Agenda Report

Subject: **Amendment to the Agreement for Engineering Services Sanitary Sewer Evaluation Survey with Strand Associates**

Prepared By: Steven M. Saunders, Director of Public Works/Village Engineer

Date: September 13, 2012

The Village recently completed a study to identify areas of the Village susceptible to storm water infiltration and inflow (I/I) into the sanitary sewers. The results of the I/I study were presented to the Village Council at the August 21, 2012 meeting (Attachment #1). At the conclusion of the presentation and after discussions, the Council directed the Village to proceed with additional services to investigate specific portions of the Village's sanitary sewer system in order to locate defects, identify rehabilitation measures and costs, and develop a rehabilitation program. To that end, Strand Associates prepared the attached proposal (Attachment #2) to amend the current engineering services agreement.

The amended agreement provides for detailed field investigations in the three priority drainage basins (14, 15, and 20) plus the remaining five cluster areas, identified from the flow monitoring study and discussed by the Council on August 21, 2012.

The results of these detailed investigations will provide the Village with specific, identified sources of I/I, recommended programs to remove the identified I/I, and opinions of probable cost for removing the I/I, in the evaluated areas. The next step upon completion of these evaluations would be to design and construct the recommended improvements.

Recommendation:

Consider authorizing the Village Manger to sign an amendment to the agreement with Strand Associates to perform additional services associated with the Sanitary Sewer Evaluation Study for an expenditure of up to $46,900, as outlined in their September 6, 2012 proposed Contract Amendment #1.

Attachments:

1. Agenda Report (August 21, 2012)
2. Strand Associates Proposal

Attachment #1
Agenda Report (August 21, 2012)

Agenda Report

Subject: **Sanitary Sewer Evaluation Survey – Report and Next Steps**

Prepared By: Steven M. Saunders, Director of Public Works/Village Engineer

Ref: February 21, 2012 Council Meeting
July 17, 2012 Council Meeting

Date: August 15, 2012

Background and Prior Discussions

On February 21, 2012, the Village Council awarded a contract to Strand Associates to complete a flow monitoring analysis of the Village's sanitary sewer system to identify areas of the Village subject to inflow and infiltration (I/I). I/I is stormwater or groundwater that enters the Village's separate sanitary sewer system, which is designed and intended to handle solely wastewater. Excessive I/I in the sanitary sewer system can lead to basement backups.

Strand Associates installed 30 flow meters to record flow information for the majority of the Village's sanitary sewer system. Flow monitoring took place for the period April 9 to June 8, 2012. Following completion of the flow monitoring work, Strand Associates compiled and analyzed the data and provided some preliminary recommendations on prioritizing basins for detailed study and analysis. Strand's data analysis consisted of identifying average dry-weather flow as a baseline, and calculating the observed increases between wet-weather flow and dry-weather flow during and immediately after a measured rain event. Inflow and infiltration data were evaluated, quantified and tabulated for each of the 30 metering basins.

Inflow was characterized by two methods. In the first method, a ratio of wet-weather flow to dry-weather flow, known as "peaking factor", was calculated for each metering location. The higher the peaking factor, the more susceptible the metering basin is to inflow. In the second method, inflow for the entire system was calculated, and each basin was ranked based on the percentage of inflow it contributed to the entire system. Infiltration for each basin was calculated using the flow volume beginning 30 minutes after the conclusion of each rainfall event and ending when the flow volume returned to the baseline dry weather flow.

Strand provided some preliminary recommendations on how to rank basins for prioritizing future actions, based on a data-driven, empirical evaluation of the system. These preliminary recommendations were discussed by the Village Council on July 17, 2012. At that meeting, the Council directed staff and Strand Associates to finalize their recommendations concerning areas subject to further detailed survey and evaluation. These areas should be selected by focusing on basins most susceptible to I/I (based on flow metering results) and areas shown to be susceptible to basement flooding ("clusters" shown in the 2011 flooding survey).

