



# Roosevelt Elementary School – Facility Reuse Study

Developed for:

Ames Smart Growth Alliance

By:



3/22/2009

## I. Introduction

The original Second Ward School was designed and constructed in the 1920's. Kimball, Bailie, and Cowgill, an Ames firm, received the commission to design the school, and the structure was constructed by R.C. Elvan of Minneapolis. It opened as Roosevelt Elementary School on January 28, 1924, and served as an elementary school for the Ames School District until the end of the school year in the spring of 2005, when the building was closed.

The original structure had a ground-floor, and two stories above grade. The ground floor contained boys and girls play rooms, and building services. A significant area of the ground floor is crawl space used for routing of utilities for the spaces above. The play rooms at the east and west ends of the building were interrupted by six columns in each space. The first and second floors each contained eight classrooms, boys and girls toilet rooms and a total of three offices. The original building contained 29,200 gross square feet.

The building has masonry exterior bearing walls with floor and roof slabs of reinforced concrete pans supported by interior concrete columns. The original interior partitions are a combination of structural tile and gypsum block clad with plaster. Windows and doors were constructed of wood. The building had a built up roof on a built up wood deck to provide slope to external drains. The building also featured an internal ventilation system served by a fan in the ground floor, which provided supply and return air to each classroom through a series of masonry shafts extending vertically through the building.

An addition, designed by Architects Rudi and Dekovic, was constructed in the late 1960's, providing a music classroom, a gymnasium/cafeteria, media center, and administrative, conference and support spaces. The addition contains 10,625 gross square feet. The addition was constructed using exterior masonry bearing walls, precast concrete floor structure, interior masonry bearing walls, and a steel bar joist and metal deck roof structure.

The appearance of the original structure has been modified, with the addition of a sloped metal roof, and the original wood sash windows have been replaced with aluminum windows and insulated panels, reducing the glazed area. The existing masonry walls are in good condition.

Mechanical and electrical systems serving the building have reached the end of their service life. The building has not been heated for some period of time. Interior remodeling projects completed throughout the building's life removed a number of the ventilation shafts in order to increase classroom size. Toilet rooms have been remodeled to update fixtures and provide accessibility. Interior doors and frames have been replaced to provide fire rated corridors. The original play rooms on the ground floor were last used as an art classroom and a daycare space. Suspended acoustical ceilings and updated lighting have been provided throughout most of the classrooms.

While some elements of interior accessibility have been provided, the building is generally not accessible and an accessible entrance to the building does not exist. Stairs exist at all entrance points to the building. An elevator would be required to provide internal accessibility between floors.

At the time the structure was constructed, it was on the edge of the developed areas of Ames. The community has grown around the school, and the structure is now surrounded by residential development, most appearing to have been constructed from the 1920's through the 1950's. The site has an area of 3.65 acres, and contains activity fields, a large playground area, and hard surfaced parking areas. A significant number of mature trees exist, particularly at the perimeter of the site.

## II. Study Intent

INVISION was engaged by Ames Smart Growth Alliance (ASGA) to survey the Roosevelt Elementary School Structure and determine the potential for reuse of the building. Michael Broshar, a Principal with INVISION, met with the AGSA Preservation Committee and presented a case study of the Kingsley Elementary School, a 1918 elementary school in Waterloo, Iowa which was recently renovated and expanded as a two section elementary school.

The ASGA asked that this study consider four options for redevelopment of the structure. The four options are as follows and as further described in Section 3:

- A. Minimal Renovation for Elementary School – Develop the scope of minimal renovations necessary to reopen the building as an elementary school.
- B. Full Renovation for Reuse as Elementary School - Renovate and expand the structure to provide an up-to-date elementary school.
- C. Preservation – Determine the scope of work necessary to reestablish the historic character of the exterior of the structure, to closely resemble the original architecture.
- D. Adaptive Reuse – Identify potential alternative uses for the structure and develop a budget for redevelopment.

