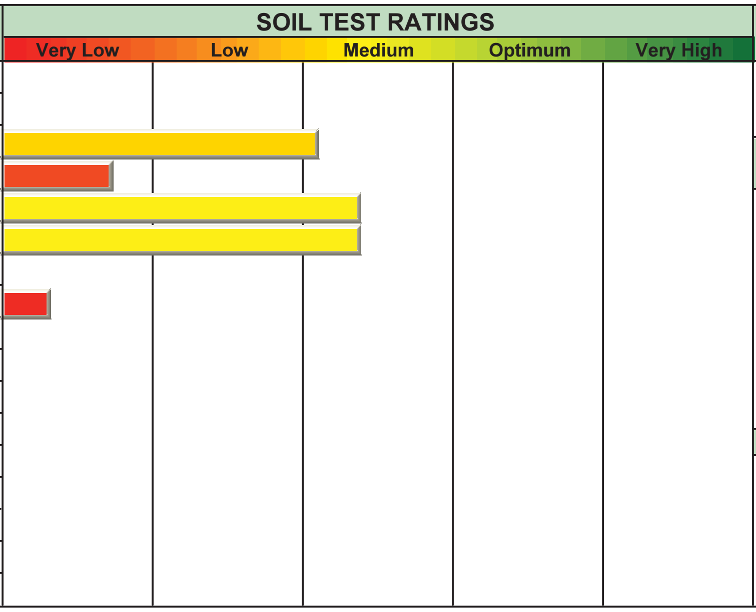
Lab Number : 19384 **Field Id :** **Sample Id :** IT-2

Test	Method	Results
Soil pH	1:1	5.4
Buffer pH		6.77
Phosphorus (P)	M3	32 ppm
Potassium (K)	M3	36 ppm
Calcium (Ca)	M3	654 ppm
Magnesium (Mg)	M3	82 ppm
Sulfur (S)		
Boron (B)	M3	0.1 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.12 mmhos/cm
Organic Matter	WB	1.6 % ENR 74
Nitrate Nitrogen		
Soil Classification		0

SOIL TEST RATINGS



Calculated Cation Exchange Capacity

5.6
meq/100g

Calculated Cation Saturation

%K	**1.6**
%Ca	**58.4**
%Mg	**12.2**
%H	**28.5**
Hmeq	**1.6**

K : Mg Ratio

0.14 🟧

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
50		2.5	2.0	6.0	0		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

Limestone application is targeted to bring soil pH to 6.2.
· Apply dolomitic lime to raise pH and improve the magnesium level.
· Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
· All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
· For best result, if there are no existing plants, broadcast all lime then till and mix 6 inches into the soil. Limit the lime application to 50 pounds per 1000 sq. ft. for existing plants, apply every 4-6 months until the recommended amount is fulfilled.
· Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

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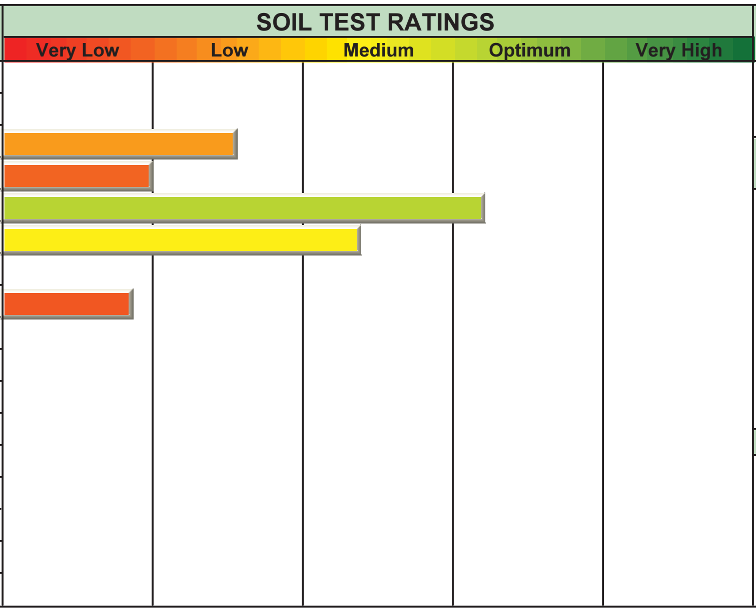
Lab Number : 19385 **Field Id :** **Sample Id :** IT-3

Test	Method	Results
Soil pH	1:1	6.2
Buffer pH		6.85
Phosphorus (P)	M3	22 ppm
Potassium (K)	M3	48 ppm
Calcium (Ca)	M3	1013 ppm
Magnesium (Mg)	M3	100 ppm
Sulfur (S)		
Boron (B)	M3	0.3 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.1 mmhos/cm
Organic Matter	WB	2.1 % ENR 82
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

6.9
meq/100g

Calculated Cation Saturation

%K	**1.8**
%Ca	**73.4**
%Mg	**12.1**
%H	**12.0**
Hmeq	**0.8**

K : Mg Ratio

0.15 🟧

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
0		2.5	2.5	6.0	0		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

Analysis prepared by: A&L Eastern Laboratories, Inc.

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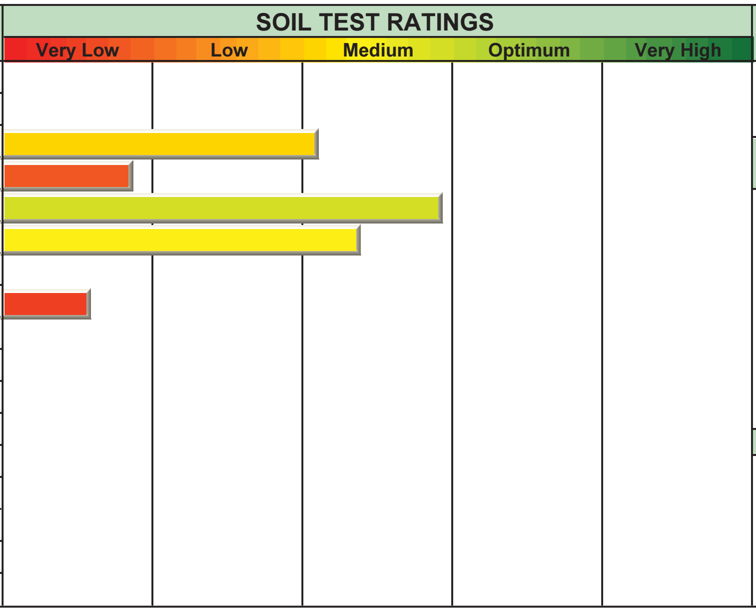
Lab Number : 19386 **Field Id :** **Sample Id :** IT-5

Test	Method	Results
Soil pH	1:1	5.9
Buffer pH		6.84
Phosphorus (P)	M3	31 ppm
Potassium (K)	M3	45 ppm
Calcium (Ca)	M3	751 ppm
Magnesium (Mg)	M3	80 ppm
Sulfur (S)		
Boron (B)	M3	0.2 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.08 mmhos/cm
Organic Matter	WB	1.9 % ENR 80
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity
5.5
meq/100g

Calculated Cation Saturation

%K	**2.1**
%Ca	**68.3**
%Mg	**12.1**
%H	**17.1**
Hmeq	**0.9**

K : Mg Ratio
0.17 🟨

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
20		2.5	2.0	6.0	0		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

Limestone application is targeted to bring soil pH to 6.2.
- Apply dolomitic lime to raise pH and improve the magnesium level.
- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
- All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.
- For best result, if there are no existing plants, broadcast all lime then till and mix 6 inches into the soil. Limit the lime application to 50 pounds per 1000 sq. ft. for existing plants, apply every 4-6 months until the recommended amount is fulfilled.
- Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.
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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

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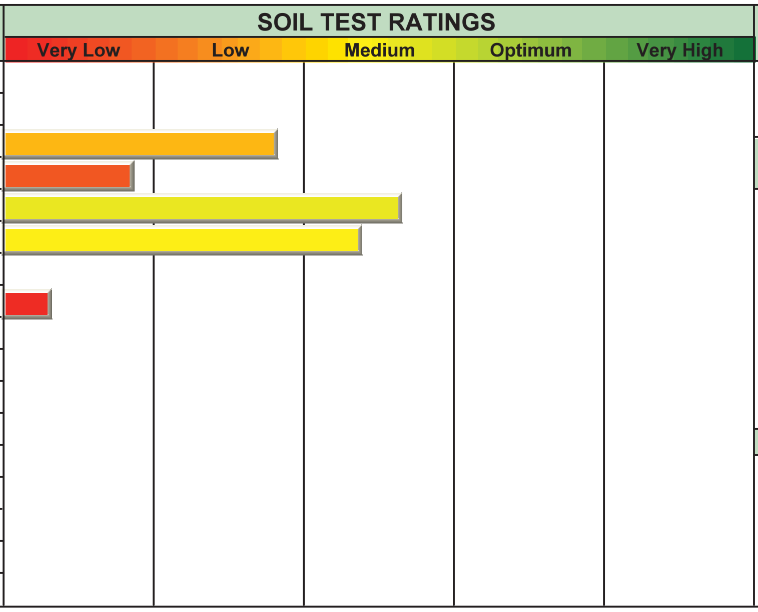
Lab Number : 19387 **Field Id :** **Sample Id :** IT-6

Test	Method	Results
Soil pH	1:1	5.6
Buffer pH		6.81
Phosphorus (P)	M3	27 ppm
Potassium (K)	M3	40 ppm
Calcium (Ca)	M3	636 ppm
Magnesium (Mg)	M3	73 ppm
Sulfur (S)		
Boron (B)	M3	0.1 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.08 mmhos/cm
Organic Matter	WB	2.1 % ENR 85
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity
5.1
meq/100g

Calculated Cation Saturation

%K	**2.0**
%Ca	**62.4**
%Mg	**11.9**
%H	**23.2**
Hmeq	**1.2**

K : Mg Ratio
0.17 🟨

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
35		2.5	2.0	6.0	0.16		0.50				

Crop : **Rec Units:**

Comments :

Bedding Plants

Limestone application is targeted to bring soil pH to 6.2.

- Apply dolomitic lime to raise pH and improve the magnesium level.
- If dolomitic lime is not used, apply required magnesium with magnesium oxide. Epsom Salts, K-Mag or Sul-PO-Mag.
- Broadcast boron using Borax and mix into the soil to raise boron level. Note boron should not be applied in the band near the plant.
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M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

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PO:	
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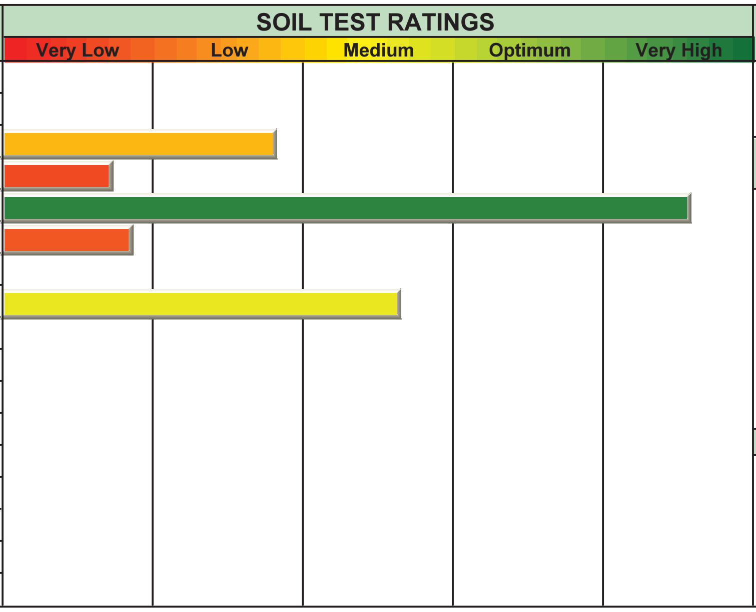
Lab Number : 19388 **Field Id :** **Sample Id :** IT-10

Test	Method	Results
Soil pH	1:1	7.8
Buffer pH		
Phosphorus (P)	M3	28 ppm
Potassium (K)	M3	55 ppm
Calcium (Ca)	M3	3650 ppm
Magnesium (Mg)	M3	111 ppm
Sulfur (S)		
Boron (B)	M3	1.0 ppm
Copper (Cu)		
Iron (Fe)		
Manganese (Mn)		
Zinc (Zn)		
Sodium (Na)		
Soluble Salts		0.6 mmhos/cm
Organic Matter	WB	3.0 % ENR 86
Nitrate Nitrogen		
Soil Classification		0



Calculated Cation Exchange Capacity

19.3
meq/100g

Calculated Cation Saturation

%K	**0.7**
%Ca	**94.6**
%Mg	**4.8**
%H	**0.0**
Hmeq	**0.0**

K : Mg Ratio

0.15 🟨

* Additional results to follow

SOIL FERTILITY GUIDELINES

Crop : Bedding Plants **Rec Units:** LB/1000 SF

(lbs) LIME	(tons)	N	P_2O_5	K_2O	Mg	S	B	Cu	Mn	Zn	Fe
0		2.5	2.0	5.5	0		0				

Crop : **Rec Units:**

Comments :

Bedding Plants

· Cation Exchange Capacity may be over-estimated due to high pH and free lime in the soil.

· All recommended fertilizers are on actual elemental basis. To convert to product basis, divide the recommended quantity in the first page by the percentage of the active ingredient then multiply by 100.

· Phosphate is more efficient if applied near the plant, apply all phosphate beside the row. Broadcast N and/or K2O then mix into the soil. If there is no fertilizer meets the ratio, you can use single element fertilizer such as Urea, Triplesuper Phosphate and Muriate of Potash to achieve the requirements. Consult the enclosed instruction sheet on lime and fertilizer application.

· Soil pH will come down naturally, it is not necessary to reduce pH if it is below 7.2. To reduce pH, apply 2.5 pounds of elemental sulfur per 1000 square feet for every 0.1 of pH unit above 7.2. For example, pH 7.4 requires 5 pounds. Sulfur should be thoroughly mix 6 inches into the soil.

· Use ammonium sulfate as all or portion of the N requirement to reduce pH.

· For more in depth explanation, go to our website www.al-labs-eastern.com and select the "Lawn and Garden" tab at the top of home page. At the bottom of the "Lawn and Garden" page, you find information explaining a soil test report and fertilizer recommendations. http://al-labs-eastern.com/forms/LawnGardenSoilTestExplained.pdf

M3 - Mehlich 3 WB - Walkley Black Color 1:1 - Water pH

Analysis prepared by: A&L Eastern Laboratories, Inc.

APPENDIX C

PAVEMENT DESIGN CALCULATIONS

LITTLE BENNETT REGIONAL PARK - DAY USE AREA

Street: PROPOSED ROADWAY

Pavement Design Data

	CBR	
	Lab	DCP (Top 12.0")
Min	0.4	0.0
Max	0.6	0.0
Ave	0.5	not
Sdev	0.1	performed
Design	**0.4**	

→

CBR

Laboratory CBR = 0.4

DCP CBR = not performed

Use CBR = 0.4

Seasonal Roadbed Resillient Modulus (M_R)

CBR (design)	Correlations	M_R (correlated)	Months	Seasons	Factors	Seasonal M_R
0.4	(A) 2555 x $CBR^{0.64}$ =	1421	Dec - Feb	Winter	1.05	**630**
	(B) 1500 x CBR =	600	Mar - Apr	Spring	0.9	**540**
			May - Sept	Summer	1	**600**
	Min =	600	Oct - Nov	Fall	0.9	**540**

ADT

Y1 = 2011

Current Yr Y2 = 2011

Design Yr Y3 = 2031

Y4 =

ADT (Y1) = 58 (Given)

ADT (Y4) = (Given)

ADT (2011) = ADT (Y2) = 1330

r = 0.010 …….(estm.)

r = 1.0%

$$\text{ADT (Y2)} = \text{ADT (Y1)} \times [\,1 + r]^{0.5(Y2 - Y1)}$$

ADT (2011) = 58

$$\text{ADT (Y3)} = \text{ADT (Y2)} \times [\,1 + r]^{0.5(Y3 - Y2)}$$

ADT (2031) = 64

Description	**PROPOSED ROADWAY**
Functional Classification	Urban Local
ADT (2011)	58
ADT (2031)	64
Posted Speed	25 mph
Truck Traffic	1%
Directional Distribution	50/50

1993 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Flexible Structural Design Module

Un-Stabilized Subgrade
Little Bennett Regional Park
Day Use Area
Proposed Roadway

Flexible Structural Design

18-kip ESALs Over Initial Performance Period	50,000
Initial Serviceability	4.2
Terminal Serviceability	2.4
Reliability Level	75 %
Overall Standard Deviation	0.45
Roadbed Soil Resilient Modulus	573 psi
Stage Construction	1
Calculated Design Structural Number	4.91 in

Effective Roadbed Soil Resilient Modulus

Period	Description	Roadbed Resilient Modulus (psi)
1	Dec - Feb	630
2	Mar - Apr	540
3	May - Sept	600
4	Oct - Nov	540

Calculated Effective Modulus	573 psi

Simple ESAL Calculation

Performance Period (years)	-
Two-Way Traffic (ADT)	-
Number of Lanes in Design Direction	-
Percent of All Trucks in Design Lane	- %
Percent Trucks in Design Direction	- %
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater	- %
Average Initial Truck Factor (ESALs/truck)	-
Annual Truck Factor Growth Rate	- %
Annual Truck Volume Growth Rate	- %
Growth	Simple
Total Calculated Cumulative ESALs	0 *

*Note: This value is not represented by the inputs or an error occurred in calculation.

Rigorous ESAL Calculation

Performance Period (years)	-
Two-Way Traffic (ADT)	-
Number of Lanes in Design Direction	-
Percent of All Trucks in Design Lane	- %
Percent Trucks in Design Direction	- %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 18-kip ESALs over Performance Period
Total	0	-	-	-	0

Growth	Simple
Total Calculated Cumulative ESALs	0 *

*Note: This value is not represented by the inputs or an error occurred in calculation.

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(in)	Width (ft)	Calculated SN (in)
1	Surface PG	0.44	1	2	-	0.88
2	Base PG	0.42	1	3	-	1.26
3	Graded Aggregate Base	0.11	1	26	-	2.86
Total	-	-	-	31.00	-	5.00

Layered Thickness Design

Thickness precision	Actual

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Spec Thickness (Di)(in)	Min Thickness (Di)(in)	Elastic Modulus (psi)	Width (ft)	Calculated Thickness (in)	Calculated SN (in)
Total	-	-	-	-	-	-	-	-	-

*Note: This value is not represented by the inputs or an error occurred in calculation.

Optimized Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Cost (sq yd/in)	Min Thick (Di)(in)	Max Thick (in)	Width (ft)	Optimum Thick (in)	Calculated SN (in)	Calculated Cost (sq yd)
Total	-	-	-	-	-	-	-	-	-	-

*Note: This value is not represented by the inputs or an error occurred in calculation.

1993 AASHTO Pavement Design

DARWin Pavement Design and Analysis System

A Proprietary AASHTOWare
Computer Software Product

Flexible Structural Design Module

Stabilized Subgrade
Little Bennett Regional Park
Day Use Area
Proposed Roadway

Flexible Structural Design

18-kip ESALs Over Initial Performance Period	50,000
Initial Serviceability	4.2
Terminal Serviceability	2.4
Reliability Level	75 %
Overall Standard Deviation	0.45
Roadbed Soil Resilient Modulus	573 psi
Stage Construction	1
Calculated Design Structural Number	4.91 in

Effective Roadbed Soil Resilient Modulus

Period	Description	Roadbed Resilient Modulus (psi)
1	Dec - Feb	630
2	Mar - Apr	540
3	May - Sept	600
4	Oct - Nov	540

Calculated Effective Modulus	573 psi

Simple ESAL Calculation

Performance Period (years)	-
Two-Way Traffic (ADT)	-
Number of Lanes in Design Direction	-
Percent of All Trucks in Design Lane	- %
Percent Trucks in Design Direction	- %
Percent Heavy Trucks (of ADT) FHWA Class 5 or Greater	- %
Average Initial Truck Factor (ESALs/truck)	-
Annual Truck Factor Growth Rate	- %
Annual Truck Volume Growth Rate	- %
Growth	Simple
Total Calculated Cumulative ESALs	0 *

*Note: This value is not represented by the inputs or an error occurred in calculation.

Rigorous ESAL Calculation

Performance Period (years)	-
Two-Way Traffic (ADT)	-
Number of Lanes in Design Direction	-
Percent of All Trucks in Design Lane	- %
Percent Trucks in Design Direction	- %

Vehicle Class	Percent of ADT	Annual % Growth	Average Initial Truck Factor (ESALs/ Truck)	Annual % Growth in Truck Factor	Accumulated 18-kip ESALs over Performance Period
Total	0	-	-	-	0

Growth	Simple
Total Calculated Cumulative ESALs	0 *

*Note: This value is not represented by the inputs or an error occurred in calculation.

Specified Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Thickness (Di)(in)	Width (ft)	Calculated SN (in)
1	Surface PG	0.44	1	1.5	-	0.66
2	Base PG	0.42	1	3	-	1.26
3	Stabilized Subgrade mixed with Gr...	0.2	1	15	-	3.00
Total	-	-	-	19.50	-	4.92

Layered Thickness Design

Thickness precision	Actual

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Spec Thickness (Di)(in)	Min Thickness (Di)(in)	Elastic Modulus (psi)	Width (ft)	Calculated Thickness (in)	Calculated SN (in)
Total	-	-	-	-	-	-	-	-	-

*Note: This value is not represented by the inputs or an error occurred in calculation.

Optimized Layer Design

Layer	Material Description	Struct Coef. (Ai)	Drain Coef. (Mi)	Cost (sq yd/in)	Min Thick (Di)(in)	Max Thick (in)	Width (ft)	Optimum Thick (in)	Calculated SN (in)	Calculated Cost (sq yd)
Total	-	-	-	-	-	-	-	-	-	-

*Note: This value is not represented by the inputs or an error occurred in calculation.

Design Information

Design Life (years)		20	
Initial Serviceability		4.2	
Terminal Serviceability		2.5	
Reliability		75%	
Z_R		-0.674	
Standard Deviation		0.45	
		Layer Coefficient	Thickness
Pavers and Bedding		0.44	130.175
	Unbound Dense Graded Base	0.11	
	Asphalt Treated Base	0.28	
	Cement Treated Base	0.20	
Base	**Asphalt Concrete Base**	0.42	
Unbound Dense Graded Subbase		0.09	

Design Assistant

ESALs	50,000
Subgrade Classification	CI, CH
Subgrade Conditions	Poor
Base Type	Unbound Dense Graded Base

Recommended Design

Pavers and Bedding	130.175
Unbound Dense Graded Base	100
Unbound Dense Graded Subbase	475

Traffic Estimates

AADT	Functional Category	Percent Commercial	# Lanes	Estimated ESALs	Total ESALs
500	Local	0.5%	2	719	14,387
1000	Local	1%	2	2825	56,498
5000	Local	1%	2	13516	270,313
10000	Minor Arterial/Collector	3%	2	79521	1,590,414
15000	Major Arterial/Collector	5%	2	196501	3,930,025
20000	Principal Arterial	5%	2	259825	5,196,505
40000	Principal Arterial	5%	2	509163	10,183,257

Subgrade Support

Category No.	Classification	Drainage Characteristics	Susceptibility to Frost Action	Resilient Modulus (MR) for Typical Subgrade Conditions (MPa)		
				Good	Fair	Poor
1	Boulders/coubbles	Excellent	None	90	80	70
2	GW, SW	Excellent	Negligible	80	70	50
3	GP, SP	Excellent to fair	Negligible to slight	70	50	35
4	GM, SM	Fair to semi-impervious	Slight to moderate	50	35	30
5	GC, SC	Practically impervious	Negligible to slight	40	30	25
6	ML, MI	Typically poor	Severe	30	25	18
7	CL, MH	Practically impervious	Slight to severe	27	20	15
8	CI, CH	Semi-impervious to impervious	Negligible to severe	25	15	6

Stormwater Management Concept Plan

STORMWATER MANAGEMENT CONCEPT PLAN

Little Bennett Day Use Area – Facility Plan

Stormwater Concept #: 239813

September 6, 2011

Submitted To:

Montgomery County
Department of Permitting Services
255 Rockville Pike, 2nd Floor
Rockville, Maryland 20850

Prepared For:

The Maryland National Capital
Park and Planning Commission
Park Development Division
9500 Brunnet Avenue
Silver Spring, Maryland 20901

Prepared By:

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and Associates, Inc.
12750 Twinbrook Parkway
Rockville, Maryland 20852-1700
Tel: 301-881-2545
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AMT: 108-157.008

*"**Professional Certification**: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the state of Maryland, License No. **32151** Expiration Date: **07/18/2013**."*

Matthew Ernest, P.E.

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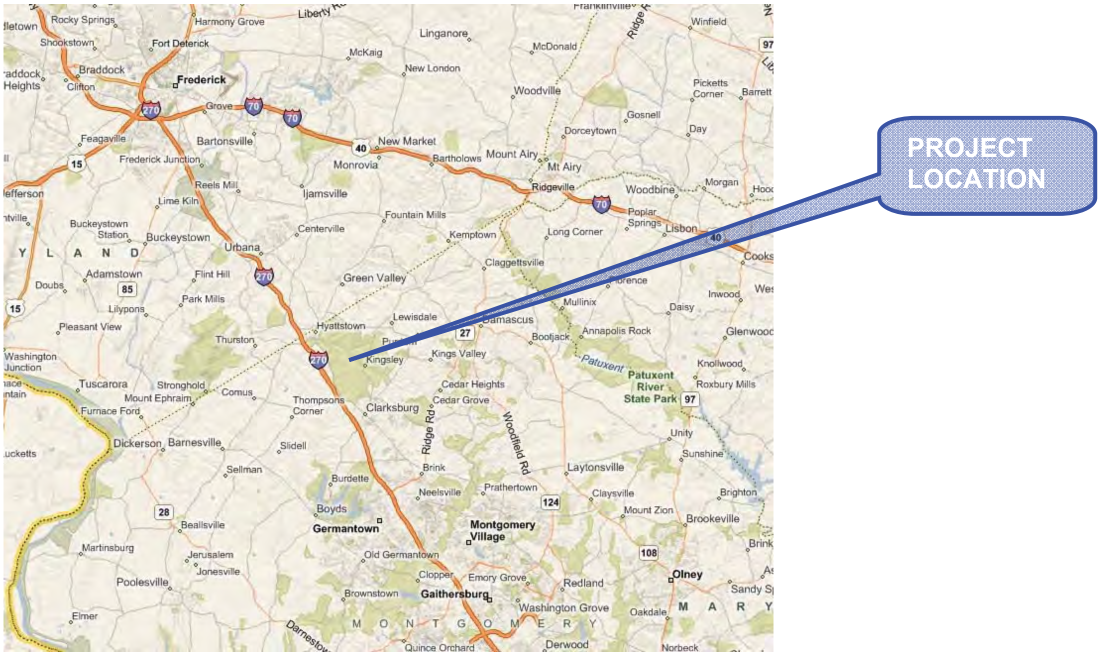
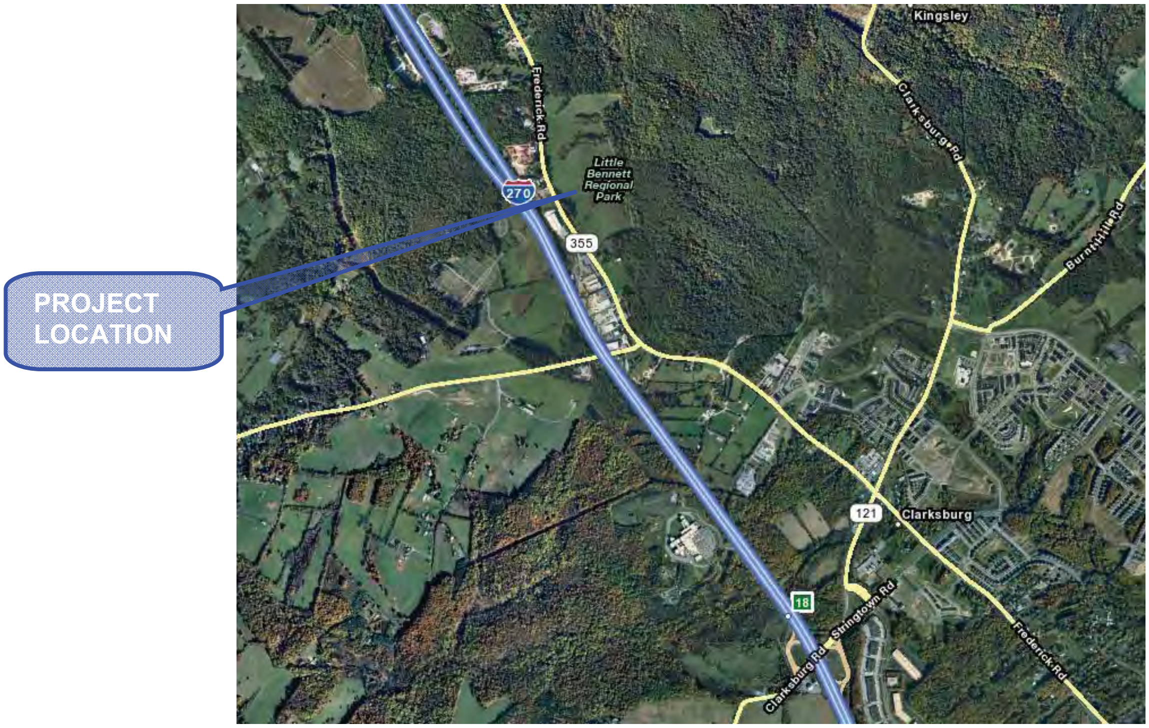


Location Map



STORMWATER MANAGEMENT CONCEPT PLAN

Little Bennett Day Use – Facility Plan

1.0 INTRODUCTION

The Maryland- National Capital Park and Planning Commission (M-NCPPC) plans to develop a distinct entrance and Day Use Area for the Little Bennett Park. The improvements are to be focused on nature based recreation and retreat. The entrance and Day Use area will be located on a 137.62 acre parcel, located along the Park's frontage off of Frederick Avenue (MD Route 355). The project area is bordered by Park land and existing residential lots. Figure 1 below shows an aerial image of the project site.

Figure 1 - Little Bennett Regional Park Gateway Area

The proposed project has been developed to comply with the Environmental Site Design requirements as required by the Maryland Department of the Environment and Montgomery County DPS. The proposed stormwater management facilities will treat stormwater runoff from the new project's impervious areas, as well as portions of Existing Frederick Avenue (MD Route 355) along the project's frontage.

2.0 PURPOSE

This report evaluates and quantifies the Environmental Site Design (ESD) requirements, to the Maximum Extent Practical, in accordance with the Stormwater Management Act of 2007.

3.0 CRITERIA

All work was performed in accordance with the *2010 Stormwater Guidelines for State and Federal Projects* and the *Maryland Department of the Environment (MDE) Stormwater Management Design Manual Volumes I and II,* and the *Montgomery County Government Storm Drain Design Criteria, Department of Transportation*, dated August 1998.

Stormwater Management requirements were determined using the procedures specified within Chapter 5, Revised 2009, of the *MDE Stormwater Management Design Manual*. Runoff curve numbers (RCN) and time of concentration (Tc) were determined using the Soil Conservation Service (SCS) TR-55 method for *Urban Hydrology for Small Watersheds*, dated June 1986. Run-off rates were calculated using TR-20 *Project Formulation-Hydrology* and Soil Conservation Service (SCS) TR-55 method for *Urban Hydrology for Small Watersheds*, dated June 1986.

4.0 Environmental Site Design Summary

4.1 Description of the Proposed Development

The M-NCPPC is acting on the recommendation of the 2007 Master Plan for Little Bennett Regional Park to develop a distinct entrance to the Park, and a Day Use Area focused on nature-based recreation and retreat. The creation of this gateway area will use design elements to welcome visitors to the largest regional park in the area, and offer recreation and interpretive opportunities that connect visitors to the beauty of the regional landscape, and the specific attributes of the site. To that end, M-NCPPC's designers are proposing nature-based learning opportunities, an adventure playground, trails, an amphitheater, picnic areas, an overlook area, and creating new meadow habitats. These elements are being designed with the intention of highlighting the unique characteristics of the site.

4.2 Documentation of Applications to State and Federal Agencies for Wetlands Permits

The Little Bennett Day Use project is currently in the Concept Planning stage. As such, applications to State and Federal agencies for Wetland, Waterway and Floodplain permits are not being filed at this time. In the subsequent stages of design, the selected engineering team will apply for all required permits including the appropriate Wetland, Waterway and Floodplain permits.

4.3 Documentation of Impervious Area

The Little Bennett Day Use project is situated on a parcel of land that is majority meadow and woods, and is considered New Development. The total disturbed area (LOD) covered by this report is 25.44 acres. An Impervious Area summary, and Alternative Surface Area summary are shown in Table-1 and Table-2 below:

Table-1: Impervious Area Summary	
Existing Route 355 Pavement	0.76 acres
Proposed Pavement, Gravel, and Building Roof Areas	4.66 acres
Trails (Compacted, Treated as Impervious)	0.66 acres
Total Impervious Area	6.08 acres

Table-2: Alternative Surface Area Summary	
Permeable Pavement and Permeable Playground surface	1.40
Reinforced Turf	0.10
Building Green Roof	.02
Total Alternative Surface Area	1.52 acres

4.4 Slopes

The Approved NRI/FSD, prepared by A. Morton Thomas and included in Appendix D, indicates areas with slopes between 15% and 25%, and areas with slopes greater than 25%. Disturbance to existing steep slopes will be minimized to the maximum extent practical.

4.5 Soils

According to the *Natural Resource Conservation Service Soil Survey of Montgomery County, Maryland* (USDA 1973), the study area is underlain by soils of Glenville Silt Loam (5B, 3-8% slopes), Linganore-Hyattstown Silt Loam (9B, 3-8% slope), Linganore-Hyattstown Silt Loam (9C, 8-15% slope), Brinklow-Blocktown Silt Loam (16B; 3-8% slope), Brinklow-Blocktown Silt Loam (16C; 8-15% slope), and Hyattstown Silt Loam (109D, 15-25%) soil series. Additional Soils information is provided in Appendix A. A Geotechnical Report is included in Appendix F.

4.6 Forests

The study area for the Natural Resource Inventory/Forest Stand Delineation, included in Appendix D, consists mainly of meadow with fescue as the dominant species. The majority of forest areas on-site are located within the Stream Buffer surrounding Soper Branch. There are no Montgomery County of State Champion Trees on the parcel, and no trees on the parcel have a DBH greater than or equal to 75% of a County or State Champion tree.

4.7 Rare, Threatened and Endangered Species

There are no know records nor readily observable rare, threatened or endangered (RTE) species nor critical habitats located on the subject parcel.

4.8 Streams and Stream Valley Buffers

As indicated on the approved NRI/FSD, included in Appendix D, a stream and associated stream buffer originates at the southern limit of the subject parcel and travels to the north. Three draws or branches join the stream from the West, flowing east and joining with the main stream, Soper Branch. M-NCPPC – Park Development has coordinated minor encroachments into the Stream Buffer with M-NCPPC Environmental Planning. It was determined that these buffer encroachments are acceptable as long as they fall outside of the existing tree line.

4.9 Floodplain

The Federal Emergency Management Administration (FEMA) *Community Panel Number 2400490050B, Montgomery County Maryland (Unincorporated Areas),* effective date July 2, 1979, indicates no Floodplain on site. Montgomery County DPS requires a Floodplain Study for all areas receiving over 30 acres of drainage. A Concept Floodplain Study for Soper Branch is included in Appendix E, as well as a study for a perennial stream on-site which drains 31.66 acres.

4.10 Description of other Mitigation Techniques

The site layout has been refined to limit the proposed impervious area as much as possible. 20’ drive aisles are proposed along Meadow Drive, the North/South Park Road, and within the proposed parking areas. Permeable pavements are being provided in the parking areas in lieu of asphalt, where possible,. Along the

West Side of Meadow Drive, gravel has been used for the shoulder, in lieu of asphalt. The shoulder on the East Side will double as a bike path, so gravel was not used in this location.

4.11 Stabilization Requirements

An engineered sediment control plan will be developed for the project during final design. For now, Concept Erosion Control plans are included in Appendix C. At the direction of M-NCPPC, the project is being designed as if it falls within a Special Protection Area, so redundant sediment control practices will be provided. Super silt fence will be used as a minimum control. Any off-site clean water will be diverted around the project area. Phased grading will be implored to minimize the amount of area disturbed at one time All storm structures conveying off-site water will be built during Phase I to minimize up-stream clean water entering the Limits of Disturbance. The erosion control plans will reflect that vegetative stabilization will be required within 3-days of establishment.

4.12 Phase Grading

Grading will be phased to minimize the amount of disturbed area denuded at one time. The North-South road, Meadow Drive, will be constructed first, including all associated storm drain. Once the roadway is completed and stabilized, construction of the additional park improvements will commence.

4.13 Groundwater Recharge

Groundwater Recharge will be provided through stone reservoirs underneath the proposed ESD facilities.

5.0 STORMWATER MANAGEMENT CONCEPT

5.1 Stormwater Management Concept Narrative

The Little Bennett project has been developed to comply with the Environmental Site Design requirements as required by the Montgomery County Department of Permitting Services (MC DPS) and the Maryland Department of the Environment (MDE). The Stormwater Management design seeks to replicate the natural hydrology of the site by utilizing small-scale Stormwater Management practices to minimize the impact of land development on downstream water resources. The Stormwater Management design calculations for this project are based upon the Environmental Site Design (ESD) criteria established by the Stormwater Management Act of 2007. Therefore, Typical Pre-Developed and Post-Developed runoff conditions (TR-20, TR-55) are not shown herein, except for the Floodplain Studies provided in Appendix C.

5.2 Environmental Site Design - Narrative

One of the goals of Environmental Site design is “Minimizing Site Imperviousness”. The original Master Plan for Little Bennett Park, drafted in 2007 and included in Appendix B3, showed meandering roadways throughout the Park. In total, the Master Plan proposed 8,450 LF of roadway within the park. One of the goals of the current design was to decrease the amount of proposed impervious. The current design proposed 3,216 LF of roadway, a decrease of 62%. In addition, 1.40 acres of Permeable Pavement, and 0.02 acres of Green Roof are proposed.

The first step in Environmental Site Design is to determine which of the 15 methods would fit with M-NCPPC’s vision of the Park. A table is included below outlining why certain methods are proposed and other methods were not implemented.

Table 3 – Environmental Site Design Summary

ESD Selection Summary		Proposed (Y/N)	Max Drainage Area	Slope Restrictions	Other Restrictions	Comments
Alternative surfaces:						
A-1	Green Roofs	Yes				A portion of the proposed building is designed as a Green Roof.
A-2	Permeable Pavements	Yes	For applications that exceed 10,000 SF, underlying soils shall have an infiltration rate (f) of 0.52 in/hr.	5% max	Permeable Pavements can not be used in fill, and can not be used in D soils.	Permeable Pavements are proposed for parking areas. Exact Locations are shown on the Impervious Area Map, in Appendix B.
A-3	Reinforced Turf	Yes		1% min; 5% max	Reinforced Turf can not be used in areas of Compacted fill, and are ineffective (although allowable) in D soils.	The Access Paths to both the Underlook Building and the Playscape area are lined with reinforced turf as requested by the Montgomery County Fire Marshal.
Nonstructural practices:						
N-1	Disconnect of Rooftop Runoff	No	500 sf	5% max	75' /150' max length	Not used due to Topographical Constraints. The majority of site slopes greater than 5%
N-2	Disconnect of Non-Rooftop Runoff	No	1,000 sf	5% max		Not used due to Topographical Constraints. The majority of site slopes greater than 5%
N-3	Sheet flow to Conservation Areas	No		5% max	50' min width/20,000 sf min conservation area	Not used due to Topographical Constraints. The majority of site slopes at greater than 5%

Micro-scale practices:						
M-1	Rainwater Harvesting	Limited				At final design, harvesting rainwater to supply the on-site 30,000 gallon Fire Suppression Tank will be explored and considered.
M-2	Submerged Gravel Wetlands	No			Soils infiltrate too well. Drainage Area is insufficient to maintain wet pool	Ground water required
M-3	Landscape Infiltration	No	10,000 sf			Site Area and drainage area sizes create need for increased number of facilities
M-4	Infiltration Berms	Yes			Limited to volume stored behind the berm due to topography	A berm would “break up” the natural slope of the meadow. M-NCPPC wants to preserve the Meadow as much as possible.
M-5	Dry Wells	No	1,000 sf			Not practical for this project type
M-6	Micro-Bioretention	Yes	20,000 sf			2 micro-bioretentions (biofilters) are proposed with this application.
M-7	Rain Gardens	No.	2,000 sf / 10,000 sf			Site Area and drainage area sizes create need for increased number of facilities
M-8	Swales	Yes	1 acre	4% max	ESDv velocity < 1.0 cfs 2’-8’ bottom width	2,358 LF of bio-swales are proposed adjacent to Meadow Drive.
M-9	Enhanced Filters	Yes			Used in bioretention facilities	Will be used for recharge to maximum extent practical

5.3 Environmental Site Design - Implementation

Environmental Site Design Controls will be provided through the use of micro-bioretention facilities (biofilters), bio swales, Green Roofs and Permeable Pavements; strategically located throughout the site. The proposed facilities provide the necessary volume to provide Full ESD for the site. The required groundwater recharge for the project will be provided beneath the underdrains of the micro-bioretention facilities and bio swales. A total of 2,215 linear feet of bio-swale, two (2) micro-bioretentions, 1.40 acres of Permeable Pavement, and 0.02 acres of Green Roof, are proposed with this Concept.

Under proposed conditions, the project site area will consist of 6.08 acres of impervious area. Gravel areas and compacted trails are treated as impervious for the purposes of this analysis. An additional 1.52 acres of Alternative Surface are provided with this design.

For the purpose of calculating ESD requirements, the site was broken into two Study Points, POS-1 and POS-2. A Study Point Map Exhibit is included in Appendix B1.

For POS-1, utilizing a site impervious to POS of 8%, and areas of B, C, and D soils, the resulting weighted Target PE is 1.00" of rainfall (per MDE Table 5.3). The Target PE is then applied to the Limits of disturbance within the drainage area to POS-1; 24.00 acres. Under these conditions, the site has a respective QE of 0.31" of run-off over the site area. An ESD Volume of 26,768 cubic feet shall be treated on-site within POS-1.

For POS-2, utilizing a site impervious to POS of 15%, and areas of B, and D soils, the resulting weighted Target PE is 1.00" of rainfall (per MDE Table 5.3). The Target PE is then applied to the Limits of disturbance within the drainage area to POS-2; 1.44 acres. Under these conditions, the site has a respective QE of 0.51" of run-off over the site area. An ESD Volume of 2,679 cubic feet shall be treated on-site within POS-2.

Tables 4 and 5 below provides a Summary of the PE and ESD Volumes shown on the Stormwater Management Concept Plan.

Table 4 – Environmental Site Design Volumetric Summary – POS-1

Target PE (inches)	PE Provided (inches)	Target ESD Volume (Cubic feet)	ESD Volume Provided (Cubic Feet)
1.00	1.03	26,768	27,488

Table 5 – Environmental Site Design Volumetric Summary – POS-2

Target PE (inches)	PE Provided (inches)	Target ESD Volume (Cubic feet)	ESD Volume Provided (Cubic Feet)
1.00	1.10	2,679	2,937

Complete ESD design calculations are provided in Appendix B.2.

An infiltration rate of 26.01 in/hr was observed at the location of the northern parking area. The Geotechnical Engineer views this result as anomalous. Additional infiltration testing will take place during Final Design. To address any DPS concerns regarding the high infiltration rates observed, a second option which does not utilize any permeable pavement was provided for POS-2. The table below provides a Summary of the PE and ESD Volumes for POS-2; Option #2. Full computations are included in Appendix B.2.

Table 6 – Environmental Site Design Volumetric Summary – POS-2; Option #2.

