Nassau County
Stormwater Management Program

newbridge CREEK subwatershed Stormwater Runoff Impact Analysis AND CANDIDATE SITE ASSESSMENT REPORT

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Stormwater Management Program

Newbridge Creek Subwatershed
Stormwater Runoff Impact Analysis

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1. INTRODUCTION

The Newbridge Creek Stormwater Runoff Impact Analysis (Analysis Report) has been prepared in accordance with the Nassau County Stormwater Management Program *Stormwater Runoff Impact Analysis Procedures Manual* (Procedure Manual). The Procedure Manual provides a methodology to assess and score all of the subwatersheds in the County in accordance with a standardized procedure. The Analysis Report contains a summary of all of the assessment data collected and developed regarding the subwatershed condition and also identifies potential water quality improvements.

The goals and objectives of the Stormwater Runoff Impact Analysis are to:

- Assess the condition of the existing subwatershed;
- Map the drainage infrastructure;
- Identify pollutants of concern; and
- Develop candidate projects and sites for mitigation of pollutant loading and improvement of water quality within the stream to the greatest extent possible.

The Analysis Report is organized into two main sections as follows:

- Subwatershed assessment; and
- Stormwater management practice (SMP) candidate site assessment and recommendations.

The subwatershed assessment section describes the drainage infrastructure mapping, vulnerability analysis and stream assessment which were conducted in accordance with the methodology outlined in the Procedures Manual. The SMP candidate site assessment and recommendations section analyzes the collected data and identifies potential locations to site SMP's and also provides an analysis of potential pollutant load reduction and water quality improvement.

The data developed in this report can be entered into a comparative analysis sheet that will allow the County to track existing conditions and anticipated improvements for each subwatershed in the County.

2. SUBWATERSHED ASSESSMENT

The Center for Watershed Protection (CWP) classifies watersheds into five watershed management units. These include catchment area, subwatershed, watershed, subbasin, and basin. According to the CWP, the subwatershed-scale is preferred for assessment studies and is therefore the scale is used for this analysis. The drainage basins for water in Nassau County are the South Shore Estuary on the south shore and the Long Island Sound on the north shore. Nassau County has defined the watersheds based on the bay or inlet to which tributaries drain. The East Bay watershed is located between the Meadowbrook Parkway and the Wantagh Parkway on the south shore. Subwatersheds are the tributaries that drain to the watersheds. For East Bay, the tributaries include East Meadow Brook, Simmond Creek, Cedar Swamp Creek, Newbridge Creek, and Bellmore Creek.

The subwatershed assessment includes review of available subwatershed data including Nassau County Geographic Information System (NCGIS) mapping, Town of Hempstead (TOH) draft GIS mapping, Nassau County record documents and other available municipal record documents. After available records are reviewed, the land use data was utilized to estimate existing impervious cover, water quality storm volumes and pollutant loads. A stream assessment was conducted to verify mapping, assess field conditions and examine drainage infrastructure systems. The compiled information was analyzed to identify locations where stormwater runoff is impacting the stream either via inputs (i.e., outfalls, illicit discharges or lack of buffers) or through effects on the stream corridor (erosion, channelization or stream crossings). This data is used to identify potential candidate site locations for recommended stormwater management practices.

2.1. DRAINAGE INFRASTRUCTURE MAPPING

All sources of potentially available drainage data were reviewed and the information collected on a new layer in the GIS system. Prior to completing the stream assessment, areas where drainage infrastructure appeared to be lacking were noted and highlighted for

review in the field. Drainage infrastructure data collected during the stream assessment was added to the drainage infrastructure maps.

2.1.1. MAP DEVELOPMENT

The Nassau County Geographic Information System (NCGIS) files for the subwatershed were requested and received from the Nassau County Department of Information Technology. The NCGIS data served as the base map on which newly identified information could be added. The TOH GIS data was added to the NC GIS data.

At the offices of the NCDPW Engineering Department, a list of drainage maps for road projects and subdivision developments within the subject subwatershed was compiled from the County drainage books (a series of three sets of documents). A Freedom of Information Law (FOIL) request including the list of drainage maps necessary for the subject infrastructure review was prepared. Table 2-1 shows the list of documents requested via the FOIL. Review of the Nassau County as-built records identified 42 documents that pertained to work conducted in the Newbridge Creek subwatershed. The maps were provided to a printing sub-consultant for scanning into Tagged Image File (TIFF) formatted documents. The documents were returned to the NCDPW Engineering Department along with a CD copy of the scanned documents. The drainage information from the scanned documents was transferred to a new GIS layer in accordance with Nassau County mapping protocols.

A FOIL request for available record documents for road projects within the subwatershed was made to New York State Department of Transportation. Paper copies of record documents were received. The drainage information that pertained to the subwatershed was mapped in AutoCAD and transferred to GIS format on the same layer as the scanned data from Nassau County record documents.

The final layer combining the data from all sources is titled "Final GIS Layers" and includes identification of the source of the data in the "Origin" database column. The data identified in the field using GPS is included on the "Final GIS Layers" and is identified as "Cashin Associates GPS".

2.1.2. FIELD DATA COLLECTION

Using the mapping developed in Section 2.1.1, areas with incomplete drainage mapping were identified. A field survey of the drainage infrastructure in those locations was conducted. This task was performed in conjunction with the Stream Assessment described in Section 2.3. During the assessment, the stream corridor was walked to verify the mapped outfalls and to identify other locations where storm runoff appeared to be directly entering the stream. The drainage infrastructure upstream of each outfall was then field verified to identify the extent of the drainage infrastructure contributing to each outfall. The drainage infrastructure of the Newbridge Creek subwatershed is shown on Map 2-1.

2.2. SUBWATERSHED VULNERABILITY ANALYSIS

The Subwatershed Vulnerability Analysis consists of three components as follows:

- subwatershed characterization;
- impervious cover assessment; and
- pollutant load analysis.

The subwatershed characterization includes a description of the subwatershed's size, land uses, boundary, and length of waterbody. The impervious cover assessment calculates the amount of impervious area in the subwatershed based on: 1) NCGIS data for parking lots, roads, building footprints; and 2) area calculations for sidewalks and driveways. The pollutant load calculation uses NCGIS data for land use in conjunction with standard coefficients for runoff pollutant levels, resulting in an estimate of pollutant loads for the subwatershed.

2.2.1. SUBWATERSHED CHARACTERIZATION

The Newbridge Creek subwatershed is located within the Town of Hempstead in the southern portion of Nassau County. Newbridge Creek is also sometimes referred to as Clements Creek. The subwatershed of Newbridge Creek assessed for this report is categorized as freshwater that discharges into East Bay. The creek has perennial groundwater flow but receives extensive stormwater inputs during and immediately following storm events. Newbridge Creek consists mainly of channelized or culverted sections of stream.

The geographic limits of the Newbridge Creek subwatershed were defined through review of the NC and TOH GIS data, topographic maps, plans of existing municipal drainage infrastructure, and field assessment. Map 2-2 shows subwatershed topography along with existing drainage infrastructure.

The current Newbridge Creek subwatershed encompasses approximately 425 acres that contribute runoff that eventually enters Newbridge Creek. Newbridge subwatershed has been mapped to exclude most areas that can be defined as self-contained. When an area contains storm runoff in on-site drainage infrastructure, that area is described as self-contained. The original subwatershed has been reduced significantly in size by the construction of self-contained areas. Self contained areas generally have recharge basins and/or other drainage infrastructure that contain storm runoff volume from roads, subdivision developments, and commercial and industrial sites.

The Newbridge Creek subwatershed is located between Merrick Road and Jerusalem Avenue from south to north and between Newbridge Road and Bellmore Avenue/Bellmore Road from west to east. Land use within the subwatershed is 61% residential. Of the 1,758 residences in the subwatershed, 1,669 or 95% are smaller

than one-quarter acre in size. Roads account for 16% of the subwatershed. Sunrise Highway, a major New York State road, extends through the subwatershed as well as the adjacent Long Island Rail Road. Commercial land use accounts for 6% of the subwatershed and is located center along the main roads including Bellmore Avenue, Sunrise Highway, and Merrick Road. Industrial land use is limited to 0.2% of the subwatershed The "other" land use category accounts for the remaining 17% and includes parks and municipal areas. The predominant land uses in the "other" category are parks and schools. Parks include recreational facilities and the natural areas along the Newbridge Creek corridor. Schools include buildings, parking lots, and athletic facilities and open space dominated by lawn.

2.2.2. IMPERVIOUS COVER ASSESSMENT

Percentage of impervious cover has been determined to be an indicator of subwatershed health. A lower percentage of impervious cover in a subwatershed generally indicates that water quality is less impacted by pollutants than in subwatersheds with higher impervious cover percentages. The Center for Watershed Protection (CWP) has established subwatershed classification based on percentage of impervious cover ranging from sensitive streams (0-10% impervious) to urban drainage stream (>60% impervious). The impervious cover assessment uses methodology included in the NC Procedures Manual. The methodology is based on CWP procedures that use GIS data to estimate impervious cover. The impervious cover within the subwatershed was calculated from the NCGIS data and standardized tables developed by the CWP. The NCGIS data necessary to calculate impervious cover is presented in Table 2-2 GIS Data Chart.

The following sources or methods were used to calculate the impervious cover in the Newbridge Creek subwatershed:

- NCGIS data allowed the actual footprint of all building areas and parking lot areas within each land use to be calculated.

- Area of roads was calculated from the NCGIS data.
- Total average driveway area was estimated by tallying the number of residences in each of five size categories, ranging from less than 1/8 acre to greater than one acre and applying impervious driveway factors from CWP as developed by Cappiella and Brown , 2001.
- Sidewalks were estimated by viewing aerial photography of the site and estimating the percentage of the subwatershed roads with sidewalks. In the case of Newbridge Creek, 95% of the streets are estimated to have 4' wide sidewalks on both sides.

