CERTIFICATE OF AUTHENTICITY

THIS IS TO CERTIFY THAT THE FOLLOWING ELECTRONIC RECORDS ARE TRUE AND ACCURATE REPRODUCTIONS OF THE ORIGINAL RECORDS OF JAMES CITY COUNTY GENERAL SERVICES DEPARTMENT- STORMWATER DIVISION; WERE SCANNED IN THE REGULAR COURSE OF BUSINESS PURSUANT TO GUIDELINES ESTABLISHED BY THE LIBRARY OF VIRGINIA AND ARCHIVES; AND HAVE BEEN VERIFIED IN THE CUSTODY OF THE INDIVIDUAL LISTED BELOW.

BMP NUMBER: **99104**

DATE VERIFIED: **July 3, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: February 24, 2010

TO: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

BMP ID or General File ID 00004 99104

PIN: 3820100002

Subdivision, Tract, Business or Owner Name (if known): James City County

Property Description: Skateboard Park

Site Address:

(For internal use only) **Box:** JC001 **Drawer:** 2

Agreements: (in file as of scan date) **N** **Book or Doc#:** **Page:**

Comments:

Contents for Stormwater Management Facilities As-built Files

Each File is to contain:

- ☐ 1. Maintenance Agreement
- ☐ 2. Construction certification
- ☐ 3. As-Built plan
- ☐ 4. Design Calculations
- ☐ 6. Correspondence
- ☐ 7. Inspection records
- ☐ 8. Miscellaneous

Scott -
These are 'conceptual' plans for the water Tower site. Much of this plan has either been scrapped or moved (i.e. skate park). The parking lot + picnic area did not get shot down. call if you have questions. Paul

WATER TOWER PARK

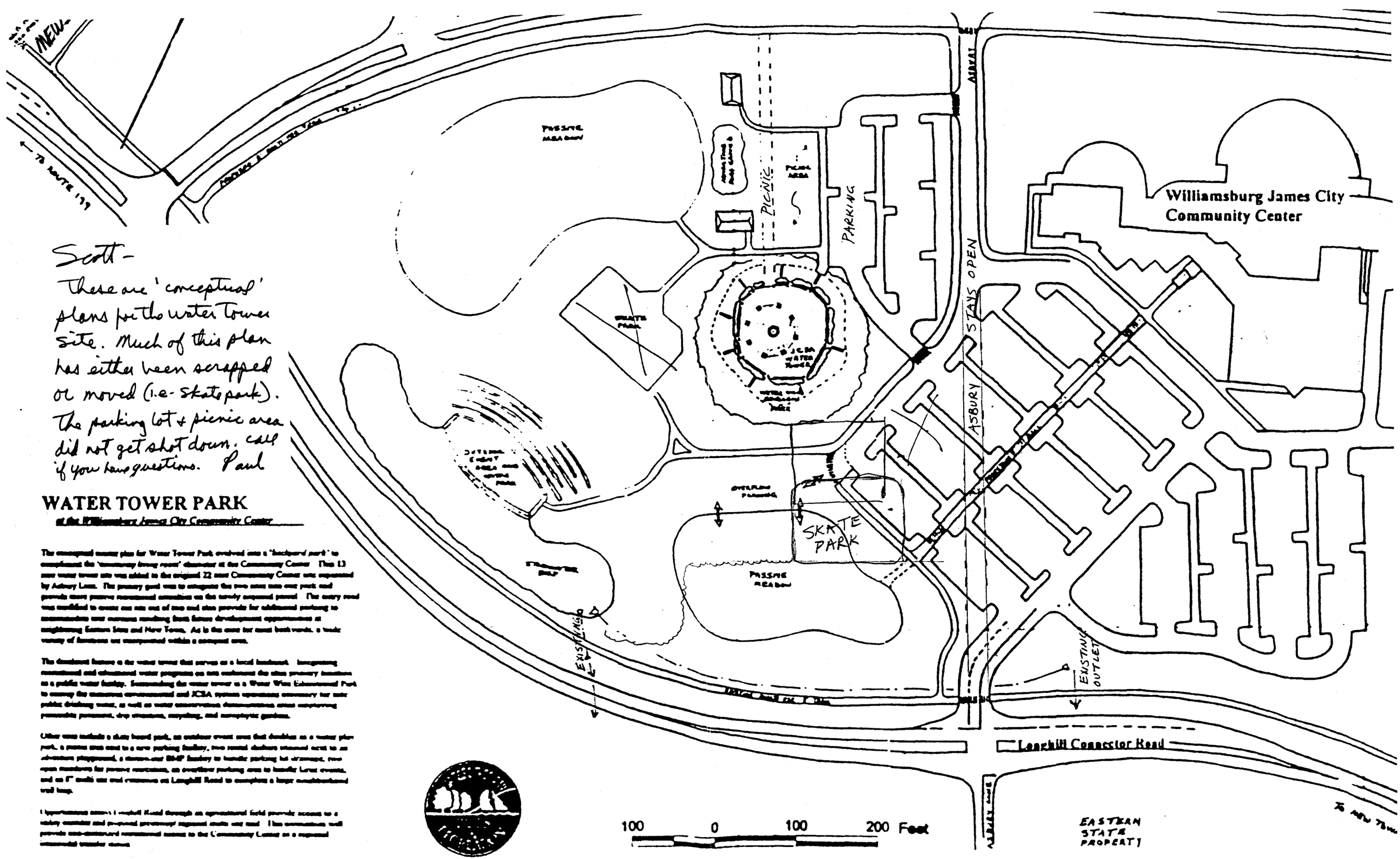
at the Williamsburg James City Community Center

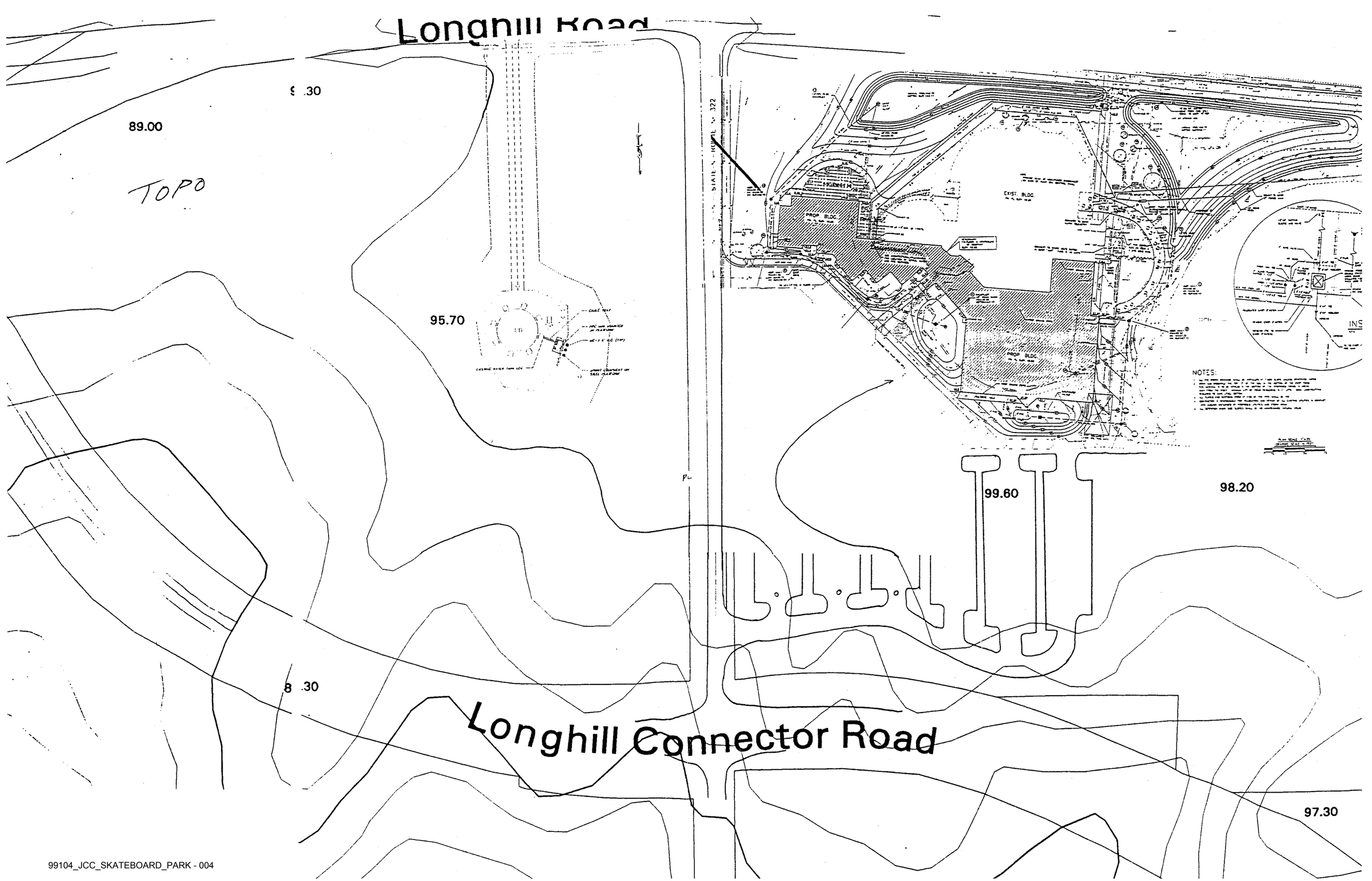
The conceptual master plan for Water Tower Park evolved into a "backyard park" to complement the "community living room" character of the Community Center. This 13 acre water tower site was added to the original 22 acre Community Center site requested by Asbury Lane. The primary goal was to integrate the new water tower park and provide more passive recreational amenities on the newly acquired parcel. The entry road was modified to create one one-way road also provide for additional parking to accommodate user overflow resulting from future development opportunities at neighboring Eastern State and New Town. As is the case for most backyards, a wide variety of functions are accommodated within a compact area.

The dominant feature is the water tower that serves as a local landmark. Interpretive educational and educational water programs are also anchored the site, primary functions are a public water display. Surrounding the water tower is a Water Wise Educational Park to convey the conservation environmental and JCSA system operations necessary for safe public drinking water, as well as water conservation demonstrations which incorporate permeable pavement, drip irrigation, recycling, and xeriphytic gardens.

