



United States Environmental Protection Agency

Solar Photovoltaic Screening Study of Properly Closed Municipal Solid Waste Landfills - Siting Solar Photovoltaics at the Town of Schodack Landfill, New York

Prepared by the Environmental Protection Agency, Region 2

September 2018

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Acknowledgments:

We would like to thank David Harris, Town Supervisor, Dawne Kelly, Town Secretary, and Bruce Goodall, Director, Transfer Station Operations, for their assistance with facilitating the landfill visit. We would also like to thank Christina Iwaniw, Distributed Energy Engineer, New York Power Authority (NYPA), Jamie Lang, Section Chief, Bureau of Solid Waste Management, New York State Department of Environmental Conservation (NYSDEC), Paola Munar, NYSDEC, and Dave Lasher, NYSDEC, for participating in the site visit and providing insight with the proposed reuse of the landfill.

This report is to be used for screening purposes only.

Additional evaluations will need to be conducted to fully characterize the feasibility and economics of the Town of Schodack landfill for photovoltaic (PV) installation. Third party solar developers and local utility companies may have technical and financial interests in pursuing potential solar renewable energy projects and should perform additional solar assessments to determine if projects are economically viable.

While the Town of Schodack landfill has been screened for solar PV, the findings of this solar screening study should not be the sole basis for determining if a PV system at the site is viable. The results of this study are presented in an unbiased manner.

This study does not assess the environmental conditions at the site.

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I. Purpose of the Solar Screening Report

Through the U.S. EPA RE-Powering America's Land Initiative, EPA promotes the reuse of potentially contaminated properties, landfills, and mining sites for renewable energy generation. This initiative identifies the renewable energy potential of these sites and provides useful resources for communities, developers, industry, state and local governments or anyone interested in reusing these sites for renewable energy development. A list of RE-Powering America Initiative resources is provided at the end of this report (Section VIII) and can be found at <http://www.epa.gov/oswercpa>.

This solar screening report provides screening/preliminary information to assist Town of Schodack officials in determining the potential for solar photovoltaic (PV) electricity generation at the town landfill. In general, the solar PV system represented in this report is a standalone system sized on proposed available area located at the Schodack Landfill. It should be noted that the viability of implementing a solar PV system on a landfill is highly impacted by the available area for an array, solar resource, shading, operating status, landfill cap status, distance and available capacity to transmission lines, distance to major roads, favorable economic conditions, and community support.

II. Background

According to town officials, the Schodack Landfill serviced the Town of Schodack until its closure in 1999. According the US Census as of 2010, the population of Schodack was approximately 12,794 people. The Landfill is located at 446 Poyneer Road, Nassau, New York. The Town of Schodack landfill is operated and maintained by the Town of Schodack. The grass cover is mowed twice a year.

According to the town officials, the Town of Schodack landfill comprises approximately 12 acres of total land. In general, a membrane/vegetative cap was used to cover the landfill and grass/vegetation covers the landfill cap. A passive gas vent system exists on the site, which must be considered before installing solar panels as they may obstruct construction. According to Columbia County officials, there is no leachate collection system in place. The last annual post closure monitoring/maintenance report was completed in 2017. The New York State Department of Environmental Conservation (NYSDEC) requires quarterly and/or annual monitoring pursuant to approved closure plans and solid waste management facility regulations. For more information about the Town of Schodack landfill and landfill design, contact Victoria Schmitt, Region 4 - Materials Management Supervisor, Schenectady Regional NYSDEC Office, work phone: (518) 357-2243.

III. Solar PV System Overview

Major System Components - A typical PV system is made up of several key components including:

- PV modules,
- Inverters and
- Balance-of-System components (including mounting racks, hardware for the panels, and wiring for electrical connections). Electrical connections (including wiring, disconnect switches, fuses, and breakers) are required to meet electrical code (e.g., NEC Article 690) for both safety and equipment protection.

In most traditional applications, wiring from the arrays to inverters (typically positioned off the landfill cap) and inverters to point of interconnection is generally run as direct burial through trenches or above ground using water/gas proof electrical conduits. For landfills, a solar PV array is connected to a mounting system that is anchored to a uniformly loaded concrete foundation or a ballasted system (see figure 2). It is recommended that PV system vendors reflect these costs in the requests for proposals when costing out the overall system. A typical solar PV system over a closed landfill is shown in Figure 1.

Additional information about solar PV systems can be reviewed in Attachment #4.



Figure 1. Town of Ulster Landfill, NY – Ulster County Executive Michael P. Hein
<https://www.youtube.com/watch?v=iikSbeKXrCY>



Figure 2. Fixed Axis Solar PV Array on a ballasted concrete foundation at the Town of Beacon Landfill, NY.

IV. Solar PV Siting Consideration/Assessment

Siting Considerations

On September 19, 2018, the U.S. Environmental Protection Agency, Region 2 (EPA) team, in cooperation with Columbia County officials visited and screened the closed landfill for potential solar photovoltaic (PV) renewable energy generation. In general, for closed landfills, a minimum of 2 usable acres is recommended to site PV systems. Usable acreage is typically characterized as "flat to gently sloping" southern exposures that are free from obstructions and get full sun for at least a 6-hour period each day. Other considerations for siting landfills for solar PV generation include:

Table 1. Siting Considerations for Solar Photovoltaic

Siting Concerns	Looking for
Age of the properly closed/capped landfill	Minor settlement impacts based on the type of waste and age of the landfill. Landfill cap integrity must be maintained during construction and life of the solar PV array.
Site topography	Existing flat area and surface stability for the PV Array. Avoid slope/grade landfill areas > 10 degrees. Slope instability can give way and displace panels & impact solar performance.
Surface and vegetative conditions	Well maintained vegetative cover with minimum soil erosion concerns. Need to have existing storm water controls.
Shading/physical sunlight obstructions on the landfill	Open area with minimum shading from trees and existing on-site buildings in order to maximize sunlight on each solar panel.
Available access roads and close distance to highways/developed roads	Developed roads and easy access for material shipment and to support heavy construction vehicles entering the landfill.
Distance to available electrical transmission lines	Nearby utility lines to interconnect with the proposed solar PV system. Longer distance will have cost and efficiency impacts.
Landfill Gas	Inactive or passive gas wells with proper engineering controls. Integrating solar and landfill gas systems may require the use of gas-proof electrical conduits/fittings.
Nearby natural resources	Nearby wetlands or streams/water bodies. Be aware of any potential flooding concerns and existing endangered species inhabiting the landfill.
Town restrictions	Any specific local codes requirements/restrictions and future land reuse established by the municipality.

During the landfill visit, the EPA solar team screened for available flat and open landfill area, free from sunlight obstruction and suitable to support solar panels. The EPA solar team also used a Solmetric SunEye¹ solar path calculator to assess shading at particular locations by analyzing the sky view where solar panels can be potentially located. By finding the solar access, the instrument can determine if the area is appropriate for solar energy generation.

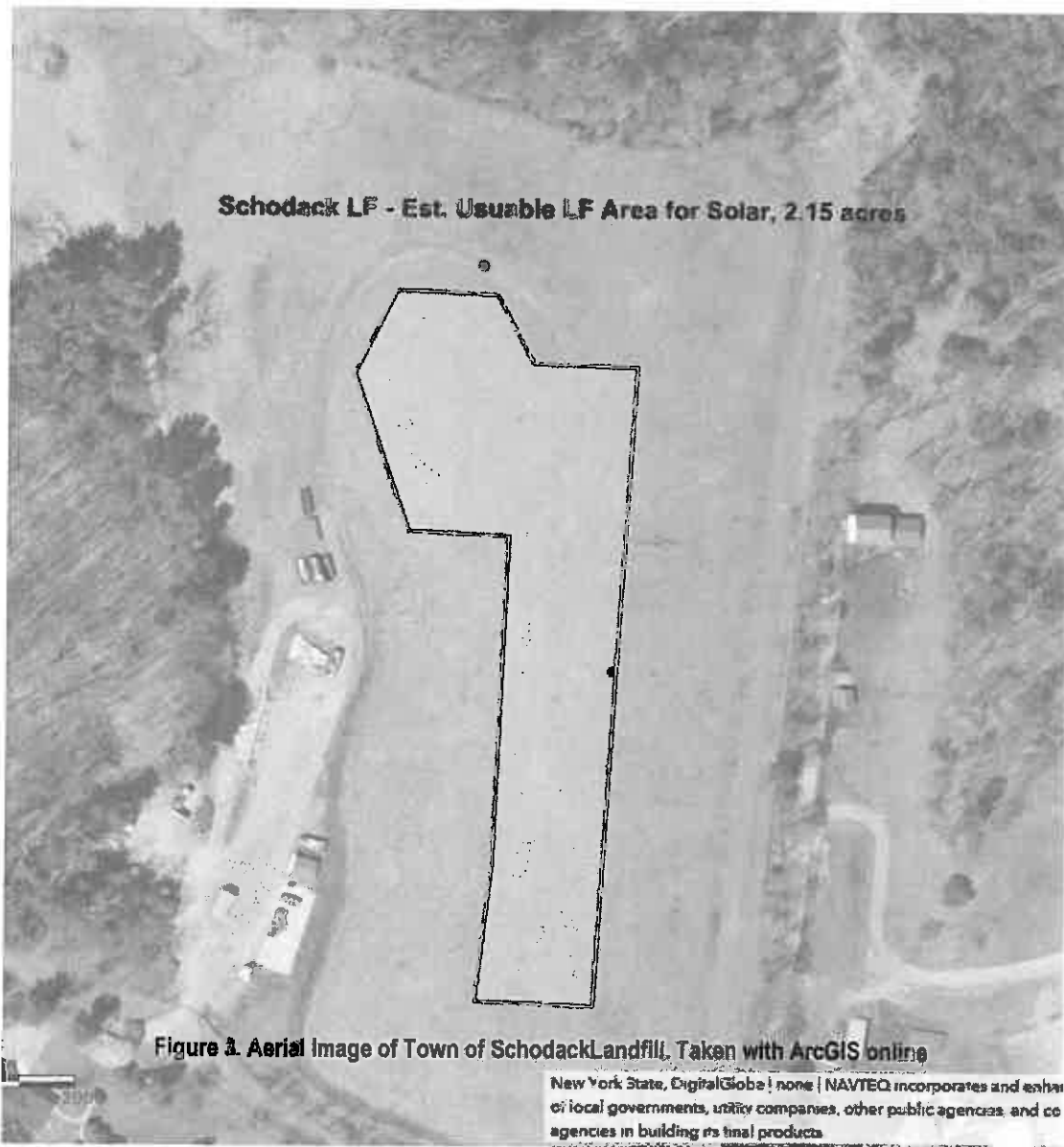
For information about the Solmetric SunEye and the SunEye annual solar access summary for the Schodack landfill see Attachment #2.

¹ More information on this tool can be found at: <http://www.solmetric.com/>

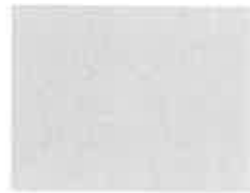
Usable Landfill Acreage

Based on Geographic Information System (GIS) and site assessment, the total recommended usable area for solar PV generation is approximately 2.15 acres. The usable areas for solar PV are depicted in the aerial image in Figure 3. In general, the proposed usable areas correspond to relatively flat and south facing open portions of the landfill and avoid areas with steeper gradient (along the north, south, east, and west portions of the landfill). **Overall, solar access yields averaged 96% annual solar exposure, which is within the favorable annual solar access range for PV systems.** More information about SunEye data can be found in Attachment #2.

Although the EPA team recommends an estimated 2.15 acres for the proposed solar PV usable area, this acreage can be reassessed and adjusted by the municipality or a potential third-party solar developer.



The following photos of the Town of Schodack landfill were collected during the site visit and illustrates the potential usable PV solar areas:



Figures 4 A-E. Images of the Town of Schodack landfill taken by EPA

Transmission/Utility Resources

There is a three-phase transmission line running along East Schodack Road approximately 0.4 miles north from the landfill. In general, the distance from the proposed solar PV system to the point of interconnection with electrical transmission should be within a half-mile distance to yield more viable economic conditions.

It is highly recommended that the Town of Schodack consult with the electric distribution company (EDC) serving the area to discuss the potential for a solar project. In general, a preliminary interconnection transmission study from the local EDC is highly recommended early in the process if Town officials decide to pursue PV solar generation on the landfill. The EDC serving the Town of Schodack is the National Grid². While the interconnection of the landfill to the local transmission line seems favorable, early coordination with National Grid is required to ensure that installations of distributed generation systems are properly designed to safely operate in parallel to the utility system, and to provide for Value Stack crediting if applicable. In New York State, Value Stack crediting is allowed for non-residential solar PV generation systems less than 2 MWs in size and a bill has been drafted to increase this number to 5 MWs for non-residential solar. For more information about the Value Stack crediting system, go to section VII of the study or visit <https://www.nysed.gov/All-Programs/Programs/NY-Sun/Contractors/Value-of-Distributed-Energy-Resources>.

A preliminary interconnection study will help National Grid determine the feasibility of interconnecting to the electrical grid, assess whether potential electrical upgrades are needed, and estimate the interconnection costs. All technical pertinent information about the proposed solar PV system should be provided to National Grid in accordance with their application requirements.

V. PVWatts System Sizing and Performance Results

PVWatts Analysis

PVWatts³ calculator is an online tool developed by the Department of Energy - National Renewable Energy Laboratory (DOE-NREL) to estimate the electricity production of a grid-connected ground- or roof-mounted photovoltaic system. It requires only a few inputs including the location of the system, system size, and basic design parameters such as whether the system will be a fixed tilt or a single-axis tracking. The design parameters have default values or users can adjust them according to their needs. The DC system size required in PVWatts is determined with an acre-to-power conversion factor. Based on research done by NREL for ground mounted solar PV systems and other similar solar PV on landfills, a value of 5.74 acres/MW has been used for a fixed-tilt system. However, based on recent discussions with solar developers involved with solar projects on landfills and improvements with solar technology, packing density, and efficiency, a conversion value of 4 acres/MW was assumed for this study. For the Town of Schodack landfill, this study recommends usable solar PV on an estimated 2.15 acres of the site for a system size of 0.5375 MW DC.

The landfill location is used to connect to NREL's Typical Meteorological Year (TMY) data, which is the closest weather data source. NREL has compiled TMY data for thousands of locations throughout the United States. This data includes the solar irradiance, which is a measurement of solar radiation on the surface of the earth and is measured by the power (Watts) per unit area (m^2), W/m^2 . The solar radiation values represent the resource available to a flat plate collector, such as a photovoltaic panel, oriented due south at an angle from horizontal to equal to the latitude of the collector location. Solar radiation, or insolation (irradiance multiplied by time), is measured in units of Watt-hours per unit area during a specific time interval. Solar radiation above 3.5 kWh/ m^2 /day, is considered favorable when considering PV siting locations. For the Town of Schodack landfill, the TMY data is taken from a weather station located 1.2 miles from the landfill and the solar radiation level was measured at 4.5 kWh/ m^2 /day.

² National Grid https://www9.nationalgridus.com/masselectric/business/energyeff/distributed_generation.asp

³ <http://www.nrel.gov/rredc/pvwatts/> PVWatts®

The weather station identification information, PV system specifications, energy specifications, and performance results for the Schodack landfill are provided in Table 2 and Table 3. The monthly performance results for the proposed solar PV system at the Town of Schodack landfill as calculated by PVWatts can be found in Attachment #3.

Table 2. PV Watts Site Identification Information for the Schodack Landfill

Weather and PV System Technical Specifications	
Weather Data Source:	42.57° N, -73.66° W, 1.2 miles
Array Type:	Fixed-Tilt
Solar Radiation Levels:	4.50 kWh/m ² /day
System Losses*:	14%
Array Tilt:	20°
Array Azimuth:	180° South

*Systems Losses is another input parameter for the PV Watts calculator. It is also referred to as the DC to AC Derate Factor and is calculated from all of the losses that the system experiences when converting DC power to grid-ready AC power. These include accuracy for PV module nameplate DC rating, conversion efficiency of the inverter and transformer, mismatch, diodes and connections (voltage drops), DC and AC wiring (resistive losses), soiling, system availability, shading, sun-tracking and age.

Table 3. PV System Yearly Performance Results for the Town of Schodack Landfill

Schodack Landfill Usable LF Areas	Fixed-Tilt PV System			
	DC System Size*	AC Energy Based on PWWATTS	GHG Reduction** (metric tons CO _{2e})	GHG Emissions Equivalent to # of Vehicles Driven Yearly**
LF Area - 2.15 acres	537.5 kW dc	669,073 kWh/year	498	107 Cars

*Assumes an area-to-power conversion of 4 acres/MW.

** EPA's Greenhouse Gas (GHG) Equivalencies Calculator (<http://www2.epa.gov/energy/greenhouse-gas-equivalencies-calculator>) was used to determine the GHG reductions based on the proposed AC energy.

Cautions for Interpreting Results – Weather Variability

Monthly and yearly energy production is modeled using photovoltaic system selected parameters and weather data that is typical or representative of long-term averages. Because weather patterns vary from year to year, the values in Table 3 are better indicators of long-term performance than of performance for a specific month or year. Photovoltaic system performance is largely proportional to the amount of solar radiation received, which may vary from the long-term average by ±30% for monthly values and ±10% for annual values.

VI. Forecasted Economics

In general, the forecasted economics for the solar PV system will factor in the needed PV arrays/tilt and orientation and balance of system (BOS) components including the inverter and electrical supply/equipment costs, as well as installation cost. Other cost factors for a PV system will depend on the system size, geographic location, mounting structure, type of PV module, and other soft costs (permit fees, installation/interconnection labor costs, sales tax, installer/developer profit, customer acquisitions costs, and transaction costs). For more information about understanding and managing solar soft costs go to <http://energy.gov/eere/sunshot/soft-costs>.

Based on NREL’s Solar PV price and cost breakdown study⁴, significant cost reductions in 2016 shows the average cost for commercial and utility-scale ground-mounted systems (includes the engineering, procurement, and construction (EPC) system hardware, other EPC direct/indirect costs, and developer costs) for different installed capacities. The actual cost declined from \$3.76/W in the fourth quarter of 2010 to \$1.42/W in the first quarter of 2016. However, this price is for systems 100 MW in size, much larger than the system that is being proposed for the Town of Schodack landfill. Therefore, an interpolation was made using data from the NREL Prices and Cost Breakdown. An installed capacity of 0.5375 MW gives a cost of \$2.06/W. For a landfill site, it is necessary to use a ballasted system in order to ensure the integrity of the landfill cap. This increases the cost by approximately 20%, bringing the cost to \$2.48/W, which is value used for this analysis.