Blueprints of the existing structure, as well as CAD facility management plans, were provided by Ames Community School District and were helpful in developing the information contained in this report. In addition, the School District opened the school in January for a day allowing field verification of the building condition.

The following four sections describe the renovation work and possible expansions required to achieve each of the options. A statement of probable cost has been developed for three of the options. These costs have been developed using cost information from similar projects, along with RS Means Square Foot Costs, a national database of building cost information.

### III. Renovation/Expansion/ Adaptive Reuse Options

#### A. Minimal Renovation for School

The intent of this option was to determine the scope of work required to place the structure back in service as an elementary school with minimal improvements. Due to the condition of the existing mechanical and electrical systems, along with the condition and layout of instructional spaces, a significant renovation would be required. The extent of renovation would require that the structure be brought up to current codes, including requirements for accessibility. The extent of remodeling and additional space required to reopen the structure as a school, makes the scope of work essentially the same as required for the full renovation and expansion of the school, with the following exceptions: Under this option, the cafeteria would continue to be a shared space with the gymnasium. Two classrooms would be provided for each grade level.

Kindergarten, grade one and grade two classrooms (2 each) would be located on the Level 1. Grade levels three through five (2 classrooms each) would be located on Level 2. On the Ground Floor, areas south of the gymnasium along the west side of the building would be redeveloped for Food Service.

The stairs in the corridor on the south side of the gymnasium would be removed and corridors extended at each level to the east. New stairs and an elevator would be constructed as an addition on the east side of the building. (Refer to the plan diagrams included in the full renovation option).

The building would receive new mechanical and electrical systems. Given the site conditions, the structure would be a good candidate for a closed loop geothermal heating and cooling system. Heat pumps within the building, likely ceiling mounted in corridor spaces, would allow removal of the existing masonry chases, where they have not already been removed. New finishes are anticipated throughout the interior of the building.

Existing replacement windows and metal panels would be removed. New windows would be provided in the original window openings. Double hung windows closely matching the original window size and configuration would be employed. New wood or metal entrance systems in character with the historic nature of the building would be used.

Option A Cost Opinion

The cost projection for the minimum school renovation option was developed by calculating proposed renovation and new construction areas, and applying unit costs for each area based upon the complexity of the work involved. The total project cost is projected at \$5,380,860 in current dollars. This cost figure includes construction cost, contingency, and soft costs. Soft costs include design fees, review by building authorities, administrative costs, and an allowance for furnishings, fixtures, and equipment (ffe). We have assumed a 20% soft cost for the project, allowing for new furnishings and fixtures. If existing furnishings and fixtures are reused, this soft cost factor could be reduced to 15%. We have included a 10% contingency factor, which is appropriate at the initiation of a project. The contingency can normally be reduced to 5% following project bidding.

Building Areas	Renovation	Unit Cost		New Construction	Unit Cost	
Ground Floor	4,200 sf	\$ 55.00	231,000			
Grade Level			-	1,600 sf	\$ 170.00	272,000
Level 1	10,840 sf	\$ 55.00	596,200	750 sf	\$ 170.00	127,500
Level 2	13,180 sf	\$ 55.00	724,900	750 sf	\$ 170.00	127,500
Ground Source Heat Pump HVAC	28,220 sf	\$ 48.00	1,354,560			
New Electrical/Data System	28,220 sf	\$ 25.00	705,500			
Elevator						65,000
			<u>\$ 3,612,160</u>			<u>\$ 527,000</u>
Combined New Construction/Renovation						4,139,160
subtotal construction						\$ 4,139,160
Contingency		10%				\$ 413,900
soft costs		20%				\$ 827,800
(fees, permits, administrative costs, ffe)						
total project cost						<u>\$ 5,380,860</u>

**B. Full Renovation for Reuse as an Elementary School**

A number of assumptions are inherent in developing the diagram for redevelopment of the structure into a modern elementary school. The first assumption is that the structure would be a two section elementary school, for kindergarten through grade five. Current best practices would provide three classrooms each for kindergarten through grade two, and two classrooms each for grade levels three through five for a two section elementary school. In addition, classrooms would be provided for special education, music and art instruction. Separate facilities would be developed for gymnasium activities and food service.