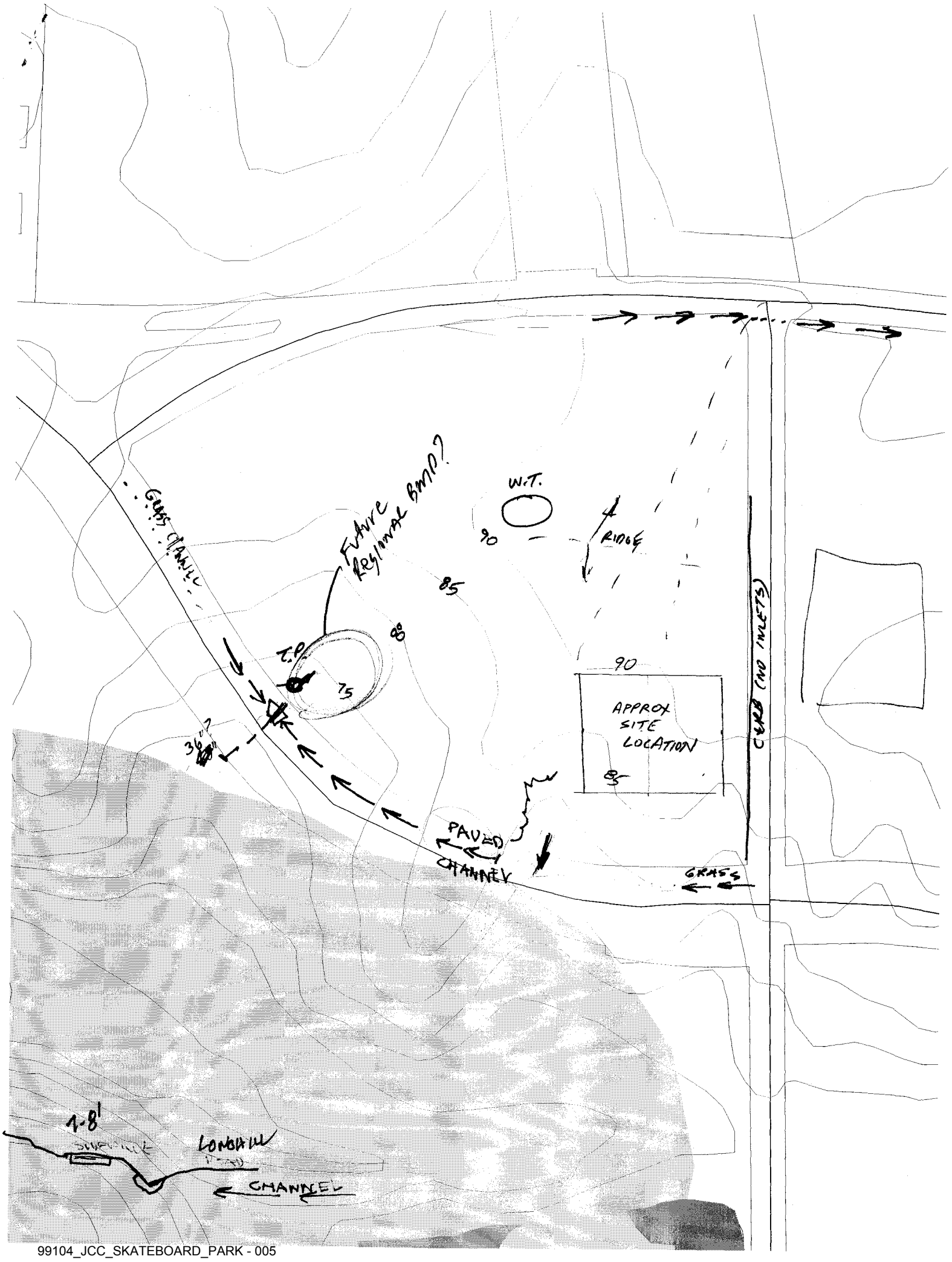
Other uses include a skate board park, an outdoor event area that doubles as a water play park, a picnic area next to a new parking facility, two passive shadows recreational areas, an adventure playground, a stormwater BMP facility to handle parking lot drainage, two open meadows for passive recreation, an overflow parking area to handle Large events, and an 8' multi use trail connection on Longhill Road to complete a larger neighborhood trail loop.

A hypothetical connect Longhill Road through an agricultural field provides access to a future residential and proposed government supported studio and retail. This connection would provide non-motorized recreational access to the Community Center as a supplemental commuter access.





99104_JCC_SKATEBOARD_PARK - 004



99104_JCC_SKATEBOARD_PARK - 005

LAN

SP-101-00

JNTY SKATE PARK

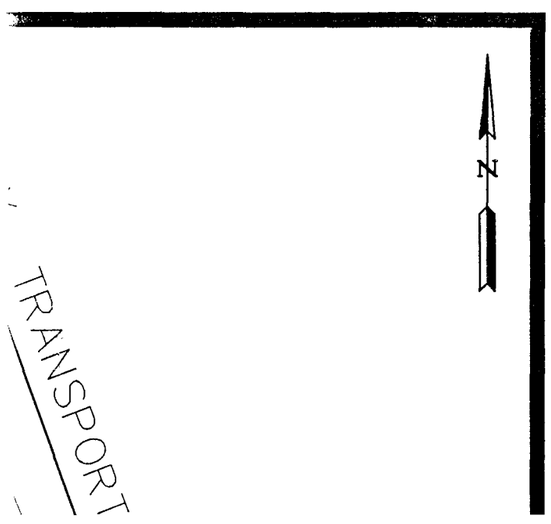
TY, VIRGINIA

FOR:

RKS AND RECREATION

COUNTY OF JAMES CITY
FINAL SITE PLAN

		DATE
APPROVED	SD/BT	9/5/00
PLANNING	CL/BT	9/8/00
TRAFFIC	DAS/BT	1/17/01
		1/23/01
PUBLIC WORKS	DEC/BT	1/12/01
ENVIRONMENT		1/23/01
ZONING	DP/BT	9/11/00
JCSA	WB/BT	9/8/00
COUNTY ENGINEER		
REA		
OTHER		

