

MSA-S-1829-4788

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10/27/10 initial clearing D.S.

Robert L. Ehrlich, Jr.
Governor



Michael S. Steele
Lt. Governor

Martin G. Madden
Chairman

Ren Serey
Executive Director

**STATE OF MARYLAND
CRITICAL AREA COMMISSION
CHESAPEAKE AND ATLANTIC COASTAL BAYS**

1804 West Street, Suite 100, Annapolis, Maryland 21401

(410) 260-3460 Fax: (410) 974-5338

www.dnr.state.md.us/criticalarea/

March 28, 2006

Mr. Otis Rolley
Director
Baltimore City Department of Planning
417 East Fayette Street, 8th Floor
Baltimore, Maryland 21202

RE: Eastern Avenue Pumping Station Consistency Report

Dear Mr. Rolley:

This office has received the 10 % pollutant reduction calculations for the above consistency project. Commission staff has determined that the above proposed development: 1) has environmental or economic consequences that will largely be confined to the immediate area of the site on which the development is located, 2) does not substantially affect the Critical Area program of the local jurisdiction, and 3) is not considered by the Commission as major development. (*See COMAR: Chapter Two, Regulations for Development in the Critical Area Resulting from State and Local Agency Programs*).

Therefore, approval of the above consistency project by the Commission is not necessary. If there are any changes in development, this office would like to be notified immediately at (410) 260-3483.

Sincerely,

A handwritten signature in cursive script that reads "Dawnn McCleary".

Dawnn McCleary
Natural Resources Planner

cc: Kenneth Hranicky
Regina Esslinger
BA.808-05

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor



Martin G. Madden
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CRITICAL AREA COMMISSION
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1804 West Street, Suite 100, Annapolis, Maryland 21401
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www.dnr.state.md.us/criticalarea/

February 27, 2006

Mr. Otis Rolley
Director
Baltimore City Department of Planning
417 East Fayette Street, 8th Floor
Baltimore, Maryland 21202

RE: Eastern Avenue Pumping Station Consistency Report

Dear Mr. Rolley:

Thank you for providing "Notification of Certification" that the above project is consistent with the City's Critical Area program. This office understands that the City is proposing to construct a generator building on an existing parking lot, add new electrical utilities, and redo the landscaping at the existing pumping station and Public Works Museum. This project is in an Intensely Developed Area and is in the 100-foot Buffer. The Buffer disturbance is contiguous with the promenade and serves as a public accessible front lawn for the Public Works Museum.

To complete our review of the project, we need the 10 % pollutant reduction calculations. Please forward this information to our office for review. If you have any questions, please feel free to call me at (410) 260-3493.

Sincerely,

A handwritten signature in cursive script that reads "Dawnn McCleary".

Dawnn McCleary
Natural Resources Planner

cc: Kenneth Hranicky
Duncan Stuart
Regina Esslinger
BA 101-06

Robert L. Ehrlich, Jr.
Governor

Michael S. Steele
Lt. Governor



Martin G. Madden
Chairman

Ren Serey
Executive Director

STATE OF MARYLAND
CRITICAL AREA COMMISSION
CHESAPEAKE AND ATLANTIC COASTAL BAYS

1804 West Street, Suite 100, Annapolis, Maryland 21401
(410) 260-3460 Fax: (410) 974-5338
www.dnr.state.md.us/criticalarea/

December 23, 2005

Mr. Kenneth Hranicky
Environmental Planner
Baltimore City Department of Planning
417 East Fayette Street, 8 th Floor
Baltimore, Maryland 21202

RE: Eastern Avenue Pumping Station
Public Works Museum

Dear Mr. Hranicky:

This office has reviewed the applicant's proposal to construct a generator building on an existing parking lot. The site is 0.76 acres, in an Intensely Developed Area and within the 100-foot Buffer.

Since this project is on City owned land, it must be submitted as a Consistency project. Please submit a letter summarizing the project and having the City confirm that it is consistent with the City's program. Because a portion of this project is in the Buffer, the applicant must pay into the Buffer Offset Fee as per Duncan Stuart's recommendation. Please note that the application contains the old 10 % phosphorus reduction worksheet. The worksheet from the 2003 guidance manual must be used.

If there are any questions, please feel free to call me at (410) 260-3483.

Sincerely,

A handwritten signature in cursive script that reads "Dawnn McCleary".

Dawnn McCleary
Natural Resources Planner

cc: Duncan Stuart
Regina Esslinger
BA 808-05

BA 101-06

MARTIN O'MALLEY
Mayor



OTIS ROLLEY III
Director

February 9, 2006

Ms. Dawnn McCleary
Chesapeake Bay Critical Area Commission
1804 West Street, Suite 100
Annapolis, Maryland 21401

Dear Ms. McCleary:

Re: Eastern Avenue Pumping Station Improvements

Please find enclosed the Consistency Report for the Eastern Avenue Pumping Station Improvements. The project is located at 751 East Avenue within the Inner Harbor region. The project is being undertaken on the grounds of the Public Works Museum which is housed in the pumping station building and consists of a generator building on an existing parking lot.

The proposed project will reduce pollutant runoff but will not modify the existing drainage area to the Critical Area, add impervious surface or permanently impact any environmental resources. There will be no negative impact to tributary streams.

A review of the Consistency Report for this project shows that the proposed action is consistent with the City's Critical Area Management Program (CAMP). If you have any questions about this project or the attached report, please contact Mr. Kenneth Hranicky at 410-396-9508.

Sincerely,

A handwritten signature in dark ink, appearing to read "Otis Rolley, III", written over a light blue circular stamp.

Otis Rolley, III
Director

OR/kh

cc: Mr. Kenneth Hranicky, Department of Planning

RECEIVED

FEB 13 2006

CRITICAL AREA COMMISSION

**Eastern Avenue Pumping Station Improvements, Public Works Museum
Consistency Report
February 9, 2006**

✓ The City of Baltimore is proposing to construct a generator building on an existing parking lot, provide new electrical utilities to connect the pumping station to the new generator building, and rework the landscaping at the northwest corner of the existing pumping station building and the entrance to the Public Works Museum. The project is located in the Inner Harbor region of Baltimore City at 751 Eastern Avenue. There is no new impervious surface planned with this project. Pollutant removal will be achieved by an onsite sand filter being constructed to treat the stormwater quality volume.

*need
10%
Calculation*

✓ The project is located within the buffer. This part of the buffer being disturbed is contiguous with the promenade and serves as the publicly accessible "front lawn" of the Public Works Museum. The City waives the Buffer Offset Fee for any part of the project that is part of the public promenade. The fact that this land is City owned eliminates the need to establish easements to ensure that it is not developed in the future as anything but promenade without going through the Critical Area process again. There are no buffer offset fees associated with this project.

X

The project is within the Waterfront Revitalization Area which is part of the Intensely Developed Area. No marinas are planned as part of this development.

SOILS

According to the USDA soil maps, the site is underlain by urban soils. Soil of this type is classified as hydrological soil group C with a Runoff Curve Number of 86 for grass and 98 for paved surfaces. Four soil borings were performed within the vicinity of the new generator building. Details on soil borings can be found in the report, Whitman, Requardt and Associates, LLP, Critical Area Analysis, dated November 2005.

VEGETATION AND MITIGATION

There are 34 existing street trees, of which 27 will be saved, and 17 additional trees will be planted. Additionally, 51 bushes/shrubs will be planted.

TIDAL WETLANDS AND FLOODPLAIN

There are no tidal wetlands associated with this project. This site is located in floodplain Zone X. This an unregulated floodplain zone.

RARE AND ENDANGERED PLANTS AND ANIMALS

The project site is not within a habitat protection area. There are no known Federal or State threatened or endangered plant or wildlife species present at this time.

?) what is better

WATER QUALITY IMPROVEMENT

Impervious Area

The construction will result in a small decrease in impervious surface. Pre-development condition was computed to be 75% impervious and post-development condition was computed to be 73% impervious.

Proposed Water Quality Improvements

It was calculated that an additional 0.33 pound of pollutant removal was required. The proposed onsite sand filter will treat 0.43 pounds.

SUMMARY

The Eastern Avenue Pumping Station Improvements will not negatively impact the Critical Area, and the project meets the requirements and intent of the Baltimore City Critical Area Management Program.

If there are questions regarding this report, please call Kenneth Hranicky, Critical Area Coordinator, City of Baltimore Department of Planning at (410)-396-9508.



WHITMAN, REQUARDT AND ASSOCIATES, LLP

CRITICAL AREA ANALYSIS

City of Baltimore
Department of Public Works
Bureau of Water and Wastewater
Water and Wastewater Engineering Division

November 2005

WHITMAN, REQUARDT & ASSOCIATES, LLP
801 South Caroline Street
BALTIMORE, MD
21231

RECEIVED

DEC 7 2005

Smb

CRITICAL AREA COMMISSION

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A. INTRODUCTION AND SCOPE

1. PROJECT DESCRIPTION

The Eastern Avenue Pumping Station project site is located in the Inner Harbor Region of Baltimore City at 751 Eastern Avenue. A small amount of landscaping area, an existing structure and paved parking area cover the entire 0.76 acre site, which includes only the disturbed area of the site. The site is bound by Eastern Avenue to the North, President Street to the East, the East Falls Avenue (i.e. the harbor) to the West and Fleet Street to the South. The property is currently owned by the Mayor and City Council of Baltimore.

The proposed project consists of constructing a generator building on the existing parking lot, providing new electrical utilities to connect the pumping station to the new generator building, reworking the landscaping at the northwest corner of the existing pumping station building and reworking the entrance to the Public Works Museum, which is housed in the pumping station building. The existing runoff from the pumping station building outfalls into booted downspouts directly into a closed storm drain system, which in-turn outfalls through the fallsway bulkhead into the harbor. The remainder of the site is drained by several inlet sumps which drain into a series of storm drains which eventually outfall through the fallsway bulkhead into the harbor.

The Baltimore City Critical Area Management Program (CAMP) sets forth provisions for all redevelopment within the Chesapeake Bay Critical Area to control pollution from stormwater runoff and to conserve and protect wildlife habitat along the shoreline of the bay. This project lies within the Waterfront Revitalization Area and is subject to Critical Area requirements specific to this area. All significant redevelopment projects are required to reduce runoff pollution from the site by a minimum of 10%. If this cannot be accomplished on the site, developers are required to contribute to the Runoff Pollution Reduction Offset Program so those water quality improvement goals can be met elsewhere within the City's watershed. In addition, all significant redevelopment within the 100' buffer portion of the Critical Area is subject to Buffer establishment requirements and habitat protection requirements. An offset fee must be paid for the total area that is not landscaped or part of a promenade easement.

The critical area analysis is based on the terms and conditions in the 2002 Edition of The Baltimore City Critical Area Management Program (CAMP) and the Baltimore City Critical Area Maps. The purpose of this submission is to identify and analyze those aspects of the Eastern Avenue Pumping Station Project which are relevant to the Baltimore City Critical Area Program. This report demonstrates the Department of Water and Wastewater's compliance with the Baltimore City Critical Area Management Program.

2. CHESAPEAKE BAY CRITICAL AREA CHARACTERISTICS

The project lies entirely within the Chesapeake Bay Critical Area of Baltimore City. A portion of site lies in the Chesapeake Bay Critical Buffer Area. The following are relevant Chesapeake Bay Critical Area characteristics:

- a. The project is within the Waterfront Revitalization Area which is part of the Intensely Developed Area.
- b. The project site is not within a habitat protection area. There are no wetlands endangered or threatened at this site.
- c. Part of site lies within the 100' buffer, but is contiguous with the public promenade. Since it is City owned, we do not anticipate an easement needing to be recorded to ensure public access.
- d. No marinas are planned as part of this development.

B. LAND USE

Currently, the site consists of 3 parcels which are jointly used by the City of Baltimore as a pumping station and as the Public Works Museum. The following is a summary of the land use of the site, which was also used for the Stormwater Management Computations:

Pre Development Site Conditions:

Total Site Area:	33,212	sf	0.762	ac
Previous Area:	8,312	sf	0.191	ac
Impervious Area:	24,900	sf	0.572	ac

Percent Impervious 75%

Post Development Site Conditions:

Total Site Area:	33,212	sf	0.762	ac
Previous Area:	9,052	sf	0.208	ac
Impervious Area:	24,160	sf	0.555	ac

Percent Impervious 73%

C. SOIL CHARACTERISTICS

According to the USDA soil maps, the site is underlain by urban soils. Soil of this type is classified as hydrological soil group C with a Runoff Curve Number of 86 for grass and 98 for paved surfaces. The site is approximately 8 feet above sea level with a small

portion within the 100-year flood plan. Four soil borings were performed within the vicinity of the new generator building. In general, beneath the surface layer of asphalt and sand or gravel subgrade are layers silty clay, brick fragments, boulder fragments and sand. For more details on soil borings, see the boring logs located in Section III.

D. DEVELOPMENT AND MITIGATION APPROACH

The Baltimore City CAMP designates the site as a Revitalization Area. The following are the mitigation approaches for Runoff Pollution Reduction and Buffer Establishment within the Waterfront Revitalization Area.

1. 10% POLLUTANT REDUCTION REQUIREMENTS

The analysis is based on the 2002 Edition of The Baltimore City Critical Area Management Program (CAMP). There is a 10% pollution reduction requirement, which applies to all disturbed areas.

The combined impervious area for the site is computed for pre-development and post-development conditions. Pre-development condition was computed to be 75% impervious and post-development condition was computed to be 73% impervious.

While the reduction in impervious area reduces some of the pollutant loading, computations reveal that an additional 0.33 pounds are still required to be removed. Pollutant removal will be achieved by the onsite sand filter being constructed to treat the stormwater quality volume. See Worksheet A in Section IV for the pollutant removal calculations.

2. BUFFER REQUIREMENTS

Whenever the developer uses a portion of the Buffer as part of a significant development the developer must contribute to the Buffer Offset Fund an amount equal to the buffer that is not part of the public promenade times \$2.50 per square foot. For this project, since the area being disturbed in the buffer is contiguous with the promenade and serves as the publicly accessible "front-lawn" of the Public Works Museum, we anticipate that there will be no buffer offset fee associated with this project. The fact that this land is City owned eliminates the need to establish easements to ensure that it is not developed in the future as anything but promenade without going through the CAMP process again.

10/22/05
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Figure 1
Baltimore City Critical Area
Proposed Development Areas

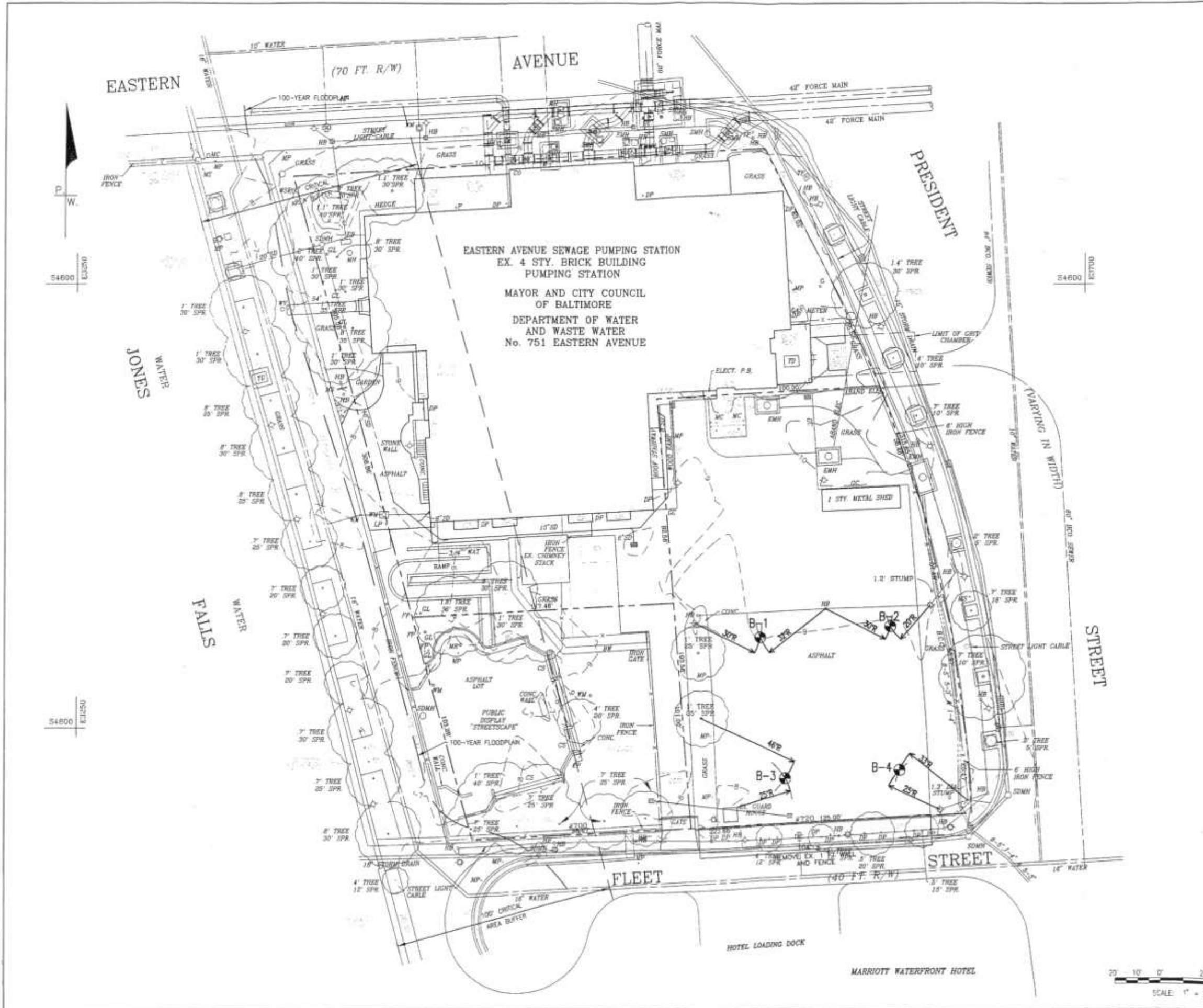


DEVELOPMENT AREAS

- RESOURCE CONSERVATION AREAS
- ▨ REVITALIZATION AREAS
- ▩ INDUSTRIAL AREAS
- CRITICAL AREA BOUNDARY

REVISION			
NO.	DESCRIPTION	DATE	BY

- NOTES
1. FOR SITE PLAN LEGEND SEE DRAWING C-1.
 2. 100-YEAR FLOOD LEVEL IS AT ELEVATION 8.81.



BASED ON SURVEY PREPARED BY CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION, TRANSPORTATION
 ENGINEERING AND CONSTRUCTION DIVISION, APRIL 26, 2004

 WRITMAN, REQUADST AND ASSOCIATES, LLP 801 SOUTH CAROLINE STREET BALTIMORE, MARYLAND 410 - 335 - 3450	FINAL SUBMITTAL
	OCT. 2005
CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER WATER AND WASTEWATER ENGINEERING DIVISION EASTERN AVENUE PUMPING STATION IMPROVEMENTS SANITARY CONTRACT NO. 791	
BORING PLAN	
SCALE: 1" = 20' DRAWING: B-1	DATE: OCT 2005 SHEET 14 OF 168

RECORD OF SUBSURFACE EXPLORATION

Project: Eastern Avenue Pumping Station

Location: Baltimore, MD

Job Number: 3081K0039

Inspector: Bob Clement

Boring Method: Hollow Stem Auger

Hole Diameter: 6 in

Water Level at Completion: Backfilled on completion

Boring Number: B-1

Drilling Company: EBA Engineering, Inc.

