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associates, pc

# **WASTEWATER CONVEYANCE SYSTEM**

## **YEAR 2015 REPORT ON PHYSICAL CONDITIONS**

*Prepared For:*  
**The Township of Hillsborough  
Municipal Utilities Authority**

A red ink signature, appearing to be 'Agha S. Hasan', is written over a horizontal line.

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## I. EXECUTIVE SUMMARY

The purpose of this report is to provide a general assessment of the present condition of The Township of Hillsborough Municipal Utilities Authority (“Authority”) wastewater collection and conveyance facilities.

The Authority currently operates and maintains over 172 miles of gravity sewer, 15 sewage pumping stations, and 14.6 miles of force main, including the Valley Road Sewerage Company system, and conducts ongoing inspections to determine the condition of the system.

The Authority continues its program to locate the existing wastewater collection/conveyance system using Global Positioning System (GPS) and Geographic Information System data collection equipment with the eventual goal of incorporating this data into Somerset County base mapping. The Authority currently has approximately 20% of the sewer system located and continues to expand its data base.

## II. INTRODUCTION/BACKGROUND

The Authority, established in 1965, has provided sanitary sewer service to the Township of Hillsborough since 1966 within a twenty (20) square mile service area situated in the Royce's Brook Drainage Basin and adjacent Hillsborough Township areas. Currently the Authority conveys an average daily flow of 3.2 million gallons generated by approximately 12,000 residential and 1,920 and industrial users.

All wastewater collected by the Authority system is discharged to the Somerset-Raritan Valley Sewerage Authority (SRVSA) interceptor for treatment and disposal at the SRVSA plant in Bridgewater Township. The TTHMUA contribution represents approximately 17.35% of the wastewater volume received by the SRVSA.

Appendices A, B and C include a Sewerage Facility Inventory and Schedule of Cost for the Authority system, pumping station inspection reports, maintenance log forms and a sewerage facilities plan showing the Authority service area and collection system.

### III. SUPPORT FACILITIES AND MAINTENANCE EQUIPMENT

The Authority administrative offices are located in Hillsborough Township at the New Center Village shopping center complex on Triangle Road. At this location, the Authority coordinates daily operation of the system, maintains plans and records concerning new construction, extensions and connections and schedules inspection/maintenance activities.

Maintenance functions are conducted out of the facility adjacent to the Sunnymead Pumping Station near Harrison Street consisting of a repair shop with crew quarters and a separate 7,200 square foot storage garage containing vehicles and equipment.

Major items of maintenance equipment include the following:

- Vactor 2100 Series 1,500 gallon combo vacuum/jet unit with 10 cubic yard debris box
- 3,000 gallon vacuum tank truck
- Envirosight CCTV System
- 50 KW trailer mounted emergency generator
- John Deere 310A backhoe/loader
- John Deere 310SG backhoe/loader
- Sterling M8500 5/7 cubic yard dump truck (40,000 GVWR)
- 2010 VAC CON Sewer Cleaning Truck
- 2010 CAM 20 Ton Tilt Bed Trailer
- Ford 3.5 cubic yard dump truck
- Eight (8) crew pickup trucks
- Dodge 4-wheel drive pickup truck
- Dodge van
- 2-Trailer mounted, 4" centrifugal, solids handling pumps
- A 4-inch Godwin centrifugal, solids handling bypass pump
- Closed-circuit television pipeline inspection and grouting system
- 2-Closed-circuit television systems for lateral and sewer connection inspection
- Closed-circuit television system with pan/tilt self propelled camera.
- Ten (10) Sigma 910 Flowmeters
- Two Toshiba Mag Flow Meters
- Two Flo-Dar Gravity Flow Meters
- John Deere Gator
- Billy Goat Brushcutter
- One (1) Panametrics Transit Time Meter
- Geographic Information System (GIS) data collection equipment

The maintenance facility and equipment listed above is reported to be in serviceable condition.

#### IV. AUTHORITY OPERATION AND MAINTENANCE PROCEDURES

As in past years and as a means of monitoring the condition of gravity sewers, the Authority periodically measures the volume of wastewater transported at key points throughout the system with portable metering equipment. Where metering results may not correlate with calculated flow estimates, selected sections of the sewers are visually inspected and/or examined with closed circuit television equipment to locate possible sources of extraneous flow. Depending on the nature of the problem, pressure grouting or replacement may be employed as a means of gravity sewer repair.

