

West Jordan Sugar Factory Feasibility Study

Executive Summary

Purpose

Phase I: The West Jordan Sugar Factory Architectural and Adaptive Use Feasibility Study was commissioned by the City of West Jordan for the purpose of evaluating possibilities for reuse of the Sugar Factory buildings, can the structures be reused, what are the best uses for the buildings, and what are the associated costs. This report will also review a brief history of the site, and present a site evaluation and survey, an architectural and building systems survey of the four structures, a structural evaluation of the four structures, the use evaluation, the architectural, structural, and systems recommendations, a conceptual cost estimate, and a conceptual feasibility analysis.

Phase II: The Phase II testing and evaluations were initiated at the recommendation of the Phase I report. This testing and additional investigation was instigated to gain further insight into quantifying the existing conditions of the site and buildings. Included in this work was the creation of floor plan and sectional drawings, material strength testing, hazardous materials survey and testing, geotechnical investigation, site survey and additional structural analysis. The results, drawings, calculations, and estimates from the additional work has been complied with the Phase I work into a single document.

Recommendations

The additional information gained from the Phase II work does not change the primary recommendations of the original report which are listed below. The one factor that has the most bearing on this report is the issue of high construction inflation. For the last year construction costs have had two major spikes which in some cases has increased the present day cost of construction by 25% from early 2005. For estimation purposes, an inflation factor of 1% per month is not uncommon. The cost estimates in this report have been updated to show a 25% inflation expense in order to bring it into alignment with todays market. The economic projections have been updated to reflect the increased construction cost due to inflation. Because the change in input was primarily an increase in project expense, the economic feasibility of the proposed uses have diminished somewhat. Additional exploration will be required to evaluate use and economic feasibility of the Sugar Factory site.

Phase I Recommendations

First- the buildings can be used and should be preserved.

Second- it is recommended that the City consider cultural and community art uses for the long term planning of the site. Such uses could include museums: interpretation centers, community theater, community art center, art gallery, dance, music, and community gathering spaces. As discussed in the body of this report, many of the uses explored are either negatively impacted by site issues or would have major impacts to the building's architectural character. This said, there are many uses discussed in Chapter 6 that would be very appropriate transitional uses such as a farmers market or using the silos as a climbing wall. Transitional uses would be used primarily to generate interest and draw community awareness to the site until the final vision can be implemented.

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Third- it is recommended that phasing the construction be considered to allow for the financial burden spread over multiple years. In addition to the financial benefit of phasing, gradual population of the site would promote awareness and use of the site, increasing the viability of more diverse uses in the future.

The final recommendation is that the city allow temporary uses into the buildings that would help maintain them with minimal changes to the architectural character or impact the future use of the buildings and site by the city.

Cost Estimate (Rough Order of Magnitude)

Four cost estimates have been provided, one for each of the four use groups. The estimates are based on square foot costs specific to uses and are based on modified costs from Means Square Foot Costs* which is a standard reference book used in the construction industry for cost estimating purposes at preliminary stages where construction drawings are not yet available. The square foot costs vary considerably from \$47 to \$120 a square foot, depending on use. This difference is due to the required level of finishes and infrastructure that are required for the different uses. For example, a restaurant space would have a higher quality finish for the floors, walls, and ceiling compared to a retail shop that may have vinyl flooring, painted gypsum board with lay-in tile ceilings. These estimates are intended to give Rough Order of Magnitude (ROM) cost for the various options. The summary for the construction costs for the sugar factory are shown below.

Estimated Construction Cost

Summary

Option	Description	Phase I (\$ millions)	Estimated Inflation 2005-2007	Phase II (\$ millions)
1	Theater and Cultural ¹	\$18.76	\$4.74	\$23.70
2	Theater and Conference ¹	\$18.95	\$4.45	\$22.27
3	Theater and Retail ¹	\$16.28	\$3.81	\$19.05
4	Conference and Retail ¹	\$1.70	\$3.98	\$19.92
5	Theater only (West Building) ²	\$2.64	\$0.53	\$2.66
6	Theater only (Sugar Factory) ³	\$2.99	\$0.77	\$3.87

1 - Assumes a full renovation on all buildings and full site development

2 - Renovation of only the west building (concrete) for use as a theater with partial site development

3 - Renovation of only the sugar factor without the silos for use as a theater with partial site development. The existing theater remains with minimal upgrades.

* Construction Publishers and Consultants, Reed Construction Data, 2004, Kingston, MA.

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Economic

To determine the relative economic viability of the four primary use groups a pro-forma was created that estimated potential revenues based on a potential level of demand with assumed operational costs subtracted from it. The summary of the potential net operating incomes for the targeted use groups is shown on the following table.

