Westland Commons Development
Vision & Design Guidelines for a Sustainable Development

St. Paul’s North End
May 2010

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Sparc has owned and maintained the 3-acre Westland Commons property at Western & Maryland in St. Paul for several years now, during which time multiple designs have been proposed, community input was sought, a CURA research project examined possibilities for “ecovillage”-like development, and a student/professional design charrette was held. This fall, Sparc will be at the point of seeking development partners to move ahead with the project. Sparc commissioned this report to bring their goals for the site together into a document and site plan that could communicate visually and specifically with potential development partners as well as study the feasibility of development proposals. The site plans contained within this document should not be confused with site plans produced by design firms for implementation which are based on discussion with actual clients. Rather, these plans are exploratory in nature and make assumptions about the needs of future clients. Once development partners are selected and needs assessed, a thorough site planning process should occur.

**Executive Summary**

The purpose of this document is to serve as a communication tool with which to approach development partners, arming Sparc with specific goals and ideas for development. The beginning of this document distills previous research, design proposals, and background information for the Westland Commons site, including new research into zoning codes and site information. Then, after laying out the overall vision for the site, three site plan options are explored. The site plans examine placement of buildings and program on the site as well as building massing for sunlight, views, and minimization of the building’s appearance from the street. The document includes approximate square footages for programs. See following page for summary.
### Option A

<table>
<thead>
<tr>
<th>Footprint</th>
<th>School</th>
<th>Senior Housing Only (30 units)</th>
<th>Senior Housing (69 units)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(35.0%)</td>
<td>123,000 ft²</td>
<td>1 Bed 15 @ 600 ft²</td>
<td>First floor offices/community center</td>
</tr>
<tr>
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<td>45000 ft²</td>
<td>1 Bed + Den 10 @ 800 ft²</td>
<td>3 Stories Senior Housing above</td>
</tr>
<tr>
<td>School</td>
<td>26,000 ft²</td>
<td>2 Bed 5 @ 1000 ft²</td>
<td>4 Multiplex units</td>
</tr>
<tr>
<td>Housing</td>
<td>Total</td>
<td>149,000 ft²</td>
<td>Includes:</td>
</tr>
<tr>
<td>Large-scale Ag</td>
<td>17,600 ft²</td>
<td>Senior Housing (30 units)</td>
<td></td>
</tr>
<tr>
<td>Parking (above)</td>
<td>17 &amp; 20</td>
<td>Multiplex Housing (56 units)</td>
<td></td>
</tr>
<tr>
<td>Parking (below)</td>
<td>60</td>
<td>1 Bed 16 @ 500 ft²</td>
<td>daycare for 125 children</td>
</tr>
<tr>
<td>Total Parking</td>
<td>105-122</td>
<td>2 Bed 24 @ 1000 ft²</td>
<td>office spaces, conference room, classroom</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Bed 16 @ 1500 ft²</td>
<td>fitness center</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>event space</td>
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</table>

### Option B

<table>
<thead>
<tr>
<th>Footprint</th>
<th>School</th>
<th>Senior Housing (44 units)</th>
<th>Senior Housing (36 units)</th>
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<tbody>
<tr>
<td>(35.0%)</td>
<td>55,600 ft²</td>
<td>1 Bed 20 @ 600 ft²</td>
<td>2-Story School for 300 students</td>
</tr>
<tr>
<td>Total Footprint</td>
<td>45,000 ft²</td>
<td>1 Bed + Den 10 @ 720 ft²</td>
<td>2-Story Senior Housing above</td>
</tr>
<tr>
<td>School</td>
<td>43,200 ft²</td>
<td>2 Bed 14 @ 900 ft²</td>
<td>3 Multiplex units</td>
</tr>
<tr>
<td>Housing</td>
<td>Total</td>
<td>149,000 ft²</td>
<td>Includes:</td>
</tr>
<tr>
<td>Large-scale Ag</td>
<td>24,000 ft²</td>
<td>Multiplex Housing (36 units)</td>
<td></td>
</tr>
<tr>
<td>Parking (above)</td>
<td>17</td>
<td>1 Bed 12 @ 500 ft²</td>
<td>science labs &amp; full kitchen</td>
</tr>
<tr>
<td>Parking (below)</td>
<td>68 - 85</td>
<td>2 Bed 12 @ 1000 ft²</td>
<td>performance &amp; rehearsal spaces</td>
</tr>
<tr>
<td>Parking (multi-plex)</td>
<td>30</td>
<td>3 Bed 12 @ 1500 ft²</td>
<td>12 classrooms (25 students each = 600)</td>
</tr>
<tr>
<td>Total Parking</td>
<td>115-132</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Option C

<table>
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<th>School</th>
<th>Senior Housing (44 units)</th>
<th>Senior Housing (36 units)</th>
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</thead>
<tbody>
<tr>
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<td>30</td>
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</tr>
<tr>
<td>Total Parking</td>
<td>115-132</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**INTRODUCTION**
Location
Willow Lake Reserve Site

Photo Context
Distances

Walkable Distances
Despite a trend over the last half-century of population flight to the suburbs, all of the area demarcations show a consistent growth in population. It is important to note that the 2010 projections were made prior to the financial crisis.