Target PE (inches)	PE Provided (inches)	Target ESD Volume (Cubic feet)	ESD Volume Provided (Cubic Feet)
1.00	1.01	2,679	2,707

5.4 Water Quantity Controls

With ESD facilities used to the Maximum Extent Practical, a PE of in excess of 1.00" was achieved with a total ESD Volume provided of 30,425 cubic feet. This exceeds the ESD Volume required. Therefore, all Water Quality Channel Protection Volume requirements have been met, and no structural practices are required to provide additional storage volume. Ten year control is not proposed with this application, and will only be provided at the request of Montgomery County DPS.

The stormwater management design strategy for this project is to seek to replicate the natural hydrology of the site by utilizing small-scale stormwater management practices to minimize the impact of land development on downstream water resources. The project was divided into 26 small drainage areas. Each of these drainage areas are tributary to an ESD measure that has been designed to fully meet the ESD criteria to the maximum extent practicable, with a Target PE of 1".

5.5 Leadership in Energy and Environmental Design

The project will utilize several small BMPs to provide ESD treatment to the maximum extent practical. Grass swales, providing pre-treatment, will be used to direct run-off into the bioretention facilities. Grass filter strips or grass swales will be used to pre-treat run-off prior to discharging to infiltration facilities. Redundant treatment systems will be used where practical. Swales are being used to the maximum extent practical in order to minimize storm drain piping systems.

The project is also being designed to meet LEED$^{©}$ requirements as governed by the U.S. Green Building Council. The project will attempt to meet the requirements of LEED credits SS 6.1, Stormwater Design: Quantity Control and SS6.2, Stormwater Design: Quality Control.

To achieve LEED Credit SS6.1, the project will implement a stormwater management plan that prevents the post-development peak discharge rate and quantity from exceeding the pre-development peak discharge rate and quantity for the one- and two-year 24-hour design storms, or implement a stormwater management plan that protects receiving stream channels from excessive erosion by implementing a stream channel protection strategy and quantity control strategies.

To achieve LEED Credit SS6.2, a stormwater management plan that reduces impervious cover, promotes infiltration, and captures and treats the stormwater runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs) will be implemented. BMPs used to treat runoff must be capable of removing 80% of the average annual post development total suspended solids (TSS) load based on existing monitoring reports. BMPs are considered to meet these criteria if (1) they are designed in accordance with standards and specifications from a state or local program that has adopted these performance standards, or (2) there exists in-field performance monitoring data demonstrating compliance with the criteria. Data must conform to accepted protocol (e.g., Technology Acceptance Reciprocity Partnership [TARP], Washington State Department of Ecology) for BMP monitoring.

The project site is designed to meet LEED requirements through the use of Environmental Site Design criteria. The project site meets all Environmental Site design standards.

5.6 Anticipated Performance – Special Protections Area Design Standards

Even though the subject project is not located within a Special Protection Area, at the direction of M-NCPPPC, AMT is designing this development to meet the below water quality performance goals established in Executive Regulation 29-95. The performance goals applicable to this development are as follows:

- Maintain stream base flow
- Minimize storm flow runoff increases
- Minimize increases to ambient water temperatures
- Minimize sediment loading
- Minimize nutrient loadings

Each Performance Goal will be discussed separately.

5.6.1 Maintain Stream Base Flow

Intent: Maximum base flow preservation is essential to supporting the critical habitat needs of the aquatic biological community.

Discussion: Good infiltration rates are anticipated at the site. Enhanced filters will be used at all bioretention and filtering practices to achieve groundwater infiltration and recharge to the maximum extent practical.

5.6.2 Minimize Storm Flow Run-off Increase

Intent: The frequency of runoff events that create erosion in stream channels needs to be managed because cumulative increases in sub watershed runoff affect downstream channels as well as on-site channels.

Discussion: Environmental Site Design (ESD) is being used to the Maximum Extent Practicable (MEP) in order to minimize storm flow run-off increases. The site will be designed such that it’s post-development run-off characteristics will mimic an area of Woods in “Good” condition.

5.6.3 Minimize Increases to Ambient Water Temperatures

Intent: Peak stream temperatures and durations are primary determinants of the biological community that can be maintained. During low flow periods of the year, the peaks and durations should not increase beyond the limits of those documented during baseline monitoring or the upper temperature limits specified in State Water Use Standards.

Discussion: To reduce thermal impacts associated with ESD practices, infiltration at each practice will be maximized. Good infiltration rates are anticipated. Increasing and maximizing infiltration will reduce the amount of surface run-off and will lower the thermal energy flowing into coldwater stream areas.

All filtering practices such as micro-bioretention facilities, bioretention facilities and Bio-swales will be designed such that underdrains will be at least 4 feet below the surface. Soil temperatures at this depth are cooler and fluctuate little in response to surface weather conditions. As run-off flows through the filtering practice, the thermal energy will dissipate and discharge temperatures will be reduced. If underdrain depth is limited, the MDE enhanced filter option 2 will be used. This enhanced filter option utilizes a perforated underdrain located at the bottom of a stone reservoir and below the outfall pipe. As the water surface elevation rises above the invert of the outlet pipe, the cooler water is siphoned from the bottom.

Shade producing plants will be used in landscaped areas. Shade trees and shrubs will be used to screen impervious areas from the sun to the maximum extent practical.

5.6.4 Minimize Sediment loading

Intent: Excessive loadings of fine sediment can deplete the habitat of an entire biological community. Abrasive sediment loadings accelerate stream bed and bank erosion contributing to stream bank instability.

Discussion: During the construction phase, the project will use SSF as a minimum for perimeter erosion control. Phased Grading, as explained in Section 4.13 of this report will be implored to minimize sediment loading, and additional disturbance associated with the construction of larger controls. All sediment controls will be stabilized within 3-days of establishment.

5.6.5 Minimize Nutrient Loading

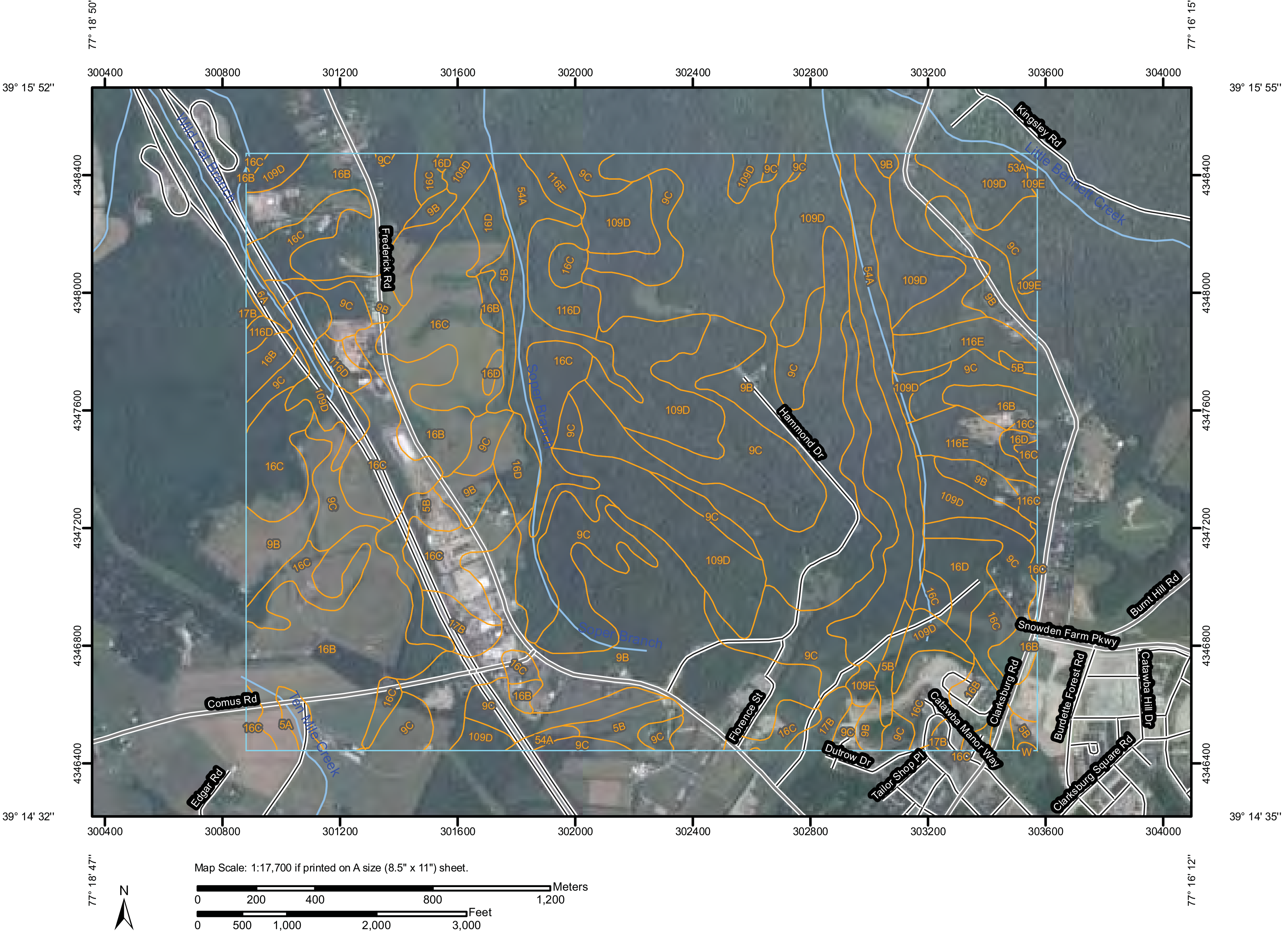
Intent: Excessive nutrient loadings can cause algae blooms and alter the community composition of the stream fish and macro invertebrates. The State has established tributary protection strategies to reduce the impact of nitrogen and phosphorus loadings in the Chesapeake Bay.

Discussion: Minimizing nutrient loading will begin with limiting nutrient input. The use of fertilizers will be minimized. If required, low or no phosphorus fertilizer can be used. A meadow type ground cover will be used to promote filtering and infiltration, thereby, reducing nutrient loading.

APPENDIX A:

SOILS MAP AND INFORMATION

Soil Map



Map Scale: 1:17,700 if printed on A size (8.5" x 11") sheet.

MAP LEGEND

Area of Interest (AOI)

☐ Area of Interest (AOI)

Soils

☐ Soil Map Units

Special Point Features

- ⊙ Blowout
- ☒ Borrow Pit
- ✱ Clay Spot
- ◆ Closed Depression
- ✕ Gravel Pit
- ∴ Gravelly Spot
- ◎ Landfill
- Λ Lava Flow
- ⩡ Marsh or swamp
- ⚒ Mine or Quarry
- ◎ Miscellaneous Water
- ◉ Perennial Water
- ∨ Rock Outcrop
- + Saline Spot
- ⁘ Sandy Spot
- ≡ Severely Eroded Spot
- ◇ Sinkhole
- ⟩ Slide or Slip
- ø Sodic Spot
- ≡ Spoil Area
- ◊ Stony Spot
- ∞ Very Stony Spot
- ▼ Wet Spot
- ▲ Other

Special Line Features

- ∼ Gully
- ⋯ Short Steep Slope
- ⌃ Other

Political Features

- ● Cities

Water Features

- ■ Oceans
- ∼ Streams and Canals

Transportation

- ┼┼┼ Rails
- ∼ Interstate Highways
- ∼ US Routes
- ∼ Major Roads
- ∼ Local Roads

MAP INFORMATION

Map Scale: 1:17,700 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:15,840.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Montgomery County, Maryland
Survey Area Data: Version 7, Feb 2, 2007

Date(s) aerial images were photographed: 6/21/2005; 6/8/2005

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Montgomery County, Maryland (MD031)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
5A	Glenville silt loam, 0 to 3 percent slopes	4.3	0.3%
5B	Glenville silt loam, 3 to 8 percent slopes	33.7	2.5%
6A	Baile silt loam, 0 to 3 percent slopes	3.6	0.3%
9B	Linganore-Hyattstown channery silt loams, 3 to 8 percent slopes	301.9	22.4%
9C	Linganore-Hyattstown channery silt loams, 8 to 15 percent slopes	251.3	18.6%
16B	Brinklow-Blocktown channery silt loams, 3 to 8 percent slopes	162.0	12.0%
16C	Brinklow-Blocktown channery silt loams, 8 to 15 percent slopes	187.5	13.9%
16D	Brinklow-Blocktown channery silt loams, 15 to 25 percent slopes	34.0	2.5%
17B	Occoquan loam, 3 to 8 percent slopes	15.2	1.1%
53A	Codorus silt loam, 0 to 3 percent slopes, occasionally flooded	0.8	0.1%
54A	Hatboro silt loam, 0 to 3 percent slopes, frequently flooded	56.3	4.2%
109D	Hyattstown channery silt loam, 15 to 25 percent slopes, very rocky	237.5	17.6%
109E	Hyattstown channery silt loam, 25 to 45 percent slopes, very rocky	4.1	0.3%
116C	Blocktown channery silt loam, 8 to 15 percent slopes, very rocky	2.2	0.2%
116D	Blocktown channery silt loam, 15 to 25 percent slopes, very rocky	22.1	1.6%
116E	Blocktown channery silt loam, 25 to 45 percent slopes, very rocky	33.4	2.5%
W	Census water	0.3	0.0%
Totals for Area of Interest		**1,350.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

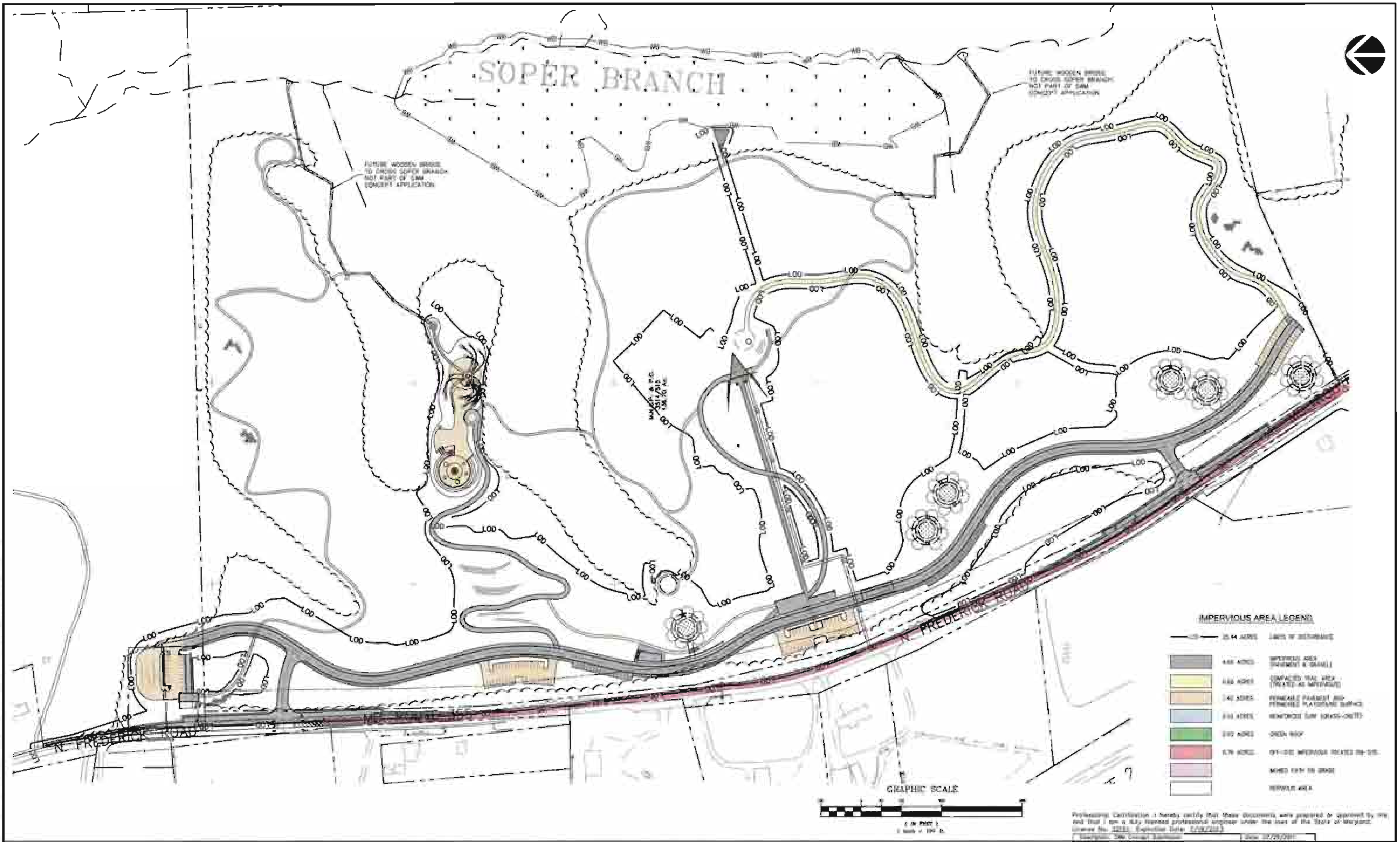
A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape,

APPENDIX B:

STORMWATER MANAGEMENT CONCEPT

APPENDIX B1:

ENVIRONMENTAL SITE DESIGN (ESD) EXHIBITS

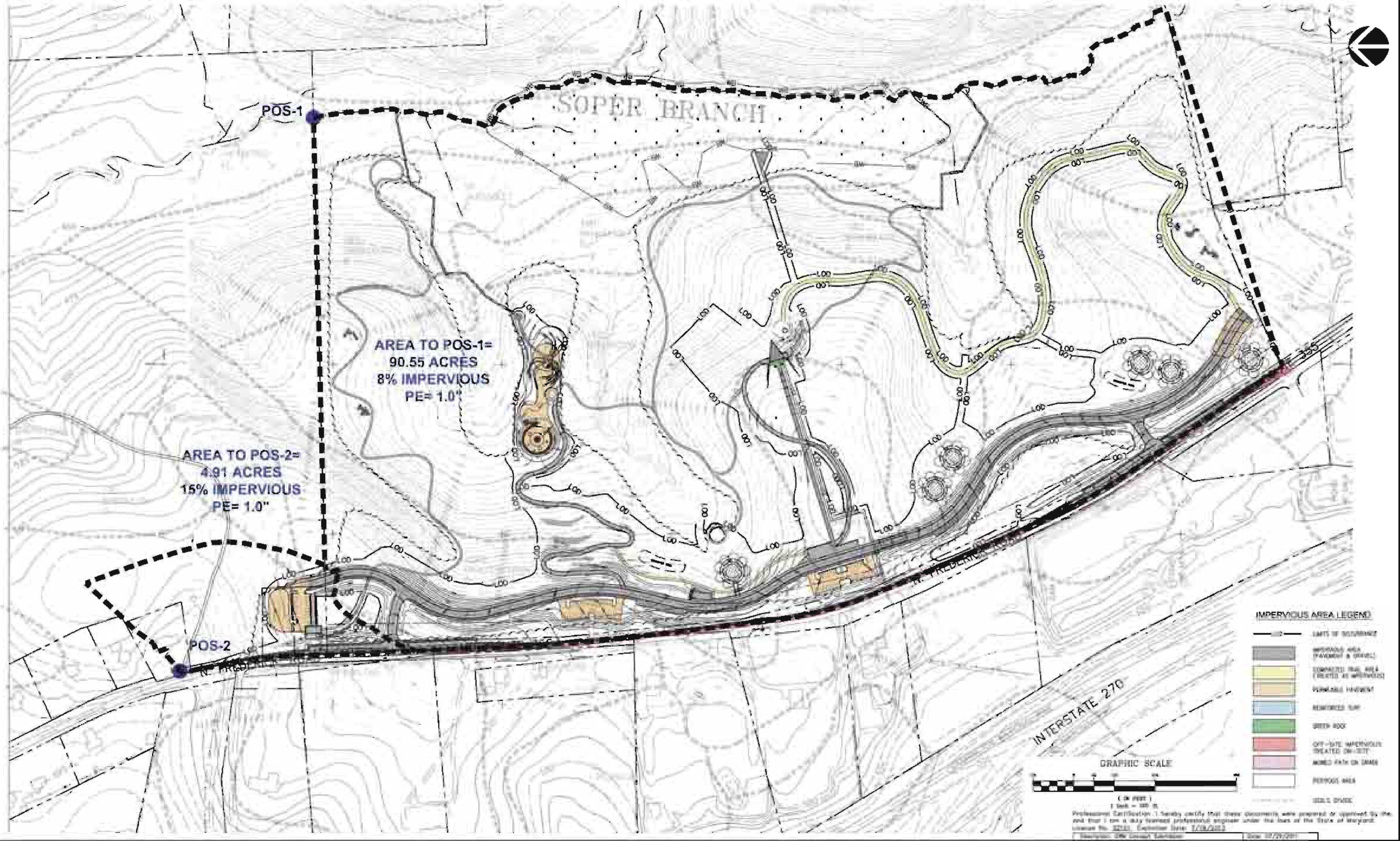


The Maryland-National Capital Park
and Planning Commission

IMPERVIOUS AREA MAP
Little Bennett Regional Park
Day Use Area

WSSC Grid Map

SHEET



Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 22101, Expiration Date: 7/18/2013

Description: SWM Concept Submission Date: 07/29/2011

DESIGN				REVIEW AND APPROVAL		REVIEW AND APPROVAL	
M-NCPPC							
Landscape Architect	Date	Checked By		Park Development	Date	Superintendent of Parks	Date
Architect	Date	Checked By		Central Maintenance	Date	Park Police	Date
Engineer	Date	Checked By		Region	Date		Date
Drawn By	Date	Checked By		Natural Resources	Date		Date

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

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REVISIONS

Rev. No.	Date	Description

SEAL

STUDY POINT MAP

Little Bennett Regional Park

Day Use Area

SCALE: 1" = 100'

WSSC Grid Map
233NW14

SHEET of 27

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Description: SWM Concept Submission

DESIGN				REVIEW AND APPROVAL		REVIEW AND APPROVAL	
M-NCPPC							
Landscape Architect	Date	Checked By		Park Development	Date	Superintendent of Parks	Date
Architect	Date	Checked By		Central Maintenance	Date	Park Police	Date
A&E Engineer	Date	Checked By		Region	Date		Date
A&E Drawn By	Date	Checked By		Natural Resources	Date		Date

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and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

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REVISIONS

Rev. No.	Date	Description

SEAL

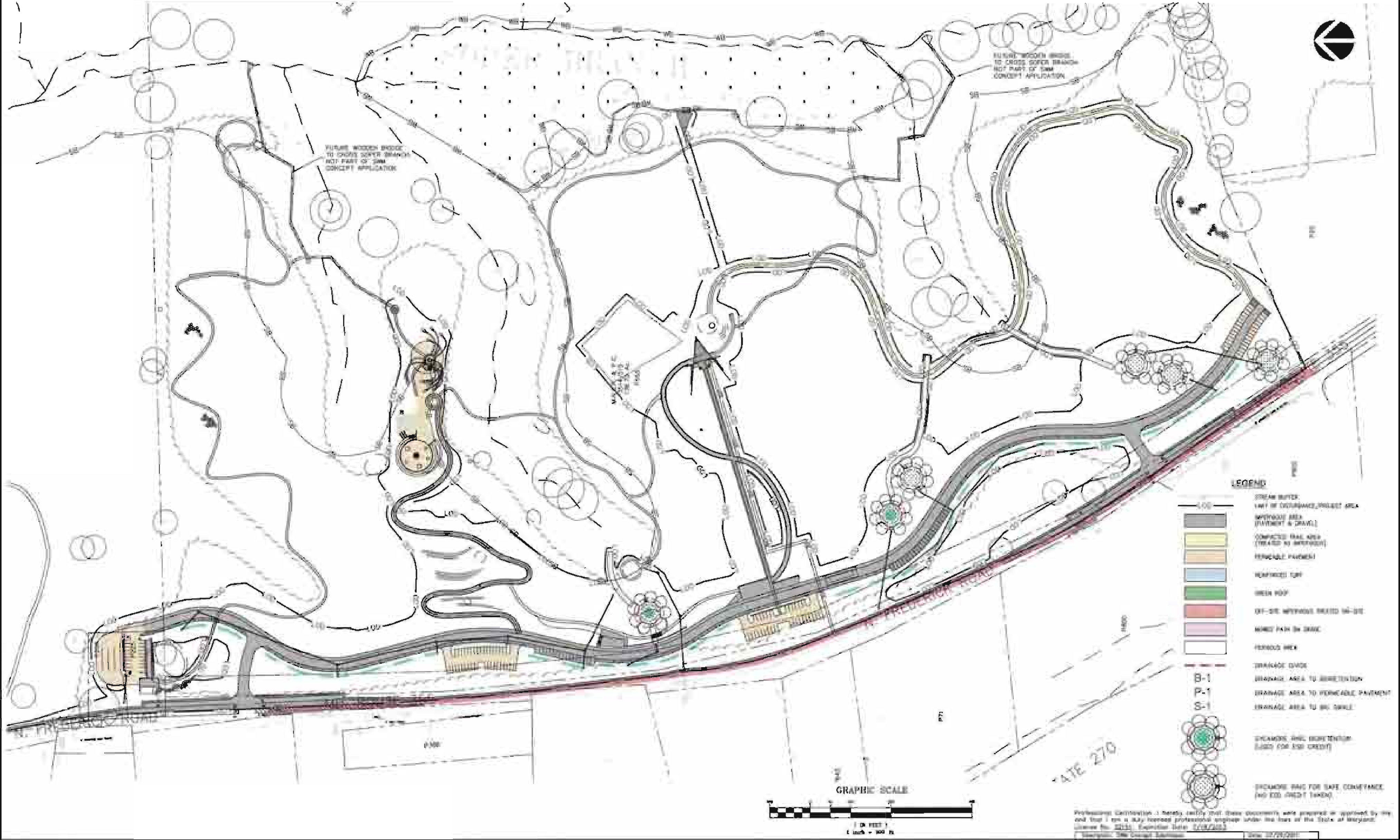
Proposed Drainage Area Map
Little Bennett Regional Park
Day Use Area

SCALE: 1"=400'

WSSC Grid Map
224NW14

ESD-1

SHEET of 27



Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. [illegible] Expiration Date: [illegible]

FINAL SCANNED

PLAN SCANNED

PARK CODE A26

DESIGN				REVIEW AND APPROVAL		REVIEW AND APPROVAL	
M-NCPPC							
Landscape Architect	Date	Checked By		Park Development	Date	Superintendent of Parks	Date
Architect	Date	Checked By		Central Maintenance	Date	Park Police	Date
Engineer	Date	Checked By		Region	Date		Date
Drawn By	Date	Checked By		Natural Resources	Date		Date

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR:

REVISIONS

Rev. No.	Date	Description

SEAL

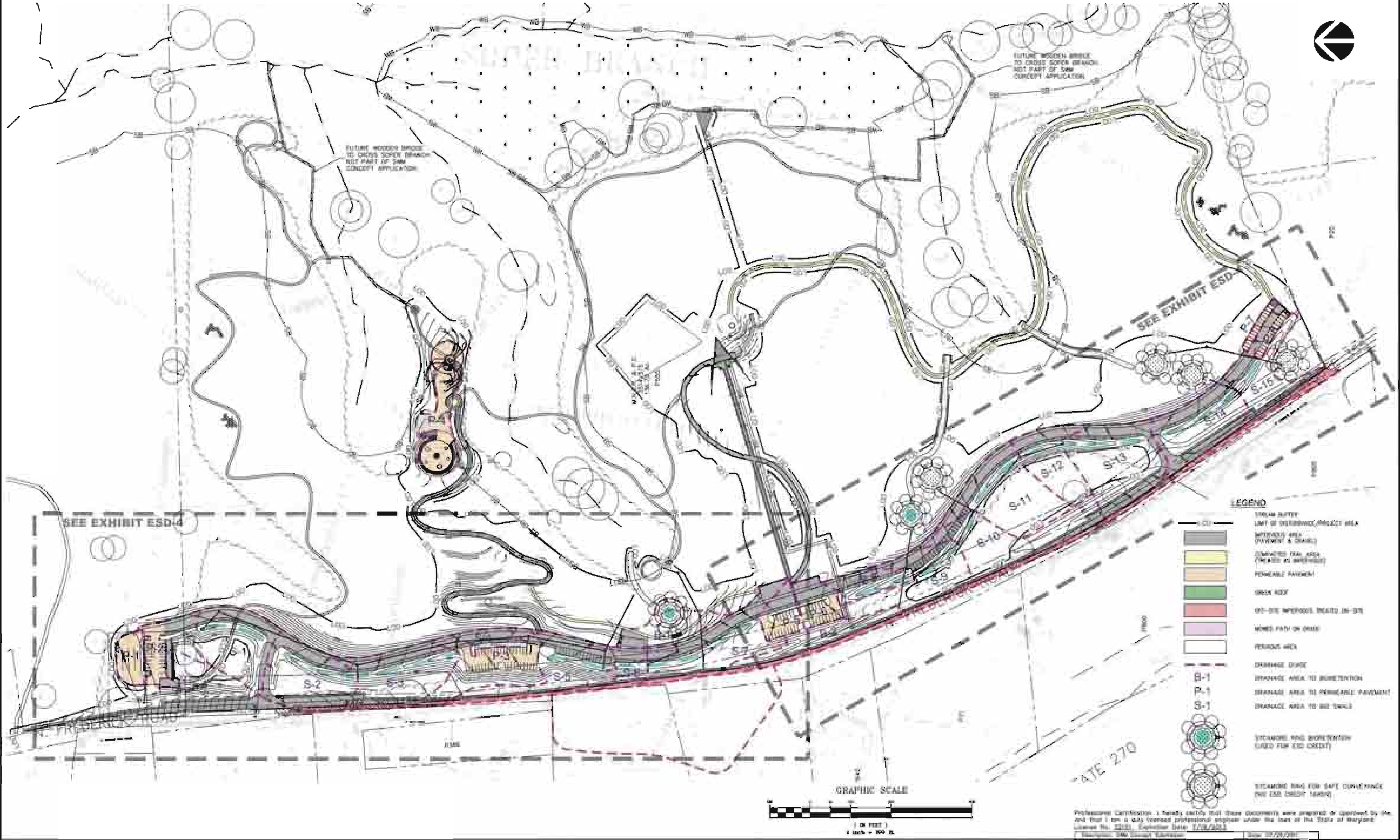
ESD MAPPING
Little Bennett Regional Park
Day Use Area

SCALE: 1"=100'

WSSC Grid Map
[illegible]

ESD-2

SHEET [illegible] of 27



Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. [illegible], Expiration Date: [illegible]

Description: SWM Concept Submission | Date: [illegible]

DESIGN			REVIEW AND APPROVAL		REVIEW AND APPROVAL	
M-NCPPC						
Landscape Architect	Date	Checked By	Park Development	Date	Superintendent of Parks	Date
Architect	Date	Checked By	Central Maintenance	Date	Park Police	Date
Engineer	Date	Checked By	Region	Date		Date
Drawn By	Date	Checked By	Natural Resources	Date		Date

The Maryland-National Capital Park and Planning Commission

Montgomery County Department of Parks and Planning
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Silver Spring, Maryland 20901
(301) 495-2595

PLANS ISSUED FOR:

REVISIONS

Rev. No.	Date	Description

SEAL

Proposed Drainage Area Map
Little Bennett Regional Park
Day Use Area

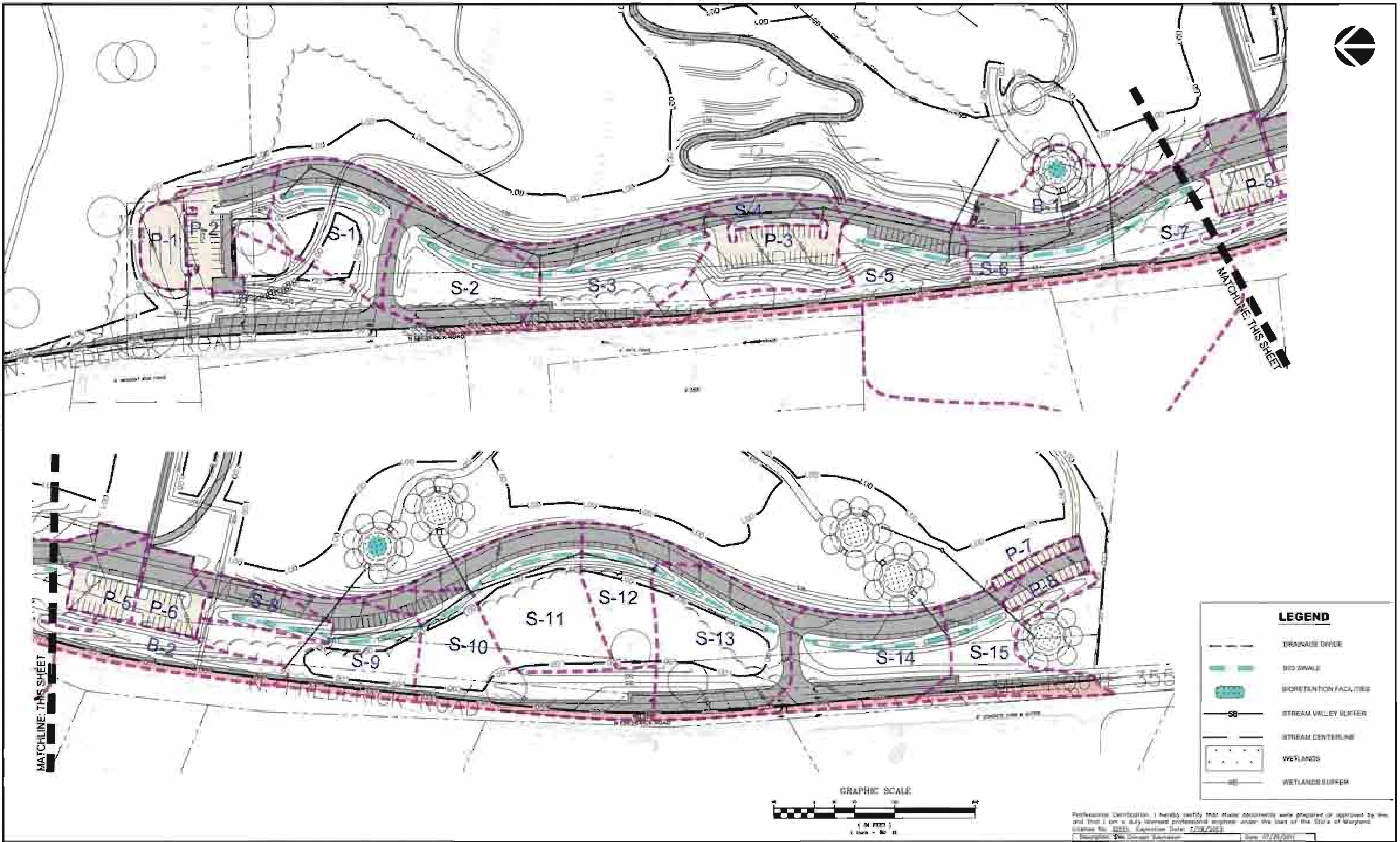
SCALE: [illegible]

WSSC Grid Map
[illegible]

ESD-3

SHEET of 27

PARK CODE: A26 PLAN SCANNED: FINAL SCANNED:



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Rev. No.	Date	Description

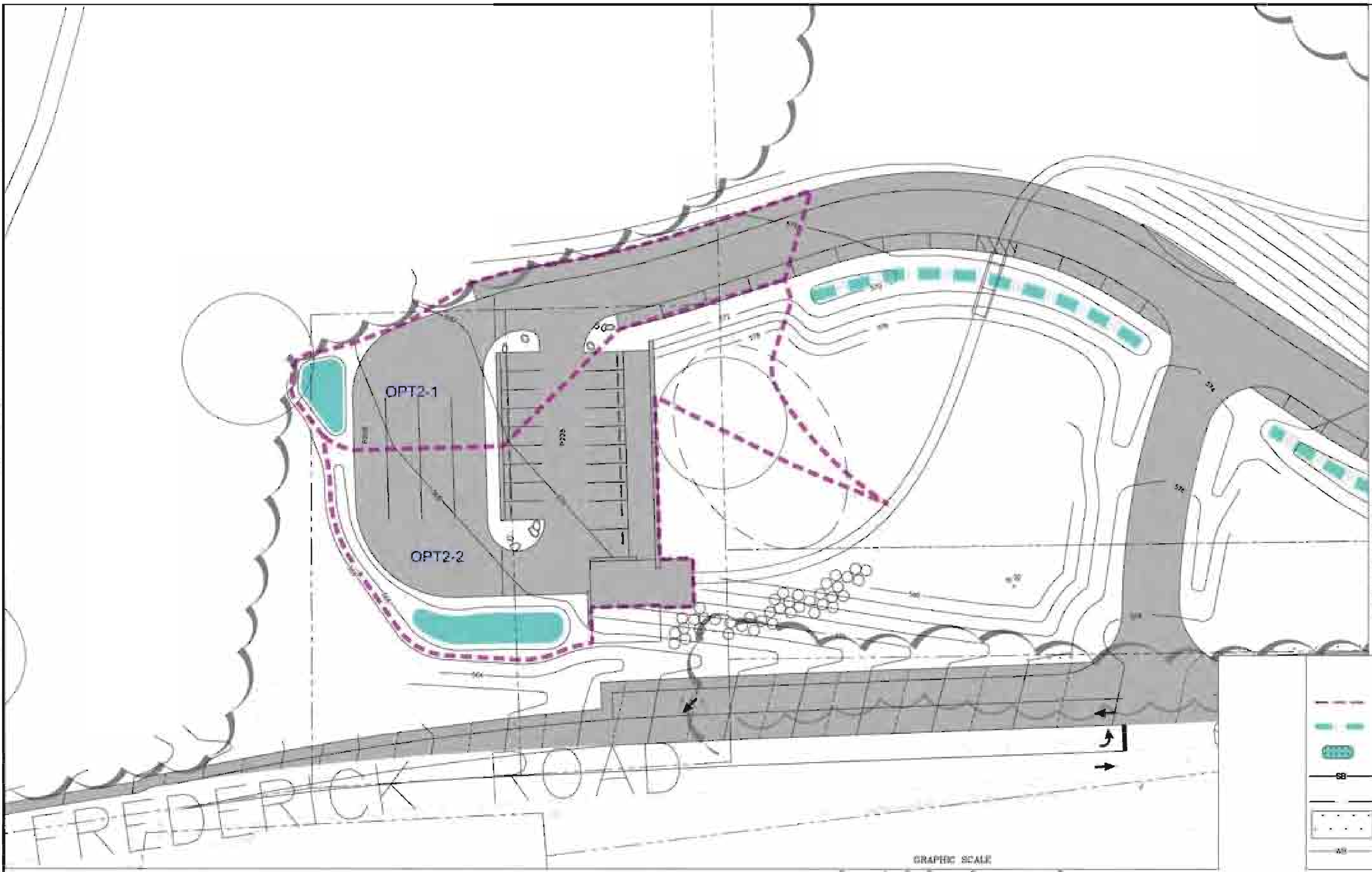
Proposed Drainage Area Map
Little Bennett Regional Park
Day Use Area

WSSC Grid Map

ESD-4

SHEET of 27

FINAL SCANNED:
PLAN SCANNED:
PARK CODE: A26



NOTE:
THE GEOTECHNICAL REPORT, INCLUDED IN APPENDIX F, SHOWS INFILTRATION RATES IN EXCESS OF 8" PER HOUR IN THIS LOCATION. ADDITIONAL TESTING SHALL BE PERFORMED AT THE TIME OF FINAL DESIGN.

THIS OPTION IS SHOWN TO VALIDATE THAT FULL ESD CAN STILL BE MET FOR THE PARKING AREA IF PERMEABLE PAVEMENTS ARE NOT PROVIDED.

LEGEND

— — —	DRAINAGE DIVIDE
▬ ▬ ▬	ESD SWALE
▨	BIORETENTION FACILITIES
—SB—	STREAM VALLEY BUFFER
— —	STREAM CENTERLINE
⁘	WETLANDS
—WB—	WETLANDS BUFFER

GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.

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Description: SWM Concept Submission
Date: 07/29/2011

DESIGN			REVIEW AND APPROVAL		REVIEW AND APPROVAL	
M-NCPPC						
Landscape Architect	Date	Checked By	Park Development	Date	Superintendent of Parks	Date
Architect	Date	Checked By	Central Maintenance	Date	Park Police	Date
Engineer	Date	Checked By	Region	Date		Date
Drawn By	Date	Checked By	Natural Resources	Date		Date

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Rev. No.	Date	Description

SEAL

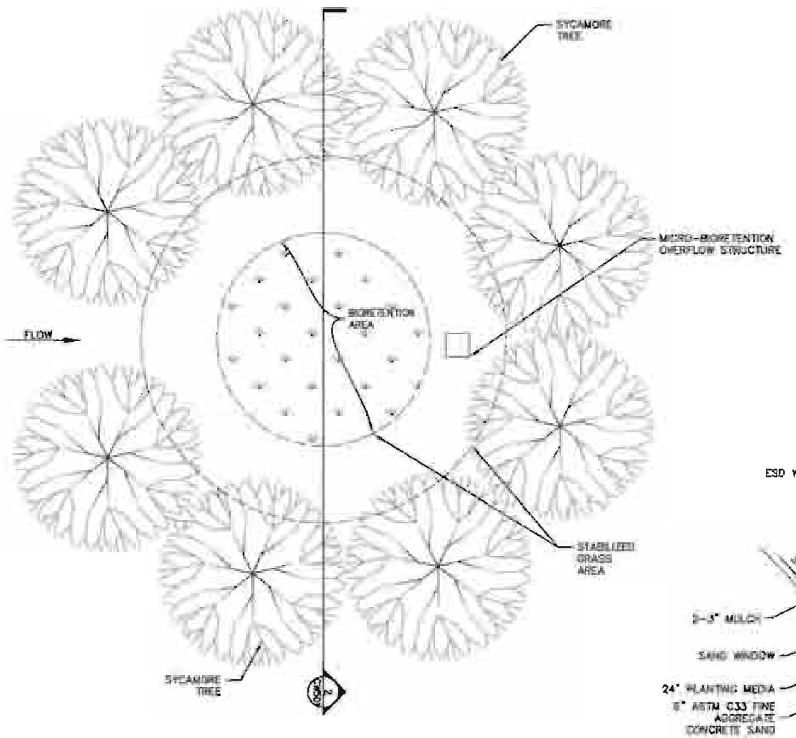
Option 2 Drainage Area Map
Little Bennett Regional Park
Day Use Area

SCALE: 1"=20'

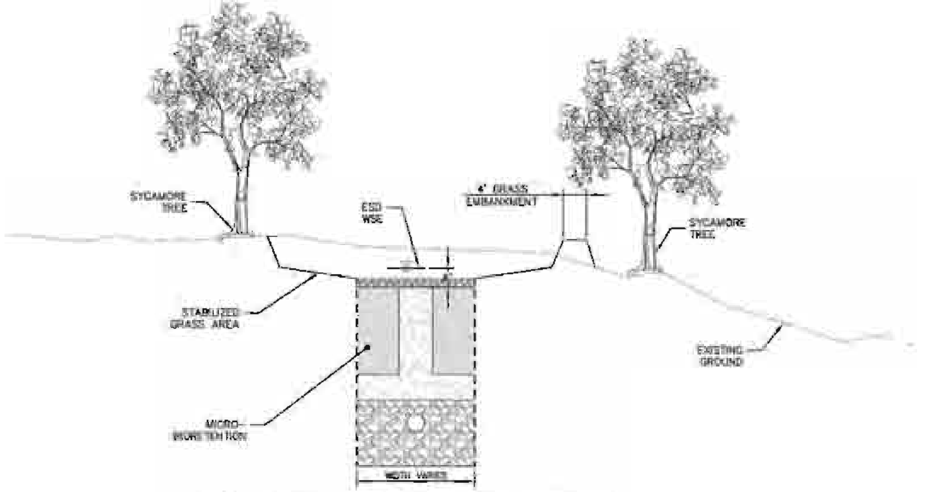
WSSC Grid Map
#234NW14

ESD-5

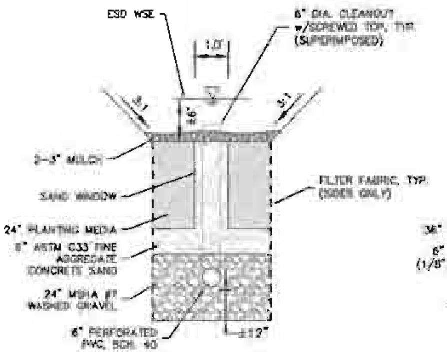
SHEET of 27



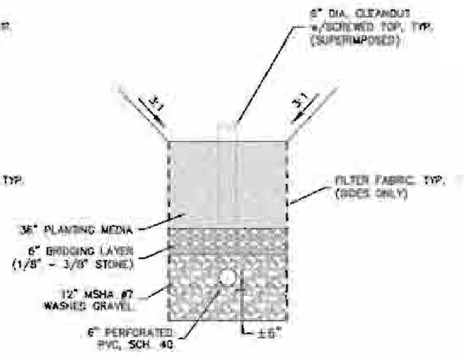
1 CW501 SYCAMORE RING- BIORETENTION AREAS (TYPICAL)
SCALE: 1"=10'
PLAN VIEW



2 CW501 SYCAMORE RING- BIORETENTION AREAS (TYPICAL)
HORIZONTAL SCALE: 1"= 10'
VERTICAL SCALE: 1"= 1'
SECTION VIEW



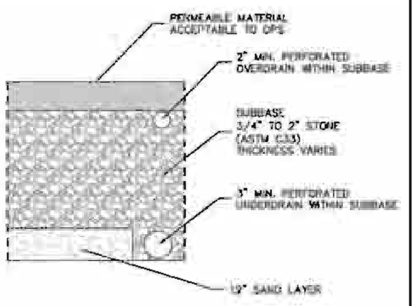
4 CW501 MICRO-BIORETENTION SECTION (TYPICAL)
NOT TO SCALE



5 CW501 BIO-SWALE SECTION (TYPICAL)
NOT TO SCALE

NOTES:

1. THE CHANNEL SLOPE SHALL BE LESS THAN OR EQUAL TO 4.0%
2. THE MAXIMUM FLOW VELOCITY FOR THE ESDv SHALL BE LESS THAT OR EQUAL TO 1.0 FPS.