With an increasing demand and supply, potential cost reductions may be expected as market conditions continue to evolve. It should be emphasized that this is a very rudimentary estimation of the economics involved for this proposed area and a more detailed analysis will be necessary moving forward. The projected estimated cost only factors the estimated initial installation costs and does not reflect the true cost of the system since available NYS incentives that may lower the costs are not included and the associated soft costs to develop the solar PV can vary for this project. Additional steps may be necessary in order to install PV panels at these sites, such as site preparation and the interconnection requirements, which can drive the overall cost.

Table 4 provides the initial system costs for a fixed tilt PV system based on the above stated pricing assumptions. The project is expected to have an optimal lifespan of 25 years, although the system can be reasonably expected to continue operation past this point.

Table 4. PV Watts Initial Economic Considerations

Fixed-Tilt PV System - Town of Schodack Landfill	
Landfill Usable Area and PV System Size	Estimated Cost Landfill Area (\$2.46 /Wdc)
Area #1 - 2.15 acres* - 0.5375 MW dc (without financial incentives)	\$1,332,501
Average regional cost of electricity** (combined sectors as of June 2018)	15.97 ¢/kWh

*Assumes 2.15 acres of solar PV usable area for the Schodack landfill and an area-to-power conversion of 4 Acres/MW based on historical data provided by NREL. **Average regional combined cost of electricity for the State of NY found through the US Energy Information Administration (USEIA) as of July 2018. http://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_6_e

VII. Benefits

In general, due to the presence of suspected or known contaminants, landfills have limited redevelopment potential and solar PV installations can be a viable reuse. Many municipal solid waste (MSW) landfills are particularly well-suited for solar development because they are often:

- Located near critical infrastructure including electric transmission lines and roads;
- Located near areas with high energy demand (e.g., large population bases);
- Constructed in areas of low grade (0-10%) needed for siting of solar PV structures;
- Offered at lower land costs when compared to open space;
- May be adequately zoned for renewable energy;
- May have environmental conditions that are not well-suited for commercial or residential redevelopment;
- Are able to accommodate net metered or utility scale projects; and

⁴ <http://www.nrel.gov/docs/fy16osti/67142.pdf> U.S. Photovoltaic Prices and Cost Breakdowns: Q1 2016 Benchmarks for Residential, Commercial, and Utility Scale Systems

Other benefits with solar on landfills:

- Can provide short and long term job opportunities;
- May reduce the environmental impacts of energy systems (e.g., reduce greenhouse gas emissions).

The **New York State Energy Research and Development Authority (NYSERDA)** promotes energy efficiency and the use of renewable energy sources in New York. According to NYSERDA, solar PV generation offers the following key benefits:

- PV systems are gentle on the environment, in contrast with electricity generated by fossil fuels;
- PV-generated electricity creates no noise, air, or water pollution;
- PV systems provide long-term stabilization of electrical costs;
- When combined with a battery backup system, a PV unit can provide power when utility power is not available.

In addition, this study outlines various financial incentives (Section VI – Incentives) that could assist in financing the implementation of a solar PV system including incentives offered by NYSERDA.⁵ To learn about programs and funding opportunities available through NYSERDA from the NY-Sun Initiative, go to <http://www.ny-sun.ny.gov/>.

Value Stack Crediting:

In New York State, another benefit to implementing a renewable energy system is **Value Stack crediting**. This system of reimbursement for electricity generation is allowed for non-residential solar PV generation systems less than 2 MWs in size. Although current New York State Laws limit non-residential solar producers to 2 MWs, a bill has been proposed to increase this number to 5 MWs. More information about the bill's status can be found at: www.nysenate.gov/legislation/bills/2017/s8273. In a conventional Value Stack situation, a **customer-sited renewable energy system** is connected to the utility grid through a customer's utility meter. This is known as "behind-the-meter generation." At any given moment, if the site is using more electricity than the system is producing, all the electricity produced by the system is used on-site and the site's electricity needs are supplemented from the grid. If the site is using less electricity than the system is producing, the excess electricity is exported to the grid and the customer receives a monetary credit based on the time and location of energy generation. This is typically recorded as negative use and is commonly referred to as the "meter spinning backwards." At the end of the billing cycle, the grid-supplied electricity and the credits for any exported electricity are reconciled, and any surplus credits can be carried forward to the next billing cycle. The specifics of Value Stack crediting are dependent on the customer's service classification. Additional information about Value Stack crediting can be found at: <https://www.nyserda.ny.gov/All-Programs/Programs/NY-Sun/Contractors/Value-of-Distributed-Energy-Resources>. It is highly recommended that town officials consult with the EDC to discuss Value Stack crediting opportunities.

Power Purchase Agreements:

A number of municipalities that own or operate landfills have expressed interest in potential revenue flow from solar PV systems. In some cases, revenue can be generated by the use of PV on a landfill site pending actual site conditions, financial incentives, economic conditions, and support from the utility companies. While the findings of this report do not recommend how a solar array at a landfill will be financed, if the municipality decides that they do not want to invest their own funds to build the solar site, they can consider entering into a Power Purchase Agreement (PPA) with a solar developer who would assume the cost of development. To learn more about PPA structures, please go to the following PPA checklist for state and local governments link: <http://www.nrel.gov/docs/fy10osti/46668.pdf> or the Interstate Renewable Energy Council PPA toolkit for local governments: <http://www.irecusa.org/solar-power-purchase-agreements-a-toolkit-for-local-governments/>

⁵ <http://www.nyserda.ny.gov/>

Incentives:

The economics of a PV system will also depend on NYS financial incentives, available federal tax credit, the regional cost of electricity, the solar resource, solar panel tilt and orientation, site conditions, distance to the electrical interconnection, and other critical requirements highlighted in this report. Table 5 provides several possible financial incentives that can be considered by the Town of Schodack officials to assist with financing the proposed solar PV systems.

Table 5. Summary of Applicable Incentives

Federal and State Solar Investment Tax Credit	As of December 2015, system owners may continue to qualify up to 30% Federal Investment Tax Credit which is expected to step down to 26 percent in 2020 and 22 percent in 2021. After 2023, the residential credit will drop to zero while the commercial and utility credit will drop to a permanent 10 percent. Always consult with your qualified tax professional or accountant to determine your eligibility for tax credits.
Modified Accelerated Cost Recovery System (MACRS)	MACRS depreciation is also considered another important financial incentive. The MACRS is a method of depreciation in which a business' investments in certain tangible property are recovered, for tax purposes, over a specified time period through annual deductions. Qualifying solar energy equipment is eligible for a cost recovery period of five years. More information about MARCS is available at: http://www.seia.org/policy/finance-tax/depreciation-solar-energy-property-macrs .
NY-Sun Commercial/Industrial Incentive Program (PON 3082)	For installations of Solar PV Systems greater than 200 kW, incentives are available on a rolling application first-come, first-served basis for eligible projects. More information is available at: http://www.nyserda.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/PON-3082-NY-Sun-Commercial-Industrial-Incentive-Program .
NY-Sun Megawatt Block Program	In June 2018, NYSERDA's NY-Sun Megawatt Block program was redesigned to include larger solar projects and encourage development on landfills and brownfield sites. More information is available at: https://www.nyserda.ny.gov/About/Newsroom/2018-Announcements/2018-06-18-NYSERDA-Announces-Redesign-of-NY-Suns-Megawatt-Block-Program .
Clean Energy Financing Arrangements	The New York Green Bank invites private sector capital providers and other clean energy industry participants to propose partnership arrangements with the Green Bank that would facilitate the financing of clean energy projects (including energy generation and energy savings projects) in the State of New York. More information is available at: http://www.nyserda.ny.gov/Funding-Opportunities/Current-Funding-Opportunities/RFP-1-Clean-Energy-Financing-Arrangements
Other Incentives	For other applicable incentives, go to the following website: http://programs.dsireusa.org/system/program?fromSir=0&state=NY

VIII. RE-Powering America's Land

Through the RE-Powering America's Land Initiative, the U.S. EPA promotes the reuse of potentially contaminated properties, landfills, and mining sites for renewable energy generation. This initiative identifies the renewable energy potential of these sites and provides useful resources for anyone interested in reusing these sites for renewable energy development. Various RE-Powering America Initiative resources are summarized below and can be found at <http://www.epa.gov/oswercpa>.

- **Mapping and Screening Tools** - Under Mapping and Screening tools, EPA's RE-Powering America's Land team screened more than 80,000 potentially contaminated sites and MSW landfills, assessing the suitability of nearly 43 million acres across the country for site renewable energy generation facilities, including utility-scale solar. Maps depicting the details of these EPA tracked sites and their potential for supporting renewable energy generation can be found at <https://www.epa.gov/re-powering/re-powering-mapping-and-screening-tools>. These maps enable users to view screening results for various renewable energy technologies at each site.
- **Technical Assistance and Support** - As part of the RE-Powering America's Land Initiative, the EPA and the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) have evaluated the feasibility of developing renewable energy production on Superfund, brownfields, and former landfills or mining sites. This project paired EPA's expertise on contaminated sites with the renewable energy expertise of NREL. A list of feasibility studies for renewable energy production using various technologies, including solar, and can be found at <https://www.epa.gov/re-powering/re-powering-feasibility-studies>.
- **Redevelopment Tools and Resources** – Under Redevelopment Tools and Resources, EPA and NREL created the joint publication, “**Best Practices for Siting Solar PV on Municipal Solid Waste Landfills**” <https://www.epa.gov/re-powering/best-practices-siting-solar-photovoltaics-municipal-solid-waste-landfills> to provide assistance in addressing common technical challenges of siting PV on MSW landfills (such as impacts to landfill settlement differentials and the PV solar performance, impacts to other landfill systems, understanding landfill cap integrity/characteristics, and understanding landfill post-closure requirements for solar PV design considerations) and provide other useful information for solar developers, landfill owners, and federal, state, and local government entities. Another document for stakeholder consideration is the “**RE-Powering Finance Fact Sheet**” - <https://www.epa.gov/re-powering/financing-renewable-energy-projects-contaminated-lands-landfills-and-mine-sites> and “**Revised Bona Fide Prospective Purchaser (BFPP) Provisions Enforcement Guidance for Tenants**” <https://www.epa.gov/enforcement/guidance-treatment-tenants-under-cerclas-bona-fide-prospective-purchaser-bfpp-provision>.
- **Fact Sheets and Success Stories** - The RE-Powering team highlights numerous success stories and fact sheets of renewable energy projects throughout the United States. The RE-Powering America team also maintains a list of completed renewable energy installations on contaminated sites and landfills. To date, the RE-Powering Initiative has identified 274 renewable energy installations on 261 contaminated lands, landfills, and mine sites, with a cumulative installed capacity over 1,450 megawatts (MW) and consistent growth in installations since the inception of the RE-Powering Initiative. For information, go to <https://www.epa.gov/re-powering/re-powering-tracking-matrix>.

IX. Conclusions

The recommended solar PV system size for the landfill is based on the usable landfill areas considered suitable for solar redevelopment. For the Town of Schodack Landfill, 2.15 acres of the total 12 acres is recommended. The 2.15 acres primarily consist of the top flat portion and gently sloped areas of the landfill (illustrated in Figure 3). The steeper sloped sections of the landfill are considered too unstable to properly support a solar PV system with a weighted ballasted system (non-penetrating foundation sitting on the landfill). Based on the recommended usable landfill area, the solar PV size amounted to a capacity of 537.5 kW dc with an estimated annual energy production of 669,073 kWh/year. Based on the findings from this study, it is recommended that the Town of Schodack officials further assess potential end use of the energy from the proposed PV system (e.g., renewable energy feeding into municipal operations) and obtain technical support (see next steps Section X.) to further evaluate the economic and technical benefits of solar PV on the landfill. In general, the economic benefits from solar generation on the landfill could include competitively priced electricity from the project, revenues via land lease payments from a solar developer, potentially reduced landfill maintenance costs, job creation, and stimulation of the local economy during solar construction. Overall, the landfill had minimal shading concerns and high solar access.

While this solar screening study provides the PV system sizes based on proposed usable area, the actual system installation will need to factor the availability of funds and the amount of power that can be sold. As indicated earlier, a third-party developer power purchase agreement (PPA) is another feasible way for a system to be financed for this site. In exchange for access to a site through a lease arrangement, third-party solar developers can finance, develop, own, and operate the solar projects utilizing their own expertise and sources of financing. These private enterprises are also able to take advantage of the federal tax benefits that cannot be captured by municipalities (or other entities that do not pay corporate income taxes), which should lower the total system cost. If the town decides to proceed with a solar system installation and work with a third-party solar developer, the developer can sell the electricity to the site host (local town facilities) or local utility via a PPA - which will sell the electricity at negotiated rate for a fixed period for a term typically varying from 20-25 years. It should be noted that early coordination with the EDC for interconnection studies will be required if Town officials decide to move forward with a solar PV project.

By using obtainable and accessible land that is unavailable for redevelopment allows for repurpose of land that would not otherwise be productive and reduces greenhouse gas emission from current power sources. In case town officials are interested in pursuing solar PV generation, additional options could be explored to make the solar PV generation more viable while understanding the economic impacts and maintaining the integrity of the landfill cap design. For example, town officials or a potential third-party solar developer could reassess and expand the recommended usable solar PV areas on the landfill. Based on EPA's screening and assessment of the existing physical landfill conditions, EPA supports the potential of solar PV generation at the Town of Schodack landfill.

As a reminder, this report is to be used for screening purposes only.

Additional evaluations will need to be conducted to fully characterize the feasibility and economics of the Town of Schodack landfill for PV installation. Third party solar developers and local utility companies may have technical and financial interests in pursuing potential solar renewable energy projects and should perform additional solar assessments to determine if projects are economically viable.

This study does not assess the environmental conditions at the site.

X. Next Steps

Early and proper planning with other key stakeholders is critical to the success of a solar PV system. The following stakeholders should be consulted in the early stages of a solar PV project:

New York State Department of Environmental Conservation (NYSDEC):



The Town of Schodack must coordinate early with the NYSDEC. To initiate this process, contact Victoria Schmitt, Region 4, Materials Management Supervisor, at (518) 357-2243. NYSDEC's review and approval of the proposed solar PV work is necessary in order to ensure that the integrity and protective measures put in place for the existing landfill cap system are maintained throughout the life of the project. To that end, it will be necessary to provide all related information to NYSDEC for the proposed solar PV system including:

- Location of the landfill and the PV system size,
- Estimated usable area on the landfill for the solar PV installation,
- The mounting foundation type placed on the landfill,
- The landfill cap's ability to withstand both the construction and long-term operation loads of the PV system,
- Impacts to the landfill cap integrity,
- Proper set back from the gas vents and no impacts to the gas venting,
- Potential storm water management issues, and
- Any additional information requested by NYSDEC.

In general, NYSDEC regional representatives' names and contact information can be found at <http://www.dec.ny.gov/chemical/76718.html>. For general questions associated with solar development at New York landfills, contact Jaime L. Lang P.E., Section Chief, Landfill Section - Bureau of Solid Waste Management, Division of Materials Management at jaime.lang@dec.ny.gov or by phone at (518) 402-8678.

Coordination with the Local Utility Provider:



National Grid should be consulted early in the planning stages so that the municipality can be alerted to any potential transmission interconnection issues that might exist or equipment upgrades needed to facilitate the solar project. The Town of Schodack officials may request a preliminary transmission interconnection study from National Grid. As indicated earlier, all technical pertinent information about the proposed solar PV system should be provided to National Grid in accordance with their application requirements.

Coordination with the NYSERDA, NY SUN



In addition to the solar PV financial incentives from NYSERDA, the NY-Sun program offers additional resources to municipalities interested in developing solar in their community. Of particular interest, is the "Solar Guideline for Local Governments": <https://www.nyserdera.ny.gov/All-Programs/Programs/NY-Sun/Communities/Local-Government-Training-and-Resources/Solar-Guidebook-for-Local-Governments>. Municipalities can also obtain technical assistance and learn more about the solar procurement process by visiting <https://training.ny-sun.ny.gov/resources-5>.

For more information and training offered under the NY-Sun program or any assistance needed with electrical interconnection, contact Houtan Moaveni at (518) 862-1090, ext. 3016, or Houtan.Moaveni@nyserdera.ny.gov.

Coordination with the New York Power Authority (NYPA):



The New York Power Authority (NYPA) is authorized, through New York Public Authorities Law 1005(17), to provide strategic, technical, and other assistance to its customers to support implementation of energy related projects including renewable energy initiatives. NYPA is uniquely positioned to procure vendors on behalf of its customers.

NYPA is committed to working with public entities to incorporate solar energy at their facilities by providing customized solar services. Through these services, NYPA acts as a trusted energy advisor to its customers, and is well positioned to oversee both policy and technical aspects of their projects. NYPA can engage at any and all phases of a project from inception to operation of the system, including financial analysis, feasibility assessment and site design, development and solicitation of a request for proposals (RFP), and contract mechanism recommendation.

NYPA is in development of over 60 MW of distributed solar PV for customers ranging from the Cities, Counties and Town's to K-12 schools, State Universities and State Agencies. By 2020, NYPA aims to develop at least 125 MW of renewable energy for the state of New York located at public facilities.

For more about the services offered by the New York Power Authority and their associated costs, go to www.nypa.gov or contact Christina Iwaniew, Certified Energy Manager, at Christina.iwaniew@nypa.gov or call (914) 390-8031.

As a reminder, this report is to be used for screening purposes only.

Additional evaluations will need to be conducted to fully characterize the feasibility and economics of the Town of Schodack landfill for PV installation. Third party solar developers and local utility companies may have technical and financial interests in pursuing potential solar renewable energy projects and should perform additional solar assessments to determine if projects are economically viable.

This study does not assess the environmental conditions at the site.

Attachment #1 – SunEye Solar Measurements

The EPA solar assessment team used a Solmetric SunEye⁶ solar path calculator to assess shading at particular locations by analyzing the sky view where solar panels will be located. By finding the solar access, the instrument can determine if the area is appropriate for solar panels. PV modules are very sensitive to shading. When shaded (either partially or fully), the panel is unable to optimally collect the high-energy beam radiation from the sun. PV modules are made up of many individual cells that all produce a small amount of current and voltage. These individual cells are connected in series to produce a larger current. If an individual cell is shaded, it acts as resistance to the whole series circuit, impeding current flow and dissipating power rather than producing it. By finding the solar access, it can be determined if the area is appropriate for solar power generation.

