

APPENDIX L

Drainage & Stormwater Memo

Mercer County Route 634 (Parkway Avenue), Scotch Road (CR 611) to Pennington Road (NJ 31) MP 2.20 – MP 4.40

Safety Concept Development Study

DRAFT Drainage and Stormwater Management Existing Conditions Memorandum



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Introduction

A Concept Development (CD) study is being performed for the Mercer County Route 634 (Parkway Avenue) under the 2015 SWP017 HSIP OBPP CDS Program. The road spans from Scotch Road (CR 611) to Pennington Road (NJ 31) (MP 2.20 to MP 4.40) in Ewing Township, and the City of Trenton, Mercer County. Parkway Avenue is an important arterial roadway in the area located adjacent to the New Jersey Department of Transportation (NJDOT) headquarters, two public schools, religious institutions, retail, and employment centers, and provides access to Routes I-95, NJ 29, NJ 129, NJ 31, Trenton-Mercer Airport, and The College of New Jersey.

The major objectives of the CD Phase are to develop a Purpose and Need Statement focused on the needed transportation improvement, identify a reasonable number of prudent and feasible alternatives to address the Purpose and Need including replacement, rehabilitation, and no-build alternatives, perform an evaluation of those alternatives, and select a Preliminary Preferred Alternative (PPA).

The overall purpose of this project is to recommend, advance, and implement safety improvements along Parkway Avenue within the project limits. This Safety Concept Development Study will review and assess existing roadway conditions, identify opportunities and deficiencies, develop and evaluate improvement alternatives, and select a preferred alternative to advance to design and construction.

As part of the Data Collection task within the CD Phase, the existing conditions of the watersheds, contributing waterbodies, existing drainage systems, soils and land use within the study limits were assessed. This Drainage and Stormwater Management (SWM) Existing Conditions Memo is provided to document the assessment. Data was obtained through digital imagery, geographic information systems and a field investigation. SWM design criteria were evaluated based on the New Jersey SWM regulations (N.J.A.C. 7:8).

Hydrology

Existing Site

The project's limits for Mercer County Route 634 spans from Scotch Road (CR 611) to Pennington Road (NJ 31) in Ewing Township and the City of Trenton. The entire project area is within two (2) Hydrologic Unit Code (HUC) 14 areas: 02040105240020 – Assumpink Creek (below Shipetaukin Creek) and 02040105210080 – Alexauken Creek / Moore Creek / Jacobs Creek.

Watershed Descriptions

Within the project area, there are seven (7) sub-area watersheds as shown on the Drainage Area, Soil Type, and Land Use Map 1 and 2 in Appendix A. The sub-watersheds were delineated using ArchHydro. A field investigation was performed to confirm these watershed boundaries and is described later in this memo. Watersheds 1 is located within HUC-14 020401052100080 and the remainder are in HUC-14 02040150240020. The watersheds are characterized by substantial urban development, including residential, commercial, and industrial areas. These watersheds are part of the overall Delaware River basin. Soil Types were identified using the NJDEP Mercer County Soil Database. The land uses were

identified using the NJDEP Land Use Layer -2012 Land Use. Many inlets were Identified as not meeting the new standard regulations and are noted.

Watershed 1 covers approximately 2.27 acres extending from mile post 2.20 to 2.30. The land cover consists of primarily commercial and open space area's and includes a series of pipes and inlets along the roadway that ultimately discharges to the Delaware River.

Watershed 2 covers approximately 32.43 acres extending from mile post 2.30 to Stratford Ave at (MP 2.75). The land cover consists of primarily commercial and open space area's and consists of a series of inlets that ultimately discharges to the Delaware River.

Watershed 3 covers approximately 76.74 acres extending from mile post 2.75 to 3.15. The land cover consists of primarily commercial, industrial and residential area's and consists of a series of inlets and pipes that ultimately discharges to the Delaware River.

Watersheds 4 covers approximately 12.38 acres extending from mile post 3.15 to 3.30. The land cover consists of primarily commercial area's and consists of a series of pipes and inlets that ultimately discharges to the Delaware River.

Watershed 5 covers approximately 111.76 acres extending from mile post 3.30 to 4.05. The land cover consists of primarily residential, commercial and wood area's and consists of a series of pipes and inlets that ultimately discharges to the Delaware River.

Watershed 6 covers approximately 4.5 acres extending from mile post 4.05 to 4.20. The land cover consists of primarily residential and commercial area's and consists of a series of pipes and inlets that ultimately discharges to the Delaware River.