Driller: Ed Gross

Date Drilled: 06-15-05

Surface Elevation: 9.0' (est)

Hammer Weight/Drop: 140 lbs/30 in

Water Level After 24 hrs: Backfilled on completion

Elevation (ft)	Water/Caved Depth (ft)	Description	Depth (ft)	Sampler Number	Blows/6"	Recovery (inches)	Remarks
9			0				
8		Brown, moist, stiff, medium to fine sandy CLAY with brick fragments (fill).		S-1	15 - 7 - 7	12	10 inches of asphalt.
7				S-2	5 - 6 - 3	16	7 inches of crushed stone.
6		Dark gray / black, moist, soft, fine sandy SILT with some gravel and wood pieces (fill).	5				
5				S-3	1 - 1 - 1	16	
4		Ditto					
3		Ditto		S-4	WOH/12" - 1	18	
2							
1		Ditto		S-5	2 - 1 - 1	18	
0							
-1		Ditto	10				
-2				S-6	1 - 1 - 1	18	
-3		Ditto					
-4				S-7	2 - 1 - 2	18	
-5		Ditto	15				
-6							
-7		Ditto		S-8	3 - 3 - 2	10	
-8							
-9		Greenish gray, wet, loose to very dense, coarse to fine SAND and GRAVEL with large boulders.	20				
-10							
-11		Ditto					
-12							
-13		Ditto	25				
-14							
-15		Ditto					
-16							
-17		Ditto					
-18							
-19		Ditto					
-20							

RECORD OF SUBSURFACE EXPLORATION 3081K0039 - EASTERN AVENUE PUMPING STATION.GPJ EBA ENGINEERING INC.GDT 6/27/05



EBA Engineering, Inc.
 4813 Seton Drive
 Baltimore, Maryland 21215

■ = Split Spoon

- ∇ Water Level At Completion
- ▼ Water Level After 24 hrs
- ⏏ Caved Depth At Completion
- ⏏ Caved Depth After 24 hrs

RECORD OF SUBSURFACE EXPLORATION

Project: Eastern Avenue Pumping Station

Location: Baltimore, MD

Job Number: 3081K0039

Inspector: Bob Clement

Boring Method: Hollow Stem Auger

Hole Diameter: 6 in

Water Level at Completion: Backfilled on completion

Boring Number: B-1

Drilling Company: EBA Engineering, Inc.

Driller: Ed Gross

Date Drilled: 06-15-05

Surface Elevation: 9.0' (est)

Hammer Weight/Drop: 140 lbs/30 in

Water Level After 24 hrs: Backfilled on completion

Elevation (ft)	Water/Caved Depth (ft)	Description	Depth (ft)	Sampler Number	Blows/6"	Recovery (inches)	Remarks	
-21			30					
-22		Greenish gray, wet, loose to very dense, coarse to fine SAND and GRAVEL with large boulders.						
-23								
-24								
-25				S-9	100/3"	3		
-26			35					
-27								
-28		White, moist to wet, very dense, coarse to fine SAND with small gravel and trace of clay.						
-29								
-30					S-10	40 - 55 - 26	18	
-31			40					
-32								
-33		Ditto						
-34								
-35				S-11	21 - 28 - 26	16		
-36			45					
-37		Bottom of Boring @ 45.0 ft						
-38								
-39								
-40								
-41								
-42								
-43								
-44								
-45								
-46								
-47								
-48								
-49								
-50								

RECORD OF SUBSURFACE EXPLORATION 3081K0039 - EASTERN AVENUE PUMPING STATION.GPJ EBA ENGINEERING INC.GDT 6/27/05



EBA Engineering, Inc.
 4813 Seton Drive
 Baltimore, Maryland 21215

■ = Split Spoon

- ▽ Water Level At Completion
- ▽ Water Level After 24 hrs
- ⊥ Caved Depth At Completion
- ⊥ Caved Depth After 24 hrs

RECORD OF SUBSURFACE EXPLORATION

Project: Eastern Avenue Pumping Station

Location: Baltimore, MD

Job Number: 3081K0039

Inspector: Bob Clement

Boring Method: Hollow Stem Auger

Hole Diameter: 6 in

Water Level at Completion: 9.9' caved @ 22.2'

Boring Number: B-2

Drilling Company: EBA Engineering, Inc.

Driller: Ed Gross

Date Drilled: 06-16-05

Surface Elevation: 9.0' (est)

Hammer Weight/Drop: 140 lbs/30 in

Water Level After 24 hrs: Backfilled on completion

Elevation (ft)	Water/Caved Depth (ft)	Description	Depth (ft)	Sampler Number	Blows/6"	Recovery (inches)	Remarks
9			0				
8		Brown, moist, stiff, coarse to fine sandy CLAY with medium to large gravel and brick fragments (fill).		S-1	14 - 5 - 3	8	10 inches of asphalt. 7 inches of crushed stone.
7				S-2	5 - 2 - 1	18	
6		Ditto					
5		Gray / black, moist, soft, fine sandy SILT with some small gravel and wood pieces (fill).	5	S-3	1 - 1 - 1	18	
4				S-4	WOH/18" - 1	18	
3		Ditto					
2		Ditto		S-5	WOH/6" - 1 - 2	18	
1				S-6	1 - 2 - 1	14	
0		Ditto					
-1		Ditto	10	S-7	1 - 2 - 4	16	
-2				S-8	1 - 1 - 2	14	
-3		Ditto					
-4		Ditto	15				
-5							
-6		Ditto					
-7		Ditto	20				
-8							
-9		Ditto					
-10		Ditto	25				
-11							
-12		Ditto					
-13		Ditto					
-14							
-15		Ditto					
-16		Ditto					
-17							
-18		Ditto					
-19		Ditto					
-20							
		White, moist, soft to hard, silty CLAY.					

RECORD OF SUBSURFACE EXPLORATION 3081K0039 - EASTERN AVENUE PUMPING STATION.GPJ EBA ENGINEERING INC.GDT 6/27/05



EBA Engineering, Inc.
4813 Seton Drive
Baltimore, Maryland 21215

■ = Split Spoon

▽ Water Level At Completion

▽ Water Level After 24 hrs

⊥ Caved Depth At Completion

⊥ Caved Depth After 24 hrs

RECORD OF SUBSURFACE EXPLORATION

Project: Eastern Avenue Pumping Station

Location: Baltimore, MD

Job Number: 3081K0039

Inspector: Bob Clement

Boring Method: Hollow Stem Auger

Hole Diameter: 6 in

Water Level at Completion: 9.9' caved @ 22.2'

Boring Number: B-2

Drilling Company: EBA Engineering, Inc.

Driller: Ed Gross

Date Drilled: 06-16-05

Surface Elevation: 9.0' (est)

Hammer Weight/Drop: 140 lbs/30 in

Water Level After 24 hrs: Backfilled on completion

Elevation (ft)	Water/Caved Depth (ft)	Description	Depth (ft)	Sampler Number	Blows/6"	Recovery (inches)	Remarks
-21			30				
-22		White, moist, soft to hard, silty CLAY.					
-23							
-24							
-25					S-9	13 - 20 - 24	16
-26			35				
-27							
-28							
-29							
-30		White, wet, very dense, coarse to fine SAND and GRAVEL with some clay.					
-31							
-32							
-33					S-10	14 - 18 - 20	16
-34			40				
-35							
-36							
-37		Bottom of Boring @ 45.0 ft					
-38							
-39							
-40							
-41							
-42							
-43							
-44							
-45							
-46							
-47							
-48							
-49							
-50							
			45	S-11	8 - 37 - 36	18	
			50				
			55				

RECORD OF SUBSURFACE EXPLORATION - EASTERN AVENUE PUMPING STATION.GPJ EBA ENGINEERING INC.GDT 6/27/05



EBA Engineering, Inc.
 4813 Seton Drive
 Baltimore, Maryland 21215

■ = Split Spoon

- ∇ Water Level At Completion
- ▼ Water Level After 24 hrs
- ⏏ Caved Depth At Completion
- ⏏ Caved Depth After 24 hrs

RECORD OF SUBSURFACE EXPLORATION

Project: Eastern Avenue Pumping Station

Boring Number: B-3

Location: Baltimore, MD

Drilling Company: EBA Engineering, Inc.

Job Number: 3081K0039

Driller: Ed Gross

Inspector: Bob Clement

Date Drilled: 06-15-05

Boring Method: Hollow Stem Auger

Surface Elevation: 8.5' (est)

Hole Diameter: 6 in

Hammer Weight/Drop: 140 lbs/30 in

Water Level at Completion: Backfilled on completion

Water Level After 24 hrs: Backfilled on completion

Elevation (ft)	Water/Caved Depth (ft)	Description	Depth (ft)	Sampler Number	Blows/6"	Recovery (Inches)	Remarks
8.5			0				
8		Brown, moist, soft to stiff, medium to fine clayey SAND with brick fragments (fill).		S-1	7 - 6 - 5	13	8 inches of asphalt.
7				S-2	2 - 1 - 3	16	6 inches of crushed stone.
6		Ditto					
5		Gray / black, moist, soft to stiff, fine sandy SILT with some small gravel and wood pieces (fill).	5	S-3	WOH/12" - 12	18	
4			Ditto		S-4	WOH/12" - 1	18
3		Ditto					
2			Ditto		S-5	1 - 1 - 2	12
1		Ditto					
0			Ditto		S-6	2 - 1 - 2	18
-1		Ditto					
-2			Ditto		S-7	2 - 1 - 1	18
-3		Ditto					
-4			Ditto		S-8	3 - 3 - 3	18
-5							
-6							
-7							
-8							
-9							
-10							
-11							
-12							
-13							
-14							
-15							
-16							
-17							
-18							
-19							
-20							
-21							

RECORD OF SUBSURFACE EXPLORATION 3081K0039 - EASTERN AVENUE PUMPING STATION.GPJ EBA ENGINEERING INC.GDT 6/27/05



EBA Engineering, Inc.
 4813 Seton Drive
 Baltimore, Maryland 21215

■ = Split Spoon

- ▽ Water Level At Completion
- ▽ Water Level After 24 hrs
- ⌋ Caved Depth At Completion
- ⌋ Caved Depth After 24 hrs

RECORD OF SUBSURFACE EXPLORATION

Project: Eastern Avenue Pumping Station

Boring Number: B-3

Location: Baltimore, MD

Drilling Company: EBA Engineering, Inc.

Job Number: 3081K0039

Driller: Ed Gross

Inspector: Bob Clement

Date Drilled: 06-15-05

Boring Method: Hollow Stem Auger

Surface Elevation: 8.5' (est)

Hole Diameter: 6 in

Hammer Weight/Drop: 140 lbs/30 in

Water Level at Completion: Backfilled on completion

Water Level After 24 hrs: Backfilled on completion

RECORD OF SUBSURFACE EXPLORATION 3081K0039 - EASTERN AVENUE PUMPING STATION.GPJ EBA ENGINEERING INC.GDT 6/27/05

Elevation (ft)	Water/Caved Depth (ft)	Description	Depth (ft)	Sampler Number	Blows/6"	Recovery (inches)	Remarks
-21.5							
-22		White, wet, loose, coarse to fine SAND and GRAVEL.	30				
-23							
-24		White / red, wet, stiff to very stiff, silty CLAY.					
-25							
-26				35	S-9	6 - 8 - 14	14
-27		Ditto					
-28							
-29							
-30				40	S-10	6 - 8 - 7	18
-31		White, wet, desne, coarse to fine silty SAND and GRAVEL with some clay.					
-32							
-33							
-34							
-35							
-36			45	S-11	7 - 16 - 21	18	
-37		Bottom of Boring @ 45.0 ft					
-38							
-39							
-40							
-41							
-42							
-43							
-44							
-45							
-46							
-47							
-48							
-49							
-50							
-51							



EBA Engineering, Inc.
 4813 Seton Drive
 Baltimore, Maryland 21215

■ = Split Spoon

- ▽ Water Level At Completion
- ▽ Water Level After 24 hrs
- ⊥ Caved Depth At Completion
- ⊥ Caved Depth After 24 hrs

RECORD OF SUBSURFACE EXPLORATION

Project: Eastern Avenue Pumping Station

Boring Number: B-4

Location: Baltimore, MD

Drilling Company: EBA Engineering, Inc.

Job Number: 3081K0039

Driller: Ed Gross

Inspector: Bob Clement

Date Drilled: 06-16-05

Boring Method: Hollow Stem Auger

Surface Elevation: 8.5' (est)

Hole Diameter: 6 in

Hammer Weight/Drop: 140 lbs/30 in

Water Level at Completion: 8.0' caved @ 22.5'

Water Level After 24 hrs: Backfilled on completion

Elevation (ft)	Water/Caved Depth (ft)	Description	Depth (ft)	Sampler Number	Blows/6"	Recovery (inches)	Remarks
8.5			0				10 inches of asphalt.
8		Brown, moist, stiff to very stiff, coarse to fine sandy CLAY with brick fragments (fill).		S-1	24 - 14 - 7	12	7 inches of crushed stone.
7				S-2	4 - 4 - 5	16	
6		Ditto	5				
5				S-3	1 - 1 - 1	18	
4		Gray / black, moist, very soft to very stiff, fine sandy SILT with some small gravel and wood pieces (fill).		S-4	WOH/18"	18	
3							
2		Ditto		S-5	1 - 1 - 2	18	
1							
0		Ditto	10				
-1							
-2		Ditto		S-6	4 - 9 - 12	18	
-3							
-4		Ditto	15				
-5							
-6		White / red, moist, stiff to very hard, silty CLAY.		S-7	5 - 6 - 12	18	
-7							
-8		Ditto	20				
-9							
-10		Ditto	25				
-11							
-12		Ditto		S-8	11 - 13 - 29	14	
-13							
-14		Ditto					
-15							
-16		Ditto					
-17							
-18		Ditto					
-19							
-20		Ditto					
-21							

RECORD OF SUBSURFACE EXPLORATION 3081K0039 - EASTERN AVENUE PUMPING STATION.GPJ EBA ENGINEERING INC.GDT 02/7/05



EBA Engineering, Inc.
 4813 Seton Drive
 Baltimore, Maryland 21215

■ = Split Spoon

▽ Water Level At Completion
 ▽ Water Level After 24 hrs
 L L Caved Depth At Completion
 ▣ Caved Depth After 24 hrs

RECORD OF SUBSURFACE EXPLORATION

Project: Eastern Avenue Pumping Station

Boring Number: B-4

Location: Baltimore, MD

Drilling Company: EBA Engineering, Inc.

Job Number: 3081K0039

Driller: Ed Gross

Inspector: Bob Clement

Date Drilled: 06-16-05

Boring Method: Hollow Stem Auger

Surface Elevation: 8.5' (est)

Hole Diameter: 6 in

Hammer Weight/Drop: 140 lbs/30 in

Water Level at Completion: 8.0' caved @ 22.5'

Water Level After 24 hrs: Backfilled on completion

Elevation (ft)	Water/Caved Depth (ft)	Description	Depth (ft)	Sampler	Number	Blows/6"	Recovery (Inches)	Remarks
-21.5								
-22		White / red, moist, stiff to very hard, silty CLAY.	30					
-23								
-24								
-25								
-26					S-9	26 - 48 - 65	18	
-27			35					
-28		Light brown, wet, medium dense, coarse to fine SAND and GRAVEL.						
-29								
-30								
-31					S-10	2 - 4 - 17	18	
-32			40					
-33								
-34								
-35		White, wet, very desne, coarse to fine silty SAND and GRAVEL with some clay.						
-36								
-37					S-11	30 - 47 - 31	18	
-38		Bottom of Boring @ 45.0 ft	45					
-39								
-40								
-41								
-42								
-43								
-44								
-45								
-46								
-47								
-48								
-49								
-50								
-51								

RECORD OF SUBSURFACE EXPLORATION: 3081K0039 - EASTERN AVENUE PUMPING STATION.GPJ EBA ENGINEERING INC.GDT 6/27/05



EBA Engineering, Inc.
 4813 Seton Drive
 Baltimore, Maryland 21215

■ = Split Spoon

- ▽ Water Level At Completion
- ▼ Water Level After 24 hrs
- ⊥ Caved Depth At Completion
- ⊥ Caved Depth After 24 hrs

Worksheet A: Standard Application Process for Redevelopment

Eastern Aveune Pumping Station and Generator Building

Step 1: Project Description

A. Calculate Percent Imperviousness

1. Site Acreage = 0.76 acres
2. Site Impervious, existing and proposed, (see table below)

	Existing (acres)	Post-Development (acres)
rooftop	<u>0.00</u>	<u>0.10</u>
roads	<u>0.00</u>	<u>0.00</u>
sidewalks	<u>0.10</u>	<u>0.09</u>
parking lots	<u>0.47</u>	<u>0.36</u>
pools/ponds	<u>0.00</u>	<u>0.00</u>
decks	<u>0.00</u>	<u>0.00</u>
other	<u>0.00</u>	<u>0.00</u>

Impervious Surface Area 0.57 0.55

Imperviousness (I)
 Existing Impervious Surface Area / Site Area = 75.00 %
 Post-Development Impervious Surface Area / Site Area = 72.37 %

Step 2: Calculate the Pre-Development Load (L pre)

A. Redevelopment

I pre = 75.00 %
 Rv = 0.73
 C = 1.08 mg/1
 A = 0.76 acres

$L_{pre} = Rv \cdot C \cdot A \cdot 8.16 = 4.86 \text{ lbs P/acre/year}$

Step 3: Calculate the Post-Development Load (L post)

A. Redevelopment and New Development

I post = 72.37 %
 Rv = 0.70
 C = 1.08 mg/1
 A = 0.76 acres

$L_{post} = Rv \cdot C \cdot A \cdot 8.16 = 4.70 \text{ lbs P/acre/year}$

*wrong
10% worksheet
A*

changed

Step 4: Calculate the Pollutant Removal Requirement (RR)

$$RR = L_{\text{post}} - (0.9)L_{\text{pre}} = 0.33 \text{ lbs P}$$

Step 5: Identify Feasible Urban BMP

Select BMP Options from the 2000 Maryland Stormwater Design Manual Volumes I & II. See Appendix D-4. Stormwater Criteria of the MD Critical Area IDA Zone... Standard Application. Calculate the load removed for each option. Removal efficiency rates are shown in Table D.4.7

BMP Type	Removal Efficiency	* Fraction of D.A. served	L post	=	Load Removed (LR)
Underground Sand Filter	0.50	0.18	4.70	=	0.42 lbs
<hr/>	<hr/>	<hr/>	4.70	=	0.00 lbs
<hr/>	<hr/>	<hr/>	4.70	=	0.00 lbs
<hr/>	<hr/>	<hr/>	4.70	=	0.00 lbs
<hr/>	<hr/>	<hr/>	4.70	=	0.00 lbs
			Total	=	0.42 lbs

If the Load Removed is equal to or greater than the pollutant removal requirement (RR) calculated in Step 4, then the on-site BMP option complies with the 10% Rule.

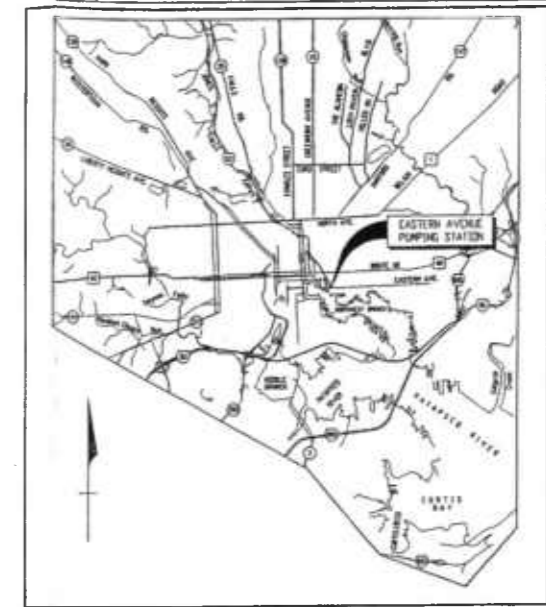
Remaining removal requirement - pounds of Phosphorus (RRR)

$$RRR = RR - LR = \underline{\underline{-0.10 \text{ lbs P}}} \quad \text{BMP Achieves 10% Rule Requirements}$$

REVISION			
NO.	DESCRIPTION	DATE	BY

SITE DATA

- TOTAL SITE AREA = 0.76 acres
- TOTAL 100' BUFFER AREA = 0.34 acres
 LANDSCAPED BUFFER AREA = 0.10 acres
 HARDSCAPED BUFFER AREA = 0.07 acres
- UNOBTURBED BUFFER AREA = 0.17 acres (not included in computations)
 LOCATED ON BALTIMORE CITY'S PUMPING STATION PROPERTY
- ALL AREAS OF THE BUFFER EXIST ON PUBLICLY OWNED AND ACCESSIBLE LAND, AND ARE CONTIGUOUS WITH THE PROMENADE.