6 CW501 PERMEABLE PAVEMENT SECTION (TYPICAL)
NOT TO SCALE

NOTES:

1. THE CHANNEL SLOPE SHALL BE LESS THAN OR EQUAL TO 4.0%
2. THE MAXIMUM FLOW VELOCITY FOR THE ESDv SHALL BE LESS THAT OR EQUAL TO 1.0 FPS.

Professional Certification. I hereby certify that these documents were prepared or approved by me and that I am a duly licensed professional engineer under the laws of the State of Maryland.

DESIGN

REVIEW AND APPROVAL

REVIEW AND APPROVAL

The Maryland-National Capital Park
and Planning Commission

PLANS ISSUED FOR:

REVISIONS

No.	Date	Description

SEAL

SWM Details

Little Bennett Regional Park
Day Use Area

WSSC Grid Map

CW501

APPENDIX B2:

ENVIRONMENTAL SITE DESIGN (ESD) CALCULATIONS

A. Morton Thomas and Associates, Inc.
Consulting Engineers

USER:	CAH
DATE:	9/6/2011
CHECKED BY:	MAE
PROJECT NO.:	108-157.008

Site Data:

Location:	Little Bennett - POS 1	
County:	Montgomery	
1-YR 24 Hour Rainfall:	2.6	
Area to POS:	90.55	acres
Proposed Impervious Area (Total):	6.86	acres*
Proposed % Impervious (I):	8%	

*Proposed Impervious includes all Existing Impervious To Remain

Step 1: Determine ESD Implementation Criteria

1A: Determine Pre-Developed Conditions

1A1: Determine Soil Conditions and RCN's for "Woods in Good Condition'

Soil Conditions

HSG	RCN (1)	Area	Percent
A(2)	38	0.00	0%
B	55	69.74	77%
C	70	6.91	8%
D	77	13.90	15%
TOTAL		90.55	100%

(1) RCN for ""Woods in Good Condition" (Table 2-2, TR-55)

(2) Actual RCN is less than 30, Use RCN=38

$$RCN_{Woods}= \frac{(RCN_A x Area_A) + (RCN_B x Area_B) + (RCN_C x Area_C) + (RCN_D x Area_D)}{(Area_A + Area_B + Area_C + Area_{D)}}$$

$RCN_{Woods}=$ 60 (Target RCN)

1B: Determine Target P_E Using Table 5.3

P_E = Rainfall used to size ESD practices

Is project using using Alternative Surfaces (Green Roof, Permeable Pavements)? YES Enter Yes or No

*MC DPS treats Alternative Surfaces as Impervious for the Purpose of Calculating PE

% Impervious: 8

HSG	% Impervious	Area	PE	(From Table 5.3)
A		0.00		
B	8	69.74	1.0	
C	8	6.91	1.0	
D	8	13.90	1.0	
		90.55		

Weighted PE 1.00 inches

1C: Compute $Q_{E;}$

QE = Runoff Depth Used to Size ESD Practices

$Q_E = P_E \times R_v$, Where

P_E =	1.00	inches of rainfall
R_V = 0.05+(0.009)(I)		
I =	29	**(Based on LOD)**
R_V =	0.31	**(Based on LOD)**
QE =	0.31	Inches of Runoff

1D: Identify Projects Limits, Calculate ESD Volume required

Project Limits (LOD within POS -1): 24.00 acres

ESD Targets for Project:

P_E =	1.00	inches of rainfall
Q_E =	0.31	inches of runoff
ESDv=	0.615	acre-feet
	26768	cubic feet

1E: Compute Total Site Recharge Volume

Recharge (Percent Volume) = S*Rv*A/12

HSG	S Value	Area
A(2)	0.38	0.00
B	0.26	69.74
C	0.13	6.91
D	0.07	0.00
	Total	76.65
	Weighted "S"	0.25

Recharge (Percent Volume) =

Rev	0.576	acre-feet
	25074.3	cubic feet

Recharge (Percent Area) = S*Aimp

Rev	1.703	acres
	74191.6	square feet

A. Morton Thomas and Associates, Inc.
Consulting Engineers

USER: CAH4
DATE: 9/6/2011
CHECKED BY: MAE
PROJECT NO.: 108-157.008

Subarea	Green Roofs	Permeable Pavements	Disconnect of Rooftop	Disconnect of Non-Rooftop	Sheetflow to Conservation Area	Rainwater Harvesting	Submerged Gravel Wetlands	Landscape Infiltration	Infiltration Berms	Dry Wells	Micro-Bioretention	Raingardens	Grass Swales	B io Swales	Wet Swales	Bioretention	**ESDv Provided**
S-1	-	-	-	-	-	-	-	-	-	-	-	-	-	2080	-	-	**2080**
S-2	-	-	-	-	-	-	-	-	-	-	-	-	-	1976	-	-	**1976**
S-3	-	-	-	-	-	-	-	-	-	-	-	-	-	2300	-	-	**2300**
P-3	-	1003	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1003**
S-4	-	-	-	-	-	-	-	-	-	-	-	-	-	676	-	-	**676**
S-5	-	-	-	-	-	-	-	-	-	-	-	-	-	1425	-	-	**1425**
P-4	-	2089	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**2089**
S-6	-	-	-	-	-	-	-	-	-	-	-	-	-	686	-	-	**686**
S-7	-	-	-	-	-	-	-	-	-	-	-	-	-	2881	-	-	**2881**
P-5	-	506	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**506**
P-6	-	507	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**507**
B-1	-	-	-	-	-	-	-	-	-	-	488	-	-	-	-	-	**488**
B-2	-	-	-	-	-	-	-	-	-	-	793	-	-	-	-	-	**793**
S-8	-	-	-	-	-	-	-	-	-	-	-	-	-	1020	-	-	**1020**
S-9	-	-	-	-	-	-	-	-	-	-	-	-	-	1352	-	-	**1352**
S-10	-	-	-	-	-	-	-	-	-	-	-	-	-	1040	-	-	**1040**
S-11	-	-	-	-	-	-	-	-	-	-	-	-	-	1633	-	-	**1633**
S-12	-	-	-	-	-	-	-	-	-	-	-	-	-	1113	-	-	**1113**
S-13	-	-	-	-	-	-	-	-	-	-	-	-	-	2101	-	-	**2101**
S-14	-	-	-	-	-	-	-	-	-	-	-	-	-	2288	-	-	**2288**
S-15	-	-	-	-	-	-	-	-	-	-	-	-	-	1030	-	-	**1030**
P-7	-	265	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**265**
P-8	-	253	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**253**
GR-1	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**64**
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	-	-	-	-	-	-	-	-	-	-	0	-	-	-	-	-	**0**
Volume	64	4623	0	0	0	0	0	0	0	0	1281	0	0	21520	0	0	**27488**
																Volume Check:	**27488**

TOTAL ESDv PROVIDED:	**27488**
PE PROVIDED:	**1.03**
Target PE:	**1.00**
TOTAL ESDv REQUIRED:	**26768**

ESD Achieved

USER: CAH
DATE: 9/6/2011
CHECKED BY: MAE
PROJECT NO.: 108-157.008

Site Data:

Location: Little Bennett - POS 2
County: Montgomery
1-YR 24 Hour Rainfall: 2.6
Area to POS: 4.91 acres
Proposed Impervious Area (Total): 0.74 acres*
Proposed % Impervious (I): 15%

*Proposed Impervious includes all Existing Impervious To Remain

Step 1: Determine ESD Implementation Criteria

1A: Determine Pre-Developed Conditions
1A1: Determine Soil Conditions and RCN's for "Woods in Good Condition'

Soil Conditions

HSG	RCN (1)	Area	Percent
A(2)	38	0.00	0%
B	55	4.73	96%
C	70	0.00	0%
D	77	0.18	4%
TOTAL		4.91	100%

(1) RCN for ""Woods in Good Condition" (Table 2-2, TR-55)
(2) Actual RCN is less than 30, Use RCN=38

$$RCN_{Woods} = \frac{(RCN_A xArea_A) + (RCN_B xArea_B) + (RCN_C xArea_C) + (RCN_D xArea_D)}{(Area_A + Area_B + Area_C + Area_{D)}}$$

RCN_{Woods}= 56 (Target RCN)

1B: Determine Target P_E Using Table 5.3

P_E = Rainfall used to size ESD practices

Is project using using Alternative Surfaces (Green Roof, Permeable Pavements)? YES Enter Yes or No
*MC DPS treats Alternative Surfaces as Impervious for the Purpose of Calculating PE

% Impervious: 15

HSG	% Impervious	Area	PE	(From Table 5.3)
A		0.00		
B	15	4.73	1.0	
C		0.00		
D	15	0.18	1.0	
		4.91		
	Weighted PE	1.00	inches	

1C: Compute $Q_{E;}$

QE = Runoff Depth Used to Size ESD Practices

$Q_E = P_E \times R_v$, Where
P_E = 1.00 inches of rainfall
$R_V = 0.05+(0.009)(I)$
I = 51 **(Based on LOD)**
R_V = 0.51 **(Based on LOD)**

QE = 0.51 Inches of Runoff

1D: Identify Projects Limits, Calculate ESD Volume required

Project Limits (LOD within POS): 1.44 acres

ESD Targets for Project:
P_E = 1.00 inches of rainfall
Q_E = 0.51 inches of runoff
ESDv= 0.062 acre-feet
2679 cubic feet

1E: Compute Total Site Recharge Volume

Recharge (Percent Volume) = S*Rv*A/12

HSG	S Value	Area
A(2)	0.38	0.00
B	0.26	4.73
C	0.13	0.00
D	0.07	0.00
Total		4.73
Weighted "S"		0.26

Recharge (Percent Volume) =
Rev 0.055 acre-feet
2375.0 cubic feet

Recharge (Percent Area) = S*Aimp
Rev 0.192 acres
8380.9 square feet

A. Morton Thomas and Associates, Inc.
Consulting Engineers

USER: CAH4
DATE: 9/6/2011
CHECKED BY: MAE
PROJECT NO.: 108-157.008

Subarea	Green Roofs	Permeable Pavements	Disconnect of Rooftop	Disconnect of Non-Rooftop	Sheetflow to Conservation Area	Rainwater Harvesting	Submerged Gravel Wetlands	Landscape Infiltration	Infiltration Berms	Dry Wells	Micro-Bioretention	Raingardens	Grass Swales	B io Swales	Wet Swales	Bioretention	**ESDv Provided**
P-1	-	1446	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1446**
P-2	-	1491	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**1491**
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Volume	0	2937	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**2937**

Volume Check: **2937**

TOTAL ESDv PROVIDED: **2937**
PE PROVIDED: **1.10**

Target PE: **1.00**
TOTAL ESDv REQUIRED: **2679**

ESD Achieved

A. Morton Thomas and Associates, Inc.
Consulting Engineers

USER: CAH
DATE: 9/6/2011
CHECKED BY: MAE
PROJECT NO.: 108-157.008

Site Data:

Location: Little Bennett - POS 2
County: Montgomery
1-YR 24 Hour Rainfall: 2.6
Area to POS: 4.91 acres
Proposed Impervious Area (Total): 0.74 acres*
Proposed % Impervious (I): 15%

*Proposed Impervious includes all Existing Impervious To Remain

Step 1: Determine ESD Implementation Criteria

1A: Determine Pre-Developed Conditions

1A1: Determine Soil Conditions and RCN's for "Woods in Good Condition'

Soil Conditions

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A(2)	38	0.00	0%
B	55	4.73	96%
C	70	0.00	0%
D	77	0.18	4%
TOTAL		4.91	100%

(1) RCN for ""Woods in Good Condition" (Table 2-2, TR-55)
(2) Actual RCN is less than 30, Use RCN=38

$$RCN_{Woods} = \frac{(RCN_A xArea_A) + (RCN_B xArea_B) + (RCN_C xArea_C) + (RCN_D xArea_D)}{(Area_A + Area_B + Area_C + Area_{D)}}$$

RCN_{Woods}= 56 (Target RCN)

1B: Determine Target P_E Using Table 5.3

P_E = Rainfall used to size ESD practices

Is project using using Alternative Surfaces (Green Roof, Permeable Pavements)? YES Enter Yes or No

*MC DPS treats Alternative Surfaces as Impervious for the Purpose of Calculating PE

% Impervious: 15

HSG	% Impervious	Area	PE
A		0.00	
B	15	4.73	1.0
C		0.00	
D	15	0.18	1.0
		4.91	

(From Table 5.3)

Weighted PE 1.00 inches

1C: Compute $Q_{E;}$

QE = Runoff Depth Used to Size ESD Practices

$Q_E = P_E \times R_v$, Where
P_E = 1.00 inches of rainfall
$R_V = 0.05+(0.009)(I)$
I = 51 **(Based on LOD)**
R_V = 0.51 **(Based on LOD)**

QE = 0.51 Inches of Runoff

1D: Identify Projects Limits, Calculate ESD Volume required

Project Limits (LOD within POS): 1.44 acres

ESD Targets for Project:
P_E = 1.00 inches of rainfall
Q_E = 0.51 inches of runoff
ESDv= 0.062 acre-feet
2679 cubic feet

1E: Compute Total Site Recharge Volume

Recharge (Percent Volume) = S*Rv*A/12

HSG	S Value	Area
A(2)	0.38	0.00
B	0.26	4.73
C	0.13	0.00
D	0.07	0.00
Total		4.73
Weighted "S"		0.26

Recharge (Percent Volume) =
Rev 0.055 acre-feet
2375.0 cubic feet

Recharge (Percent Area) = S*Aimp
Rev 0.192 acres
8380.9 square feet

A. Morton Thomas and Associates, Inc.
Consulting Engineers

USER: CAH4
DATE: 9/6/2011
CHECKED BY: MAE
PROJECT NO.: 108-157.008

Subarea	Green Roofs	Permeable Pavements	Disconnect of Rooftop	Disconnect of Non-Rooftop	Sheetflow to Conservation Area	Rainwater Harvesting	Submerged Gravel Wetlands	Landscape Infiltration	Infiltration Berms	Dry Wells	Micro-Bioretention	Raingardens	Grass Swales	B io Swales	Wet Swales	Bioretention	ESDv Provided
OPT2-1	-	-	-	-	-	-	-	-	-	-	951	-	-	-	-	-	**951**
OPT2-2	-	-	-	-	-	-	-	-	-	-	1757	-	-	-	-	-	**1757**
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Volume	0	0	0	0	0	0	0	0	0	0	2707	0	0	0	0	0	**2707**

Volume Check: **2707**

TOTAL ESDv PROVIDED: **2707**
PE PROVIDED: **1.01**

Target PE: **1.00**
TOTAL ESDv REQUIRED: **2679**

ESD Achieved

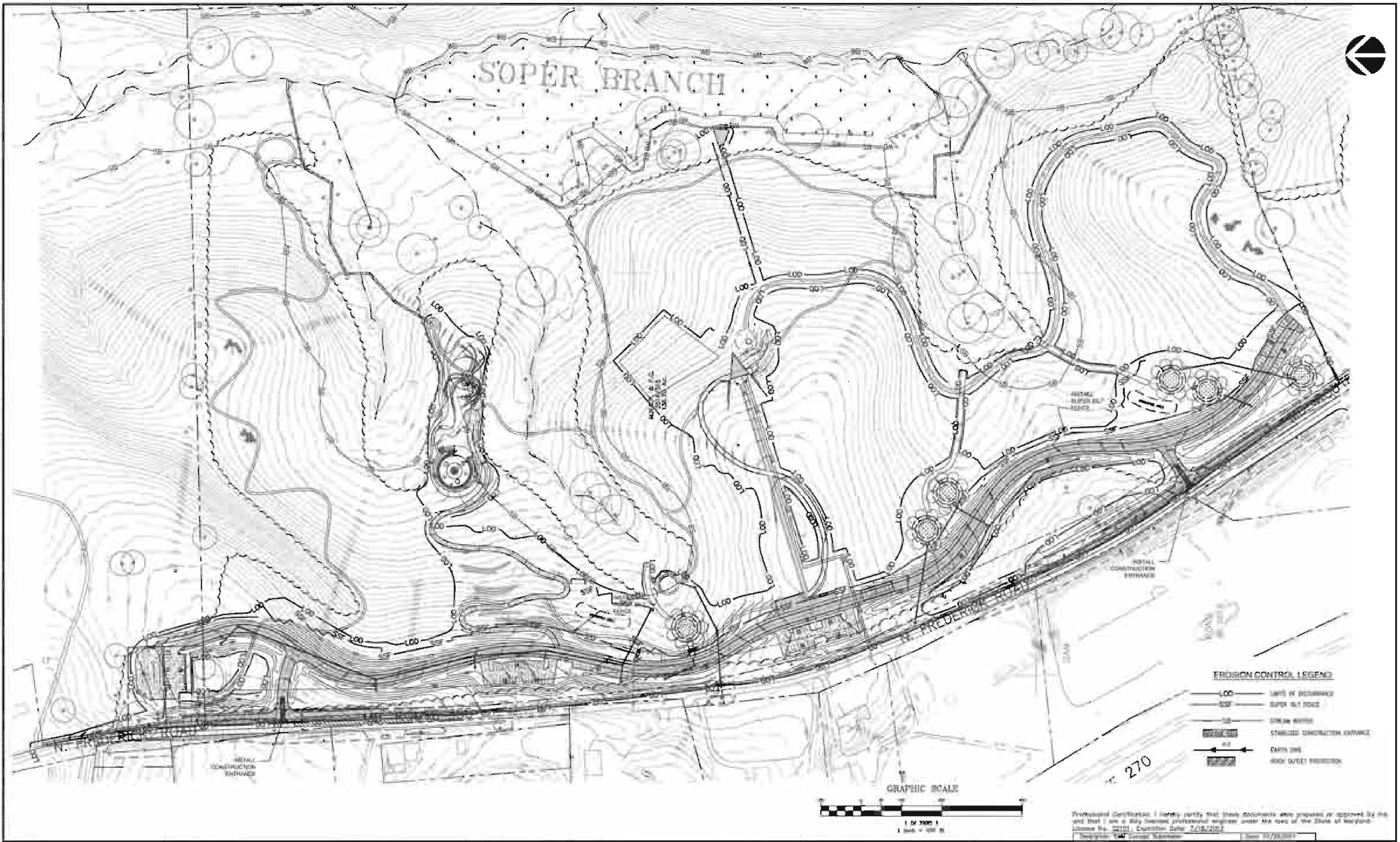
APPENDIX B3:

2007 LITTLE BENNETT MASTER PLAN (FOR COMPARISON PURPOSES)

Little Bennett Gateway Area - Day Use Area Concept Plan

APPENDIX C:

CONCEPT EROSION CONTROL PLANS



EROSION CONTROL LEGEND

——LOD——	LIMITS OF DISTURBANCE
——SSF——	SUPER SILT FENCE
——SB——	STREAM BUFFER
▨	STABILIZED CONSTRUCTION ENTRANCE
←—←—	EARTH DIKE
▨	ROCK OUTLET PROTECTION

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. [illegible] Expiration Date: [illegible]

The Maryland-National Capital Park and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

Concept Erosion Control Plan - Phase I
Little Bennett Regional Park
Day Use Area

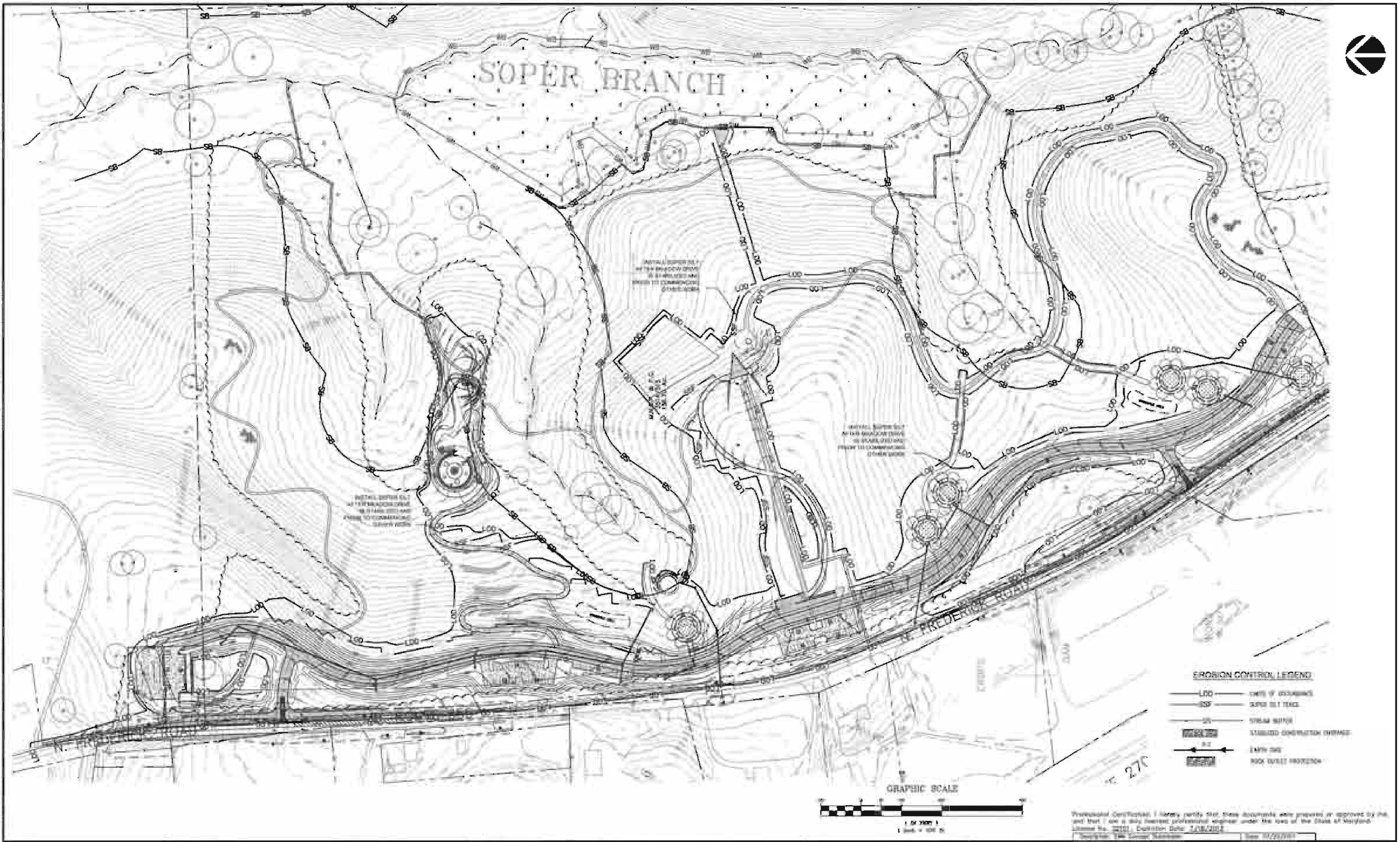
WSSC Grid Map
[illegible]

SCALE: 1" = 100'

CE101

SHEET [illegible]

PAGE CODE: A28
PLAN SCANNED
FINAL SCANNED



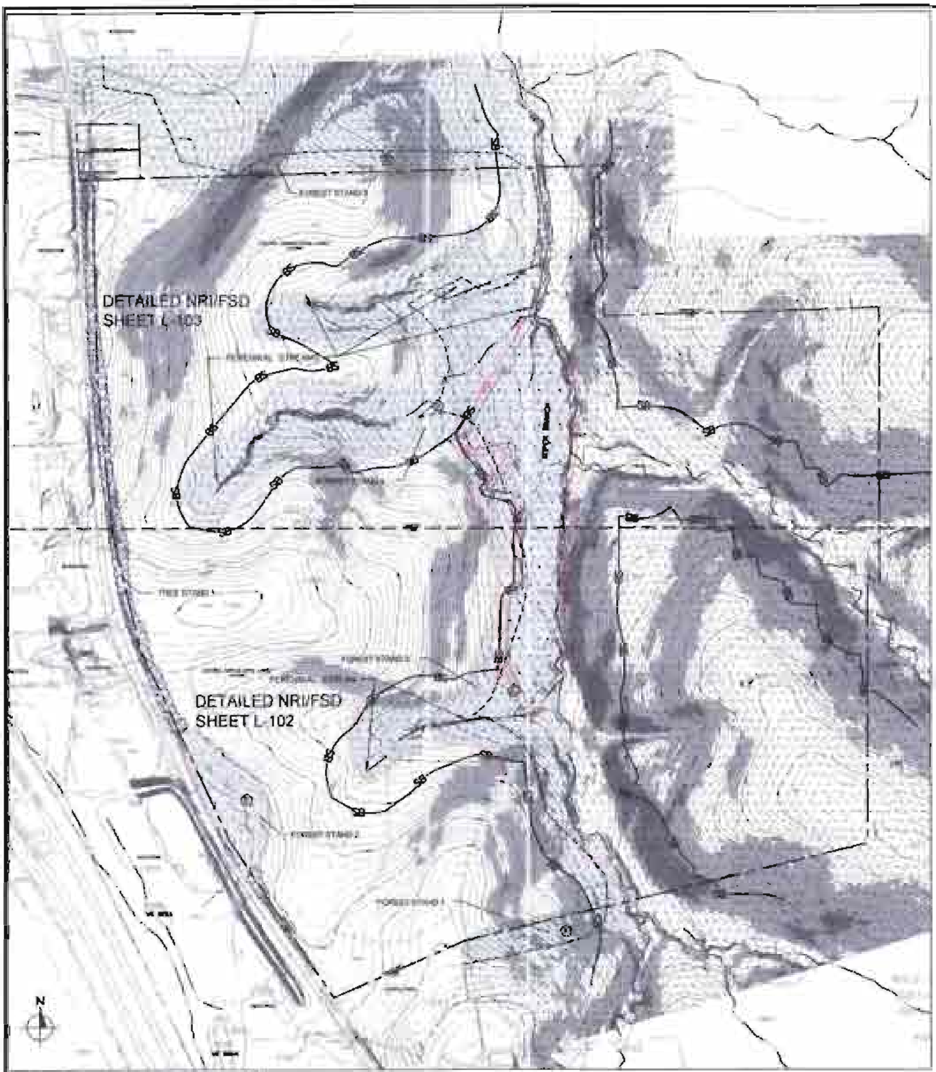
The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

Concept Erosion Control Plan- Phase II
Little Bennett Regional Park
Day Use Area
WSSC Grid Map
#234NW14

CE102

APPENDIX D:

APPROVED NRI/FSD



LEGEND

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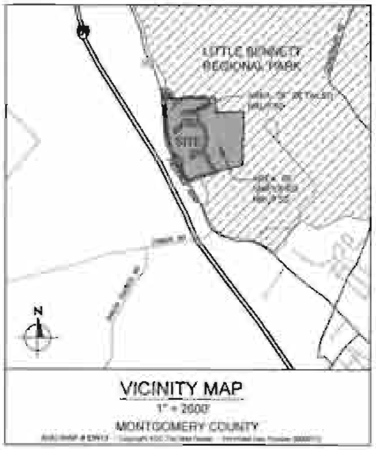


VICINITY MAP

1" = 2000'

MONTGOMERY COUNTY

PROPERTY INFORMATION: [illegible]

[illegible]

NARRATIVE DESCRIPTION:

[illegible]

GENERAL NOTES

[illegible]

SUMMARY TABLE (FOR PROJECT LIMITS)

EXISTING FOREST	= [illegible] ACRES
WETLANDS (EXCLUDING THOSE ASSOCIATED WITH SEEPS & STREAMS)	= [illegible] ACRES
FORESTED WETLANDS ( )	= [illegible] ACRES
STREAM BUFFER	= [illegible] ACRES
FORESTED STREAM BUFFER	= [illegible] ACRES
100 YEAR FLOODPLAIN	= [illegible] ACRES

APPROVED

GRAPHIC SCALE

CERTIFICATION

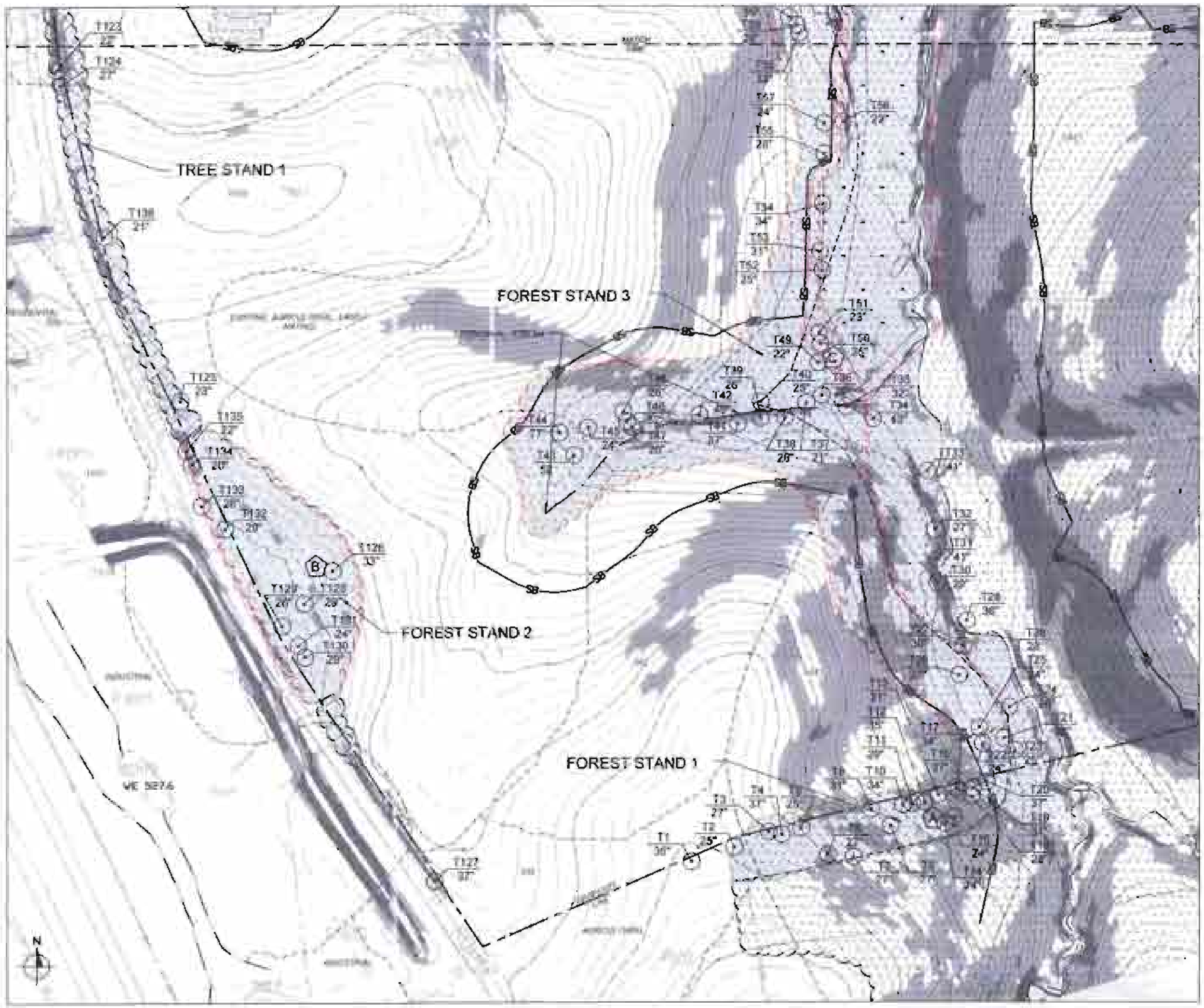
07/19/2010

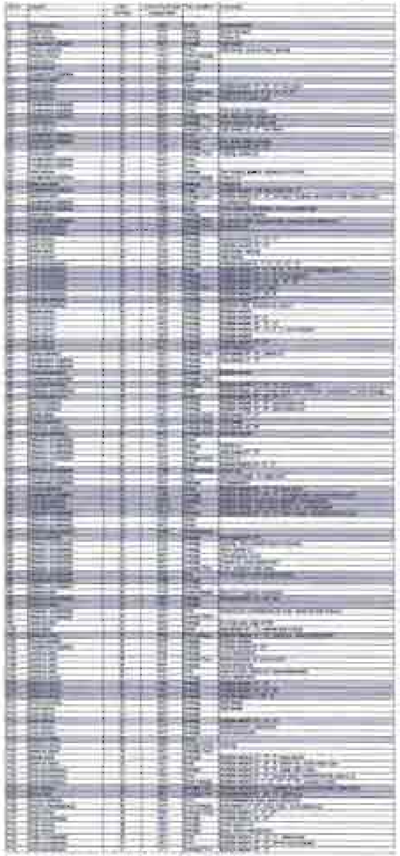
The Maryland-National Capital Park and Planning Commission

LITTLE BENNETT REGIONAL PARK
DAY USE AREA

SIMPLIFIED NRI/FSD

L-101





[illegible] — THIS HILLSIDE FOREST IS DOMINATED BY TULIP POPLAR AND RED MAPLE IN THE 18 TO 29" DBH RANGE. INDIVIDUALS OF THESE SPECIES ARE ALSO PRESENT IN THE 10"-17" DBH RANGE BUT VERY FEW JUVENILE SPECIMENS ARE TO BE FOUND. THIS FOREST STAND IS EDGED BY MEADOW (FORMERLY AGRICULTURAL) AND RED MAPLES DOMINATE THE EDGE THEN TRANSITION TO TULIP POPLAR. BASAL AREA IS 88 SF/ACRE. OTHER SPECIES PRESENT INCLUDE RED OAK, CHESTNUT OAK AND MOCKERNUT HICKORY. STANDING DEAD WOOD IS AVERAGE WITHIN THE PLOT. THE STAND IS WELL STRATIFIED WITH GROWTH AT EACH LEVEL. THE UNDERSTORY CONTAINS JUVENILE HICKORIES, OAKS, AND SOME CHERRIES. THE SHRUB LAYER IS ABUNDANT WITH SPICEBUSH AND SOME VIBURNUM. CANOPY COVERAGE IS 70% UNDERSTORY COVERAGE IS 30% HERBACEOUS GROUND COVER OCCUPIES 30% OF THE GROUND PLANE AND DOWNED WOODY DEBRIS 15%. INVASIVE PLANT COVER 10% MOSTLY JAPANESE BARBERRY. THIS FOREST HAS APPROXIMATELY 23 SIGNIFICANT OR SPECIMEN TREES OF WHICH THE AVERAGE SIZE IS BETWEEN 24" AND 30" DBH. THE AREA HAS BEEN LABELED PRIORITY AREA 1 (HIGH) FOR RETENTION DUE TO THE STEEP SLOPES OF 15-25% HIGHLY ERODIBLE SOILS, AND THE STREAM BUFFER. EFFORTS SHOULD BE MADE TO MINIMIZE THE AREA OF DISTURBANCE.

[illegible] — THIS UPLAND FOREST SITS ON A KNOLL AND IS BORDERED ON THE WEST BY MD ROUTE 355 (FREDERICK ROAD). THE DOMINANT SPECIES IS RED MAPLE WITH DOMINANT TREES GREATER THAN 18" DBH. BASAL STAND AREA IS 80 SF/ACRE. OTHER SPECIES PRESENT ARE TYPICAL EARLY SERAL HACKBERRY, BLACK LOCUST, AND BLACK CHERRY. THE GREATEST NUMBER TREES ARE IN THE INTERMEDIATE (10"-18" DBH) SIZE CLASS FOLLOWED BY THE 6"-10" DBH CLASS. CANOPY COVERAGE IS 80% UNDERSTORY 10% HERBACEOUS GROUND COVER 40% DOWNED WOODY DEBRIS 20% AND INVASIVE PLANT COVER 40%. THE STAND IS NOT WELL STRATIFIED AND IS DOMINATED BY THE CANOPY LAYER WITH LITTLE TO MODERATE SUBCANOPY AND UNDERSTORY GROWTH. THE SHRUB LAYER IS DOMINATED BY INVASIVE SPECIES SUCH AS MULTIFLORA ROSE AND GREENBRIAR. SLOPES ARE NOT STEEP. FACTORS DETRACTING FROM THE QUALITY OF THE FOREST ARE 1) INVASIVE SPECIES UNDERSTORY, 2) THE SMALL WIDTH AND PHYSICAL ISOLATION OF THE FOREST, AND 3) LACK OF REPLACEMENT SEEDLINGS POSSIBLY DUE TO BROWSING. THE MOST COMMON UNDERSTORY SPECIES ARE MULTIFLORA ROSE AND GREENBRIAR INTERSPERSED MODERATELY THICK. THE STAND FLOOR IS DOMINATED WITH MULTIFLORA ROSE, VIRGINIA CREEPER, AND GREEN BRIER. THE AREA HAS BEEN LABELED PRIORITY AREA 2 (MODERATE) DUE TO THE BUFFER BETWEEN THE COMMERCIAL/INDUSTRIAL AND PARK LAND USE AND THE PRESENCE OF A SPECIMEN (33" DBH) RED MAPLE THOUGH ITS CONDITION IS AVERAGE/POOR.

[illegible] — THIS IS A LINEAR LOWLAND FOREST WITH A STAND BASAL AREA OF 100 SF/AC. IT IS COMPRISED PRIMARILY OF EARLY SERAL AND HYDRIC SPECIES. THE STAND IS BORDERED TO THE WEST BY MEADOW AND ON THE EASTERN SIDE INCLUDES A NON-TIDAL WETLAND. MANY TREES IN THE LARGE SIZE CLASS (GREATER THAN 18" DBH) ARE TULIP POPLARS AND RED MAPLES AND THEY DOMINATE THE CANOPY. THE GREATEST NUMBER OF INDIVIDUAL TREES ARE IN THE INTERMEDIATE (10-18" DBH) CLASS. SILVER MAPLE IS ALSO ABUNDANT ALONG THE BANKS OF THE PERENNIAL STREAM AND ALONG WHAT APPEARS TO HAVE BEEN A FENCE ROW LEADING NORTH FROM THE PERENNIAL STREAM. OTHER EARLY SERAL SPECIES PREVALENT ARE BLACK CHERRY AND BLACK LOCUST. RED MAPLE IS DOMINANT IN THE UNDERSTORY THOUGH BLACK GUM IS SPREAD THROUGHOUT. LARGER TREES (>18" DBH) ARE WELL REPRESENTED, INTERMEDIATE TREES (10"-18" DBH) ARE SOMEWHAT REPRESENTED AND SMALLER (<6") UNDERSTORY TREES ARE ABUNDANT. CANOPY COVERAGE IS 80% AND UNDERSTORY IS 20%. THE HERBACEOUS LAYER IS DOMINATED BY SKUNK CABBAGE, MULTIFLORA ROSE AND SOME SAPLINGS. HERBACEOUS GROUND COVER OCCUPIES 50% DOWNED WOODY DEBRIS IS 20% AND INVASIVES COVER 20%. THE AREA HAS BEEN LABELED PRIORITY AREA 1 (HIGH) FOR RETENTION DUE TO THE ADJACENT WETLAND AND LOCATION WITHIN THE STREAM BUFFERS. EFFORTS SHOULD BE MADE TO MINIMIZE THE AREA OF DISTURBANCE.