The impervious cover data was entered into the standard table from the Procedures Manual. The data table and results of calculations are shown on Table 2-3. The impervious area of the Newbridge Creek subwatershed is 188 acres of the 425 total subwatershed acres. This represents 44% of the subwatershed. Based on the 44% impervious figure, Newbridge Creek receives a subwatershed classification of non-supporting stream.

Non-supporting streams are dominated by urban stormwater runoff and increased flooding. The streams are generally channels for the conveyance of stormwater runoff and can no longer support the biological community. The stream channel becomes highly unstable, and many stream reaches experience severe widening, down cutting, and streambank erosion. Pool and riffle structure needed to sustain fish is diminished or eliminated and the substrate can no longer provide habitat for aquatic insects or spawning areas for fish. Water quality is consistently rated as fair to poor, and water recreation is no longer possible due to the presence of high bacterial levels. Streams generally display increases in nutrient loads to downstream receiving waters, even if effective urban BMPs are installed and maintained. The biological quality of non-supporting streams is generally considered poor, and is dominated by pollution-tolerant insects and fish. Although these streams may have potential for partial repair,

pre-development biological conditions cannot be achieved. These streams should be managed to prevent bank erosion, improve the stream corridor and improve water quality. The non-supporting subwatershed management goals are to minimize the downstream pollutant levels, alleviate flooding conditions, and improve the aesthetics of the corridor. All of these goals pertain to Newbridge Creek.

2.2.3. STORM POLLUTANT LOAD CALCULATION

Nassau County has identified a number of pollutants associated with stormwater runoff to be of concern for the County's subwatersheds. Impervious surfaces act as a "trap and conveyance" mechanism for the pollutants, ultimately resulting in deposition of the pollutants into nearby waterbodies. These pollutants negatively affect the surface water quality. The pollutants identified by the County are carried in large quantities in storm runoff from roads and paved surfaces.

Total Suspended Solids – Total Suspended Solids (TSS), which includes silts and sediments, constitute the largest mass of pollutant loadings to surface waters. This pollutant is exported in greatest quantities from construction sites. In addition, TSS is generated from lands with insufficient vegetative cover, stream channel erosion, street sanding operations, and vehicle tires. NYSDEC has identified TSS as a pollutant of concern for New York State waters and requires that 80% of TSS be removed from runoff from new construction. The subwatershed's extensive road system, parking lots and compacted soils on small, older lots contribute to TSS in Newbridge Creek.

Phosphorus and Nitrogen – Total Phosphorus (TP) and Total Nitrogen (TN) are two nutrients necessary for plant growth. Nonpoint sources of TP and TN are recognized causes of water quality degradation in many water bodies. These nutrients, washed into waterbodies via stormwater runoff, typically originate in lawn fertilizers and animal wastes from pets, waterfowl, small mammals and livestock. NYSDEC has identified TP as a pollutant of concern for New York State waters and requires that

40% of TP be removed from runoff from new construction. Residences with yards that drain to the street and directly to the creek and pet wastes contribute TP and TN in Newbridge Creek.

Fecal Coliform and Other Pathogens – Pathogens include bacteria, viruses and other microorganisms that can cause human illnesses such as hepatitis A. The suspected causes of this impairment originate in the feces of pets, livestock and waterfowl that are carried into waterbodies by stormwater runoff. Pet wastes and waterfowl contribute to high fecal coliform levels in Newbridge Creek.

Hydrocarbons (Oils and Grease, Petroleum Compounds) – Oils and grease contain an array of hydrocarbon compounds, some of which can be toxic to aquatic life even at low concentrations. The major source of hydrocarbons in urban runoff is through the leakage of crankcase oil and other lubricating agents from motor vehicles and from facilities that service motor vehicles (e.g., repair shops and gasoline stations). Hydrocarbon concentrations are typically highest in runoff from parking lots, roadways, and service stations, areas which are all represented within the Newbridge Creek subwatershed. Illegal disposal of waste oil onto streets and into storm sewers can also contribute to this problem.

Floatable Debris – Besides the obvious negative aesthetic effects, trash can impact aquatic life through either ingestion or entanglement. Roads through commercial areas within the Newbridge Creek subwatershed contribute to the floatable debris load to Newbridge Creek.

The pollutant loads were calculated in accordance with the Procedures Manual using the “Simple Method” for all pollutants with the exception of Floatable Debris. The Simple Method uses the land uses and CWP pollutant coefficients to calculate the pollutant loads. Land use was separated into the five categories of residential,

commercial, industrial, roads and other. Pollutant load coefficients were assigned based on the land use. The "other" category includes parks, municipal properties and any other uses not included in the categories mentioned. Existing land uses within the subwatershed are presented on Map 2-4. The NCGIS land use data necessary to calculate pollutant loads is presented in Table 2-2 GIS Data Chart. Nassau County development criteria have long mandated that commercial and industrial properties contain their storm runoff on site. Those land uses can be excluded from the calculation if the field assessment confirms that these land uses are self-contained and do not contribute runoff to the waterbodies. For floatable debris, coefficients based on land use were developed for the categories of residential, commercial, industrial, roads and other. The coefficients are applied to each land use area to estimate floatable debris generation with the subwatershed.

The data was entered into the Water Quality Volume and Pollutant Load Calculation Table provided in the Procedure Manual. The resulting pollutant loads are shown on Table 2-4. The pollutant loads for each pollutant were assigned severity points based on the least, 1 point, to the most, 6 points, severe pollutant threat in the watershed. The pollutant loads are multiplied by the assigned severity points and the total is divided by 100 and entered into the pollutant severity score row on the Comparative Analysis Table. The pollutant loads are also used to assess potential SMP improvements to each individual subwatershed.

2.3. STREAM ASSESSMENT

The stream assessment was conducted in accordance with the Procedure Manual. In addition, the CWP *Unified Stream Assessment: A User's Manual* was reviewed prior to the field effort. The assessment was conducted during the winter months when the lack of vegetation improved access to and provided visibility of the outfalls and stream corridor condition. Newbridge Creek was assessed by traveling upstream from southern end of the

subwatershed at Merrick Road. On the data sheets, the banks are described as left (west) and right (east) looking downstream.

The stream assessment for Newbridge Creek was conducted on January 22, 2007 and January 23, 2007. The equipment used by survey personnel to conduct the assessment included data assessment sheets, GPS unit, dry erase board and markers, digital camera, clipboard with a water resistant storage compartment, tape measure and waders. For this subwatershed, aerial photos and property line maps were used to record field data. In the event that property owners had concerns regarding the work, the survey team carried a contact list of the governing authority to provide to the residents. Each stream assessed was assigned an identification number starting with 100. Newbridge Creek was the eighth stream assessed by this methodology and was assigned identification number 107.

During the stream assessment, the stream corridor was photographed at regular intervals and at specific locations. The interval photographs record the stream surroundings and any immediately identified points of interest. When a data assessment sheet was completed, a photograph of the specific location was taken. For each Outfall (OT) sheet, photographs were taken from three different directions. When the location to be photographed was accessible, a dry erase board was labeled with the RCH and OT #'s and sited to appear within the photograph. All photographs were immediately logged on the Photo Log sheet. The photographic log and photographs are included in Appendix B.

The data sheets were completed in either the field at each location or, when field conditions did not allow the immediate completion, immediately after returning from the field. Data Sheets are included in Appendix A. The data sheets are organized by reach in number order. In each reach section, the reach data sheets (RCH) are first followed by the outfall data sheets (OT), then the other data sheets.

When it was necessary to cross private property to reach the stream corridor, the assessment team would explain the purpose of the assessment and ask the property owner for permission to cross the property.

Reach boundaries were determined during the field assessment. The reach limits are selected based on one or more of the following criteria: change in surrounding land use; change in stream conditions; or a dividing characteristic such as a stream crossing or long culvert. Newbridge Creek was assigned one reach based on its consistent stream conditions. The reach was assigned identification number 107-1.

The following paragraphs are a summary of the data collected on the assessment sheets. Newbridge Creek has a single branch that flows south into East Bay. The creek is approximately 1 mile long with a large percentage of channelized or culverted segments. Although the creek is perennially-fed its character is dominated by stormwater runoff from extensive upgradient drainage infrastructure. The stream is almost completely surrounded by high-density residential land use. The stream buffers are narrow and severely impacted by the adjacent land uses which include grass area that extend to the creek bank and channels modified by stone embankments and retaining walls. During the field assessment, existing conditions were recorded on aerial photographs used as field sheets. Due to the large scale of the subwatershed, the aerial photography was used in lieu of the limited space allotted for this task on the Reach Level Assessment sheets.

Culverted segments of the creek include the 1,200-foot culvert/piped section from Merrick Road north to Orange Street and the 700-foot culvert under Sunrise Highway and the Long Island Railroad property. The creek north of Linden Street is culverted to the northern limit of the subwatershed. According to local residents, the section of the stream from Linden Street north to Beltagh Avenue was culverted within the last 10 years when additional residential development took place.

The open segments of the creek are generally narrow and the majority the open segments are channelized by various methods including stone, concrete, and earthen structures. The channelization has severely impacted the stream's buffer zone. The creek receives the majority of its flow from stormwater runoff from the subsurface infrastructure, with some from surface runoff. The field assessment for the creek noted the following information regarding the condition of the creek:

- dominant substrate was sand and gravel;
- water clarity was naturally colored with numerous attached and floating aquatic plants;
- occasional signs of fish life;
- stream shading $\geq$ 25%;
- channel dynamics - completely channelized and in poor condition;
- reach accessibility for the most part was difficult due to private property, sensitive areas, and man-made structures; and
- excessive vegetation disruption.

The culverted segments discussed above were precluded from the field assessment because of lack of access. Locations where outfalls are assumed to be located in culvert areas are at Merrick Road, Hughes Street, Nassau Street, Orange Street, Sunrise Highway and all outfalls from Oak Street north.

Fourteen outfalls were field identified. Outfalls OT-8, OT-11, and OT-12 were identified to be outfalls from residential properties. No illicit discharge was observed and the pipes may be weep holes for retaining wall located along the creek channel and do not require further discussion.