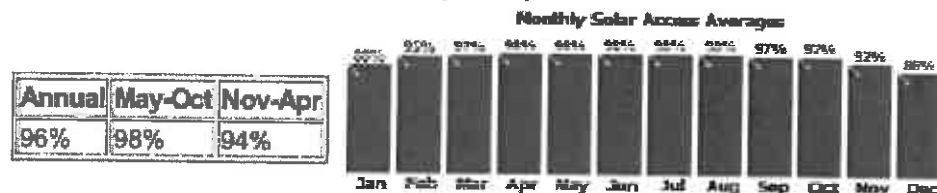
The assessment team collected several Solmetric SunEye data points (skyline views) across the entire perimeter of the landfill in sections with adequate flat area as shown in Figure 3. Overall, **solar access yields averaged 96%** annual solar exposure, which is within the favorable annual solar access range for PV systems.

Session Properties

Name	Schodack Landfill
Creation Date	9/19/2018 8:04
Note	(none)
Location	42.6°N, 73.7°W Mag Dec: 13.5°W Time Zone: GMT-05:00

Solar access averages of 4 skylines in this session

Skylines Averaged: Sky01, Sky03, Sky06, Sky07



TSRF averages of 4 skylines in this session: 93%

Figure 5. Session properties for Solmetric SunEye

The Total Solar Resource Fraction (TSRF) is the ratio of insolation available accounting for both shading and Tilt and Orientation Factor (TOF), compared to the total insolation available at a given location at the optimum tilt and orientation and with no shading. TRSF is also expressed in percent. The TOF is the solar insolation at the actual tilt and orientation divided by the insolation at the optimum tilt and orientation, expressed in percent.

⁶ More information on this tool can be found at: <http://www.solmetric.com/>

Attachmen #2 – PVWatts Monthly Performance Results for the Schodack Landfill

Performance Results 2.15 MW Fixed-Tilt PV System		
Month	Solar Radiation* (kWh/m²/day)	LF Area AC Energy (kWh)
January	2.53	34,999
February	3.90	48,500
March	4.58	60,240
April	5.41	66,593
May	5.73	69,934
June	6.21	72,871
July	6.24	74,364
August	5.83	69,806
September	5.04	59,907
October	3.56	46,156
November	2.74	35,068
December	2.20	30,635
Total	4.50* Monthly average	669,073

**Solar Radiation values above 3.5 kWh/m²/day are considered favorable when considering PV siting locations.
 **The solar photovoltaic performance degradation, a reduction in power generation due to long-term exposure, is under 1% per year. Silicon modules have a lifespan range of 25–30 years but can keep producing energy beyond this range. For information about, a reduction in power generation due to long-term exposure, go to <http://www.nrel.gov/docs/fy12osti/51664.pdf>.*

Attachment #3 – PV Systems Overview

Major System Components

A typical PV system is made up of several key components including:

- PV modules,
- inverters and
- balance-of-system components (including mounting racks, hardware for the panels, and wiring for electrical connections). Electrical connections (including wiring, disconnect switches, fuses, and breakers) are required to meet electrical code (e.g., NEC Article 690) for both safety and equipment protection.

In most traditional applications, wiring from the arrays to inverters and inverters to point of interconnection is generally run as direct burial through trenches. It is recommended that PV system vendors reflect these costs in the requests for proposals when costing out the overall system.



Figure 6. Ground mount array (source: NREL)

Solar PV cells are the electricity-generating component of a solar energy system. When sunlight (photons) strikes a PV cell, an electric current is produced by stimulating electrons (negative charges) in a layer in the cell designed to give up electrons easily. The existing electric field in the solar cell pulls these electrons to another layer. By connecting the cell to an external load, this current (movement of charges) can then be used to power the load, e.g., light bulb.

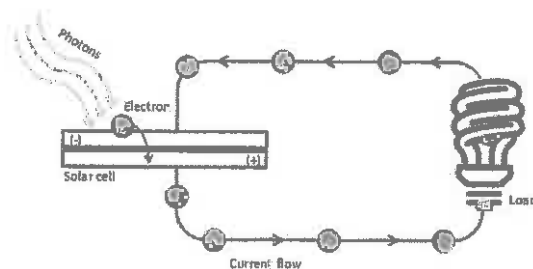


Figure 7. Generation of electricity from a PV cell (source: EPA)

PV cells are assembled into a PV panel or module. PV modules are then connected to create an array. The modules are connected in series and then in parallel as needed to reach the specific voltage and current requirements for the array. The direct current (DC) electricity generated by the array is then converted by an inverter to usable alternating current (AC) that can be consumed by adjoining buildings and facilities or exported to the electricity grid. PV system size varies from small residential (2-10 kilowatts (kW)), commercial (100-500 kW), to large utility scale (10+ megawatts (MW)). Central distribution plants are also currently being built in the 100 MW+ scale. Electricity from utility-scale systems is commonly sold back to the electricity grid.

The solar array has to be secured and oriented optimally to maximize system output. The structure holding the modules is referred to as the mounting system. The mounting systems can be ground mounted utilizing a ballast system on top of a landfill cap where there are commonly large unshaded areas. For ground mount

systems, the mounting system can be either directly anchored into the ground (via driven piers or concrete footers) or ballasted on the surface without ground penetration. Mounting systems must withstand local wind loads, which range from 90–120 mph range for most areas or 130 mph or more for areas with hurricane potential. Depending on the region, snow and ice loads must also be a design consideration for the mounting system.

PV Module

Module technologies are differentiated by the type of PV material used, resulting in a range of conversion efficiencies from light energy to electrical energy. The module efficiency is a measure of the percentage of solar energy converted into electricity. Two common PV technologies that have been widely used for commercial- and utility-scale projects are crystalline silicon and thin film.

Crystalline Silicon

Traditional solar cells are made from silicon. Silicon is quite abundant and nontoxic. It builds on a strong industry on both supply (silicon industry) and product side. This technology has been demonstrated for a consistent and high efficiency over 30 years in the field. The performance degradation, a reduction in power generation due to long-term exposure, is under 1% per year. Silicon modules have a lifespan in the 25-30-year range but can keep producing energy beyond this range.

Typical overall efficiency of silicon solar panels is between 12% and 18%. However, some manufacturers of mono-crystalline panels claim an overall efficiency nearing 20%. This range of efficiencies represents significant variation among the crystalline silicon technologies available. The technology is generally divided into mono- and multi-crystalline technologies, which indicates the presence of grain-boundaries (i.e., multiple crystals) in the cell materials and is controlled by raw material selection and manufacturing technique. Crystalline silicon panels are widely used based on deployments worldwide.

Figure 8 shows two examples of crystalline solar panels: mono- and multi-silicon installed on tracking mounting systems.

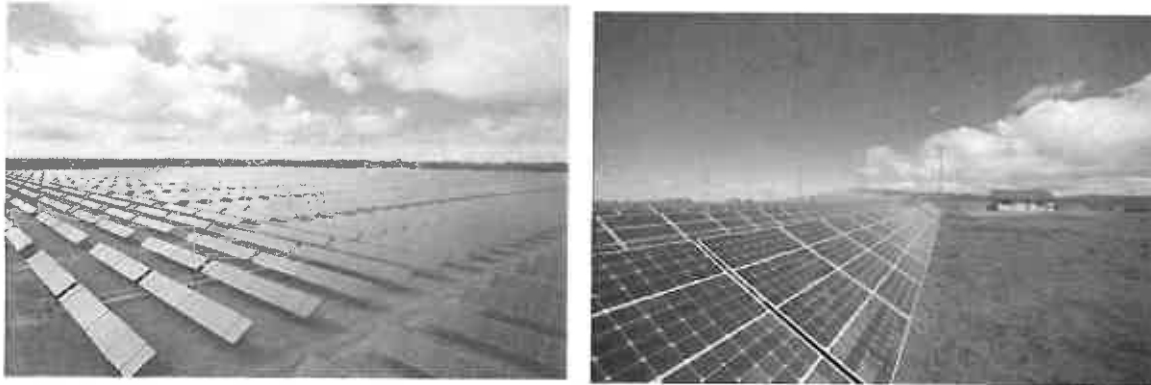


Figure 8. Mono- and multi-crystalline solar panels. Photos by (left) SunPower Corporation, NREL 23816 and (right) SunPower, NREL 13823

Thin Film

Thin-film PV cells are made from amorphous silicon (a-Si) or non-silicon materials such as cadmium telluride (CdTe). Thin-film cells use layers of semiconductor materials only a few micrometers thick. Due to the unique nature of thin films, some thin-film cells are constructed into flexible modules, enabling such applications as solar energy covers for landfills such as a geomembrane system. Other thin film modules are assembled into rigid constructions that can be used in fixed tilt or, in some cases, tracking system configurations.

The efficiency of thin-film solar cells is generally lower than for crystalline cells. Current overall efficiency of a thin-film panel is between 6% and 8% for a-Si and 11-12% for CdTe. Industry standard warranties of both crystalline and thin film PV panels typically guarantee system performance of 80% of the rated power output for 25 years. After 25 years, they will continue producing electricity at a lower performance level.

Mounting Systems

The array has to be secured and oriented optimally to maximize system output. The structure holding the modules is referred to as the mounting system. Typical ground mounted systems can be categorized as fixed-tilt or tracking. Fixed-tilt mounting structures consist of panels installed at a set angle, typically based on site latitude and wind conditions, to increase exposure to solar radiation throughout the year. Fixed-tilt systems are used at many landfill sites. Fixed-tilt systems have lower maintenance costs but generate less energy (kWh) per unit power (kW) of capacity than tracking systems. The selection of mounting type is dependent on many factors including installation size, electricity rates, government incentives, land constraints, soil conditions, alignment and latitude requirements, and local weather.

The mounting system design will also need to meet applicable local building code requirements with respect to snow, wind, and seismic zones. Selection of mounting types should also consider frost protection needs especially in cold regions. Contaminated land applications may raise additional design considerations due to site conditions, including differential settlement. Selection of the mounting system is also heavily dependent on anchoring or foundation selection.

Inverters

Inverters convert DC electricity from the PV array into AC electricity, which can connect seamlessly to the electricity grid. Inverter efficiencies can be as high as 98.5%. Inverters also sense the utility power frequency and synchronize the PV-produced power to that frequency. When utility power is not present, the inverter will stop producing AC power to prevent "islanding," a condition which could be dangerous to utility workers trying to fix a de-energized distribution system. This safety feature is built into all grid-connected inverters in the market.

Electricity produced from the PV system may also be fed to a step-up transformer to increase the voltage to match the grid. There are two primary types of inverters for grid-connected systems: string and micro inverters. Each type has strengths and weakness and may be recommended for different types of installations.

Wiring for Electrical Connections

Electrical connections, including wiring, disconnect switches, fuses, and breakers are required to meet electrical code (e.g., NEC Article 690) for both safety and equipment protection. In most traditional applications, wiring from (i) the arrays to inverters and (ii) inverters to point of interconnection is generally run as direct burial through trenches.

Attachment #4 – Glossary or Definition of Terms

Glossary or Definition of Terms	
PV	Photovoltaic energy
AC	Alternating current, which can be transmitted over+ power lines
DC	Direct current, which cannot be transmitted over power lines
Ballast	A footing on which a solar panel can be placed which will not penetrate the landfill cap
Inverter	A machine which takes in direct current and converts it to alternating current, which can then be transmitted to an electrical substation for transmission to a utility company
Energy Density	The amount of energy available per a given region of space (per unit volume); this is impacted by the packing factor, which is the number of solar arrays that can be placed in a specific area
kW or kWh	Kilowatt or kilowatt hours
MW or MWh	Megawatt or megawatt hours
ITC	Investment tax credits
O&M	Operations and maintenance
Payback Period	Number of years until the project is paid for
PPA	Power purchase agreement, which is a legal contract between an electricity provider and a purchaser that defines all commercial terms for the sale of electricity
Transformer	An electrical device used to increase or decrease the alternating voltage in electrical power applications. A transformer on a solar power facility is primarily used to step-up the voltage to deliver the renewable energy to the utility grid.
GIS	Geographic Information System
EDC	Electric distribution company

3

Dawne Kelly

From: Kimberly Anderson <kim.anderson@schindler.com>
Sent: Tuesday, August 28, 2018 3:20 PM
To: Dawne Kelly
Subject: Town Of Schodack
Attachments: Town Of Schodack_41-5183_HXpress.pdf

Dawne,

Attached is the proposal to complete a MOD, on your elevator at the Town building, as discussed. Please let me know if you have any questions at all.

Typically the time frame on ordering and scheduling such materials is about 10-12 weeks. The time frame of completing such work is 4-6 weeks.

As a reminder, if any of your major components, such as your controller, operator and/or tank unit fail completely, there is typically a 4-6 lead time on the material ordering of the controller and operator, and tank units, are around 2-4 weeks.

QUICK SUMMARY:

Description of Work	Included in Proposal
Machine Room	
Tank unit and Miconic HX control. Tank unit includes new submersible pump one single speed AC motor, valve, hush kit, and all necessary piping in machine room	Replace
Battery Lowering	New
Oil Cooler	Not Included
Tank Heater	Not Included
Scavenger Pump	Not Included
Rupture Valve	Not Included
Machine Room Wiring	Replace
Door Operator Front	
Door operator and clutch	Replace
Hoistway Door Equipment	
4 Interlock(s) per car	Replace
4 Spirator(s) per car	Replace
Car and Hall Fxtures	
4 Surface Mounted Hall Stations	Replace
1 Surface mounted car riding lantern	Replace
Main Car Operating Panel	Replace
Floor lockout provisions	Not Included
Finish	#4 SS
Car and Hoistway	
Hoistway Wiring	Replace
Car Wiring	Replace

All other systems and components not noted above will be reused and integrated into the new elevator system.

Best Regards,

Kim

Kim Anderson | Service Account Representative
Phone [518-782-0744 ext. 4166](tel:518-782-0744) | Mobile [518-229-5833](tel:518-229-5833) | Fax [518-782-0949](tel:518-782-0949)
kim.anderson@schindler.com

Schindler Elevator | Service Department
12 Walker Way | Albany, NY 12205, USA
www.us.schindler.com

Please consider your environment.

**Your Albany/Poughkeepsie team is committed to exceeding your expectations. If you are not completely satisfied with your experience, please share your feedback [HERE](#).*

Is your elevator thinking **Ahead**?
www.schindler.com/ahead-us

Schindler supports sustainable urban development with safe, reliable and ecologically sound mobility solutions.

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Dawne Kelly

From: Brendan Wall <bwall@garlandind.com>
Sent: Friday, August 24, 2018 3:09 PM
To: Dawne Kelly; cc@pipelinedeals.com; Crystal Ledbetter
Subject: Re: Roof Survey
Attachments: Schodack Town Hall - Roof Survey.pdf

Hi Dawne,

Thank you for meeting with me this morning to discuss the roof survey.

Attached please find the report we discussed for your review. The moisture scan is the first step, which will drive the restoration scenario.

Please call me with any questions. Thank you.

Have a nice weekend.

Regards,

Brendan M. Wall
Territory Manager
M: 617.259.7990
bwall@garlandind.com
<http://bwall.garlandco.com>
www.garlandco.com
<https://www.linkedin.com/in/brendanwall>

The Garland Company, Inc.
"Service Is Our BEST Product"

The Garland Company, Inc.
Roof Asset Management Program



Schodack
SCHODACK
Schodack

Schodack Town Hall - Roof Survey

Prepared By
Brendan Wall

Prepared For
Dawne Kelly

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Client Data

Client: Town of Schodack

Client Data

Name	Town of Schodack		
Address 1	265 Schuurman Road		
City	Castleton	State	New York
ZIP	12033	Country	United States

Contact Info

Contact Person	Dawne Kelly	Title	Asst. to Town Supervisor
Mobile Phone:	-	Office Phone:	518-477-7918;303
Email:	dawne.kelly@schodack.org		



Facility Summary

Client: Town of Schodack

Facility: Town Hall

Facility Data

Address 1	265 Schuurman Road
City	Castleton
State	New York
ZIP	12033
Type of Facility	Municipal
Square Footage	7,500
Contact Person	Dawne Kelly

