



Nassau County Stormwater Management Program



TIFFANY BROOK SUBWATERSHED STORMWATER RUNOFF IMPACT ANALYSIS AND CANDIDATE SITE ASSESSMENT REPORT

FINAL – October 1, 2007



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Engineering • Planning • Construction Management



Nassau County
Stormwater Management Program

Tiffany Brook Subwatershed
Stormwater Runoff Impact Analysis
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1. INTRODUCTION

The Tiffany Brook Stormwater Runoff Impact Analysis (Analysis Report) has been prepared in accordance with the Nassau County Stormwater Management Program *Stormwater Runoff Impact Analysis Procedures Manual* (Procedures Manual). The Procedures 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
- Identify 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 Oyster Bay Harbor/Mill Neck Creek watershed is located between Locust Valley and Oyster Bay Cove on the north shore. Subwatersheds are the tributaries that drain to the watersheds. For Oyster Bay Harbor and Mill Neck Creek the tributaries include Tiffany Creek, Whites Creek and Mill River which drain directly into the harbor and Francis Ponds/Beaver Brook, Kentucky Brook and Bailey Arboretum Brook which drain into Mill Neck Creek.

The subwatershed assessment included review of available subwatershed data including Nassau County Geographic Information System (NCGIS) mapping, other available municipal mapping, Nassau County record documents and other available municipal record documents. After available records were reviewed, the land use data was utilized to estimate existing impervious cover, water quality storm volumes and pollutant loads. The stream assessment was conducted to verify mapping, assess field conditions and examine drainage infrastructure systems. The compiled information was then 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 was 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.

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 20 documents that pertained to work conducted in the Tiffany Brook 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 Tiffany Brook 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 Tiffany Brook subwatershed is located within the Town of Oyster Bay in the northeastern portion of Nassau County. Tiffany Brook extends from its headwaters near the intersection of Cove Road and Yellow Cote Road to the outflow into Oyster Bay Cove.

Tiffany Brook is comprised of a short tidal segment and a longer freshwater segment. The tidal segment is influenced by the Oyster Bay Cove tidal changes and received stormwater flow from the area located northeast of Tiffany Rd. The freshwater segment is a partially channelized stream located between Cove Neck Rd. and Yellow Cote Road that receives surface runoff from adjacent residential properties and nearby roads. Several small drainage infrastructure systems also discharge to the freshwater segment. The northern end of the freshwater brook segment includes a small pond located on private property just south of Cove Neck Rd. The pond has a weir prior to and culvert under Cove Neck Road connecting it to Oyster Bay Cove. The remainder of the freshwater brook segment runs through a mostly wooded residential property.

The geographic limits of the Tiffany Brook subwatershed were defined through review of topographic maps, plans of existing municipal drainage infrastructure, and field assessment. Map 2-2 shows subwatershed topography along with existing drainage infrastructure.

The Tiffany Brook subwatershed encompasses approximately 1,894 acres that potentially contribute runoff to Tiffany Brook. See Section 3 for a description of self-contained areas that no longer contribute water quality storm volume runoff to Tiffany

Brook. The Tiffany Brook subwatershed is approximately 1 mile long and begins just south of North Hempstead Turnpike (25A) and ends in Oyster Bay Cove, just north of Tiffany Rd and Cove Neck Road. The subwatershed extends from Sandy Hill Road and Berry Hill Road east to Cove Edge Road.

Land use within the subwatershed is comprised mostly of residential areas. The subwatershed is 71% residential and 26% other (parks, municipal, etc.). Of the 533 residences in the subwatershed, 476 or 89% are larger than one acre in size.

2.2.2. IMPERVIOUS COVER ASSESSMENT

Percentage of impervious cover has been determined to be an indicator of subwatershed health. Lower percentages of impervious cover in a subwatershed generally indicate 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 Tiffany Brook 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 Tiffany Brook, none 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 Tiffany Brook subwatershed is 115 acres of the 1,894 total subwatershed acres. This represents 6% of the subwatershed. Based on the 6% impervious figure, Tiffany Brook receives a subwatershed classification of sensitive stream.

Sensitive streams have a subwatershed impervious cover of 0% to 10%. The streams are generally of high quality, typified by stable channels, excellent habitat structure, good to excellent water quality, and diverse communities of both fish and aquatic insects. Due to the low impervious cover condition, frequent flooding and other hydrological changes that accompany urbanization are not experienced. It should be noted that some sensitive streams located in rural areas may have been impacted by prior poor grazing and cropping practices which may have severely altered the riparian zone. Consequently, all the properties of a sensitive stream may not be present. However, once riparian management improves, these streams are often expected to recover. The main goals for sensitive subwatershed management in Tiffany Brook's case are to maintain the biodiversity and channel stability.

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 majority of the subwatershed's TSS level is derived from its roadways.

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 large yards that have cultivated lawns and limited buffers and drain directly into the stream contribute TP and TN to Tiffany Brook.

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 and waterfowl wastes may contribute to fecal coliform levels in Tiffany Brook.

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. Roadways and paved surfaces are the main contributors of hydrocarbons within the Tiffany Brook 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. Floatable debris levels in Tiffany Brook would be anticipated to be low.

The pollutant loads were calculated in accordance with the Nassau County 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 Procedures 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 NC Procedures 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. Tiffany Brook was assessed by traveling upstream from the mouth of the river at Oyster Bay Harbor. On the data sheets, the banks are described as left (west) and right (east) looking downstream.