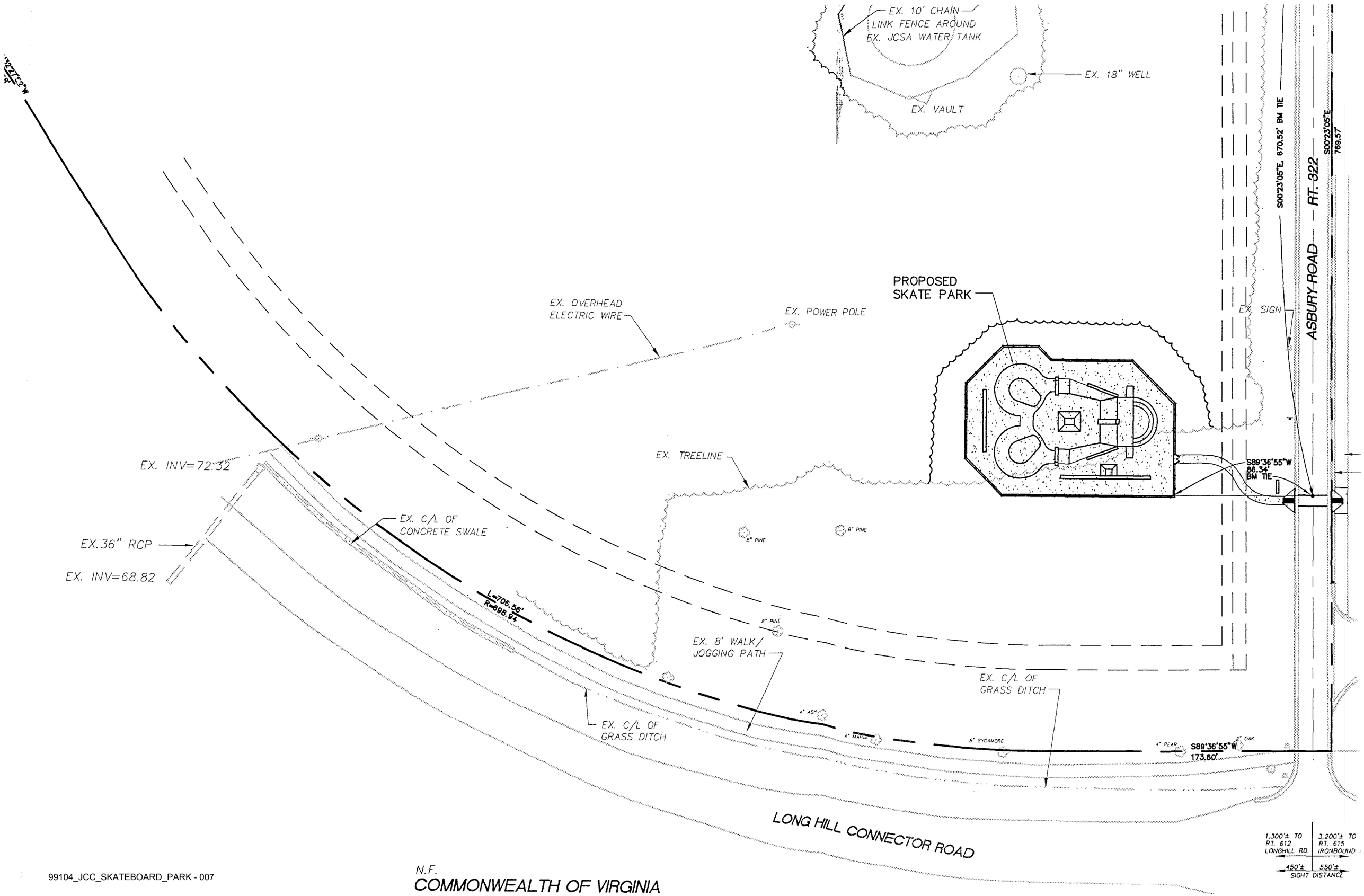


INDEX OF SHEETS

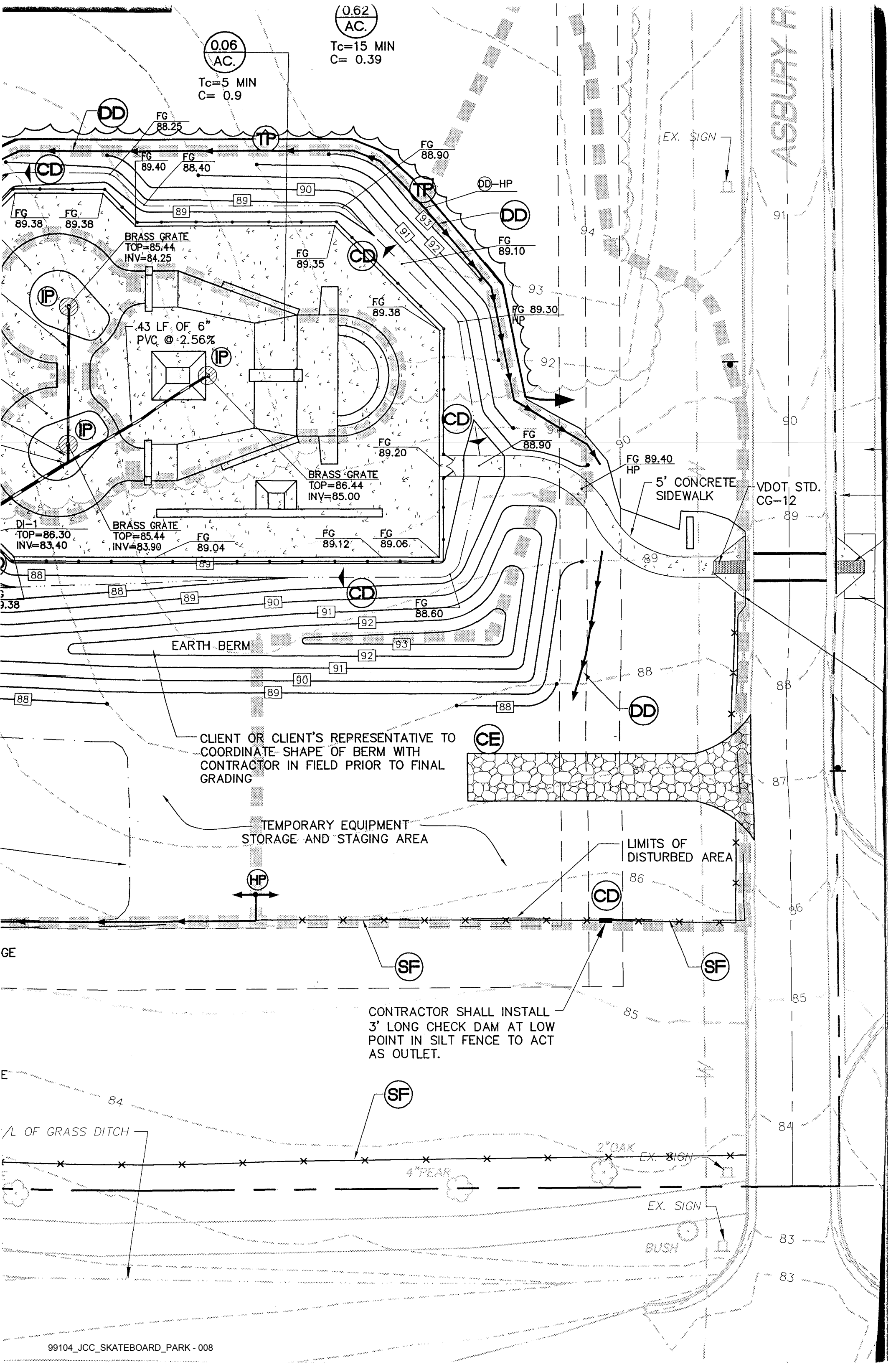
SHEET NUMBER	DESCRIPTION
1	COVER SHEET
2	OVERALL SITE PLAN
3	SITE PLAN
4	GRADING, DRAINAGE, AND EROSION / SEDIMENT CONTROL PLAN
5	LANDSCAPE PLAN
6	SKATE PARK LAYOUT AND GRADING PLAN
7	SKATE PARK CONSTRUCTION DETAILS
8	SKATE PARK CONSTRUCTION DETAILS
9	NOTES AND DETAILS

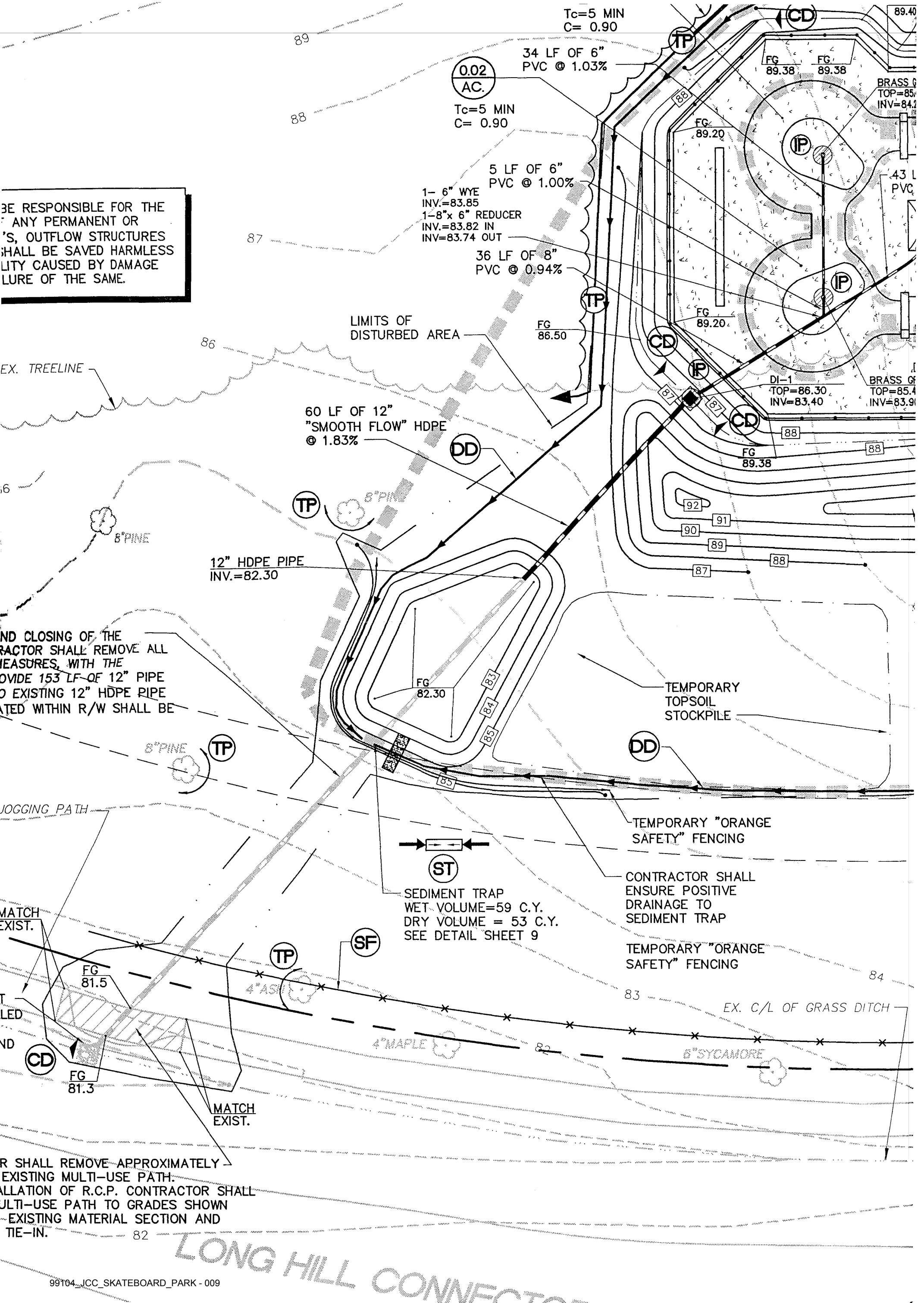
GENERAL NOTES

99104_JCC_SKATEBOARD_PARK - 006



99104_JCC_SKATEBOARD_PARK - 007


0.62 AC.
Tc=15 MIN
C= 0.39
0.06 AC.
Tc=5 MIN
C= 0.9
DD
FG 88.25
TP
FG 89.40
FG 88.40
CD
FG 88.90
DD-HP
DD
FG 89.38
FG 89.38
BRASS GRATE
TOP=85.44
INV=84.25
FG 89.35
CD
FG 89.10
FG 89.38
FG 89.30
HP
43 LF OF 6" PVC @ 2.56%
IP
IP
IP
CD
FG 89.20
FG 88.90
FG 89.40
HP
BRASS GRATE
TOP=86.44
INV=85.00
5' CONCRETE SIDEWALK
VDOT STD. CG-12
DI-1
TOP=86.30
INV=83.40
BRASS GRATE
TOP=85.44
INV=83.90
FG 89.04
FG 89.12
FG 89.06
CD
FG 88.60
EARTH BERM
DD
CE
CLIENT OR CLIENT'S REPRESENTATIVE TO COORDINATE SHAPE OF BERM WITH CONTRACTOR IN FIELD PRIOR TO FINAL GRADING
TEMPORARY EQUIPMENT STORAGE AND STAGING AREA
LIMITS OF DISTURBED AREA
HP
CD
SF
SF
CONTRACTOR SHALL INSTALL 3' LONG CHECK DAM AT LOW POINT IN SILT FENCE TO ACT AS OUTLET.
SF
/L OF GRASS DITCH
2"OAK
EX. SIGN
4"PEAR
EX. SIGN
BUSH
ASBURY R
EX. SIGN
94
91
93
92
90
89
88
87
86
85
84
83



BE RESPONSIBLE FOR THE
ANY PERMANENT OR
'S, OUTFLOW STRUCTURES
SHALL BE SAVED HARMLESS
LITY CAUSED BY DAMAGE
LURE OF THE SAME.

ND CLOSING OF THE
RACTOR SHALL REMOVE ALL
IEASURES, WITH THE
OVIDE 153 LF OF 12" PIPE
O EXISTING 12" HDPE PIPE
ATED WITHIN R/W SHALL BE

R SHALL REMOVE APPROXIMATELY
EXISTING MULTI-USE PATH.
ALLATION OF R.C.P. CONTRACTOR SHALL
ULTI-USE PATH TO GRADES SHOWN
EXISTING MATERIAL SECTION AND
TIE-IN.