Net Operating Income Pro Forma Summary

Option	Use Groups	Potential Net Operating Income		
		Low Demand 20% Occupancy	Medium Demand 40% Occupancy	High Demand 80% Occupancy
1	Theater and Cultural	\$ (2,038,986.38)	\$ (1,859,007.63)	\$ (1,520,191.50)
2	Theater and Conference	\$ (1,935,531.76)	\$ (1,754,907.89)	\$ (1,415,124.08)
3	Theater and Retail	\$ (1,660,776.15)	\$ (1,413,723.35)	\$ (974,296.15)
4	Conference and Retail	\$ (1,488,364.58)	\$ (985,631.90)	\$ (34,844.96)
5	Theater Only (West Building)	\$ (238,451.19)	\$ (153,151.19)	\$ 12,448.81
6	Theater Only (East Building)	\$ (358,121.99)	\$ (199,821.99)	\$ 111,778.01

() indicates negative figure

If consideration is given to renovating the entire site and installing the recommended uses, the probability that the site could be self sufficient in generating revenue is slight. But a phased approach starting with the renovation of a single building has a higher probability of generating revenue to the point of being self sufficient from city financial support.

Targeting uses that will have minimal impact to the building exteriors are more likely to allow for renovation grants that would be income above what is shown in the following table.

Uses

The exploration for potential uses for the site and building began with stake holder group meetings; this meeting generated over 50 different possible uses. Potential uses were grouped into uses which were then put into a matrix where they were evaluated for “appropriateness” based on financial (ability to generate positive cash flow), compatibility (with the Sugar Factory, neighborhood, etc.), and architectural criteria. From this matrix four use groups were created: theater and cultural center, theater and conference center, theater and retail, and lastly conference center and retail. These four “use groups” have been further evaluated to determine their strengths and weaknesses internally and externally. Economic feasibility has also informed final recommendations.

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Summary of Phase II Work

Building Condition & Context

Structurally the buildings on the site can be reused. All of the buildings will need varying degrees of remediation work but, none of their conditions are beyond repair. From the material testing and the geotechnical investigation there were some structural assumptions from the original report that were incorrect. Additional analysis has been completed to account for these differences. This said, the cost for the overall structural upgrade (in early 2005 dollars) remains nearly the same. The structural deficiencies found at the Sugar Factory site are common challenges that face a large percentage of historic buildings and can be designed for.

The structural recommendations for the buildings are made with the assumption that the final use will be a high occupancy use. If it is determined that the final use will be similar to the existing or a less intensive use, the structural requirements will change. Also, it is not required to upgrade buildings that are not being remodeled. The determining factor(s) of whether or not to keep the buildings is more of a political and economical challenge. As an example, a local city remodeling their historic city hall chose not to complete the seismic upgrade because it was economically unfeasible to do so. In their case because of existing occupancy conditions they were not required, and opted not to because they felt the probability of a large seismic event that would impair the building to an sizable extend was not high enough to justify the cost. In the case of the Sugar Factory site, it would not be required to upgrade the Silo to renovate the Sugar Factory.

The mechanical and electrical system components on the site are for the most part antiquated and should be replaced with any upgrade of use.

Architecturally, the buildings are prime candidates for renovation and reuse. Each building has its own architectural character and history. They all have beautiful details that make them individually wonderful and worth saving. The buildings as a group offer a real glimpse into the history of West Jordan and early industry in the Salt Lake Valley.

The building components are in varying states of disrepair. The most notable issue is with the roofing systems of the concrete (west) and metal buildings, which are in dire need of replacement. If these buildings are to be retained by the city for future use the exterior envelopes of the buildings should be repaired to stop the intrusion of water into the building. Otherwise the deterioration will only accelerate, increasing the future cost of remodeling.

Hazardous Materials Survey

The hazardous material survey included testing for asbestos and lead based paint. The survey was made by JBR Environmental Consultants, Inc. and was completed November 8, 2005. The full report, including recommendations for both Asbestos and Lead Based Paint are located in the Appendix.

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Asbestos was found in all structures evaluated in the form of insulation, undercoatings, flashing, and shingles. The table below lists the abatement costs for removal of materials that contain asbestos in concentrations greater than 1%. Please note that all non-friable roofing materials (shingles and flashing) that contain asbestos in concentrations greater than 1% are not regulated by EPA. These materials can be removed by a roofing contractor that follows proper OSHA regulations.