OT-1 is a pipe outfall that discharges runoff from a high-density residential area on between Merrick Road and Sunrise Highway on the east side of the creek. The creek buffer in the area from OT-1 to OT-3 is sloped lawn that extends to the creek bank.

OT-2 is a concrete sluiceway that carried runoff from a high-density residential area on the west side of the creek immediately south of Sunrise Highway.

OT-3 and OT-4 appear to discharge storm runoff from the commercial property (P.C. Richards) on the west bank of the creek on the south side of Sunrise Highway. OT-3 is a 6" plastic pipe in the retaining wall that appears to extend to the rear parking lot. OT-4 includes five 4" clay pipes, located just north of OT-3 in a retaining wall, that appear to carry discharge from the building. See photographs 12 and 16 in Appendix A. Extensive trash, possibly discharged from the Sunrise Highway outfall, severe bank erosion and crumbling retaining walls were also noted along the creek corridor in this location.

OT-5 and OT-6 (Grand Avenue), OT-9 and OT-10 (Wilson Avenue), and OT-13 and OT-14 (Linden Avenue) are all grates located along the curb on the culvert above the creek. Runoff from the street is directly discharged into the creek at all of these locations. Extensive trash and dumped construction materials were also noted in the vicinity of Grand Avenue.

OT-7 is a 36"x24" concrete elliptical pipe located in a 4-foot diameter catch basin with an open wall on the east bank of the stream. Dry weather discharge was observed. The pipe appears to have a trickle flow and the catch basin appears to be a structure. See photographs 26-29 in Appendix A. The creek channel from OT-7 north is generally channelized with concrete and/or stone retaining wall or rubble embankments and severe erosion evident in places. In some locations the retaining wall appears to be on the verge of collapse. In one location, the channel has been modified to extend around a residential property.

A summary of the results of the remainder of the data sheets are as follows:

- ER-1 is identified as a collapsing retaining wall located on the right stream bank, adjacent to the P.C. Richard and Son building. The wall appears to have severe erosion problems and most of the wall has already collapsed into the stream. The fallen material (concrete block) appears to block some of the stream's flow, causing a possible fish barrier, and also results in accumulation trash from upstream. The accumulated trash is mostly floatable debris such as paper, Styrofoam, and plastic products. See photographs 11 and 14-18 in Appendix A.
- ER-2 is located between Wilson Avenue and Linden Street along various residential property lines. This location shows a severely eroded and collapsing retaining wall along both sides of the stream. The wall is made up of stone and concrete blocks and is temporarily stabilized by metal bars running perpendicular to the stream. The walls are in critical condition and appear to require immediate attention. Further collapse will likely lead to property damage and stream blockage. See photographs 49-59 in Appendix A.

- CM-1, a 150-foot section of the stream having a concrete wall on both sides, has little or no buffer zone and poor floodplain conditions. The only form of vegetation along this section is grass, providing minimal protection. However, the walls appear to be in stable condition. See photographs 32-39 in Appendix A.

- The overall trash level in this reach was assessed as being in the marginal to suboptimal range. The overall reach showed moderate to suboptimal levels of trash such as bottles, cans, Styrofoam, metals, glass and lighters, etc in isolated areas. Floatable debris appeared to accumulate in specific areas by being transported downstream until trapped at these locations or by accumulating from illegal dumping.

- The overall stream condition was assessed to be in the marginal range due to isolated areas of bank erosion, little or no vegetative protection, and encroachment

due to man-made structures. The overall buffer and floodplain condition was assessed to be in the poor to marginal range due to numerous floodplain encroachments and inadequate buffer widths.

Potential 'hot spots' or illicit discharge within the creek subwatershed include commercial and industrial uses such as the multiple auto repair shops, service stations, and gas stations located along Merrick Road and Sunrise Highway and the railroad station that can store materials at these locations including gas tanks, auto parts, and oil/grease containers and dumpsters.

Table 2-5 Subwatershed Comparative Analysis tabulates the information collected during the field assessment, along with the impervious cover results and pollutant severity score to produce a subwatershed total score. While the subwatershed total score can be subjective due to the many additional factors involved in assessing the subwatershed condition and the feasibility of SMP's, the general subwatershed score categories are as follows:

- 0-15 Optimal/Sensitive
- 16-30 Suboptimal/Impacted
- 31-45 Marginal/Non-supporting
- 46+ Poor/Urban

Newbridge Creek was scored a 43 placing this creek in the Marginal/Non-supporting category. Marginal/Non-supporting creeks are estimated to have been extensively impacted by high levels of impervious cover and the pollutant loads. The subwatershed score can also be used to assess the conditions of a specific subwatershed in relation to other subwatersheds in the County or other jurisdiction. For example a watershed with a score of 48 would be identified as poor/urban and would face greater impacts that a

watershed with a score of 11. However, even watersheds with low score may have segments that can be improved by specific stormwater management practices.

The Marginal/Non-supporting category appears to match the existing conditions found in the Newbridge Creek subwatershed. The Creek has been severely impacted by surrounding high density land use, reduction of vegetated buffers and impacts to the stream bank by the channelization. In addition significant portions of this corridor have been culverted so that the creek is no longer visible. Although the impacts are great, there are opportunities to implement SMP's that will reduce the pollutant impacts that Newbridge Creek contributes to East Bay.

3. SMP CANDIDATE SITE ASSESSMENT AND RECOMMENDATIONS

3.1. WATER QUALITY CLASSIFICATIONS/DESIGNATED USES

Table 3.1 summarizes the NYSDEC general water quality classifications in terms of their best usage. The watersheds that were analyzed for this report include the freshwater sections of the river and creek tributaries which fall within the Class 'C" waters.

Table 3.1 NYSDEC Water Quality Classifications (6 NYCRR Part 885 and Part 701)**.**

Waterbody	Water Classification	Best Usage
River /Creek - freshwater	C	The best usage of Class C waters is fishing. These waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.
River/Creek - saline	SC	The best usage of Class SC waters is fishing. These waters shall be suitable for fish propagation and survival. The water quality shall be suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes.
East Bay	SA	The best usages of Class SA waters are shell fishing for market purposes, primary and secondary contact recreation and fishing. These waters shall be suitable for fish propagation and survival.

The NYSDEC has designated East Bay and its tributaries, including Newbridge Creek, a priority waterbody with known aquatic life impairment. A priority waterbody is a waterbody determined by NYSDEC staff, with public input, having uses precluded, impaired, stressed or threatened and, in some cases, requiring establishment of a TMDL. The causes of the impairments have been identified as silt, sediments, phosphorus and pathogens from urban and storm runoff. East Bay and its tributaries are NYSDEC uncertified shellfishing areas. Uncertified shellfishing areas are lands where the NYSDEC

has prohibited shellfish harvesting for food uses in accordance with NYSDEC regulation 6 NYCRR Part 41.

Table 3.1 identifies "best usages". The actual usage of the waters is dependent upon the impairments to the quality of the waters. The numerous parameters that commonly characterize water quality include taste, color, suspended solids, oils, refuse, thermal discharges, phosphorus, nitrogen, pathogens and dissolved solids. A common example of this is Class "B" waters that have a best usage for primary recreational contact (swimming) but are closed due to impacts to the water quality as a result of high bacteria levels. Town and County beaches are often closed after a rainfall that causes high bacteria levels in those waters.

Two major water quality parameters for Class "C" waters are dissolved oxygen (DO) and coliform bacteria concentrations. Adequate DO is essential to the growth and reproduction of finfish and shellfish. DO is also important for the natural decomposition of organic wastes. Current public health standards call for low coliform bacteria concentrations as the presence of such bacteria is regarded to be an indication of potentially pathogenic contamination from human or animal wastes. The actual water quality may not be suitable for the best usage based on these water quality parameters.

3.2. SITE ASSESSMENT/SMP SELECTION

The Newbridge Creek subwatershed is dominated by high density residential and commercial land use with limited park and municipal land uses. The impervious cover assessment determined that the subwatershed is 44% impervious and that Newbridge Creek is a non-supporting creek with severe degradation from urbanization. The buffer along the creek corridor has been severely impacted and lacks vegetative cover. Several potential 'hot spots' or illicit discharges were identified that may drain to the brook. Hot spots are land uses that are known to have high levels of various materials including oil, grease, auto or marine parts, dumpsters, gas tanks or other hazardous materials. Illicit

discharges are locations where storm runoff or unpermitted discharges outfall directly into the brook corridor or into infrastructure that discharges into or will eventually reach the brook.

No self–contained areas such as subdivisions or roads were identified in this subwatershed. Some commercial properties may be self-contained, in particular those that have been more recently developed. As existing properties are redeveloped, the drainage infrastructure should be reviewed and modified to contain storm runoff areas on-site.

Several small localized areas along the brook corridor were identified where surface runoff drains toward the brook. These areas have limited buffers, generally low grasses, and significant encroachment by development. The narrow nature of these buffers most likely will not provide adequate space to site a SMP for the outfall, but the buffers can be revegetated with tall grasses or heavy vegetative cover to reduce erosion along the banks and reduce surface runoff carrying pollutants to the creek.

The entire subwatershed is connected to Newbridge Creek through surface flow or through drainage infrastructure. Locations that drain to recharge basins have been removed from the watershed by Nassau County or Town of Hempstead in connection with previous mapping work completed for drainage studies. The drainage infrastructure and area topography are shown on Map 2-2. The field assessment could not provide an assessment of outfalls in locations where the creek has been culverted as discussed in earlier sections. These areas, including north of Merrick Road, at Sunrise Highway, at the Long Island Rail Road property and north of Linden Avenue, may require further analysis to determine the potential to site SMP's at these outfalls.

SMP's that can treat pollutants found in runoff from existing roads and high-density residential areas include ponds, infiltration trenches, sand filters, and bioretention basins. Additionally ultra-urban retrofits can be considered if suitable locations for other SMP's

are not available or feasible. Newbridge Creek has limited open locations for siting larger SMP's.