The Authority utilizes a pumping station Inspection Report form to record basic station data such as pump running time, generator fuel consumption and general observations made during these routine inspections. Under normal conditions each station is inspected twice a week except for the Sunnymead station which is inspected daily.

In addition to daily/weekly inspection report forms, more specific Authority maintenance functions are identified on Maintenance Record Logs that include date entries for each item of work completed. Copies of the Pumping Station Inspection Report and Maintenance Record Log forms are included in Appendix B.

In order to proactively identify the need for less obvious replacement/repair needs at older stations, preventative maintenance programs are also being developed to audit mechanical/electrical system equipment conditions. These audits are typically performed by contractors specializing in this work.

With respect to safety procedures, Authority personnel have been trained in accordance with OSHA/PEOSHA regulations and are equipped with a full complement of safety equipment.

## V. SYSTEM IMPROVEMENTS/REPAIRS

### A. Mulford Lane Sewage Pumping Station

This facility has been upgraded as the primary means of conveying wastewater discharged to the collection system upstream of the now decommissioned River Road Wastewater Treatment Plant. Upgrading work included new mechanical and electrical modifications to improve station wet well and electrical equipment access. The Authority has completed the Bid Documents for replacement of the existing submersible sewage pumps with wet well mounted suction lift pumps and associated mechanical/electrical equipment. Public bids are anticipated to be received in mid 2015 after the completion of the River Road Sewage Pumping Station project.. This project will be completed by the Authority staff in coordination with a local contractor/excavator.

### B. Sunnymeade and Blackwells Mills Sewage Pumping Station Energy Audits

The three Variable Frequency Drives, (VFD's), were installed in 1999 and are due for upgrading. We are currently evaluating the most efficient way to approach the project and anticipate replacing the three VFD's over the next two years.

### C. Infiltration/Inflow Program/Sunnymeade Sewage Pumping Station Flow Metering

Meter chamber construction for the recently installed Toshiba magnetic flow meters and recording instruments for each of the Sunnymeade station force mains has been completed. The increased data accuracy will permit the Authority to monitor/confirm the Somerset Raritan Valley Sewerage Authority flow and billing data. In addition, the new metering systems will facilitate continuous evaluation of Sunnymeade station operating efficiency and overall infiltration/inflow data. As a part of their ongoing infiltration/inflow abatement (I/I) program additional flow meters have been purchased and will be integrated into the Authority's I/I program. In addition, with the use of the GIS Equipment, the Authority has been able to pinpoint and repair I & I sources uncovered during GIS location operations. The Authority is also pursuing an I & I Remediation Program where the Authority will repair I & I sources located on private property.

### D. River Road Pumping Station

The Authority will be replacing the existing submersible sewage pumps and associated mechanical/electrical equipment. Public bids are anticipated to be received in early 2016. This project will be completed by the Authority staff in coordination with a local contractor/excavator.

### E. Sewage Pumping Station Repairs

In addition to system improvements identified above and routine station and conveyance system repairs, sewage pumps over the last five years have been reconditioned at the following stations:

Station	Year Repair Completed				
<b>Mulford Lane</b>	2011	2012	2013	2014	2015
- Pump 1 Reconditioned		X			
- Pump 2 Reconditioned					
- Spare Pump Reconditioned					
<b>Rohill Realty</b>					
- Pump 1 Reconditioned					
<b>Carriage Hill</b>					
- Pump 2 Reconditioned	X				
<b>Sunnymead</b>					X
- Pump 1 Reconditioned					
- Pump 2 Reconditioned					
- Pump 3 Reconditioned					



VI. FIVE-YEAR CAPITAL IMPROVEMENT PLAN

The following Five-Year Capital Improvement Plan was adopted on September 23, 2015.