VICINITY MAP
NOT TO SCALE



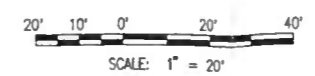
LOCATION MAP
NOT TO SCALE

BASED ON SURVEY PREPARED BY CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION, TRANSPORTATION
 ENGINEERING AND CONSTRUCTION DIVISION, APRIL 28, 2004

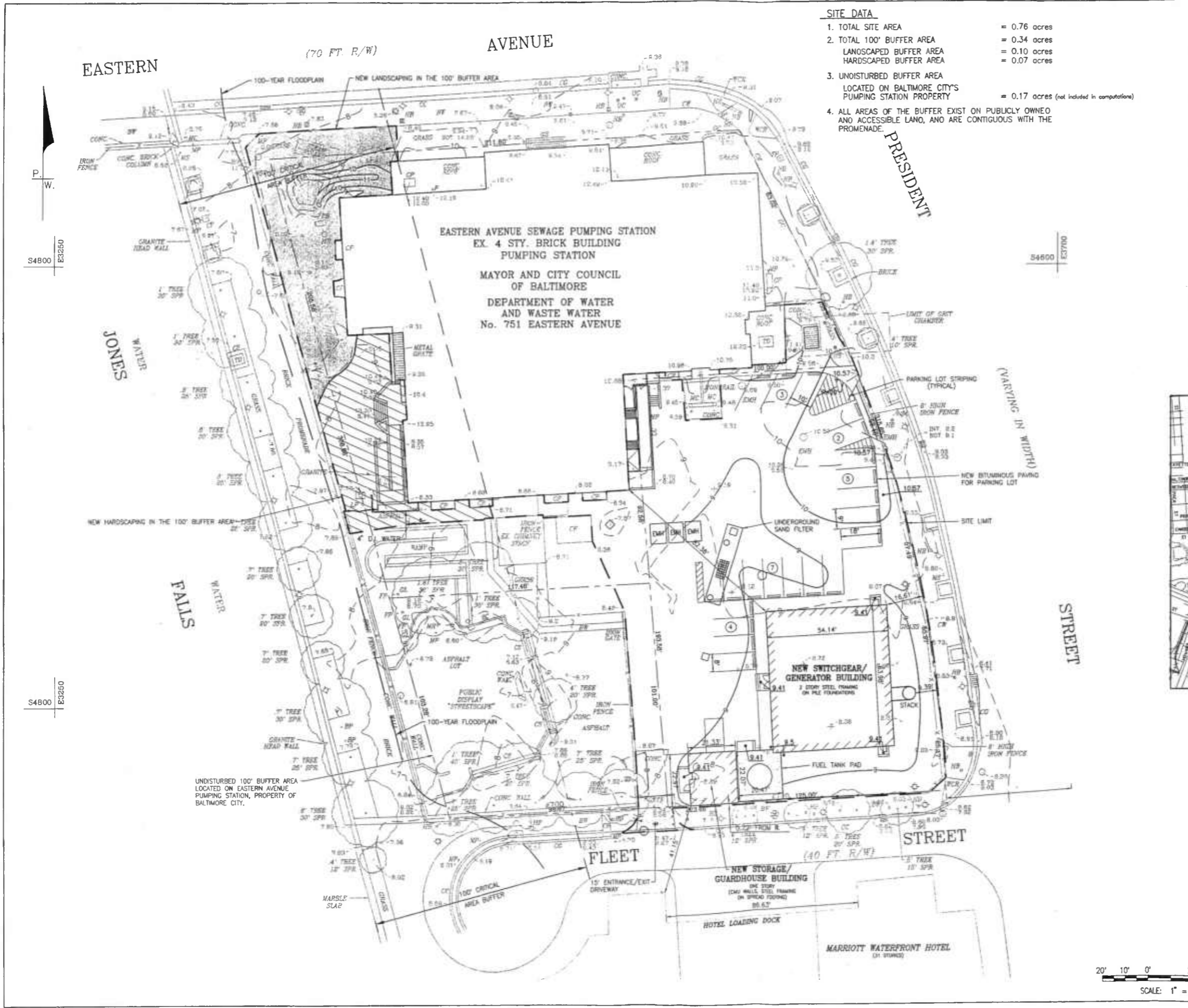
WR&A
 WHITMAN, REQUARDT AND ASSOCIATES, LLP
 801 SOUTH CAROLINE STREET
 BALTIMORE, MARYLAND
 410 - 235 - 3450
 Contact: Jeff Ratnow

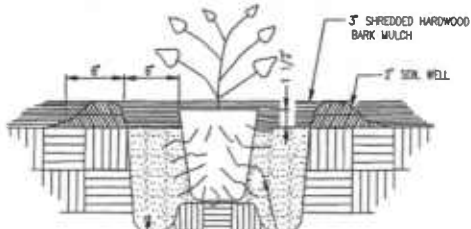
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER
 WATER AND WASTEWATER ENGINEERING DIVISION
 EASTERN AVENUE PUMPING STATION IMPROVEMENTS
 SANITARY CONTRACT NO. 791

CRITICAL AREA PLAN

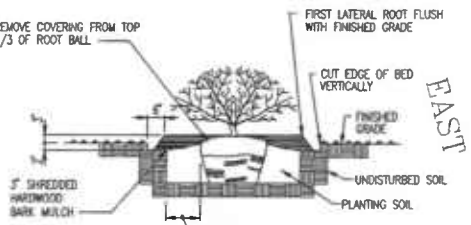


SCALE: 1" = 20' DATE: NOV 2005
 DRAWING: CRA-1 SHEET 1 OF 1





PLANTING DETAIL - CONTAINER PLANT
NO SCALE



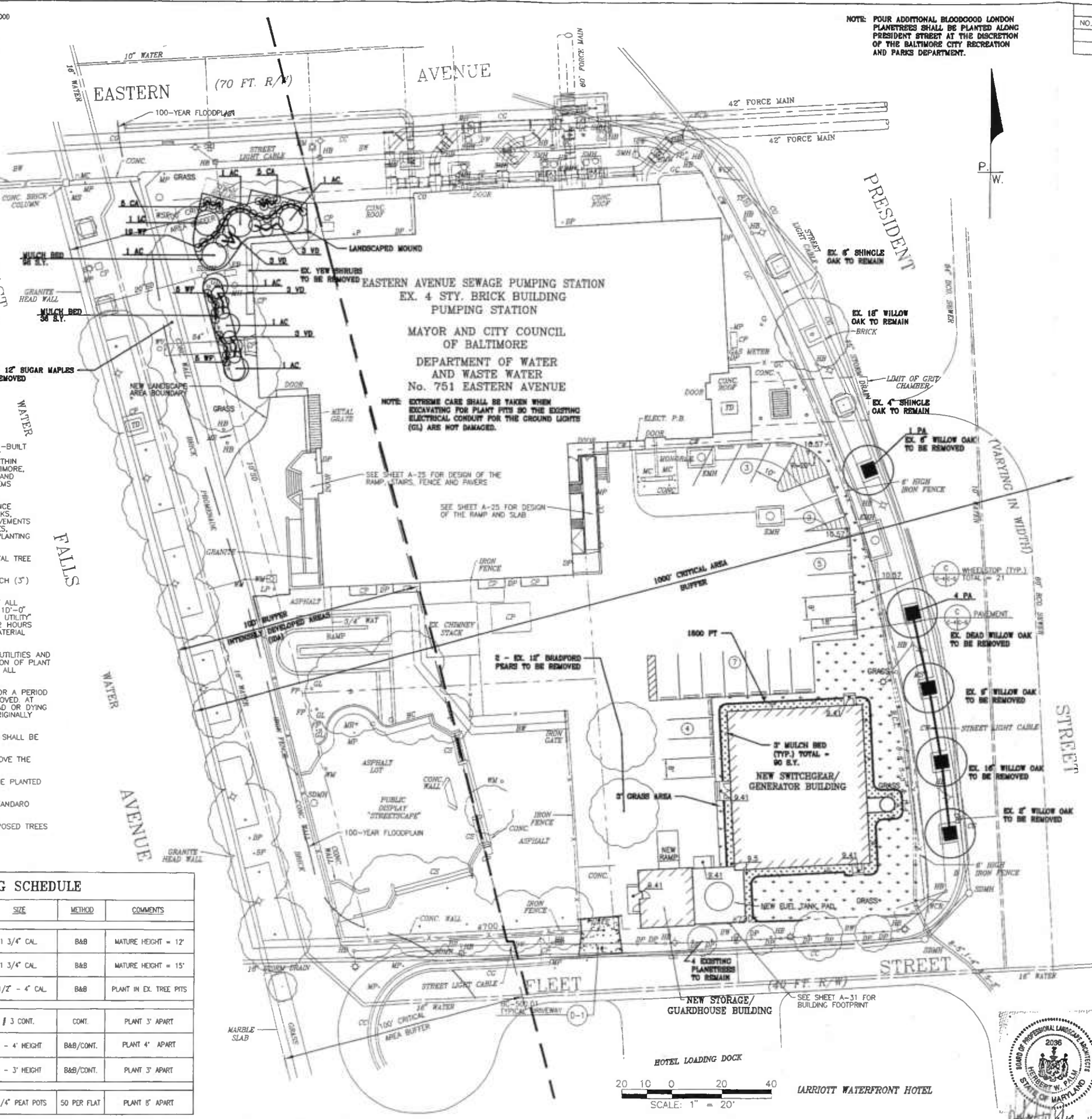
PLANTING DETAIL - SHRUB
NO SCALE

LANDSCAPE NOTES:

1. THESE DRAWINGS ARE FOR LANDSCAPE PURPOSES ONLY. AS-BUILT SITE CONDITIONS MAY VARY. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND UTILITY LOCATIONS WITHIN THE PROJECT LIMITS, AND SHALL INFORM THE CITY OF BALTIMORE, DEPARTMENT OF PUBLIC WORKS (DPW), BUREAU OF WATER AND WASTEWATER, OF ANY DISCREPANCIES OR POTENTIAL PROBLEMS PRIOR TO COMMENCING WORK.
2. ALL PLANTING AND MULCHING SHALL BE DONE IN ACCORDANCE WITH THE CITY OF BALTIMORE, DEPARTMENT OF PUBLIC WORKS, BOOK OF STANDARDS, CATEGORY NO. 7 - ROADSIDE IMPROVEMENTS AND THE SPECIFICATIONS FOR MATERIALS, HIGHWAYS, BRIDGES, UTILITIES AND INCIDENTAL STRUCTURES, ARTICLE 36-13 - PLANTING TREES, SHRUBS, AND VINES.
3. ALL TREES SHALL HAVE A MULCH BED COMPRISING THE TOTAL TREE PIT AREA.
4. EACH TREE PLANTING AREA WILL BE SPREAD WITH THREE INCH (3") DEEP SHREDDED HARDWOOD BARK MULCH.
5. DO NOT PLANT TREES WITHIN 5'-0" OF THE CENTERLINE OF ALL UNDERGROUND UTILITY LINES. DO NOT PLANT TREES WITHIN 10'-0" OF THE CENTERLINE OF ALL OVERHEAD UTILITY LINES. "MISS UTILITY" (1-800-257-7777) MUST BE CONTACTED A MINIMUM OF 72 HOURS PRIOR TO PROCEEDING WITH ANY EXCAVATION FOR PLANT MATERIAL INSTALLATION.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO UTILITIES AND MAY MAKE MINOR ADJUSTMENTS IN SPACING AND/OR LOCATION OF PLANT MATERIALS. CONTRACTOR TO VERIFY "AS BUILT" LOCATION OF ALL UTILITIES.
7. THE CONTRACTOR SHALL GUARANTEE ALL PLANT MATERIAL FOR A PERIOD OF TWO YEARS AFTER INSTALLATION IS COMPLETE AND APPROVED. AT THE END OF TWO YEARS ALL PLANT MATERIAL WHICH IS DEAD OR DYING SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE AS ORIGINALLY SPECIFIED.
8. ALL AREAS NOT STABILIZED IN PAVING OR PLANT MATERIALS SHALL BE SEEDED AND MULCHED.
9. ALL STREET TREES SHALL BRANCH A MINIMUM OF 6'-0" ABOVE THE GROUND LEVEL.
10. DO NOT PLANT ANY TREES IN THE FALL. ALL TREES MUST BE PLANTED BETWEEN MARCH 15 - APRIL 30.
11. FOR TREE STAKING DETAIL, SEE CITY OF BALTIMORE, DPW STANDARD BC 710.D1.
12. EXISTING 5' x 5' TREE GRATES, AT THE LOCATIONS OF PROPOSED TREES ALONG PRESIDENT STREET, SHALL BE RE-USED.

LANDSCAPE PLANTING SCHEDULE

KEY	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	METHOD	COMMENTS
DECIDUOUS TREES						
AC	6	AMELANCHIER CANADENSIS 'SPRYZAM'	TRAZAM SHADBLOW SERVICEBERRY	1 3/4" CAL.	B&B	MATURE HEIGHT = 12'
LC	1	LAGERSTROEMIA INDICA 'CATAMBA'	CATAMBA CRAPENDELTREE	1 3/4" CAL.	B&B	MATURE HEIGHT = 15'
PA	9	PLATANUS X ACERIFOLIA 'BLOODGOOD'	BLOODGOOD LONDON PLANETREE	3 1/2" - 4" CAL.	B&B	PLANT IN EX. TREE PITS
SHRUBS						
CA	10	COTONEASTER APOICULATUS 'TOM THUMB'	DWARF COTONEASTER	3 CONT.	CONT.	PLANT 3' APART
VD	12	VIORURNUM DENTATUM 'CHRISTOM'	BLUE MUFFIN ARROWWOOD VIORURNUM	3' - 4' HEIGHT	B&B/CONT.	PLANT 4' APART
WF	29	WEIGELA FLORIDA 'VARIEGATED NANA'	VARIEGATED DWARF WEIGELA	2' - 3' HEIGHT	B&B/CONT.	PLANT 3' APART
GROUND COVER						
PT	1800 (36 FLATS)	PACHYSANDRA TERMINALIS	PACHYSANDRA	2 1/4" PEAT POTS	50 PER FLAT	PLANT 8' APART



NOTE: FOUR ADDITIONAL BLOODGOOD LONDON PLANETREES SHALL BE PLANTED ALONG PRESIDENT STREET AT THE DISCRETION OF THE BALTIMORE CITY RECREATION AND PARKS DEPARTMENT.

REVISION			
NO.	DESCRIPTION	DATE	BY

PROGRAM CERTIFICATION/LANDSCAPE MAINTENANCE AGREEMENT FORM

I AM AWARE OF THE REQUIREMENTS OF THE CITY OF BALTIMORE CRITICAL AREA MANAGEMENT PROGRAM AND I AGREE TO COMPLY WITH THESE REGULATIONS AND ALL APPLICABLE POLICY, GUIDELINES AND ORDINANCES. I FURTHER AGREE TO:

1. CERTIFY INSTALLATION OF THE APPROVED BEST MANAGEMENT PRACTICE(S) TO MAINTAIN SUCH PRACTICES AND HAVE SIGNED, IF APPROPRIATE, A DECLARATION OF COVENANTS--INSPECTION/MAINTENANCE AGREEMENT FOR STORMWATER MANAGEMENT/FACILITY AND FILED IT WITH THE DEPARTMENT OF PUBLIC WORKS, CONSTRUCTION MANAGEMENT DIVISION. CERTIFY INSTALLATION OF THE LANDSCAPING/PLANTING PLAN NOT LATER THAN ONE (1) YEAR FROM THE DATE OF OCCUPANCY TO THE BALTIMORE CITY PLANNING DEPARTMENT, 417 E. FAYETTE STREET, 8TH FLOOR, BALTIMORE, MD 21202.
2. CERTIFY IMPLEMENTATION OF THE LANDSCAPE MAINTENANCE AGREEMENT LISTED IN ITEMS A-F BELOW. I SHALL BE RESPONSIBLE FOR THIS MAINTENANCE AND TREE CARE FOR A PERIOD OF TWO YEARS. SERVICES SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:
 - A. WATERING
 - WATERING SHALL BE PROVIDED DURING THE GROWING SEASON AS REQUIRED.
 - FIRST GROWING SEASON: ONCE PER WEEK.
 - SECOND AND SUBSEQUENT GROWING SEASONS: AS NEEDED, BUT NOT LESS THAN ONCE PER MONTH DURING JULY AND AUGUST. THIS INCLUDES TREES PLANTED IN THE SIDEWALK AND THE PUBLIC RIGHT-OF-WAY.
 - B. REINFORCEMENT OF PLANTING REQUIREMENTS
 - A MINIMUM OF 100% OF THE TOTAL NUMBER OF TREES IS REQUIRED TO SURVIVE AT THE END OF THE TWO-YEAR MAINTENANCE PERIOD.
 - C. MOWING AND FERTILIZER USE
 - MOWING: AREAS REQUIRING MOWING SHOULD BE KEPT TO A MINIMUM. IF NECESSARY, RAISE THE LAWN MOWER BLADE TO AT LEAST 3 INCHES. THIS WILL REDUCE SOIL EROSION, INCREASE WATER ABSORPTION, AND INCREASE TURF DROUGHT TOLERANCE. ON AREAS THAT ARE LAWN THAT DO NOT REQUIRE CLOSE MOWING, ALLOW THE GRASS TO ATTAIN A HEIGHT OF AT LEAST 10 INCHES. MOWING IN THESE AREAS IS PERMITTED ONCE PER YEAR IN THE FALL AFTER SEPTEMBER.
 - FERTILIZER, PESTICIDES AND HERBICIDES: AVOID THE USE OF ANY FERTILIZER, ESPECIALLY THOSE CONTAINING PHOSPHOROUS OR NITROGEN, CHEMICAL PESTICIDES AND HERBICIDES. IF PEST (RAT) CONTROL IS NECESSARY, USE INTEGRATED PEST MANAGEMENT, WHICH LIMITS PESTICIDE APPLICATIONS TO TIMES WHEN A PROBLEM IS ACTUALLY PRESENT. REMOVE ALL HUMAN WASTE SOURCES: GARBAGE, SPOILED FOOD, PET EXCREMENT, ETC. - THESE ARE ALL RODENT FOOD SOURCES.
 - D. STORMWATER FACILITIES
 - PLANTINGS IN STORMWATER FACILITIES/BEST MANAGEMENT PRACTICES ARE TO BE LEFT ALONE TO PROVIDE HABITAT FOR BIRDS AND OTHER SPECIES. DO NOT MOW GRASS OR OTHER PLANTS IN THESE AREAS, BUT KEEP TRASH CLEANED OUT.
 - E. CONTROL OF INVASIVE PLANT SPECIES
 - PHRAGMITES, ALANTHUS (TREE-OF-HEAVEN) AND OTHER NON-NATIVE PLANT REMOVAL SHALL BE UNOBTAINED IN ANY AREAS ON-SITE FOR A MINIMUM OF TWO YEARS. INVASIVE, NON-NATIVE PLANTS WILL OVERTAKE THE NEWLY PLANTED, NATIVE, LANDSCAPING PLANTS AND CREATE A MONOCULTURE UNLESS CONTROLLED. NON-NATIVE, INVASIVE PLANTS SHOULD BE SPOT-CONTROLLED USING A COMBINATION OF "RODENT" HERBICIDE, HAND CUTTING AND WEEDING. CARE SHOULD BE TAKEN NOT TO SPRAY ANY NEWLY PLANTED, NATIVE PLANTS.
 - F. PROTECTION FROM DISEASE AND INJURY
 - PERIODIC INSPECTION SHALL BE MADE FOR ANY EVIDENCE OF DISEASE OR DAMAGE.

DEVELOPER'S SIGNATURE _____ DATE _____
 OWNER'S NAME _____ DATE _____
 OWNER'S SIGNATURE _____ DATE _____



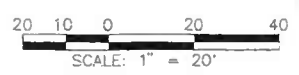
WHITMAN, REQUARDT AND ASSOCIATES, LLP
 801 SOUTH CAROLINE STREET
 BALTIMORE, MARYLAND
 410 - 235 - 3450

FINAL SUBMITTAL
 OCT. 2005

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER
 WATER AND WASTEWATER ENGINEERING DIVISION
 EASTERN AVENUE PUMPING STATION IMPROVEMENTS
 SANITARY CONTRACT NO. 791

LANDSCAPE PLAN

SCALE: 1" = 20' DATE: JUNE 2005
 DRAWING: L-1 SHEET 13 OF 168



MARRIOTT WATERFRONT HOTEL



WHITMAN, REQUARDT AND ASSOCIATES, LLP

The City of Baltimore, Department of Public Works

Eastern Avenue Pumping Station and Generator Building

**STORMWATER
MANAGEMENT
CONCEPT PLAN
REPORT**

November 2005

PREPARED BY:

WHITMAN, REQUARDT AND ASSOCIATES, LLP
BALTIMORE, MARYLAND
(410) 235-3450

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III. METHODOLOGY.....	3
IV. STORMWATER MANAGEMENT REQUIREMENTS.....	3
V. STORMWATER QUALITY MANAGEMENT DESIGN.....	5

APPENDIX

- A Storm Water Management Computations
- B TR-55 Computations
- C Soils Map
- D Drawings:
 - SWM - 1 (Land Use Plan)
 - SWM - 2 (Drainage Area Plan for SWM Filter)
 - SWM - 3 (Site Plan)
 - Construction Drawings C-1, C-2, C-3, C-4 and C-5

I. INTRODUCTION

The Eastern Avenue Pumping Station project site is located in the Inner Harbor Region of Baltimore City at 751 Eastern Avenue. A small amount of landscaping area, an existing structure and paved parking area cover the entire 0.76 acre site, which includes only the disturbed area of the parcel. The site is bound by Eastern Avenue to the North, President Street to the East, the East Falls Avenue (i.e. the harbor) to the West and Fleet Street to the South. The property is currently owned by the Mayor and City Council of Baltimore.