EROSION AND SEDIMENT CONTROL MEASURES, EXCEPTION OF SILT FENCE, AND PROVIDE 153 LF OF 12" PIPE (INCLUDING END SECTION), TIE-IN TO EXISTING 12" HDPE PIPE @ INV.=82.30. PROPOSED PIPE LOCATED WITHIN R/W SHALL BE 12" RCP (APPROX. 24 LF).
12" ES-1
INV=79.5

TEMPORARY TOPSOIL STOCKPILE

TEMPORARY "ORANGE SAFETY" FENCING

CONTRACTOR SHALL ENSURE POSITIVE DRAINAGE TO SEDIMENT TRAP

SEDIMENT TRAP
WET VOLUME=59 C.Y.
DRY VOLUME = 53 C.Y.
SEE DETAIL SHEET 9

TEMPORARY "ORANGE SAFETY" FENCING

EX. 8' WALK/JOGGING PATH

EX. C/L OF GRASS DITCH

MATCH EXIST.

FG 81.5

FG 81.3

CONTRACTOR SHALL PROVIDE PYRAMAT TURF REINFORCEMENT MATTING AT OUTLET OF 12" RCP. MATTING SHALL BE INSTALLED PER MANUFACTURER SPECIFICATIONS. MATTING SHALL BE 10' LONG AND A MINIMUM OF 4' WIDE. MATTING SHALL EXTEND TO TOP OF SLOPE ON BOTH SIDES OF ROADSIDE DITCH.

MATCH EXIST.

CONTRACTOR SHALL REMOVE APPROXIMATELY 30 L.F. OF EXISTING MULTI-USE PATH. UPON INSTALLATION OF R.C.P. CONTRACTOR SHALL RESTORE MULTI-USE PATH TO GRADES SHOWN AND MATCH EXISTING MATERIAL SECTION AND GRADES AT TIE-IN.

FG 82.30

8"PINE

4"OAK

4"ASH

4"MAPLE

6"SYCAMORE

TP

TP

SF

ST

DD

CD

81

82

83

84

LONG HILL CONNECTOR ROAD

N.F.
COMMONWEALTH OF VIRGINIA
EASTERN STATE HOSPITAL
D.B. 18, PG. 346
D.B. 34, PG. 575

NOTE:

1. ALL PVC DRAIN LINES SHALL BE SCHEDULE 40.
2. RCP PIPE SHALL BE CLASS III.
3. HDPE PIPE SHALL BE TYPE S IN ACCORDANCE WITH AASHTO M252.

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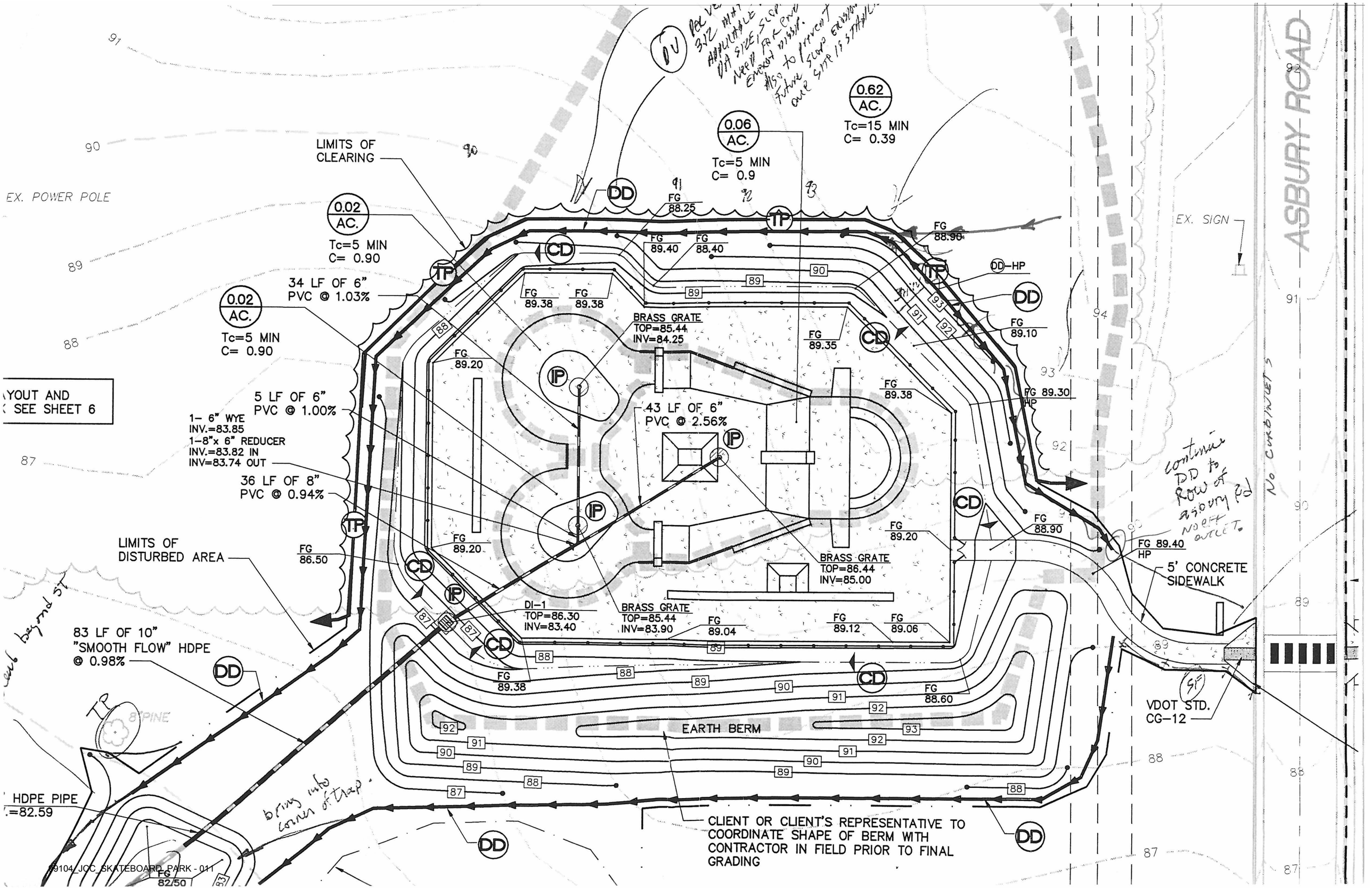

ASBURY ROAD
EX. POWER POLE
EX. SIGN
LIMITS OF CLEARING
0.02 AC.
Tc=5 MIN
C= 0.90
0.06 AC.
Tc=5 MIN
C= 0.9
0.62 AC.
Tc=15 MIN
C= 0.39
34 LF OF 6" PVC @ 1.03%
5 LF OF 6" PVC @ 1.00%
1- 6" WYE
INV.=83.85
1-8"x 6" REDUCER
INV.=83.82 IN
INV=83.74 OUT
36 LF OF 8" PVC @ 0.94%
43 LF OF 6" PVC @ 2.56%
83 LF OF 10" "SMOOTH FLOW" HDPE @ 0.98%
LIMITS OF DISTURBED AREA
BRASS GRATE
TOP=85.44
INV=84.25
BRASS GRATE
TOP=86.44
INV=85.00
BRASS GRATE
TOP=85.44
INV=83.90
DI-1
TOP=86.30
INV=83.40
EARTH BERM
CLIENT OR CLIENT'S REPRESENTATIVE TO COORDINATE SHAPE OF BERM WITH CONTRACTOR IN FIELD PRIOR TO FINAL GRADING
5' CONCRETE SIDEWALK
VDOT STD. CG-12
DD-HP
FG 89.30 HP
FG 89.40 HP
HDPE PIPE
=82.59
FG 82.50
FG 86.50
FG 88.25
FG 89.40
FG 88.40
FG 88.90
FG 89.38
FG 89.38
FG 89.20
FG 89.35
FG 89.10
FG 89.38
FG 89.20
FG 88.90
FG 89.04
FG 89.12
FG 89.06
FG 89.38
FG 88.60
YOUT AND
SEE SHEET 6
end beyond ST
8" PINE
bring into corner of trap.
No curb inlets
continue DD to ROW of Asbury Rd NO OFF OUTLET.
69104_JCC_SKATEBOARD PARK - 011

James City County, Virginia
Environmental Division
Stormwater Management Program

Stormwater Management Design Plan
Staff "Quick" Review

Plan No. SP - 101 - 00 Date/Time: 9/22/00 8:45AM
Project Name: JAMES CITY COUNTY SKATEBOARD PARK
Rough Location: ASHBURY ROAD ~~AT EASTERN STATE HOSPITAL~~ NEAR JCC REC CENTER.
ADC Map: Sheet 5 Grid: J - 4 ☐ First Review
Flood Map / Zone: 510201- 00 35B Zone: X ☐ ____ Review
Description: outside 500-YR FLOODPLAIN
Drainage Area: ☐ Onsite Only ☐ Offsite Only ☒ Combination of Both
Submitted:

Y	N		
☐	☒	Demolition Plan (if applicable)	Sheets: None.
☒	☐	Site, Geometric or Layout Plan	Sheets: 2, 3
☒	☐	Grading Plan	Sheets: 4 & 6
☒	☐	Storm Drainage Plan	Sheets: 4 & 6
☒	☐	E&SC Plan	Sheets: 4
☒	☐	Environmental Inventory	Sheets: Cover
☒	☐	Note & Detail Sheets	Sheets: 7, 8, 9
☐	☐	Drainage Map(s)	None
☐	☐	Soils Map	None
☐	☒	E&SC and SWM plan checklists.	
☒	☐	E&SC Design Report (Attachment).	
☐	☒	E&SC and Stormwater Management / Drainage Narrative.	
☐	☒	Stormwater Management Design Report (Attachment).	
☐	☒	Geotechnical Report (Attachment).	
☐	☒	Waivers, Variances, Exceptions included (Attachments in Writing).	
		☐ VESCH ☐ CBPO (RPA, Steep Slope) ☐ Other:	
☐	☐	Other (List):	