**TOWNSHIP OF HILLSBOROUGH MUNICIPAL UTILITIES AUTHORITY  
FIVE YEAR CAPITAL IMPROVEMENT PLAN**

A.	ROYCE BROOK INTERCEPTOR UPGRADE – PHASE 2	\$15,000
B.	REHABILITATION OF MANHOLE CHANNELS – IVY HILL AND CARRIAGE HILL PUMP STATIONS	\$25,000
C.	COMPUTER SYSTEM UPGRADE (Software & Hardware)	\$25,000
D.	REHABILITATION OF DISCHARGE LINE FROM BLACKWELLS MILLS PUMP STATION	\$175,000
E.	PUMPING STATIONS REMOTE MONITORS	\$60,000
F.	PUMPING STATION UPGRADES	\$750,000
G.	SATELLITE LATERAL TV SYSTEM	\$145,000
H.	REPLACE CUES TV/GROUTING TRUCK	\$350,000
I.	SUNNYMEADE PUMPING STATION BY-PASS PUMP	\$100,000
J.	VEHICLE REPLACEMENTS	\$300,000
K.	REPLACE VACUUM TRUCK	\$200,000
L.	INFILTRATION/INFLOW EQUIPMENT	\$75,000
M.	SUNNYMEAD PUMPING STATION SOLAR PROJECT	\$553,000
N.	MISC. EQUIPMENT	<u>\$220,000</u>
	<b>TOTAL ESTIMATED COST</b>	<b>\$2,993,000</b>

## VII. RECOMMENDATIONS

Given the age of older components of the wastewater conveyance system, the Authority continues to pay increasing emphasis on prioritizing and implementing preventative maintenance programs and proceeding with repair and replacement work where required and permissible. This particularly applies to the more complex power distribution, emergency power, sewage pumping equipment and control systems. Potential operation and maintenance, and energy cost savings afforded by newer technologies continue to be a consideration.

We concur with the approach taken by the Township of Hillsborough Municipal Utility Authority to maintain the wastewater conveyance system and related facilities and recommend that current efforts be continued in the present manner.

## APPENDIX A

**Township of Hillsborough Municipal Utilities Authority**  
**Sewerage Facilities Inventory - October 2015**  
**Gravity Sewers Constructed by TTHMUA and PRIVATE Developers to Date:**

PIPE DIA. (IN.)	HTMUA (L.F.)	PRIVATE (L.F.)	TOTALS (L.F.)
8	79,322	672,199	751,521
10	1,230	9,553	10,783
12	16,827	16,838	33,665
14	0	2,408	2,408
15	1,223	0	1,223
16	8,598	2,030	10,628
18	23,623	7,003	30,626
21	5,678	0	5,678
24	29,677	0	29,677
27	5,669	0	5,669
30	15,464	0	15,464
36	1,571	0	1,571
<b>Totals:</b>	<b>188,882</b>	<b>710,031</b>	<b>898,913</b>

**Force Mains Constructed to Date:**

PIPE DIA. (IN.)	TOTALS (L.F.)
1.5	1,196
2	3,470
4	7,052
6	53,185
8	2,600
10	3,630
12	1,233
14	3,630
16	1,233
<b>Total</b>	<b>77,229</b>

**Total Number of Manholes:**      4,371

**Pump Stations:**

Oxford Place	Ivy Hill	Blackwell's Mills
Carriage Hill	Ninth Street	Country Classics
Rohill	Hodge Road	Royce Brook
River Road	Mulford Lane	Gumble Court
Route 206	Boehm Way	Claremount

**Meter Chambers:**

Chamber #9H (Flume) - Southside Avenue, Somerville  
 12" Parshall Flume (o/o by SRVSA)

Chamber #9H (Pipe) – Hillsborough-Somerville Trunk  
 Transit-Time Open Channel Flowmeter (o/o by SRVSA)

**Inverted Siphons:**

345 L.F. each of 8, 14 & 16-Inch Diameter  
 Polyethylene Pipe and Siphon Inlet Chamber

THE TOWNSHIP OF HILLSBOROUGH MUNICIPAL UTILITIES AUTHORITY

SCHEDULE OF COST OF SEWERAGE SYSTEM TREATMENT PLANT,  
SEWERS, PUMPING STATION, ETC.