The proposed project consists of constructing a generator building on the existing parking lot, providing new electrical utilities to connect the pumping station to the new generator building, reworking the landscaping at the northwest corner of the existing pumping station building and reworking the entrance to the Public Works Museum, which is housed in the pumping station building. The existing runoff from the pumping station building outfalls into booted downspouts directly into a closed storm drain system, which in-turn outfalls through the fallsway bulkhead into the harbor. The remainder of the site is drained by several inlet sumps which drain into an 18" storm drain located in Fleet Street. The 18" storm drain outfalls through the fallsway bulkhead into the harbor.

It is proposed that an underground sand filter will be constructed to treat the required water quality volume.

II. CRITERIA

All stormwater management criteria in this report were designed in accordance with the Baltimore City Stormwater Management Manual, dated February 2003. In addition, all stormwater management requirements are in accordance with the stormwater management regulations defined in the Code of Maryland Regulations (COMAR) 26.17.02.

III. METHODOLOGY

Surface area quantities were determined by planimetric methods. Baltimore City performed topographic surveys of the project site.

IV. STORMWATER MANAGEMENT REQUIREMENTS

As stated in the City Stormwater Management Manual, redevelopment is defined as "development where the existing land use is industrial, commercial or multifamily." This project can be considered redevelopment because new construction occurs on an existing developed site. Therefore, stormwater management for this site will be designed according to the redevelopment criteria of the Design Manual and COMAR.

Under COMAR 26.17.02.05(D), requirement options for redevelopment are a 20% reduction in existing impervious area of the site, an implementation of stormwater management practices for 20% of the existing unmanaged impervious area, or a 20% combination of management and reduction of the existing impervious area.

In addition, stormwater management for redevelopment projects is not required to meet all the volume requirements as defined in the 2000 Maryland Stormwater Design Manual. Specifically, as stated by COMAR 26.17.02.05(D)(6), "The recharge, channel protection storage volume, and overbank flood protection volume requirements specified in the Design Manual do not apply to redevelopment projects unless specified by the approving agency." Only Water Quality Volume (WQ_v) is required for stormwater management on redevelopment projects.

It should be noted that our plan does not include some of the information requested by the checklist. We offer the following explanation:

Drainage Area Maps

Since the site does not require quantity management, we felt that a complete site analysis for quantity management was not applicable to our project. We limited our analysis to the drainage area being routed through the sand filter to (1) ensure that an adequate amount of impervious area would be routed through the filter to comply with the SWM computations and (2) to ensure that the over flow pipe in the sedimentation chamber could adequately convey the 100 year storm. Therefore, while our plan shows the entire site's drainage areas, it only shows in detail the drainage area routed through the sand filter.

Hydrologic Calculations

Since this site does not require quantity management we did not analyze any predevelopment peak flows or any post development flows not draining directly to the sand filter. We did analyze flows to the sand filter structure to ensure that the 100-year storm would be adequately conveyed by the system. TR-55 computations can be found in Appendix B.

Calculations Showing Compliance with SWM Requirements:

Since this site does not require quantity management we did not analyze the peak flow without the proposed BMP, just without it to ensure that the 100-year storm would be adequately conveyed through the filter.

V. STORMWATER QUALITY MANAGEMENT DESIGN

The manipulation of the land surface as a result of this project has been categorized as follows:

- 1) Existing pervious to remain.
- 2) Existing impervious to remain.
- 3) Existing impervious to proposed pervious.
- 4) Existing Pervious to proposed impervious.

Appendix B contains drawing SWM-1, which shows the location and quantities of the above-mentioned land surfaces. The following table summarizes the quantities of these areas:

<i>Description</i>	<i>Area (Acres)</i>
Site Area	0.76
Existing pervious to remain	0.14
Existing impervious to remain	0.50
Existing impervious to proposed pervious	0.07
Existing Pervious to proposed impervious	0.05

To satisfy the Baltimore City stormwater management requirements, this project proposes to utilize a combination of (1) impervious area removal and (2) treatment of runoff with an underground sand filter. The runoff will be collected through an inlet cast into the top slab of an underground sand filter located in the center of the parking lot adjacent to the North West corner of the new generator building. The site will be regraded to create a sump at the inlet location. The treated runoff will then be released into an existing storm drain located along the southern edge of the site.

The detailed calculations can be found in Appendix A. While the vault can achieve minimum sand filter depth requirements, the grading and existing outfall elevation constraints prohibit the vault from achieving the minimum total vault height requirements. Therefore the vault will have an access grates in lieu of manhole access on top of the filter bed to provide adequate access for maintenance and repair.

To meet the WQ_v requirement shown above, the sand filter vault was designed with inside storage dimensions of 31' long, 5' wide and 4.5' deep.

This project qualifies to be categorized as redevelopment

Formulas: $WQ_v = P * R_v * A$
 $P = 1"$ of precipitation
 $R_v = 0.05 + 0.009(I)$
 $A = \text{Site Area (.762 ac)}$
 $I = [\text{area requiring treatment/site area}] * 100$

Pre Development Site Conditions:

Total Site Area:	33212 sf	0.762 ac
Previous Area:	8312 sf	0.191 ac
Impervious Area:	24900 sf	0.572 ac

Percent Impervious 75%

Post Development Site Conditions:

Total Site Area:	33212 sf	0.762 ac
Previous Area:	9052 sf	0.208 ac
Impervious Area:	24160 sf	0.555 ac

Percent Impervious 73%

20% Reduction Required

Ex Impervious	24900 sf	0.572 ac
20% Reduction	4980 sf	0.114 ac

<- Reduce Site Impervious Area by this amount

Actual Reduction Achieved	740 sf	0.017 ac
(.57 ac minus .55 ac)		

A treatment facility is required to treat the balance: 4240 cf

Remaining balance requiring treatment: 0.097 ac
 A minimum of 0.097 acres must be routed through the sand filter. This plan has diverted 0.138 ac which is greater than the required minimum, thereby satisfying SWM requirements.

$I = [(\text{remaining balance requiring treatment}) / \text{total site area}] * 100 = 12.77$

$R_v = 0.05 + 0.009 * I$

$R_v = 0.165$

$WQ_v = 1" * 0.165 * 0.762 \text{ ac}$

WQv= 0.126 ac - in

WQv= 0.010 ac - ft

WQv= 456 cf

Several iterations were made by hand. For presentation purposes of the report the following computations will show that the final selected filter design satisfies the City's SWM Criteria

Pretreatment (Vp):

The system must store 25% of the water quality volume (WQv)

$$V_p = 25\% \cdot WQ_v = 114 \text{ CF}$$

Minimum Sedimentation Area (Asf):

Use formula for $I < 75\%$ because $I = 73\%$

$$A_{sf} = 0.066 (WQ_v) = 30 \text{ SF}$$

Treatment:

System must temporarily hold 75% of the WQv prior to filtration (Vtemp)

$$V_{temp} = 75\% \cdot WQ_v = 342 \text{ cf}$$

Required Filter Bed (Af)

$$A_f = [WQ_v \cdot d_f] / [k \cdot (h_f + d_f) \cdot t_f]$$

df = minimum filter bed depth =	2.5 ft
K = coefficient of permeability for sand filters =	3.5 ft/day
hf = avg height of water above the filter bed =	0.5 ft/day
tf = design filter bed drain time =	1.67 days

$$A_f = 65 \text{ SF}$$

Check selected filter size to ensure it achieves the computed Vp, Asf, Vtemp and Af:

Vp:

Sedimentation chamber dimensions:

9 feet long
5 feet wide
3.5 feet deep

Sedimentation Chamber Volume = 158 cubic feet which is greater than the required Vp (114cf)

Asf:

Sedimentation Area: 9 feet long
 5 feet wide

Sedimentation Chamber area = 45 square feet which is greater than the required Asf (30 sf)

Vtemp:

$V_{temp} = V_p + V_{treatment}$

$V_p = 158$ cubic feet

$V_t =$ [ponding depth above filter*vault area upstream of weir wall]
 +volume of sand filter chamber*porosity of sand)

$V_t = [1' * (16'+3'+9')*5'] + [2.5'*16'*5'*0.4] = 220$ cf

Vtemp = 378 which is greater than the required Vtemp (342 cf)

Af:

Filter Bed Area: 16 feet long
 5 feet wide

Filter Bed Area = 80 square feet which is greater than the required Af (65 sf)

It can be concluded that the selected vault satisfies the City's SWM requirements.

WinTR-55 Current Data Description

--- Identification Data ---

User: jratnow Date: 10/31/2005
 Project: Eastern Avenue Pumping Station Units: English
 SubTitle: Post Development Areal Units: Acres
 State: Maryland
 County: Baltimore
 Filename: H:\70000\70599\Civil\SWM\eastern ave ps tr55 run.w55

--- Sub-Area Data ---

Name	Description	Reach	Area(ac)	RCN	Tc
SWM-1		Outlet	0.18	95	0.1

Total area: .18 (ac)

--- Storm Data --

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
3.2	4.2	5.1	5.5	6.3	7.1	2.6

Storm Data Source: Baltimore County, MD (NRCS)
 Rainfall Distribution Type: Type II
 Dimensionless Unit Hydrograph: <standard>

jrtnow

Eastern Avenue Pumping Station
Post Development
Baltimore County, Maryland

Storm Data

Rainfall Depth by Rainfall Return Period

2-Yr (in)	5-Yr (in)	10-Yr (in)	25-Yr (in)	50-Yr (in)	100-Yr (in)	1-Yr (in)
3.2	4.2	5.1	5.5	6.3	7.1	2.6

Storm Data Source: Baltimore County, MD (NRCS)
Rainfall Distribution Type: Type II
Dimensionless Unit Hydrograph: <standard>

jratnow

Eastern Avenue Pumping Station
Post Development
Baltimore County, Maryland

Watershed Peak Table

Sub-Area or Reach Identifier	Peak Flow by Rainfall Return Period					
	2-Yr (cfs)	5-Yr (cfs)	10-Yr (cfs)	25-Yr (cfs)	50-Yr (cfs)	100-Yr (cfs)

SUBAREAS						
SWM-1	0.69	0.92	1.14	1.23	1.42	1.60
REACHES						
OUTLET	0.69	0.92	1.14	1.23	1.42	1.60

←
An 8" PVC SD
@ 10% has
been provided
to handle
The 100 Year
Storm. 8" @
10% has a
Capacity of
7 cfs

jratnow

Eastern Avenue Pumping Station
Post Development
Baltimore County, Maryland

Hydrograph Peak/Peak Time Table

Sub-Area or Reach Identifier	Peak Flow and Peak Time (hr) by Rainfall Return Period					
	2-Yr (cfs) (hr)	5-Yr (cfs) (hr)	10-Yr (cfs) (hr)	25-Yr (cfs) (hr)	50-Yr (cfs) (hr)	100-Yr (cfs) (hr)

SUBAREAS						
SWM-1	0.69 11.93	0.92 11.93	1.14 11.93	1.23 11.93	1.42 11.93	1.60 11.93
REACHES						
OUTLET	0.69	0.92	1.14	1.23	1.42	1.60

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Eastern Avenue Pumping Station
Post Development
Baltimore County, Maryland

Sub-Area Summary Table

Sub-Area Identifier	Drainage Area (ac)	Time of Concentration (hr)	Curve Number	Receiving Reach	Sub-Area Description
SWM-1	.18	0.100	95	Outlet	

Total Area:	.18 (ac)				

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Eastern Avenue Pumping Station
Post Development
Baltimore County, Maryland

Sub-Area Time of Concentration Details

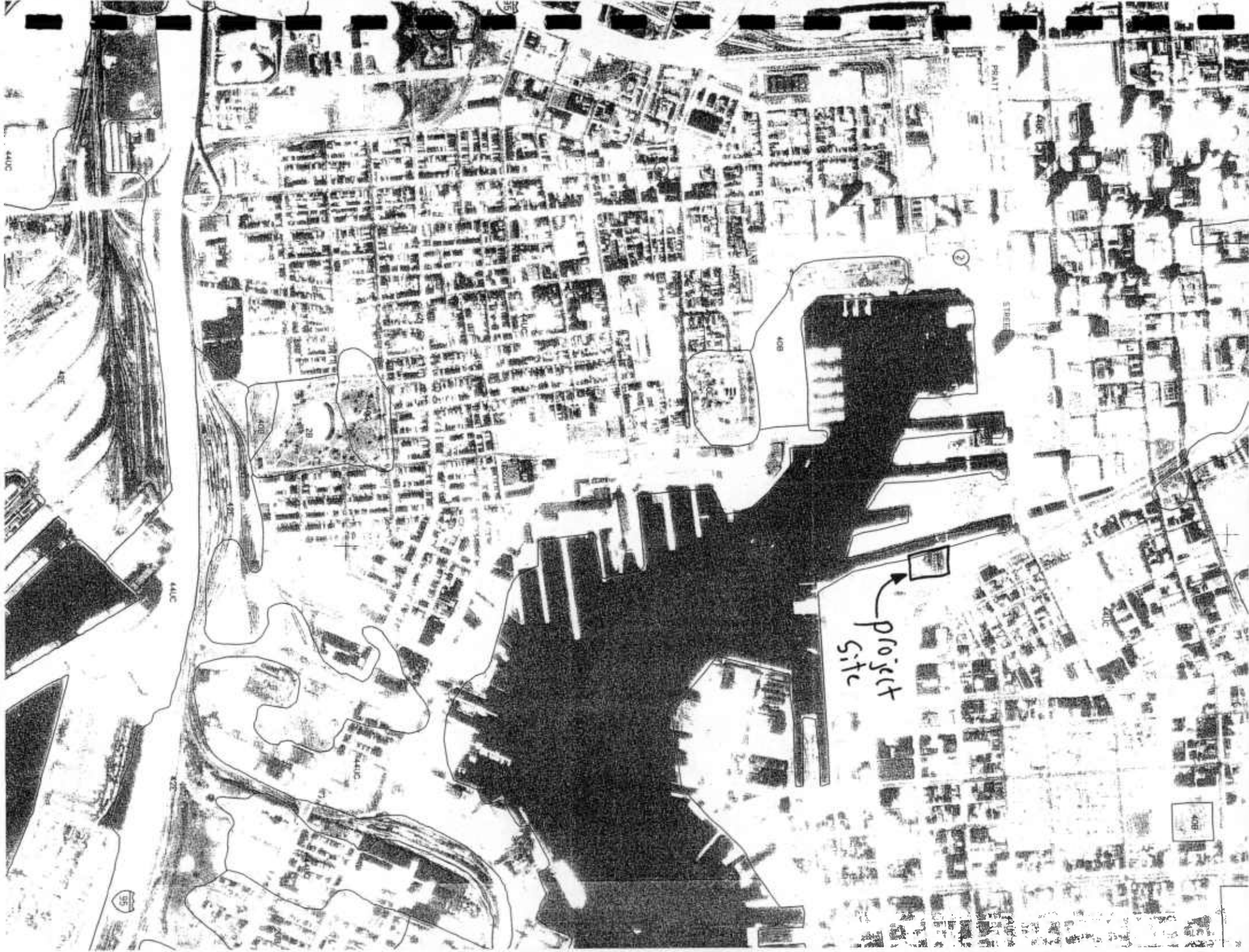
Sub-Area Identifier/	Flow Length (ft)	Slope (ft/ft)	Mannings's n	End Area (sq ft)	Wetted Perimeter (ft)	Velocity (ft/sec)	Travel Time (hr)
SWM-1 SHEET	90	0.0470	0.011				0.013
						Time of Concentration	0.1 =====

jratnow

Eastern Avenue Pumping Station
Post Development
Baltimore County, Maryland

Sub-Area Land Use and Curve Number Details

Sub-Area Identifier	Land Use	Hydrologic Soil Group	Sub-Area Area (ac)	Curve Number
SWM-1	Open space; grass cover < 50% (poor)	C	.042	86
	Paved parking lots, roofs, driveways	C	.138	98
Total Area / Weighted Curve Number			.18	95
			===	==



Project Site

2

A41C

A41C

50

BOB

BOB

SHAY STREET

A41C

REVISION			
NO.	DESCRIPTION	DATE	BY

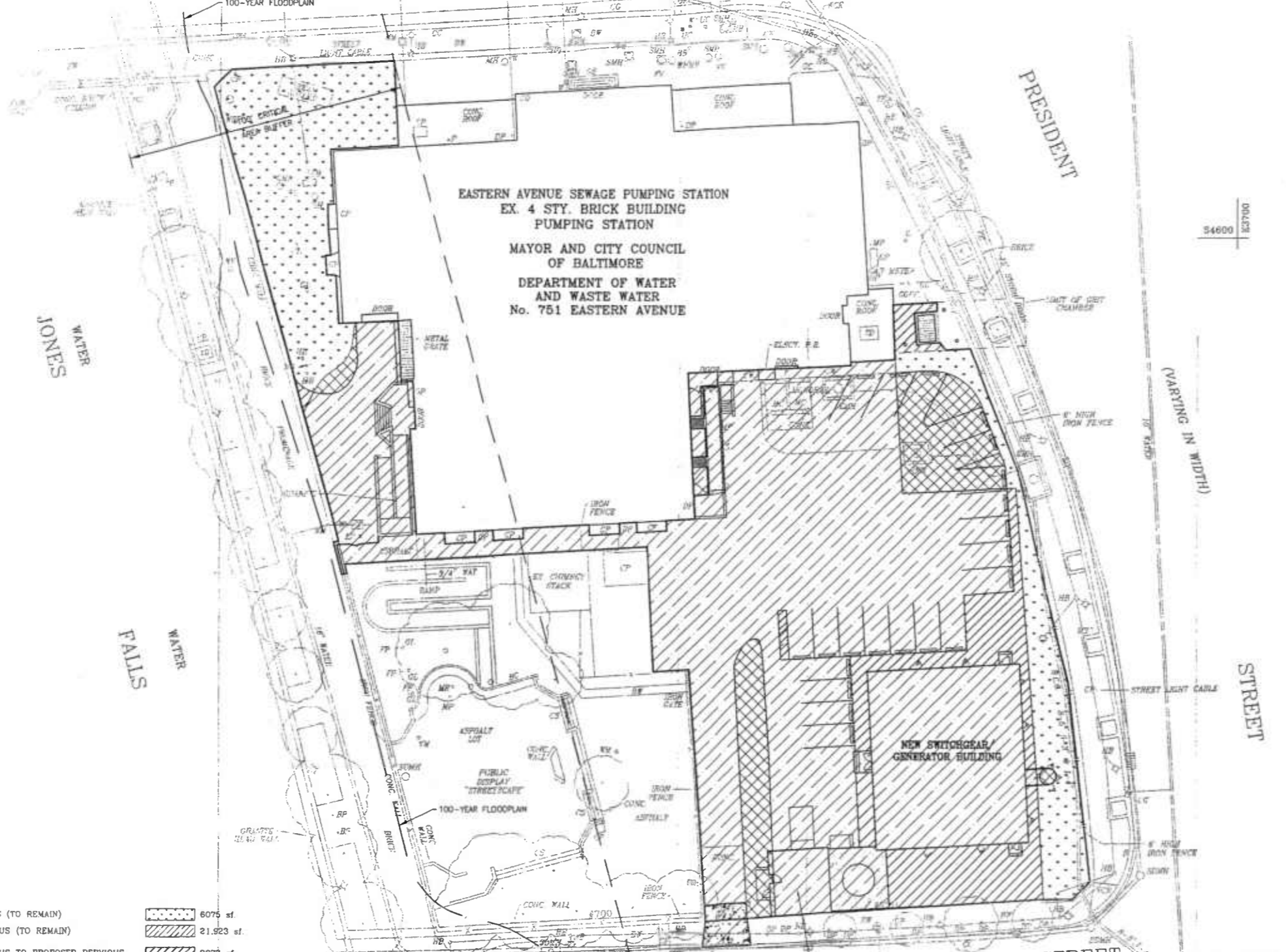
EASTERN AVENUE
(70 FT. R/W)

JONES WATER FALLS



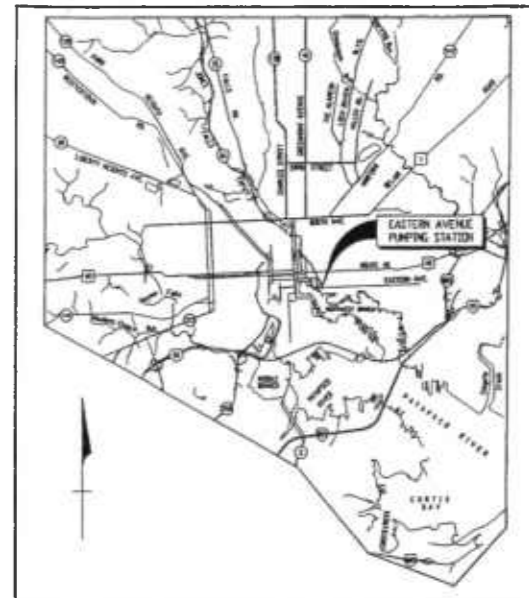
S4600 E3250

S4600 E3250



PRESIDENT STREET
(VARYING IN WIDTH)

STREET



LAND USE KEY

EXISTING PERVIOUS (TO REMAIN)		6075 sf.
EXISTING IMPERVIOUS (TO REMAIN)		21,923 sf.
EXISTING IMPERVIOUS TO PROPOSED PERVIOUS		2977 sf.
EXISTING PERVIOUS TO PROPOSED IMPERVIOUS		2237 sf.