JCC GIS Database: Zoning: R - 2 Tax Parcel ID: ____
Receiving Water: Powhatan Creek Site Acreage: 13.10 acres / s.f.
Other Known Approvals: ____
Site Plan Information: Owner: ____
Zoning: R - 2 Description: General Residential
Site Area: 13.10 acres / s.f
Disturbed Area: 0.78 AC. acres / s.f. (5.95%)
☐ Disturbance > 5 acres, NPDES Notice of Intent required.
Impervious Cover: ____ acres / s.f. (5.88%)
☒ Less than or equal to 60 percent. Meets CBPO requirements.
☐ More than 60 percent. Does Not Meet CBPO requirements.
Open / Green Space: 12.33 acres / s.f. (94.10%)

Site Development Plan:

☐ Residential, Lots, etc.	☐ Commercial (B / O / R)	☒ Govern./Institutional	☐ Industrial
☒ Roadways or Entrances	☐ Parking or Loading	☐ Water	☐ Sanitary Sewer
☒ Landscaping	☐ SWM/BMP facilities	☒ Manmade Drainage	☐ Parks, Amenities
☐ Pump/Lift Station	☐ Dams (regulated)	☐ Other, SKATEBOARD PARK	

Soils Information: Site: 188 Kempsville Fs/ 2-6 Hydric: ❒ Yes ☒ No
Soil Survey Sheet DA: HSG: B
BMP: N/A Hydric: ❒ Yes ☒ No
Description of Soils at BMP: Slight Erosion, mod-slow perc;

BMP Control: ☒ None ❒ Onsite ❒ Offsite ❒ Previous Approved ❒ Manufactured BMP <10%
BMP Types: 1- Name: _____ (JCC BMP Type _____ - _____), Points _____
2- Name: _____ (JCC BMP Type _____ - _____), Points _____
3- Name: _____ (JCC BMP Type _____ - _____), Points _____
OnSite Drainage Type: ❒ Reinforced Concrete Pipe ❒ Corrugated Metal Pipe ❒ Aluminum Type Pipe
❒ Corrugated Polyethylene Pipe ☒ PVC Type Pipe ❒ Open Channel Type
❒ Culverts Type: _____
❒ Other (Specify): DI & BRASS GRATE INLETS.

1. VDOT Standards & Specifications Referenced for work **within** R/W: ❒ Yes ❒ No
2. VDOT Standards & Specifications Referenced for work **outside** R/W: ❒ Yes ❒ No

Site Limitations: ❒ RPA ❒ RMA ❒ Steep Slopes ❒ Delineated Wetlands
❒ Hydric Soils? ❒ Critical Soils ☒ Vegetated ☒ Buffers
❒ Defined Natural Drainage Features onsite ☒ Downstream Storm/Culv.
❒ Evidence of Downstream Channel Erosion (by Field Observation) _____
❒ Floodplain ❒ Problem Drainage Area ❒ Stormwater Hotspot
❒ Site Activities may warrant a General VPDES Permit for Discharge of Stormwater Associated with Industrial Activities (ie. process water, batch plants, etc.).
❒ Other (Specify): _____

Site Stormwater Management / BMP Control (Add sheets if necessary for Multiple Onsite Facilities):

❒ Yes ❒ No	#				
Predev (Present)	DA =	ac.	C/CN =	Tc =	min / hrs.
2-year			cfs		
10-year			cfs		
100-year			cfs		
PostDev w/o Detention (Inflow)	DA =	ac.	C/CN =	Tc =	min / hrs.
2-year			cfs		
10-year			cfs		
100-year			cfs		
PostDev with Detention (Routed)	DA =	ac.	C/CN =	Tc =	min / hrs.
2-year			cfs	at El.	
10-year			cfs	at El.	
100-year (DHW)			cfs	at El.	

Downstream Tailwater Assumption for Pond Routing: _____
Routed Peak Discharges (Outflows) from BMP meets Predevelopment Allowables: ❒ Yes ❒ No
Appears to Meet VESCH / E&SC Ordinance / CBP Ordinance Requirements: ❒ Yes ❒ No

Pond / BMP Design Data (Add Sheet If Necessary for Multiple Onsite Facilities):

❒ Check if None ❒ Provided: BMP # _____ Type: NONE.

Y N * See Below for Pertinent Water Quality Treatment Design Information.

❒ ❒ Top of Facility El. _____

❒ ❒ Design High Water El. _____

❒ ❒ Emergency Spillway (E.S.) Crest El. _____ BW:_____ SS: _____

❒ ❒ FreeBoard _____ 1 ft. or > with E.S.

❒ Acceptable ❒ Not Acceptable. _____ 2 ft. or > w/o E.S.

❒ ❒ Principal Spillway (Riser) Crest El. _____ Size/Type: _____

❒ ❒ Principal Spillway Crest 1 ft. below crest of emergency spillway. ❒ Yes ❒ No ❒ N/A

❒ ❒ Stage-Storage Curve or Data

❒ ❒ Outlet Rating Curve or Table (Discharge Structure Rating)

❒ ❒ 1-year design storm El. _____ or Volume _____

❒ ❒ 1-year, 24 hour detention criteria for Stream Channel Protection. ❒ Yes ❒ No ❒ N/A

❒ ❒ Extended Detention Provided (Min. 24 hours) ❒ Yes ❒ No ❒ N/A

❒ ❒ Normal/Permanent Pool El. _____ ❒ N/A

❒ ❒ Orifice/Weir #1 (highest El.) El. _____ Type: _____

❒ ❒ Orifice/Weir #2 El. _____ Type: _____

❒ ❒ Orifice/Weir #3 El. _____ Type: _____

❒ ❒ Orifice/Weir #4 El. _____ Type: _____

❒ ❒ Orifice/Weir #5 (lowest El.) El. _____ Type: _____

❒ ❒ Low Flow Orifice (ExDet, CPv) El. _____ Type: _____

❒ ❒ Pond Drain w/ Valve El. _____ Type: _____

❒ ❒ Pond Bottom El. _____ Riser Height: _____

❒ ❒ Steps or Access Provided (for over 4 ft. depth) ❒ N/A

❒ ❒ Riser Base Bottom El. _____ Type: _____

❒ ❒ Core Trench ❒ N/A

❒ ❒ Anti-Seep Collars or other acceptable Seepage Control Method. ❒ N/A

❒ ❒ Principal Spillway Anti-Vortex Device and Trash Rack. Type: _____

❒ ❒ Low Flow Orifice Cage-Type Trash Rack. Type: _____

❒ ❒ Outlet Barrel: Type/Class: _____ Size: _____

Inv. U/S: _____ Inv D/S: _____

Slope: _____ _____ Length: _____ (ft.)

❒ ❒ Flared End Section. Matches Outlet Barrel material type.

❒ ❒ Outlet Protection.

❒ Standard riprap outlet protection (OP) Type: _____

❒ Special Dissipator Structure (SDS) Type: _____

❒ ❒ Sediment / Cleanout Elevation El. _____ or Depth _____

❒ ❒ Adequate Channel Downstream of BMP: ❒ 1-year, 24-hour, or ❒ MS # 19 criteria.

Sketch or Notes, If Necessary:

<u>* WQV Design Information.</u>

Imperv. Area _____

WQTV _____

Vol. Required _____

Vol. Provided _____

Sediment Trap & Basins

❒ Temporary Sediment Trap # 1 _____ DA = _____ < 3 acres

❒ Temporary Sediment Trap # 2 _____ DA = _____ < 3 acres

❒ Temporary Sediment Basin # 1 _____ DA = _____ ❒ BMP # ____ convert.

❒ Temporary Sediment Basin # 2 _____ DA = _____ ❒ BMP # ____ convert.

E&SC Plan Comments: _____

Plan Review Steps & Components:

Y	N	
☒	☐	First "Look-Thru". Quick look through plan for familiarity.
☐	☒	Worksheet for BMP Point System. New plan meets 10 point system or redevelopment method. N/A < 10%
☐	☒	FEMA Special Flood Hazard Areas. Check against property, site and development.
☒	☐	Check JCC Tax Parcel Maps for RPA / RMA locations and parcel identification.
☐	☒	Stormwater hotspot, general screening, layout or separation distances (if any) satisfactory.
☒	☐	Environmental Inventory for Chesapeake Bay Ordinance requirements satisfactory.
☒	☐	Highlight and check impact to environmental sensitive areas (wetlands, RPA, steep slope,etc.).
☐	☒	Demolition plan (if any) or offsite borrow, waste areas and onsite stockpiles.
☒	☐	Review existing topography to determine adequacy of E&SC plan (Phase I).
☒	☐	Review grading plan to check for conflicts (offsite grading, cut-fills, slopes,) & Phase II E&SC.
☒	☐	Review layout plan to check for conflicts (buildings, parking, buffers, etc.).
☒	☐	Highlight culverts and storm drains. Check pipe data, thickness and utility, cover conflicts.
☐	☒	Proper culvert and stormdrain specifications, notes, and details or reference to VDOT.
☒	☐	Review Sequence of Construction (for E&SC and SWM/BMP applicability to site work).
☐	☒	Review plan based on Chapter 19 Subdivision ordinance as it relates to SWM/BMP control. N/A
☒	☐	Review plan based on Chapter 24 Zoning as it relates to SWM/BMP control.
☒	☐	Review plan based on Chapter 23 Chesapeake Bay ordinance requirements.
☒	☐	Review plan based on General Knowledge and Experience for Design/Construction.
☒	☐	Review plan based on JCC BMP manual for the BMP type selected for project. N/A
☐	☒	Review plan based on JCC Stormwater Conveyance System D/C Guidelines (***Future***).
☒	☐	Review plan based on Virginia Erosion and Sediment Control Handbook (VESCH).
☐	☒	Review plan based on Virginia Stormwater Management Handbook (VSMH) for BMP type.
☐	☒	Review plan based on Hampton Roads BMP Design Guidance manual (***Optional***).
☐	☒	Review plan based on MWCOG, Controlling Urban Runoff BMP manual (***Optional***).
☒	☐	Review plan based on standard JCC E&SC and SWM Design Plan Checklists.
☐	☒	Review plan based on JCC BMP Construction Specifications (***Future***).
☐	☒	Review Maintenance Plan for SWM / BMP facility. Detailed and specific guidance.
☐	☐	Review BMP Landscaping Plan (deep pool, shallow water, shoreline fringes, etc.).
☐	☐	Review E&SC Plan Design Report and computations (Attached report).
☐	☐	Review SWM Design Report and computations (Attached Report).
☐	☐	Adequate Channels proven downstream of both uncontrolled or SWM/BMP areas.
☐	☐	Adequate function, conversion of Temp Sed Basins (volume, discharge, WSELs) to BMP's.
☐	☐	Geotechnical. Information per App. E JCC BMP manual or to substantiate use of other BMPs.
☐	☐	Provisions on plan requiring proper Record Drawing and Const. Cert of facility.
☐	☐	Drainage and Open Space Easements, if necessary, appear satisfactory.
☐	☐	Inclusion of H&H and SWM / BMP data into any JCC databases.
☐	☐	Other: _____

Prepared Environmental Division comments for the following categories based on above review areas:

☐ ☐	***General Comments:***	☐ ☐	***Erosion & Sediment Control Plan:***
☐ ☐	***Floodplain:***	☐ ☐	***Chesapeake Bay Preservation:***
☐ ☐	***Stormwater Management / Drainage:***	☐ ☐	***Other:***

Additional Notes & Comments: BMP waived for WQ but may be required to achieve quantity control. Bioretention.