LEGEND

PROPERTY LINE
CANOPY EDGE
SOIL LIMITS
SOIL TYPE
—SB— STREAM BUFFER
TREE STAND ON SITE
FOREST STAND
FOREST STAND ON SITE
WETLAND
WETLAND EDGE
WETLAND BUFFER

15%-25% SLOPES
25% AND GREATER SLOPES
CENTER LINE OF STREAM
⊙ SIGNIFICANT OR SPECIMEN TREE
100' OFFSET FROM FOREST EDGE/ AREA OF DETAILED MAPPED

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

APPROVED

THIS PLAN IS FOR NATURAL RESOURCE INVENTORY/FOREST STAND DELINEATION PLAN PURPOSES ONLY

GRAPHIC SCALE

CERTIFICATION

I CERTIFY THAT THESE DOCUMENTS WERE PREPARED UNDER MY SUPERVISION AND THAT I AM A DULY LICENSED ARCHITECT UNDER THE LAWS OF THE STATE

07/19/2010

STEVEN D. [illegible]
LICENSE NUMBER

DESIGN | REVIEW AND APPROVAL | REVIEW AND APPROVAL

The Maryland-National Capital Park and Planning Commission

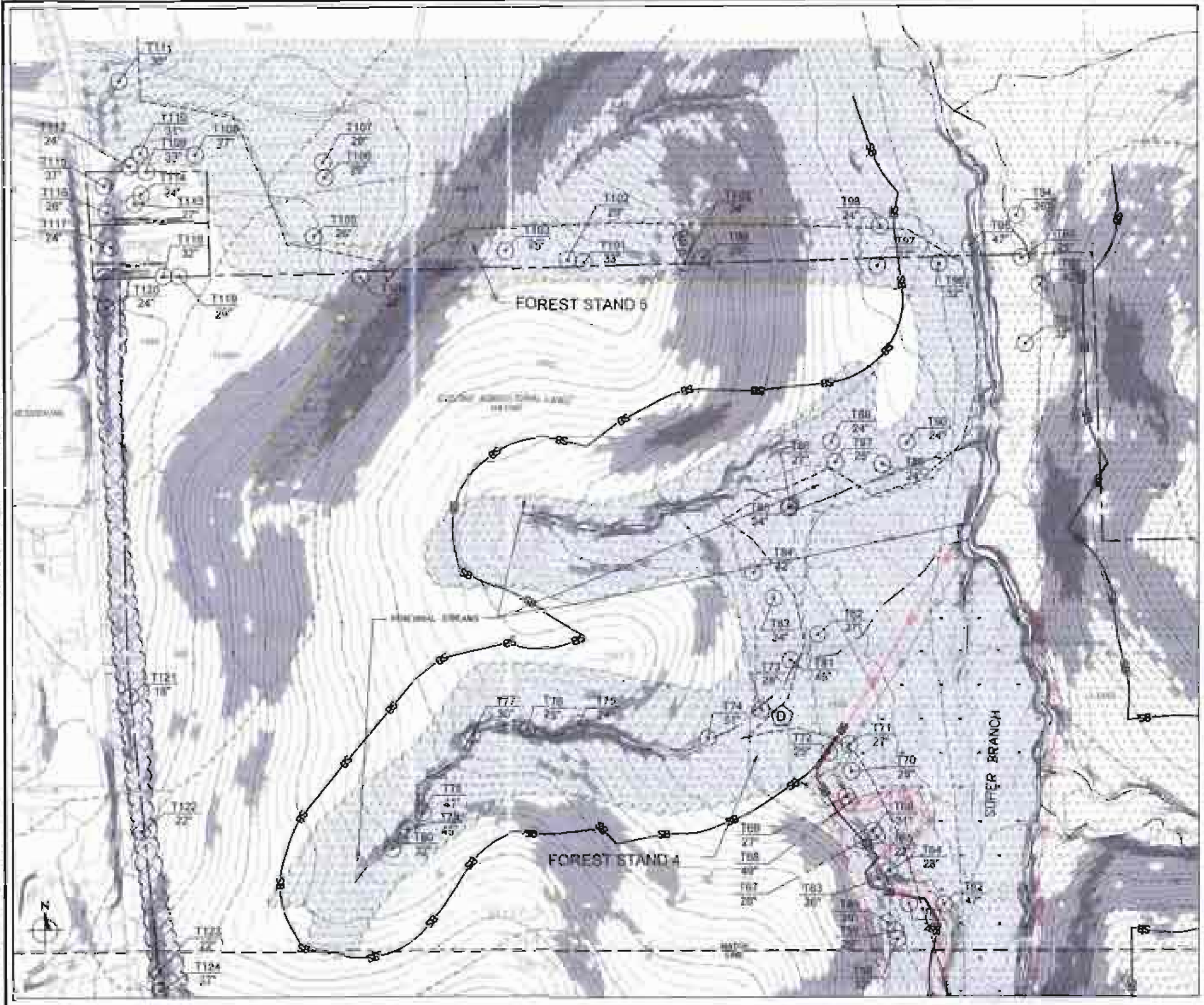
Montgomery County Department of Parks and Planning

PLANS ISSUED FOR

REVISIONS

LITTLE BENNETT REGIONAL PARK
DAY USE AREA

DETAILED NRI/FSD
L-102



[illegible] — THIS LOWLAND FOREST HAS A WELL STRATIFIED STRUCTURE WITH A STAND BASAL AREA OF 50 SF/AC. THE FOREST IS PRIMARILY SYCAMORE WITH DOMINANT TREES BETWEEN 24" AND 30" DBH. HOWEVER, LARGER TREES (>18" DBH) ARE NOT WELL REPRESENTED. INTERMEDIATE TREES (10"-18" DBH) ARE WELL REPRESENTED AND SMALLER (<10") UNDERSTORY TREES ARE WELL REPRESENTED. THIS FOREST HAS APPROXIMATELY 25 SIGNIFICANT OR SPECIMEN TREES OF OVERWHELMINGLY SYCAMORE. MIXED WITH THE SYCAMORES ARE TULIP POPLARS AND OAKS ON THE HIGHER AREAS AND SILVER MAPLES ALONG THE MEADOW EDGE AND PERENNIAL STREAM BANK. CANOPY COVERAGE IS 70%. THE UNDERSTORY IS DOMINATED BY TULIP POPLAR WITH SOME DOGWOOD AND RIVER BIRCH ALSO REPRESENTED. UNDERSTORY COVERAGE IS 30%. THE SHRUB LAYER IS DOMINATED BY SPICEBUSH WITH SOME MULTIFLORA ROSE, GREENBRIAR AND VIBURNUMS ALSO PRESENT. HERBACEOUS GROUND COVER IS DIVERSE, OF NOTE ARE PATCHES THICK WITH TRILLIUM AND SKUNK CABBAGE. HERBACEOUS COVERAGE IS 80%. THE AMOUNT OF DOWNED WOODY DEBRIS IS LOW AND INVASIVE PLANT COVER IS 25%. THE AREA HAS BEEN LABELED PRIORITY AREA 1 (HIGH) FOR RETENTION DUE TO THE PERENNIAL STREAMS AND WETLAND AND STREAM BUFFERS. EFFORTS SHOULD BE MADE TO MINIMIZE THE AREA OF DISTURBANCE.

[illegible] — THIS HILLSIDE/UPLAND FOREST HAS A WELL STRATIFIED STRUCTURE WITH A STAND BASAL AREA OF 90 SF/AC. THE FOREST IS PRIMARILY MIXED OAKS INCLUDING WHITE, RED AND CHESTNUT WITH DOMINANT TREES BETWEEN 24" AND 30" DBH. LARGER TREES (>18" DBH) ARE SOMEWHAT REPRESENTED. INTERMEDIATE TREES (10"-18" DBH) ARE FAIRLY WELL REPRESENTED AND SMALLER (<10") UNDERSTORY TREES ARE ABUNDANT. THE STAND IS LOCATED ON MODERATELY STEEP AND STEEP SLOPES. THE CANOPY AND SUBCANOPY LAYERS ALSO INCLUDE HICKORIES, A BLACK WALNUT GROVE, RED MAPLE, BLACK CHERRY, TULIP POPLAR AND, ALONG THE MEADOW EDGE, SILVER MAPLE. CANOPY COVERAGE IS 80%. THE UNDERSTORY CONSISTS OF BLACK CHERRY, RED MAPLE, HICKORIES AND OAKS. UNDERSTORY COVERAGE IS 5%. COMMON SHRUB SPECIES ARE THE VIBURNUM, SPICEBUSH, AND MULTIFLORA ROSE. INVASIVE COVER IS 20%. HERBACEOUS GROUND COVER IS 60% AND THE AMOUNT OF DOWNED WOODY DEBRIS (DWD) AND STANDING DEADWOOD IS AVERAGE. THIS FOREST HAS APPROXIMATELY 25 SIGNIFICANT OR SPECIMEN TREES ON SITE WHICH ARE PRIMARILY OAKS. THE AVERAGE SIZE IS BETWEEN 24" AND 30" DBH. THE AREA HAS BEEN LABELED PRIORITY AREA 1 (HIGH) DUE TO THE STEEP SLOPES, ERODIBLE SOILS AND THE PREVALENCE OF SPECIMEN TREES. EFFORTS SHOULD BE MADE TO MINIMIZE THE AREA OF DISTURBANCE.

LEGEND

- PROPERTY LINE
- CANOPY EDGE
- SOIL LIMITS
- SOIL TYPE
- STREAM BUFFER
- TREE STAND ON SITE
- FOREST STAND
- FOREST STAND ON SITE
- WETLAND
- WETLAND EDGE
- WETLAND BUFFER
- 15%-25% SLOPES
- 25% AND GREATER SLOPES
- CENTER LINE OF STREAM
- ⊙ SIGNIFICANT OR SPECIMEN TREE
- 100' OFFSET FROM FOREST EDGE AREA OF DETAILED [illegible]
- Ⓐ SAMPLE POINT

GRAPHIC SCALE

THIS PLAN IS FOR NATURAL RESOURCE INVENTORY/FOREST STAND DELINEATION PLAN PURPOSES ONLY

CERTIFICATION

I CERTIFY THAT THESE DOCUMENTS WERE [illegible] UNDER MY SUPERVISION AND THAT I AM A DULY LICENSED [illegible] ARCHITECT UNDER THE LAWS OF THE [illegible]

07/14/2010

STEVEN D. [illegible]
LICENSE NUMBER MD RLA #[illegible]

THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

APPROVED

Approval No. [illegible]
Date Approved 6/24/10
Expiration Date 6/24/12
6/24/10
Date

The Maryland-National Capital Park and Planning Commission

Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2595

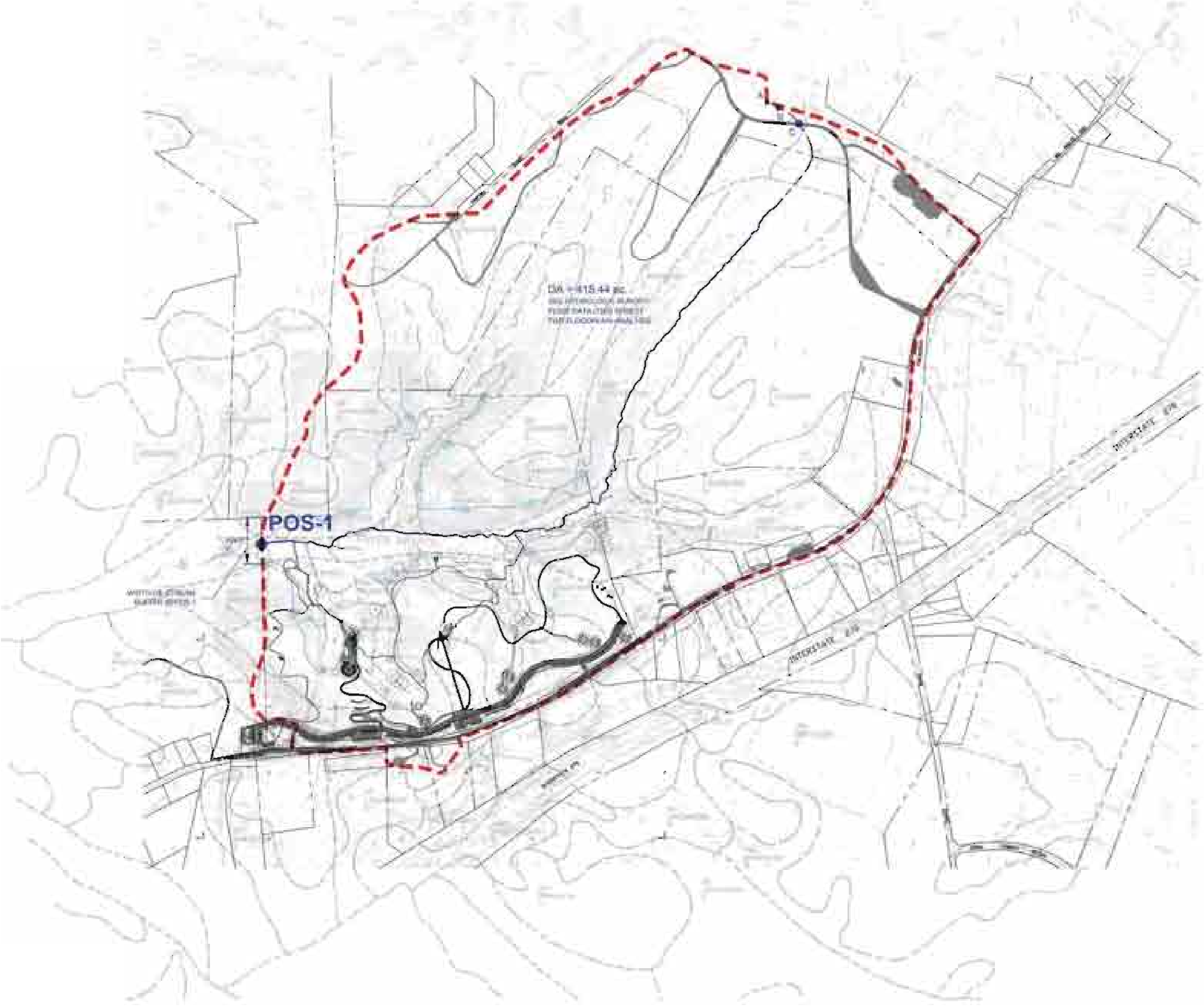
LITTLE BENNETT REGIONAL PARK
DAY USE AREA

SCALE: 1" = 100'

DETAILED NRI/FSD
L-103

APPENDIX E:

FLOODPLAIN STUDY



LEGEND

🟥 🟥 🟥	DRAINAGE DIVIDE
A ●——● B	TIME OF CONCENTRATION PATH
POS-1	POINT OF STUDY FOR SOPER BRANCH FLOODPLAIN ANALYSIS
- - - - - -	SOILS DIVIDE
▨	IMPERVIOUS SURFACE IN STUDY AREA

HYDROLOGIC RUNOFF FLOW DATA

	(TR-20)			(TR-20)			
				FLOW (Q) (CFS)			
POS	AREA (AC.)	RCN	Tc	1-YR	2-YR	10-YR	100-YR
POS-1	415.44	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

GRAPHIC SCALE

(IN FEET)

1 inch = 400 ft.

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. [illegible], Expiration Date: [illegible]

Description: [illegible] Date: [illegible]

DESIGN

M-NCPPC

Landscape Architect Date Checked By

Architect Date Checked By

Engineer Date Checked By

Drawn By Date Checked By

REVIEW AND APPROVAL

Park Development Date

Central Maintenance Date

Region Date

Natural Resources Date

REVIEW AND APPROVAL

Superintendent of Parks Date

Park Police Date

Date

Date

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2595

PLANS ISSUED FOR:

REVISIONS

Rev. No.	Date	Description

SEAL

Soper Branch Floodplain Drainage Area Map

Little Bennett Regional Park

Day Use Area

SCALE: 1"=400'

WSSC Grid Map
[illegible]

FPM-1

SHEET of 27

Worksheet for Soper Branch 100 Year

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01100	ft/ft
Discharge	760.05	ft³/s

Section Definitions

Station (ft)	Elevation (ft)
0+00	457.75
1+30	456.00
1+36	454.00
1+44	452.00
1+47	451.00
1+51	451.00
1+54	452.00
1+60	454.00
1+72	455.00
2+30	454.00
2+32	453.00
2+34	453.00
2+36	454.00
2+50	456.00
2+63	458.00
3+76	477.00

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 457.75)	(3+76, 477.00)	0.050

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method

Worksheet for Soper Branch 100 Year

Options

Closed Channel Weighting Method	Pavlovskii's Method	

Results

Normal Depth	4.60	ft
Elevation Range	451.00 to 477.00 ft	
Flow Area	182.24	ft²
Wetted Perimeter	117.74	ft
Hydraulic Radius	1.55	ft
Top Width	115.95	ft
Normal Depth	4.60	ft
Critical Depth	4.10	ft
Critical Slope	0.03564	ft/ft
Velocity	4.17	ft/s
Velocity Head	0.27	ft
Specific Energy	4.87	ft
Froude Number	0.59	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	4.60	ft
Critical Depth	4.10	ft
Channel Slope	0.01100	ft/ft
Critical Slope	0.03564	ft/ft

100-Year Cross Section for Soper Branch

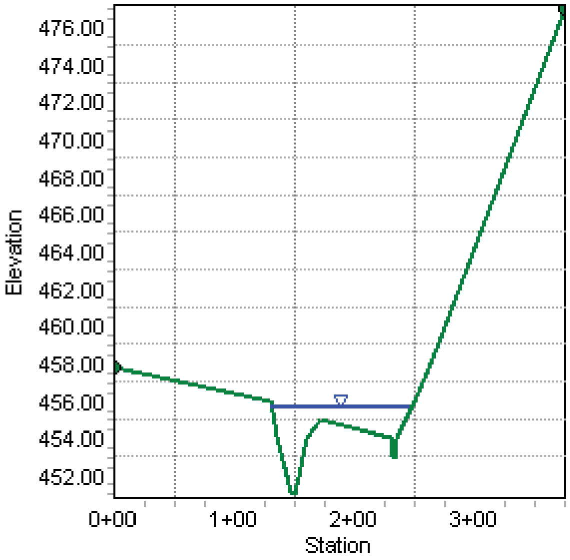
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.01100	ft/ft
Normal Depth	4.60	ft
Discharge	760.05	ft³/s

Cross Section Image



```
CAH                      Little Bennett Regional Park
                           POS-1 Floodplain Analysis
                         Montgomery County, Maryland

                    Sub-Area Time of Concentration Details


 Sub-Area      Flow            Mannings's    End     Wetted               Travel
Identifier/   Length    Slope      n        Area    Perimeter   Velocity   Time
               (ft)    (ft/ft)             (sq ft)    (ft)      (ft/sec)   (hr)
--------------------------------------------------------------------------------
POS-1
  SHEET          100   0.0300     0.400                                    0.304
  SHALLOW        200   0.0700     0.050                                    0.013
  CHANNEL       6731                                            4.000      0.467

                                                 Time of Concentration      .784
                                                                        ========
```

```
CAH                      Little Bennett Regional Park
                           POS-1 Floodplain Analysis
                         Montgomery County, Maryland

                  Sub-Area Land Use and Curve Number Details


 Sub-Area                                           Hydrologic   Sub-Area   Curve
Identifier           Land Use                          Soil        Area     Number
                                                      Group        (ac)
--------------------------------------------------------------------------------
POS-1     Open space; grass cover > 75%       (good)    B         83.92       61
          Open space; grass cover > 75%       (good)    D          4.38       80
          Paved parking lots, roofs, driveways          B         17.06       98
          Woods                               (good)    B        212.97       55
          Woods                               (good)    C          6.91       70
          Woods                               (good)    D          90.2       77

          Total Area / Weighted Curve Number                     415.44       63
                                                                 ======       ==
```

```
_

******************80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY******************

JOB TR-20           ECON                          SUMMARY   NOPLOTS
TITLE 001 LITTLE BENNETT REGIONAL PARK
TITLE     SOPER BRANCH FLOODPLAIN STUDY
 6 RUNOFF 1 001       1       0.6491          63       0.7841 1   1   1  SOPERDA
   ENDATA                                                               7
 7 INCREM 6             0.10
   ENDCMP 1
 7 COMPUT 7 001   001               2.1         1.0         2 2  01  01 1Year
   ENDCMP 1
 7 COMPUT 7 001   001               3.2         1.0         2 2  01  02 2Year
   ENDCMP 1
 7 COMPUT 7 001   001               5.2         1.0         2 2  01  10 10Year
   ENDCMP 1
 7 COMPUT 7 001   001               7.2         1.0         2 2  01  99 100Year
   ENDCMP 1
   ENDJOB 2

*******************************END OF 80-80 LIST********************************
```

```
SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/          DRAINAGE
STRUCTURE            AREA       STORM NUMBERS..........
  ID               (SQ MI)            1         2        10        99


 XSECTION    1          .65
___________________________
   ALTERNATE    1                  10.89     94.44    385.26    760.05


ECON2/URB1 "FLOW-FREQ" PEAKS FROM SUMMARY TABLE #3 REORDERED IN DECENDING ORDER
```

Acoustic Report

HUSH
ACOUSTICS LLC

9109 Coronado Terrace, Fairfax, VA 22031
T [703] 534.2790 F [703] 286.7955

May 17, 2011

Ms. Ching-Fang Chen
Park Development Division
The Maryland-National Capital Park and Planning Commission
9500 Brunett Avenue
Silver Spring, MD 20901

Re: Little Bennett Regional Park Day Use Area
Acoustical Analysis

Ms. Chen:

This report summarizes the highway noise analysis for the Little Bennett Regional Park Day Use Area project in Montgomery County, MD.

1. Executive summary

A site survey was performed and sound levels were measured in the locations shown in Figure 2 for seven days. Traffic volumes were counted briefly at the end of the survey. The Traffic Noise Model was used to model existing conditions. The output sound levels compared moderately well to the measured sound levels. A traffic forecast was developed based on data provided by the state highway administration. The Traffic Noise Model was used to predict future noise levels in outdoor use areas and at the façade of the one proposed building.

The design goals are to ensure that the Day-Night Average Sound Level (DNL) not exceed 55 dB in most outdoor use areas and 50 dB at the base/stage of the amphitheater, and that the hourly average sound level not exceed 35 dB in the visitor facility multipurpose room.

The year 2030 DNL will be as presented in section 5. The year 2030 DNL may slightly exceed the goal of 50 dB in parts of the base/stage of the amphitheater, may slightly exceed the goal of 55 dB at the picnic shelter, sycamore ring at the retaining wall, and in portions of the amphitheater (at the sloping trail), and will significantly exceed the goal of 55 dB at the park house picnic area. If it were desired to reduce noise levels it would be appropriate to reduce ground elevations in the affected locations, and construct an earthen berm between the park house picnic area and the road. Indoor noise levels will meet the goal in the visitor center multipurpose room.

2. Introduction

Hush Acoustics LLC was contracted by the Maryland-National Capital Park and Planning Commission to perform sound level measurements on the site, to model future noise levels, to design noise barriers, and to design modifications to the proposed building to limit indoor noise levels, as necessary. This analysis was based on the Overall Grading Plans (at various scales) prepared by A. Morton Thomas & Associates, Inc. These drawings show locations of proposed recreation areas, the proposed building, existing ground elevations, selected proposed spot elevations, pavement of Route 355, proposed lanes of

Route 355, and lanes of I-270. The site is located along the east side of Route 355 north of Comus Road and south of Old Hundred Road (Route 109). An aerial photo of the site is included as Figure 1.

Figure 1. Vicinity Map

It is not clear exactly what the goal should be for noise in a park. The Code of Maryland Environmental Noise Standards are a DNL of 55 dB for a residential zone and 64 dB for a commercial zone; there is no mention of parks. The Montgomery County Staff Guidelines for the Consideration of Transportation Noise Impacts in Land Use Planning and Development dated June 1983 provides outdoor DNL criteria as a function of both site location and community type. Per Table 2-1 of the guidelines, the DNL goal should be 55 dB in permanent rural areas, 60 dB where suburban densities predominate, and 65 dB in the urban ring and along major highway corridors. Again, there is no mention of public parks; the focus is residences. The Montgomery County Staff Guidelines also state that the interior noise guideline is a DNL of 45 dB. Most county and state environmental policies and regulations can historically be traced to the U.S. Environmental Protection Agency (EPA). The EPA guideline is a DNL of 55 dB for outdoor activity interference and annoyance for all "outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use." Given this information, we recommend a design goal of a DNL of 55 dB for most outdoor use areas. One exception is the base/stage of the amphitheater which might benefit from an even stricter goal, since people would need to hear voices and music at greater distances than in picnic areas. In that area a better goal might be a DNL of 50 dB.

3. Site survey

The purposes of the site survey are as follows:

1. to measure noise levels on the site. Noise level data are useful for the following reasons:
    a. to determine how the hourly average sound levels compare to the Day-Night Average Sound Levels (DNL). The DNL is the noise metric used by many organizations. However, the Traffic Noise Model (TNM) used the hourly average sound level. For locations mostly impacted by traffic noise, the relationship between the DNL and loudest hour average sound level is relatively constant. The measured sound levels are useful for determining this relationship.
    b. to identify any significant non-traffic noise sources.
2. to observe traffic conditions such as prevailing speeds, classifications (i.e., percentages of automobiles, trucks, buses, and motorcycles), and directional distributions. Many of these parameters are not well documented in traffic studies. The prevailing speed often differs from the posted speed limit.
3. to observe road conditions such as locations and timing of traffic flow control devices (e.g., traffic signals, stop signs, and toll booths), and the pavement type.
4. to observe site conditions not represented on the site plan such as the presence and height of existing noise barriers along the road right-of-way.

3.1 Sound level measurement procedure

Three Larson Davis model 831 and LxT sound level meters were installed in the locations indicated in Figure 2 from 12 p.m. on Thursday February 3, 2011, through 10 a.m. on Friday February 10, 2011. The sound level meters were programmed to report average, maximum, and minimum A-weighted sound levels during each one-minute interval. For an explanation of A-weighted sound levels see the appendix. The meters were chained to trees and the microphones were attached to branches 6 to 7 feet above the ground.

3.2 Site observations

The site currently has open fields with small forested areas. The main noise source on the site is traffic on Route 355 and I-270. There is also some aircraft noise and activity on industrial/commercial parcels between Route 355 and I-270.

There are no stop signs or traffic signals on Route 355 or I-270 near the site. The pavement of both roads is asphaltic concrete. There are no median barriers or noise barriers along either road. Route 355 has one lane each direction with partial (roughly 1- to 3-foot wide) paved shoulders. I-270 has two lanes each direction with full shoulders.

The posted speed limit is 50 mph on Route 355 at the site although it drops to 30 mph at Route 121 to the south of the site and at Route 109 to the north of the site. The posted speed limit is 65 mph on I-270 at the site although it drops to 55 mph approximately 1/2 mile south of the site.

3.3 Measured sound levels

Average sound levels during five-minute intervals were calculated based on the measured one-minute average sound levels. Figure 3 presents the resulting five-minute average sound levels. Hourly average sound levels were calculated based on the five-minute average sound levels. Figure 4 presents the hourly average sound levels. The Day-Night Average Sound Levels (DNL) were calculated for each full calendar day. For an explanation of DNL see the appendix. Table 1 presents the DNL and loudest-hour average sound level, and the difference between the two, for each calendar day.

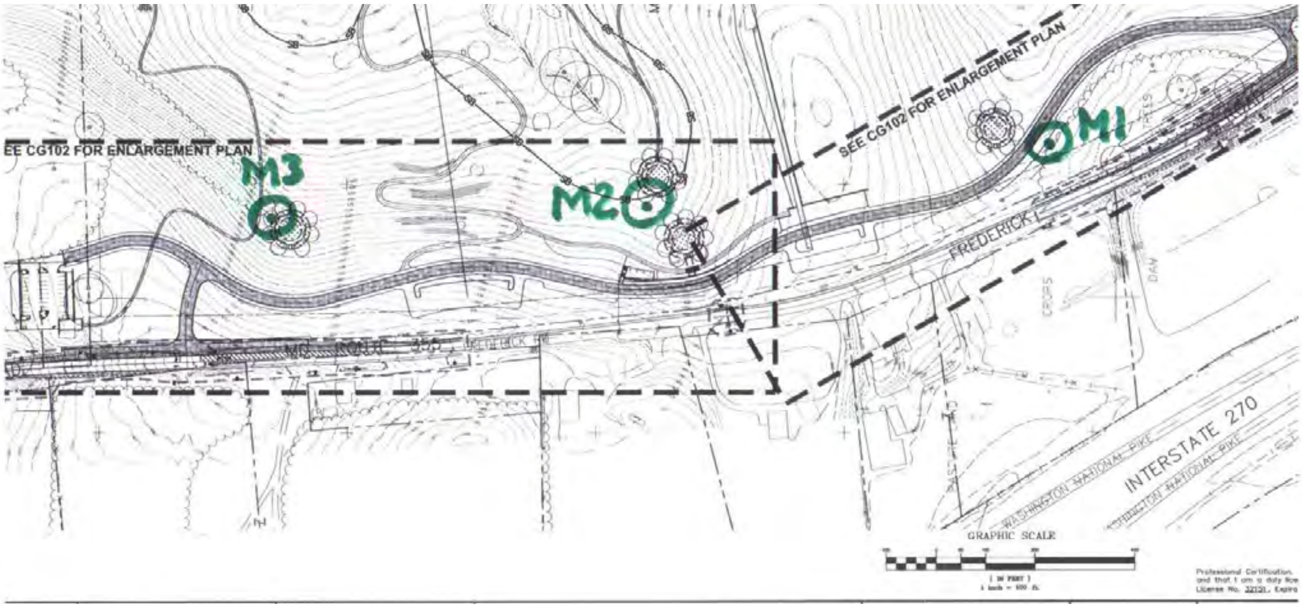


Figure 2. Sound Level Meter Locations

Table 1. Measured DNL and Loudest-Hour Average Sound Levels, dB

Day, Date	DNL			Loudest-Hour Average Sound Level			DNL Minus Loudest-Hour Average		
Thu., Feb. 03, 2011	-	-	-	59.4	54.7	50.7	-	-	-
Fri., Feb. 04, 2011	60.8	58.2	55.9	60.8	58.8	55.4	-0.1	-0.6	0.5
Sat., Feb. 05, 2011	57.5	55.5	54.5	56	55.8	54.6	1.5	-0.3	-0.1
Sun., Feb. 06, 2011	57.6	55.7	53.9	56.1	53.6	52.4	1.4	2.1	1.5
Mon., Feb. 07, 2011	60.9	60.1	58.8	60.2	58.7	57.1	0.7	1.4	1.7
Tue., Feb. 08, 2011	62.6	59.2	55.5	61.9	59.0	55.8	0.7	0.1	-0.3
Wed., Feb. 09, 2011	60.0	55.7	51.8	58.7	56.4	53.6	1.3	-0.7	-1.8
Thu., Feb. 10, 2011				60.1	55.5	50.2	-	-	-

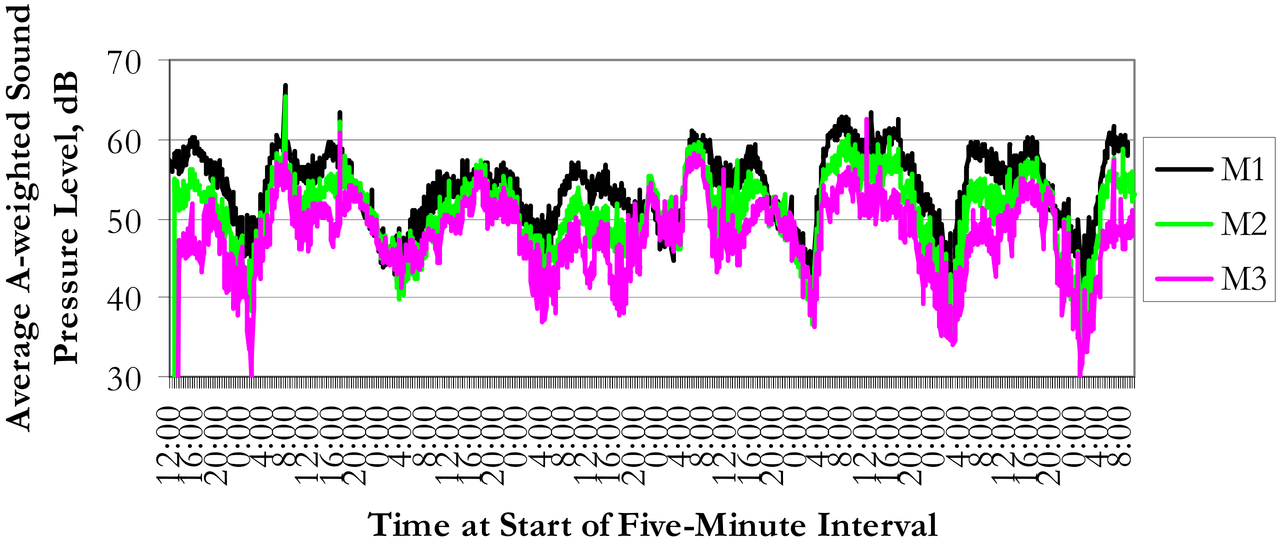


Figure 3. Five-Minute Average Sound Levels

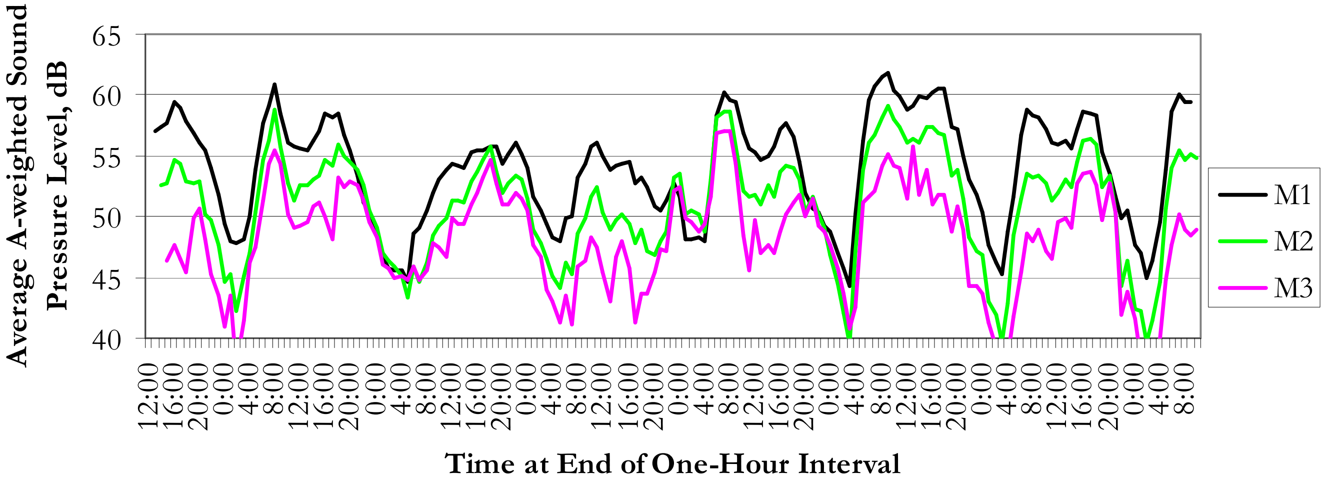


Figure 4. Hourly Average Sound Levels

3.4 Traffic counts

Traffic volumes were counted during one 15-minute interval for each direction of traffic on Route 355 and on one 5-minute interval for each direction of traffic on I-270 at the end of the survey. From these volumes the hourly average traffic volumes were extrapolated. Table 2 presents the extrapolated hourly traffic volumes. Automobiles include pickup trucks, passenger cars hauling trailers, and vans. Medium trucks are six-wheeled cargo vehicles with two axles. Heavy trucks are cargo vehicles with three or more axles. Speeds were determined using a hand-held radar gun. The median speeds for dozens of vehicles are listed in Table 2.

Table 2. Extrapolated Hourly Traffic Volumes and Prevailing Speeds, Thursday Feb. 10, 2011

Time	Lanes	Speed	Autos	Medium Trucks	Heavy Trucks	Buses	Motor-cycles
841-856 am	Rt. 355 NB	47.5	52	4	4	0	0
	Rt. 355 SB	49.0	420	16	4	4	0
859-904 am	I-270 SB	-	3,996	0	60	24	0
905-910 am	I-270 NB	-	1,464	12	48	0	0

4. Outdoor noise modeling

4.1 TNM overview

In the United States, highway noise levels are typically analyzed using the Federal Highway Administration's (FHWA) Traffic Noise Model (TNM). The current version is 2.5. The output from TNM is the hourly average sound level at the receivers. The program allows input of the following information:

- Coordinates of selected points along the road centerlines
- Pavement width and type
- Road locations which are elevated (structure roadways)
- Hourly volumes and speeds of autos, medium trucks, heavy trucks, buses, and motorcycles for each road segment
- Locations of traffic flow control devices such as stop signs, traffic signals, and toll booths at the start of roads
- Coordinates and heights of evaluation points (receivers)
- Coordinates of ground elevations in selected locations (terrain lines)
- The default ground type, and coordinates and ground material in selected locations (ground zones)
- Coordinates and height of areas covered with thick evergreen forest (tree zones)
- Coordinates of existing and proposed objects that shield the site such as noise walls and buildings (barriers)
- Coordinates, height and spacing between buildings of rows of buildings which partially shield the site (building rows)

4.2 TNM validation

The traffic volumes and speeds presented in Table 2 were input into TNM. This TNM run is called the validation run. Each direction of travel of each road was modeled as an individual road in TNM. The locations and elevations of selected points along Route 355 and I-270, and the widths of each road, were taken from the site plan. Since the observed existing pavement is asphaltic concrete, the pavement was modeled as Dense-Graded Asphaltic Concrete (DGAC). This is the louder, and more common, of the two types of asphaltic concrete available in TNM. Two terrain lines were added on the site east of

Route 355, and two terrain lines were added between Route 355 and I-270 to model the changes in elevation. The default ground type was lawn.

The output sound levels were then compared to the sound levels measured during the traffic counts. Table 3 presents this comparison.

It can be seen from Table 3 that TNM produced sound levels between 2.8 dB lower and 1.7 dB greater than were measured. This level of agreement between the modeled and measured sound levels is reasonable.

Table 3. Comparison of TNM Validation Run Output and Measured Sound Levels, dB

	M1	M2	M3
Measured 8:41-8:56 am	59.4	54.8	48.0
TNM output	58.7	52.0	49.7
TNM Minus Measured	-0.7	-2.8	1.7

4.3 Future traffic conditions

The Maryland State Highway Administration (MDSHA) provided Average Daily Traffic (ADT) volumes for 2030 of 115,750 for I-270 and 11,200 for Route 355. They also provided peak-hour volumes of 6% for I-270 (morning and afternoon), and 11% morning and 14% afternoon for Route 355. They had no class counts for Route 355, but they were able to provide class counts for one full day on I-270; from those counts we calculated an average of 4.1% medium trucks, 5.0% heavy trucks, 0.7% buses, and 0.4% motorcycles. Based on our brief traffic counts for Route 355, it was assumed that traffic would include 4.0% medium trucks, 1.6% heavy trucks, 0.8% buses, and 0.0% motorcycles.

For 3 of the 4 full weekdays of sound level data presented above, the loudest hour occurred during the morning rush-hour period. This is surprising since (1) there is clearly more traffic southbound in the morning and the southbound lanes are all farther from the site, and (2) based on the MDSHA data there should be more traffic on Route 355 in the afternoon than in the morning. In modeling noise levels, the sound levels output from the model would be higher with more traffic heading northbound than southbound, since the northbound lanes are closer to the site and the edge of the road partially shields southbound traffic. For our analysis of future noise levels we evaluated the afternoon rush-hour period. Based on an extrapolation from our traffic counts it was assumed that the future directional factor in the afternoon will be 88% northbound on Route 355 and 73% northbound on I-270. For simplicity it was assumed that the peak traffic hour will generate the highest noise levels (i.e., the loudest-hour).

The resulting forecast traffic volumes are presented in Table 4. It can be seen from Tables 2 and 4 that the forecast total traffic volumes are much higher than those observed during the site visit on Route 355 and somewhat higher on I-270. To be conservative the speed was assumed to be 50 mph on Route 355 which is a bit greater than the speeds we noted while on site, but is equal to the posted speed limit. For I-270 the speed was assumed to be equal to the posted speed limit of 65 mph.

Table 4. Year 2030 Loudest-Hour Traffic Volumes

Lanes	Autos	Medium Trucks	Heavy Trucks	Buses	Motor-cycles	Prevailing Speed (mph)
Rt. 355 NB	1,292	55	22	11	0	50
Rt. 355 SB	176	8	3	2	0	50
I-270 SB	1,684	78	93	13	7	65
I-270 NB	4,554	210	253	35	18	65

4.4 Future highway noise modeling

TNM was run using the traffic volumes and speeds presented in Table 4. Unless noted in this paragraph all modeling parameters were the same as for the validation run. The site plan shows widening Route 355 at the two entrances to the park. These road changes were incorporated into the analysis. The proposed interior road was included in the analysis solely as an indication of ground elevation, as well as to account for sound reflections off the pavement. Receivers were located in selected outdoor activity areas, at the proposed building, as well as in various other locations on the site. Locations and ground elevations of receivers were taken from the site plan. The receiver heights were 5 feet above the ground elevations in all cases other than 7 feet above the ground elevation at the building.

4.5 Future outdoor highway noise levels

It can be seen from Table 2 that the DNL was between 1.8 dB less than and 1.7 dB greater than the loudest-hour average sound level. The future loudest-hour average sound levels were output from TNM. To be conservative, and to account for the inaccuracy of the model discussed in section 4.2, it was assumed that in the year 2030 the DNL would be approximately 2 dB greater than the loudest-hour average sound level. The resulting year 2030 DNL are presented in Figure 5.

5. Outdoor highway noise mitigation

There are ten areas of interest shown on the latest site plan. The year 2030 DNL can be summarized as follows (referencing the key numbers 1-10 on the site plan):

Areas where we are proposing a goal of a DNL of 55 dB:

1.	64-71 dB	Park house (building to be demolished) and picnic area
2.	<45 dB	Bottom of sledding hill
3.	51-57 dB	Amphitheater (trail traverses across slope with places for people to sit – no bldg)
4.	48-49 dB	Playscape
5.	56 dB	Picnic shelter (shielded by retaining wall)
6.	56 dB	Sycamore ring at the retaining wall
8.	55 dB	Visitor facility roof (on top of building)
10.	<45 dB	Outdoor classroom (overlook deck)

Areas where we are proposing a goal of a DNL of 50 dB:

9.	50-52 dB	Base/stage of the amphitheater

Figure 5. Year 2030 DNL Contours

Other areas:

7.	64-65 dB	Entry terrace

Note that this analysis is very sensitive to the assumed future ground elevations. Lower elevations will produce lower sound levels.

At the base/stage of the amphitheater the predicted DNL may slightly exceed (i.e., by 1-2 dB) the goal of 50 dB in some areas. The DNL in this location could be reduced simply by reducing the elevation of the amphitheater to benefit from natural shielding of the surrounding terrain, or by moving it slightly farther to the east to accomplish the same lower elevation.

The DNL will meet the goal of 55 dB at the bottom of the sledding hill, the playscape, the visitor facility roof (on top of the building), and the outdoor classroom (overlook deck). The DNL may slightly exceed (i.e., by 1 to 2 dB) the goal of 55 dB at the picnic shelter, sycamore ring at the retaining wall, and in portions of the amphitheater (at the sloping trail).

The DNL will significantly exceed the goal of 55 dB at the park house and picnic area. Reducing sound levels in this area would require constructing a noise barrier such as a noise wall or earthen berm. The goal is extremely hard to meet here due to the proximity to the road. It would take a 25-foot tall barrier to approach the goal. With a 20-foot tall barrier the DNL would be approximately 56-57 dB. With a 15-foot tall barrier the DNL would be approximately 57-58 dB. With a 10-foot tall barrier the DNL would be approximately 58-60 dB.

6. Indoor highway noise levels

The visitor facility will have several spaces including a multipurpose room. A reasonable goal for a multipurpose room which is sometimes used as a classroom is an hourly average sound level no higher than 35 dB. This is the criterion used by American National Standard ANSI S12.60 for classrooms. We predict an outdoor hourly average sound level of 53 dB at the roof of the building, 49 dB at the side facades, and approximately 40-45 dB within the open corridor of the building. These sound levels correspond to DNL of approximately 55 dB on the roof, 51 dB at the side facades, and 42-47 dB in the open corridor.

Since the side facades are the weakest link acoustically, this means that the building envelope must reduce traffic noise levels by 14 dB (i.e., 49-35=14 dB). This reduction is called the NLR.

We performed calculations for the proposed multipurpose room. With standard windows and doors and a non-carpeted floor the predicted NLR is approximately 20 dB. This easily meets the goal of 14 dB. Therefore, no upgrades are required beyond standard construction to reduce traffic noise indoors.

The following appendices provide additional information about acoustical terminology and criteria, and the precision of this analysis.

If you have any questions, please contact me at 703/534-2790 or via e-mail at Gary@HushAcoustics.com.

Sincerely,

Gary Ehrlich

Gary Ehrlich, P.E.
Principal

Appendix A – Noise Metrics

There are many different ways to express sound levels, but all ways must have some means of incorporating the three most important aspects of the sound: loudness (level), pitch (frequency), and duration (time pattern). The chosen way to express the sound level is known as the noise metric.

Level. The sound level is almost always expressed in decibels, abbreviated dB. The decibel is a unitless quantity; it is technically based a ratio between the sound pressure and a standard reference pressure. Sound level meters can show the sound level varying with a moving needle or changing electronic display. How quickly this display changes, and therefore how quickly the meter responds to changes in sound level, is called the time weighting network or simply the meter "response." The four most commonly used responses are peak, impulsive, fast, and slow; peak response is the fastest response while slow is the slowest. The peak response is only normally used to evaluate the potential for hearing damage and damage to structures, and is never used to express the annoyance of noise. The impulsive response is only typically used to evaluate loud periodic noises such as pile driving and gun fire. The fast and slow responses are the most commonly used. Fast response is used when the sound level changes relatively rapidly over time as would be the case at a night club or a construction site. Slow response is used when the sound level is relatively steady as would be the case for environmental noise such as near highways, railroads, and airports.

