CAPITAN SECONDARY SCHOOL

SCHEMATIC DESIGN BOOK | SEPTEMBER 26, 2014

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table of contents

INTRODUCTION

project team and committee

PROJECT TEAM

Capitan Municipal Schools

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- Graeme Means - Civil Engineer

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- Abbas Shirian - Mechanical Engineer
- Ilir Mesiti - Mechanical Engineer
- Scott Surdahl - Plumbing Engineer
- Larry Adkins - Electrical Engineer
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- Matt Mulligan - Chief Operating Officer
- Martin Lovato - Project Executive
- James Salsbury - Estimator/Pre-Construction Services Manager
- Chris Jiron - BIM Coordination

PROJECT NARRATIVES

architectural narrative

PROJECT SUMMARY

Capitan's new Secondary School will accommodate 290 students in grades 6-12. The two story building will include administration and associated support space, classrooms and a Media Center. No changes have been made to the previously submitted program.

This schematic design is based on the following:

- Compliance with PSFA's Adequacy Standards
- Adherence to the key concepts of Programming
- Input from Capitan staff and the Steering Committee on key functional relationships in the site and building layout

Included in this submittal are schematic plans that place the programmed spaces into a specific building plan design that efficiently meets current needs and provides flexibility for future changes. Also included are schematic elevations and renderings that indicate glazing size. Narratives from each design discipline describe the basis of design and preliminary thoughts on organization, materials, and systems in more detail.

BUILDING ORGANIZATION

The Secondary School is an efficient, two story classroom building with the single a story administration at the west end to provide supervision over the drop off area, main student parking lot, and campus courtyard. Grades 6-8 are located on the second level and grades 9-12 are located on the ground level. The main stair and elevator are close to the main entrance to minimize the interaction between the upper and lower grades as the middle schoolers head to their classes on the second floor. Location of the upper grades on the ground floor allows students the freedom and flexibility needed for their schedule which has some students attending classes at other facilities on campus. There are stacking Special Ed half size classrooms located near the administration, adjacent to Special Ed Director's office, IEP conference room, and Nurse. The Media Center is located at the heart of the school, surrounded by classrooms and connecting both floor levels. There are great views into learning within the building and out to the campus courtyard to the north and athletic field to the south. The main Science Lab is adjacent to the dedicated high school science classroom. Both spaces have direct access to a Prep Room located in between them. Support space and staff resources are also centrally located with a work room, restroom, and janitor closet stacking on both floors.

PROJECT GOALS

A number of goals were established by the Steering Committee. The Schematic Design responds directly to the key project goals and are detailed below:

Technology-rich; "full campus integration"
The classroom design concept follows the SCALE UP classroom model which is heavily focused on technology integration into instruction. The Media Center will be designed as a place for students to "plug in." The design team, technology designer, and district will be sitting to discuss the technology needs for this first phase in detail as well as establishing a plan for the future phases of work.

Easy to maintain and operate
Capitan's Secondary School has an efficient layout with support space such as storage and janitor closets centrally located for ease of maintenance and operation. The design team and client will build on the existing information gathered to develop the Owner Project Requirements (OPR) Document to guide finish and system selection as well as develop district standards. Once the HVAC system is selected, the mechanical space will be located to provide easy access for maintenance.

Controlled access; secure and safe
The administration is located to offer supervision over the surrounding site and to act as a point of control. After classes commence, visitors will be guided through the administration before having access to the rest of the building.

Open - "Education on display"
The Media Center is an open space located at the heart of the school connecting the middle and high school floors. It is surrounded by classroom space and allows for open circulation through it. There are great views into and out of the space to link the interior with the exterior environment. The Science Lab and classroom spaces will have glazing to also showcase learning in action.

Natural light
Natural light is brought into all regularly occupied spaces, especially the Classrooms and Media Center. The building is sited with an optimal orientation to allow for easier control of heat gain and glare into these spaces. Strategies to shade the glazed areas are being studied. Sun shades will strategically be used in addition

to the large overhangs.

Flexibility - education spaces and infrastructure
Spaces are designed to be flexible to support a variety of instruction methods and other functions. The Steering Committee agree that furniture is key part of this. The building is organized to "stack" spaces and utilities as much as possible to support efficient systems and structure.

Warm and inviting, non-institutional
The main entry is welcoming and includes a waiting/reception area with seating and easy access to the conference room and offices. Interior spaces are bright and have a strong connection to the exterior. Finishes and landscaping will also have a warm, inviting feel.

Collaboration space
Grade levels are grouped on separate floor levels and surround the open Media Center located at the center of each corridor. The connection of the neighboring classrooms encourages collaboration. The SCALE UP classroom design concept is heavily focused on collaboration with the use of "huddle" boards for break out discussions. Flexible furniture will allow for students to gather in groups and work together. Outdoor learning spaces will also encourage collaboration among students and staff.

Open feel, but cozy
All spaces are designed to be open with the use of glazing at the exterior and within interior spaces. The Media Center is open connecting the first and second floor, but allows for dedicated space for the upper and lower grades. Ceilings and suspended elements will be designed at the appropriate height for the scale of the space and occupant. Furniture and finishes will also have a cozy feel.

PRELIMINARY CODE ANALYSIS

Use and Occupancy Classification: Educational
Construction Type: IIB
Fire Protection: NFPA 13 sprinkler system assumed

Egress Notes:

- Exit Access travel distance permitted: 250'-0" (assumes sprinkler system)
- Corridor fire resistance rating required: 0-hr (assumes sprinkler system)
- Minimum Building Exits required: 2 (165 students plus faculty and staff)

Accessibility Notes:

- Existing conditions will be made accessible to meet ADA requirements

INTERIOR DESIGN

The interior design of the new school will bring together interior architecture, finishes and furniture to provide a comprehensive environment, supporting a culture of trust, which is both flexible and fun. The interior finishes will be a combination of environmentally-responsible materials that achieve a learning environment defined by its warmth, comfort, durability, long-life, and ease of maintenance.

The spaces will be designed to promote a university-like, career-focused atmosphere. This theme will be reinforced through material selections and the design of large open work spaces, accompanied with intimate, conference space for students. Constructed elements will provide storage and allow teachers to maximize space in open areas. Varying colors and finishes will convey encouragement for collaboration among students and faculty alike, while also aiding in the functionality of spaces for quiet study. School pride will also be a big part of the design.

Furniture will be entirely mobile, so that students and staff can create personal environments designed for various learning styles and projects.

Finish materials and casework for each space will be developed during the next phase of design, based on input received from staff. The interior finishes will work cohesively with all other design decisions for an overall dynamic, engaging environment for learning, socialization, and well-being.

SITE DESIGN

The goals for this first phase will be to incorporate a new site design that enhances circulation and outdoor spaces and improves adjacent existing conditions as much as possible while keeping in mind future planned phases of work. The design will aim to minimize disruption of existing facilities, students and staff. Area outside of the new building will be designed to provide learning opportunities for students and have a close connection to the interior space especially the are around the Media Center. The reconfigured bus loop will allow for a more open entry to the Secondary School and adjacent location for the Elementary School.

The siting of the new building will require relocation of the existing playground equipment to the center of campus for kindergarten and elementary students. All site design will tie in with the Master Drainage plan.

LANDSCAPE

As the first of multiple future phases for the Capitan Municipal School campus, this landscape design will create the momentum for further campus improvements while maintaining the welcoming atmosphere. Landscape improvements will concentrate on making the gathering spaces fresh and fun for students to learn and socialize while being easy to maintain. The central entry plaza will be planted with native and naturalized species of xeric plants that will not lift pavements with their roots. Slopes will be stabilized with rock mulches and native grass seeding to keep erosion to a minimum.

PROJECT NARRATIVES

civil narrative

GENERAL

The existing K-12 campus is located at the southeast corner of NM 380 and South Forest Ave. NM 48 is the south boundary of the campus and Tiger Drive is the west boundary. There are vehicular access points from all four surrounding streets. The majority of the site is developed with permanent buildings with supporting paved parking, circulation, playground and drainage site improvements.

GRADING AND DRAINAGE

The site slopes from west to east with varying grades. The western end of the site has relatively steep grades often exceeding 5%, and the eastern end of the site has minimal slope, often less than 1%. The site is not impacted by offsite upstream runoff that is contained and diverted to the north in Tiger Drive. Site runoff is handled internally with a mixture of sheet and concentrated surface runoff draining into private storm drain systems that discharges to public right-of-way. The site can be divided into three existing drainage basins. The north basin generally includes the existing High School Building, the Library, the Gymnasium, and a portion of the Multi-Purpose Building. This basin drains to the east and north to the intersection of NM 380 and South Forest Ave where public storm drain culverts and ditches convey runoff to the east. The southern basin includes school property west of and south of the football field, and drains to the east and south to a ditch and storm drain system in NM 48. The remaining center basin is the largest basin and it includes the Middle School, the large parking lot and drop-off area west of the Middle School, the central courtyard, the football field, the Field House, the Vocational Building, the Admin Building, a large portion of the Elementary School Building, and the play areas. The center basin drains to an internal storm drain that outlets to the surface on the east side of the football field and to South Forest Ave where it continues south to a low spot at the intersection of 4th Street where runoff turns to the east through the downstream residential area.

The existing site storm drains are generally undersized for their contributing areas, and in need of sediment removal and repair. The storm drains do not currently convey runoff efficiently off the site and result in backups and poor drainage conditions throughout the campus. Proposed development will maintain the existing drainage concept with three basins draining to the three historic outfalls, and will construct new storm drains to more efficiently convey the runoff offsite. Existing storm drains serving the central courtyard and the parking and drop-off area currently run through the proposed footprint of the Secondary School and will be replaced and re-routed. In conjunction with this phase, an interim detention basin will be constructed to control and attenuate the peak rate of stormwater runoff draining to South Forest and the downstream neighborhood. This basin will be designed to retain less than 18" of runoff and will be fenced. In the future, this pond can be eliminated if a new master planned storm drain is constructed to divert runoff from the parking lot and drop-off area to the northeast to NM 380. This will reduce the amount of stormwater draining the South Forest east of the football field and allow reclamation of this interim detention area.

Low Impact Development (LID) techniques will be employed for storm water quality and quantity purposes. Specifically, landscaped areas will be depressed to capture and filter stormwater runoff. Paved areas will be directed to landscaped areas. Infiltration will be promoted wherever possible. When appropriate, portions of the existing storm drain network will be reconstructed or replaced with new storm drains serving the reconstructed areas. When possible, runoff will be conveyed by gravity as surface drainage across paved areas to minimize the need for storm drains.

Building roof runoff generally will not be allowed to drain onto paved surfaces immediately surrounding the buildings to eliminate the related hazards and conflicts with wet or frozen pavement and pedestrian uses. This will also reduce concrete wear and staining associated with nuisance flows and trickles related to surface discharge of roof runoff. The ground will be sloped away from the building to encourage rapid drainage away from the structure.

No improvements are proposed to the southern basin.

FIRE PROTECTION, DOMESTIC WATER & SANITARY SEWER

The site utility design for this project will focus on efficiency by making continued use of existing improvements to the maximum extent feasible with the goal of minimizing new improvements when it can be demonstrated that existing facilities are capable of handling the site needs and do not conflict with the new construction. The site is currently served by the public municipal supply, and there are metered service connections to existing public lines at multiple locations, including one from South Forest Drive, one from Tiger Drive, one from NM 380, and two from a pubic line that crosses the middle of the site from east to west. It is anticipated that this proposed building can tap into the existing system at a location in close proximity to the project.

The new Secondary School will require a new fire sprinkler system. As demonstrated by pressure and flow tests, the existing public system does not have adequate capacity for fire protection. The

Village is constructing a new public water line project that will provide increased pressure and capacity. As part of this project, a new fire protection line will tap into the new system. A new backflow preventer will be located in a heated enclosure outside the building to prevent backflow and backsiphonage into the public system.

The site is currently served by an existing internal sanitary sewer network that runs throughout the site with at least two discharge points to the public main in South Forest Drive to the east. It is anticipated that the proposed improvements will make use of this existing network with new connections to the internal system as required. An existing site sanitary sewer line crosses the proposed footprint and will require relocation.

TRAFFIC AND CIRCULATION

This project does not include modifications to the existing site parking, or any significant changes to existing patterns for drop-off, circulation, or emergency access improvements. A possible option is being explored that would reconstruct a portion of the bus drop-off lane farther to the west of the proposed building, thereby providing more room for construction and a larger open area. The benefit needs to be weighed against the costs associated with reconstruction, including utility relocations and additional ADA access improvements.

PROJECT NARRATIVES

structural narrative

CODE AND DESIGN CRITERIA

The building structure on this project will be designed to satisfy all of the applicable criteria and parameters contained within the 2009 International Building Code and applicable local provisions. The following design loads and criteria shall apply:

Occupancy Category:	III
Basic Wind Speed:	90 mph
Wind Exposure:	C
Importance Factor (wind):	1.15
Seismic Design Category:	B
Importance Factor (seismic):	1.25
Soil Site Class:	C
Frost Depth:	24 inches
Roof Live Load:	30 psf (non-reducible)
Roof Snow Load:	30 psf (non-reducible)
Suspended Equipment:	4 psf allowance plus actual weight of heavy equipment
Allowable Soil Bearing:	20,000 psf at properly constructed piers

DESCRIPTION OF STRUCTURE

The project will consist of a new, two-story school building and grounds. There will be high school facilities on the ground floor and middle school facilities on the second floor.

ROOF FRAMING

The roof framing for the building will consist of metal roof deck supported by a combination of steel bar joists and steel wide flange beams supported on wide flange girders and steel tube columns. The steel roof framing will be sloped for drainage.

FLOOR FRAMING

The second floor area will be constructed of a reinforced concrete topping slab over galvanized metal decking supported by composite wide flange steel beams and girders on steel tube columns.

WALL FRAMING

The typical exterior wall system will be cold-formed structural steel stud curtain wall framing with nonstructural sheathing and architectural wall finish. Walls will be supported by the foundation and braced by the roof and floor framing.

LATERAL FORCE RESISTING SYSTEM

The primary vertical components of the lateral force resisting system are braced frames consisting of roof and floor beams or girders, tube steel columns, and tube steel diagonal braces. The primary horizontal components of the lateral force resisting system are the metal deck roof diaphragms and metal deck/concrete floor slabs. The horizontal elements will collect the lateral loads due to wind and seismic forces and will distribute them into the braced frames which will transfer them to the foundation.

GROUND FLOOR CONSTRUCTION

Interior ground floor construction will be concrete slabs on ground reinforced with steel reinforcing bars. Slabs will bear directly on a 10 mil minimum thickness vapor retarder over a layer of engineered fill.

FOUNDATION SYSTEM

The foundation will consist of reinforced concrete grade beams and pile caps supported by reinforced concrete drilled piers. Piers will be a minimum of 35 feet long and will be embedded at least 5 feet into the sandstone subgrade.

PROJECT NARRATIVES

mechanical / electrical / plumbing

GENERAL

The purpose of this narrative is to recap the design approach and general recommendations for this facility.

This project is a new 27,000 square-feet secondary school including classrooms, media center, science labs, administration offices and other supporting areas.

The facility will contain special accommodations to serve the needs of handicapped students as well as faculty and staff. The individual systems will be elaborated upon in respective sections below.

The concept of design in most systems is based on energy efficiency and simplicity of maintenance.

The project will be designed in compliance with Section 15-3-36, Energy Efficiency Standards for Public Buildings, NMSA 1978 and shall qualify for the Environmental Protection Agency's (EPA) ENERGY STAR.

References

The mechanical and electrical system design will adhere to the following codes to ensure safe and proper installation of the system.

- Uniform Mechanical Code (UMC - Latest Edition)
- Uniform Plumbing Code (UPC - Latest Edition)
- National Electrical Code (NEC - Latest Edition)
- International Building Code (IBC - Latest Edition)
- National Fire Protection Association (NFPA - Latest Edition)
- American Society of Heating, Refrigeration, Air Conditioning Engineers (ASHRAE)
- Americans with Disabilities Act (ADA)
- National Fire Protection Code & Life Safety NFPA
- New Mexico Public School Facilities Authority (PSFA) Design Guidelines
- Capitan School District Design Guidelines

Design Conditions

Climatic:

- Location: Capitan, New Mexico
- Elevation: 6,500 feet above sea level
- Winter: 99.6% Design Dry-bulb: 2° F
- Summer: 0.4% Design Dry-bulb/Wet-bulb: 91° F/59° F

Indoor Design Conditions

Space	Winter (°F)	Summer (°F)	Relative Humidity (RH%)
General	70	75	N/A
Classrooms	70	75	N/A
Mech/Elec Room	55	90	N/A
IT/Comp Room	68	75	N/A

Envelope Construction

See Architectural.

Interior Loads

The individual space loads are currently not well defined. Heating and cooling load calculations will be based on engineering judgment and similar projects until the loads are better understood. People: 250 British thermal units per hour (Btu/hr) (sensible), 200 Btu/hr (latent). Space occupancy will be based on architectural furniture plans and ASHRAE standards where no information is available.

Lights: 1.0 Watts per ft^2 average
Equipment: 0.35 Watts per ft^2 average

Ventilating and Indoor Air Quality Strategies

ASHRAE Standard 62.1-2007 to meet ventilation and indoor air quality requirements.

Filters capable of 60% or greater duct spot efficiency.

Noise Requirements

Standard design per ASHRAE for normally occupied areas.

MECHANICAL HVAC SYSTEMS

The mechanical HVAC system has not yet been determined. Four systems are being evaluated in a Life Cycle Cost Analysis (LCCA). Refer to LCCA for additional information.

The four (4) alternative systems consist of:

1. Four Pipe Fan Coil with Energy Recovery Unit, Air Cooled Chiller & Hot Water Boilers
2. Active Chilled Beams with Air Cooled Chiller, Hot Water boilers and Energy Recovery Unit
3. Ground Coupled Heat Pump (GCHP) System with Energy Recovery Unit
4. Variable Refrigerant Flow (VRF) System with Energy Recovery Unit

FIRE PROTECTION SYSTEM

Interior System

A new wet pipe fire sprinkler system will be designed to protect the entire classroom building. The fire alarm valve assembly will be located within the mechanical room. Each room shall receive protection from this system. The Siamese fire department inlet location will fall within the prescribed 100' maximum separation from a fire hydrant. A post indicator valve and reduced pressure backflow preventer (BFP) will be located on-site as indicated on the Civil Engineers drawings. A heated enclosure will protect the BFP from freezing conditions.

Compliance with applicable NFPA and IBC Codes will be integrated into the system design. No allowances will be made for future expansion unless otherwise directed by the District.

Exterior System

Refer to the Civil Engineer's drawings and narrative.

PLUMBING SYSTEMS

Storm Drainage System

A hard-piped, primary and secondary storm water collection system will be provided for the building. The primary system will connect to a sub-surface collection system designed by the Civil Engineer. The secondary systems will discharge onto grade through downspout nozzles as an indicator of blockage of the primary system. Bi-functional roof drains will be used throughout the building. This type of drain combines the primary and secondary drains into a single roof penetration thereby minimizing potential leak paths.

Sanitary Drainage System

The sanitary sewer system will be designed around a conventional gravity-type system. Waste and vent systems may utilize PVC in direct-bury installations and insulated PVC or service-weight cast iron on above-grade installations. All Science Room waste streams from the sinks, hoods, and floor drains will be directed to the neutralizer. All system connections will be trapped and vented with vents routed to termination at the roof level in as few locations and as remote from air intakes as is practicable.

Wall- and floor cleanouts will be incorporated into the design to address maintenance concerns.

Plumbing Fixtures

All plumbing fixtures will be specified using commercial quality materials and trim and will be fully compliant with all applicable accessibility requirements and conservation standards. Water closets, urinals, and lavatories will be wall hung to ease housekeeping tasks unless otherwise required by the District. Lavatories will follow District standards and be specified around a multi-station wash fountain if deemed appropriate by the Architect. Flush valves and faucets will be electronically operated and of ultra-low flow designs. Service sinks will be specified to be floor mounted. Floor drains with trap guards (non-water based trap seal maintenance devices) and loose key hose bibs will be installed in each restroom to facilitate floor cleaning. Electric water coolers will be installed.

Potable Water Systems

The domestic cold water line will originate at the nearest adequately sized service line. Domestic hot water will be generated by a new gas-fired, storage type water heater located within the mechanical room. A recirculating domestic hot water loop will be routed in such a manner as to reduce to the degree possible the time delay in delivering hot water to each fixture.

Due to the elevated levels of hardness present in the municipal water supply, a water softener will be incorporated into the design to supply softened water to the water heater and the supply side of the thermostatic mixing assemblies. The District will be conferred with to determine their desire to soften all incoming domestic cold water.

The Science Rooms may, depending upon District preferences, include panic hardware (emergency shut-off actuator, solenoid valves, wiring, and hardware) that will control the flow of water to all non-emergency faucets. This need will be confirmed during the design phase.

Natural Gas System

The on-site natural gas systems will be provided as required. The interior systems will be designed around low pressure distribution with service routed to each point of connection. No provisions will be made to accommodate future expansion unless otherwise directed by the District and Architect. Gas pressure regulators will be located to minimize concerns of gas reintrainment through doors, operable windows, and air intakes.

The Science Rooms may, depending upon District preferences, include panic hardware (emergency shut-off actuator, solenoid valves, wiring, and hardware) that will control the flow of gas to all gas cocks. This need will be confirmed during the design phase.

ELECTRICAL SYSTEMS

The existing electrical service is not adequately sized and will be replaced. The building renovation will be fed from a new distribution switchboard location TBD containing the service entrance. This new service may feed other buildings on that end of the campus.

Applicable Standards

- National Fire Protection Association (NFPA) Codes: NFPA 70 (National Electrical Code), 72, 101, 780
- New Mexico Electrical Code (NEC latest edition)
- International Building Code (IBC latest edition)
- Uniform Fire Code (UFC)
- Illuminating Engineering Society of North America (IESNA) Handbook
- Uniform Federal Accessibility Standards (UFAS)
- New Mexico Night Skies Protection Act
- International Energy Conservation Code (latest edition)
- Capitan Independent Schools -- District Design Guidlines

Preliminary Electrical Sizing Analysis

Current NEC-based estimate for the new building addition's electrical demand is [12 W/sf x 25,293 sf = 327 kW] which equates to 909 Amps at the service voltage of 208Y/120 Volts.

Electrical utility Primary Service

The existing primary electrical distribution is presently served underground from the local power company; Otero County Electric Cooperative. As discussed above, the existing service is not adequately sized for the planned work, coordination is necessary with the utility to upgrade the utility company's service.

Secondary Power Distribution

208Y/120V, 3 phase from pad-mounted utility transformer to the 1200 amp electrical main switchboard. The capacity of this switchboard may be higher depending on the number of buildings currently served from the existing service equipment which will be removed.

208Y/120V, 3 phase electrical panels will be located in (new) sub electrical rooms in the new building renovation.

Lighting, mechanical and plumbing equipment will be on the 208Y/120V, 3 phase distribution system. General receptacle loads – as well as computers, copiers and IT/AV equipment – will be on the 208Y/120V, 3 phase distribution system.

Branch Circuits

Individual circuits will be used for general lighting and receptacle loads. NMEC device quantities will be adhered to on a branch circuit. Generally, loading on lighting circuits will be limited to 75% or less of the branch breaker rating. A minimum of 20% spare breakers / space will be allowed in all branch circuit panel boards. All 120 volt branch circuits will have dedicated neutrals for each phase conductor. An equipment grounding conductor will be run in each single branch circuit, and for each multi-wire combined circuit.

Emergency Power

Emergency egress lighting loads will be provided with integral battery packs or served from a central lighting inverter. The battery packs will provide backup for interior corridors, restrooms and large classrooms. The lighting inverter could provide backup for exterior fixtures.

The Fire alarm system has self-contained, integral batteries to operate equipment for a set time in the event of a power outage.

Surge Suppression

Surge Protective Devices (SPD) – previously referred to as Transient Voltage Surge Suppression (TVSS) – will be installed at each of the branch circuit panelboards. The SPD is used to minimize damage from electrical transients that can affect or harm electronic equipment.

Grounding System

All feeders and branch circuits will contain insulated, copper, equipment ground conductors. A new concrete encased grounding electrode system ground will be established at the new service equipment.

Lighting

Lighting design will consider ease of maintenance, energy efficiency and suitability for the environment. LED luminaires with a color temperature of 3500 Kelvin, with standard 0-10V dimming drivers will be utilized. Illumination levels will be in accordance with IESNA recommendations and school requirements. Typical maintained illumination levels will be designed to the following levels:

Lighting Strategies

Classrooms: linear direct/indirect luminaires will be considered to provide a better teaching and learning environment. Luminaires will be mounted 18" below ceiling level with ceiling heights at or about 10'-0"' AFF. Where ceiling heights are lower than 9'-6", recessed,

direct/indirect fixtures will be used. Foot candle levels will be 50.

Offices: linear direct/indirect luminaires will be considered. Luminaires will be mounted 18" below ceiling level with ceiling heights at or about 9'-6"' AFF. Where ceiling heights are lower than 9'-6", recessed, direct/indirect fixtures will be used Foot candle levels will be approximately 40. This will be determined based on the task in office.

Corridors: 2x4 or 1x4 "decorative" troffer luminaires will be utilized. Luminaires will be recessed in ceiling. Foot candle levels will be approximately 15. Special consideration will be given to common areas and the like.

Storage Spaces/Utility rooms: Fluorescent surface mounted utility strips with wire guards will be used for general illumination. Foot candle levels will be 20.

Exterior Lighting: Exterior building mounted lighting will be provided at all exterior egress doors. And at areas where building mounted lighting can accommodate lighting requirements for these areas.

Pole mounted fixtures will be provided in any new parking areas. 20-25' poles will be used in parking areas and 15' poles will be used in walkway and playground areas. Exact configuration will be determined during design.

The design team will propose to specify LED-sourced lighting for all exterior applications, in order to reduce/eliminate the ongoing maintenance of said fixtures, as compared to traditional, short-life-span sources such as H.I.D. (eg, metal halide or high pressure sodium) and Compact Fluorescent (CFL).

Lighting Control Strategies

Lighting control design will consider ease of maintenance, energy efficiency and suitability for the environment.

Classrooms

Master control of room will be via a dual technology ceiling or wall mounted sensor. The sensor will turn on and off room switch control. Dual pushbutton dimmer switches will be installed at entry to classroom. One dimming switch will control luminaires within the determined daylight zone, another will control the lighting outside of the daylight zone. An additional switch may be included if a teaching wall task luminaire is utilized. Teacher has full control of room classroom lighting.

Offices

Offices will have dual relay, occupancy sensor switch control for low/high output lamp control. Sensor will also include a light level sensor to hold the lighting off when the pre-set light level is exceeded.

Large Open Areas

Dual technology sensors mounted on wall or ceiling at several locations will be used. Sensor will turn on and off room switch control. Keyed Toggle switches will be considered at entry to room. One switch will control single inner lamps and one switch will control two outboard lamps of luminaires. By utilizing dual switching we can provide four different levels of lighting: off, one lamp, two lamps, and three lamps. The user will have full control of room lighting. Another option would be for the sensors to control a simple "on-off" function.

Corridors

Lighting will be controlled with Keyed override switches. No sensors will be used in the corridors. Corridors will also be programmed via a programmable system to turn on at 6am and off at 11pm. Programmed times can be modified based on school needs.

Exterior Lighting

All exterior lighting, building mounted as well as pole mounted parking lot fixtures will be controlled by a programmable system to turn on at dusk and off at 11 pm. Programmed times can be modified based on school needs.

Utility Rooms (Janitors closet, Small/Large Restrooms & Custodian)

Master control of rooms will be via a dual technology ceiling or wall mounted sensor. Sensor will turn on and off room switch control. Toggle and or Keyed toggle switches will be installed at entry to the room.

Electrical / Communication / Mechanical Rooms

Control of rooms will be via toggle switches installed at entry to the room.

General Power

Receptacles

General-purpose duplex receptacles, in addition to user required outlets, will be provided as follows:

Corridors - 50 feet on center for cleaning purposes.

Classrooms, offices, etc. – 8-10 feet on center or one per wall with consideration for special or computer use receptacles.

Computer room – one duplex receptacle per computer station and additional receptacles for servers, printer, etc.

Special purpose outlets will be located based on equipment layouts and requirements.

GFCI receptacles will be used on building exteriors, in restrooms, and within 6 feet of sinks. GFCI receptacles will also be installed within 25 feet of roof or exterior mounted mechanical equipment.

Dedicated receptacles will be provided for special equipment, i.e. copiers, printers, fax machines, coffee makers, microwaves, etc.

Digital Sub-Metering System

As required by PSFA, a new digital electric power meter could be installed at the main electrical switchboard that will serve the new building addition. This meter would perform data logging of energy usage and report the data to the building's DDC or EMS control system. Additional meters will be provided for the lighting and mechanical distribution panels.

Lighting Protection System

A lightning protection system is anticipated as not being required for this project. Such a system is optional for these types of buildings and their need is judged based on a risk assessment. It is not anticipated that this facility is subject to high risk and hence does not merit this type of system.

SPECIAL SYSTEMS

Communication Systems

Communication design focus on this first phase of work with the construction of the new Secondary School, but will tie in and be coordinated with future planned phases of work. Two to three (depending on final layout and room placements) new communication rooms (IDF) will be designed to provide services to each floor serving area. Fiber and copper backbone from campus service will be run to this new building and distributed between rooms. Category 6 cabling to new telecom outlets will be designed. Wireless access point locations will be designed for full coverage of spaces to allow for flxibility. The communication cabling, terminations and support equipment for cabling will be submitted for Erate funding and installation(TBD). These items will be shown on drawings for GC contract as "for reference only" and will not be in GC contract. Conduit and other pathways required for cabling system will be in GC contract.

Audio-Visual Systems

Classrooms will be designed to support electronic white board technology. Design will provide structural backing and power as needed.

Intercom / Paging System

A new intercom system will be required and designed for. New call switches, speakers and clocks will be provided.

SAFETY & SECURITY SYSTEMS

Fire Alarm

A new Class A, supervised, 24-volt DC-powered, multiplexed, addressable fire alarm system is planned. The system will use horns for audible notification.

The new panel will be connected to, and monitored by the existing main fire alarm panel in the administration office.

Manual pull stations duct smoke detectors, smoke detectors, and audible (horn) / visible notification appliances will be located throughout each section of the school according to NFPA requirements and the State Fire Marshal's Office (SFMO) requirements.

The system will be battery backed-up in accordance with NFPA -72. The system will be remote stationed monitored via a digital communicating device. HVAC equipment, and flow and tamper switches in the building will be interlocked to the fire alarm system in accordance with NFPA standards.

Smoke and heat detectors – will be installed in spaces as required by PSFA, and per NFPA.

Pull stations - at all exits.

Horns and strobes - horns in corridors and strobes will be located in accordance with ADA requirements.

Fire/smoke dampers for all mechanical ductwork penetrations through rated partitions.

Access Control

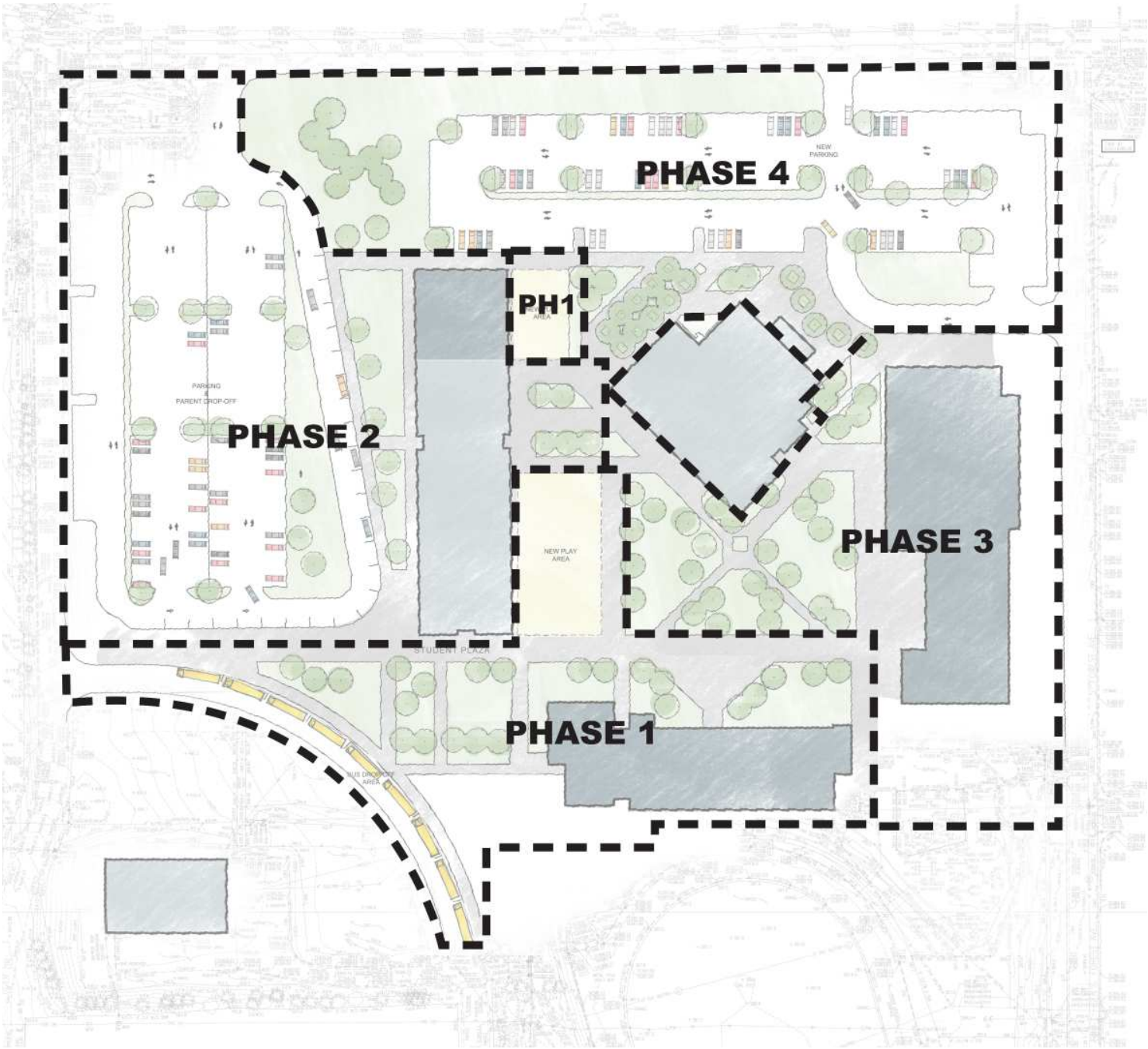
Owner is considering some sort of access control system. Design will provide for door/entry rough-ins and will coordinate requirements with owner.

Security and Video Surveillance

It is proposed that a new IP based surveillance security be designed with head-end equipment located in new, secure communication/IT room.

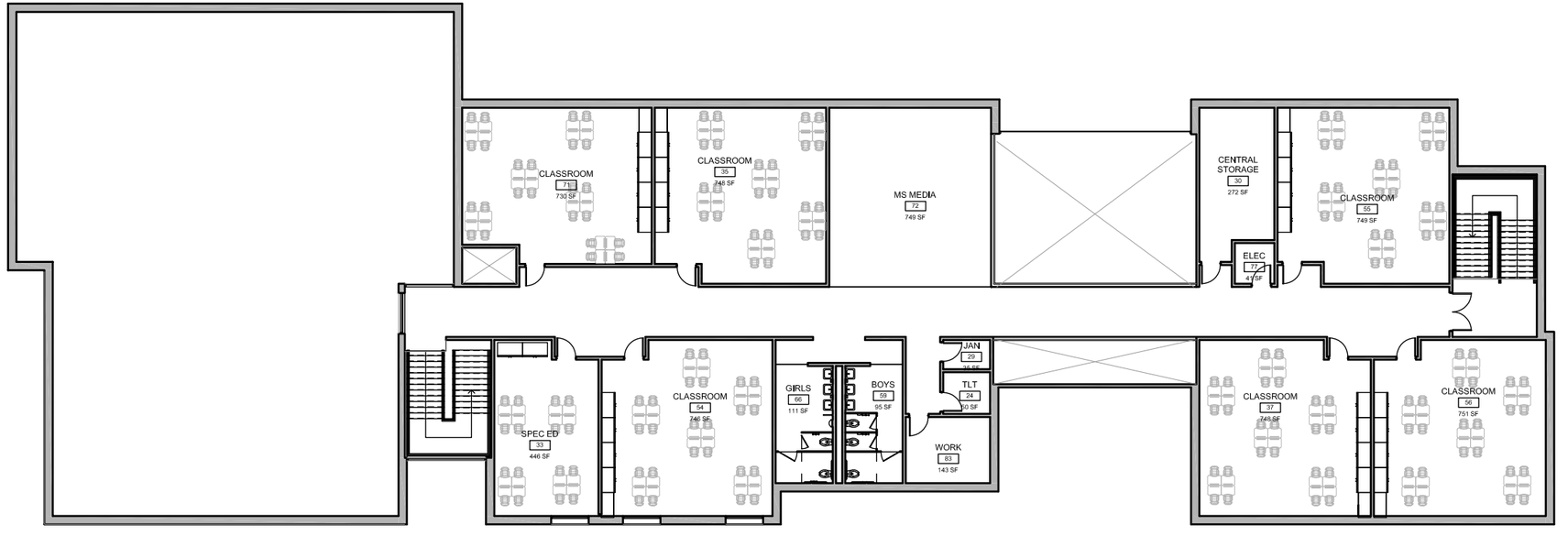
SCHEMATIC DRAWINGS

site plan + phasing

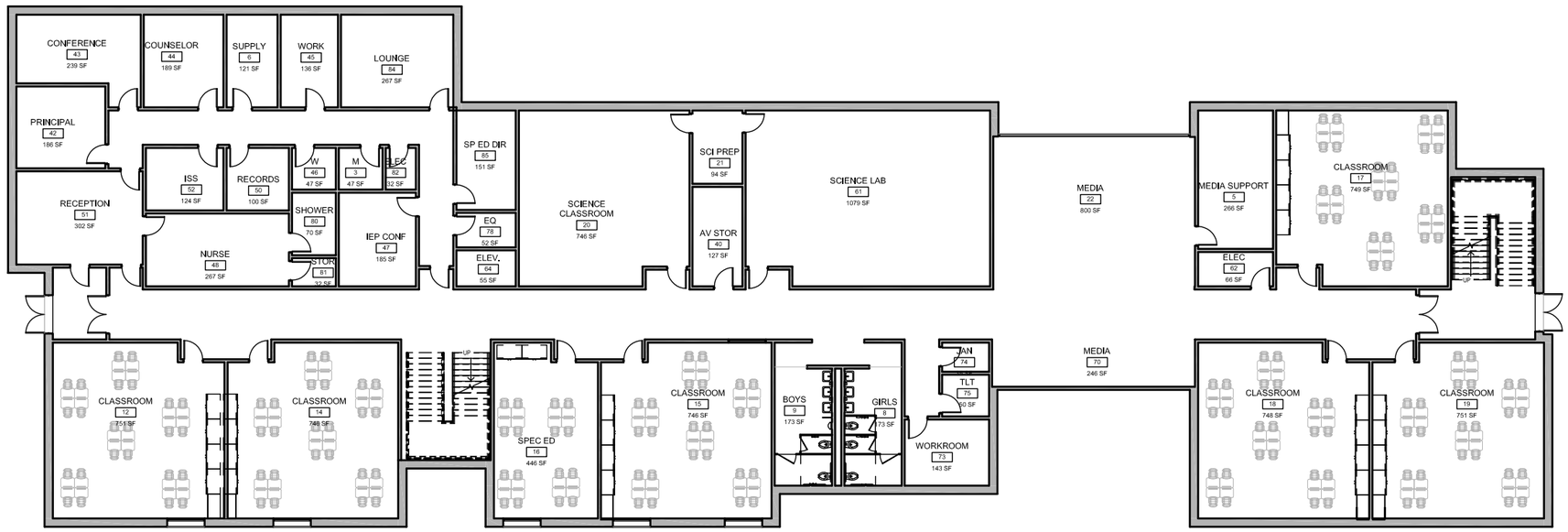


SCHEMATIC DRAWINGS
floor plan

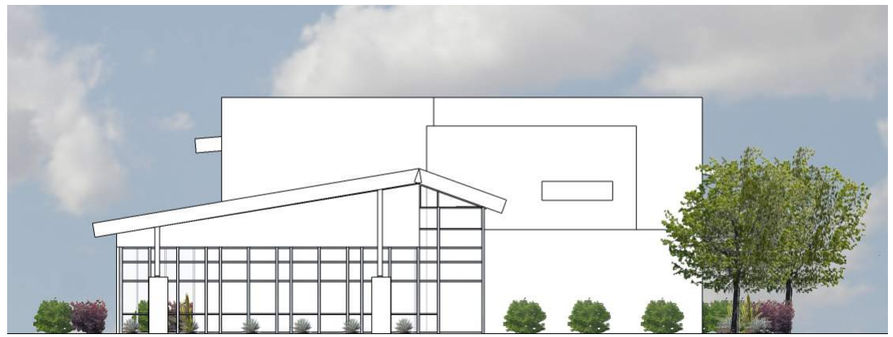
second floor plan



first floor plan

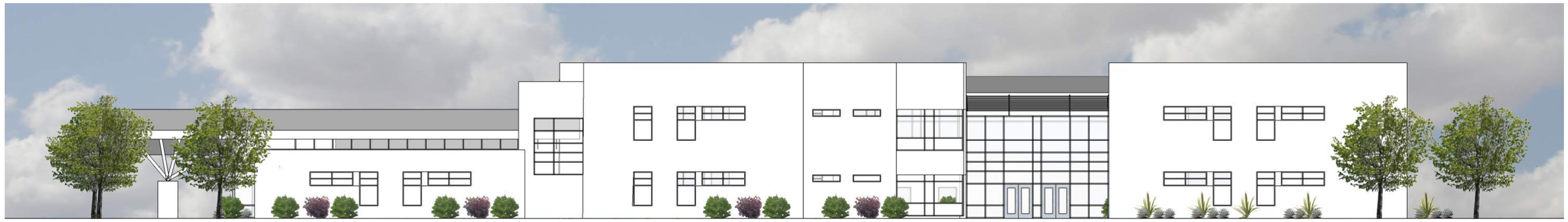


SCHEMATIC DRAWINGS
elevations



west elevation

east elevation



south elevation

north elevation

SCHEMATIC DRAWINGS

renderings

north courtyard view

main Entrance

main Entrance

south view of media center

SUPPORTING MATERIALS

preliminary cost estimates

Capitan New Secondary School 26-Sep-14

DURATION 12 MONTHS 26-Sep-14

SPECIFIED GENERAL CONDITIONS

COST CO	DESCRIPTION	QUANTITY	UNIT	LABOR	PR BURDEN	EQUIPMENT	MATERIAL	SUBS	OTHER	TOTAL
	SUPERINTENDENT -	56.0	1480	$82,821	$28,987					$111,808
	ASST. SUPERINTENDENT -	0.0	1350	$0	$0					$0
	PROJECT MANAGER	0.0	1450	$0	$0					$0
	ASSISTANT PM OR OFFICE ADMIN	0.0	1000	$0	$0					$0
	PRE-CONSTRUCTION MANAGER	0.0	2000	$0	$0					$0
	QUALITY CONTROL	0.0	0	$0	$0					$0
	SUPERIN/ENGINEER BENEFITS	12							$18,000	$18,000
	JOB OFFICE	12						$1,200	$5,760	$6,960
	TELEPHONE	12							$1,140	$1,140
	TRAVEL EXPENSES								$6,200	$6,200
	SUBCONTRACTOR BIDDING COSTS								$1,000	$1,000
**********	**TOTAL SPECIFIED GENERAL CONDITIONS**			**$82,821**	**$28,987**	**$0**	**$0**	**$1,200**	**$32,100**	**$145,108**