The stream assessment for Tiffany Brook was conducted from December 28, 2006 to January 2, 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, 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. Tiffany Brook was the third stream assessed by this methodology and was assigned identification number 102.

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. Tiffany Brook was assigned two reaches based on tidal influence and land use. The reaches were assigned identification numbers starting with xxx-1 at the

subwatershed's downstream end. Reach 102-1 is the tidal segment and Reach 102-2 is the freshwater residential land use segment. If branches had been encountered, the major branch reaches would have been completed and numbered first. The secondary branches subsequently would have been completed heading downstream from the point of confluence with the main branch.

The following paragraphs are a summary of the data collected on the assessment sheets. Tiffany Brook is located at the northeastern end of the subwatershed and is approximately one mile long with 3 small branches. Tiffany Brook flows north into Oyster Bay Cove. The brook's riparian zone is dominated by forested wetland areas and large residential yards.

Reach 102-1 is tidal and receives some of the runoff from surface inlets/outfalls (OT-1 and OT-2). The two outfalls identified in this reach are surface inlets located in the culvert under Cove Neck Road. These outfalls drain directly into, the culvert. The northern end of the culvert is connected to a wooden bulkhead showing signs of severe deterioration and failure at various locations. The southern end of the culvert extended to a small pond located on private property. The pond is surrounded by a cultivated lawn with no buffer and little shading. This pond is used by a large waterfowl population which increases the pollutant loads. The overall stream condition in this reach is assessed to be in the poor to suboptimal range due to poor overall vegetative protection and severe bank erosion issues on the left bank of the wooden bulkhead area. The overall buffer and floodplain condition was assessed to be in the poor to marginal range because of a small vegetated buffer zone, cultivated lawn floodplain vegetation, and a significant amount of floodplain encroachment. However, the floodplain habitat does provide an adequate mix of wetland and non-wetland habitats.

Reach 102-2 extends from the south side of the pond in Reach 102-1 to Yellow Cote Road. The northern end of Reach 102-2, according to local residents, has shown increased

water levels over the past few years, encroaching on the floodplain for extended periods and killing the trees in that area changing the area from a forest to more wetland-like than it had previously been. There are a total of 5 outfalls identified in this reach (OT-1 through OT-5).

OT-1, located toward the middle of the reach, is identified as an 18-inch tile pipe with a trickle flow that discharges from an unknown source. Further investigation of this site is necessary with respect to the flow source. The overall stream condition was assessed to be in the optimal range due to ideal in-stream habitat and vegetative protection. The overall buffer and floodplain condition was also assessed to be in the optimal range due to a wide, vegetated buffer with little or no floodplain encroachment.

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

Tiffany Brook was scored a 5 placing the brook in the Optimal/Sensitive condition. Optimal/Sensitive streams are estimated to have low levels of impervious cover and 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 than 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.

Tiffany Brook predominantly ranges in the Optimal/Sensitive stream category due to its lack of significant buffer impacts, limited floodplain encroachment and low density residential land use particularly in Reach 2. It also appears there are opportunities to implement SMP's that will further reduce pollutant impacts to Tiffany Brook.

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 brook 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 /Brook - 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/Brook - tidal	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.
Oyster Bay Harbor	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 Oyster Bay Harbor 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 pathogens from urban/storm runoff and municipal sources. The Oyster Bay Cove area of Oyster Bay Harbor is a NYSDEC uncertified shellfishing area. Uncertified shellfishing areas are lands where the NYSDEC has prohibited shellfish harvesting for food uses in accordance with NYSDEC regulation 6NYCRR Part 41.

Pathogen TMDL's for shellfishing waters in Oyster Bay Harbor have been completed. There are set target percent reductions for pathogens levels.

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 Tiffany Brook subwatershed is dominated by low-density land use with some commercial use. The subwatershed was assessed to be 6% impervious and analysis determined that Tiffany Brook was a sensitive stream with stable channels, limited buffer encroachment and extensive vegetative cover. No potential "hot spots" or illicit discharges were identified in the vicinity of the brook. Hot spots are land uses that are known to have high levels of materials such as oil, grease, automotive 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.

Significant portions of the subwatershed surface drain to the brook. The majority of these areas have significant wooded buffers and extremely limited development. No structural SMP is recommended for these locations. Should the land use of these areas be modified, the need for SMP's should be reassessed at that time.

The original subwatershed appears to have been reduced in size by the installation of recharge basins and other drainage infrastructure that contain storm runoff volume from roads and subdivision developments. When an area contains storm runoff in on-site drainage infrastructure, that area is described as self-contained. In future analyses, those areas determined to be self-contained should be removed from the subwatershed area calculations. Most of the development south of Route 25A appears to have recharge basins and/or drainage structures in place that will contain the water quality storm volume. There are two recharge basins located north of Route 25A that appear to contain the water quality storm volume (at a minimum) and are assumed to be self-contained. An additional two basins located in close proximity to Tiffany Brook may have overflows that allow pollutants to reach the brook. Future investigation should include determining volumes of these basins and a review of the overflow mechanism should be performed to determine if the basins contain the water quality storm volume and provide pollutant mitigation.

SMP's that can treat pollutants found in runoff from roads 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.

3.3. SMP IMPLEMENTATION CANDIDATE SITES

The Tiffany Brook subwatershed has several potential parcels that could be used to site SMP's that would reduce pollutant loads into Tiffany Brook. The proposed candidate sites and the SMPs discussed herein are shown on Map 3-1 Candidate Sites Map.