Immediate Next Steps

Strand Associates has identified immediate next steps for consideration by the Village. This activity consists of performing a pilot SSES study entailing detailed evaluations of the sanitary sewer system in certain high-priority basins and cluster areas discussed at the July 17, 2012 Council Meeting. Strand Associates has recommended that basins 14, 15, and 20 be evaluated, along with a portion of basin 26, previously unmetered areas of Oak Street and Sunview Lane and five clusters of reported flooding east of Green Bay Road. These recommended areas are shown in Figure 5.03-1 of the Strand Report, and represent the highest priority areas based on measured I/I and the results of the September 2011 flood survey. Detailed analysis in these areas would consist of manhole evaluations, smoke testing, and, depending on the results of the smoke testing, television inspection of sewer lines showing potential defects.

In basins 14, 15, and 20, these detailed evaluations would start in the portions of the basins where flooding clusters were observed, however these detailed studies would expand to the remaining areas of these basins as well. This approach is recommended because the cause of basement flooding may not originate in the area where flooding was reported. However, starting in the vicinity of the flooding clusters and working back through the remainder of the basin allows for the possibility of discovering problems early in the process and possibly minimizing the level of effort to be expended. In the limited cluster areas, the detailed investigations will be limited to the vicinity of the flooding clusters, again in order to minimize the level of effort to be expended on the program.

Strand Associates has estimated that this pilot SSES study can be completed for $75,000, including $28,100 for potentially televising up to 50% of the evaluated portions of the sewer system. The amount and location of sewer main to be televised will depend on the conditions uncovered during the detailed evaluation. The Village does have the capability of video-inspecting sewers in-house and depending on the amount of television inspection needed, may complete this television inspection with Public Works crews.

This initial detailed evaluation approach presents the Village with several advantages when compared to a broader initial approach of evaluating all of the higher priority areas. First, it focuses the Village's resources on initially addressing the highest priority areas, as evidenced both by I/I evaluation and by the Village's flood survey. Second, it allows the Strand Associates to further refine their estimated costs for future detailed investigations based on direct field inspections in Winnetka. Finally, it will provide the Village with some hard data on the amount and type of defects or needed repairs in the public and portions of private systems in the pilot study areas that can be extrapolated across the remainder of the Village's system to predict the level of capital expenditures needed to address I/I and basement flooding in the remainder of the Village.

Future Actions

Strand Associates has also identified a program of future actions for consideration by the Village, to provide a complete evaluation to identify future improvements to the Sanitary

Sewer System. This program includes performing detailed evaluations of all of the remaining metering basins over a two year period at an estimated cost of $340,500.

Strand Associates also recommends for consideration a program that would examine the Village's sanitary sewer system for susceptibility to backups associated with the MWRDGC's intercepting sewer system. This program would consist of the Village purchasing three flow meters (and associated software and staff training) that could be installed in proximity to key points where the Village's system connects to the MWRDGC's system. These meters could be monitored on a long-term basis by Village staff to identify if and when back-up conditions exist in the MWRDGC's system. These meters would also be useful on a long-term basis to evaluate the effectiveness of any future I/I elimination activities by way of before-and-after flow metering. The estimated cost to purchase three flow meters, the evaluation software, and to receive operational training is approximately $24,500. Strand has also suggested undertaking a hydraulic analysis of the Village's sewer system in the vicinity of its connections to the MWRDGC's interceptor system to identify areas where the Village's system might be hydraulically susceptible to backflow from the MWRDGC system. This hydraulic investigation is estimated to cost approximately $30,000, but is not recommended by staff at this time. It is less expensive and more reliable for the Village to monitor its system in the vicinity of the MWRDGC connections to obtain hard evidence of potential backflows into the Village system than to expend a significant sum to determine if the MWRDGC's system can theoretically surcharge into the Village's system.

Summary and Recommendations

Strand Associates has proposed a program of actions that, if implemented in its entirety, would complete a detailed evaluation of most of the Village's sanitary sewer system, and a determination of the susceptibility of the Village's system to backup from the MWRDGC intercepting system, by the end of 2014, at a cost of approximately $470,000. What is missing from this estimate, however, is the timeline and cost of making identified repairs. It is impossible at this time to provide anything more than a guess as to the nature and cost of potential repairs. Staff is recommending that the Council consider an alternate, more deliberate approach that would immediately address three pressing issues. This approach consists of immediately proceeding with detailed investigations of very targeted areas, consisting of three basins that exhibit significant I/I and basement flooding, plus clusters of identified basement flooding in 8 other limited areas. This approach also includes budgeting for and obtaining three flow meters (and staff training) to be used by staff to identify whether the MWRDGC interceptor system does contribute backup to areas of the Village's sanitary sewer system.