DIRECT COSTS DIVISION 1

COST CO	DESCRIPTION	QUANTITY	UNIT	LABOR	PR BURDEN	EQUIPMENT	MATERIAL	SUBS	OTHER	TOTAL
	LAYOUT & BATTERBOARDS	26000	0.25	$6,500	$3,315		$3,500			$13,315
	TOILETS	0							$9,000	$9,000
	WATER	0							$850	$850
	COOLERS, ICE, CUPS	0							$0	$0
	TEMPORARY POWER & LIGHTS	0					$2,000		$2,500	$4,500
	ELECTRICAL ENERGY/GENERATORS	0							$16,000	$16,000
	BARRICADES			$0	$0		$0			$0
	TEMPORARY FENCING	0					$0	$0	$9,815	$9,815
	WARNING LIGHTS									$0
	BUILDING HEAT	12		$4,800	$2,496		$6,900			$14,196
	WINTER PROTECTION			$3,400	$1,768		$15,000		$0	$20,168
	SNOW REMOVAL			$2,100	$1,092					$3,192
	DEWATERING									$0
	SAFETY & FIRE PROTECTION	0		$3,500	$1,750		$6,500	$5,200	$0	$16,950
	TEMPORARY CONSTRUCTION			$0	$0		$0			$0
	INTERIM CLEANUP	26000	0.3	$7,800	$3,978		$4,200			$15,978
	HAUL TRASH	0							$29,000	$29,000
	DUMP FEES									$0
	FINAL CLEANUP							$13,000		$13,000
	WASH WINDOWS									$0
	JOB SIGNS						$3,000			$3,000
	PHOTOGRAPHS									$0
	BLUEPRINTS						$4,500			$4,500
	CPM SCHEDULE									$0
	MOVING EXPENSES									$0
	DUST CONTROL			$8,900	$4,628		$6,800			$20,328
	PROTECT TREES & SHRUBS									$0
	TESTING							$0		$0
	INSPECTIONS									$0
	OWNERS OFFICE FURN CLEAN									$0
	SURVEYOR							$29,000		$29,000
	HBC EQUIPMENT					$45,000				$45,000
	FUEL, OIL, GREASE						$20,000			$20,000
	SWPPP							$7,980		$7,980
	DUST CONTROL PERMIT									$0
	VIDEOGRAPHER									$0
	UEC'S									$0
**********	**TOTAL DIRECT COSTS DIVISION 1**			**$37,000**	**$19,027**	**$45,000**	**$72,400**	**$55,180**	**$67,165**	**$295,772**

DIRECT COSTS DIVISION 1

COST CO	DESCRIPTION	QUANTITY	UNIT	LABOR	PR BURDEN	EQUIPMENT	MATERIAL	SUBS	OTHER	TOTAL
	DIV 2 EARTHWORK									
	DEMOLITION - SITE								$0	$0
	DEMOLITION - BUILDING (field house & admin)								$0	$0
	DIV 3 CONCRETE									
	EXCAVATE FOOTINGS								$15,000	$15,000
	MISC (curing,expansion,perim. Insul.)								$12,000	$12,000
	READY MIX								$159,000	$159,000
	REBAR								$74,000	$74,000
	FORM & PLACE CONCRETE								$218,920	$218,920
	PUMPING								$26,000	$26,000
	SPLASH BLOCKS								$2,500	$2,500
	BASECOARSE								$7,900	$7,900
	POLISHED CONCRETE								$75,000	$75,000
	FLOOR PROTECTION								$12,000	$12,000
	DIV 4 MASONRY									
	MASONRY								$175,000	$175,000
	DIV 5 METALS									
	STR STEEL								$375,000	$375,000
	STEEL ERECTION								$160,000	$160,000
	DIV 6 CARPENTRY									
	ROUGH CARP.								$60,000	$60,000
	CASEWORK/CAST PLASTIC FABRICATIONS								$170,000	$170,000

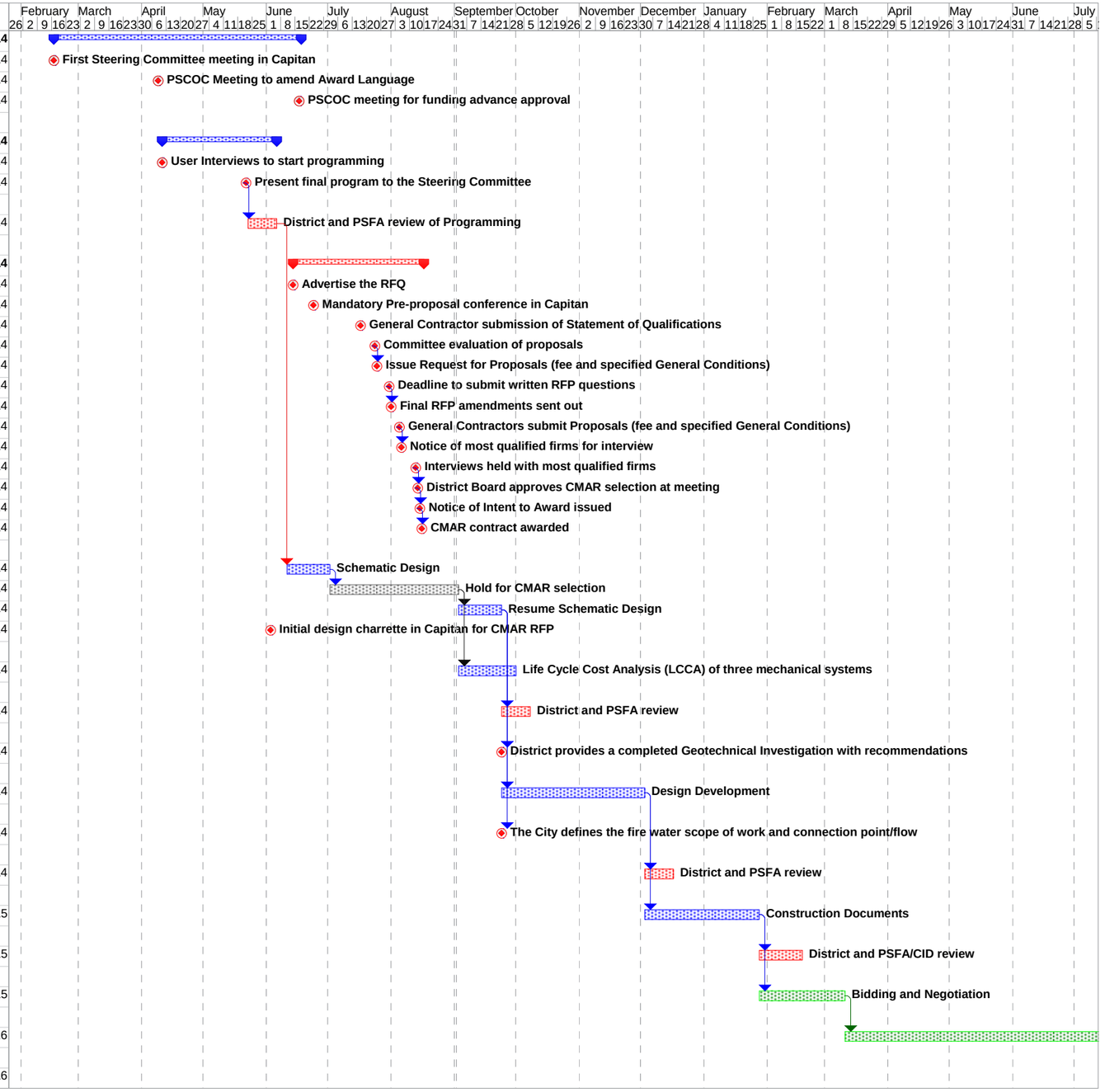
	DIV 7 MOISTURE PROT									
	BITUMINOUS DAMPROOFING								$8,500	$8,500
	THERMAL INSULATION								$32,000	$32,000
	TPO ROOF								$180,000	$180,000
	ROOF ACCESSORIES								$3,500	$3,500
	SEALANTS								$16,500	$16,500
	DIV 8 DOORS & WINDOWS									
	HOLLOW METAL								$24,000	$24,000
	WOOD DOORS								$10,000	$10,000
	FINISH HARDWARE								$23,000	$23,000
	INSTALL DOOR & HARDWARE								$12,000	$12,000
	ALUMINUM / GLASS								$215,000	$215,000
	DIV 9 FINISHES									
	FRAMING / DRYWALL								$335,000	$335,000
	STUCCO / EXTERIOR FINISH								$100,000	$100,000
	ACOUSTICAL CEILINGS								$70,000	$70,000
	CERAMIC IN RESTROOMS								$49,000	$49,000
	CARPET								$28,000	$28,000
	PAINTING								$50,000	$50,000
	DIV10 SPECIALTIES									
	VISUAL DISPLAY BOARDS								$25,000	$25,000
	TOILET COMP								$16,000	$16,000
	INTERIOR SIGNAGE								$8,500	$8,500
	LOCKERS								$0	$0
	FEC								$3,200	$3,200
	TOILET ACCESS								$5,500	$5,500
	DIV 11 EQUIPMENT									
	RESIDENTIAL APPLIANCES (fridge, range, hood)								$12,000	$12,000
	DIV 12 FURNISHINGS									
	PROJECTION SCREENS								$0	$0
	MUD MATS								$4,000	$4,000
	BLINDS								$20,000	$20,000
	DIV 14									
	ELEVATORS								$46,000	$46,000
	DIV 21 FIRE PROTECTION									
	FIRE PROTECTION								$59,000	$59,000
	DIV 22/23 PLUMBING & HVAC									
	PLUMBING / MECHANICAL								$725,000	$725,000
	DIV 26 ELECTRICAL									
	ELECTRICAL								$600,000	$600,000
	DIV 31 EARTHWORK									
	EARTHWORK								$155,000	$155,000
	BACKFILL GRADE BEAMS (EXTERIOR & INTERIOR)								$27,500	$27,500
	DRILLED PIERS								$100,000	$100,000
	DRILLED PIERS SPOILS								$15,000	$15,000
	DIV 32 EXTERIOR IMPROVEMENTS									
	FLEXIBLE PAVING (bus loop)								$30,000	$30,000
	PAINTED PAVEMENT MARKINGS									$0
	SITE SIGNAGE									$0
	CHAIN LINK FENCES AND GATES (at detention pond only)								$7,500	$7,500
	IRRIGATION, LANDSCAPING, GROUND COVER								$45,000	$45,000
	REMOVE & RELOCATE PLAYGROUND EQUIPMENT								$0	$0
	DIV 33 UTILITIES									
	UTILITIES								$100,000	$100,000
	RIP RAP								$4,000	$4,000
**********	**TOTAL DIVISION 2-33**			**$239,642**	**$96,029**	**$90,000**	**$144,800**	**$112,760**	**$4,905,550**	**$5,588,780**

SPECIFIED GENERAL CONDITIONS	$145,108
CONSTRUCTION COST	$5,884,552
INSURANCE	$5,000
BUILDING PERMIT	$10,976
BOND	$46,109
PRECON FEE	$46,200
SUBTOTAL	$6,137,945
CONTINGENCY	$132,000
SUBTOTAL	$6,269,945
CMAR FEE	$376,197
SUBTOTAL	$6,646,142
NMGRT @ 7%	$465,230
TOTAL W/ NMGRT	**$7,111,372**
OWNERS TARGET GMP W/ NMGRT	**$7,111,434**
DELTA	**$62**

SUPPORTING MATERIALS

project schedule

Task Name	Duration	Start	Finish
Project scoping, PSFA Award Language change	**88 days**	**Mon 2/17/14**	**Wed 6/18/14**
First Steering Committee meeting in Capitan	1 eday	Mon 2/17/14	Tue 2/18/14
PSCOC Meeting to amend Award Language	1 eday	Wed 4/9/14	Thu 4/10/14
PSCOC meeting for funding advance approval	1 eday	Tue 6/17/14	Wed 6/18/14
Programming	**40 days**	**Fri 4/11/14**	**Fri 6/6/14**
User Interviews to start programming	1 eday	Fri 4/11/14	Sat 4/12/14
Present final program to the Steering Committee	1 eday	Thu 5/22/14	Fri 5/23/14
District and PSFA review of Programming	14 edays	Fri 5/23/14	Fri 6/6/14
CMAR procurement	**46 days**	**Sat 6/14/14**	**Sun 8/17/14**
Advertise the RFQ	1 eday	Sat 6/14/14	Sun 6/15/14
Mandatory Pre-proposal conference in Capitan	1 eday	Tue 6/24/14	Wed 6/25/14
General Contractor submission of Statement of Qualifications	1 eday	Thu 7/17/14	Fri 7/18/14
Committee evaluation of proposals	1 eday	Thu 7/24/14	Fri 7/25/14
Issue Request for Proposals (fee and specified General Conditions)	1 eday	Fri 7/25/14	Sat 7/26/14
Deadline to submit written RFP questions	1 eday	Thu 7/31/14	Fri 8/1/14
Final RFP amendments sent out	1 eday	Fri 8/1/14	Sat 8/2/14
General Contractors submit Proposals (fee and specified General Conditions)	1 eday	Tue 8/5/14	Wed 8/6/14
Notice of most qualified firms for interview	1 eday	Wed 8/6/14	Thu 8/7/14
Interviews held with most qualified firms	1 eday	Wed 8/13/14	Thu 8/14/14
District Board approves CMAR selection at meeting	1 eday	Thu 8/14/14	Fri 8/15/14
Notice of Intent to Award issued	1 eday	Fri 8/15/14	Sat 8/16/14
CMAR contract awarded	1 eday	Sat 8/16/14	Sun 8/17/14
Schematic Design	3 ewks	Tue 6/10/14	Tue 7/1/14
Hold for CMAR selection	9 ewks	Tue 7/1/14	Tue 9/2/14
Resume Schematic Design	3 ewks	Tue 9/2/14	Tue 9/23/14
Initial design charrette in Capitan for CMAR RFP	1 eday	Tue 6/3/14	Wed 6/4/14
Life Cycle Cost Analysis (LCCA) of three mechanical systems	4 ewks	Tue 9/2/14	Tue 9/30/14
District and PSFA review	14 edays	Tue 9/23/14	Tue 10/7/14
District provides a completed Geotechnical Investigation with recommendations	1 eday	Tue 9/23/14	Wed 9/24/14
Design Development	10 ewks	Tue 9/23/14	Tue 12/2/14
The City defines the fire water scope of work and connection point/flow	1 eday	Tue 9/23/14	Wed 9/24/14
District and PSFA review	14 edays	Tue 12/2/14	Tue 12/16/14
Construction Documents	8 ewks	Tue 12/2/14	Tue 1/27/15
District and PSFA/CID review	21 edays	Tue 1/27/15	Tue 2/17/15
Bidding and Negotiation	6 ewks	Tue 1/27/15	Tue 3/10/15
Construction and Close-Out	365 edays	Tue 3/10/15	Wed 3/9/16
District move in	3 wks	Thu 3/10/16	Wed 3/30/16



SUPPORTING MATERIAL

conference reports

Planning committee meetings related to the Schematic Design were held on the following dates:

- February, 17 2014
- March, 03 2014
- March, 19 2014
- March, 20 2014
- March, 31 2014
- April, 28 2014
- May, 22 2014
- June, 17 2014
- August, 25 2014
- September, 17 2014

The following pages contain the minutes of these meetings.

Meeting Minutes

Project No.:	14-0005
Project:	New Capitan High School
Date:	February 17, 2014
Place:	Capitan Board Room
Attending:	see sign in sheet
By:	D/P/S Dekker/Perich/Sabatini, Ltd. 7601 Jefferson NE, Suite 100 Albuquerque, NM 87109
Copies To:	all in attendance, design team
Issue Date:	February 28, 2014

Discussion Items:

1. Brief introductions were conducted by each committee individual and the project team.
2. Lines of communication were established. Shirley Crawford will be the point of contact for Capitan Schools. Shirley will distribute information between the building committee and the design team. Ovidiu Viorica, PSFA Regional Manager, should be copied on all emails.
3. Committee members will communicate through Shirley, who will then send information to Shannon for the design team to evaluate or respond.
4. Shannon Parks will be the point of contact for D/P/S and will distribute information as necessary through Shirley and Ovidiu.
5. An overview of the design process was given:
    a. Steering Committee Meetings:
        i. The steering committee will act as an ambassador to community.
        ii. Members need to participate and be honest and open in the steering committee meetings while representing their role for the good of the broader group.
    b. Programming Design Phase:
        i. Goal: Determine what spaces are needed, how big and how many, and how they relate to each other. Make sure the program expectations align with standards, requirements and project budget.
        ii. Design team will verify completed utilization study. The utilization identifies the existing spaces and how they are used throughout the day. The utilization study helps inform the number and sizes of spaces required.
        iii. Interviews will be conducted with staff members. Spreadsheet will be developed to assign required square footage for each space to make up the numeric program.
        iv. A graphical program is then developed to provide a visual spatial comparison of the assignable spaces. The graphical program is used as one of several aids in the development of the arrangement of spaces.
        v. Adjacency Diagrams will be used to:
            1. Provide a visual representation of required proximities of programmed spaces.
            2. DPS to verify adjacencies with Design Committee members and through interviews with facility members.
    c. Comments on Programming:
        i. It is important to right size the new building to spend less on operation and more on learning spaces. The industry standard for operation costs is approximately $6/sf.
        ii. Being a small district allows for a natural contingency for classroom sizes. Capitan's smaller population allows for fewer students in each class. Classrooms will be able to handle some population growth. Designing flexible spaces is critical.
        iii. Having the ability to add on will be a design consideration.
        iv. Gary shared that safety should be thought about from inside the classroom out.
        v. Project scope needs to be determined as soon as possible and will be a goal for the next meeting. Scope needs to be defined before programming begins.
    d. Schematic Design Phase:
        i. Goal: Develop a clear concept of the scope and conceptual design of the project.
        ii. Includes establishing spatial relationships and scale of building spaces.

iii. General indication of the exterior design.
iv. The Life Cycle Cost Analysis will be conducted. This looks at three potential mechanical systems based on the district's location, ability to service, climate, system lifespan and associated cost. This will begin in this phase with completion near the beginning of the next phase, Design Development.
v. The design team will present information in multiple forms to help the Steering Committee make decisions such as two dimensional plans coupled with three dimensional models.
vi. PSFA will conduct a review to make sure the design meets adequacy standards.

e. Design Development Phase:

i. Design is worked out in greater detail.
ii. All aspects of design including finishes, mechanical, plumbing and electrical are determined.
iii. Three dimensional renderings and building models are presented.

f. **Construction Document Phase:**

i. All details required for construction are defined.

6. A preliminary schedule was presented and is attached. However, a defined project scope will inform the detailed schedule. The scope needs to be identified immediately.
    a. The goal is to complete construction in time to allow the school to move into the new building over the summer of 2016. It is important that the construction timeframe also works seasonally so certain portions of work are completed before winter months.
    b. The design and construction schedule should be sensitive to student testing which begins March 10th.
    c. After each design phase the district and PSFA will have a review period.
    d. Steering Committee meetings will be held Mondays 6-7:30. The next Meeting will be Monday, March 3rd.
    e. The Steering Committee involvement will be heaviest in the early design phases of the project: Programming and Schematic Design. Consistent attendance and feedback will be critical. There will be roughly 6-8 committee meetings throughout the project.
7. Project funding was discussed. How best to share this information with the community should be determined at the next meeting.
    a. Ed Vinson stated that the School Board established how the project will be funded:
        i. Option 1: Capitan needs to get to 70% free and reduced lunches and 7 mils to receive a waiver. Right now, the district is at 67% free and reduced. Passing a bond would get the district to 7 mils. Members of this committee were urged to get the message out to the community for everyone to complete these applications.
        ii. Option 2: Take an advance from PSCOC and pass a series of bonds to pay back the money.
8. All discussed using the Construction Manager at Risk (CMAR) procurement method.
    a. Capitan went through an extensive selection process to select CMAR for the high school renovation project. PSFA and the district stated that contractor selection would have to be redone for the new project. The district needs to determine the best procurement method moving forward based on the scope of the project.
9. The Steering Committee and staff would like to see precedents for 21st century classrooms. One option may be tours of recently completed similar projects.
10. Goals for the next Steering Committee meeting:
    a. Define the scope.
        i. The design team will present the two scope options: High School for grades 9-12 or Secondary school for grades 6-12. Each scoping option will include a preliminary cost, schedule and other information to help determine the order of magnitude.
    b. Gain a holistic understanding of the procurement options for contractor selection.
        i. The design team will present pros and cons for CMAR or Request for Proposal (RFP) for Construction

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Minutes

Sign –In Sheet

Dekker/Perich/Sabatini
architecture interiors landscape planning engineering

Project Number: 14-0005
Project Name: New Capitan High School
Owner: Capitan Municipal Schools
Meeting Purpose: Kick Off
Meeting Date and Time: Click here to enter a date. at Click here to enter text.

Name	Representing	Telephone	Cell	Email
Ricky LaMay		575-354-2763	575-937-0550	~~lamay63@Hotmail.com~~ ~~[illegible]~~
Laura McInnes		575-808-3445		hointmac@yahoo.com
Amanda Daugherty		575-914-0196		daugherty28@hotmail.com
Gayla Skeen		575-336-8435		gaylaskeen@hotmail.com
David Skeen				
Jerett Perry		354-[illegible]76	937-5992	jerett.perry@capitantigers.org
Tiffany Barry				tiffany.barry@capitantigers.org
Kimberly Stone		354-8512	202.512.0219	kimberly.stone@capitantigers.org
Becky Huey		354-8521	937-2390	becky.huey@capitantigers.org
April Lindsay		354-0679	937-5894	april.lindsay@capitantigers.org
Daryl Lindsay		354-0679	937-0495	lindsayd@gmail.com
Rebekah Stephens		354-8574	937-0280	rebekah.stephens@capitantigers.org
Gary Tregembo		575-937-3127	575-354-9021	garytregembo@capitantigers.org
Shannon Parks	D/P/S	505-761-9700		shannonp@dpsdesign.org
Matt McKim	D/P/S	505 761 9700		MATTM@DPSDESIGN.ORG
Jessica Becker		575-973-7377		jessica.becker@Capitan Tigers.com
Victoria Sedillo		575-808-3189		victoria.sedillo@capitantigers.com
Kim King			973-3062	Kimberly.King@capitantigers.com
Brian and Kelly Newell		575-354-7307		brianandkelly@windstream.net
William Clement		575-336-2586	973-0541	nywrit62@windstream.net
Shirley Crawford	CMS	577-354-8511	973-4719	shirley.crawford@capitantigers.org
Melanie Sandoval	CHS	505-350-6518		melanie.sandoval@capitantigers.org

Ed. Vinson	School Board	937-3933	Ed.Vinson@clayton.k12.nm.us
Ovidiu Viorica	PSFA	505-270-1355	oviorica@nmpsfa.org

Capitan Municipal Schools

February 17, 2013

Agenda

- Introductions
- Design Process
- Project Schedule
- Cost/Project Funding
- Project Scope
- Big Picture Goals
- CMAR?
- Next Steps

Introductions: Committee Role

Participate and be honest.

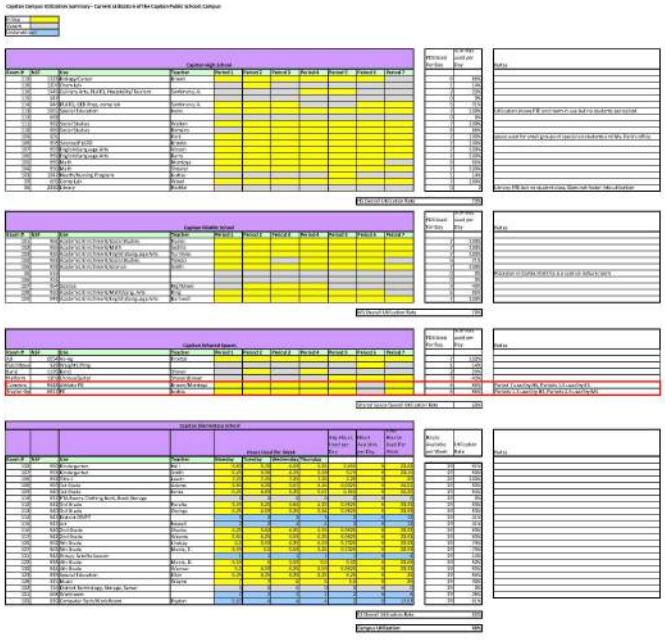
Represent your role and the broader group.

Act as an ambassador.

Design Process: Programming

Verify completed Utilization

How does that translate to a NEW building? What are the space requirements? How many?



Design Process: Programming

Determine required adjacencies

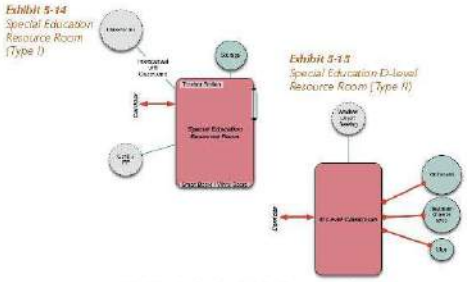
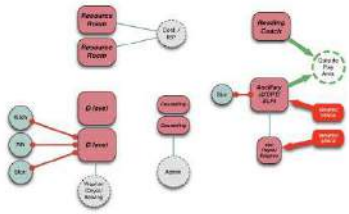


Exhibit 5-14
Special Education Resource Room (Type I)

Exhibit 5-15
Special Education D-level Resource Room (Type II)

The D-level educational instruction room will provide space for up to eight D-level students. The room will have a separate shower room with changing table, storage, and a kitchenette. It will be near the washer/dryer room and clothes bank, shared with the student health center.

Exhibit 5-16
Special Education Cluster Relationship Diagram



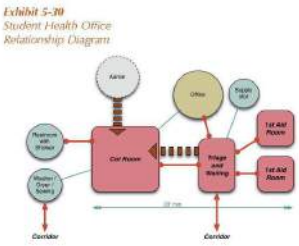


Exhibit 5-30
Student Health Office Relationship Diagram

Student Health Office
The main part of the health office consists of the first aid area, where first aid is administered, and the cot area for sick students waiting to be transported. The nurse's office accommodates administrative activities, conferences, and health testing. It requires a 20-foot length for vision testing.

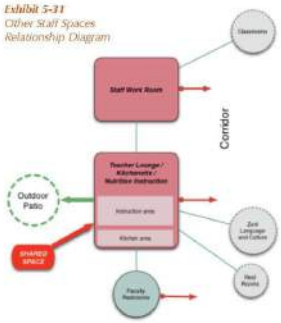
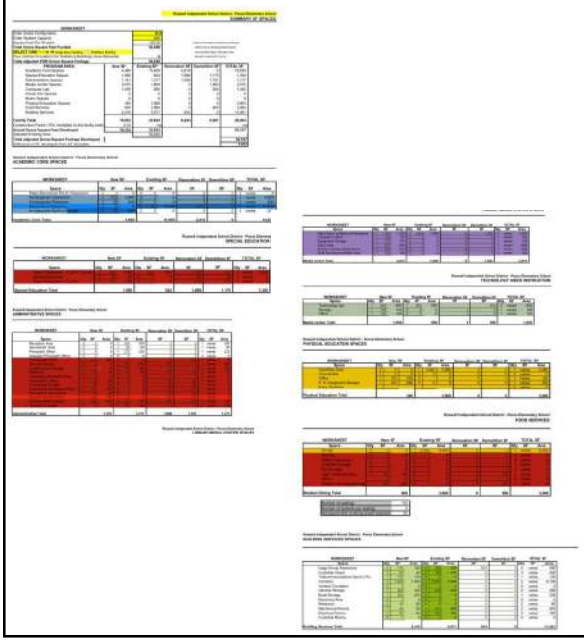


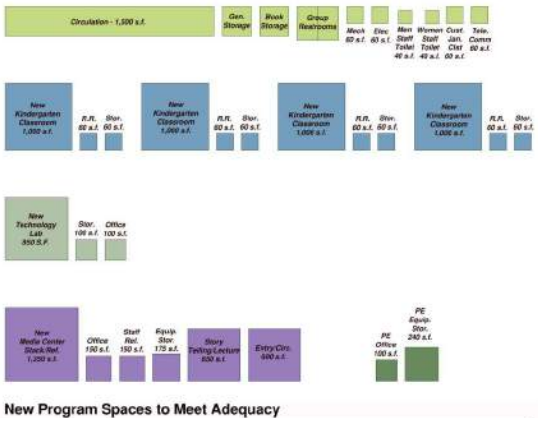
Exhibit 5-31
Other Staff Spaces Relationship Diagram

Other Staff Spaces
Teachers will use the teacher's lounge during preparation and break times, and the lounge includes a full kitchen area. Teacher workrooms should be located near classroom areas so that teachers will have time to access workrooms and restrooms between classes. The workrooms and the lounge can be adjacent but cannot occupy the same space. The lounge provide instructional space to support health programs and the Zuni Language and Culture program. The lounge will be located nearby to Zuni Language and Culture classrooms.

Design Process: Programming

Develop Program – numeric + graphic

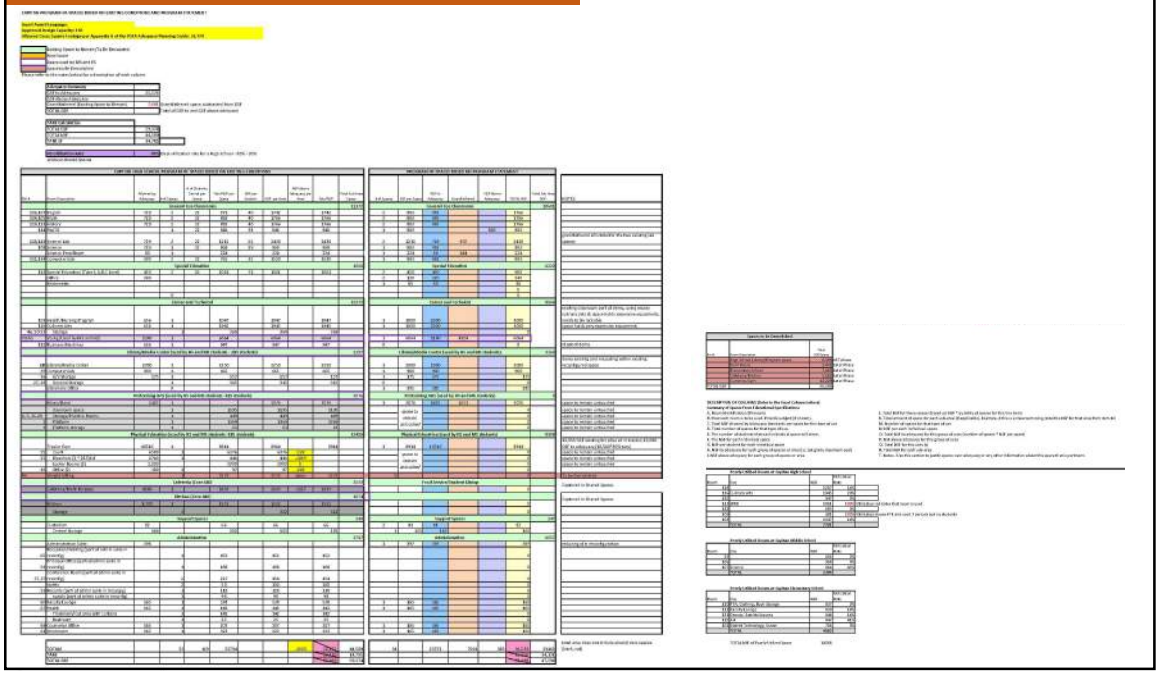


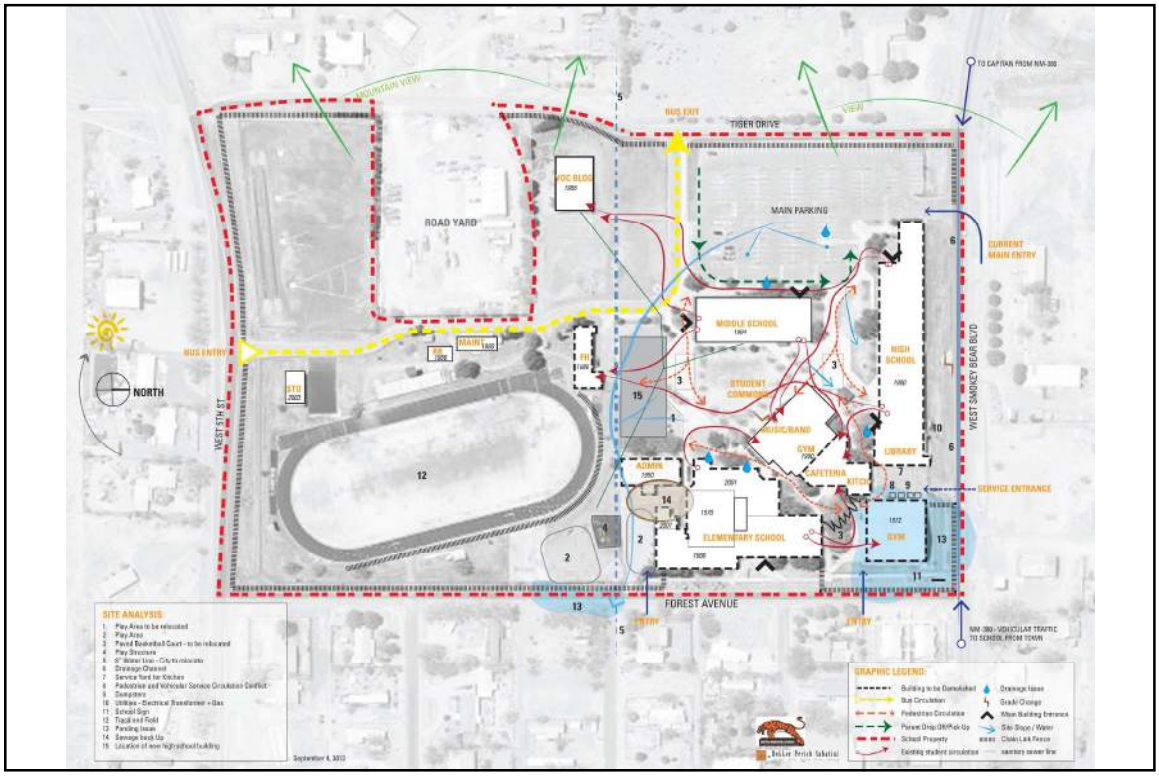


New Program Spaces to Meet Adequacy

Design Process: Programming

Program

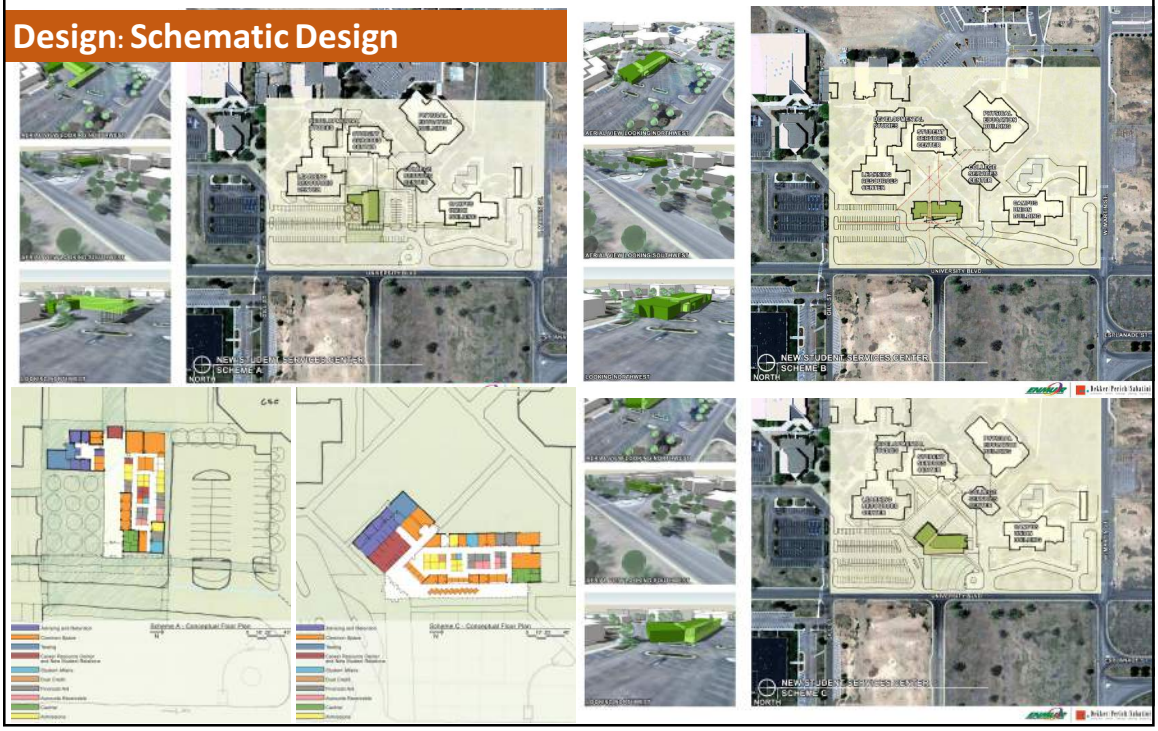




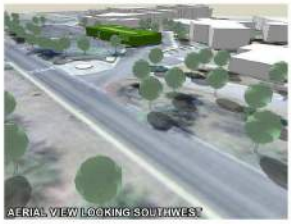
Design: Schematic Design

- Develop a clear concept of the scope and conceptual design of the project.
  - Relationships and scale of building and spaces
  - General indication of exterior design

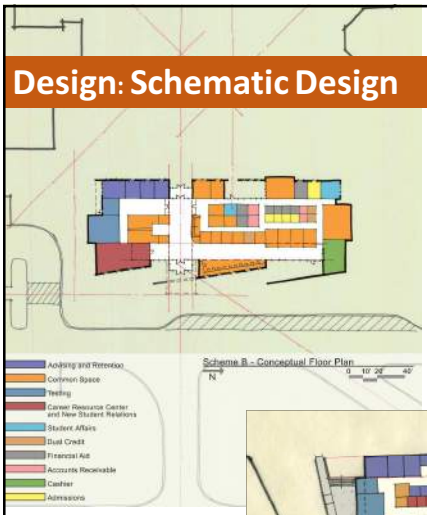
Design: Schematic Design

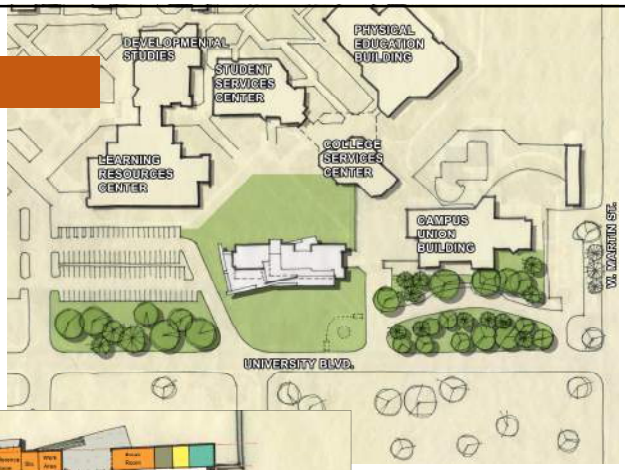


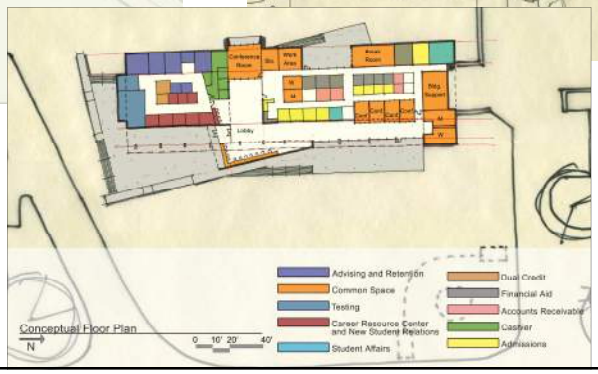
Design: Schematic Design



Design: Schematic Design

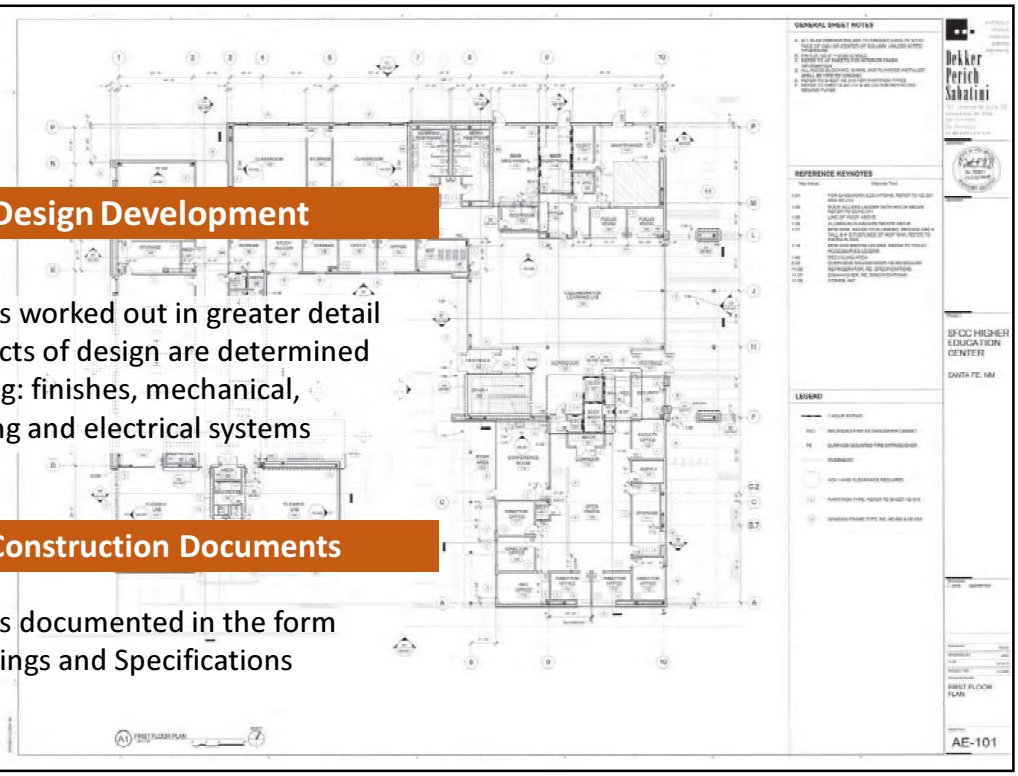






Design: Design Development

- Design is worked out in greater detail
- All aspects of design are determined including: finishes, mechanical, plumbing and electrical systems