Asset Information

Name	Date Installed	Square Footage	Roof Access
Main	2000	7,500	Penthouse



Construction Details

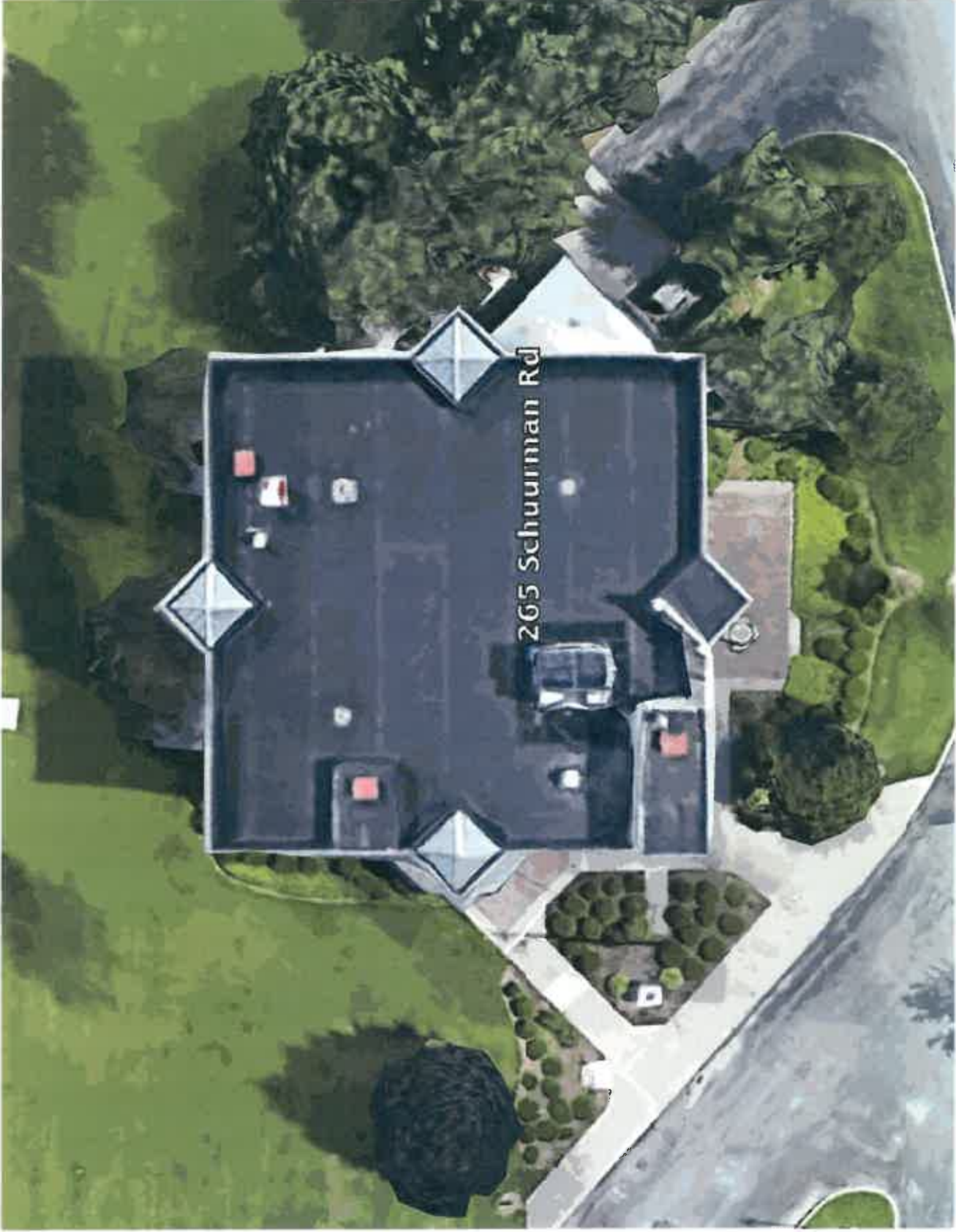
Client: Town of Schodack

Facility: Town Hall

Roof Section: Main

Information

Year Installed	2000	Square Footage	7,500
Slope Dimension	1/4"	Eave Height	40
Roof Access	Penthouse	System Type	EPDM: Fully Adhered



265 Schuurman Rd



Photo Report

Client: Town of Schodack

Facility: Town Hall

RoofSection: Main

Report Date: 07/10/2018

Title: Inspection



Photo 1

Overview



Photo 2
Oxidized roof top
equipment



Photo 3
Overview



Photo 4
Overview



Photo 5
Cooling tower



Photo 6

Vegetation growth at
drain sump



Photo 7

Debris at drain



Photo 8

Vegetation growth on membrane



Photo 9

Debris



Photo 10

Single ply EPDM membrane is shrinking due to UV degradation



Photo 11

Puncture in single ply EPDM membrane



Photo 12

Puncture in single ply
EPDM membrane



Photo 13

Puncture



Photo 14

Open condition at the perimeter edge of parapet wall

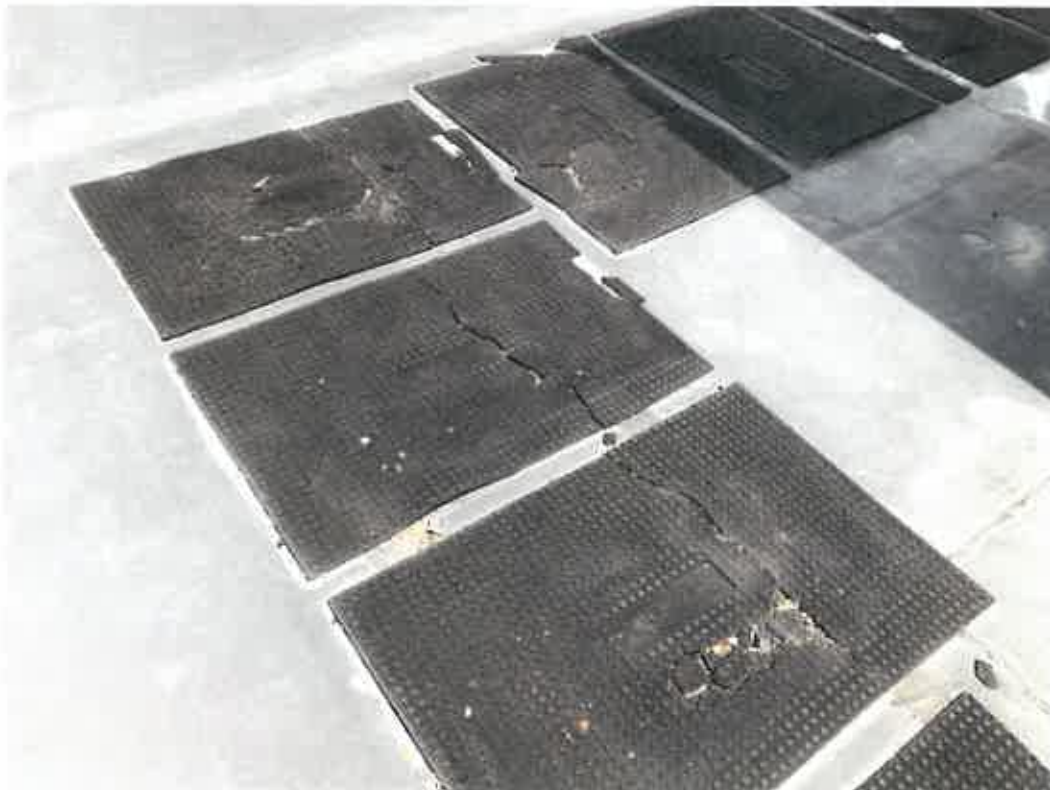


Photo 15

Deteriorated walkway pads due to extended UV exposure



Photo 16

Standing Seam hip roofs
- 3 total



Photo 17

Stairwell penthouse roof
lacks positive
drainage/scuppers



Photo 18
Stairwell penthouse



Photo 19
Deteriorated sealant at
vertical joint



Photo 20

Lower roof elevation



Solution Options

Client: Town of Schodack

Facility: Town Hall

Roof Section: Main

Inspection Options

Solution Option:	Inspection	Action Year:	2018
Square Footage:	7,500	Expected Life (Years):	-
Budget:	\$500 00		

Infrared Moisture Survey - 7,500 SF

Quality roof asset management decisions and solutions can only be made by identifying all factors involved and their relative importance to the roof assembly, as a whole. Water infiltration below the roof membrane and into the insulation not only reduces the energy efficiency of your roof system, but more importantly, poses a threat to the longevity of existing or new roofing assets. Additionally, the structural soundness of the building may be compromised, not to mention possible disruption to the operations below.

Visual inspections and core cutting alone provide only surface and localized information. A moisture survey will allow you to "see" below the existing roof cover, hence, allowing you to allocate funds to achieve maximum life expectancy. Again, the purpose of the infrared scan is to determine how much of the insulation contains moisture. By removing these isolated areas of wet insulation, combined with quality repairs, we can then extend the service life of the entire roof system. Ultimately, the moisture scan will determine whether repairs, restoration or replacements are to be considered for these roofs.

A Moisture Survey is the first step in a series of processes that will allow you to maximize the life cycle of your roofing assets. It will allow you to establish a benchmark of your roof's current condition, and consequently, sound recommendations and future budgets.

The following is our proposal for performing an infrared and nuclear roof moisture survey and comprehensive visual condition evaluation on the above referenced roof elevations at your facility.

The non-destructive roof survey shall include the following as a minimum:

1. Furnish an 11" x 17" and 24" x 36" roof plan identifying all deficient roof conditions observed.
2. We shall follow with a written report prepared with the following information from roof core samples taken to verify moisture content and roof system compositions:
 - (A) Roof Membrane Type
 - (B) Roof Core Identification
 - (C) Type of bitumen
 - (D) Type and number of membrane plies
 - (E) Thickness and type of each insulation layer
 - (F) Type of vapor barrier (if any)

- (G) Type of roof deck
- (H) Photographic documentation of roof cores
- (I) Photographic documentation of all observed roof deficiencies

3. A comprehensive list of wall and curb flashings, roof penetrations, roof drains, etc. and the condition of same. All roof penetrations shall be shown on the roof plan.

4. We will make recommendations for roof repairs and/or replacement enabling you to determine:

- (A) The present overall condition of the existing roof system
- (B) The extent of any roof repairs necessary
- (C) The need for removal or replacement of the roof (or parts of roof)
- (D) The projected useful life of said roof

5. We shall provide a complete cost estimate breakdown for roof system repairs to deficient items and cost associated with replacement of the roof system.

Repair Options			
Solution Option:	Repair	Action Year:	2019
Square Footage:	7,500	Expected Life (Years):	-
Budget:	\$2,500.00		

1. Perform repairs to seal all holes/slices and open conditions in the single ply assembly.
2. Provide general housekeeping and routine maintenance.
3. Remove and dispose of all rooftop debris.

Restore Options			
Solution Option:	Restore	Action Year:	2018
Square Footage:	7,500	Expected Life (Years):	10
Budget Range:	\$90,000.00 - \$110,000.00		

The existing EPDM roof assembly is in fair condition and is approaching the end of it's serviceable life. Many deficiencies exist, i.e. open conditions, membrane shrinkage and extensive degradation.

The recommended scope of work is as follows:

1. Perform all necessary roof repairs and replace wet insulation with like kind.
2. Prep, prime and clean membrane with scrub brushes and cleanser to remove all talc/debris from the membrane. Power wash the entire roof surface.
3. Install 1-coat application of aliphatic urethane coating (white) over the entire roof surface.
4. Provide a 10 Year Warranty.

Note: Test cuts have not been performed to determine if hazardous materials are present and to verify existing roof composition. This budget figure does NOT include the cost of asbestos abatement. Should abatement be required per the data gathered from the test cuts, we will provide revised budget numbers.

Additionally, the budget figures are conservative to reflect typical industry trends in inflation rates in labor and materials. Additional dollars are carried for unknown conditions such as double layer roof tear-offs, deck

repair, etc.

We will assist with the following at no cost:

- Assist in the design of the roof replacement - specs, details and drawings
- Attend pre-bid and pre-construction meetings to assist with any RFI's
- Perform daily job site inspections to ensure the proper materials/methods are being used and procedures are being followed per code and specification
- Provide Owner with regular progress reports, including photos
- Perform a final inspection with punch list
- Perform annual follow-up inspections upon Owner's request

Replace Options			
Solution Option:	Replace	Action Year:	2019
Square Footage:	7,500	Expected Life (Years):	40
Budget Range:	\$225,000.00 - \$265,000.00		

The existing EPDM roof assembly is in fair condition and is approaching the end of its serviceable life.

When choosing a roof system, it is critical that the Owner choose a system that ensures both, long term performance and low life-cycle cost.

We suggest a redundant, multi-ply, roof assembly installed in cold adhesive, which has been proven to be the most durable roof assembly available. This multi-ply roof is warranted for 40 years, with a potential life expectancy of up to 50 years with proper inspections and maintenance. This low odor, cold applied system is designed specifically for a facility and environment that will be occupied by residents and employees during construction.

The recommended scope of work is as follows:

1. Remove/dispose of all roof(s) and insulation down to the substrate deck.
2. Furnish and install new vapor barrier on the deck, as necessary.
3. Adhere new flat/tapered insulation/coverboard to meet R-30 code requirements.
4. Install new multi-ply roof assembly in cold adhesive.
5. Raise curbs and HVAC equipment to accommodate new flashing heights.
6. Install new perimeter blocking to accommodate new insulation heights.
7. Provide new metal flashing components and accessories.
8. Provide a 40-Year NDL Edge-to-Edge Warranty.

Note: Test cuts have not been performed to determine if hazardous materials are present and to verify existing roof composition. This budget figure does NOT include the cost of asbestos abatement. Should abatement be required per the data gathered from the test cuts, we will provide revised budget numbers.

Additionally, the budget figures are conservative to reflect typical industry trends in inflation rates in labor and materials. Additional dollars are carried for unknown conditions such as double layer roof tear-offs, deck repair, etc.

We will assist with the following at no cost:

- Assist in the design of the roof replacement - specs, details and drawings
- Attend pre-bid and pre-construction meetings to assist with any RFI's
- Perform daily job site inspections to ensure the proper materials/methods are being used and procedures are being followed per code and specification
- Provide Owner with regular progress reports, including photos
- Perform a final inspection with punch list
- Provide a 40 Year NDL Warranty on the roofing system
- Perform annual follow-up inspections upon Owner's request



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Public agencies may adopt a piggyback contract that was either let to the lowest responsible bidder or based upon the best overall value.

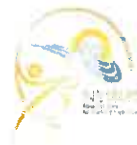
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Timeline

- August 1, 2012: Governor Cuomo approved [Senate Bill 5525](#) Bill modified the State's procurement code to make piggyback contracts available to local government agencies within New York.
- November 2012: Comptroller's Office requested that certain [clarifications be made to the new law](#) in order to make it clear that contracts awarded based upon best value could be utilized in a piggyback manner.
- November 13, 2013: Governor Cuomo signed [Senate Bill 3766](#) into law.

New York State Sponsors



For more information on piggybacking in NY visit:
uscommunities.org/resources/piggybacking-in-ny



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Overview of the Program

The U.S. Communities Government Purchasing Alliance (U.S. Communities) is a nonprofit government purchasing cooperative founded in 1996 by the National League of Cities, the U.S. Conference of Mayors, the National Association of Counties, the Association of School Business Officials and the National Institute of Governmental Purchasing. U.S. Communities assists local and state government agencies, school districts (K-12), higher education, and nonprofits in reducing the costs of purchased goods and services by offering managed access to competitively solicited contracts between suppliers and lead public agencies. The U.S. Communities program is non-exclusive and entirely free to participating public agencies. There are currently over 50,000 registered participating public agencies. In 2011, aggregate program sales exceeded \$1.4 billion, with \$200 million in estimated savings to participating public agencies.

History in New York

For over ten years, U.S. Communities has worked to establish legislation in New York that would provide agencies with the ability to access cooperative purchasing contracts and achieve efficiencies in the procurement process. This included drafting legislation, establishing and meeting with bill sponsors, working with local associations (NYSSBA, NYCOM, NYSAC, NY Towns, SAMPO, among others), and providing program data that demonstrates the efficiencies created by cooperative purchasing. This joint effort resulted in New York becoming the 50th state to establish cooperative purchasing laws on August 1, 2012. (Senate Bill 5525, passed unanimously).

Competitive Solicitation Process

In order for a New York State municipality to utilize a cooperative purchasing contract, that contract must have been “let by the United States of America or any agency thereof, any state or any other county of political subdivision or district therein if such contract was let in a manner that constitutes competitive bidding consistent with state law...”

Lead Public Agency Model

U.S. Communities utilizes a “Lead Public Agency” model, meaning all U.S. Communities contracts are competitively solicited through a sealed bid process by a public agency (Lead Public Agency) and made available to all eligible agencies nationwide (participating public agencies). The Lead Public Agency, with the assistance of an evaluation team comprised of purchasing professionals from other public agencies, completes the full solicitation and award process. As a result, all contracts offered through U.S. Communities have been awarded in a fair and competitive manner by government, for government, with no awards influenced in any manner by U.S. Communities. The Lead Public Agency then manages the

contract for the entire term and is available to answer any participating public agency questions or concerns and provide additional documentation if necessary.

Some examples of Lead Public Agencies include Fresno Unified School District, CA, Fairfax County, VA, Harford County Public Schools, MD, County of Los Angeles, CA, and the City of Seattle, WA. All solicitations, master agreements and supplemental documents are available on the U.S. Communities public website.

Advertising

All contracts offered through the U.S. Communities program are publicly advertised to ensure compliance with state advertising requirements. Methods of advertising may include, but are not limited to, posting on the Lead Public Agency website, the U.S. Communities public website, Onvia Demand Star, BidSync, local association websites or announcements, Canadian MERX Public Tenders and others. Information for all advertising methods for each contract are available on the U.S. Communities public website.

Awards: Lowest Bidder/Best Value

Similar to New York procurement, all U.S. Communities Lead Public Agencies utilize either a lowest responsible bidder or best value evaluation for competitive solicitations. The common method for a bid is an Invitation to Bid (“ITB”), and contracts are awarded to the lowest responsible bidder. Alternately, a Request for Proposals (“RFP”) is often used to ensure an overall best value award of a competitive solicitation, accounting for cost, quality and efficiency. Lead Public Agencies utilize the ITB or RFP process depending on the commodity or service being let.

New York General Municipal Laws § 103 provides both a lowest responsible bidder standard and a “best value” standard for purchase contracts. The “best value” standard was recently passed by the State Legislature in 2011.

Cooperative Standards – U.S. Communities

U.S. Communities hopes that all potential participating agencies engage in some form of analysis of all cooperative programs. Something that years of experience in cooperative purchasing have proven is that not all cooperative purchasing programs are the same. U.S. Communities firmly believes that there is significant value in cooperative contracts but also recognizes the potential for harm resulting from contracts that were not appropriately advertised, evaluated or awarded. As a result, U.S. Communities does everything possible to assist public agencies with their analysis and utilization of contracts. A few examples that may be beneficial to your members are:

1. All contracts available on the public website – no registration required for access to review
2. National Sponsors available for inquiries/guidance
3. Lead Public Agencies available for all contract inquiries
4. Advisory Board of public procurement professionals nationwide
5. Dedicated Program Managers
6. Dedicated Supplier Managers
7. Third-party audits of all contracts (results accessible to all participating agencies)
8. Quarterly reviews with Lead Public Agency and Supplier

With the assistance of our Advisory Board comprised of public procurement professionals nationwide, the program has also created a “Legal Due Diligence Standards” list and a “Cooperative Procurement Standards Checklist” for agencies to consider before proceeding with purchases via a national contract. Both are attached and will hopefully be helpful for your members when reviewing cooperative contracts.

I hope the included information is helpful with your analysis of U.S. Communities. We appreciate your interest in the program and look forward to achieving the shared goal of savings taxpayer’s money.