This approach will provide an initial estimate of the nature, scope, and cost of necessary repairs in the most critical areas of the Village's sanitary sewer system, which could be extrapolated to provide an idea of what might be encountered in other areas of the Village. This approach will also indicate if the MWRDGC system backs up to the Village, and could be accomplished for a total estimated cost of approximately $100,000, or less depending on the amount of television inspection required. This approach is detailed below.

Recommended Actions	Estimated Timeframe	Estimated Cost
Detailed Investigation of First Priority Areas (including possible television inspection)	Fall 2012	$75,000
Budget for Improvements identified during Detailed Investigation of First Priority Areas	Winter 2012-13	N/A
Flow Meter Purchase	Spring 2013	$24,500
Engineering and Construction of improvements – first priority areas	Spring – Summer 2013	Unknown
Possible Additional Actions for Future Consideration	**Estimated Timeframe**	**Estimated Cost**
Detailed Investigation of Remaining Priority Areas (including possible television inspection)	2013	$105,500
Engineering and Construction of improvements – remaining priority areas	2014	Unknown
Detailed Investigation of Lower Priority Areas (including possible television inspection)	2014	$235,000
Engineering and Construction of improvements – lower priority areas	2015	Unknown

Budget Evaluation:

The FY 2012-13 Capital Budget contains $350,000 in the sewer fund for three line items – Sanitary Sewer Evaluation Studies, Trenchless Lining, and System I/I Repairs. The current status of capital items in this fund is as follows:

Item	Budget	Estimate	Variance
Sanitary Sewer Evaluation Studies	$100,000	$108,000 (Strand flow metering contract)	$8,000
Trenchless Lining	$150,000	$166,000 (contract awarded to Michels construction May 2012)	$16,000
System I/I Repairs	$100,000	$75,000 (proposed detailed investigation of priority areas and clusters)	($25,000)
Total	***$350,000***	***$349,237***	***($1,000)***

As a result, funding is available to implement the first portions of this approach in the current budget.

Recommendation:

Consider the next steps recommended by Strand Associates and presented in their August 2012 report to the Village of Winnetka:

1. Consider directing staff to obtain contractual pricing for Strand Associates to perform detailed investigations of metering basins 14, 15, and 20, and the flooding cluster areas identified in figure 5.03-1 of Strand Associates' report dated August, 2012, and;

2. Consider directing staff to obtain budgetary pricing for purchase of 3 flow meters, associated software, and operational training, for use in evaluating possible backflow from the MWRDGC's intercepting sewer system.

Attachments:

1. Strand Associates August 2012 Report

Attachment #2
Strand Associates Proposal

STRAND ASSOCIATES®

Strand Associates, Inc.®
1170 South Houbolt Road
Joliet, IL 60431
(P) 815-744-4200
(F) 815-744-4215

September 6, 2012

Mr. Steven M. Saunders, Director of Public Works
Village of Winnetka
1390 Willow Road
Winnetka, IL 60042

Re: Sanitary Sewer Evaluation Survey-Pilot Investigation Study
Amendment No. 1 to Agreement for Engineering Services-
Sanitary Sewer Evaluation Survey

Dear Mr. Saunders:

We are providing the enclosed Agreement Amendment No. 1 for Strand Associates, Inc.® to investigate specific portions of the Village's sanitary sewer system in order to locate defects, identify rehabilitation measures and costs, and develop a rehabilitation program enabling the Village to begin sewer improvements next year.

This Pilot Investigation Program follows recommendations in our Sanitary Sewer Evaluation Survey (SSES)-Flow Monitoring Report dated August 2012, and direction given by the Village Council at its August 21, 2012, Council Meeting. Following are the specific actions and goals of the program.

1. Field investigations will be performed in the areas indicated in Figure 5.03-1 and shall include:

    a. Manhole investigations entailing visual observation of manhole interior and exterior for defects and potential sources of inflow or infiltration into the sewer system. Observations will be documented and recommendations made for rehabilitation of observed manhole deficiencies.

    b. Smoke testing of sewers and observation for potential inflow or infiltration sources on the Village's sewer system and private sewer laterals. Observations and photos will be documented and categorized as either public or private sources. Recommendations will be made for rehabilitation of observed deficiencies. The results of smoke testing will also be used to direct sewer televising.

    c. Sewer televising of sewers that exhibited potential infiltration during smoke testing. Televising video will be reviewed to document sewer deficiencies, and recommendations will be made for rehabilitation of sewer defects.