Candidate Site 1 is the parcel located on the south corner of Cove Road and Shutter Lane. This parcel is denoted as a community service land use and appears to be underdeveloped with a large amount of open area. This location offers the opportunity to site a bioretention basin that would detain and filter the water quality storm volume. Larger flows would continue to flow directly into the brook.

In lieu of identifying only specific individual candidate sites, the following is a discussion of potential structural and non-structural SMP's and general types of candidate sites. These practices should be considered for possible future use in this subwatershed, as deemed necessary.

Candidate Site 2 identifies the existing recharge basin as offering opportunity to provide additional storage capacity. Expansion of the recharge basin can be used to provide storage volume of the water quality storm runoff from additional portions of the subwatershed. Larger stormwater volume from the expanded areas would continue to bypass these recharge basins.

Candidate Site 3 identifies the opportunity to install leaching basins that would capture and infiltrate runoff or vegetated swales that would filter runoff along roads that drain toward the brook.

Candidate Site 4 identifies the opportunity to locate vacant parcels that can be acquired and used to site SMP's such as ponds, wetlands, and bioretention basins that would filter

the runoff. Map 2-4 Land Use identifies numerous vacant parcels in the subwatershed. Those located along roads or close to the brook offer the greatest opportunity to capture pollutants prior to flowing into the brook.

Nonstructural SMPs that can aid in reducing the pollutants that enter Tiffany Brook from lands in the subwatershed include:

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

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

<u>Tiffany Brook (ID No. 102)</u>					
COUNTY FILE # (BROWN / BLACK BOOK)		OLD COUNTY FILE # (BLUE BOOK)		MUNICIPALITY FILE # (RED BOOK)	
1747-1				180-9	
133-10				1028-9	
3327-2				925-9	
1900-6				7220-2	
48-2					
4607-3					
2323-3					
1900-5					
48-5					
133-9					
587-5					
599-2					
587-5					
184-1					
3305-4					
1267-4					

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

Name of Subwatershed: **Tiffany Brook (ID No. 102)**

Tributary to:	Oyster Bay
Adjacent Land Use:	Low Density Residential

Impervious Information

	Area		Building Area		Parking Lot Area		Length of Roads		Number of Residences
Residential	1,338	Acres	42	Acres	X		X		533
Commercial	2	Acres	0.2	Acres	0.3	Acres	X		X
Industrial	0	Acres	0	Acres	0	Acres	X		X
Roadway (Pavement)	64	Acres	X		X		X		X
Other (Parks, Municipal, (ROW-Pvmt), Etc.)	490	Acres	2	Acres	2	Acres	X		X
Total Subwatershed	1,894	Acres	45	Acres	2	Acres	116,854	LF	X

Residential Lots	Quantity in Subwatershed
43,561 +	476
21,781 - 43,560 SF	23
10,891 - 21,780 SF	8
5,446 - 10,890 SF	8
0 - 5,445 SF	18
Total Number	533

Assumed Percentage of Roadway With Sidewalks (%)	0
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 : Capiella and Brown, 2001		
WVA Table 4: Average Driveway Areas in the Chesapeake Bay Region		

Average Residential Driveway Area Calculation				
Subwatershed:		Tiffany Brook (ID No. 102)		
Tributary to:		Oyster Bay		
Residential > 1 acre - 3212 SF	Units	476	Acres	4.7
Residential > 1/2 acre to ≤ 1 acre - 2,073 SF	Units	23	Acres	0.2
Residential > 1/4 acre to ≤ 1/2 acre - 1,152 SF	Units	8	Acres	0.1
Residential > 1/8 acre to ≤ 1/4 acre - 652 SF	Units	8	Acres	0.1
Residential ≤ 1/8 acre - 432 SF	Units	18	Acres	0.2
Total Acres Driveways Impervious	Units	533	Acres	5

Sidewalk Area Calculation	
Subwatershed: Tiffany Brook (ID No. 102)	
Tributary to: Oyster Bay	
Linear feet of road	116,854
Assumed percentage with Sidewalks	0
Sidewalk Width	4
Sides Sidewalk	2
Total Acres Sidewalk	0
Calculation : LF of road x % with sidewalks x 4 ft w x 2 sides	

Impervious Area Calculation		
Subwatershed:		Tiffany Brook (ID No. 102)
Tributary to:		Oyster Bay
Adjacent Land Use:		Low Density Residential
Total Subwatershed Area	Acres	1,894
Impervious areas		
Buildings Area	Acres	45
Roads Area	Acres	64
Parking Lot Area	Acres	2
Sidewalks Area - See Table	Acres	0
Driveway Area Total - See Table	Acres	5
TOTAL IMPERVIOUS AREA	Acres	115
TOTAL % IMPERVIOUS	%	6%
Classification	8	

