Anvil Mountain, Silverton, Colorado: A U.S. EPA Brownfields Sustainability Pilot

By Christopher De Sousa and Michael Hayek

SITE HISTORY

The Anvil Mountain brownfield redevelopment project consists of an 16.8-acre property, including 8.8 acres of the former Martha Rose/Walsh Smelter. The property is located adjacent to the town of Silverton in San Juan County, Colorado. The history of the Martha Rose/Walsh Smelter reflects the boom and bust cycle that defined western mining.

The smelter has experienced many periods of development and abandonment throughout its history. In 1882, Seth R. Beckworth constructed a 20-ton smelting plant on the site and operated it as an ore crushing facility that produced silver, lead, and gold using a coal-fired blast furnace. For the next hundred years, ownership of the smelter would change hands multiple times and its capacity would increase and decrease depending on who owned the site. Duane Eggett owned the property from 1979 to 1990 and Lancaster Trust owned the property from 1990 until 2004. The site is currently owned by San Juan County. Needless to say, the site has a deep history of industrial legacy.

The Rose/Walsh Smelter site was selected for redevelopment in 2003. The site was chosen for its flat terrain, lack of development in the surrounding area, and close proximity to the town’s infrastructure. It was deemed an appropriate site for redevelopment as it was a large plot of semi-vacant land in a town where vacant land was diminishing.

1 Methodological note: Information for the present case study was obtained from available project reports and from a telephone interview with the project coordinator. The project is ongoing and the information here is current up until June 1, 2012. For any questions, please contact Christopher De Sousa, Associate Professor, Director, School of Urban and Regional Planning, Ryerson University, chris.desousa@ryerson.ca.


3 Interview
contamination in addition to remains of the former smelting operation, including the former railroad grade, several small piles of scrap iron wood, and slag.  

**PROJECT VISION**

The Town of Silverton and San Juan County intend to redevelop the entire site into a Planned Unit Development (PUD). The proposed redevelopment is meant to create a new community consisting of affordable housing units. The project will provide high-density dwellings that consist of a mix of single-family and multi-family dwellings. In addition, the proposed redevelopment will be pedestrian-oriented, with an abundant mix of open and green space, and architecturally designed to respect the industrial heritage of the site.

Originally, the town envisioned placing a county shop on the site with room for residential development. However, this idea received considerable public opposition and was abandoned. The plan was to lay streets, utilities and infrastructure on the site and then allow the private sector to develop the property. However, once environmental assessments were conducted, the extent of contamination required a change in the vision. Given the resources required to remediate the site, it was deemed more financially effective to develop higher density living in the form of multi-family dwellings.

The redevelopment will include affordable renewable energy options aimed at reducing emissions. The town has a relatively harsh, cold climate. A major consideration in housing design, therefore, is to identify the most suitable and appropriate energy conservation design options. The project would consider implementing technologies such as high efficiency insulation, roofing, windows; solar energy; and geothermal exchange heat pumps. Residents of Silverton often pay as much for heat and basic utilities as they do for housing because of the harsh climate. Building affordable housing that is also energy efficient will reduce utility bills and help make it possible for low- to median-income Silverton residents to transition from renters to homeowners. The project also encourages historic and heritage preservation through architectural design that reflects existing Silverton neighborhoods and honors Silverton’s mining heritage.

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5 Interview

The redevelopment, referred to as Anvil Mountain, will include the construction of as many as 49 units of housing ranging from 1,200 to 2,200 square feet. There will be a mix of single family and multi-family dwellings. The project was planned as an affordable housing development with green and sustainable design and construction innovations integrated into the development. The project is expected to be built out by 2020 and consist of the following: 13 affordable single family dwellings at $228,000 each, 4 market rate single family dwellings, 12 duplex units, and 20 multi-family units.

According to a study conducted by URS Inc., Phase I and Limited Phase II Environmental Site Assessments (ESAs) of the site have already been completed. These ESAs were conducted as due diligence activities regarding the potential purchase and development of the property for residential use. The Phase I ESA identified the presence of contamination on the property. Potential soil and groundwater metals contamination related to past smelting operations were identified. The Phase II assessment identified lead, arsenic, barium and asbestos contaminants of concern that must be addressed.

Field sampling was conducted at the smelter property to assess and evaluate the environmental conditions identified in the Phase I and Phase II. Due to the levels of lead, arsenic, and barium, the site was deemed unacceptable for residential use without remedial action. In addition, the data gathered were used to perform an evaluation of risk to the health of potential construction workers, residents, recreationists, and on-site workers. The report by URS Inc. concluded that contaminants found on the property, if not remediated, could potentially pose a health risk to prospective users of the space.

Remediation of the site began in 2007 and continued well into 2009. It was anticipated that remediation would have been completed in time for construction to commence in late 2009, however, additional soil removal was required in the summer of 2009 and construction was delayed until 2010. Cleanup of the site is being administered in partnership with the U.S. Environmental Protection Agency (USEPA) and the Colorado Department of Public Health.

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and Environment (CDPHE). The contamination will be buried and capped according to state and federal guidelines to meet necessary standards for residential use. The remediation has been funded using a combination of USEPA Brownfield Cleanup Grant and other matching and leveraged State funds.  