Watershed 7 covers approximately 15.86 acres extending from mile post 4.20 to 4.55. The land cover consists of primarily residential area's and consists of a series of pipes and inlets that ultimately discharges to the Delaware River.

Soils

An evaluation of the soils and land use within the project area was completed. The current NRCS Web Soils Survey identifies the soil mapping units within the project area between hydrologic soils Group "B", "C", "D" and soils that were unidentifiable as N/A. Soil types within the project drainage areas are listed in Table 1. A map identifying soil types for the project can be found in Appendix A, Figures 1 and 2.

Table 1- Soil Description by Watershed

Watersheds	Soil Type	Group	Soil Type Description
Watershed 1	UdstB	D	Udorthents stratified substratum 0 to 8 percent slopes
	MbpB	B	Matapeake loam 2 to 5 percent slopes
Watershed 2	MbpB	B	Matapeake loam 2 to 5 percent slopes Phalanx loamy
Watershed 3	MbpB	B	Matapeake loam 2 to 5 percent slopes Phalanx loamy
	PHG	N/A	Pits sand and gravel
	UdstB	D	Udorthents stratified substratum 0 to 8 percent slopes
	MBYB	C	Mattapex and Bertie loams 0 to 5 percent slopes
Watershed 4	MbpB	B	Matapeake loam 2 to 5 percent slopes
Watershed 5	MbpB	B	Matapeake loam 2 to 5 percent slopes
	MBYB	C	Mattapex and Bertie loams 0 to 5 percent slopes
	UR	N/A	Urban Land
Watershed 6	UR	N/A	Urban Land
Watershed 7	UR	N/A	Urban Land

Stormwater Management Requirements

The NJDEP SWM Regulations (N.J.A.C. 7:8) defines a “Major Development” as any project that results in one- quarter (0.25) of an acre increase in net new impervious surface or has a disturbance area that exceeds one (1) acre. “Major Developments” must comply with the NJDEP SWM Rules for stormwater quality, stormwater quantity and groundwater recharge. The project area also lies within the Delaware and Raritan Canal Commission’s (DRCC) Review Zone B. The DRCC Regulations (N.J.A.C. 7:45) defines a “Major Project” any project disturbing more than one acre of land in Review Zone A or B. Major Projects must comply with the Stormwater Runoff and Quality Standards of the DRCC. Once the proposed design alternatives for the project are identified, a matrix will be provided to describe whether SWM requirements are triggered for each permitting agency, along with recommendations for compliance for each alternative.

Stormwater Quantity

Stormwater quantity regulations are required for a Major Development. This regulation states that there shall either be no increase between the pre-construction hydrograph and post-construction hydrographs for any storm event as a result of the proposed project; that the peak runoff rates for the 2, 10, and 100 year events be reduced to 50, 75, and 80 percent of the pre-construction rate respectively; or, in tidal flood hazard areas, it can be demonstrated that increased runoff will not increase flood damages downstream of the point of discharge.

Compliance with this requirement is typically achieved through a combination of Best Management Practices (BMPs) such as SWM basins and swales. Once the conceptual design alternatives are provided, the SWM team will determine whether compliance with the stormwater quantity regulations must be demonstrated.

Stormwater Quality

Stormwater quality regulations are triggered when there is an increase in net new impervious area of one-quarter (0.25) acre or more. Stormwater quality regulations state that the post construction load of Total Suspended Solids (TSS) must be reduced by 50 percent for reconstructed pavement and 80 percent for new impervious area for the water quality design storm (a storm with 1.25 inches of rainfall in 2 hours).

Compliance with the stormwater quality regulations is typically achieved through a combination of Best Management Practices (BMPs) such as SWM basins, swales, and Manufactured Treatment Devices (MTDs). If the proposed conceptual design alternatives result in over one-quarter (0.25) acre increase in impervious area, the potential locations for Low Impact Development (LIDs) BMPs, small SWM basins/swales, or MTDs within the Right-of Way (ROW) will be identified.

Groundwater Recharge

Groundwater recharge requirements are triggered for a Major Development. The groundwater recharge regulations state that either the pre-construction recharge volumes be maintained; or, the post-construction increase of the runoff volume for the 2-year storm be infiltrated.