From 1990 to 2000 all the demarcation areas experienced a growth in employment similar to population growth. However, with the recession and financial crisis, it is prudent to assume growth has stopped or even reversed for the area.

The changes between the graphs from 1990 to 2000 show a dramatic increase in diversity of the market area. In the decade of the 90’s all the race groups experienced a sizable increase in population size as well as becoming a larger percentage of the population except for Caucasians who saw a decline in total numbers as well as a sharp decrease in percentage of the population. However, as indicated below, the residents who live within one mile of the Willow Reserve site show a racial composition similar to the market area in 1990.

Total Population Growth

Despite a trend over the last half-century of population flight to the suburbs, all of the area demarcations show a consistent growth in population. It is important to note that the 2010 projections were made prior to the financial crisis.

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Race of Population (1 Mile Radius)

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Age Distribution

The age distribution shows a pretty traditional downward sloping curve for a population. The most interesting trend displayed in the information is the aging of the baby boomers. For the 45-54 age group there is a spike in group size between the 1990 and 2000 statistics, showing the baby boomers moving into this age range. Then there is a spike in population, although not as large, between 2000 and the projected 2009 statistics. This again shows the movement of the baby boomer population bubble through the age groups.

Not only has the population become more diverse, but also more educated. Marked gains are seen in all categories of higher education graduation. The increase in level of education for the area is also noted in the increase in median income which in 2004 was $34,395. Although this is lower than the metro median, so is the percentage of college graduates.

Education

Education Attainment of Persons Over 25 (Market Area)

As stated above, the area is a mix of owner-occupied residences and renting-occupied residences. The majority of rented properties in the area are apartments with fairly consistent monthly rents (Displayed below).

Housing

Home Owners vs. Renters (1 Mile Radius)

Owner-occupied housing in the area is currently primarily single family homes. However, the majority of the new housing stock in the area is for owner occupation is condominiums. From the current housing stock there are two price groupings. The first is the older single family homes which have prices ranging from $50,000 to $120,000, depending largely on number of bedrooms and bathrooms and condition. The second is the new condominium and townhouse development with prices from $170,000+ varying based on bedrooms and bathrooms as well as location and additional amenities.

Demographics

Note: For more detailed information at a larger size, please see the Greenlight Charrette information packet.
Note: This summer St. Paul is moving several schools. For example, the Paul & Sheila Wellstone school will move into the building formerly occupied by Washington Tech Magnet. Map may not be accurate.
Site History

The Westland Commons Project location is a 3-acre piece of land owned by Sparc on the NE corner of Maryland and Arundel in St. Paul. Sparc purchased the land in 2005 and hopes to develop it sometime in the next five years. Funding requires that a portion of the development include affordable housing. Sparc decided to purchase the land as the availability to purchase a site of this caliber in older neighborhoods is very rare. Furthermore, Sparc wanted to ensure the neighborhood had input into the final development.

In 2006-7 Sparc developed plans to build 32 townhouse units on the site. However, due to the declining market, they were unable to secure funding. Sparc began to dream of creating a development which would be economically, socially, and environmentally sustainable, include green mixed-use development, and use prefabrication. In Summer 2009, they hired a Research Assistant to explore these possibilities through a lengthy paper. January 2010 saw a charrette for the site involving students and professionals through Greenlight at the University of Minnesota.

Until this point, the project was known as the Willow Reserve. In response to community concern that the Willow Reserve itself might be developed, the name was changed to Westland Commons, a combination of WESTern and MaryLAND where the land is located. The focus for development became integration of equal parts Institutional, Housing, and Agricultural use. This document is the result of a Summer 2010 Research Assistant position working towards definition of a Master Plan including these goals.
The Willow Reserve is located at the North end of the property, a nature preserve which is heavily wooded and contains a marshy pond and wetlands. The land was purchased decades ago to provide a resting area for migratory birds. As well, the wetlands function as an overflow spot for the Trout Brook storm water management system. The land is owned by City of St. Paul (Public Works), but many different organizations have a stake in any future use of that land, including, but not limited to, the aforementioned Public Works, the Capital Region Watershed District, and the City of St. Paul Department of Parks and Recreation.