(Note: THIS FORM FOR COUNTY USE ONLY.)

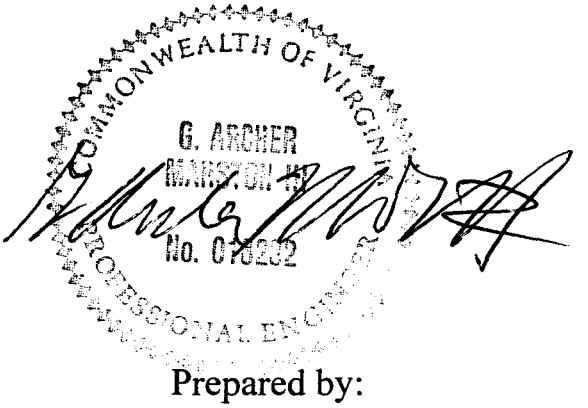
☒ 1st Rev ☐ 2nd Rev ☐ 3rd Rev

Signature: [signature] Date: 09/25/00

Drainage Calculations for James City County Skatepark

Longhill Connector Road

James City County

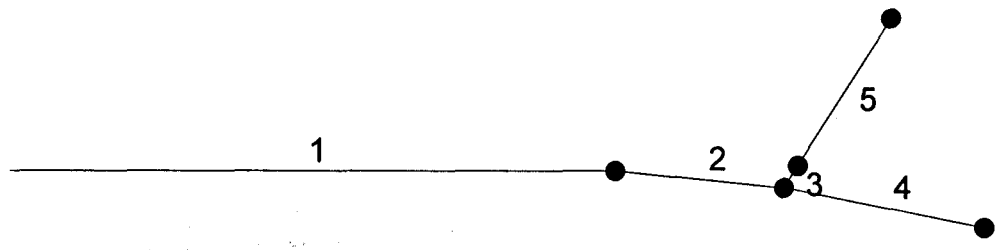


Prepared by:
AES Consulting Engineers
5248 Olde Towne Rd.
Williamsburg, Va. 23188
(757) 253-0040

Submitted: August 23, 2000
Revised: December 19, 2000

AES CONSULTING ENGINEERS

Hydraflow Plan View



Project file: 865108STM1.stm	IDF file: JCCstormsewer.IDF	No. Lines: 5	08-23-2000

Hydraflow Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	128.0	0.62	0.72	0.39	0.24	0.33	15.0	15.0	5.1	1.71	2.16	3.67	10	0.98	83.40	82.15	83.98	82.98	86.30	83.15	DI-1 TO OUTL
2	1	36.0	0.00	0.10	0.00	0.00	0.09	0.0	5.2	7.1	0.64	1.17	2.50	8	0.94	83.74	83.40	84.12	84.02	84.50	86.30	WYE TO DI-1
3	2	5.0	0.02	0.04	0.90	0.02	0.04	5.0	5.2	7.1	0.25	0.56	1.64	6	1.00	83.90	83.85	84.25	84.25	85.44	84.50	SS-1 TO WYE
4	2	43.0	0.06	0.06	0.90	0.05	0.05	5.0	5.0	7.1	0.38	0.90	2.80	6	2.56	85.00	83.90	85.32	84.25	86.44	84.50	SS-3 TO WYE
5	3	34.0	0.02	0.02	0.90	0.02	0.02	5.0	5.0	7.1	0.13	0.57	1.42	6	1.03	84.25	83.90	84.43	84.25	85.44	85.44	SS-2 TO SS-1

Project File: 865108STM1.stm | I-D-F File: JCCstormsewer.IDF | Total number of lines: 5 | Run Date: 08-23-2000

NOTES: Intensity = 143.72 / (Tc + 19.20) ^ 0.94; Return period = 10 Yrs. ; Initial tailwater elevation = 82.98 (ft)

AES CONSULTING ENGINEERS
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PROJECT JCC SKATEPARK
PROJECT NO. 8651-8
SUBJECT OUTLET PROTECTION DESIGN
SHEET NO. 1 OF 1
CALCULATED BY CBR DATE 8/23/00

Q_{10} = 1.7 CFS

ASSUME MIN. TAILWATER

FROM PLATE 3.18-3 (VESCH)

L_A = 4'

→ USE 5'W x 5'L x 1' D RIP-RAP CLASS AI APRON W/ FILTER FABRIC. (APPROX 1 CY)

NO WATER QUALITY FACILITIES HAVE BEEN PROPOSED WITH THIS PROJECT BECAUSE THE IMPERVIOUS AREA IS 5.9% WHICH IS LESS THAN 10%, THE REQUIREMENT FOR PROVIDING WATER QUALITY.

SEDIMENT TRAP DESIGN

D.A. = ~~0.56~~ 0.73 AC

2.5 ~~482~~ 804 WET VOL. REQ = ~~0.56~~ 0.73 AC (67 CY/AC) = ~~37.5~~ 48.9 CY < ~~38.8~~ 58.9 CY PROVIDED

3.0 ~~617~~ 990

4.0 ~~930~~ 1264 DRY VOL. REQ = ~~0.56~~ 0.73 AC (67 CY/AC) = ~~37.5~~ 48.9 CY < ~~41.3~~ 52.4 CY PROVIDED

5.0 ~~1299~~ 1568 LENGTH OF OUTLET = 6' (DA) = ~~0.56~~ 0.73 (6') = ~~3.4~~ 4.4' USE ~~4'~~ 5' OUTLET

BOTTOM OF TRAP = 82.5

TOP OF WET / BOTTOM OF DRY / INV OF OUTLET = 84.0

TOP OF DRY = 85.0

TOP OF TRAP = 86.0

WIDTH OF TOP OF TRAP = 2.0'

CLEANOUT ELEV = 83.25' (VOLUME = 0.73 AC (34 CY/AC) = 24.8 CY)

CONSULTING ENGINEERS

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PROJECT	JCC SKATEPARK
PROJECT NO.	8651-8
SUBJECT	Ditch Calculations
SHEET NO.	1
DATE	11/2/00
BY	CBR

ROADSIDE DITCH DESIGN COMPUTATIONS

From Station	To Station	Area (ac)	C	CA (INCREMENTAL)	Tc (min)	I-2 in/hr	I-10 in/hr	S Ditch Slope (ft/ft)	Q-2 (CFS)	Act Vel-2 (FPS)	Allow Vel-2 (FPS)	Lining Type	Q-10 (CFS)	Depth of Flow10 (in.)	Remark
DELETED ~~PROPOSED OUTFALL~~	~~ROADSIDE DITCH (GRASS)~~	~~1.55~~	~~0.37~~	~~0.57~~	~~17~~	~~3.6~~	~~4.9~~	~~0.0347~~	~~2.1~~	~~2.9~~	~~3.5~~	~~Grass~~	~~2.8~~	~~8.0~~	~~1' DEEP GRASS DITCH W/ 3:1 SS, OK~~
ROADSIDE DITCH (GRASS)	ROADSIDE DITCH (CONCRETE)	3.57	0.42	1.50	17	3.6	4.9	0.0133	5.4	1.6	3.5	Grass	7.3	9.0	15" DEEP GRASS DITCH W/ 4:1, 12:1 SS, OK
ROADSIDE DITCH (CONCRETE)	EX. CULVERT	3.99	0.43	1.72	17	3.6	4.9	0.0200	6.2	7.2		Concrete	8.4	9.0	2' DEEP EC-3 LINED DITCH W/ 2:1 SS, OK
EX. CULVERT	EX. CULVERT	12.14	0.38	4.61	23	3.1	3.9		14.3				18.0		SEE ATTACHED CULVERT CALCULATION

LD-269
Rev 3-83

Project JCC SKATEPARK
EX. 36" RCP IN LONGHILL CONNECTOR ROAD R/W

Plan Sheet No. ____ Designer ____
Rev. Date ____ Date ____

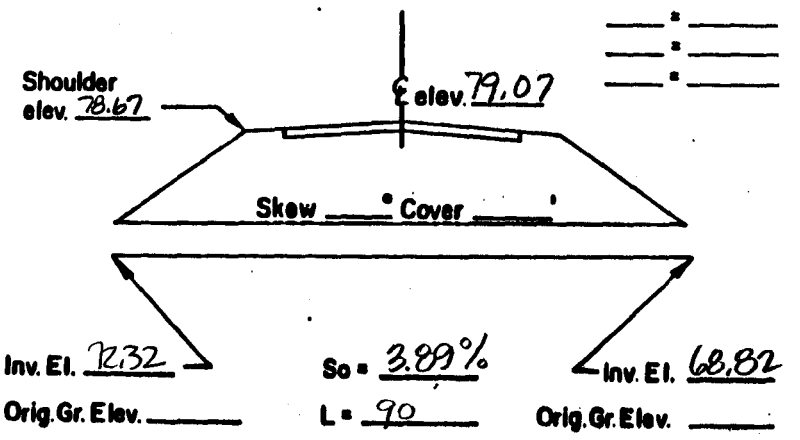
Sheet ____ of ____

HYDROLOGICAL DATA:
D.A. = 12.14 AC.
C = 0.38
i_{10} = 3.9 in/HR
T_c = 23 MIN

AHW Controls
100 yr. Flood plain ____ elev. ____
Design AHW depth ____ elev. ____
Structures ____ elev. ____

