

The Town of Holliston, having been designated as a Green Community, is dedicated to reducing our energy consumption by 20% in five years. To that end, the Town of Holliston Green Community team initially received approval for six projects in town to use the \$147,279 Green Community Grant. The six projects came in slightly under budget resulting in approximately a \$14,761 balance. On January 10, 2017, Holliston requested and was granted approval from the DOER to use these remaining funds for a seventh project.

The seven projects were focused on three buildings the team selected as needing immediate upgrades to the lighting and heating systems. Those buildings included:

Holliston Town Hall, 703 Washington Street

Holliston Central Street Fire Station, 59 Central Street

Holliston Police Department, 550 Washington Street

All seven projects were procured through MGL c. 30B Procurement Laws as well as MGL C. 25A, s. 14 which states (a) A state agency, building authority or local governmental body may contract for energy conservation projects that have a total project cost of \$100,000 or less, directly and without further solicitation, with electric and gas utilities, their subcontractors and other providers of such energy conservation projects authorized under sections 19 and 21 of Chapter 25 and section 11G.

The seven projects that were accomplished using the Green Community Grant money are as follows:

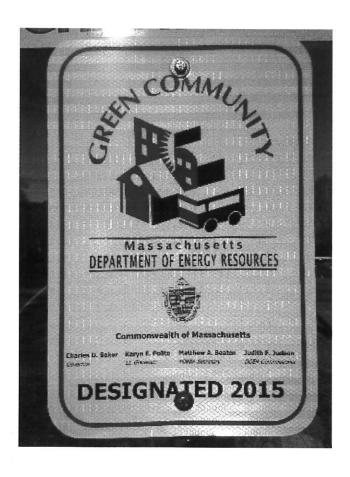
- 1. Fire Department: Installation of Stand-Alone Programmable Thermostats
- 2. Fire Department: Weatherization Air-Sealing and Insulation
- 3. Fire Department: Installation of Boiler, Water Heater, and VFD Drives
- 4. Town Hall: Replacement of Lighting and Lighting Controls
- 5. Town Hall: Weatherization Air-Sealing and Insulation
- 6. Police Department (Phase 1): Replacement of exterior and interior high-occupancy lights
- 7. Police Department (Phase 2): Replacement of additional lights.

Further detailed information about each project can be found on the following pages of this report.

One of the lessons learned across all the projects was that the Town needs to find a better way to contract out the projects. The Town undertook seven projects at three separate buildings. When contracts to do the work were drafted, all the projects at one building (except the Fire Station boiler) were contained in a single contract. This caused some issues balancing the initial Financial Statements supplied by World Energy, which were separated into individual projects, with the Invoices and Change Orders that displayed a total for all the projects for a particular building. Assuring the Final Invoices matched the Financial Statements became arduous. Having each project on a separate contract and invoiced separately would have made balancing each project much simpler and less time consuming. A process we hope to implement in the next round of projects.

The Green Community Team consisted of Town Administrator Jeff Ritter, Fire Chief, Michael Cassidy, Assistant to the Town Administrator, Andrea Minihan, and Technology, Director Chris Meo. Jeff Ritter oversaw the projects at the Town Hall, Fire Chief Michael Cassidy was instrumental in managing the day to day installation at the Fire Station, while Lt. David Gatchell coordinated the installation of lights at the Police Station.

Thank you for your time and attention spent working with the Town of Holliston.



Town of Holliston Green Community Project 1 Central Street Fire Station Stand-Alone Programmable Thermostats

Original Project Request

The original request was to install 13 outdated, inefficient thermostats with programmable thermostats to remove the human factor of reducing energy by automatically controlling the adjustment of the heating and cooling of the Fire Station during periods of inactivity or low use.

Implemented Project

A Statement of Work and Contract was signed on August 2, 2016, with World Energy for their contractors to install 13 Honeywell programmable thermostats throughout the Fire Station, including 6 in the garage bays, 3 in dispatch, 1 upstairs, and 2 in washrooms. (See Table 1 for exact placement of all thermostats). The work was performed the last week of October as electricians removed the 13 old thermostats and rewired and tested the new thermostats.

The original project was estimated to cost \$1,747.60 with a Gas and Electric Utility incentive estimated at \$190.91. The actual cost of the project came in slightly lower at \$1,637.58 with a slightly higher Utility incentive of \$229.02. The Green Community Grant funds were used to pay the remaining \$1,408.56 balance.