SWM DATA

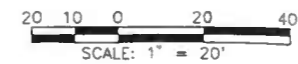
TOTAL SITE AREA	= 33,212 sf. (.76 ac.)
PRE-DEVELOPMENT IMPERVIOUS	= 24,900 sf. (.572 ac.)
AREA REQUIRED TO MANAGE 20%	= 4980 sf. (.114 ac.)
POST-DEVELOPMENT IMPERVIOUS	= 24,180 sf. (.555 ac.)
IMPERVIOUS REDUCTION ACHIEVED	= 740 sf. (.017 ac.)
REMAINING IMPERVIOUS AREA REQUIRING TREATMENT	= 4240 sf. (.097 ac.)
SOIL TYPE FOR ENTIRE SITE	= 44 uC (Type C)



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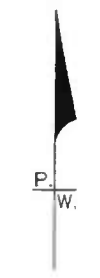
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WATER AND WASTEWATER ENGINEERING DIVISION
EASTERN AVENUE PUMPING STATION IMPROVEMENTS
SANITARY CONTRACT NO. 791

**STORMWATER MANAGEMENT
LAND USE PLAN**



SCALE: 1" = 20' DATE: NOV 2005
DRAWING: SWM-1 SHEET 1 OF 3

REVISION			
NO.	DESCRIPTION	DATE	BY



S4600 E3250

S4800 E3250

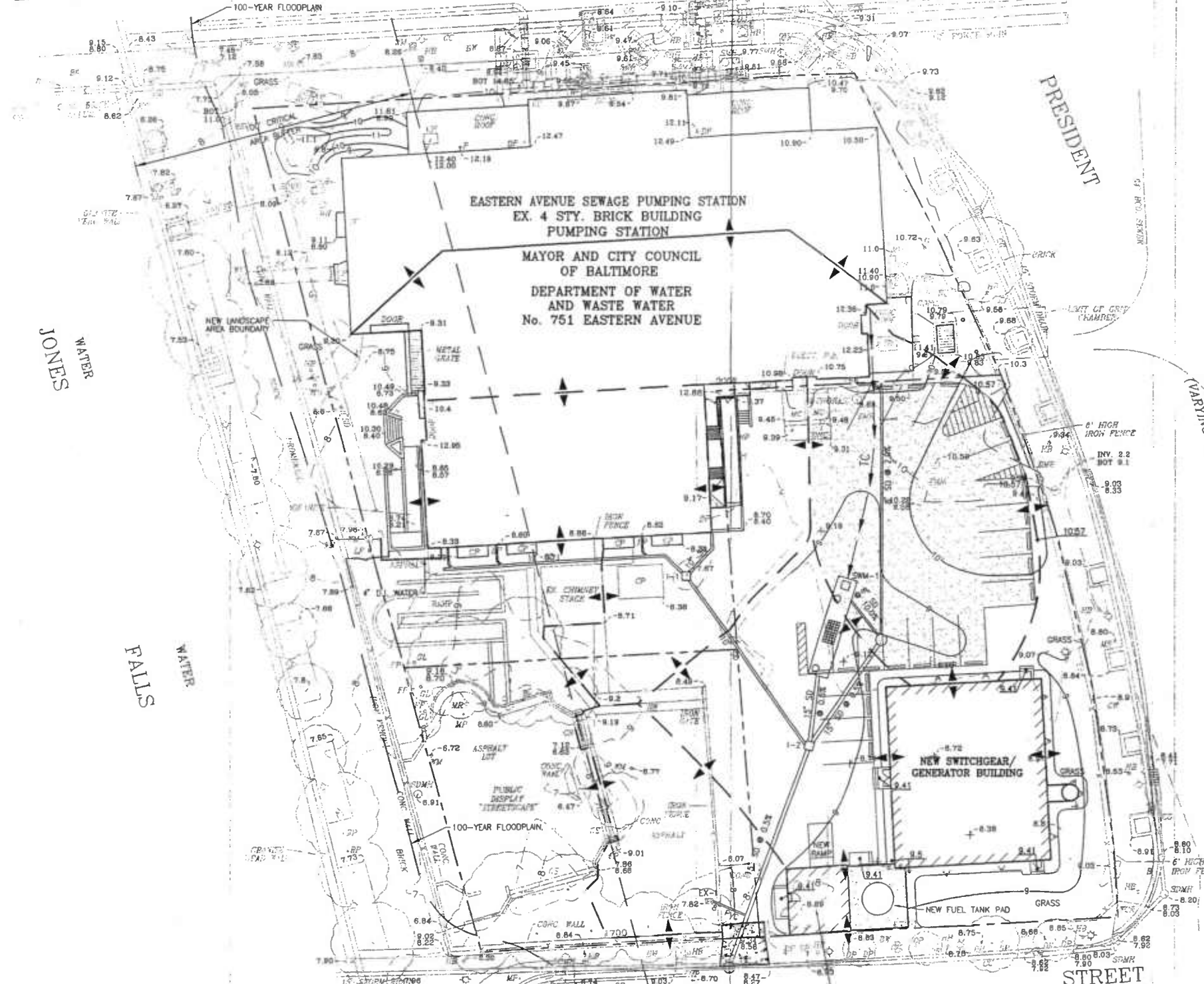
EASTERN

(70 FT. R/W)

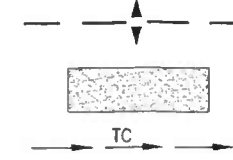
AVENUE

JONES WATER

FALLS WATER



LEGEND



DRAINAGE AREA DIVIDE

IMPERVIOUS DRAINAGE AREA TO UNDERGROUND SAND FILTER

TIME OF CONCENTRATION PATH

DRAINAGE AREA TO SAND FILTER = 0.180 ac. (0.138 ac. impervious)

S4600 E3700

STREET

STREET

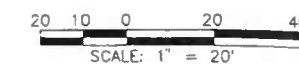
FLEET

(40 FT. R/W)

NEW STORAGE/GUARDHOUSE BUILDING

HOTEL LOADING DOCK

MARRIOTT WATERFRONT HOTEL



SCALE: 1" = 20'



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SANITARY CONTRACT NO. 791

STORMWATER MANAGEMENT
POST-DEVELOPMENT DRAINAGE AREA MAP

SCALE: 1" = 20'

DATE: NOV. 2005

DRAWING: SWM-2

SHEET 2 OF 3

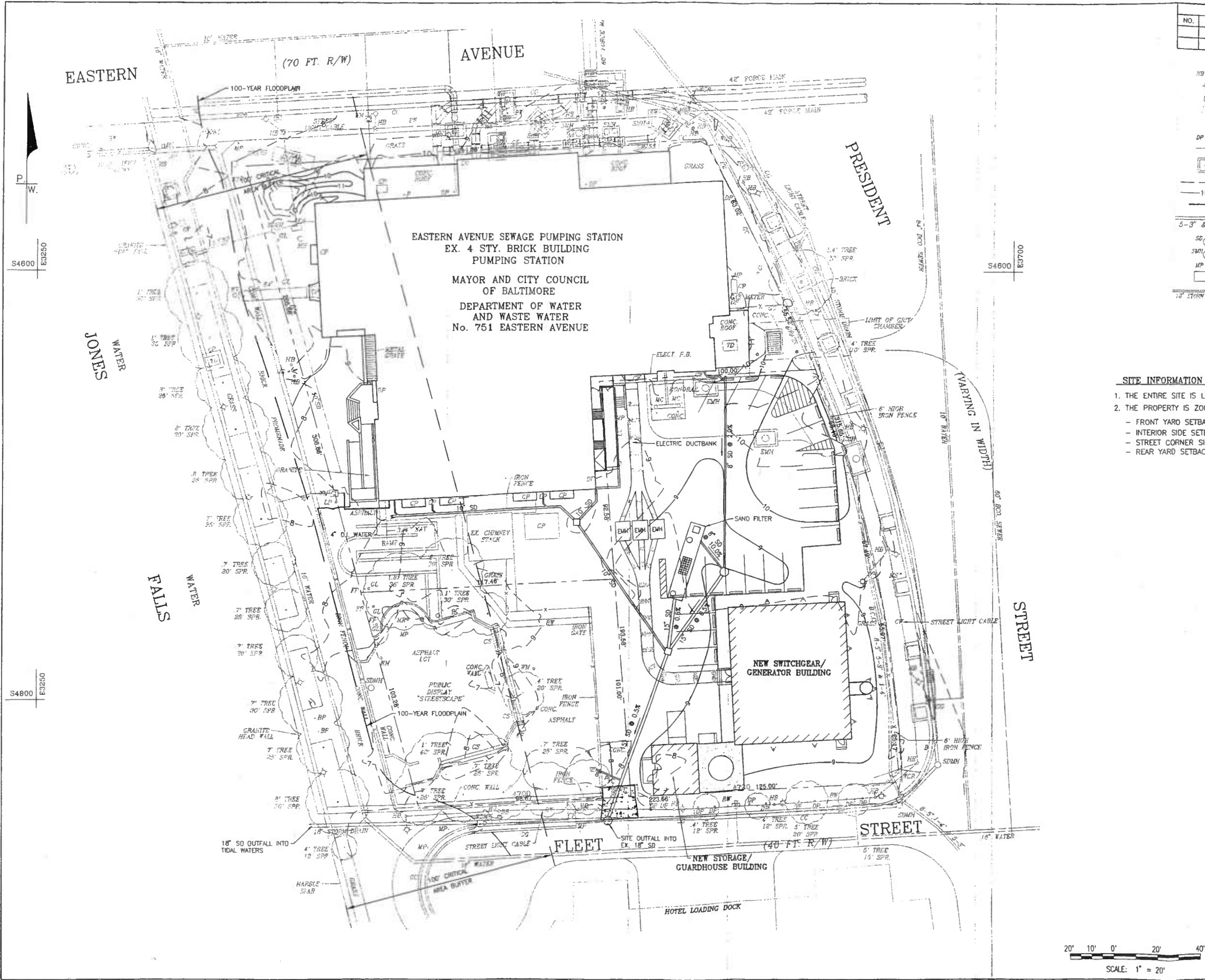
REVISION			
NO.	DESCRIPTION	DATE	BY

LEGEND

	HANDBOX		LIGHT POLE
	SD INLET		TREE
	FIRE HYDRANT		ORAIN PIPE
	FENCE		ELECTRIC MH
	MINOR CONTOUR		MAJOR CONTOUR
	BUILDING		ELECTRIC DUCTBANK
	SD MANHOLE		SANITARY MANHOLE
	METAL PIPE		PAVEMENT
	STORM DRAIN		LIGHTS

SITE INFORMATION

- THE ENTIRE SITE IS LOCATED IN THE CHESAPEAKE BAY CRITICAL AREA.
- THE PROPERTY IS ZONED B-2-4 AND HAS THE FOLLOWING REQUIREMENTS:
 - FRONT YARD SETBACK = none required
 - INTERIOR SIDE SETBACK = none required
 - STREET CORNER SIDE SETBACK = none required
 - REAR YARD SETBACK = none required



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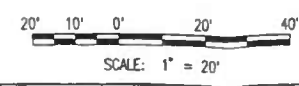
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EASTERN AVENUE PUMPING STATION IMPROVEMENTS
 SANITARY CONTRACT NO. 791

SITE PLAN

SCALE: 1" = 20'
 DRAWING: SWM-3

DATE: NOV. 2005
 SHEET 3 OF 3



REVISION			
NO.	DESCRIPTION	DATE	BY

3.M #7787 ELEV. 8.66'
 2" CUT IN W. END OF BOTTOM
 STONE STEP ENTRANCE TO 2 S. S. B.
 PUMPING STATION S. SIDE EASTERN
 AVE. 140° E. OF EAST FALLS AVE.

DEMOLITION LEGEND

- REMOVE HANDBOX
- REMOVE LIGHT POLE
- REMOVE SD INLET
- REMOVE TREE
- REMOVE DECORATIVE METAL FENCE
- REMOVE STORM DRAIN
- REMOVE CURB & WALLS
- BITUMINOUS PAVEMENT REMOVAL
- SPECIFIC LIMITS OF REMOVAL
- REMOVE CONCRETE PAVEMENT

ABBREVIATIONS

- B - BRICK
- BC - BRICK CURB
- BW - BRICK WALK
- CC - CONCRETE CURB
- CG - CONCRETE GUTTER
- CP - CONCRETE PAD
- CO - CLEAN OUT
- CS - CONCRETE STEPS
- CW - CONCRETE WALK
- OP - DRAIN PIPE
- EB - ELECTRIC BOX
- EMH - ELECTRIC MANHOLE
- FP - FLAG POLE
- FV - FLOW VALVE
- G - GAS
- GC - GRANITE CURB
- GL - GROUND LIGHT
- GS - GRANITE STEPS
- HB - HANDBOX
- MC - METAL COVER
- MP - METAL PIPE
- MR - METAL RAIL
- MS - METAL SIGN
- P - PIPE
- SOMH - STORM ORAIN MANHOLE
- SMH - SANITARY MANHOLE
- TD - TRAP DOOR
- TP - TRAFFIC POLE
- UC - UNMARKED COVER
- W - WATER
- WCR - WHEEL CHAIR RAMP
- WM - WATER METER
- WSP - WOOD SIGN POST
- WV - WATER VALVE

GENERAL NOTES

- THE EXISTING TOPOGRAPHY, PROPERTY BOUNDARIES, PHYSICAL FEATURES AND LOCATIONS SHOWN FOR EXISTING UTILITIES ARE BASED ON SURVEYS PERFORMED BY BALTIMORE CITY. WRA DOES NOT GUARANTEE THEIR ACCURACY.
- UNDERGROUND UTILITIES ARE SHOWN ON THIS DRAWING ONLY FOR THE CONVENIENCE OF THE USER OF THE DRAWING AND THERE IS NO WARRANTY OR GUARANTEE OF THE CORRECTNESS OR COMPLETENESS OF THE INFORMATION GIVEN. THE USER OF THE DRAWING MUST VERIFY ALL SUCH INFORMATION TO HIS OWN SATISFACTION.
- THE ELEVATIONS SHOWN HEREON ARE ALL REFERRED TO THE MEAN LOW TIDE AS ADOPTED BY THE BALTIMORE CITY SURVEY CONTROL SYSTEM.
- ALL ITEMS ON THIS DRAWING TO BE DEMOLISHED OR REMOVED SHALL BE DISPOSED OF BY THE CONTRACTOR UNLESS NOTED OTHERWISE.
- ALL COURSES AND COORDINATES SHOWN HEREON ARE REFERRED TO THE TRUE MERIDIAN AS ADOPTED BY THE BALTIMORE SURVEY CONTROL SYSTEM AND ARE BASED ON THE FOLLOWING TRAVERSE STATIONS:
 32568 E 3938.391 S 4511.038
 31799 E 3378.877 S 4174.831
- DELIVER SHED AND GUARD HOUSE TO CITY STORAGE FACILITY AT BACK RIVER WTP, 8201 EASTERN BLVD. AS DIRECTED BY THE ENGINEER. CONTENTS OF SHED TO BE REMOVED BY CITY, PRIOR TO REMOVAL.
- 100-YEAR FLOOD LEVEL IS AT ELEVATION 8.81.



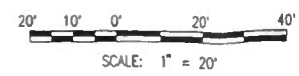
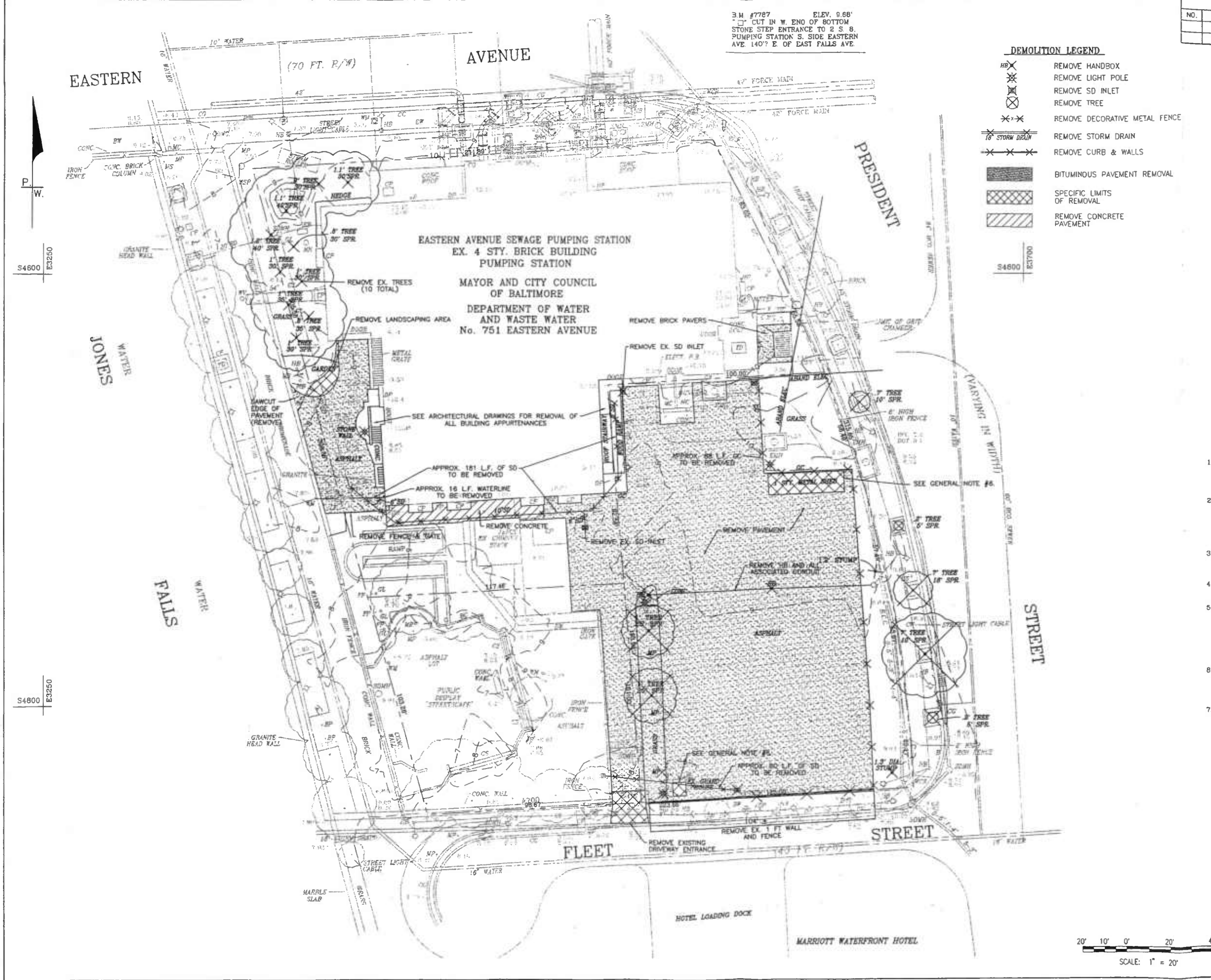
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 OCT. 2005

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 BUREAU OF WATER AND WASTEWATER
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 SANITARY CONTRACT NO. 791

EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: 1" = 20'
 DATE: OCT 2005
 DRAWING: C-1 SHEET 4 OF 168