Design: Construction Documents

- Design is documented in the form of Drawings and Specifications

Project Schedule

Programming	April 1, 2014
Schematic Design	June 15, 2014
Design Development	Sept 1, 2014
Construction Documents	Dec 15, 2014
PSFA/District/CID Review	Jan 15, 2015
Bidding + Negotiation	Feb 22, 2015
Construction	March 1, 2015 – March 1, 2016
Final Acceptance/ Close out	April 1, 2016

Best committee meeting dates?
Committee involvement throughout the project

Meeting Minutes

Project No.:	14-0005
Project:	New Capitan High School
Date:	March 3, 2014
Place:	Capitan Board Room
Attending:	see sign in sheet
By:	D/P/S Dekker/Perich/Sabatini, Ltd. 7601 Jefferson NE, Suite 100 Albuquerque, NM 87109
Copies To:	all in attendance, design team
Issue Date:	March 11, 2014

Discussion Items:

1. The **purpose** of this meeting was to present options for both a grades 9-12 and 6-12 school, and options for procurement of a general contractor for the committee to come to a decision.
2. The concept of Maximum Allowable Construction Costs (MACC) and Total project budget were discussed. The MACC is the cost for the building, bricks and mortar only without New Mexico Gross Receipts Tax (NMGRT). The MACC is usually 75% of the total project costs and is normally the number used in association with square foot costs. The total project cost includes the MACC, NMGRT, fees for design, surveys, testing and an Owner's contingency for construction changes. This contingency is normally 3-5% of the MACC for new construction.
3. Scope | Option 1:
    a. High school grades 9-12, 22,000-24,000 sf on two stories located between the field and the middle school.
    b. The bus loop would be modified to allow more space between it and the new HS building.
    c. The field house and district administration buildings are not shown as part of this work scope as the PSFA will not participate in the costs of these improvements.
    d. ES next need, once the HS is occupied, the ES would temporarily move into the old HS building. No temporary campus would be needed saving approx. $1M.
    e. The existing ES is 37,000 sf with 65% utilization, the existing HS is 33,900 sf with 70%utilization and the existing MS is 15,600 sf with 70% utilization.
    f. Next, demo of the old HS and build a new multipurpose facility 30,000 sf+/- in its place. The multipurpose facility in all three schemes is composed of; new HS gym, Cafeteria for the campus, kitchen and possibly the location for the field house and district administration.
    g. A combination school didn't meet the standards for three gyms, meaning the PSFA wouldn't participate in building a new ES gym. However, utilization of the existing two gyms does justify the need for two instead of one. Other solutions discussed were to partition one of the gyms to provide two separate spaces for PE classes to run simultaneously. Also discussed was the possibility to have the cafeteria in the multi-purpose facility function as the ES gym.
    h. Look at claiming water with cisterns for field watering.
4. Scope | Option 2:
    a. Secondary school in the same site as option 1 with 31,000-33,000sf for grades 6-12.
    b. Many spaces are being shared now between the schools.
    c. Same bus loop modifications as Option 1.
    d. Next demo HS, add on to the MS to accommodate the ES, 18,000 sf of addition totaling 33,000 sf.
    e. Next demo ES now that the school is empty and build the multi-purpose facility in its place.
    f. Pros of this scheme include; proximity of the two gym spaces, keeps all academic space away from NM380, larger area at the new campus entry to the northeast, better campus drainage, kids don't have to move during construction, one less building to build. This option is less square footage than option 1.
    g. Concern over two stories and fire, safety, shooter, etc.

   h. This option will save the district significant money over the next 30 years by not needing to build a new ES or operate and maintain the additional square footage.
   i. This option would also build more space, sooner. Meaning added value to the district as the cost of construction is again escalating.
   j. According to industry standards, it costs approximately $6/sf to maintain a facility. Looking at the current district operations and maintenance budget, the district will not be able to properly operate a campus much more than 100,000 sf. This option helps bring the total square footage closer to that number.
5. Scope | Option 3:
   a. This option was seen as not feasible as it would require moving the HS students back into the ES to construct a new HS on the existing HS site.
6. The steering committee unanimously voted to present Option 2 as the scope direction at the March 13, 2014 Board meeting with the following revisions:
   a. Look at the MS addition as two stories extending into the existing parking lot with an adjacent playground. This scheme allows for new parking at the northeast corner.
   b. As design continues, we will look for ways to provide covered walkways and waiting areas.
7. Five procurement methods were reviewed:
   a. Low bid
   b. Prequalification based low bid
   c. Design-build
   d. Request for proposal for construction services
   e. Construction Manager at Risk (CMAR)
8. Since the first three methods are seldom used due to inherent issues, the last two methods were discussed at length.
9. Procurement | Request for proposal for construction services:
   a. Does not necessarily result in the lowest bids, since the bid is only half of the criteria for selection.
   b. The general contractor has more risk in this scenario as he has a relatively basic understanding of scope.
   c. The district has no flexibility in working with the general contractor to get the subcontractors they feel are best for the district.
10. Procurement | Construction Manager at Risk (CMAR):
   a. The general contractor is selected upfront and participates in the design process providing cost and constructability feedback along the way.
   b. Because the CMAR has involvement, his risk is reduced since he has a very good understanding of scope.
   c. The general contractor will bid all parts of the work out and receive a minimum of three bids to ensure competition.
   d. The general contractor will work with the district to select the best subcontractors based on qualifications, proximity and price.
   e. Because of the CMAR's involvement and selection of the most qualified subs, the quality of the project is normally the best of the five methods.
11. The steering committee voted 10 to 4 to recommend the CMAR procurement method to the Board at the March 13, 2014 meeting.
12. The next meeting will be at 6:00pm on March 17, 2014 in the Board room. An agenda will be circulated before this meeting.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Minutes

Dekker/Perich/Sabatini
architecture interiors landscape planning engineering

Sign –In Sheet

Project Number: 14-0005
Project Name: New Capitan High School
Owner: Capitan Municipal Schools
Meeting Purpose: Scope Discussion
Meeting Date and Time: 3/3/2014 at Capitan Board Room

Name	Representing	Telephone	Cell	Email
Laura McInnes	Parent	575-808-3445		hointmac@yahoo.com
Amanda Daugherty	PTA / Parent	575-354-1148		daugherty28@hotmail.com
Darylll [illegible]	Parent	(575) 937-0245		lindsyjd@gmail.com
Ovidiu Viorica	PSFA	(505) 270-1355		oviorica@nmpsfa.org
Tiffany Berry	High School	575-808-9961		tiffany.berry@capitantigers.org
Angela Romero	High School	575 354 2808		angela.romero@capitantigers.org
Dennis Rich	Parent	575 937-5996		denandyvonne@netscape.net
Ricky Lamay	LaMay Electric [illegible]	575-937-0590		Lamay@hotmail.com
Jarrett Perry	CMS [illegible]	575-937-5412		jarrett.perry@capitantigers.org
Jessica Becker	AD CHS/CMS	575-973-7377		jessica.becker@capitantigers.org
Victoria Sedillo	Middle School	575-808-3189		victoria.sedillo@capitantigers.org
DAOE: Cayla Sleen	Parent	575-336-8435		Cayla.Sleen@hotmail.com
Brian Newell	Parent	575-937-3572		brianandkelly@windstream.net
Shirley Crawford	CMS - Supt			
Kimberly N. Stone	Business Mgr - Parent			
William Demarest	Parent	575-973-0541		ny west62@windstream.net
Megan Caldwell	D/P/S	505 761-9100		

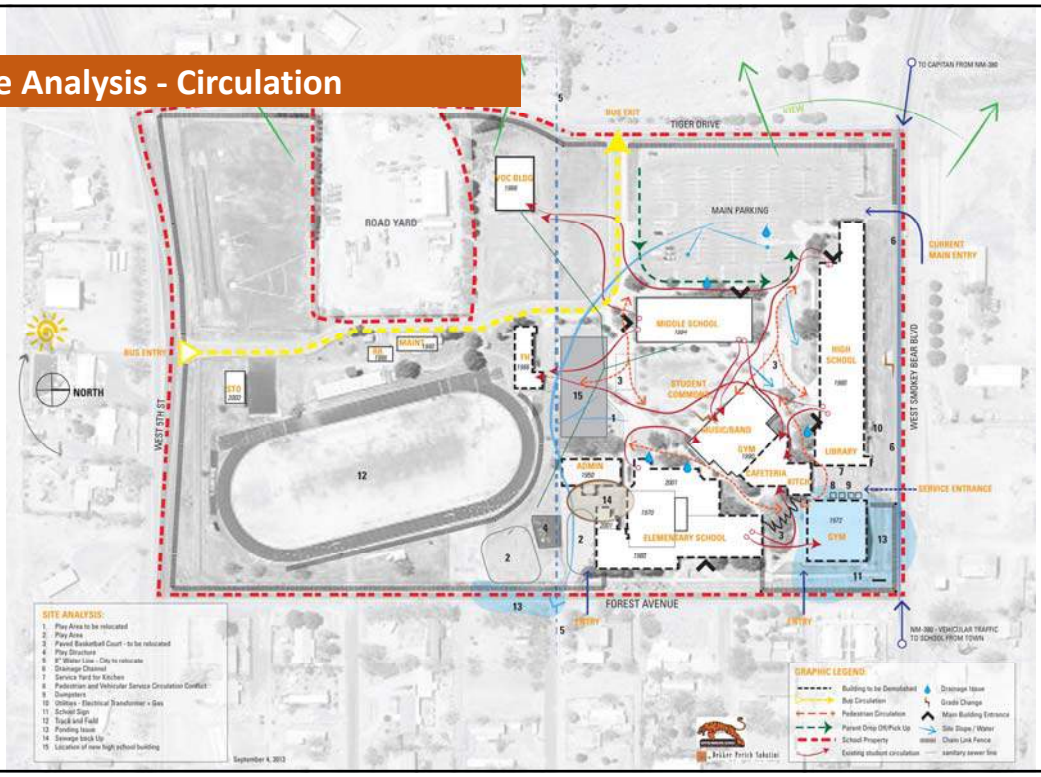
Capitan Municipal Schools

March 03, 2014

Agenda

1. Project Scoping Discussion
   a. Site Analysis
   b. Scope Options:
      i. Review phasing
      ii. Review locations
      iii. Review cost & schedule
2. Discuss Procurement Options
   a. CMAR
   b. Qualifications based RFP for Construction
3. Next Steps
   a. Schedule next committee meeting

Site Analysis - Circulation



Scope: Capitan District Needs

1. Replace Capitan High School
2. Replace Capitan Elementary School
3. New Multi-Purpose Facility:
   - Replace kitchen
   - Replace Cafeteria
   - Replace Cummins Gym (HS Gym)
   - Replace Field House
4. Resolve campus wide drainage issues

Scope: Cost

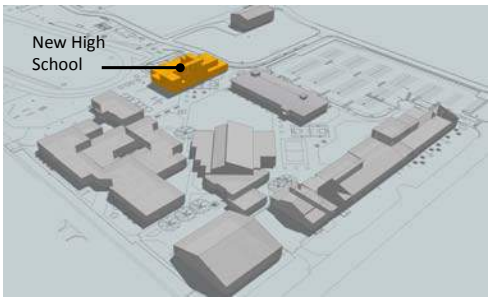
MACC = Maximum Allowable Construction Cost

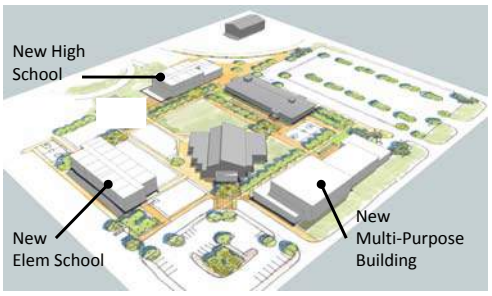
- bricks and mortar
- Rule of thumb: MACC = 75% of Total Project
- MACC is generally what square foot cost refers to

Total Project (includes MACC + soft costs)

- New Mexico Gross Receipt Tax (7% of MACC = big number)
- Owner's contingency: new building generally = 3-5% of MACC
- Architectural + engineering design fees; architectural fee % is established by the state based on size and complexity
- Surveys + testing
- FF+E (furnishings, fixtures + equipment)

Scope Options – Option 1





<u>High School: Grades 9 -12</u>

Design Schedule: *4/2014 – 1/2015*
Construction Schedule: *3/2015 – 3/2016*

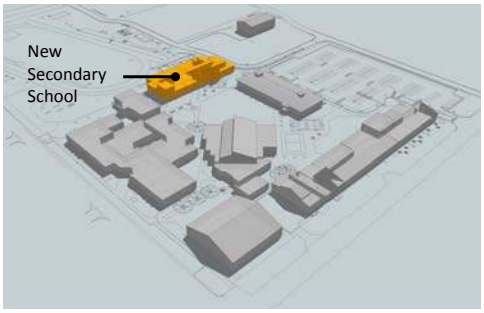
Approx. ~22,000-24,000sf @ $245/sf

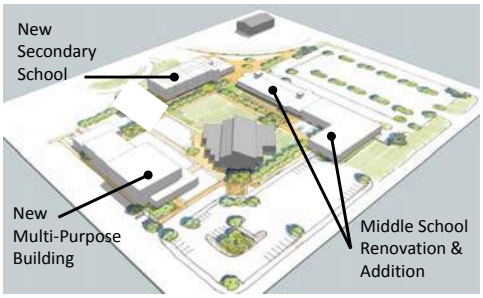
MACC = $5.88M

Total Project = $7.84M

- Public spaces are along 380
- HS is adjacent to VoAg and field
- Separate Middle School
- most overall campus square footage – most costly to maintain + operate
- ES is far from bus loop + parent drop off

Scope Options – Option 2





Secondary School: Grades 6 -12

Design Schedule: *4/2014 – 1/2015*
Construction Schedule: *3/2015 – 3/2016*

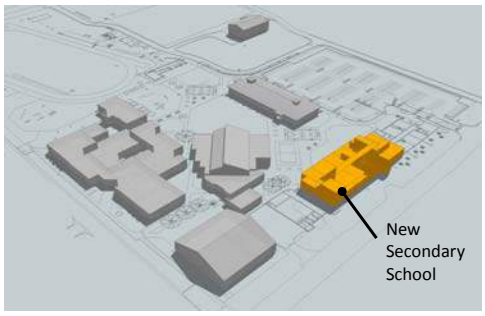
Approx. ~31,000-33,000sf @ $245/sf

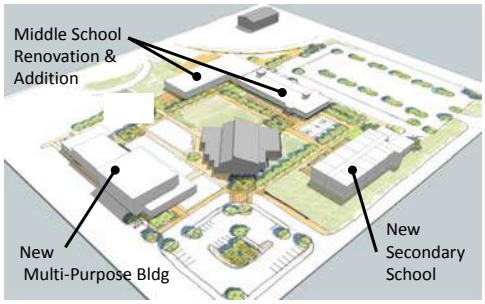
MACC = $7.84M

Total Project = $10.45M

- Programming design phase will involve more users in process
- Less overall campus square footage = less operational + maintenance costs
- Buffer between 380 and education spaces
- ES students do not have to relocate in between phases
- Separation of bus, parent, visitor + service
- Allows for more parking
- Helps facilitate drainage

Scope Options – Option 3





Secondary School: Grades 6 -12

Design Schedule: *4/2014 – 1/2015*
Construction Schedule: *?/2015 – ?/2016*

Approx. ~31,000-33,000sf @ $245/sf +
$185,170 in demo

MACC = $8.25M

Total Project = $11M

- Programming design phase will involve more users in process
- Less overall campus square footage = less operational and maintenance costs
- ES students do not have to relocate in between phases
- Demolition of HS building included in first phase – *schedule impact?*

General Contractor Procurement

Owner Risks:

- Poor quality
- Over budget
- Schedule delays

General Contractor Procurement

Methods of procurement for construction services for school construction:

- Low bid
- Prequalification based Low Bid
- Design-Build
- Request for Proposal (RFP) for construction services
- Construction Manager At Risk (CMAR)

General Contractor Procurement

Low Bid:

Pros
- Best competition and price?
- Advantage for local GC?

Cons
- Risk - does not allow for the best quality
- Higher risk for the GC, and expect higher OH+P
  - GC stuck with low bid subcontractors
  - 2 Hours before a bid to ensure scope is covered

General Contractor Procurement

Prequalification based low bid:

Pros
- The owner can prequalify a pool of GCs and subs based on specific criteria

Cons
- Risk to the Owner if a small number of subcontractors participate – higher costs
- Complicated and lengthy process

General Contractor Procurement

Design Build: only allowed for $10M and above

Pros
- The Design Build team guarantees a price

Cons
- Risk - owner has very little control over the design process
  - Design Professional works for the GC and sometimes never meets the owner
  - Emphasis on price, not quality

General Contractor Procurement

Request for Proposal (RFP) for construction services:

Pros
- Allows for competition between qualified GCs and subcontractors
- Weighting of quals vs price emphasizes getting the most qualified GC And major subs

Cons
- Selection process is more complicated – 2 step process
- Risk for GC - not involved in the project as a team member
  - Higher OH+P required

General Contractor Procurement

Construction Manager at Risk (CMAR):

Pros

- The GC is selected upfront based on quals/precon services and fee and provides real time feedback for cost and systems evaluations
- Lower risk for the GC and lower OH+P
  - Better understanding of scope
  - Ability to select the best subcontractors w/ owner
- Better information on budget
- Lower construction costs?

Cons

- Selection process is more complicated – 3 step process
- Possible schedule impact

Meeting Minutes

Project No.:	14-0005
Project:	New Capitan Secondary School
Date:	March 19, 2014
Place:	Conference Call
Attending:	Shirley Crawford Jerrett Perry Ovidiu Viorica Matthew McKim Shannon Parks Megan Cardwell
By:	D/P/S Dekker/Perich/Sabatini, Ltd. 7601 Jefferson NE, Suite 100 Albuquerque, NM 87109
Copies To:	All in attendance
Issue Date:	March 24, 2014

Discussion Items:

1. The **purpose** of this conference call was to discuss and come to an understanding of the overriding, conceptual framework for the new secondary school at the District level before visiting with the individual users.
2. The discussion items of the conference call are outlined on the attached agenda.
3. The **district vision** visualizes people walking in the school and knowing that it was designed for students of the 21st century, social needs, technology, multi-functional classrooms, easy to maintain, while focusing on a safe environment for a student centered facility.
4. The **district goals** for the new secondary school are to offer a world class education in a small, rural school. Additionally, they would like to provide a safe and comfortable atmosphere for students to develop a collaborative district by creating close facilities and shared outdoor spaces/classrooms. It was stated that the use of outdoor amphitheaters/spaces are typically rarely used, can be pricey and some spaces may have drainage issues. Implementation of the outdoor spaces is critical and teachers would need to have plan on how to utilize the spaces accordingly.
5. **Security and safety** for the school is a priority and it was suggested to have the ability to lock the classroom from the inside and contact/involve a hardware consultant early in the design process.
6. What will be the **culture** for the new school? How will the school be perceived by the community? One of the goals is for the facility to be welcoming but secure. The facility should be bright and not vacuous with the idea of having pod-like sitting areas (i.e. nex Gen Academy) to embrace a “close feeling”. To incorporate a visual connection while preserving the “classroom”. There should be a main point of entry that is easy to locate and with eyes always on the front door. The middle school and high school to maintain their own identity but still have a sense of community as a whole alongside teachers embracing the concept. The notion of having windows into the classrooms but set up high in case of a lock down situation.
7. It would be ideal to group together grades 6th-8th on their own floor and 9th-12th on another. There is a possibility that there could be 2 science labs? The labs would include: Physics/Chemistry and Life Science which would not need a fume hood. There is the other possibility that 1 lab could be designed, but there is concern with 20 sections of science that is available and that might not be likely and would come down to a scheduling issue. Library/Media center could work best on the 1st floor as a shared space.
8. Instruction strategy / shared spaces
   a. Currently, classrooms are not functioning for plugging in devices and moving furniture.
   b. A **need** for **flexible, movable furniture** (casters, stackable, etc.)

c. It is recommended to have a **furniture design package** from D/P/S incorporated into this contract. D/P/S will show this as a broken out cost.
d. Investigate the concept of a **Flip Classroom**
    i. Concept involves students previewing videos & passages at night, then go to class ready to work on problems. Classroom becomes a collaborative space and home is the instruction place.
    ii. Teacher becomes the facilitator
    iii. Students to be allowed to utilize breakout spaces and has been very useful with middle school students.
e. Investigate the elimination of the library as a space, reduce stacks, create c.o.w. storage – this can then be turned into more of a sitting area / student collaboration spaces with technology available,
f. Multiple instruction surfaces
    i. Balance with supervision of breakout spaces and windows to some extent.
    ii. How much storage would be need?
    iii. 90^{o} teaching?
g. Separate workrooms would be ideal with one on each floor.
h. A common teachers lounge

9. Vocational Classes
    a. The CNA program has expanded to include EMT training and would like to be brought back to campus and showcased.
    b. All classes currently at Vo Ag will remain.
    c. Business career classes are also offered including multi-media and graphics, and need an upgraded computer lab.
    d. Culinary Arts
        i. If culinary arts are to be in the new facility, the space can only be used for one function as it would be too hard to use as a dual space.
        ii. Culinary arts program could be more beneficial in the new multi-purpose building, but will happen to the program in interim? Could it still remain in the current location until then?
        iii. What would make sense long term? There is concern about what would happen with the program and district does not want to eliminate the program.
        iv. Possible career lab?
        v. Is it associated with the kitchen? Existing food service is provided by contract company
        vi. Adequacy to be considered and flexibility is recommended
10. Technology
    a. Two labs to be included. One lab is a higher end and one hybrid classroom for
    b. There is a want for students to be able to plug in their laptops within the media center
    c. Testing Requirements: broadband, WAPS
    d. Will there be an opportunity to do a raised floor? No floor boxes
    e. Recommended to include a proposal for furniture design.
11. Media Center to be a multi-functional space and have the feeling of openness and promote collaboration.
12. Other
    a. Award sub-committee April 2
    b. Change award language and demonstrate that this is the right thing to do
    c. Options with associated costs, expected – High school route vs secondary school route
        i. Show it saves money and speeds up schedule
        ii. Focus on funds needed for first phase for each option
    d. CMAR for phase one or all three
    e. Ovidiu to send agenda and needs packets by Tuesday
    f. Modify options to show costs and schedule for all phases
    g. Repayment plan
    h. Presentation as simple as possible: total cost, only break down of first option

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Minutes

Meeting Minutes

Project No.:	14-0005
Project:	New Capitan Secondary School
Date:	March 20, 2014
Place:	Capitan Campus
Attending:	As noted in the minutes below
By:	D/P/S Dekker/Perich/Sabatini, Ltd. 7601 Jefferson NE, Suite 100 Albuquerque, NM 87109
Copies To:	Ovidiu Viorica, Shirley Crawford and Jerrett Perry for distribution to all in attendance and the Steering Committee
Issue Date:	April 11, 2014

Discussion Items:

1. The **purpose** of the user interviews was to start to define the physical and performance requirements for the new facility which will guide its design and development. These discussions were framed by the overarching district goals and vision as established with Principal Perry and Superintendent Crawford and received general consensus from staff. These ideals include:
    a. 21st century learning environment
    b. Technology-rich
    c. World class education in a small, rural school
    d. Student-centered
    e. Collaborative student spaces
    f. Multi-functional, flexible spaces (consistent, standard designed spaces)
    g. Safe, but welcoming (provide a clear, recognizable main entry and point of control)
    h. Middle school and high school should retain their own identity while incorporating a sense of community
    i. Facility designed to be easily maintained
2. Staff were updated on the current status of the project. The school board voted for the new facility to be a secondary school that houses 6th-12th grade based on the recommendation of the Steering Committee comprised of 25 teachers, parents, and community and village members. The project is starting programming – the very beginning phase of the project. The design of the facility has not begun. User input is critical throughout the process, especially in these beginning stages.

3. <u>User Interview 1 – Administration</u>

- Rebekah Stephens - Counselor
- Jerrett Perry – Middle school + High school Principal
- Jessica Becker – Athletic Director, Teacher, Coach
- Stephanie Aldaz – High School Secretary
- Gwen Jones – Middle School Secretary

a. Brief introductions were given and the overarching district goals and visions from Jerrett and Shirley were explained.
b. Below is a list of spaces needed/discussed:
    i. Main Entry – main point of control
    ii. Main administration suite to include:
        1. **Principal's Office** - proximity to conference room

2. **Counselor Office** - to serve all middle school and high school students with a lockable, dedicated storage closet
3. **Secretary/reception** – space for one secretary for the middle school and one for the high school. Space should have lockable storage.
4. **Nurses Office** to be centrally located in/near the administration suite and main entry.
    a. There will need to be room for at least 2 cots
    b. Locked storage for medications
    c. Restroom including a shower
    d. Small, under counter lockable fridge for medications
    e. Direct exit to the outside
    f. Window from reception area
5. **ISS** - to support up to 5-6 students at a time with direct supervision
6. **Conference Room**
    a. To be shared between counselor and principal offices in order to move students in and out for confidentiality and provide easy access for both schools
    b. Space should support up to 10-12 people at a time (Approximately 250sf)
    c. Will need technology to hold webinars, department meetings (i.e. wall mounted flat screen, projector, and smart board)
7. **Storage**
    a. Vault
    b. Cumulative files
    c. General supplies

iii. Workrooms

1. One workroom per floor
2. Centrally located among classrooms
3. Staff restrooms

iv. Teachers' Lounge

1. Location and quantity to be discussed in more detail

v. Athletic Director Office

1. Possible locations were discussed: adjacent to weight room and field house (weight room would have to be separate from field house per Title IX), Upstairs to provide supervision was considered, Multi-Purpose building
    a. If the office is to be located within the Multi-purpose building, there will need to be a space provided until multi-purpose building is constructed. (This could potentially be SRO per Jerrett)

vi. General Supply Storage

1. 1 on each floor?
2. Be thoughtful of how it is provided to prevent from hoarding

vii. Maintenance/ Janitor Closet

1. Provide on each floor
2. Space needs to meet storage requirements

viii. Ancillary Service office

1. Flexible office space
2. Needs to be able to seat at least 4 people
3. Located in/near administration area so outside visitors have to sign in
4. ITV needs

5. sound proof
6. Includes use speech, social workers, psychologist, probation officers,
7. Wall mount flat screen

ix. **Special Education Office**:

1. Create home base for the director within the secondary school. Could be located in or adjacent to the admin suite. Special ed office should have a conference room attached.
    a. two D level classrooms are likely required for the secondary school with additional pull out space of B and C level students. This is discussed in more detail with Ms Park.

c. Grade level locations were discussed. High school students move in and out of main school with classes in other locations more than middle school students. It may make more sense for them to be located on the ground floor.
d. There is concern about having administration supervision upstairs making sure to separate the two age groups.
e. Investigate placing the reception area to allow high school students to distribute one way and the middle school students the opposite way.
f. Ruidoso middle school was used as an example in reference to a lot of underutilized space. Bloomfield High school was a design that was liked due to its modern feel. Alamogordo forest service building was acknowledged because of its rugged exterior and was relatable to Capitan's hard working culture. There was also mention of the REI building in Denver.
g. The question was raised where the media center would be located. It was suggested to possibly be placed in the center of the building where it could then serve as a control point where schools come together and have viewing access to the outdoor fields and have the ability to bring in natural light. There is a need to investigate the relationship between the grades and media center and how the two populations co-mingle and are separated. The second idea for the media center location would be to place it on the end of the building.
h. A common idea that was agreed upon was to keep an open feel to the building and that "being seen" tends to set a standard of conduct.
    i. Nex-Gen has this concept with the open balcony with a large common space. This allows for great supervision.
i. Definite adjacencies consisted of the following:
    i. ISS – Administration – Nurse – Special Ed
    ii. Principal – Conference Room – Counselor
j. Lockers
    i. Jerrett recommended no lockers for the school but with a question of how do you handle students with sports equipment, books, bags, band equipment, etc? Also suggested to research what other schools were doing. More discussion on lockers will be required before any decisions are made.
    ii. Theft is a concern
    iii. Another suggestion was to incorporate 1/3 of the lockers available which then raised the question on how do you decide who gets a locker. That idea was not viewed as favorable.
k. The culinary arts rooms should likely be located in the new building. It could be located in the multi-purpose building, but there is fear that the program would die if it was put on hold during the multiple phases of construction.

4. User Interview 2 – Middle School General Education Teachers

- Victoria Sedillo – Math
- Jennifer Barnwell – Language Arts / Keyboarding
- Kim King – Math / Language Arts
- Joyce Turnbow – Language Arts / Math / Social Studies
- Jason Hightower- 7th Grade Science
- Jim Clark – 7th/8th Grade Social Studies

- Jerrett Perry – Principal
- Erme Nichols – Title I
- Sandra Smith – Science

a. Brief introductions were given and the overarching district goals and visions from Jerrett and Shirley were explained.

b. Staff were interested in seeing precedent images. It was then explained that the user interviews were to help guide and gain a better understanding of the needs before precedent images and ideas are to be presented.

c. Currently technology is used through smart boards and laptops.

d. Classroom Vision:
    i. It is vital to for classrooms to be multi-functional and easily transformed with easy access to technology and allowing for collaboration.
    ii. Design a setup where students are able to work in groups but still be able to view smart boards in any part of the classrooms. A possible solution would be to add more screens around the classroom.
    iii. Design break out spaces

e. It is important to show the staff and committee what is currently being designed and what a 21st century classroom concept is and how it functions.

f. The staff does not like an institutional look, but there is also a concern with a “fish bowl” concept and potential issues with security.

g. Atrisco Heritage high school (Albuquerque) was mentioned in reference to the lockers and seating areas as well as their break out spaces.

h. Middle school does not use the flip classroom concept due to extracurricular activities and resource availability at home. 90% of the teaching is done in the classroom.

i. **Media Center**
    i. need to make sure everyone has access to material and media while still providing a multi-functional area
    ii. Media center vs books in hand
    iii. Stacks are still needed with storage available, but should not be staffed
    iv. “Starbucks feel”
    v. Technology to be integrated

j. Staff feel existing lockers are too small, thin lockers do not work and need to be able to fit binders, jackets, etc.

k. **Breakout Spaces**
    i. These spaces should be able to hold a class of 20 students to have group discussions and be able to break out / rearrange into groups of 4.
    ii. Spaces need to be technology rich with possible white boards
    iii. Flexible space is ideal referring to the concept that changing learning environments will keep the students more engaged.
    iv. Easy to supervise by one person.
    v. Each school to have their own break out spaces

l. All agree with separating the high school students and middle school students by floor.

m. All agree there should be one main entrance to control who comes in and out of the building**.** An elevator is required by code.

n. Common Areas
    i. Each school to have a designated common area

o. Stair location was discussed to be placed allowing common areas for both schools to create a sense of community and also be easily supervised.

p. Teachers like the long flat files incorporated into the casework as well as the current casework layout and no need for closets.

q. **Support Spaces**
    i. Workrooms – prefer one on each floor
    ii. Staff prefer having two teacher lounges.
        1. Current lounge is too small
        2. Having two lounges allows for better supervision on each floor. If it is to be one lounge, it will need to be able to hold all staff. It is preferred to have separate lounges to be able to hold confidential conversations about specific issues.
        3. D/P/S stated that a single large lounge may serve staff better than two smaller lounges. There is a total square footage that the new facility will have to be designed within. When some spaces get larger, others will have to get smaller.

r. Display area is required to showcase students achievements

s. The design should incorporate greenery (plants)

t. The new facility should have good ventilation and windows to bring in a lot of natural light

u. Design should possibly incorporate a legacy project from the existing facilities. One suggestion are the wood floors in admin building which are said to be the only thing left of the original school house.

5. <u>User Interview 3 – Middle School / High School Science Teachers</u>

- Jason Hightower – 7th grade Science
- Sandra Smith – 6th and 8th grade Science
- Royce Brown – Biology / Health

a. Brief introductions were given and the overarching district goals and visions from Jerrett and Shirley were explained.

b. Computer access is important to have the ability to run statistics, generate graphs and data at the high school level.

c. Currently the high school students are in lecture with smart boards, use virtual labs in a science lab with perimeter seating.

d. Middle school likes a standard instruction space and doesn't necessarily need a lab if a demonstration table and mirror device were present in front of the classroom. This would offer flexibility.

e. The number of lab spaces will need to be evaluated as the utilization studies are conducted. Preference to have 2 labs, although using one is a possibility, due to scheduling difficulties – 8 different curriculums and 20 periods.

f. **Lab**
    i. Incorporate moveable demonstration tables
    ii. flexible space
    iii. Technology driven and state of the art
    iv.
    v. Incubator, exhaust, chemical closet and storage
    vi. Should be incorporated in high school area of facility with easy access to middle school needs – possible bottom floor in the corner of building? Investigate ventilation?
    vii. Needs to support chemistry
    viii. Long tables for students to view microscopes in groups

g. **General Science Classroom**
    i. Can be designed for a regular setup and slightly larger
    ii. sink
    iii. Demonstration table
    iv. Flooring needs to be considered (do not want/like VCT/ tile flooring)
    v. Flexible space
    vi. Storage / casework / book shelves

h. Mescalero Apache School was mentioned to be very tech savvy with a great entry and user friendly campus.
i. Teachers would like to see examples of a 21st century science lab
j. Overall consensus is to include one science lab in the building if possible.

6. <u>User Interview 4 – Special Education</u>

- Elaine Park – Special Ed Coordinator (Middle school and high school)
  Shirley Crawford - Superintendent

a. Brief introductions were given and the overarching district goals and visions from Jerrett and Shirley were explained.
b. Investigate providing a home base in the new secondary facility
c. Currently has (3) level C students with (2) level D coming up, Jerrett to provide student counts D/P/S.
d. There are sometimes medically fragile kids which need an adjacency to the nurse, but the majority of the time not dealing with D level kids at the upper grade levels. Student population is always different.
e. **Office**
    a. Needs to be secure
    b. Provide easy access to conference room for IEPs (groups range from 5-10 people) within Admin suite
    c. Secure storage; files are kept for 7 years
    d. Uses iTV (stated that this setup up works better than projection) and needs good laptop
f. Staff includes (2) teachers and (2) IA's
g. Furniture
    a. It is preferred to have separate tables and chairs
    b. It is ideal to supply furniture for kids that need motion such as a wiggle cushion, chair that slightly reclines, rocker chair, sensory cushion and bungee cords on chair legs to allow the students to move and play.
    c. Involve D/P/S interiors early during programming phase to present furniture options
h. **Pull out Space**
    a. for groups of 8-12 b level students; half classroom?
i. **Classrooms**
    a. Adjacent to office
    b. Similar technology and storage as a general classroom
    c. Include a space for Life Skills in the new facility
    d. (1) High school special ed and (1) middle school special ed are required. Utilization studies to be done will help identify the size requirements. A half classroom size may be suitable to serve the population.
    e. Student groups can range from 8-12 students
    f. Life skills to use culinary arts?
j. **Life Skills**
    a. D level space
    b. small kitchen, shower, and area to do laundry

7. <u>User Interview 5 – High School General Education Teachers</u>

- Tiffany Barry – English I & II
- Jo Beth Vinson – English III & IV
- Angela Romero – Social Studies
- Jim Carlton – Math / Science

- Melanie Sandoval – Math
- Frank Walston – History

a. Brief introductions were given and the overarching district goals and visions from Jerrett and Shirley were explained.
b. Staff expressed interest in facility having designated Student Council space
    a. Storage
    b. Media center as possible location
    c. They like the one at Centennial high school
    d. Student council space is not typically funded by psfa; perhaps this space could have dual uses.

c. Media Center
    a. Would like the media center to be multi-functional and have an open "starbucks" atmosphere rather than a traditional library
    b. Investigate including offices for college prep (scholarship application area), recruiters
    c. Include shared spaces between students while incorporating a separate space for high school students
    d. Possible partitioning the media center so it can be used by multiple schools at the same time
    e. Provide resources and collaboration areas for students
    f. Possibly two stories
    g. Area/office for staff training, webinars, etc
d. Discussed locating high school functions on the ground floor with middle school residing on the second floor
e. Display area for student achievements is required.
f. staff like the break out spaces at Centennial high school and Artisco Heritage
g. Staff prefer one Teachers' lounge possibly located on 2nd floor
h. Breakout spaces for socialization and collaboration
i. Classrooms
    a. Believe average class load will be between 20-27 students. The utilization study and further investigation will inform projected class sizes.
    b. Provide ample space for working on projects
    c. Storage
    d. staff expressed an interest in having sinks in classrooms
        i. D/P/S wanted staff to consider the potential maintenance issues that arise, their cost and that PSFA may not participate in that cost
    e. Math wants to organize students/classrooms by discipline, not grade. There is a concern with organizing the students in this way, but perhaps the classrooms can be designed similarly to allow for this opportunity in the future.
    f. Classrooms will likely be smaller than the existing high school classrooms but will be more efficient and function better
    g. Would like the ability to reconfigure furniture and sliding marker boards
j. Outdoor amphitheater
    a. PSFA has mentioned concern about such outdoor spaces not being used
    b. Staff said that it does not need to be a formal space, but outdoor learning areas
    c. Jerrett feels as if staff/students will utilize the space
k. Flooring
    a. Concrete

i. Easy to maintain
ii. Overall consensus for having polished concrete in the hallways
iii. Combo of concrete and carpet in classrooms

b. Carpet
i. Like the middle school carpet
ii. Quiet and like the carpet tile in case you need to replace and area
iii. Powerbond is an option and can be hosed down
iv. Concern of maintenance of carpet
v. Kids like to sit on the floor

l. Workrooms
a. Would like to have 2 workrooms – one on each floor
b. Centrally located

m. want a "green" building with a lot of natural light and views to landscaping around the building
n. Investigate Cloudcroft special ed setup (including life skills, classroom and office)

8. <u>User Interview 6 – Computer /Technology</u>

- Jennifer Barnwell – Keyboarding
- Shirley Wood – Business Comp App, Web Design, Multi-Media, Yearbook, Dual Credit
- Robert Miller – IT
- Anita Sambrano – Culinary Arts / Alternative School

a. 6th graders take keyboarding and 7th/8th graders don't have computers, technology is integrated in classroom instruction
b. Robert is planning to use tablets with keyboards in the future, but will need full size keyboards for 6th grade keyboarding. Failed model this year per Robert: laptops for lab use with keyboards, mouse and flag screens on a docking stations and had issues with reliability.
c. Prefer fixed perimeter stations to monitor all computer stations or can switch classroom around where the teacher teaches from back still being able to monitor all screens during instruction
d. Culinary Arts
a. Located near life skills
b. Service access adjacency
c. Need to have visual to bakery area
d. Current dining area is too large,
e. Full kitchen

e. **PLATO Lab** (all online based)
a. Can be designed as a general classroom
b. Needs to have at least 40 stations
c. Serves middle and high school students
d. Wifi
e. Location preferred near stairs for easy access for middle and high school students
f. Has 7 periods a day but doesn't need to be hard wired. This needs to be on laptops
g. Short Cycle assessment testing currently, size will change due to teachers being responsible for this testing in future.

f. **Dedicated multi-media/computer lab** adjacent to media center
g. (1) High-end lab and (1) General Lab (i.e. PLATO, keyboarding)
a. C.O.W.s would work for 6th grade keyboarding

b. Raised flooring?

9. Precedents will be identified and presented to the steering committee and staff based on the input provided.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Minutes

AGENDA

Project No.: 14-0005
Project: New Capitan Secondary School
Date: 3/20/2014

Discussion Items:

Our **goal** for these discussions will be to begin to define the physical and performance requirements for the new facility which will guide its design and development.

10:30-11:30: SHIRLEY'S OFFICE	Meet with administration – counselor, receptionists, principal
12:00-12:45 (working lunch): MS LOUNGE	Middle School general education teachers
1:00-2:00: BOARD ROOM	MS/HS science teachers
2:00-3:00: BOARD ROOM	Special Education staff
3:15-4:05 (7th period): HS OFFICE	High School general education teachers
After school: BOARD ROOM	Shirley, Jennifer, Anita, Tech

END OF AGENDA

	NAME	ROLE	EMAIL
	Rebekah Stephens	Counselor	rebekah.stephens@capitantigers.org
(1) ADMIN	Jereth Perry	Principal	jereth.perry@capitantigers.org
	Jessica Becker	AD / Teacher / Coach	jessica.becker@Capitantigers.org
	Stephanie Alder	MS Secretary	stephanie.alder@capitantigers.org
	Gwen Jones	MS Secretary	gwen.jones@capitantigers.org
(2) MS EDU	Victoria Sedillo	MS Math	victoria.sedillo@capitantigers.org
General	Jennifer Barnwell	MS LA/Kybdg	jennifer.barnwell@ " "
	Kim King	MS Math/LA	Kimberly.King@ " "
	Joyce Turnbow	(MS) LA/MATH/Soc. St.	joyce.turnbow@capitantigers.org
	Jason Hightower	7th Science	jason.hightower@ " "
	Jim Clark	7th & 8th Social Studies	jim.clark@capitantigers
	Jereth Perry	MS/HS Principal	jereth.perry@capitantigers.org
	Esmeralda Sedillo	MS Title I	esmeralda@ " "
	Sandra Smith	6th-8th Science	sandra.smith@cap....
(3) MS/HS Science	JASON HIGHTOWER		
	SANDRA SMITH		
	Royce Brown	Biology/Health	royce.brown@capitantigers.org
	Elaine Park	Secondary SPED Coordinator/Teacher	elaine.park@capitantigers.org

MIDDLE SCHOOL

PRINT NAME	SUBJECT / TITLE	EMAIL
Tiffany Barry	English I, II Teacher	tiffany.barry@capitantigers.org
JoBeth Vinson	English III, II Teacher	jobeth.vinson@ " "
Angela Romero	Social Studies / Science / Art / Theatre	angela.romero@ " "
Jim Carlton	MATH / SCIENCE	JIM.CARLTON@ " "
Melanie Sandoval	Math / Teacher	melanie.sandoval@capitantigers.org
FRANK WALSTON	History / Teacher	frank.walston@capitantigers.org

COMPUTER

Jennifer Barnwell	Keyboarding	jennifer.barnwell@capitantigers.org
Shirley Wood	Bus. Comp Apps, Web Design, Multimedia, Yearbook, Dual Credit	~~school~~ Shirley.Wood@Capitantigers.org
Robert Miller	IT	robert.miller@capitantigers.org
Anita Sambrano	Culinary Arts / Alternative School	anita.sambrano@capitantigers.org

Meeting Minutes

Project No.:	14-0005
Project:	New Capitan Secondary School
Date:	March 31, 2014
Place:	Capitan Board Room
Attending:	see sign in sheet
By:	D/P/S Dekker/Perich/Sabatini, Ltd. 7601 Jefferson NE, Suite 100 Albuquerque, NM 87109
Copies To:	Steering Committee, design team
Issue Date:	April 4, 2014

Discussion Items:

The **purpose** of the meeting was to update the committee on the programming progress and set goals in the context of the current trends and best practices.