STATION ____

freq. TWelev
____ = ____
____ = ____
____ = ____
____ = ____
____ = ____



DISCHARGES USED
Q 10 = 18.0 CFS
Q ____ = ____ CFS
Q ____ = ____ CFS
Q ____ = ____ CFS
Q ____ = ____ CFS

RISK ASSESSMENT
ADT ____
Detours Available ____, Length ____
Overtopping Stage ____
Flood Plain Management ____
Criteria and Significant Impact ____

CULVERT TYPE & SIZE	Q	Q/B	HEADWATER COMPUTATIONS: INLET CONT. HW/D	INLET CONT. HW	OUTLET CONTROL Ke	dc	$\frac{dc+D}{2}$	ho	H	LSo	HW	CONT. HW. ELEV.	OUTLET VELOCITY C.M.	OUTLET VELOCITY Smooth	End Treat.	COMMENTS
EX. 36" RCP	18.0		0.65	1.95	0.5	1.4	2.2	2.2	<.4	3.5	-0.9	1.95				INLET CONTROLS - ADEQUATE

Design Flood Exceed Prob. ____ Elev ____
Overtop Flood Exceed Prob. ____ Elev ____

240 A

Hydraflow Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	
1	End	23.0	12.14	12.14	0.37	4.49	4.49	23.0	23.0	4.2	18.95	260.2	4.30	36	15.22	72.32	68.82	73.71	71.82	79.07	78.67	PROPOSED CUL

Project File: 865108STM3.stm | I-D-F File: JCCstormsewer.IDF | Total number of lines: 1 | Run Date: 11-02-2000

NOTES: Intensity = 143.72 / (Tc + 19.20) ^ 0.94; Return period = 10 Yrs. ; Initial tailwater elevation = 71.82 (ft)

SJT Comp

Culvert Calculator Report
Worksheet-2

Solve For: Headwater Elevation

Culvert Summary					
Allowable HW Elevation	81.60	ft	Headwater Depth/ Height	1.79	
Computed Headwater Elevation	82.23	ft	Discharge	7.30	cfs
Inlet Control HW Elev	82.23	ft	Tailwater Elevation	80.75	ft
Outlet Control HW Elev	82.06	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	80.00	ft	Downstream Invert	79.50	ft
Length	23.00	ft	Constructed Slope	0.021739	ft/ft

Hydraulic Profile					
Profile	CompositeS1S2		Depth, Downstream	0.87	ft
Slope Type	Steep		Normal Depth	0.82	ft
Flow Regime	N/A		Critical Depth	1.08	ft
Velocity Downstream	7.99	ft/s	Critical Slope	0.011783	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.013	
Section Material	Concrete		Span	1.25	ft
Section Size	15 inch		Rise	1.25	ft
Number Sections	1				

Outlet Control Properties					
Outlet Control HW Elev	82.06	ft	Upstream Velocity Head	0.65	ft
Ke	0.50		Entrance Loss	0.33	ft

Inlet Control Properties					
Inlet Control HW Elev	82.23	ft	Flow Control	Submerged	
Inlet Type	End-Section Conforming to fill slope		Area Full	1.2	ft^2
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

EL EL
82.23 > 81.6 = 0.63' OVER SIDEWALK.

15"ϕ SIDEWALK CULVERT.

CONSULTING ENGINEERS

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December 20, 2000

James City County
Development Management
101-E Mounts Bay Road
Williamsburg, Va. 23187

Attn: Mr. Benjamin A. Thompson

RE: James City County Skatepark
JCC Case No. S-101-00
AES Project No. 8651-8

Dear Mr. Thompson:

The following is an itemized letter of response to your correspondence dated December 12, 2000.

Environmental Division:

1. Please see sheet 4 for the location of the temporary safety fencing for the sediment trap.
2. See sheet 4 for the revised storm drainage system layout. The supporting calculations have also been revised and are included.
3. As discussed with Mr. Scott Thomas of the JCC Environmental Division and Mr. P.K. Das of the Virginia Department of Transportation, Pyramat turf reinforcement matting has been added to the plans in lieu of standard outlet protection stone. It has been agreed that this form of outlet protection will help to benefit the proposed outfall from both an aesthetic and maintenance standpoint.
4. The proposed pipe system has excess capacity for the minimal amount of future development that could potentially take place south of the skatepark. Additionally, upon reaching a site impervious cover of 10%, overall site water quality will need to be provided.

Virginia Department of Transportation:

1. Please see the Environmental Division comment response #3 concerning the proposed storm system outfall.

AES Consulting Engineers hereby submits three sets of revised plans for final approval. Should you have any questions or need any additional information, please give me a call.

Sincerely;
AES Consulting Engineers

Charles B. Records
Project Engineer

Attachments
cc: John Carnifax, James City County Parks and Recreation

S:\JOBS\8651\08\WORDPROC\DOCUMENT\865108I02.CBR.doc

CONSULTING ENGINEERS

5248 Olde Towne Road • Suite 1 • Williamsburg, Virginia 23188
(757) 253-0040 • Fax (757) 220-8994 • E-mail aes@aesva.com

November 3, 2000

James City County
Development Management
101-E Mounts Bay Road
Williamsburg, Va. 23187

Attn: Mr. Benjamin A. Thompson

RE: James City County Skatepark
JCC Case No. S-101-00
AES Project No. 8651-8

Dear Mr. Thompson:

The following is an itemized letter of response to your correspondence dated October 20, 2000.

Planning:

1. As we discussed on the telephone earlier last month, the Zoning Ordinance section reference for all proposed signage, 24-70, has been added as General Note #19.

Environmental Division:

1. A Land Disturbing Permit and Siltation Agreement, with surety, shall be provided to Ms. Joan Etchberger with the James City County Environmental Division prior to land disturbance or final site plan approval.
2. See sheet 2 and 4 for the location and the type of the existing channels.
3. See sheet 4 for the location of the temporary staging and equipment storage areas.
4. The diversion dike has been added to sheet 4 and the sediment trap calculations have been revised. See the attached calculations.
5. See sheet 4 for the limits of the proposed disturbed area.
6. The diversion dike has been extended all the way around the sediment trap. The diversion dike at the northeast portion of the site has not been removed because the flow will be contained within grassed area adjacent to the existing roadway and it will outlet through the check dam to be installed at the low point of the silt fence located in the southeastern portion of the site.
7. The configuration of the diversion dike has been revised. A stretch of silt fence with a check dam outlet has been located in the southeastern portion of the site.
8. Please see the revised construction sequence.
9. A cleanout depth has been added to the sediment trap detail and the trap has been reconfigured to accommodate a 2:1 length to width ratio. Safety fence barrier has not been added to the plan due to the aesthetics along a Community Character Corridor roadway and because the wet volume depth of the trap is only 1.5 feet deep.
10. See sheet 8 and 9 for the detail for the silt fence inlet protection insert for the proposed grates within the skatepark area.
11. See sheet 4 for the location of the tree protection as requested.

Explanation does not hold water, fencing is the same as tree protection

12. ✓ Silt fence has been added along the southeastern portion of the project to contain all sediment-laden runoff.
13. ✓ When future development of the site occurs and the impervious area of the site exceeds 10%, a water quality BMP structure will be provided.
14. In accordance with MS-19 of the Virginia Erosion and Sediment Control regulations, adequacy calculations have been provided for the downstream channels/culvert. See the attached calculations. 15" CULV ACROSS SIDEWALK, HW > SIDEWALK EL.
15. ✓ A cross culvert has been added to the construction plans to convey stormwater under the existing multi-use asphalt path and discharge it into an adequate channel.
16. ✓ See sheet 4 for the material specifications for all of the pipe types shown on the construction plans.
17. ✓ See sheet 6 for the specification for the brass grates. & 8
18. ✓ See sheet 4 for the grass swale detail. The inverts of the proposed storm sewer piping have been shown.
19. ✓ There are not any BMP facilities required or associated with this project.
20. ✓ Please see the attached drainage calculations.

Virginia Department of Transportation:

1. Please see all applicable sheets pertaining to the revision of the right-of-way lines for the subject property.
2. The proposed sign has been moved to ensure 10' separation between it and the back of curb.
3. There are not any proposed vehicular entrances to the site. The skatepark utilizes the existing Recreation Center parking lot and no additional parking is provided.
4. Noted.
5. See sheet 3 for the pavement striping detail.
6. See sheet 3 for the specifications on the pedestrian crosswalk signage.
7. See sheet 3.
8. See sheet 4.
9. In accordance with MS-19 of the Virginia Erosion and Sediment Control regulations, adequacy calculations have been provided for the downstream channels/culvert. See the attached calculations.
10. There are not any BMP facilities required or associated with this project.
11. See General note #21 on the cover sheet.
12. Observed.

AES Consulting Engineers hereby submits thirteen sets of revised plans for final approval. Should you have any questions or need any additional information, please give me a call.

Sincerely;
AES Consulting Engineers

Charles B. Records
Project Engineer

Attachments
cc: John Carnifax, James City County Parks and Recreation
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ENVIRONMENTAL DIVISION REVIEW COMMENTS
JAMES CITY COUNTY SKATE PARK
PLAN NO. SP - 101 - 00
December 12, 2000 MDW / SJT

Erosion & Sediment Control Plan:

1. Temporary Sediment Trap. Use of temporary plastic safety fence was not implemented as recommended along the lower (southern) portion of the sediment trap. VESCH Minimum Standard and Specification 3.01 recommends that this practice is to be applied where control measures are considered unsafe by virtue of access by the public. Regardless of wet or dry volume depth, the sediment trap is in very close proximity to the sidewalk along Longhill Road Extension and the area between the sidewalk and the trap is in a relatively cleared state and the trap could be easily accessed.