Pictures above show several areas within the reserve- forest, clearing, and pond.
Plants on site include:
- clover
- vetch
- mustard
- nettle
- native grasses
- burdock (non-native weed - must be eliminated)

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- clover
- vetch
- mustard
- nettle
- native grasses
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Current Assets
Two community meetings and a survey in April 2009 indicated community support for the area to remain green space.

A community charrette in April 2010 asked two groups of participants to create word and image collages of possibilities for the site. (See below) Urban agriculture was a dominant interest. Senior housing, educational use, and recreation were additional interests.
Loeb Lake Small Area Plan Recommendations (Sections Relevant to Westland Commons)

Housing
2. Develop new housing on the Larson Nursery site along Maryland south of Willow Reserve. Due to its prominent location on Maryland, this site can be redeveloped into owner-occupied townhomes or low-to medium-density condominiums. The development should consider sensitive wetland soil conditions and be non-intrusive to the wetland. A walking path from the development to Willow Reserve would provide a highly desirable amenity.

Willow Reserve
13. Protect the natural environment at Willow Reserve. Preserve it as a habitat for bird and other urban wildlife by improving the pedestrian paths, or providing other non-intrusive equipment for human activities. Preserve the wetland for stormwater retention and surface water filtration.
14. Make Willow Reserve a low-intensity, non-programmed bird and wildlife observation area. Limit pedestrian activities to designated paths. Preserve the habitat and quietness of Willow Reserve.
15. Provide directional signs to Willow Reserve along Maryland, Arundel and Virginia.
16. Provide educational signs about the flora, fauna, geology and ecology of the area.

Park Connections
17. A park and greenspace connection between Marydale Park and Willow Reserve would enhance both amenities. The most logical place to provide this connection would be the triangular area bounded by the railroad tracks, Maryland, and Arundel, which hosts a mix of commercial, industrial, and multiple-family residential buildings. A historic wetland map from 1940s indicates that the Willow Reserve wetland was much bigger than it is today. The public space in this area could include parkland, restored wetland, and/or partially day-lighted stream with water from the storm sewer lines that lead to Willow Reserve (See Recommendation 3 under “Housing”).

St. Paul Zoning Codes

The Westland Commons Area is located in a medium-density multiple-family residential district, designated RM2.

RM2 requirements include:
- 1500 ft² min. lot area per unit, no min. width
- 5 story, 50’ height limit (no limit if zoned RM3)
- Setbacks 25’ front, ½ height side, 25’ rear
- Maximum lot coverage of 35%

If Sparc’s property is approximately 128,675 ft², that results in a maximum possible combined building footprint of 45,000 ft².

Preliminary Break Down:
- Institutional Use 17,000-20,000 ft²
- Housing 25,000-28,000 ft²
- Dedicated Agriculture 42,000-50,000 ft² (83,000 ft² total non-built area, but around 33,000 ft² required for drives, sidewalks, shaded areas, etc.)

Divided by lot:
Smaller lot (34516 ft²) -> 12,000 ft²
Larger lot (94159 ft²) -> 33,000 ft²
Required Objectives
- focus on sustainable development that sets project apart and enables it to succeed in tough market
- enough development on site for Sparc to at least break even
- affordable housing component
- mix of housing/agriculture/institutional partner

Desired Objectives
- institution anchors southwest corner
- development is low consumer and high producer of resources (energy, materials, fully utilize landscape (agriculture, water treatment, housing, education)
- parking is concealed (undercroft) or at least not front & center in project
Rainwater Input to Site
128,500 ft² x 36” average yearly rainfall = 386,025 ft³/year = 2,404,486 gal/year

Domestic Water Needs (see sidebar)
*If all the water arriving onto the site were captured and consumed solely for domestic use, how many residents could it support?*

Average Water Use
69.3 gal/person x 364.25 days = 25,242 gal/year/person
95 residents or 38 households

Employing Conservation Practices
45.2 gal/person x 364.25 days = 16,464 gal/year/person
146 residents or 58 households

*According to a 2006 UN Human Development Report, each person in the US consumes over 100 gallons of water per day. It is unclear if this includes industrial and agricultural uses. At this rate, the site could support less than 66 residents, or 26 households.*

Water Use Statistics

Daily indoor per capita water use is 69.3 gallons. Here is how it breaks down:

<table>
<thead>
<tr>
<th>Use</th>
<th>Gallons per Capita</th>
<th>% Daily Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Showers</td>
<td>11.6</td>
<td>16.8%</td>
</tr>
<tr>
<td>Clothes Washers</td>
<td>15.0</td>
<td>21.7%</td>
</tr>
<tr>
<td>Dishwashers</td>
<td>1.0</td>
<td>1.4%</td>
</tr>
<tr>
<td>Toilets</td>
<td>18.5</td>
<td>26.7%</td>
</tr>
<tr>
<td>Baths</td>
<td>1.2</td>
<td>1.7%</td>
</tr>
<tr>
<td>Leaks</td>
<td>9.5</td>
<td>13.7%</td>
</tr>
<tr>
<td>Faucets</td>
<td>10.9</td>
<td>15.7%</td>
</tr>
<tr>
<td>Other Domestic Uses</td>
<td>1.6</td>
<td>2.2%</td>
</tr>
</tbody>
</table>

By installing more efficient water fixtures and regularly checking for leaks, households can reduce daily per capita water use by about 35% to about 45.2 gallons per day Here’s how it breaks down for households using conservation measures:

<table>
<thead>
<tr>
<th>Use</th>
<th>Gallons per Capita</th>
<th>% Daily Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Showers</td>
<td>8.8</td>
<td>19.5%</td>
</tr>
<tr>
<td>Clothes Washers</td>
<td>10.0</td>
<td>22.1%</td>
</tr>
<tr>
<td>Toilets</td>
<td>8.2</td>
<td>18.0%</td>
</tr>
<tr>
<td>Dishwashers</td>
<td>0.7</td>
<td>1.5%</td>
</tr>
<tr>
<td>Baths</td>
<td>1.2</td>
<td>2.7%</td>
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<tr>
<td>Leaks</td>
<td>4.0</td>
<td>8.8%</td>
</tr>
<tr>
<td>Faucets</td>
<td>10.8</td>
<td>23.9%</td>
</tr>
<tr>
<td>Other Domestic Uses</td>
<td>1.6</td>
<td>3.4%</td>
</tr>
</tbody>
</table>

By utilizing water capturing, conservation, reuse, and filtration systems, can Westland Commons be Water Independent?

Source:
CoHousing Communities

CoHousing communities offer a pedestrian-friendly, high-density yet often agrarian environment similar to visions Sparc expressed for the site. Most CoHousing buildings are 2.5 stories or less, while Sparc may need to build 3.5 stories to achieve the needed amount of units.

Village Cohousing Community, Madison
http://villagecohousingcommunity.com/

Duwamish Cohousing, Seattle
http://www.duwamishcohousing.org/index.html

Puget Ridge Cohousing, Seattle
http://www.pugetridge.net/

Jackson Place Cohousing, Seattle
http://www.seattlecohousing.org/info.htm

EcoVillage at Ithaca
http://ecovillageithaca.org/evi/

Homes face pedestrian-oriented courtyard

Commonhouse with attached Greenhouse

A variety of materials and roof pitches at EcoVillage at Ithaca adds character vs. uniform block

CoHousing Model
Cedar Square Raised Beds
- large 3’ x 3’ planting area
- available in three heights
- ideal for patio salad gardens

existing mature trees incorporated into design
Silverwood Park, St. Anthony, MN (above & below)

undercroft parking enclosed w/garage door
ample bike storage
(student housing in Germany)

amphitheater tucked into hillside

raingardens and other water features filter & slow water’s movement to wetlands

permeable pavement used to decrease runoff

Community Features

ideal for wheelchair-bound gardeners
(pictured above: 2′ x 4′ flat planters)
accessible multi-level gardening
The multifamily units contain four sets of apartments sharing a common stairway, each containing:

- 1 Bed @ 500 ft²
- 2 Bed @ 1000 ft² (back units contain 2)
- 3 Bed @ 1500 ft²

Units could be further split or combined to accommodate extended families or smaller families. Each unit has exposure to southern sun.
Charter School Space Requirements
Based on the curricular needs of a local 7-12 Charter School.