Asbestos-Containing Material (ACM)

Estimated Abatement Cost Summary

Metal Building (North Building) ^{2,3}	\$75,500
Concrete Building (West Building) ¹	\$0
Sugar Factory (East Building) ^{1, 2, 4, 5, 6}	\$75,000
Silos ¹	\$0
Total Estimated Abatement Cost	\$150,500

Asbestos Types

1 - Silver Flashing. Asbestos found is non-friable roofing material. The roofing contractor will be required to follow OSHA standards for removal of the shingles and needs to be made aware of its presence.

2 - Thermal System Insulation (TSI) Aircell® Pipe Insulation

3 - Sink Undercoating

4 - Transite® Panels

5 - TSI - Tank Insulation

6 - TSI - Boiler Insulation

Lead based paint was found in materials tested in the Metal, Concrete, and Sugar Factory buildings. The results indicate that the levels of Lead-based paint are above the HUD regulatory levels as they pertain to child occupied facilities. OSHA regulations must be followed for worker protection if renovation or demolition is performed on the items tested.

Buried debris has been found during site exploration activities. It is possible that some of the debris that is buried and potentially uncovered during site construction activities will contain asbestos and lead-based paint.

Material Testing

Material testing was provided by AGEC, P.C. The testing used visual observation, concrete core sampling, and radar testing to determine footing and foundation size, concrete strength, and steel reinforcement present. The full results of the test are located in the appendix. This information was used by the structural engineer to allow for a greater degree of confidence in making recommendations for the structural upgrading of the structures. In all 10 cores samples were taken and 15 radar testes were taken.

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Geotechnical Study

The geotechnical study was completed by Earthtec Testing and Engineering, P.C. and completed January 18, 2006. The purpose of the study was to evaluate subsurface conditions and engineering characteristics of the foundation soils to assist in developing plans for the remodel and reuse of the Old Sugar Factory complex. The full report located in the Appendix presents the results of the geotechnical investigation including field exploration, laboratory testing, engineering analysis, and recommendations.

The study is based on 7 test holes drilled and 13 test pits that were excavated on site. From this exploration it was found that the site is covered with 0 to 3 1/2 feet of fill soils. The fill generally consists of rubble (brick, concrete and metal) likely from demolished buildings on site. Native soils below the fill generally consist of medium stiff to very lean clay. Ground water was encountered about 35 feet below the existing site grade. The soil present will allow a maximum bearing capacity of 2000 psf (pounds per square foot).

Survey

The site survey was completed by ESI Engineering and included locations of buildings, major site features (fences, bollards, pads, etc...), utilities, roads, railings, and topography. The survey is attached to this report.

Site Considerations

The Sugar Factory site contains the four remaining structures from the West Jordan Sugar Factory: the west concrete building, north metal building, east factory/playhouse building and the two silos. Situated at the southwest corner of the new West Jordan City Park, the site is underdeveloped and is primarily being used by West Jordan for storage and equipment housing as well as for community theater rehearsal and performance in a makeshift black box theater. The only identified physical constraint for future site development is the determination of how much buried debris remains from the previous buildings.

The site is remote from the major transportation corridors of the city which makes it unsuitable for all but destination orientated uses. Because of its remoteness it is felt that retail and the majority of commercial establishments would be unwilling to relocate to this site.

Close proximity to the new city park and its amenities remove the potential uses of exercise or recreation. Infrastructure supporting the arts is the one primary component lacking from the park and the adjoining area.

The site, although appearing to be “part of the park,” is separated by distance and access. If the Sugar Factor is to play a central role as part of the park, strategies to connect it should be explored.





Building History

Sugar Beets in Utah

Years ago, the tall chimney etched across the skyline espoused to the people for miles that a sugar beet factory was having a favorable effect on the local community. Utah's first sugar beet factory was erected in Sugar House in the 1850's. "The best French Beet Seed" and English processing machinery were brought to Utah. This was arduous and heroic venture for a Western pioneer community. For several years beets were produced and processed with the imported seed and machinery, but chemical techniques had not developed well enough in the pioneer West to produce a successful result.

The first successful sugar beet factory in Utah was constructed in Lehi. In September of 1889 the Utah Sugar Company filed incorporation papers in Salt Lake City. Experiments to determine the best growing locations and practical processing locations for sugar beet production were conducted. Seed was distributed and local newspapers carried articles on the culture of beets. The Cornerstone of the Lehi factory was laid on 26 December 1890. This expensive venture was financially backed by the Church of Jesus Christ of Latter-day Saints¹. The LDS Church would continue to back the Utah-Idaho Sugar Company (U and I) for the next 75 years. The Church would come to the rescue of the sugar beet industry time after time-during the Depression, the infestation of Curly Top Disease, and national shifts in the economy.