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, Capiella and Brown

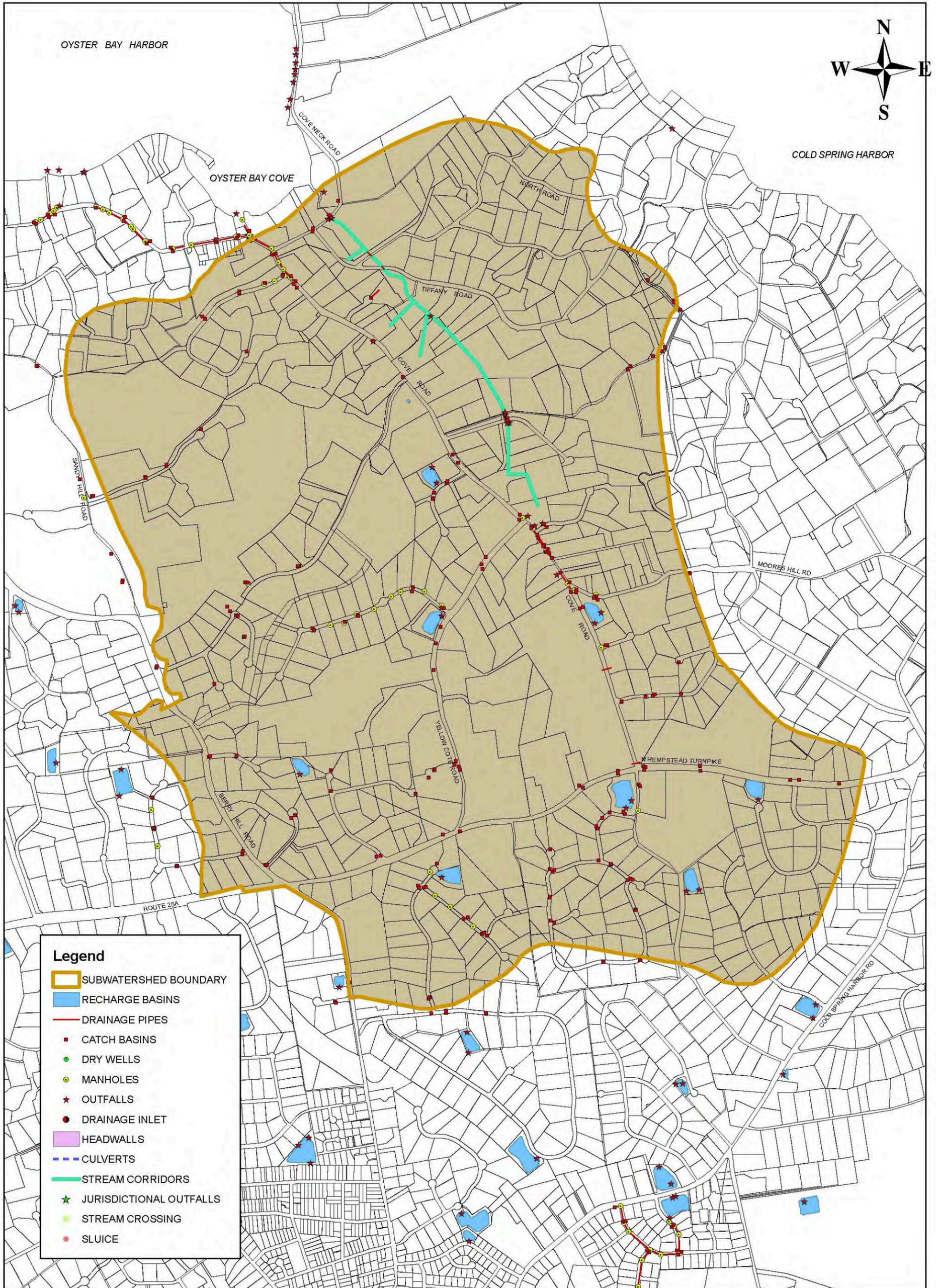
Initial Subwatershed Classification			
8	Sensitive Stream	0-10% impervious	
6	Impacted Stream	>10%- to 25% impervious	
4	Non-Supporting Stream	> 25%- 60% impervious	
2	Urban Drainage Stream	> 60% impervious	
Source: WVA Figure 4 and Table 2			

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

Subwatershed	Tiffany Brook (ID No. 102)								
Tributary To	Oyster Bay								
Land Use		Residential	Commercial	Industrial	Roadway	Other	TOTAL		
Contributory Area	Acres	1,338.2	2.0	0.0	63.7	490.4	1,894.2		
Impervious Area	Acres	42.1	0.4	0.0	63.7	3.8	110.0		
Impervious Area	%	3.1	21.9	0	100.0	0.8	5.8		
Water Quality Storm Event Volume	WQv-acre-feet	10.5	0.0	0.0	6.0	2.8	19.4		
Water Quality Storm Event Volume	WQv-Cubic Feet	456,423.9	2,112.7	0.0	263,396.4	121,713.2	843,646.1		
Annual Rainfall	inches	42.0	42.0	42.0	42.0	42.0	42.0		
Annual Runoff	inches	3.0	9.4	1.9	35.9	2.2	3.9		
Total Nitrogen (TN)	coefficient mg/l	2.2	2.0	2.5	3.0	2.0		SEVERITY PTS.*	TOTALS
	lbs	1,969.3	8.3	0.0	1,549.7	477.4	4,004.6	3.0	12,013.9
Total Suspended Solids (TSS)	coefficient mg/l	100.0	75.0	150.0	120.0	54.5			
	lbs	89,511.9	310.7	0.0	61,987.4	13,009.1	164,819.1	4.0	659,276.5
Total Phosphorus (TP)	coefficient mg/l	0.4	0.2	0.4	0.5	0.3			
	lbs	358.0	0.8	0.0	258.3	62.1	679.2	2.0	1,358.4
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	3.2	0.0	0.0	0.4	0.5	4.1	6.0	24.7
Floatable Debris	coefficient CF/AC	5.0	8.0	5.0	8.0	5.0			
	CF	6,690.9	15.7	0.0	509.2	2,452.2	9,667.9	1.0	9,667.9
Oil and Grease	coefficient mg/l	3.3	5.0	4.0	8.0	3.0			
	lbs	2,953.9	20.7	0.0	4,132.5	716.1	7,823.2	5.0	39,116.0
							186,998.2		721,457.3
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									
								SCORE	380.9