**One Story** (72140 ft²)

<table>
<thead>
<tr>
<th>Room Type</th>
<th>Required Area</th>
<th>Total Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classrooms 18 @ 900 ft²</td>
<td>16200 ft²</td>
<td></td>
</tr>
<tr>
<td>Science Lab 2 @ 1200 ft²</td>
<td>2400 ft²</td>
<td></td>
</tr>
<tr>
<td>Combined Storage</td>
<td>400 ft²</td>
<td></td>
</tr>
<tr>
<td>Computer Lab &amp; Storage</td>
<td>1840 ft²</td>
<td>1840 ft²</td>
</tr>
<tr>
<td>Art</td>
<td>1500 ft²</td>
<td>1500 ft²</td>
</tr>
<tr>
<td>Ceramics</td>
<td>1500 ft²</td>
<td>1500 ft²</td>
</tr>
<tr>
<td>Kiln/Clay/Glazing</td>
<td>500 ft²</td>
<td>500 ft²</td>
</tr>
<tr>
<td>Music Room</td>
<td>2500 ft²</td>
<td>2500 ft²</td>
</tr>
<tr>
<td>Storage</td>
<td>300 ft²</td>
<td>300 ft²</td>
</tr>
<tr>
<td>Recording Studio/Practice</td>
<td>350 ft²</td>
<td>350 ft²</td>
</tr>
<tr>
<td>Office</td>
<td>100 ft²</td>
<td>100 ft²</td>
</tr>
<tr>
<td>Administration/Offices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reception</td>
<td>250 ft²</td>
<td>250 ft²</td>
</tr>
<tr>
<td>Principals</td>
<td>150 ft²</td>
<td>150 ft²</td>
</tr>
<tr>
<td>Secretary</td>
<td>100 ft²</td>
<td>100 ft²</td>
</tr>
<tr>
<td>Conference Room</td>
<td>250 ft²</td>
<td>250 ft²</td>
</tr>
<tr>
<td>Health</td>
<td>700 ft²</td>
<td>700 ft²</td>
</tr>
<tr>
<td>Teacher Workroom</td>
<td>500 ft²</td>
<td>500 ft²</td>
</tr>
<tr>
<td>Storage</td>
<td>300 ft²</td>
<td>300 ft²</td>
</tr>
<tr>
<td>Teacher Offices (50 ft²/staff-3@300)</td>
<td>900 ft²</td>
<td>900 ft²</td>
</tr>
<tr>
<td>Full Service Kitchen</td>
<td>2000 ft²</td>
<td>2000 ft²</td>
</tr>
<tr>
<td>Serving</td>
<td>1500 ft²</td>
<td>1500 ft²</td>
</tr>
<tr>
<td>Storage/Support</td>
<td>2000 ft²</td>
<td>2000 ft²</td>
</tr>
<tr>
<td>Bike Parking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toilets</td>
<td>2000 ft²</td>
<td>2000 ft²</td>
</tr>
<tr>
<td>Custodial</td>
<td>700 ft²</td>
<td>700 ft²</td>
</tr>
<tr>
<td>General Storage</td>
<td>2800 ft²</td>
<td>2800 ft²</td>
</tr>
<tr>
<td>Mechanical/Electrical</td>
<td>6400 ft²</td>
<td>6400 ft²</td>
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<tr>
<td>Circulation</td>
<td>24000 ft²</td>
<td>24000 ft²</td>
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**Optional (10400 ft²)**

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<thead>
<tr>
<th>Room Type</th>
<th>Required Area</th>
<th>Total Area</th>
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</thead>
<tbody>
<tr>
<td>Video Production</td>
<td>400 ft²</td>
<td></td>
</tr>
<tr>
<td>General Shop</td>
<td>3000 ft²</td>
<td></td>
</tr>
<tr>
<td>Fitness/Dance/Acting Studio</td>
<td>3000 ft²</td>
<td></td>
</tr>
<tr>
<td>Weight/Equip. Room</td>
<td>3000 ft²</td>
<td></td>
</tr>
<tr>
<td>Lockers</td>
<td>1000 ft²</td>
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**1.5/2 Stories**

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<tr>
<th>Room Type</th>
<th>Required Area</th>
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<tbody>
<tr>
<td>Cafeteria/Multipurpose</td>
<td>6000-9000 ft²</td>
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</tr>
<tr>
<td>Entrance Lobby</td>
<td>700 ft²</td>
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**Optional**

<table>
<thead>
<tr>
<th>Room Type</th>
<th>Required Area</th>
<th>Total Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Library</td>
<td>2550 ft²</td>
<td></td>
</tr>
<tr>
<td>Greenhouse</td>
<td>as large as possible</td>
<td></td>
</tr>
<tr>
<td>Gymnasium</td>
<td>4000-14000 ft²</td>
<td></td>
</tr>
<tr>
<td>Auditorium or Black Box</td>
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<td></td>
</tr>
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</table>

