

Branch Brook Park and Belleville Park Stormwater System

Water that travels over the earth's surface, in many instances, gets picked up in a stormwater system and is carried to a surface discharge point downstream such as a stream or river. This is especially the case in urban areas such as Newark. The requirement for stormwater systems discharge rate and, later, their associated detention systems, was legislated to try and mitigate the flooding downstream that was occurring due to development. The end product of this requirement was to bypass part of the hydrologic cycle process. In doing so, the water does not get a chance to percolate back into the groundwater system nor be utilized by vegetation, and the problems with water quantity and quality are just transported further downstream. This bypass of the hydrologic cycle is occurring in Branch Brook and Belleville Parks.

Two combined storm and sanitary sewer mains are located within Branch Brook Park and one combined sewer bisects the park (Figures 19a & 19b). A major 72" combined sewer trunk line snakes its way north to south through the Middle and Southern Divisions of the park then turns east at I-280 and discharges in the Passaic River. Accommodations for this sewer were taken into consideration as the park's design was being developed. It was also common at the time of the park's development to discharge the stormwater system directly into a waterbody. It was not until 1972, with the passing of the Clean Water Act, that it was acknowledged how detrimental such discharge could be to the health of the earth's ecosystem.

Existing documents from the City of Newark and the Essex County Department of Parks Recreation and Cultural Affairs (Essex County Parks) were reviewed. Two mapping sets exist for the City of Newark sewer system. One set are overall sewer maps that indicate sanitary, storm, and combined sewer systems and the direction of flow. The second set identifies the utilities located within the municipal right-of-way with their sizes and material. Upon review of this information it was determined that the only stormwater that enters Branch Brook Park from outside the park's boundary is discharged into the Second River approximately at Franklin Avenue and Mill Street (Figure 20). There is no City of Newark sewer that discharges into the various watercourses in the three divisions. There are, however, additional contributors to the discharge into the Second River. Portions of East Orange and Bloomfield enter the sewer that discharges into the Second River. Mapping from the City of Belleville was not available. By evaluating the contributing area from neighboring municipalities, however, it can be presumed that a portion of Belleville also discharges into the Second River. Figure 21 shows this drainage area overlaid on the subwatersheds. The majority of the sewer system follows the flow of the water through the watershed and into the Second River.

The stormwater system within the park was evaluated utilizing 19 Essex County Parks record drawings dated 1941-1965 and 47 improvement drawings dated 1980-1984 (See Appendix I for a full list of drawings evaluated.) The survey generated for this project was utilized as the base information. This survey was prepared utilizing 1996 aerial topography from City of Newark geographic information system, 2002 aerial topography and field survey. The record drawings were then input into a CAD drawing and overlaid on the base information. The improvement drawings were also input into CAD and overlaid on the base information and the record drawing information was updated with changes noted from these plans. This information was field verified in October – December 2002. Utility structures that were observed and not indicated on the record and im-

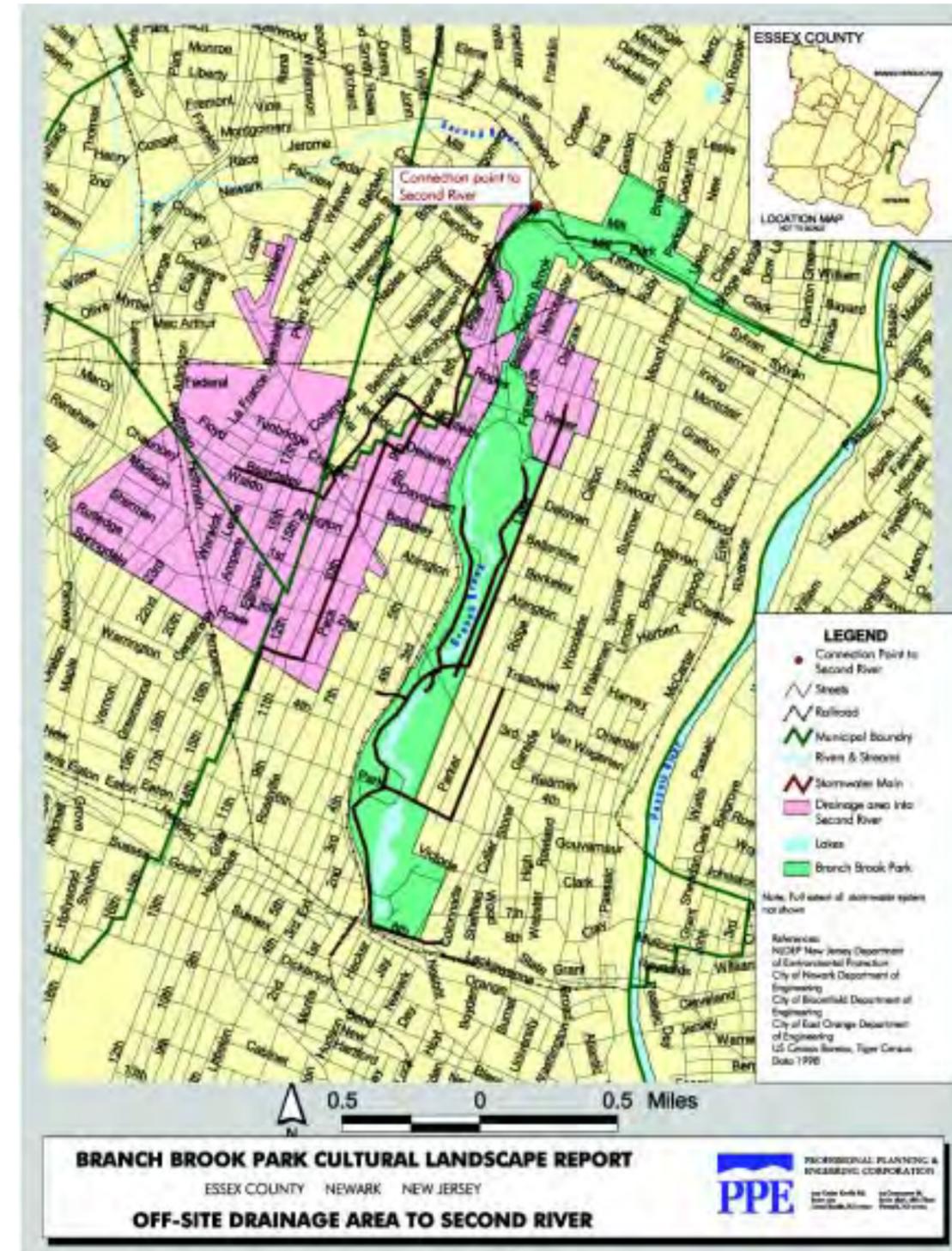
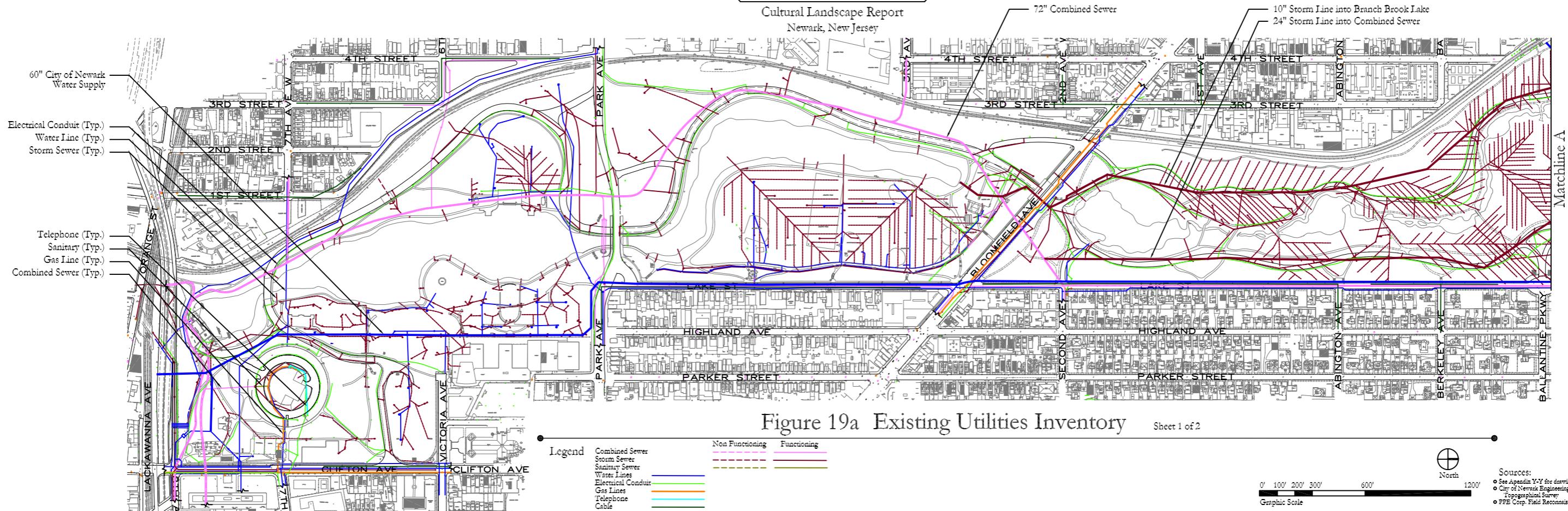


Figure 20

BRANCH BROOK PARK

Cultural Landscape Report
Newark, New Jersey



BRANCH BROOK PARK

Cultural Landscape Report
Newark, New Jersey

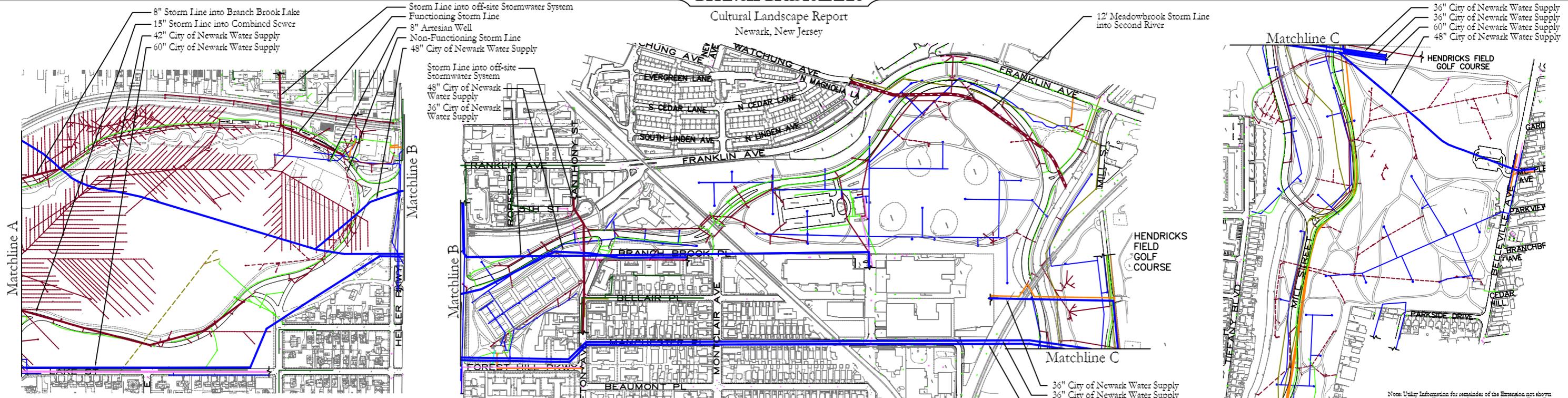
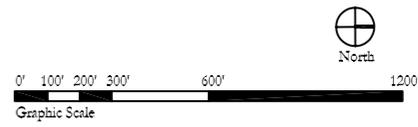


Figure 19b Existing Utilities Inventory Sheet 2 of 2

Legend

Combined Sewer	Non Functioning	Functioning
Storm Sewer	-----	-----
Sanitary Sewer	-----	-----
Water Lines	-----	-----
Electrical Conduit	-----	-----
Gas Lines	-----	-----
Telephone	-----	-----
Cable	-----	-----



Note: Utility Information for remainder of the Extension not shown due to insufficient base information available from Essex County Department of Parks Recreation and Cultural Affairs

- Sources:
- See Appendix Y-Y for drawing reference list.
 - City of Newark Engineering Dept. Topographical Survey
 - PPE Corp. Field Reconnaissance



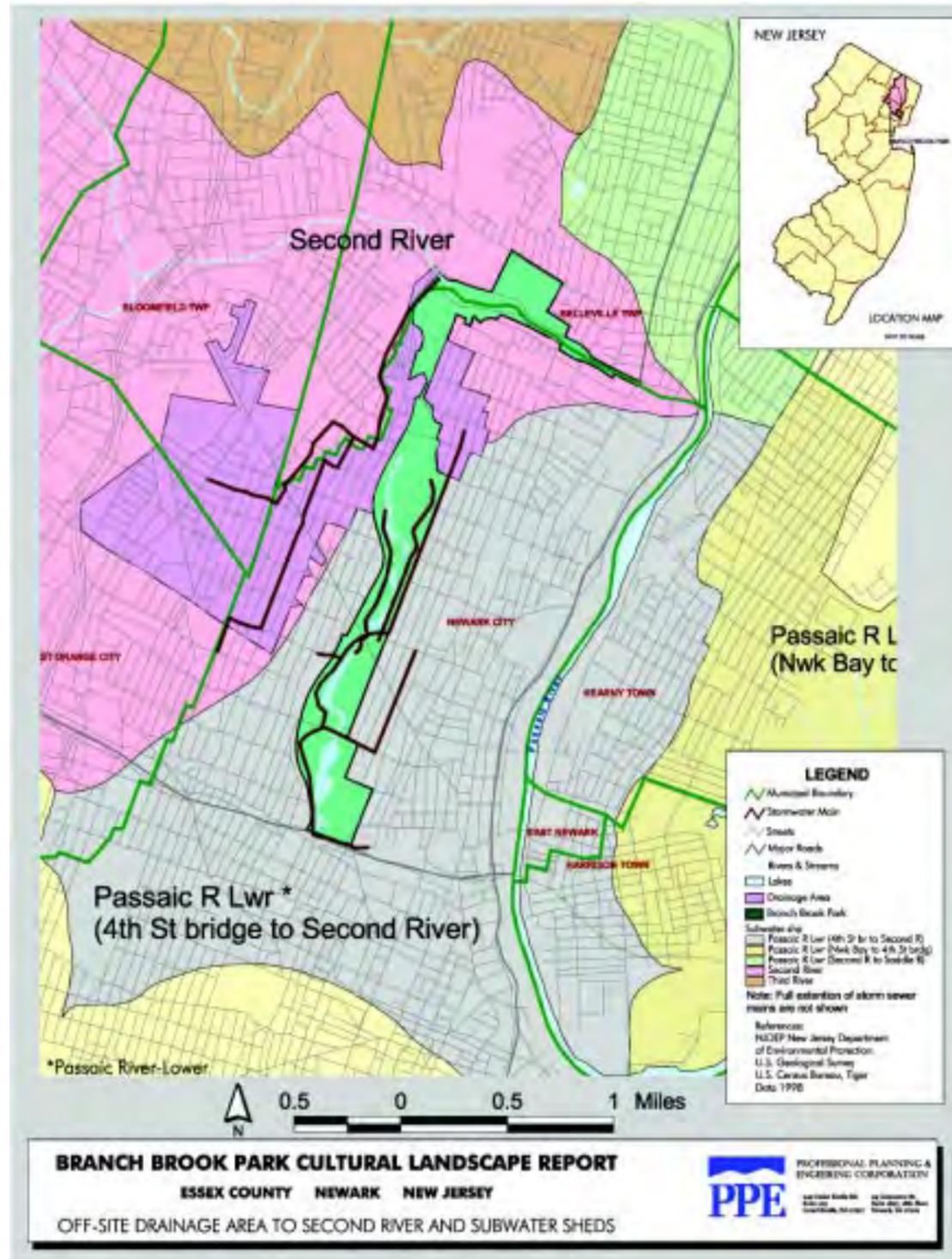


Figure 21

provement drawings nor on the base information were noted. The locations of the structures indicated on the base information were field verified. A general evaluation of the condition of structures within the park was also completed. The resulting mapping illustrates the existing utilities being utilized within Branch Brook Park and Belleville Park from the base information received and above grade investigations (Figures 19a & 19b). This portion of the report will discuss the stormwater system as it relates to the hydrologic system in the parks. Other utility systems will be discussed later in this report.

Field visits/investigations revealed the following:

- Most of the roadway storm drain inlets are silted in and require cleaning.
- The majority of the structures indicated on the record drawings were not found in the field indicating that they have either been removed or have been covered over. Thus, the storm drain system is not functioning.
- There currently are several areas where significant amounts of ponding is occurring in grass and wooded areas as well as erosion occurring due to stormwater systems not functioning (Figure 18).
- Erosion is occurring at discharge points into the ponds and lake.