3.3. SMP IMPLEMENTATION CANDIDATE SITES

Limited sites can be identified in this subwatershed for location of traditional SMP practices. Outfall drainage areas in this subwatershed have both roadway and residential-related pollutant concerns, and potential mitigation measures would ideally address sediments, hydrocarbons (oil and grease), nitrogen, phosphorus and bacteria**.** Ultra-urban retrofits appear to offer the best mitigation for TSS, hydrocarbons and trash. Total nitrogen, total phosphorus and fecal coliform generally require longer detention time SMP's, which cannot be sited in this watershed due to the limited available land area. Intensive public education to reduce these pollutants should be used in conjunction with the SMP's discussed below. An effort to increase the vegetative cover along the creek corridor will help to filter surface runoff from surrounding residential properties.

Candidate Site 1 is outfall OT-1, a pipe outfall that discharges runoff from a high-density residential area between Merrick Road and Sunrise Highway on the east side of the creek. The drainage area is 19 acres and is 48 % impervious. Ultra urban retrofits at this location such as catch basin filter inserts in the upgradient inlet structures or the installation of a water quality inlet or hydrodynamic structure at the outfall will treat sediments, hydrocarbons and trash pollutant loads, but as noted above, do not address nitrogen, phosphorus or bacteria.

Candidate Site 2 is outfall OT-2, a concrete sluiceway that carries runoff from a high-density residential area on the west side of the creek immediately south of Sunrise Highway. The drainage area is 4 acres and is 59 % impervious. Potential SMP options include installation of an infiltration basin or trench. These SMP's will treat the sediment, hydrocarbons, nitrogen, phosphorus and bacteria, but do not address trash pollutants.

OT-3 and OT-4 appear to discharge storm runoff from the commercial property (P.C. Richards) on the west creek bank on the south side of Sunrise Highway. When this property is redeveloped, the drainage infrastructure should be reviewed and modified to contain storm runoff on-site.

Candidate Site 3 is outfall OT-5 and outfall OT-6 (Grand Avenue; 17 acres, 49% impervious). Candidate Site 5 is outfall OT-9 and outfall OT-10 (Wilson Avenue; 8 acres, 37% impervious). Candidate Site 6 is outfall OT-13 and outfall OT-14 (Linden Avenue; 11 acres, 43% impervious). These locations all have grates located along the curb on the culvert above the creek. Runoff from the street is directly discharged into the creek at each of these locations. Installation of catch basin inserts in upgradient inlets or installation ofwater quality inlets or hydrodynamic structures prior to the outfalls will capture trash, sediments and hydrocarbons.

Candidate Site 4 is outfall OT-7. OT-7 is a concrete pipe located in a 4-foot diameter catch basin with an open wall located on the east bank of the creek. The drainage area is 15 acres and is 42 % impervious. Dry weather discharge was observed, the pipe appearing to have a trickle flow. Initially, the location should be investigated to determine the source of the flow. As the existing catch basin structure appeared to be damaged, the structure should be removed and replaced with a water quality inlet or hydrodynamic structure. See photographs 26-29 in Appendix A.

Non-structural SMP's that can aid in reducing the pollutants that enter Newbridge Creek include:

- Increased street sweeping;
- Public education on fertilizer and chemical use and disposal;
- Public education on the importance of buffers between cultivated lawns and waterbodies.
- Public education on the importance of vegetative cover to prevent soil erosion; and

- Public education on the proper storage and disposal for commercial property owners such as auto shops and gas stations.

3.4. POLLUTANT LOAD REDUCTION ANALYSIS

To estimate the pollutant load reductions achieved by implementation of the proposed SMP's, the outfall drainage areas that contribute to each identified SMP were estimated and the outfall drainage area pollutant loads were calculated using Tables 3-1 GIS Data, Table 3-2 Impervious Cover, and Table 3-3 Water Quality Storm Event Volume and Pollutant Load for each outfall. The individual outfall tables for each area are included in the rear of this report. Table 3-4 - Pollutant Reduction Analysis was completed by inserting the pollutant load totals for each pollutant of concern from Table 2-5 and from Table 3-3 for each outfall in the appropriate columns and rows on Table 3-4.

Based on a review of the topography and drainage infrastructure, it was determined that all 425 acres of the subwatershed drain to Newbridge Creek. Individual commercial or industrial sites may contain their storm runoff on-site in leaching pools or small recharge areas. Analysis during SMP design may further identify these locations and warrant removal from the involved outfall drainage areas. Approximately 2 acres along the stream bank appear to surface drain to Newbridge Creek.

The Candidate Site Assessment identified a total of nine outfalls for potential SMP's at six candidate sites. Proposed SMP's include water quality inlets and an infiltration trench. The outfall locations include one swale, two pipes and six road grate outfalls. Where outfalls are located in close proximity and carry flow from similar areas, two SMP's are proposed but are identified as a single candidate site. For example, the road drainage from the east and west sides of Wilson Avenue is carried to outfalls OT-9 and OT-10 along the curb lines across from each other.

If the proposed water quality inlets and infiltration trench are implemented, and perform as anticipated, it is estimated that the pollutant loads from outfall drainage areas of Newbridge Creek can be reduced by the following quantities and percentages:

Pollutant	Load Removal	Percent Removal
Total Nitrogen (TN)	19 lbs	1 %
Total Suspended Solids (TSS)	19,167 lbs	14 %
Total Phosphorus (TP)	6 lbs	1 %
Fecal Coliform (F Coli)	0 billion colonies	0 %
Trash (Floatable Debris)	320 lbs	13 %
Oil & Grease (Hydrocarbons)	759 lbs	10 %

Siting of SMP's in this watershed is limited by the extensive development and impervious surfaces that already exist. In addition, there are outfalls located north of Merrick Road, near Sunrise Highway and north of Linden Avenue in culverts which could not be assessed due to lack of accessibility. These locations may represent opportunities to site additional SMP's and should be further investigated to determine the feasibility of locating additional SMP's to further reduce the pollutant load level entering Newbridge Creek.

Nassau County Stormwater Management Program
Stormwater Runoff Impact Analysis
NCDPW Engineering Department
Map File List of Requested Plans
Table 2-1

Newbridge Creek (ID No. 107)					
COUNTY FILE # (BROWN / BLACK BOOK)		**OLD COUNTY FILE #** (BLUE BOOK)		**MUNICIPALITY FILE #** (RED BOOK)	
39-Y-1		1205-9		1494-1	
1751-1		1259-4		2158-2	
1416-1		656-12		2149-1	
1314-3		1250-1		129-8	
1537-3		664-9		1450-9	
1196-1		1290-4		1329-6	
		303-9		1318-10	
		1445-5		1951-6	
		1494-2		2061-4	
		1031-3		1610-6	
		87-8		7306-2	
		1648-5		4389-1	
		1576-3		2509-1	
		1580-4		1406-4	
		4062-3		1046-4	
		146-1		7258-1	
		549-10		1825-3	
				ENV.26-1076	
				1349-7	

Nassau County Stormwater Management Program
Stormwater Runoff Impact Analysis
GIS Data
Table 2-2

Name of Subwatershed:	**Newbridge Creek (ID No. 107)**
Tributary to:	**East Bay**
Adjacent Land Use:	**High Density Residential**

Impervious Information

	Area		Building Area		Parking Lot Area		Length of Roads		Number of Residences
Residential	260	Acres	57	Acres					1,758
Commercial	25	Acres	8	Acres	8	Acres			
Industrial	1	Acres	0.4	Acres	0.1	Acres			
Roadway (Pavement)	67	Acres							
Other (Parks, Municipal, (ROW-Pvmt), Etc.)	72	Acres	4	Acres	12	Acres			
Total Subwatershed	425	Acres	69	Acres	20	Acres	80,526	LF	

Residential Lots	Quantity in Subwatershed
43,561 +	0
21,781 - 43,560 SF	5
10,891 - 21,780 SF	84
5,446 - 10,890 SF	958
0 - 5,445 SF	711
Total Number	1,758

Assumed Percentage of Roadway With Sidewalks (%)	95
Sidewalk Width (FT)	4
Assumed Sides of Roadway With Sidewalk	2

*** Source NCGIS Database Dated July 24, 2006**

Nassau County Stormwater Management Program
Stormwater Runoff Impact Analysis
Impervious Cover Calculations
Table 2-3

Impervious Driveway Factors		
Residential Lot Area (AC)	**Average Driveway Area (SF)**	**NC criteria**
2	3,212	1-2+ AC
1	2,073	1/2-1 AC
1/2	1,152	1/4-1/2 AC
1/4	652	1/8 - 1/4 AC
1/8	432	0-1/8 AC
Source : Cappiella and Brown, 2001		
WVA Table 4: Average Driveway Areas in the Chesapeake Bay Region		

Average Residential Driveway Area Calculation				
Subwatershed:	**Newbridge Creek (ID No. 107)**			
Tributary to:	East Bay			
Residential > 1 acre - 3212 SF	Units	0	Acres	0.0
Residential > 1/2 acre to ≤ 1 acre - 2,073 SF	Units	5	Acres	0.05
Residential > 1/4 acre to ≤ 1/2 acre - 1,152 SF	Units	84	Acres	1
Residential > 1/8 acre to ≤ 1/4 acre - 652 SF	Units	958	Acres	10
Residential ≤ 1/8 acre - 432 SF	Units	711	Acres	7
Total Acres Driveways Impervious	Units	1,758	Acres	17

Sidewalk Area Calculation	
Subwatershed:	**Newbridge Creek (ID No. 107)**
Tributary to:	East Bay
Linear feet of road	80,526
Assumed percentage with Sidewalks	95
Sidewalk Width	4
Sides Sidewalk	2
Total Acres Sidewalk	14
Calculation : LF of road x % with sidewalks x 4 ft w x 2 sides	