Based upon World Energy saving's analysis performed in 2016, the Town expected to realize electric savings of 46 kWh (.15 MMBTUs) per year as well as a decrease in gas usage of 924 therms (92.4 MMBTUs) per year, for a combined yearly savings of \$878. After the project, World Energy is still expecting the town to see a combined 92.55 MMBTUs savings per year.

Table 1

Location	Cooling?	Heat Type	Quantity	Sq. Ft
1st Floor Garage	N	Gas	4	4800
1st Floor Garage - Workroom	N	Gas	1	600
1st Floor – Back Hallway	N	Gas	1	100
1st Floor – Shower Room	N	Gas	1	100
1 st Floor – Bath	N	Gas	1	100
1st Floor – Dispatch	Y	None	1	300
1 st Floor – Dispatch	N	Gas	1	300
1 st Floor – Dispatch – Bath	N	Gas	1	100
1st Floor – Water Bay Rescue	N	Gas	1	1250
2 nd Floor Kitchenette	N	Gas	1	200
		Total:	13	7850

Town of Holliston Green Community Project 2 Central Street Fire Station Weatherization: Air Sealing and Insulation

Original Project Request

The original request was to accomplish air-sealing and add insulation to the Central Street Fire Station to improve the heating and cooling system by keeping warm air outside and cool air inside during the summer as well as keep the warm heated air inside and cool air outside during the winter months by sealing gaps around windows, pipes, bell tower, and other areas found during the energy audit.

Implemented Project

A Statement of Work and Contract was signed on August 2, 2016, with World Energy for their contractor to apply door weather stripping and window casing seals to close air gaps to the outside. The door and floor of the Bell Tower, as well as an unused window in the basement that had been nailed shut, was wrapped with 1.5" rigid foam board to create an insulation barrier. Lastly, gaps surrounding pipes were sealed to prevent air flow. The work was performed during the first week in October of 2016 and took about four days.

Pipe Gaps (Before)



Bell Tower – Door and Floor (Before)



Pipe Sealed (After)

Bell Tower – Floor (After)



Door – Seals (After)

After) Bell Tower – Door (After)







The original project was estimated to cost \$10,204.24 with a Gas and Electric Utility incentive estimated at \$1114.74. Once the contract was drafted, it was realized there was an accidental duplicate of estimated charges on the World Energy Audit of 2016. In essence, the estimated cost of Air-Sealing and Insulation should have been \$2,551.06 and not \$5,102.12 for each project as originally estimated on the application for a total cost of \$5,102.12 for both projects combined instead of \$10,204.24. In addition, the incentives were accidentally duplicate on the World Energy Audit of 2016. The total estimated incentives should have been \$658.39 instead of \$1,114.74 as originally stated on the town's application.

Using the corrected estimate, the actual cost of the project came in slightly lower at \$3,888.46 from the originally corrected estimated cost of \$5,102.12 with a slightly lower Utility incentive of \$543.82. The Green Community Grant funds were used to pay the remaining \$3,344.64 balance.

Based upon World Energy savings analysis performed in 2016, the Town expected to realize electric savings of 968 kWh (3.3 MMBTUs) per year as well as a decrease in gas usage of 597 therms (59.7 MMBTUs) per year, for a combined yearly savings of \$709. After the project, World Energy is still expecting the town to see a combined 63 MMBTUs savings per year.

During the review of the finances for this report, a billing error was discovered with the Fire Station Project. Check #187418 in the amount of \$6,176.16 was accidentally entered into World Energy's Accounting System as \$6,167.17 resulting in Holliston overpaying by \$9. This was adjusted as a credit by World Energy on document CN-0791 and seen on the Munis balance sheet as a \$-9.00 credit.

Appendix 1 contains the Scope of Work Proposal and Contract for the Fire Department which includes information on the Programmable Thermostats, Air Sealing and Insulation that was added, as well as the VFD Close Coupled End Pumps that were installed.

Town of Holliston Green Community Project 3 Central Street Fire Station Boiler Replacement

Original Project Request

The original request was to replace the Fire Station's Boiler, Hot Water Heater, and the two single-speed circulator heat pumps. The old 75-80% efficient gas fired boiler was close to its end of life as well as one of the circulator pumps was malfunctioning and had been turned off.