1. D/P/S gave a project update to the committee:
   a. District Goals and Vision were shared as discussed with Superintendent Crawford and Principal Perry.
      i. 21st Century Learning Environment
      ii. Technology-rich
      iii. World class education in a small, rural school
      iv. Student-centered
      v. Collaborative
      vi. Multi-functional, flexible spaces (*consistent, standard designed spaces*)
      vii. Safe and welcoming (*clear recognizable main entry, point of control*)
      viii. Middle school and high school retain their own identity while incorporating a sense of community
      ix. Ease of maintenance
   b. User interviews were conducted to start to define the physical and performance requirements for the new facility which will guide its development. These discussions were framed by the district vision. Meeting minutes will be distributed to the staff and steering committee. The teachers were urged to think long-term and to make comments not on how they teach today, but how best to deliver the District's vision of education based on the ideas listed above. The following main ideas from the user groups were presented to the committee:
      i. 1 Main Entry
      ii. Safety
      iii. Administration area to support both schools
      iv. Administration supervision available on 2nd floor
      v. Open Concept + Sense of Community
      vi. Technology-rich
      vii. Flexible Media Center
      viii. Student Collaboration – Break-out spaces?
      ix. Flexible & Multi-functional Classrooms
      x. Teach how students learn vs how teachers teach.
      xi. Flexible & Functional Furniture
      xii. Separate high school and middle school
      xiii. Common areas
      xiv. Teacher support spaces on each floor
      xv. General Storage areas
      xvi. Showcase Area to display student achievements

xvii. Student Council Space + Storage
xviii. Natural Light

c. District vision and teacher comments are not completely aligned. As project goals are established by the steering committee, concepts will have to be balanced and prioritized.

2. D/P/S presented various precedents to the committee based on the feedback provided from staff.
   a. The **SCALE UP Classroom**: (**S**tudent **C**entered **A**ctive **L**earning **E**nvironment **U**pside down **P**edagogies). This is a common design for higher education classrooms and beginning to trickle down to high school and middle schools. Classroom design allows students to engage in the learning process more and see presentation material easier. All favored the SCALE UP concept and technology integration.
   b. PSFA experience has shown that furniture is critical for flexibility. It is important that furniture design coincides with the building design. Vendors offer to perform this work "free", but this will not save money. Like classrooms, furniture should be standardized and should work well for all spaces. Integrating wiring in the furniture should be avoided, but instead offer a path for wiring.
   c. Staff like the teaching unit that offered storage behind layered white boards. Casework can be a big cost and will need to be considered during design. Casework that is separated as upper and lower units with a counter can be more costly and less functional.
   d. Floor boxes are hard to clean and cause difficulty for maintenance. They are not flexible and don't allow layout reconfiguration over time.
   e. All preferred **Science Labs** that were flexible and that could serve as both typical classroom and lab space. Shirley preferred the technology-rich lab space set up with computers.
   f. The committee liked the brightness and openness that interior windows offered the classrooms. The visibility will promote a level of conduct for all users.
   g. **Collaboration Space** that felt open was favored. The steering committee liked the image of UNM Collaborative Teaching and Learning Building with its floor to ceiling glazing, flexible furniture and marker board. Windows and presentation needs will need to be balanced. All like the "huddle boards" (marker boards) and their promotion of problem solving and collaboration.
   h. The **Media Center** should be treated as a **Commons**. This space should support collaboration, gathering, student and teacher technology needs (go "plug in") and should extend to the exterior. This space should be open and can happen on two connected floors and should allow for supervision. Committee did not like furniture booths for small group breakout.
3. Goal setting began and will be continued at the next steering committee meeting.
   a. Initial thoughts included:
      i. Technology-rich; "full campus integration"
      ii. Open: education on display
      iii. Natural light
      iv. Open feel, but cozy
      v. Controlled access
      vi. Flexible infrastructure
   b. More discussion to take place regarding spaces shared between middle and high school students and how to treat the two populations in the new facility. Expectations must be placed on older kids while still providing a safety net for 6th graders. The design of the new building will help promote standards of conduct. District policies can help the 5th grade transition to 6th grade.
   c. The committee may not always agree on subjects, but it is important that all voices are heard, items are voted on and the committee moves forward in a solid direction.
4. The committee discussed community outreach. It is important to get the right information out and do so quickly and often. The committee will strategize this at the next meeting.
5. The next committee meeting will be held April 28, 2014 from 6-7:30. The committee is to think about goals and community outreach.

Attachments:
PowerPoint presentation and other education planning resource material

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Minutes

Capitan Municipal Schools

March 31, 2014

Agenda

- Project Update
  - Determining district vision / goals
  - Overview of user interviews
- Precedent Presentation – *21st Century Learning Environments*
- Goal Setting – *Interactive discussion*
- Community Outreach
- Next Steps
  - CMAR
  - Programming and Utilization

Overall District Goals & Vision

- 21st Century Learning Environment
- Technology-rich
- World class education in a small, rural school
- Student-centered
- Collaborative
- Multi-functional, flexible spaces (*consistent, standard designed spaces*)
- Safe and welcoming (*clear recognizable main entry, point of control*)
- Middle school and high school to retain their own identity while incorporating a sense of community
- Facility easy to maintain

Overview of User Interviews

- 1 Main Entry
- Safety
- Administration area to support both schools
- Administration supervision available on 2nd floor
- Open Concept + Sense of Community
- Technology-rich
- Flexible Media Center
- Student Collaboration – break-out spaces?
- Flexible & multi-functional classrooms
- Spaces that support how students learn versus how teachers teach
- Flexible & Functional Furniture
- Separate high school and middle school
- Common areas
- Teacher support spaces on each floor
- General Storage areas
- Showcase area to display student achievements
- Student Council space + storage
- Natural Light

21St Century Learning

List of 21st Century Skills
from http://movingforward.wikispaces.com/21st+century+skills

- **Problem solving**
- **Synthesizing across content areas**
- **Interpersonal communication**
- Search strategies
- Information credibility
- Dealing with information overload
- How to write for an online, rather than print, environment
- **Computerized presentation skills**
- Workspace ergonomics
- Basic debugging
- **How to use and apply information**
- Reflection
- Cross-cultural communication
- **Authentic Learning**

21St Century Learning

Attributes of a 21st Century Learner
from: http://blog109.org/communities/dsherman/archive/category/1883.aspx

A 21st Century Learner…

- **is curious**
- **asks questions**
- accesses information from a variety of sources
- analyzes information for quality
- communicates using a variety of media
- gathers and communicates information and employs technology ethically
- **adapts to an ever changing information landscape**
- needs a supportive network
- **is a partner in his/her education**
- manages time effectively
- **has the ability to prioritize and plan effectively.**

21St Century Learning

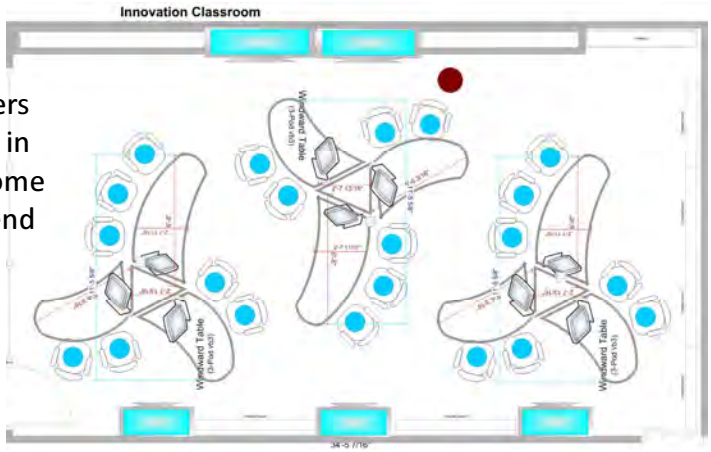
Windward School Los Angeles, CA
Grades 7-12

SCALE-UP
Student-Centered Active Learning Environment with Upside-down Pedagogies

"Flip" traditional idea of instruction

- Students become the teachers
- Things that typically happen in the classroom, happen at home
- develop material based on end product

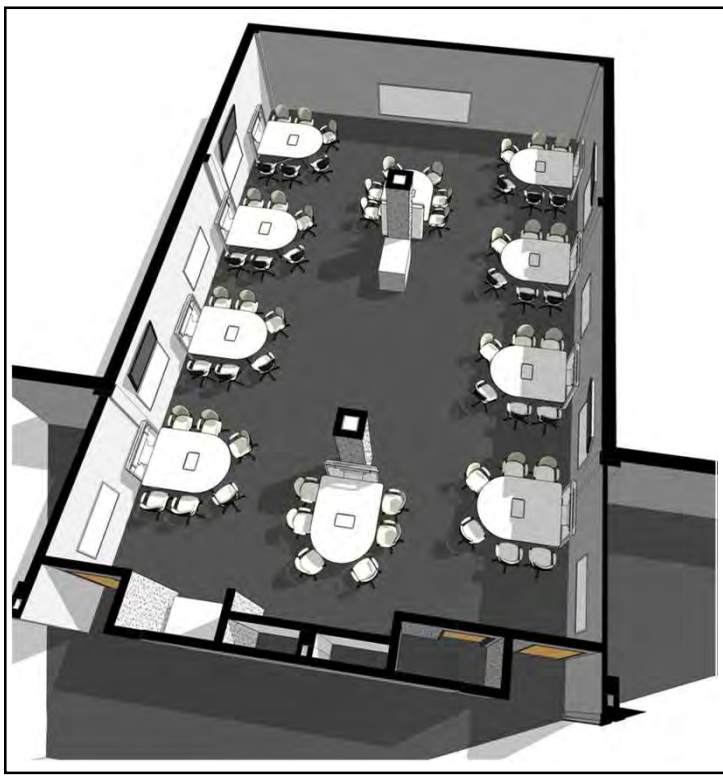
https://www.windwardschool.org/podium/default.aspx?t=52562&a=137468&play=1

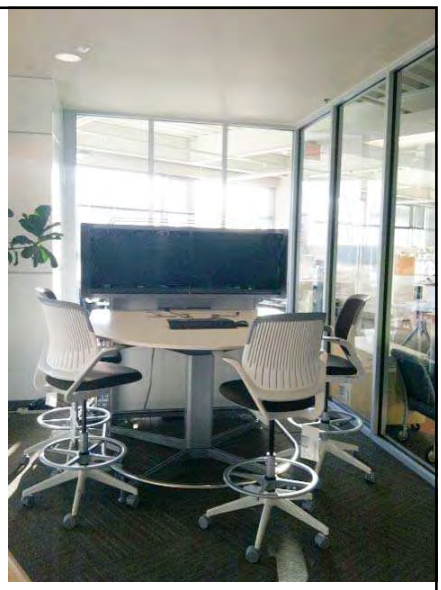


21St Century Learning

Windward School Los Angeles, CA
Grades 7-12

*"Our Middle School program provides a challenging, stimulating learning environment. We know that young adolescents learn best when they **engage actively** with material. Our innovative classrooms **inspire** students to develop the academic and **critical thinking** skills needed for **success** in Upper School and in life."*



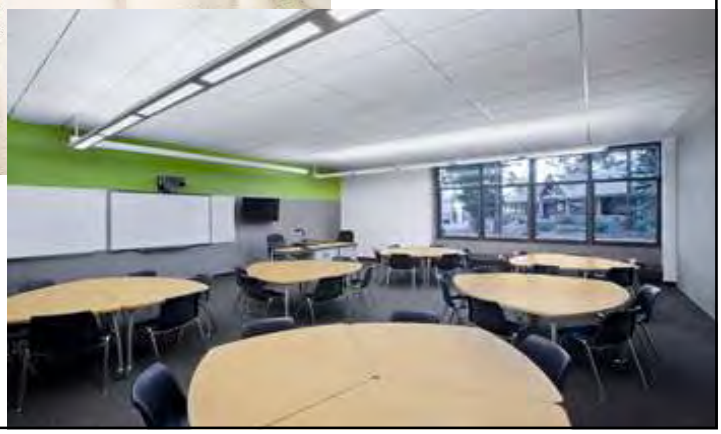



UNM Collaborative Teaching & Learning

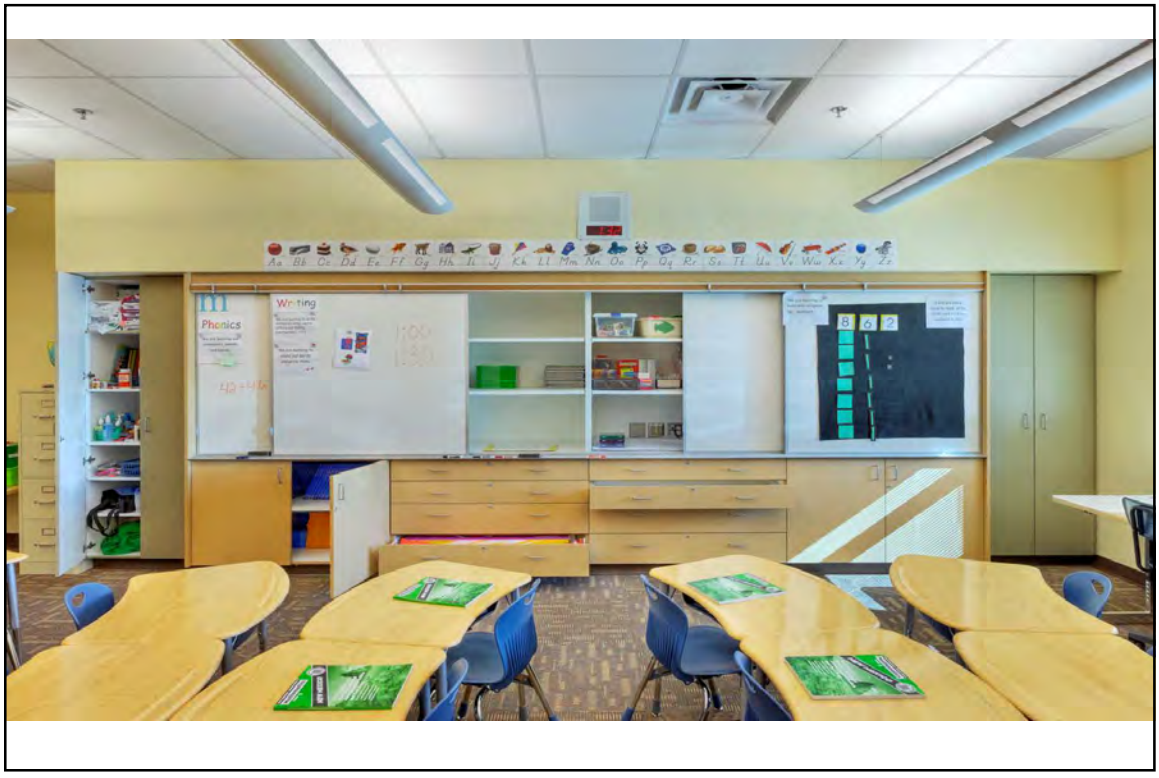
flexible furniture

flexible furniture

flexible furniture



Los Alamos middle school


Phonics
Writing


nex+Gen Academy

Science Classroom & Labs

Science Classroom & Labs

Centennial high school

Science Classroom & Labs

Del Norte high school

Science Classroom & Labs

Los Alamos middle school

Science Classroom & Labs

Los Alamos Middle School

Science Classroom & Labs

Science Classroom & Labs

Common Areas / Break-out Spaces

- Physical “heart” of the school
- Multi-purpose space linking major school components together
- Blurs traditional spatial boundaries
- Accommodates health and wellness activities
- The cultural and intellectual nucleus of the school

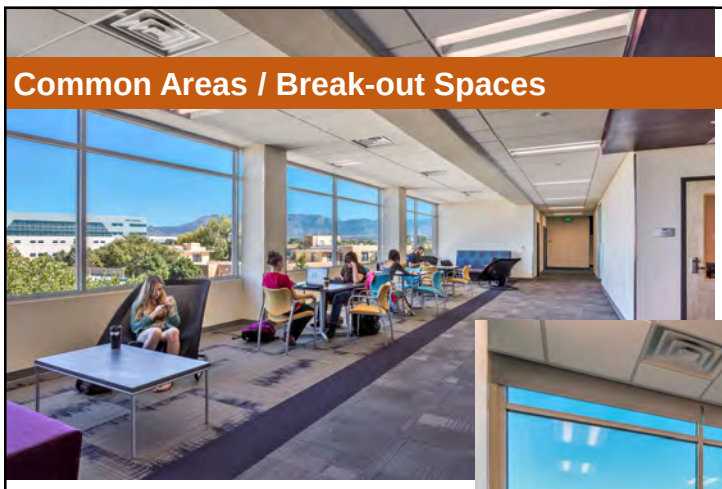
Common Areas / Break-out Spaces

nex+Gen Academy

Common Areas / Break-out Spaces

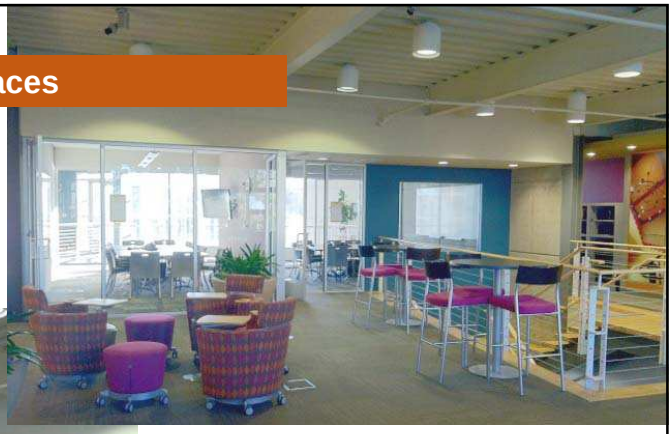
nex+Gen Academy

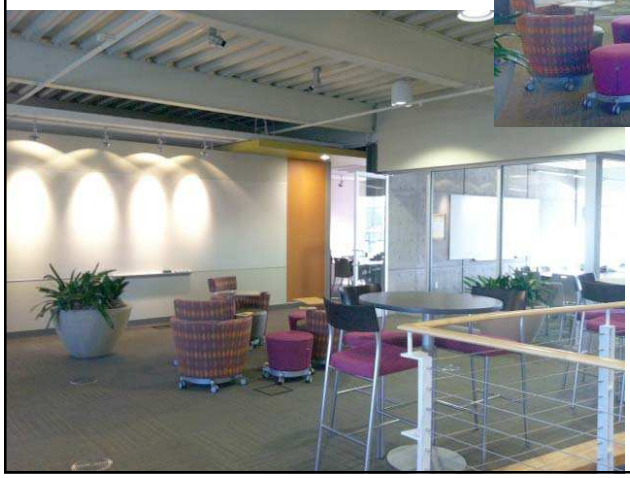
Common Areas / Break-out Spaces



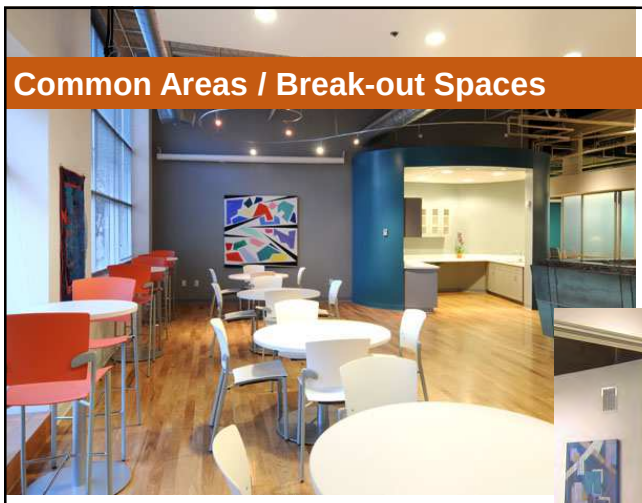
UNM Collaborative Teaching & Learning

Common Areas / Break-out Spaces

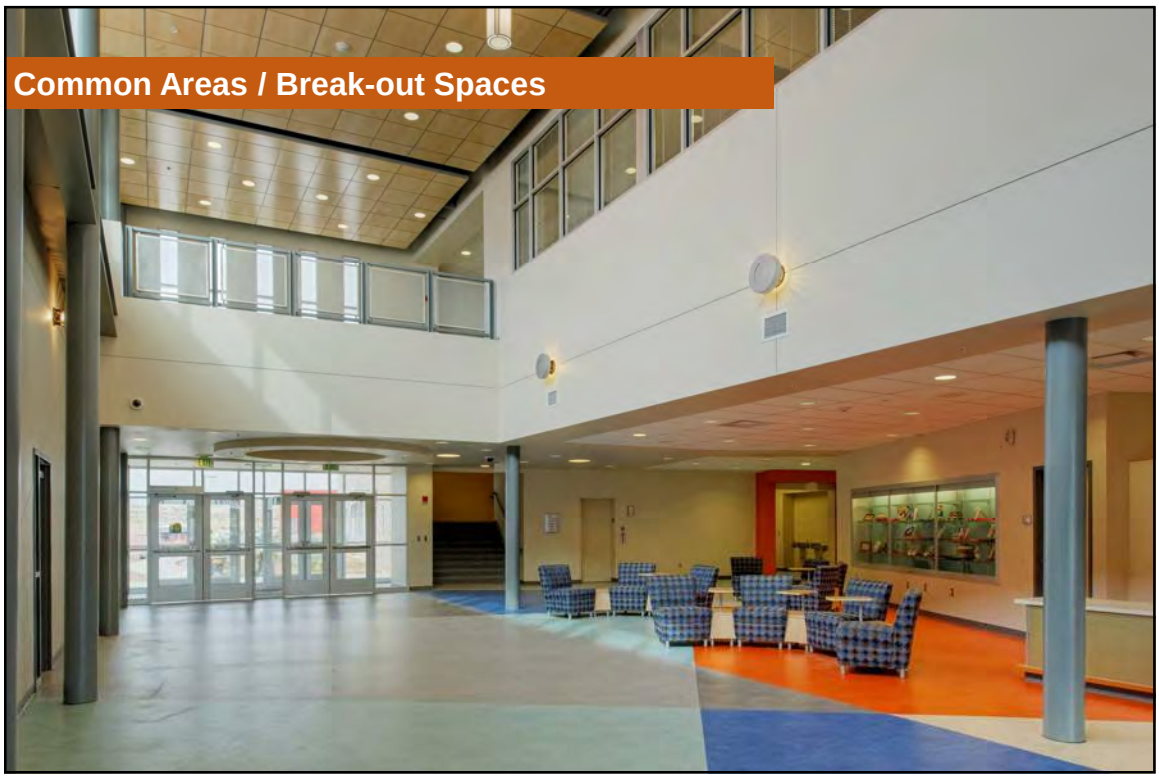




Common Areas / Break-out Spaces

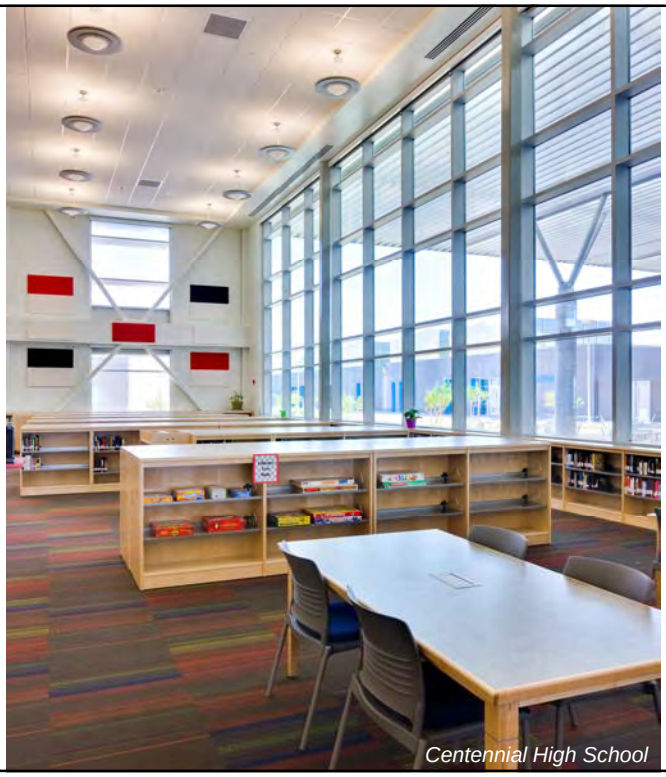


Common Areas / Break-out Spaces



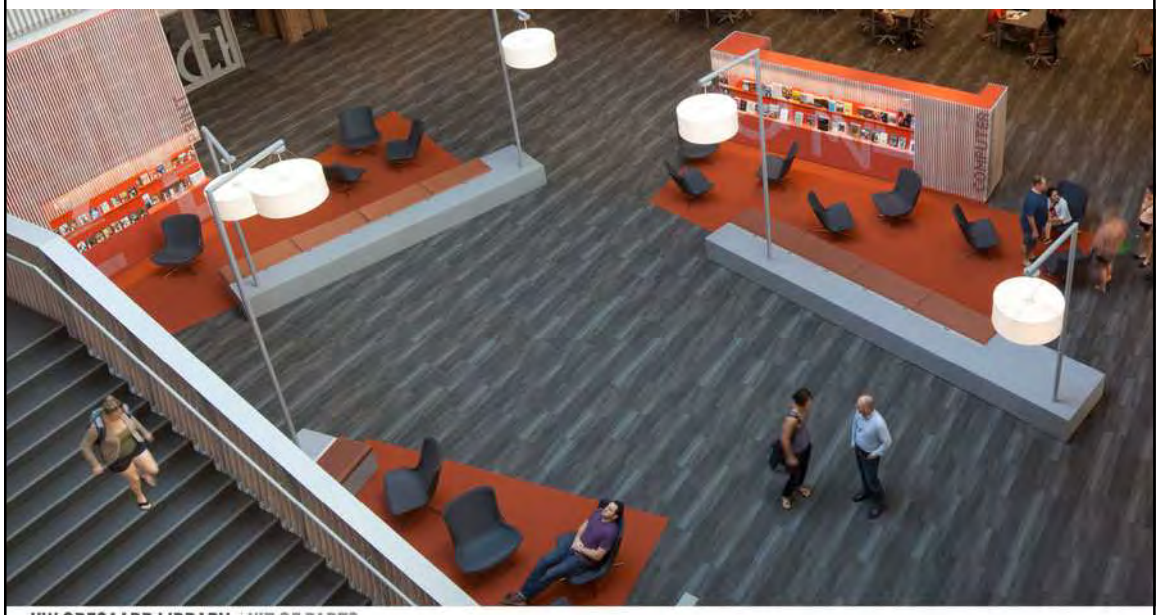
Library / Media Center

Del Norte High School



Centennial High School

Los Alamos Middle School



UW ODEGAARD LIBRARY | KIT OF PARTS

A NEW COLLABORATIVE LEARNING ENVIRONMENT

The design team was enlisted by the University of Washington to renovate the 165,000-square-foot Odegaard Undergraduate library — and re-imagine it as a learning commons of the twenty-first century. Approximately 10,000 students use the building each day, as a place for collaboration, research and technology access.

The University envisioned the library as the epicenter for creating pedagogical change on campus. The team worked with UW instruction researchers to create an insertion into the building for learning behaviors such as: discovery of collection, consultation, prototyping, and production. Each insertion is color-coded to create a recognizable family within the existing building.

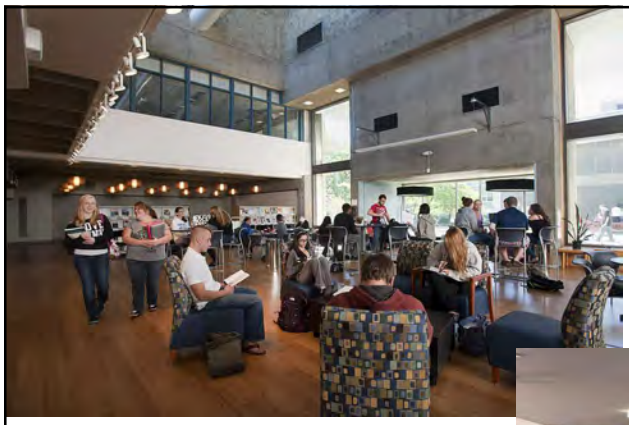
2013 LEARNING MODEL

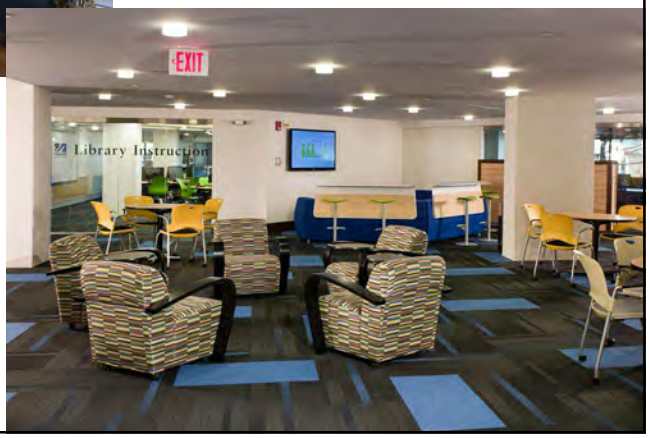
1970'S LEARNING MODEL

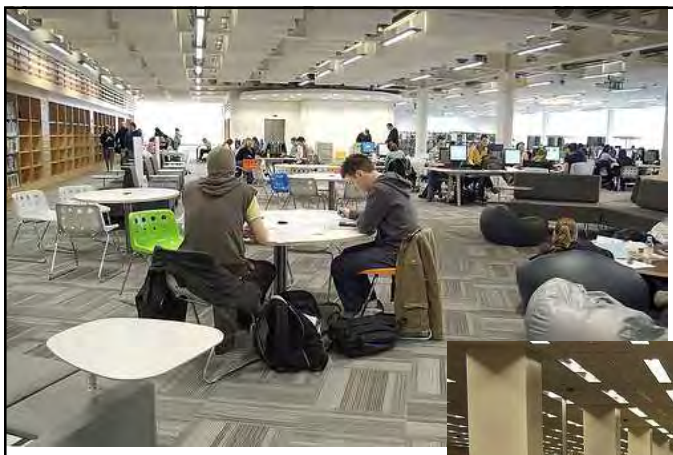
UW ODEGAARD LIBRARY | MODES OF LEARNING

Team spaces incorporate flat-screen monitors for students to plug in personal laptops and share content. Classrooms have no teaching station at the front — students sit in round "pods" and work together while the instructor moves between the groups.

UW ODEGAARD LIBRARY | KIT OF PARTS








GROUP3 PLANNERS
www.group3planners.com


nex+Gen Academy | Albuquerque NM

Goal Setting

What are the **big picture** things that Capitan Secondary School has to be/do to succeed?

Think about:

- ✓ Function
- ✓ Identity/image
- ✓ Relationship to site community
- ✓ Long term operations

Community Outreach

Next Steps:

- CMAR
- Programming and Utilization

Meeting Minutes

Project No.:	14-0005
Project:	New Capitan Secondary School
Date:	April 28, 2014
Place:	Capitan School Board Room
Attending:	See sign in sheet
By:	D/P/S Dekker/Perich/Sabatini, Ltd. 7601 Jefferson NE, Suite 100 Albuquerque, NM 87109
Copies To:	Steering Committee, design team
Issue Date:	May 20, 2014

Discussion Items:

The **purpose** of the meeting was to set and prioritize goals in the context of the current trends and best practices and to present the preliminary program of spaces.

1. D/P/S gave a project update to the committee:
   a. Before the steering committee meeting, D/P/S gave staff a brief presentation sharing the project update, images of 21st century learning environments and trends, test fit diagrams, the utilization study and preliminary program.
   b. **April / June PSCOC Meeting**
      i. April meeting went very well. Ovidiu, Matt and Shannon attended along with Ed by telephone. Committee and school district were praised for communication and overall was a very positive meeting.
      ii. The goal for that meeting was to have the award language changed to be a secondary school to serve grades 6-12 and renovation and addition to the middle school to serve grades K-5 as was voted on by the school board and steering committee.
      iii. At the June PSCOC meeting, Capitan will ask for the advance for the next phase of work. Representation by some of the steering committee members would be very positive.
      iv. Ovidiu stated that this project has a lot of support from the council. Asking for the advance would allow the project to go forward with CMAR and have the money allocated.
      v. This process will not affect the construction timeline.
      vi. Matt will re-work the schedule and present at the next steering committee meeting.
      vii. Shirley stated the current enrollment is 280 students. 127 middle school and 153 high school. The award language states that project is to be designed for 290 students. DPS will make sure the program reflects the correct number.
      viii. The community meeting will be held after the funding is secured.

2. **Goal setting** interactive discussion to establish and prioritize goals for the new facility.
   a. The team will use these goals throughout the project as the design criteria for the new building.
   b. Below is a prioritized list of goals agreed upon by the steering committee:
      1. **Technology-rich**; "full campus integration" (**21 Votes**)
      2. **Easy to maintain** and operate (**18 votes**)
      3. **Controlled access**; secure and safe (**11 votes**)
      4. **Open** –"Education on display" (**10 votes**)
      5. **Natural light** (**9 votes**)
      6. **Flexibility**-education spaces and infrastructure (**9 votes**)
      7. **Warm and inviting** – non-institutional (**9 votes**)
      8. **Collaboration space** (**5 votes**)

9. **Open feel, but cozy** (**2 votes**)

c. General comments:
   i. Justin did not like the look and feel of Centennial high school. Stated it gave a cold feeling, did not like the exterior of the building, it felt like a prison / institutional. Liked the media center and the entry.
   ii. Justin stated he liked the look of split face block, wants warm and inviting atmosphere
   iii. Jerrett wants to visit the idea of having 2 science labs
   iv. Perhaps the middle school science lab doesn't have to be as large as the high school lab
   v. Interaction between schools will happen, but schedules will be different.

3. **Test Fits** were presented to the steering committee showing two options of preliminary space planning for general classroom size and layout.
   a. Test fit sizes were determined by examining the student population, academic program and staff and general classroom space requirements.
   b. The test fits presented accommodate 22-24 students@ 725sf, use the SCALE UP model with a square proportion, include flexible furniture, flat screens and huddle boards on each wall. These classrooms are smaller than the existing classrooms at the middle and high school, but will allow for more flexibility and better accommodate the current and projected enrollment. The test fits illustrate the spaces' flexibility showing multiple configurations for various teaching styles and strategies.

4. The **utilization study** was presented to the committee showing the projected utilization for the new facility to be about 86%. The utilization of the existing middle and high school buildings are less than 70%. Studying the utilization helps determine the space requirements for the program and makes sure that the facility is "right sized" so that district is not paying to maintain and operate unused space.
   a. All general classrooms have very good utilization.
   b. The culinary arts space has a very low utilization. This program will be evaluated as the project progresses.

5. General Comments:
   a. Middle school science program may be served by a hybrid general classroom which may possibly include sinks at the perimeter and adjacent storage for a mobile demonstration table.
   b. One idea discussed was that the high school science lab and a general classroom could be joined by a science prep room so both spaces have access, storage and prep space.
   c. Design spaces should serve more than one function, i.e. culinary arts, health, etc.. If the culinary arts program remains, it should be adjacent to the common space and be utilized as a place to eat.
   d. A question was raised if it was worth spending money on culinary arts if only10 students are participating and will it be utilized as it should be? There needs to be a discussion held at a board meeting determining the life of the culinary arts program? Is there a possibility to provide a different location for the program? If this subject is revisited in the future, perhaps culinary arts program can reside within the multi-purpose building.
   e. If there was no designated computer lab, maybe there is a space designed within the media center that can hold a computer class. Does that space have raised flooring and dedicated computers vs students and laptops?

6. Preliminary **Program of Spaces** was presented to the committee showing what spaces the design team has identified so far for the new facility. The program of spaces also shows the minimum adequacy standards as identified by the state and the proposed size and quantity based on the test fits and utilization study done.
   a. D/P/S is currently in the process of working with Jerrett and staff in determining the spaces that are needed.
   b. D/P/S is to verify the design capacity and how that may affect classroom and space sizes.
   c. The media center in the new facility is identified as 2,465 sf. This size is determined by the design capacity of the new school. This could be one large space or broken up into separate spaces throughout the building.
   d. The program of spaces shows the new facility to be 26,464 sf. This number will fluctuate as programming is finalized.

8. **CMAR** selection committee was decided on by the steering committee:
   a. Daryl Lindsay – Steering Committee

b. Dennis Rich – Steering Committee
c. Ovidiu Viorica – PSFA
d. Justin King – Steering Committee
e. Ricky LeMay – steering committee
f. Matt McKim – Dekker /Perich/Sabatini

9. Committee reviewed the RFP schedule and process and established the following dates together:
   a. Meeting focused on signing off on programming – May 22nd
   b. Schematic Design Charrette – June 3rd
   c. Advertise – June 14th
   d. Pre-proposal – June 24th
   e. Qualifications – July 17th
   f. Committee evaluation / select proposal submission – July 24th
   g. Proposals Due – August 5th
   h. Notify short list – August 6th
   i. Interview – August 13th
   j. School board – August 14th
   k. Notice of Intent to award – August 15th.

10. Next Steps:
   a. The next steering committee meeting will be May 22 at 6pm. D/P/S will present the final programming for committee review before submitting to PSFA.
   b. D/P/S will do an all-day design charrette on June 3rd to give a jump start on Schematic Design. The design team will work on developing options on site. Members of the steering committee are welcome to pop in and out. That night, preliminary design options will be presented to the committee for comment.

Attachments:
Powerpoint presentation.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Minutes

	A	B
2	**PRINTED NAME**	**SIGNATURE**
3	Ovidiu Viorica - PSFA	
4	Daryl Lindsay	
5	April Lindsay	
6	Dennis Rich	
7	Kimberly Stone	
8	Neal Morrow	
9	Kristi Morrow	
10	JERRETT PERRY	
11	Jessica Becker	
12	Brian Newell	
13	ED Vincent	
14	Mary Crawford	
15	MATT McKIM	
16	Jason King	
17		
18		
19		
20		
21		
22		
23		
24		

Capitan Municipal Schools

April 28, 2014

Agenda

1. Project Update
   - April PSCOC Meeting
   - June PSCOC Meeting
2. Goal Setting
3. Review Preliminary Program of Spaces
4. Community Outreach
5. CMAR
   - Review RFP schedule/process
   - Selection Committee

Goal Setting

What are the **big picture** things that Capitan Secondary School has to be/do to succeed?

Think about:

- ✓ Function
- ✓ Identity/image
- ✓ Relationship to site community
- ✓ Long term operations

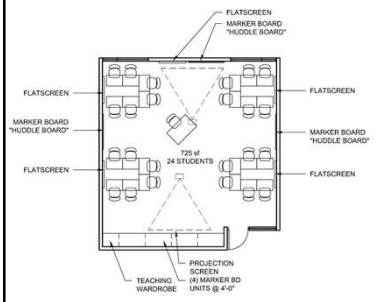
Goal Setting

Initial goals discussed 3/31/14 Meeting:

- Technology-rich; "full campus integration"
- Open – "education on display"
- Natural Light throughout
- Open feel, but cozy
- Controlled Access; secure and safe
- Flexibility; both education spaces and facility infrastructure
- Active common space

What else??