Impervious Area Calculation		
SubWatershed:	**Newbridge Creek (ID No. 107)**	
Tributary to:	East Bay	
Adjacent Land Use:	High Density Residential	
Total Subwatershed Area	Acres	425
Impervious areas		
Buildings Area	Acres	69
Roads Area	Acres	67
Parking Lot Area	Acres	20
Sidewalks Area - See Table	Acres	14
Driveway Area Total - See Table	Acres	17
TOTAL IMPERVIOUS AREA	Acres	**188**
TOTAL % IMPERVIOUS	%	**44%**
Classification	**4**	

Impervious Area Notes
1. GIS Data Table is source for areas of buildings, roads and parking lots.
2. Sidewalk area calculations are based on percentage of sidewalk area estimated by preparer
3. Impervious Driveways Factors Table - Average Driveway Areas Souce: WVA Table 4, Cappiella and Brown

Initial Subwatershed Classification			
	8	Sensitive Stream	0-10% impervious
	6	Impacted Stream	>10%- to 25% impervious
	4	Non-Supporting Stream	> 25%- 60% impervious
	2	Urban Drainage Stream	> 60% impervious
Source: WVA Figure 4 and Table 2			

Nassau County Stormwater Management Program
Stormwater Runoff Impact Analysis
Water Quality Storm Event (WQSE) Volume and Pollutant Load Estimates
Table 2-4

Subwatershed		**Newbridge Creek (ID No. 107)**							
Tributary To		East Bay							
Land Use		**Residential**	**Commercial**	**Industrial**	**Roadway**	**Other**	**TOTAL**	SEVERITY PTS.*	TOTALS
Contributory Area	Acres	260.2	25.0	1.0	67.4	71.8	**425.3**		
Impervious Area	Acres	56.9	16.3	0.5	67.4	15.4	**156.5**		
Impervious Area	%	21.9	65.2	52.0	100.0	21.5	36.8		
Water Quality Storm Event Volume	WQv-acre-feet	6.4	1.6	0.1	6.4	1.7	16.2		
Water Quality Storm Event Volume	WQv-Cubic Feet	279,735.8	69,219.0	2,300.0	278,873.3	76,158.1	706,286.2		
Annual Rainfall	inches	42.0	42.0	42.0	42.0	42.0	42.0		
Annual Runoff	inches	9.3	24.1	19.6	35.9	9.2	14.4		
Total Nitrogen (TN)	coefficient mg/l	2.2	2.0	2.5	3.0	2.0			
	lbs	1,206.9	271.5	11.3	1,640.7	298.7	**3,429.2**	3.0	10,287.5
Total Suspended Solids (TSS)	coefficient mg/l	100.0	75.0	150.0	120.0	54.5			
	lbs	54,860.6	10,181.2	676.6	65,629.7	8,140.0	**139,488.1**	4.0	557,952.4
Total Phosphorus (TP)	coefficient mg/l	0.4	0.2	0.4	0.5	0.3			
	lbs	219.4	27.1	1.8	273.5	38.8	**560.7**	2.0	1,121.4
Fecal Coliform (F Coli)	coefficient mpn/100 ml	7,750.0	3,000.0	2,400.0	1,700.0	5,000.0			
	billion colonies	1.9	0.2	0.0	0.4	0.3	**2.9**	6.0	17.4
Floatable Debris	coefficient CF/AC	5.0	8.0	5.0	8.0	5.0			
	CF	1,300.9	199.6	5.1	539.1	358.8	**2,403.4**	1.0	2,403.4
Oil and Grease	coefficient mg/l	3.3	5.0	4.0	8.0	3.0			
	lbs	1,810.4	678.7	18.0	4,375.3	448.1	**7,330.6**	5.0	36,652.9
							153,214.8		**608,435.0**
								SCORE	**1,430.7**

SOURCE:
"C" Valve Source; See Table
Impervious Area is based on NCGIS Impervious Area Data from building areas, parking areas, and road areas
* The pollutant loads for each pollutant were assigned severity points based on the least, 1 point, to the most, 6 points, severe pollutant threat in the watershed. The pollutant loads are multiplied by the assigned severity points and the total is divided by 100

Nassau County Stormwater Management Program
Stormwater Runoff Impact Analysis
Subwatershed Comparative Analysis
Table 2-5

	Unit Criteria	Scoring Criteria	Newbridge Creek (ID No. 107)	
			107-1	
Stream Assessment Quantification	**Unit**	**Points**	**Qty**	**Qty x Pts**
Outfall	per outfall	2	14	28
Suspected Illicit Discharge or Hot Spot Locations	per location	8	0	0
WQ Retrofit/Restoration Candidates	per location	1	3	3
Infrastructure Investigations Required	per location	1	2	2
Severe Bank Erosion	per location	1	3	3
Inadequate Buffers	per 5% of reach	5	16	80
Road Crossings	per location	1	4	4
Channelized Segments	per 5% of reach	1	19	19
Public Ownership of the Stream Corridor	per 10% of reach	1	1	1
Livestock Encroachment or High Waterfowl Populations	per location	5	1	5
Threatened Infrastructure	per location	3	3	9
Trash Accumulation In Stream	per location	5	2	10
Stream Condition Subtotal (RCH)	from RCH sheet.	80	41	-5
Buffer/Floodplain Condition Subtotal (RCH)	from RCH sheet.	80	21	-3
Reach Total	**No. of Reaches**	1	**156**	
Subwatershed Total			**156**	
Impervious Cover Classification	Sensitive, Impacted, Non supporting, Urban	8,6,4,2	**4**	
Pollutant Load			**14**	
Total Score			**43**	
RANK				

Nassau County Stormwater Management Program
Candidate Site Assessment
GIS Data
Table 3-1

Outfall(s) **OT-1**

Tributary to	**Newbridge Creek Reach 107-1**
Adjacent Land Use	**High-density Residential**

Impervious Information

	Area		Building Area		Parking Lot Area		Length of Roads		Number of Residences
Residential	13.50	Acres	3.20	Acres					129
Commercial	1.10	Acres	0.28	Acres	0.57	Acres			
Industrial	0.18	Acres	0.14	Acres	0.00	Acres			
Roadway (Pavement)	3.76	Acres							
Other (Parks, Municipal, (ROW-Pvmt), Etc.)	0.87	Acres	0.003	Acres	0.00	Acres			
Total Subwatershed	19.41	Acres	3.62	Acres	0.57	Acres	5406	LF	

Residential Lots	Quantity in Subwatershed
43561 +	0
21781 - 43560 SF	0
10891 - 21780 SF	0
5446 - 10890 SF	38
0 - 5445 SF	91
Total Number	129

Assumed Percentage of Roadway With Sidewalks (%)	0.00
Sidewalk Width (FT)	0.00
Assumed Sides of Roadway With Sidewalk	0.00

Nassau County Stormwater Management Program
Candidate Site Assessment
Water Quality Storm Event (WQSE) Volume and Pollutant Load Estimates
Table 3-3

Outfall		**OT-2**					
Tributary To		Newbridge Creek Reach 107-1					
Land Use		**Residential**	**Commercial**	**Industrial**	**Roadway**	**Other**	**TOTAL**
Contributory Area	Acres	2.10	1.00	0.00	0.86	0.00	**3.96**
Impervious Area	Acres	0.43	0.89	0.00	0.86	0.00	**2.18**
Impervious Area	%	20.48	89.00	0	100.00	0	55.05
Water Quality Storm Event Volume	WQv-acre-feet	0.05	0.09	0.00	0.08	0.00	0.22
Water Quality Storm Event Volume	WQv-Cubic Feet	2143.15	3706.96	0.00	3558.85	0.00	9408.96
Annual Rainfall	inches	42.00	42.00	42.00	42.00	42.00	42.00
Annual Runoff	inches	8.86	32.17	1.89	35.91	1.89	20.62
Total Nitrogen (TN)	coefficient mg/l	2.20	2.00	2.50	3.00	2.00	
	lbs	9.25	14.54	0.00	20.94	0.00	**44.72**
Total Suspended Solids (TSS)	coefficient mg/l	100.00	75.00	150.00	120.00	54.50	
	lbs	420.31	545.24	0.00	837.54	0.00	**1803.09**
Total Phosphorus (TP)	coefficient mg/l	0.40	0.20	0.40	0.50	0.26	
	lbs	1.68	1.45	0.00	3.49	0.00	**6.62**
Fecal Coliform (F Coli)	coefficient mpn/100 ml	7750.00	3000.00	2400.00	1700.00	5000.00	
	billion colonies	0.01	0.01	0.00	0.01	0.00	**0.03**
Floatable Debris	coefficient CF/AC	5.00	8.00	5.00	8.00	5.00	
	CF	10.50	8.00	0.00	6.88	0.00	**25.38**
Oil and Grease	coefficient mg/l	3.30	5.00	4.00	8.00	3.00	
	lbs	13.87	36.35	0.00	55.84	0.00	**106.06**

SOURCE:
"C" Valve Source; See Table
Impervious Area is based on NCGIS Impervious Area Data from building areas, parking areas, and road areas

Nassau County Stormwater Management Program
Candidate Site Assessment
GIS Data
Table 3-1

Outfall(s) **OT-5 & 6**

Tributary to	**Newbridge Creek Reach 107-1**
Adjacent Land Use	**High-density Residential**

Impervious Information

	Area		Building Area		Parking Lot Area		Length of Roads		Number of Residences
Residential	12.00	Acres	2.90	Acres					112
Commercial	0.80	Acres	0.28	Acres	0.29	Acres			
Industrial	0.00	Acres	0.00	Acres	0.00	Acres			
Roadway (Pavement)	2.15	Acres							
Other (Parks, Municipal, (ROW-Pvmt), Etc.)	1.75	Acres	0.001	Acres	1.50	Acres			
Total Subwatershed	16.70	Acres	3.18	Acres	1.79	Acres	3216	LF	

Residential Lots	Quantity in Subwatershed
43561 +	0
21781 - 43560 SF	0
10891 - 21780 SF	2
5446 - 10890 SF	28
0 - 5445 SF	82
Total Number	112