Implemented Project

Due to a request from the Utility Company and to assist in the incentive paperwork, this project needed to be separated into two projects. Eversource requested that the Boiler be submitted as a separate project so incentives could be applied to the Circulator Motors because Boilers were not allowed with their incentive programs. Based upon this realization, a separate Statement of Work and Contract was signed on August 2, 2016 with World Energy titled "Central Street Fire Station – Boiler Only" and the circulator pump project was incorporated into the other Statement of Work and Contract signed on August 2, 2016 for the Fire Station project.

The first obstacle came during the initial install walk-through when it became apparent that a stock VFD Heat Pump would not work with the Fire Station and custom made pumps were going to be needed. This was going to set the project back 6-8 weeks. The decision was made to install the two Lochinvar boilers and water heater using the old leaking heat pumps while the new ones were being custom made. The installation of two Lochinvar gas condensing boilers (model KBN400) and an indirect Lochinvar water heater (model SIT040) occurred during the last week in October and first week in November spanning 8 days. Throughout this time, the Fire Station experienced a few cold nights resulting in the Dispatchers bundling up in the evening.

The biggest milestone came when two large custom made pumps finally arrived and were installed in late November. The installation occurred over a two day period the week of November 21st.

The Lochinvar boiler and heater was estimated to cost \$52,278.01 with \$5711.00 incentives and the VFD Close Coupled Heat Pumps were estimated to cost \$16,413.08 with a Utility Incentive of \$1,793.01 for a combined project cost of \$68,691.09 with Utility Incentives of \$7,504.01.

The actual cost of the Lochinvar Boilers came in substantially lower at \$40,228.67. Unfortunately, Eversource stated during the incentive request application they no longer offer gas incentives resulting in the Green Community Grant funds being used to pay the full amount. Due to the fact that the VFD Heat Pumps were required to be custom made, there was a slight increase in the project cost. The total cost was \$20,646.01 but the town did receive a larger incentive than originally estimated. The electric incentive received was \$2,887.45 resulting in

the remaining \$17,758.56 being paid from the Green Community Grant funds. The total net price for both projects combined came in at \$57,987.23 slightly lower than the estimated net price of \$61,187.08 on the original application.

Based upon World Energy savings analysis performed in 2016, the Town expected to realize electric savings of 1,047 kWh (3.56 MMBTUs) per year as well as a decrease in gas usage of 2,498 therms (249.8 MMBTUs) per year, for a combined yearly savings of \$2,510. After the project, World Energy is still expecting the town to see a combined 63 MMBTUs savings per year.

Appendix 2 contains the Scope of Work Proposal and Contract for the Fire Department – Boiler Only project which includes information on the Lochinvar Boiler and Lochinvar In-Direct Water Tank that was installed.

VFD Heat Pumps



Lochinvar KBN400 Boilers



Lochinvar Water Heater



Town of Holliston Green Community Project 4 Town Hall Weatherization: Air-Sealing and Insulation

Original Project Request

The original request was to accomplish air-sealing and add insulation to the Town Hall to improve the heating and cooling system by keeping warm air outside and cool air inside during the summer as well as keep the warm heated air inside and cool air outside during the winter months by sealing gaps around windows, pipes, attic space, and other areas found during the energy audit.

Implemented Project

A Statement of Work and Contract was signed on August 2, 2016, with World Energy for their contractor to apply weather stripping to the doors and window casing seals to close air gaps to the outside. The door to the attic was wrapped with 1.5" rigid foam board to create an insulation barrier. In addition, all gaps around pipes leading into the attic were sealed to prevent air leaks into and from the conditioned space. The work was performed the second week of October 2016, and took about 3 days to complete.

Pipe Air Gaps (Before)



Window Gaps (Before)



Pipe Sealed (After)



Window Sealing (After)



Attic Wall Insulation (After)



Door Gaps (Before)



Door Seals (After)



The original project was estimated to cost \$16,209.75 with a Gas and Electric Utility incentive estimated at \$2,509.11. The actual cost of the project came in slightly lower at \$13,060.55 with a slightly higher Utility incentive of \$2,943.24. The Green Community Grant funds were used to pay the remaining \$10,117.31 balance.