2. Findings and recommendations from the field investigations will be compiled and opinions of probable cost will be assigned to establish a sewer system rehabilitation program. The rehabilitation program will be presented to the Village Council for direction to proceed.

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3. Upon approval of a final sewer system rehabilitation program, specifications and bidding documents will be developed for the Village to advertise, bid, and perform sewer system rehabilitation.

4. The results of the findings and recommendations will also be used to project what might be expected in other, unstudied areas of the Village. This projection and associated costs will be used by the Village to develop a long-term budget for sewer system rehabilitation across the entire Village.

We are excited about the opportunity to work with the Village and to move forward with addressing its sanitary sewer system concerns. Please call me at 815-744-4200 with questions or comments.

Thank you for the opportunity to continue working with the Village on this project.

Sincerely,

STRAND ASSOCIATES, INC.®

Michael R. Waldron, P.E.

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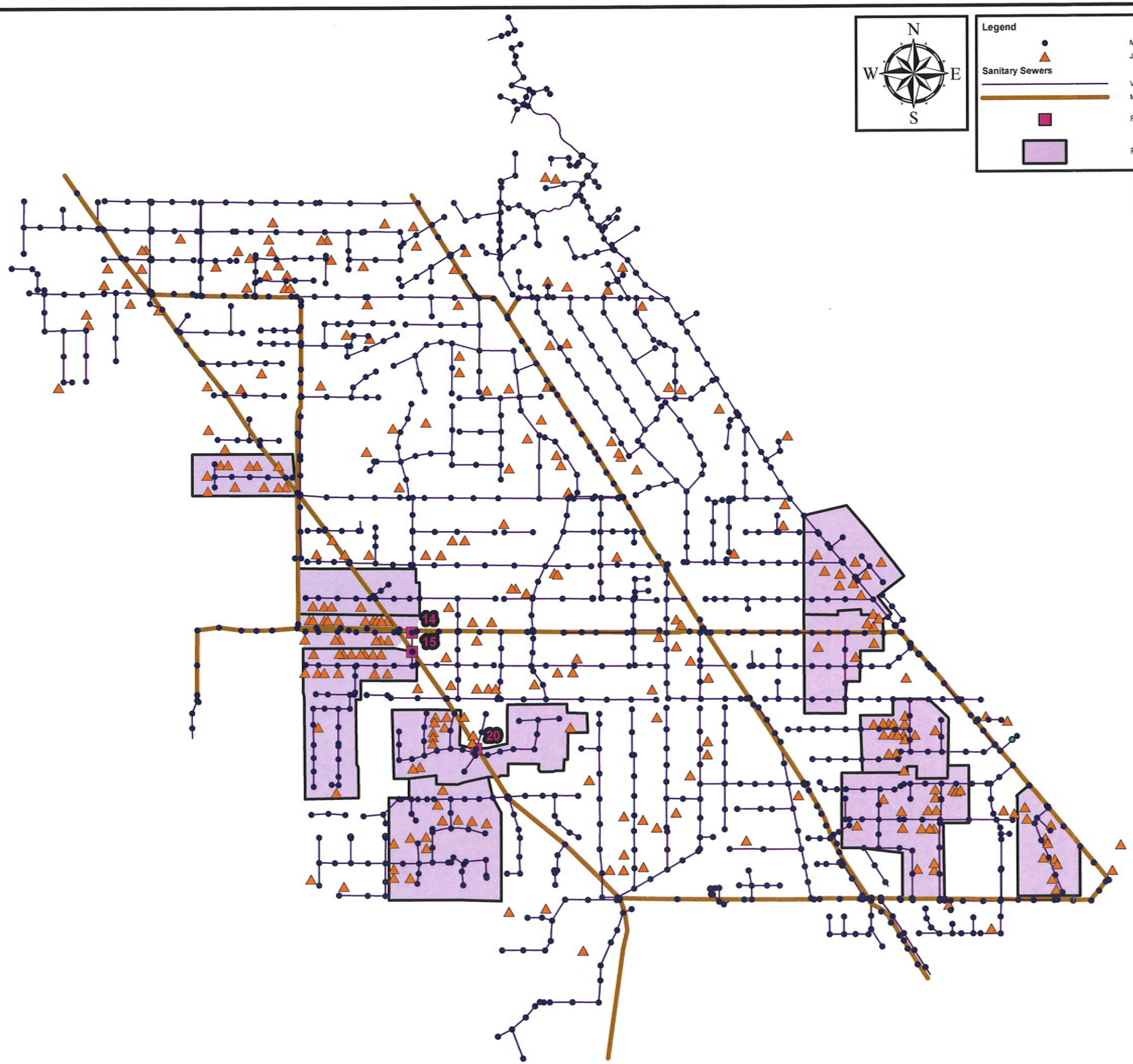