The accompanying diagrams show the potential for redevelopment of the existing structure, along with a one story addition, to create a modern two section elementary school.

**Figure 1: Ground Floor / Grade Level Plan**

Kindergarten rooms are provided in the addition in order to create 1,200 square foot classrooms with grade level access. The existing gymnasium would be dedicated for a gymnasium/assembly use. A new cafeteria is indicated, providing grade level access for food delivery. This addition is sited on the east side of the existing structure, in order to connect with the existing entrance and provide accessibility. The existing north stair is removed and located in the addition, along with an elevator to provide accessibility to the main levels of the building. The elevator would be two sided, providing access at grade on one side and access to the existing floor levels of the building on the other side. Ground floor areas of the original structure would be used for building service and storage.

**Figure 2: Level 1 Plan**

Grade one and grade two classrooms are shown on the first floor, along with special needs classroom and resource space. The main entrance would be maintained on the south elevation of the building. Stairs and ramp access on the exterior of the building allows the entrance to be raised to be accessible. Administrative offices, Guidance, conference and volunteers spaces are provided near the main entry. The office location allows controlled supervision of the building entrance during the school day.

### **Figure 3: Level 2 Plan**

Grade level three through five classrooms are located on the second floor, along with art and music classrooms, faculty lounge, and the media center.

In this diagram, classrooms have been developed within the existing classroom spaces. Existing classrooms within Roosevelt Elementary range in size from 700 to 750 SF in area.

As in Option A, the building would receive new mechanical and electrical systems. Given the site conditions, the structure would be a good candidate for a closed loop geothermal heating and cooling system. Heat pumps within the building, likely ceiling mounted in corridor spaces, would allow removal of the existing masonry chases, where they have not already been removed. New finishes are anticipated throughout the interior of the building.

Existing replacement windows and metal panels would be removed. New windows would be provided in the original window openings. Double hung windows closely matching the original window size and configuration would be employed. New wood or metal entrance systems in character with the historic nature of the building would be used.