**Total (not including options)** 90,000 ft²

**Parking** 85 total

<table>
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<tr>
<th>Room Type</th>
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<tbody>
<tr>
<td>Faculty &amp; Staff</td>
<td>30</td>
</tr>
<tr>
<td>25 teachers</td>
<td></td>
</tr>
<tr>
<td>5 admin/support staff</td>
<td></td>
</tr>
<tr>
<td>Students</td>
<td>25</td>
</tr>
<tr>
<td>400-600 students</td>
<td></td>
</tr>
<tr>
<td>200 @ driving age -&gt; 20-30 parking spots</td>
<td></td>
</tr>
<tr>
<td>Residents</td>
<td>30</td>
</tr>
<tr>
<td>30 units</td>
<td></td>
</tr>
</tbody>
</table>

**Funding**

Charter schools receive funds to cover costs for leasing their building, but they cannot use these funds to pay for ownership of a building. In 2004-2005 and as recently as 2008, this amount was the lesser of $1200 per pupil or 90% of the leasing cost.
These schools employ glass curtain walls to create organic curves in the building despite its otherwise rectangular form. They also let in plenty of natural light and give views to the outdoors while providing security. Two-story entry lobbies are full of light and welcoming.
Rosa Parks tried to achieve a “national parks” effect while using modern materials. Lots of windows tie the school to the outdoors. Catwalks connect second story classrooms.
Option A

- **Footprint (35.0%)**: 45,000 ft²
- **School**: 123,000 ft²
- **Senior Housing Only (30 units)**:
  - 1 Bed: 15 @ 600 ft²
  - 1 Bed + Den: 10 @ 800 ft²
  - 2 Bed: 5 @ 1000 ft²
- **3-Story School with Senior Housing above**
  - Includes:
    - gym & exercise facilities
    - multiple performance & rehearsal spaces
    - 24 classrooms (25 students each = 600)
- **Housing (above)**: 26,000 ft²
- **Large-scale Ag**: 35,000 ft²
- **Parking (above)**: 17 & 20
- **Parking (below)**: 68 - 85
- **Total Parking**: 105-122
To include all enough classrooms and support services for 600 students, at least 90,000 ft\(^2\) is required. A gymnasium, fitness center, auditorium, and library would require additional space (see space guidelines on page 20). This option explores what the site could look like if it were sold directly to a school. Senior housing could still be part of the program on top of the building, meeting funding requirements for affordable housing creation.
### Site Plans: Option B

#### Footprint
- **Total Footprint**: 45,000 ft²
- **School**: 27,400 ft²
- **Housing**: 17,600 ft²
- **Large-scale Ag**: 25,000 ft²

#### Total Square Feet: 150,300 ft²

#### Parking
- **Parking (above)**: 15
- **Parking (below)**: 60
- **Parking (multi-plex)**: 40
- **Total Parking**: 115

#### Housing Units
- **Senior Housing (69 units)**
  - **1 Bed**: 36 @ 600 ft²
  - **2 Bed**: 30 @ 750 ft²
  - **3 Bed**: 3 @ 1000 ft²
- **Multiplex Housing (56 units)**
  - **1 Bed**: 16 @ 500 ft²
  - **2 Bed**: 24 @ 1000 ft²
  - **3 Bed**: 16 @ 1500 ft²

#### Additional Amenities
- **First floor offices/community center**
- **3 Stories Senior Housing above**
- **4 Multiplex units**
- **Daycare for 125 children**
- **Office spaces, conference room, classroom**
- **Fitness center**
- **Event space**
This option provides 125 units of housing, a daycare, community facilities, and office space. However, without the school, the demand for parking is incredibly high, and there may be too many people living on the site to maintain a small community feeling. The height of the senior housing/office building could be reduced, diminishing the project’s scale and putting more emphasis on the multiplex housing.
Footprint (35.0%)  
Total Footprint 45,000 ft²  
School 32,000 ft²  
Housing 13,200 ft²  
Large-scale Ag 32,000 ft²  

School 55,600 ft²  
Senior Housing 43,200 ft²  
Multiplex Housing 24,000 ft²  
Total Square Feet 149,000 ft²  

Parking (above) 17  
Parking (below) 68-85  
Parking (multi-plex) 30  
Total Parking 115-132  

Senior Housing (44 units)  
1 Bed 20 @ 600 ft²  
1 Bed + Den 10 @ 720 ft²  
2 Bed 14 @ 900 ft²  

Multiplex Housing (36 units)  
1 Bed 12 @ 500 ft²  
2 Bed 12 @ 1000 ft²  
3 Bed 12 @ 1500 ft²  