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Some of the public entities in NY who
 have used the [US Communities Contract](#) for their roofing needs:

SCHOOLS	MUNICIPALITIES
<ul style="list-style-type: none"> ● Johnson City Central Schools ● Binghamton City School District ● Vestal Central School District ● Gowanda Central School District ● Pearl River Central School District ● Rockland BOCES 	<ul style="list-style-type: none"> ● Orleans County ● Seneca County ● Erie County ● Chautauqua County ● Greene County ● Village of Washingtonville ● City of Port Jervis ● Town of Mt Hope ● Town of Boston
<p style="text-align: center;">LIBRARIES</p> <ul style="list-style-type: none"> ● Finkelstein Memorial Library ● Port Jervis Library 	

For more information, [find your Garland Representative](#)
 by zip code at GarlandCo.com and information on US Communities at USCommunities.org



PREVAILING WAGE PROJECT

Per the NY State Department of labor [website](#)

“Under New York State Labor Law, contractors and subcontractors must pay the prevailing rate of wage and supplements (fringe benefits) to all workers under a public work contract. Employers must pay the prevailing wage rate set for the locality where the work is performed. Prevailing wage is the pay rate set by law for work on public work projects. This applies to all laborers, workers or mechanics employed under a public work contract. The Bureau of Public Work administers Articles 8 and 9 of the New York State Labor Laws”

<https://www.labor.state.ny.us/workerprotection/publicwork/PWContents.shtm>

State Code	Building Code International Building Code IBC 2015	Energy Code International Energy Conservation Code IECC 2015	Plumbing Code International Plumbing Code IPC 2015
Wind Uplift	IBC 1504.1 Roof decks and roof covering shall be designed according to Chapter 16. IBC 1609.1.1 Wind loads must be determined using ASCE 7-10. <i>Contact Engineering for Wind Uplift Calculations</i>		
Storm Shelter	IBC 423.3 FEMA 361 or ICC 500 storm shelter required in areas where tornado wind speed exceeds 250 mph. IBC 423.4 See "Shelter design wind speeds for tornadoes" for areas. Requirement for all Educational facilities and emergency operation centers i.e. police, fire, rescue, 911 call centers.		
ANSI/SPRI ES-1	IBC 1504.5 Low slope roof edge metal wind uplift test (does not include gutters). Wind pressures still need to be determined from ASCE 7-10. The edge metal product must be tested or the contractor must be certified by NRCA to meet code. <i>Contact Engineering for Edge Metal Calculations</i>		
Gravel & Aggregate	IBC 1504.8 Aggregate or ballast may not be used in hurricane prone regions or on roofs higher than shown in table 1504.8. Local exceptions may be available when embedding gravel.		
Slope Limitations	IBC 1507.1, 1507.10, 1507.11, 1507.12, 1507.13 Modified Bitumen, Standing Seam Metal, and Single Plies are 1/4:12 minimum slope. IBC 1507.10.1 Coal Tar Pitch roofing is allowed to a minimum slope of 1/8:12 IBC 1511.1 Exception: Reroofing shall not be required to meet the minimum design slope requirement of 1/4:12 slope for roofs that PROVIDE POSITIVE DRAINAGE		
Roof Drainage	IBC 1503.4 Roof drainage shall comply with International Plumbing Code (IPC) sections 1106 and 1108. Emergency overflow drains or scuppers must be provided when the roof is internally drained. Scuppers shall not have an opening of less than 4 inches. See Plumbing code. Overflow drains or scuppers shall be set to a height to make sure the weight of ponded water does not overload the roof. Typical overflow height above roof is 2". Overflow drains and scuppers must use separate plumbing lines. <i>Contact Engineering for Drainage Calculations</i>		
Recover vs. Replace	IBC 1511.3.1.1 A roof needs to be torn off if any of the following apply: 1. Existing roof assembly is water soaked 2. Existing roof is wood shake, slate, clay, or cement, or asbestos cement 3. Existing roof has 2 or more roof coverings in place. IBC 1511.3.1 (2) Standing seam metal roof systems that do not rely on the existing roof system for support shall not require removal of the existing roof coverings if a structural evaluation shows the building can support the weight. <i>Contact Engineering for Structural Evaluation</i>		
Fire	IBC 1505.1 Class A fire rating is typically required for public buildings. Check with local or city code officials for actual requirements. A Class A rated system over a wood or tectum deck requires a barrier board.		
Structural	IBC 1511.2 Roof must be capable of supporting loads that will be encountered during reroofing. IBC 3403.2 Structural Code: If a new roof adds more than 5% weight, then a structural evaluation must be performed. IEBC 707.3.2 Deck Enhancement: Evaluate roof diaphragm attachment IEBC 707.3.1 Parapet Wall: Seismic areas require evaluation of non-reinforced masonry parapet walls <i>Contact Engineering for Structural Evaluation</i>		
Insulation & R-Value	IECC C402.2.2 Insulation values are determined by IECC or ASHRAE 90.1 and are specific to climate zones and construction type. Refer to climate zone map and tables C402.2 in IECC section 4. <i>Contact Engineering for: WUFI Calculation or Moisture/Thermal Evaluation</i>		
SRI / Reflectivity	Not required per code.		
Air Barriers	IECC 402.5.1 A continuous air barrier shall be provided throughout the building thermal envelope for all buildings.		
Vapor Retarder	IBC 1405.3.1 Class I or II vapor retarders shall be provided on the interior side of frame walls in Zones 5, 6, 7, 8, and Marine 4.		



New York State
Department of Health

MANDATORY ASBESTOS TESTING

Per the NY State Department of health [website](#):

12 NYCRR Part 56

“New York State Department of Labor regulations relating to the hazards to public safety and health during the removal, encapsulation, enclosure, repair, or the disturbance of friable and non-friable asbestos, or any handling of asbestos material that may result in the release of asbestos fiber.”

For more information visit:

<https://www.health.ny.gov/environmental/indoors/asbestos/laws.htm>



CONSTRUCTION & PLANNING

by Brian Lambert

Scan Before You Replace: Non-Destructive Moisture Tests Provide Valuable Information for Roofing Professionals

You are feeling a little under the weather and finally make an appointment to go see your family doctor. He does a cursory examination, and decides you need surgery immediately. Wouldn't you want a more thorough exam? What about a CAT scan, an MRI, an EKG, or some other tests? Wouldn't you want more information on what is wrong before the surgery? Wouldn't you want some scientific evidence that you need the surgery? This evidence allows doctors to pinpoint exactly what is wrong and target the problem area. Advanced imaging techniques provide crucial information for medical professionals. Similarly, nondestructive moisture tests provide roofing professionals valuable information concerning the moisture content of roofing insulation.

CONSEQUENCES OF WET INSULATION

There are several reasons why it is important to identify wet insulation trapped within a commercial roofing system. For example:

- Roof leaks can cause costly interior damage to facilities and create hazardous conditions for building occupants.
- Wet insulation becomes a conductor of energy rather than a resistor, resulting in increased energy bills.
- Trapped moisture in insulation is a great place for mold to propagate and may eventually lead to indoor air quality issues.
- Wet insulation often causes roofing fasteners to corrode and reduces the uplift performance of the roof, which can lead to a roof blow off.
- Trapped moisture can speed the deterioration of the building's structural deck.
- Wet insulation will degrade the roofing system.
- Wet insulation adds unnecessary weight to the building.

Thankfully, rather than simply doing a quick visual assessment of the roof and deciding it needs to be replaced, today's roofing professionals

can rely on several different non-destructive moisture tests to help make solid recommendations based on unbiased scientific information. The decision of when to repair, restore or replace a large commercial roof often involves a million dollars or more. Before you make a million dollar decision, building owners should insist on more evidence to support the recommendation.

INFRARED THERMOGRAPHY

Infrared Thermography, also known as an IR scan, is a non-destructive test method to detect and record temperature differences across the surface of an object. IR scans are the most common moisture detection method for identifying wet insulation on commercial roofing systems. During the day, wet insulation will absorb much more heat energy than dry insulation. At night, this heat is retained in the wet insulation longer and is released slower into the atmosphere. Most IR scans are done at night in order to capture this thermal signature of wet insulation trapped in a roofing system. It is common to precisely mark these damaged areas of wet insulation with spray paint on the roof surface. A CAD drawing is then produced identifying wet areas throughout the roof sections.

IR scans work best when conditions provide for a distinct temperature difference between the interior and exterior of the building. Additionally, optimal conditions are at night following a sunny day and when nighttime temperatures cool quickly. The greater the rate of outside temperature change, the greater the difference in surface temperatures between the wet and dry areas.

There are some limitations to IR scans. Ponding water or any precipitation within the last 24 hours prior to the scan may lead to inaccurate readings. IR scans will only detect moisture in the top roof system. If there are multiple



ABOUT THE AUTHOR: Brian Lambert is director of products and systems for The Garland Company, Inc. He has been active in industry initiatives since 1993. He is frequently a guest speaker at architectural and building maintenance seminars, and has written many articles on roof system performance.

roofs on the building and moisture is trapped in the lower roof, an IR scan will not detect this moisture.

It is important to remember that IR scans work on the principle of solar gain and temperature difference. When multiple roofs are on a building, the trapped moisture in the lower roof never acquires the heat it needs to be detected by an IR scan. Additional constructions that can produce false readings with IR scans include ballasted systems, lightweight concrete decks, and roofs with highly reflective roof surfaces.

NUCLEAR SCANS

Nuclear scans use a nuclear gauge to detect various levels of hydrogen ions trapped within the roof system. The readings displayed by the gauge are a measurement of the quantity of hydrogen ions that are present within a detectable area beneath the gauge. Since hydrogen ions are present in water, these readings can be correlated to moisture content once a base line reading for a dry area has been established.

The readings are used to create a map of the wet areas on the roof plan, which again show the location and outline of the suspected wet areas. Areas with wet insulation will have greater concentrations of hydrogen than those with dry insulation. This method of data collection shows where the moisture level is highest, allowing the source of the leak to be more easily determined.

With nuclear roof scans, the entire roof is typically marked in a 5' x 5' or 10' x 10' grid pattern. Within each grid point, a reading is taken and recorded on a roof plan. The smaller the grid pattern, the more data points are collected. For example, a 10,000 square foot roof with a 10' x 10' grid would require 100 data points. If the grid were 5' x 5', there would be 400 data points.

Obviously, more data points will provide more accurate information, but will also take longer and therefore be more costly. An experienced technician often narrows the grid pattern in areas with wet insulation to better pinpoint problem areas. A core cut is taken in areas with the highest readout to verify moisture.

The nuclear readings can miss small areas of wet insulation because the actual readings are taken on a very small proportion of the total roof. Taking nuclear scans on larger roofs will take significantly more time than taking infrared scans. However, nuclear roof moisture surveys are performed during the day, and are not affected by debris on the roof, winds, or reflective roof coatings.

ELECTRONIC FIELD VECTOR MAPPING

Electronic Field Vector Mapping (EFVM) takes a different approach when it comes to nondestructive moisture tests. Whereas the goal of infrared and nuclear scans is to locate wet insulation, the goal of EFVM is to locate the point where moisture can enter a roof system. EFVM begins with a grounded wire

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loop around a given roof section—typically 5,000 to 20,000 square feet. A technician then applies water over the surface of the test area, using the water as a conductive medium. A low-voltage, pulsating electric charge is created between the nonconductive roof system and the conductive structural deck.

Watertight roof systems will isolate the difference, whereas a puncture or point of entry will cause an electrical connection to occur. Trained technicians can read the directional flow of the current and pinpoint the exact point of moisture entry into the roof system.

One advantage of EFVM is that once the point of entry is detected, it can be repaired and then retested the same day to ensure that the leak point has been repaired accurately. Although EFVM can be used on a variety of low slope roof systems, it is most often used on roofs where finding a leak poses difficulties, such as vegetated roof systems, ballasted single plies, and inverted roof membrane assemblies.

NON-DESTRUCTIVE MOISTURE TESTS SAVE OWNERS MONEY

Non-destructive testing provides roofing professionals and building owners with valuable information to make sound business decisions about their roofing assets. Valuable information gathered from nondestructive moisture scans can help building owners and facility managers extend the life of their roofing assets. Prematurely replacing a roof that can be repaired or restored costs building

owners millions of dollars annually. By using nondestructive moisture tests, the question of repair vs. replace is answered with hard data.

Although the most nondestructive tests are commonly performed on aged roof systems, many design and roofing professionals are now requiring nondestructive tests on newly installed roofs as a measure of quality assurance. Some manufacturers require them as a condition of the warranty. This requirement is written directly into the roofing specification and virtually guarantees that the newly installed roof is sound, watertight, and contains no trapped moisture.

CONCLUSION

As with many advanced technologies, quality people are just as important as great technology. Trained and qualified professionals are needed to perform these tests and interpret the results. Similarly, a design professional or trained roofing expert must then use this valuable information—in combination with core cuts and visual inspections—to create a game plan that maximizes the building owner's roofing investment.

The medical profession has used advanced imaging techniques for decades to pinpoint problems and keep us healthy. Similar technology is now available for building owners and facility managers to help extend the life of their roofing assets. Require a nondestructive scan before you replace your next roof and you will likely save thousands of dollars. ✪



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GUEST COLUMN



Better Roofs are Less Expensive

by Richard A. Boon, P.E., CCI

“The cost to install a roof is only a portion of the total cost of owning a roof”

The ultimate question for roofing is: "What is the best roof?" The accountants will tell you that the answer is simple: the roof that costs the least over its life. It really does not matter what material is used or how the roof is attached; the answer is the roof that lasts the longest. If the roof fails, then the cost of a new roof is added to the cost.

When most owners look at roofing, they look at the materials and the systems, and the only part of the cost they consider is the initial cost. But the cost to install a roof is only a portion of the total cost of owning a roof.

The practice of examining the cost of owning a roof over its entire life is called life-cycle cost analysis. This is the best way to compare the cost/value of roofing systems. Something that is crucial is: How long do you expect to own the building? If the building is indefinitely, then the analysis should be run for at least 20 years. Some people will use 30 years. The standard design life for roofing is 39 years. There are very few systems that are functional at the end of this life expectancy.

The next consideration is the changing value of a dollar over time. One common method for relating future expenses to present costs is to use the t-bill rate, minus the inflation rate. A time value of approximately 5 percent is a reasonable number for this analysis.

There are costs associated with other aspects of roofing, such as installation inspections, semi-annual inspections, and related repairs, costs associated with making the warrantor live up to the warranty, and so on. There are also routine expenses to consider, such as cleaning the drains, recaulking the flashings and performing general housekeeping.

With some systems, the costs of performing some of these items are covered by the warrantor as a part of a complete package. They can also be purchased from some contractors or roofing consultants for an annual service charge. All costs need to be known or estimated for the term of the study period.

The last item that needs to be known is the relative life expectancy of the roofs in question. There are sources for this information. The most conservative approach is to use the warranty life as the service life. This is generally shorter than the real life because there is no routine maintenance done. Then the life may well be shorter than the warranty.

Life-cycle Cost Scenario

Let's create a simple scenario that illustrates how these factors combine to produce a life-cycle cost:

The roof in question is bid using two different systems. The first is a commodity-grade roof with a 15-year warranty and a bid of \$225,000. The second system is a premium roof, and the bid is \$300,000.

We are assuming that the owner is a public entity, so that taxes can be ignored. We are using our 5 percent discount rate for the time value of the funds.

The cost to maintain the commodity-grade roof is at least \$1,000 per year, to cover the costs of the required inspections and the cost of a consultant on the project during installation (many consultants are considerably higher). When that roof is replaced, in its 15th year, its present value cost is \$113,640, representing the initial cost adjusted for the time value of the funds. When you add the continuing cost of maintenance, the total-ownership cost for the commodity

The figures used in this illustration are in accordance with ASTM E-917, Standard Practice for Measuring Life-Cycle Costs of Buildings and Building Systems, which provides building owners with an excellent tool for comparing roofing options on a financial basis.

Other Factors

There are other factors that can be included in a model. These include a simple energy cost savings as well as the cost associated with any leaks in the system. If a roof leaks, then the wet areas need to be fixed, as does the damage done to the building. The additional energy lost can be considered as well.

There is also a cost associated with disrupting the facility to put a new roof on. This should be added to the cost of the roof. It has been reported that the return on an initial investment of \$10 to \$12 can be justified through the savings of a year in maintenance.

Conclusion

So, which of these roofs saves the owner the most money? Clearly, the higher up-front costs of premium roofing systems are fully justified through long-term savings.

By looking at more than just the initial cost of the roof, the owner is making a better financial decision. This same logic applies to making a multitude of construction-related purchasing decisions.

Are the published life expectancies of high-performance roofing products truly achievable? There is no question that a knowledgeable person looks at the roof at least once a year (industry recommendation is twice a year), and the problem areas are corrected promptly, most commercial roofs will last significantly longer than their warranties. This is true when defective materials cause the roof to shrink excessively or to shatter.

Life-cycle cost analysis is also the best way to discuss making roofing decisions with financial people. The one that makes the decision is the one that signs the checks. Roofing people are great at providing technical information but poor at providing financial information that supports the right decision.

Improve the quality of your data. Examine your own roofs or the roofs of others in your area and find out what is good and what's not. This data can then be used to better model the true life-cycle costs.

Richard A. Boon, P.E., is an independent roofing consultant with Construction Support Services Inc. of Littleton, Colo. and is the director of The Roofing Industry Educational Institute and serves on Roofing Contractor's editorial advisory board.

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Subject: Schindler Elevator Modernization Proposal

Proposal #: MCOS-B43QEV
Project: Town Of Schodack
265 Schuurman Rd
Castleton On Hudson, NY 12033-3223

Schindler Elevator Corporation is pleased to offer you the following proposal, which includes engineering services, material, and labor, to modernize the project referenced above.

For more than 125 years Schindler Elevator Corporation has been a recognized leader in the development and maintenance of safe, efficient, cost effective people moving systems. Schindler has a unique combination of expertise, innovative products and field resources to modernize equipment in any type of facility and to suit any modernization requirement.

We sincerely hope you will consider taking advantage of the many benefits of a Schindler modernization. We trust you will find our commitment to quality installation, while minimizing inconvenience, a key component in demonstrating our dedication to being your vertical transportation partner.

Schindler Elevator Corporation can offer financing options for the project at competitive rates which are administered by our third party broker. Please see the enclosed brochure for details on our financing plan.

Should you have any questions or require additional clarification about your elevator modernization, please do not hesitate to call me.