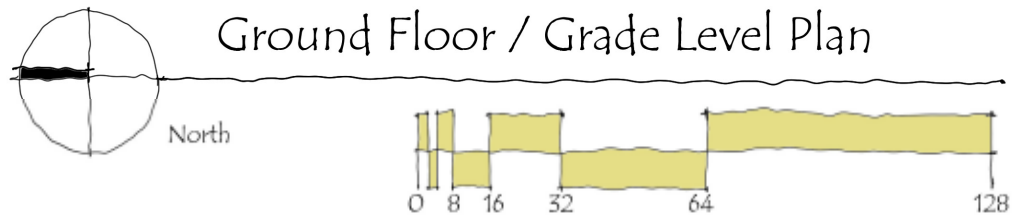
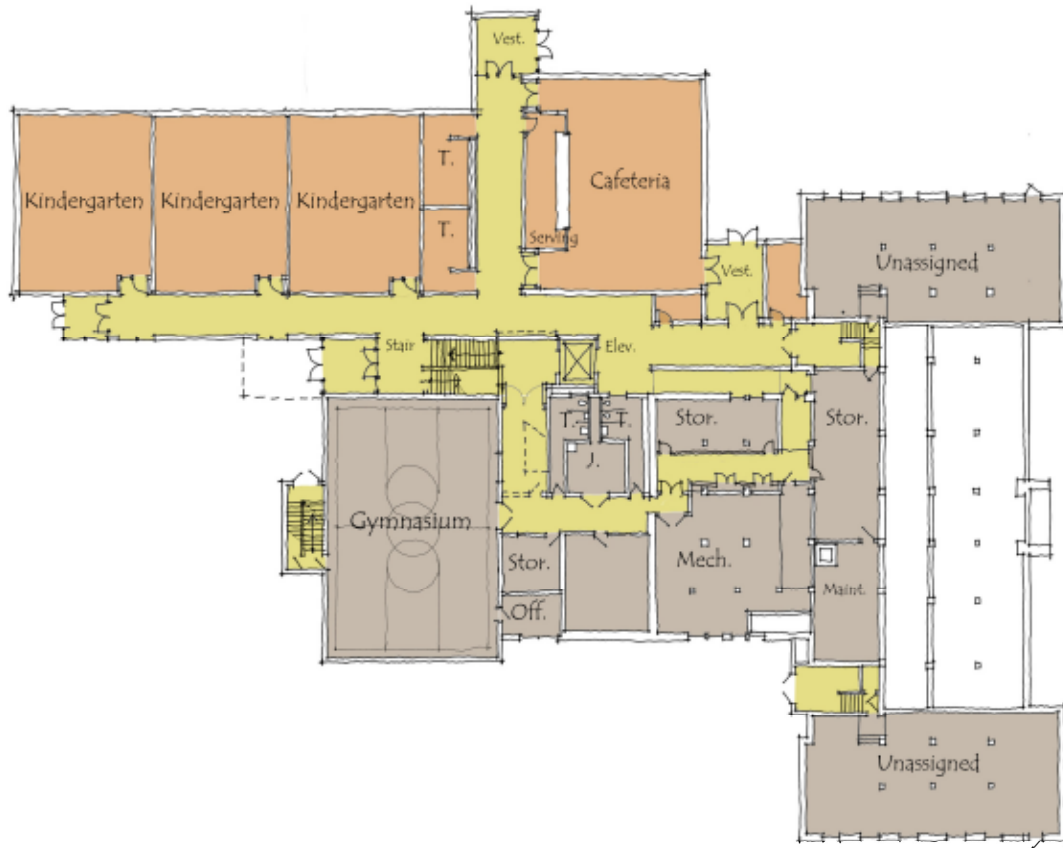


Figure 1.