Stormwater Management / Drainage:

2. Sidewalk Cross Culvert. In accordance with MS-19 of the Virginia Erosion and Sediment Control regulations, pipe improvements shall be designed so the 10-year storm is contained within the appurtenances and pipes and storm sewer systems shall be analyzed by the use of a 10-year storm to verify that stormwater will be contained within the pipe or system. Based on the 10-year design headwater computations as submitted for the 15 inch RCP culvert across the sidewalk, it appears the culvert is under inlet control and the headwater elevation on the upstream side of the culvert would overtop the sidewalk, thus creating an undesirable condition. Two alternatives exist to correct this situation. The preferred arrangement is to eliminate the 70 l.f. of stormwater conveyance channel and put the entire system into properly sized underground storm drain. This alternative would eliminate the open channel segment, which again is in close proximity to the sidewalk; however, it would require installation of storm drain manholes due to directional changes. The alignment could be slightly revised to eliminate the need for two additional manholes. The second option would consist of keeping the current open channel segment and up-sizing the cross-culvert to prevent headwater overtopping of the sidewalk for the design storm event. Provide revised storm drain or culvert headwater computations depending on the selected scenario.

3. Outlet Protection. In accordance with MS-19, for sites where runoff is discharged into a pipe, downstream stability analyses at the outfall of the pipe shall be performed. Address outlet protection or energy dissipation requirements at the outfall (south) end of the sidewalk culvert to prevent erosion. The velocity at the outfall end of the 15 inch pipe could as high as 7-8 fps for a 15 inch pipe, exceeding the permissible velocity of the grass channel at the outfall point.

4. Future Consideration. It may be prudent to also consider potential future development west of the skateboard park and future storm runoff connections, when considering the size of the culvert across the sidewalk. Regardless of whether an open-channel or manhole/storm drain arrangement is used at the lower end of the system, future development within the cross-culvert's tributary area, whether based on existing topography or possible future land alterations, may potentially connect into this system, thus requiring a larger size pipe for capacity and to limit overtopping of the sidewalk, if the open channel configuration is used. In addition, it is unknown at this time whether contributing area (just west of the skateboard site) will have stormwater management/BMP control or if it will be bypassed in an uncontrolled manner to this sidewalk cross culvert.

PREVIOUS Comments

ENVIRONMENTAL DIVISION REVIEW COMMENTS
JAMES CITY COUNTY SKATE PARK
PLAN NO. SP - 101 - 00
September 22, 2000

1.10 W/ SJT

General Comments:

1. ✓ A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project.

2. ✓ Existing Channels. On Sheets 2 and 4, clearly designate the grassed and paved channel locations along the north side of Long Hill Connector. It is important to know the start location of the paved concrete channel relative to the onsite outfall.

Erosion & Sediment Control Plan:

3. ✓ Staging & Equipment Storage. Show any temporary staging and equipment storage areas (with required erosion and sediment controls) or indicate on the plans that none are anticipated for the project site. It would appear a staging area may be needed due to the amount of rebar/concrete work and potential equipment associated with this specialized site.

4. ✓ Topsoil Stockpile. Provide a temporary diversion dike. rather than silt fence, along the south (downslope) side of the temporary soil stockpile. Ensure the diversion dike properly intercepts runoff from the pile and conveys it to the sediment trap. Adjust sediment trap computations as required due to acceptance of additional drainage area.

5. ✓ Limits of Work. Modify the limits of disturbed area as shown on the plan to encompass the construction entrance and proposed sign area. Also, since installation of the sediment trap is proposed as one of the first steps of sitework, initially there may be the need for more direct access to the trap. Adjust the limit of disturbed area southward as necessary.

6. ✓ Upslope Diversion Dikes. The upslope temporary diversion dike need to be fully extended westward around the sediment trap. Also, the upslope diversion dike which extends from the diversion dike - high point in an east direction can be removed. There is no defined drainage feature to adequately outlet runoff from the diversion to other than curbside at Ashbury Road. Adjust sediment trap computations as required to compensate for the loss this eastern diversion dike.

7. ✓ Downslope Diversion Dike. Ensure the downslope temporary diversion dike which collects runoff from disturbed portions of the site is properly located to adequately drain into the sediment trapat the northeast corner.

8. ✓ Construction Sequence. In Step 2 of the construction sequence, include immediate stabilization of the temporary topsoil stockpile area in accordance with the provisions of MS-2 of the Virginia Erosion and Sediment Control regulations (Stabilization of Soil Stockpiles). Also, modify Step 4 to include JCC Environmental Division approval required prior to removal

9. Temporary Sediment Trap. Due to the highly accessible location of the trap relative to the sidewalk along Longhill Road Extension and since the area is in a relatively cleared state, include provisions for a safety fence barrier around or between the sidewalk and the trap. Reference VESCH Minimum Standard 3.01✓ Specify a cleanout depth or elevation based on ½ design volume of the trap's wet storage area✓ If reconfiguration of the trap (grading) is required due to additional drainage area, attempt to achieve a 2:1 length to width ratio.✓ NO SAFETY FENCE PROVIDED.

10. Inlet Protections. Explain how the proposed inlet protections in the interior portion of the site work area may affect fine site work operations. Based on the fine grading as shown on Sheet 6, use of insert-type inlet sediment filters would be an acceptable alternate if interior grading and sitework activities are impacted.

11. Tree Protection. Provide tree protection around the existing pines and ash trees near the stormwater outfall work vicinity. These trees are highly visible and should be preserved to the greatest extent possible.

12. Silt Fence. Add silt fence south (downslope) of the east portion of the CG-12 and 5 ft. sidewalk walkway area or alternatively wrap the temporary diversion dike eastward to cover this disturbed area. Otherwise, disturbance from this area would be uncontrolled toward Ashbury Road.

Stormwater Management / Drainage:

13. Water Quality. Onsite impervious area is proposed at 0.68 acres resulting in a percent impervious value of 5.2 percent (or 5.87 percent accounting for the existing water tank/road). This value is less than 10 percent of site area; therefore in accordance with Section 23-10(4) of the Chesapeake Bay Preservation ordinance, an onsite BMP would not be necessary to provide for water quality control. However, any future development within the base tract would probably result in the need for water quality control structure(s).

14. Stormwater Quantity. Although water quality control is generally not required for this portion of site development, compliance with Chapter 8 of the James City County Code (Erosion and Sedimentation Control) and the provisions of MS-19 of the Virginia Erosion and Sediment Control regulations (Stormwater Runoff) is still required. Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or manmade receiving channel, pipe or storm sewer system. Since no type of onsite detention is currently proposed, at a minimum, adequacy in accordance with MS-19 is still necessary. Based on the current outfall arrangement, this would consist of submission of computations to show adequacy (capacity/erosion resistance) for 1) the area between the pipe outfall to the existing Long Hill Connector roadside channel, 2) the grass and paved channels along Long Hill Connector (as applicable) and 3) the 36 inch culvert across Long Hill Connector and its outfall channel. Downstream channel improvements may be necessary if the channel is inadequate for capacity and/or erosion resistance. *Note: VDOT review and approval is necessary for any drainage improvements proposed within the road right-of-way.* 15" CULV ACROSS SIDEWALK OVERTOPS.

15. Receiving Channel. The outfall discharge arrangement from the site is undesirable. Concentrated stormwater runoff leaving a development site shall be discharged directly into an adequate natural or manmade receiving channel, pipe or storm sewer system. The area between the immediate pipe outfall and roadside channel along Long Hill Connector is not a defined natural or manmade channel. Furthermore, proposed manmade improvements do not extend across the sidewalk area to existing channels along Longhill Connector.

It is suggested that other alternatives be evaluated rather than the current outfall scheme. Currently, downstream channel improvements are only proposed to the north side of the sidewalk. Discharge from the onsite storm sewer system and graded outfall channel, as such, would be conveyed in a concentrated manner directly onto/across naturally flat, stabilized soils and the asphalt sidewalk. In addition, discharge from the outfall as proposed would tend to cause erosion along the sidewalk edges, degrade the sidewalk base or surface and/or create an unsafe runoff condition across the walkway. CANNOT ENFORCE.

Other Suggested Alternatives include:

- ❒ An arrangement similar to the current plan; however include a cross-culvert at a location directly south of the outfall across the sidewalk to the existing roadside channel;

SELECTED ALTHOUGH HW EXCEEDS SIDEWALK

- ☐ Provide a new channel along the north side of the sidewalk. The new channel would traverse in a general west direction, parallel to the sidewalk and Longhill Connector. The new channel would continue to the natural low point near the inlet to the existing 36 inch VDOT culvert location. Again a cross-culvert would be required across the sidewalk. The advantages to this alternative, if feasible due to site topography, would be a single culvert and channel system is already in place for future development of remaining portions of the tract. This would eliminate the need for additional sidewalk cross-culvert cuts due to future development. Future development would need to be considered for sizing of the new channel and sidewalk cross-culvert. NOT SELECTED.

- ☐ Develop a site design that limits postdevelopment discharge from the site at predevelopment levels. Several options exist to achieve this goal, including onsite detention, use of low impact development techniques and/or other effective BMP's such as bioretention, infiltration, etc. Onsite inlets (as flow controls) and channel storage may be considered in any detention routings. *Note: This alternative is consistent with the provisions of MS-19 and the County Erosion and Sediment Control ordinance; however, if a BMP type facility is used for detention, then the more stringent 24-hour detention of the 1-year, 24 hour storm criteria would apply to this site.* NOT SELECTED.

16. ✓ Onsite Storm Drains. Show material class and specifications for all onsite storm drain pipe types including PVC (Schedule 40, ASTM D3034, etc.) and Corrugated Polyethylene Pipe (AASHTO M252 Type S, etc.) or reference appropriate VDOT Road and Bridge Standards.

17. ✓ Brass Grates. Provide typical detail and specifications for the onsite proposed brass inlet grates. SHEET 6 & 8

18. ✓ Stormwater Conveyances. For all proposed onsite channels, storm drains and culverts, ensure all pertinent construction information is shown on the construction plan. For channels include intended channel shape, sideslope, slope, lining and important dimensions. For storm drains/culverts, include all invert elevations.

19. ✓ Currently the development plan does not incorporate a stormwater management/BMP facilities. If the plans are modified to include a facility in order to provide stormwater quantity control, design and construction must be in accordance with the provisions of the Chesapeake Bay and Erosion and Sediment Control ordinances and the JCC BMP manual. Also include a long-term maintenance and inspection plan.

20. ✓ Professional seal and signature required on supplemental drainage reports (computations).