Example of clogged stormwater system.



Example of clogged stormwater system (inlet at the lower right) and its effect on standing water.

Further investigation was performed to identify the drainage areas within Branch Brook Park (Figure 22). One of the goals of this study is to investigate the feasibility of restoring the watercourse to its original designed condition with running water. The drainage areas within Branch Brook Park and Belleville Park, therefore, have been categorized into four subsystems;

- Direct runoff into a park waterbody;
- Indirect runoff into Branch Brook Lake;
- Runoff collected and discharged into a combined sewer;
- Runoff collected and discharged into an off-site sewer.

The map of these subsystems reflects the existing condition taking into consideration the observed condition of the clogged and missing drainage structures. For the areas where the structures are clogged, the drainage for these areas is noted as direct runoff into the waterbody. These areas are in the formal gardens and Lions Area in the Southern Division and the area previously known as “Blue Jay Swamp” in the Northern Division. These areas as well as areas along the lake, ponds and watercourse shorelines and banks, result in 100 acres of direct runoff into Branch Brook Park watercourses and 15 acres of direct runoff into the Second River. Belleville Park has no direct

BRANCH BROOK PARK

Cultural Landscape Report
Newark, New Jersey

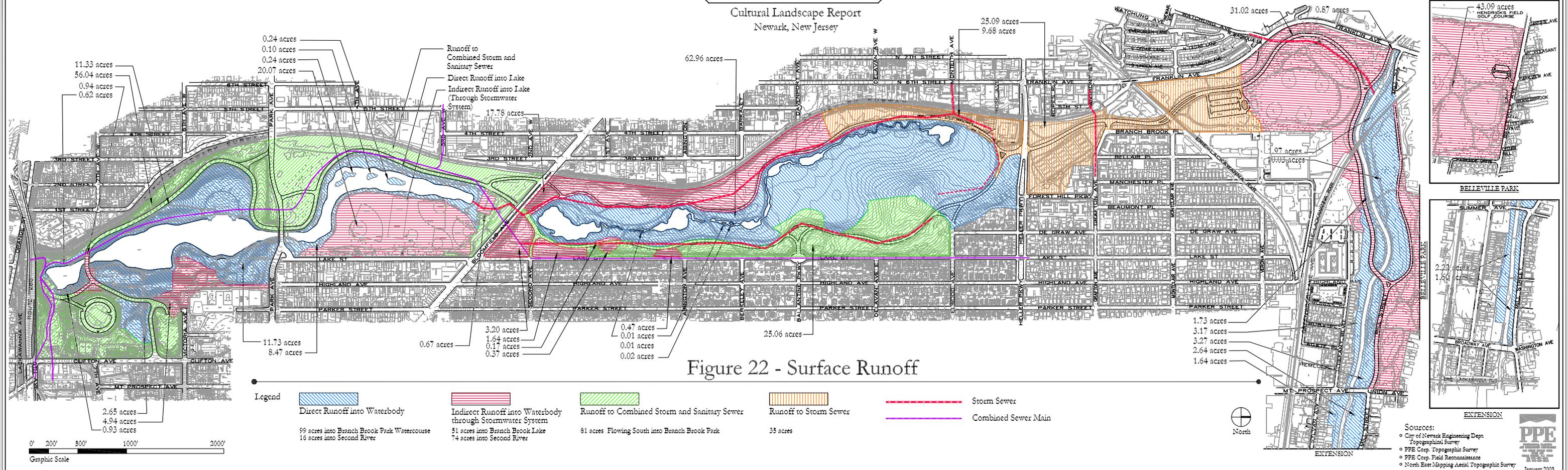


Figure 22 - Surface Runoff



Sources:
 • City of Newark Engineering Dept.
 • Topographic Survey
 • PPE Corp. Topographic Survey
 • PPE Corp. Field Reconnaissance
 • North East Mapping Aerial Topographic Survey
 January 2003



runoff. Indirect runoff is sheet flow to a drainage structure, which is then conveyed to a discharge point into a water body. Fifty acres of Branch Brook Park are collected and discharged into the ponds and lake. The storm system in Belleville Park is not functioning. The topography directs the runoff to Mill Street. Inlets in Mill Street collect the stormwater from Belleville Park which is eventually discharged into the Second River. This runoff is therefore considered indirect runoff and encompasses 43 acres. The area identified as contributing runoff to the combined storm and sanitary sewer is the greatest portion, 80 acres, of Branch Brook Park and is collected and discharged into the combined sewer. An additional 35 acres of runoff are collected and directed off site.

The runoff that is presently collected and discharged into the combined sewer system and carried away from the park is a potential source of water for the Branch Brook Park hydrologic system. There are three main sewers traversing portions of Branch Brook Park: a 72" City of Newark combined sewer that runs through the Middle and Southern Division, a sewer that traverses the park north of the Visitors Center, and a third combined sewer that traverses the extension and discharges stormwater from East Orange, Bloomfield, Belleville and the City of Newark into the Second River. The discharge location for the second sewer mentioned has not been confirmed, however, studying the development patterns surrounding this area it is likely that this sewer connects to the combined sewer that discharges into the Second River. The sewer system laterals to the east and west of Branch Brook Park are combined sewers.

Possibilities do exist for redirecting a portion of the internal stormwater sewer system to utilize as a source of water for the park. There are constraints, however, to utilize this stormwater as a source of water for the Branch Brook Park hydrologic system. The water will have non-point source contaminants (phosphorus, nitrogen, oil and grease, etc.) that should be treated in order to not degrade the water quality within the park any further. Water quality enhancements can be achieved in several ways, such as implementing sand filters, biofilters, forebay with a wetland plant system, and by mechanical structures. Another constraint is the original design intent in the Northern Division. As stated in Volume II of this study, the Olmsted Firm did not want to use the pools and brook of the Northern Division for drainage, which would have required lowering the water unaesthetically below the elevation of the meadow surface, rather, they wanted to have a "brimful effect" for the brook, keeping its level close to that of the meadow. Therefore, he intended to use "underground agricultural drains emptying into a main drain," on both the east and west sides of the Northern Division.

These main drains continue to exist today, however, in differing states of condition (Figure 19b). They also discharge into two separate systems. The beginning sections of the western main, as well as the laterals throughout, were observed as non-functioning due to the extent of standing water from Heller Parkway south to the Meadow Pool area. The western stormwater system already discharges into the northern end of Branch Brook Lake, but by making the system functional again additional water will be available for use sooner than waiting for the water to travel through to groundwater sources.

The eastern stormwater sewer main appears to be fully functional with the majority of the laterals not functioning. Similarly, by improving the system to functioning conditions, water will be available sooner. This main discharges into the 72" combined sewer. By redirecting the discharge to a watercourse within the park it could be a new source of water for the parks watercourses. There are

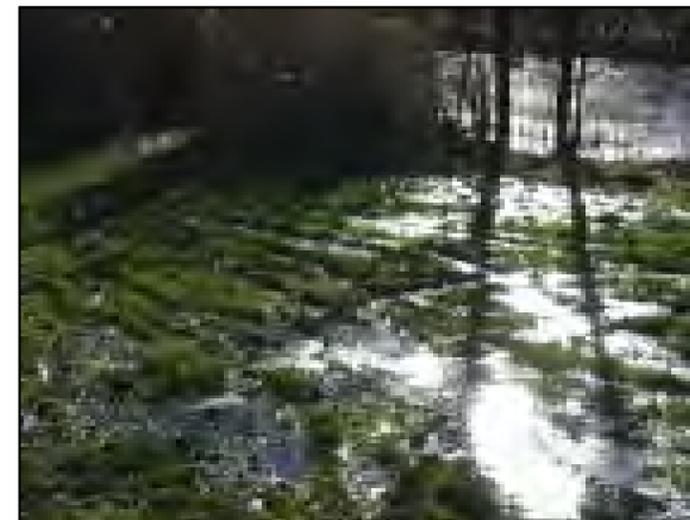
two possible ways to direct this water: 1. Connect it to the western main and discharge into Branch Brook Lake, and 2. Create a forebay that would act as a detention and treatment pond for the water. As the western main currently floods in the vicinity of the Rick Cerone baseball field parking area it would not be prudent to add additional volume to this system. As the improvements proceed in the Rick Cerone baseball field area consideration should be made to capture the stormwater in this area and redirect it to a forebay as well.

This analysis reveals the following conclusions:

- It is not feasible to redirect the stormwater from the surrounding neighborhoods into Branch Brook Park for use in the water system as there would be very high concentrations of bacteria and solid wastes that could not be treated within the park boundary.
- Design constraints exist in the implementation of redirecting water from within the park to the water system such as non-point source contaminants and the original Olmsted firm design intent.
- Improving the western stormwater system in the Northern Division would allow additional water to be available for the water courses. This water, however, should be pretreated with the use of a forebay with wetland vegetation, etc.
- Redirecting the eastern stormwater sewer main in the Northern Division from the combined sewer to the water courses would provide additional water to the system. Similar to the western stormwater system, this water should be pretreated.
- The former location of the Albeona Pool is a possible location for the use of a forebay to capture water for use in Branch Brook Park and to filter non-point source pollution.
- Further detailed study is required to evaluate the feasibility of the redirection of the stormwater.

Standing Water

Areas of standing water were noted during site visits conducted between September and December 2002 (Figure 18). Site visits occurred between 18-48 hours after rainfall of varying intensity. Standing water was noted during a majority of the site visits. The map is a general representation of ponding areas and not an exhaustive study of all ponding areas within the park. The major areas of ponding occur in the Northern Division and are primarily



Localized area of standing water with evidence of vehicular traffic. This traffic causes soil compaction and disturbed the soil horizons, decreasing the soils ability to hold water.



Large expanse of standing water on meadow in Northern Division. Saturated soils have a negative impact on the use of these areas.

located in the area of the former Blue Jay Swamp. One area of significant standing water that is outside of the former Blue Jay Swamp is located between the internal loop road and Heller Parkway south of the maintenance building. The ponding appears to be due to the failing of the underground drainage system. Localized ponding was noted in the Middle and Southern Divisions in areas in proximity of the lake shoreline and appeared to be due to nonfunctioning inlets or a low point in the topography with no inlet. Saturated soils were also reported by the Branch Brook Park maintenance staff in the formal garden area but were not observed during site visits. None of the original storm sewer system is functioning in this location and no later improvements were made to the area.



Standing water west of West Drive. This area continues to exhibit characteristics of the swamp that existed prior to the development of the park.

Water Clarity

The clarity or turbidity of the surface water in the lake, ponds and watercourses has a direct effect on the health of the system. During site visits between September and December 2002, water clarity ranged between 6-12 inches. This is an indication of sediment and suspended solids within the water as well as possible nutrient loads that can cause algae blooms.

Historic Water Sources

Historic surface water locations surrounding Branch Brook Park were investigated as a possible source of water for the park. Historically, as development occurred in the United States existing lakes streams and rivers were enclosed and placed underground. A Newark News article dated March 17, 1963 entitled *Newark Almost Like Venice – But Waterways are Underground, City Records Show* (Burke, Harry) indicates that there are three underground rivers that flow through Branch Brook Park (Figure 23). No underground lakes are noted in this area. One underground river noted in the Southern Division enters the park from the southeast near the existing boat house and continues east to the Passaic River. Currently there are two combined sewer systems that converge at the boat house location and continue east to the Passaic River (Figure 19a). These sewers most likely convey the historic natural watercourse underground.

A second underground river is noted flowing into the park from the west at a location south of Park Avenue. The watercourse is similarly shown on Maps of Newark dated 1862 and 1873 (Gimigliano, Church, Githens and Vint, undated, figures 8 and 9) as well as an 1855 map entitled *Part of the City of Newark Showing the Property of the Newark Aqueduct Co.* The watercourse extends to the southwest to approximately present day 1st Street if it was to be extended. There currently is a combined sewer main that enters the 60" combined stormwater/sanitary sewer main that traverses the park's Middle and Southern Divisions at approximately that location (Figure 19a). This storm

system from 6th Avenue West most likely includes this original natural stream.

Also noted on the 1855 map of the Newark Aqueducts Co. property is a spring and watercourse that begins approximately between present day 5th and 6th Avenues and Orange Street and 7th Avenue West. It travels northeasterly and enters the park at present day 7th Avenue West. Presently a combined sewer enters the park at 7th Avenue West and connects to the 60" combined sewer (Figure 19a). The system from 7th Avenue West most likely includes the water from this spring and watercourse.

The Newark News article also illustrates an underground river entering the park just north of Park Avenue in the approximate location of Clark's Pond. A combined sewer enters the park at 3rd Avenue and connects to the 60" combined sewer. This location is significantly further north than Clark's Pond. No other substantiating evidence was found for this historic location.

Numerous wells and springs were located in the present day Southern Division and utilized by the Newark Aqueduct Company to service residents and businesses (Map of Part of the City of Newark showing the property of the Newark Aqueduct Co., 1855). There is, however, little historical evidence of the springs that must have fed Blue Jay Swamp and other swamp land in the Northern Division. Springs appear to continue to feed the area due to the existence of saturated soils and large areas of surface water ponding in the

Blue Jay Swamp area and some of the areas within the historical swamp lands. There is, however, lack of historical information regarding these springs and as such specific water sources have not been able to be identified that would be utilized in restoring the water courses in the Northern Division.

The conclusion from this analysis is that the majority of the original streams and rivers that ran through the area are currently conveyed through an underground combined storm and sanitary sewer system and are not available for use as a water source for the Branch Brook Park watercourse. The existence of springs historically known and believed to exist in the park and surrounding area have not been able to be substantiated. A geologic study, therefore, is recommended to be undertaken to evaluate specific groundwater availability and capacity to be utilized as a source for the park's watercourse.

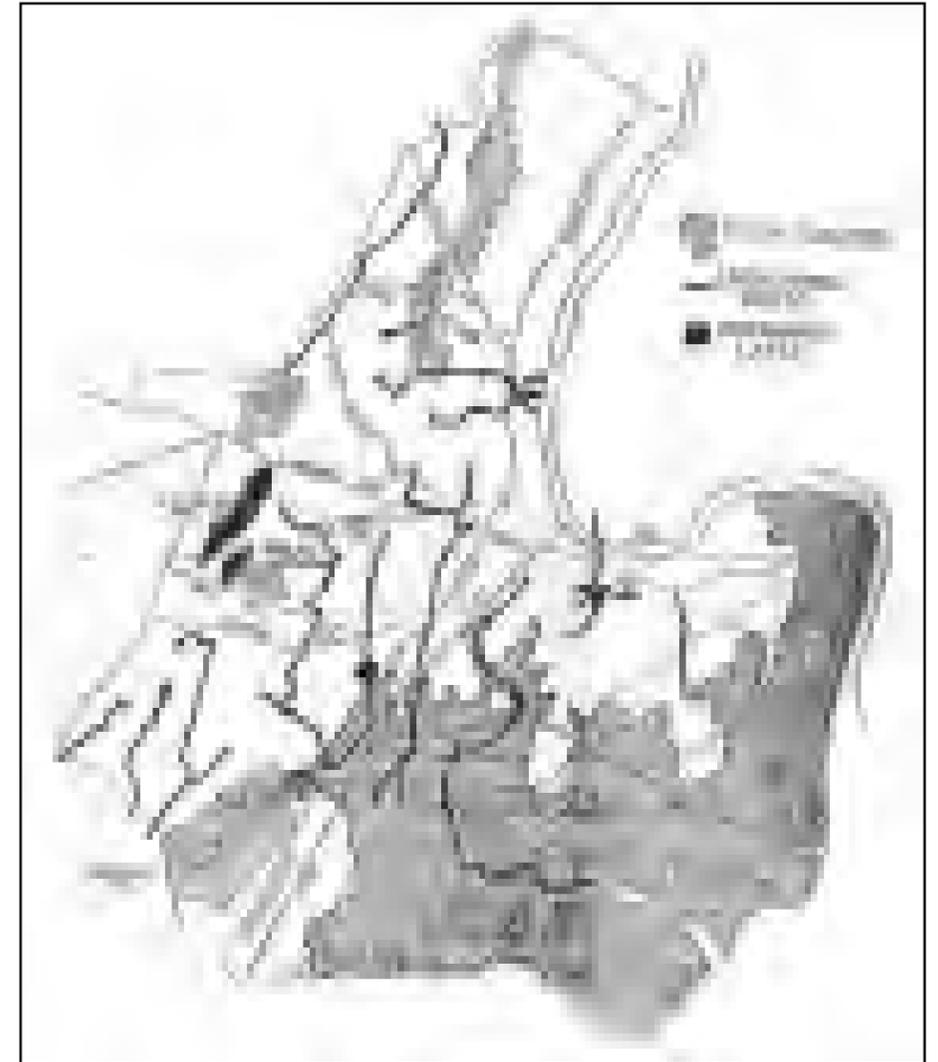


Figure 23: Historic surface waters in City of Newark (Burke, 1963).