Following are how high A-weighted sound levels are for some familiar sounds (taken from U.S. Environmental Protection Agency documents):

Noises:

Chain saw operator	103-115 dBA
Heavy truck at 50 feet	85-95 dBA
Motorcycle driver	80-115 dBA
Power lawn mower operator	80-95 dBA
Subway rider	80-90 dBA
Train passenger	72-90 dBA
City bus at 50 feet	70-85 dBA
Waste food disposer	67-93 dBA
Automobile at 50 feet	64-88 dBA
Vacuum cleaner	60-85 dBA
Washing machine	47-73 dBA
Refrigerator	45-68 dBA

Average conversational speech at 1 meter:

Inside suburban house	55 dBA
Outdoors in suburban area	55 dBA
Inside urban house	57 dBA
Outdoors in urban area	65 dBA
On a train	66 dBA
On an aircraft	68 dBA

Frequency. The frequency of sound is always expressed in Hertz, abbreviated Hz. The audible frequency range (20 Hz to approximately 15,000 or 20,000 Hz) is typically divided into bands covering one octave, or one-third of an octave. Each doubling of frequency is defined as one octave. A sound level can then be stated either as a single-value covering the entire audible frequency range, or for a given octave or one-third octave band. When sound levels are stated for the entire audible frequency range, the sound could be filtered to roughly simulate the hearing sensitivity of the average person. There are two commonly-used filter types: A- and C-weighting. An A-weighted sound level is by far the most-commonly used, and was designed to approximately represent the hearing sensitivity of a person exposed to sounds of moderate loudness. A C-weighted sound level is occasionally used to assess noise from blasting and other loud short-duration sounds and was developed to approximately represent the hearing sensitivity of a person exposed to loud sounds. For environmental noise studies, or for most other purposes as well, it is assumed that the sound level is A-weighted if there is no specific designation otherwise.

Time Pattern. The variation of a sound level over time is perhaps the most complex of the three parameters, and there are a myriad of ways to express this variation. The various ways can be divided into single-event sound levels and long-term sound levels. Examples of "single events" are a train passby, an aircraft overflight, or a gun firing. Single-event sound levels can be based on the maximum sound level reached during the event (abbreviated L_{max}), the total sound energy produced during the event (known as the sound exposure level, or SEL), or the number of times the sound level exceeds a threshold value (known as the number of events above, or NA). Long-term sound levels must be based on sound levels over a given time interval. Common time intervals are one hour and 24 hours. During this time interval the stated quantity could be the average sound level (known as the equivalent-continuous sound level, or L_{eq}), the amount of time the sound level exceeds a threshold value (known as time above, or TA), or the sound level exceeded any set percentage of the time (known as the statistical sound level; e.g., the sound level exceeded ten percent of the time is written L_{10}, while the sound level exceeded 90 percent of the time is written the L_{90}). One-hour average sound levels, or occasionally one-hour statistical sound levels, are used by the Federal Highway Administration and state departments of transportation to express highway noise levels. The sound level exceeded 90 percent of the time, L_{90}, is often considered the background sound level, since it is not significantly affected by loud periodic noise events. 24-hour average sound levels, and occasionally 24-hour statistical sound levels, are typically used to express all forms of transportation noise including highway, aircraft, and railroad noise. The 24-hour average noise level can include some adjustments to account for peoples' increased sensitivity to noise in the evening and at night. The two most common ways to account for this sensitivity is with the Day-Night Average Sound Level (DNL) and the Community Noise Equivalent Level (CNEL). The DNL is just a 24-hour average sound level for a calendar day with 10 dB added to all noise which occurs between 12 a.m. and 7 a.m. and between 10 p.m. and midnight. The CNEL is the same as DNL but with 5 dB added to all noise which occurs between 7 p.m. and 10 p.m.

Appendix B – Noise Criteria

Noise is unwanted since it causes: (1) hearing damage, (2) annoyance, (3) speech interference, and (4) sleep disturbance. There are various types of noise criteria that revolve around different unwanted causes. The Occupational Safety and Health Act (OSHA) established maximum allowable sound levels in the workplace in an effort to prevent hearing damage. The OSHA limits often become significant in industrial and military settings, as well as for construction workers. In most work and home environments the sound levels are well below the OSHA limits. Most noise criteria relate to the other three unwanted effects of noise. There are noise criteria at the federal, state, and local levels, and there are also non-regulatory criteria developed by many private and governmental organizations.

Federal Noise Criteria. There are many government agencies that have established noise criteria. The U.S. Environmental Protection Agency (EPA) developed many of the criteria used by other federal agencies. The U.S. Department of Housing and Urban Development (HUD) established an outdoor noise standard that residential use assisted or supported by HUD is "acceptable" where the DNL does not exceed 65 dB, "normally unacceptable" where the DNL is over 65 dB but does not exceed 75 dB, and "unacceptable" where the DNL exceeds 75 dB. The HUD indoor noise goal is that the DNL not exceed 45 dB inside proposed residences. These limits are typically only evaluated by HUD when the project receives funding from the Federal Housing Administration (FHA). The Federal Aviation Administration (FAA) has established a threshold of a DNL of 65 dB, above which residential development is not compatible; the FAA indoor threshold is a DNL of 45 dB. These limits are typically only evaluated when environmental noise studies (such as environmental assessments or environmental impact statements) are performed in support of a major project, or when existing residences, schools, or churches are sound insulated in FAA-sponsored programs. The Department of the Navy uses similar criteria which are typically only evaluated when environmental noise studies (such as Air Installation Compatible Use Zone, or AICUZ, studies) are completed in support of a major realignment of assets. The Federal Highway Administration (FHWA) established noise abatement criteria (NAC) for various land uses; the NAC for residential use is an hourly average sound level of 67 dB outdoors and 52 dB indoors. When the sound level approaches or exceeds the NAC a noise impact occurs; the state departments of transportation may define the word "approach" although it is typically considered to be when the sound level reaches within one dB of the NAC.

State Noise Criteria. Many states have established different noise criteria for four purposes: (1) to control noise produced by citizens, (2) to evaluate the compatibility of a proposed land use with respect to environmental noise, (3) to determine if construction of a state-funded noise barrier is warranted along a highway, and (4) to verify that new construction provides adequate acoustical separation between dwelling units of multi-family housing. The first purpose is incorporated into a noise ordinance and is enforceable against the person generating the noise. The Code of Maryland includes such as noise ordinance, while in the state of Virginia the noise ordinances are developed at the local level. Noise ordinances typically limit the maximum A-weighted noise level, and many also limit the maximum noise level in each octave band. The second purpose is incorporated into the environmental noise policy and is enforceable by the state and local (if adopted at the local level) planning and zoning departments. The Code of Maryland also includes such an environmental noise policy, while in most other states such as Virginia it is solely up to the municipalities to develop such a policy. The state of California has a building code requirement that where the outdoor DNL or CNEL exceeds 60 dB, an acoustical analysis shall be performed demonstrating that the indoor DNL or CNEL not exceed 45 dB. Environmental noise policies are almost always expressed in terms of the DNL, with the exception of the state of California which also uses CNEL. The third purpose is incorporated in the noise barrier policy and is used by the state department of transportation. Maryland and Virginia, as well as other states, have such a noise barrier policy. The noise barrier policies are almost always expressed in terms of the hourly average sound level referencing the noise abatement criteria used by the FHWA, although some are expressed in terms of the sound level exceeded during 10 percent of the hour (the L_{10}). The fourth purpose is incorporated into the state and local building code in the form of a minimum acceptable Sound Transmission Class (STC) or Impact Insulation Class (IIC) rating.

Local Noise Criteria. Many municipalities have established both a noise ordinance and an environmental noise policy. The environmental noise policy is sometimes summarized in a policy plan, comprehensive plan, or similar document, while in other jurisdictions it is not documented at all, outside of in-house planning department memos. The environmental noise policy is sometimes enforceable by ordinance in the case of an overlay zone. Overlay zones are often adopted around airports or military air bases, as is the case for High Point, North Carolina. In some municipalities the state department of transportation noise barrier policy is used to assist determining if a developer applying for a re-zoning must build a highway noise barrier.

Private Noise Criteria. In many cases, there are no applicable regulatory criteria. For example, there rarely is any regulatory limit on noise levels due to plumbing systems, noise levels in classrooms, or noise levels transmitted from one office to another. In these cases it is useful to consider non-binding criteria developed by private and governmental organizations. The American Society of Heating Refrigerating and Air-conditioning Engineers (ASHRAE) provides recommendations regarding noise from mechanical systems. The ASHRAE recommendations are typically expressed in terms of the Room Criterion (RC) rating, and used to be expressed in terms of the Noise Criterion (NC) rating. The American National Standards Institute (ANSI) developed a standard regarding noise levels in schools, and this standard has been adopted into law in some jurisdictions. The World Health Organization (WHO) has developed many noise standards for various purposes. In some cases it is useful to assess what percentage of syllables, words, or sentences would be intelligible in a given noise environment; two noise metrics used for this purpose are called speech transmission index (STI) and articulation index (AI). Various textbooks provide guidance on appropriate STI and AI values. There has also been some research into the percentage of people that would be "highly annoyed" or awakened by given noise levels. This research could be cited in the development on a noise criterion.

Appendix C – Precision of Predictions

It is not generally feasible to calculate the precision of a noise level or noise level reduction predictions. Unlike fields such as structural engineering, it is not typical practice to incorporate a specific margin of error in acoustical studies. Where possible, somewhat conservative assumptions were used in the outdoor noise level analysis. However, STC ratings quoted by manufacturers of products such as windows and doors are inherently anti-conservative, since the manufacturer has the option to test products many times and only publish the best rating the product ever achieved. Also, there are a variety of field installation issues which could make the STC ratings of walls be lower than anticipated. These two factors (slightly conservative assumptions used to predict outdoor noise levels, and possibly anti-conservative data used to predict indoor noise levels) may roughly balance each other out. The end result is that our predictions should roughly match future measured sound levels on average, with a statistical variation above and below.

If a general margin of error were desired, it would be advisable to exceed the recommended acoustical performance (often expressed by the STC rating) of walls, windows, and doors by a couple of points. For highway noise analyses, a margin of error could be also incorporated by extending any recommended highway noise barriers farther (i.e., shielding a greater angle of view) and a couple of feet higher. If you would like to incorporate a specific margin of error, please let us know and we could revise our analysis.

Hush Acoustics LLC does not provide any warranty or guarantee as to the precision of the noise level or noise level reduction predictions or measurements.

Detailed Cost Estimate

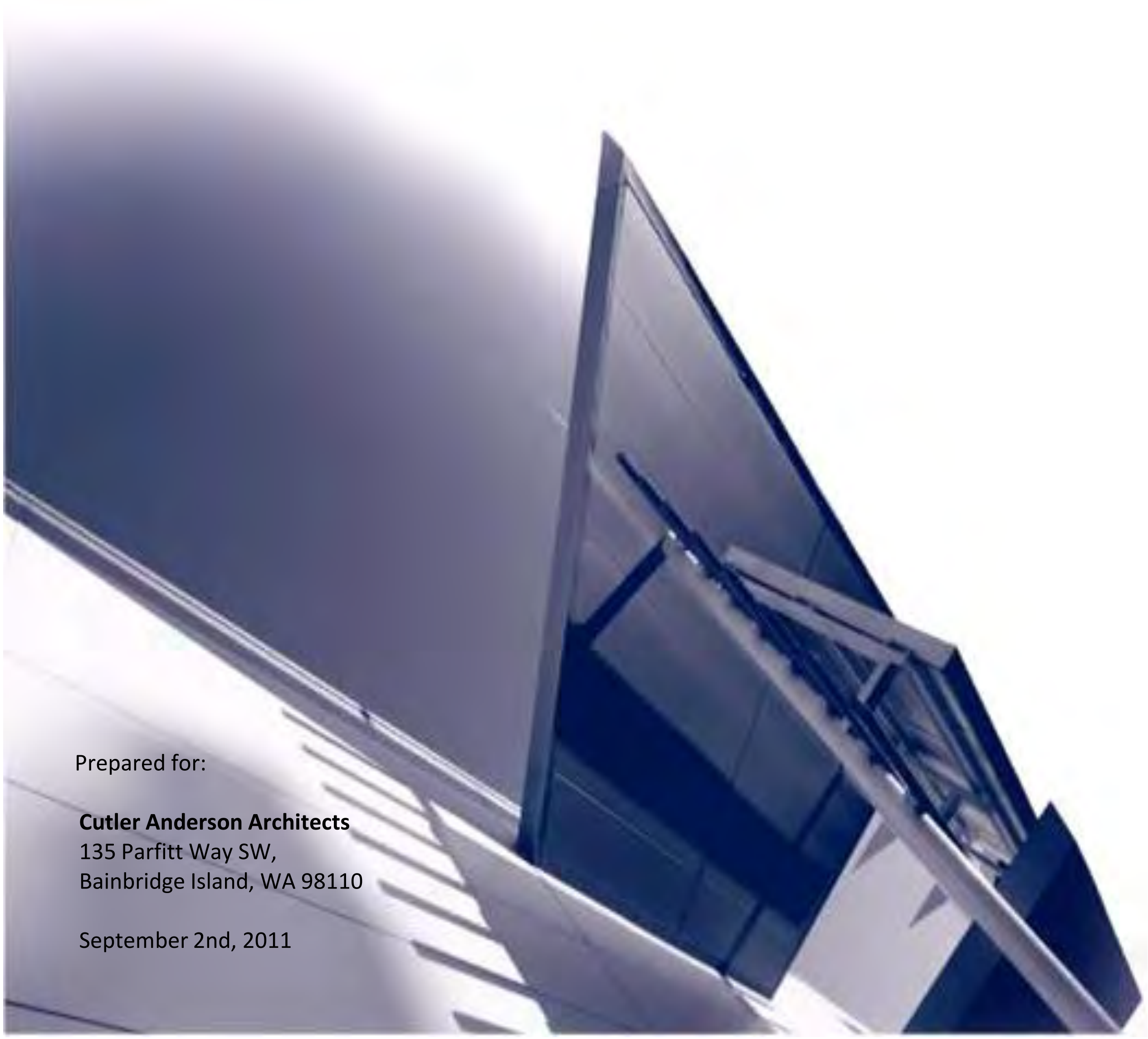
RLB | Rider Levett Bucknall

REPORT

30% Construction Documents Cost Estimate

Little Bennett Regional Park - Day Use Area
The Underlook and Amphitheater
Clarksburg, MD

RLB | Rider Levett Bucknall



Prepared for:

Cutler Anderson Architects
135 Parfitt Way SW,
Bainbridge Island, WA 98110

September 2nd, 2011

Little Bennett Regional Park - 30% Construction Documents Estimate

Project Summary

BASIS OF ESTIMATE

This estimate has been prepared at the request of Cutler Anderson Architects and is to provide a 30% Construction Documents Cost Estimate for the proposed Construction of a Day Use Area at the Little Bennett Regional Park, located at Frederick Road, Clarksburg, MD.

The estimate is based upon measured quantities and built-up rates prepared from the Design Development Drawings and Outline Specifications, dated July 6th 2011.

Where information was insufficient, assumptions and allowances were made, based wherever possible on discussions with the architect and engineers.

Pricing is based on September 2011 costs. An allowance of 7.5% for Design/Estimating Contingency has been included. No escalation has been included in this estimate.

It is assumed that the project will be competitively bid and that the contractor will be required to pay prevailing wage rates.

ITEMS SPECIFICALLY EXCLUDED

- Excavation in rock and/or contaminated fill
- Hazardous materials abatement
- Work outside building footprint unless noted otherwise
- Site pathways, and emergency/maintenance access roads
- Parking lots and picnic areas
- Landscaping unless noted otherwise
- Site utilities up to within 5'0" from building footprint
- Furniture, Fittings and Equipment (FF&E)
- Raised access flooring
- Murals and works of art
- Mockups
- Staging / Phasing costs
- Construction Management Fees
- Owner's Contingency
- Land and legal costs
- Architectural, Engineering and other professional fees
- Items marked as "Excl." in the estimate

QUALIFICATIONS AND ASSUMPTIONS

Site Construction

- Due to the lack of geotechnical information, we have assumed that the max depth cut of 6'-0" will be suitable to be over excavated and battered, in lieu of a shoring/earth retention system.
- Site aerial photographs indicate that it is a "greenfield" site and that no major site clearing wil be required. We have not allowed for site clearing beyond topsoil strip, and associated earthworks.
- Site filling and grading has been allowed for. No allowance for grass or landscaping these areas has been included.
- All landscaping to site and green roof has been excluded unless noted otherwise
- Imported planting mix to the green roof system has been included
- Pedestrian paving to Breezeway entrances has been included to the extent inferred by the floor plans, approx. 20'-0" from building footprint (total area allowed - 470 sq. ft.)
- Site walls assumed as colored concrete
- No backup waterproofing or drainage mat has been allowed to site walls
- External stairs assumed as colored concrete on grade
- Site lighting has been included only to the stepped pedestrian passageway

Structural

- Where detailed sections have not been provided, continuous strip footings have been allowed at 1'-4" x 0'-8" deep (as per Detail A)
- Isolated spread footings have been allowed at column locations (assumed 1'-4" sq. x 0'-8" deep)
- Suspended concrete slab to green roof system has been allowed at 8" thick
- All suspended slabs priced using traditional formwork method (in lieu of metal deck construction)
- Reinforcing bar to continuous strip footings has been allowed at 60 lbs / cy
- Reinforcing bar to isolated spread footings has been allowed at 100 lbs / cy
- Reinforcing bar to foundation, site, and exterior concrete walls has been allowed at 150 lbs / cy
- Structural steel columns have been assumed as HSS 6 x 6 x 1/2"

Building Enclosure

- Exterior cladding assumed as clapboard wood siding type system

Finishes

- Wood ceiling finish, with clear sealer, has been allowed to the Breezeway
- No ceiling finish has been allowed to the Storage/Fountain areas or Mech/Janitor (unfinished concrete)
- Wood base has been allowed to the Office and Multi-Function Room where walls lined with GWB.
- Resilient base has been allowed to all other walls where lined with GWB

Fittings and Miscellaneous

- Overhead coiling roller door has been allowed to the Storage/Fountain room
- Glass paved skylight allowed as "mid-range" quality/finish
- We have allowed for 2'-0" adjustable plastic laminate shelving to the Storage Room
- We have allowed for 4'-0" mirrors at full length to each of the Lavatory countertops

Little Bennett Regional Park - Day Use Area

30% Construction Documents Cost Estimate - Revision 1

Location Summary

Rates Current At August 2011
GFAR: Gross Floor Area

Code	Description		GFAR SF	Cost/SF	Total Cost
A	**Amphitheater**				**$50,400.00**
B	**Building Works - The Underlook**		**2,126**	**$316.64**	**$673,186.00**
		Estimated Net Cost	**2,126**	**$340.35**	**$723,586.00**
Margins & Adjustments					
General Conditions		8.0%			$57,887.00
Bonds and Insurance		1.8%			$13,676.00
Overhead and Profit		4.0%			$31,806.00
Design/Estimating Contingency		6.6%			$54,269.00
Escalation					Excl.
		Estimated Total Cost	**2,126**	**$414.50**	**$881,224.00**

Little Bennett Regional Park - Day Use Area

30% Construction Documents Cost Estimate - Revision 1

Divisions/Elements Summary

Rates Current At August 2011
Gross Floor Area: 2,126.00 SF

		Percentage	Cost/SF	Total Cost
02	**Site Construction**			
A1010	Standard Foundations	0.2%	$0.54	$1,142.00
A1030	Slab on Grade	0.2%	$0.76	$1,618.00
C2010	Stair Construction	0.4%	$1.48	$3,150.00
G1010	Site Clearing			
G1030	Site Earthwork	2.4%	$8.20	$17,441.00
G2020	Parking Lots			
G2030	Pedestrian Paving	1.7%	$5.81	$12,357.00
G2040	Site Development	14.6%	$49.66	$105,581.00
G2050	Landscaping	0.1%	$0.50	$1,071.00
G3010	Water Supply			
G3020	Sanitary Water			
G3030	Storm Sewer			
G4010	Electrical Distribution			
G4020	Site Lighting	0.4%	$1.48	$3,150.00
G4030	Site Communications & Security			
	Site Construction Total	**20.1%**	**$68.44**	**$145,510.00**
03	**Concrete**			
A1010	Standard Foundations	2.9%	$9.80	$20,843.00
A1030	Slab on Grade	1.3%	$4.37	$9,291.00
B1010	Floor Construction	0.5%	$1.58	$3,353.00
B1020	Roof Construction	2.2%	$7.38	$15,698.00
B2010	Exterior Walls	7.3%	$24.76	$52,646.00
	Concrete Total	**14.1%**	**$47.90**	**$101,831.00**
05	**Metals**			
B1020	Roof Construction	5.7%	$19.26	$40,949.00
C1030	Fittings	0.7%	$2.33	$4,950.00
	Metals Total	**6.3%**	**$21.59**	**$45,899.00**
06	**Wood, Plastics, and Composites**			
B1010	Floor Construction	0.9%	$3.12	$6,627.00
B1020	Roof Construction	1.4%	$4.60	$9,776.00
B2010	Exterior Walls	1.9%	$6.35	$13,494.00
C1010	Partitions	0.3%	$1.18	$2,504.00
C1030	Fittings	1.5%	$5.08	$10,801.00
	Wood, Plastics, and Composites Total	**6.0%**	**$20.32**	**$43,202.00**
07	**Thermal and Moisture Protection**			
A1030	Slab on Grade	0.6%	$1.94	$4,129.00
B1010	Floor Construction	0.2%	$0.76	$1,620.00
B1020	Roof Construction	3.5%	$11.89	$25,271.00
B2010	Exterior Walls	2.3%	$7.87	$16,728.00

Little Bennett Regional Park - Day Use Area

30% Construction Documents Cost Estimate - Revision 1

Divisions/Elements Summary

Rates Current At August 2011
Gross Floor Area: 2,126.00 SF

			Percentage	Cost/SF	Total Cost
B3010	Roof Coverings		4.0%	$13.63	$28,969.00
		Thermal and Moisture Protection Total	**10.6%**	**$36.09**	**$76,717.00**
08	**Openings**				
B2010	Exterior Walls		13.4%	$45.68	$97,119.00
B2030	Exterior Doors		2.5%	$8.68	$18,450.00
B3020	Roof Openings		1.2%	$3.98	$8,460.00
C1029	Interior Doors		0.4%	$1.52	$3,240.00
C1030	Fittings		7.0%	$23.93	$50,873.00
		Openings Total	**24.6%**	**$83.79**	**$178,142.00**
09	**Finishings**				
C3010	Wall Finishes		0.5%	$1.83	$3,893.00
C3020	Floor Finishes		1.7%	$5.83	$12,393.00
C3030	Ceiling Finishes		4.3%	$14.72	$31,305.00
		Finishings Total	**6.6%**	**$22.39**	**$47,591.00**
10	**Specialities**				
C1030	Fittings		1.2%	$4.00	$8,505.00
		Specialities Total	**1.2%**	**$4.00**	**$8,505.00**
11	**Equipment**				
E2020	Movable Furnishings				
		Equipment Total			
15	**Mechanical**				
D2010	Plumbing Fixtures		2.7%	$9.31	$19,800.00
D3040	Distribution Systems		2.1%	$7.20	$15,307.00
		Mechanical Total	**4.9%**	**$16.51**	**$35,107.00**
16	**Electrical**				
D5010	Electrical Service & Distribution		1.3%	$4.50	$9,567.00
D5020	Lighting and Branch Wiring		3.2%	$10.80	$22,961.00
D5030	Communications & Security		1.2%	$4.02	$8,554.00
		Electrical Total	**5.7%**	**$19.32**	**$41,082.00**
		Estimated Net Cost		**$340.35**	**$723,586.00**
		Grand Total		**$340.35**	**$723,586.00**

Little Bennett Regional Park - Day Use Area

30% Construction Documents Cost Estimate - Revision 1

Divisions/Elements/Item

Rates Current At August 2011

Gross Floor Area: 2,126.00 SF

		Unit	Qty	Rate	Total Cost
02	**Site Construction**				
A1010	**Standard Foundations**				
5	Excavate for foundations	CY	21	$11.00	$227.00
25	Excavate for foundation walls	CY	9	$11.00	$97.00
27	Excavate for external walls partially below grade	CY	12	$11.00	$130.00
6	Backfill to foundations with excavated material	CY	7	$11.00	$76.00
7	Remove and dispose excavated spoil from site	CY	34	$18.00	$612.00
	Standard Foundations Total			**$0.54/SF**	**$1,142.00**
A1030	**Slab on Grade**				
16	Excavate for slab on grade	CY	39	$11.00	$421.00
17	Imported washed gravel as sub-base for slab on grade	CY	22	$23.00	$495.00
18	Remove and dispose excavated spoil from site	CY	39	$18.00	$702.00
	Slab on Grade Total			**$0.76/SF**	**$1,618.00**
C2010	**Stair Construction**				
111	4'-0" Wide reinforced colored concrete stair on grade, complete	FT/R	7	$450.00	$3,150.00
	Stair Construction Total			**$1.48/SF**	**$3,150.00**
G1010	**Site Clearing**				
143	General site clearing - Nil (none required, presumed greenfield site)	Item			Excl.
	Site Clearing Total				
G1030	**Site Earthwork**				
142	Strip topsoil and stockpile on site	CY	26	$5.00	$117.00
1	Bulk excavation to reduced levels	CY	397	$9.00	$3,573.00
2	Imported granular fill to rear of walls below grade	CY	51	$22.00	$1,147.00
149	Site grading to East of green roof system using excavated material	CY	297	$11.00	$3,208.00
3	Backfill to bulk excavation with excavated material	CY	45	$11.00	$486.00
4	Remove and dispose excavated spoil from site	CY	55	$18.00	$990.00
141	Shoring - Excluded; max cut 6'-0" (allowance made to over excavate and batter)	Item			Excl.
144	Final grading and trim to building platform	Item			$900.00
29	4" Sub-soil foundation drain	LF	290	$18.00	$5,220.00
	Page Total				**$21,551**

		Unit	Qty	Rate	Total Cost
02	**Site Construction (cont)**				
145	Allowance for miscellaneous site grading around building footprint	Item			$1,800.00
	Site Earthwork Total			**$8.20/SF**	**$17,441.00**
G2020	**Parking Lots**				
84	Parking lots and roadways - Excluded (not part of Scope of Works)	Item			Excl.
86	Emergency/maintenance access - Excluded (not part of Scope of Works)	Item			Excl.
	Parking Lots Total				
G2030	**Pedestrian Paving**				
83	Pedestrian paving, complete including 1 1/2" sand bedding on 6" imported structural fill over vapor barrier	SF	469	$18.00	$8,442.00
79	4'-0" Wide stepped passageway, complete including 4" decomposed granite on 6" structural fill, vapor barrier, and 6" x 18" concrete curb risers at 5'-0" O.C.	SF	290	$14.00	$3,915.00
	Pedestrian Paving Total			**$5.81/SF**	**$12,357.00**
G2040	**Site Development**				
74	8" Reinforced colored concrete site walls, complete	SF	1,309	$32.00	$41,234.00
75	Extra over for 1" x 6" board form finish	SF	1,964	$3.00	$5,303.00
76	1'-4" x 0'-8" Reinforced concrete continuous strip footing, complete	LF	204	$27.00	$5,508.00
77	Waterproofing to site walls	SF	328	$3.00	$886.00
115	2" Dia. Wood wall mounted handrail	LF	20	$68.00	$1,350.00
140	Allowance for amphitheater	SF	8,000	$6.00	$50,400.00
124	Allowance for external building signage	Item			$900.00
87	Site walkways - Excluded (not part of Scope of Works)	Item			Excl.
85	Paved picnic area - Excluded (not part of Scope of Works)	Item			Excl.
	Site Development Total			**$49.66/SF**	**$105,581.00**
G2050	**Landscaping**				
61	Imported planting fill to green roof construction	CY	34	$32.00	$1,071.00
112	Landscaping to green roof system - Excluded (assume not part of Scope of Works)	SF	918		Excl.
	Page Total				**$119,009**

		Unit	Qty	Rate	Total Cost
02	**Site Construction (cont)**				
88	Landscaping - Excluded (not part of Scope of Works)	Item			Excl.
	Landscaping Total			**$0.50/SF**	**$1,071.00**
G3010	**Water Supply**				
116	Site water supply utilities - Excluded (not part of Scope of Works)	Item			Excl.
	Water Supply Total				
G3020	**Sanitary Water**				
117	Site sanitary sewer utilities - Excluded (not part of Scope of Works)	Item			Excl.
	Sanitary Water Total				
G3030	**Storm Sewer**				
118	Site storm sewer utilities - Excluded (not part of Scope of Works)	Item			Excl.
	Storm Sewer Total				
G4010	**Electrical Distribution**				
119	Site electrical utilities - Excluded (not part of Scope of Works)	Item			Excl.
	Electrical Distribution Total				
G4020	**Site Lighting**				
121	Allowance for path lighting to stepped pedestrian passageway	Item			$3,150.00
120	Miscellaneous site lighting - Excluded (not part of Scope of Works)	Item			Excl.
	Site Lighting Total			**$1.48/SF**	**$3,150.00**
G4030	**Site Communications & Security**				
122	Site communications and security services - Excluded (not part of Scope of Works)	Item			Excl.
	Site Communications & Security Total				
	Site Construction Total			**$68.44/SF**	**$145,510.00**
	Page Total				**$3,150**

		Unit	Qty	Rate	Total Cost
03	**Concrete**				
A1010	**Standard Foundations**				
8	1'-4" x 0'-8" Reinforced concrete continuous strip footing, complete	LF	361	$23.00	$8,123.00
9	1'-8" x 0'-8" Reinforced concrete continuous strip footing, complete	LF	110	$27.00	$2,970.00
10	1'-4" sq. x 0'-8" Deep reinforced concrete isolated spread footing, complete	EA	12	$45.00	$540.00
11	6" Reinforced concrete foundation wall, complete	SF	319	$24.00	$7,752.00
12	8" Reinforced concrete foundation wall, complete	SF	54	$27.00	$1,458.00
	Standard Foundations Total			**$9.80/SF**	**$20,843.00**
A1030	**Slab on Grade**				
13	5" Reinforced colored concrete slab on grade, complete including 6x6 W2.9xW2.9 WWF reinforcement	SF	1,147	$8.00	$9,291.00
	Slab on Grade Total			**$4.37/SF**	**$9,291.00**
B1010	**Floor Construction**				
14	5" Reinforced colored concrete suspended slab, complete	SF	207	$9.00	$1,863.00
15	Soffit formwork to suspended slab	SF	207	$7.00	$1,490.00
	Floor Construction Total			**$1.58/SF**	**$3,353.00**
B1020	**Roof Construction**				
55	8" Reinforced concrete suspended slab, complete	SF	918	$9.00	$8,262.00
56	Sloping soffit formwork to suspended slab	SF	918	$8.00	$7,436.00
	Roof Construction Total			**$7.38/SF**	**$15,698.00**
B2010	**Exterior Walls**				
21	8" Reinforced colored concrete wall, complete	SF	1,049	$31.00	$32,099.00
22	12" Reinforced colored concrete wall, complete	SF	114	$33.00	$3,796.00
23	12" "Thermomass" insulated precast colored concrete wall panel	SF	420	$38.00	$15,876.00
24	Extra over for 1" x 6" board form finish to visible faces	SF	324	$3.00	$875.00
	Exterior Walls Total			**$24.76/SF**	**$52,646.00**
	Concrete Total			**$47.90/SF**	**$101,831.00**
	Page Total				**$101,831**

		Unit	Qty	Rate	Total Cost
05	**Metals**				
B1020	**Roof Construction**				
43	Structural steel column framing	t	2.40	$3,150.00	$7,560.00
42	Structural steel beam roof framing	t	4.90	$3,150.00	$15,435.00
44	Structural steel fascia channel	t	2.26	$3,150.00	$7,119.00
45	Allowance for base plates and anchor bolts	EA	12	$900.00	$10,800.00
46	Allowance for miscellaneous steel, plates, and connections	t	0.01	$3,500.00	$35.00
	Roof Construction Total			**$19.26/SF**	**$40,949.00**
C1030	**Fittings**				
146	Allowance for stainless steel handrail to select operable glazed doors	LF	44	$113.00	$4,950.00
	Fittings Total			**$2.33/SF**	**$4,950.00**
	Metals Total			**$21.59/SF**	**$45,899.00**
	Page Total				**$45,899**

		Unit	Qty	Rate	Total Cost
06	**Wood, Plastics, and Composites**				
B1010	**Floor Construction**				
35	2" x 6" Wood stud framing as vertical support to crawl space sub-floor	SF	123	$6.00	$775.00
31	11 7/8" TJI Wood joist framing	SF	591	$5.00	$2,660.00
32	3/4" T&G Plywood sub-floor	SF	591	$4.00	$2,128.00
33	Batt insulation to sub-floor framing	SF	591	$2.00	$1,064.00
	Floor Construction Total			**$3.12/SF**	**$6,627.00**
B1020	**Roof Construction**				
47	3 1/8" x 9" Glulam roof beam	LF	129	$14.00	$1,741.00
48	4" x 6" T&G Wood decking to underside of roof structure	SF	1,488	$4.00	$5,357.00
49	1/2" Plywood sheathing	SF	1,488	$2.00	$2,678.00
	Roof Construction Total			**$4.60/SF**	**$9,776.00**
B2010	**Exterior Walls**				
69	2" x 6" Wood stud exterior wall framing	SF	1,071	$6.00	$6,747.00
73	1/2" Plywood sheathing to exterior stud wall framing	SF	1,071	$2.00	$1,928.00
72	Exterior wall cladding fixed to stud framing	SF	1,071	$5.00	$4,819.00
	Exterior Walls Total			**$6.35/SF**	**$13,494.00**
C1010	**Partitions**				
66	2" x 4" Wood stud partition framing	SF	187	$5.00	$841.00
67	2" x 6" Wood stud partition framing	SF	264	$6.00	$1,663.00
	Partitions Total			**$1.18/SF**	**$2,504.00**
C1030	**Fittings**				
91	Casework - Plastic laminate lavatory countertop with 3" high red oak backsplash; 2'-0" Wide	LF	20	$158.00	$3,150.00
101	Casework - Plastic laminate adjustable shelving to 8'-0" high; 2'-0" wide (assumed)	LF	17	$225.00	$3,825.00
95	Allowance for rough carpentry	SF	2,126	$1.00	$1,913.00
96	Allowance for wood blocking	SF	2,126	$1.00	$1,913.00
	Fittings Total			**$5.08/SF**	**$10,801.00**
	Wood, Plastics, and Composites Total			**$20.32/SF**	**$43,202.00**
	Page Total				**$43,202**

		Unit	Qty	Rate	Total Cost
07	**Thermal and Moisture Protection**				
A1030	**Slab on Grade**				
19	2" Rigid insulation; extruded polystyrene	SF	1,147	$3.00	$3,097.00
20	Vapor barrier	SF	1,147	$1.00	$1,032.00
	Slab on Grade Total			**$1.94/SF**	**$4,129.00**
B1010	**Floor Construction**				
34	Vapor barrier to crawl space	SF	1,800	$1.00	$1,620.00
	Floor Construction Total			**$0.76/SF**	**$1,620.00**
B1020	**Roof Construction**				
51	6" Rigid Insulation; polyisocyanurate	SF	1,488	$5.00	$8,035.00
52	3/4" Perlite insulation board	SF	1,488	$2.00	$2,678.00
60	4" Rigid insulation to green roof	SF	918	$4.00	$3,305.00
57	Acoustic insulation under suspended slab roof construction	SF	918	$2.00	$1,652.00
58	Monolithic rubberized asphalt waterproofing membrane to green roof	SF	918	$5.00	$4,957.00
59	Drainage mat to green roof	SF	918	$4.00	$3,305.00
50	Vapor barrier	SF	1,488	$1.00	$1,339.00
	Roof Construction Total			**$11.89/SF**	**$25,271.00**
B2010	**Exterior Walls**				
30	2" Rigid insulation; extruded polystyrene	SF	691	$3.00	$1,866.00
70	Fiberglass batt insulation to exterior stud wall framing	SF	1,071	$2.00	$1,928.00
26	Monolithic rubberized asphalt waterproofing membrane	SF	1,330	$5.00	$7,182.00
28	Drainage mat to exterior wall	SF	1,330	$4.00	$4,788.00
71	Vapor barrier to exterior stud wall framing	SF	1,071	$1.00	$964.00
	Exterior Walls Total			**$7.87/SF**	**$16,728.00**
B3010	**Roof Coverings**				
53	TPO Roofing membrane	SF	1,488	$14.00	$20,088.00
54	1" x 6" Synthetic roof decking; removable pallet construction	SF	1,488	$5.00	$6,696.00
92	Sheet metal gutter and flashing; 24-ga	LF	47	$18.00	$846.00
94	Allowance for miscellaneous flashings and trims	SF	1,488	$1.00	$1,339.00
	Roof Coverings Total			**$13.63/SF**	**$28,969.00**
	Thermal and Moisture Protection Total			**$36.09/SF**	**$76,717.00**
	Page Total				**$76,717**

		Unit	Qty	Rate	Total Cost
08	**Openings**				
B2010	**Exterior Walls**				
68	1" Insulated Low-E aluminum framed fixed/operable glazing system, complete including screens at operable panels	SF	858	$113.00	$96,525.00
113	Louvered crawl space access	SF	22	$27.00	$594.00
	Exterior Walls Total			**$45.68/SF**	**$97,119.00**
B2030	**Exterior Doors**				
97	2 @ 3'-0" x 7'-0" Aluminum framed double leaf glazed door, complete including insulated glass, rail, finish and hardware	EA	2	$5,850.00	$11,700.00
98	3'-0" x 7'-0" Wood framed single leaf wood veneer door, complete including finish and hardware	EA	5	$1,080.00	$5,400.00
99	5'-5" x 8'-5" High overhead coiling door, complete including frame, track, finish and hardware	EA	1	$1,350.00	$1,350.00
	Exterior Doors Total			**$8.68/SF**	**$18,450.00**
B3020	**Roof Openings**				
93	Prefabricated solid glass paver skylight system	SF	47	$180.00	$8,460.00
	Roof Openings Total			**$3.98/SF**	**$8,460.00**
C1029	**Interior Doors**				
100	3'-0" x 7'-0" Wood framed single leaf wood veneer door, complete including finish and hardware	EA	3	$1,080.00	$3,240.00
	Interior Doors Total			**$1.52/SF**	**$3,240.00**
C1030	**Fittings**				
89	Glass guardrail and stainless steel handrail to rooftop	LF	133	$383.00	$50,873.00
	Fittings Total			**$23.93/SF**	**$50,873.00**
	Openings Total			**$83.79/SF**	**$178,142.00**
	Page Total				**$178,142**

		Unit	Qty	Rate	Total Cost
09	**Finishings**				
C3010	**Wall Finishes**				
62	5/8" GWB wall lining fixed on stud framing; standard	SF	1,446	$1.00	$1,301.00
63	5/8" GWB wall lining fixed on stud framing; moisture resistant	SF	334	$2.00	$601.00
65	Paint finish to GWB wall lining	SF	1,779	$1.00	$1,601.00
64	Clear acrylic concrete sealer	SF	433	$1.00	$390.00
	Wall Finishes Total			**$1.83/SF**	**$3,893.00**
C3020	**Floor Finishes**				
39	3/4" x 2 1/4" T&G Wood flooring; Red Oak	SF	591	$14.00	$7,979.00
38	Hardener to concrete	SF	1,356	$2.00	$2,441.00
147	Clear polyurethane sealer to wood flooring	SF	591	$1.00	$532.00
40	Wood base	LF	83	$13.00	$1,120.00
41	3" Resilient base	LF	119	$3.00	$321.00
	Floor Finishes Total			**$5.83/SF**	**$12,393.00**
C3030	**Ceiling Finishes**				
36	Wood spaced board ceiling; CVG Douglas fir	SF	1,580	$14.00	$21,330.00
150	Wood spaced board external soffit	SF	284	$14.00	$3,834.00
37	Clear finish to wood ceiling and external soffit	SF	1,864	$2.00	$3,355.00
114	Allowance for lining to underside of floor framing at Multi-Function apex	SF	20	$5.00	$108.00
148	Allowance for painting to exposed steel framing	SF	1,488	$2.00	$2,678.00
	Ceiling Finishes Total			**$14.72/SF**	**$31,305.00**
	Finishings Total			**$22.39/SF**	**$47,591.00**
	Page Total				**$47,591**

Divisions/Elements/Item

Rates Current At August 2011

Gross Floor Area: 2,126.00 SF

		Unit	Qty	Rate	Total Cost
10	**Specialities**				
C1030	**Fittings**				
102	Toilet Accessories - Toilet partition cubicle; standard	EA	1	$675.00	$675.00
103	Toilet Accessories - Toilet partition cubicle; HC accessible	EA	2	$900.00	$1,800.00
106	Toilet Accessories - Grab rails	EA	2	$135.00	$270.00
104	Toilet Accessories - Toilet tissue dispenser	EA	3	$45.00	$135.00
108	Toilet Accessories - Toilet seat cover dispenser	EA	3	$67.00	$202.00
105	Toilet Accessories - Paper towel dispenser / receptacle	EA	2	$180.00	$360.00
107	Toilet Accessories - Soap dispenser	EA	2	$45.00	$90.00
90	Miscellaneous - Access hatch to crawl space	EA	1	$900.00	$900.00
109	Miscellaneous - Mirror to lavatory countertop	SF	80	$27.00	$2,160.00
123	Miscellaneous - Allowance for signage	SF	2,126	$1.00	$1,913.00
	Fittings Total			**$4.00/SF**	**$8,505.00**
	Specialities Total			**$4.00/SF**	**$8,505.00**

Page Total **$8,505**

		Unit	Qty	Rate	Total Cost
11	**Equipment**				
E2020	**Movable Furnishings**				
138	Furniture, Fittings, and Equipment - Excluded (assumed by Owner)	Item			Excl.
	Movable Furnishings Total				
	Equipment Total				
	Page Total				

		Unit	Qty	Rate	Total Cost
15	**Mechanical**				
D2010	**Plumbing Fixtures**				
125	Water closet; standard	EA	1	$1,800.00	$1,800.00
126	Water closet; HC accessible	EA	2	$1,800.00	$3,600.00
127	Urinal; wall mounted	EA	1	$1,800.00	$1,800.00
128	Lavatory; counter basin	EA	3	$1,800.00	$5,400.00
129	Drinking fountain; dual height	EA	1	$1,800.00	$1,800.00
130	Janitors sink; floor mounted	EA	1	$1,800.00	$1,800.00
131	Hot water tank; 30-gal	EA	1	$1,800.00	$1,800.00
132	Pressure tank; 82-gal	EA	1	$1,800.00	$1,800.00
	Plumbing Fixtures Total			**$9.31/SF**	**$19,800.00**
D3040	**Distribution Systems**				
133	Allowance for electric forced heating / air-conditioning system	SF	2,126	$7.00	$15,307.00
	Distribution Systems Total			**$7.20/SF**	**$15,307.00**
	Mechanical Total			**$16.51/SF**	**$35,107.00**
	Page Total				**$35,107**

		Unit	Qty	Rate	Total Cost
16	**Electrical**				
D5010	**Electrical Service & Distribution**				
134	Allowance for electrical service and distribution	SF	2,126	$5.00	$9,567.00
	Electrical Service & Distribution Total			**$4.50/SF**	**$9,567.00**
D5020	**Lighting and Branch Wiring**				
135	Allowance for lighting and branch wiring	SF	2,126	$11.00	$22,961.00
	Lighting and Branch Wiring Total			**$10.80/SF**	**$22,961.00**
D5030	**Communications & Security**				
136	Allowance for data and communications	Item			$900.00
137	Allowance for security system	SF	2,126	$2.00	$3,827.00
139	Allowance for fire alarm system	SF	2,126	$2.00	$3,827.00
	Communications & Security Total			**$4.02/SF**	**$8,554.00**
	Electrical Total			**$19.32/SF**	**$41,082.00**
	Total Cost				**$723,586.00**

Community Correspondence

From: krisnachuck becker [krisnachuck@gmail.com]
Sent: Wednesday, October 27, 2010 8:20 PM
To: Chen, Ching-Fang; Hanley, Wendy
Subject: comment on day use plan for Little Bennett

Hi,
I'm sorry I wasn't able to come to the public meeting about this. As a mother with young children, I expect to use the new facility often, but evening meetings are difficult. I really don't know much about the plan other than the design forwarded on Clarksburg Civic Association group, but I'd like to put in my vote for a natural playground in the "playscape" as they have elsewhere in the county (see Gazette article below.)
http://www.gazette.net/stories/06162010/bethnew224147_32554.php

I love the different areas for the butterfly house, and the bugs house, etc. because it gets people to walk outside a little between each.