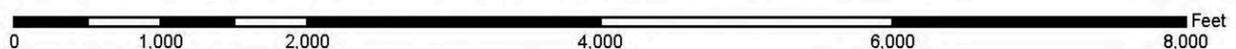
**Nassau County Stormwater Management Program
Stormwater Runoff Impact Analysis
Subwatershed Comparative Analysis
Table 2-5**

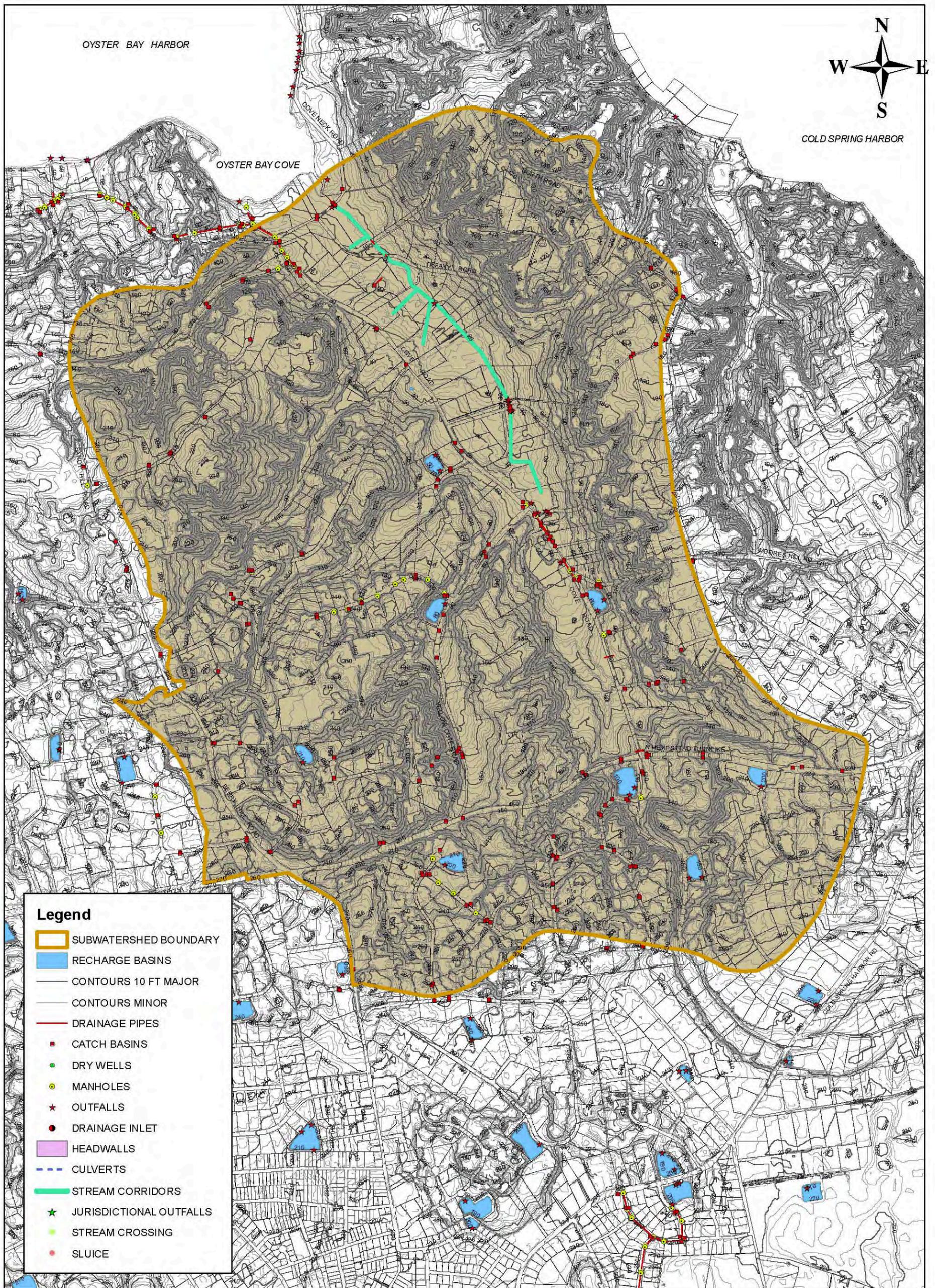
	Unit Criteria	Scoring Criteria	Tiffany Brook (ID No. 102)			
			102-1		102-2	
			Qty	Qty x Pts	Qty	Qty x Pts
Stream Assessment Quantification	Unit	Points				
Outfall	per outfall	2	2	4	5	10
Suspected Illicit Discharge or Hot Spot Locations	per location	8	0	0	1	8
WQ Retrofit/Restoration Candidates	per location	1	1	1	1	1
Infrastructure Investigations Required	per location	1	1	1	2	2
Severe Bank Erosion	per location	1	1	1	0	0
Inadequate Buffers	per 5% of reach	5	5	25	0	0
Road Crossings	per location	1	2	2	3	3
Channelized Segments	per 5% of reach	1	20	20	1	1
Public Ownership of the Stream Corridor	per 10% of reach	1	3	3	1	1
Livestock Encroachment or High Waterfowl Populations	per location	5	1	5	0	0
Threatened Infrastructure	per location	3	1	3	2	6
Trash Accumulation In Stream	per location	5	0	0	0	0
Stream Condition Subtotal (RCH)	from RCH sheet.	80	40	-5	77	-10
Buffer/Floodplain Condition Subtotal (RCH)	from RCH sheet.	80	32	-4	77	-10
Reach Total	No. of Reaches	2	56		13	
Subwatershed Total			69			
Impervious Cover Classification	Sensitive, Impacted, Non supporting, Urban	8,6,4,2	8			
Pollutant Load			4			
Total Score			5			
RANK						