Groundwater Hydrologic System

In Essex County the groundwater bearing rock formations are divided into two groups: (1) consolidated rocks of Triassic age, and (2) unconsolidated sediments of Pleistocene age. The consolidated rocks of the Brunswick Formation exhibit very small pore spaces so that an insignificant quantity of water moves through them under natural hydraulic or pumping conditions. A joint and fracture system has developed, however, in which the storage and movement of groundwater takes place. Unconsolidated sediments have a greater capacity to store and transmit water due to their larger pore spaces. The pore spaces in clays and silts, however, are so small that they restrict the movement of water (Nichols, 1968).

The rocks of the Brunswick Formation are the main source of ground water in Essex County. The shales and sandstones are generally capable of sustaining moderate to large yields to wells (Nichols, 1968) The aquifer underlying Branch Brook Park is ranked "C" with an anticipated median yield of 101 –250 gallons per minute from a high capacity well (NJGS, 1999) (Figure 24). Water generally is present in weathered joint and fracture systems in the upper 200 or 300 ft (Barksdale & Herpers, 1958). Below a depth of 500 ft, fractures are fewer and smaller, and water availability is reduced, depending on rock type (USGS, 1999). The best producing wells are generally between 300 and 400 feet deep. Results of pump tests in the 1960's result in the findings that water is not transmitted equally in all directions. The flow of the water within the bedrock is aligned along the strike of the bedrock, approximately N 30° E (Figure 25) (Nichols, 1968). More recent information is not available. The WMA 4 characterization report when released is expected to have additional information.

Unconsolidated sediments of Pleistocene age consist of clay, silt, sand, gravel, and boulders and are categorized as either stratified drift and unstratified drift. Only sand and gravel aquifers in stratified drift deposits contain sufficient quantities of water to be utilized as a source of water. Water in stratified drift occurs under unconfined (water table) and confined (artesian) conditions. Unconfined aquifers (water tables) in Essex County aquifers do not yield large quantities of water, as they are commonly less than 20 feet thick and do not encompass a large area. These aquifers are recharged directly from precipitation on the exposed aquifer area. Semiconfined or confined aquifers occur where sand and gravel deposits have been covered by lake clay or silt, or by glacial till. They are recharged by leakage through overlying confining beds of clay, silt or till, and by precipitation falling on outcrop areas outside Essex County. The size shape and distribution of the aquifers conform to the size shape and distribution of the bedrock valleys. The bedrock valley in the Newark area is filled with till and clay, and contains only minimal amounts of water bearing sand (Nichols, 1968).

Refer to Figure 26 when reviewing the following description of the hydrologic and engineering characteristics for the specific deposits found in Branch Brook Park and the surrounding area located on the U.S. Geological Survey Orange quadrangle. The NJDEP Division of Science, research and Technology of the New Jersey Geological Survey compiled this information (Stanford, 2001).

General Groundwater Hydrologic and Engineering Characteristics

Branch Brook Park is underlain primarily by geological units Qr in the Southern, Middle and Northern Divisions with Qs occurring in the old Blue Jay Swamp area stretching from Bloomfield Avenue to the northern most Erie-Lackawanna Railroad.

Qr Geologic Unit – Rahway Till: Qr is a poorly-sorted, nonstratified sediment deposited directly by glacial ice or by sediment flows from glacial ice and so has been consolidated by the weight of the ice Qr is a silty sand to sandy clayey silt and is not very permeable (Stanford, 2001).

Qs Geologic Unit – Swamp Deposits: Qs consists of organic silt and clay, and peat. Qs is found in salt marsh and swamp areas and has variable permeability depending upon the clay and silt content of the material. Fill placed on top of salt-marsh, alluvial, or swamp deposits is also subject to settlement because the underlying materials are highly compressible. The strength of the surficial materials depends on their grain size, compaction, and water content. Qs has a low strength because it has not been subject to water or sediment loads greater than those at present, and has been continuously saturated or moist since their time of deposition, and so are noncompact. Qs and fill have variable hydraulic conductivities that depend upon the clay and silt content of the material (Stanford, 2001).

The surficial geology in the Extension is varied. Qr extends north from the Northern Division to just north of Grafton Avenue. Geologic unit Qwt2 is then found to the north extending almost to Mill Street. Geologic unit Qal begins at the same point as Qwt2 and generally follows the park roadway along that which was historically Meadow Brook and terminates at the Second River.

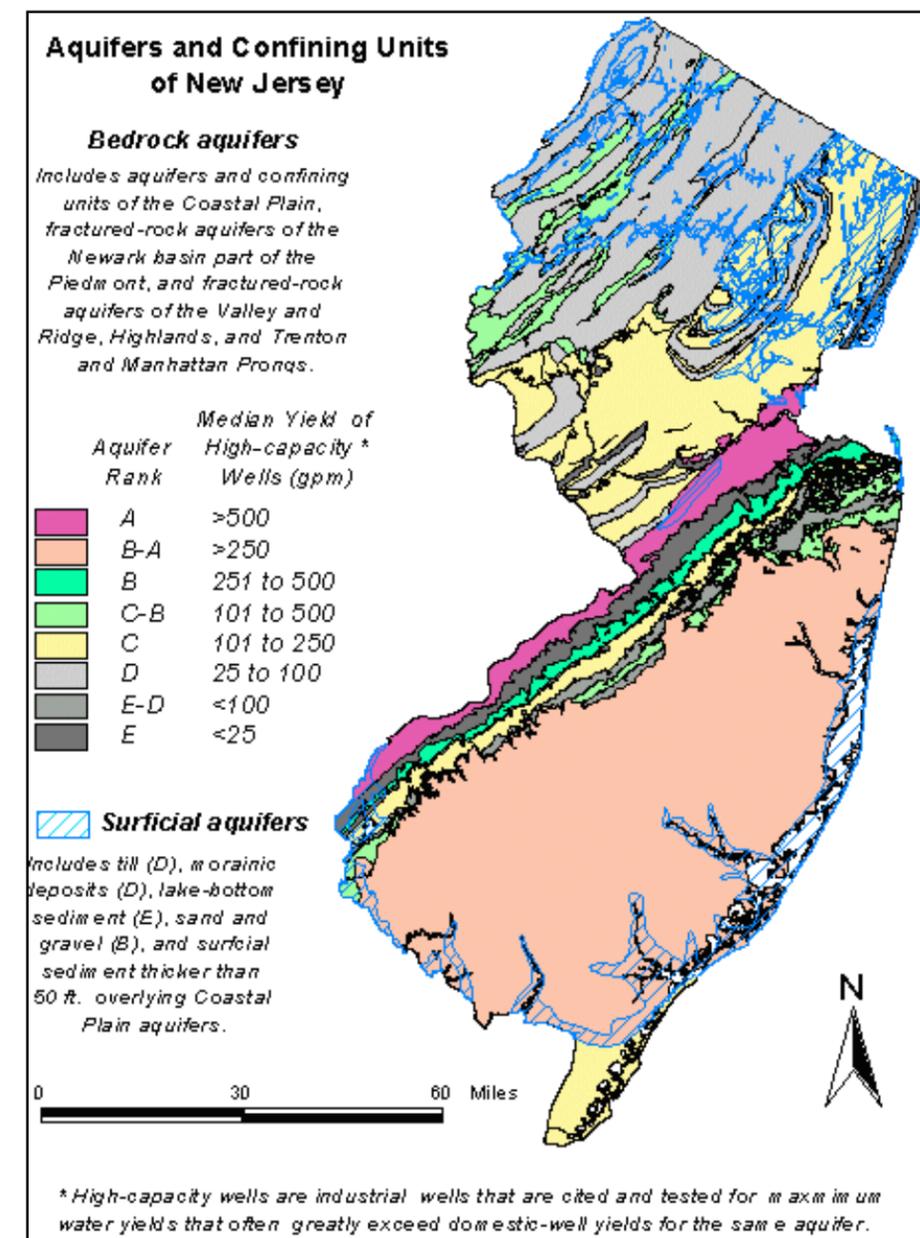


Figure 24: Aquifers and confining units of New Jersey (NJDEP NJGS, 1999)

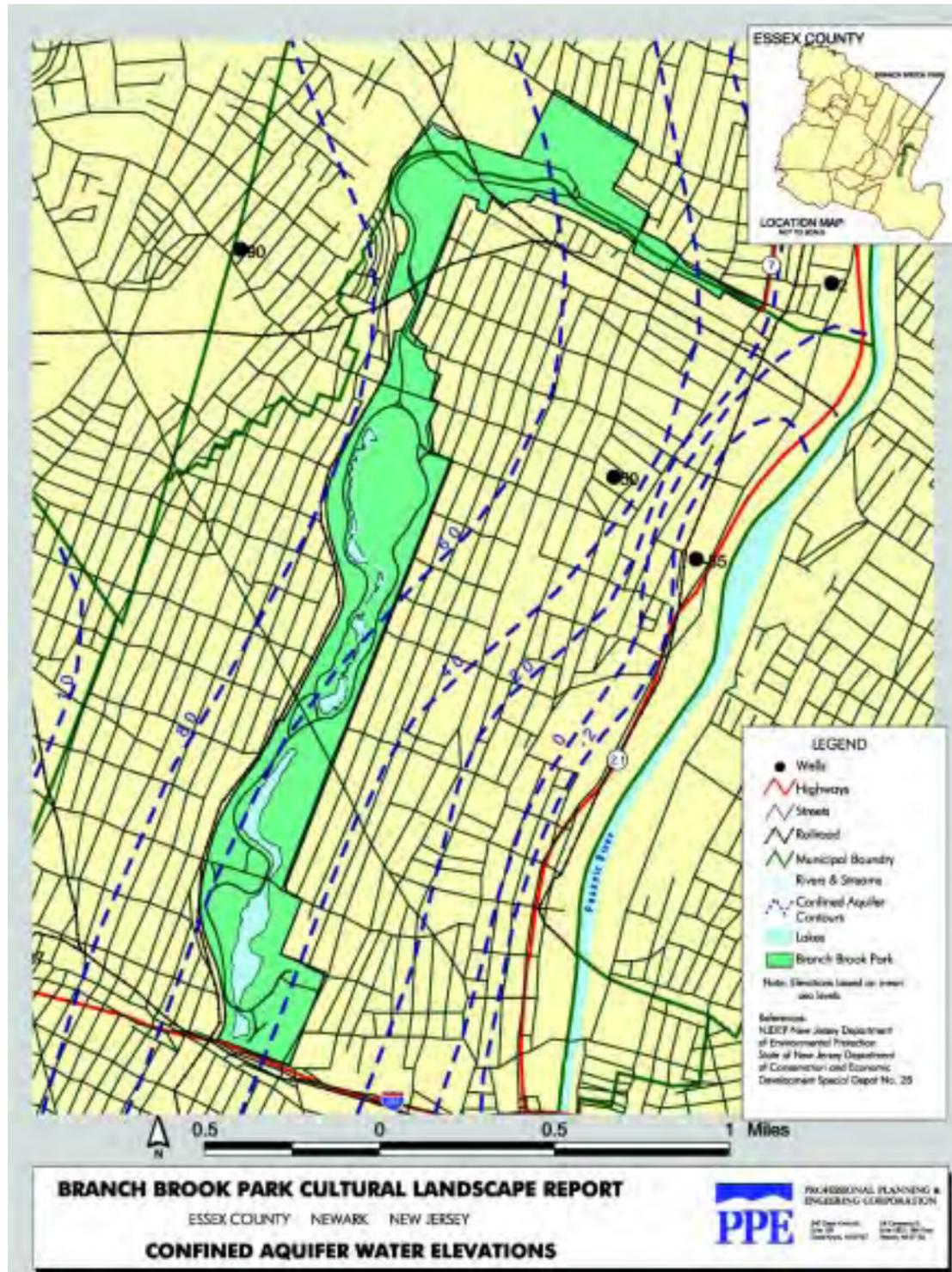


Figure 25

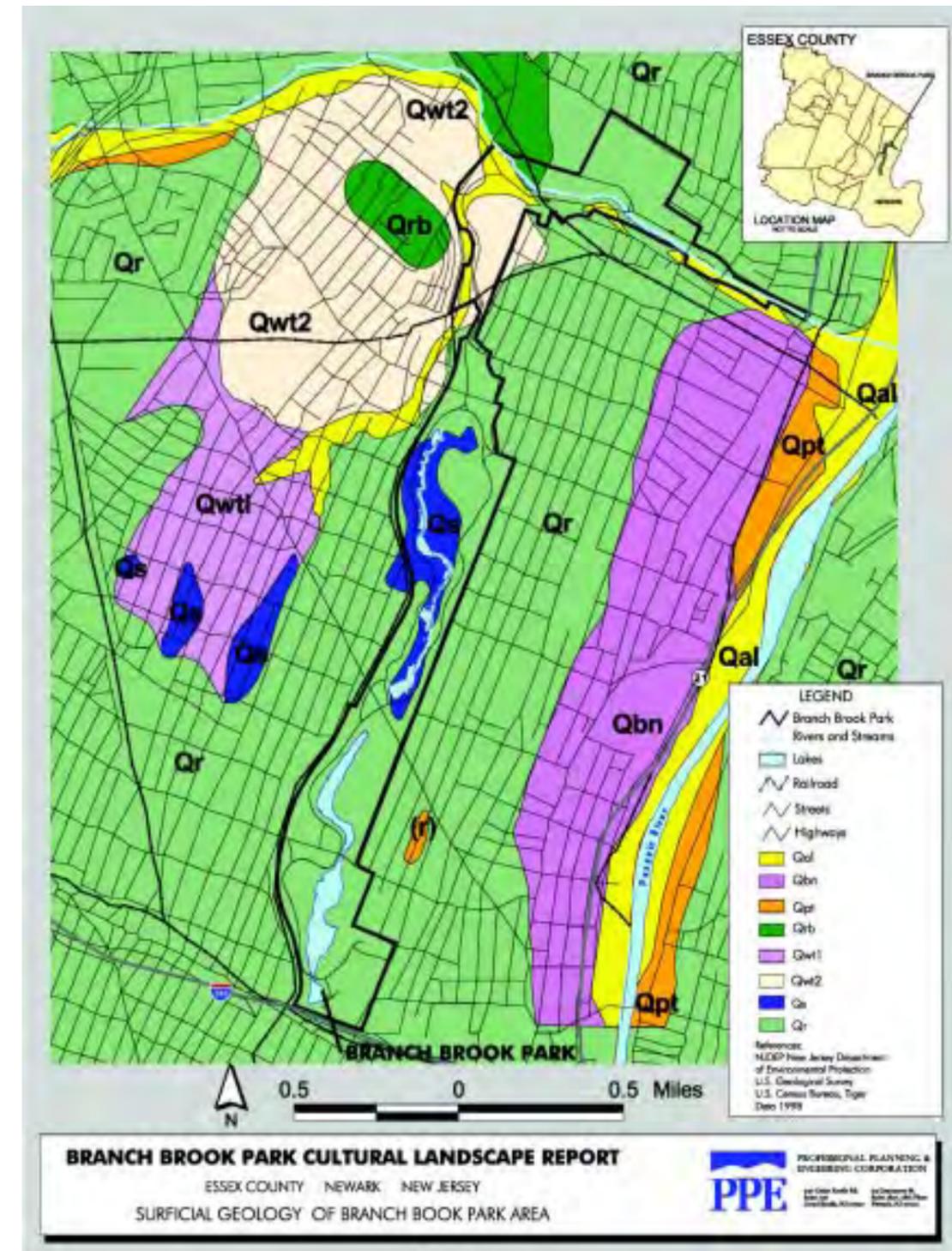


Figure 26

Qwt2 Geologic Unit - Glacial Lake Watessing Deposit: Qwt2 includes deltaic and lacustrine (lake) – fan sediment deposited in a lower lake stage. It consists of fine-to-course sand and some pebble gravel and silt as much as 40 feet thick (Stanford, 2001).

Qal Geologic Unit – Alluvium: Qal consists of sand, silt, pebble-to-cobble gravel, minor clay. It contains variable amounts of organic matter as much as 25 feet thick. Similar to Qs, Qal is of low strength because it has not been subject to water or sediment loads greater than those at present, and also has been continuously saturated or moist since its time of deposition, and so are noncompact. It also may contain significant amounts of organic matter, which is weaker than mineral soil. Construction generally requires the use of pilings to transfer loads to the underlying bedrock or till, or the excavation of the natural material and replacement with engineered fill of greater strength. Qal is moderately permeable (Stanford, 2001).