2-Story School for 300 students  
2-Story Senior Housing above  
3 Multiplex units  
Includes:  
- science labs & full kitchen  
- performance & rehearsal spaces  
- 12 classrooms (25 students each = 600)
An issue with placing a school AND housing on the site is that if the school eventually needs to expand, it will have no where to do so and would need to move. Best practices in school design suggest that a school is built on enough land to allow for future expansion. One way of addressing this issue is including senior housing on the upper floors of the school, with the option of the school eventually taking over the senior housing for classroom space. This would require a leasing situation for the senior housing rather than purchasing of condos. Another option would be to build the multifamily housing units using prefabricated modules. They would be costly to move, but at least they could be reused.
Web Resources

Sustainable Sites Initiative
http://www.sustainablesites.org/

Living Machine installers
www.livingmachines.com/

Permaculture
www.permaculture.org/

Plants for a Future Database
http://www.ibiblio.org/pfaf/D_search.html

Architecture Firms
McCcamant-Durrett (The CoHousing Company)
http://www.mccamant-durrett.com/index.cfm
Kraus Fitch Architects
http://www.krausfitch.com/

Minnesota Charter School Handbook
http://www.centerforschoolchange.org/mn-charter-school-handbook/facilities.html#law

References

Het Meesterwerk
30 apartments above primary school p. 222


Previously developed plans which were unable to be implemented due to the recession. 36 units.
Quick analysis of site plan possibilities with use of weeHouse modules.
The following contains the highlights from the work of seven participating groups of students, faculty, & design professionals.

Greenlight Charrette
Guiding Principles

Development fosters the transportation of people, energy, waste, commodities and ideas in, out, and through the community. It works to eliminate “waste” and instead looks at secondary and tertiary uses of all resources.

Energy Optimization – Efficient use of natural resources
The Mix – Flexibility in use of the site
Agro-Dwelling – Community using land as a resource

“urban density of self subsistence”

COMMUNITY RELEVANCE: Be locally appropriate; build on local strengths, needs, and desires
STEWARDSHIP: Respecting and building on local resources (history, culture, ecology)
GO BEYOND ZERO ENERGY AND CARBON NEUTRAL: Be a net exporter of energy, clean water, clean air, bio-recycling
DESIGN FOR ALL SPECIES: Design for the wider ecological community, focusing on maximum diversity (x2)
INTEGRATION: Design across scales and ecological issues and topics
Beyond Green
Integrated Sustainability
Proposal for the Willow Reserve

Sparc's Project Objectives given to participants.
Programmatic Components

Housing
- Diversity of sizes and types (mixed arrangement)
- Individual Mixed Income Family Units
- 80% Affordable, 20% Market
- Multi-family
- Family courtyard housing
- Intergenerational Housing
- Live/work – street visibility
- Studio
- Garden Family Units
- Larger, mixed use building
- Townhomes

Growing Plants
- Community gardens (x2)
- Green wall gardens – can support affordable construction using standard design materials such as block walls
- Greenhouse This space will incorporate multiple flows, both in and out. It connects people to the land and the community.

Growing People
- Café/Teaching Kitchen
- Educational Outreach/ and observation - wetlands
- Specialized education / vocational training facility to teach based on applied technologies of the site (aka apprenticeship) x3
- Educational entertainment shared, but separate

Growing Community
- Intergenerational play
- Community Center – A place for people to gather and educate, along with a shared workshop for bicycles and other hobbies.

Livelihood
- Commercial space within development for hospice care, chronic rehabilitation based on contact with nature.
- Residents work in exchange for a place to live
- Community produces a product (CSA, Art, food product)
Greenlight Charrette

PREVIOUS WORK

- Regional connections
- Create ecological links from Como to Trilium Park
- Ecovillage “seeded” thru the community
Building Components

Passive Design— reducing active energy
  Orientation, massing, Passive House Standards
  http://www.passiv.de/07_eng/index_e.html
  http://www.passivehouse.us/passiveHouse/PHIUSHome.html

Energy Production & Management
  Incorporate active strategy as needed (solar, geothermal, wind as energy co-operative)
  Renewable electric (PV) and daylighting
  District Systems for site buildings & energy efficiency (x3)
  District Systems for Neighborhood (x2)
    Geothermal well field under restored wetland provides district level energy
      3 tons/family
      50 to 200 year life expectancy
      1 to 20 year payback for large scale system

Integrated Systems
  Greywater treatment
  Built in “Living Machine” waste treatment system (x2)

Site Strategies
  Control and utilize storm-water flows for site use (x3)
  Include SPARC site and Willow Reserve (15+ acres)
  Balance use of land (agriculture/buildings) with natural environment-
    connect with Willow Reserve (x3)
  Increase density at appropriate scales (4 story max using site topography)

Pedestrian Priority (x2)
  Activate street edge with people program & activities
  Promote pedestrian scale materials and quality
  Pedestrians invited through the site by bringing nature from Willow Reserve
    toward the street: “green corridors.”