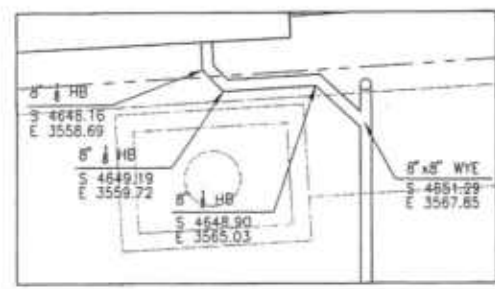
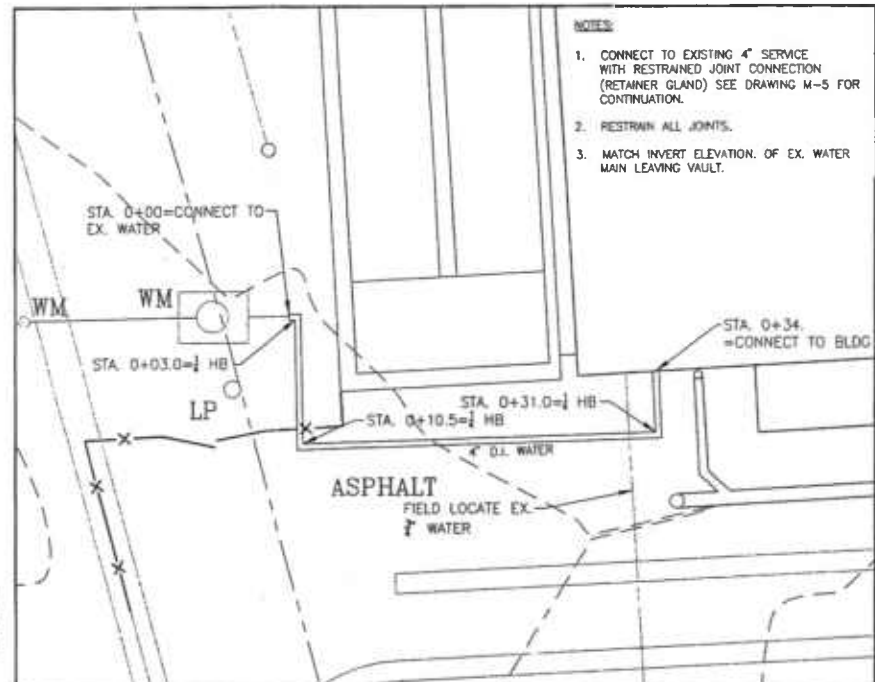
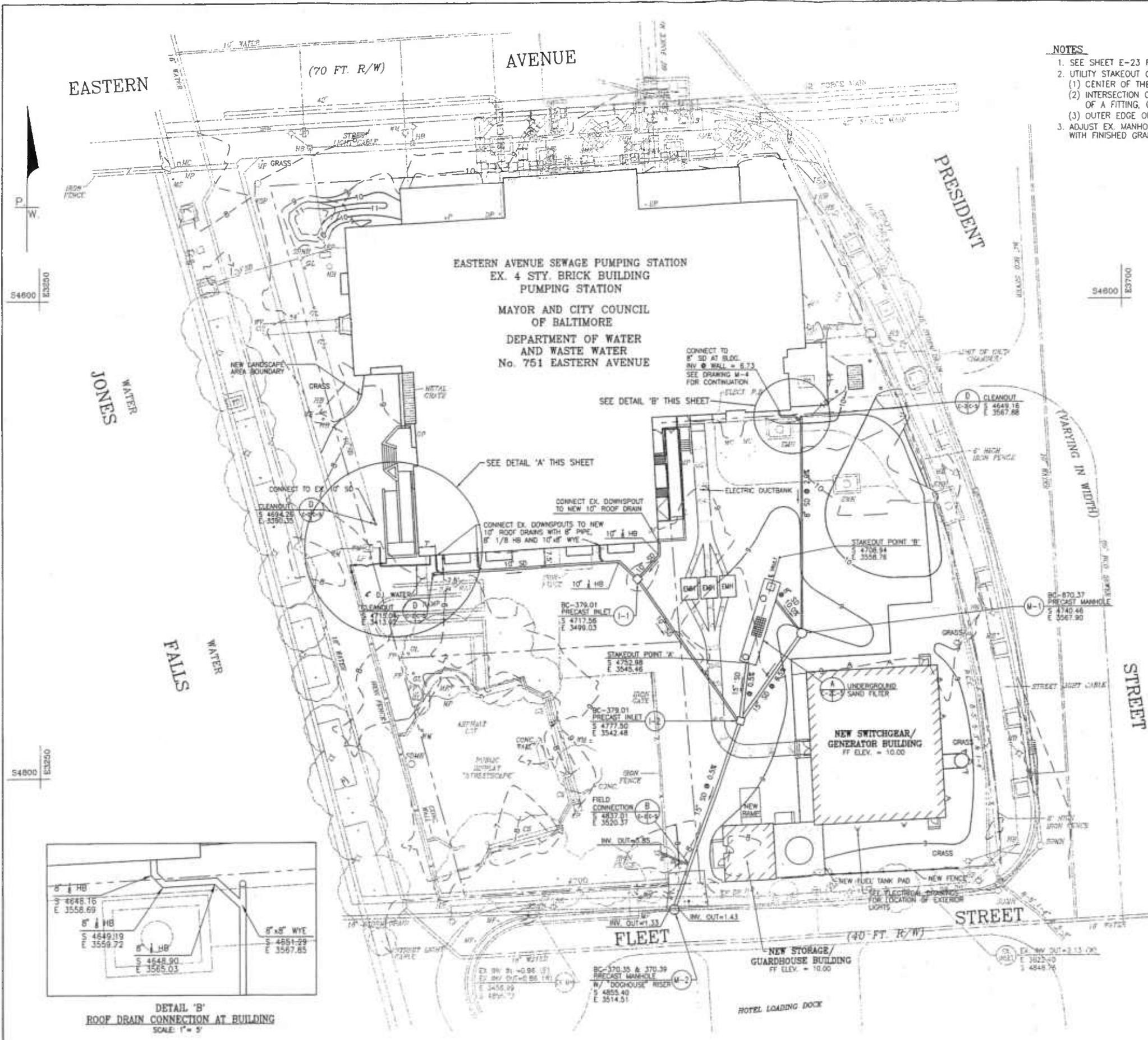
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NO.	DESCRIPTION	DATE	BY

NOTES

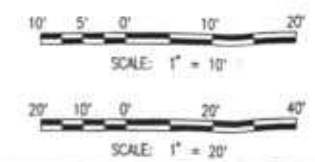
- SEE SHEET E-23 FOR SITE ELECTRICAL WORK.
- UTILITY STAKEOUT COORDINATES ARE TO:
 - CENTER OF THE STRUCTURE,
 - INTERSECTION OF THE CHANGE IN DIRECTION OF A FITTING, OR
 - OUTER EDGE OF THE SAND FILTER WALL.
- ADJUST EX. MANHOLE TOPS TO BE FLUSH WITH FINISHED GRADES.

LEGEND

HB	○	HANDBOX	○	○	TREE
LI	⊙	LIGHT POLE	□	□	FIRE HYDRANT
SD	⊙	SD INLET	—	—	DRAIN PIPE
DP	—	DRAIN PIPE	—	—	FENCE
EMH	⊙	ELECTRIC MH	—	—	MINOR CONTOUR
9	—	MINOR CONTOUR	—	—	MAJOR CONTOUR
10	—	MAJOR CONTOUR	—	—	BUILDING
5-3' & 1-4'	—	ELECTRIC DUCTBANK	—	—	SD MANHOLE
SD	○	SD MANHOLE	○	○	SANITARY MANHOLE
SMH	○	SANITARY MANHOLE	—	—	METAL PIPE
MP	—	METAL PIPE	—	—	PAVEMENT
16" STORM DRAIN	—	STORM DRAIN	—	—	LIGHTS
CONCRETE DRIVEWAY	—	CONCRETE DRIVEWAY	—	—	



DETAIL 'B' ROOF DRAIN CONNECTION AT BUILDING SCALE: 1" = 5'



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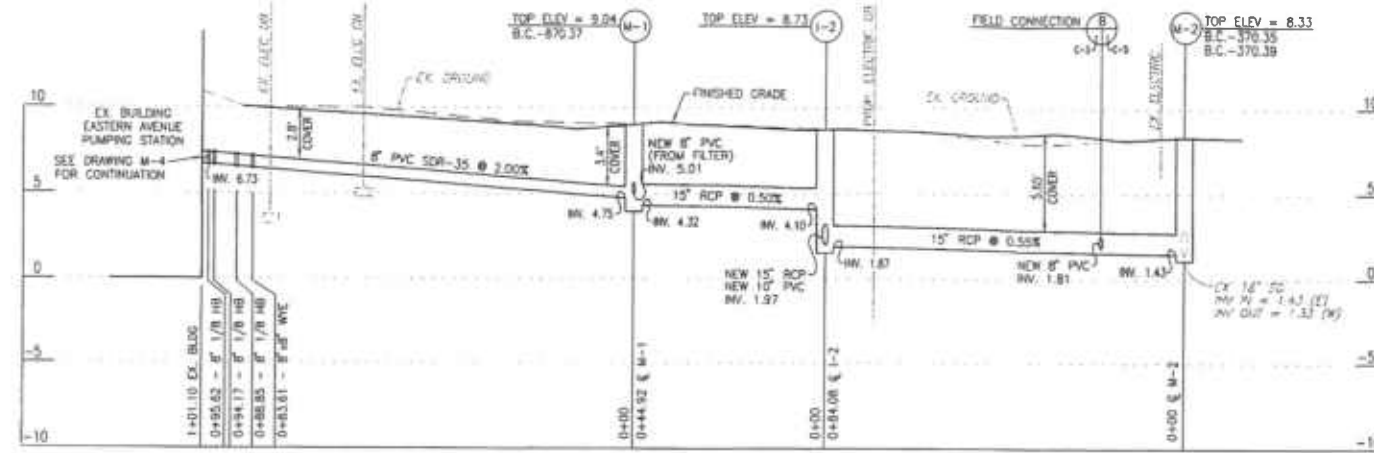
CITY OF BALTIMORE
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 BUREAU OF WATER AND WASTEWATER
 WATER AND WASTEWATER ENGINEERING DIVISION

EASTERN AVENUE PUMPING STATION IMPROVEMENTS
 SANITARY CONTRACT NO. 791

UTILITY PLAN

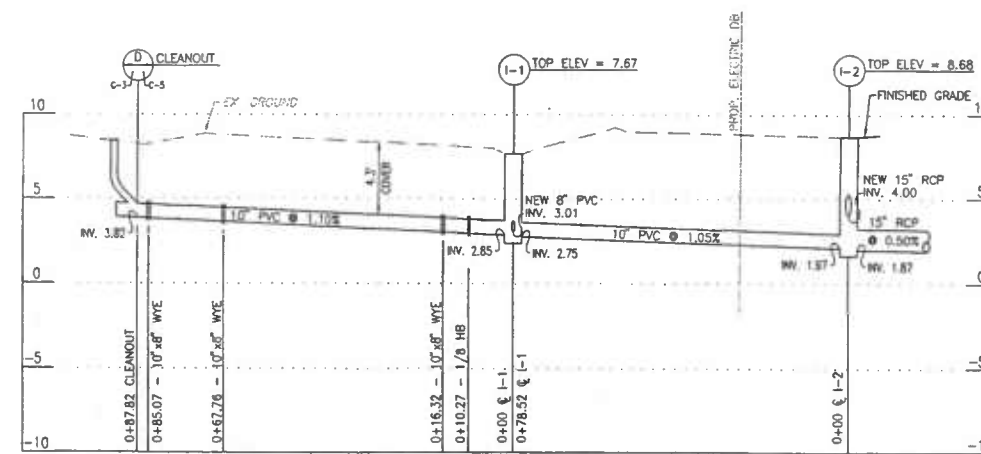
SCALE: 1" = 20'
 DATE: OCT 2005
 DRAWING: C-2
 SHEET 5 OF 168

REVISION			
NO.	DESCRIPTION	DATE	BY



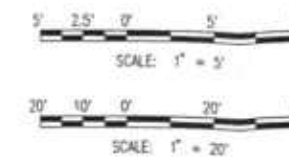
STORM DRAIN PROFILE
EX. BLDG TO M-2


HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=5'



STORM DRAIN PROFILE
EX. BLDG DOWNSPOUT
TO I-1 TO I-2

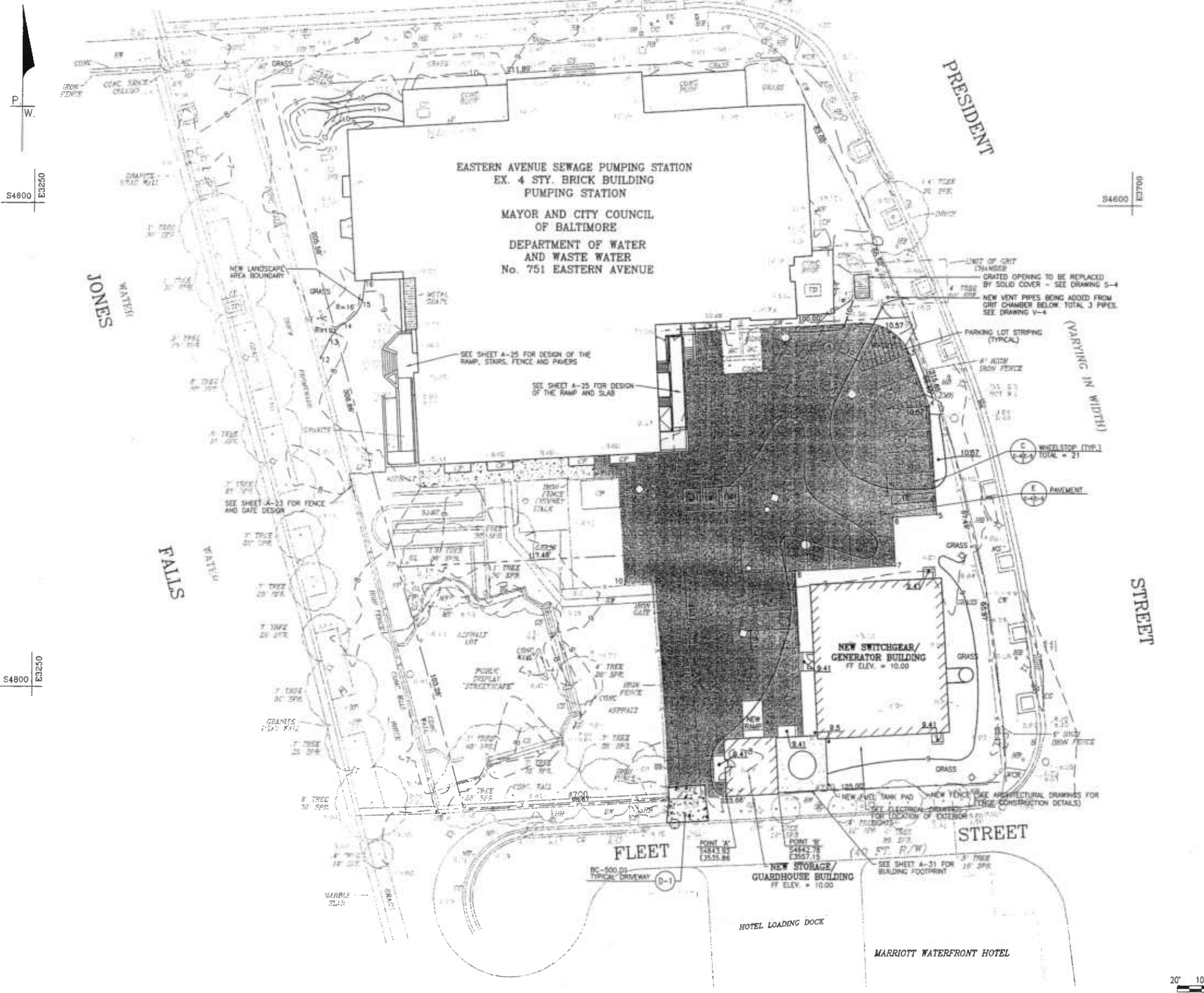
HORIZONTAL SCALE: 1"=20'
VERTICAL SCALE: 1"=5'



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UTILITY PROFILES	
SCALE: 1" = 20' DRAWING: C-3	DATE: OCT 2005 SHEET 6 OF 168

REVISION			
NO.	DESCRIPTION	DATE	BY

EASTERN AVENUE
(70 FT. R.W.)

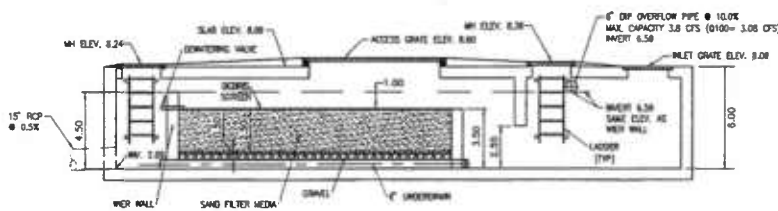
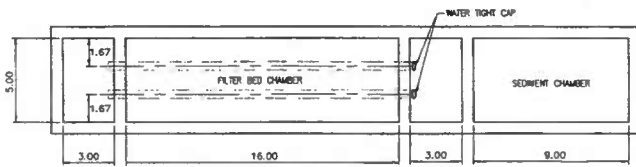
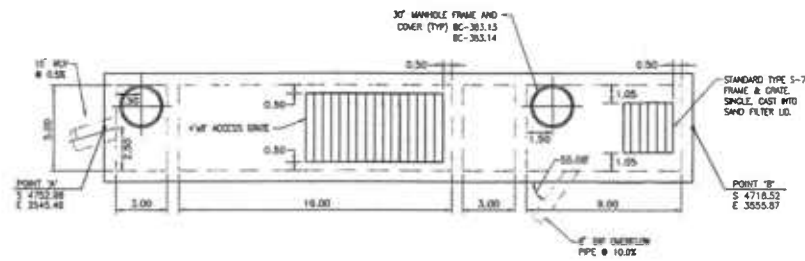


BASED ON SURVEY PREPARED BY CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION, TRANSPORTATION
ENGINEERING AND CONSTRUCTION DIVISION, APRIL 28, 2004

 WHITMAN, REQUARDT AND ASSOCIATES, LLP 801 SOUTH CAROLINE STREET BALTIMORE, MARYLAND 410 - 235 - 3450	FINAL SUBMITTAL
	OCT. 2005
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SITE AND GRADING PLAN	
SCALE: 1" = 20' DRAWING: C-4	DATE: OCT 2005 SHEET 7 OF 168

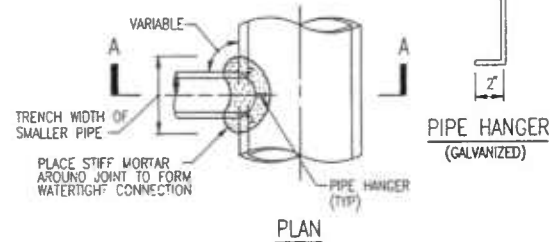
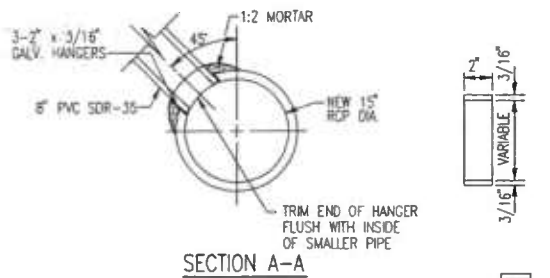
SAND FILTER MATERIAL SPECIFICATIONS