A small section of Geologic Unit Qrb extends south through Hendrics Field Golf Course to terminate at the Second River. Belleville Park and the majority of the remainder of the Extension consist of Unit Qr with small pockets of Qal located along the Second River.

Geologic Unit Qrb – Bloomfield Moraine Deposit: Qrb is another poorly sorted, nonstratified sediment deposited directly by glacial ice or by sediment flows from glacial ice. Similar to Qr, Qrb is interbedded with fine-to-course sand and pebble-to-cobble gravel as much as 70 feet thick. Qrb forms irregular ridges that stand 20 to 40 feet above adjacent the terrace surface (Stanford, 2001).

Site Specific Branch Brook Park Groundwater Hydrogeology

There are two wells located near the maintenance building. One well is 180' deep and is located by the greenhouse structures. This well has been decommissioned. A second well is located approximately 180 feet southeast of the maintenance building. This well was installed in 1982 at a reported depth of 90 feet. It has been shut down by the NJDEP due to groundwater contamination. See the Contaminated Sites section of this report for more information. At the time of use it was pumping 180 gallons per minute (GPM) at maximum total dynamic head (TDH). This translates into approximately 260,000 gallons per day (GPD). 260,000 GPD falls significantly below the historical rate of 1,000,000 GPD that was pumped from Branch Brook Lake and Clark's Pond to the Northern Division.

During the site investigations noted by Remedial Technology and Engineering specific groundwater information was noted. Shallow groundwater occurs in the area by the maintenance building within the overburden at depths ranging from 9 to 15 feet below surface grades. The overburden aquifer consists of glacial till and residual soils. Groundwater occurs within the overburden in unconfined conditions (PMK, 2002) indicating that the water is not under pressure and as such is not a reliable source of water. Upon review of this information and the contour maps the lateral groundwater flow direction is generally towards the north/northwest (PMK, 2002).

Contaminated Sites

Contaminated sites have been identified utilizing geographic information system data from NJDEP (NJDEP, 2002). The classifications for this report are as follows:

- Contaminated site within watershed
- Contaminated site near park boundary and beyond

Contaminated Site Within Watershed

These sites are located within the off site storm water watershed area that discharges into the Second River. There are 16 sites within this boundary. These sites range from light industrial, gas stations, and residential. The type and extent of contamination was not evaluated for these contaminated sites outside the park. See Figure 27 for a detailed list.

One contaminated site is located within Branch Brook Park at the maintenance facility. According to a letter from the NJDEP Bureau of Underground Storage Tanks dated May 16, 2002 there are three areas of concern (AOC) regarding contamination on this site. AOC #1 is for a former 10,000 gallon unleaded gasoline Underground Storage Tank (UST) and associated piping. AOC #2 is for a former 5,000 gallon leaded gasoline UST and associated piping, and AOC #3 is for a former 4,000 gallon diesel UST and associated piping. The soils and groundwater have been tested and contamination is evident for the 4,000 gallon UST and the 5,000 gallon UST.

A Remedial Action Workplan (RAW) has been reviewed by the NJDEP and approved in the letter noted above. This approval requires institutional controls of a Classification Exception Area (CEA) and Well Restriction Area (WRA). This area is approximately 115' x 130' and extends from the south face of the maintenance building south through the greenhouses and east to approximately 50' from the east face of the maintenance building (Figure 15). This area encompasses the existing 8" diameter well previously utilized as a water source for the Branch Brook Park watercourse. All designated ground water uses within this area are suspended for the duration of the CEA including the use as a source for the park's water course. The duration of the CEA and WRA is seven years from the date of the RAW approval letter or May 16, 2007 for most of the contaminants found. The time period for lead is indeterminate. Two methods of remediation are proposed: the use of soil vapor extraction wells and air sparging wells. Once the remediation process has begun it is anticipated to take between 5-7 years to complete. Essex County is currently seeking funding to implement the RAW. This could necessitate the request for the RAW and thus delay the reopening of the 8" diameter well.

Contaminated Sites Near Park Boundary and Beyond

Not all of the contaminated sites shown in close proximity to Branch Brook are a potential risk for contamination. The flow of the groundwater has an impact on potential contamination. Groundwater in this area of the City of Newark is generally in a northeasterly direction (see Geology, Groundwater Hydrology and Soils section for additional information). The sites that are located to the south and east have a potential to affect the groundwater in and around Branch Brook Park and Belleville Park. There are 17 sites that are adjacent to Branch Brook Park, 8 of which are located to the south or east of the park. These sites are primarily light industrial with three associated with vehicular service. The type and extent of contamination was not evaluated for these contaminated sites. See Figure 27 for a detailed list. Other contaminated sites are shown to give a sense of reference of the overall impact that soil and groundwater contamination has on land use in this section of the City of Newark and surrounding municipalities (Figure 27).

Hydrology Recommendations

The indicators studied include physical and hydrological indicators (erosion, habitat quality, wetland and riparian vegetation) and water quality indicators (non-point source pollution, exceedance frequencies of water quality standards, sedimentation). The extent of erosion, the observance of algae, wetland weed vegetation, lack of a complete riparian buffer, water turbidity, sedimentation, stormwater system discharge into the water bodies and groundwater contamination lead to the conclusion that the water system in Branch Brook Park remains eutrophic and in poor condition. Several tasks should be completed to address the eutrophic condition and contributing factors to the eutrophication.

The following tasks are separated into different time categories to aid in the planning and implementation of improvements to Branch Brook Park and Belleville Park.

- *Immediate Tasks:* Immediate tasks include taking steps to rectify emergency conditions where the resource will be lost or irreparably damaged if the condition is not addressed now. Immediate tasks should be completed within one year.
- *Short-term Tasks:* Short-term tasks include initiating new programs that will become ongoing efforts and conducting feasibility studies for future capital improvements. Short-term tasks should be completed within 2 years.
- *Intermediate Tasks:* Intermediate tasks include capital improvements based on the feasibility studies. There currently is only one intermediate task as this time. Intermediate tasks should be complete within 5 years.
- *Ongoing/Long-term Tasks:* Ongoing/long-term tasks include the continuation of programs begun earlier and major capitol improvements. The long-term tasks should be complete within 10 years.

Immediate Tasks

1. *Install additional soil erosion and sediment control measures and maintain until eroded areas are stabilized. The accumulation of sediment has a detrimental effect on the aquatic habitat. The areas where major erosion is occurring should receive soil erosion and sediment control measures until they can be permanently stabilized.*
2. *Revegetate shorelines recently denuded of vegetation in the Southern Division. The slopes near the boat house are the most prone to erosion due to their steep and long slopes, lack of ground cover, and no understory vegetation. The areas with geoblock reinforcing are exhibiting signs of erosion. The slopes need revegetation to stop the eutrication of the lake.*
3. *Complete the Remedial Action Workplan (RAW) for the soil and groundwater contamination by the maintenance building. The existing well near the maintenance building in the Northern Division cannot be utilized until the soil and groundwater contamination has been remediated. Because the remediation is expected to take 5-7 years, it should be started as soon as possible. Once remediated the water produced by the existing well can contribute to the restoration of the watercourse system in Branch Brook Park.*
4. *Restore riparian buffers along all water edges to the maximum width practical and historically correct, preferably between 75 and 100'. Riparian buffers help reduce non-point pollution into receiving waters and provide food and habitat for wildlife. The steep slopes and banks of the lake, ponds and watercourses*

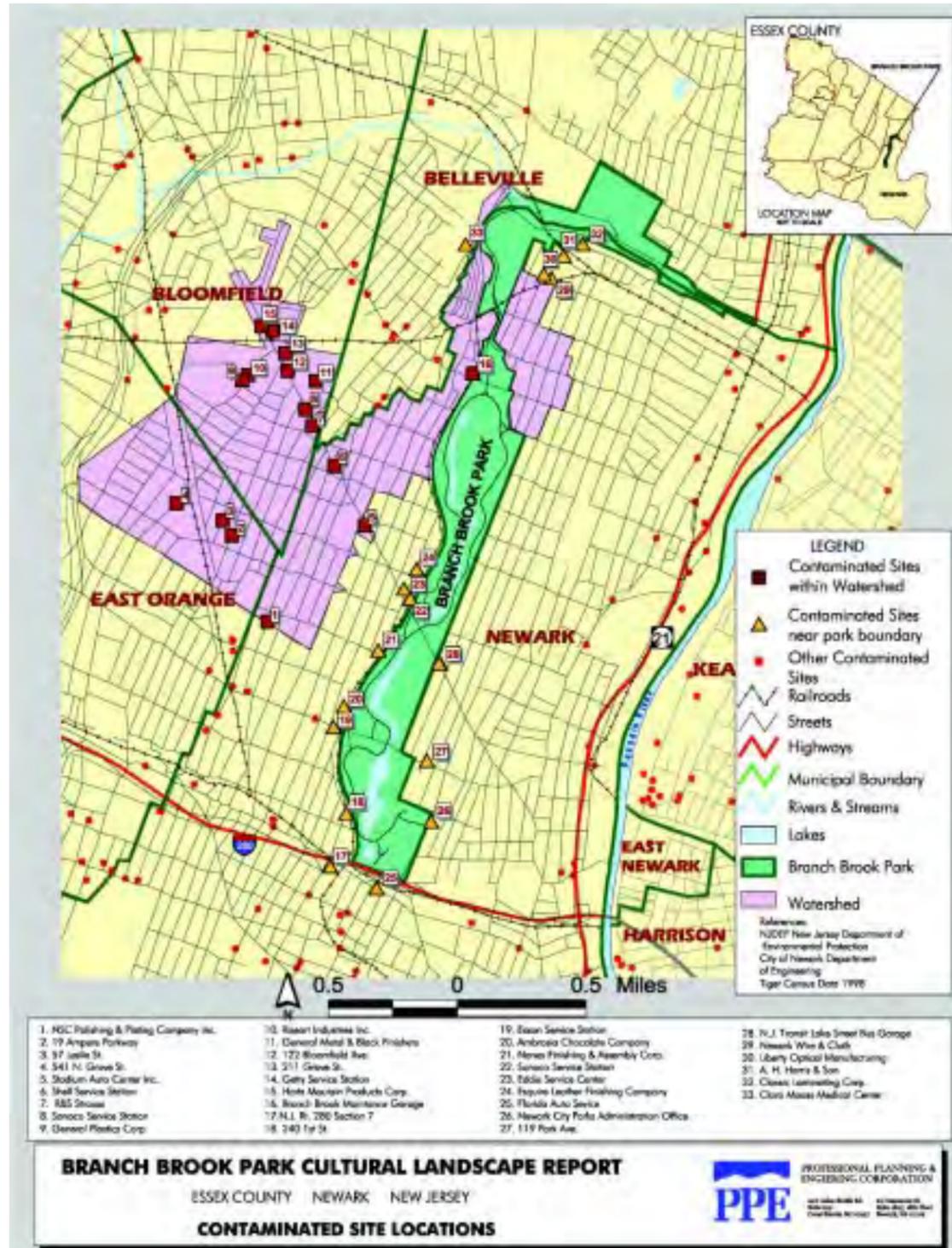


Figure 27

should be stabilized with herbaceous and woody vegetation. "Hard" elements such as boulders should be utilized when vegetation alone would be inadequate.

Short-Term Tasks (within 2years)

These tasks are subdivided into three categories:

- Public Support Programs
- Management and Maintenance Programs
- Feasibility Studies

Public Support Programs

1. Strongly encourage NJDEP to include Branch Brook Lake in an amendment to the existing USEPA Memorandum of Agreement (MOA) listing Branch Brook Lake on the 303(d) list. One of NJDEP's priorities is addressing the impaired waters listed in the MOA with the EPA. Branch Brook Lake was listed on the 1998 impaired waters 303(d) list but was not listed in the agreement. Being listed in the MOA would open up additional funding opportunities from state and federal agencies.
2. Participate in Watershed Management 4 (WMA 4) Planning Process. Monthly committee meetings are held for the Public Advocacy Committee, Open Space Committee and the Technical Advisory Committee. The committees are supported by the NJDEP and include watershed stakeholders. First hand information is available regarding the planning efforts for the watershed as well as providing a forum to present Branch Brook Park's issues at hand to a larger audience that would support water quality improvements envisioned.
3. Notify Natural Resource Conservation Service (NRCS) when any excavation is occurring within the park. Partnering with NRCS will allow for the completion of specific soil mapping to be completed in Branch Brook Park and Belleville Park. NRCS will visit the excavation and evaluate the soil profile exposed for items such as drainage structures or other construction. The specific mapping will aid in the management of the park's water and vegetation by having a detailed understanding of soil properties.
4. Develop a clear list of anticipated projects and then develop a fundraising strategy for these anticipated projects. Funding for environmental projects is a priority for many agencies, corporations and foundations. Continue to foster relationships with groups and agencies such as the NJ Green Acres Program and continue to lay the groundwork for the funding to be available when a project is scheduled. Initial funding may be found through the NJDEP 319(h) program, NJDEP Non-Point Source Projects Program, the New Jersey Clean Lakes Bond Act and the US EPA Clean Lakes Program. The US EPA Clean Lakes Program is a discretionary program dependent on funding from the current administration. The program was not funded in the 2002-2003 fiscal budget.
5. Enlist volunteer groups for improvement projects, water quality testing, and continued trash pick-up. Continue to work with Prudential and their community service group. Begin build-

ing relationships with other agencies and community groups such as the Morris Land Conservancy's Partners for Parks and the NJ Community Water Watch. The Partners for Parks program sets up corporate volunteers to work on clean-up projects. The Community Water Watch is associated with Rutgers University. The Newark Chapter works on water quality issues on the Passaic River and its tributaries and specifically works on the Second River. They also work with local communities in providing education programs, river clean-ups and water monitoring.

6. Educate the public, Essex County Administration and maintenance staff on how the stewardship of Branch Brook Park and Belleville Park fits within the regional watershed. Programs should be developed to aid in the understanding of how all actions affect water quality and ecosystem not only within Branch Brook and Belleville Park but the region. Several steps can be taken:
 - a. Watershed awareness: Raise basic watershed awareness using signs, storm drain stenciling, stream walks, maps.
 - b. Personal stewardship: Educate the public, Essex County officials and park maintenance staff about the individual role they play in the watershed and communicate specific messages about positive and negative behaviors.
 - c. Professional training: Educate Essex County officials and park maintenance staff on how to apply the tools of watershed protection.
 - d. Watershed engagement: Provide opportunities for the public to actively engage in watershed protection and restoration.

Management and Maintenance Programs

1. Implement a long-term water quality monitoring program. Benefits of establishing a long-term water quality monitoring program include the ability to assess the success or failure of implemented BMPs and to modify maintenance procedures to address various pollutants. Monitoring the quantity of water traveling through the watercourses will enable a realistic evaluation of the restoration of the watercourses as well as give the ability to estimate the amount of pollutants traveling through the watercourse.
2. Develop and implement a forestry management plan, including a detailed vegetation survey, with a special component to address the life and health of the cherry trees. The overall health of Branch Brook Park and Belleville Park's forest health should be addressed. The forests are a benefit to the larger community. They provide benefits such as processing carbon dioxide (a pollutant) and releasing oxygen into the air, reducing air and surface temperatures and providing food and habitat for wildlife. The cherry trees are a unique resource and should receive special attention. They are a source of pride, are a tourist attraction, and a source of revenue from those tourists. The forestry management plan should include a detailed vegetation survey, assess the condition of all of the trees within the park, and determine the health and safety of each tree. From this inventory a management plan is developed to include a program of removal, pruning, fertilizing, and replacement. The program should also include an Integrated Pest Management Program.
3. Develop and implement a turf management program. This program's goal is to establish healthy dense turf throughout the park. Healthy turf is more disease resistant and requires less watering and fertilizer and is more resilient. The program should include aeration, seeding and an Integrated Pest Management Program. The program should also include rotation of the athletic fields out of use to allow heavily used fields to rest.