SOURCE: NCGIS AND CASHIN ASSOC. P.C.

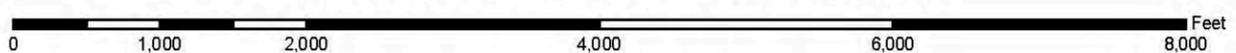
MAP 2-1
NASSAU COUNTY STORMWATER
MANAGEMENT PROGRAM
STORMWATER RUNOFF IMPACT ANALYSIS
DRAINAGE INFRASTRUCTURE
TIFFANY BROOK SUBWATERSHED

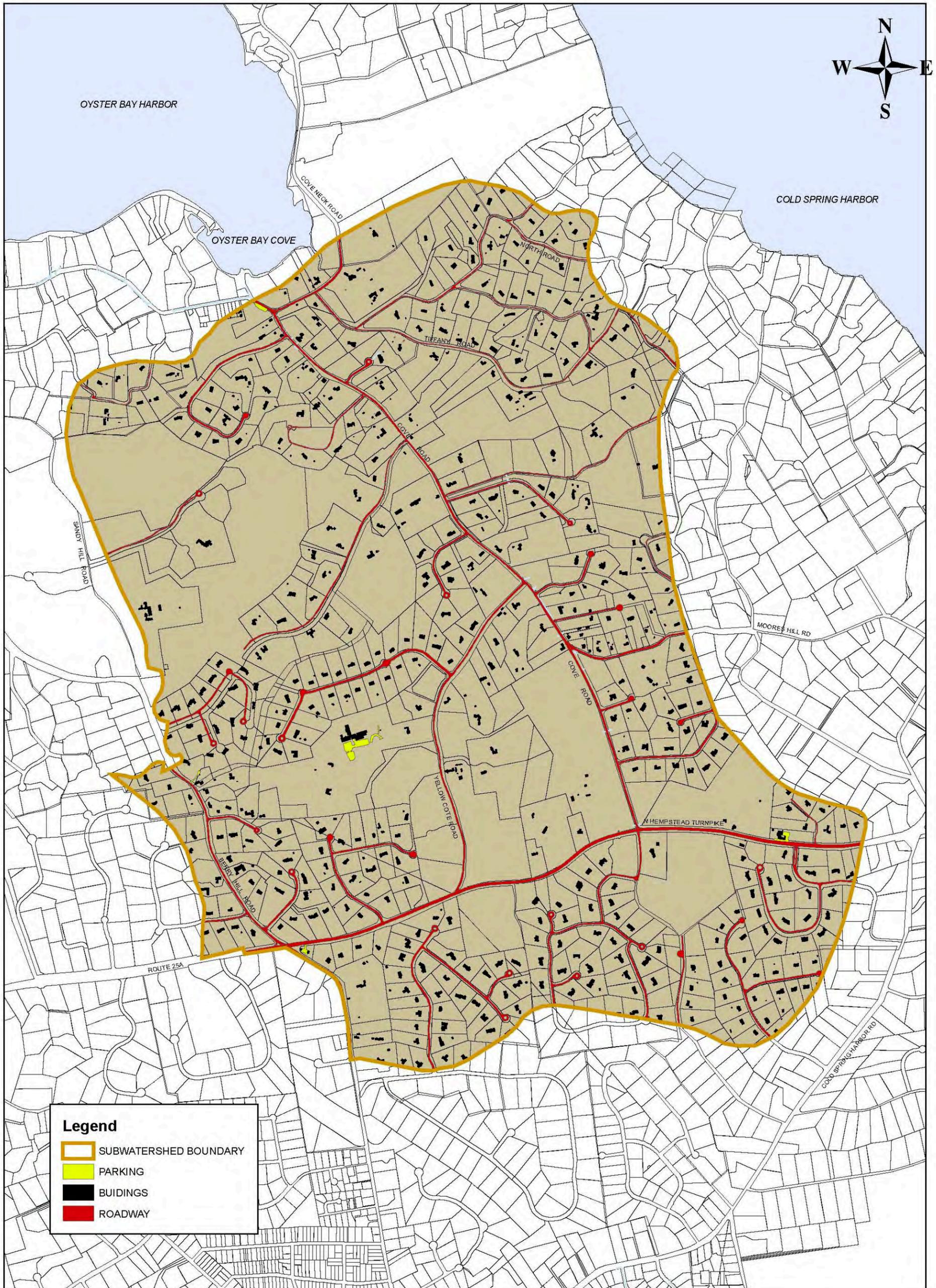




SOURCE: NCGIS