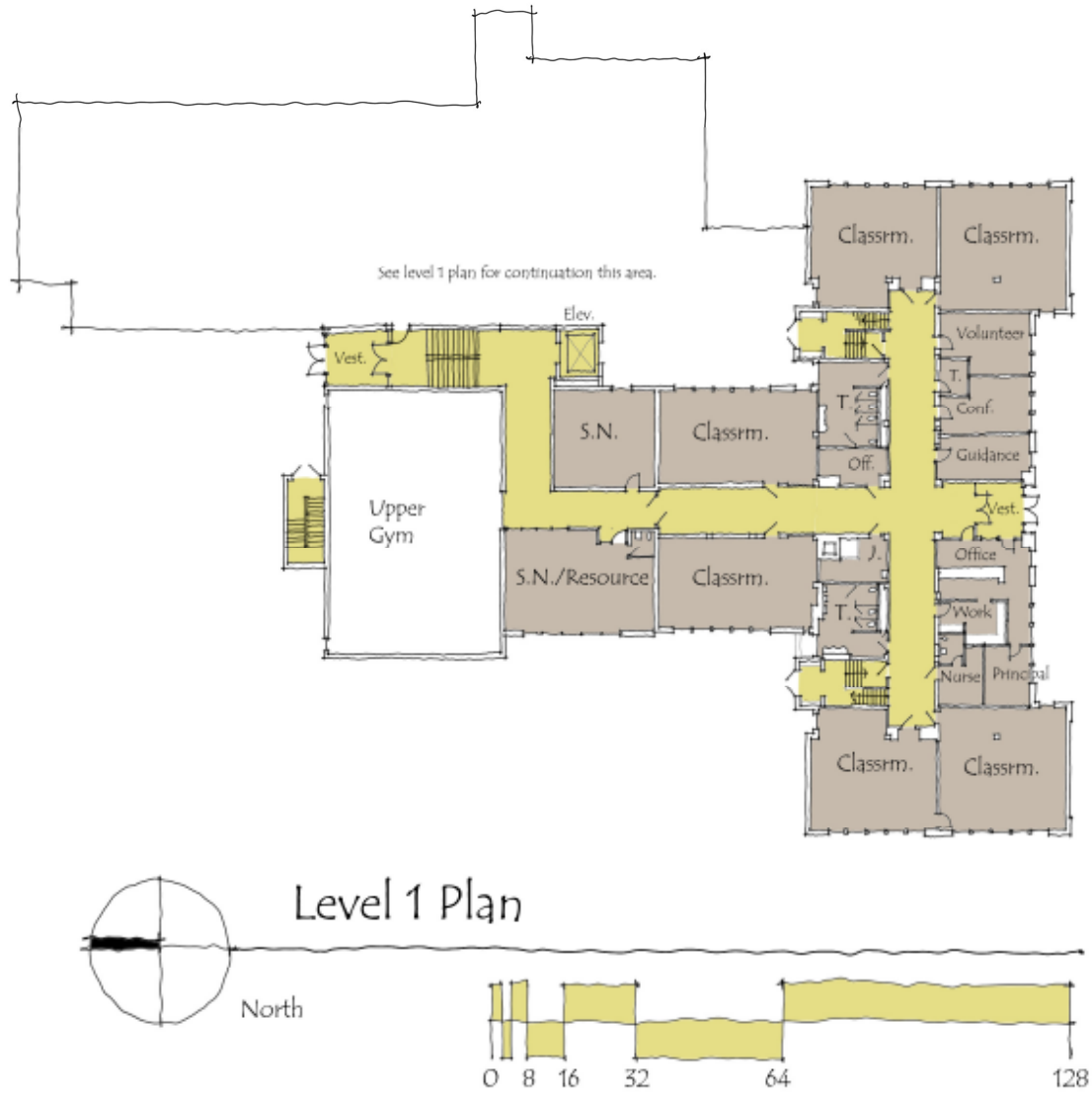


Figure 2.

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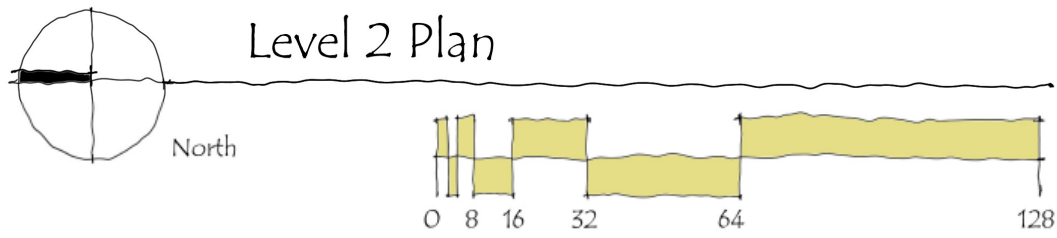
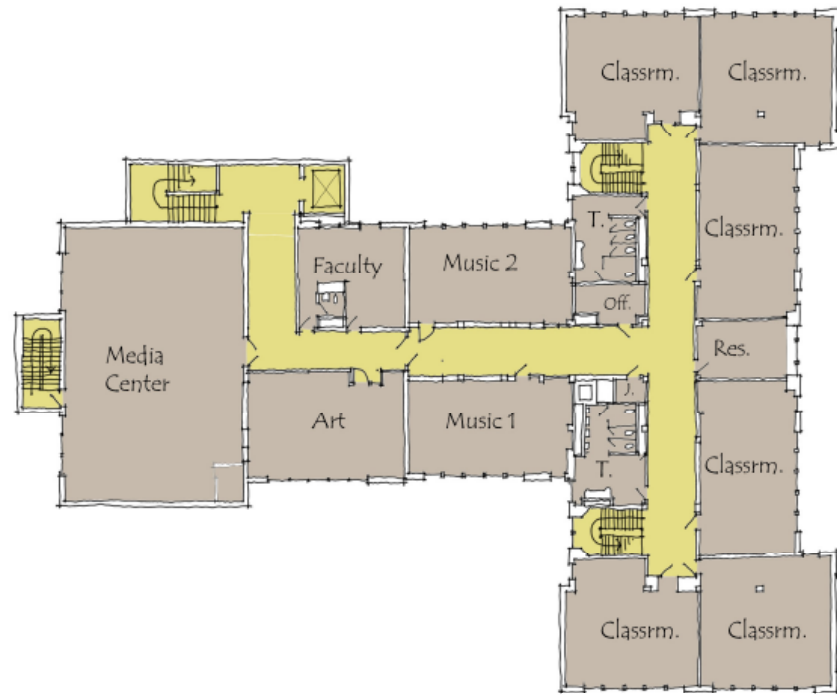