PILOT STUDY

SANITARY SEWER EVALUATION SURVEY
VILLAGE OF WINNETKA
WINNETKA, IL

STRAND ASSOCIATES®

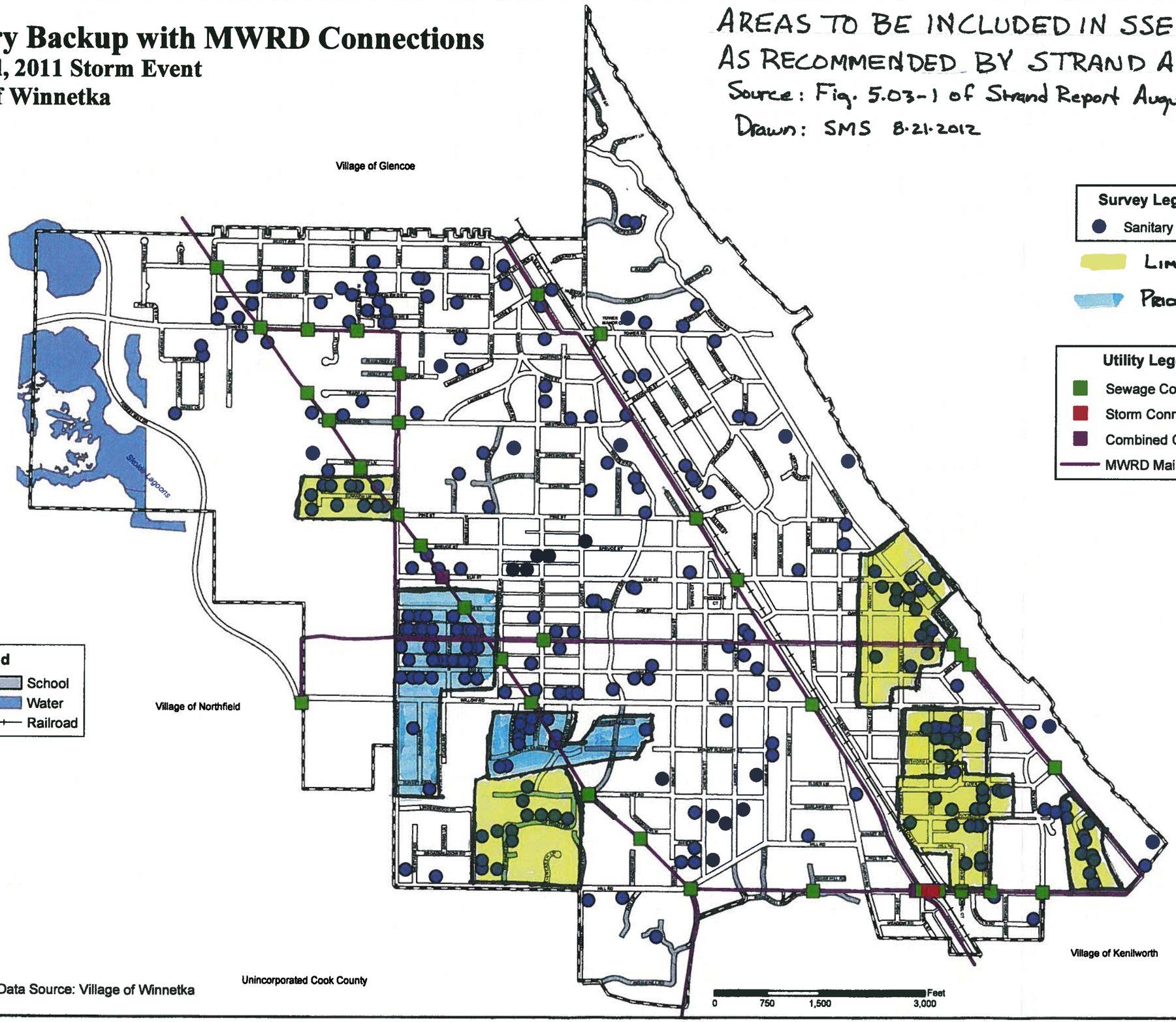
FIGURE 5.03-1

Sanitary Backup with MWRD Connections

July 23rd, 2011 Storm Event

Village of Winnetka

AREAS TO BE INCLUDED IN SSES "PILOT STUDY"
AS RECOMMENDED BY STRAND ASSOC. & STAFF
Source: Fig. 5.03-1 of Strand Report August 2012
Drawn: SMS 8-21-2012



Survey Legend

- Sanitary Backup
- LIMITED FLOOD CLUSTER
- PRIORITY BASIN

Utility Legend

- Sewage Connection
- Storm Connection
- Combined Connection
- MWRD Main

Map Legend

- Village Boundary
- Roads
- Private Roads
- School
- Water
- Railroad

Data Source: Village of Winnetka

GIS consortium

State Plane Nad 83 Illinois East
May 1, 2012 EDV SanitaryBackup

DRAFT

September 6, 2012

Village of Winnetka
1390 Willow Road
Winnetka, IL 60042

Attention: Mr. Steven M. Saunders, Director of Public Works

Re: Amendment No. 1 to the February 28, 2012, Agreement for Engineering Services
Sanitary Sewer Evaluation Survey

This is Amendment No. 1 to the referenced Agreement.

Under **Scope of Services,** ADD the following:

"15. Conduct field investigations in the Pilot Study area depicted in Figure 5.03-1 in the report titled, "Sanitary Sewer Evaluation Survey–Flow Monitoring Study," dated August 2012. Field investigations shall include the following:

a. Manhole observations, documentation of visual defects, and recommendations for rehabilitation of observed manhole deficiencies.

b. Sanitary sewer smoke testing, observation and photo documentation of smoke, and recommendations for rehabilitation of observed deficiencies.

16. Make recommendations to OWNER on sewer televising based on the results of the sanitary sewer smoke testing.

17. Provide technical criteria to OWNER for OWNER's use in procuring sanitary sewer televising video.