Based upon World Energy savings analysis performed in 2016, the Town expected to realize electric savings of 1502 kWh (5 MMBTUs) per year as well as a decrease in gas usage of 819 therms (81.9 MMBTUs) per year, for a combined yearly savings of \$1351.38. After the project, World Energy is still expecting the town to see a combined 86.9 MMBTUs savings per year.

During the review of the finances for this report, a billing error was discovered with the Town Hall Project. World Energy undercharged the Town by \$10 resulting in an issue balancing the project financial statements with the check amounts. World Energy issued a second invoice in the amount of \$10 on IN-0792 which is also represented on the Munis balance sheet as a \$10 charge.

Town of Holliston Green Community Project 5 Town Hall Lighting and Lighting Controls

Original Project Request

The original project request was to replace older fluorescent and halogen bulbs with light-emitting diode (LED) bulbs and fixtures, and install dimmers, and occupancy sensors throughout the interior and exterior of Town Hall.

Implemented Project

A Statement of Work and a Contract was signed on August 2, 2016 for the light replacement project. During the second and third week of October, electricians retrofitted or replaced 322 fixtures and ballasts, and 21 motion/dimming sensors. The attached Statement of Work (Appendix 3) details a comparison of the existing bulb and the new bulb that was installed as a replacement. The Statement of Work also details the rooms where motion and dimming sensors were installed into. The project took approximately 4 days to complete with another day to resolve a few fixtures that components were delayed in shipping.

The two milestones in the project were the arrival of the bulbs and the pickup of the used bulbs indicating the project was completed.

The original project was estimated to cost \$49,354.13 with an Electric Utility incentive estimated at \$7,639.55. The actual cost of the project came in at \$42,893.00 with a significant higher Utility incentive of \$9,666.07. The Green Community Grant funds were used to pay the remaining \$33,226.93 balance.

Based upon World Energy savings analysis performed in 2016, the Town expected to realize electric savings of 37,868 kWh (129 MMBTUs) per year, for a yearly savings of \$11,516.83. After the project, World Energy adjusted their electric savings to 34,481 kWh (117 MMBTUs) per year, for a yearly savings of \$10,486.73.

Lights and sensors replaced at Town Hall







Town of Holliston Green Community Project 6 Police Station Lighting and Lighting Controls

Original Project Request

The original project request was to replace older high-energy consuming halogen bulbs on the outside of the Police Station with light-emitting diode (LED) bulbs and fixtures. In addition, interior lights in high-occupancy and public spaces were also slated to be replaced.

Implemented Project

A Statement of Work and a Contract was signed on August 2, 2016, for the light replacement project. During the third week of October, electricians retrofitted or replaced 104 fixtures and ballasts, and 7 motion/dimming sensors. The attached Statement of Work (Appendix 4) details a comparison of the existing bulb and the new LED bulb that was installed as a replacement. In addition to all the outside and flag pole bulbs, LED fixtures and bulbs were replaced in the Dispatch Office, Upstairs Hallway, Public Training Room, and other locations were the lights are on 24 hours. The Statement of Work also details the rooms where motion and dimming sensors were installed. The project took approximately 3 days to complete.

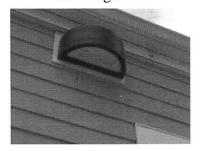
The original project net cost was estimated to be \$19,751.51 while the actual net cost came in at \$25,976.71. The total project cost was \$34,079.64 with an Electric incentive of \$9.835.00 bringing the net cost to the Green Community Grant funds to \$25,976.71.

The reason the project came in slightly over budget was because of fixtures around the three flag poles that needed to be completely replaced and rewired due to damage to the electrical. In addition, there were no LED replacements that could be used in the existing hallway light fixtures so all new fixtures needed to be purchased.

Based upon World Energy savings analysis performed in 2016, the Town expected to realize electric savings of 50,836 kWh (173 MMBTUs) per year, for a yearly savings of \$10,014.52, after all the bulbs in the Police Station are replaced. After the Phase 1 project was completed, World Energy has calculated a 32,784 kWh (111.56 MMBTUs) savings per year resulting in electrical cost savings of \$6,458.34.



Exterior Lights



New Flag Pole Lights



Training Room Lights



Town of Holliston Green Community Project 7 Police Station – Phase 2 Lighting and Lighting Controls

Original Project Request

On January 10, 2017, after the first six projects were completed under budget, the Town of Holliston requested and received approval from the DOER to use the remaining funds to continue replacing the Police Station lights. The project consisted of replacing all the remaining bulbs on the main floor (including the Admin Offices, Interview Rooms, and Cell Block, as well as the hallway downstairs.

