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WASTEWATER CONVEYANCE SYSTEM

YEAR 2017 REPORT ON PHYSICAL CONDITIONS

Prepared For:
The Township of Hillsborough
Municipal Utilities Authority

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Report contents include information provided by the Authority.

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 177 miles of gravity sewer, 16 sewage pumping stations, and 16 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 30% 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
- Seven (7) crew pickup trucks
- Jeep Patriot compact crossover SUV
- 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
- SCADA Pump Station Monitoring System

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

Upgrading work continues to make the facility 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 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. Old and antiquated control system needs to be replaced; new circuit board based controls system has been received; Contractor is coordinating with Electric Company for shut down so system may be replaced.

B. Royce Brook (Sunnymead) Sewage Pumping Station

The three Variable Frequency Drives, (VFD's) installed in 1999, were replaced in 2016 and 2017. Authority has commenced on the initial steps for the construction of a new Pump Station to permit abandonment of the existing Sunnymead Pumping Station. Condition assessment of the two forcemain piping was performed through non-destructive Broadband Electro-Magnetic (BEM) Inspection, to determine existing pipe wall thickness at 2 locations (at the low spot – station grounds; and at the high spot - adjacent to the Ball Field in Village Green Park) on each forcemain. Results confirmed loss of wall thickness near the pipe crown at all 4 locations, and recommended continued testing every 5 – 10 years.

C. Blackwells Mills Sewage Pumping Station

A station by-pass connection was added, and volute on one of the pumps was replaced. Authority intends to repair structure of manhole located upstream of the station and in the station driveway, replace the older control system. This station is anticipated to be worked on after the Royce Brook (Sunnymead) Station.

D. River Road Sewage Pumping Station

The Authority replaced the mechanical/electrical equipment in 2016, and 2017; the submersible sewage pumps were replaced in 2017. This project will be completed by the Authority staff in coordination with a local contractor/excavator. A roof has been placed over the outside enclosures for poer and control equipment. Sewage pumps have been replaced, driveway has been paved; fence and gate repairs will be done soon.

E. Ivy Hill Sewage Pumping Station

Authority anticipates replacement of all gate and check valves before the years' end.

F. 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				
Mulford Lane	2013	2014	2015	2016	2017
- Control system					New control system installed with Electric Company coordinated shut down.
Claremont					
- Pump 1 Replaced					X
- Pump 2 Replaced					X
Route 206					
- PLC Number 1 Replaced					X
- PLC Number 2 Replaced					X
Carriage Hill					
- Check Valve Pump 1 Replaced					X
- Check Valve Pump 2 Replaced					X
Sunnymead			X		
- Pump 1 Reconditioned					New VFD
- Pump 2 Reconditioned					New VFD
- Pump 3 Reconditioned					New VFD
River Road					
- Replaced entire mechanical/ electrical equipment					X

VI. FIVE-YEAR CAPITAL IMPROVEMENT PLAN

The following Five-Year Capital Improvement Plan was adopted on September 27, 2017.

TOWNSHIP OF HILLSBOROUGH MUNICIPAL UTILITIES AUTHORITY

FIVE YEAR CAPITAL IMPROVEMENT PLAN

A. SUNNYMEADE PUMP STATION UPGRADE	\$1,120,000
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	125,000
E. REHABILITATION OF ROUTE 206 SEWER LINES	150,000
F. PUMPING STATION UPGRADES	750,000
G. SATELLITE LATERAL TV SYSTEM	145,000
H. REPLACE VIDEO TV/GROUTING TRUCK	100,000
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	220,000
O. REHABILITATION OF SEWER LINES	450,000
P. RECONSTRUCT DISCHARGE LINES AT SUNNYMEADE	<u>200,000</u>
TOTAL ESTIMATED COST (Adopted September 27, 2017)	\$4,538,000

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 2017

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	688,039	767,361
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
Totals:	188,882	725,871	914,753

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
Total	77,229

Total Number of Manholes: **4,431**

<u>Pump Stations:</u>				
	Blackwell's Mills	Country Classics	Ivy Hill	River Road
	Boehm Way	Gumble Court	Mulford Lane	Rohill
	Carriage Hill	Hidden Brook*	Oxford Place	Route 206
	Country Classics	Hodge Road	Ninth Street	RoyceBrook

• Operating, but not taken over.

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.

2017	BALANCE		ADDITIONS	BALANCE	
	NOVEMBER 30, 2016			November 30, 2017	
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	49,880.00			526,231.11
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

THE TOWNSHIP OF HILLSBOROUGH MUNICIPAL UTILITIES AUTHORITY

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

2017	BALANCE NOVEMBER 30, 2016	ADDITIONS	BALANCE November 30, 2017
Computer System	172,161.58		172,161.58
Sewer Cleaning Equipment	227,469.82		227,469.82
Septage Hauling Equipment	70,208.00		70,208.00
Equipment and Furniture	974,281.07	33,660.00	1,007,941.07
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	647,477.65	25,357.00	672,834.65
Carriage Hill Pump Station Upgrade	170,512.26		170,512.26
River Road Pump Station Upgrade	131,039.98	39,280.00	170,319.98
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
Blackwells Pump Station Upgrade	31,207.98		31,207.98
Fox Chase Sewer Replacement	41,482.87		41,482.87
Scott Drive Rehabilitation	132,839.75		132,839.75
Lateral Repairs	14,232.95		14,232.95
Sewer Main Repairs	18,927.14		18,927.14
Easement Maintenance	26,000.00		26,000.00
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
Total	30,091,495.75	148,177.00	30,239,672.75
Deductions:			
Interest on Investments	3,832,585.51		3,832,585.51
NET COST	\$26,258,910.24	\$148,177.00	\$26,407,087.24

APPENDIX B

APPENDIX C

SEWERAGE FACILITIES PLAN (REVISED APRIL 2009)

THE TOWNSHIP OF HILLSBOROUGH MUNICIPAL
UTILITIES AUTHORITY

— Sewerage Facilities Plan —