Test Fit – Typical Classroom Option 1



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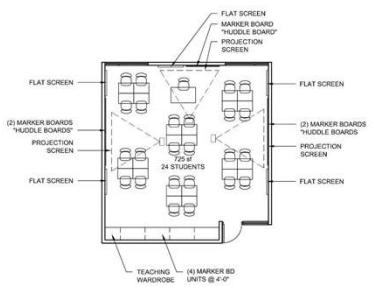

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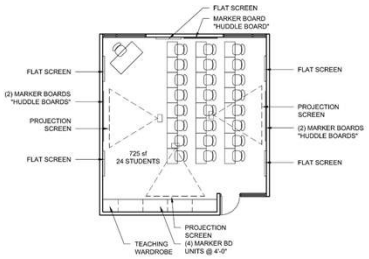
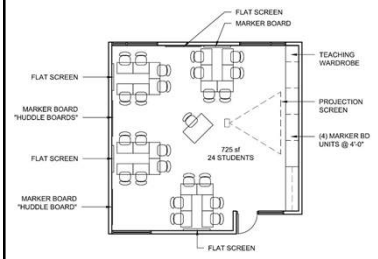
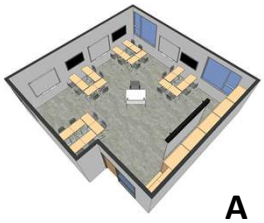


C

Test Fit – Typical Classroom Option 2





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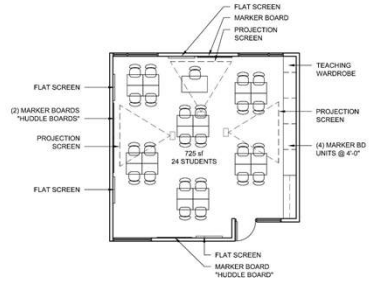

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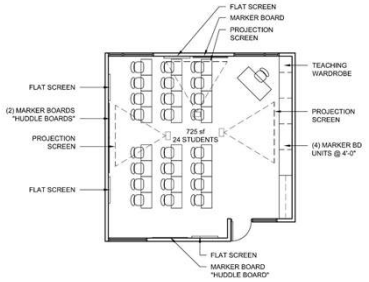


C

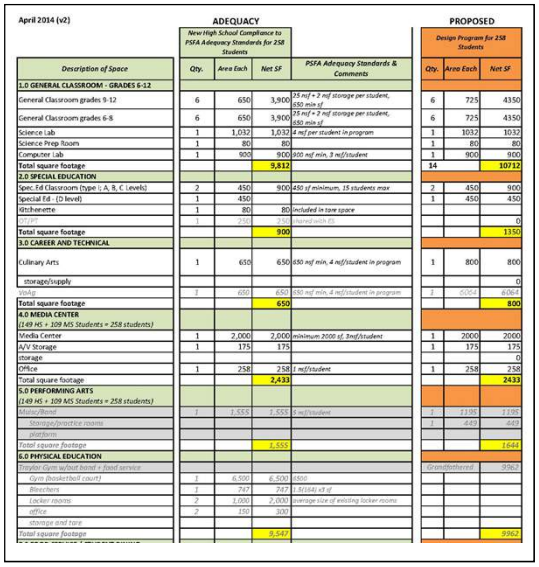
Utilization

In Use	
Vacant	
Underutilized	

Capitan Secondary School									PDS Used Per Day	% of PDS used per Day
Use	**Teacher**	**Period 1**	**Period 2**	**Period 3**	**Period 4**	**Period 5**	**Period 6**	**Period 7**		
HS English (III & IV)	Vinson								7	100%
HS Math	Sandoval								7	100%
HS Math	Carlton								7	100%
HS Science	Brown								5	71%
HS Social Studies	Walston								7	100%
HS Social Studies/ Eng (I & II)	Romero								7	100%
HS Business Education/PLATO	Sambrano								7	100%
HS/MS Science Lab	Brown/Hightower								2	29%
MS Science	Hightower								5	86%
MS Lang Arts/Keyboard	Barnwell								7	100%
MS History	Clark								6	86%
MS 7th & 8th Lang Arts/ 7th Math	King								6	86%
MS 8th Math/ 7th lang arts	Sedillo								6	86%
MS Math/intro to art	Turnbow								7	100%
Culinary Arts	Sambrano								1	14%
Special Ed HS	*Park*								*7*	*100%*
Special Ed MS	*Park*								*7*	*100%*
Comp Lab									*0*	*0%*
Media									*0*	*0*

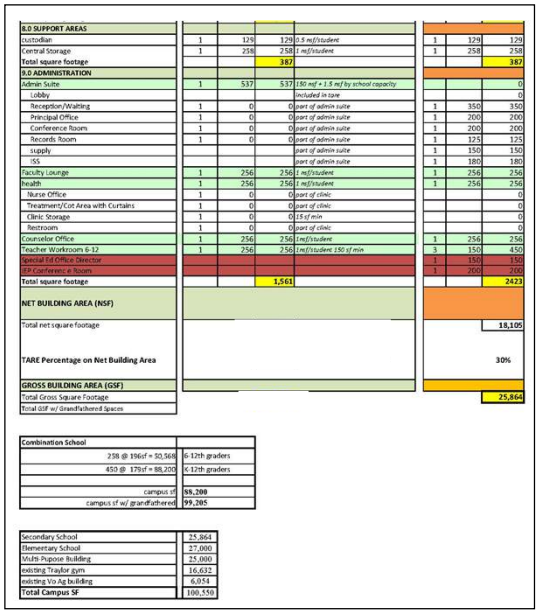
HS & MS Overall Utilization Rate	86%

Preliminary Program of Spaces



April 2014 (v2)

	ADEQUACY				PROPOSED		
	New High School Compliance to PSFA Adequacy Standards for 258 Students				Design Program for 258 Students		
Description of Space	Qty.	Area Each	Net SF	PSFA Adequacy Standards & Comments	Qty.	Area Each	Net SF
1.0 GENERAL CLASSROOM - GRADES 6-12							
General Classroom grades 9-12	6	650	3,900	25 nsf + 2 nsf storage per student, 650 min sf	6	725	4350
General Classroom grades 6-8	6	650	3,900	25 nsf + 2 nsf storage per student, 650 min sf	6	725	4350
Science Lab	1	1,032	1,032	44 nsf per student in program	1	1032	1032
Science Prep Room	1	80	80		1	80	80
Computer Lab	1	900	900	900 nsf min, 3 nsf/student	1	900	900
Total square footage			9,812		14		10712
2.0 SPECIAL EDUCATION							
Spec. Ed Classroom (type I: A, B, C Levels)	2	450	900	450 sf minimum, 15 students max	2	450	900
Special Ed - (D level)	1	450			1	450	450
Kitchenette	1	80	80	included in tare space			
[illegible]	1	350	350	shared with ES			0
Total square footage			900				1350
3.0 CAREER AND TECHNICAL							
Culinary Arts	1	650	650	650 nsf min, 4 nsf/student in program	1	800	800
storage/supply							0
Shop	1	650	650	650 nsf min, 4 nsf/student in program	1	5054	6064
Total square footage			650				800
4.0 MEDIA CENTER							
(149 HS + 109 MS Students = 258 students)							
Media Center	1	2,000	2,000	minimum 2000 sf, 8nsf/student	1	2000	2000
A/V Storage	1	175	175		1	175	175
storage							0
Office	1	258	258	1 nsf/student	1	258	258
Total square footage			2,433				2433
5.0 PERFORMING ARTS							
(149 HS + 109 MS Students = 258 students)							
Multipurpose	1	1,555	1,555	6 nsf/student	1	1195	1195
Storage/practice rooms					1	449	449
platform							
Total square footage			1,555				1644
6.0 PHYSICAL EDUCATION						Grandfathered	9962
Traylor Gym w/bat band + fixed service							
Gym (basketball court)	1	6,500	6,500	6500			
Bleachers	1	747	747	(1.5/164) sf sf			
Locker rooms	2	1,000	2,000	average size of existing locker rooms			
office	2	150	300				
storage and tare							
Total square footage			9,547				9962



8.0 SUPPORT AREAS						
custodian	1	129	129	0.5 nsf/student	1	129	129
Central Storage	1	258	258	1 nsf/student	1	258	258
Total square footage			387				387
9.0 ADMINISTRATION							
Admin Suite	1	537	537	150 nsf + 1.5 nsf by school capacity			0
Lobby				included in tare			0
Reception/Waiting	1	0	0	part of admin suite	1	350	350
Principal Office	1	0	0	part of admin suite	1	200	200
Conference Room	1	0	0	part of admin suite	1	200	200
Records Room	1	0	0	part of admin suite	1	125	125
supply				part of admin suite	1	150	150
ISS				part of admin suite	1	180	180
Faculty Lounge	1	256	256	1 nsf/student	1	256	256
health	1	256	256	1 nsf/student	1	256	256
Nurse Office	1	0	0	part of clinic			0
Treatment/Cot Area with Curtains	1	0	0	part of clinic			0
Clinic Storage	1	0	0	15 sf min			0
Restroom	1	0	0	part of clinic			0
Counselor Office	1	256	256	1 nsf/student	1	256	256
Teacher Workroom 6-12	1	256	256	1 nsf/student: 150 sf min	3	150	450
Special Ed Office Director					1	150	150
ED Conference Room					1	200	200
Total square footage			1,561				2423
NET BUILDING AREA (NSF)							
Total net square footage							18,105
TARE Percentage on Net Building Area							30%
GROSS BUILDING AREA (GSF)							
Total Gross Square Footage							25,864
Total GSF w/ Grandfathered Spaces							

Combination School	
258 @ 196sf = 50,568	6-12th graders
450 @ 179sf = 88,200	K-12th graders
campus sf	88,200
campus sf w/ grandfathered	99,205

Secondary School	25,864
Elementary School	27,000
Multi-Pupose Building	25,000
existing Traylor gym	16,632
existing Vo Ag building	6,054
Total Campus SF	100,550

Preliminary Program of Spaces

April 2014 (v2)

	ADEQUACY				PROPOSED		
	New High School Compliance to PSFA Adequacy Standards for 258 Students				Design Program for 258 Students		
Description of Space	Qty.	Area Each	Net SF	PSFA Adequacy Standards & Comments	Qty.	Area Each	Net SF
1.0 GENERAL CLASSROOM - GRADES 6-12							
General Classroom grades 9-12	6	650	3,900	25 nsf + 2 nsf storage per student, 650 min sf	6	725	4350
General Classroom grades 6-8	6	650	3,900	25 nsf + 2 nsf storage per student, 650 min sf	6	725	4350
Science Lab	1	1,032	1,032	4 nsf per student in program	1	1032	1032
Science Prep Room	1	80	80		1	80	80
Computer Lab	1	900	900	900 nsf min, 3 nsf/student	1	900	900
Total square footage			**9,812**		**14**		**10712**
2.0 SPECIAL EDUCATION							
Spec.Ed Classroom (type I; A, B, C Levels)	2	450	900	450 sf minimum, 15 students max	2	450	900
Special Ed - (D level)	1	450			1	450	450
Kitchenette	1	80	80	included in tare space			
OT/PT	1	250	250	shared with ES			0
Total square footage			**900**				1350

Preliminary Program of Spaces

3.0 CAREER AND TECHNICAL							
Culinary Arts	1	650	650	650 nsf min, 4 nsf/student in program	1	800	800
storage/supply							0
VoAg	1	650	650	650 nsf min, 4 nsf/student in program	1	6064	6064
Total square footage			**650**				**800**
4.0 MEDIA CENTER *(149 HS + 109 MS Students = 258 students)*							
Media Center	1	2,000	2,000	minimum 2000 sf, 3nsf/student	1	2000	2000
A/V Storage	1	175	175		1	175	175
storage							0
Office	1	258	258	1 nsf/student	1	258	258
Total square footage			**2,433**				**2433**
5.0 PERFORMING ARTS *(149 HS + 109 MS Students = 258 students)*							
Music/Band	1	1,555	1,555	5 nsf/student	1	1195	1195
Storage/practice rooms					1	449	449
platform							
Total square footage			1,555				1644
6.0 PHYSICAL EDUCATION							
Traylor Gym w/out band + food service					Grandfathered		9962
Gym (basketball court)	1	6,500	6,500	6500			
Bleechers	1	747	747	1.5(164) x3 sf			
Locker rooms	2	1,000	2,000	average size of existing locker rooms			
office	2	150	300				
storage and tare							
Total square footage			9,547				9962

Preliminary Program of Spaces

8.0 SUPPORT AREAS								
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Central Storage	1	258	258	*1 nsf/student*	1	258	258
Total square footage			**387**				**387**
9.0 ADMINISTRATION							
Admin Suite	1	537	537	*150 nsf + 1.5 nsf by school capacity*			0
Lobby				*included in tare*			0
Reception/Waiting	1	0	0	*part of admin suite*	1	350	350
Principal Office	1	0	0	*part of admin suite*	1	200	200
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Records Room	1	0	0	*part of admin suite*	1	125	125
supply				*part of admin suite*	1	150	150
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Nurse Office	1	0	0	*part of clinic*			0
Treatment/Cot Area with Curtains	1	0	0	*part of clinic*			0
Clinic Storage	1	0	0	*15 sf min*			0
Restroom	1	0	0	*part of clinic*			0
Counselor Office	1	256	256	*1nsf/student*	1	256	256
Teacher Workroom 6-12	1	256	256	*1nsf/student 150 sf min*	3	150	450
Special Ed Office Director					1	150	150
IEP Conferenc e Room					1	200	200
Total square footage			**1,561**				**2423**

Preliminary Program of Spaces

NET BUILDING AREA (NSF)	
Total net square footage	**18,105**
TARE Percentage on Net Building Area	**30%**
GROSS BUILDING AREA (GSF)	
Total Gross Square Footage	**25,864**

Combination School	
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Secondary School	25,864
Elementary School	27,000
Multi-Pupose Building	25,000
existing Traylor gym	16,632
existing Vo Ag building	6,054
Total Campus SF	100,550

CMAR if we could start today

May 10, 2014	Advertisement of RFQ
May 20, 2014	Mandatory Pre-Proposal Conference
June 10, 2014	Contractor Submission of Statement of Qualifications
	Committee evaluation of proposals
June 17, 2014	Request for Proposals (Fee + specified General Conditions)
June 19, 2014	Deadline to submit written RFP questions
June 23, 2014	RFP Amendments sent out
June 30, 2014	Contractor Submission of Proposals (Fee + specified General Conditions)
July 1, 2014	Notice of most qualified firms for Interview
July 8, 2014	Interviews held with most qualified firms
???	Notice of Intent to Award Issued
Board mtg?	District approves CM at Risk Selection
???	CM at Risk Contract Awarded

Meeting Minutes

Project No.:	14-0005
Project:	New Capitan Secondary School
Date:	May 22, 2014
Place:	Capitan Board Room
Attending:	Please see attached sign-in sheet
By:	D/P/S Dekker/Perich/Sabatini, Ltd. 7601 Jefferson NE, Suite 100 Albuquerque, NM 87109
Copies To:	Steering Committee, design team
Issue Date:	May 24, 2014

Discussion Items:

The **purpose** of the meeting was to review the programming draft copy with the committee to hear comments before completion and submission to the PSFA.

1. Ovidiu updated the group on the dates for the upcoming PSCOC meetings:
    a. The PSCOC meetings have been scheduled in Albuquerque. This arrangement will have the meetings on June 25th and 26th in the Isotopes stadium / University area (by the PSFA office).
    b. The agendas for the meetings will be finalized after the site visits for the new applications. I expect the regular PSCOC will be held in the afternoon (most likely on 26th, yet I cannot guarantee the day at this time).
2. D/P/S met with Ovidiu, Martica and Rico from the PSFA to review the draft program. Comments received were very positive and all were in agreement with the secondary school decision and liked the proposed reduction in square footage. These meetings will help speed up the review process and allow the PSFA to provide informed feedback.
3. D/P/S walked the committee through each page of the draft document, leaving copies for each member to review and pass any feedback to Shirley who will forward to the design team.
    a. All understood that the pink text indicates areas where content needs to be reviewed or added.
    b. All in attendance were in agreement with the content of the adjacency diagrams.
    c. Shirley correctly noted that the program shows one teacher lounge, D/P/S noted that this can be two spaces totaling what is shown in the spread sheet.
    d. Those in attendance gravitated towards the classroom test fit scenarios that allowed for windows into the corridors.
    e. Those in attendance liked the idea Ed proposed months ago of associating an outdoor space with the media center. Ovidiu recommended that D/P/S and anyone else interested to visit the new Estancia Middle School outdoor area and moveable stacks in the media center.
    f. On page 28, Phase 4 budget discussion, D/P/S will add the demolition scope to the scope narrative. Currently there are line items for this work but it is not mentioned in the body of the text.
4. The schedule was reviewed showing construction starting in March 2015 as previously discussed including some details not reviewed in the past:
    a. The CMAR selection dates have been added to begin after the PSCOC approves the advance in June, 2014.
    b. Schematic Design has been scheduled to be far enough along at the beginning of the CMAR selection to share a broad-stroke conceptual design to allow the GCs to commit to the anticipated scope of work.
    c. Ovidiu will review the State procurement language for the geotechnical portion of the project to see if this can be procured without a formal RFP process. If an RFP is needed, this needs to be initiated quickly to provide a completed report by the beginning of the Design Development phase in August, 2014.
        i. D/P/S will begin writing the requirement document for these services as well as identifying locations for deep and shallow borings.

   ii. Ovidiu asked that we coordinate the shallow boring locations with High Mesa (our Civil engineer) for the new bus loop and any other flat work areas. It was noted that the bus loop will be located over an area of fill and this should be looked at closely.
   d. Ricky Lamay will discuss the fire water line progress with others at the Village and report to this committee on June 3. This is a critical item for the Village to have all design complete by the beginning of the DD phase the third week of August, 2014 so this project can move forward.
5. D/P/S will arrive in Capitan on June 3, 2014 at 10:00am for an all-day charrette in the Board room. The committee, faculty, staff and community can come and go as they please during the day, but the steering committee will formally meet at 6:00pm on the third to review the results of the charrette.

Attachments:
PowerPoint presentation
Sign-in sheet

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Minutes

	A	B
2	**PRINTED NAME**	**SIGNATURE**
3	MATT McKIM - D/P/S	
4	Ed Vinson	
5	Ovidiu Viorica	
6	Brian Newell	
7	Kristi Morrow	
8	Shirley Crawford	
9	Ricky Lamay	
10	Dennis Rich	
11	Becky Hung	
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Meeting Minutes

DEKKER PERICH SABATINI | ARCHITECTURE DESIGN INSPIRATION

Project No.: 14-0005
Project: **New Capitan Secondary School**
Date: June 17, 2014
Place: Capitan Board Room

Attending: Please see attached sign-in sheet

By: D/P/S
Dekker/Perich/Sabatini, Ltd.
7601 Jefferson NE, Suite 100
Albuquerque, NM 87109

Copies To: Steering Committee, design team
Issue Date:

Discussion Items:

The **purpose** of the meeting was to present the outcome of the charrette and to gain approval of the preliminary Schematic Design scheme prior to the Board meeting/approval on the 19th.

1. **Project Updates**

   a. Matt briefly described the event and process of the all-day **charrette** that was held on June 3rd in Capitan's board room
   b. The **June PSCOC** meeting will be on June 25th at 1pm and is scheduled to be in Albuquerque to request the advance. It is encouraged for community members to attend.
      i. The subcommittee has met and is aware of the project. There is a concern about maintaining the building due to a low maintenance score. Capitan will have to demonstrate the ability to successfully maintain the building/campus.
      ii. D/P/S will be present at the PSCOC meeting and will prepare two informational boards showing current project images, key information and a general timeline. The boards will later be used for the community meeting on July 8th and will be on display at the school.

   c. **CMAR RFQ** document has been prepared and the selection committee will need to review and be available for the following dates:
      i. CMAR RFQ Proposal review on August 7, 2014 (full day) and the CMAR Interviews on August 13, 2014 (half day). Confirmation of the selection committee voting members needing to be available these two days are as follows:
         1. Daryl Lindsay – Steering Committee
         2. Dennis Rich – Steering Committee
         3. Ovidiu Viorica – PSFA
         4. Justin King – Steering Committee
         5. Rick LaMay – Steering Committee
         6. Matt McKim – Dekker / Perich / Sabatini
   d. The Owner Architect Agreement (Contact) needs to be updated to match the scope of the secondary school. D/P/S will submit a new Work Order for the remaining phases and to align the new scope of the larger project.
   e. **Geotechnical report** does not need to go out for the RFP. D/P/S will issue the document to the District along with a list of recommended engineers who can perform this work.
   f. **Village Water System Project**:
      i. Rick LaMay stated there were not any updates on the fire water line. If the line is not in place, a booster pump and generator will be required. This is a critical item and the

design is recommended to be complete by the beginning of design development so the project can continue to move forward.

ii. Schedule indicated needing to have the following by August 21, 2014:
    1. Date for water line to be in place.
    2. Plans from Village showing the new system so the new secondary school building can be properly designed and coordinated.
    3. A written agreement between the Village and the District.

2. **Charrette – June 3, 2014**

a. *Recap* - The all-day charrette was held in the Capitan board room on June 3, 2014. Matt reviewed the project goals that were voted on by the steering committee which were used as a reference during the charrette. These design goals will be critical for the design throughout the project.
b. *Process* - The design team used the graphic program to start developing bubble diagrams and floor plan schemes of how the spaces can start to work as a building, while studying the adjacency requirements suggested by the school board and steering committee. The design team came up with four different schemes and developed those ideas into one preferred scheme to present to the steering committee later on that evening as the start of schematic design.
c. *Preferred Scheme* – The chosen scheme consisted of the following big ideas:
    i. All general classrooms stacked on the south side of the building
    ii. The media center becoming centralized within the building with visibility to what may become the main corridor of the campus and outdoor courtyard. The media center also split between floors giving each school their own separate space but also retaining visibility and connection with an open to below scheme.
    iii. The administration area was placed at the northwest end of the building to allow for controlled access and visibility to the parking lot, bus loop, parent drop off and campus commons.

3. **Grading & Site Studies**

a. D/P/S met with their civil engineer, Graeme Means of High Mesa Consulting Group to discuss possible pros and cons of building placement options, the proposed new bus route concept and grading issues on the site.
b. Three options for building orientation and site utility impacts + bus loop grading were studied and are as follows:
    i. Option 01
        1. Building is oriented at a 45^{o} angle with demolition of existing field house
        2. Building will conflict with existing waterline and will propose significant utility relocations with the possibility of sanitary sewer line running under the new building. The length of utility runs may not allow for enough fall
        3. The grade change across length of the building would be +/- 8'.
        4. Allows for a west entrance
        5. Sun control would be challenging
        6. Relationship of the media center to the courtyard is weakened.
    ii. Option 02
        1. Building is oriented perpendicular to the football field.
        2. Significant utility relocations and longer runs will be required.
        3. The grade change across length of the building would be +/- 6'.
        4. Entrance opens to the North West
        5. Relationship of the media center and the courtyard is stronger than option 01.
        6. Issues with sun control will be a factor.
    iii. Option 03
        1. Building is placed at a North/South orientation
        2. Water line relocation will not be required and building avoids SAS from VoAG building

3. Rerouting of requires a shorter run than option 01 and 02.
4. Grade change across length of the building is +/- 5'
5. Entrance opens to the north and has better access to morning sun than other options.
6. Relationship of the media center to the courtyard is the strongest of all options
7. Sun control is easier to handle with building orientation

iv. Some committee members expressed concern about having a north facing entry. The design team will study options for the entry orientation and a way to offer better visibility from the reception area.

v. New Bus Loop Grading Study

1. The proposed new bus loop consists of pushing the bus loop to the west creating more building area for the new secondary school building.
2. The bus loop becomes a smoother arc allowing a better alignment for the busses.
3. The proposed loop works well with the existing grading.

4. **Revised Floor Plan Scheme**

a. After the charrette on June 3, 2014, D/P/S continued to develop the scheme that was decided upon.
b. Based on the site and grading studies done by the civil engineer, the design team moved forward with site option 03 with the building oriented on a north/south axis.
c. D/P/S modeled and drafted the chosen scheme from the charrette in Revit (**B**uilding **I**nformation **M**odeling software) to develop the scheme into an actual floor plan incorporating a schematic wall thickness, restrooms and support spaces. The design team is working on developing the design to meet the square footage identified in the program.
d. The floor plan is currently a work in progress as the design team is adjusting the spaces to meet desired square footage and accomplish the goals and big picture ideas (location of classrooms, media center and administration).
    i. Comments
        1. The committee likes the initial floor plan
        2. Administration area needs to be modified so there is better visibility to the parking lot and the receptionist needs to be located more up front.
        3. Study needs to be done with east light into the entry of the building considering it is a north entrance. The study will be done in the Revit software.
        4. Modify the plan so that there is a special ed on the second floor
        5. The committee likes the secured entry concept into the building through the reception area.
e. A decision on lockers needs to be made and is very important because it will impact design. Lockers take up a lot of floor and wall space. Security with this issue will need to be thought about and addressed. If full technology is integrated into the school, the need for lockers could be eliminated.
f. A new conceptual overall site plan shows demolition of the existing high school / Cummins gym / elementary school and part of Traylor gym. To the north is proposed new parking for teachers and guest to the campus while utilizing the majority of the existing parking lot to the west for student parking. The site plan also shows the addition to the existing middle school which will also be renovated to become the new elementary school with a new outdoor area to the west of the building.

5. **Playground Location Studies**

a. D/P/S studied 4 possible options for the relocation of existing playground equipment that is west of the district admin building. The district prefers to move it only once if possible within phase 1.
    i. *Option 1* – Playground equipment to be relocated once to the west of the existing middle school near where the redesign of existing parking lot and parent drop-off would eventually be.

ii. *Option 2* – Playground equipment to be temporarily relocated in-between the existing elementary school and Cummins gym with a concern that there will not be enough initial space.
iii. *Option 3* – Playground equipment to be relocated once to the center of campus where the existing open space is just east of the middle school. Members of the committee liked this option.
iv. *Option 4* – This option consist of a combination of option 1 and 3. The playground equipment would be moved temporarily to the existing open space in the center of campus and a space would be created for the middle school students to the west of the middle school building. Once the middle school renovation/addition was completed (becoming the new elementary school), the playground would then move to the west of the new elementary school, opening up the center open space again for the middle school students.

b. The committee unanimously voted for Option 3, D/P/S will continue with design using this option.

6. The committee approved D/P/S to proceed with the schematic design as noted in the minutes above.
7. The next committee meeting is scheduled for **6:00pm on August 7, 2014** to review progress.

Attachments:
Powerpoint presentation
Sign-in sheet

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Minutes

Conference Report

DEKKER PERICH SABATINI
ARCHITECTURE DESIGN INSPIRATION

Project No.: 14-0005
Project: **Capitan New Secondary School**
Date: August 25, 2014
Place: Capitan Board Room

Attending: See sign in sheet
By: Shannon Parks

Copies To: All attendees, Graeme Means – High Mesa, Abbas Shirian – B+P
Issue Date: August 29, 2014

Discussion Items:

1. New steering committee members were introduced including new principal Jimmie Mace, maintenance director Jerry Deal, new member and Capitan parent Michelle Stearns, and Construction Manager at Risk (CMAR) Contractor Matt Mulligan with HB Construction.
2. David Cox with the Village spoke about the planned relocation of the Village water line that currently bisects the site in the east west direction.
    a. The design was done by Dennis Engineering. D/P/S will contact Steve at Dennis Engineering for drawings and flow information to share with Graeme Means of High Mesa Consulting.
    b. The Village of Capitan is waiting for the state to give the ok for the work to commence, but David feels confident that the work will be complete in time for the construction start of the new Secondary School. Its timing is critical to the project schedule.
    c. When the water line is removed, four water taps feeding existing buildings will have to be relocated.
    d. Gary Tregembo also pointed out that there are electrical lines running north-south located under the bus loop and their depth is unknown.
    e. The new line will extend from 48 to Tiger Drive.
    f. D/P/S will set up a meeting with David before the Secondary School design is complete so he can review.
3. HB Construction was chosen by the selection committee to be the CMAR for the new Capitan Secondary School. Matt McKim described the benefits of the CMAR procurement method and the role of HB during the design process. Having the contractor on board early gives the team a better handle on cost and constructability which ensures good, durable decisions are made. Since HB will have a clear understanding of scope as they are a part of the design process, construction will be smoother and the possibility of change orders will be greatly reduced. This procurement method is still competitive as the CMAR will be required to seek bids from at least three sub-contractors for each portion of work.
4. Matt Mulligan gave a brief presentation about HB Construction. Matt stated that some of the ways that they go above and beyond are to provide a 23 month walk through in addition to the typical 11 month, extending the typical 1-year construction warranty to two years. They also provide a 2 year maintenance period and have it written into sub-contractors' contracts.
5. Matt McKim briefly reviewed the phases of design (programming, schematic design, design development, construction documents, construction, 11 month walk through). The contract is broken out in these phases as a means of establishing progress milestones. This format is an industry standard. Right now, we have completed programming and are almost through Schematic Design. Matt reviewed some schedule sensitive items that will need to be addressed before the completion of the Schematic Design Phase as well as items that have already been addressed:
    a. Items complete:
        i. Water Quality Test: The results showed that some treatment will likely be required.
        ii. The Conductivity Test: The results were very positive and some of the best in the state. This shows that ground coupled heat pump system is a viable option HVAC system for The district who may want to consider ground coupled heat pumps as one of the three systems to be reviewed in the Life Cycle Cost Analysis (LCCA).

   iii. PSFA required questions for LCCA
   iv. Selection of geotechnical engineer: Three proposals were gathered and Terracon was recommended. They have mobilized drilling equipment on site and started gathering samples. The geotechnical investigation evaluates the soil and subsurface conditions. They will provide a report that has recommendations for foundation systems and flatwork sections (concrete paving and asphalt).
   v. Selection of CMAR
b. Items that need to be completed before end of Schematic Design (9/25):
   i. Selection of three HVAC systems to be evaluated for the LCCA: The steering committee agreed to a GoTo meeting for September 3 at 1:30. Abbas (mechanical engineer from Bridgers & Paxton) will review 12-13 systems to help the district in their selection for LCCA. The mechanical system will likely have an impact on square footage.
   ii. Building location: Options were reviewed later in the meeting.
   iii. Demolition of the District Admin Building: Options were reviewed later in the meeting.
   iv. Lockers: Lockers will inform hallway widths and space needs.
      1. The steering committee will make a recommendation and the school board will decide.
      2. No lockers would mean two sets of books would be needed, but the goal is to utilize e-books and have more technology in the hands of students.
      3. Feedback from other schools without lockers said that student traffic flow in corridors was better.
      4. No lockers could save the project about $250,000 for use elsewhere in the project.
      5. Some worry that eliminating lockers would result in more students going to their car during school hours.
      6. Students and staff should be involved in this decision.
c. Items that need to be complete at start of Design Development Phase (9/26-11/05):
   i. Select Mechanical System
   ii. Village water line design with anticipated flow information
   iii. Geotechnical recommendations complete
d. Shirley added the importance of including the relocating of the play area in the project timeline. HB will help in this discussion.

6. All reviewed the previous design layout and steering committee comments that needed to be addressed:
   a. North entry
   b. View angles need to be studied.
   c. Administration needs rework and also the addition of a work area
   d. There should be one special ed classroom per floor level
   e. Square footage
   f. Lockers?
7. The previous siting diagram showed a strong “entry corridor” between the existing middle school and secondary school with a nice relationship between the media center and the courtyard. This configuration provides a single point of access to the school that would help with security and monitoring.
8. D/P/S reviewed sun studies using the previous location and conceptual massing of the new building. The sun studies looked at the shadows cast by the building during August, December, and February at 8am, 10am, 1pm and 4pm. The studies also illustrated the importance of building height and location of one and two story portions to maximize sun in the “entry corridor” area. These studies show a low slope roof with parapets, a sloped roof would shade the north, east and west sides to a greater extent.
9. D/P/S reviewed four siting options showing different entry points and building locations with estimated costs. Each option required different grading and retainage and the different internal building layouts resulted in varying site lines from the administration.
   a. All preferred option 4 which included a west facing entrance, little to no retainage at the west end, less ramp length at the east end, optimal sight lines, and less shade in the “entry corridor” between the existing middle school and new building.
   b. This option requires demolition of the district administration to be included in this phase of work instead of a later one.
   c. Relocation of the play area south of the ES should also be included in this project scope.

   d. Demolition of the existing admin building and expanded site scope will increase the MACC. However, the district will save money on operating costs by backfilling district admin staff in other unused spaces.
   e. A new vault location will be required for the interim until there is a permanent location for the district admin. The district has started digitizing files, but this will take some time and money to complete. This cost creating a temporary rated vault space should be compared with the cost of digitizing all files.
   f. The selected option will be taken to the school board for approval.
10. D/P/S reviewed the updated floor plan.
   a. Committee liked the updated layout as all previous comments were addressed.
   b. Specific classrooms can be configured as a computer lab if needed. Additional power and data will be provided.
   c. The media center and its needs will have to be more closely examined as the design develops.
   d. Classroom sizes are smaller than existing classrooms, but will be more efficient and flexible. The classrooms are sized to fit 28 students.
11. The future location of the multi-purpose and field house functions should be kept in mind.
12. Next steps:
   a. GoTo Meeting to evaluate which three systems should be using in the Life Cycle Cost Analysis: Wednesday 9/3 @ 1:30. Instructions:
      1. https://global.gotomeeting.com/join/225076461

      2. Use your microphone and speakers (VoIP) - a headset is recommended. Or, call in using your telephone.

      Dial +1 (571) 317-3122
      Access Code: 225-076-461
      Audio PIN: Shown after joining the meeting
      Meeting ID: 225-076-461

   b. Steering committee meeting: Wednesday, 9/17 @ 6pm

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report

Capitan Municipal Schools | New Secondary School

Steering Committee Meeting | August 25, 2014

Agenda

1. **Introductions of new team members**
2. **Village water project and possible impacts on this project**
3. **Project schedule update and discussion of milestones**
   - Life Cycle Cost Analysis
   - Geotechnical investigation
   - Utility location
   - Thermal conductivity test – done
   - Water quality test - done
4. **Design meeting schedule**
5. **Steering committee meeting schedule**
6. **Design update**
   - Floor Plan Revisions
   - Sun + Massing Studies
   - Site Access/Grading Studies
7. **Next Steps**
   - Next committee meeting
   - Finalize schematic design
   - Schematic design estimate

ABOUT HB CONSTRUCTION – COMPANY OVERVIEW


HB Construction HQ


HB's ASA-NM General Contractor of the Year Awards

- Family-owned general contractor
- Never finished a project late in the company's 23-year history
- Built more than $200 million worth of K-12 schools throughout New Mexico
- Recently named the American Subcontractor Association of New Mexico's 2014 General Contractor of the Year
- Named one of Albuquerque Business First's Best Places to Work five years in a row

ABOUT HB CONSTRUCTION – COMMUNITY INVOLVEMENT


HB Construction's Annual Endowment grant meeting


Share the Warmth Drive

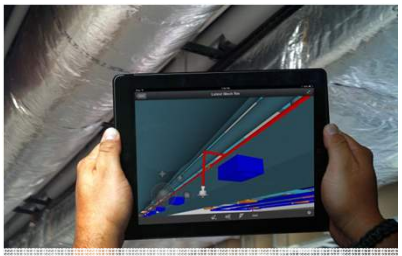

RMDH Guest Chef Dinner

- Rich tradition of community service in all of the communities we build in
- Named the Association of Fundraising Professionals' 2012 Outstanding Business/Corporation in Philanthropy
- Annual "Share the Warmth" winter clothing drive has collected more than $14,000 worth of winter clothing items and donations which have helped organizations throughout New Mexico
- A few of our community giving traditions include: Annual HB Construction Endowment grants, Annual Share the Warmth clothing drive, Semi-Annual blood drive, Annual Ronald McDonald House Guest Chef Dinner

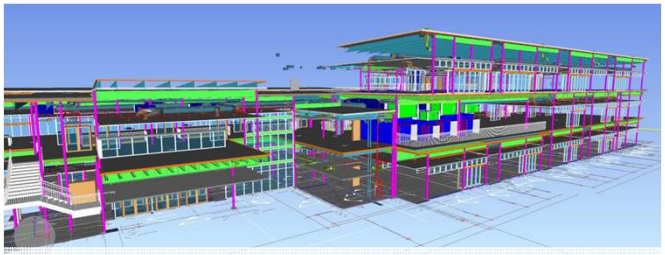
ABOUT HB CONSTRUCTION – TECHNOLOGY

Student jobsite tour with BIM Director Chris Jiron

- Use the latest in construction technology
- Regularly host learning workshops/ tours for local schools to teach students about construction technology
- Actively seek out opportunities to use our construction work to teach upcoming construction professionals



BIM 360 Glue Demonstration



BIM rendering of the Sandia High School Math/Science Building

Schedule

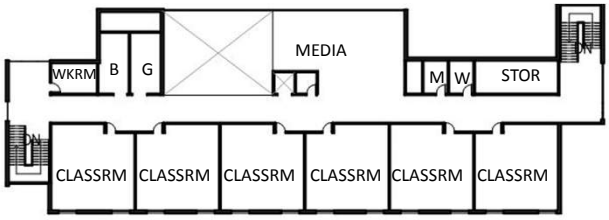
Items already complete:

- ✓ Water quality test
- ✓ Conductivity test
- ✓ Fill out PSFA questionnaire for LCCA
- ✓ Select district's geotech engineer
- ✓ Select CMAR

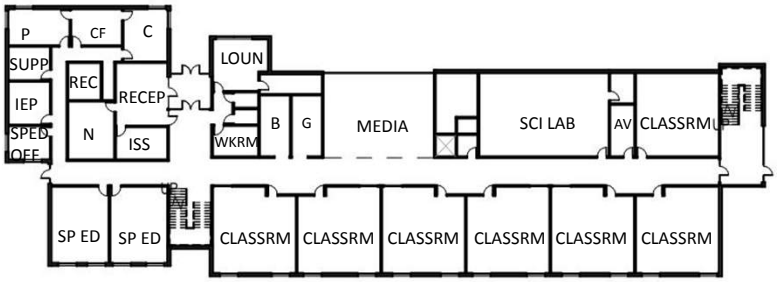
Decisions that need to be made to complete Schematic Design (9/25):
LCCA - (3) HVAC systems – Schedule GoTo Meeting next week
building location
District admin – demo?
Lockers?
Schedule Schematic Design Review meeting: Thursday 9/11?

Tasks that need to be made at start of Design Development Phase (9/26-11/05):
Mechanical system selected
Village water line design with anticipated flow information
Geotechnical recommendations complete

Where we left off:



Second Floor



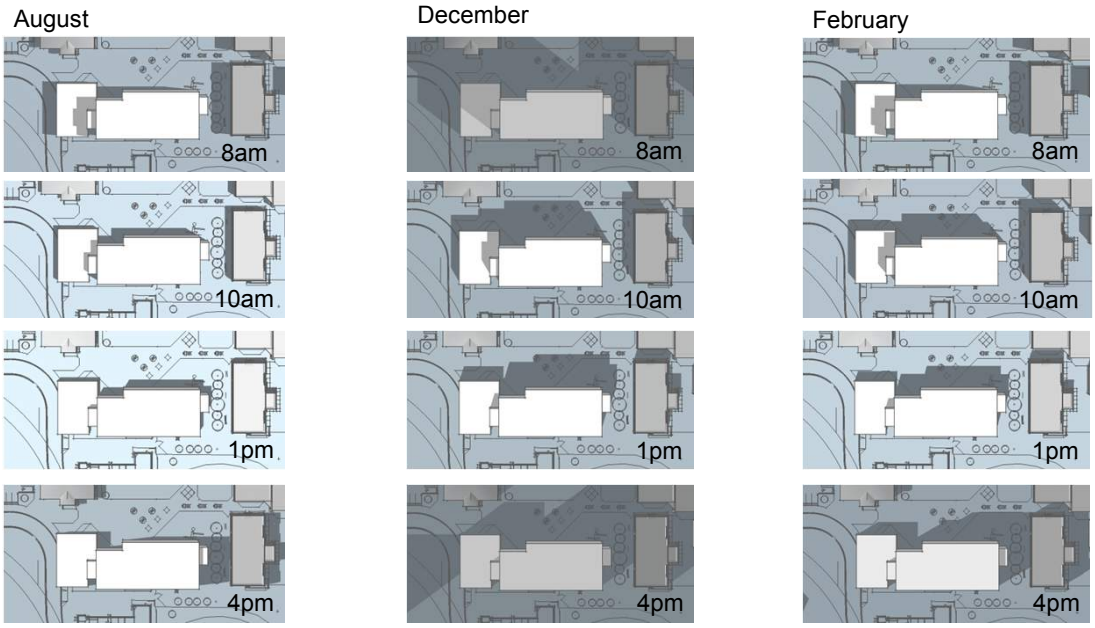
First Floor

North entry.

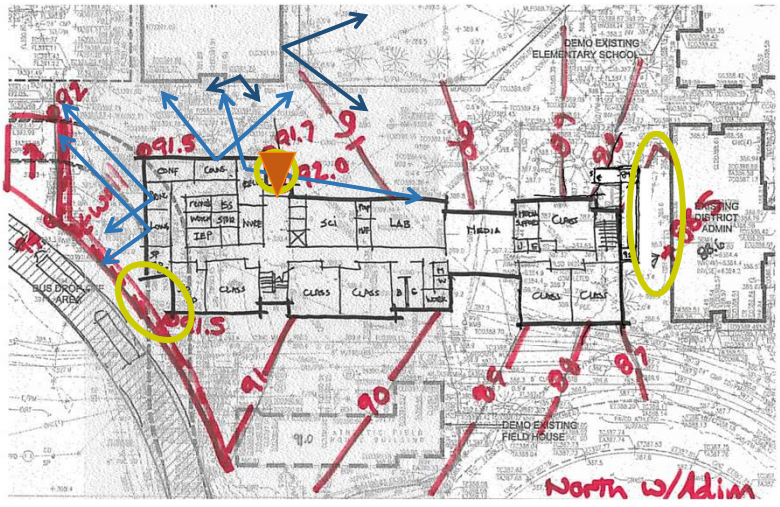
- Study view angles – reception is buried.
- Rework administration.
- Include work room in administration area.
- One special ed classroom on each floor level.
- Square footage
- Lockers?

