

Giaudrone Middle School

Photo: NAC/Benjamin Benschneider



FLOOR SPACE: 124,488 ft²
BUDGET: \$ 19 million (\$152.63/ft²)
BUILDING POPULATION: 900+ students, & staff
CONSTRUCTION DATES: August 22, 2003
OWNER: Tacoma School District #10
ARCHITECT: Northwest Architectural Company
GENERAL CONTRACTOR: Garco Construction
CONSTRUCTION MANAGER: Heery International, Inc.
STRUCTURAL ENGINEERS: Coughlin Porter Lundeen
MECHANICAL ENGINEERS & ENERGY CONSULTANTS: Hargis Engineers
ELECTRICAL ENGINEERS: NAC Engineering
LIGHTING CONSULTANTS: Seattle Lighting Design Lab
CIVIL ENGINEERS: Sitts & Hill Engineers, Inc
LANDSCAPE ARCHITECTS: Weisman Design Group Inc.

PROJECT NOTES

SITE AND WATER

- **Neighborhood School:** Serves the local urban neighborhood area, with the majority of the student population living within a 2-mile radius, creating a neighborhood center and potentially reducing vehicle emissions.
- **Site Patterning:** Site layout and massing of the building are arranged for optimal daylighting, solar access, and acoustical buffering. Classroom houses are sited towards the quiet residential neighborhood with the large masses of gymnasium and commons sited to act as an acoustical buffer from the adjacent interstate highway.
- **Stormwater:** Biofiltration swales and treatment devices improve water quality and reduce off-site stormwater flow.

ENERGY AND ATMOSPHERE

- **Energy Modeling:** Energy modeling demonstrates an energy savings of 35% versus a similar code-compliant building.
- **Performance Optimization:** The boiler system design utilizes two high efficient boilers to run lead/lag with primary and secondary pumping systems. The physical set-up coupled with a computerized boiler control optimizes the operation of the system -- saving money. Occupancy sensors and CO₂ sensors are utilized to limit operation and turn off unnecessary outside air to unoccupied or lightly occupied spaces.
- **Integrated Lighting Controls:** Classroom electric lights respond automatically to available natural light through the use of photosensors and dimming controls, maintaining energy consumption for lighting that is in proportion to the daylight.

MATERIALS AND RESOURCES

- **Waste as Resource:** Diverted 80% of the demolished material from the landfill and reduced import of off-site fill by using a Comprehensive Waste Management Plan.
- **Material Selection:** Installed materials and systems with recycled content: structural steel frame and decking, light gage metal framing/ gypsum wallboard systems, aluminum windows, and acoustical ceiling panel systems.
- **Resource Efficiency:** Specified materials and finishes that require minimal maintenance with a long service life. The structure within larger gathering spaces was left exposed and used as the finished floor and ceiling.

INDOOR ENVIRONMENTAL QUALITY

- **Natural Light:** Daylight distribution is achieved through the use of exterior shading devices, interior light shelves, and high performance glazing. The larger spaces utilize a combination of clerestory and monitor windows to bring daylight deep into the space.
- **Environmental Control:** Temperature and lighting is separately controlled for each classroom. Roll-down shades allow each space to be darkened as appropriate for the activity. Operable windows are provided in every classroom.
- **Acoustical Comfort:** Classroom houses are separated from the more active spaces by the main interior circulation 'street'. Acoustical reinforcement systems in the classrooms amplify instructor's voice for improved communication and information diffusion.

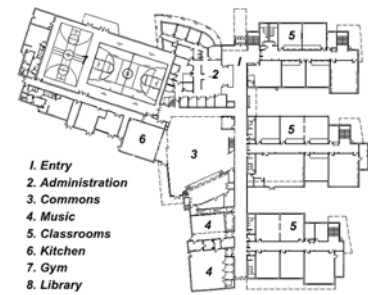
BUILDING SMART

Giaudrone Middle School is a new 850 student facility built on an existing school site. The goal was to create a higher density facility on a restricted site between a low scale urban residential neighborhood and a busy interstate highway. Design Charrettes generated ideas and goals for the scope of the project.

Optimizing natural daylighting was identified as a major goal for the project. Not only was this to increase the academic performance of the students, but also to create better working environments, reduce the cost of energy consumption, and provide a better quality of light. Working with the Lighting Design Lab, several typical classroom window models were tested for light levels, penetration, and glare control throughout a solar year.

Another goal was to increase the density of the building to allow a larger student load without adding substantially to the impervious surfaces of the site. By using a compact building lay-out, which sits on the approximate location of the old building, the site could stay open and existing fields expanded and improved. Utilizing existing topography and balancing the cut and fill, off site import/export was minimized, and a new softball field was added beside the expanded track and football field.

Construction and demolition recycling programs were a goal for the project from the start. Nearly all the existing asphalt removed was ground up and re-used as a subgrade material for new paved areas. All demolition and construction debris was collected, and 80% was recycled.



Lower Floor Plan



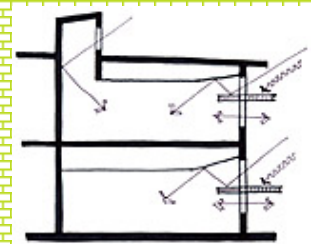
Acoustical considerations were an important goal for both the site and building design. Because of its close proximity to a busy interstate highway, acoustical studies were done to monitor sound levels across the site. A cast-in-place sound wall was incorporated into the design to bring the decibel levels at the play fields to a safe and unobtrusive level. On the interior, acoustical performance was enhanced with listening assistance equipment in the classrooms, gym, music, and library. Acoustical curtains, batts, panels and isolated ceiling systems acoustically separate busier noisy areas like the commons from the more academic class areas.



A light scoop washes a science classroom white board with natural light. Narrow bands of florescent lighting above the school's white boards allow them to be seen even in a darkened classroom.



sun-breaks attached to the south-facing windows, which block direct sunlight from entering the classrooms while reflecting indirect light onto the room's ceilings to provide natural illumination.



One of Giaudrone Middle School's classroom wings. Note the brise-soleil or

Acknowledgements: The information used in this case study was provided by Northwest Architectural Company, Benjamin Benschneider, Photographer, and the Tacoma School District web site.