Compliance with the groundwater recharge regulations is typically achieved through infiltration basins or bioretention-swales. However, since the project is located immediately adjacent to a tidal bay, precipitation and runoff ultimately drain to salt water rather than infiltrating to a freshwater aquifer. Coordination with NJDEP will be necessary to confirm whether the groundwater recharge requirements of the NJDEP Stormwater Regulations are applicable to this project.

Existing Drainage Evaluation

As-Built Plans

The as-built plans depicted the drainage structures in Table 2.

Table 2-Drainage Structures Identified in Field Investigation

Watersheds						
1	2	3	4	5	6	7
2 “B” inlets	5 “A” inlets 9 “B” inlets	2 “A” inlets 14 “B” inlets	1 “A” inlets 3 “B” inlets	1 “A” inlet 20 “B” inlets	5 “B” inlets	2 “B” inlets

Google Earth/ Google Maps

Location of the inlets depicted on the as-built plans were verified using Google Earth and aerial imagery. No new structures were identified.

Field Investigation

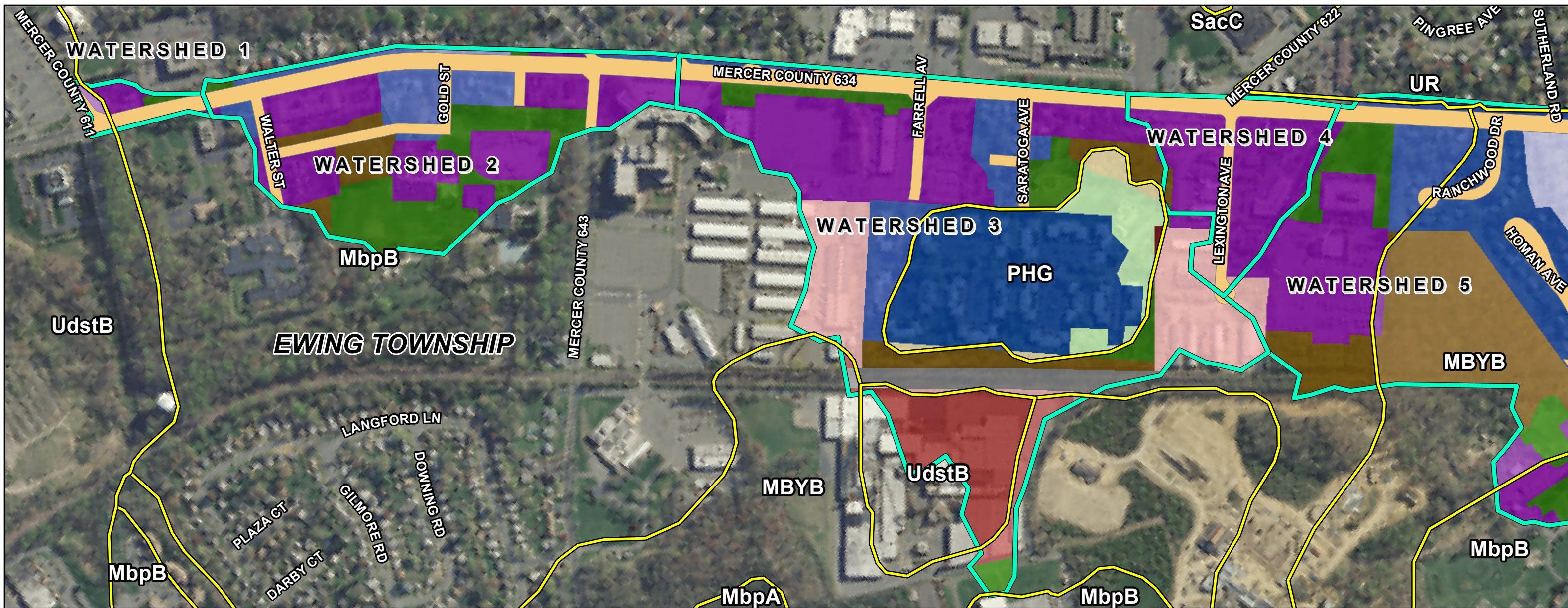
A field investigation was performed to confirm the watershed boundaries, and to assess the presence of drainage structures. The field investigation was performed in the morning of 10/24/2017, with weather

conditions at 52° F and intermediate rain events with about +/-1 in of rainfall. Refer to appendix B for more detailed information from the field investigation.