The USEPA has been involved in the project since its inception. The EPA has provided assistance to the town and county by evaluating site conditions and plans, identifying and evaluating energy efficiency options, and providing recommendations regarding potential resources and funding approaches that the town may pursue to implement the recommendations. In addition, the EPA provided recommendations to achieve successful funding and implementation of the development effort. San Juan County received aid from the National Renewable Energy Laboratory (NREL) through a separate Technical Assistance Project funded by the U.S. Department of Energy. The NREL recommended that the most suitable energy savings options for the site included:

<table>
<thead>
<tr>
<th>Solar Orientation</th>
<th>- Orienting structures in a way that maximizes passive solar access</th>
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<tbody>
<tr>
<td>Glazing</td>
<td>- Selecting glass with the appropriate balance between allowing solar heat to be transmitted into the house, while keeping the heat inside the home from escaping</td>
</tr>
<tr>
<td>Shading</td>
<td>- Using overhangs and trees to block out the sun in the summer and allow the winter sun to shine inside the home</td>
</tr>
<tr>
<td>Thermal Mass</td>
<td>- Including elements in the house that absorb the heat during the day and release it back into the home throughout the night</td>
</tr>
<tr>
<td>Isolated Gain Passive Solar</td>
<td>- Having a glass room at the south side of the house that is able to be warmed during the day. The heat in this room can be spread to the rest of the house by opening a door connecting the spaces and shut during the evening.</td>
</tr>
<tr>
<td>Building Envelope\textsuperscript{11}</td>
<td>- Designing the building in a highly efficient manner to complement the passive solar elements</td>
</tr>
</tbody>
</table>

Brownfield redevelopment is an exercise in sustainable development. The main goals of the pilot project were to remediate soil contamination, provide affordable housing, and create energy efficiencies through green design. While the project expects to implement solar orientation, glazing, thermal mass, and passive solar measures, some of the innovations in green energy listed in the table above will not be incorporated into the design of the Anvil


Mountain redevelopment due to the cost prohibitive nature of their installment\textsuperscript{12}. In addition, the redevelopment will be buffered from the adjacent highway by utilizing green space for noise damping and drainage management.\textsuperscript{13}

Nearly half (44\%) of Silverton’s homeowners and renters spend 50\% or more of their household income on housing costs. To address this, a portion of the homes built will be offered to people who make 80\% of the area’s median income, which is approximately $36,000. Although the development and financing scheme for the affordable housing portion of the project is still being debated, it is anticipated that future residents will be given the opportunity to build their homes themselves, thereby allowing them to conduct some of the work and contribute “sweat equity” to the project. This may even be considered part of their down payment.\textsuperscript{14}

The history of the site will be preserved through the use of interpretive signage and historic photography. In addition, the lower railroad grade and the Rail Scale structure at the site will also be preserved. Furthermore, the architectural design of the dwellings will incorporate Silverton’s mining heritage.\textsuperscript{15}

Throughout the planning process of the Anvil Mountain Neighborhood, numerous open houses and public meetings were organized to both inform the public and gather feedback.

The town of Silverton has approximately 400 to 500 permanent residents year-round, and the local workforce have very few options to purchase a home in the area. A project like this provides locals with opportunities to buy into the local housing market and stay in the town, thus contributing to and strengthening the local economy, which is heavily dependent upon tourism.

**PROJECT FUNDING**

The property cost a total of $279,000; San Juan County paid $200,000 and Housing Solutions for the Southwest and Colorado Housing Inc. contributed towards the remainder of the price. The total cost per acre was $17,437. The County has mandated that for every new subdivision, a certain amount of housing must be dedicated to affordable housing. In 2003, the Durango Mountain Resort paid the county “Fees-in-Lieu” funds so that the resort may be exempt from providing affordable housing themselves.\textsuperscript{16} Essentially, fees are paid by the developer to ‘hire’ San Juan County or its agents to develop affordable housing so the developer is not required to build it themselves. These funds, according to County regulations, are reserved for investments in affordable housing and were used to purchase the site. The County expects to recover its initial financial investment plus an

\textsuperscript{12} Interview


\textsuperscript{14} Interview


\textsuperscript{16} Interview
estimated additional million dollars through property sales and development charges. The County plans to sell three wooded lots at a market rate to help subsidize the development of the affordable lots.

BENEFITS, BARRIERS, AND LESSONS LEARNED

The redevelopment of Anvil Mountain is expected to yield a number of environmental, social, and economic benefits. The remediation of pollution from the site reduces potential exposure to contamination and creates a cleaner environment. The utilization of green technology in the construction and design will reduce the carbon footprint and emissions of the development, adding to the environmental benefits. The affordable housing component of the redevelopment provides those without the means to do so with an affordable and safe option for living. As the project coordinator noted, one of the main benefits of this type of development is that it provides people with the option to purchase an affordable living space close to where they work. Due to a housing market with prices inflated by a combination of tourism and limited land supply, prices of homes have simply been beyond the means of many of those who wish to reside in the community. Furthermore, construction and remediation will generate employment that will have multiplier effects that feed back into the community. Finally, this project is also dedicated towards historical and heritage preservation that celebrates the character of the area and preserves the industrial legacy of Silverton.