Implemented Project

A Statement of Work and a Contract was signed on January 10, 2017 for the light replacement project. During the first week of February, electricians retrofitted or replaced 72 fixtures and ballasts, and 4 motion/dimming sensors. The attached Statement of Work (Appendix 5) details a comparison of the existing bulb and the new LED bulb that was installed as a replacement. The Statement of Work also details the rooms where motion and dimming sensors were installed. The project took 6 days to complete which included two significant snow storms in the Metrowest region.

The original project cost was estimated to be \$16,484.90 with an estimated Electric incentive of \$1,723.50. The total final project cost was \$19,285.81 with a slightly larger Electric incentive of \$2,068.20. In addition, a \$2,000 rebate from MassSave, obtained by Holliston, was applied to this project bringing the final cost to \$15,217.61 which should close out the grant funding.

The reason for the increase in cost was during the retrofit, the electrician found 12 lights in the Cell Block/Detention Center which required special battery backup bulbs for prisoner safety. This is due to the fact that building code requires these 12 lights must remain powered during the 15-20 seconds of a power outage before the generator turns on so they must be self-powering. These 12 fixtures required a bulb that has a built in battery backup during power outages and normal retrofit bulbs could not be used in these fixtures. The last page of Appendix 5 includes details about the retrofitted lighting fixture and the expected run time during an outage.

Based upon World Energy savings analysis performed in 2016, the Town expected to realize electric savings of 50,836 kWh (173 MMBTUs) per year, for a yearly savings of \$10,014.52 after all the bulbs in the Police Station are replaced. World Energy has calculated a savings for the Phase 2 project of 6,894 kWh (23.4 MMBTU's) per year for a cost savings of \$1,358.10. After both Police Station projects were completed, World Energy has calculated a combined savings of 39,678 kWh (135 MMBTUs) savings per year resulting in electrical cost savings of \$7,816.43.

Appendix 5 also includes a copy of the paid invoice and final change order displaying the additional cost of the self-powered lights.

With the completion of Project 7 – Phase 2 of the Police Station lights, this completes all the projects requested with Green Community Grant Funds. Attached at the end of this report is the printout of the General Ledger from Munis showing all checks issued to World Energy totaling \$147,279 for all seven projects.

Additional Projects Accomplished

During 2016, in addition to the Green Community Grant Projects, the Town and Schools also undertook a major lighting retrofit at all school buildings. During the summer of 2016, electricians replaced most of the halogen and fluorescent bulbs with LED equivalents. In total, approximately 11,000 bulbs were replaced at an initial cost of \$259,948. The School Department applied for different incentives including Eversource incentives and a free bulb program, which resulted in free bulbs and rebates totaling \$69,210. This resulted in a total net cost to the Town of only \$190,738. This project was paid for by a Capital Expenditure vote during the May 2015 Town Meeting.

In addition, the schools started a new procedure to unplug all non-essential equipment (computers, printers, TV's, vending machines, refrigerators, ice machines, etc) during the summer months when school is not in session.

Based upon MassEnergy's website, the lighting project along with the new summer procedures seem to have reduced the school's overall yearly electrical consumption from 3,278,718 kWh in 2015 to 2,843,428 kWh in 2016, a reduction in 435,291 kWh for the 2016 year or a 13% reduction in electricity usage.

Another project undertaken by the town in November of 2015, was the replacement of all fluorescent light bulbs to LED bulbs at the East Holliston Fire Station. A total of 13 fixtures were replace with LED retrofits. East Holliston Fire Station is an unoccupied sub-station but some lights are kept on for safety and security reasons. The bulbs were donated by a local contractor during the renovation of the sub-station. In addition to the bulb replacement, the renovation also replaced an old garage door with an insulated door and weather stripping reducing the heat loss during winter months. Based upon MassEnergy's website, this project seems to have reduced the East Holliston Fire Station yearly electrical consumption from 3,095 kWh in 2015 to 1,531 kWh in 2016, a reduction in 1564 kWh used or a 50% reduction in electrical consumption.