18. Review sanitary sewer televising video, document observed sewer defects, and provide recommendations for rehabilitation of observed sewer deficiencies.

19. Compile observations and recommendations into a pilot rehabilitation program and opinion of probable cost and provide to OWNER for review.

20. Attend one meeting with OWNER to review pilot rehabilitation program.

21. Attend one Village Council meeting to present the pilot rehabilitation program.

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DRAFT

22. Develop specifications, bidding documents, and Contract Documents for advertising and bidding the pilot rehabilitation program. OWNER shall advertise the pilot rehabilitation program for solicitation of bids in a news paper of its choice. ENGINEER will use its standard bidding documents.

23. Prepare Bidding Documents using Engineers Joint Contract Documents Committee C-700 Standard General Conditions of the Construction Contract, 2007 edition, technical specifications, and engineering drawings.

24. Attend one bid opening and assist OWNER with award of Contract."

Under **Compensation**, ADD at the end of the first paragraph, "OWNER shall compensate ENGINEER for task items 15 through 24, a lump sum of $46,900."

Under **OWNER's Responsibilities**, ADD the following after item 8,

"9. Procure or conduct sanitary sewer televising based on the results of the smoke testing program and provide televising video to ENGINEER.

10. Provide notification of smoke testing to all potentially affected property owners."

Under **Schedule**, CHANGE June 29, 2012, to "December 21, 2012."

IN WITNESS WHEREOF the parties hereto have made and executed this Amendment.

ENGINEER:	OWNER:
STRAND ASSOCIATES, INC.®	VILLAGE OF WINNETKA
DRAFT	**DRAFT**
Matthew S. Richards Date Corporate Secretary	Steven M. Saunders Date Director of Public Works

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