Parking
  Communal Parking: underground and/or solar panel shaded lot.
  Hidden Garages (x2)

Housing
  Private balconies conducive to gardening.
  Innovative designs to reduce energy consumption.

Materials
  Natural materials, age gracefully, develop character (wood, concrete)
  Affordable combinations (CMU block hidden by green walls/gardens)
SOLAR COMMUNITY
Rolf Disch
Freiburg, Germany

ISSUES
• ZED
• Passive solar with active systems
• Mixed use; commercial and retail on north-south street; solar community behind on east-west axis

Performance Profile
• Total annual building energy consumption: estimated -2.02 kBtu/ft2 [-6.4 kWh/m2]
• Total annual on-site energy produced: estimated 17.6 kBtu/ft2
• Size of photovoltaic system: 39.6 kW grid-tied photovoltaic array supplies 61,250 kWh
• Size of solar thermal system: solar hot water system, size not available
• Carbon dioxide emissions: -4.6 metric tons of CO2; 45.3 metric tons of carbon dioxide emissions are outweighed by 49.9 metric tons of carbon dioxide offsets
Greenlight Charrette
Site Carrying Capacity = Density

- Many Layers of Use
- Energy, Water, Waste, Employment & Economic capacity determine site density
- Long Term Building Flexibility (moveable, portable)
Greenlight Charrette
Greenlight Charrette
**BENEFITS**
- Minimal roads within development
- Water feature/tree in center provides visual focus and allows access
- Buildings front Maryland

**DRAWBACKS**
- Large surface parking
- Low density

Greenlight Site Plan A
BENEFITS
Strong front on Maryland, yet open to road
Agriculture interspersed with dwelling in open courtyards
Low density throughout

DRAWBACKS
Many long driveways required
Drives & buildings near Willow Reserve
Requires two largest trees (cottonwood & maple) to be cut down

Greenlight Site Plan B
BENEFITS
Housing clusters form pedestrian courtyard sheltered from road, yet receiving adequate summer sun and open to community
Institution separated from housing by trees
Concealed access to underground parking (40-48 spots)

DRAWBACKS
Long driveways required
Drives & buildings near Willow Reserve
Requires two largest trees (cottonwood & maple) to be cut down

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<tr>
<th>Footprint</th>
<th>Square Footage</th>
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<tr>
<td>Total</td>
<td>42049</td>
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<tr>
<td>Institution</td>
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<tr>
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<td>20250</td>
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<tr>
<td>Large-scale Ag</td>
<td>35500</td>
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</tbody>
</table>

| Total       | 151903          |
| Institution | 91153           |
| Housing     | 60750           |
**PREVIOUS WORK**

**Site Plan 1B**

**Footprint**
- Total: 41734
- Institution: 21799
- Housing: 19935
- Large-scale Ag: 35000

**Square Footage**
- Total: 149090
- Institution: 91153
- Housing: 57937

**BENEFITS**
- Greenhouse/atrium at center of townhomes
- Strong street front opens to allow access
- Institution separated from housing by trees
- Concealed access to underground parking (40-48 spots)

**DRAWBACKS**
- Minimized space for agriculture- separated into smaller chunks
- Large driveway on East
**Site Plan 1C**

**BENEFITS**
- Large unobstructed spaces left for agriculture
- Connected building mass combines institution and dwelling
- Passive Plex conceals large building mass
- Concealed access to underground parking

**DRAWBACKS**
- Building may appear overpowering to neighborhood/rest of site
- Dissimilar building typologies in close proximity
- Most original trees torn down

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<th>Footprint</th>
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<th>Square Footage</th>
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<td>Large-scale Ag</td>
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PREVIOUS WORK

Site Plan 2A

+ trees preserved and form center of two courtyards
+ agricultural space maximized
- housing minimized

permeable pavement circular drive
surrounding tree/native plantings
PREVIOUS WORK

Site Plan 2B

+ shared parking joins programs and could be used for play/farmers' markets
+ housing maximized
- parking at center of development (celebrating cars too much?)

amphitheater built into side of hill

parking could be sheltered but not inclosed (would this work with MN climate? these are passive standard apartments in Germany)
Site Plan 2C
+ agriculture visible to community but framed by buildings
+ several distinct courtyards created which flow into one another
- limited access to Reserve (privacy increases with distance from street)

Site Plan 2D
same as plan A, but with circular drive instead of parking lot- more visually engaging and welcoming, but is too much function lost?