Sincerely,

Kim Anderson

Kim Anderson
Sales Representative

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Date 8/28/2018

Schindler Elevator Corporation

Dawne Kelly
265 Schuurman Rd
Castleton On Hudson, NY 12033-9530

Contact: Kim Anderson
Telephone: 518-782-0744
Fax: 518-782-0949
E-mail: Kim.Anderson@schindler.com
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Date: 8/28/2018
Subject: Schindler Elevator Modernization Proposal

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Project Overview

Below is an outline of the work to be performed during this modernization. We have also included an analysis of the opportunities our technology offers to increase your flexibility in managing and leasing your property and improving your return on investment.

Elevators included in Modernization Proposal			
Number of Units	Type	Unit Number	Reference Name
1	Hydro	01	Bank A

Modernization Benefits

A Schindler modernization offers a number of benefits which have been outlined below:

Advantages with Schindler Modernization	Risks from Deferred Modernization
Smooth, reliable performance as a result of precision engineering, expert installers and quality components utilizing digital technology <ul style="list-style-type: none"> Miconic technology has been proven with 70,000+ installations globally, stable platform, high reliability and offers superior ride quality 	Poor reliability and potential for higher injury claims and legal costs. Higher operating costs and lower customer satisfaction. Longer wait and travel time for tenants, unreliable ride quality and less system reliability when a car is taken out of service.
Compliance with the latest safety and ADA codes.	Potential for higher injury claims and legal costs.
Long term product support with parts replacement and maintenance. Schindler's Service Excellence offered long after the modernization.	Lack of consistent technical expertise. Short lifecycle of parts support and design obsolescence.
Improved service from Schindler Ahead (SA) which provides remote connectivity to your Equipment. Schindler Ahead will automatically notify us if any connected component or function is operating outside established parameters. When appropriate, we will communicate with you to schedule service calls. Monitoring will be performed 24/7 and will automatically communicate with our Customer Service Network using dedicated wireless cellular technology.	Longer periods of downtime due to troubleshooting. Increased disruptions for tenants and lower customer satisfaction.
Financing may be available based on credit qualifications.	

Project Scope - Bank A

Number of Units	1	Capacity	3000
Type	Hydraulic	Speed	125 fpm
Unit Numbers	01	# of stops	4
Machine Location	Adjacent	# of openings	4 Front

Description of Work	Included in Proposal
Machine Room	
Tank unit and Miconic HX control. Tank unit includes new submersible pump one single speed AC motor, valve, hush kit, and all necessary piping in machine room	Replace
Battery Lowering	New
Oil Cooler	Not Included
Tank Heater	Not Included
Scavenger Pump	Not Included
Rupture Valve	Not Included
Machine Room Wiring	Replace
Door Operator Front	
Door operator and clutch	Replace
Hoistway Door Equipment	
4 Interlock(s) per car	Replace
4 Spirator(s) per car	Replace
Car and Hall Fixtures	
4 Surface Mounted Hall Stations	Replace
1 Surface mounted car riding lantern	Replace
Main Car Operating Panel	Replace
Floor lockout provisions	Not Included
Finish	#4 SS
Car and Hoistway	
Hoistway Wiring	Replace
Car Wiring	Replace

All other systems and components not noted above will be reused and integrated into the new elevator system.

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SCHINDLER AHEAD

Your Schindler HXpress Modernization package comes enabled with Schindler Ahead. The **Schindler Ahead Hardware** provides remote connectivity to your Equipment, and will automatically notify us if any connected component or function is operating outside established parameters. When appropriate, we will communicate with you to schedule service calls. Monitoring will be performed 24/7 and will automatically communicate with our Customer Service Network using dedicated wireless cellular technology. Schindler will make every reasonable effort to maintain wireless connectivity.

Schindler Ahead has three service tiers to fit your individual needs. The tiers are Connect, Enhanced, and Premium.

Connect – Schindler's Connect package provides wireless cellular communication from your equipment's controller to Schindler's data network. This allows the Schindler Cube to be connected to your equipment 24/7. Connect also provides access to the basic features of ActionBoard and ActionBoard Mobile, giving you real time information on your equipment.

Enhanced – The Enhanced Package includes the features of Connect, plus access to Schindler's Elevated Support Professional (ESP) Team. This team analyzes information gathered by Schindler Ahead, which improves the reliability of your equipment and improves the response time. The ESP Team can alert you when a shutdown is detected, helps confirm issues remotely, and provides real-time ETAs for technicians en route. With these enhanced diagnostics, we can guarantee that you will not be charged for Running on Arrival calls. Under the "No Running on Arrival Guarantee," Schindler will fully cover the cost of any callback related to the following situations: Elevator or Escalator Running in normal operation, or running under any of the following special services modes: Independent service, Fireman's service (Phase I or Phase II), or Inspection operation. All other callbacks will be billed as outlined in the service agreement.

Premium – The premium package is our top tier, and was created for customers requiring the most comprehensive level of service. Our premium package offers the highest level of functionality and support. The Premium tier also includes concierge level assistance for all of your service needs.

These cumulative tiers provide increasing benefits, including access to **Schindler ActionBoard and ActionBoard Mobile**, which are communication technologies that provide access to real-time information about your equipment. Some of the available information includes: performance history, reports, push notifications, service call records, unit profiles and more.

Additionally, Schindler Ahead enables the option to add **TeleAlarm**, a cellular emergency phone monitoring service, to any tier. This service includes a reliable cellular connection that allows incoming and outgoing emergency calls from the elevator cab, and eliminates the need for a traditional analog phone line.

Please contact your Schindler Service representative for more detail on incorporating one of these service tiers into your service contract.

Work by Others

The owner will provide the following requirements based on ANSI A17.1 Code, the governing code, except when applicable codes conflict with ANSI A17.1 Code. Rules referenced are ANSI A17.1 Rules.

Hoistway

1. Provide 75-degree bevel guards on all projections, recesses or setbacks over two inches, except for the loading or unloading side. Rule 100.6.
2. Provide pit light and GFI outlet. Light switch to be located adjacent to each pit entrance.
3. Provide a legal hoistway inclusive of ventilation and shaftway bevel guards, as required.
4. Cutting and patching walls and floors.
5. Provide a pit access ladder for each elevator, where required.
6. Provide a lockable, self-closing, fire-rated pit door, where required.
7. Hoistway venting or pressurization to prevent accumulation of smoke and gas, as required by Local Building Code.

Machine Room

1. Enclose/relocate all non-elevator oriented conduit, ducts and drains from elevator machine room, where required in the machine hoistway and/or pit. Enclosures, when used, need to be two-hour rated.
2. Provide means to regulate control room temperature and humidity between 55° F and 90° F with relative humidity no more than 85% non-condensing. Peak equipment heat release is a minimum of 6,000 BTU/Hour/Unit (maximum = 9,000 BTU/Hour/Unit) for a Hydraulic unit.
3. Provide machine room smoke/heat detector as required by regulation. In the event sprinklers are anticipated within the machine room area, means to remove primary power prior to the application of water must be provided as required by code.
4. Provide new electric wiring from the present disconnect switches to the terminals of the new elevator controllers in the new locations, inclusive of a normal/standby 120 VAC, 15 AMP supply at each controller.
5. Provide connection at the first elevator controller for fire recall operation, where auto-recall is needed to respond to a life safety/fire alarm system.
6. Provide proper lighting in the elevator machine rooms within the vicinity of every controller and mainline disconnect
7. Provide a fused disconnect switch or circuit breaker and a light switch adjacent to the lock jamb-side of the machine room door for each elevator location, per the National Electric Code. Rule 210.5 and NFPA No. 70 Rule 620-51. Provide auxiliary disconnects, as required, based on the elevator contractor's drawings.
8. Provide copper wire feeder and branch wiring circuits to the controller, including a main line switch and convenience outlets.
9. Provide a telephone outlet near an elevator controller in each machine room.
10. Provide a self-closing and locking access machine room door.
11. Provide an "ABC" fire extinguisher.

General Requirements

1. Provide sufficient space for storage of materials on site throughout the duration of the modernization.
2. Provide clear floor space to be used as a work area.

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3. If not presently outfitted, each elevator lobby should be equipped with smoke detectors, which can be used to initiate automatic fire recall. Actuation from water flow sensing or the general building alarm may require special approval.
4. Paint new or modified hoistway equipment to match building aesthetics, as required.
5. Provide building signage and floor designations related to other building systems, as required.
6. Provide building corridor lighting sufficient for illumination of elevator landing sills, as required by code.

Electrical Requirements

1. The permissible voltage drop for elevator feeders shall not exceed 3% between the service delivered to the building and our supply terminal.
2. All three legs of the three phase feeder must be hot with respect to ground and balanced to each other with no more than a 5% variation between individual legs.
3. The maximum permissible voltage variation measured in the machine room under all operating conditions shall not exceed plus or minus 10% of the nominal building supply power source voltage.
4. A 20 amp, single phase, 110VAC, dedicated circuit with a duplex receptacle for the oil heater unit.

Price and Payment Terms

1. Our price for the work proposed is \$83,964.00, including appropriate tax. This price is firm for 90 days, and thereafter subject to change without notice.

You agree to the following payment schedule:

- 35% of the price quoted above upon execution of this Contract;
- Balance to be paid in one installment upon material delivery equal to 95% of the remaining balance within 30 days of invoice;
- Final payment within 30 days of completion of the work.

Any late or overdue payments will bear interest at the rate of 1 1/2% per month. Attorneys' fees and other costs of collection will be included in the event that we must pursue legal action for payment or in the event that you are otherwise in breach of this contract.

We will not release to manufacture until the above initial payment is made. We will not turn over equipment prior to receipt of 95% of the price for the work.

2. Schindler understands the costs for capital improvement can put a strain on a property's budget. Schindler has partnered with leading Finance organizations in an effort to help our clients sort through the best options to fund these capital improvements. We have simplified the process so all private financial information as well as future payments are handled between the Finance organization's representative and our client. Schindler facilitates the transaction and only requires a new 5-year maintenance contract as part of the agreement. Financing option is subject to credit check and approval.

Often times there are other building components which require upgrade due to the upgrade of the elevator system. These costs can be rolled into the total finance package with the lender.

Our monthly finance payment for the elevator work over 60 months would be \$1,682.64*.

If for some reason our contract is cancelled prior to the 60-month term all remaining balances become due immediately. *Monthly finance payment is an approximation and will be finalized following the credit check and contract.

Your sales representative, Kim Anderson, will be happy to facilitate the process moving forward if you are interested in our financing option. The finance credit approval form can be found attached to this document.

General Terms and Conditions

1. The price quoted in Article 1 above is based upon all the work being performed during our regular working hours of regular working days. If overtime is required, the additional price usually charged by us shall be added to the contract price. Your advance approval in writing is required before we will schedule or perform any overtime work.
2. The equipment furnished hereunder remains personal property and we retain title thereto until final payment is made, with the right to retake possession of the same at the cost of the Purchaser if default is made in any of the payments, irrespective of the manner of attachment to the realty, the acceptance of notes, or the sale, mortgage or lease of the premises.
3. The completion of the work as covered by this Agreement or acceptance thereof shall constitute a waiver by you of all claims for loss or damage due to delay. It is also understood and agreed that we shall not be liable for the condition, design, application or compliance with acceptable codes of any equipment not furnished under this Agreement or for the omission of any work or equipment not covered by this Agreement. We reserve the right to remove and retain all equipment that has been replaced or new materials not used in construction.
4. Schindler reserves the right to furnish its most modern of equipment and no statements contained in this contract are to make it obligatory for us to furnish equipment, the design of which has been discontinued or supplanted by new standards or codes.
5. All previous communication between us, whether written or verbal, with reference to the subject matter of this Agreement, is hereby abrogated, and this contract when duly accepted and approved constitutes the agreement between us, and no modification of this agreement shall be binding upon the Purchaser or Schindler, or either of us, unless such modification shall be in writing, duly accepted by the Purchaser and approved by Schindler. The contract date shall be the date of approval by Schindler.
6. The Purchaser is to provide suitable connections from the power mains to the controller, together with any cutouts, line switches, phase reversal or lightning arresters, and any other such components as that may be necessary to meet purchaser and/ or local code requirements.
7. Any changes in the building required to meet any local or state building or electrical codes are to be made by the Purchaser. Any cutting or patching necessary for the installation of equipment furnished under this contract shall be done by the Purchaser. Schindler shall not under any circumstances be liable for any redecorating that may be necessary upon the completion of its work. No work or service other than that specifically mentioned herein is included or intended. Such work by others must be coordinated by Purchase with Schindler in order to avoid delays to Schindler's work.
- 8A. It is expressly understood, in consideration of the performance of the service enumerated herein at the price stated, that nothing in this agreement shall be construed to mean that Schindler assumes any liability on account of injury or damage to persons or property, except to the extent directly and solely due to the negligent acts or omissions of Schindler or its employees; and that the Purchaser's responsibility for injury or damage to persons or property while riding on or being in or about the equipment referred to is in no way affected by this Agreement. Schindler shall not be responsible or liable for any loss, damage, detention or delay caused by labor trouble, strikes, lockouts, fire, explosion, theft, lightning, windstorm, earthquake, floods, storms, riot, civil commotion, malicious mischief, embargoes, shortages or materials or workmen, unavailability of material from usual sources, Government priorities or requests or demands of the National Defense Program, civil or military authority, war, insurrection, failure to act on the part of the Purchaser's or Schindler's suppliers, orders or instructions of any federal, state or municipal government or any department or agency thereof, Act of God, or by any cause whatsoever beyond its reasonable control. Dates for the performance or completion of work shall be extended to the extent of such delays.

- 8B. Purchaser agrees to defend, indemnify and hold Schindler harmless from and against any claims, lawsuits, demands, judgments, damages, costs and expenses arising out of this Agreement except to the extent caused by or resulting from the established sole and direct fault of Schindler.
- 8C. We will not be liable for damages of any kind, whether in contract or in tort, or otherwise, in excess of the price of this Agreement. We will not be liable in any event for special, indirect, liquidated or consequential damages, which include but are not limited to loss of rents, revenues, profit, good will, or use of equipment or property, or business interruption.
9. Schindler guarantees that the equipment furnished hereunder will comply with the foregoing specifications and if promptly notified in writing will, at our expense, correct any defects in such equipment occurring within one year from the date of completion or acceptance whichever occurs first, which are not due to ordinary wear and tear or improper use, care or maintenance. The correction of such defects constitutes the limit of our responsibility. THERE ARE NO OTHER WARRANTIES OR GUARANTEES, EXPRESS OR IMPLIED, OTHER THAN OF TITLE. The equipment installed under this agreement requires maintenance service, such as periodic examinations, lubrication and adjustment by competent elevator mechanics. Our guarantee is not intended to supplant this normal servicing of the equipment and it is not to be construed that we will provide free maintenance service of this type, except as may be provided under other provisions of the contract, or that we will correct, without charge, breakage, maladjustment or other troubles occurring as a result of improper or inadequate maintenance.
10. We will defend any suit or proceeding brought against you so far as based on a claim that any equipment, or any part thereof, furnished under this contract constitutes an infringement of any patent of the United States, provided that such equipment or part is not supplied according to your design, and it is used as sold by us, if notified promptly in writing and given authority, information and assistance (at our expense) for the defense of same, and we shall pay all damages and costs awarded therein against you. In case said equipment or any part thereof is in such suit held to constitute infringement and the use of said equipment or part is enjoined, we shall at our own expense either: procure for you the right to continue using said equipment or part; or replace same with non-infringing equipment; or modify it so it becomes non-infringing; or remove said equipment and refund the purchase price and the transportation and installation costs thereof. The foregoing states our entire liability for patent infringement by said equipment or any part thereof.
11. Purchaser will have the hoistways and machine room in safe and proper condition and the proper electrical current available as indicated on our attached schedule. Purchaser will also provide adequate access for delivery and a dry protected place for storage of equipment. Storage requirement of a minimum of 150 sq ft will be required for this project. If storage constraints force double handling of equipment, we will be compensated by you for all additional costs for labor and materials to overcome such obstacles at our standard billing rate. If the locations where the work is to be performed are not ready or are unsafe, we reserve the right not to begin or to discontinue the work. If adequate storage is not available, we will be compensated for all storage costs, as well as costs for demobilization and remobilization if necessary.

If completion of our work is delayed beyond our control and the following date: _____, our price will be increased in proportion to any additional costs to complete, including but not limited to labor rate increases, component material price increases, storage costs, demobilization and remobilization expenses and the like.

12. Should latent or concealed conditions be encountered in the performance of the work below the surface of the ground or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown physical conditions below the surface of the ground or should concealed or unknown conditions in an existing structure of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in the work of the character provided for in this contract be encountered, the contract price and time shall be equitably adjusted by change order upon claim by either party made within 20 days and after the first observance of the conditions.

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Date 8/28/2018

13. Any proprietary material, information, data or devices contained in the equipment or work provided hereunder, or any component or feature thereof, remains our property. This includes, but is not limited to, any tools, devices, manuals, software, modems, source/ access/ object codes, passwords. In the event Schindler's maintenance obligation is terminated, the Schindler Ahead features ("SA") (if applicable) will be deactivated and Schindler reserves the right to remove the Schindler Ahead hardware. If Schindler is no longer the maintenance provider, Customer is responsible for obtaining alternative telephone service for the elevator phones.
14. Our bid is based on reusing existing components as is in regard to seismic conditions except as herein noted. Any required changes to existing components resulting from seismic requirements will need to be bid separately.
15. In the event of governmental changes to applicable tariffs, tax rates, including but not limited to sales tax, use tax, excise tax, privilege tax, transaction tax and similar changes, or loss of tax exempt status, Schindler reserves the right to adjust the contract price accordingly to account for all additional cost impacts.
16. We are not responsible for the removal of any hazardous materials. We will take possession, remove, and dispose any elevator equipment not being reused.

Schindler Elevator Corporation

By: **Kim Anderson**

Kim Anderson

(Signature)

Accepted: _____
(Full legal name of Purchaser)

By: _____ (Signature) _____ (Title)

Date: _____

∇ Principal or Owner

∇ Agent for Principal or Owner: _____
(Name of Principal or Owner)
Town Of Schodack

Approved: **Schindler Elevator Corporation**

By: _____
(Signature)

Date: _____

Financing Credit Application

APPLICANT INFORMATION:

Business Name		Contact	
Street Address		City	State Zip
Phone	Years in Business	Nature of Business	
<input type="checkbox"/> Own Business Property		<input type="checkbox"/> Rent Business Property (Landlord, Phone #)	
<input type="checkbox"/> Proprietorship		<input type="checkbox"/> Partnership	<input type="checkbox"/> Corporation <input type="checkbox"/> Limited Liability Corp.