On March 1, 2017, the Holliston Water Department will begin offering a "Water Conservation Rebate" for customers who purchase ultra-high efficiency toilets and washing machines to replace older less efficient models. Appendix 6 is a draft Water Conservation Rebate Application that will be sent out in the next round of water bills. Households requiring less water results in less demand on the Town's water infrastructure resulting in a slight decrease on electrical pumps throughout the system as well as conserving the Town's water resources.

On Saturday, May 6, 2017, a community based group of citizens have scheduled a "Green Communities Educational Forum". The purpose of this meeting is to educate the public about

the advantages of Holliston being a "Green Community." There will be a panel discussion that would include the Board of Selectmen, Town Administrator and Town's energy management team. The community based discussion will review completed projects to date, the projected energy savings, and will also highlight a discussion regarding future energy efficiency projects to public buildings being applied for as part of the competitive round of funding through the Green Communities program.

Lastly, the Green Community Team Members over the year have attended numerous conferences and webinars to evaluate additional projects going forward. Some of these webinars included implementing an electrical vehicle fleet and most recently everyone attended the DOER's LED Streetlight Rapid Retrofit Webinar on Thursday, February 2, 2017.

Press Releases and News Articles

News Article on November 16th on the Holliston Reporter in regards to the Holliston Community Solar Farm: http://www.hollistonreporter.com/article/12453/state-and-local-officials-celebrate-holliston-community-solar-project.html

Coverage on the Holliston Reporter of the Board of Selectmen's October 12, 2016 Meeting in which Jeff Ritter updates the Board on the Lighting Project.

http://www.hollistonreporter.com/article/12354/selectmen-met-on-october-12th.html

Coverage on the Holliston Reporter of the Board of Selectmen's May 19, 2016 Meeting in which the Town accepts the Green Community Grant.

http://www.hollistonreporter.com/article/11929/holliston-receives-green-community-funding.html

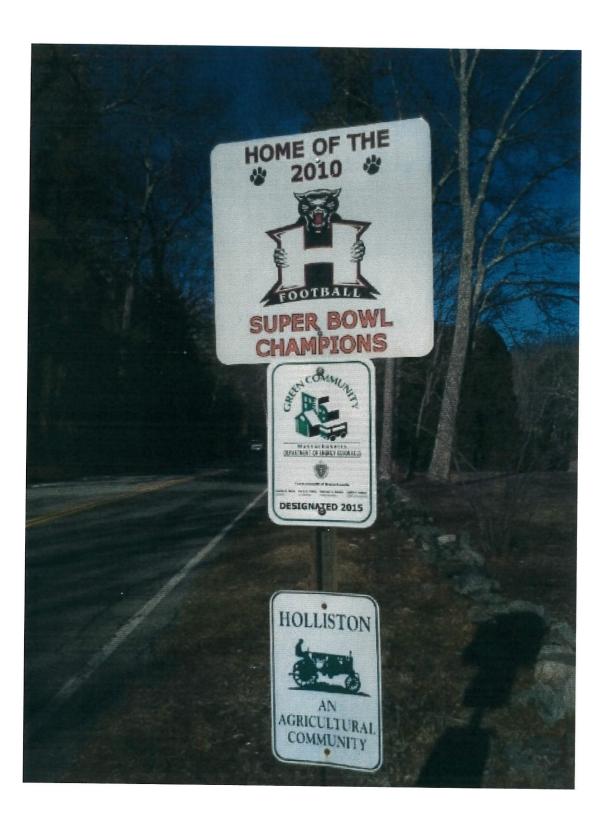
Coverage on the Holliston Reporter of the Green Community Designation Event: http://www.hollistonreporter.com/article/11646/holliston-is-now-a-green-community.html

Press Release from the Town of Holliston published on the Holliston Reporter inviting the Public to the Green Community Designation Event:

http://www.hollistonreporter.com/article/11640/holliston-is-now-a-green-community.html

Metrowest Daily News Coverage of the four town Green Community Designation Event: http://www.metrowestdailynews.com/news/20160216/holliston-four-other-towns-honored-asgreen-communities

Metrowest Daily News Press Release inviting the Public to the Green Community Designation Event: http://www.metrowestdailynews.com/article/20160212/NEWS/160217929



G/L ACCOUNT DETAIL

Org: 276122 Object: 55263 GREEN COMMUNITIES GRANT 276 -0100-0122-00-00-00-55263 -

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