4. *Include within the Maintenance and Treatment Plans the maintenance of riparian buffers. The riparian buffers require regular maintenance if they are to function properly. Should these systems not function there is a significant decrease in the water quality within Branch Brook Park. It is important to specifically identify maintenance measures that should be implemented for the riparian buffer to support the health of this system so residual non-point pollution is not contributed to the parks.*
5. *Develop Best Management Practices (BMP's) that address water quantity and quality concerns specific for Branch Brook and Belleville Parks and an implementation program. BMP's should promote groundwater recharge, slowing of runoff, reduction of impervious surfaces, sediment/pollutant removal, and habitat creation or enhancement. BMP's could include such tools as a dry extended detention pond, wet extended detention pond, wet pond, infiltration trench, porous pavement, water quality inlet, grassed swale or filter strip.*
6. *Develop an invasive species removal program. Invasive species can spread quickly to push out other more desirable plant species. This program should address the immediate removal needs as well as long term process for identifying and removing invasive species found within the park.*

Feasibility Studies

1. *Complete a feasibility study to determine costs and benefits of reconfiguring the Branch Brook Park stormwater system within the park. Opportunities exist to redirect stormwater that is lost to the City of Newark combined sewers and utilize the stormwater as a source of water for the park. This water must be treated if the water quality within the park is to improve. The initial studies completed indicate an initial possibility for the reconfiguration. A detailed study must be completed to determine the full extent possible for this reconfiguration.*
2. *Complete a feasibility study to determine if it is possible to dredge the water bodies within Branch Brook Park to their original designed depth or deeper if studies indicate feasibility. Sediment is a contributor to the eutrophication of Branch Brook Lake and the connecting waterbodies. The study would establish the quantity and quality of sediment, explore the possibility of increasing the depth of the lake, establish the costs and benefits of a dredging program, and identify possible funding and partnership opportunities.*
3. *Develop a baseline for environmental indicators. Further detailed study should be completed to address other environmental indicators not studied as part of this scope of work such as biological indicators as well as detailed testing for water quality and physical and hydrological indicators. The testing should build on the NJDEP National Environmental Performance Partnership System Cause-Condition-Response Environmental Indicator Model (NJDEP, 1998) to increase potential funding possibilities.*

Ongoing / Long Term Tasks (Ongoing / within 10 years)

1. *Commission the completion of a flood limit study that would delineate the flood hazard boundary specific to Branch Brook Park. Branch Brook Lake is not a studied water body and*

does not have a flood hazard boundary specific to the park. The flood hazard boundary delineated on the FIRM maps is not consistent with the elevations within the park. A flood limit study will be required to obtain a NJDEP stream encroachment permit for major work within the park that comes relatively close to the watercourse. The completion of this study in the early stages will aid in the planning of capitol improvements.

2. *Rebuild all catch basins to include trash hoods and sediment sumps or build new catch basins as part of park rehabilitation. It is evident that trash and sediment is being transported into the watercourses in Branch Brook Park. The installation of a trash hood and sediment sump will allow the greater amount of these non-point pollutants to remain in the structures where it is easier to remove than within a lake or river. It is important to maintain the structures with regular cleaning or they are ineffectual.*
3. *Continue to lobby NJDEP to include Branch Brook Lake in an amendment to the existing EPA MOA listing Branch Brook Lake on the 303(d) list until accomplished.*
4. *Continue to develop and modify a fundraising strategy for anticipated projects.*
5. *Continue to inform NRCS when any excavation is occurring within the park.*
6. *Continue long-term monitoring program.*
7. *Continue to implement the dredging program if it was determined to be feasible.*
8. *Continue relationships with volunteer groups.*
9. *Continue to educate the public, Essex County Administration and maintenance staff.*
10. *Continue pro-active drainage structure cleaning and maintenance program.*
11. *Continue street sweeping program.*
12. *Continue long term water quality monitoring program.*
13. *Continue to implement forestry management plan.*
14. *Continue to implement a turf management program.*
15. *Continue implementation of Best Management Practices (BMPs) as capitol improvements are planned for Branch Brook Park and Belleville Park.*
16. *Implement reconfiguration of stormwater system if it was determined feasible.*

CHAPTER 8: UTILITIES

The utilities within the park were evaluated utilizing 19 Essex County Parks record drawings dated 1941-1965 and 47 improvement drawings dated 1980-1984, 47 City of Newark current subsurface structures maps, and above grade field verification. See Appendix I for a full list of drawings evaluated. The survey generated in Phase I of this project was utilized as the base information. This survey was generated utilizing 1996 aerial topography from City of Newark geographic information system, 2002 aerial topography and field survey. The record drawings were then screen digitized into a CAD drawing and overlaid on the base information. The improvement drawings were also screen digitized into CAD and overlaid on the base information and the record drawing information was updated with any changes. This information was field verified in October – December 2002. Utility structures that were observed and not indicated on the record and improvement drawings and not on the base information were noted. Field verification also ensued to confirm the location of the structures indicated on the base information. The resulting mapping illustrates the existing utilities being utilized within Branch Brook Park and Belleville Park from the base information received and above grade field verifications (Figures 19a & 19b). For a discussion of the stormwater system see “Surficial Hydrologic System.” Water, electric, gas and telephone lines are found within Branch Brook Park in addition to the stormsewer system described in an earlier section of this report.

Water Service

Several water mains traverse Branch Brook Park. These mains provide water to the City of Newark as well as to the park. The water originates at the Wanaque Reservoir located about 20 miles north west of the park in northern Passaic County, near the New York State border.

The Southern Division of Branch Brook Park is serviced by a few major water lines (Figure 19a). There is a 60” main which runs south near Barranger High School, and services the east side of park. The 60” main then continues to flow south and exits the park under Route 280. Two additional lines cross the park in this section in an east west direction. One 24” line comes from 7th Avenue West (used to supply the old reservoir at the Roller Rink Area) decreases to a 20” line and crosses the park to Clifton Avenue. The second, 36” line enters from 1st Street, crosses the park, services the Boat House, and exits at multiple points near the corner of 8th Avenue and Clifton Avenue. The west side of the park in the Southern Division is serviced by another smaller 24” line, located on the corner of Park Avenue and Lake Street.

The Middle Division is serviced by the 60” water main located in Lake Street. Water service enters the park at the field house and generally parallels the eastern walkway. Localized water service branches off of this line for the fields and Seniors’ Building.

In the Northern Division two mains of 48” and 36” (Figure 19b) cross Heller Parkway at Forest Hill Parkway and connect to form a 42” main that flows under the ball fields in this division. The main

then traverses west under the Branch Brook watercourse and exits the park onto Davenport Ave. The maintenance building is serviced by a 24” line, which runs east and west along Heller Parkway. The 60” main runs along Lake Street in this section and continues south where it enters the Middle Division. Of special note is the artesian well located approximately 200 feet to the southeast of the maintenance building. This well was historically utilized for a water source for the watercourse in the Northern Division. NJDEP directed the well to be shut down in March 1999 due to groundwater contamination. See the Contaminated Sites section of this report for more information.

The Extension between Heller Parkway and the Southern Erie Lackawanna Railroad bridge (tennis court area and field house) is serviced from the parallel mains located on Forest Hill Parkway. The Visitors’ Center and adjoining ball fields north of the southern Erie Lackawanna Railroad bridge is serviced from a 36” line entering from an industrial complex, which then turns south onto Branch Brook Place. This system also provides water to the small maintenance building near Franklin Avenue. The Extension south of Mill Street is serviced by a line off of the corner of Highland Avenue and Tiffany Boulevard along Mill Street in this section. Lines that run off of a 36” main running south through this section service these areas. A line off Union Avenue services the section along Mill Street just west of Union Avenue.

Belleville Park’s water service enters the park in two places, one off the corner of Belleville Avenue and Parkview Avenue, and the other near the corner of Belleville Avenue and Mt. Pleasant Avenue.

Electrical Service

Extensive electric service also exists within Branch Brook Park (Figures 19a & 19b). The service primarily runs parallel to the roadway system and from that branches off to various buildings within the park. The service enters the park at generally the same locations as the water service. In the Southern Division, the electric service enters the park at three points along Clifton Avenue, one point at the end of Victoria Avenue, and at one point along the Park Avenue Bridge. The Middle Division’s service enters at two points along the Park Avenue Bridge and one point along Lake Street. In the Northern Division the electric service enters at two points along the Bloomfield Avenue Bridge and four points along Lake Street. A line off of Heller Parkway services the maintenance building. The Extension has various electrical connections, one from Heller Parkway and another from Forest Hill Parkway that services the tennis courts and field house. Another connection is from Branch Brook Place. A line from the industrial area located to the west services the Visitors’ Center. A line off Franklin Avenue services the small maintenance building near Franklin Avenue. Belleville Park has limited electric service only to the Shelter and Senior Citizens’ Buildings.

Gas and Telephone Service

There are limited gas and telephone lines that are located within the park. Gas and telephone service the roller rink building only. Additionally, a gas main runs beneath Mill Street and crosses the Second River across from Hendrics Field Golf Course. No other locations for gas were noted during this study.

Utilities Along Adjacent Roadways

There is an extensive utility network that is located within the adjoining roadway right-of-ways. Only those utility systems that Branch Brook Park and Belleville Park tie into are located in Figures 19a & 19b. The adjoining utility systems limits are indicated, to the extent shown, to give a general understanding of the source location. Cable service is located along the park's perimeter streets and would be able to service most areas of the park. This potential would be evaluated when a definitive program is established for park improvements.

Recommendations

Short-term Tasks (within 2 years)

1. *Remove sediment and debris from existing clogged drainage structures. The non-functioning stormwater system has increased the amount of surface runoff directly entering Branch Brook Lake. Increased erosion is occurring in several areas of the park due to the increased runoff.*
2. *Implement a pro-active drainage structure cleaning and maintenance program. This program works in conjunction with the removal of sediment and debris from the existing clogged drainage structures. By maintaining a clean system, non-point pollution can be reduced.*
3. *Implement a street sweeping program. Street sweeping removes litter, heavy metals, and sediment that would otherwise be ultimately discharged into a receiving water.*
4. *Include, within the Maintenance and Treatment Plans, the maintenance of stormwater and sanitary sewer systems. Sewers require regular maintenance if they are to function properly. Should these systems not function, there is a significant decrease in the water quality within Branch Brook Park. It is important to provide regular maintenance on the stormwater and sanitary sewers so residual non-point pollution is not contributed to the park.*
5. *Complete a feasibility study to determine costs and benefits of reconfiguring the Branch Brook Park stormwater system within the park. Opportunities exist to redirect stormwater that is lost to the City of Newark combined sewers and utilize the stormwater as a source of water for the park. This water must be treated if the water quality within the park is to improve. The initial studies completed indicate an initial possibility for the reconfiguration. A detailed study must be completed to determine the full extent possible for this reconfiguration.*

Intermediate Tasks (within 5 years)

1. *Connect catch basins to dry wells. The use of dry wells with an overflow to the stormwater sewer system will encourage groundwater recharge and aid in the removal of some pollutants.*

Ongoing / Long Term Tasks (Ongoing / within 10 years)

1. *Rebuild all catch basins to include trash hoods and sediment sumps or build new catch basins as part of park rehabilitation. It is evident that trash and sediment is being transported into the watercourses in Branch Brook Park. The installation of a trash hood and sediment sump will allow the greater amount of these non-point pollutants to remain in the structures, where it is easier to remove than within a lake or river. It is important to maintain the structures with regular cleaning or they become ineffectual.*
2. *Continue pro-active drainage structure cleaning and maintenance program.*
3. *Continue street sweeping program.*
4. *Implement reconfiguration of stormwater system if it was determined feasible.*

CHAPTER 9: VEHICULAR CIRCULATION AND PARKING

Vehicular traffic occurs in Branch Brook Park for two main reasons: vehicles traveling to a destination within the park and vehicles travelling through the park as a bypass to get to a destination outside the park. In addition, when the destination is reached in the park a location must be found to park the vehicle. To get a better understanding of the way the vehicular circulation system is utilized, the internal and adjacent roadway network was analyzed for indications of direction of travel. Interviews were conducted with facility managers to understand how each facility is utilized, the peak times of demand. In addition, athletic and special permits were reviewed. To further understand the parking demands in the park an on-site parking analysis was conducted. Finally, possible off-site parking locations were identified that were either vacant, abandoned, or for sale within ¼ mile of Branch Brook Park and Belleville Park and mass transit stops were located within a two block area of the parks.

Roadway Network

The internal roadway circulation encompasses a mix of two-way and one-way traffic as illustrated in Figure 28. There are eleven vehicular entrances to Branch Brook Park and one to Belleville Park. There are two vehicular entrances to the Southern Division, one from Clifton Avenue (#1) and one from Park Avenue traveling east (#2). Clifton Avenue is a north-south collector street. The Clifton Avenue entrance is located approximately 1,500 feet to the north of I-280 entrance ramps. Access to the park from I-280 is from the 1st Avenue exit east along Orange Street and left onto Clifton Avenue. I-280 has connections to the New Jersey Turnpike (Turnpike) to the east and the Garden State Parkway (Parkway) and I-80 to the west providing ease of access from New Jersey and the larger region. Park Avenue is an east-west arterial that connects Newark to suburban New Jersey and divides the Middle Division from the Southern Division of the park. The roadway circulation within the Southern Division is two-way with the exception of the internal parking lot at the roller rink.

The vehicular entrances to the Middle Division are from Park Avenue traveling west (#3) and from Bloomfield Avenue (#4) (Figure 28). Bloomfield Avenue is another major arterial that runs north-west-southeast. This road provides access to Newark from Bloomfield, Glen Ridge, Montclair, and other municipalities. The roadway circulation in this division is two-way.

There are four vehicular entrances to the Northern Division located at Second Avenue (#5), Ballantine Parkway (#6), Elmwood Avenue (#7) and Heller Parkway (#8) (Figure 28). All of these entrances are local two-way streets running east-west with the exception of Heller Parkway, which is a collector street. Heller Parkway runs east-west and connects Broadway to Franklin Avenue on the west border of the park where the name changes to Franklin Street. Franklin Street continues west where it ultimately connects with Bloomfield Avenue. The only vehicular entrance from west of the park is

from Heller Parkway. The roadway circulation in the Northern Division is one-way with the eastern drive northbound and the western drive southbound.

There are four entrances to the Extension located at Heller Parkway (#8), Grafton Avenue (#9), Franklin Avenue (#10), and Mill Street (#11). Grafton Avenue is a local street with an entrance and exit to McCarter Highway and NJ RT. 21, which ties into the larger New Jersey roadway network. Mill Street west of Franklin Avenue is a local road that travels northwest and connects to Bloomfield Avenue, an arterial roadway that extends east-west through Belleville, Bloomfield, and Glen Ridge, and connects to Bloomfield Avenue. The Erie Lackawanna Railroad bisects Mill Street west of Franklin Avenue, outside of Branch Brook Park. Access from the east is from Franklin Avenue. This area is not located within Branch Brook Park. Access from the west is from the intersection with the internal park roadway. The roadway system in the Northern Division is two-way.

The surrounding roadway network is primarily two-way with some areas of one-way circulation. The areas of one-way are located in the Lower Roseville and Upper Roseville areas to the west of Branch Brook Park, as well as the area between Park Avenue and Second Avenue to the east of the park.

Facility Usages

Interviews were conducted with Branch Brook Park and Belleville Park maintenance staff, and Branch Brook Park Roller Rink and tennis facilities management. These interviews were conducted to gain an understanding of the uses within the park, and the times and intensity of use. From this information a peak use time range was to be determined to aid in the evaluation of parking demand within Belleville and Branch Brook Parks.

Interviews

The maintenance staff gave a general overview of the uses within the park highlighting major events, vehicular circulation patterns, and sources for additional information.

Major events include the following:

· Cherry Blossom Festival	5,000-10,000 people Entire Park
· Cherry Blossom Dinner	1,000 people
· Cherry Blossom Run	900 participants; 5,000 spectators
· Festivals in the Middle Division	5,000-10,000 people Middle Division
· Bike Races	500-1,000 participants and spectators
· NJ Symphony & fireworks	2,000 people
· Blue Mass	varies

The Cherry Blossom Festival is held during one weekend in April when the cherry blossoms are blooming. The festival draws between 5,000-10,000 people. During the weekend of the festival, the entire park roadway is closed from Union Ave. to Clifton Ave. At other times the roadway between Heller Parkway and Union in Belleville is stop and go traffic at all times of the day to view the blossoms. A parking arrangement exists during the festival between Clara Mass Hospital and the County for the use of the hospital parking lot. A Cherry Blossom Run is held the weekend after the Cherry Blossom Festival. All park roads and road entrances from Union Ave. to Clifton Ave.