INFORMATION ON PRINCIPAL(S):

Name		Title	SS#	
Street Address		City	State	Zip
Name		Title	SS#	
Street Address		City	State	Zip

BANK REFERENCE:

Name of Bank	Contact & Phone #	Acct #
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TRADE REFERENCE(S):

Supplier	City/State	Phone #	Contact / Acct #
Supplier	City/State	Phone #	Contact / Acct #

AUTHORIZATION: By submitting or signing and faxing the above application, you certify that the information provided in this credit application is accurate and complete and you authorize Schindler Elevator Corp, its successors and/or assigns to obtain information from the references listed and obtain a consumer credit report that will be ongoing and relate not only to the evaluation and/or extension of the business credit requested, but also for purposes of reviewing the account, increasing the credit line on the account (if applicable), taking collection action on the account, and for any other legitimate purpose associated with the account as may be needed from time to time. The individual signing or submitting this application further waives any right or claim, which such individual would otherwise have under Fair Credit Reporting Act in the absence of this continuing consent.

SIGNATURE OF APPLICANT: _____ **DATE** _____

ECOA NOTICE (TO BE RETAINED BY APPLICANT): Your business credit application will be reviewed carefully and a decision will be rendered promptly. If your business credit application is denied, you have the right to a written Statement of the specific reasons for denial. To obtain a statement, please contact us within 60 days from the date that you are notified of our decision. We will send you a written statement of the reasons for denial within 30 days of your request. **NOTICE:** The Federal Equal Credit Opportunity Act prohibits creditors from discriminating against credit applicants on the basis of race, color, religion, national origin, gender, marital status, age (provided applicant has the capacity to enter into a binding contract), because all or part of the applicant's income derives from any public assistance program; or because the applicant has, in good faith, exercised any right under the Consumer Credit Protection Act. The federal agency that administers our compliance with this law is the Federal Trade Commission, Equal Credit Opportunity, Washington, DC 20580.

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Date 8/28/2018

Modernization Invoice Application No. 1

Bill to:		Ship to:		Invoice Date: 8/28/2018	
Company	Town Of Schodack	Town Of Schodack		Invoice Number:	HX-B43QEV
Contact Address	265 Schuurman Rd	265 Schuurman Rd			
		Castleton On Hudson, NY 12033-3223			
City	Castleton On Hudson				
State	NY				
Zip	12033-9530				
Contact Name	Dawne Kelly			Billing Terms	
Agent for				Progress Bill Terms:	Net Due 30 Days
				Final Bill Terms:	Net Due 60 Days

Progress Billing – Elevator Installation

Contract Amount				83,964.00
	<u>Work Value</u>	<u>Retention</u>	<u>Net Due</u>	
Total Work Completed	35%	5%		27,918.03*
Less Previously Billed	0%			0.00
Current Application				27,918.03

*Invoice amount is an approximation and will be confirmed with final contract
Please note the invoice number on your payment remittance

All Invoice / Payment / Contact Questions to:	
Sales Rep Name	Kim Anderson
Office Name	2812
Phone Number	518-782-0744

Remittance
Schindler Elevator
PO Box 70433
Chicago, IL 60673-0433

Dawne Kelly

From: Charles Peter
Sent: Friday, October 19, 2018 4:41 PM
To: David Harris; trexforschodack@gmail.com; m.kenney9@verizon.net; scottswar@gmail.com; jamesbult@gmail.com
Cc: Dawne Kelly
Subject: Streaming service quote
Attachments: Schodack NY Proposal r1.pdf

Good afternoon,

A few months ago, Board members Bult and Rex met with myself and Bob Katz. Mr. Katz had worked to set up the Town of Sand Lake's camera system that they use to broadcast their Town meetings. Mr. Katz had come up with a figure of roughly around \$15,000 to model a similar set up for us. Additionally, the Town of Sand Lake utilizes a company, Town Hall Streams, to stream these meetings online. After some discussions with various Board members it was obvious the \$15,000 was far more than the Town was interested in pursuing. At Mr. Katz's suggestion though, I reached out to Eric Spenlinhauer who runs Town Hall Streams. I exchanged some emails detailing the Town's goal and followed up with a phone conversation.

The result of this was the attached basics of a proposal. Town Hall Streams would provide the equipment, installation, and hosting site for the streaming of Town Meetings. The camera(s) would be installed and attached into the existing microphone system so when the mics were turned on so would the camera(s). Additionally, whenever there was a meeting we would like streamed, someone would schedule the time on the Town Hall Streams website and the feed would go live at the start of the meeting. This would allow us to broadcast our Zoning and Planning meetings as well.

Some of the options that are included for consideration are picture in picture (PIP) and the ability to go live on the Town Facebook page simultaneously. While one option it to mount one Camera that would be focused on the Board and whoever is addressing the board, another option is to have a dedicated camera for the Board and one that captures the speaker and the audience. If that option was pursued the PIP would be required. While the bulk of the picture would be dedicated to the Board, a smaller screen could show the audience. The Facebook Live option as stated would allow the board meetings to be streamed on both Town Hall Streams external hosting site as well as the Town's Facebook page. In some previous discussions with the Supervisor and Board Member Rex, the ability for people who don't have Facebook to access the live streams was an issue of importance. A dedicated link to the external hosting page could be posted on the Town's website for those people and those who utilize Facebook could watch via that if this additional option is considered.

Ultimately this proposal from Town Hall Streams offers several advantages to the route Mr. Katz had originally laid out. While the production value of Sand Lake's system would far surpass this, it also currently is operated by two people per meeting. This system, outside of scheduling streaming times in advance, wouldn't require any extra people to oversee during meetings. A small switch would be attached to the mic system as stated so as long as the mic system is used, we could stream any meeting we wanted without having a dedicated person there. Additionally, the Town of Sand Lake, while they purchased their equipment outright, still pays Town Hall Streams for hosting and technical support. This proposal includes all installation, equipment, and maintenance.

Ultimately, the Town is looking at an annual cost of between \$3,000 to \$3,600 under this proposal. Please look it over and give me any feedback on further questions or suggestions you have.

Thank you,
Charles Peter



Schodack NY Town Hall Meetings Live and On Demand Streaming Proposal

Scope:

Town Hall Streams will provide the town of Schodack New York a system that will provide real time and on demand playback of any meetings that are broadcast on the local cable channel. All equipment will be supplied, installed and maintained by Town Hall Streams. The equipment comes with full warranty for as long as the town continues the service with Town Hall Streams.

Meetings will be streamed live and available for On Demand playback via www.townhallstreams.com links may be posted from the town website. On Demand playback is available for a period of 5 Years. We will allow for authorized persons to download one digital copy for any use. Town Hall Streams will use the current internet connection at the location.

Cost:

- Streaming \$250.00/month
 - PIP \$ 30.00/month
 - Facebook Live \$ 25.00/month
- Equipment and basic installation is included

Term:

12 months

Warranty:

Lifetime or length of contract

Payment:

By Check

Company:

Town Hall Streams – 8 Osprey Lane, York Maine 03909

Name: _____

Signed: _____

Date: _____



Estimate: Camera System
Date: July 31, 2018

- SECURITY ALARMS
- FIRE ALARMS
- WATER DETECTION
- CCTV SYSTEMS
- CARD ACCESS SYSTEMS
- ALARM MONITORING
- INTERCOM SYSTEMS
- TEMPERATURE ALARMS
- SPRINKLER MONITORING



4 GLENS FALLS TECHNICAL PARK, GLENS FALLS, NEW YORK 12801-3802
NYS LIC # 12000076894
PHONE (518) 798-9551 FAX (518) 792-5199

- FIRE EXTINGUISHERS
- CLEAN AGENT SYSTEMS
- CO₂ SYSTEMS
- RESTAURANT HOOD & DUCT PRE-ENGINEERED SYSTEMS
- EXTINGUISHER CABINETS
- FIRE HOSE & FITTINGS
- SAFETY EQUIPMENT
- FIRE TRAINING

Customer:
Town of Schodack
265 Schuurman Rd.
Castle-On-Hudson NY
David Harris 854-3078
David.Harris@schodack.org

PROPOSAL TO INSTALL NEW CAMERA SYSTEM AT TOWN OFFICE

Scope of work:
THE RUNNING OF ALL WIRES ACOCIATED WITH CAMERA SYSTEM, MOUNTING CAMERAS, ASSOCIATED HARDWARE, SETTING UP, PROGRAMING AND TESTING OF NEW CAMERA SYSTEM.
New Equipment Includes:
<ul style="list-style-type: none"> • One (1) HX-N7616EP4T NVR 16ch/4terr. • Two (2) HX-TR2342F2 IP Turret Style Camera 4MP/2.8MM • One (1) HX-TR2342F4 IP Turret Style Camera 4MP/4MM • Eleven (11) HX-0D2142F2 IP Dome Style Cameras 4mp/2.8mm • One (1) 0E-24LED 24" Color Monitor • One (1) ZG-MDZ Surge Protector for Monitor & NVR • Two (2) TQ-TPES50 Poe Switch • Two (2) HX-WMS Wall Bracket for Turret Cameras • Three (3) HX-PC130T Brackets • Eleven (11) HX-CB110 Camera Brackets for Dome Cameras • All Wire, Labor, and Misc. Materials
Total Price: \$ 14,800.00+Tax

Above information is not an invoice and only a quote of services described above. This quote is contractual.

NOTES:

- 1) All set up and software for viewing is included in this price.
- 2) The customer will be trained on the use of the software upon completion.
- 3) Customer will need to supply access to router for off-site viewing and programming.
- 4) Price is based on prevailing wage rate as per customer.
- 5) Customer to supply secure area for NVR.
- 6) **The customer is required to be present during installation to assure the view of each camera is acceptable.**
- 7) Terms net 30 days.
- 8) A 110v outlet will be required for NVR, MONITOR.
- 9) May be subject to N.Y. State sales tax or a tax-exempt certificate will be necessary.
- 10) The use of wire molding may be necessary in some instances.
- 11) If you have any questions concerning this quote, contact "{Robert Blumenreiter, (518) 798-9551/Robert@nyfire.biz}

Thank you for your business!

Estimate: Camera System
Date: July 31, 2018

- SECURITY ALARMS
- FIRE ALARMS
- WATER DETECTION
- CCTV SYSTEMS
- CARD ACCESS SYSTEMS
- ALARM MONITORING
- INTERCOM SYSTEMS
- TELEPHONE ALARMS
- SPRINKLER MONITORING



4 GLENS FALLS TECHNICAL PARK, GLENS FALLS, NEW YORK 12801-3802
NYS LIC # 12100076494
PHONE (518) 798-4551 FAX (518) 792-5199

- FIRE EXTINGUISHERS
- CLEAN AGENT SYSTEMS
- COP SYSTEMS
- RESTAURANT HOOD & DUCT PRE-ENGINEERED SYSTEMS
- EXTINGUISHER CABINETS
- FIRE HOSE & FITTINGS
- SAFETY EQUIPMENT
- FIRE TRAINING

Customer:
Town of Schodack
265 Schuurman Rd.
Castle-On-Hudson NY
David Harris 854-3078
David.Harris@schodack.org

PROPOSAL TO INSTALL NEW CAMERA SYSTEM AT TOWN OFFICE

Scope of work:

THE RUNNING OF ALL WIRES ACOCIATED WITH CAMERA SYSTEM, MOUNTING CAMERAS, ASSOCIATED HARDWARE, SETTING UP, PROGRAMING AND TESTING OF NEW CAMERA SYSTEM.

CONTRACTOR'S GUARANTEE:

We guarantee all material used in this contract to be as specified above and the entire job to be done in a neat, workmanlike manner. Any variations from plan or alterations requiring extra labor or material will be performed only upon written order and billed in addition to the sum covered by this contract. New York Fire and Signal Corp. does not warrant that the system may not be compromised or circumvented. In the event that a loss should occur through failure of the system or through negligence on behalf of New York Fire and Signal Corp., its employees or agents, the liquidated damages shall be held to no more than Two Hundred Fifty Dollars (\$250.00). Agreements made with our workmen are not recognized.

SIGNED: Robert Blumenreiter, Sales Consultant DATE: July 31, 2018

ACCEPTANCE OF BID:

If any account open under this proposal is not paid in accordance with payment terms, the account will be past due and in default. If any said account becomes past due, a finance charge will be assessed in the amount of 2% calculated on the billing date of each month on the balance as of the last day of the previous month (less payments and credits applied to said balance) until payment of said account has been made in full. Two percent (2%) per month is an annual rate of twenty-four percent (24%). If any said account becomes past due, and is referred for collection purposes, I and/or We agree to pay all costs of collection, including reasonable attorney's fees (minimum of \$200.00), and disbursements and court costs incurred in connection therewith.

The above specifications, terms and contract are satisfactory, and I (we) hereby authorize the performance of this work. It is understood and agreed by the parties hereto that New York Fire and Signal Corp. is not an insurer. Insurance, if any, will be purchased and paid for by the owner of the system.

SIGNED: _____ DATE: _____

THIS PROPOSAL IS VOID IN 30 DAYS UNLESS A COPY IS SIGNED AND RETURNED
ALL PRICING SUBJECT TO CHANGE IN 365 DAYS. THIS INFORMATION IS PROPRIETARY IN NATURE.
ANY DISCLOSURE TO A THIRD PARTY IS PROHIBITED

Dawne Kelly

From: Paul F. Gigante <pfg@escohvac.com>
Sent: Monday, October 22, 2018 10:12 AM
To: Dawne Kelly
Subject: FW: boiler burners

ESCO, Inc.

*Heating, Cooling, Temperature Control,
& Energy Management*
Servicing the NYS Capital District since 1981
12 Burdick Drive
Albany, New York 12205
P (518) 482-0375
F (518) 482-0398

Like Us On Facebook "ESCO Heating & Cooling Plus"

From: Paul F. Gigante
Sent: Wednesday, September 19, 2018 9:21 AM
To: 'dawne.kelly@schodack.org' <dawne.kelly@schodack.org>
Subject: boiler burners

Dawn
Good morning, I found a Wayne burner that could fit your boilers. The burner would replace your existing burner and fit to your boilers. The burners are approx.. \$1,400.00 each plus labor to install.
At least you will have an option of not changing the boilers.

Thanks

Paul

ESCO, Inc.

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& Energy Management*
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Albany, New York 12205
P (518) 482-0375
F (518) 482-0398

Like Us On Facebook "ESCO Heating & Cooling Plus"

Dawne Kelly

From: Paul F. Gigante <pfg@escohvac.com>
Sent: Monday, October 22, 2018 10:25 AM
To: Dawne Kelly
Subject: RE: boiler burners

Dawne

I think that it would take 4 to 6 hours for the change over if everything goes right. So about \$800.00 with travel.

Thanks

Paul

ESCO, Inc.

*Heating, Cooling, Temperature Control,
& Energy Management*
Servicing the NYS Capital District since 1981
12 Burdick Drive
Albany, New York 12205
P (518) 482-0375
F (518) 482-0398

Like Us On Facebook "ESCO Heating & Cooling Plus"

From: Dawne Kelly <dawne.kelly@schodack.org>
Sent: Monday, October 22, 2018 10:16 AM
To: Paul F. Gigante <pfg@escohvac.com>
Subject: RE: boiler burners

Hi Paul,

I am sure the Board will ask "What is the approximate cost of labor to install?" Please let me know if you can by Thursday, October 25th so I can include that info in their agenda packets.

Dawne M. Kelly
Assistant to Supervisor Harris
Town of Schodack
265 Schuurman Road
Castleton-on-Hudson, New York 12033
Telephone: (518) 477-7918
Fax Line: (518) 477-9594

Confidential Legal Notice: This message (including any attachments) is intended for the use of the individual or entity to whom it is addressed and contains information that is privileged and confidential. If you are not the intended recipient, or the employee or agent responsible for delivering it to the intended recipient, you should not disseminate, distribute or copy this information and communication to any individual(s) not specifically identified in the above address headings.

From: Paul F. Gigante [mailto:pfg@escohvac.com]
Sent: Monday, October 22, 2018 10:12 AM
To: Dawne Kelly
Subject: FW: boiler burners

Wm. J Keller & Sons Construction Corp.
Main Office | 1435 Route 9 | Castleton, NY 12033 | (518) 732-7782
Heavy & Highway | Utility Contractors | Site Development
www.wmjcellerandsons.com



October 9th, 2018

Laberge Group
4 Computer Drive West
Albany, New York 12205

Re: Schodack Sewer District No. 1 – Extension 1

Attn: Ron Laberge

Dear Ron,

Below is the cost for excavating and backfilling additional conduit. If you have any questions, please let me know.