Assumed Percentage of Roadway With Sidewalks (%)	0.00
Sidewalk Width (FT)	0.00
Assumed Sides of Roadway With Sidewalk	0.00

Nassau County Stormwater Management Program
Candidate Site Assessment
Water Quality Storm Event (WQSE) Volume and Pollutant Load Estimates
Table 3-3

Outfall		**OT-7**					
Tributary To		Newbridge Creek Reach 107-1					
Land Use		**Residential**	**Commercial**	**Industrial**	**Roadway**	**Other**	**TOTAL**
Contributory Area	Acres	11.70	2.60	0.04	0.00	0.81	**15.15**
Impervious Area	Acres	2.90	1.82	0.04	0.00	0.49	**5.25**
Impervious Area	%	24.79	70.00	100.00	0	60.49	34.65
Water Quality Storm Event Volume	WQv-acre-feet	0.32	0.18	0.00	0.00	0.05	0.55
Water Quality Storm Event Volume	WQv-Cubic Feet	13917.42	7701.41	165.53	0.00	2097.41	23881.77
Annual Rainfall	inches	42.00	42.00	42.00	42.00	42.00	42.00
Annual Runoff	inches	10.32	25.70	35.91	1.89	22.47	13.68
Total Nitrogen (TN)	coefficient mg/l	2.20	2.00	2.50	3.00	2.00	
	lbs	60.05	30.21	0.81	0.00	8.23	**99.29**
Total Suspended Solids (TSS)	coefficient mg/l	100.00	75.00	150.00	120.00	54.50	
	lbs	2729.42	1132.78	48.69	0.00	224.18	**4135.07**
Total Phosphorus (TP)	coefficient mg/l	0.40	0.20	0.40	0.50	0.26	
	lbs	10.92	3.02	0.13	0.00	1.07	**15.14**
Fecal Coliform (F Coli)	coefficient mpn/100 ml	7750.00	3000.00	2400.00	1700.00	5000.00	
	billion colonies	0.10	0.02	0.00	0.00	0.01	**0.13**
Floatable Debris	coefficient CF/AC	5.00	8.00	5.00	8.00	5.00	
	CF	58.50	20.80	0.20	0.00	4.05	**83.55**
Oil and Grease	coefficient mg/l	3.30	5.00	4.00	8.00	3.00	
	lbs	90.07	75.52	1.30	0.00	12.34	**179.23**

SOURCE:
"C" Valve Source; See Table
Impervious Area is based on NCGIS Impervious Area Data from building areas, parking areas, and road areas

Nassau County Stormwater Management Program
Candidate Site Assessment
GIS Data
Table 3-1

Outfall(s) **OT-9 & 10**

Tributary to	**Newbridge Creek Reach 107-1**
Adjacent Land Use	**High-density Residential**

Impervious Information

	Area		Building Area		Parking Lot Area		Length of Roads		Number of Residences
Residential	7.20	Acres	1.40	Acres					79
Commercial	0.00	Acres	0.00	Acres	0.00	Acres			
Industrial	0.00	Acres	0.00	Acres	0.00	Acres			
Roadway (Pavement)	0.96	Acres							
Other (Parks, Municipal, (ROW-Pvmt), Etc.)	0.23	Acres	0.000	Acres	0.00	Acres			
Total Subwatershed	8.39	Acres	1.40	Acres	0.00	Acres	1405	LF	

Residential Lots	Quantity in Subwatershed
43561 +	0
21781 - 43560 SF	0
10891 - 21780 SF	1
5446 - 10890 SF	20
0 - 5445 SF	58
Total Number	79

Assumed Percentage of Roadway With Sidewalks (%)	0.00
Sidewalk Width (FT)	0.00
Assumed Sides of Roadway With Sidewalk	0.00

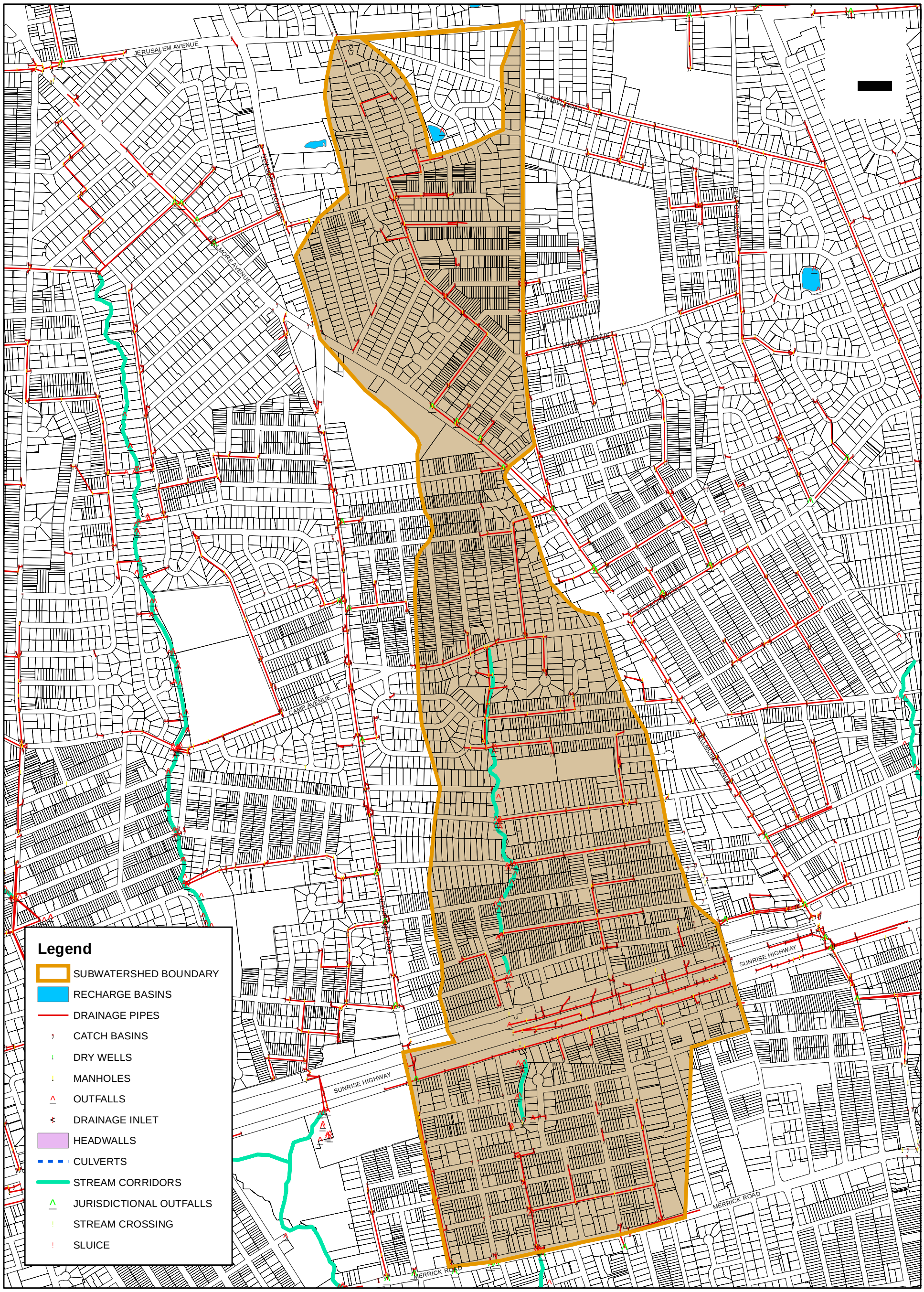
Nassau County Stormwater Management Program
Candidate Site Assessment
Water Quality Storm Event (WQSE) Volume and Pollutant Load Estimates
Table 3-3

Outfall		**OT-13 & 14**					
Tributary To		Newbridge Creek Reach 107-1					
Land Use		**Residential**	**Commercial**	**Industrial**	**Roadway**	**Other**	**TOTAL**
Contributory Area	Acres	8.80	0.14	0.00	1.50	0.16	**10.60**
Impervious Area	Acres	2.30	0.04	0.00	1.50	0.00	**3.84**
Impervious Area	%	26.14	28.57	0	100.00	0.00	36.23
Water Quality Storm Event Volume	WQv-acre-feet	0.25	0.00	0.00	0.14	0.00	0.40
Water Quality Storm Event Volume	WQv-Cubic Feet	10933.56	187.31	0.00	6207.30	34.85	17363.02
Annual Rainfall	inches	42.00	42.00	42.00	42.00	42.00	42.00
Annual Runoff	inches	10.78	11.61	1.89	35.91	1.89	14.21
Total Nitrogen (TN)	coefficient mg/l	2.20	2.00	2.50	3.00	2.00	
	lbs	47.17	0.73	0.00	36.52	0.14	**84.57**
Total Suspended Solids (TSS)	coefficient mg/l	100.00	75.00	150.00	120.00	54.50	
	lbs	2144.24	27.55	0.00	1460.82	3.72	**3636.34**
Total Phosphorus (TP)	coefficient mg/l	0.40	0.20	0.40	0.50	0.26	
	lbs	8.58	0.07	0.00	6.09	0.02	**14.75**
Fecal Coliform (F Coli)	coefficient mpn/100 ml	7750.00	3000.00	2400.00	1700.00	5000.00	
	billion colonies	0.08	0.00	0.00	0.01	0.00	**0.09**
Floatable Debris	coefficient CF/AC	5.00	8.00	5.00	8.00	5.00	
	CF	44.00	1.12	0.00	12.00	0.80	**57.92**
Oil and Grease	coefficient mg/l	3.30	5.00	4.00	8.00	3.00	
	lbs	70.76	1.84	0.00	97.39	0.21	**170.19**

SOURCE:
"C" Valve Source; See Table
Impervious Area is based on NCGIS Impervious Area Data from building areas, parking areas, and road areas