BRANCH BROOK PARK

Cultural Landscape Report
Newark, New Jersey

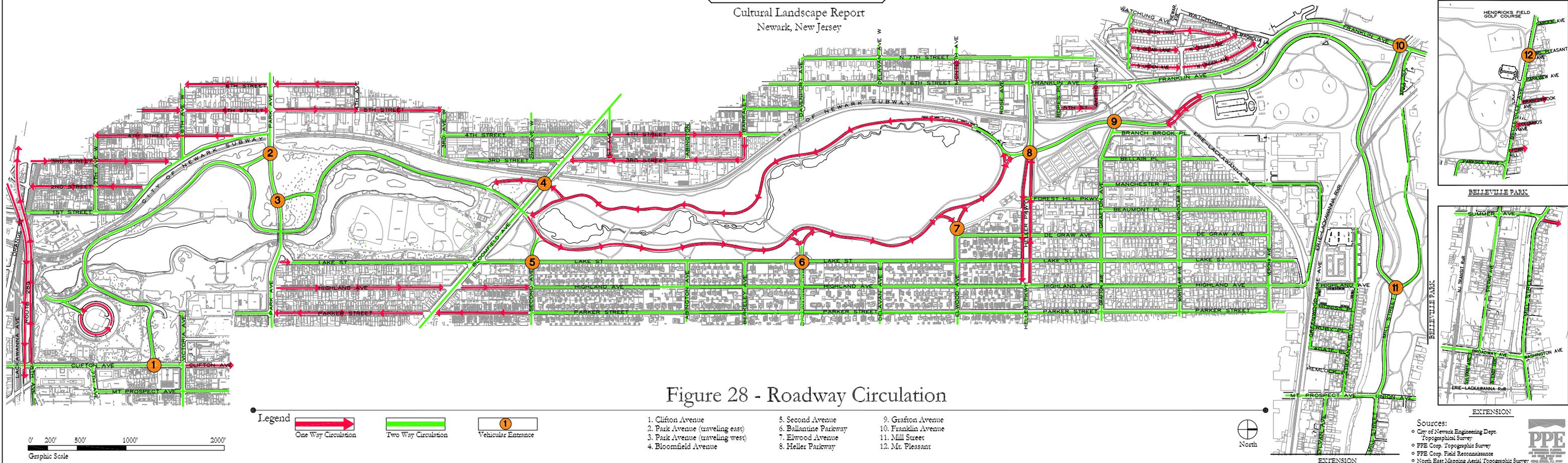
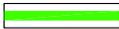


Figure 28 - Roadway Circulation

Legend

-  One Way Circulation
-  Two Way Circulation
-  Vehicular Entrance

- | | | |
|---------------------------------|-----------------------|---------------------|
| 1. Clifton Avenue | 5. Second Avenue | 9. Grafton Avenue |
| 2. Park Avenue (traveling east) | 6. Ballantine Parkway | 10. Franklin Avenue |
| 3. Park Avenue (traveling west) | 7. Elwood Avenue | 11. Mill Street |
| 4. Bloomfield Avenue | 8. Heller Parkway | 12. Mt. Pleasant |



- Sources:
- City of Newark Engineering Dept. Topographic Survey
 - PFE Corp. Topographic Survey
 - PFE Corp. Field Reconnaissance
 - North East Mapping Aerial Topographic Survey
 - Map Quest 2003.



are closed. The run draws about 900 participants and 5,000 spectators. The event is over around 12:00 noon.

There are two festivals in the Middle Division that run four days in June and July. These festivals each attract between 5,000 – 10,000 people. Special event permits are issued for these events. Carnival rides are brought in and placed on the ball fields. NJ Symphony and fireworks are held on the Saturday closest to the fourth of July on the Great Meadow. Parking is allowed on the lawn. 2,000 people attend this event. Blue Masses are held for fallen County police officers on the concourse directly across from the cathedral. The cathedral contacts the County police to let them know when a mass will be held. Parking is allowed on the concourse at that time. Three bicycle race events are usually held during the spring and summer. The Northern Division roadway between Heller and Bloomfield Parkways (which encircles the great lawn) are closed for the events. Attendance ranges from 500-1000 participants and spectators.

The park is heavily used for commuter cut-through traffic Monday through Friday, year round. Approximate morning commute traffic is between 6:30 to 9:00 a.m. The maintenance staff estimates the evening commute occurs between 4:30 to 6:00 p.m. Commuters cut through the Extension and other entrance points to the park and exit at Clifton Ave. and head south into downtown Newark. In 2002 (and periodically in the past) the east - west Drives in the Northern Division were closed from Sunday to Monday to cut down on the amount of trash generated in that area. The roads were reopened after Labor Day. Currently there are no plans to make this a regularly planned closure.

Branch Brook Park Roller Rink

The roller rink is located in the Southern Division at the location of the old reservoir. It is open year-round, seven days a week. Table 3 indicates the times of operation. The heaviest use occurs during the summer and the winter. The daily attendance logs for 2002 were evaluated to determine the peak time of use. However, due to the methodology utilized for logging in the attendance, peak time was difficult to be determine. Each day is broken down into approximately seven time blocks. These time blocks vary based upon the daily manager’s determination. The decisions by the daily managers regarding the hourly breakdown of the time blocks are not recorded. It is, therefore, impossible to determine a peak time of use for a specific day and specific hours during the day. A general assessment can, however, be made for the number of patrons in attendance for a week and time of year.

Table 4 is a compilation of the daily and weekly attendance at the roller rink. The average weekly attendance is 2,700 guests. The highest attendance occurs during Labor Day week with attendance almost 12,000 guests. The second highest attendance occurred between February 18 and April 7, 2002. The average attendance, except the week of February 25, is 4,700 guests. The remaining times of the year range between 1,200 guests to 2,500 guests. Friday and Saturday are the busiest with approximately 25 percent of attendance occurring on each of those days. Thursday and Sunday are the next highest attendance at approximately 12 percent of the total each day. Monday, Wednesday and Tuesday are the next busiest days of the week at 10, 8 and 8 percent of the total, respectively.

BRANCH BROOK PARK ROLLER SKATING CENTER SCHEDULE

	WINTER	FALL / SPRING	SUMMER
MONDAY	6:30-9:30 P.M. Family Gospel Skate	6:30-9:30 P.M. Family Gospel Skate	10:00-6:00 P.M. Group packages Avail. / Camps
			Noon-6:00 P.M. Public Skating (any 2 hours)
			6:30-9:30 P.M. Family Gospel Skate
TUESDAY	6:30-9:00 P.M. Group packages Avail. Private parties	6:30-9:00 P.M. Group packages Avail. Private parties	10:00-6:00 P.M. Group packages Avail. / Camps
			Noon-6:00 P.M. Public Skating (any 2 hours)
			Avail. Private parties
WEDNESDAY	6:30-9:00 P.M. Group packages Avail. Private parties	6:30-9:00 P.M. Group packages Avail. Private parties	10:00-6:00 P.M. Group packages Avail. / Camps
			Noon-6:00 P.M. Public Skating (any 2 hours)
			6:30-9:30 P.M. Teen Dance 'n Skate (ages 12-16)
			10:00-2:00 A.M. Club BBP (16 + over) (No skating)
THURSDAY	6:30-9:00 P.M. Avail. Private parties	6:30-9:00 P.M. Avail. Private parties	10:00-6:00 P.M. Group packages Avail. / Camps
	9:30-1:00 A.M. Adult Skate (18 & over w/ID)	9:30-1:00 A.M. Adult Classics	Noon-6:00 P.M. Public Skating (any 2 hours)
	9:30-2:00 A.M.. Big Bob's NY Nite* (21 & older w/ID) *(First Thursday of every Month ONLY)		6:30-9:00 P.M. Dollar Day
			9:30-1:00 A.M. Adult Nite (18 & ove w/ID)
FRIDAY	4:00-6:30 P.M. Dollar Nite	4:00-6:30 P.M. Dollar Day	10:00-6:00 P.M. Group packages Avail. / Camps
	7:00-11 00 P.M. Teen Nite (ages 11-16)	7:00-11 00 P.M. Teen Dance 'n Skate (ages 11	Noon-6:00 P.M. Public Skating (any 2 hours)
			6:30-9:00 P.M. Public Skating (any 2 hours)
SATURDAY	12:30-3:00 P.M. Family Skate	12:30-3:00 P.M. Public Skating	12:30-3:00 P.M. Public Skating
	4:00-7:00 P.M. Family Skate	3:30-6:00 P.M. Public Skating	3:30-6:00 P.M. Public Skating
	7:30-10:30 P.M. Late Nite Skate	6:30-9:30 P.M. Late Nite Skate 10:00-2 A.M. Club BBP (16 + over)	6:30-9:30 P.M. Teen Dance 'n Skate (ages 12-16) 10:00-2 A.M. Club BBP (16 + over)
SUNDAY	2:00-5:00 P.M. Family Skate	2:00-5:00 P.M. Public Skating	12:30-3:00 P.M. Public Skating
	5:30-8:30 P.M. Family Skate	5:30-8:30 P.M. Public Skating	3:30-6:00 P.M. Public Skating
			6:30-9:00 P.M. Public Skating

Table 3 - Branch Brook Park Roller Skating Center Schedule

Branch Brook Park Tennis Courts

This facility is a year-round fee facility with 20 lighted tennis courts (4 clay and 16 hard courts) and a heated field house with an office and meeting space. There are two full time people employed by a concessionaire and two additional full time people employed during the summer months. The annual fee is \$175.00 for unlimited play. There are currently 35-40 members. The courts are continuously locked and members have a key for access. The concessionaire utilizes membership dues to maintain the courts.

The primary concern of the players and facility manager is to provide increased security. In the past, the facility was heavily utilized. With the increase in crime in the area and several incidents involving facility users, the patrons have gone to other free and fee-based facilities. There are no parking facilities in this section of the Extension to serve the tennis facility users. In the summer of 2002, 16 people had their cars stolen or broken into while parking on the surrounding streets. County tournaments for young children and adults were once played at this facility but were stopped because the courts were not in good condition and the area had become unsafe. Initiatives have been started with the City of Newark and adjacent apartment complex residents to increase the safety of the area. In addition, local youths have been employed over the summer to try to avert the crimes that have been occurring.

The Althea Gibson program is located at this facility, and runs spring through fall in the morning and evening on Saturday and Sunday. Thirty-five to fifty children participate. The Police Athletic League offers a program that also runs spring through fall, and serves 75-85 children. Their program is Monday through Friday in the morning and afternoon. Baby Land, a non-profit organization, has a summer program for 125 children late mornings Monday through Friday, except Wednesday. The local boy's and girl's tennis teams utilize the courts from 3:30 p.m. to 7 p.m. Monday through Friday with approximately 160 children at the facility at that time. The boy's season is in the spring and the girl's season is in the fall. There are four day tournaments at the end of each season held at the facility with approximately 360-400 children and 200 spectators. See Table 5 for specific dates and times.

Permits

Athletic field permits and special event permits were reviewed for Branch Brook Park. Permit information was not received for Belleville Park.

Athletic Field Permits

Athletic field permits are let by blocks of time for the athletic events, and the special event permits by the anticipated attendance (Table 6). There are five baseball/softball fields in the Middle Division and four baseball/softball fields in the Extension (near the Visitors Center). Seven local high schools utilize the fields in the Middle Division during the Spring. All five diamonds are scheduled for use Monday through Friday 3 p.m. to 9 p.m., and diamonds 3 & 4 on Saturday 1 p.m. to 7 p.m. See Table 6 for a listing of users and times. Nine groups utilize the diamonds in the Extension during the

spring, summer, and fall. Diamonds 1-4 are scheduled between 3 p.m. and 6 p.m. Monday through Friday. Diamonds 1 & 2 are also scheduled for 6 p.m. to 9 p.m. Monday through Thursday, and diamond 3 is scheduled for 6 p.m. to 9 p.m. Tuesday through Thursday. Diamond 4 is also scheduled for 6 p.m. to 9 p.m. on Thursday. Fields 1 & 2 are the only fields scheduled for Saturday between 1:30 p.m. and 4:30 p.m. All diamonds are scheduled for use between 1:30 p.m. and 4:30 p.m. on Sundays, with diamonds 1 & 4 also scheduled between 9 a.m. and 12 noon.

GUEST COUNT REPORT										
Week	Week No.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.	Total	
12/31/2001-1/6/2002	1	215	263	21	49	857	845	263	2,513	
1/7/2002-1/13/2002	2	106	158	137	26	456	1,258	405	2,546	
1/14/2002-1/20/2002	3	81	203	239	25	1,556	669	632	3,405	
1/21/2002-1/27/2002	4	991	35	228	174	808	1,396	524	4,156	
1/28/2002-2/3/2002	5	106	30	94	106	751	1,260	514	2,861	
2/4/2002-2/10/2002	6	159	318	57	80	831	1,140	577	3,162	
2/11/2002-2/17/2002	7	Data not available								
2/18/2002-2/24/2002	8	1,060	123	25	668	1,407	1,305	460	5,048	
2/25/2002-3/3/2002	9	91	265	41	166	0	0	40	510	
3/4/2002-3/10/2002	10	205	545	104	373	1,128	1,305	514	4,083	
3/11/2002-3/17/2002	11	97	276	360	360	1,387	1,157	608	4,245	
3/18/2002-3/24/2002	12	Data not available								
3/25/2002-3/31/2002	13	328	90	430	577	1,108	932	1,358	4,823	
4/1/2002-4/7/2002	14	1,063	204	281	561	1,356	1,511	372	5,348	
4/8/2002-4/14/2002	15	335	185	227	283	961	905	231	3,124	
4/15/2002-4/21/2002	16	178	23	0	0	0	1	0	202	
4/22/2002-4/28/2002	17	83	65	80	47	1,159	741	250	2,425	
4/29/2002-4/5/2002	18	Data not available								
5/6/2002-5/12/2002	19	212	19	210	307	323	646	89	1,806	
5/13/2002-5/19/2002	20	119	233	426	366	278	549	168	2,139	
5/20/2002-5/26/2002	21	270	122	195	349	281	574	134	1,925	
5/27/2002-6/2/2002	22	235	66	178	196	217	455	129	1,476	
6/3/2002-6/9/2002	23	62	216	59	345	251	370	157	1,460	
6/10/2002-6/16/2002	24	57	111	150	602	179	421	179	1,699	
6/17/2002-6/23/2002	25	292	326	1,311	337	121	385	195	2,967	
6/24/2002-6/30/2002	26	311	1	60	79	508	409	119	1,487	
7/1/2002-7/7/2002	27	136	223	243	34	415	229	104	1,384	
7/8/2002-7/14/2002	28	212	303	321	485	783	229	126	2,459	
7/15/2002-7/21/2002	29	176	461	636	466	666	324	153	2,882	
7/22/2002-7/28/2002	30	470	501	336	598	830	304	155	3,194	
7/29/2002-8/4/2002	31	392	815	419	1,182	466	234	127	3,635	
8/5/2002-8/11/2002	32	329	321	209	481	490	315	145	2,290	
8/12/2002-8/18/2002	33	306	234	348	369	564	170	203	2,194	
8/19/2002-8/25/2002	34	235	269	326	498	489	350	192	2,359	
8/26/2002-9/1/2002	35	325	173	31	243	426	243	446	11,887	
9/2/2002-9/8/2002	36	Data not available								
9/9/2002-9/15/2002	37	53	0	0	48	217	393	241	952	
9/16/2002-9/22/2002	38	88	0	0	267	840	644	232	2,071	
9/23/2002-9/29/2002	39	Data not available								
9/30/2002-10/6/2002	40	70	38	221	62	707	772	238	2,108	
10/7/2002-10/13/2002	41	22	139	86	298	447	118	288	1,398	
10/14/2002-10/20/2002	42	399	176	67	378	518	589	328	2,455	
10/21/2002-10/27/2002	43	57	395	493	421	465	684	344	2,859	
10/28/2002-11/3/2002	44	96	170	252	707	591	427	250	2,493	
11/4/2002-11/10/2002	45	184	97	76	394	901	866	266	2,784	
11/11/2002-11/17/2002	46	Data not available								
11/18/2002-11/24/2002	47	114	58	270	150	265	1,143	241	2,241	
11/25/2002-12/1/2002	48	93	212	30	17	522	548	191	1,613	
12/2/2002-12/8/2002	49	74	1	0	200	263	480	198	1,216	
12/9/2002-12/15/2002	50	75	0	0	229	429	439	355	1,527	
12/16/2002-12/22/2002	51	Data not available								
12/23/2002-12/29/2002	52	318	194	21	386	513	591	0	2,023	
TOTAL		10,880	8,657	9,298	13,989	27,730	28,326	12,741	121,434	

Table 4 - Branch Brook Park Roller Skating Center Attendance

Program	Dates	Time(s)	Number of Participants
Althea Gibson	End of April – End of Sept.	9 a.m. – 1 p.m. 6 p.m. – 8:30 p.m. Sat. and Sun.	35-50 children 6 instructors
Police Athletic League (PAL)	May – Oct.	9 a.m. - 1 p.m. 2 p.m. – 4 p.m. Mon.-Fri.	75-85 children 4 instructors
Baby Land (Non-profit)	End of June – Sept. 1	11 a.m. – 1 p.m. Mon./Tue./Thurs./Fri.	125 children 4 instructors
Boys High School Tennis	March - May	3:30 p.m. – 7 p.m. Mon.-Fri.	8 high schools 160 children
Girls High School Tennis	Sept. – End of October	3:30 p.m. – 7 p.m. Mon.-Fri.	8 high schools 160 children
Essex County Boys High School Tennis Tournament	Spring at end of season	8:30 a.m. – 6 p.m. 4 days: Tues./Wed./Thurs. with finals on Sat.	16-20 high schools 360-400 children 200 spectators
Essex County Girls High School Tennis Tournament	Fall at end of season	8:30 a.m. – 6 p.m. 4 days: Tues./Wed./Thurs. with finals on Sat.	16-20 high schools 360-400 children 200 spectators
NOTES:			
1. The heaviest time of use is the last week of each high school tennis season when there are usually three matches and full use of the remaining courts for practice.			
2. All of the participants arrive via bus or van.			