Scope of Work:

- E&B trench from telephone pole to building
- E&B trench from building to pump station for dialer and light
- Stilsing Electric to coordinate dialer, electrical, telephone per attached proposal

Total: \$ 9,515

Thank you,

Jameson Phillips

Jameson Phillips
Estimator / Project Manager



500 South Street
 Rensselaer, NY 12144
 518-463-4451 (phone)
 518-463-7023 (fax)

CHANGE PROPOSAL REQUEST

Keller Construction
 1435 Route 9
 Castleton, NY 12033

Attn: Jameson Phillips

DATE 10/9/2018
STILSING JOB # 769
STILSING PROPOSAL # 1
OWNER'S REQUEST #
CHANGE PROPOSAL COST \$7,930.00

Re: Schodack Sewer Dist
District 1 Ext 1

DAYS FOR EXTENSION TO
CONTRACT COMPLETION:

The following is our cost breakdown for Pole Mounted Light & Dialer:

Summary:

A.) Labor		\$3,701.15
B.) Equipment		\$322.50
C.) Material		\$2,871.80
D.) Others		\$0.00
E.) Subcontractor		\$0.00
		=====
SUBTOTAL		\$6,895.45
		=====
Overhead & Profit (Stilsing Work)	15%	\$1,034.32
		=====
SUBTOTAL		\$7,929.77
		=====
Overhead & Profit (Subcontractor)	5%	\$0.00
Sales Tax a % of Material Only	0%	\$0.00
Sales Tax a % of Rentals Only	0%	\$0.00
		=====
SUBTOTAL		\$7,929.77
Bond		\$0.00
		=====
GRAND TOTAL		\$7,929.77
		=====
QUOTE		\$7,930.00

If you would like to proceed with this additional work please issue a change order in the amount of Seven Thousand Nine Hundred Thirty Dollars and 00/100

Cost Breakdown:

A.) Labor		Hours	@	Rate	
I.	** Project Supervisor:		@	\$55.00	\$0.00
II.	* Foreman:		@	\$40.43	\$0.00
	Journeyman:	43.00	@	\$38.50	\$1,655.50
	Fringe Benefits Foreman:		@	\$27.30	\$0.00
	Fringe Benefits Journeyman:	43.00	@	\$27.25	\$1,171.75
	Ins./Taxes		@	30.91%	<u>\$873.90</u>
TOTAL					\$3,701.15

B.) Equipment		Hour	@	Per Hour	
	Service Truck Hours	21.5	@	\$15.00	\$322.50
			@		\$0.00
			@		<u>\$0.00</u>
TOTAL					\$322.50

C.) Material		Per Attached Breakdown	
	Material:	RACO Guard It 4 Channel Auto Dialer	\$926.80
	Material Quote:		\$1,945.00
	Freight:		\$0.00
	Expediting Charges:		<u>\$0.00</u>
TOTAL			\$2,871.80

D.) Others		# Of Trips	@	Per Trip	
	Travel:	0	@	\$0.00	\$0.00
	Living Expense:	0	@	\$0.00	\$0.00
	Truck Expense:	0	@	\$40.00	\$0.00
	Warehouse/Driver Exp.:	0	@	\$18.00	\$0.00
	Other:	0	@	\$0.00	\$0.00
	Tool/Equipment Exp.:				<u>\$0.00</u>
TOTAL					\$0.00

E.) Subcontractors:				
1.)				\$0.00
2.)				\$0.00
3.)				<u>\$0.00</u>
TOTAL				\$0.00

**5% of Journeyman Hours

*10% of Journeyman Hours

Job ID: 769
 Project: Schodack Sewer



Takeoff

Vendor: TARGET

Labor Level: CONEST

26 Sep 2018 10:46:24

Phase: BRANCH
 L-SubPhase: COP-1 YARD LIGHT AND DIALER

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
TITLE	50	EA	M	2	SCH 40 DIRECT-BURIED 1-DUCT	0.0000	0.00	0.0000	0.00
10202	50	FT	M	2	PVC SCH 80	1.4952	74.76	0.0667	3.34
40043	5	OZ	M	OUNCE	PVC (GLUE) CEMENT	0.4507	2.25	0.0115	0.06
390584	53	FT	M	3"	RED TRENCH CAUTION TAPE	0.0325	1.72	0.0033	0.18
TITLE	2	EA	M	2	SCH-80 PVC RISER W/PVC 90-ELL	0.0000	0.00	0.0000	0.00
20382	2	EA	M	2	PVC SCH 80 90-DEG EL	8.9164	17.83	0.2309	0.46
10202	20	FT	M	2	PVC SCH 80	1.4952	29.90	0.0667	1.33
31376	4	EA	M	2	PVC COUPLING	0.5451	2.18	0.1150	0.46
40043	2	OZ	M	OUNCE	PVC (GLUE) CEMENT	0.4507	0.90	0.0115	0.02
240229	2	EA	M	2	GALV RIGID STRUT CLAMPS	1.1736	8.95	0.0493	0.08
161442	3	EA	M	2	CONDUIT 2-HOLE STL STRAP	2.8750	8.63	0.0518	0.16
31386	1	EA	M	2	PVC MALE ADAPTER	2.3000	2.30	0.1783	0.18
40237	1	EA	M	2	LOCKNUT	0.7637	0.76	0.1208	0.12
160581	6	EA	M	5/16 x 3"	GALV LAG BOLT	1.2004	7.20	0.0345	0.21
160423	6	EA	M	5/16"	GALV FLAT WASHER	0.1486	0.89	0.0012	0.01
10196	50	FT	M	3/4"	PVC SCH 80	0.5351	26.76	0.0380	1.99
20378	4	EA	M	3/4"	PVC SCH 80 90-DEG EL	2.3259	9.30	0.1380	0.55
31372	6	EA	M	3/4"	PVC COUPLING	0.1484	1.19	0.0003	0.02
31277	2	EA	M	3/4"	PVC LB CONDUIT BODY	2.4427	4.89	0.4025	0.80
31382	4	EA	M	3/4"	PVC MALE ADAPTER	0.2265	1.11	0.1150	0.46
240213	8	EA	M	3/4"	PLATED RIGID STRUT CLAMPS	2.2945	18.36	0.0288	0.23
240011	30	FT	M	5/8" x 5/8" H	1/2" GALV STRUT CHNL 1-1/8" SLOT GALV	8.5223	85.22	0.8928	6.92
160268	10	EA	M	3/8 x 2 1/4"	GALV WEDGE ANCHOR	1.3235	13.23	0.1725	1.73
70082	500	FT	M	1 1/4"	THINWALL CW (STR)	0.0872	43.61	0.0040	2.01
TITLE	20	EA	M	W/#12	3/4 PVC ON-CONCRETE	0.0000	0.00	0.0000	0.00
30164	60	FT	M	3/4"	PVC SCH 40	0.4088	24.53	0.0363	2.32

Skilling Electric Inc

500 South St
 Rensselaer, NY 12144

Phone: 5184634451
 Web:

ContEst Software Systems

Phases: BRANCH
 L-SubPhases: COP-1 YARD LIGHT AND DIALER

Item #	Qty	U/M	Q/M	Size	Description	Material Unit	Material Result	Labor Unit	Labor Result
20216	6	EA	M	3/4	PVC SCH 40 90-DEG-EL	0.4528	2.72	0.1297	0.78
31372	9	EA	M	3/4	PVC COUPLING	0.1484	1.34	0.0405	0.36
40043	2	OZ	M		PVC (GLUE) CEMENT	0.4507	0.90	0.0115	0.02
70033	132	FT	M	12	THINWALL CU (STR)	0.1299	17.15	0.0048	0.64
70145	66	FT	M	12	GREEN THHN CU (GRD 20A)	0.3006	8.57	0.0345	0.52
161373	15	EA	M	3/4	PVC 2-HOLE STRAP	0.0000	0.00	0.1840	5.52
161170	30	EA	M	3/16 x 1 1/2 - 3"	HAMMER DRILLED HOLE	0.0439	1.26	0.0288	0.86
161159	30	EA	M	#8-12 x 1 1/4"	PLASTIC ANCHOR	0.0009	0.03	0.0201	0.60
161129	30	EA	M	#12 x 1"	GALV SHEET METAL SCREW	0.0000	0.00	0.0032	0.03
160421	30	EA	M	#12	GALV FLAT WASHER	0.2765	1.66	0.1150	0.69
31332	6	EA	M	3/4	PVC MALE ADAPTER	0.1290	0.77	0.0644	0.39
40233	8	EA	M	3/4	LOCKNUT	4.1088	4.11	0.2300	0.23
150498	1	EA	M	2" DEEP 16.5-CI	1G ALUM WP BOX W/ 3 x 3/4"UBS	18.0491	18.05	0.0966	0.10
310933	1	EA	M		1G WP SWITCH PLATE W/20A LP SWITCH	0.0000	0.00	0.0000	0.00
TITLE	1	EA	M	3/4	LIQUIDITE CONDUIT	1.5624	1.56	0.0403	0.08
50081	2	FT	M	3/4	LIQUIDITE CONDUIT	6.1984	6.20	0.1739	0.17
50092	1	EA	M	3/4	LIQUIDITE 90D ANGLE CONNECTOR	3.7878	3.79	0.1449	0.14
50103	1	EA	M	3/4	LIQUIDITE STRAIGHT CONNECTOR	4.6690	4.67	0.2645	0.53
40120	2	EA	M	3/4	GRND BUSHING INSULATED	389.2500	199.75	2.4350	2.42
100167	1	EA	M	70W LED	OUTDOOR POLE MOUNTED SHOE BOX	6.9212	6.92	0.0725	0.72
10004	10	FT	M	1 1/2	GRC	4.2345	8.47	0.0368	0.07
240228	2	EA	M	1 1/2	GALV RIGID STRUT CLAMPS	0.0000	0.00	1.1500	1.15
3030009	1	EA	M		SECURITY SYSTEM TELEPHONE DIALER	15.1000	15.10	0.9080	0.81
1	1	EA	M	18 x 18 x 6	INSTALL DIALER ENCLOSURE	0.0000	0.00	3.0000	3.00
2	1	EA	M		DIALER STARTUP ELECTRICIAN	0.0000	0.00	3.0000	3.00
3	1	EA	M		DIALER STARTUP CONTROLS TECHNICIAN	0.0000	0.00	3.0000	3.00
4	1	EA	M		PHONE COMPANY INTERACTION	172.5000	172.50	2.0000	2.00
100531	15	EA	M	34	WIRE TERMINATION LBR	0.0000	0.00	0.0345	0.55
Phase Totals:						926.80	926.80	43.41	43.41
Job Totals:						926.80	926.80	43.41	43.41

Stalring Electric Inc

500 South St
 Rensselaer, NY 12144

Phone: 5184634451
 Web:

Conest Software Systems



QUOTE

QUOTE NO: SQ18-1403D
 DATE: October 9, 2018

Quotation Valid for 30 DAYS

To: Stilsing Electric Inc.
 George Gipp
 500 South St.
 Rensselaer, NY 12144

Page: 1
 of: 1

Ref: Autodialer - Schodack Sewer Pump Station

Ph: 518-463-4451 x107 email: ggipp@stilsingelectric.com

SALES PERSON	JOB	SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE	PAYMENT TERMS	DUPLICATE
M.Mincher	TBD	Best way	Prepay & Add	TBD	Net 30	TBD

Qty	Part #	Description	Unit Price	Line Total
1	LOT	RACO Guard-II (4) Channel Auto Dialer To Include: (1) NEMA 4X Non-metallic lockable enclosure (1) Guard-It AC Power Supply (1) Guard-It Battery Backup (1) Network dataline surge protector Configuration of dialer at GCS (requires landline for all programming) Note: On-site service not included. Any required service to be billed at time and material. See attached 2018 rate sheet.	\$1,945.00	\$1,945.00
			Subtotal	\$1,945.00
			Sales Tax	
			Total	\$1,945.00

This quotation prepared by: Megean Mincher - Sales

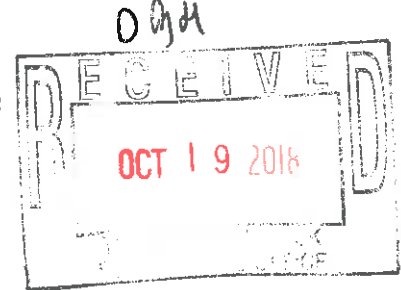
This is a quotation on the goods named, subject to GCS Standard Terms & Conditions:
 All sales are final, Terms Net 30 Days, Sales Tax may apply.
 Shipping and handling cost will be calculated and added to invoice.

To accept this quotation, sign here and return: X

THANK YOU FOR YOUR BUSINESS!



October 11, 2018
VIA EMAIL & MAIL



David Harris, Supervisor
Town of Schodack
265 Schuurman Road
Castleton, New York 12033

Re: Professional Services Proposal
Sewer Rate Analysis
Town of Schodack, New York

Dear Supervisor Harris:

As requested we are hereby providing our professional services proposal to assist the Town of Schodack with a sewer district rate analysis to evaluate the potential and options for sewer district consolidation. The following information will be needed for the analysis:

1. Sewer district maps.
2. Sewer district formation documents.
3. Tax page information for each existing district.
4. Unit allocation for each parcel in district.
5. Outstanding debt for each district.
6. Schedule of debt service payments for each district.
7. Operation and maintenance budget(s).
8. Current rate schedule for each district (debt and O & M).
9. List of any anticipated additional costs in district for next few years, if any.
10. Known issues in district that will require capital expenditures to repair or replace.
11. Known infiltration and inflow (I & I) issues in each district.
12. Metered water use for parcel by sewer district.

Project Initiation Meeting. To perform an analysis that is consistent with the Town's intent, we believe that it is important to document the process to be undertaken at a project initiation meeting. We would recommend that the meeting consist of the Town Supervisor, the Town's Special District Counsel, as well as those department heads that touch upon water and sewer rate structures. The purpose of the meeting will be to discuss the process proposed and possible and desired outcomes.

Review of Sewer District Financials. Laberge Group will review the current sewer district financial information pertaining to the capital and O&M costs and make recommendations for changes. The purpose of the review is to evaluate alternative methods for allocating debt service and review the potential for district consolidation. The review will include a table of all district users and the annual cost to those users under varying methodologies.

It is expected that the review and subsequent recommendation(s) may lead to sewer district consolidation or re-forming of the sewer districts which will involve the services of the Town's special district counsel. A separate proposal will be forwarded for our assistance to counsel at that time.

David Harris, Supervisor
October 11, 2018
Page 2 of 2

Estimated Budget. Since the services to be provided can vary widely based upon the number of alternatives and possible outcomes to be considered, we propose to provide our services on an hourly basis. We expect that the cost for the above tasks will range from \$22,000 to \$28,000. We have enclosed a contract addendum for your use in authorizing these services.

Please contact us with any questions or comments on the above or the enclosed.

Very truly yours,
LABERGE GROUP

By: 

Richard F. Laberge, P.E.
President

RFL: cjb
Enc.

CONTRACT ADDENDUM NO. 2018 – 07
(SEWER RATE ANALYSIS)

DATED: October 9, 2018

TO
Agreement for Professional Services
(Original agreement date: January 3, 2011)

The original Agreement, between Town of Schodack, Rensselaer County, New York, the OWNER and Laberge Group, the ENGINEER is hereby amended as follows:

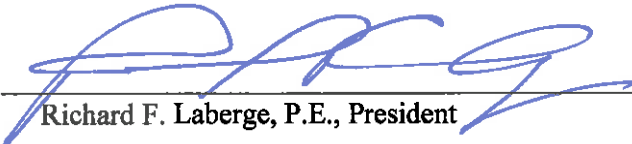
This Addendum authorizes additional services for a Sewer Rate Analysis for the Town of Schodack in accordance with the ENGINEER's letter dated October 9, 2018 (attached). The fee for these services shall be based upon hourly rates plus reimbursable expenses with a budget up to \$28,000.

This Addendum shall be attached to and form a part of the Contract Documents.

TOWN OF SCHODACK

BY: _____
David Harris, Supervisor

LABERGE GROUP

BY:  _____
Richard F. Laberge, P.E., President

October 11, 2018
VIA EMAIL & MAIL

David Harris, Supervisor
Town of Schodack
265 Schuurman Road
Castleton, New York 12033

Re: Professional Services Proposal
Sewer Rate Analysis
Town of Schodack, New York

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It is expected that the review and subsequent recommendation(s) may lead to sewer district consolidation or re-forming of the sewer districts which will involve the services of the Town's special district counsel. A separate proposal will be forwarded for our assistance to counsel at that time.

David Harris, Supervisor
October 11, 2018
Page 2 of 2

Estimated Budget. Since the services to be provided can vary widely based upon the number of alternatives and possible outcomes to be considered, we propose to provide our services on an hourly basis. We expect that the cost for the above tasks will range from \$22,000 to \$28,000. We have enclosed a contract addendum for your use in authorizing these services.

Please contact us with any questions or comments on the above or the enclosed.

Very truly yours,
LABERGE GROUP

By: _____
Richard F. Laberge, P.E.
President

RFL: cjb
Enc.



October 11, 2018
VIA EMAIL & MAIL

David Harris, Supervisor
Town of Schodack
265 Schuurman Road
Castleton, New York 12033

Re: Professional Services Proposal
Sewer Rate Analysis
Town of Schodack, New York

Dear Supervisor Harris:

As requested we are hereby providing our professional services proposal to assist the Town of Schodack with a sewer district rate analysis to evaluate the potential and options for sewer district consolidation. The following information will be needed for the analysis:

1. Sewer district maps.
2. Sewer district formation documents.
3. Tax page information for each existing district.
4. Unit allocation for each parcel in district.
5. Outstanding debt for each district.
6. Schedule of debt service payments for each district.
7. Operation and maintenance budget(s).
8. Current rate schedule for each district (debt and O & M).
9. List of any anticipated additional costs in district for next few years, if any.
10. Known issues in district that will require capital expenditures to repair or replace.
11. Known infiltration and inflow (I & I) issues in each district.
12. Metered water use for parcel by sewer district.

Project Initiation Meeting. To perform an analysis that is consistent with the Town's intent, we believe that it is important to document the process to be undertaken at a project initiation meeting. We would recommend that the meeting consist of the Town Supervisor, the Town's Special District Counsel, as well as those department heads that touch upon water and sewer rate structures. The purpose of the meeting will be to discuss the process proposed and possible and desired outcomes.

Review of Sewer District Financials. Laberge Group will review the current sewer district financial information pertaining to the capital and O&M costs and make recommendations for changes. The purpose of the review is to evaluate alternative methods for allocating debt service and review the potential for district consolidation. The review will include a table of all district users and the annual cost to those users under varying methodologies.

It is expected that the review and subsequent recommendation(s) may lead to sewer district consolidation or re-forming of the sewer districts which will involve the services of the Town's special district counsel. A separate proposal will be forwarded for our assistance to counsel at that time.

David Harris, Supervisor
October 11, 2018
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**CONTRACT ADDENDUM NO. 2018 – 07
(SEWER RATE ANALYSIS)**

DATED: October 9, 2018

**TO
Agreement for Professional Services
(Original agreement date: January 3, 2011)**

The original Agreement, between Town of Schodack, Rensselaer County, New York, the OWNER and Laberge Group, the ENGINEER is hereby amended as follows:

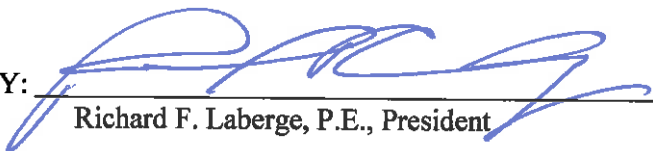
This Addendum authorizes additional services for a Sewer Rate Analysis for the Town of Schodack in accordance with the ENGINEER's letter dated October 9, 2018 (attached). The fee for these services shall be based upon hourly rates plus reimbursable expenses with a budget up to \$28,000.

This Addendum shall be attached to and form a part of the Contract Documents.

TOWN OF SCHODACK

BY: _____
David Harris, Supervisor

LABERGE GROUP

BY:  _____
Richard F. Laberge, P.E., President



October 11, 2018
VIA EMAIL & MAIL

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