Figure 3.



Figure 4.

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Option B Cost Opinion

The cost projection for the school option was developed by calculating proposed renovation and new construction areas, and applying unit costs for each area based upon the complexity of the work involved. The total project cost is projected at \$7,245,700 in current dollars. This cost figure includes construction cost, contingency, and soft costs. Soft costs include design fees, review by building authorities, administrative costs, and an allowance for furnishings, fixtures, and equipment (ffe). We have assumed a 20% soft cost for the project, allowing for new furnishings and fixtures. If existing furnishings and fixtures are reused, this soft cost factor could be reduced to 15%. We have included a 10% contingency factor, which is appropriate at the initiation of a project. The contingency can normally be reduced to 5% following project bidding.

For comparison, a new two section elementary school of 43,500 SF (300 students at 145 SF per student) would be projected to cost \$10,200,000 with soft costs and contingencies. This is based on \$180 per square foot for new construction plus a 10% contingency and 20% for soft costs (fees, permits, administrative costs, and ffe).

Building Areas	Renovation	Unit Cost		New Construction	Unit Cost	
Ground Floor	4,200 sf	\$ 55.00	231,000			
Grade Level						
Elevator/Stairs Addition				1,600 sf	\$ 170.00	272,000
Cafeteria/Toilets/Circulation				3,279 sf	\$ 170.00	557,430
Kindergarten Classroom Addition				5,411 sf	\$ 170.00	919,870
Level 1	10,840 sf	\$ 55.00	596,200	750 sf	\$ 170.00	127,500
Level 2	13,180 sf	\$ 55.00	724,900	750 sf	\$ 170.00	127,500
Ground Source Heat Pump HVAC	28,220 sf	\$ 48.00	1,354,560			
New Electrical/Data System	28,220 sf	\$ 25.00	705,500			
Elevator						65,000
			<u>3,612,160</u>			<u>2,069,300</u>
Combined New Construction/Renovation						5,681,460
subtotal construction						\$ 5,681,460
Contingency		10%				\$ 568,100
soft costs		20%				\$ 1,136,300
(fees, permits, administrative costs, ffe)						
total project cost						\$ 7,385,860

## C. Preservation

Under this option, the building exterior would be restored to closely resemble the condition of the original architecture. The restoration would be accomplished in accordance with the *Secretary of the Interiors Guidelines for Historic Preservation*. Improvements to the building interior and upgrades to building mechanical and electrical systems are not included in the scope of the work in this option.

The significant changes to the building exterior that have occurred over the life of the building that have “significantly altered” the structure are the addition of the low slope metal roofing and the replacement of the aluminum window and panel system in the original window openings. The metal roof and its support framing would be removed and replaced with a membrane roof in order to return the structure more closely to its original appearance. Metal drain collectors and downspouts would be installed at the original scupper locations.