Table 5: Branch Brook Park Tennis Facility Programs

There are two baseball/softball fields in Belleville Park. No permit information was received regarding the users and times of use for Belleville Park. The maintenance staff for Belleville Park indicated that there was not enough parking as up to 600 people may attend softball games on any given night. People parked on the side streets to the north, as well as south across the Second River.

There are four groups that utilize the open area in the Northern Division by Heller Parkway to play soccer. In the spring, the area is utilized from 4 to 7 p.m. Wednesday through Friday and 9 a.m. to 3 p.m. on Saturday. In the fall, groups utilize the area 4 p.m. to 7 p.m. Wednesday through Friday and 9 a.m. to 3 p.m. on Saturday. There are also five tournament days in September through November, when the area is utilized between 11:30 a.m. to 3 p.m. Diamond #1 in the Middle Division is utilized for soccer in the fall, Monday through Friday 3 p.m. to 6 p.m. and 9 a.m. to 12 p.m. on Saturday.

Football is played in the Middle Division field in the fall, Monday through Friday 3 p.m. to 6 p.m. Football is also played in the Extension diamond area Monday through Friday 3 p.m. to 6 p.m. and on Saturday 9 am to 12 noon. Cricket is played during the spring and summer in the Northern Division across from the maintenance building. Crease A is utilized on Sunday 12 p.m. to 6 p.m. and Crease B is utilized on various Sundays during the same time period.

BRANCH BROOK PARK FIELD UTILIZATION SUMMARY

BASEBALL/SOFTBALL - MIDDLE AREA

2002 PERMIT No.	ORGANIZATION / SCHOOL	SEASON	DIAMOND	DAY	TIME
	Eastside High School	Spring	1	Monday-Friday	3 pm-6 pm
	Arts High School	Spring	2	Monday-Friday	3 pm-6 pm
# 953	Science High School	Spring	Middle Diamond	Monday-Friday	3 pm-6 pm
	Barringer High School	Spring	4 & 5	Monday-Friday	3 pm-6 pm
	North Ward Center	Spring	1	Monday-Friday	6 pm-9 pm
# 1042			2, Middle Diamond, 4 & 5	Monday-Friday	6 pm-9 pm
			1,2,Middle Diamond, 4 & 5	Saturdays & Sundays	6 pm-6 pm
# 955	TECH High School	Spring	1 (Rick Cerrone)	Monday-Friday	3 pm-6 pm
# 1129	Belleville	Spring	1, 2, 3, 4	Fridays	6 pm-9 pm
			4	Tuesday & Wednesday	6 pm-9 pm
			3 & 4	Saturday	1 pm-7 pm
			4	6/19 - 6/26	6 pm-9 pm

BASEBALL/SOFTBALL - EXTENSION AREA

2002 PERMIT No.	ORGANIZATION / SCHOOL	SEASON	DIAMOND	DAY	TIME
	Essex County Vocational School	Spring	1, 2, 3 & 4	Monday-Friday	3pm-6pm
		Spring	1, 2, 3 & 4	Saturday	10am-1pm
	Essex County Lawyers League	Spring	1 & 2	Monday-Thursday	6pm-9PM
		Summer			
# 1144	Essex County Law		1 & 2	Monday-Thursday	6pm-9pm
# 0985	North Jersey Diamond Girls	Spring	3	Tuesday-Thursday	6pm-9pm
	Luis Quintana Softball	Spring, Summer and Fall	1, 2, 3 & 4	Sundays	1:30pm-4:30pm
# 1018	Young Guns	Spring/Summer	1 & 2	Saturday	2pm-5pm
# 0997	Jersey Blaze	Spring/Summer	4	Thursdays	6pm-9pm
			3	Wednesdays	6pm-9pm
# 1409	Central Lewmar	Fall	4	Sundays	9am-12 noon
	AA Flight Sports	Spring, Summer	1	Sundays	9am-12pm
		Fall			

SOCCER

2002 PERMIT No.	ORGANIZATION / SCHOOL	SEASON	LOCATION	DAY	TIME
# 1305	Ecuadorian Soccer		Near Heller pkwy	Saturdays & Sundays	
# 1546	Barringer H. S.	Fall	Diamond #1	Monday-Friday Saturday	3pm-6pm 9am-12pm
# 961	Just One Soccer League	Spring	Open Area near Heller pkwy	Wednesday-Friday Saturday	4-7pm 9am-3pm
# 1561	Just One Soccer League	Fall	Open Area near Heller pkwy	Wednesday-Friday Saturday	5pm-7pm 9am-3pm
# 1524	Just One Soccer League	Fall	Open Area near Heller pkwy	9/8-9/22-10/6 10/27-11/10	11:30am-3pm

FOOTBALL

2002 PERMIT No.	ORGANIZATION / SCHOOL	SEASON	FIELD	DAY	TIME / DATES
# 1546	Ron Fazio	Fall	Middle Football Ext. Diamond	Monday-Friday Monday-Friday Saturday	3pm-6pm 8/19-11/15 3pm-6pm 9/9-11/15 9am-12

CRICKET

2002 PERMIT No.	ORGANIZATION / SCHOOL	SEASON	FIELD	DAY	TIME
	NJ Cricket Association	Spring/Summer	A	Sundays	12pm-6pm
	NJ Cricket Association	Spring/Summer	B	various Sundays	12pm-6pm
	Newark Cricket Club	Spring/Summer	B	various Sundays	12pm-6pm

Table 6 - Branch Brook Park Field Utilization Summary

Special Event Permits

Special event permits are requested from March through October. Table 7 lists events, dates, times and attendance. Event attendance numbers range from 30 for a wedding ceremony to 10,000 for two separate festivals. Three events are held that utilize the entire park: two long distance runs and March of Dimes walk. These events bring 500, 500 and 1,000 people to the park, respectively.

BRANCH BROOK PARK
SPECIAL EVENTS PERMITS SUMMARY

2002 PERMIT No.	PERMIT TYPE	ORGANIZATION	EXACT LOCATTION(S)	DATE	TIME	NUMBER OF PEOPLE
# 1033	Newark Disgance Classic	Division of Recreation/Cultural Affairs	Park Rd. . (Clifton Ave. to Mill St)	3/3/2002	9:30am-1pm	500
# 0947	Bicycle Training Series	United State Cycling Federation	west Roadway Middle (one way loop)	3/9, 3/16, 3/23, 3/30	8am-1pm	60
# 1084	10 k Memorial Run	William & Jasmine Memorial Scholarship Foundation	park roadway throughout the park	4/7/2002	9am-12pm	500
# 1106	Field Day	Japanese Children's Society, Inc.	Mill St. Area	4/15/2002 Rain Date: 4/19/02	10am-2 pm	100
# 0930	Walk-a-lhon	Broadway House for continuing Care	area between Bloomfield Ave. & Heller Parkway	4/27/2002	10am-2 pm	299
# 0934	Walk America	March of Dimes	Entlire Park	4/28/2002	8am-1pm	1,000
# 1071	Wedding Ceremony	N/A	between Miller St. & Grafton Ave.	5/4/2002	4pm-5:30pm	30
# 1019	Softball Tournament	New Jersey Diamond Girls	Diamond #'s 1,2,3 & 4	5/4/02, 5/5/02, 6/29/02, 6/30/02, 7/6/02 & 7/7/02	8am - 6pm	90
# 1166	Wedding Ceremony	N/A	Lions Area	5/18/2002	1pm-2:30pm	100
# 1593	2nd Annual Latino Aids Health Fair	UMDNJ	Near the Lions	6/2/2002	10am-6pm	500
# 1285	Field Day	Rafael Hernandez School	Middle Division	6/7/2002 Rain Date: 6/11/02	10am-2pm	150
# 1256	Wedding Ceremony	N/A	area near the end of Mill Street	6/15/2002	3pm-4pm	30
# 1311	Annual Father's Day Festival	C.I.D.R.A. Inc.	Southern Division Lions Area off Park Avenue	6/16/2002	12pm-9pm	500
# 1330	Field Day	Broadway Elementry School	Extension area diamond #'s 2,3 & 4	6/20/2002 Rain Date: 6/24/02	9am-2pm	85
# 1222	Softball Tournament	Gibbons, Del Deo, Dolan, Griffinger & Vecchione	Extension area Diamond #'s 1,2,3 & 4	6/25/2002 Rain Date: 6/27/02	3pm-8pm	190
# 1015	Wedding Ceremony	N/A	Lions Area	6/29/2002	11am-2pm	100
# 1373	Fiestas Patronales-Carnival	Puerto Rican Heritage Statewide Foundation	Middle Division	7/04/02 - 7/7/02	12noon-11pm	10,000
# 1128	Wedding Ceremony	N/A	near the Cherry Blossoms	8/10/2002	1pm-2pm	150
# 1473	Religious Festival	Our Lady of Cisne Ass. & St. Michael's Church	Area where building #50 was located	8/17/2002	12:30pm 8:30pm	150
# 1056	Wedding Ceremony	N/A	Visitor's Center area	8/18/2002	1pm-3pm	100-175
# 1503	Festival	Puerto Rican Heritage Statewide Committee	Rick Cerone Complex	9/5/02 - 9/8/02 Thursday - Sunday	5pm-11pm	10,000
# 1577	Walk-a-lhon	Opt's Evente	Building # 50 area & paths throughout park.	9/29/2002	12noon-6 pm	3,000
# 1595	Softball Tournament	Seton Hall Law School - Irish American Law Students Association	Extension area diamond #'s 2,3 & 4	10/5/2002 Rain Date: 10/12/02	9am-5 pm	100
# 1600	Cross Country Meet	Bishop Francis Essex Catholic H.S.	Clifton Ave. area around Lake	10/12/2002	1pm-3pm	60

Table 7 - 2002 Special Events within Branch Brook Park

The Southern Division is host to a health day festival, a cross country meet, and wedding ceremonies. These events were anticipated to draw 500, 60, and 100 people, respectively. The Middle Division was host to a walk-a-thon, softball tournaments (3-two day events), field day, carnival, and festival with anticipated attendance of 299, 90, 150, 10,000 and 10,000 people, respectively. The carnival and festival are four-day events. The Northern Division hosts a bicycle training series, religious festival, and a walk-a-thon with anticipated attendance of 60, 150 and 3,000 people, respectively. The Extension hosts a field trip, field day, and two softball tournaments with 100, 85, 190 and 100 people anticipated in attendance. There were also four wedding ceremonies in the extension with 30, 30, 150 and 175 people in attendance. The Cherry Blossom Festival, as mentioned earlier, is held throughout the park and draws 10,000 over the week long event.

In summary, over the course of 2002, there was approximately one special event per month held in each of the four divisions of Branch Brook Park. The events that generate the heaviest use occur in the Middle Division, with two events of 10,000 people (one in July and one in September), one event of 299 in April, and three of 90 in May, June and July.

Information was not available regarding the programming at the Seniors' Centers in Branch Brook Park and Belleville Park.

Traffic Level of Service

The traffic level of service investigation took place during April and May 2003. Twenty-one intersections were evaluated within the park (Figure 29) to determine where the park users are traveling from, where they exit the park, and in which direction they travel. This will also help give an understanding for any internal roadway improvements that may be required, such as traffic calming measures or road closure times.

Mass Transit

Evaluating the mass transit opportunities for access to Branch Brook Park and Belleville Park aids in the further understanding of parking needs within the park. Those users that have easy access to mass transit can be encouraged to use the services in lieu of driving to the park. Evaluation of mass transit also aids in addressing the pedestrian access needs for the parks. An extensive mass transit network exists that allows users to arrive at Branch Brook Park without the use of a vehicle. The following information is from NJ TRANSIT (NJ TRANSIT, 2002a)

NJ TRANSIT Bus

NJ TRANSIT operates an extensive bus network of intra and interstate routes throughout New Jersey and into New York and Philadelphia.

All bus stops within a two-block radius of Branch Brook Park were located. As no stops were located within two blocks of Belleville Park, the closest stop was identified. Figure 24 illustrates the six stops served by seven bus routes located in close proximity to Branch Brook Park. Beginning in Newark and radiating out, these routes connect to 16 other New Jersey municipalities and to New York City. These routes are as follows:

BRANCH BROOK PARK

Cultural Landscape Report
Newark, New Jersey

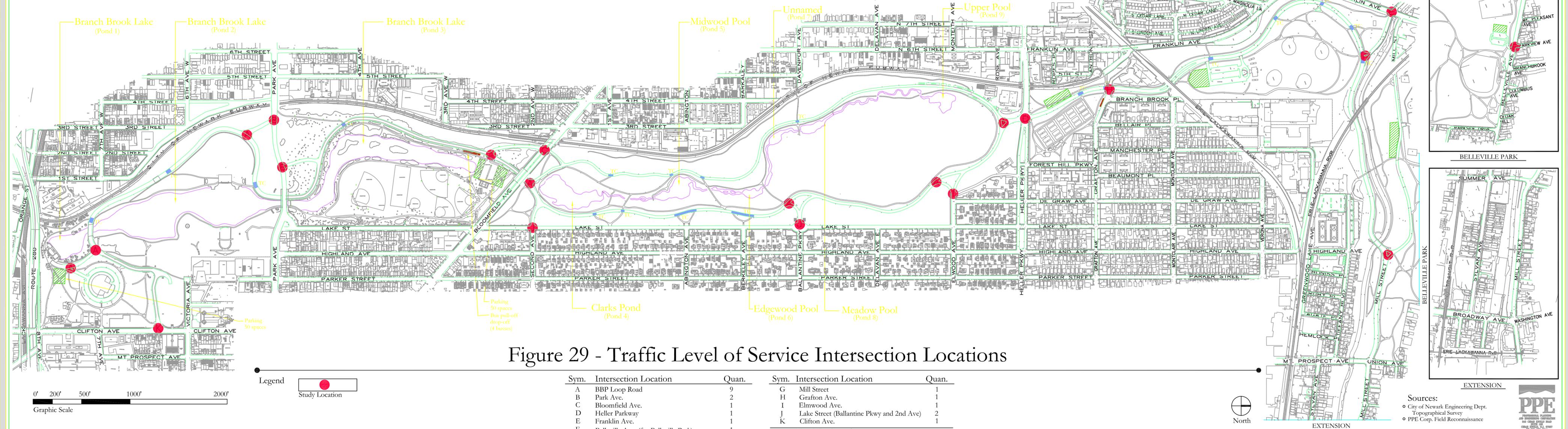


Figure 29 - Traffic Level of Service Intersection Locations

Sym.	Intersection Location	Quan.	Sym.	Intersection Location	Quan.
A	BBP Loop Road	9	G	Mill Street	1
B	Park Ave.	2	H	Grafton Ave.	1
C	Bloomfield Ave.	1	I	Elmwood Ave.	1
D	Heller Parkway	1	J	Lake Street (Ballantine Pkwy and 2nd Ave)	2
E	Franklin Ave.	1	K	Clifton Ave.	1
F	Belleville Ave. (for Belleville Park)	1		Total Evaluated	21

Sources:
 • City of Newark Engineering Dept. Topographical Survey
 • PPE Corp. Field Reconnaissance

- Newark Willowbrook (11),
- Mt. Prospect (27),
- Newark-Montclair State-Willowbrook (28),
- Park Avenue (41),
- Main Passaic (74),
- Bloomfield-City Subway (93),
- Clifton Avenue-Crosstown (99),
- Newark-New York (108).

The closest bus stop that services Belleville Park is located at Franklin Avenue and Belleville Avenue (Figure 30). These routes connect Branch Book Park to nine New Jersey municipalities. Routes 92 and 93 also connect to the City Subway. There are three routes that service this stop:

- Main Passaic (74),
- Orange Crosstown (92),
- Bloomfield-City Subway (93).

Newark City Subway

As part of its bus division, NJ TRANSIT operates the Newark City Subway, a 4.3-mile light rail trolley system between the Newark-Belleville border and Newark's Central Business District. Opened in the 1930s, the system intersects with the extensive local bus network in the Newark/Essex County area. Providing 17,000 trips daily, the subway operates seven days a week with frequent weekday service, every two minutes, during the morning and evening rush periods (NJTRANSIT, 2002b).