Where we left off:

Sun Studies



Site Access / Grading: Option 1



Estimated Cost:
West retaining wall: $45,000; east ramp: $22,500

10ft wide sidewalk along bus lane

30ft wide sloped surface at 1:20 leading down into campus

2% max cross-slope between south end of MS and north side of new building

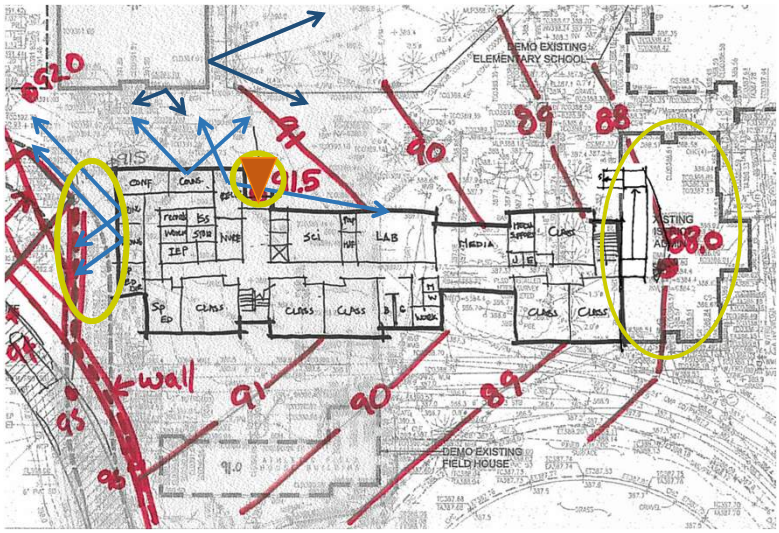
Has the most drop at the east end; **5.5ft** (attributable to the crawlspace under the admin building requires exterior grade about 2ft below finished floor)

Requires most retaining wall at west end

Requires 49' of ramp length at east end

Requires bus access connection to be farther to west

Site Access / Grading: Option 2



10ft wide sidewalk along bus lane

30ft wide sloped surface at 1:20 leading down into campus

2% max cross-slope between south end of MS and north side of new building

Demolition of admin building required

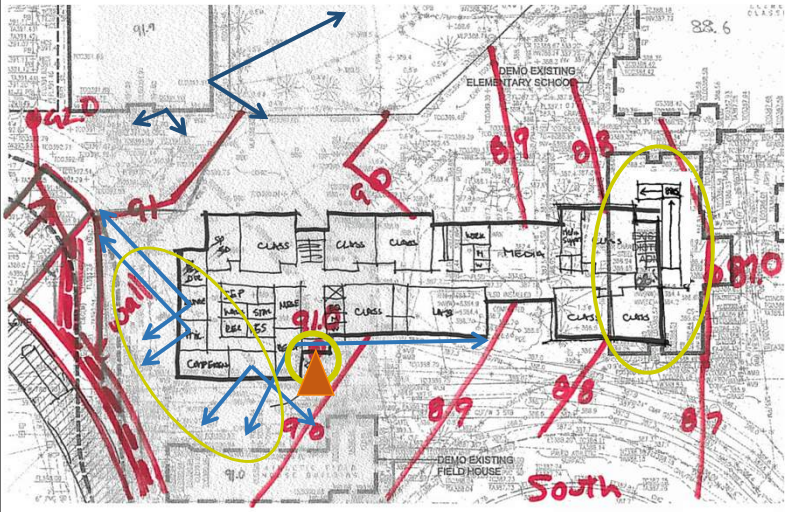
Least drop at the east end of building, **3.5ft**

Requires 42' of ramp length at east end

Requires a retaining wall at west end

Estimated Cost:
West retaining wall: $28,000; east ramp: $20,000

Site Access / Grading: Option 3



10ft wide sidewalk along bus lane

30ft wide sloped surface at 1:20 leading down into campus

2% max cross-slope between south end of MS and north side of new building

Demolition of admin building required

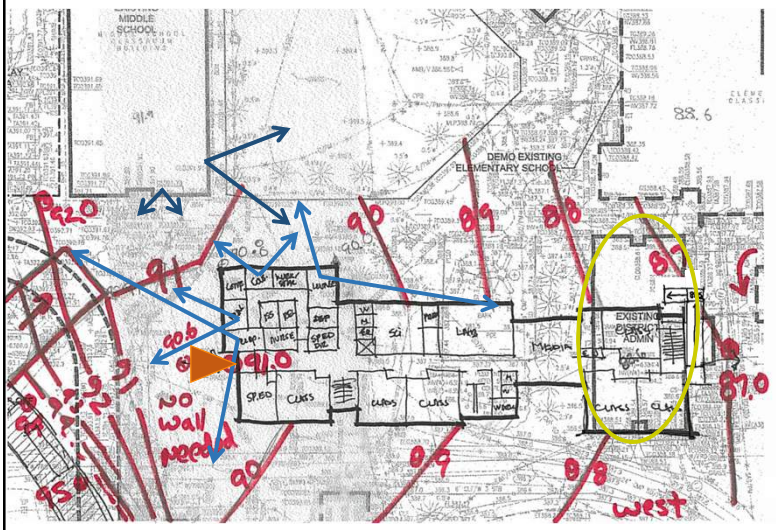
Has **4ft** of drop to east end of building

Requires 42' ramp length at east end of building

Requires retaining wall at west end

Estimated Cost:
West retaining wall: $25,000; east ramp: $21,000

Site Access / Grading: Option 4



10ft wide sidewalk along bus lane

30ft wide sloped surface at 1:20 leading down into campus

2% max cross-slope between south end of MS and north side of new building

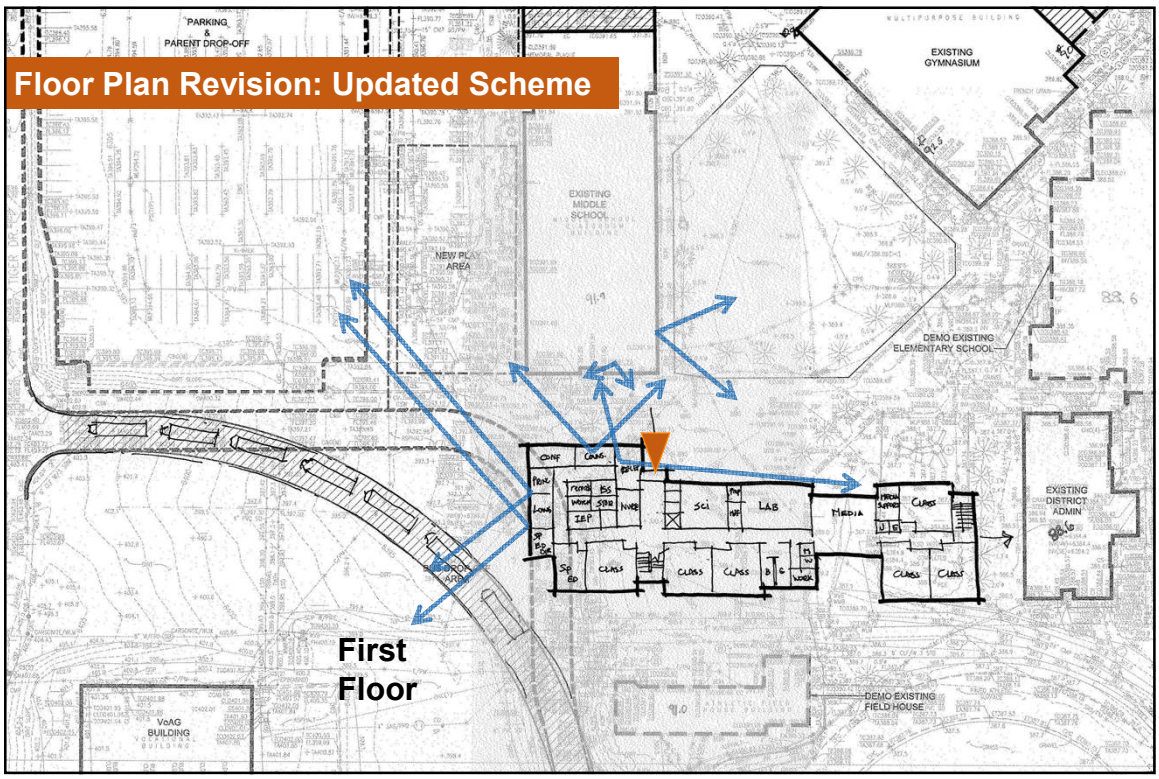
Demolition of admin building required

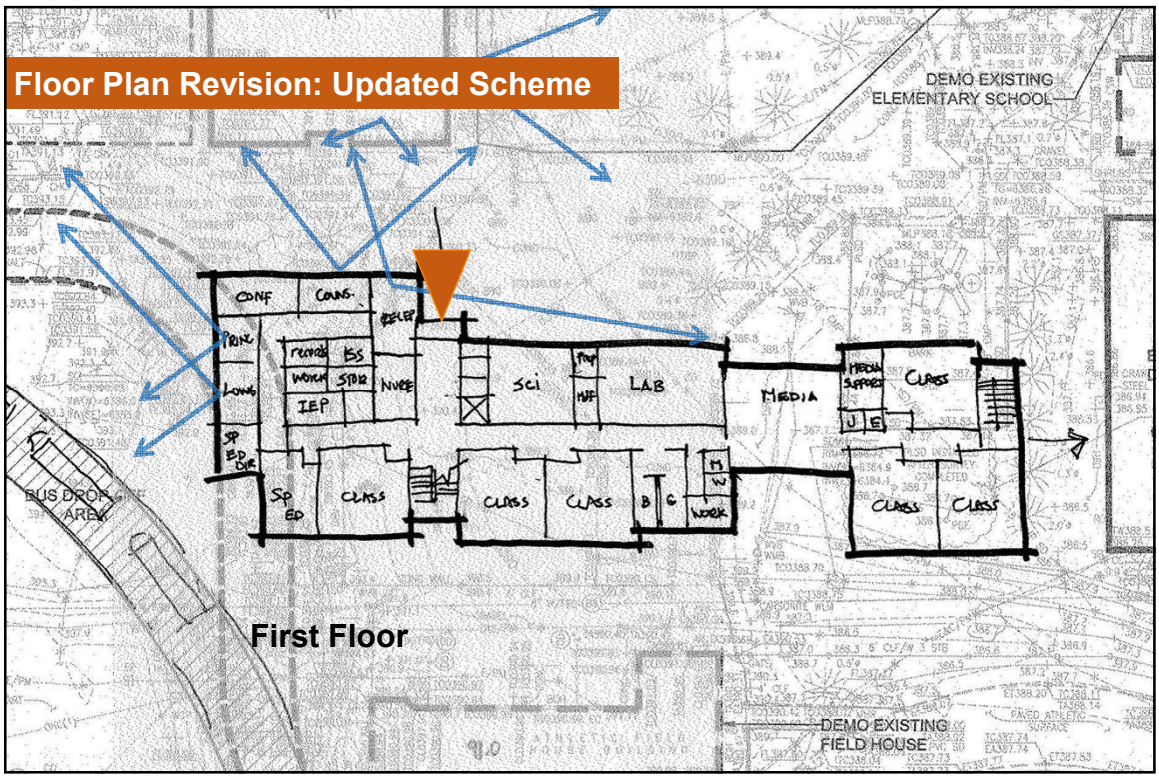
4ft of drop to east end of the building

Requires 42' ramp length at east end of building

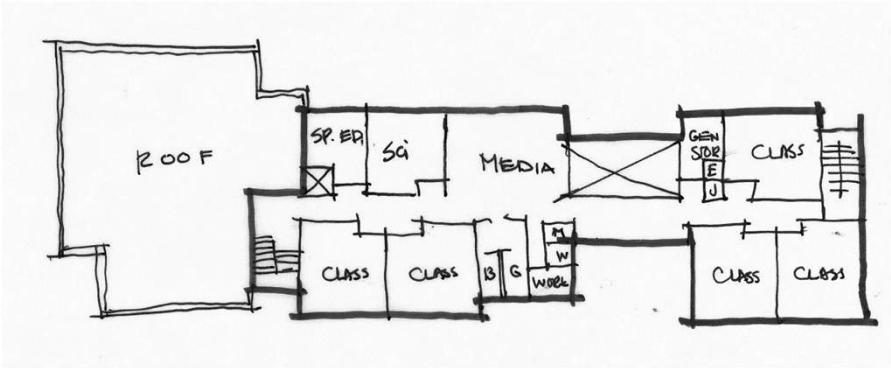
Does NOT require a retaining wall, but could be added to open up more space on the west end

Estimated Cost:
east ramp: $21,000


Floor Plan Revision: Updated Scheme
PARKING & PARENT DROP-OFF
EXISTING GYMNASIUM
EXISTING MIDDLE SCHOOL
NEW PLAY AREA
DEMO EXISTING ELEMENTARY SCHOOL
EXISTING DISTRICT ADMIN
VoAG BUILDING
DEMO EXISTING FIELD HOUSE
First Floor


Floor Plan Revision: Updated Scheme
DEMO EXISTING ELEMENTARY SCHOOL
BUS DROP AREA
DEMO EXISTING FIELD HOUSE
First Floor

Floor Plan Revision: Updated Scheme



Second Floor

Schedule:

DPS 14-0005
April 30, 2014

Task Name	Duration	Start	Finish
Project scoping, PSFA Award Language change	**88 days**	**Mon 2/17/14**	**Wed 6/18/14**
First Steering Committee meeting in Capitan	1 eday	Mon 2/17/14	Tue 2/18/14
PSCOC Meeting to amend Award Language	1 eday	Wed 4/9/14	Thu 4/10/14
PSCOC meeting for funding advance approval	1 eday	Tue 6/17/14	Wed 6/18/14
Programming	**40 days**	**Fri 4/11/14**	**Fri 6/6/14**
User Interviews to start programming	1 eday	Fri 4/11/14	Sat 4/12/14
Present final program to the Steering Committee	1 eday	Thu 5/22/14	Fri 5/23/14
District and PSFA review of Programming	14 edays	Fri 5/23/14	Fri 6/6/14
CMAR procurement	**46 days**	**Sat 6/14/14**	**Sun 8/17/14**
Advertise of RFQ	1 eday	Sat 6/14/14	Sun 6/15/14
Mandatory Pre-proposal conference in Capitan	1 eday	Tue 6/24/14	Wed 6/25/14
General Contractor submission of Statement of Qualifications	1 eday	Thu 7/17/14	Fri 7/18/14
Committee evaluation of proposals	1 eday	Thu 7/24/14	Fri 7/25/14
Issue Request for Proposals (fee and specified General Conditions)	1 eday	Fri 7/25/14	Sat 7/26/14
Deadline to submit written RFP questions	1 eday	Thu 7/31/14	Fri 8/1/14
Final RFP amendments sent out	1 eday	Fri 8/1/14	Sat 8/2/14
General Contractors submit Proposals (fee and specified General Conditions)	1 eday	Tue 8/5/14	Wed 8/6/14
Notice of most qualified firms for interview	1 eday	Wed 8/6/14	Thu 8/7/14
Interviews held with most qualified firms	1 eday	Wed 8/13/14	Thu 8/14/14
District Board approves CMAR selection at meeting	1 eday	Thu 8/14/14	Fri 8/15/14
Notice of Intent to Award issued	1 eday	Fri 8/15/14	Sat 8/16/14
CMAR contract awarded	1 eday	Sat 8/16/14	Sun 8/17/14
Schematic Design	6 ewks	Fri 6/6/14	Fri 7/18/14
Initial design charrette in Capitan for CMAR RFP	1 eday	Tue 6/0/14	Wed 6/4/14
Life Cycle Cost Analysis (LCCA) of three mechanical systems	7 ewks	Mon 7/7/14	Mon 8/25/14
District and PSFA review	14 edays	Fri 7/18/14	Fri 8/1/14
DESIGN HOLD UNTIL CMAR ON BOARD	19 edays	Fri 8/1/14	Wed 8/20/14
District provides a completed Geotechnical Investigation with recommendations	1 eday	Wed 8/20/14	Thu 8/21/14
Design Development	10 ewks	Wed 8/20/14	Wed 10/29/14
The City defines the fire water scope of work and connection point/flow	1 eday	Fri 8/29/14	Sat 8/30/14
District and PSFA review	14 edays	Wed 10/29/14	Wed 11/12/14
Construction Documents	10 ewks	Wed 11/12/14	Wed 1/21/15
District and PSFA/CID review	21 edays	Wed 1/21/15	Wed 2/11/15
Bidding and Negotiation	6 ewks	Wed 2/11/15	Wed 3/25/15
Construction and Close-Out	365 edays	Wed 3/25/15	Thu 3/24/16
District move in	3 wks	Thu 3/24/16	Wed 4/13/16

Conference Report

DEKKER PERICH SABATINI
ARCHITECTURE DESIGN INSPIRATION

Project No.: 14-0005
Project: **Capitan New Secondary School**
Date: September 17, 2014
Place: Capitan Board Room

Attending: See sign in sheet
By: Shannon Parks

Copies To: All attendees, design team

Issue Date: September 24 2014

Discussion Items:

1. Shirley updated the committee with the following items:
    a. The school board approved building option 4 and the demolition of the district administration building.
    b. The need for lockers was discussed with students. Some are for and some are against. The new building will likely need to include at least a half size locker for coats and some belongings. This will be discussed in greater detail in the next Steering Committee meeting.
2. D/P/S reviewed the three systems to be included in the Life Cycle Cost Analysis (LCCA) based on the GoTo meeting held on September 8. Some of the factors the selection of these systems was based on are: comfort, controls, minimizing of rooftop equipment and penetrations, easily maintained, proximity to service and parts, district standards, minimize mechanical footprint on square footage, water quality, noise/ vibration and redundancy of systems.
    a. Four Pipe Fan Coil with Energy Recovery Unit, Chilled Water and Hot Water Heating
    b. Active Chilled Beam with Chilled Water Cooling, Hot Water Heating and Energy Recovery Unit
    c. Ground Coupled Heat Pump System with Energy Recovery Unit
        i. Three possible locations were discussed for the borefield which includes approximately 66 boreholes, 25' apart.
            1. Football field: This requires replacement of the entire field and likely repair of part of the track. This option is less expensive than some of the others, but coordinating the field's replacement with football season is unlikely.
            2. Main parking lot: This requires replacement of the parking lot which is the most costly option. This work was planned to be included in the next phase of work. This would eliminate the use of the parking lot for the elementary school's borefield.
            3. Area adjacent to the VoAg building: This is a possibility. Potential work on the bus loop will be a factor in the extent of space to work with. A cost is needed for this option.
    d. Matt Mulligan suggested a fourth system be evaluated: Variable Refrigerant Volume (VRV) heat pump with Heat Recovery, and Energy Recovery Unit on the Roof
        i. The initial cost for this system will likely be less than the others, but there is concern for maintainability of the system as it requires someone who is specially certified and trained to work with this system. It also uses proprietary equipment.
3. Matt (HB) presented the initial schematic design estimate. He stressed that this is very fluid as this is early in the process. As the design is more defined and developed, items will have to be prioritized. Certain line items will be budgeted higher while other will be budgeted less to compensate.
    a. HB met with a demolition sub prior to the meeting who evaluated the field house and administration building. The approximate cost is about $70,000 for both buildings.
    b. HB contacted exerplay to discuss the possibility of relocating the existing play structures. The cost of relocation will have to be evaluated with the cost of new equipment. The younger play equipment may not be worth the move.

   c. The FF&E (furniture, fixtures, and equipment) is budget owner separate and is not included in what HB presented.
   d. D/P/S to send a proposal for doing the furniture design. Vendors may offer to do this design for no cost, but the cost will be hidden somewhere within the service and Capitan may see more limited options.
4. HB reviewed their proposed logistics plan.
   a. The construction fence may need to be altered if the younger play structure to the east remains during construction.
   b. Forest Rd may need to be repaired after use during construction as the large trucks and equipment could likely damage it. When these repairs take place will have to be evaluated as there are multiple phases of work after the construction of the Secondary School. This is also true for Tiger Drive located on the school's property. These costs should be factored into the logical phase's budget.
   c. The logistics plan will be discussed in further detail as the project design continues to develop.
5. D/P/S presented the proposed relocation concept plan for the play areas. D/P/S assumed that two new play areas will be needed similar in size to the existing. These two play areas are shown to be located within the courtyard.
   a. Becky and Jimmie expressed concern for the location and the lack and open space that will be available for the kids.
   b. The existing elementary and middle school basketball courts will be demolished as they are located within the new building's footprint.
   c. Shirley suggested the possibility of creating a temporary court in the parking lot adjacent to the existing high school building.
   d. Becky reviewed the layout with staff after the steering committee meeting and responded with the outcome of those discussions. Email is attached for reference.
   e. Capitan would like save as many existing trees as possible. They offer great shade for the play areas and add beauty to the campus.
6. The civil engineer, High Mesa Consulting, is trying to wrap up the master grading and drainage plan. Now that he has an approximate building footprint size and location, he can complete is required calculations.
   a. The strategy will be to send much of the site's drainage load to the northeast toward the drainage channel along NM380, and the rest to the southeast. The existing parking lot will ultimately drain to the northeast through a storm drain line.
   b. Once the existing high school is demolished, the proposed drain line can be installed. In the meantime, a temporary retention pond will be required at the southeast corner of the site. This will be no deeper than 18" and will have a controlled outlet flow to Forest Ave.
   c. Removal of the existing younger play structure will need to be coordinated with the installation of the temporary retention pond at the southeast corner of the site.
7. D/P/S discussed the various pros and cons to different assemblies: metal roof versus TPO.
   a. Some committee members expressed concern for a TPO roof. D/P/S uses TPO roof on most schools and districts have found it to be easy to maintain and repair if needed.
   b. Hail is not an issue when the correct substrate is used with the system.
   c. Ovidiu stated that metal roofing can sometimes last longer.
   d. Metal roofing is more costly than TPO roof and harder to repair. Detailing penetrations is challenge.
8. D/P/S reviewed different roof design strategies including how the various approaches would handle drainage.
9. Various process models were briefly shown showing the impact of different roof lines.
10. D/P/S presented the Schematic Design digital model. The model is monochromatic and material-less at this point and is intended to get general approval on the overall look. The committee had the following comments:
    a. The majority of the committee did not like the "butterfly" roof over the administration area. Some thought it looked too "California" and too "technical" and generally did not tie in with Capitan. The community should be considered more.
    b. All liked the amount of glass at the main entry and administration and supervision it would offer staff of the campus.

c. All liked the amount of glazing at the media center and the visual connection it offered between the courtyard on the north and field on the south of the building.
d. All like the upside down "L" shaped windows that are similar in look to those at the mid school building.
e. Many would prefer a more "rustic feel."
f. Some committee members were concerned with the lack of relationship with the existing middle school building.
g. Ovidiu mentioned the importance of balancing the glazing with an efficient wall assembly. Glass has less r-value. The cost also needs to be considered. Glass versus solid wall will need to be evaluated.
h. Generally the committee liked the design, but strongly disliked the "butterfly" roof. D/P/S is to send out alternate roof options for the administration area.

11. The Schematic Design package is due Friday, 9/26 and D/P/S would like to include the LCCA. For B&P's purposes, D/P/S will share the model presented with them for their energy modeling and calculations to not hold up the completion of the LCCA.
12. Alternative roof options were sent to the committee on 9/19 for feedback and are attached to this document. The majority of responses favored option 1.
13. The next steering committee meeting will be 10/1 at 6:00pm.

This report is assumed to be a true and accurate account of this communication unless notice to the contrary is received within 10 calendar days of issue.

End of Report

DEKKER
PERICH
SABATINI
ARCHITECTURE
DESIGN
INSPIRATION

Attendance Record

Project No.: 14-005
Project: **Capitan Secondary School**
Owner: Capitan Municipal Schools

Meeting Purpose: Steering Committee Meeting
Meeting Date and Time: 9/17/14, 6pm

Name	Representing	Telephone	Cell	Fax	E-mail
ED VINSON	CAPITAN				
Shirley Crawford	Capitan				
Victoria Sedillo	CMS				
JERRY DEAL	CAPITAN				
MATT MULLIGAN	HB Construction				
Becky Huey	Capitan				
Ovidiu Viorica	PSFA				
Darcy [illegible]	Capitan				
April Lindsey	Capitan				
Jim Nesbitt	"				

Capitan Municipal Schools | New Secondary School

Steering Committee Meeting | September 17, 2014

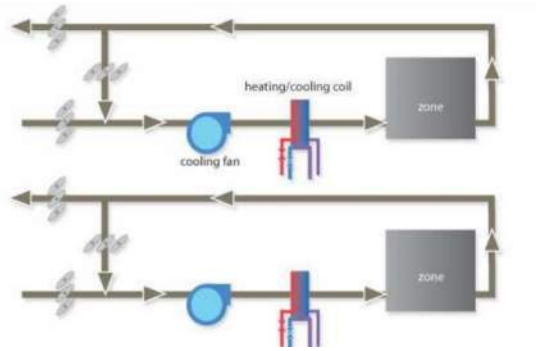
Agenda

1. **Review HVAC Systems to be evaluated in the Life Cycle Cost Analysis**
   a) *Four Pipe Fan Coil with Air Cooled Chiller and Hot water Boilers*
   b) *Active Chilled Beams with Air Cooled Chiller and Hot Water Boilers*
   c) *Ground Coupled Heat Pump (GCHP) System*
2. **Schematic Estimate**
3. **Site Logistics**
4. **Playground Relocation**
5. **Site Drainage Master Plan**
6. **Roof Design Strategy**
7. **Building Massing**
8. **Next Steps**

Mechanical Systems | Option 1

Four Pipe Fan Coil with Energy Recovery Unit, Chilled Water & Hot Water Heating

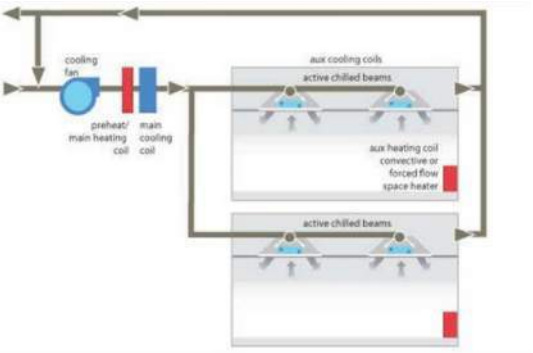
- Good Space temperature control
- Control system - Central equipment control system is more complex
- More space is required for the ductwork and piping distribution systems
- Additional space is required for central equipment
- Maintenance – Fan coil units system require work to be done in occupied areas
- Noise – With the units located directly above the spaces, careful consideration is necessary to control noise from the units



Mechanical Systems | Option 2

Active Chilled Beams with Chilled Water Cooling, Hot Water Heating and Energy Recovery Unit

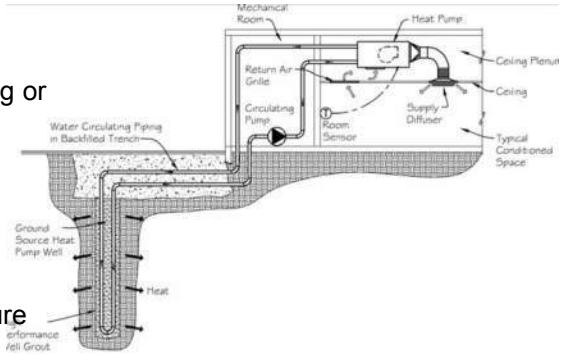
- Good Space temperature control
- Control system - Central equipment control system is more complex
- Lower operational costs than Option #1
- Systems are known for quiet operation
- Lower than average floor to floor heights possible
- Many points of maintenance in the building



Mechanical Systems | Option 3

Ground Coupled Heat Pump system with Energy Recovery Unit

- Good space temperature control
- System allows occupants a choice of heating or cooling anytime
- Simple control system
- Low maintenance and operational costs
- Incremental system allows a single unit failure to only affect the space served by the heat pump (small area)
- Electric only system for heating and cooling.
- Somewhat more flexible than ducted systems when spaces/zones are modified



- Routine Maintenance in penthouse mechanical rooms and outside of tenant space
- Requires extensive site work for bore field

Mechanical Systems | Borefield Location 1

Football Field

$1.50/sf @ 32,000sf……. Sod
$1.50/sf ……. …….. Irrigation
$140,000 Approx. Total

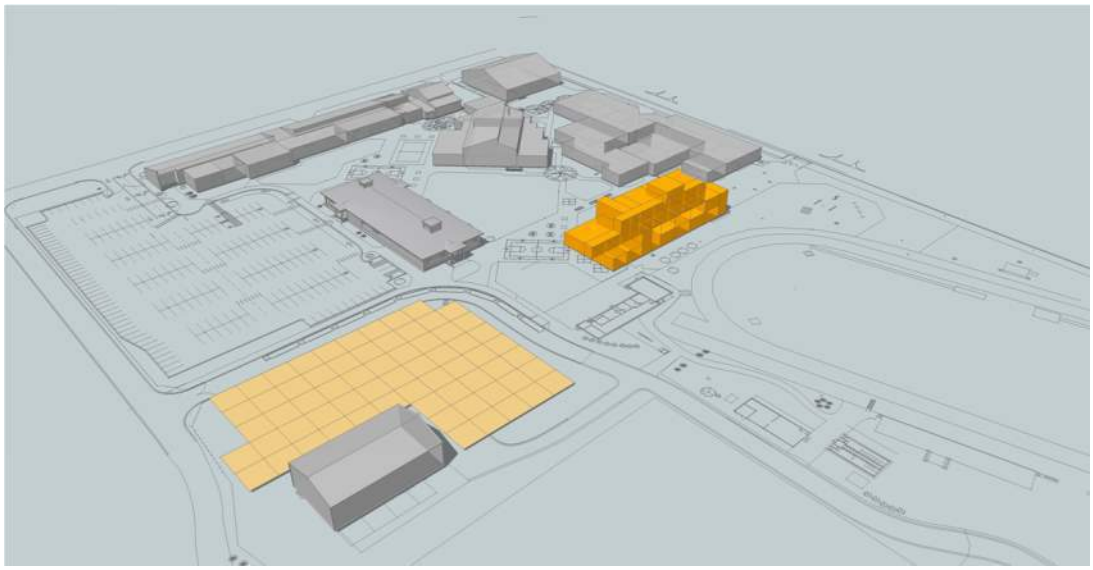
Mechanical Systems | Borefield Location 2

Parking Lot

Assuming 4” asphalt over 6” Base Course
2” asphalt over 4” Base Course : -$40,000
$300,000 **Approx. Total**

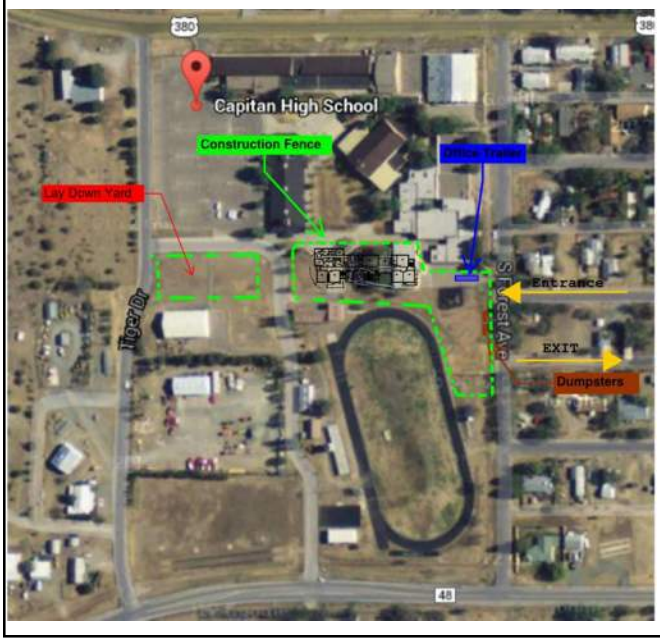
Mechanical Systems | Borefield Location 3

Near VoAg

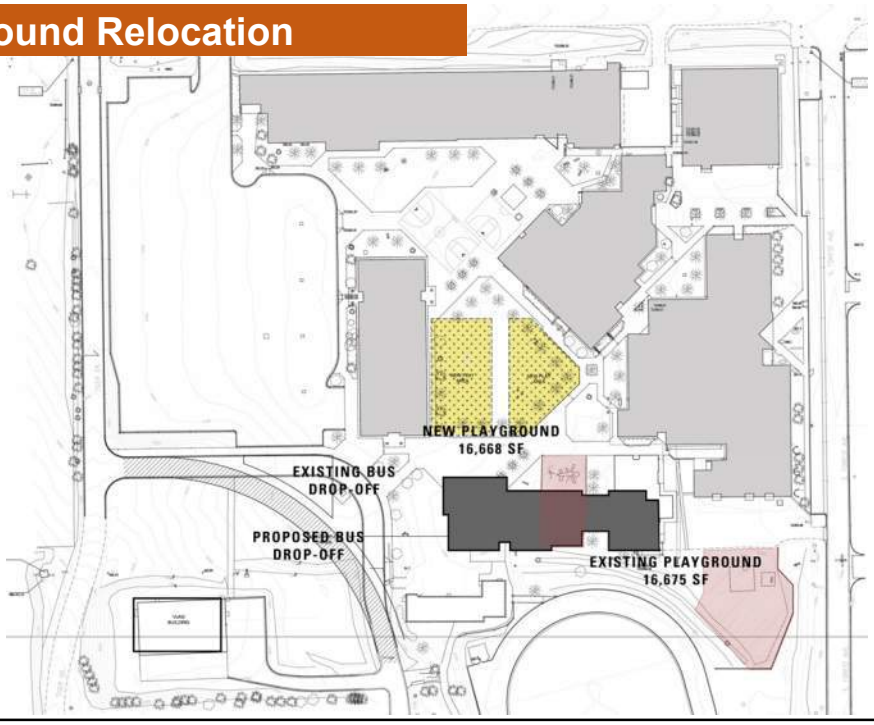


Schematic Estimate

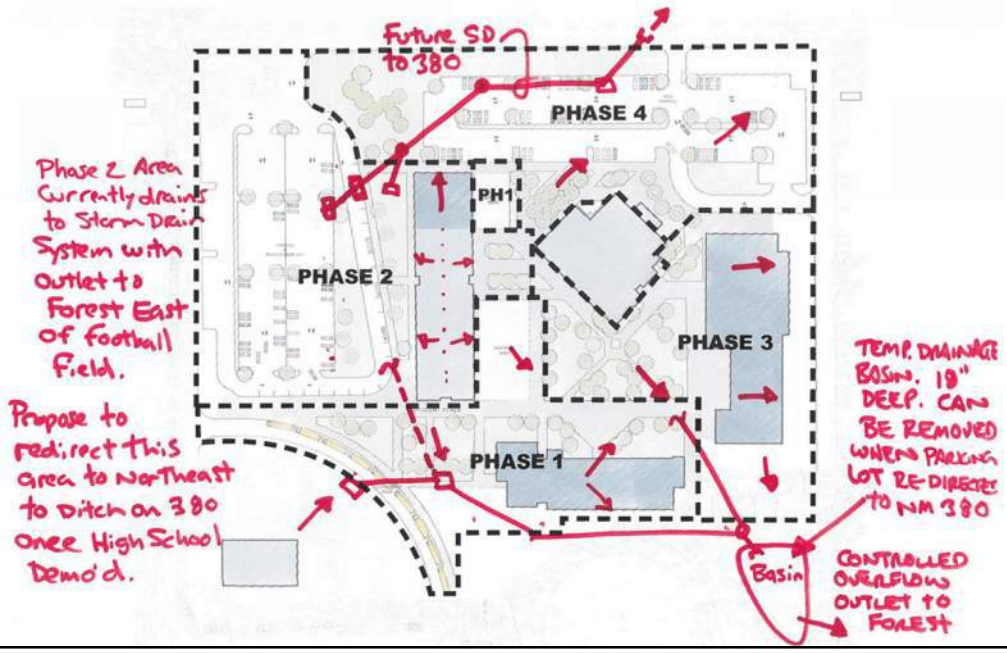
Site Logistics



Playground Relocation



Site Drainage | Conceptual Masterplan



Roof Design Strategy

Metal Roof

- $18/sf
- Relies on seaming and sealant
- Difficult penetration details
- Snow and ice guards needed
- Gutters and downspout maintenance
- Difficult to replace a panel, or locate a leak

TPO Membrane Roof

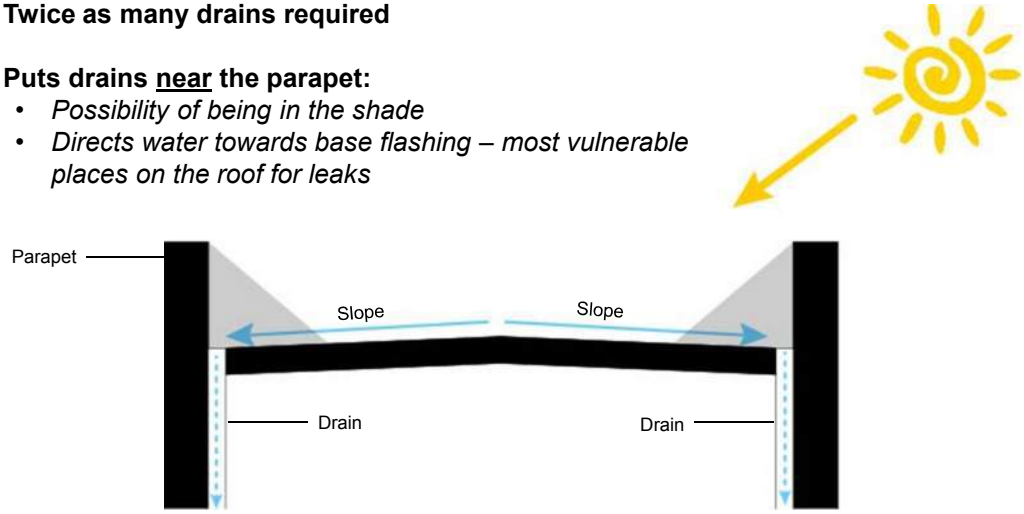
- $9/sf
- Roof is hot air welded, creating a continuous membrane without seams, including parapets
- Simple penetration details
- Internal drains
- White color reduces heat island effect
- Temporary patches using peel and stick

Overall District Goals & Vision

- 21st Century Learning Environment
- Technology-rich
- World class education in a small, rural school
- Student-centered
- Collaborative
- Multi-functional, flexible spaces (*consistent, standard designed spaces*)
- Safe and welcoming (*clear recognizable main entry, point of control*)
- Middle school and high school to retain their own identity while incorporating a sense of community
- Facility easy to maintain

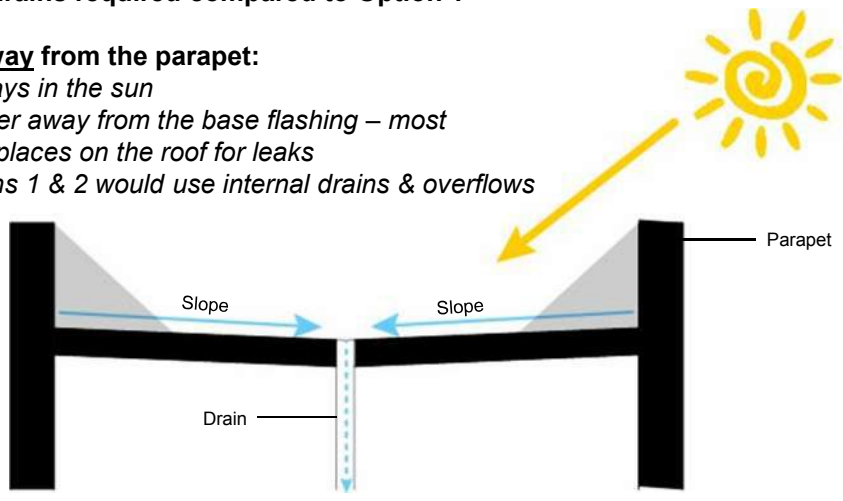
Roof Design Strategy | Option 1

- **TPO roof membrane, very reliable and easy to temporarily patch, roof has a positive slope to drain**
- **Twice as many drains required**
- **Puts drains <u>near</u> the parapet:**
  - *Possibility of being in the shade*
  - *Directs water towards base flashing – most vulnerable places on the roof for leaks*



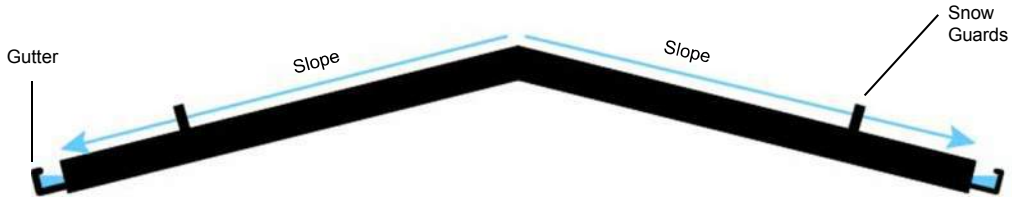
Roof Design Strategy | Option 2

- **TPO roof membrane, very reliable and easy to temporarily patch, roof has a positive slope to drain**
- **Half as many drains required compared to Option 1**
- **Puts drains <u>away</u> from the parapet:**
  - *Drains always in the sun*
  - *Directs water away from the base flashing – most vulnerable places on the roof for leaks*
  - *Both Options 1 & 2 would use internal drains & overflows anyway*

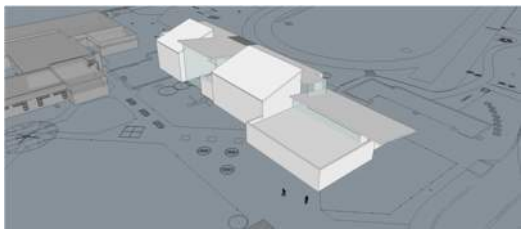


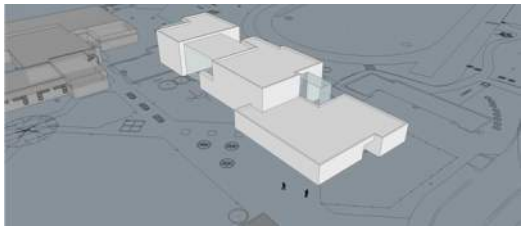
Roof Design Strategy | Option 3

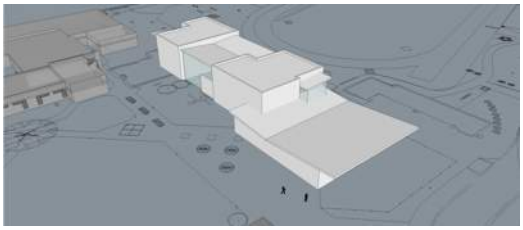
- **Since the roof is visible, a standing seam roof would be required**
  - *More expensive in upfront cost*
  - *Questions about this roof meeting the PSFA warranty requirements*
  - *Makes for a taller structure on campus with one story buildings*
- **Ice and snow guards needed**
- **How to direct water?**
  - *Gutters and down spouts are maintenance problems, but control drainage*
  - *Without gutters, water is allowed to run down the face of the building creating issues:*
    - *Water damage and infiltration*
    - *Ice and standing water at the base of the building*

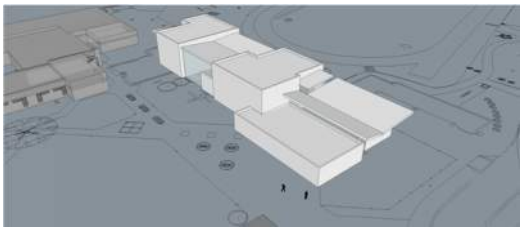


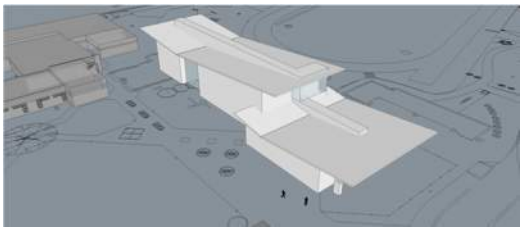
Building Massing | Studies











Building Massing | Preferred Option

Building Massing | Preferred Option

Next Steps

1. **Submit Schematic Design – 9/26**
2. **Complete LCCA**
3. **Next committee meeting – 9/30?**
   - **Develop OPR (Owner Project Requirements Document) – before next committee meeting?**

Life Cycle Cost Analysis

Capitan New Secondary School

Capitan, New Mexico

Prepared for

DEKKER
PERICH
SABATINI

Prepared by

BRIDGERS & PAXTON

September 30, 2014

B&P PROJECT # 6984.01

EXECUTIVE SUMMARY

This analysis compares four (4) alternative heating, ventilating and air conditioning systems (HVAC) for the 27,000 ft^2 (gross area) Capitan New Secondary School, located in Capitan, NM. For the purposes of this analysis the areas examined consist of classrooms, media center, offices and other supporting areas.

The following sections briefly outline the mechanical features of each alternative. Each classroom is served by an individual zone temperature control. Offices are zoned in groups of two for larger thermal blocks.

The four (4) alternative systems consist of:

1) Four Pipe Fan Coil with Energy Recovery Unit, Chilled Water & Hot Water Heating

2) Active Chilled Beams with Chilled Water Cooling, Hot Water Heating and Energy Recovery Unit

3) Ground Coupled Heat Pump (GCHP) system with Energy Recovery Unit

4) Variable Refrigerant Volume - Heat Recovery with Airside Energy Recovery Unit.

In this analysis, the results for the four alternatives were compared against each other to determine best value of life cycle mechanical system cost. The study life is 30 years for each HVAC alternative.