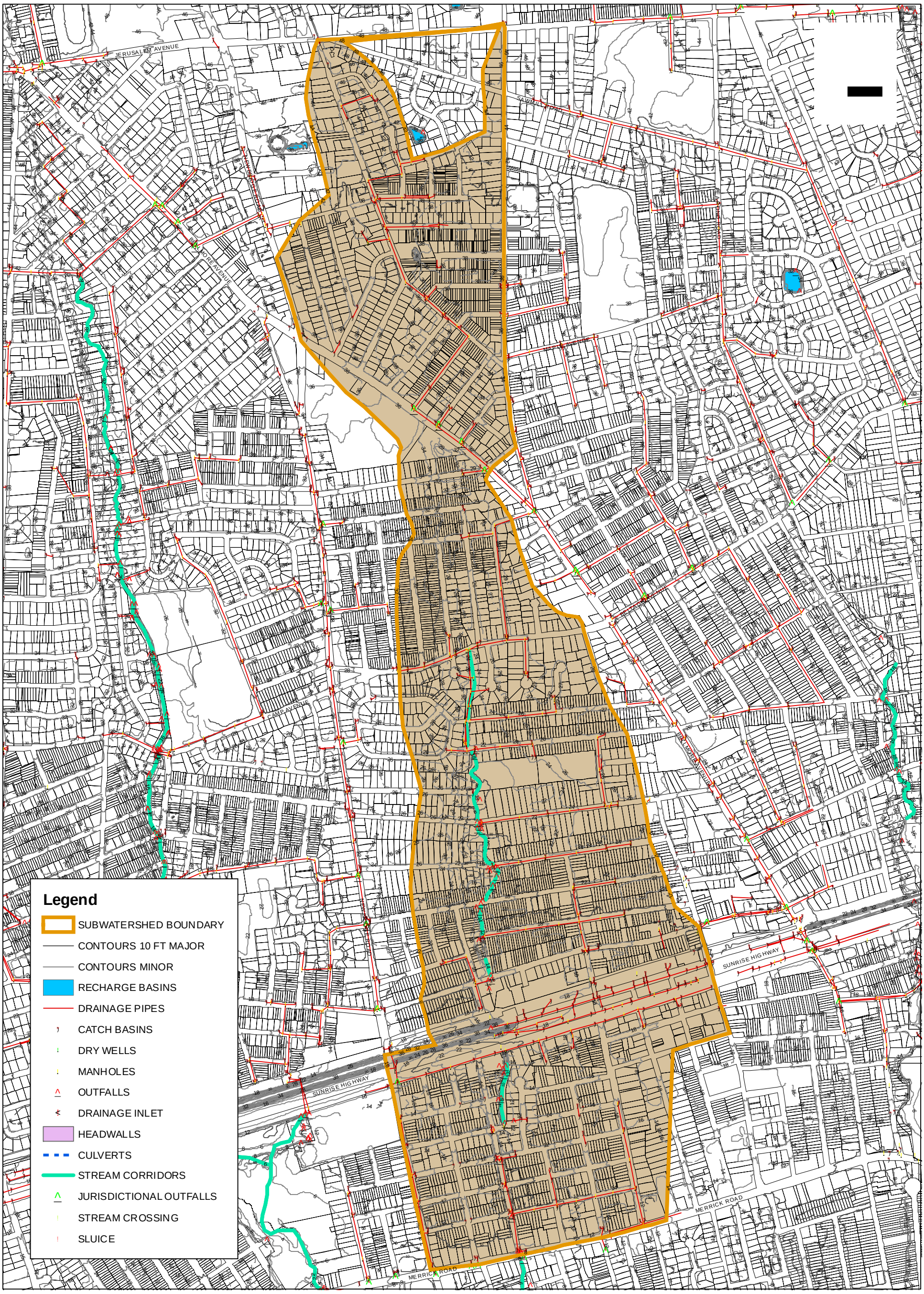
Nassau County Stormwater Management Program
Candidate Site Assessment
Pollutant Reduction Analysis
Table 3-4

Newbridge Creek Reach 107-1											
East Bay											
Location		**Subwatershed Area Pollutant Load (Enter Data from Table 2-4)**	**Candidate Site 1**	**Candidate Site 2**	**Candidate Site 3**	**Candidate Site 4**	**Candidate Site 5**	**Candidate Site 6**	**Candidate Sites Total Pollutant Load Reduction**	**Drainage Area Total Pollutant Load**	**Drainage Area Pollutant Reduction (%)**
Outfall			OT 1	OT 2	OT 5 & 6	OT 7	OT 9 & 10	OT 13 & 14			
Stormwater Management Practice			WQI	Infiltration Trench	WQI	WQI	WQI	WQI			
Total Nitrogen (TN)	pollutant load (lbs)	3429	176	45	147	99	54	85	19	3429	1%
	SMP Pollutant Reduction %		0%	42%	0%	0%	0%	0%			
	Pollutant Reduction (lbs)		0	19	0	0	0	0			
Total Suspended Solids (TSS)	pollutant load (lbs)	139488	7419	1803	5860	4135	2324	3636	19167	139488	14%
	SMP Pollutant Reduction %		82%	0%	82%	82%	82%	82%			
	Pollutant Reduction (lbs)		6,083	0	4,805	3,391	1,906	2,982			
Total Phosphorus (TP)	pollutant load (lbs)	561	29	7	24	15	9	15	6	561	1%
	SMP Pollutant Reduction %		0%	90%	0%	0%	0%	0%			
	Pollutant Reduction (lbs)		0	6	0	0	0	0			
Fecal Coliform (F Coli)	Pollutant load (billion colonies)	2.89	0.14	0.03	0.14	0.13	0.06	0.09	0.00	2.89	0%
	SMP Pollutant Reduction %		0%	0%	0%	0%	0%	0%			
	Pollutant Reduction (bc)		0.00	0.00	0.00	0.00	0.00	0.00			
Floatable Debris (Trash)	pollutant load (CF)	2403	112	25	92	84	45	58	320	2403	13%
	SMP Pollutant Reduction %		82%	0%	82%	82%	82%	82%			
	Pollutant Reduction (CF)		92	0	76	69	37	47			
Oil and Grease (Hydrocarbons)	pollutant load (lbs)	7331	385	106	291	179	108	170	759	7331	10%
	SMP Pollutant Reduction %		67%	0%	67%	67%	67%	67%			
	Pollutant Reduction (lbs)		258	0	195	120	73	114			



SOURCE: NCGIS AND CASHIN ASSOC. P.C.

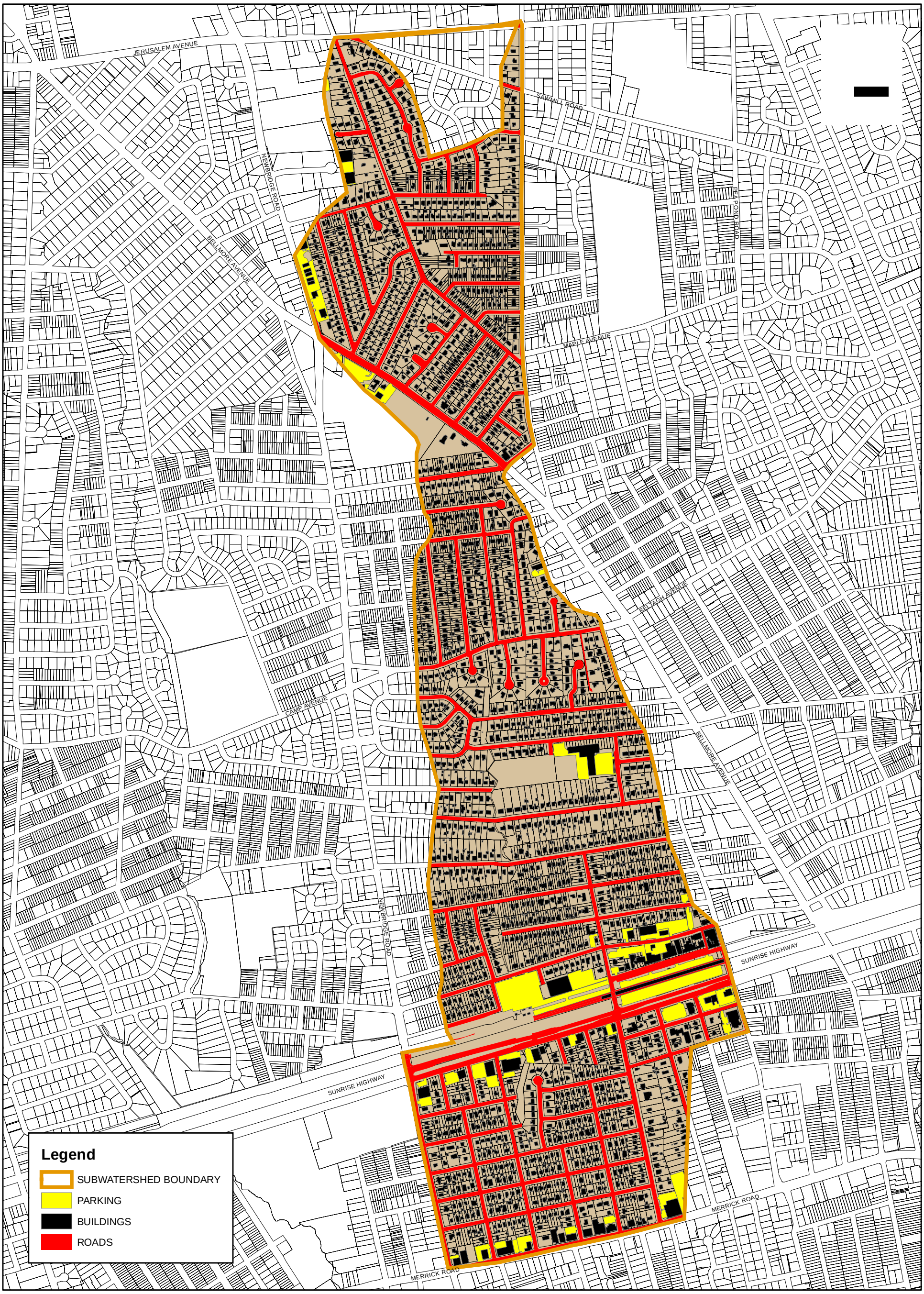
MAP 2-1
NASSAU COUNTY STORMWATER MANAGEMENT PROGRAM
STORMWATER RUNOFF IMPACT ANALYSIS
DRAINAGE INFRASTRUCTURE
NEWBRIDGE SUBWATERSHED



SOURCE: NCGIS AND CASHIN ASSOC. P.C.