The Newark City Subway links residents in north Newark and from Newark's northern suburbs to the downtown district. This system connects to Newark's Penn Station and intersects with an extensive local bus network in the greater Newark area (NJ TRANSIT, 2002c). The subway runs directly adjacent to Branch Brook Park's western border and terminates at Anthony Street. There are four station stops that service the park (Figure 24): the Park Avenue station, the Bloomfield Avenue station, the Davenport Avenue station, and the Heller Parkway station. There are pedestrian entrances to the park a short walk from each station. Three entrances are at grade and the fourth is an elevated walkway that passes over the subway tracks. The City Subway does, however, cut off the majority of possible pedestrian access points to Branch Brook Park from the west.

NJ TRANSIT Rail

NJ TRANSIT operates the state's commuter rail network. The rail system's 12 lines are grouped into three divisions (NJTRANSIT, 2002d):

- The Hoboken Division (includes the MidTOWN DIRECT service on the Morris & Essex line to and from New York Penn Station and lines operating to and from Hoboken Terminal on the Morris & Essex, Main/Bergen, Pascack Valley and Boonton)
- The Newark Division (includes the Northeast Corridor, North Jersey Coast and Raritan Valley lines operating to and from Newark Penn Station, Hoboken Terminal and New York Penn Station)
- The Atlantic City Rail Line (which operates between the seaside resort city, Philadelphia and points in between).

Because of its extensive system with connections to other rail systems, NJ TRANSIT can be an important link to Branch Brook Park from within New Jersey and outside the state.

City of Newark Greenway Network

The City of Newark is in the process of developing a greenway network to link geographic areas within the city to greenspaces and pedestrian/bicycle paths outside the downtown. Greenways encourage travel by walking and bicycle. The greenway routes have been identified that would connect Branch Brook Park with Weequahic Park, Hayes Park West with Vailsburg Park, and the areas in between. Utilizing this network users of Branch Brook Park will have a direct connection to the central business district and to the four quadrants of the City of Newark.

Parking

The project team examined existing parking availability within the park (Figure 31). There are 1174 total on-street parking spaces and 380 parking lot spaces within Branch Brook Park, and 51 parking lot spaces within Belleville Park. In the Southern Division there are 336 on street parking spaces and 102 parking lot spaces. Parking spaces are not designated in the area leading to the roller rink, however, there is room for a total of 40 cars that can be parked along both sides of the roadway. These numbers are not included in the parking tally. The Middle Division has 283 on street parking spaces and 78 parking lot spaces. There are only two pedestrian access areas to the ball diamond area. One is from the parking lot near the senior center and the other is across the pedestrian bridge near Park Avenue. Even though there is a significant amount of parking in this division, there is poor access to the high use ball diamond area from this parking. This causes parking to occur on Lake Street and other local streets which provide easier access to the ballfields. There are 570 on-street parking spaces available in the Northern Division and no parking lot spaces. There are several pedestrian crossover points from the west to the east side of the park, thus providing ample opportunity to find a place to park. The Essex County maintenance facility (in the Northern Division) has 60-70 people who report there Monday through Friday. Parking along the roadway and adjacent fenced parking is utilized by the workers.

The Extension has no on-street parking spaces designated and 125 parking lot spaces at the Visitors Center only (Figure 25). During the Cherry Blossom Festival, this lot is designated for VIP use only. The tennis facility is not serviced by any parking spaces. Common practice for parking at athletic facilities in the United States is to provide one parking space for every three users (Dines, Harris, 1998). Utilizing this standard, the number of users per court (40), and the full time staff for the facility (2) the tennis facility would need 15 parking spaces. Accommodations for bus drop-off, pick-up, and parking also need to be evaluated.

There is an off-site parking lot available to park users across from the Steven Crane apartments. This area is off Franklin Avenue at Magnolia Lane adjacent to the Extension near the Visitors' Center. This lot is also shared with commuters. There are approximately 100 spaces in this lot.

The surrounding area within ¼ mile of the park boundary was investigated for possible additional off-site parking areas. The west side of Branch Brook Park, the southeast side on Parker Street and Highland Avenue, and bordering areas in Bellville have new development occurring on underutilized parcels. To the northeast of Branch Brook Park, single family homes are located with no vacant or abandoned properties. The majority of parcels that

BRANCH BROOK PARK

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Newark, New Jersey

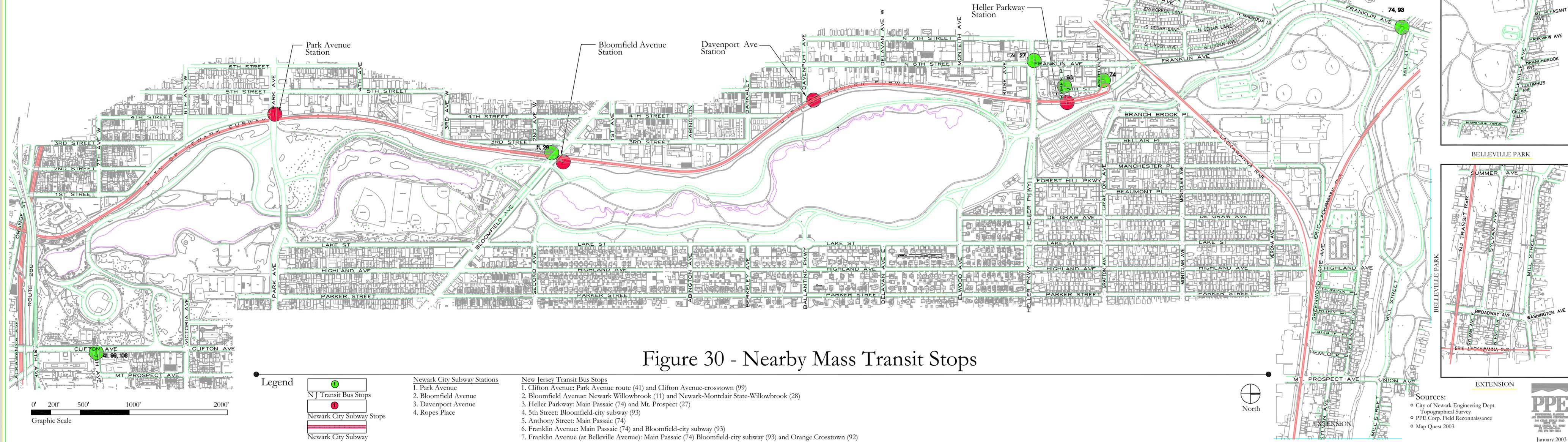


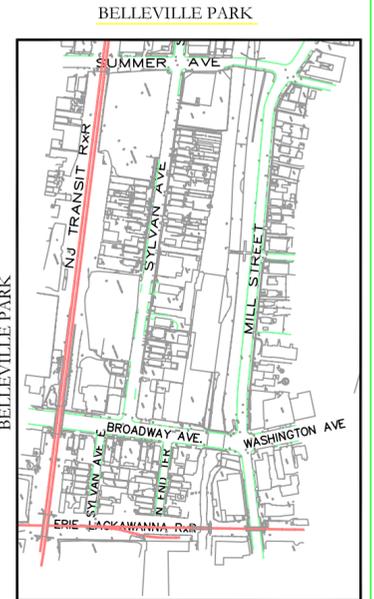
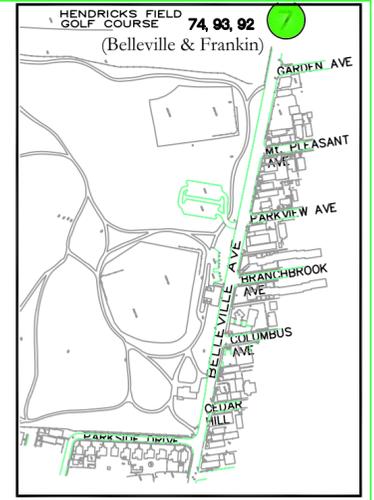
Figure 30 - Nearby Mass Transit Stops

Legend

- NJ Transit Bus Stops
- Newark City Subway Stops
- Newark City Subway

- Newark City Subway Stations**
1. Park Avenue
 2. Bloomfield Avenue
 3. Davenport Avenue
 4. Ropes Place

- New Jersey Transit Bus Stops**
1. Clifton Avenue: Park Avenue route (41) and Clifton Avenue-crosstown (99)
 2. Bloomfield Avenue: Newark Willowbrook (11) and Newark-Montclair State-Willowbrook (28)
 3. Heller Parkway: Main Passaic (74) and Mt. Prospect (27)
 4. 5th Street: Bloomfield-city subway (93)
 5. Anthony Street: Main Passaic (74)
 6. Franklin Avenue: Main Passaic (74) and Bloomfield-city subway (93)
 7. Franklin Avenue (at Belleville Avenue): Main Passaic (74) Bloomfield-city subway (93) and Orange Crosstown (92)



Sources:

- City of Newark Engineering Dept. Topographical Survey
- PPE Corp. Field Reconnaissance
- Map Quest 2003.

BRANCH BROOK PARK

Cultural Landscape Report
Newark, New Jersey

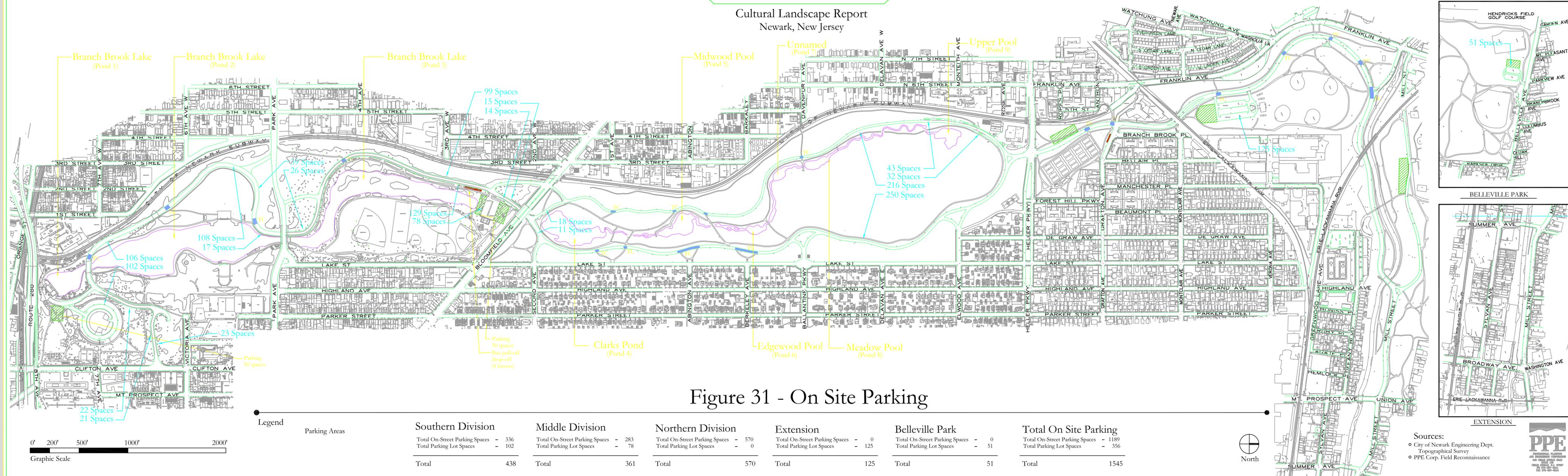


Figure 31 - On Site Parking

Legend

Parking Areas

Southern Division

Total On-Street Parking Spaces - 336
Total Parking Lot Spaces - 102

Middle Division

Total On-Street Parking Spaces - 283
Total Parking Lot Spaces - 78

Northern Division

Total On-Street Parking Spaces - 570
Total Parking Lot Spaces - 0

Extension

Total On-Street Parking Spaces - 0
Total Parking Lot Spaces - 125

Belleville Park

Total On-Street Parking Spaces - 0
Total Parking Lot Spaces - 51

Total On Site Parking

Total On-Street Parking Spaces - 1189
Total Parking Lot Spaces - 356

Total 438

Total 361

Total 570

Total 125

Total 51

Total 1545



Sources:
 • City of Newark Engineering Dept.
 • Topographical Survey
 • PPE Corp. Field Reconnaissance

were vacant or abandoned were 25'x75' and would not support the use as a parking lot. Table 8 lists these parcels and their sizes. There were two sites west of Branch Brook Park that were the size to support off-site parking.

One parcel is located on 1st Street between 2nd Street and 3rd Street. This parcel is 66,000 square feet and currently owned by the City of Newark and designated for recreational use. There is an asphalt pad and lawn on the site with few street trees. This parcel should not be used as a parking lot even though it is underutilized. The second parcel is located on 3rd Avenue between 3rd and 4th Streets. The property appears to be an vacant warehouse and is currently for sale. There is an operating athletic jersey wholesaler located on a portion of the property fronting 3rd Street. The east side of this parcel is 1,000 feet from the Bloomfield Avenue entrance and there is no opportunity to cross the City Subway without a major intrusion into the park. No other available properties for development as off-site parking locations were found within ¼ mile of Branch Brook Park and Belleville Park.

NO.	LOCATION (1)	DESCRIPTION	AREA (SF)
1a	Block 1912 - Lot 27	Abandoned Property	5,616 sq. ft.
1b	Block 1912 - Lot 28	Vacant Lot	352 sq. ft.
2a	Block 1914 - Lot 1	Abandoned Property	1,200 sq. ft.
2b	Block 1914 - Lot 2	Vacant Lot	2,475 sq. ft.
3a	Block 1914 - Lot 71	Abandoned Property	1,300 sq. ft.
3b	Block 1914 - Lot 31	Vacant Lot	1,776 sq. ft.
4a	Block 1914 - Lot 14	Abandoned Property	2,500 sq. ft.
4b	Block 1914 - Lot 15	Vacant Lot	2,500 sq. ft.
5	Block 1908 - Lot 6	Vacant Lot	4,000 sq. ft.
6	Block 1949 - Lot 27	Vacant Lot	2,200 sq. ft.
7	Block 1951 - Lot 22	Property For Sale	66,000 sq.ft.
8	Block 599 - Lot 14	Abandoned Property	3,500 sq. ft.
9	Block 538 - Lot 12	Abandoned Property	1,445 sq. ft.
10	Block 538 - Lot 29	Abandoned Property	2,500 sq. ft.
11	Block 507 - Lot 10	Abandoned Property	2,000 sq. ft.
12	Block 507 - Lot 17	Abandoned Property	2,500 sq. ft.
13	Block 538 - Lot 40-41	Abandoned Property / burnt	4,900 sq. ft.
14	Block 1911.02 - Lot 48	Developed asphalt pavement	45,800 sq. ft.
15	Block 507 - Lot 24	Abandoned Property	2,500 sq. ft.
16	Block 538 - Lot 55-56	Abandoned Property / burnt	3,000 sq. ft.

(1) Area within 1/4 mile of Branch Brook Park and Belleville Park boundaries.

Table 8 - Possible Off-site Parking Locations

CONCLUSION

Branch Brook Park and Belleville Park are great resources for not only the local residents but also Essex County and the region as a whole. They represent the forward thinking of the Essex County forefathers and the design forethought representative of projects completed by Fredric Law Olmsted and the Olmsted Brothers. Due to constraints present at the time of the original design and construction and lack of funding the parks over the last decade have fallen into disrepair.

The extent of erosion, the observance of algae, wetland weed vegetation, lack of a complete riparian buffer, water turbidity, sedimentation, stormwater system discharge into the water bodies and groundwater contamination lead to the conclusion that the water system in Branch Brook Park remains eutrophic and in poor condition. Several tasks can be completed to address the eutrophic condition and contributing factors to the eutrophication. These tasks include immediate emergency measures to save a portion of the resource, public and staff outreach and education, feasibility studies and implementation of the recommendations from the feasibility studies. There are many potential opportunities to improve the water quality in Branch Brook Park. To capitalize on them several feasibility studies are required to be completed. Increasing the water quantity requires a much more involved study of the water budget for the park. The planning for the completion of the recommendations should be incorporated into the treatment and management plan for Branch Brook and Belleville Parks.

There appears to be adequate utilities for improvements in Belleville and Branch Brook Park. Without knowledge of the specific improvements a final determination can not be made.

Branch Brook Park and Belleville Park are being heavily utilized for their athletic fields and as a location for special events. Specific information for Belleville Park was not available as well as the number of users for the athletic events. There are significant parking opportunities for general use of the park. There are not, however, adequate parking facilities located adjacent to the Middle Division and Belleville Park athletic fields, nor the tennis facility in the Extension. A traffic level of service was conducted in the spring of 2003 which will be utilized to analyze the number of parking spaces required in the park. Recommendations for improvements to traffic circulation will also be provided. These recommendations should be incorporated into the treatment and management plans.

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