Windows and doors on the 1960’s addition would remain unchanged, as they are original to the building addition. Metal windows and entrances at openings in the original structure would be removed and replaced. Window openings would be refit with wood double hung operating sash windows closely matching the detailing of the original windows. Doors and frames would be replaced with wood units to closely match the original frame profiles.

Option C Cost Opinion

The cost projection for exterior improvements to restore the structure to more closely resemble its original appearance is approximately \$502,000. This is comprised of construction cost of \$386,000, with a 15% contingency and 15% allocated for design fees approvals, and administrative costs, in 2009 dollars.

Item	Original Building	Unit Cost		1960's Addition	Unit Cost	
Window Replacement	3,410 sf	\$ 48.00	163,680	650 sf	\$ 48.00	31,200
Door Replacement	280 sf	\$ 48.00	13,440	120 sf	\$ 48.00	5,760
			-			
Roofing	9,500 sf	\$ 9.50	90,250	4,400 sf	\$ 9.50	41,800
Sheet Metal Downspouts			10,000			
Masonry Restoration			30,000			
			\$ 307,370			\$ 78,760
Combined Construction						386,130
Subtotal Construction						\$ 386,130
Contingency		15%				\$ 57,900
Soft Costs (fees, permits, administrative costs)		15%				\$ 57,900
Total Project Cost						\$ 501,930

**D. Adaptive Reuse**

Several potential uses for the building have been identified with the assistance of the ASGA Preservation Committee. Uses identified range from apartment/loft housing to a community/arts center to a satellite library for Ames. Housing and community center uses are compatible with the building structure, however, only a portion of the structure would be appropriate for library use, due to higher floor loading building code requirements for libraries. The former gymnasium and media center spaces in the addition could be used for that purpose.

Accessibility would be required for any reuse of the building with a public function, including redevelopment of the structure for apartment/loft housing. The most logical place to develop and accessible entrance is in the location of the east entrance the addition, similar to that indicated for providing accessibility in the school renovation option.

Housing – There is a potential for development of up to 18 living units within the existing structure. These units would make use of existing classroom large spaces, as well as subdividing the media center and gymnasium, and could range in size from 700 to 1,500 square foot units. If the units were more modest in size (700 to 800 sf each), there is the potential for developing up to 26 units.

Community/Arts Center - The existing classrooms lend themselves well to be reused as assembly spaces for community learning and meeting functions. Updating of mechanical and electrical systems would be required. Updating of finishes would be desirable and would be necessary in many areas due to the introduction of new mechanical and electrical systems.

#### Option D Cost Opinion

Project costs for an adaptive reuse of the existing school building will vary widely, based on the type of use for which the building is converted. A use which does not require extensive additions of walls will be less costly than a use which subdivides existing spaces or requires significant removal of existing interior partitions. In any event, mechanical and electrical upgrades will be required, due to the condition of existing equipment and a requirement to meet current building codes. We have also projected the cost of an addition to replace the north stairs and add an elevator to provide accessibility for the building. Using a contingency factor of 10% and soft costs of 15%, we project an adaptive reuse project cost would range from \$3,900,000 to \$4,700,000.

#### Green Strategies

Reuse of an existing building structure is perhaps the greenest strategy that can be employed. In addition, a number of green strategies should guide the preservation and reuse of the Roosevelt Elementary School. Daylighting strategies can be employed, particularly given the size of the windows in the original structure. These windows can also be used to provide natural ventilation when the weather is appropriate. The building should be insulated to improve the thermal envelope. A closed loop geothermal heating and ventilating and air conditioning system can be employed to reduce energy costs over the life of the building. Plumbing fixtures used in the renovation should be low flow to reduce water usage. Materials used in the renovation should be selected based on their sustainable characteristics.

#### Conclusion

Roosevelt Elementary School was well constructed, using a concrete column and slab floor and roof system with masonry load bearing exterior walls. The structure is sound. The character of the building matches the neighborhood character that grew up around it. The building is an excellent candidate for reuse.