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

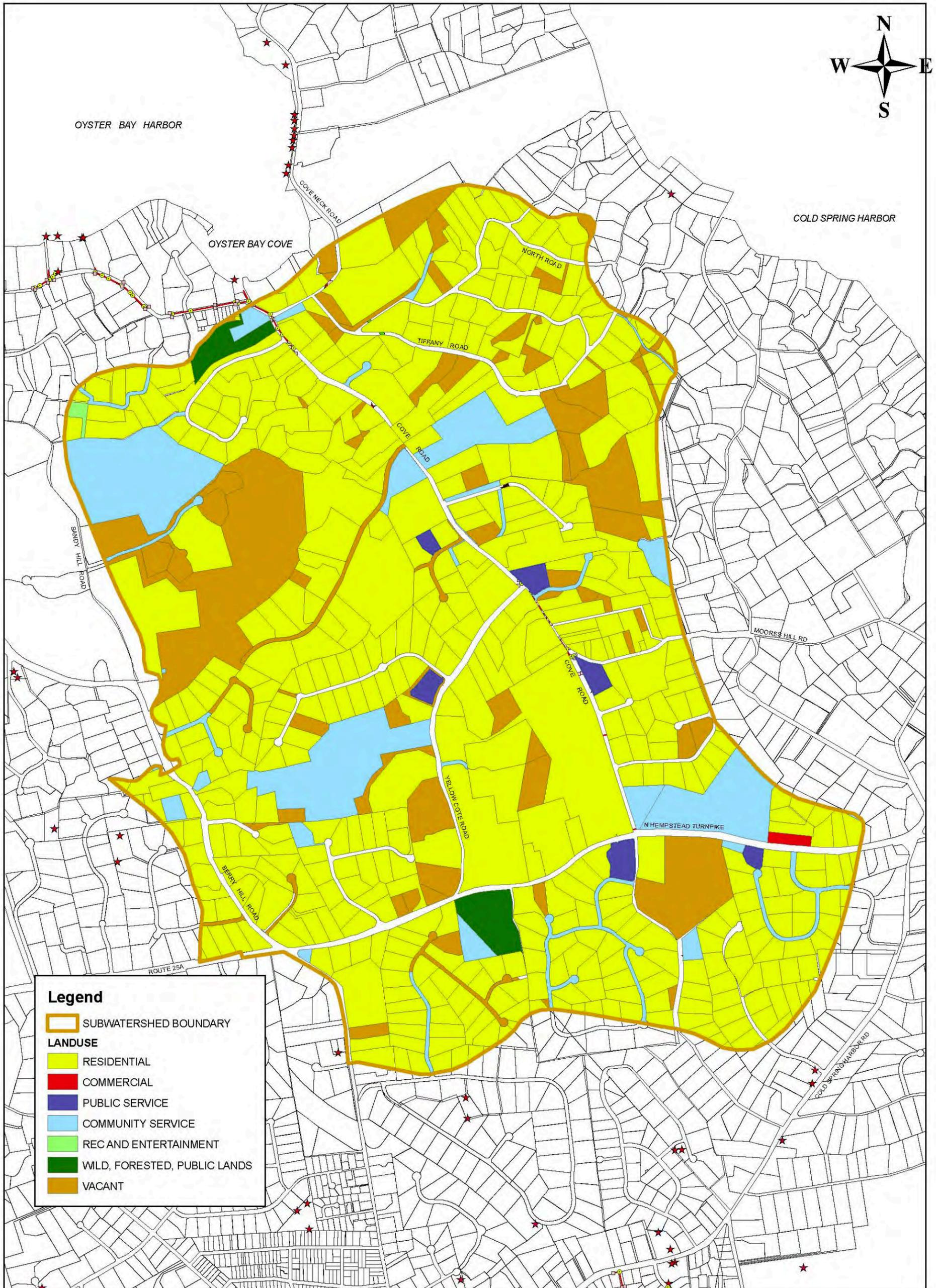




SOURCE: NCGIS AND CASHIN ASSOC. P.C.

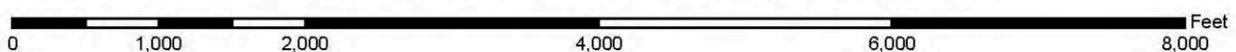
MAP 2-3
NASSAU COUNTY STORMWATER
MANAGEMENT PROGRAM
STORMWATER RUNOFF IMPACT ANALYSIS
IMPERVIOUS AREAS
TIFFANY BROOK SUBWATERSHED