MATERIAL	SPECIFICATIONS/TEST METHOD	SIZE	NOTES
SAND	CLEAN ASHTO-M-6 OR ASTM-C-33 CONCRETE SAND	0.075 TO 0.04"	SAND SUBSTITUTIONS SUCH AS DIABASE AND GRAYSTONE #10 ARE NOT ACCEPTABLE. NO CALCIUM CARBONATE OR DOLOMITIC SAND SUBSTITUTIONS ARE ACCEPTABLE. NO "ROCK DUST" CAN BE USED FOR SAND.
UNDERDRAIN GRAVEL	ASHTO-M-43	0.375" TO 0.75"	
UNDERDRAIN PIPING	F 758, TYPE PS 28 OR ASHTO-M-278	4" - 6" RIGID SCHEDULE 40 PVC OR SDR35	3/8" PERF. @ 6" ON CENTER, 4 HOLES PER ROW; MINIMUM OF 5" OF GRAVEL OVER PIPES; NOT NECESSARY UNDERNEATH PIPES
CONCRETE (CAST-IN-PLACE)	USHA STANDARDS AND SPECS. SECTION 802, MIX NO. 3, F'C = 3500 PSI, NORMAL WEIGHT, AIR-ENTRAINED; RE-INFORCING TO MEET ASTM-615-60	N/A	ON-SITE TESTING OF POURED-IN-PLACE CONCRETE REQUIRED. 28 DAY STRENGTH AND SLUMP TEST; ALL CONCRETE DESIGN (CAST-IN-PLACE OR PRE-CAST) NOT USING PROBABLY APPROVED STATE OR LOCAL STANDARDS REQUIRES DESIGN DRAWINGS SEALED AND APPROVED BY A PROFESSIONAL STRUCTURAL ENGINEER LICENSED IN THE STATE OF MARYLAND.
CONCRETE (PRE-CAST)	PER PRE-CAST MANUFACTURER	N/A	SEE ABOVE NOTE
NON-REBAR STEEL	ASTM A-36	N/A	STRUCTURAL STEEL TO BE HOT-DIPPED GALVANIZED ASTM-A-123



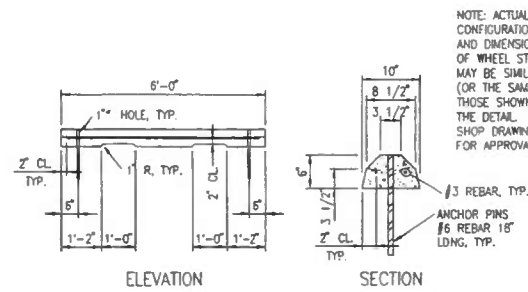
UNDERGROUND SAND FILTER

SCALE: 1" = 5'



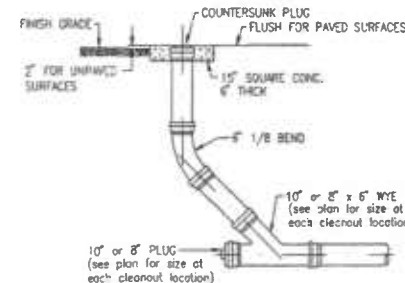
FIELD CONNECTION

NOT TO SCALE



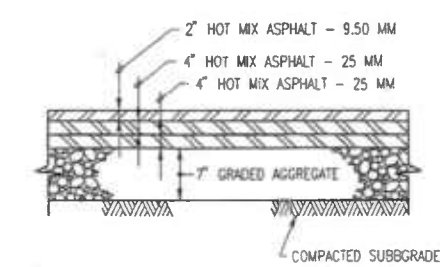
WHEELSTOP DETAIL

SCALE: 1" = 5'



CLEANOUT

NOT TO SCALE



PAVEMENT SECTION

NO SCALE

PROGRAM CERTIFICATION/LANDSCAPE MAINTENANCE AGREEMENT FORM

I AM AWARE OF THE REQUIREMENTS OF THE CITY OF BALTIMORE CRITICAL AREA MANAGEMENT PROGRAM AND I AGREE TO COMPLY WITH THESE REGULATIONS AND ALL APPLICABLE POLICY, GUIDELINES AND ORDINANCES. I FURTHER AGREE TO:

- CERTIFY INSTALLATION OF THE APPROVED BEST MANAGEMENT PRACTICE(S), TO MAINTAIN SUCH PRACTICES AND HAVE SIGNED, IF APPROPRIATE, A DECLARATION OF COVENANTS-INSPECTION/MAINTENANCE AGREEMENT FOR STORMWATER MANAGEMENT FACILITY AND FILED IT WITH THE DEPARTMENT OF PUBLIC WORKS, CONSTRUCTION MANAGEMENT DIVISION.
- CERTIFY INSTALLATION OF THE LANDSCAPING/PLANTING PLAN NOT LATER THAN ONE (1) YEAR FROM THE DATE OF OCCUPANCY TO THE BALTIMORE CITY PLANNING DEPARTMENT, 417 E. FAYETTE STREET, 8TH FLOOR, BALTIMORE, MD 21202.
- CERTIFY IMPLEMENTATION OF THE LANDSCAPE MAINTENANCE AGREEMENT LISTED IN ITEMS A-F BELOW. I SHALL BE RESPONSIBLE FOR THIS MAINTENANCE AND TREE CARE FOR A PERIOD OF TWO YEARS. SERVICES SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:

- WATERING**
 - WATERING SHALL BE PROVIDED DURING THE GROWING SEASON AS REQUIRED.
 - FIRST GROWING SEASON: ONCE PER WEEK.
 - SECOND AND SUBSEQUENT GROWING SEASONS: AS NEEDED, BUT NOT LESS THAN ONCE PER MONTH DURING JULY AND AUGUST. THIS INCLUDES TREES PLANTED IN THE SIDEWALK AND THE PUBLIC RIGHT-OF-WAY.
- REINFORCEMENT OF PLANTING REQUIREMENTS**
 - A MINIMUM OF 100% OF THE TOTAL NUMBER OF TREES IS REQUIRED TO SURVIVE AT THE END OF THE TWO-YEAR MAINTENANCE PERIOD.
- MOWING AND FERTILIZER USE**
 - MOWING: AREAS REQUIRING MOWING SHOULD BE KEPT TO A MINIMUM. IF NECESSARY, RAISE THE LAWN MOWER BLADE TO AT LEAST 3 INCHES. THIS WILL REDUCE SOIL EROSION, INCREASE WATER ABSORPTION, AND INCREASE TURF DROUGHT TOLERANCE. ON AREAS THAT ARE LAWN THAT DO NOT REQUIRE CLOSE MOWING, ALLOW THE GRASS TO ATTAIN A HEIGHT OF AT LEAST 10 INCHES. MOWING IN THESE AREAS IS PERMITTED ONCE PER YEAR IN THE FALL AFTER SEPTEMBER.
 - FERTILIZER, PESTICIDES AND HERBICIDES: AVOID THE USE OF ANY FERTILIZER, ESPECIALLY THOSE CONTAINING PHOSPHOROUS OR NITROGEN, CHEMICAL PESTICIDES AND HERBICIDES. IF PEST (RAT) CONTROL IS NECESSARY, USE INTEGRATED PEST MANAGEMENT WHICH LIMITS PESTICIDE APPLICATIONS TO TIMES WHEN A PROBLEM IS ACTUALLY PRESENT. REMOVE ALL HUMAN WASTE SOURCES: GARBAGE, SPOILED FOOD, PET EXCREMENT, ETC. - THESE ARE ALL RODENT FOOD SOURCES.
- STORMWATER FACILITIES**
 - PLANTINGS IN STORMWATER FACILITIES/BEST MANAGEMENT PRACTICES ARE TO BE LEFT ALONE TO PROVIDE HABITAT FOR BIRDS AND OTHER SPECIES. DO NOT MOW GRASS OR OTHER PLANTS IN THESE AREAS, BUT KEEP TRASH CLEANED OUT.
- CONTROL OF INVASIVE PLANT SPECIES**
 - PHRAGMITES, ALANTHUS (TREE-OF-HEAVEN) AND OTHER NON-NATIVE PLANT REMOVAL SHALL BE UNDERTAKEN IN ANY AREAS ON-SITE FOR A MINIMUM OF TWO YEARS. INVASIVE, NON-NATIVE PLANTS WILL OVERTAKE THE NEWLY PLANTED, NATIVE LANDSCAPING PLANTS AND CREATE A MONOCULTURE UNLESS CONTROLLED. NON-NATIVE, INVASIVE PLANTS SHOULD BE SPOT-CONTROLLED USING A COMBINATION OF "RODEO" HERBICIDE, HAND CUTTING AND WEEDING. CARE SHOULD BE TAKEN NOT TO SPRAY ANY NEWLY PLANTED, NATIVE PLANTS.
- PROTECTION FROM DISEASE AND INJURY**
 - PERIODIC INSPECTION SHALL BE MADE FOR ANY EVIDENCE OF DISEASE OR DAMAGE.

DEVELOPER'S SIGNATURE _____ DATE _____

OWNER'S NAME _____ DATE _____

OWNER'S SIGNATURE _____ DATE _____

REVISION			
NO.	DESCRIPTION	DATE	BY

ENGINEER'S CERTIFICATION **STORMWATER MANAGEMENT**

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED BY ME OR UNDER MY SUPERVISION AND MEETS THE MINIMUM STANDARDS OF THE BALTIMORE CITY DEPARTMENT OF PUBLIC WORKS REQUIREMENTS AND SPECIFICATIONS.

ANTHONY U. OLSEN _____ DATE _____
 PRINT NAME SIGNATURE

WHITMAN, REQUARDT AND ASSOCIATES, LLP _____ 410-235-3450
 801 SOUTH CAROLINE ST., BALTIMORE MD. 21231 ADDRESS TELEPHONE NUMBER

DEVELOPER'S/LAND OWNER'S CERTIFICATION **STORMWATER MANAGEMENT**

I/WE CERTIFY THAT ALL PROPOSED WORK SHOWN ON THESE CONSTRUCTION DRAWING(S) AND ON THE APPROVED SEDIMENT CONTROL DRAWING(S) WILL BE ACCOMPLISHED PURSUANT TO THESE PLANS. I/WE ALSO UNDERSTAND THAT IT IS MY/OUR RESPONSIBILITY TO HAVE THE CONSTRUCTION SUPERVISED AND CERTIFIED INCLUDING THE SUBMITTAL OF "AS-BUILT" PLANS WITHIN THIRTY (30) DAYS OF COMPLETION, BY A REGISTERED PROFESSIONAL ENGINEER.

 PRINT NAME SIGNATURE DATE

 ADDRESS TELEPHONE NUMBER

MAINTENANCE AND LIABILITY **STORMWATER MANAGEMENT**

MAINTENANCE OF THE STORMWATER MANAGEMENT FACILITY AND APPURTENANT DRAINAGE STRUCTURES SHALL BE THE RESPONSIBILITY OF THE PROPERTY OWNER. THE PROPERTY OWNER SHALL ALSO BE FULLY LIABLE FOR ALL DAMAGES OR INJURIES THAT MAY BE SUSTAINED BY ANY PERSON OR PROPERTY AS A RESULT OF ANY FAILURE OR MALFUNCTION OF THE STORMWATER MANAGEMENT FACILITY AND APPURTENANCES.

OWNER/DEVELOPER PRINT NAME ADDRESS PHONE

 SIGNATURE DATE

AS-BUILT CERTIFICATION **STORMWATER MANAGEMENT**

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND COMPLIES WITH THE APPROVED PLANS AND SPECIFICATIONS.

ANTHONY U. OLSEN _____ DATE _____
 PRINT NAME SIGNATURE

WHITMAN, REQUARDT AND ASSOCIATES, LLP _____ 410-235-3450
 801 SOUTH CAROLINE ST., BALTIMORE MD. 21231 ADDRESS TELEPHONE NUMBER

WHITMAN, REQUARDT AND ASSOCIATES, LLP
 801 SOUTH CAROLINE STREET
 BALTIMORE, MARYLAND
 410 - 235 - 3450

FINAL SUBMITTAL

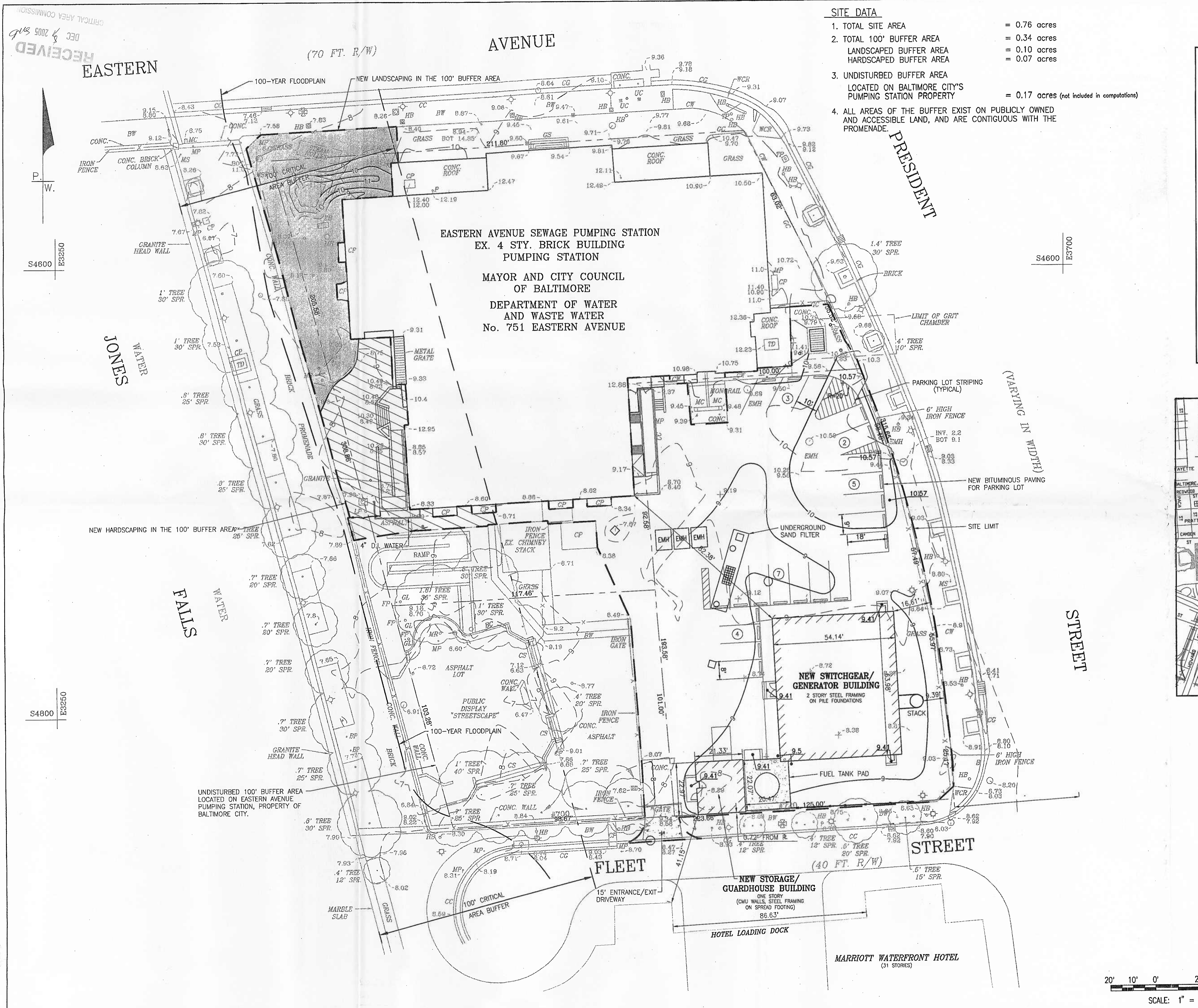
OCT. 2005

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER
 WATER AND WASTEWATER ENGINEERING DIVISION

EASTERN AVENUE PUMPING STATION IMPROVEMENTS
 SANITARY CONTRACT NO. 791

STORMWATER MANAGEMENT AND SITE DETAILS

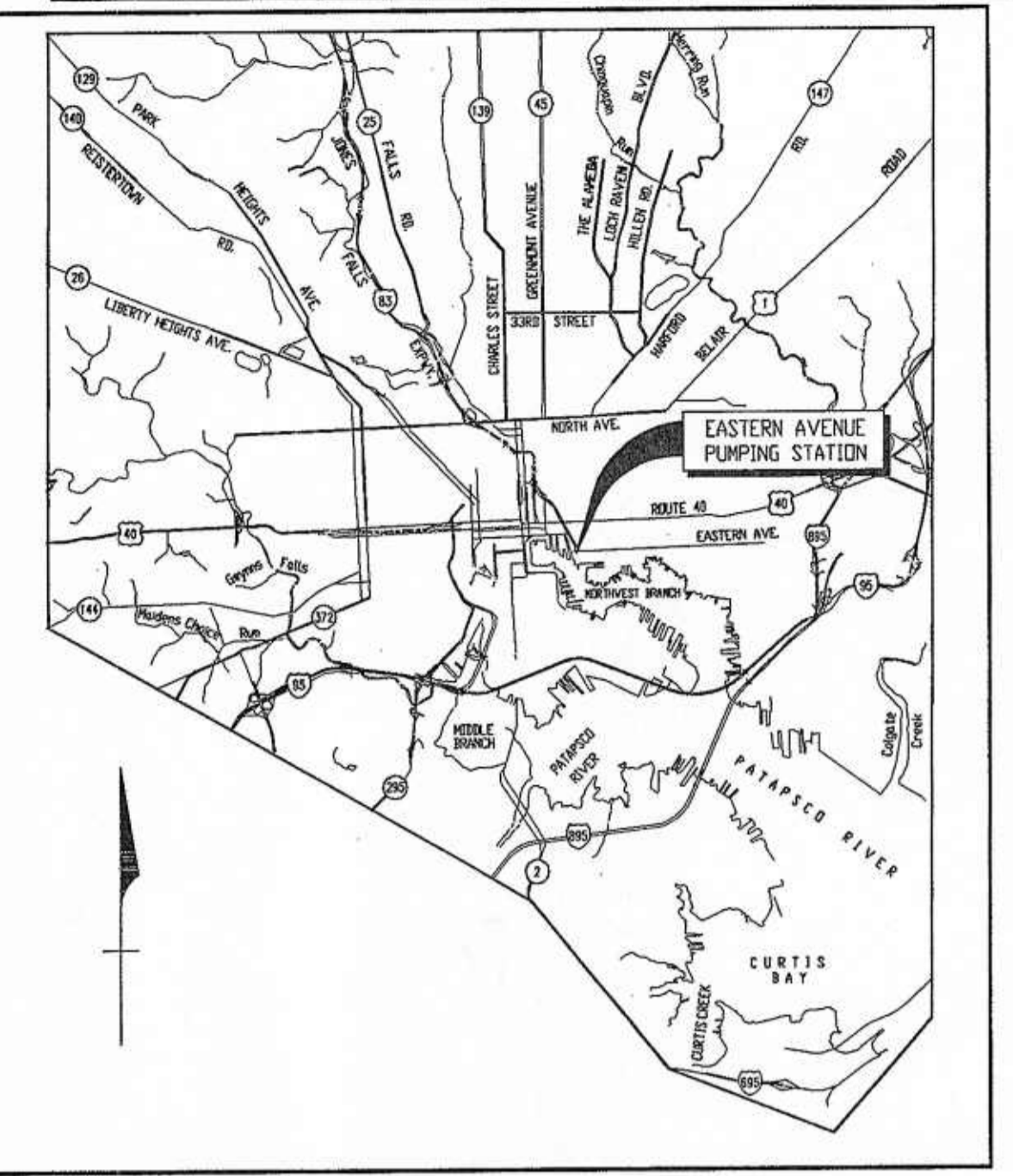
SCALE: 1" = 20' DATE: OCT 2005
 DRAWING: C-5 SHEET 8 OF 168



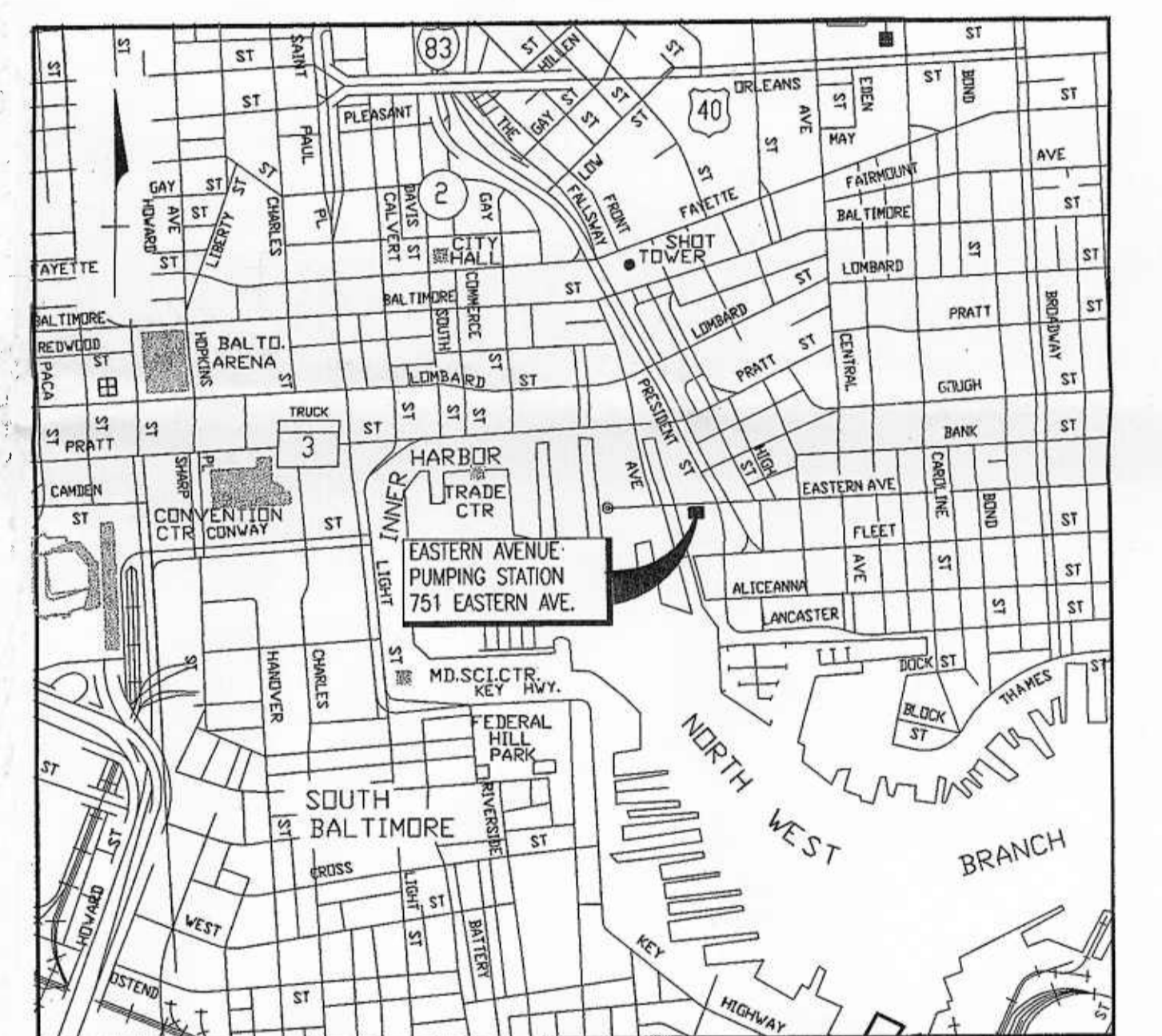
SITE DATA

1. TOTAL SITE AREA	= 0.76 acres
2. TOTAL 100' BUFFER AREA	= 0.34 acres
LANDSCAPED BUFFER AREA	= 0.10 acres
HARDSCAPED BUFFER AREA	= 0.07 acres
3. UNDISTURBED BUFFER AREA LOCATED ON BALTIMORE CITY'S PUMPING STATION PROPERTY	= 0.17 acres (not included in computations)
4. ALL AREAS OF THE BUFFER EXIST ON PUBLICLY OWNED AND ACCESSIBLE LAND, AND ARE CONTIGUOUS WITH THE PROMENADE.	