Is the sculpture something kids could climb on or otherwise interact with?

Meadowside Nature center is a popular destination for us when we need to meet with a few other moms on a cold winter day. Will there be something similar to their small Discovery Room with a carpet for kids to play on, and nature puzzles/toys, or a cave to climb through? Even though it is far from here, it is really one of the very few good places around for free (and educational) places to meet with a playgroup. If this request requires plans for a new structure though, don't worry about it.

In general, I hope the overall plan minimizes forest clearing/mown lawn areas. Seems unnecessary maintenance to me. Also, as the mother of young kids, I'd appreciate a pesticide-free park for them to play in, if they do play on manicured lawn area, or in the playground area.

Thanks for your consideration of these comments/suggestions. We love Little Bennett and use the trails to the stream often. We've camped there twice this year. We expect to use this part of the park too.

-Krisna Becker

Chen, Ching-Fang

From: Sousa, Lou [Lou.Sousa@ee.doe.gov]
Sent: Thursday, September 30, 2010 1:56 PM
To: Chen, Ching-Fang
Subject: Another Look at Little Bennett Park

Hello, Ching.

Thank you for your presentation last night and for asking for our input to your draft facility plan as well as for offering to send me your presentation. I would like to draw from it to put together a short piece about the plan and the whole review/CIP process on the home page of our public website at www.friendsoflittlebennett.org.

When you visit our website, please try to take a look at one of our archived homepage stories about another meadow in the park that shares many of the same serenely scenic characteristics as the one where the day use area will be located: www.friendsoflittlebennett.org./Archive20100611.htm Be sure also to take a look at the online album containing some of my photos of the meadow that accompanies the story at www.friendsoflittlebennett.org./Images/Prescott.Meadow/index.html

I would feel privileged to show the meadow to you on your next visit to LBRP, if you have time. The absolute best time to see & experience the meadow is June but October would be OK if you can make it out sometime this month. Just let me know. I could take time off from work.

While visiting our website you might also want to take a long at some of our Trails pages (see for example www.friendsoflittlebennett.org./WesternPiedmontTrail.htm).

For some views of Little Bennett during the last two weeks of October (when the Park is at its scenic peak), see www.friendsoflittlebennett.org./Images/October.Color.2009/

Lou Sousa
President
Friends of Little Bennett Park
Clarksburg, MD
202-586-9236 (wk)

MONTGOMERY COUNTY DEPARTMENT OF PARKS
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

MEETING REPORT

MEETING DATE: September 29th, 2010

STAFF ATTENDING:

Mitra Pedoeem	M-NCPPC Park Development Division (PDD) Chief
Patricia McManus	M-NCPPC PDD Design Section Supervisor
Ching-Fang Chen	M-NCPPC PDD Landscape Architect
Eileen Emmet	M-NCPPC PDD Architect
Jim Humerick	M-NCPPC Northern Region Operations Manager
Wendy Hanley	M-NCPPC Park Manager
Lanshing Hwang	Symbiosis, Inc. Consultant
Steve Torgerson	A. Morton Thomas & Associates, Inc. Consultant
Matthew Ernest	A. Morton Thomas & Associates, Inc. Consultant

PROJECT: Little Bennett Regional Park, Day Use Area-Facility Planning

SUBJECT: Community Meeting

AGENDA

- Introduction - Patricia McManus
- Purpose of the meeting, facility planning process and schedule- Patricia McManus
- Background, site and approach – Ching-Fang Chen/Lanshing Hwang
- Concept alternative- Ching-Fang Chen/Lanshing Hwang
- Question session - Patricia McManus/Staff Team
- Summary - Patricia McManus

PUBLIC COMMENTS AND DISCUSSION

The concept for the Day Use Area was presented to approximately 15 attendees, the majority of whom live in the surrounding area. Many of the attendees are familiar with the site and participated in the planning process for the 2007 Little Bennett Regional Park Master Plan.

The key concept of preserving the cultural landscape and capturing the spirit of the land was presented along with the approach of respecting the culture, ecology and land use of the site to achieve a balance for conservation, recreation, education and service. The design elements are intended to efficiently to serve multiple functions and to provide flexibility for the future, and included nature-based recreation and integrated educational and play experiences. Sustainable design strategies for circulation, vegetation, habitat protection, material recycling, energy harvesting and storm water management were discussed. Specific comments and suggestions are summarized below in general categories.

Vehicular Circulation and Parking

- Consider sight lines and locations of acceleration and deceleration lanes at park entrances.
- What kind of traffic will be generated by the park and how many parking spots are provided? Staff indicated that initial estimates are for 20-30 peak hour trips. Parking is provided for 450 cars, based on the program of requirements from the park master plan.
- Consider the potential for widening of Route 355 and how it might affect the location of the Meadow Drive and buffer landscape.
- The surface material for the Meadow Drive should be bike and pedestrian-friendly. Gravel may not be desirable.
- Provide some equestrian parking for the multi-use trail. Consider the locations and quantity of existing trailer parking available in other areas of the park to determine the need for the day use area.

Trails

- Where are the current natural surface trail connections? There is an existing multi-use natural surface trail that connects to the day use area at the northern portion of the site near the existing park house, and a hiker-only trail connection at the southeast portion of the site near Soper's Branch.
- Consider how the plan addresses the Clarksburg Greenway hard surface trail plan. The original plan located the trail immediately adjacent to Route 355 and not further inside the park as proposed. The trails should be separated from the driveway and vehicular traffic and not combined.
- Provide trail connectivity from Snowden Farm Parkway to the Clarksburg Greenway.
- Provide a trail connection from the Woodcrest community behind the maintenance yard to the day use area.
- Concern was expressed about allowing pedestrian access to any area of the meadow and whether this would damage the ecological health of the meadow. It was suggested that access should be restricted to minimize adverse impacts. Others indicated that visitors usually stay within mown paths, because they are not comfortable strolling in a tall meadow. Park staff intends to monitor the use and will protect the meadow as necessary.
- Provide accessibility to the playground for grandparents and children, and consider distances that people need to walk.

Program Elements

- Consider the safety of the playground and ensure that there is adequate visibility for parents watching their children.
- If considering restrooms or composting toilets, one citizen mentioned Liberty Town Park in Frederick, Maryland as a good example.
- Provide some picnic areas with covered shelters, so that there are different types of picnicking opportunities for different types of users.
- Consider relocating picnic areas further from MD 355 due to noise. A noise study should be conducted, and noise levels should be considered in the park design and location of picnic areas.
- Consider alternative means of identifying the park entrance than the white poles. The design of these elements is too modern and many people may have difficulty relating to them.
- Consider the purpose of the camp fire feature, if the park is closed at dusk. If the park will be used for special events or evening rentals, would additional lighting of the park be needed?

- Would the amphitheater be used for rock concerts or fireworks? This area is envisioned as a nature based retreat, so these uses would be incompatible. These uses would be more suitable for nearby recreational parks with athletic complexes, such as South Germantown Recreational Park.
- Consider providing interpretive information and kiosks at parking, gathering or trailhead areas along the Meadow Drive, to provide information for those who prefer not to walk long distances. The history of MD 355 should be interpreted in the park.
- Consider how the plan could accommodate winter activities, such as sledding or cross-country skiing.
- Use of the site at night for star gazing was suggested. The park manager indicated that there are other locations in the park that provide better opportunities and have less light pollution.

Site

- A neighbor of the park mentioned that there are two existing wells near the southern stream valley which may yield approximately 20 gallons per minute.
- Concerns were expressed regarding erosion problems near the southern property border and Soper's Creek.

Operational Considerations

- There was discussion about the challenges of operating and staffing this new facility. The design approach taken will result in reduced operating costs from the original master plan. The participants expressed a willingness to support the project.
- The project should seek opportunities to advertise, sell, persuade and inform the community
- Naming opportunities should be considered
- Atypical approaches to park operations and maintenance should be considered, including use of volunteer groups, partnerships, or use of correctional facility inmates.

Additional Comments and Discussion

There was discussion about why the concept changed from the Master Plan concept. Staff indicated that the development of the new concept was inspired by recent sustainable design approaches and an awareness of green strategies that have become more prevalent since the completion of the 2007 Master Plan. The proposed concept will be able to fulfill the program of requirements from the master plan, protect the unique culture and ecological landscape, increase the sustainability of the site, reduce costs, and reduce the developed footprint of the site. The attendees expressed general support for the design approach, the overall plan objectives and design elements, the maintenance and preservation of natural areas and open space, and indicated that the plan took a responsible approach that would address the needs of future generations.

This report was prepared by: Ching-Fang Chen, Landscape Architect/Project Manager, October 26, 2010

Agency Correspondence

MONTGOMERY COUNTY DEPARTMENT OF PARKS
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

MEETING REPORT

MEETING DATE: August 16, 2011

STAFF ATTENDING:

Gail Tait-Nouri	DOT	
Bob Simpson	DOT	
David Anspacher	Planning	
Ki Kim	Planning	Area 3
Charles Kines	Parks	Park Planning & Stewardship
Wendy Hanley	Parks	Northern Region
Patricia McManus	Parks	Park Development
Marian Elsasser	Parks	Park Development
Ching-Fang Chen	Parks	Park Development

PROJECT: Little Bennett Regional Park, Day Use Area-Facility Planning

SUBJECT: **Trail and Sidewalk Concept**

The M-NCPPC and Montgomery County Department of Transportation (MCDOT) staff met and discussed trail connection issues along MD Route 355 between M-NCPPC Maintenance Yard and Hyattstown. Staff revisited recommendations, memorandums and plans from *2005 Countywide Bikeways Functional Master Plan*, *1994 Clarksburg Master Plan & Hyattstown Special Study Area (*Greenway Network and Bikeway Plan*)*, and *2007 Little Bennett Regional Park Master Plan (*Clarksburg Greenway). Staff discussed the trail concept for the corridor along MD Route 355 to ensure consistency, efficiency and safety. Proposed trail for the facility plan of Little Bennett Regional Park-Day Use Area and future projects for countywide shared use path, bikeway and sidewalk connections have been coordinated and outlined. The comments are summarized as follows.

- MCDOT staff confirmed that **SP-72** Countywide Shared Use Path per *2005 Countywide Bikeways Functional Master Plan* and **B-3** Frederick Road Bikeway per *1994 Clarksburg Master Plan & Hyattstown Special Study Area* will be located on the **west** side of MD Route 355 within the road right-of-way and be completely independent from the park recreational trails. The path will support the future Corridor Cities Transitway and provide non-vehicular access for the community. The right-of-way on the west side of MD Route 355 is unconstrained by grade and trees and would best support the bikeway. DOT typically also builds a public sidewalk in the right-of-way on the opposite side of the road from a bikeway. In this case the sidewalk would be constructed on the east side of MD 355. DOT does not anticipate including the bikeway and sidewalk project in their CIP anytime in the near future.

- The Day Use Area is a major destination along MD Route 355 corridor. A trail connection from the existing trail on MD 355 near the M-NCPPC Maintenance Yard to the Day Use Area is desirable in the short term to provide a pedestrian connection from the Clarksburg Town Center. The *2007 Little Bennett Regional Park Master Plan* recommends that the trail be set back from the road right-of-way a minimum of 50 feet to provide a better park experience. Staff discussed that the alignment may not be feasible due to environmental constraints such as steep slopes and encroachment to the wetland and stream buffer of the Sopers Branch. In addition, M-NCPPC does not own the parcel immediately south of the Day Use Area, and it may not be practical to bring public access in close proximity behind the private property. Staff recommends aligning an 8' hard-surface trail/sidewalk connection on the east side of MD Route 355 and stay fairly close to the road, so that this connection can serve dual purpose as a park trail connection and the future public sidewalk on MD 355. Park staff is recommending initiating a separate trail facility plan or design project to study this important connection from Stringtown Road to the Day Use Area and will coordinate the design with DOT.

- Once the sidewalk/trail on the east side of MD 355 reaches the Day Use Area, the sidewalk/trail will be located within the park on the east side of the access road, Meadow Drive, from the South Entrance to the Park House Picnic and Parking Area. This will be a separated, eight-foot wide hard surface path. Pavement design, landscape strips, signs and lighting will be studied in the detailed design phase to ensure safety and conformance to trail design guidelines.

- The path at the north end of the day use area will connect to a future natural surface trail connection within the park, as well as the future DOT sidewalk on the east side of MD 355 north of the Day Use Area to Hyattstown.

- Clarksburg Greenway through the interior of the Little Bennett Regional Park as recommended in the *2007 Little Bennett Regional Park Master Plan* and *1994 Clarksburg Master Plan & Hyattstown Special Study Area* can remain natural surface to protect the environmentally sensitive area along Little Bennett Creek.

Trail Concept is summarized in the following diagram:

Park Multi-purpose Trail
natural surface trail
(M-NCPPC CIP project)

County Sidewalk
5' min. width, hard-surface sidewalk on east side of MD Route 355 in ROW and Park property, connect to Hyattstown (DOT future project)

Park Recreation Trail/Sidewalk
8' wide hard-surface path on east side of the Meadow Drive, begin from the South Entrance to the Park House Picnic and Parking area, connect to park multi-purpose trail (M-NCPPC CIP project)

SP-72 Countywide Shared Use Path
B-3 Clarksburg Master Plan Bikeway
Class I, hard-surface, off-road bikeway on west side of MD Route 355 in ROW, connect from Clarksburg Town Center to Hyattstown (DOT future project)

Park Connector Trail/Sidewalk
8' wide hard-surface sidewalk on east side of MD Route 355 in ROW and Park property, connect to M-NCPPC Maintenance Yard
(M-NCPPC future project)

This report was prepared by:

Ching-Fang Chen
Landscape Architect/Project Manager

Distributed for Review: August 22, 2011

Copy: Attendees

A. Morton Thomas and Associates, Inc.
Consulting Engineers

Top 35
Best Firm To
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Civil Engineering News Magazine

July 29, 2011

Attn: Richard Brush c/o Tom Weadon
Montgomery County
Department of Permitting Services
255 Rockville Pike, 2nd Floor
Rockville, MD 20850

Re: **Little Bennett Regional Park**
Day Use Area – Facility Plan
North Frederick Road
Clarksburg, MD 20871

Stormwater Concept #: 239813
AMT #: 108-157.008

Dear Brush,

In response to your comments received on April 18, 2011, we offer the following:

Comment #1 **The maximum drainage area to a micro biofilter will be 20,000 SF. Underdrains will be required for the micro biofilter. A modified design may be utilized with meeting the minimum criteria for micro biofilters.**

Response Six (6) Sycamore Rings still remain on the plans, but only two (2) will be used for ESD credit. The two (2) used for ESD both have drainage areas less than 20,000 SF. The others will be used for the safe-conveyance of off-site drainage.

Comment #2 **Clear maintenance access must be provided to all structures.**

Response Clear maintenance access is now provided to all structures. The majority of the ESD credit is met through road-side bioswales and Permeable Pavement, which have access by Meadow Drive. The two (2) proposed biofilters are adjacent to Meadow Drive.

Comment #3 **A Floodplain Study will be required for all areas of the site that have a drainage area of greater than 30 acres.**

Response A formal Floodplain study will be prepared at final design, if required by DPS. For now, a Concept Level Floodplain study has been included for any area on-site draining more than 30 acres. See Appendix E.

Comment #4 **A complete geotechnical report for the proposed development will be required for concept approval.**

Response A complete Geotechnical Report is included in Appendix E.

Comment #5 **Explore using porous pavement for the pathways and parking spaces to obtain additional storage volume. Explore using enhanced filters for additional storage volume to meet the required ESDv goal.**

Response Porous Pavement is now proposed for several of the parking areas. See “Impervious Area Map Exhibit”; Appendix B. Enhanced Filters will be used for additional volume at all bio filters to address recharge volume.

Comment #6 **The protection of the Stream Valley Buffers is critical to Environmental Site Design. All proposed disturbance and development should be removed and relocated from the Stream Valley Buffers.**

Response M-NCPPC - Park Development has been coordinating with M-NCPPC - Environmental Planning, specifically Josh Penn and John Carter, regarding encroachments to the Stream Buffer. The design team was instructed that encroachments are okay as long as they fall outside of the tree line. A letter to DPS confirming this determination will be issued prior to SWM Concept Approval.

Comment #7 **The existing 1.25 ac of impervious area should be included in the proposed percentage of overall site imperviousness.**

Response The existing impervious area (now 0.76 per project limit clarification) is included in the overall site impervious.

Comment #8 **The SWM structures must be designed to their target ESDv and all other options for additional volume exhausted prior to maximizing volume in each structure.**

Response All SWM structures are now designed to their target ESDv. See calculations; Appendix B.

Please contact me at (301) 881-2545 or charper@amtengineering.com if you have any questions or need any additional information.

Sincerely,
A. Morton Thomas and Associates

Chuck Harper, P.E.
Project Manager

AMT
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Top 35
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Work For Nationally
Civil Engineering News Magazine

September 6, 2011

Attn: Richard Brush c/o Tom Weadon
Montgomery County
Department of Permitting Services
255 Rockville Pike, 2nd Floor
Rockville, MD 20850

Re: **Little Bennett Regional Park**
Day Use Area – Facility Plan
North Frederick Road
Clarksburg, MD 20871

Stormwater Concept #: 239813
AMT #: 108-157.008

Dear Brush,

In response to the comments discussed on August 25, 2011, we offer the following:

Comment #1	**Calculate the PE value for a project using Study Points, not the Parcel area. Depending on engineering approach, there will be between two (2) and four (4) study points for the Little Bennett project. A map showing the study points and respective drainage areas shall be included with the next submission.**
Response	The project has been divided into two (2) study points, POS-1 and POS-2. A map showing the study points and the respective drainage areas has been included in Appendix B1.
Comment #2	**Study Points should not include any areas to the East of Soper Branch, since no work is proposed on that side of the stream. Site impervious will likely remain below 15%, keeping the PE = 1”.**
Response	Study points shown in Appendix B1 adhere to the criteria outlined above. The PE for both Study Points remained at 1”.
Comment #3	**The calculation of “Rv” (the dimensionless volumetric coefficient) was clarified. Rv = 0.05 + 0.009 * (Iproject) where (Iproject) is the percent impervious within the Project Area, or Limits of Disturbance (LOD).**
Response	The Rv calculation has been revised as described above. See Appendix B2.
Comment #4	**The ESD Volume required calculation was clarified. ESDv = [(PE * Rv * A) / 12], where Rv is calculated as described in Item #3, and A = Project Area (LOD). The ESDv required for Little Bennett will increase from ±8,000 CF to ±30,000 CF using this methodology.**
Response	The ESD Volume required calculation has been revised as described above.
Comment #5	**Permeable Pavements, Green Roof areas, and Reinforced Turf areas shall be treated as impervious for the calculation of (Iproject).**
Response	The computations have been revised to include Alternative Surfaces in the calculation for (Iproject). See Appendix B2.

Comment #6	**The infiltration test for the permeable pavement parking area to the North (P-1 and P-2) showed a rate of 26.01"/hr. Permeable Pavements will not be acceptable to DPS when infiltration rates exceed 6" per hour, or are less than 0.52"/hr. The Geotechnical Engineer should explain potential reasoning for the high infiltration rate in report, similar to what was done for the low rate at IT-4. (See Page 6 of Geotechnical Report).**
Response	This was discussed with the Geotechnical Engineer of record. It is believed that this result of the infiltration test was anomalous. Additional Testing will be performed at the time of Final Design. For the purpose of this Concept, a second option is shown eliminating the Permeable Pavement in this area, and adding two (2) micro-bioretentions to treat the run-off from the parking area. Full ESD is met with both scenarios.
Comment #7	**Current DPS policy is that Porous Concrete is the only acceptable permeable pavement for use in Parking Areas.**
Response	Noted.
Comment #8	**An informal Floodplain Study for Soper Branch is required with the next submission. AMT shall verify that the 100-year Floodplain is contained within the Stream Buffer. Details required include Drainage Areas, TR-55, TR-20 and Cross-Sections. (Water Surface Elevations do not need to be plotted on the plans).**
Response	An informal Floodplain Study for Soper Branch has been provided with this submission. See Appendix E.
Comment #9	**A Letter from M-NCPPC stating that the proposed encroachments into the Stream Buffer are acceptable is required prior to SWM Concept approval by DPS.**
Response	As discussed via email on August 30, M-NCPPC requests that conditional approval of the Stormwater Concept be granted, pending determination by the Planning Board for the Stream Buffer encroachments.
Comment #10	**Additional Geotechnical Testing is required for Permeable Pavement areas greater than 10,000 SF, in particular areas P-2 (if not removed per item #6 above) and P-3.**
Response	Permeable Pavement locations have been revised so that no area is larger than 10,000 SF.
Comment #11	**Permeable Pavement Area P-4 is not an acceptable application of Permeable Pavement. The impervious area draining to the permeable pavement is larger than the permeable pavement area itself. As a rule of thumb, 50% of the drainage area to Permeable Pavement shall be the permeable pavement itself.**
Response	The Permeable Pavement Parking Area previously labeled "P-4" has been converted to gravel, and now drains to bio swale "S-5".
Comment #12	**The Geotechnical Report shall be revised to verify that ALL infiltration testing was done per Montgomery County Standards. The item of confusion may be the "unofficial" Perc Test performed, and associated narratives. Language shall be added to the report to clarify infiltration-testing techniques.**
Response	Language clarifying the infiltration testing techniques was added to Section 2.3 on Page 4 of the Geotechnical Report. See Appendix F.

Comment #13	**Typical Cross-sections for the Permeable Pavement systems, bio filters, and bio swales shall be included with the next submission.**
Response	Plan Sheet CW501 showing cross-section for the ESD measures shown has been included with this submission. See Appendix B1.
Comment #14	**To increase Volume credit in the bio swale, increase the media thickness from 2' to 3', and count the 6" of sand beneath the media. DPS is still debating internally whether to count the voids in the stone beneath the sand layer. For computation purposes show the media thickness as 3.5'.**
Response	The bio swale computations have been updated to show 3.5' media thickness. See Appendix B2.
Comment #15	**The playscape area can be modeled as Permeable Pavement, similar to what is shown on the MNCPPC "Fibar" detail. DPS has not yet determined if spray rubber or poured-in-place rubber will be acceptable surface materials. In the meantime, AMT shall add statement to the report that "Surface Material of the Playscape will require DPS approval at the time of final design."**
Response	The placyscape area is now modeled as Permeable Pavement. The surface material will be approved by DPS at final design.
Comment #16	**The minimum ponding depth on a micro-bioretention shall be 6". Computations currently show 3". Please revise.**
Response	The micro-bioretention computations have been revised to show a 6" ponding depth. See Appendix B2.

Please contact me at (301) 881-2545 or charper@amtengineering.com if you have any questions or need any additional information.

Sincerely,
A. Morton Thomas and Associates

Chuck Harper, P.E.
Project Manager

AMT
A. Morton Thomas and Associates, Inc.
Consulting Engineers

MEETING MINUTES

From: **Chuck Harper, P.E.** April 18, 2010

Project: Little Bennett Gateway Facility Plan
Stormwater Management Concept – Permit
#239813
AMT: 108-157.008

Meeting Number:	Meeting Date:	Project Phase:	Meeting Location
DPS-1	April 14, 2011	Schematic Design	DPS, 255 Rockville Pike; 2nd Floor

Meeting Purpose:
Discuss the Stormwater Management Concept plan, submitted to DPS on March 14, 2011.

Attendees:	Distribution:	Attachments:
Ching-Fang Chen (MNCPPC) Matthew Ernest (AMT) Chuck Harper (AMT) Tom Weadon (MC DPS) Rick Brush (MC DPS)		DRAFT Comment Letter from DPS

Item	Action	Description
1.		Ching-Fang opened the meeting by introducing the vision and intent of the Little Bennett Park design.
2.		Tom Weadon distributed a "DRAFT" comment letter for discussion (attached).
3.		Comment #1, Drainage Area limitations. DPS stated that the maximum drainage area to a micro-bioretention facility shall be 20,000 SF.
4.		AMT modeled Sycamore Rings as three (3) separate facilities. DPS will treat Sycamore Rings as one (1) facility. The drainage area shall be limited to ±20,000 SF per Sycamore Ring. AMT requested the required distance between facilities; DPS did not provide a specific distance.
5.		AMT and MNCPPC stated that the Original Master Plan for Little Bennett Park called for roads throughout the Park. One goal of Environmental Site Design is limiting impervious area. The current design proposes significantly less impervious area than the Master Plan. Rick Brush said to document this in the SWM Concept Report.
6.		DPS stated that Sycamore Rings with large drainage areas (example Southwestern most Sycamore Ring) can be treated as "safe conveyance" when not used for Stormwater Management credit.
7.		Comment #6, Stream Valley Buffer encroachments. Rick Brush requested something in writing that Stream Buffer encroachments are acceptable to other regulatory agencies. This will be required for DPS to support plan approach.
8.		Rick Brush suggested coordination with DEP, Anne English specifically.
9.		DPS stated that the Facility Plans should address stream improvements.
10.		Maintenance was discussed. DPS stated that we can work together on this once facility locations are determined.
11.		Comment #3, Floodplain Studies. DPS wants Floodplain Studies for drainage areas greater than 30 acres. For concept plan, the Floodplain Study can be conceptual.
12.		Gravel areas shall be treated as impervious, and must be treated by ESD measures. Compacted paths shall be treated as impervious for the purpose of calculating ESD volumes, but do not need to be treated.
13.		DPS informed AMT and MNCPPC of the new review procedure. Plans are distributed to DEP and DOT. Comments are returned within 21 days and included in the comment letter.
14.		Comment #8 was clarified. Since compacted paths are treated as impervious for the purpose of calculating volume, facilities will be oversized to account for incremental increases.

A. Morton Thomas and Associates, Inc.
Consulting Engineers

Chuck Harper, P.E.
A Morton Thomas and Associates

Note: The above meeting minutes are the interpretation of the writer. If you feel any item requires correction or clarification, please notify the writer within 10 business days.

DRAFT

April 12, 2011

Mr. Chuck Harper, P. E.
A. Morton Thomas and Associates, Inc.
12750 Twinbrook Parkway
Rockville, MD 20852

Re: Stormwater Management *CONCEPT* Request
for Little Bennett Day Use Area
Preliminary Plan #: N/A
SM File #: 239813
Tract Size/Zone: 136.7/RDT
Total Concept Area: 36.5ac
Lots/Block: N/A
Parcel(s): ————
Watershed: Little Bennett creek

Dear Mr. Harper:

Based on a review by the Department of Permitting Services Review Staff, the stormwater management concept for the above mentioned site is **unacceptable**. The stormwater management concept proposes to meet required stormwater management goals via biofitration and grass swales.

Please submit a revised stormwater management concept for review and approval. All submissions must be accompanied by a resubmittal application The revised submission must incorporate the following items:

1. The maximum drainage area to a micro biofilter will be 20,000sf. Underdrains will be required for the micro biofilters. A modified design may be utilized with meeting the minimum criteria for micro biofilters.
2. Clear maintenance access must be provided to all structures.
3. A floodplain study will be required for all areas of the site that have a drainage area of greater than 30 acres.
4. A complete geotechnical report for the proposed development will be required for concept approval.
5. Explore using porous pavement for the pathways and parking spaces additional Volume. Use enhanced Filters for additional Volume also.
6. The protection of the Stream Valley Buffers is critical to environmental site design. All proposed disturbance and development should be removed and relocated from the Stream Valley Buffers.
7. The existing 1.25ac of impervious area should be included in the proposed percentage of overall site imperviousness
8. The SWM structures must be designed to their target ESDv and all other options for additional volume exhausted prior to maximizing volume in each structure.

This list may not be all-inclusive and may change based on available information at the time.

If you have any questions regarding these actions, please feel free to contact Thomas Weadon at 240-777-6309.

Sincerely,

Richard R. Brush, Manager
Water Resources Section
Division of Land Development Services

RRB: tla CN 239813

cc: C. Conlon
SM File # 231893

ESD Acres:	Denied
STRUCTURAL Acres:	N/A
WAIVED Acres:	N/A

A. Morton Thomas and Associates, Inc.
Consulting Engineers

MEETING MINUTES

From: **Chuck Harper, P.E.** June 3, 2011

Project: Little Bennett Gateway Facility Plan AMT: 108-157.008

Meeting Number:	**Meeting Date:**	**Project Phase:**	**Meeting Location**
DPS-2	June 1, 2011	Design Development	Montgomery County DPS 255 Rockville Pike; 2nd Floor

Meeting Purpose:
Underlook Building Pre-Design Consultation

Attendees:	**Distribution:**	**Attachments:**
Melvin Stansbrough (DPS) Ching-Fang Chen (MNCPPC) Eileen Emmet (MNCPPC) Chuck Harper (AMT) Jim Cutler (Cutler Anderson) Lanshing Hwang (Symbiosis)	All Attendees	

Item	Action	Description
1.		Ching-Fang opened the meeting by introducing the vision and intent of the Little Bennett Park design.
2.		Melvin outlined the applicable building codes. The plan will follow the 2009 IBC, the 2003 Life Safety Code, NEC 2008, and the 2010 ADA Code.
3.		For ADA, the County has no new adoptions to the code. At the time of final design, analysis should be done regarding any new adoptions by the State of Maryland. (The State will typically make some requirements more stringent).
4.		Jim described the two routes to the building (direct: non-ADA, meandering: ADA), and gave an overview of building materials. Half of the building is a concrete structure; the other half is wood/steel.
5.		Design team was instructed to coordinate with Marie LeBaw, the Fire Marshal contact.
6.		Melvin stated that the building's distance from the nearest public roadway (≥350') would prompt sprinkler system requirement.
7.		Melvin stated that Montgomery County requires a 20' paved vehicular access road. The current Little Bennett plan shows ±8'.
8.		Design Team was instructed that Fire Code requirements are outlined in Chapter 22 of the County Code.
9.		Jim threw out the idea of standpipes in lieu of sprinklers and larger access road. This will be discussed with Marie LeBaw at future meeting TBD.
10.		Melvin stated that if there are to be night activities, the emergency path may require lighting of 1 ft-candle.
11.		Melvin recommended that MNCPPC schedule a DRC meeting for the project.
12.		Lanshing confirmed that there are no specific EMS access requirements for the play area. Melvin mentioned that EMS can use ATV's along the accessible path.

Chuck Harper, P.E.
A Morton Thomas and Associates

Note: The above meeting minutes are the interpretation of the writer. If you feel any item requires correction or clarification, please notify the writer within 10 business days.

A. Morton Thomas and Associates, Inc.
Consulting Engineers

MEETING MINUTES

From: **Chuck Harper, P.E.** June 17, 2011

Project: Little Bennett Gateway Facility Plan AMT: 108-157.008

Meeting Number:	Meeting Date:	Project Phase:	Meeting Location
DPS-3	June 14, 2011	Design Development	Montgomery County DPS 255 Rockville Pike; 2nd Floor

Meeting Purpose:
Meeting with MC DPS to discuss Well and Septic.

Attendees:	Distribution:	Attachments:
Gene Von Gunten (DPS) Ching-Fang Chen (MNCPPC) Eileen Emmet (MNCPPC) Chuck Harper (AMT) Bruce Anderson (Cutler Anderson) Lanshing Hwang (Symbiosis)	All Attendees	

Item	Action	Description
1.		Ching-Fang opened the meeting by introducing the vision and intent of the Little Bennett Park design.
2.		Gene stated that based on the locations of the two (2) existing wells on-site, the design should propose a new well location.
3.		The minimum size of a septic field is 10,000 SF.
4.		Composting toilets will not work for this application due to the location of the bathrooms.
5.		A sand mound could be used if the site does not Perc. A sand mound can work on up to a 12% grade.
6.		This site offers an opportunity to propose a “greener” system, which uses a sand mound in lieu of a drain field, and an aerobic unit underground in lieu of a standard septic tank.
7.		Sand mounds can have plantings, but no trees. Top soil can be added to buffer the appearance.
8.		The required distance to bedrock was discussed. A site must have 6.5’-7’ of soil before encountering bedrock to use a septic tank and drain field. A site must be 2’ minimum of soil to use a sand mound, and 4’ minimum to the water table. If the depth is shallower than 1’, there are no options.
9.		A formal Perc Test must be performed between February 1 and April 15.
10.		The formula for calculating drain field size was provided. (5 gallons per person) x (the number of users) x (a factor of 20) = Size in Square Feet. (Note: the minimum allowable size is 10,000 SF.)
11.		CFC, BA, and CH to coordinate and determine demand so plan depicts accurate drain field size.
12.		GVG suggested that M-NCPPC explore the use of a Geothermal Heating System.

Chuck Harper, P.E.
A Morton Thomas and Associates

Note: The above meeting minutes are the interpretation of the writer. If you feel any item requires correction or clarification, please notify the writer within 10 business days.

A. Morton Thomas and Associates, Inc.
Consulting Engineers

MEETING MINUTES

From: **Chuck Harper, P.E.**

August 25, 2010

Project: Little Bennett Gateway Facility Plan
Stormwater Management Concept –
Permit #239813

AMT Project: 108-157.008

Meeting Number:	Meeting Date:	Project Phase:	Meeting Location
DPS-4	August 25, 2011	SWM Concept	DPS, 255 Rockville Pike; 2nd Floor

Meeting Purpose:
Discuss the Stormwater Management Concept plan, submitted to DPS on August 2, 2011.

Attendees:

Tom Weadon (MC DPS)
Chuck Harper (AMT)

Distribution:

All Attendees
Ching-Fang Chen (MNCPPC)
Matthew Ernest (AMT)
Stephen Reid (MNCPPC)

Attachments:

The following is a summary of DPS comments on the Little Bennett SWM Concept:

Item	Action	Description
1.	AMT	Calculate the PE value for a project using Study Points, not the Parcel area. Depending on engineering approach, there will be between two (2) and four (4) study points for the Little Bennett project. A map showing the study points and respective drainage areas shall be included with the next submission.
2.	AMT	Study Points should ignore off-site areas, and should not include any areas to the East of Soper Branch, since no work is proposed on that side of the stream. Site impervious will likely remain below 15%, keeping the PE = 1".
3.	AMT	The calculation of "Rv" (the dimensionless volumetric coefficient) was clarified. Rv = 0.05 + 0.009 * (Iproject) where (Iproject) is the percent impervious within the Project Area, or Limits of Disturbance (LOD).
4.	AMT	The ESD Volume required calculation was clarified. ESDv = [(PE * Rv * A) / 12], where Rv is calculated as described in Item #3, and A = Project Area (LOD). The ESDv required for Little Bennett will increase from ±8,000 CF to ±30,000 CF using this methodology.
5.	AMT	Permeable Pavements, Green Roof areas, and Reinforced Turf areas shall be treated as impervious for the calculation of (Iproject).
6.	AMT/TLB	The infiltration test for the permeable pavement parking area to the North (P-1 and P-2) showed a rate of 26.01"/hr. Permeable Pavements will not be acceptable to DPS when infiltration rates exceed 6" per hour, or are less than 0.52"/hr. The Geotechnical Engineer should explain potential reasoning for the high infiltration rate in report, similar to what was done for the low rate at IT-4. (See Page 6 of Geotechnical Report).
7.		Current DPS policy is that Porous Concrete is the only acceptable permeable pavement for use in Parking Areas.
8.	AMT	An informal Floodplain Study for Soper Branch is required with the next submission. AMT shall verify that the 100-year Floodplain is contained within the Stream Buffer. Details required include Drainage Areas, TR-55, TR-20 and Cross-Sections. (Water Surface Elevations do not need to be plotted on the plans).
9.	MNCPPC	A Letter from M-NCPPC stating that the proposed encroachments into the Stream Buffer are acceptable is required prior to SWM Concept approval by DPS.
10.	AMT/TLB	Additional Geotechnical Testing is required for Permeable Pavement areas greater than 10,000 SF, in particular areas P-2 (if not removed per item #6 above) and P-3.
11.	AMT	Permeable Pavement Area P-4 is not an acceptable application of Permeable Pavement. The impervious area draining to the permeable pavement is larger than the permeable pavement area itself. As a rule of thumb, 50% of the drainage area to Permeable Pavement shall be the permeable pavement itself.

12.	AMT/TLB	The Geotechnical Report shall be revised to verify that ALL infiltration testing was done per Montgomery County Standards. The item of confusion may be the "unofficial" Perc Test performed, and associated narratives. Language shall be added to the report to clarify infiltration-testing techniques.
13.	AMT	Typical Cross-sections for the Permeable Pavement systems, bio filters, and bio swales shall be included with the next submission.
14.	AMT	To increase Volume credit in the bio swale, increase the media thickness from 2' to 3', and count the 6" of sand beneath the media. DPS is still debating internally whether to count the voids in the stone beneath the sand layer. For computation purposes show the media thickness as 3.5'.
15.	AMT	The playscape area can be modeled as Permeable Pavement, similar to what is shown on the MNCPPC "Fibar" detail. DPS has not yet determined if spray rubber or poured-in-place rubber will be acceptable surface materials. In the meantime, AMT shall add statement to the report that "Surface Material of the Playscape will require DPS approval at the time of final design."
16.	AMT	The minimum ponding depth on a micro-bioretention shall be 6". Computations currently show 3". Please revise.

Chuck Harper, P.E.
A Morton Thomas and Associates

Note: The above meeting minutes are the interpretation of the writer. If you feel any item requires correction or clarification, please notify the writer within 10 business days.

Chen, Ching-Fang

From:	Chen, Ching-Fang
Sent:	Friday, May 27, 2011 2:21 PM
To:	Carter, John
Cc:	Penn, Joshua; McManus, Patricia; Frank, Andrew; Pedoeem, Mitra
Subject:	Little Bennett RP-Day Use Area facility plan
Attachments:	LB-DD-PreFCP.pdf

Good afternoon,

We are preparing to submit our Preliminary Forest Conservation Plan for the Little Bennett Regional Park-Day Use Area. Our proposed playground is located within stream buffer areas with impacts to forest, in order to protect a unique meadow habitat and provide linkages from the play area to environmental interpretive areas. We met with Environmental Planning staff to discuss our proposed plan, and we understand that our plan would likely be denied based on a strict interpretation of the Forest Conservation Law. The Forest Conservation Law is written to protect forest, floodplains, stream buffers, endangered species and significant trees. It offers no such protection for meadow habitats. We would like the opportunity to explain the background and intent of our project and request your guidance for how to proceed with forest conservation requirements.

The proposed site for the Day Use Area is located east of MD 355 and west of the Sopers Branch, approximately 65 acres in size. The existing site is primarily undeveloped old field with pockets of biodiversity areas. The 2007 Little Bennett Regional Park Master Plan recommends developing a Day Use Area to welcome people and provide them with an overview of the natural and cultural interpretive opportunities of the entire park. The program of requirements in the master plan includes a visitor and nature center, access road, parking, group picnic areas, a nature-based adventure playground, group fire ring, amphitheatre, trails and opportunities for nature interpretation. The Department of Parks has deferred the development of the visitor and nature center as part of this project, due to current economic conditions and the high cost of developing and operating this facility. The proposed project includes a small visitor station and outdoor classroom to provide opportunities for interpretation of nature.

When we began this project, the Department’s Natural Resources Supervisor and Forest Ecologist identified the existing cultivated meadow as one of very few continuous meadow landscapes left in the County, and a high quality example with very few invasive species. The rolling topography reflects the nostalgic piedmont landscape. We observed ground nesting birds on the site, which are rarely seen anymore including wild turkey and meadowlarks. As the County continues to develop, our parkland becomes ever more important for preserving our natural heritage and biological diversity. Meadow dependent birds have suffered a precipitous population decline as greater than 90% of their habitat has disappeared due to development and natural succession. Meadow habitats are easy targets for development, lacking the legal protections of wetlands and forests.

The 2007 Little Bennett Regional Park Master Plan proposed traditional park development on this site, which would have eliminated the existing meadow landscape. The current concept in the facility plan attempts to preserve most of the meadow, while achieving the full program of requirements from the master plan. The plan recommends a loosely structured, enticing linear experience that offers physical connections to various ecosystems of the park, and also includes an active central play hub. The play elements are integrated with the natural environment and provide opportunities for exploration, education, and enjoyment for all park users. Various themes and areas for nature interpretation can also be provided along the way, including birds, bats, butterflies and insects. The concept proposes locating the play area at the smallest finger of meadow between two stream buffers for the following reasons:

- **Preservation of Meadow**: The area is away from the main meadow corridor, and has the least impact to the continuity of meadow habitat. The disruption of the vista from all angles of the site will be also minimized.
- **Minimized Site Disturbance**: This area is the flattest of the entire site. Grading can be minimized to accommodate the program needs. The only alternative area available would be the site of the future visitor center.
- **Interpretive Opportunities**: This area of the site is surrounded by various types of ecosystems that offer opportunities for hands-on environmental education.
- **Connectivity:** The area is located in proximity to other program elements and provides trail connections to the sledding hill, amphitheatre, outdoor classroom, and nature interpretation areas.

We believe the impact to forest and stream buffer are offset by the following environmental benefits provided by our proposed plan:

- **Preservation of Meadow Adjacent to Stream Buffers**: The plan preserves large expanses of undeveloped meadow outside of regulatory stream buffers for Sopers Branch. This effectively expands the current stream buffer to protect the watershed. If necessary, we would be willing expand the width of the regulated buffer to offset stream buffer areas impacted by the development of our play area.
- **Stormwater Treatment of Offsite Runoff**: The plan proposes to voluntarily mitigate 10.3 acres of upstream off-site stormwater from other development along MD 355. This is about 70 times more than the stormwater impact of the proposed play area.
- **Reforestation:** Although the project has no reforestation requirements, the plan proposes to allow woody plants to emerge through natural succession along the main drive. The succession will be managed to control invasive species. The strip will become part of the hedgerow and gradually contribute to reforestation of the site.
- **Site Sustainability:** The overall sustainability of the project is significantly improved compared to the original master plan concept and includes less than half of the road, stormwater treatment, and site disturbance originally proposed. The outdoor classroom building will be LEED certified, and many other sustainable development practices will be employed.

We believe our overall approach to the project minimizes environmental impact and supports our mission of preservation, conservation, education and recreation. We would appreciate the opportunity of meeting with you to discuss our project.

Ching-Fang Chen, RLA, LEED-AP
Landscape Architect
Park Development Division

The Maryland-National Capital Park and Planning Commission
9500 Brunett Avenue
Silver Spring, MD 20901
301.495.2557
Ching-Fang.Chen@montgomeryparks.org

Chen, Ching-Fang

From: Chen, Ching-Fang
Sent: Wednesday, July 27, 2011 1:12 PM
To: Penn, Joshua
Cc: Carter, John; Murray, Callum; McManus, Patricia; Pedoeem, Mitra
Subject: Little Bennett RP-Day Use Area PreFCP
Attachments: Little Bennett Day Use Area.pdf

Josh,

We really appreciate your guidance during the facility plan process and are already to submit the Forest Conservation Plan for Little Bennett Regional Park-Day Use Area. In June we discussed the design intent and implementation of the Forest Conservation regulation for the project with your team. We are able to rework the design to fulfill your recommendations.

- A large portion of the playscape program in the revised plan has been shifted to the west out of the stream buffer area.

- The revised plan keeps the limit of disturbance away from the existing tree line as delineated in the approved NRI/FSD plan and allows a minimum 5' buffer from the existing mown edge.

- Interpretation trails have been simplified to minimize stream crossing and site disturbance . One on the south and one on the north, the trails provide necessary connection to future crossings of the Sopers Branch and to the interior of the park as recommended in the 2007 Little Bennett Regional Park Master Plan.

- The interpretation boardwalk is intended to confine the visitors and provide ADA access. The 5' wide boardwalks are aligned to stay completely out of the critical root zones (CRZ) of trees larger than 30" dbh and CRZ of all 24"+ dbh trees except in two locations. The boardwalk will be constructed by hand with helical pile to minimize site disturbance. The transparent metal grating will ensure protection of existing hydrology and forest floor.