During Preliminary Engineering, additional survey of the project area will be recommended to clearly identify drainage structure locations and elevations, and sizes and connections of pipe systems. Lastly, some of the curb-openings throughout the project site do not follow the NJDEP Eco requirements.

Conclusion

This Drainage and SWM Existing Conditions Memo summarized the hydrology, existing drainage systems and SWM requirements and design criteria within the project area. Based on the existing conditions evaluation and field investigation, additional survey will be required during preliminary engineering to confirm properties of the existing drainage structures. Upon completion of the conceptual design alternatives, the SWM team will determine whether NJDEP and DRCC stormwater quality, stormwater quantity, or groundwater recharge requirements are applicable to the project.



LEGEND

SOIL BOUNDARY	1/2 ACRE RES, N/A TYPE SOIL	COMMERCIAL, C TYPE SOIL	INDUSTRIAL, N/A TYPE SOIL	RAILROAD, C TYPE SOIL
WATERSHED BOUNDARY	1/4 ACRE RES, B TYPE SOIL	COMMERCIAL, D TYPE SOIL	OPEN SPACE FAIR, B TYPE SOIL	RAILROAD, D TYPE SOIL
ROADWAY	1/8 ACRE RES, B TYPE SOIL	COMMERCIAL, N/A TYPE SOIL	OPEN SPACE FAIR, C TYPE SOIL	WOODS FAIR, B TYPE SOIL
LAND USE, HSG	1/8 ACRE RES, C TYPE SOIL	INDUSTRIAL, B TYPE SOIL	OPEN SPACE FAIR, D TYPE SOIL	WOODS FAIR, C TYPE SOIL
3 ACRE RES, C TYPE SOIL	1/8 ACRE RES, N/A TYPE SOIL	INDUSTRIAL, C TYPE SOIL	OPEN SPACE FAIR, N/A TYPE SOIL	WOODS FAIR, D TYPE SOIL
1/2 ACRE RES, B TYPE SOIL	COMMERCIAL, B TYPE SOIL	INDUSTRIAL, D TYPE SOIL	RAILROAD, B TYPE SOIL	WOODS FAIR, N/A TYPE SOIL

SOURCE DATA

- NJDEP LAND USE LAYER- 2012 LAND USE LAND COVER IN NEW JERSEY
- NJDEP SOILS LAYER - MERCER COUNTY

SYMBOL	TYPE	SOIL TYPE DESCRIPTION
MbpB	B	Matapeake loam 2 to 5 percent slopes
MBYB	C	Mattapex and Bertie loams 0 to 5 percent slopes
UdstB	D	Udorhents stratified substratum 0 to 8 percent slopes
PHG	N/A	Pits sand and gravel
UR	N/A	Urban land