The Trane Trace 700, version 6.3.0 modeling program, using TETD-TA1 (ASHRAE Transfer Function Method), for cooling and UATD Method for heating was used to model the energy consumption and economic caparisons between the alternatives.

Parameters

Alt #	Maint Cost ($/ft^2)	Maint. Inflation Rate (%)	Cost of Capital (%)	Avg. Electric Consumption Cost** ($/kWh)	Average Gas Cost*** ($/therm)	Utility Inflation Rate (%)	Recurring Depreciable Cost ($/ft^2)	Service Life (Yrs)
1 – 4PFC	0.076	5	2.37	0.073	0.64	3.48	10.7	23
2 - ACB	0.076	5	2.37	0.073	0.64	3.48	10.7	23
3 - GCHP	0.076	5	2.37	0.073	0.64	3.48	10.6	23
4- VRF	0.076	5	2.37	0.073	0.64	3.48	10.4	23

** Cost of electricity: $0.073 per KWH average. Modeling performed using an on-peak (Noon-10 PM)/off-peak (10 PM-Noon) time of use schedule. On-peak rate: $0.07825 per KWH, Off-peak rate: $0.06804 per KWH (Otero County Electric Cooperative)

*** Cost of Natural Gas: $0.64 per Therm (Zia Natural Gas Co.)

Results

Alt #	First Cost ($/ft^2)	Total First Cost ($)	First Year Utility Cost ($)	First Year Maint. Cost ($)	Total First Year Alt. Cost ($)	Total Life Cycle Cost ($)
1	33.10	765,254	20,071	1,757	787,082	1,954,414
2	44.00	1,017,256	20,678	1,757	1,039,692	2,227,320
3	30.00	693,584	18,625	1,757	713,966	1,829,050
4	28.75	664,684	19,253	1,757	685,694	1,813,884

Based on life cycle cost results, Alternative #4 has the lowest Life Cycle Cost.

TABLE OF CONTENTS

GENERAL

Introduction

The purpose of this narrative is to outline the mechanical system design options to be compared in a Life Cycle Cost Analysis (LCCA) for this project and analyze those systems based on first costs, utility and energy costs, water use, operation and maintenance costs, periodic replacement costs and life time cost.

Energy consumption and costs in this analysis are NOT predictions of actual energy consumption or costs for the project. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, equipment type, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.

References:

The mechanical and electrical system design will adhere to the following codes to ensure safe and proper installation of the system.

- Uniform Mechanical Code (UMC - Latest Edition)
- Uniform Plumbing Code (UPC - Latest Edition)
- International Building Code (IBC - Latest Edition)
- National Fire Protection Association (NFPA - Latest Edition)
- American Society of Heating, Refrigeration, Air Conditioning Engineers (ASHRAE)
- Americans with Disabilities Act (ADA)
- National Fire Protection Code & Life Safety NFPA
- New Mexico Public School Facilities Authority (PSFA) Design Guidelines
- Capitan Municipal Schools Design Guidelines
- State of New Mexico Electrical Code

DESCRIPTION OF THE BUILDING

Design Model

All four (4) design alternatives have been calculated using the same simulation software program, climate data, and temperature control set points, utilization schedules, and energy rates. Table 1 below shows assumptions of net floor area and window area as a percentage of wall area for several of the space types used in the analysis.

Space Use Classification

The determination of different space categories wad driven from using current architectural plans. Table 1 below lists the building areas for each alternative.

Table 1: Alternative 1-4 Space Types

Space Types	Net Area, ft^2	Bldg. Orientation	Window Areas, % of Wall
Classrooms	10,599	Based on site plan	20%
Media Center	2,045		75%
Office/Conference	1,754		60%
Other Misc.	8,722		18%
Total	**23,120**		

Design Conditions

Climatic:

- Location: Capitan, New Mexico
- Elevation: 6500 feet above sea level
- Winter 99.6% Design Dry-bulb: 2^{o} F
- Summer 0.4% Design Dry-bulb/Wet-bulb: 91^{o} F/59^{o} F

Indoor Design Conditions

Space	Winter (^{O}F)	Summer (^{O}F)	Relative Humidity (RH%)
General	70	75	N/A
Classrooms	70	75	N/A
Mech/Elec Room	55	95	N/A
IT/Comp Room	68	72	N/A

Building Envelope

The building envelop was modeled with an orientation consistent with the site plan. The total gross area of the exterior wall, roofs, floors, and the exposed perimeter slabs on grade are modeled the same in all alternatives.

Internal Loads

Table 2 below lists the internal heat loads for each alternative.

1) Occupancy:

   All occupancy loads were estimated for the purpose of this report only and are identical in each of the four alternatives. People are modeled using a load of 250 British thermal units per hour (Btu/hr) (sensible), 200 Btu/hr (latent). Space occupancy is based on architectural furniture plans and ASHRAE standards where no information is available.

2) Lighting:

   The determination of different lighting categories was derived from using the space type lighting classification in accordance with ASHRAE Std. 90.1-2004 Section 9, Table 9.5.1. Lighting loads were modeled identically for all three alternatives. See Table 2 for details.

3) Receptacle and other Loads:

   All receptacle and process loads were estimated for the purpose of this report only and are identical in each of the three alternatives. See Table 2 for details.

Table 2: Internal Heat Load Inputs

Space Types	Occupancy Loads	Lighting Loads, W/ft^2	Receptacle Loads, W/ft^2
Classrooms	25 People	1.0	0.35
Media Center	40 ft^2/ person	1.2	0.35
Office/Conference	100 ft^2/ person	1.0	1.5
Other Misc.	No occupants	1.0	0

Schedules

The program has the capability of modelling hourly variations in occupancy. Lighting power, miscellaneous equipment power, thermostat set points and HVAC system operations, defined separately for each day of the week and holidays. The same schedules are used in each alternative.

Thermal block

Heating ventilating and air conditioning (HVAC) zones are estimated for the purpose of this report only and are modeled the same in each of the four alternatives.

Indoor Air Quality

- Use ASHRAE Standard 62.1-2007 to meet ventilation and indoor air quality requirements.
- Consider a dedicated ventilation system such that the quantity of air can be regulated and measured.
- Consider the use of a heat recovery system that will transfer the heat between air supplied to and air exhausted from the building.
- Provide filters capable of 60% or greater duct spot efficiency.

Noise

Standard design guidelines were used per ASHRAE for normally occupied areas.

Selection Criteria

The mechanical HVAC system will be selected based on a Life Cycle Cost Analysis (LCCA).The project shall be designed in compliance with Section 15-3-36, Energy Efficiency Standards for Public Buildings, NMSA 1978 and shall qualify for the Environmental Protection Agency's (EPA) ENERGY STAR.

To optimize the selection of efficient, cost-effective mechanical and ventilation systems, a Life Cycle Cost Analysis (LCCA) will be performed on four mechanical alternatives. The LCCA will evaluate first costs, utility and energy costs, operation and maintenance costs, and periodic replacement costs. The following sections briefly outline the four (4) mechanical systems alternatives.

DESCRIPTION OF ALTERNATE HVAC SYSTEMS

Alternate No. 1 - Four Pipe Fan Coil with Energy Recovery Unit, Chilled Water & Hot Water Heating

Alternate No. 1 consists of a 4-pipe fan coil system. A separate fan coil unit is located in each space. Each unit supplies a constant volume of conditioned air to the space and the coils are cycled to meet the varying load. See Figure 1.

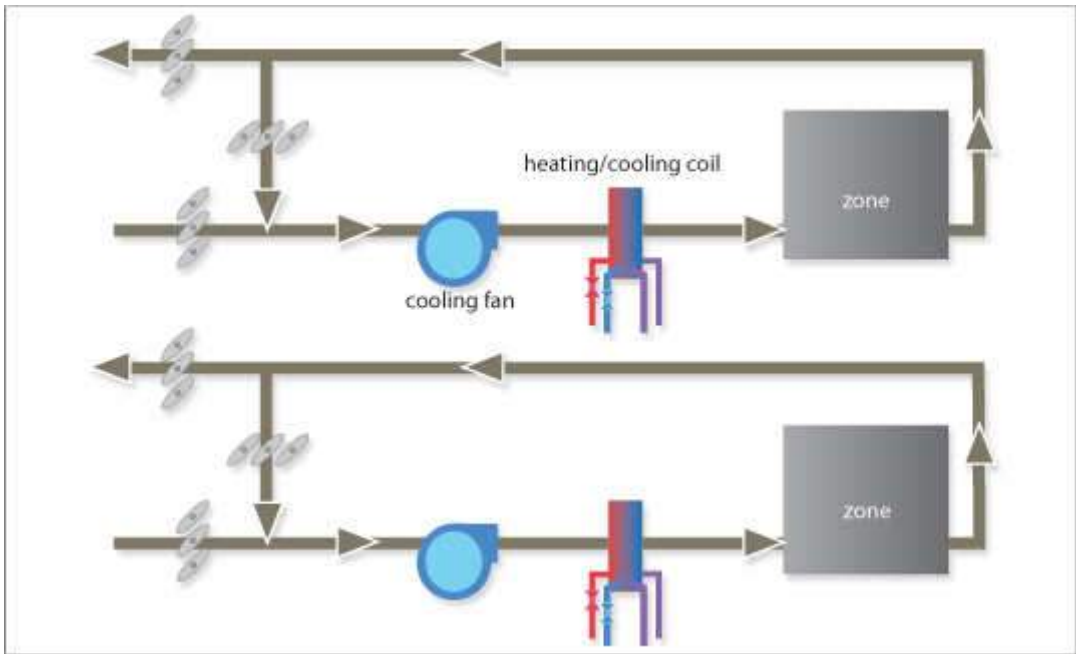


Figure 1 – Four Pipe Fan Coil with Energy Recovery Unit, Chilled Water & Hot Water Heating

The mechanical cooling plant consists of an air cooled chiller and chilled water cooling coils.

The mechanical heating plant consists of two hot water boilers and hot water terminal heating coils served by two constant volume pumps.

Ventilation air will be provided by a packaged heat recovery unit located in a mechanical room or a penthouse. The heat recovery unit will use the general building exhaust air to pre-heat and cool the incoming outside air using a rotating heat wheel. The ventilation air will be ducted to the individual space ceiling plenums where it will be mixed with the air recirculating to the fan coil units.

Design Considerations

- Space temperature control - Separate heating and cooling source in the primary air and secondary water give occupants a choice of heating or cooling.
- Control system - Central equipment control system is more complex.
- More space is required for the ductwork and piping distribution systems
- Additional space is required for central equipment and air handling units.
- Maintenance – Fan coil units system require much more maintenance than central all-air system, and this work must be done in occupied areas.
- Noise – With the units located directly above the spaces, careful consideration is necessary to control noise from the units.

Alternate No. 2 - Active Chilled Beams with Chilled Water Cooling, Hot Water Heating and Energy Recovery Unit

Alternate No. 2 consists of an Active Chilled Beam which uses chilled and hot water to temper the space with radiant panels or sails. Each thermal zone has an array of ceiling panels or sails to accommodate the HVAC loads. Outside air will be provided by an Energy Recovery Ventilator (ERV) located in a mechanical room or a penthouse. This preconditioned air will then ducted to each space through the active chilled beam. See Figure 2.

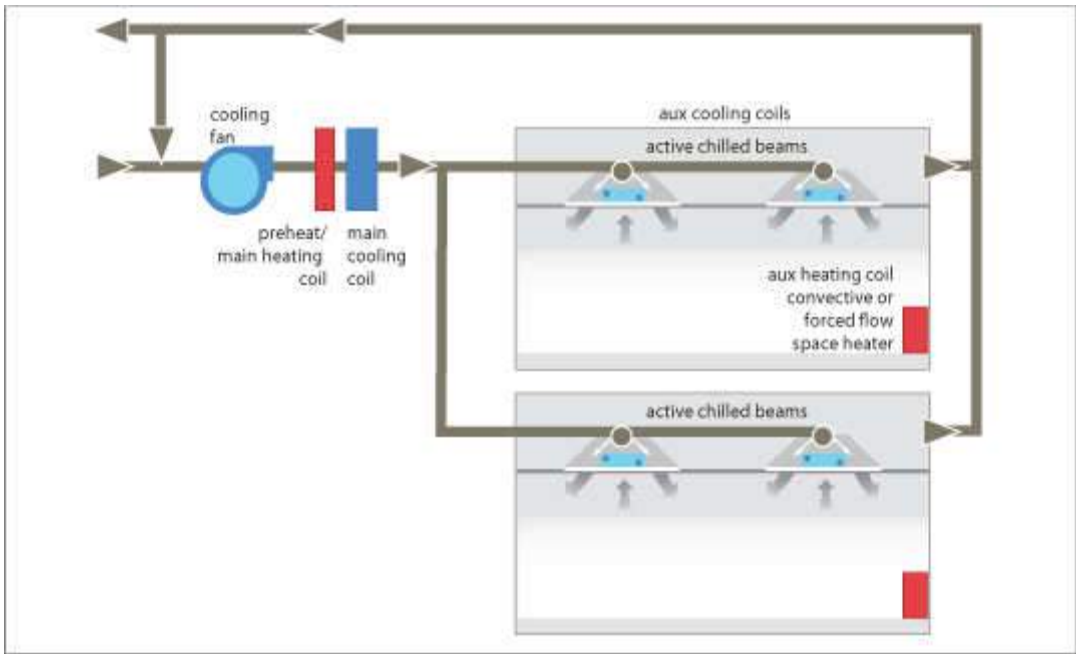


Figure 2 – Active Chilled Beams with Chilled Water Cooling, Hot Water Heating and Energy Recovery Unit

The mechanical cooling plant consists of an air cooled chiller and chilled water cooling coils.

The mechanical heating plant consists of two hot water boilers and hot water terminal heating coils served by two constant volume pumps.

Design Considerations:

- Systems are known for quiet operation
- Lower than average floor to floor heights possible
- Appropriate for high internal cooling loads
- Good Individual Control
- Diminished ventilation effectiveness
- Many points of maintenance in the building
- The possibility of condensation on panels and equipment is a concern.

Alternate No. 3 - Ground Coupled Heat Pump (GCHP) system with Energy Recovery Unit

Alternate No.3 consists of Ground Coupled Heat Pump (GCHP) system. Space heating and cooling will be provided by high efficiency heat pumps located in mechanical rooms or penthouses. Each heat pump has its own refrigeration compressor and fan, and will provide heating and cooling to the space. Heat will be added to and rejected from the heat pump condensing water loop using an array of vertical piping buried beneath the site. Low velocity ductwork will connect the heat pumps to the diffusers in the space. Return air will recirculate to the heat pumps through the open ceiling plenum. See Figure 3.

Ventilation air will be provided by a dedicated outside air handling unit. This unit has a packaged heat recovery unit located in a mechanical room or a penthouse. The heat recovery unit will use the general building exhaust air to pre-heat and cool the incoming outside air using a rotating heat wheel. The ventilation air will be ducted to the individual space ceiling plenums where it will be mixed with the air recirculating to the heat pumps.

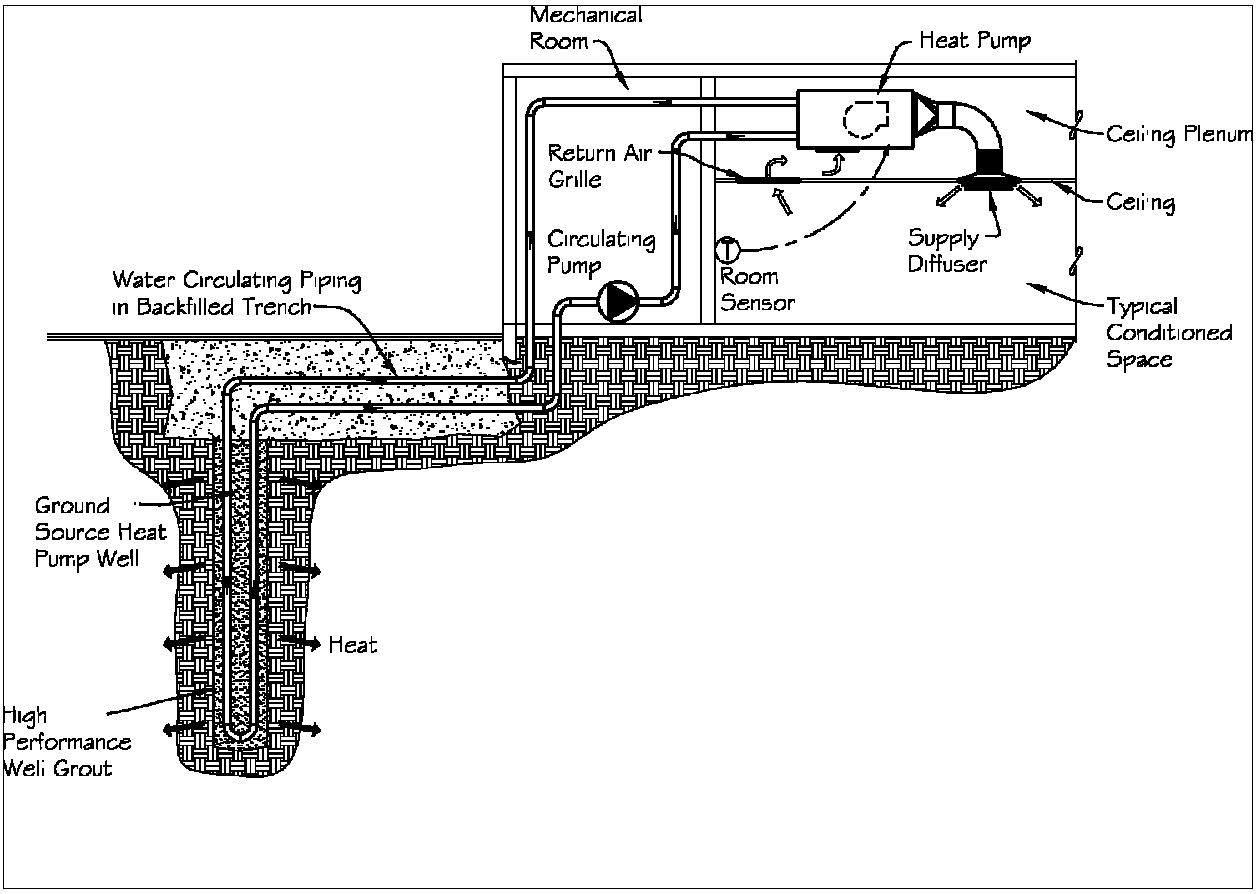


Figure 3 – Ground Coupled Heat Pump (GCHP) system with Energy Recovery Unit

Ground source loop will be a series of vertical wells drilled into the ground to use the earth as an energy source or “heat sink.” This “Closed Loop” transports energy to and from the ground using the water in the piping. Piping is insulated and made of copper or steel inside the building and non-insulated HDPE plastic outside the building. The ground source array would consist of 4.5" diameter holes dug to 300 feet deep approximately 25 feet on center. The parking lots are ideal locations for bore holes.

Mechanical room will house ground coupled loop manifolds, two heat pump circulating water pumps (one is back-up) with variable speed drive (VSD).

The primary cooling/heating plant consists of a condenser water loop buried in the ground using the earth as a heat sink. In the cooling season the loop will transfer heat absorbed from the space by the heat pumps and transfer it to the ground for storage. When heating is required, the condenser loop recaptures the heat from the ground and returns it to the space. It is estimated that the pumping equipment will be housed in mechanical rooms totaling 200 ft2.

Design Considerations:

- Incremental system allows a single unit failure to only affect the space served by the heat pump (small area).
- Electric only system for heating and cooling.
- Somewhat more flexible than ducted systems when spaces/zones are modified.
- Routine Maintenance occurs in tenant space if units are located above the ceiling.
- Requires extensive site work for bore field.

Alternate No. 4 – Variable Refrigerant Volume – Heat Recovery with Airside Energy Recovery Unit

Alternate No. 4 consists of a Variable Refrigerant Volume (VRV) heat pump system similar to Daikin. VRV fan coil units are located above each space, and connected to a shared Heat Recovery/Heat Pump unit located on the roof or ground. Multiple Indoor fan coil units (evaporators) are connected to a single condensing unit. As a result, the refrigerant acts much like a condenser water loop in a water source heat pump system allowing some zones to share heat with others that demand it. See Figure 4.

Ventilation air will be provided by a dedicated outside air handling unit. This unit has a packaged heat recovery unit located in a mechanical room or a penthouse. The heat recovery unit will use the general building exhaust air to pre-heat and cool the incoming outside air using a rotating heat wheel. The ventilation air will be ducted to the individual space ceiling plenums where it will be mixed with the air recirculating to the fan coil units.

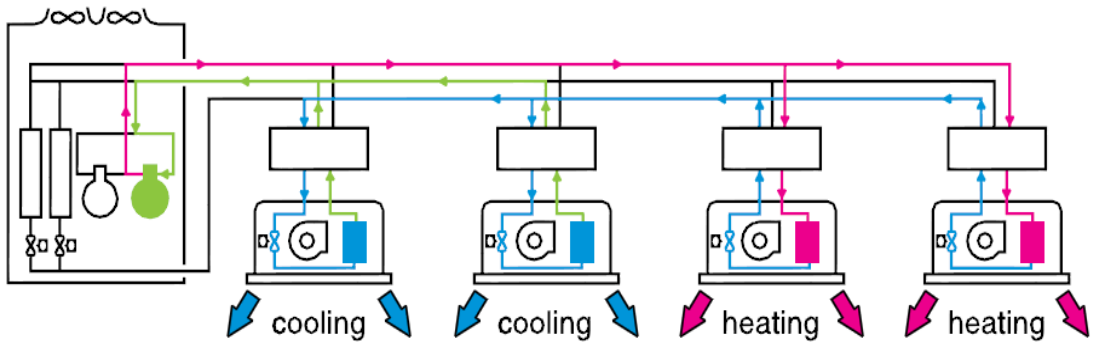


Figure 4 – Variable Refrigerant Volume (VRV) heat pump - Heat Recovery, and Airside Energy Recovery Unit

The cooling/heating plant consists of an air cooled heat pump condenser located on the roof or ground. The air cooled condenser rejects and absorbs heat to the ambient air.

Design Considerations:

- Incremental system allows a single unit failure to only affect the space served by the fan coil unit (small area).
- Electric only system for heating and cooling.
- Somewhat more flexible than ducted systems when spaces/zones are modified.
- Routine Maintenance occurs in tenant space if units are located above the ceiling.

MECHANICAL SYSTEMS COST SUMMARY

Mechanical, electrical, and controls construction cost (material/labor) for the four alternatives were derived from past experience in school construction and adjusted for current material prices. The costs below (Table 3) exclude fire protection and plumbing cost in all alternatives. The costs used in this analysis are for the purposes of system comparison only and should not be used as construction bid prices from General Contractors.

The quality of maintenance and maintenance supervision can be a major factor in overall life-cycle cost of a mechanical system. The maintenance cost of mechanical systems varies widely depending upon configuration, equipment locations, accessibility, system complexity, and system reliability requirements. The estimated system maintenance costs were based on ASHRAE Owning and Operating Costs and are kept the same through all alternatives per PSFA request. The costs shall not to be intended for actual service costs. Refer to Table 3 below.

Table 3: Equipment First Costs and Estimated Maintenance Costs

Alternatives	Equipment First Costs	Yearly Maintenance Costs
Alternative #1	$765,254	$1,757
Alternative #2	$1,017,256	$1,757
Alternative #3	$693,584	$1,757
Alternative #4	$664,684	$ 1,757

APPENDIX

Trace Outputs
(Additional Inputs & Outputs are available upon request)

Economic Summary

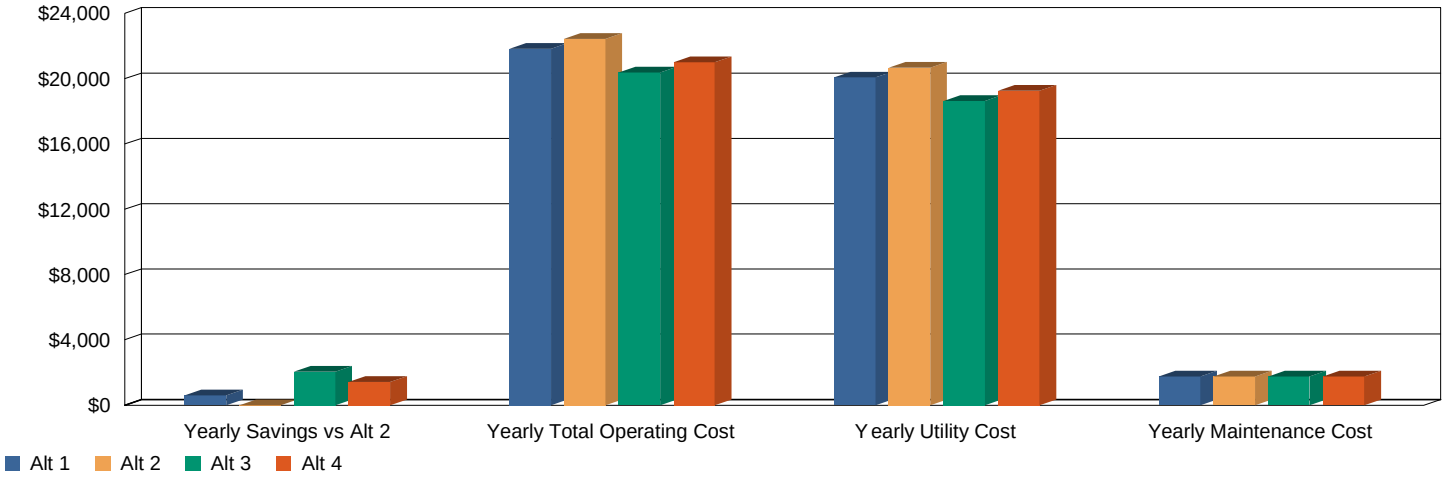
Project Information

Location		Study Life:	30 years
Project Name	Capitan New Secondary School	Cost of Capital:	2.37 %
User		Alternative 1:	FOUR PIPE FAN COIL with ERV-CW/HW
Company		Alternative 2:	ACTIVE CHILLED BEAMS with CW/HW ERV
Comments	TRACE 700 v6_2_7 - gbXML imported on Wednesday, September 10, 2014 at 03:45 PM	Alternative 3:	GROUNG COUPLED HP SYS with ERV
		Alternative 4:	VARIABLE REFRIGERANT FLOW with ERV

Economic Comparison of Alternatives

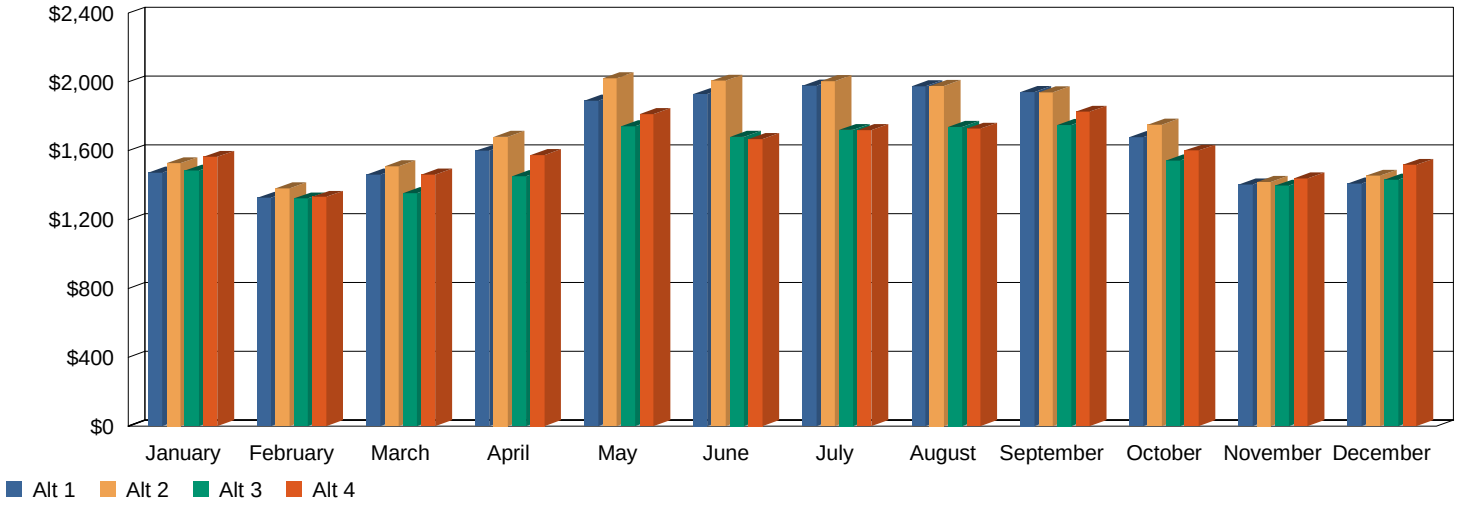
	Yearly Savings ($)	First Cost Difference ($)	Cumulative Cash Flow Difference ($)	Simple Payback (yrs.)	Net Present Value ($)	Life Cycle Payback (yrs.)	Internal Rate of Return (%)	Life Cycle Cost
Alt 2 vs Alt 1	-607	252,002	-283,255	No Payback	-272,906	No Payback	Does Not Payback	-272,906.10
Alt 1 vs Alt 3	-1,446	71,670	-152,810	No Payback	-125,365	No Payback	Does Not Payback	-125,364.50
Alt 1 vs Alt 4	-817	100,570	-162,903	No Payback	-140,530	No Payback	Does Not Payback	-140,530.10
Alt 2 vs Alt 3	-2,053	323,672	-436,065	No Payback	-398,271	No Payback	Does Not Payback	-398,270.50
Alt 2 vs Alt 4	-1,425	352,572	-446,158	No Payback	-413,436	No Payback	Does Not Payback	-413,436.20
Alt 3 vs Alt 4	628	28,899	-10,093	46.0	-15,166	No Payback	Does Not Payback	-15,165.61

Annual Operating Costs



	Yearly Savings vs Alt 2	Yearly Total Operating Cost ($)	Yearly Utility Cost ($)	Yearly Maintenance Cost ($)	Plant kWh/ton-hr
Alt 1	607	21,828	20,071	1,757	1.320
Alt 2	0	22,435	20,678	1,757	1.563
Alt 3	2,053	20,382	18,625	1,757	0.902
Alt 4	1,425	21,010	19,253	1,757	0.682

Monthly Utility Costs



ECONOMIC PARAMETERS

By Bridgers & Paxton

Project Name: Capitan New Secondary School
Location:
Building Owner:
Program User:
Company:
Comments: TRACE 700 v6_2_7 - gbXML imported on Wednesday, September 10, 2014 at 03:45 PM

Study Life:	30 Yrs	Income Tax Rate:	0.000 %
Mortgage Life:	30 Yrs	Cost of Capital:	2.370 %
Depreciation Life:	30 Yrs	Property tax rate:	0.000 %
Mortgage Interest Rate:	10.000 %	Insurance Expense rate:	0.000 %
Percent Financed:	0.0 %		
Depreciation Method:	None	Annual Inflation Rate Of	
Declining Balance Taxes:	100.0 %	Maintenance Expense	5.000 %
		Replacement Expense	5.000 %
		Property Taxes	0.000 %
		Insurance Expense	0.000 %

Alt #	First Cost ($/ton)	First Cost ($/ft²)	Additional First Cost	Total First Cost	Maintenance Cost ($/ton)	Maintenance Cost ($/ft²)	Total Maint. Cost	Total Alt. Cost
4	22,951.52	28.75	0.00	664,684.38	60.67	0.08	1,757.08	666,441.45
3	25,433.45	30.00	0.00	693,583.69	64.43	0.08	1,757.08	695,340.77
2	37,302.40	44.00	0.00	1,017,256.13	64.43	0.08	1,757.08	1,019,013.20
1	28,061.58	33.10	0.00	765,254.00	64.43	0.08	1,757.08	767,011.08

MONTHLY UTILITY COSTS

By Bridgers & Paxton

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
					------- Monthly Utility Costs -------								
Alternative 1													
Electric													
On-Pk Cons. ($)	237	226	288	346	436	367	347	374	399	378	248	238	3,884
Off-Pk Cons. ($)	270	232	286	267	351	280	273	276	305	290	260	249	3,339
On-Pk Demand ($)	572	558	594	713	766	898	940	912	868	723	551	569	8,664
Off-Pk Demand ($)	201	200	220	231	299	343	378	373	328	246	220	201	3,240
Total ($):	1,279	1,215	1,387	1,557	1,851	1,889	1,939	1,934	1,901	1,638	1,279	1,257	19,127
Gas													
On-Pk Cons. ($)	193	112	73	42	41	41	41	41	41	42	125	152	944
Monthly Total ($):	1,473	1,327	1,461	1,600	1,892	1,930	1,979	1,975	1,941	1,680	1,404	1,410	20,071

Building Area = 23,119 ft²

Utility Cost Per Area = 0.87 $/ft²

MONTHLY UTILITY COSTS

By Bridgers & Paxton

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
					------- Monthly Utility Costs -------								
Alternative 2													
Electric													
On-Pk Cons. ($)	264	204	276	360	477	417	394	421	429	394	227	229	4,093
Off-Pk Cons. ($)	272	247	289	264	369	297	290	287	318	288	271	263	3,453
On-Pk Demand ($)	599	589	634	759	813	910	922	873	822	766	568	595	8,850
Off-Pk Demand ($)	245	245	245	258	321	344	359	355	330	263	245	245	3,455
Total ($):	1,379	1,285	1,444	1,641	1,980	1,967	1,964	1,936	1,899	1,712	1,312	1,332	19,851
Gas													
On-Pk Cons. ($)	148	96	67	41	41	41	41	41	41	41	107	123	827
Monthly Total ($):	1,527	1,381	1,510	1,682	2,021	2,007	2,005	1,976	1,940	1,752	1,419	1,455	20,678

Building Area = 23,119 ft²

Utility Cost Per Area = 0.89 $/ft²

MONTHLY UTILITY COSTS

By Bridgers & Paxton

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
					------- Monthly Utility Costs -------								
Alternative 3													
Electric													
On-Pk Cons. ($)	263	230	271	300	392	310	300	322	360	328	257	251	3,583
Off-Pk Cons. ($)	338	266	295	262	331	247	249	248	290	285	296	302	3,407
On-Pk Demand ($)	516	519	536	648	706	772	802	798	755	666	522	531	7,769
Off-Pk Demand ($)	311	268	211	202	274	312	331	331	305	225	282	303	3,356
Total ($):	1,428	1,283	1,313	1,412	1,702	1,641	1,681	1,699	1,710	1,503	1,356	1,387	18,116
Gas													
On-Pk Cons. ($)	58	41	41	41	41	41	41	41	41	41	42	45	509
Monthly Total ($):	1,485	1,324	1,354	1,452	1,743	1,682	1,722	1,739	1,751	1,544	1,398	1,432	18,625

Building Area = 23,119 ft²

Utility Cost Per Area = 0.81 $/ft²

MONTHLY UTILITY COSTS

By Bridgers & Paxton

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
					------- Monthly Utility Costs -------								
Alternative 4													
Electric													
On-Pk Cons. ($)	271	220	272	298	395	262	260	280	366	326	239	263	3,452
Off-Pk Cons. ($)	278	248	287	258	335	213	221	218	292	279	269	263	3,161
On-Pk Demand ($)	662	548	591	697	749	818	852	845	803	719	629	676	8,587
Off-Pk Demand ($)	312	277	272	282	294	335	348	345	326	237	261	275	3,565
Total ($):	1,523	1,292	1,421	1,534	1,773	1,628	1,680	1,689	1,787	1,561	1,399	1,477	18,765
Gas													
On-Pk Cons. ($)	42	41	41	41	41	41	41	41	41	41	41	41	489
Monthly Total ($):	1,564	1,333	1,462	1,575	1,814	1,669	1,721	1,730	1,828	1,601	1,439	1,518	19,253

Building Area = 23,119 ft²

Utility Cost Per Area = 0.83 $/ft²

ALTERNATIVE COMPARISON

By Bridgers & Paxton

Alternative 1 vs Alternative 3

First Cost Difference	71,670.31
Down Payment Difference	71,670.31
Net Present Value of Incremental Cash Flows	-125,364.46
Life Cycle Cost Difference	-125,364.46
Revenue Penalty Difference	0.00
Simple Payback on Investment	Does not pay back
Life Cycle Payback on Investment	Does not pay back
Internal Rate of Return	Does not pay back
Cost of capital (%)	2.4

Year	Cash Flow Difference	Cumulative Cash Flow Difference	Present Value of Flow Difference	Net Present Value
0	-71,670.31	-71,670.31	-71,670.31	-71,670.31
1	-1,445.52	-73,115.83	-1,412.05	-73,082.36
2	-1,495.82	-74,611.65	-1,427.36	-74,509.73
3	-1,547.88	-76,159.53	-1,442.84	-75,952.57
4	-1,601.74	-77,761.27	-1,458.48	-77,411.05
5	-1,657.48	-79,418.75	-1,474.30	-78,885.35
6	-1,715.16	-81,133.91	-1,490.28	-80,375.63
7	-1,774.85	-82,908.76	-1,506.44	-81,882.07
8	-1,836.62	-84,745.38	-1,522.78	-83,404.85
9	-1,900.53	-86,645.91	-1,539.29	-84,944.14
10	-1,966.67	-88,612.58	-1,555.98	-86,500.12
11	-2,035.11	-90,647.68	-1,572.85	-88,072.97
12	-2,105.93	-92,753.61	-1,589.91	-89,662.88
13	-2,179.22	-94,932.83	-1,607.15	-91,270.02
14	-2,255.05	-97,187.89	-1,624.57	-92,894.60
15	-2,333.53	-99,521.41	-1,642.19	-94,536.78
16	-2,414.74	-101,936.15	-1,659.99	-96,196.78
17	-2,498.77	-104,434.92	-1,677.99	-97,874.77
18	-2,585.73	-107,020.65	-1,696.19	-99,570.96
19	-2,675.71	-109,696.36	-1,714.58	-101,285.53
20	-2,768.82	-112,465.18	-1,733.17	-103,018.70
21	-2,865.18	-115,330.36	-1,751.96	-104,770.67
22	-2,964.89	-118,295.25	-1,770.96	-106,541.63
23	-9,831.07	-128,126.32	-5,736.25	-112,277.88
24	-3,174.84	-131,301.15	-1,809.57	-114,087.45
25	-3,285.32	-134,586.47	-1,829.19	-115,916.65
26	-3,399.65	-137,986.12	-1,849.03	-117,765.67
27	-3,517.96	-141,504.08	-1,869.08	-119,634.75
28	-3,640.38	-145,144.46	-1,889.34	-121,524.10
29	-3,767.07	-148,911.53	-1,909.83	-123,433.93
30	-3,898.16	-152,809.69	-1,930.54	-125,364.46

ALTERNATIVE COMPARISON

By Bridgers & Paxton

Alternative 1 vs Alternative 4

First Cost Difference	100,569.63
Down Payment Difference	100,569.63
Net Present Value of Incremental Cash Flows	-140,530.08
Life Cycle Cost Difference	-140,530.08
Revenue Penalty Difference	0.00
Simple Payback on Investment	Does not pay back
Life Cycle Payback on Investment	Does not pay back
Internal Rate of Return	Does not pay back
Cost of capital (%)	2.4

Year	Cash Flow Difference	Cumulative Cash Flow Difference	Present Value of Flow Difference	Net Present Value
0	-100,569.63	-100,569.63	-100,569.63	-100,569.63
1	-817.14	-101,386.76	-798.22	-101,367.84
2	-845.57	-102,232.34	-806.87	-102,174.72
3	-875.00	-103,107.33	-815.62	-102,990.34
4	-905.45	-104,012.78	-824.47	-103,814.81
5	-936.96	-104,949.74	-833.41	-104,648.22
6	-969.57	-105,919.31	-842.44	-105,490.66
7	-1,003.31	-106,922.62	-851.58	-106,342.24
8	-1,038.22	-107,960.84	-860.81	-107,203.05
9	-1,074.35	-109,035.19	-870.15	-108,073.20
10	-1,111.74	-110,146.93	-879.58	-108,952.78
11	-1,150.43	-111,297.35	-889.12	-109,841.89
12	-1,190.46	-112,487.82	-898.76	-110,740.65
13	-1,231.89	-113,719.71	-908.50	-111,649.16
14	-1,274.76	-114,994.47	-918.35	-112,567.51
15	-1,319.12	-116,313.59	-928.31	-113,495.82
16	-1,365.03	-117,678.62	-938.38	-114,434.20
17	-1,412.53	-119,091.15	-948.55	-115,382.76
18	-1,461.69	-120,552.84	-958.84	-116,341.60
19	-1,512.55	-122,065.39	-969.24	-117,310.83
20	-1,565.19	-123,630.58	-979.74	-118,290.58
21	-1,619.66	-125,250.24	-990.37	-119,280.94
22	-1,676.02	-126,926.26	-1,001.11	-120,282.05
23	-22,023.47	-148,949.74	-12,850.31	-133,132.36
24	-1,794.70	-150,744.44	-1,022.93	-134,155.29
25	-1,857.16	-152,601.60	-1,034.03	-135,189.32
26	-1,921.79	-154,523.39	-1,045.24	-136,234.55
27	-1,988.67	-156,512.06	-1,056.57	-137,291.13
28	-2,057.87	-158,569.93	-1,068.03	-138,359.15
29	-2,129.49	-160,699.42	-1,079.61	-139,438.76
30	-2,203.59	-162,903.02	-1,091.32	-140,530.08

ALTERNATIVE COMPARISON

By Bridgers & Paxton

Alternative 2 vs Alternative 1

First Cost Difference	252,002.13
Down Payment Difference	252,002.13
Net Present Value of Incremental Cash Flows	-272,906.06
Life Cycle Cost Difference	-272,906.06
Revenue Penalty Difference	0.00
Simple Payback on Investment	Does not pay back
Life Cycle Payback on Investment	Does not pay back
Internal Rate of Return	Does not pay back
Cost of capital (%)	2.4