	BALANCE		BALANCE
	NOVEMBER 30, 2014	ADDITIONS	November 30, 2015
Plant and Facilities-Hillsborough Sewer Company	\$152,642.07		152,642.07
Royce Brook Interceptor	1,037,852.95		1,037,852.95
Royce Brook Plant	196,840.91		196,840.91
Triangle Road Trunk Sewer	235,806.85		235,806.85
Valley Road Trunk and Collector	662,285.59		662,285.59
Hillsborough-Somerville Trunk	570,794.90		570,794.90
Hillsborough Pumping Station	357,133.71		357,133.71
Hamilton Road Trunk Sewer	10,321.13		10,321.13
Country Club Infiltration	281,609.68		281,609.68
Falcon Road Collection System	314,690.23		314,690.23
Collector Line - Kimberwyck	31,477.82		31,477.82
Amwell Road Collector	150,294.82		150,294.82
Route 206 Collector	69,362.64		69,362.64
Valley Road Trunk Extension	334,133.33		334,133.33
Frankfort Trunk Sewer	817,036.04		817,036.04
Park Avenue Collector	20,677.70		20,677.70
New Amwell Road Collector	242,018.14		242,018.14
Valley Road Collector	9,918.02		9,918.02
Weston Road Collector	3,028.75		3,028.75
Camplain Road Extension	709.20		709.20
Flagtown Collection System	2,202,243.09		2,202,243.09
Frankfort Trunk Extension	139,682.18		139,682.18
Onandagua Extension	9,539.86		9,539.86
Garage-Maintenance Building	52,871.99		52,871.99
Pleasant's Landing Trunk Extension	19,427.32		19,427.32
On Site and Off Site Improvements:			
City Financial Corporation	67,413.39		67,413.39
U.S. Homes Corporation	94,226.67		94,226.67
J.L.D. Corporation	44,994.81		44,994.81
Various Collector Extensions	66,595.55		66,595.55
Starview Drive Extension	42,611.74		42,611.74
Underground Storage Tank Removal	8,530.00		8,530.00
Sunnymead Pump Station Rehabilitation	476,351.11		476,351.11
Garage/Maintenance Building Expansion	529,286.77		529,286.77
Royce Brook Trunk Dualization	2,062,317.76		2,062,317.76
Brooks Boulevard Force Main	382,937.44		382,937.44
Collection System Detention Facility	30,000.00		30,000.00
Acquisition of Valley Road Sewer Co.	808,940.99		808,940.99
Rehabilitation-Valley Road Sewer Co.	475,766.28		475,766.28
Televising and Grouting Equipment	187,584.17		187,584.17
Computer System	138,062.01		138,062.01
Sewer Cleaning Equipment	368,479.82		368,479.82

THE TOWNSHIP OF HILLSBOROUGH MUNICIPAL UTILITIES AUTHORITY

SCHEDULE OF COST OF SEWERAGE SYSTEM TREATMENT PLANT,  
SEWERS, PUMPING STATION, ETC.

Septage Hauling Equipment	70,208.00		70,208.00
Equipment and Furniture	1,123,517.25	-155,389.51	968,127.74
Carriage Hill Sewer Replacement	300,085.08		300,085.08
Hillsborough-Somerville Trunk Replacement	1,064,544.87		1,064,544.87
Generator/Pump Station Upgrade	537,010.53		537,010.53
Carriage Hill Pump Station Upgrade	170,512.26		170,512.26
River Road Pump Station Upgrade		42,454.30	42,454.30
Royce Brook Trunk Dualization - Phase II	4,406,068.08		4,406,068.08
Ivy Hill/Oxford Pump Station Upgrades	240,755.81		240,755.81
Fox Chase Sewer Replacement	41,482.87		41,482.87
Scott Drive Rehabilitation	132,839.75		132,839.75
Lateral Repairs	5,076.82		5,076.82
Sewer Main Repairs	12,277.14		12,277.14
Easement Maintenance		13,400.00	13,400.00
Engineering Surveys	19,187.68		19,187.68
Financial and Legal Expense	239,248.33		239,248.33
Bonding Expense	252,001.03		252,001.03
Interest and Discount on Bonds	7,678,753.85		7,678,753.85
Interest on Notes	987.43		987.43
Trustee's Fees	32,066.94		32,066.94
<b>Total</b>	<b>30,033,121.15</b>	<b>-99,535.21</b>	<b>29,933,585.94</b>
Deductions:			
Interest on Investments	3,832,585.51		3,832,585.51
<b>NET COST</b>	<b>\$26,200,535.64</b>	<b>-\$99,535.21</b>	<b>\$26,101,000.43</b>

## APPENDIX B

# INSPECTION REPORT

[illegible]



**PUMPING STATION:**

MONTH: 20

MONTH: 20

[illegible]

**PUMPING STATION:**

MONTH: 20

### MAINTENANCE RECORD LOG

[illegible]

## APPENDIX C

### SEWERAGE FACILITIES PLAN (REVISED APRIL 2009)

THE TOWNSHIP OF HILLSBOROUGH MUNICIPAL  
UTILITIES AUTHORITY

— Sewerage Facilities Plan —