- The 5' wide mown trails in the meadow have also been aligned to keep away from the tree lines.

The facility plan is on the September 8th agenda for Planning Board approval. I understand we are tight on the PreFCP review schedule. Do you think it will feasible to proceed and receive approval in time for the Board? Your recommendation will be much appreciated.

We are ready to re-submit for stormwater management concept to DPS. The reviewer also needs your confirmation that it is acceptable for park program to be in the stream buffer area. We would like to ask for your help to provide a letter of confirmation.

Thank you very much. .

Ching-Fang Chen, RLA, LEED-AP
Landscape Architect
Park Development Division

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A. Morton Thomas and Associates, Inc.
Consulting Engineers

MEETING MINUTES

From: **Chuck Harper, P.E.**
June 17, 2011

Project: Little Bennett Gateway Facility Plan
AMT: 108-157.008

Meeting Number:	Meeting Date:	Project Phase:	Meeting Location
FM-1	June 14, 2011	Design Development	Montgomery County DPS 255 Rockville Pike; 2nd Floor

Meeting Purpose:
Meeting with Fire Marshal to discuss access requirements

Attendees:	Distribution:	Attachments:
Marie LaBaw (FM) Ching-Fang Chen (MNCPPC) Eileen Emmet (MNCPPC) Chuck Harper (AMT) Bruce Anderson (Cutler Anderson) Lanshing Hwang (Symbiosis)	All Attendees	

Item	Action	Description
1.		Ching-Fang opened the meeting by introducing the vision and intent of the Little Bennett Park design.
2.		Marie stated that a 12' wide access road will be required to both the Playscape area and the Underlook Building for EMS access.
3.		The 12' wide access road can be 10' of pavement with 1' of alternative surface on each side. Grasspave 2 is not an acceptable alternative surface; Grasscrete is acceptable.
4.	AMT	An ambulance turnaround is required for both the Playscape area and Underlook building. Once locations are determined, AMT is to show Auto-turn movements for turnaround. Auto-turn studies are to be based off ambulance movements.
5.		Marie stated that ATV's will not be an option.
6.		As currently designed, driving through the building, in lieu of providing turnaround, does not work due to lack of vertical clearance. 13.5' of vertical clearance is required. (Note: horizontal clearance was deemed adequate.)
7.		Using the serpentine access path that starts at the southern end of Meadow Drive as the EMS access was discussed. The path is not currently designed as a paved, and would also need to be widened. Amphitheatre could serve as a turnaround for this option.
8.	ML	Since there are no compliant water source nearby, a 30,000 Gallon storage tank will be required within a mile of the building. (Distance measured by truck travel path). ML to send CH generic spec of tank.
9.		A 25' x 80' operational area is required at the location of the 30,000 Gallon storage tank. The operational area must be paved.
10.		Sprinklers are not required for the Underlook building.
11.		In summary, there are three (3) options for EMS access to the Underlook Building: • Increase the building height and use Amphitheatre as vehicle turnaround. • Provide turnaround area along ADA path, before building. Widen path to 12'. • Pave and increase width of the Maintenance Path that begins at the South end of Meadow Drive.

12.	AMT and CA to coordinate and prepare a submission to ML showing Auto-turn movements, tank location, site signage, Typical sections of the pathways, building type, etc… If acceptable, ML can issue a letter saying "the preliminary concept has been agreed upon."
13.	Lanshing was instructed to talk the inspector regarding burning the meadow. ML to email the name of the inspector.

Chuck Harper, P.E.
A Morton Thomas and Associates

Note: The above meeting minutes are the interpretation of the writer. If you feel any item requires correction or clarification, please notify the writer within 10 business days.

MONTGOMERY COUNTY DEPARTMENT OF PARKS
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

MEETING REPORT

MEETING DATE: December 1, 2010

STAFF ATTENDING:	John Hench	Parks	Park Planning & Stewardship Division
	Joey Lampl	Parks	Cultural Resources Stewardship
	Heather Bouslog	Parks	Cultural Resources Stewardship
	Wendy Hanley	Parks	Northern Region
	Steve Radov	Parks	Northern Region
	Patricia McManus	Parks	Design
	Ching-Fang Chen	Parks	Design

PROJECT: Little Bennett Regional Park, Day Use Area-Facility Planning

SUBJECT: Native American Heritage Interpretive Program

The park staff met and discussed issues related to Native American heritage in the Montgomery County Park system and clarified the program for the Little Bennett Regional Park- Day Use Area.

The archaeological data provided by the Cultural Resources Section indicated that the Native American people made less use of the piedmont region than other areas. There are no significant traces of land use by Native Americans at the Little Bennett Regional Park. The Native American camping sites found were primarily situated near the Potomac River such as rock shelters at Block House Point.

It's our objective to interpret the natural, cultural and historic resources in the park system. Native Americans are one of the important cultural and historic heritages in the County. Currently, the Montgomery County Parks are able to accommodate temporary interpretive programs at facilities that are suitable for program space and have the resources for programming, such as Black Hill Regional Park Visitor Center and Brookside Gardens Visitors Center. Contact Steve Radov for more information.

In the short term, the Cultural Resources Stewardship Section is considering an initiative to include funding in the Capital Improvements Program for Native American Heritage interpretation. The team proposed to represent Native American culture in the parks by interpretive signage at well-visited park sites, or known sites which have archaeological findings. It has been discussed that the interpretation should include what was here by the Native American as well as contemporary Native American culture in the area. Joey Lampl is the contact person for the project.

You may be aware that the Visitor Welcome and Nature Center has been put on hold in the facility plan due to current budget crisis. It's understood that a permanent interpretive program of the Native American heritage will be included when the Visitor Welcome and Nature Center is in place. We will make sure to involve your organization in the process when the project is realized in the future.

This report was prepared by:

Ching-Fang Chen
Landscape Architect/Project Manager

Distributed for Review: January 14, 2011

Copy: Attendees

MONTGOMERY COUNTY DEPARTMENT OF PARKS
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

MEETING REPORT

MEETING DATE: January 6, 2010

ATTENDING:

Ki Kim	Planning	Transportation Planning
Joshua Penn	Planning	Environmental Planning
Eugene Rose	Parks	Horticulture & Arboriculture
Rob Gibbs	Parks	Natural Resources
Bill Hamilton	Parks	Natural Resources
Norma Kawecki	Parks	Natural Resources
Rachel Newhouse	Parks	Park & Trail Planning
Andrew Frank	Parks	Environmental Engineering
Stephen Reid	Parks	Environmental Engineering
Mike Horrigan	Parks	Northern Region
Jim Humerick	Parks	Northern Region
Wendy Hanley	Parks	Northern Region
Steve Radov	Parks	Northern Region
Patricia McManus	Parks	Design
Heidi Sussmann	Parks	Design
Eileen Emmet	Parks	Design
Ching-Fang Chen	Parks	Design

PROJECT: Little Bennett Regional Park, Day Use Area - Facility Planning

SUBJECT: Kick-off Meeting

Agenda

The kick-off meeting was intended to:

- Brief the PDCO team with background information.
- Summarize insights of the Little Bennett Regional Park Master Plan and Clarksburg Master Plan and Hyattstown Special Study Area.
- Establish the core value and vision for the team and the project.
- Review the approved concept of the Gateway Area (Day Use Area).
- Identify opportunities and differentiate the park of the Day Use Area from adjacent parks.
- Review examples of sustainable park projects.
- Review examples of recently accomplished green buildings for the visitor center.
- Discuss project approaches and program strategies.

Vision (as presented)

- Design a forward-thinking park for future generations.
- Offer unique, cohesive and memorable day use experience.
- Create experience of discovery and learning through story telling of nature.
- Promote people's understanding of nature and stewardship of land.
- Provide a platform for M-NCPPC to explore sustainable park development and to share knowledge, experiences and best practices with the visitors.
- Integrate design aspects, aesthetics, ecology into park management.

Comments and Discussion

Comments made at the meeting are summarized below.

Vision

1. The presented vision was well received. The team expressed strong support of the concept of sustainable park development and land stewardship.
2. The team discussed our current practices and what we might do differently in the future. The team examined the mission of offering recreation, education, and land management as well as contributing to the environment in terms of carbon sequestration, habitat restoration and climate control through implementation of the project.

Concept

1. The team supported the Gateway Area Concept as proposed on the 2007 Master Plan focusing on nature oriented activities including picnic areas, meadow habitats, nature based adventure playground, group fire ring and amphitheatre, and interpretive landscapes. The design of the elements shall enhance the beauty of nature and the spirit of the park.
2. The team expressed concerns of the focal point water feature. The feasibility of sustaining a water feature that is able to retain standing water based on the existing watershed, topography and soil will require considerable efforts of engineering and construction. It will likely be very costly. The team agreed that the element should be reexamined.

Visitor Center

1. The team supported realizing the concept of the Visitor Welcome and Nature Center as recommended on the 2007 Master Plan. Though a *Countywide Interpretive Center Functional Plan* has not been studied, the team expressed strong support of moving forward with facility planning of the visitor center. The team considered the visitor center to be an integral part of the Day Use Area and shall be developed side by side with the rest of the Day Use Area.
2. The location of the visitor center was discussed. The current location as shown on the Gateway Area Concept Plan was intended to keep the facility away from the interior of the environmentally sensitive area to protect the park's natural resources. For the purpose of a visitor welcome center, the concept is well-acknowledged. For the interpretive purpose of a nature center, the team expressed concerns that the location may be too far from the heart of nature to be interpreted, too close to the traffic and noise of MD-355 and I-270 and the setting to be lacking in natural character. There was

discussion of potentially enhancing a landscape buffer along MD-355 in the near future, rather than waiting for the project to be implemented. There are upcoming plans to widen MD-355.
3. The team agreed that the Visitor Center shall be a green building with minimum carbon footprint. It shall be an example and inspiration to the community for sustainable park facility of the 21st century.
4. The team recommended follow up meetings involving a focused group of the PDCO team members to discuss, evaluate and study the requirements of the visitor and nature center.

Landscape

1. The facility planning intends to carry out the concept proposed in the 2007 Master Plan of the Gateway Concept as nature based recreational and interpretive landscapes.
2. The concept of “carbon surplus landscape” was well received. The concept of innovative planting design by *Dr. Norbert Kühn* was conveyed; use plants that can clearly build stable communities under the give conditions of a site and to transform the plant communities according to a design perspective to enhance the aesthetics of the landscape.
3. The team supported exploring sustainable park development strategies such as: *maintaining the current state through appropriate measures; allowing succession to proceed naturally; effecting changes in succession through interventions and improving the aesthetic value by changing the species composition*. Possibilities of allowing plants and animals to evolve from the current state of a disturbed cropland to various states of successional landscapes and habitats were discussed. The edge communities occurring through succession will provide a higher degree of ecological service, from carbon sequestration, recycling, bio-filtration, and wildlife habitat than landscapes of conventional park land.
4. The interpretive program can be rooted in storytelling of the evolving ecosystems. The landscape shall be authentic, is a reminder of the site and is part of nature and the natural dynamic.
5. The landscape shall be designed so it can be maintained for a long time with less care and with low cost.

Access

1. The concept of assuring the park will be accessible by different modes of transportation was reinforced by the team. It is in the future Plan for the Corridor City Transitway to service the park vicinity along MD-355. The Plan does not include a transit stop near the public entrance as proposed in the Master Plan for Little Bennett Regional Park. The team suggested advocating a bus stop at the proposed entrance location to improve pedestrian connection, ease of access, and safety to the park by public transportation.

Community Input

1. It’s the team’s intention to involve the community. The team proposed to organize the first community meeting after the program of requirements for the Visitor Welcome and Nature Center is established.

Moving forward

1. The landscape architectural aspect of the project will be studied and developed in house.
2. Project manager plans to send out task orders to multi-disciplinary consultants by mid February for the scope of survey, NRI/FSD, Preliminary Forest Conservation Plan, Stormwater Management, Environmental Site Design and Geotechnical Investigation. We intend to begin work on the survey and NRI/FSD right away, as recommended by Environmental Planning staff.
3. For visitor center, the project manager is pursuing consultants with relevant expertise to work with the PDCO team in the pre-concept phase to facilitate program development. A/E consultants and interpretive designer with expertise of visitor and nature center will be procured after the program of requirements is further defined.
4. For landscape, the project manager intends to pursue consultants with expertise in sustainable design, soil ecology, meadow habitat and succession management to work with the PDCO team on the facility planning.
5. A follow up meeting for the visitor center with the focused group has been scheduled for February 19th.
6. A site visit with the PDCO team will be scheduled for early spring.

This meeting report will be recorded as accepted unless the preparer is contacted in writing within two weeks. This report was prepared by:

Ching-Fang Chen Distributed for Review: February 4, 2010
Landscape Architect/Project Manager

Copy: Attendees
Gerald Barrick, Central Maintenance

Harper, Chuck

From: Ernest, Matthew
Sent: Wednesday, November 17, 2010 11:30 AM
To: Corren Giles (cgiles@sha.state.md.us)
Cc: Chen, Ching-Fang; Torgerson, Steven; Harper, Chuck; Ernest, Matthew
Subject: Little Bennet Facility Plan - Intersection Site Distance Plans
Attachments: SHA-1.pdf; SHA-2.pdf; SHA-3.pdf; SHA-4.pdf; _LB-sight distance evaluation form.pdf; CS100.pdf

Hi Corren,

I wanted to follow up from a conversation you had with Steve Torgerson from our office. Attached are revised site plans, site distance profiles and ISD worksheet for your review.

The project is only a facility plan. So construction documents are not being prepared. Whenever the project moves forward, a formal access permit submission would be made at that time. We are looking for SHA concurrence on our entrance configuration and locations.

Please review and let me know if you need any additional information or if you have any questions.

Thanks,

Matthew Ernest, P.E.
Associate

A. Morton Thomas & Associates, Inc.
12750 Twinbrook Parkway
Rockville, MD 20852
Phone: 301-881-2545 ¦ Fax: 301-881-0814 ¦ Cell: 240-994-2217
www.amtengineering.com

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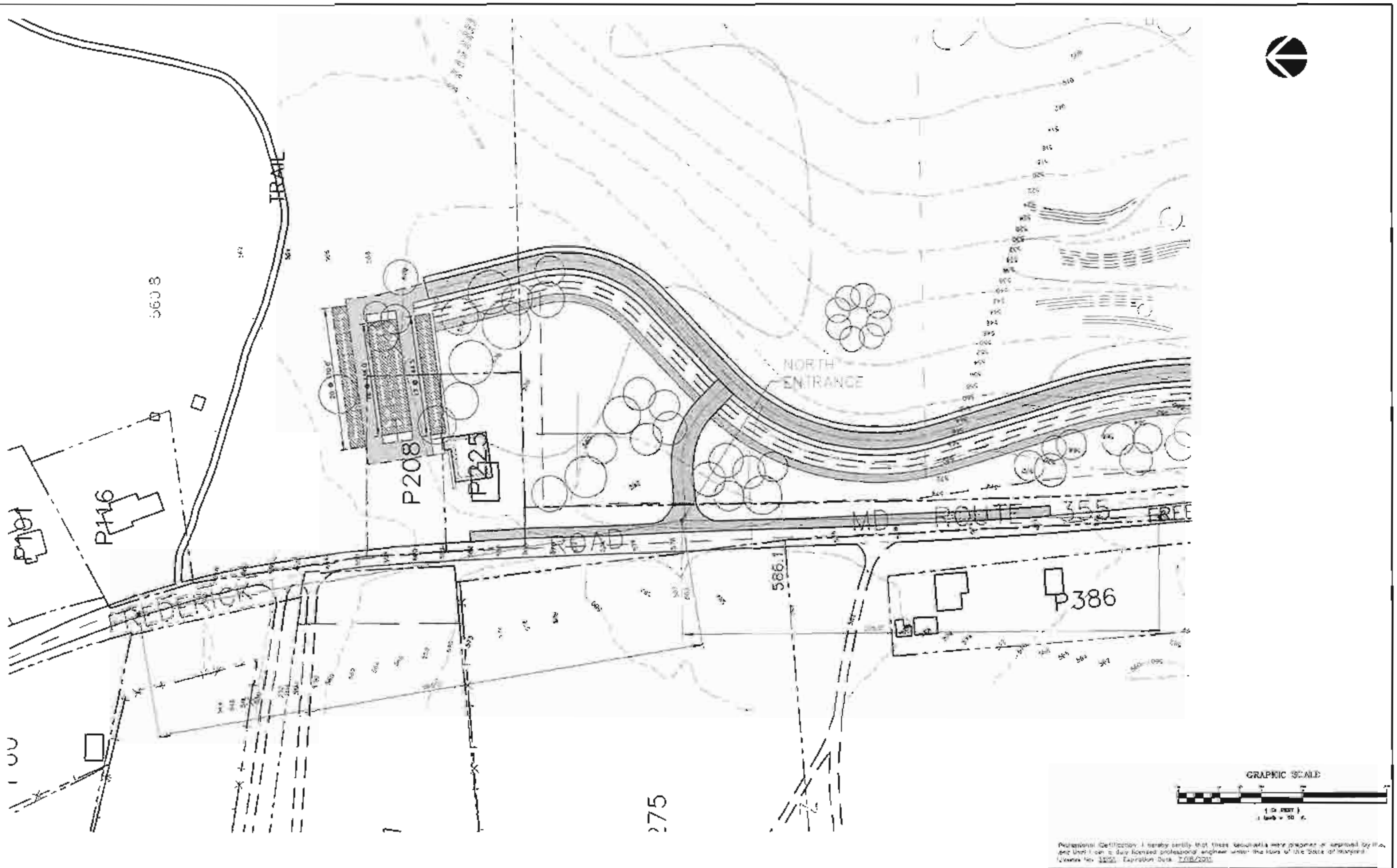

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 32055 Expiration Date 7/08/2011

DESIGN
M-NCPPC
Landscape Architect Date Checked By
Architect Date Checked By
AMT
Engineer Date Checked By
AMT
Drawn By Date Checked By

REVIEW AND APPROVAL
Park Development Date
Design Development Date
Date
Date

REVIEW AND APPROVAL
Superintendent of Parks Date
Park Police Date
Date
Date

The Maryland-National Capital Park and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2578

PLANS ISSUED FOR
REVISIONS
Rev. No. Date Description

N.A.

NORTH ENTRANCE
SITE DISTANCE PLAN
Little Bennett Regional Park
Day Use Area

Scale 1"=50'

WSSC Grid Map

SHA-1

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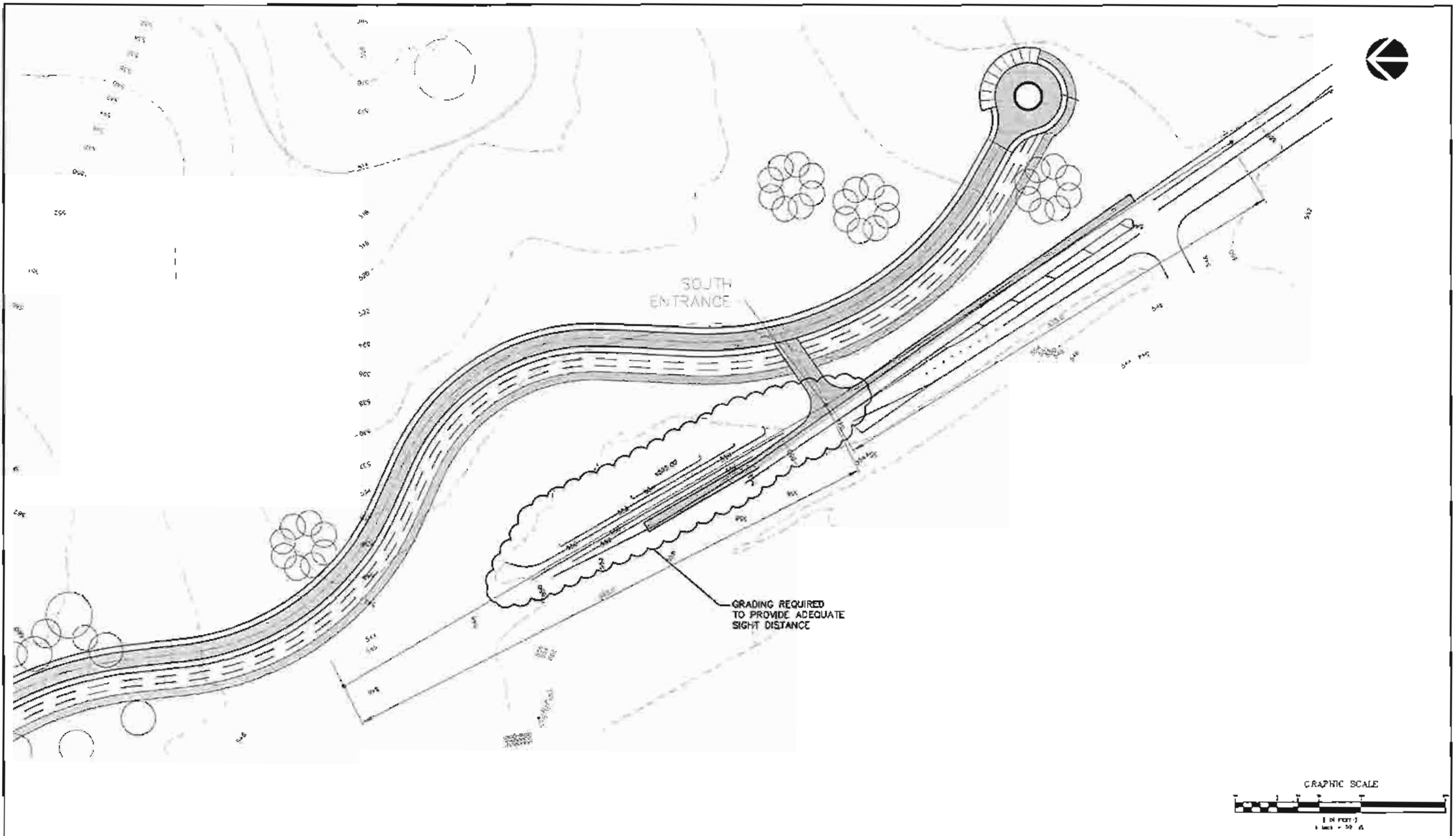


Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 32251 Expiration Date 7/10/2011

DESIGN			REVIEW AND APPROVAL		REVIEW AND APPROVAL	
Landscape Architect	Date	Checked By	Park Development	Date	Superintendent of Parks	Date
Architect	Date	Checked By	Central Maintenance	Date	Park Police	Date
Engineer	Date	Checked By	Region	Date		Date
Drawn By	Date	Checked By	Natural Resources	Date		Date

The Maryland-National Capital Park and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS CODED FOR

REVISIONS

Rev. No.	Date	Description

SEAL

SOUTH ENTRANCE
SITE DISTANCE PLAN
Little Bennett Regional Park
Day Use Area

SCALE 1"=50'

WSSC Grid Map
#210NW2

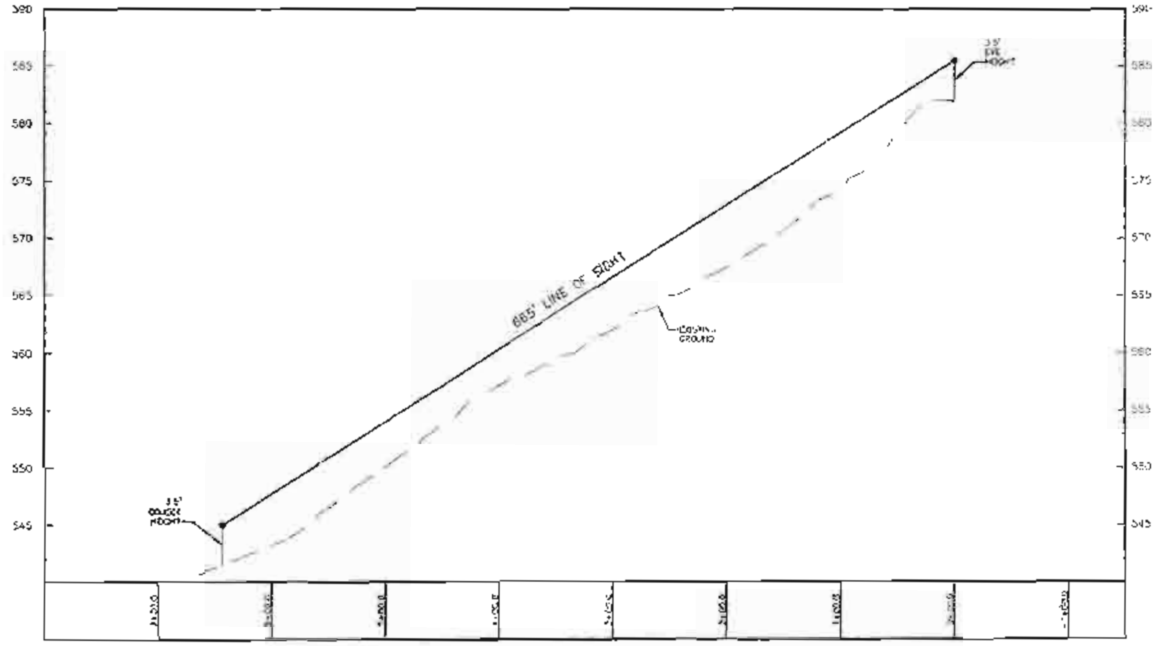
SHA-2

SHEET of

FINAL SCANNED:

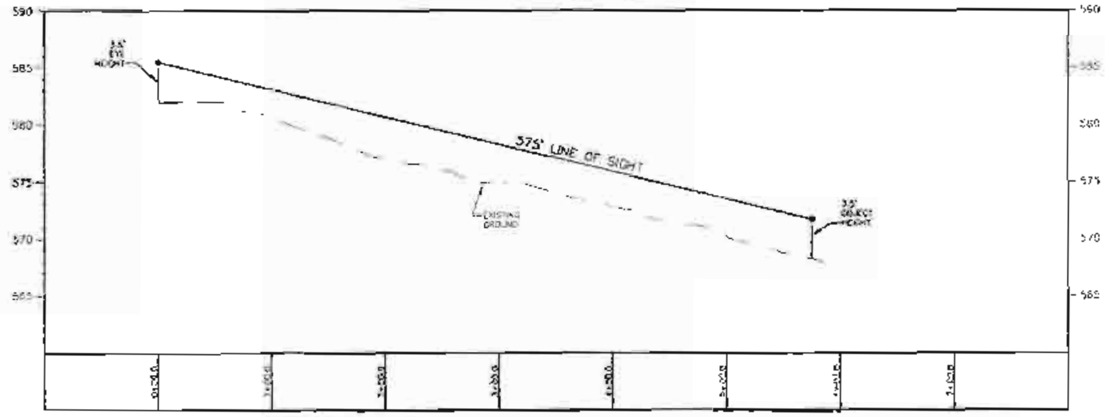
PLAN SCANNED:

PARK CODE: A26



LB - North Entrance Sight Distance LEFT TURN PROFILE

SCALE: HORZ 1" = 50'
VERT 1" = 5'



LB - North Entrance Sight Distance RIGHT TURN PROFILE

SCALE: HORZ 1" = 50'
VERT 1" = 5'

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 32151, Expiration Date: 2/18/2011

DESIGN			REVIEW AND APPROVAL		REVIEW AND APPROVAL	
Landscape Architect	Date	Checked By	Park Development	Date	Superintendent of Parks	Date
Architect	Date	Checked By	Central Maintenance	Date	Park Police	Date
Engineer	Date	Checked By	Region	Date		Date
Drawn By	Date	Checked By	Natural Resources	Date		Date

The Maryland-National Capital Park
and Planning Commission

Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR

REVISIONS

Rev. No.	Date	Description

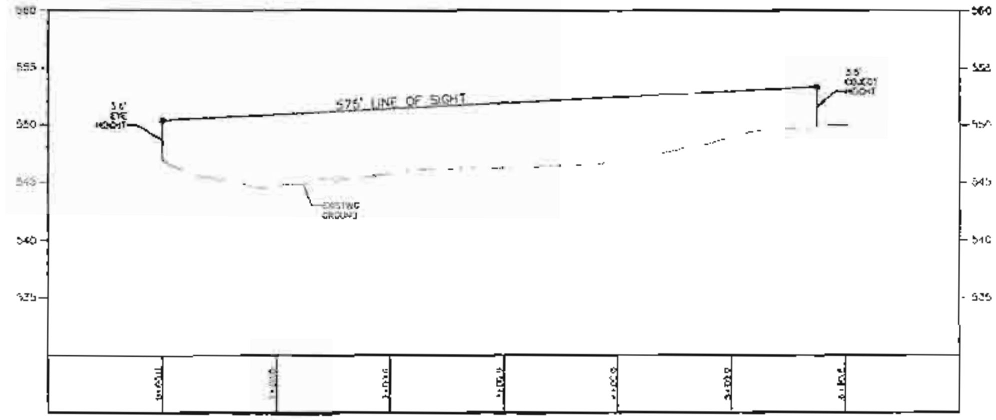
NORTH ENTRANCE
SITE DISTANCE PROFILES
Little Bennett Regional Park
Day Use Area

SCALE: AS NOTED

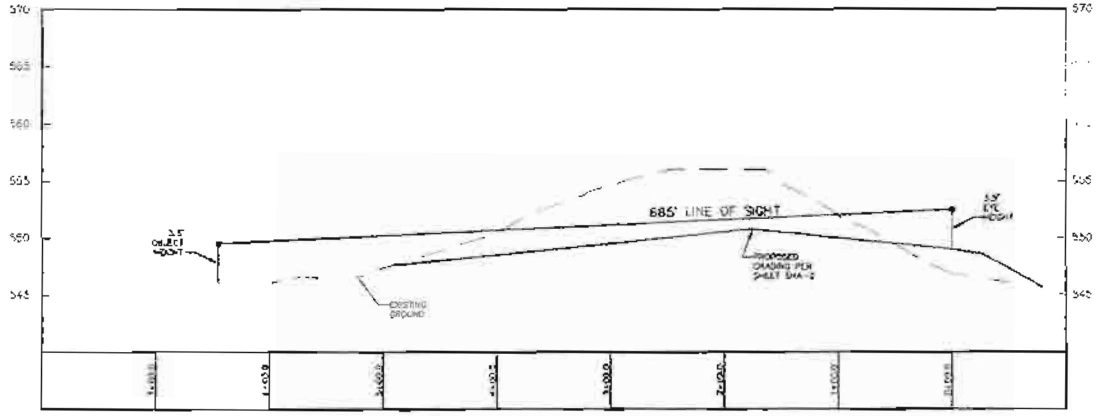
WSSC Grid Map
#210NW2

SHA-3

SHEET



LB - South Entrance Sight Distance RIGHT TURN PROFILE
SCALE HORZ 1" = 50'
VERT 1" = 5'



LB - South Entrance Sight Distance LEFT TURN PROFILE
SCALE HORZ 1" = 50'
VERT 1" = 5'

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 32151, Expiration Date: 7/16/2011

DESIGN				REVIEW AND APPROVAL		REVIEW AND APPROVAL	
M-NCPPC							
Landscape Architect	Date	Checked By		Park Development	Date	Superintendent of Parks	Date
Architect	Date	Checked By		Central Maintenance	Date	Park Police	Date
AMT Engineer	Date	Checked By		Region	Date		Date
AMT Drawn By	Date	Checked By		Natural Resources	Date		Date

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495 2535

PLANS ISSUED FOR
REVISIONS

Rev. No.	Date	Description

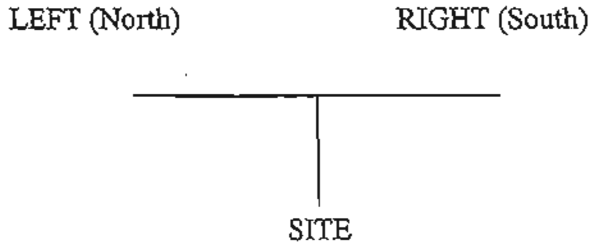
SEAL

SOUTH ENTRANCE
SITE DISTANCE PROFILES
Little Bennett Regional Park
Day Use Area
SCALE AS NOTED
WSSC Grid Map
#210NW2

SHA-4

SHEET of x

Sight Distance Measurement and Evaluation Worksheet



INTERSECTION SIGHT DISTANCE	MEASUREMENT (ft)	
• 3.5' object placed at proposed access • 3.5' driver's eye height on approaching lane	LEFT 665	RIGHT 575
STOPPING SIGHT DISTANCE	MEASUREMENT (ft)	
• 2.0' object placed at proposed access • 3.5' driver's eye height on approaching lane	LEFT 665	RIGHT 575

Evaluation

Posted Speed = 50 mph

Design Speed = Posted Speed + 10 mph = 60 mph (EAPD Policy)

Intersection Sight Distance (ISD):

Turning Movement	State Standard ISD Requirement Based on Design Speed	Reduced ISD Requirement Based on Posted Speed *
Left Turn from Site Access	665	555
Left Turn into Site Access	570	425
Right Turn from Site Access	575	480

*Substandard condition meeting this requirement may be acceptable upon consideration of site specific traffic and safety conditions, feasibility constraints, etc. Mitigation may be required for any substandard condition.

Stopping Sight Distance (SSD):

SSD Required for the Design Speed: 570 ft

Results

Please refer to AASHTO's Policy on Geometric Design of Highways and Streets, Tables 9-5 and 9-58.

Engineering Access Permits Division

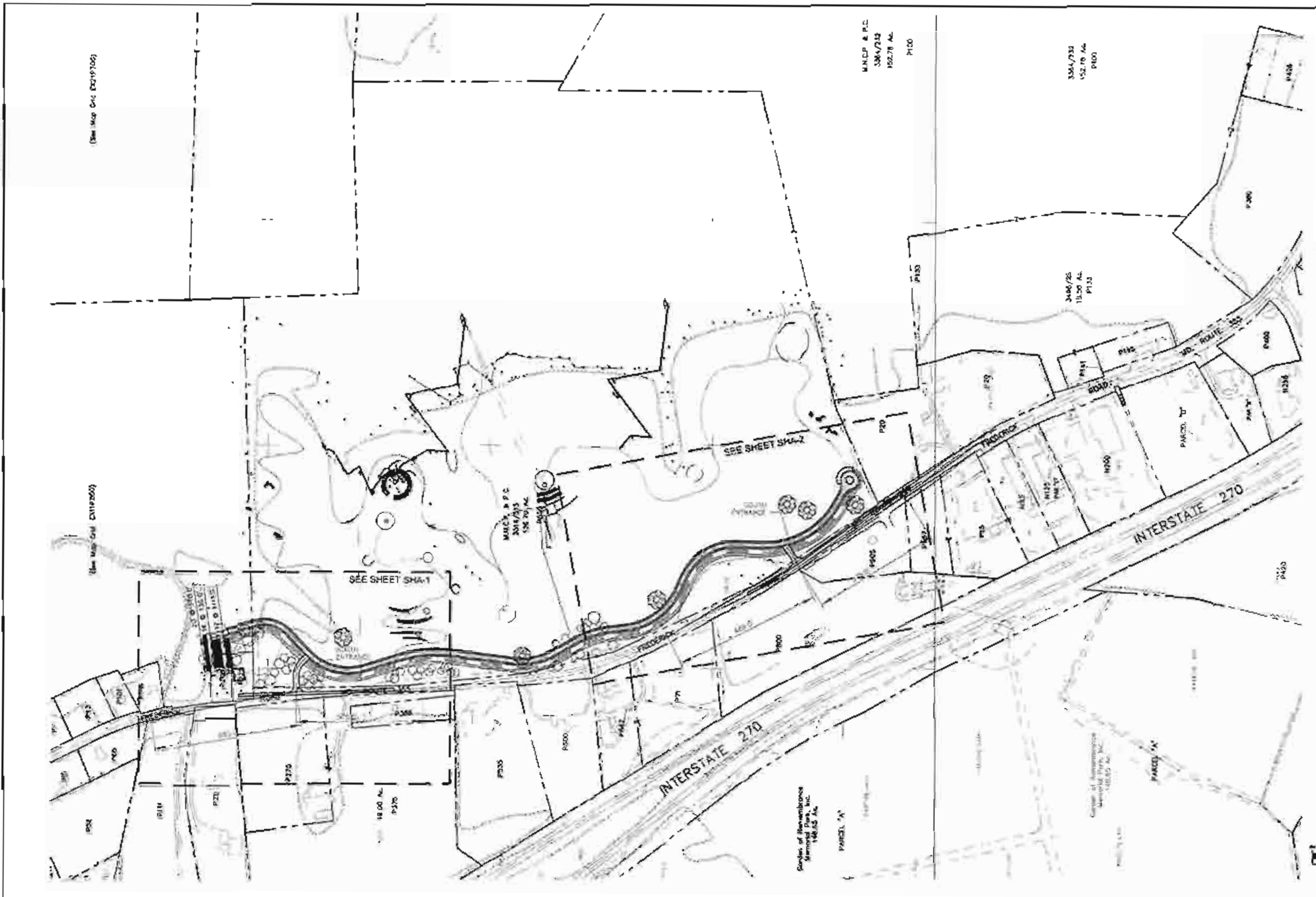
SIGHT DISTANCE QUICK REFERENCE CHART

(Use for Field Review of Proposed Access Locations)

Full Movement Access on 2-Lane Undivided Highway			
Posted Speed (mph)	Assumed Design Speed (mph)	Intersection Sight Distance Required (ft)	Stopping Sight Distance Required (ft)
30	40	445	305
35	45	500	360
40	50	555	425
45	55	610	495
50	60	665	570
55	65	720	645
60	70	775	730
65	75	830	820

Notes:

1. Assumes passenger vehicle for design purposes and level grade ± 3% maximum. Refer to AASHTO if conditions differ.
2. Any sight distance less than the above values, even if only in one direction, is considered "substandard".
3. If substandard conditions are determined, alternate access locations that would meet standards may be required.
4. If alternate access locations are not available, the substandard conditions should be evaluated in detail with respect to specific movements. Mitigation and/ or denial of specific movements that do not meet sight distance standards may be required. This should be discussed with the RSE or ADC prior to any conceptual approval of an access location.



INTERSECTION DESIGN SUMMARY

TOTAL PARK AREA:	137 ACRES
TOTAL PEAK HOUR TRIPS:	28
POSTED SPEED:	50 MPH
DESIGN SPEED (ASSUMED):	60 MPH

DECELERATION LANE REQUIREMENTS

MDSHA TABLE 13.3.2: SINCE BETWEEN 10 AND 29 TRIPS, USE PARTIAL DECELERATION LANES

TOTAL LENGTH:	350'
LANE LENGTH:	250'
TAPER LENGTH:	100'

ACCELERATION LANE REQUIREMENTS

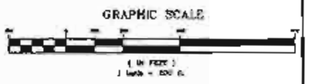
MDSHA TABLE 13.4.2: SINCE BETWEEN 10 AND 25 TRIPS, USE PARTIAL ACCELERATION LANES

TOTAL LENGTH:	360'
LANE LENGTH:	180'
TAPER LENGTH:	180'

INTERSECTION SITE DISTANCE REQUIREMENTS

CASE B1: LEFT TURN ONTO 2 LANE HIGHWAY
ISD = 665' (AASHTO EXHIBIT 9-55)

CASE B2: RIGHT TURN ONTO 2 LANE HIGHWAY
ISD = 575' (AASHTO EXHIBIT 9-58)



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The Maryland-National Capital Park and Planning Commission

Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2595

PLANS ISSUED FOR:
REVISIONS

Rev. No.	Date	Description

Overall Site Plan

Little Bennett Regional Park
Day Use Area

SCALE 1" = 200
WSSC Grid Map
229NW2

CS100

SHEET X of X

Harper, Chuck

From: Corren Giles [CGiles@sha.state.md.us]
Sent: Friday, December 17, 2010 8:49 AM
To: Torgerson, Steven
Cc: Ernest, Matthew; Osband, Greg; 'Chen, Ching-Fang'; Raymond Burns (SHA)
Subject: RE: MNCPPC Little Bennett Regional Park Gateway - SHA Access Coordination Questions

Steve,

Going back through my emails, I reviewed the exhibits sent to me by Matthew. Regarding the sight distance, as long as MNCPPC is planning to modify the roadway grading as shown in the exhibits and the sight distance requirements can be met, the southern access point should be ok.

Corren V. Giles, EIT
Chief, Construction Support Section

From: Corren Giles
Sent: Tuesday, December 07, 2010 2:49 PM
To: 'Torgerson, Steven'
Cc: Ernest, Matthew; Osband, Greg; Chen, Ching-Fang
Subject: RE: MNCPPC Little Bennett Regional Park Gateway - SHA Access Coordination Questions

Hello Steve,

I have completed my review and offer the following comments. Obviously since this is not a detailed plan, I don't have many comments to offer at this point. Thank you for your patience. I have attached a checklist to be used once you are ready to submit for a formal review and the sight distance evaluation form.

General
- Each access point cannot be officially approved until sight distance evaluations (on the SHA form) have been submitted to ensure that both intersection and stopping sight distances are adequate. For the south entrance when exiting, there is a hill to the right which may impact reaching the required sight distances.
- A 5' shoulder must be provided along the entire property frontage.
- Will there be sports programs and events that will generate peak hour traffic which may necessitate a left turn lane at either or both access points?

North Entrance
- This should be relocated and placed opposite the access just south of the proposed location, on the west side of MD 355.
- Only 12' wide accel/decel lanes are required; but 13' can be provided if it is the desire of the County. The length will be determined once more detailed project information and data is provided.

South Entrance
- The location of this access may need to change if the sight distance is not sufficient or geometric changes will be required along MD 355 to mitigate any deficiency.
- Only 12' wide accel/decel lanes are required; but 13' can be provided if it is the desire of the County. The length will be determined once more detailed project information and data is provided.

Please let me know if you have any questions.

PLEASE NOTE: As of December 15th, I will be working in the Office of Construction. **Starting the 15th, please contact Ray Burns for all Montgomery County Access Permits matters.** He can be reached at rburns1@sha.state.md.us or 410-545-5592. Please forward this announcement to others in your office.

Corren V. Giles
Montgomery County Area Engineer
Access Management Division
State Highway Administration
707 N. Calvert Street C-302
Baltimore, MD 21202
(410) 545-5595 phone (410) 209-5026 fax

From: Torgerson, Steven [mailto:storgerson@amtengineering.com]
Sent: Friday, December 03, 2010 9:44 AM
To: Corren Giles
Cc: Ernest, Matthew; Osband, Greg; Chen, Ching-Fang
Subject: MNCPPC Little Bennett Regional Park Gateway - SHA Access Coordination Questions

Good Morning Corren,

I hope that you had a wonderful holiday weekend. I am following up on the frontage access on 355 to the Little Bennett Regional Park Gateway Facility Plan. We are getting close to finalizing our stormwater concept and interior vehicular circulation for the day use area. One of the critical pieces of information that we are missing is a letter of confirmation from SHA that the access locations off 355 are acceptable. As per our earlier conversation, we are currently developing the facility plan. When completed, this document will bring the design of the park to DD documents. The plans will still have to be submitted to SHA during the preparation of the final construction documents. This will not happen until the project is funded for construction; however, we want to know that we are developing a set of plans that can easily be transferred for final construction documents. In addition, the facility plan needs to be as accurate as possible for pricing and public outreach purposes. Please see the following hyperlink for conceptual illustrative of the site.
http://friendsoflittlebennett.org/PDF/DayUseAreaPlan.pdf

What does your time frame look like to complete your review? Is there any way that you can get something to us by the end of the week? Please let me know if you need any information or if you would like to discuss the project in more detail. I can be reached at 301.881.2545.

Best regards,

Steven Torgerson, ASLA, RLA

A. Morton Thomas & Associates, Inc.
12750 Twinbrook Parkway
Rockville, MD 20852
Phone: 301-881-2545 ¦ Fax: 301-881-0814 ¦ Cell: 240-599-6683
www.amtengineering.com

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Please consider the environment before printing this e-mail

Please consider the environment before printing this email

Harper, Chuck

From: Ernest, Matthew
Sent: Wednesday, November 17, 2010 11:30 AM
To: Corren Giles (cgiles@sha.state.md.us)
Cc: Chen, Ching-Fang; Torgerson, Steven; Harper, Chuck; Ernest, Matthew
Subject: Little Bennet Facility Plan - Intersection Site Distance Plans
Attachments: SHA-1.pdf; SHA-2.pdf; SHA-3.pdf; SHA-4.pdf; _LB-sight distance evaluation form.pdf; CS100.pdf

Hi Corren,

I wanted to follow up from a conversation you had with Steve Torgerson from our office. Attached are revised site plans, site distance profiles and ISD worksheet for your review.