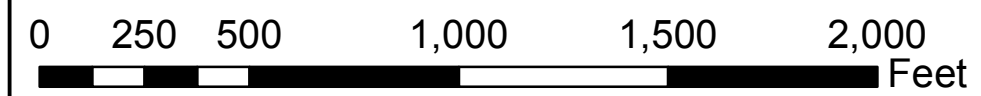
MERCER COUNTY

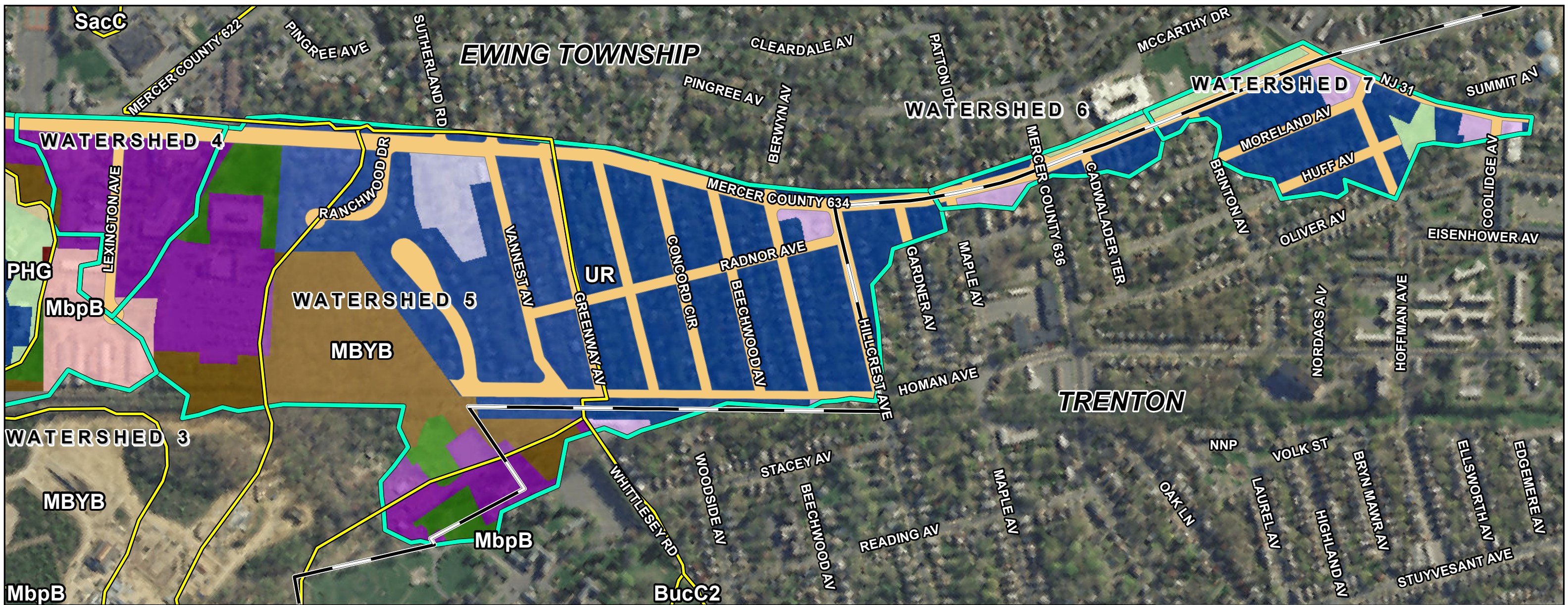
DRAINAGE AREA, SOIL TYPE, AND LAND USE MAP -1-

Mercer County Route 634 (Parkway Avenue),
 Scotch Rd (CR 611) to Pennington Rd (NJ 31)
 (MP 2.20 – MP 4.40)
 Concept Development Study

Ewing Township
 Mercer County, New Jersey

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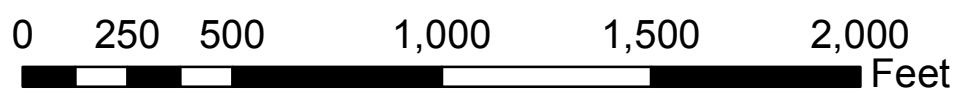


LEGEND

MUNICIPAL BOUNDARY	1/2 ACRE RES, B TYPE SOIL	COMMERCIAL, B TYPE SOIL	INDUSTRIAL, D TYPE SOIL	RAILROAD, B TYPE SOIL
SOIL BOUNDARY	1/2 ACRE RES, N/A TYPE SOIL	COMMERCIAL, C TYPE SOIL	INDUSTRIAL, N/A TYPE SOIL	RAILROAD, C TYPE SOIL
WATERSHED BOUNDARY	1/4 ACRE RES, B TYPE SOIL	COMMERCIAL, D TYPE SOIL	OPEN SPACE FAIR, B TYPE SOIL	RAILROAD, D TYPE SOIL
ROADWAY	1/8 ACRE RES, B TYPE SOIL	COMMERCIAL, N/A TYPE SOIL	OPEN SPACE FAIR, C TYPE SOIL	WOODS FAIR, B TYPE SOIL
LAND USE, HSG	1/8 ACRE RES, C TYPE SOIL	INDUSTRIAL, B TYPE SOIL	OPEN SPACE FAIR, D TYPE SOIL	WOODS FAIR, C TYPE SOIL
3 ACRE RES, C TYPE SOIL	1/8 ACRE RES, N/A TYPE SOIL	INDUSTRIAL, C TYPE SOIL	OPEN SPACE FAIR, N/A TYPE SOIL	WOODS FAIR, D TYPE SOIL
				WOODS FAIR, N/A TYPE SOIL

SOURCE DATA

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SYMBOL	TYPE	SOIL TYPE DESCRIPTION
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MERCER COUNTY

DRAINAGE AREA, SOIL TYPE, AND LAND USE MAP -2-

Mercer County Route 634 (Parkway Avenue), Scotch Rd (CR 611) to Pennington Rd (NJ 31) (MP 2.20 – MP 4.40)
 Concept Development Study

Trenton and Ewing Township
 Mercer County, New Jersey