The Anvil Mountain project faced a number of obstacles to successful redevelopment. The discovery of additional soil contamination delayed construction by one year, to 2010. Due to the additional volume of contaminated soils, the County was forced to expand the planned repository area, causing some buildable space to be sacrificed. The County served as the lead developer in the project. It encountered issues such as funding shortfalls and lack of expertise. The consultants contracted by the EPA contacted private developers in San Juan County to determine their capacity to redevelop the site, but those contacted stated that they would have major difficulty in managing a redevelopment of such complexity due to their inexperience in brownfield redevelopment. As a result, the consultants suggested that the County employ an outside developer with experience in brownfield redevelopment. Another obstacle encountered by the consultants contracted by EPA was the lack of local data to run their models and simulations on the viability of energy conserving design options. To address this, the consultants used weather data from Leadville, CO because its climate is most similar to that of Silverton.

Funding was also a challenge. The County was able to secure $1.3 million in grants from the EPA, Colorado Department of Local Affairs, Colorado Brownfields Foundation, Colorado Department of Health and

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Environment, and Colorado Department of Transportation. The County also received another $300,000 of In-Kind assistance from EPA and the Bureau of Land Management. San Juan County has contributed over $500,000 to the project. EPA consultants assisted in identifying grants from other prospective sources to fund supplemental pieces of the project. EPA consultants assisted in identifying grants from other prospective sources to fund supplemental pieces of the project. EPA consultants assisted in identifying grants from other prospective sources to fund supplemental pieces of the project. EPA consultants assisted in identifying grants from other prospective sources to fund supplemental pieces of the project. EPA consultants assisted in identifying grants from other prospective sources to fund supplemental pieces of the project. EPA consultants assisted in identifying grants from other prospective sources to fund supplemental pieces of the project. EPA consultants assisted in identifying grants from other prospective sources to fund supplemental pieces of the project.

The fact that the development is an affordable housing project also raised some concern from those community members who are not in favor of government subsidization of housing in general.

Throughout the course of the project, unexpected financial considerations arose that forced those in charge to diversify project funding. The County originally counted on funding from the State of Colorado to cover two-thirds of project costs. That funding was no longer available after the state suffered from the national financial crisis. EPA assisted in identifying grants and other potential funding sources to help diversify the pool of funding sources. Some important lessons learned from the project overall have been the importance of getting assistance with identifying funding opportunities and the targeting of technical assistance to deal with project-specific issues and with the local context versus broad-based issues.

### TIMELINE

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>1882</td>
<td>20-ton smelting plant is constructed on the site and operated as an ore crushing facility.</td>
</tr>
<tr>
<td>1882-1979</td>
<td>Ownership of facility changes hands several times and capacity is increased and decreased depending on owner.</td>
</tr>
<tr>
<td>1979-1990</td>
<td>Duane Eggett takes ownership of the property.</td>
</tr>
<tr>
<td>1990-2004</td>
<td>Lancaster Trust takes ownership of the property.</td>
</tr>
<tr>
<td>2003</td>
<td>Site is selected for redevelopment.</td>
</tr>
<tr>
<td>2004-present</td>
<td>San Juan County own the property.</td>
</tr>
<tr>
<td>2006</td>
<td>URS Inc. is contracted by USEPA to conduct ESAs. Hazardous contaminants are found in the soil.</td>
</tr>
<tr>
<td>2007-2010</td>
<td>Remediation of contaminants is conducted.</td>
</tr>
<tr>
<td>2011</td>
<td>Construction of Anvil Mountain Neighborhood redevelopment is underway.</td>
</tr>
</tbody>
</table>

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REFERENCES


San Juan Development Association. (n.d.). Anvil Mountain Neighborhood and affordable housing: Questions from the Community and Answers from the Project Coordinator. Economic, Housing and Community Development for San Juan County, Co.


ACKNOWLEDGEMENTS

This work was performed under a subcontract with the University of Illinois at Chicago and made possible by grant number TR-83418401 from U.S. Environmental Protection Agency and its contents are solely the responsibility of the author and do not necessarily represent the official views of the U.S. EPA. Chris De Sousa would like to sincerely thank William Tookey from San Juan County and Adam Sickmiller (formerly from the County) for providing information about the project. He would also like to thank his student assistants – Michael Hayek, Kevin Duffy, Jason Tilidetzke, Laura Lynn Roedl, Lily D’ Souza, and Elizabeth Durkin - for their research support.

The Sustainable Brownfields Consortium is an interdisciplinary group of researchers and technical advisors who are analyzing best practices for sustainable redevelopment of brownfields and the environmental, economic and public health benefits that can result. Funded by a grant from U.S. EPA, the project is a collaboration of the University of Illinois at Chicago (where it is based), University of Illinois at Urbana-Champaign, University of Wisconsin-Milwaukee, Ryerson University, Resources for the Future, Kandiyo, and Hellmuth + Bicknese Architects. The project website is at www.brownfields.uic.edu.