The project is only a facility plan. So construction documents are not being prepared. Whenever the project moves forward, a formal access permit submission would be made at that time. We are looking for SHA concurrence on our entrance configuration and locations.

Please review and let me know if you need any additional information or if you have any questions.

Thanks,

Matthew Ernest, P.E.
Associate

A. Morton Thomas & Associates, Inc.
12750 Twinbrook Parkway
Rockville, MD 20852
Phone: 301-881-2545 ¦ Fax: 301-881-0814 ¦ Cell: 240-994-2217
www.amtengineering.com

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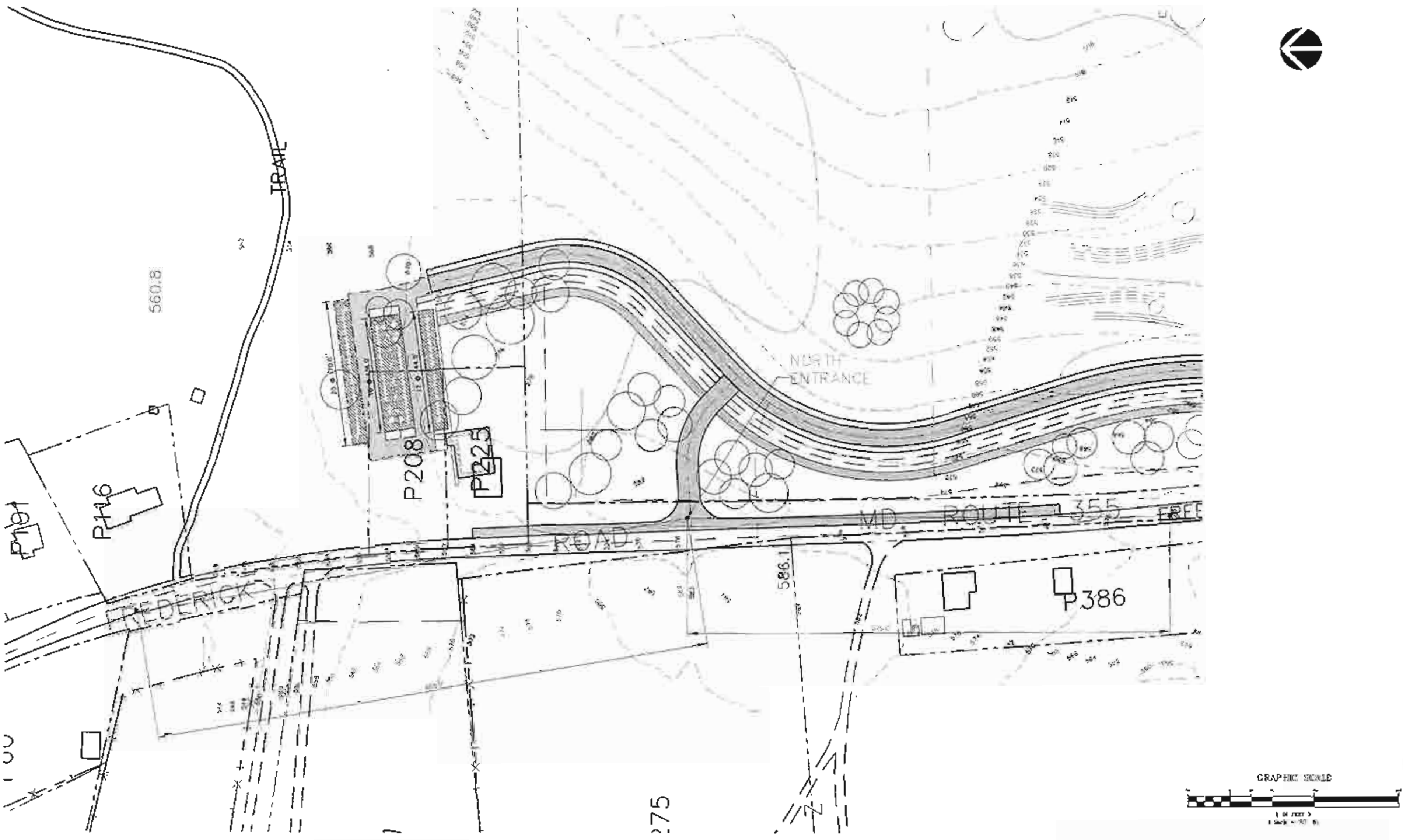

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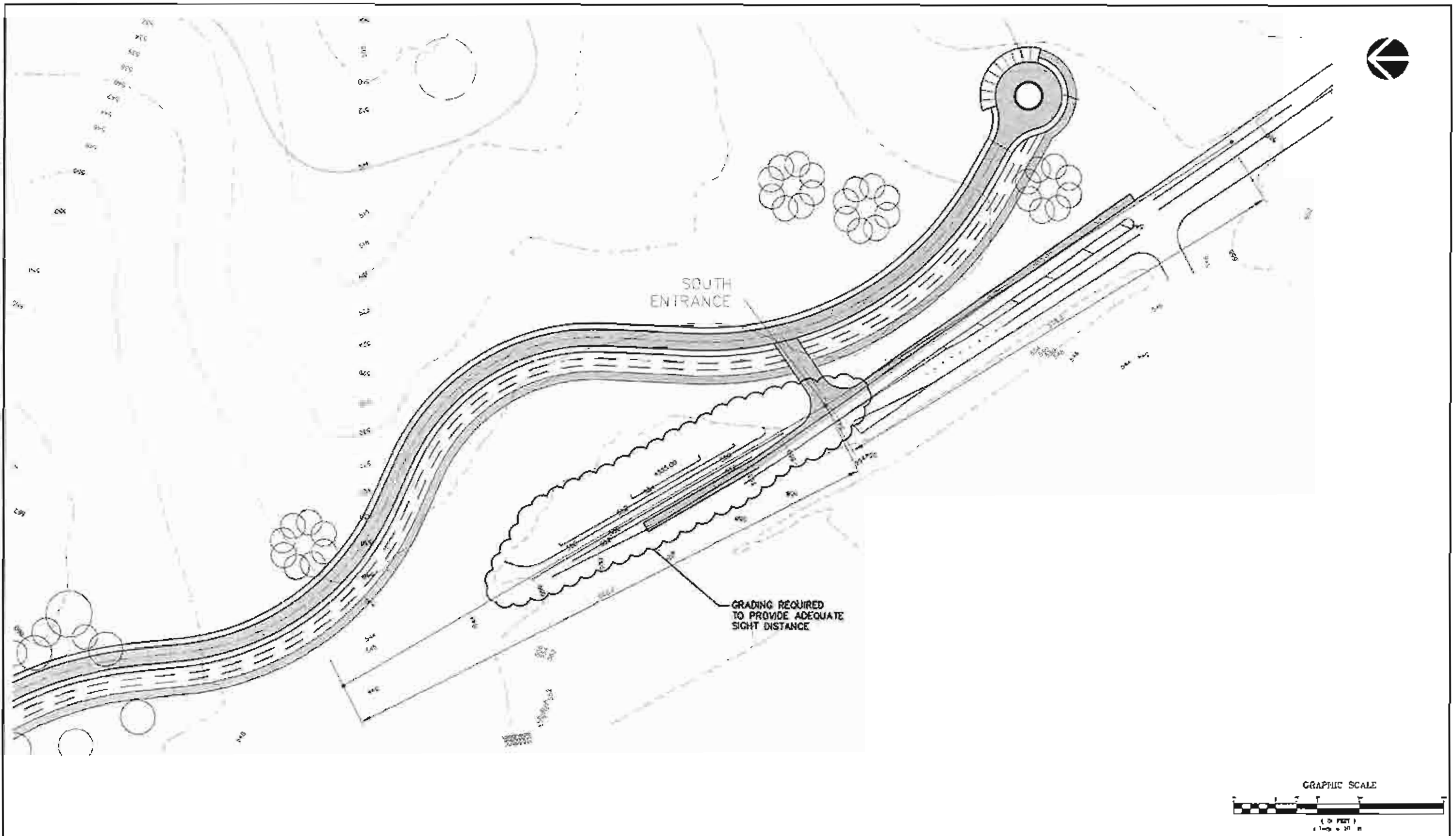
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2595

NORTH ENTRANCE
SITE DISTANCE PLAN
Little Bennett Regional Park
Day Use Area

WSSC Grid Map

SHA-1

SHEET



Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 32151, Expiration Date 7/18/2011

DESIGN			REVIEW AND APPROVAL		REVIEW AND APPROVAL	
Landscape Architect	Date	Checked By	Park Development	Date	Superintendent of Parks	Date
Architect	Date	Checked By	Central Maintenance	Date	Park Police	Date
Engineer	Date	Checked By	Region	Date		Date
Drawn By	Date	Checked By	Natural Resources	Date		Date

The Maryland-National Capital Park and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR
REVISIONS

Rev. No.	Date	Description

SCALE

SOUTH ENTRANCE
SITE DISTANCE PLAN
Little Bennett Regional Park
Day Use Area

SCALE 1"=30'

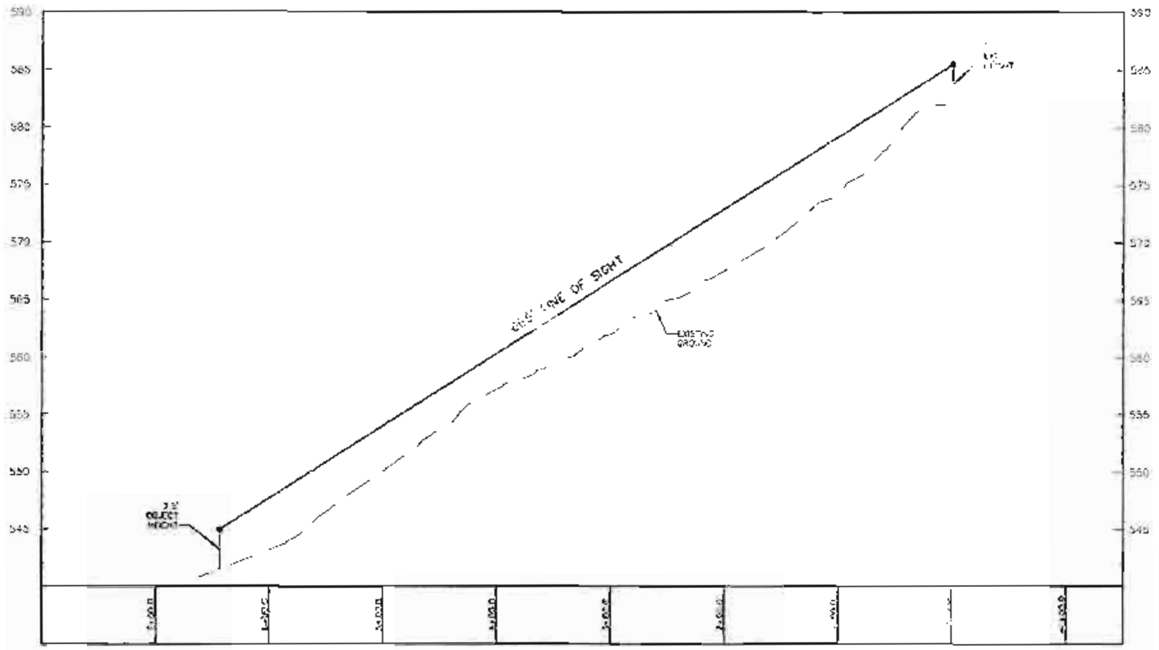
WSSC Grid Map
#210NW2

SHA-2

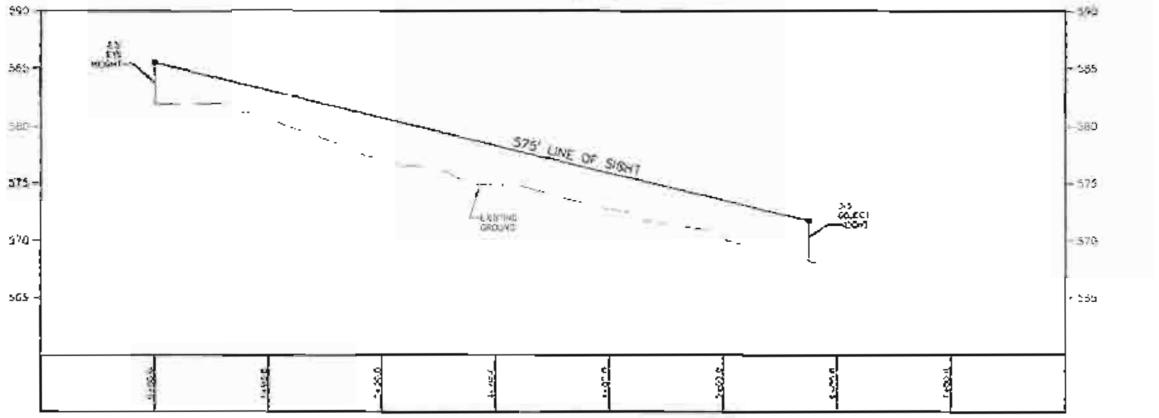
SHEET of

FINAL SCANNED

PARK CODE: A26 PLAN SCANNED



LB - North Entrance Sight Distance LEFT TURN PROFILE
SCALE: HORZ 1" = 30
VERT 1" = 5'



LB - North Entrance Sight Distance RIGHT TURN PROFILE
SCALE: HORZ 1" = 50'
VERT 1" = 5'

GRAPHIC SCALE

(IN FEET)
1 inch = 50 ft.

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License No. 33151 Expiration Date: 7/18/2021

DESIGN
M-NCPPC
Landscape Architect Date Checked By
Architect Date Checked By
Engineer Date Checked By
Drawn By Date Checked By

REVIEW AND APPROVAL
Park Development Date
Central Maintenance Date
Region Date
Natural Resources Date

REVIEW AND APPROVAL
Superintendent of Parks Date
Park Police Date
Date
Date

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Park and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

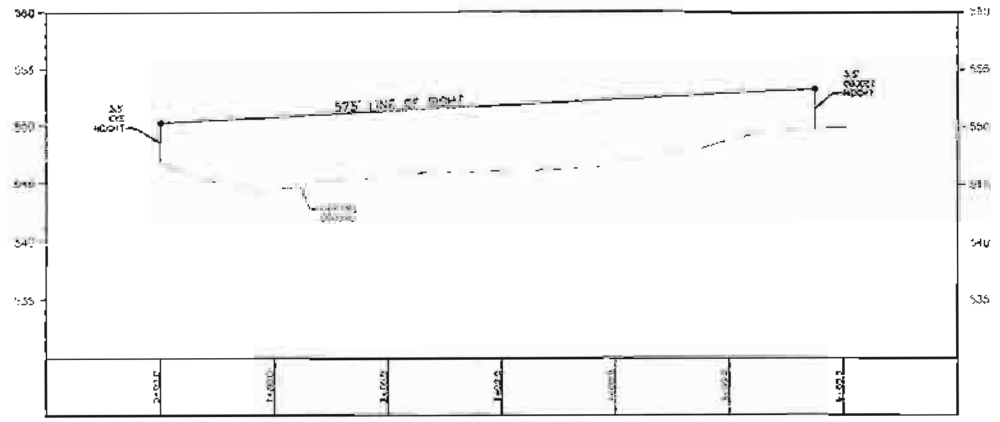
PLANS ISSUED FOR:
REVISIONS
Rev. No. Date Description

SEAL

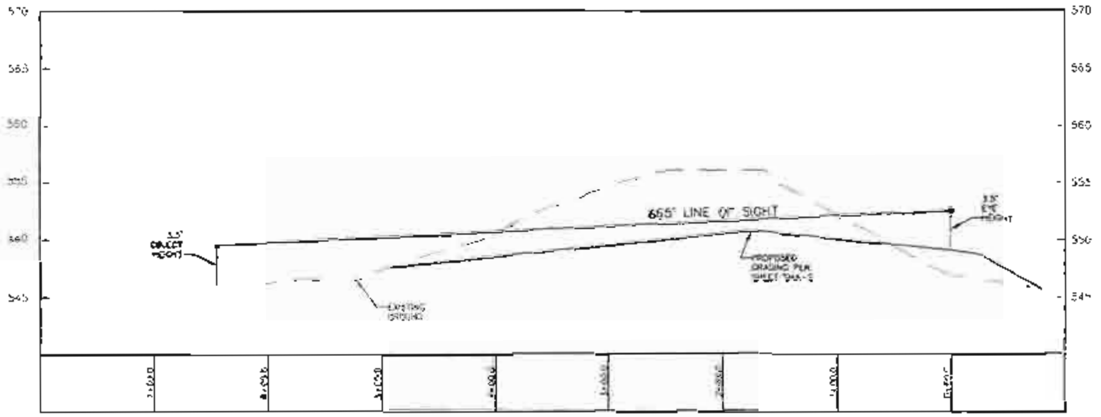
NORTH ENTRANCE
SITE DISTANCE PROFILES
Little Bennett Regional Park
Day Use Area
SCALE AS NOTED
WSSC Grid Map
##NW##

SHA-3

SHEET of



LB - South Entrance Sight Distance RIGHT TURN PROFILE
SCALE: HORZ. 1" = 50'
VERT. 1" = 5'



LB - South Entrance Sight Distance LEFT TURN PROFILE
SCALE: HORZ. 1" = 50'
VERT. 1" = 5'

GRAPHIC SCALE
(IN FEET)
1 inch = 50 ft.

Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland.
License No. [illegible], Expiration Date [illegible]

DESIGN | REVIEW AND APPROVAL | REVIEW AND APPROVAL

Park Development
Park Police

The Maryland-National Capital Park
and Planning Commission
Montgomery County Department of Parks and Planning
9500 Brunett Avenue
Silver Spring, Maryland 20901
(301) 495-2535

PLANS ISSUED FOR
REVISIONS
Date
Description

SOUTH ENTRANCE
SITE DISTANCE PROFILES
Little Bennett Regional Park
Day Use Area

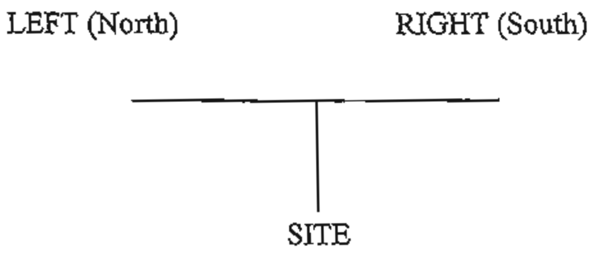
SCALE: AS NOTED

WSSC Grid Map
[illegible]

SHA-4

SHEET of

Sight Distance Measurement and Evaluation Worksheet



INTERSECTION SIGHT DISTANCE	MEASUREMENT (ft)	
• 3.5' object placed at proposed access • 3.5' driver's eye height on approaching lane	LEFT 665	RIGHT 575
STOPPING SIGHT DISTANCE	MEASUREMENT (ft)	
• 2.0' object placed at proposed access • 3.5' driver's eye height on approaching lane	LEFT 665	RIGHT 575

Evaluation

Posted Speed = 50 mph

Design Speed = Posted Speed + 10 mph = 60 mph (EAPD Policy)

Intersection Sight Distance (ISD):

Turning Movement	State Standard ISD Requirement Based on Design Speed	Reduced ISD Requirement Based on Posted Speed*
Left Turn from Site Access	665	555
Left Turn into Site Access	570	425
Right Turn from Site Access	575	480

*Substandard condition meeting this requirement may be acceptable upon consideration of site specific traffic and safety conditions, feasibility constraints, etc. Mitigation may be required for any substandard condition.

Stopping Sight Distance (SSD):

SSD Required for the Design Speed: 570 ft

Results

Please refer to AASHTO's Policy on Geometric Design of Highways and Streets, Tables 9-5 and 9-58.

Engineering Access Permits Division

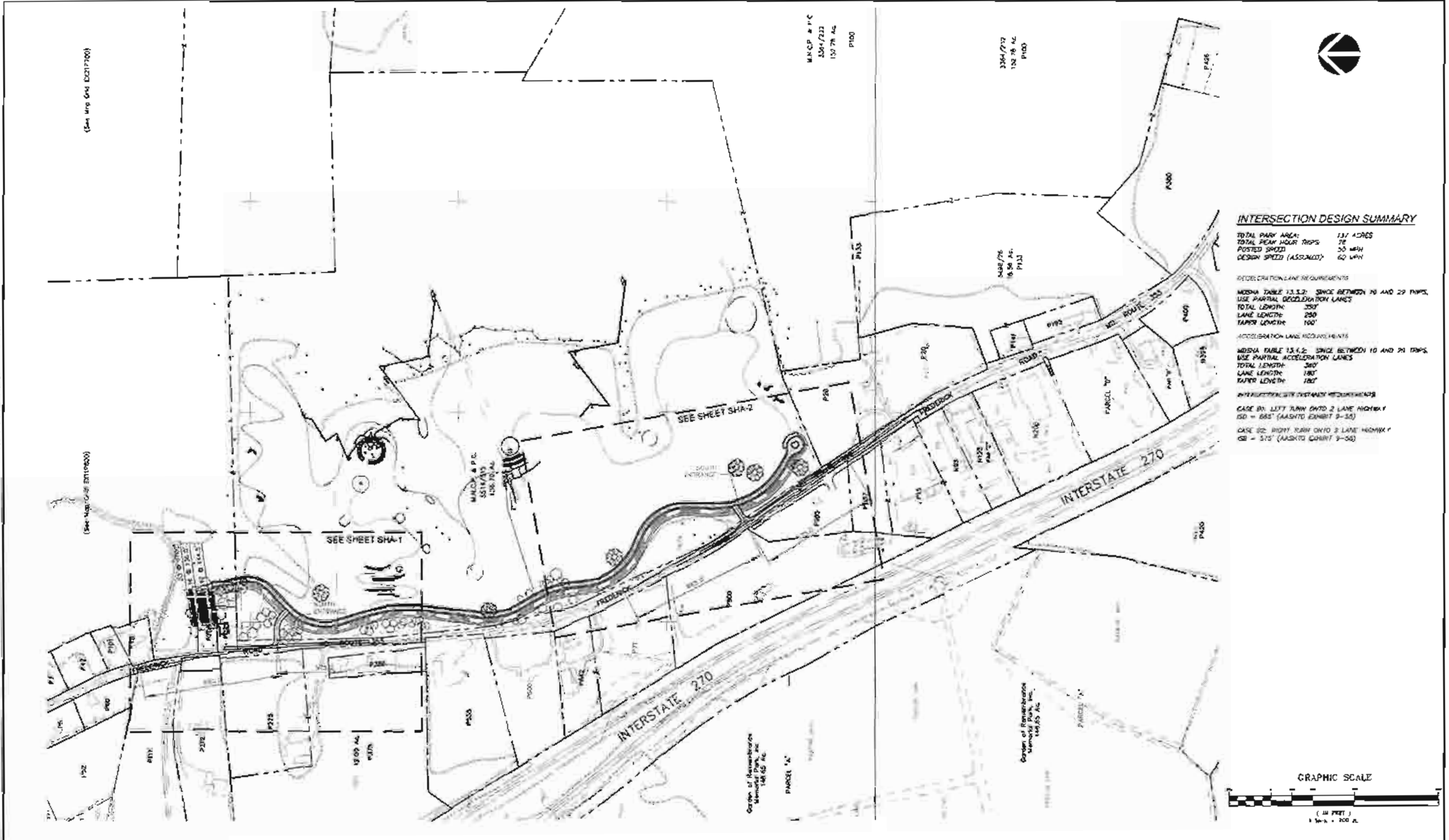
SIGHT DISTANCE QUICK REFERENCE CHART

(Use for Field Review of Proposed Access Locations)

Full Movement Access on 2-Lane Undivided Highway			
Posted Speed (mph)	**Assumed Design Speed (mph)**	**Intersection Sight Distance Required (ft)**	**Stopping Sight Distance Required (ft)**
30	40	445	305
35	45	500	360
40	50	555	425
45	55	610	495
50	60	665	570
55	65	720	645
60	70	775	730
65	75	830	820

Notes:

1. Assumes passenger vehicle for design purposes and level grade ± 3% maximum. Refer to AASHTO if conditions differ.
2. Any sight distance less than the above values, even if only in one direction, is considered "substandard".
3. If substandard conditions are determined, alternate access locations that would meet standards may be required.
4. If alternate access locations are not available, the substandard conditions should be evaluated in detail with respect to specific movements. Mitigation and/ or denial of specific movements that do not meet sight distance standards may be required. This should be discussed with the RSE or ADC prior to any conceptual approval of an access location.



INTERSECTION DESIGN SUMMARY

TOTAL PARK AREA:	137 ACRES
TOTAL PEAK HOUR TRIPS:	78
POSTED SPEED	50 MPH
DESIGN SPEED (ASSUMED)	60 MPH

DECELERATION LANE REQUIREMENTS

MDSHA TABLE 13.5.2: SINCE BETWEEN 10 AND 29 TRIPS, USE PARTIAL DECELERATION LANES

TOTAL LENGTH:	350'
LANE LENGTH:	250
TAPER LENGTH:	100'

ACCELERATION LANE REQUIREMENTS

MDSHA TABLE 13.4.2: SINCE BETWEEN 10 AND 29 TRIPS, USE PARTIAL ACCELERATION LANES

TOTAL LENGTH:	360'
LANE LENGTH:	180'
TAPER LENGTH:	180'

INTERSECTION SITE DISTANCE REQUIREMENTS

CASE B1: LEFT TURN ONTO 2 LANE HIGHWAY
ISD = 665' (AASHTO EXHIBIT 9-55)

CASE B2: RIGHT TURN ONTO 2 LANE HIGHWAY
ISD = 575' (AASHTO EXHIBIT 9-58)

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License No. 3223 Expiration Date 3/18/2011

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Montgomery County Department of Parks and Planning
8787 Georgia Avenue
Silver Spring, Maryland 20910
(301) 495-2595

PLANS ISSUED FOR
REVISIONS

Overall Site Plan

Little Bennett Regional Park
Day Use Area

WSSC Grid Map
221NW2

CS100

MONTGOMERY COUNTY DEPARTMENT OF PARKS
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

MEETING REPORT

MEETING DATE: June 8, 2011

STAFF ATTENDING:	Ki Kim	Planning	Area 3
	Charles Kines	Parks	Park Planning & Stewardship
	Wendy Hanley	Parks	Northern Region
	Patricia McManus	Parks	Park Development
	Marian Elsasser	Parks	Park Development
	Ching-Fang Chen	Parks	Park Development

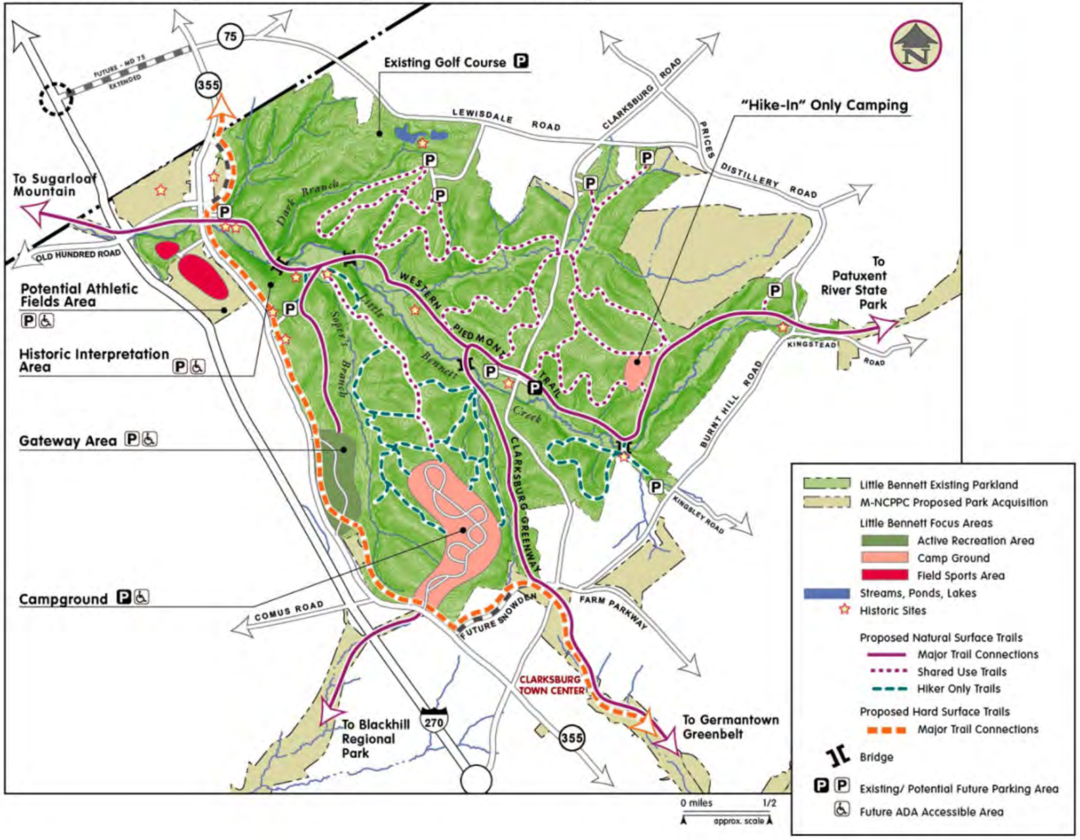
PROJECT: Little Bennett Regional Park, Day Use Area-Facility Planning

SUBJECT: Clarksburg Greenway and Countywide Bikeways

The park staff met and discussed issues related to Clarksburg Greenway and Countywide Bikeways for the facility plan of the Little Bennett Regional Park-Day Use Area.

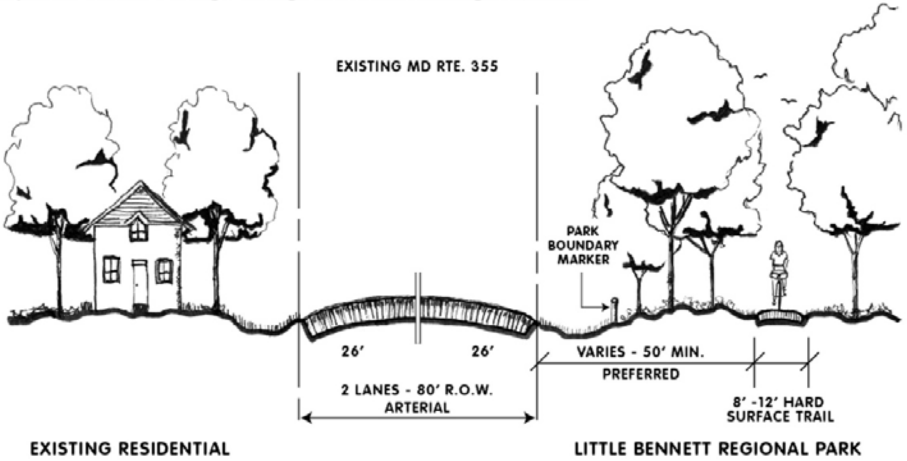
Background

Little Bennett Regional Park Proposed Trail Plan Map



The 2007 Little Bennett Regional Park Master Plan emphasizes the concept of accessibility by different transportation modes. The Plan extends the Clarksburg greenway network to the park so people can get to the park without using their car. The Plan recommended that the trail be set back from the road right-of-way on Route 355 a minimum of 50 feet to provide a better park experience.

Proposed Road Frontage Along Little Bennett Regional Park

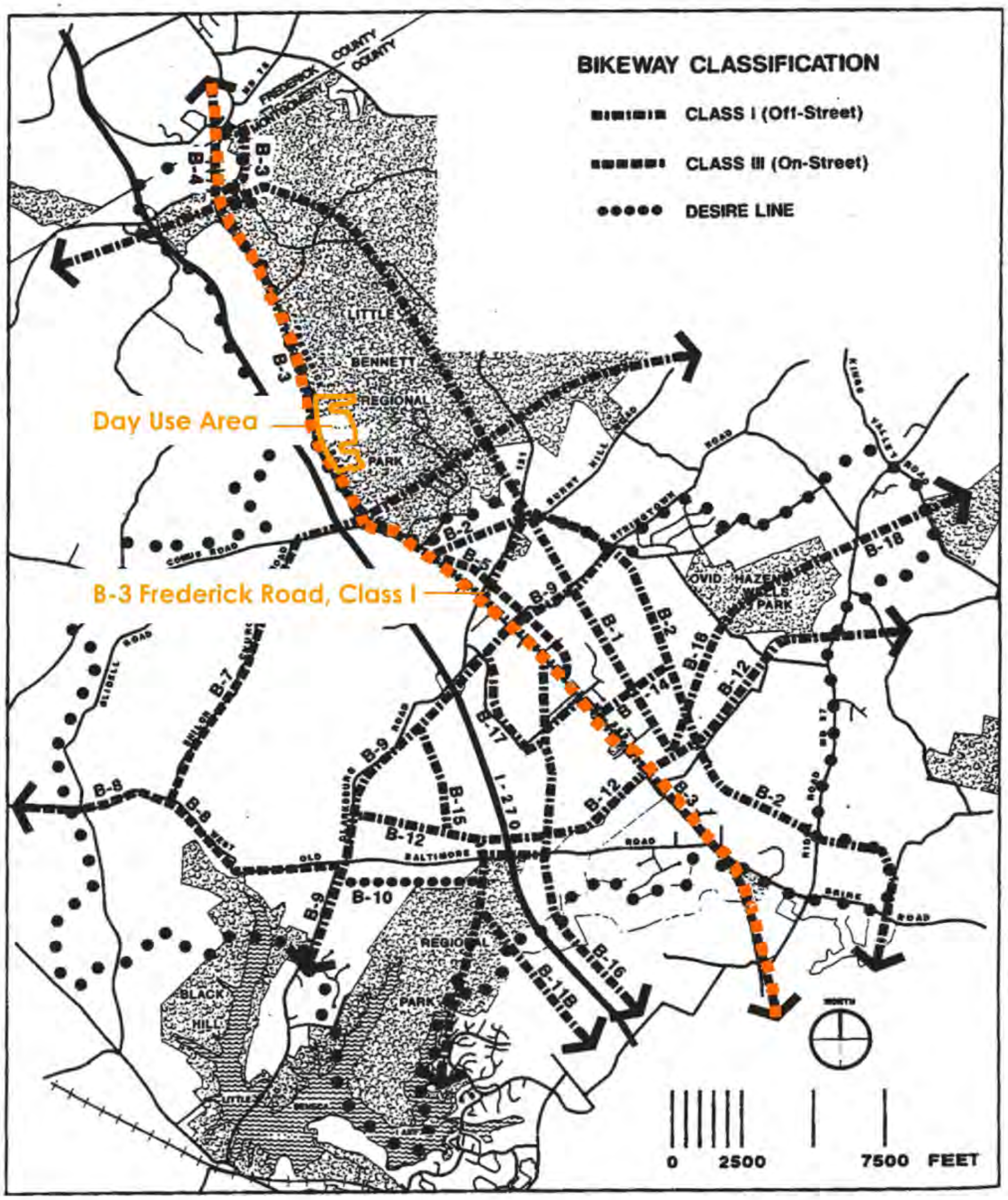


The section of the trail between the maintenance yard and the day use area was shown in the Little Bennett master plan to be routed through parkland near Soper's Branch, rather than along the road right-of-way to provide a better park experience. This might not be feasible for environmental reasons. The trail was shown to connect the day use area and then extend north along Route 355 in the right-of-way to Route 109 and Hyattstown.

The 1994 Clarksburg Master Plan intended the transportation bikeway on Route 355, Frederick Road, to be integrated with the Clarksburg Greenway Trail (page 131 of Clarksburg Master Plan.) The B-3, Class I (Off-Street) transportation bikeway runs along the west side of Route 355 south of Route 121, Clarksburg Road, and is intended to be located along the east side of Route 355 north of Route 121. The bikeway is intended to extend south at least to the Montgomery County Fairgrounds in Gaithersburg. The Plan recommended implementing the bikeway system as development occurs.

Bikeway Plan

Figure 43



Clarksburg Master Plan and Hyattstown Special Study Area
Approved and Adopted June 1994

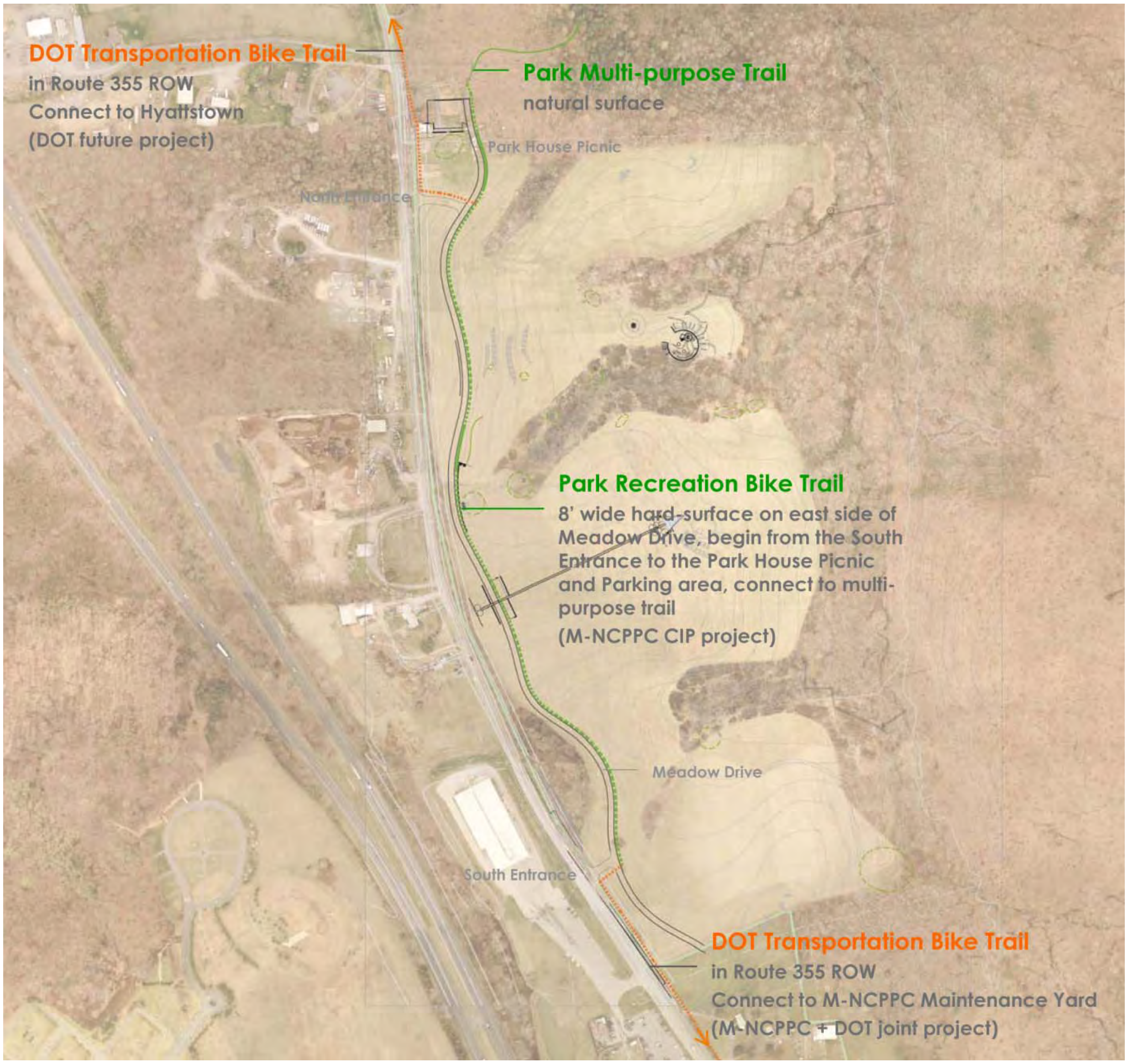
Maryland-National Capital Park & Planning Commission

Discussion

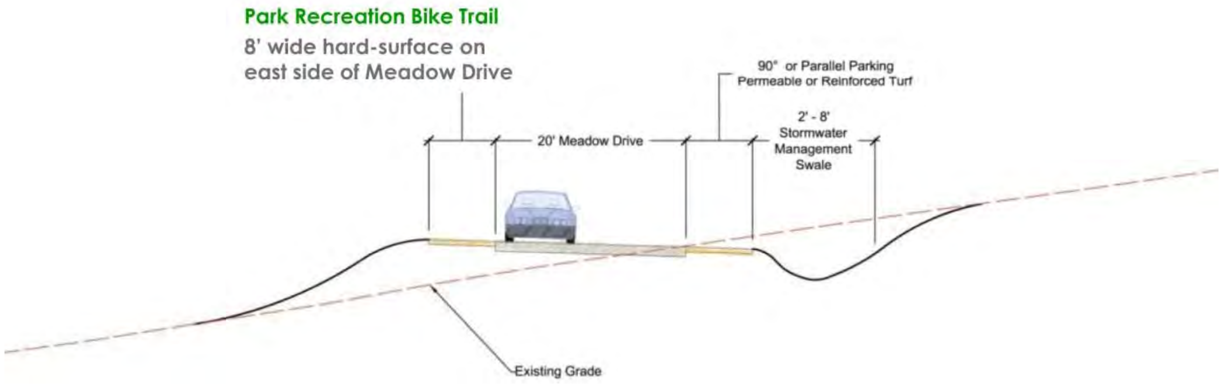
Trail Connection

The proposed Day Use Area and Hyattstown are the major destination for the bike trail. It is important to make the connection from the terminus of the Clarksburg Greenway trail to the day use area at the time the park is developed. The bike trail between the maintenance yard and the day use area does not exist and Montgomery County DOT does not currently have this project in their CIP. The trail would be about a mile long and could be located along the road ROW, if the location in the park were unfeasible. Staff will contact Gail Tait-Nouri at DOT to discuss coordination and potential timing for this project and whether the planning for the trail could be a joint project in either the Parks CIP or the County CIP.

MCDOT has agreed to build the trail on the east side of Route 355 between Hyattstown Mill Road and Route 109 without widening the road. The trail is currently designed to connect to their planned sidewalks in the town and to be completed in summer of 2013.



Proposed Trail Location
Staff discussed whether the transportation bikeway would be routed along Route 355 right-of-way in front of the day use area or whether it could be included along the roadway within the day use area. The Route 355 ROW in this area is constrained by steep slopes and a hedgerow that is providing screening for the park. Park staff would prefer to have the trail run along the park access road, Meadow Drive, to serve both the recreation and transportation function. The alignment can be well-integrated with topography. Stormwater can be efficiently managed and the hedgerow buffer can be preserved. The recreation bike trail will connect to the transportation bike trail along the road north and south of the day use area. The trail will be set back from the busy Route 355 traffic as recommended in the Little Bennett Regional Park Master Plan. The park plan can accommodate an eight-foot wide hard-surface pedestrian and bike trail on the east side of the Meadow Drive. This area was originally intended to be used as a shoulder for casual parking. Because of the deferred development of the Visitor Welcome and Nature Center, the park plan can provide adequate parking without using this area.



Lighting
Transportation bikeways should be lighted, be in the Master Plan ROW or reasonably close to it, and be open 24 hours. The recreational trail does not have lighting because the Park facilities are close at dark. The County may not want the trail to be routed through the park but rather remain on the roadway. The park plan will propose the trail location here on an interim basis to fulfill the access needs but will not propose lighting. If DOT decides to locate the bikeway in the right-of-way in front of the park, the park trail could be converted to parking at a later date. If the trail were to remain within the park, lighting could be added in the future. The Clarksburg Greenway Trail is currently not lighted.

This report was prepared by:

Ching-Fang Chen Distributed for Review: June 10, 2011
Landscape Architect/Project Manager

Copy: Attendees & PDCO team