In 1893 Church President Joseph F. Smith gave this as the reason for aiding the sugar beet industry:

"We started the sugar works here a few years ago. Why? Because when we came to reflect about it we saw that we had reached a point in our history where there was not a single enterprise of a public character that was calculated to give employment to our people. The railroads had gone into the hands of outsiders, as we term them, and instead of their pursuing a wise policy, they abandoned the course that had been pursued by their predecessors, and discharged the Mormon people for their service. Brought in strangers from the east and west, and gave them employment..... The government of the city has also been turned over. Every man that was suspected of having the least color of Mormonism was discharged from the service of the city, and strangers were imported and given work. There was not a thing being done of a public character calculated to give employment to the Latter-day Saints in any direction: and we began to feel that there was a responsibility resting upon us which required something to be done, in a small way at least, in the direction of giving employment to our people. So we started the sugar works, although few people had confidence in the success of the undertaking.... Men of means were very chary (cautious) about it, and did not feel to take any very active part in attempting to start it."

Research and hybridization of seed production, and mechanization changed the labor requirements over the years. Labor needs in the early sugar beet industry were well suited to the large size of LDS families. The thinning and topping of the beets was considered "stoop labor". The LDS boys and girls in each beet growing district were given seasonal school breaks to perform these tasks. In the spring they moved up and down the rows with a short-handled hoe thinning the beet plants.

¹ The Church of Jesus Christ of Latter-day Saints is known in Utah as "the LDS Church," or simply "the Church," and known elsewhere as "the Mormon Church."



Sugar House sugar factory

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Twenty rows, 650 feet long, were a grueling days work that would yield a wage of \$2 to \$4. Each fall during the two week "beet vacation", the youth would harvest the mature beets. Research produced hybridized seed which needed little thinning. The new seed and increased mechanization changed the labor requirements. In 1913-1917, 11.2 hours of labor were required to produce a ton of sugar beets. By 1933 to 1936, efficiency decreased this to 8.7 hours, while in 1958, 4.4 hours were needed and in 1964, 2.7 hours were required.

The significant activities of the Utah Sugar Company during the learning or experimental years may be summarized under five headings: "(1) production of seed; (2) growing the crop; (3) operations at the factory; (4) processing "waste" molasses; and (5) erection of auxiliary cutting stations."

Centralization



West Jordan Sugar Factory, while owned by U and I Sugar Company

U and I owned and /or operated 30 factories over a 75 year period. The replacement of the 30 small community factories to five centralized producing units occurred between 1889 and 1964. This is similar to the thousands of little foundries and black smith shops that were centralized, the abandonment of a railroad line that had served over a long period of time, the razing of a factory that had set production records. These are part of the "creative destruction" process that has made the American economy the most productive and progressive in the world.



U and I Sugar Company display at the State Fair

The West Jordan factory was constructed at 8200 South and 2000 West in 1916 by the Dyer Construction Company. It survived to be one of the 5 centralized processing plants. The West Jordan facility was the center of some of the most important sugar industry research. It developed disease resistant strains of beets and hybrid monogerm seed which produced larger, higher sugar content beets on single rather than clustered plants. The original capacity of the factory was 500 tons of beets processed per day. The capacity increased to 900 tons in the 1920's and to 1,700 tons in the 1960's.

Statistics

In 1916, 846 growers in the West Jordan District planted 6,132 acres of beets, harvested 57,118 tons, and the factory produced 95,272 bags of sugar. In the peak year before the depression, 1920, West Jordan had 1,347 growers planted 9,300 acres yielding 185,045 bags of sugar. Because of a shortage of beets the plant did not operate in 1934 and 1941. In 1965 the district produced 122,000 tons of beets and 500,000 bags of sugar. From 1916 to 1966, the West Jordan factory processed more than 4 million tons of sugar beets and manufactured more than 11 million 100-pound bags of sugar.

Builiing History

1970 to 1971 were the last years of sugar production for the West Jordan factory. Beet sugar production was not competitive with cane sugar production without tariffs or Federal price supports. U & I Sugar Company retained ownership of the factory until the late 1970's. When it passed into the hands of the LDS Church. During the 70's the processing equipment was removed and sold. Nearly two-thirds of the original factory was destroyed in the process. Green houses and offices were also torn down. Only the packaging facility, storage silos, and warehouses remained intact.

In the mid 1980's the LDS Church used the silos for wheat storage for its Welfare program. In the 1990's the property was sold to the City of West Jordan. The city has used it as a storage facility, police dog training area, as mounting sites for antennas and receivers, and community theater space.



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This building history is only a brief overview. Kirk Huffaker at the Utah Heritage Foundation is compiling a more extensive history of the West Jordan Sugar Factory.