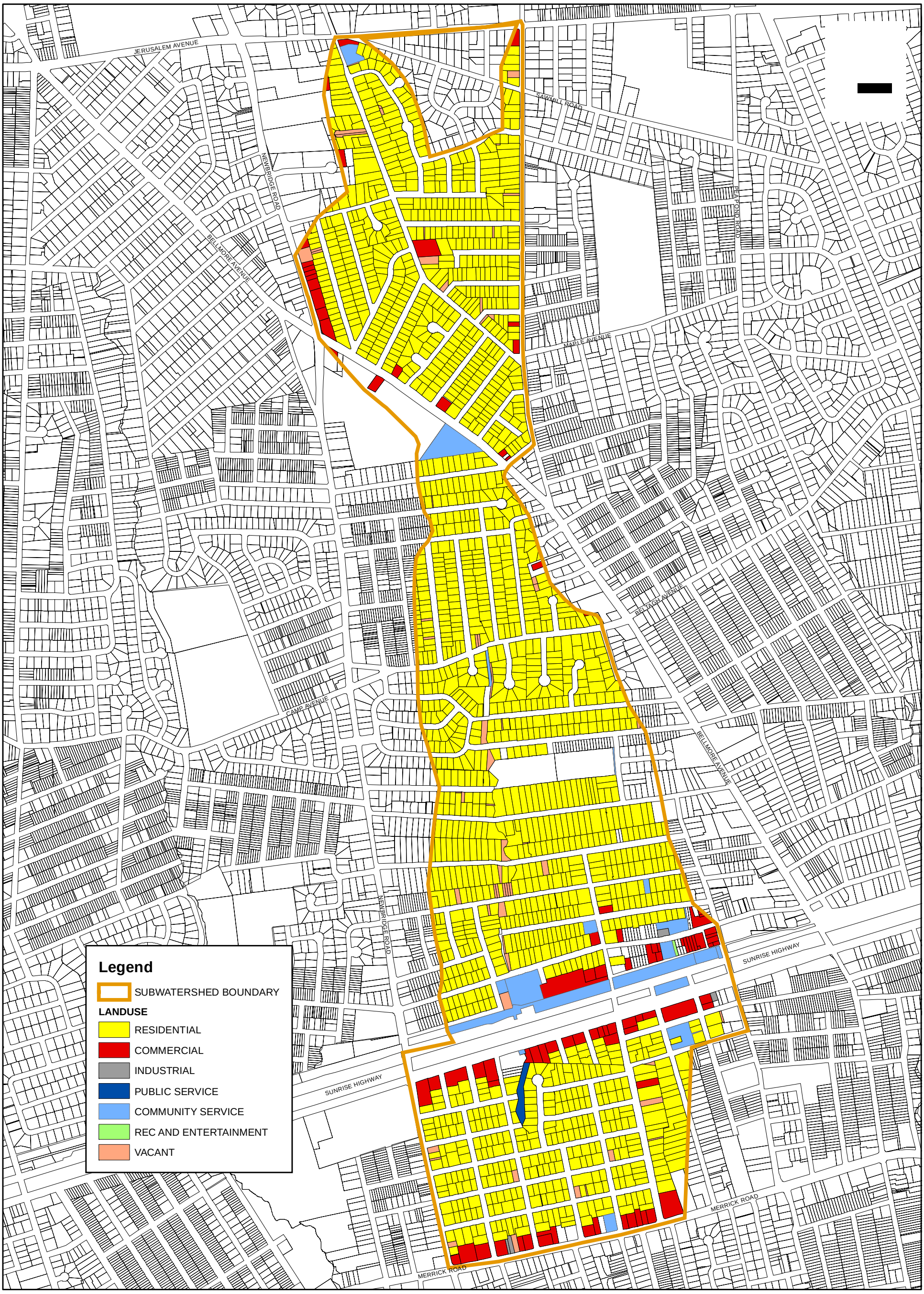
MAP 2-2
NASSAU COUNTY STORMWATER MANAGEMENT PROGRAM
STORMWATER RUNOFF IMPACT ANALYSIS
CONTOURS
NEWBRIDGE SUBWATERSHED

0 500 1,000 2,000 3,000 4,000 Feet



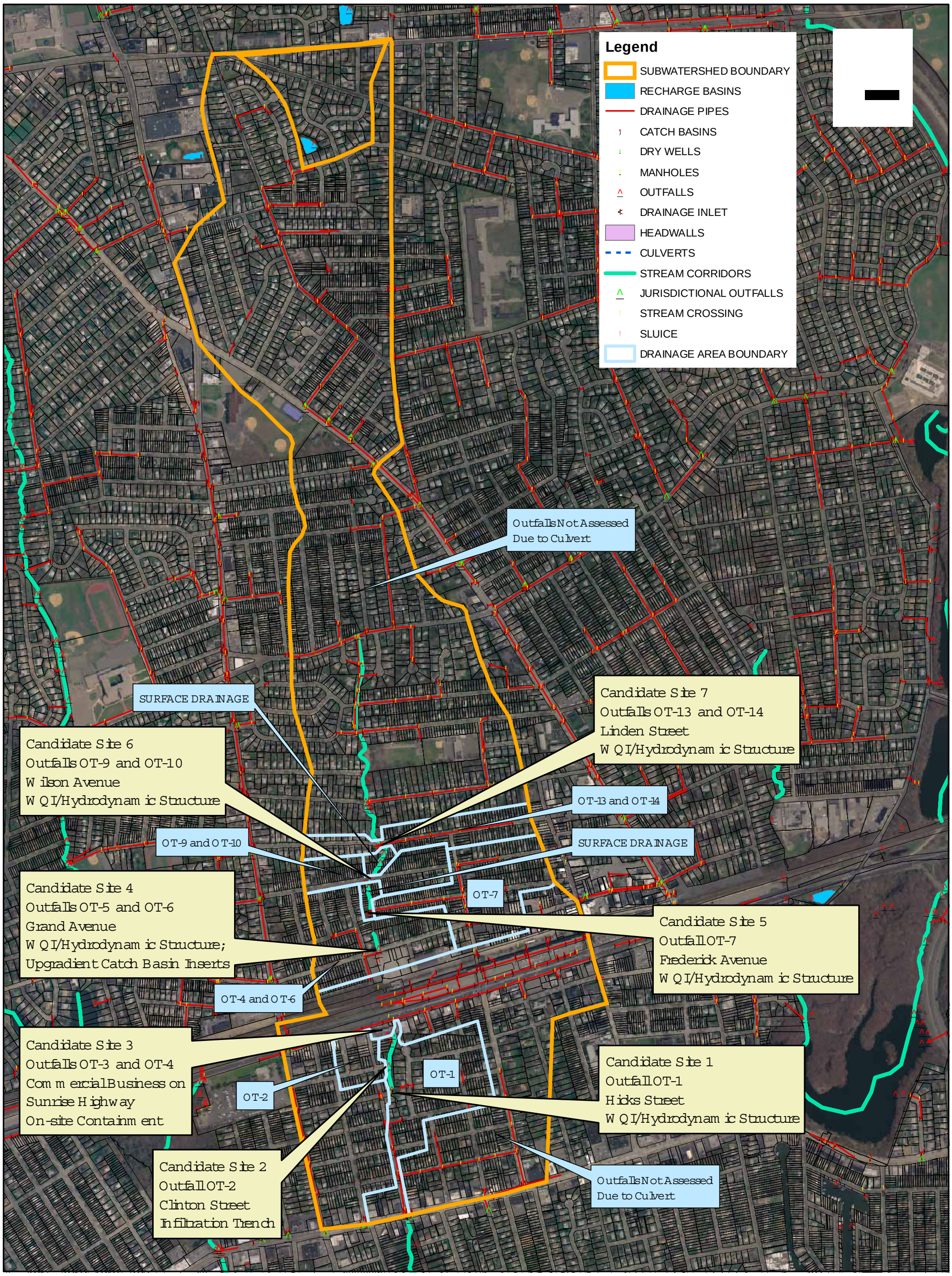
SOURCE: NCGIS AND CASHIN ASSOC. P.C.

MAP 2-3
NASSAU COUNTY STORMWATER
MANAGEMENT PROGRAM
STORMWATER RUNOFF IMPACT ANALYSIS
IMPERVIOUS AREAS
NEWBRIDGE SUBWATERSHED



SOURCE: NCGIS AND CASHIN ASSOC. P.C.

MAP 2-4
NASSAU COUNTY STORMWATER
MANAGEMENT PROGRAM
STORMWATER RUNOFF IMPACT ANALYSIS
LAND USE
NEWBRIDGE SUBWATERSHED



SOURCE: NCGIS AND CASHIN ASSOC. P.C.

Cashin Associates, P.C.
ENGINEERING • PLANNING • CONSTRUCTION MANAGEMENT

MAP 3-1
NASSAU COUNTY STORMWATER MANAGEMENT PROGRAM
STORMWATER RUNOFF IMPACT ANALYSIS
SMP CANDIDATE SITE MAP
NEWBRIDGE SUBWATERSHED

0 500 1,000 2,000 3,000 4,000 Feet

Nassau County
Stormwater Management Program

newbridge CREEK subwatershed Stormwater Runoff Impact Analysis AND CANDIDATE SITE ASSESSMENT REPORT

Appendix a – field data

CASHIN ASSOCIATES, P.C.

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