REVISION			
NO.	DESCRIPTION	DATE	BY



VICINITY MAP
NOT TO SCALE



LOCATION MAP
NOT TO SCALE

BASED ON SURVEY PREPARED BY CITY OF BALTIMORE
DEPARTMENT OF TRANSPORTATION, TRANSPORTATION
ENGINEERING AND CONSTRUCTION DIVISION, APRIL 28, 2004



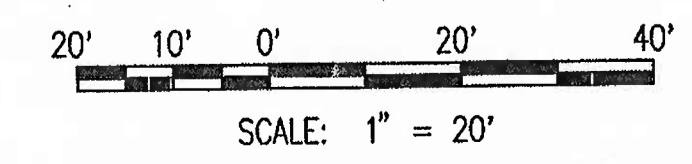
WHITMAN, REARDON & ASSOCIATES, LLP
801 SOUTH CAROLINE STREET
BALTIMORE, MARYLAND
410 - 235 - 3450
Contact: Jeff Ratnow

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER
WATER AND WASTEWATER ENGINEERING DIVISION
EASTERN AVENUE PUMPING STATION IMPROVEMENTS
SANITARY CONTRACT NO. 791

CRITICAL AREA PLAN



CRITICAL AREA PLAN



SCALE: 1" = 20'	DATE: NOV 2005
DRAWING: CRA-1	SHEET 1 OF 1

REVISION			
NO.	DESCRIPTION	DATE	BY

PROGRAM CERTIFICATION/LANDSCAPE MAINTENANCE AGREEMENT FORM

I AM AWARE OF THE REQUIREMENTS OF THE CITY OF BALTIMORE CRITICAL AREA MANAGEMENT PROGRAM AND I AGREE TO COMPLY WITH THESE REGULATIONS AND ALL APPLICABLE POLICY, GUIDELINES AND ORDINANCES. I FURTHER AGREE TO:

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 - PERIODIC INSPECTION SHALL BE MADE FOR ANY EVIDENCE OF DISEASE OR DAMAGE.

DEVELOPER'S SIGNATURE _____ DATE _____
 OWNER'S NAME _____ DATE _____
 OWNER'S SIGNATURE _____ DATE _____

BASED ON SURVEY PREPARED BY CITY OF BALTIMORE
 DEPARTMENT OF TRANSPORTATION, TRANSPORTATION
 ENGINEERING AND CONSTRUCTION DIVISION, APRIL 23, 2004

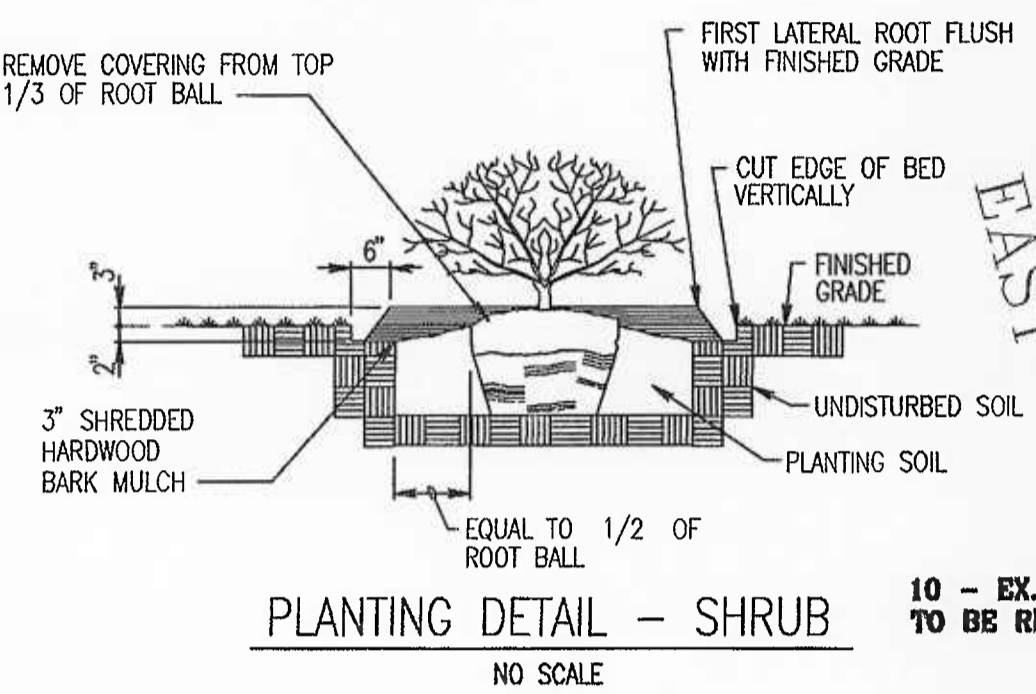
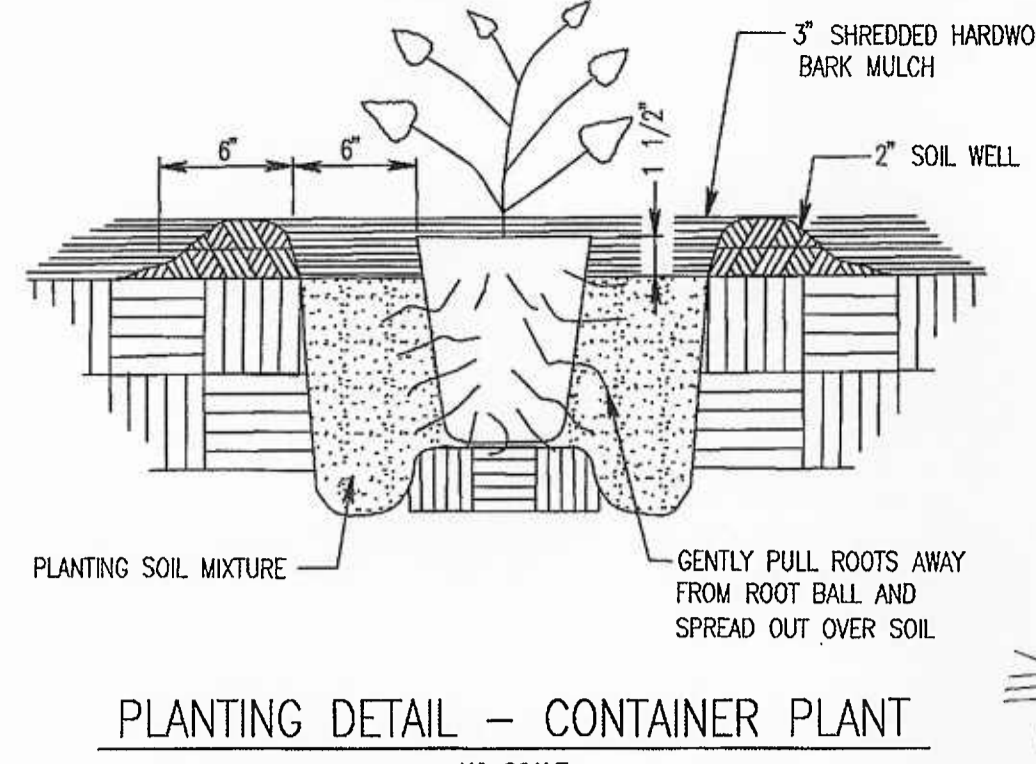
WRA
 WHITMAN, REQUARDT AND ASSOCIATES, LLP
 801 SOUTH CAROLINE STREET
 BALTIMORE, MARYLAND
 410 - 235 - 3450

FINAL
 SUBMITTAL
 OCT. 2005

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER
 WATER AND WASTEWATER ENGINEERING DIVISION
 EASTERN AVENUE PUMPING STATION IMPROVEMENTS
 SANITARY CONTRACT NO. 791

RECEIVED
 LANDSCAPE PLAN
 DEC 2005
 CRITICAL AREA COMMISSION

SCALE: 1" = 20' DATE: JUNE 2005
 DRAWING: L-1 SHEET 13 OF 168



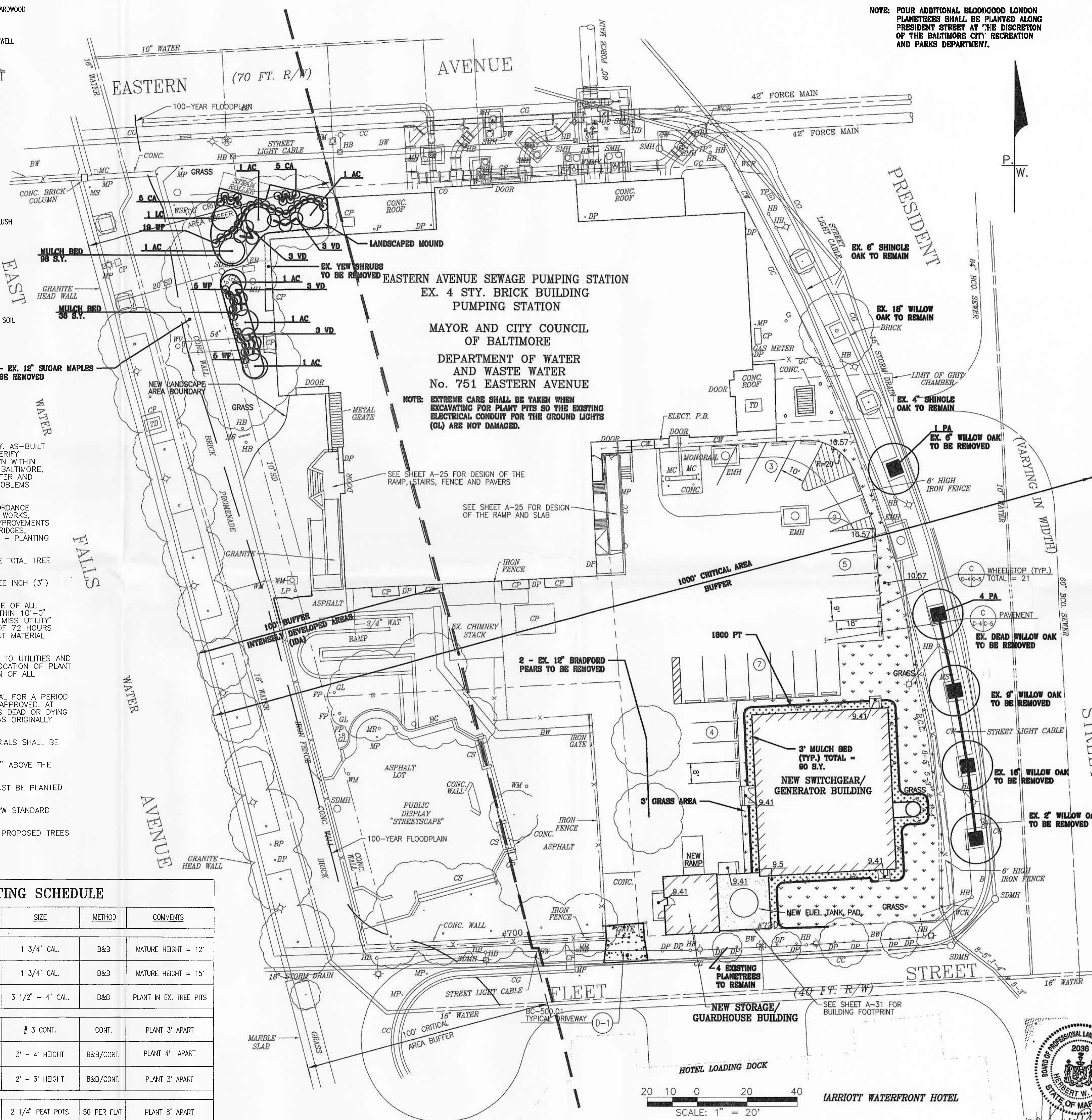
LANDSCAPE NOTES:

1. THESE DRAWINGS ARE FOR LANDSCAPE PURPOSES ONLY. AS-BUILT SITE CONDITIONS MAY VARY. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND UTILITY LOCATIONS SHOWN WITHIN THE PROJECT LIMITS, AND SHALL INFORM THE CITY OF BALTIMORE, DEPARTMENT OF PUBLIC WORKS (DPW), BUREAU OF WATER AND WASTEWATER, OF ANY DISCREPANCIES OR POTENTIAL PROBLEMS PRIOR TO COMMENCING WORK.
2. ALL PLANTING AND MULCHING SHALL BE DONE IN ACCORDANCE WITH THE CITY OF BALTIMORE, DEPARTMENT OF PUBLIC WORKS, BOOK OF STANDARDS, CATEGORY NO. 7 - ROADSIDE IMPROVEMENTS AND THE SPECIFICATIONS FOR MATERIALS, HIGHWAYS, BRIDGES, UTILITIES AND INCIDENTAL STRUCTURES, ARTICLE 36-13 - PLANTING TREES, SHRUBS, AND VINES.
3. ALL TREES SHALL HAVE A MULCH BED COMPRISING THE TOTAL TREE PIT AREA.
4. EACH TREE PLANTING AREA WILL BE SPREAD WITH THREE INCH (3") DEEP SHREDDED HARDWOOD BARK MULCH.
5. DO NOT PLANT TREES WITHIN 5'-0" OF THE CENTERLINE OF ALL UNDERGROUND UTILITY LINES. DO NOT PLANT TREES WITHIN 10'-0" OF THE CENTERLINE OF ALL OVERHEAD UTILITY LINES. "MISS UTILITY" (1-800-257-7777) MUST BE CONTACTED A MINIMUM OF 72 HOURS PRIOR TO PROCEEDING WITH ANY EXCAVATION FOR PLANT MATERIAL INSTALLATION.
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO UTILITIES AND MAY MAKE MINOR ADJUSTMENTS IN SPACING AND/OR LOCATION OF PLANT MATERIALS. CONTRACTOR TO VERIFY 'AS BUILT' LOCATION OF ALL UTILITIES.
7. THE CONTRACTOR SHALL GUARANTEE ALL PLANT MATERIAL FOR A PERIOD OF TWO YEARS AFTER INSTALLATION IS COMPLETE AND APPROVED. AT THE END OF TWO YEARS ALL PLANT MATERIAL WHICH IS DEAD OR DYING SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE AS ORIGINALLY SPECIFIED.
8. ALL AREAS NOT STABILIZED IN PAVING OR PLANT MATERIALS SHALL BE SEEDED AND MULCHED.
9. ALL STREET TREES SHALL BRANCH A MINIMUM OF 6"-0" ABOVE THE GROUND LEVEL.
10. DO NOT PLANT ANY TREES IN THE FALL. ALL TREES MUST BE PLANTED BETWEEN MARCH 15 - APRIL 30.
11. FOR TREE STAKING DETAIL, SEE CITY OF BALTIMORE, DPW STANDARD BC 710.01.
12. EXISTING 5' x 5' TREE GRATES, AT THE LOCATIONS OF PROPOSED TREES ALONG PRESIDENT STREET, SHALL BE RE-USED.

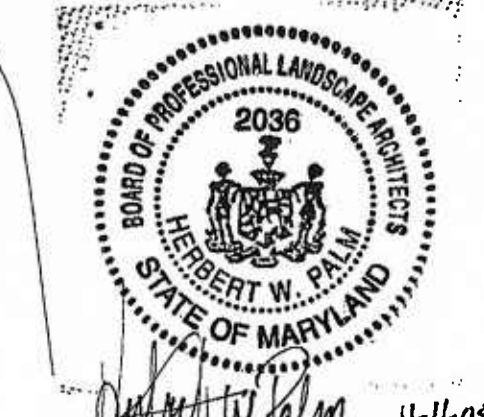
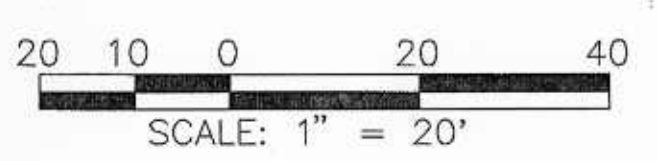
LANDSCAPE PLANTING SCHEDULE

KEY	QUANTITY	BOTANICAL NAME	COMMON NAME	SIZE	METHOD	COMMENTS
DECIDUOUS TREES						
AC	6	AMELANCHIER CANADENSIS 'SPRIZAM'	TRAZAM SHADBLow SERVICEBERRY	1 3/4" CAL.	B&B	MATURE HEIGHT = 12'
LC	1	LAGERSTROEMIA INDICA 'CATAWBA'	CATAWBA CRAPPEMYRTLE	1 3/4" CAL.	B&B	MATURE HEIGHT = 15'
PA	9	PLATANUS X ACERIFOLIA 'BLOODGOOD'	BLOODGOOD LONDON PLANETREE	3 1/2" - 4" CAL.	B&B	PLANT IN EX. TREE PITS
SHRUBS						
CA	10	COTONEASTER APICULATUS 'TOM THUMB'	'TOM THUMB' DWARF COTONEASTER	# 3 CONT.	CONT.	PLANT 3' APART
VD	12	VIBURNUM DENTATUM 'CHRISTOM'	BLUE MUFFIN ARROWWOOD VIBURNUM	3' - 4' HEIGHT	B&B/CONT.	PLANT 4' APART
WF	29	WEIGELA FLORIDA 'VARIEGATED NANA'	VARIEGATED DWARF WEIGELA	2' - 3' HEIGHT	B&B/CONT.	PLANT 3' APART
GROUND COVER						
PT	1800 (36 FLATS)	PACHYSANDRA TERMINALIS	PACHYSANDRA	2 1/4" PEAT POTS	50 PER FLAT	PLANT 8' APART

\$\$\$\$\$DGN SPEC\$\$\$\$\$
 \$\$\$SYTIME\$\$\$\$\$



NOTE: FOUR ADDITIONAL BLOODGOOD LONDON PLANETREES SHALL BE PLANTED ALONG PRESIDENT STREET AT THE DISCRETION OF THE BALTIMORE CITY RECREATION AND PARKS DEPARTMENT.



11-11-05

FILE REF.