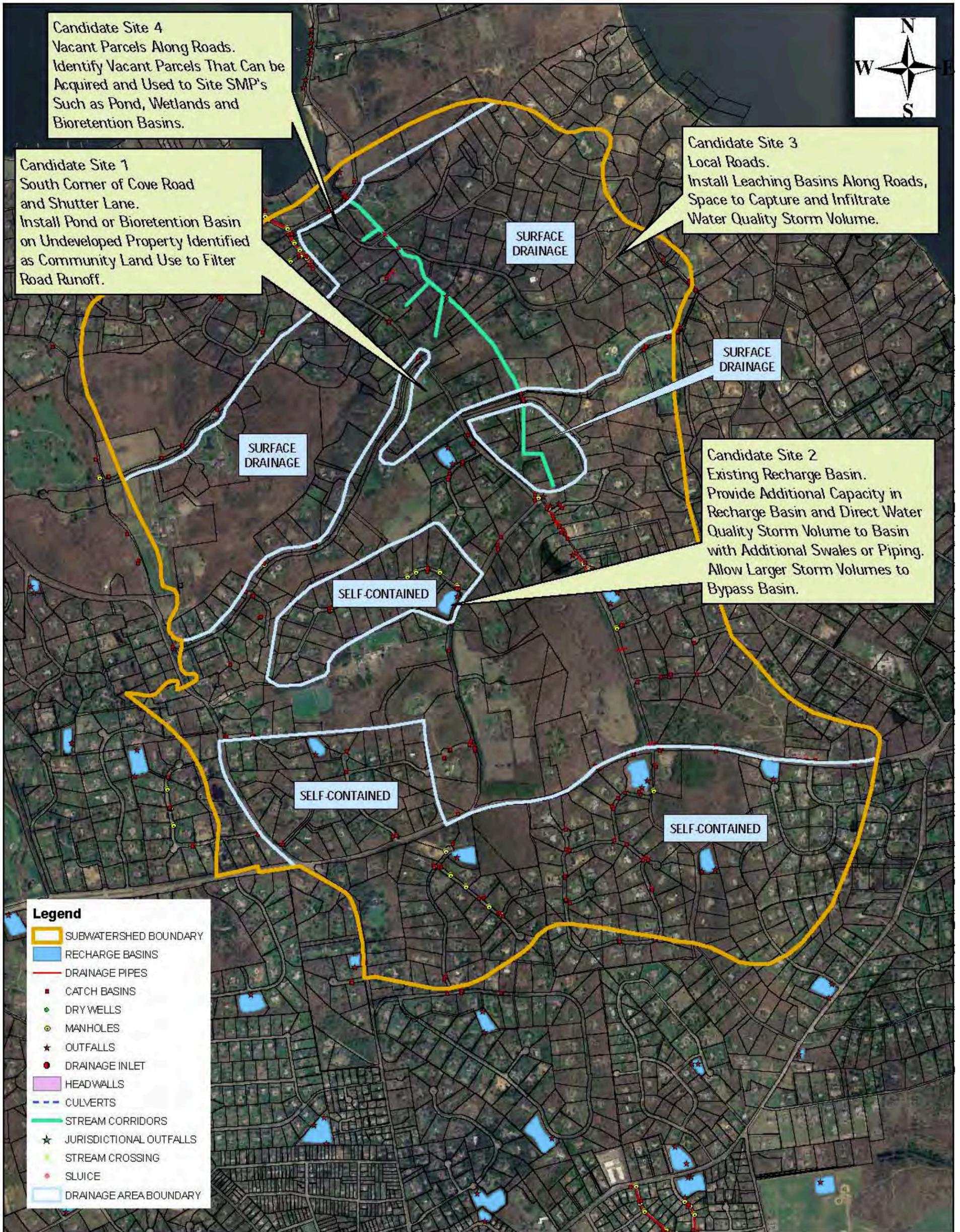
0 1,000 2,000 4,000 6,000 8,000 Feet



SOURCE: NCGIS AND CASHIN ASSOC. P.C.

MAP 2-4
NASSAU COUNTY STORMWATER
MANAGEMENT PROGRAM
STORMWATER RUNOFF IMPACT ANALYSIS
LANDUSE
TIFFANY BROOK SUBWATERSHED





Candidate Site 4
 Vacant Parcels Along Roads.
 Identify Vacant Parcels That Can be Acquired and Used to Site SMP's Such as Pond, Wetlands and Bioretention Basins.

Candidate Site 1
 South Corner of Cove Road and Shutter Lane.
 Install Pond or Bioretention Basin on Undeveloped Property Identified as Community Land Use to Filter Road Runoff.

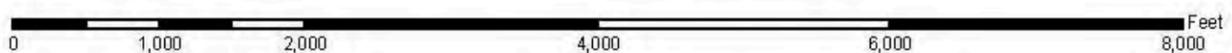
Candidate Site 3
 Local Roads.
 Install Leaching Basins Along Roads, Space to Capture and Infiltrate Water Quality Storm Volume.

Candidate Site 2
 Existing Recharge Basin.
 Provide Additional Capacity in Recharge Basin and Direct Water Quality Storm Volume to Basin with Additional Swales or Piping. Allow Larger Storm Volumes to Bypass Basin.

- Legend**
- SUBWATERSHED BOUNDARY
 - RECHARGE BASINS
 - DRAINAGE PIPES
 - CATCH BASINS
 - DRY WELLS
 - MANHOLES
 - ★ OUTFALLS
 - DRAINAGE INLET
 - HEADWALLS
 - CULVERTS
 - STREAM CORRIDORS
 - ★ JURISDICTIONAL OUTFALLS
 - ◇ STREAM CROSSING
 - ◇ SLUICE
 - DRAINAGE AREA BOUNDARY

SOURCE: NCGIS AND CASHIN ASSOC. P.C.

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





Nassau County Stormwater Management Program



TIFFANY BROOK SUBWATERSHED STORMWATER RUNOFF IMPACT ANALYSIS AND CANDIDATE SITE ASSESSMENT REPORT

APPENDIX A – FIELD DATA



CASHIN ASSOCIATES, P.C.
Engineering • Planning • Construction Management