Year	Cash Flow Difference	Cumulative Cash Flow Difference	Present Value of Flow Difference	Net Present Value
0	-252,002.13	-252,002.13	-252,002.13	-252,002.13
1	-607.40	-252,609.53	-593.34	-252,595.46
2	-628.54	-253,238.06	-599.77	-253,195.24
3	-650.41	-253,888.47	-606.28	-253,801.51
4	-673.05	-254,561.52	-612.85	-254,414.36
5	-696.47	-255,257.99	-619.49	-255,033.85
6	-720.70	-255,978.69	-626.21	-255,660.07
7	-745.79	-256,724.48	-633.00	-256,293.07
8	-771.74	-257,496.22	-639.87	-256,932.93
9	-798.60	-258,294.81	-646.80	-257,579.74
10	-826.39	-259,121.20	-653.82	-258,233.55
11	-855.14	-259,976.34	-660.91	-258,894.46
12	-884.90	-260,861.25	-668.07	-259,562.53
13	-915.70	-261,776.94	-675.32	-260,237.85
14	-947.56	-262,724.51	-682.64	-260,920.48
15	-980.54	-263,705.05	-690.04	-261,610.53
16	-1,014.66	-264,719.71	-697.52	-262,308.05
17	-1,049.97	-265,769.68	-705.09	-263,013.13
18	-1,086.51	-266,856.20	-712.73	-263,725.86
19	-1,124.32	-267,980.52	-720.46	-264,446.32
20	-1,163.45	-269,143.97	-728.27	-265,174.60
21	-1,203.94	-270,347.91	-736.17	-265,910.76
22	-1,245.83	-271,593.74	-744.15	-266,654.91
23	-1,289.19	-272,882.93	-752.22	-267,407.13
24	-1,334.05	-274,216.98	-760.38	-268,167.51
25	-1,380.48	-275,597.46	-768.62	-268,936.13
26	-1,428.52	-277,025.98	-776.95	-269,713.08
27	-1,478.23	-278,504.21	-785.38	-270,498.46
28	-1,529.67	-280,033.89	-793.89	-271,292.36
29	-1,582.91	-281,616.79	-802.50	-272,094.86
30	-1,637.99	-283,254.79	-811.20	-272,906.06

ALTERNATIVE COMPARISON

By Bridgers & Paxton

Alternative 2 vs Alternative 3

First Cost Difference	323,672.44
Down Payment Difference	323,672.44
Net Present Value of Incremental Cash Flows	-398,270.53
Life Cycle Cost Difference	-398,270.53
Revenue Penalty Difference	0.00
Simple Payback on Investment	Does not pay back
Life Cycle Payback on Investment	Does not pay back
Internal Rate of Return	Does not pay back
Cost of capital (%)	2.4

Year	Cash Flow Difference	Cumulative Cash Flow Difference	Present Value of Flow Difference	Net Present Value
0	-323,672.44	-323,672.44	-323,672.44	-323,672.44
1	-2,052.92	-325,725.35	-2,005.39	-325,677.83
2	-2,124.36	-327,849.71	-2,027.13	-327,704.96
3	-2,198.29	-330,048.00	-2,049.11	-329,754.08
4	-2,274.79	-332,322.79	-2,071.33	-331,825.41
5	-2,353.95	-334,676.74	-2,093.79	-333,919.20
6	-2,435.87	-337,112.60	-2,116.50	-336,035.70
7	-2,520.64	-339,633.24	-2,139.45	-338,175.14
8	-2,608.35	-342,241.59	-2,162.64	-340,337.78
9	-2,699.12	-344,940.72	-2,186.09	-342,523.88
10	-2,793.05	-347,733.77	-2,209.80	-344,733.67
11	-2,890.25	-350,624.03	-2,233.76	-346,967.43
12	-2,990.83	-353,614.86	-2,257.98	-349,225.41
13	-3,094.91	-356,709.78	-2,282.46	-351,507.87
14	-3,202.62	-359,912.39	-2,307.21	-353,815.08
15	-3,314.07	-363,226.46	-2,332.23	-356,147.31
16	-3,429.40	-366,655.86	-2,357.52	-358,504.82
17	-3,548.74	-370,204.60	-2,383.08	-360,887.90
18	-3,672.24	-373,876.84	-2,408.92	-363,296.82
19	-3,800.03	-377,676.88	-2,435.04	-365,731.86
20	-3,932.27	-381,609.15	-2,461.44	-368,193.30
21	-4,069.12	-385,678.27	-2,488.13	-370,681.43
22	-4,210.72	-389,888.99	-2,515.11	-373,196.54
23	-11,120.26	-401,009.25	-6,488.47	-379,685.01
24	-4,508.89	-405,518.14	-2,569.95	-382,254.96
25	-4,665.80	-410,183.93	-2,597.81	-384,852.77
26	-4,828.17	-415,012.10	-2,625.98	-387,478.76
27	-4,996.19	-420,008.29	-2,654.46	-390,133.21
28	-5,170.06	-425,178.35	-2,683.24	-392,816.45
29	-5,349.97	-430,528.32	-2,712.33	-395,528.78
30	-5,536.15	-436,064.48	-2,741.74	-398,270.53

ALTERNATIVE COMPARISON

By Bridgers & Paxton

Alternative 2 vs Alternative 4

First Cost Difference	352,571.75
Down Payment Difference	352,571.75
Net Present Value of Incremental Cash Flows	-413,436.14
Life Cycle Cost Difference	-413,436.14
Revenue Penalty Difference	0.00
Simple Payback on Investment	Does not pay back
Life Cycle Payback on Investment	Does not pay back
Internal Rate of Return	Does not pay back
Cost of capital (%)	2.4

Year	Cash Flow Difference	Cumulative Cash Flow Difference	Present Value of Flow Difference	Net Present Value
0	-352,571.75	-352,571.75	-352,571.75	-352,571.75
1	-1,424.54	-353,996.29	-1,391.56	-353,963.31
2	-1,474.11	-355,470.40	-1,406.65	-355,369.95
3	-1,525.41	-356,995.81	-1,421.90	-356,791.85
4	-1,578.49	-358,574.30	-1,437.32	-358,229.17
5	-1,633.43	-360,207.73	-1,452.90	-359,682.07
6	-1,690.27	-361,898.00	-1,468.66	-361,150.73
7	-1,749.09	-363,647.09	-1,484.58	-362,635.30
8	-1,809.96	-365,457.05	-1,500.68	-364,135.98
9	-1,872.95	-367,330.00	-1,516.95	-365,652.93
10	-1,938.13	-369,268.12	-1,533.40	-367,186.33
11	-2,005.57	-371,273.70	-1,550.02	-368,736.35
12	-2,075.37	-373,349.06	-1,566.83	-370,303.18
13	-2,147.59	-375,496.65	-1,583.82	-371,887.00
14	-2,222.33	-377,718.98	-1,600.99	-373,488.00
15	-2,299.66	-380,018.64	-1,618.35	-375,106.35
16	-2,379.69	-382,398.33	-1,635.90	-376,742.25
17	-2,462.50	-384,860.83	-1,653.64	-378,395.89
18	-2,548.20	-387,409.03	-1,671.57	-380,067.46
19	-2,636.88	-390,045.91	-1,689.69	-381,757.15
20	-2,728.64	-392,774.55	-1,708.02	-383,465.17
21	-2,823.60	-395,598.14	-1,726.54	-385,191.71
22	-2,921.86	-398,520.00	-1,745.26	-386,936.96
23	-23,312.66	-421,832.67	-13,602.52	-400,539.49
24	-3,128.76	-424,961.42	-1,783.31	-402,322.80
25	-3,237.64	-428,199.06	-1,802.65	-404,125.44
26	-3,350.31	-431,549.37	-1,822.19	-405,947.64
27	-3,466.90	-435,016.27	-1,841.95	-407,789.59
28	-3,587.55	-438,603.82	-1,861.92	-409,651.51
29	-3,712.39	-442,316.21	-1,882.11	-411,533.62
30	-3,841.59	-446,157.80	-1,902.52	-413,436.14

ALTERNATIVE COMPARISON

By Bridgers & Paxton

Alternative 3 vs Alternative 4

First Cost Difference	28,899.31
Down Payment Difference	28,899.31
Net Present Value of Incremental Cash Flows	-15,165.61
Life Cycle Cost Difference	-15,165.61
Revenue Penalty Difference	0.00
Simple Payback on Investment	46.0 years
Life Cycle Payback on Investment	Does not pay back
Internal Rate of Return	Does not pay back
Cost of capital (%)	2.4

Year	Cash Flow Difference	Cumulative Cash Flow Difference	Present Value of Flow Difference	Net Present Value
0	-28,899.31	-28,899.31	-28,899.31	-28,899.31
1	628.38	-28,270.93	613.83	-28,285.48
2	650.25	-27,620.69	620.49	-27,664.99
3	672.88	-26,947.81	627.22	-27,037.78
4	696.29	-26,251.52	634.02	-26,403.76
5	720.52	-25,530.99	640.89	-25,762.87
6	745.60	-24,785.40	647.84	-25,115.03
7	771.54	-24,013.85	654.87	-24,460.16
8	798.39	-23,215.46	661.97	-23,798.20
9	826.18	-22,389.28	669.14	-23,129.05
10	854.93	-21,534.35	676.40	-22,452.65
11	884.68	-20,649.67	683.73	-21,768.92
12	915.47	-19,734.20	691.15	-21,077.77
13	947.33	-18,786.88	698.64	-20,379.13
14	980.29	-17,806.58	706.22	-19,672.92
15	1,014.41	-16,792.18	713.87	-18,959.04
16	1,049.71	-15,742.47	721.61	-18,237.43
17	1,086.24	-14,656.23	729.44	-17,507.99
18	1,124.04	-13,532.19	737.35	-16,770.64
19	1,163.16	-12,369.03	745.34	-16,025.30
20	1,203.63	-11,165.40	753.43	-15,271.87
21	1,245.52	-9,919.88	761.59	-14,510.28
22	1,288.87	-8,631.01	769.85	-13,740.42
23	-12,192.41	-20,823.42	-7,114.05	-20,854.48
24	1,380.13	-19,443.29	786.64	-20,067.84
25	1,428.16	-18,015.13	795.17	-19,272.67
26	1,477.86	-16,537.27	803.79	-18,468.88
27	1,529.29	-15,007.98	812.51	-17,656.37
28	1,582.51	-13,425.47	821.32	-16,835.06
29	1,637.58	-11,787.89	830.22	-16,004.84
30	1,694.57	-10,093.32	839.22	-15,165.61

YEARLY CASH FLOW

By Bridgers & Paxton

Alternative: 1
Life Cycle Cost: $ 1,954,414.03

Year	Utility Cost ($)	Maint. Cost ($)	Interest Cost ($)	Principal Cost ($)	Property Taxes ($)	Insurance Cost ($)	Revenue Penalty ($)	Replace. Expenses ($)	Deprec. Tax ($)	Cash Flow Effect ($)	Present Value ($)
0	0	0	0	765,254	0	0	0	0	0	765,254	765,254
1	20,071	1,757	0	0	0	0	0	0	0	21,828	21,322
2	20,769	1,845	0	0	0	0	0	0	0	22,614	21,579
3	21,492	1,937	0	0	0	0	0	0	0	23,429	21,839
4	22,240	2,034	0	0	0	0	0	0	0	24,274	22,103
5	23,014	2,136	0	0	0	0	0	0	0	25,149	22,370
6	23,814	2,243	0	0	0	0	0	0	0	26,057	22,641
7	24,643	2,355	0	0	0	0	0	0	0	26,998	22,915
8	25,501	2,472	0	0	0	0	0	0	0	27,973	23,193
9	26,388	2,596	0	0	0	0	0	0	0	28,984	23,475
10	27,307	2,726	0	0	0	0	0	0	0	30,032	23,761
11	28,257	2,862	0	0	0	0	0	0	0	31,119	24,051
12	29,240	3,005	0	0	0	0	0	0	0	32,245	24,344
13	30,258	3,155	0	0	0	0	0	0	0	33,413	24,642
14	31,311	3,313	0	0	0	0	0	0	0	34,624	24,944
15	32,400	3,479	0	0	0	0	0	0	0	35,879	25,249
16	33,528	3,653	0	0	0	0	0	0	0	37,181	25,560
17	34,695	3,835	0	0	0	0	0	0	0	38,530	25,874
18	35,902	4,027	0	0	0	0	0	0	0	39,929	26,193
19	37,151	4,229	0	0	0	0	0	0	0	41,380	26,516
20	38,444	4,440	0	0	0	0	0	0	0	42,884	26,844
21	39,782	4,662	0	0	0	0	0	0	0	44,444	27,176
22	41,167	4,895	0	0	0	0	0	0	0	46,062	27,513
23	42,599	5,140	0	0	0	0	0	723,645	0	771,384	450,089
24	44,082	5,397	0	0	0	0	0	0	0	49,478	28,201
25	45,616	5,667	0	0	0	0	0	0	0	51,282	28,553
26	47,203	5,950	0	0	0	0	0	0	0	53,153	28,909
27	48,846	6,248	0	0	0	0	0	0	0	55,093	29,271
28	50,546	6,560	0	0	0	0	0	0	0	57,106	29,638
29	52,305	6,888	0	0	0	0	0	0	0	59,193	30,009
30	54,125	7,232	0	0	0	0	0	0	0	61,357	30,387

Alternative: 2
Life Cycle Cost: $ 2,227,320.10

Year	Utility Cost ($)	Maint. Cost ($)	Interest Cost ($)	Principal Cost ($)	Property Taxes ($)	Insurance Cost ($)	Revenue Penalty ($)	Replace. Expenses ($)	Deprec. Tax ($)	Cash Flow Effect ($)	Present Value ($)
0	0	0	0	1,017,256	0	0	0	0	0	1,017,256	1,017,256
1	20,678	1,757	0	0	0	0	0	0	0	22,435	21,916
2	21,398	1,845	0	0	0	0	0	0	0	23,242	22,179
3	22,142	1,937	0	0	0	0	0	0	0	24,079	22,445
4	22,913	2,034	0	0	0	0	0	0	0	24,947	22,716
5	23,710	2,136	0	0	0	0	0	0	0	25,846	22,989
6	24,535	2,243	0	0	0	0	0	0	0	26,778	23,267
7	25,389	2,355	0	0	0	0	0	0	0	27,744	23,548
8	26,273	2,472	0	0	0	0	0	0	0	28,745	23,833
9	27,187	2,596	0	0	0	0	0	0	0	29,783	24,122
10	28,133	2,726	0	0	0	0	0	0	0	30,859	24,415
11	29,112	2,862	0	0	0	0	0	0	0	31,974	24,711
12	30,125	3,005	0	0	0	0	0	0	0	33,130	25,012

YEARLY CASH FLOW

By Bridgers & Paxton

13	31,173	3,155	0	0	0	0	0	0	0	34,329	25,317
14	32,258	3,313	0	0	0	0	0	0	0	35,572	25,626
15	33,381	3,479	0	0	0	0	0	0	0	36,860	25,940
16	34,543	3,653	0	0	0	0	0	0	0	38,195	26,257
17	35,745	3,835	0	0	0	0	0	0	0	39,580	26,579
18	36,989	4,027	0	0	0	0	0	0	0	41,016	26,906
19	38,276	4,229	0	0	0	0	0	0	0	42,504	27,237
20	39,608	4,440	0	0	0	0	0	0	0	44,048	27,572
21	40,986	4,662	0	0	0	0	0	0	0	45,648	27,912
22	42,412	4,895	0	0	0	0	0	0	0	47,308	28,257
23	43,888	5,140	0	0	0	0	0	723,645	0	772,673	450,841
24	45,416	5,397	0	0	0	0	0	0	0	50,813	28,962
25	46,996	5,667	0	0	0	0	0	0	0	52,663	29,322
26	48,632	5,950	0	0	0	0	0	0	0	54,582	29,686
27	50,324	6,248	0	0	0	0	0	0	0	56,572	30,056
28	52,075	6,560	0	0	0	0	0	0	0	58,635	30,431
29	53,887	6,888	0	0	0	0	0	0	0	60,775	30,812
30	55,763	7,232	0	0	0	0	0	0	0	62,995	31,198

Alternative: 3
Life Cycle Cost: $ 1,829,049.57

Year	Utility Cost ($)	Maint. Cost ($)	Interest Cost ($)	Principal Cost ($)	Property Taxes ($)	Insurance Cost ($)	Revenue Penalty ($)	Replace. Expenses ($)	Deprec. Tax ($)	Cash Flow Effect ($)	Present Value ($)
0	0	0	0	693,584	0	0	0	0	0	693,584	693,584
1	18,625	1,757	0	0	0	0	0	0	0	20,382	19,910
2	19,273	1,845	0	0	0	0	0	0	0	21,118	20,152
3	19,944	1,937	0	0	0	0	0	0	0	21,881	20,396
4	20,638	2,034	0	0	0	0	0	0	0	22,672	20,644
5	21,356	2,136	0	0	0	0	0	0	0	23,492	20,896
6	22,099	2,243	0	0	0	0	0	0	0	24,342	21,150
7	22,868	2,355	0	0	0	0	0	0	0	25,223	21,409
8	23,664	2,472	0	0	0	0	0	0	0	26,137	21,670
9	24,488	2,596	0	0	0	0	0	0	0	27,084	21,936
10	25,340	2,726	0	0	0	0	0	0	0	28,066	22,205
11	26,222	2,862	0	0	0	0	0	0	0	29,084	22,478
12	27,134	3,005	0	0	0	0	0	0	0	30,139	22,754
13	28,079	3,155	0	0	0	0	0	0	0	31,234	23,035
14	29,056	3,313	0	0	0	0	0	0	0	32,369	23,319
15	30,067	3,479	0	0	0	0	0	0	0	33,546	23,607
16	31,113	3,653	0	0	0	0	0	0	0	34,766	23,900
17	32,196	3,835	0	0	0	0	0	0	0	36,031	24,196
18	33,316	4,027	0	0	0	0	0	0	0	37,344	24,497
19	34,476	4,229	0	0	0	0	0	0	0	38,704	24,801
20	35,675	4,440	0	0	0	0	0	0	0	40,115	25,111
21	36,917	4,662	0	0	0	0	0	0	0	41,579	25,424
22	38,202	4,895	0	0	0	0	0	0	0	43,097	25,742
23	39,531	5,140	0	0	0	0	0	716,882	0	761,553	444,352
24	40,907	5,397	0	0	0	0	0	0	0	46,304	26,392
25	42,330	5,667	0	0	0	0	0	0	0	47,997	26,724
26	43,803	5,950	0	0	0	0	0	0	0	49,753	27,060
27	45,328	6,248	0	0	0	0	0	0	0	51,575	27,402
28	46,905	6,560	0	0	0	0	0	0	0	53,465	27,748
29	48,537	6,888	0	0	0	0	0	0	0	55,425	28,100
30	50,227	7,232	0	0	0	0	0	0	0	57,459	28,456

YEARLY CASH FLOW

By Bridgers & Paxton

Alternative: 4
Life Cycle Cost: $ 1,813,883.95

Year	Utility Cost ($)	Maint. Cost ($)	Interest Cost ($)	Principal Cost ($)	Property Taxes ($)	Insurance Cost ($)	Revenue Penalty ($)	Replace. Expenses ($)	Deprec. Tax ($)	Cash Flow Effect ($)	Present Value ($)
0	0	0	0	664,684	0	0	0	0	0	664,684	664,684
1	19,253	1,757	0	0	0	0	0	0	0	21,010	20,524
2	19,923	1,845	0	0	0	0	0	0	0	21,768	20,772
3	20,617	1,937	0	0	0	0	0	0	0	22,554	21,023
4	21,334	2,034	0	0	0	0	0	0	0	23,368	21,278
5	22,077	2,136	0	0	0	0	0	0	0	24,212	21,536
6	22,845	2,243	0	0	0	0	0	0	0	25,087	21,798
7	23,640	2,355	0	0	0	0	0	0	0	25,995	22,063
8	24,463	2,472	0	0	0	0	0	0	0	26,935	22,332
9	25,314	2,596	0	0	0	0	0	0	0	27,910	22,605
10	26,195	2,726	0	0	0	0	0	0	0	28,921	22,881
11	27,106	2,862	0	0	0	0	0	0	0	29,969	23,161
12	28,050	3,005	0	0	0	0	0	0	0	31,055	23,445
13	29,026	3,155	0	0	0	0	0	0	0	32,181	23,733
14	30,036	3,313	0	0	0	0	0	0	0	33,349	24,025
15	31,081	3,479	0	0	0	0	0	0	0	34,560	24,321
16	32,163	3,653	0	0	0	0	0	0	0	35,816	24,621
17	33,282	3,835	0	0	0	0	0	0	0	37,118	24,925
18	34,440	4,027	0	0	0	0	0	0	0	38,468	25,234
19	35,639	4,229	0	0	0	0	0	0	0	39,867	25,547
20	36,879	4,440	0	0	0	0	0	0	0	41,319	25,864
21	38,162	4,662	0	0	0	0	0	0	0	42,825	26,186
22	39,491	4,895	0	0	0	0	0	0	0	44,386	26,512
23	40,865	5,140	0	0	0	0	0	703,356	0	749,360	437,238
24	42,287	5,397	0	0	0	0	0	0	0	47,684	27,179
25	43,758	5,667	0	0	0	0	0	0	0	49,425	27,519
26	45,281	5,950	0	0	0	0	0	0	0	51,231	27,864
27	46,857	6,248	0	0	0	0	0	0	0	53,105	28,214
28	48,488	6,560	0	0	0	0	0	0	0	55,048	28,570
29	50,175	6,888	0	0	0	0	0	0	0	57,063	28,930
30	51,921	7,232	0	0	0	0	0	0	0	59,154	29,295

Energy Cost Budget / PRM Summary

By Bridgers & Paxton

Project Name: Capitan New Secondary School	Date: September 30, 2014
City:	Weather Data: Capitan, NM

Note: The percentage displayed for the "Proposed/ Base %" column of the base case is actually the percentage of the total energy consumption.

* Denotes the base alternative for the ECB study.

		* Alt-1 FOUR PIPE FAN COIL wi			Alt-2 ACTIVE CHILLED BEAMS			Alt-3 GROUNG COUPLED HP S`			Alt-4 VARIABLE REFRIGERANT		
		Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtuh	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtuh	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtuh	Energy 10^6 Btu/yr	Proposed / Base %	Peak kBtuh
Lighting - Conditioned	Electricity	125.9	31	68	125.9	100	68	125.9	100	68	125.9	100	68
Space Heating	Electricity	0.5	0	1	0.6	130	1	11.1	2,275	70	5.8	1,195	100
	Gas	71.9	18	536	53.5	74	409	3.4	5	171	0.2	0	45
Space Cooling	Electricity	74.9	18	122	92.3	123	113	49.1	66	88	46.8	62	86
Pumps	Electricity	1.1	0	5	0.9	85	4	10.0	893	4	0.0	0	0
Heat Rejection	Electricity	7.8	2	12	8.4	108	19	0.0	0	0	4.2	54	6
Fans - Conditioned	Electricity	76.2	19	36	72.6	95	34	80.7	106	38	75.5	99	54
Receptacles - Conditioned	Electricity	50.5	12	25	50.9	101	25	50.5	100	25	50.9	101	25
Total Building Consumption		**408.8**			**405.3**			**330.6**			**309.3**		

		* Alt-1 FOUR PIPE FAN COIL w	Alt-2 ACTIVE CHILLED BEAMS	Alt-3 GROUNG COUPLED HP S`	Alt-4 VARIABLE REFRIGERANT
Total	**Number of hours heating load not met**	254	416	522	164
	Number of hours cooling load not met	486	0	486	479

	* Alt-1 FOUR PIPE FAN COIL w		Alt-2 ACTIVE CHILLED BEAMS		Alt-3 GROUNG COUPLED HP S`		Alt-4 VARIABLE REFRIGERANT	
	Energy 10^6 Btu/yr	Cost/yr $/yr	Energy 10^6 Btu/yr	Cost/yr $/yr	Energy 10^6 Btu/yr	Cost/yr $/yr	Energy 10^6 Btu/yr	Cost/yr $/yr
Electricity	336.9	19,127	351.7	19,851	327.2	18,116	309.1	18,765
Gas	71.9	944	53.5	827	3.4	509	0.2	489
Total	**409**	**20,071**	**405**	**20,678**	**331**	**18,625**	**309**	**19,253**

Electric demand On peak	Min Charge: 0 Min demand: 0 Fuel adjustment: 0 kWh/kW flag: No Customer charge: 0	Start period: January End period: December	$	Rate 8.130	Cutoff
Electric consumption On peak	Min Charge: 0 Min demand: 0 Fuel adjustment: 0 kWh/kW flag: No Customer charge: 0	Start period: January End period: December	$	Rate 0.032	Cutoff
Gas On peak	Min Charge: 0 Min demand: 0 Fuel adjustment: 0 kWh/kW flag: No Customer charge: 0	Start period: January End period: December	$	Rate 0.466	Cutoff
Water On peak	Min Charge: 0 Min demand: 0 Fuel adjustment: 0 kWh/kW flag: No Customer charge: 0	Start period: January End period: December	$	Rate 0.000	Cutoff
Electric demand Off peak	Min Charge: 0 Min demand: 0 Fuel adjustment: 0 kWh/kW flag: No Customer charge: 0	Start period: January End period: December	$	Rate 5.870	Cutoff
Electric consumption Off peak	Min Charge: 0 Min demand: 0 Fuel adjustment: 0 kWh/kW flag: No Customer charge: 0	Start period: January End period: December	$	Rate 0.024	Cutoff
Oil On peak	Min Charge: 0 Min demand: 0 Fuel adjustment: 0 kWh/kW flag: No Customer charge: 0	Start period: January End period: December	$	Rate 0.400	Cutoff

Otero County Electric Coop

Electric demand On peak	Min Charge: 0 Min demand: 0 Fuel adjustment: 0 kWh/kW flag: No Customer charge: 85.00	Start period: January End period: December	$	Rate 11.000	Cutoff
Electric demand Off peak	Min Charge: 0 Min demand: 0 Fuel adjustment: 0 kWh/kW flag: No Customer charge: 0	Start period: January End period: December	$	Rate 5.250	Cutoff
Electric consumption On peak	Min Charge: 0 Min demand: 0 Fuel adjustment: 0 kWh/kW flag: No Customer charge: 0	Start period: January End period: December	$	Rate 0.078	Cutoff
Electric consumption Off peak	Min Charge: 0 Min demand: 0 Fuel adjustment: 0 kWh/kW flag: No Customer charge: 0	Start period: January End period: December	$	Rate 0.068	Cutoff

Purchased steam	Min Charge: 0	Start period: January		Rate	Cutoff
On peak	Min demand: 0	End period: December	$	1.775	
	Fuel adjustment: 0				
	kWh/kW flag: No				
	Customer charge: 0				
Purchased chilled water	Min Charge: 0	Start period: January		Rate	Cutoff
On peak	Min demand: 0	End period: December	$	1.564	
	Fuel adjustment: 0				
	kWh/kW flag: No				
	Customer charge: 0				
Electric consumption	Min Charge: 0	Start period: January		Rate	Cutoff
On peak	Min demand: 0	End period: December	$	0.082	
	Fuel adjustment: 0				
	kWh/kW flag: No				
	Customer charge: 0				

XCEL ENERGY /NM Gas Co. by IM

Electric consumption	Min Charge: 0	Start period: January		Rate	Cutoff
On peak	Min demand: 0	End period: December	$	0.057	
	Fuel adjustment: 0				
	kWh/kW flag: No				
	Customer charge: 40.00				
Water	Min Charge: 0	Start period: January		Rate	Cutoff
On peak	Min demand: 0	End period: December	$	1.001	
	Fuel adjustment: 0				
	kWh/kW flag: No				
	Customer charge: 0				
Gas	Min Charge: 0	Start period: January		Rate	Cutoff
On peak	Min demand: 0	End period: December	$	0.870	
	Fuel adjustment: 0				
	kWh/kW flag: No				
	Customer charge: 60.00				

Zia Natural Gas Company

Gas	Min Charge: 0	Start period: January		Rate	Cutoff
On peak	Min demand: 0	End period: December	$	0.634	
	Fuel adjustment: 0				
	kWh/kW flag: No				
	Customer charge: 40.63				

Otero County Electric Coop Time of Use

Simulation type: Reduced year

January - December	Saturday to Sunday	Start time	End time	Rate	Time-of-day
		Midnight	noon	Off-peak	
		noon	10 p.m.	Peak	
		10 p.m.	Midnight	Off-peak	
January - December	Cooling design to Weekday	Start time	End time	Rate	Time-of-day
		Midnight	noon	Off-peak	
		noon	10 p.m.	Peak	
		10 p.m.	Midnight	Off-peak	

Geotechnical Engineering Report

Capitan High School
150 Forest Avenue
Capitan, New Mexico
September 22, 2014
Terracon Project No. 68145079

Prepared for:
Capitan Municipal Schools
Capitan, New Mexico

Prepared by:
Terracon Consultants, Inc.
Las Cruces, New Mexico

EXECUTIVE SUMMARY

A geotechnical exploration has been performed for a new secondary school building to be constructed on the existing Capitan High School Campus located at 150 Forest Avenue in Capitan, New Mexico. Terracon's geotechnical scope of work included the advancement of seven (7) test borings to approximate depths of 5 to 41-1/2 feet below ground surface (bgs).

Based on the information obtained from our subsurface exploration, the site is suitable for development of the proposed project. The following geotechnical considerations were identified:

- The site soils generally consisted of lean clay with varying amounts of sand from the surface to depths of about 10 feet bgs and to the total explored depths of Borings B-3 (21-1/2 feet bgs), B-6 (16-1/2 feet bgs) and B-7 (5 feet bgs). The clay was underlain by silty clayey sand with gravel and silty gravel to the total explored depths of Borings B-1, B-2, and B-4. In Boring B-5, the clay was underlain by sandy silt, silty clayey sand with gravel and silty gravel to a depth of about 32 feet bgs. Bedrock (sandstone) was then encountered to the total explored depth of 41-1/2 feet bgs. A perched groundwater zone was encountered in Boring B-5 at a depth of about 25 feet bgs. The soil samples collected below that depth did not contain free water.
- The proposed structure can be supported by a grade beam and drilled shaft foundation system. Straight shaft foundations, drilled a minimum of 5 feet into bedrock, with a minimum shaft length of 35 feet are recommended. Temporary casing may be required to maintain an open hole and prevent sloughing during pier excavation and placement of reinforcing steel and concrete due to the perched groundwater zone encountered at about 25 feet bgs.
- Construction of floor slabs on engineered fill composed of approved on-site or imported soils is considered acceptable for the project provided some movement can be tolerated. On-site soils that are not suitable for use as engineered fill could be blended with imported granular material to achieve the engineered fill requirements set forth in this report.
- The 2009 International Building Code, Table 1613.5.2 IBC seismic site classification for this site is C.
- Heavy vehicle (School Bus) access and drives – 4-1/2" AC over 6" ABC over 10" Compacted Native Subgrade.
- Close monitoring of the construction operations discussed herein will be critical in achieving the design subgrade support. We therefore recommend that Terracon be retained to monitor this portion of the work.

This geotechnical executive summary should be used in conjunction with the entire report for design and/or construction purposes. It should be recognized that specific details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. The section titled **GENERAL COMMENTS** should be read for an understanding of the report limitations.

TABLE OF CONTENTS

Terracon

September 22, 2014

Capitan Municipal Schools
PO Box 278
Capitan, NM 88316-0278

Attn: Shirley Crawford, Superintendent
P: 575-354-8500
E: shirley.crawford@capitantigers.org

Re: Geotechnical Engineering Report
Capitan High School
150 Forest Avenue
Capitan, New Mexico
Terracon Project No. 68145079

Dear Ms. Crawford:

Terracon Consultants, Inc. (Terracon) has completed the geotechnical engineering services for the above referenced project. These services were performed in general accordance with our proposal number P6814-222G dated August 5, 2014. This geotechnical engineering report presents the results of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report, or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Daniel Balderrama
Staff Professional

JAMES D. COSPER, II
NEW MEXICO
14477
9-22-14
REGISTERED PROFESSIONAL ENGINEER

J. Dan Cosper, P.E.
Office Manager

Copies to: Addressee (1 via email, 3 via mail)

GEOTECHNICAL ENGINEERING REPORT
CAPITAN HIGH SCHOOL
150 FOREST AVENUE
CAPITAN, NEW MEXICO

Terracon Project No. 68145079
September 22, 2014

1.0 INTRODUCTION

This report presents the results of our geotechnical engineering services performed for a new secondary school building to be constructed on the Capitan High School Campus located at 150 Forest Avenue in Capitan, New Mexico. Terracon's geotechnical scope of work included the advancement of seven (7) test borings to approximate depths of 5 to 41-1/2 feet below ground surface (bgs). Logs of the borings along with a site location map and boring location plan are included in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- subsurface soil conditions
- earthwork
- seismic considerations
- foundation design and construction
- lateral earth pressures
- pavements

2.0 PROJECT INFORMATION

2.1 Project Description

Item	Description
Site layout	Refer to the Site Location Plan and Boring Location Plan (Exhibits A-1 and A-2)
Structures	The proposed project will include a new two-story secondary school building (approximately 27,000 square feet in ground contact area). Access drives and minimal site structures with concrete sidewalks are associated with the project.
Building construction	The building is planned to be of steel frame construction with either exterior non-bearing stud walls or load bearing masonry exterior walls.
Finished floor elevation (FFE)	Elevation of finished grade assumes to balance cut and fill

Item	Description
Maximum loads	Columns: 50 to 150 kips Walls: 5.0 klf Floor Slabs: 150 psf (assumed)
Assumed Traffic Loads	Heavy Duty (School Bus) Areas: 80,000 ESALs
Below Grade Areas	Retention pond

2.2 Site Location and Description

Item	Description
Location	150 Forest Avenue in Capitan, New Mexico
Existing site features	Existing High School
Surrounding developments	North: Middle School West: Access Drive East: District Administration South: Field House (scheduled for demolition)
Current ground cover	Grass landscaping, concrete flatwork (basketball court) and a playground
Existing topography	Relatively flat

3.0 SUBSURFACE CONDITIONS

3.1 Typical Subsurface Profile

Specific conditions encountered at the boring locations are indicated on the individual boring logs included in Appendix A of this report. Stratification boundaries on the boring logs represent the approximate location of changes in soil types; in-situ, the transition between materials may be gradual. Based on the results of the borings, subsurface conditions on the project site can be generalized as follows:

Description	Approximate Depth to Bottom of Stratum (feet)	Material Encountered	Consistency/Density
Stratum 1	5 to 21-1/2	Lean Clay with varying amounts of sand.	Soft to Hard
Stratum 2	21-1/2 to 32	Silty Clayey Sand with Gravel, Silty Gravel, Sandy Silt from 10 to 20 feet bgs in Boring B-5.	Medium Stiff to Stiff/Loose to Dense
Stratum 3	41-1/2	Bedrock (Sandstone)	Very Dense

Laboratory tests were conducted on selected soil samples and the test results are presented in Appendix B. Laboratory test results indicate that the near surface soils exhibit moderate compressibility potentials at in-situ moisture contents. The soils have a slight tendency for hydro-compaction when elevated in moisture content. The soils do not exhibit expansion under a surcharge load of 1,000 psf.

3.2 Groundwater

A perched groundwater zone was encountered at a depth of about 25 feet bgs in Boring B-5. It is our opinion that the saturated zone encountered is perched since saturated zones were not encountered above or below this depth in the boring. This observation represents only groundwater conditions at the time of drilling, and may not be indicative of other times, or at other locations. Groundwater conditions can change with varying seasonal and weather conditions, and other factors.

4.0 RECOMMENDATIONS FOR DESIGN AND CONSTRUCTION

4.1 Geotechnical Considerations

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encountereiwhow t128(hea)176(es)36(b,)21(or)16(isyi)4ns. rat924(en)2(nti)18((ll)2yacdh)31(om)16(p)2(pr)1
nsrdratii

and construction of earth supported elements including foundations are contingent upon following the recommendations outlined in this section.

Earthwork on the project should be observed and evaluated by Terracon. The evaluation of earthwork should include observation and testing of engineered fill, subgrade preparation, foundation bearing soils, and other geotechnical conditions exposed during the construction of the project.

4.2.1 Site Preparation

Prior to construction or placing any fill, all vegetation, concrete flatwork and any otherwise unsuitable material should be removed from the construction areas. Wet or dry material should either be removed or moisture conditioned and compacted. Exposed areas which will receive fill or be constructed upon, once properly cleared, should be scarified to a minimum depth of 10 inches, conditioned to near optimum moisture content, and compacted.

The site should be initially graded to create a relatively level surface to receive fill or be constructed upon, and to provide for a relatively uniform thickness of fill beneath the proposed floor slabs and pavements (if applicable for grading purposes).

Although evidence of underground facilities such as septic tanks, cesspools, utilities and basements was not observed during the site reconnaissance, such features could be encountered during construction. If unexpected fills or underground facilities are encountered, such features should be removed and the excavation thoroughly cleaned prior to backfill placement and/or construction.

4.2.2 Fill Material Types

All fill materials should be inorganic soils free of vegetation, debris, and fragments larger than six inches in size. Pea gravel or other similar non-cementitious, poorly-graded materials should not be used as fill or backfill without the prior approval of the geotechnical engineer.

Approved imported materials, on-site soils or on-site soils blended with imported granular materials may be used as fill material for the following:

- general site grading
- floor slab backfill

Imported soils, on-site soils or blended soils for use as fill material should conform to low volume change materials as indicated in the following specifications:

Gradation	Percent Finer by Weight (ASTM C 136)
1”	100
No. 4 Sieve	50-100
No. 200 Sieve	25-75

- Liquid Limit ..... 30 (max)
- Plasticity Index ..... 15 (max)

Engineered fill should be placed and compacted in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift.

4.2.3 Fill Material Placement and Compaction Requirements

Item	Description
Fill Lift Thickness	10 inches or less in loose thickness
Minimum Compaction Requirements [1]	95% of the materials maximum modified Proctor dry density (ASTM D 1557)
Moisture Content	Within 2% of optimum moisture content value as determined by the modified Proctor test at the time of placement and compaction

1. We recommend that engineered fill be tested for moisture content and compaction during placement. Should the results of the in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the test should be reworked and retested as required until the specified moisture and compaction requirements are achieved.

4.2.4 Grading and Drainage

Positive drainage must be provided during construction and maintained throughout the life of the project. Infiltration of water into utility trenches or foundation excavations should be prevented during construction. Planters and other surface features which could retain water in areas adjacent to the building should be sealed or eliminated. In areas where sidewalks or paving do not immediately adjoin the structure, we recommend that protective slopes be provided with a minimum grade of approximately 5 percent for at least 5 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

If adequate drainage is not provided for this project, larger movements than outlined in our report can be anticipated for this project.

Downspouts, roof drains or scuppers should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving. Sprinkler systems should not be installed within five feet of foundation walls. Landscaped irrigation adjacent to the foundation system should be minimized or eliminated.

4.2.5 Earthwork Construction Considerations

Although the exposed subgrade is anticipated to be relatively stable upon initial exposure, unstable subgrade conditions could develop during general construction operations, particularly if the soils are wetted and/or subjected to repetitive construction traffic. The use of light construction equipment would aid in reducing subgrade disturbance. The use of remotely operated equipment, such as a backhoe, would be beneficial to perform cuts and reduce subgrade disturbance. Should unstable subgrade conditions develop, stabilization measures will need to be employed.

Upon completion of filling and grading, care should be taken to maintain the subgrade moisture content prior to construction of slabs and pavements. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned, and recompacted prior to slab and pavement construction.

Temporary excavations will probably be required during grading operations. The grading contractor, by his contract, is usually responsible for designing and constructing stable, temporary excavations and should shore, slope or bench the sides of the excavations as required, to maintain stability of both the excavation sides and bottom. All excavations should comply with applicable local, state and federal safety regulations, including the current OSHA Excavation and Trench Safety Standards.

The geotechnical engineer should be retained during the construction phase of the project to observe earthwork and to perform necessary tests and observations during subgrade preparation; moisture conditioning; re-compaction; placement and compaction of controlled compacted fills; backfilling of excavations into the completed subgrade, and just prior to construction of slabs and pavements.

4.2.6 Corrosion Potential

Results of corrosivity testing are provided in Appendix B. The results of soluble sulfate testing (660 mg/Kg) indicate that ASTM Type I/II Portland cement should be suitable for concrete on and below grade for the project.

Laboratory test results indicate that on-site soils have a pH value of 8.0 and minimum resistivity of 543 ohm-centimeters. The pH and minimum resistivity values should be used to determine potential corrosive characteristics of the on-site soils with respect to contact with the steel pipe

materials that will be used for project construction. Values for pH and minimum resisitivity are commonly used to help evaluate the corrosion potential of the soil with respect to buried metal such as metal utility pipes and CMP culverts. This and other information is typically analyzed by a corrosion specialist to determine site specific recommendations. For specific recommendations regarding soil corrosivity, we recommend a corrosion specialist be consulted.

4.3 Foundation Recommendations

Due to the compressibility potential of the subsurface soils and the proposed loading, it is recommended that the structure be supported by drilled, straight-shaft foundations. Design recommendations for foundations for the proposed structure are presented in the following paragraphs.

4.3.1 Foundation Design Recommendations

The structure can be supported by a grade beam and drilled, straight shaft foundation system. Design recommendations for foundations for the proposed structure and related structural elements are presented in the following paragraphs.

Description	Value
Foundation Type	Grade Beam and Drilled Pier Foundation System
Structures	Two-Story Secondary School Building
Bearing Material	Drilled piers founded at a minimum depth of 35 feet
Allowable Bearing Pressure	See pier capacities (Section 4.3.2)
Minimum Dimensions	Columns: 24 inches Walls: 16 inches
Minimum Embedment Depth Below Finished Grade	24 inches for pier caps
Total Estimated Movement	1 inch
Estimated Differential Movement	½ inch in 40 feet under walls

Finished grade is defined as the lowest adjacent grade within five feet of the foundation for perimeter (or exterior) footings and finished floor level for interior footings. The allowable foundation bearing pressures apply to dead loads plus design live load conditions. The weight of the foundation concrete below grade may be neglected in dead load computations.

Exterior footings (pier caps and grade beams) should be placed a minimum of 24 inches below finished grade to provide confinement for the bearing soils. Interior footings should bear a

minimum of 18 inches below finished grade. Finished grade is the lowest adjacent grade for perimeter footings and floor level for interior footings.

Footings, foundations, and masonry walls should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. The use of joints at openings or other discontinuities in masonry walls is recommended.

4.3.2 Drilled, Straight Shaft Foundation System

The drilled, straight-shaft foundation system should be designed by the project structural engineer to resist both horizontal and vertical forces. Horizontal forces can be resisted by the passive pressure of soil acting on the vertical face of the support column foundations. Vertical downward forces can be resisted by the allowable end bearing pressure of the soils at the bottom of the drilled straight-shafts. Vertical uplift forces can be resisted by the dead weight of the support column and its foundation. When foundation concrete is cast in direct contact with excavation sides in native materials, an allowable side friction value can also be used to resist vertical loads.

The allowable design criteria for utilization of a drilled straight-shaft foundation system for the proposed support columns are presented in the table below. The table includes the effective soil unit weights, allowable end bearing pressure, lateral passive pressure and side friction values. Care should be exercised to utilize an appropriate loading condition in the analyses. The design parameters presented in the tables below are applicable for the natural undisturbed soils. The capacities within the upper 4 feet of the on-site native soils should be disregarded to account for surface effects and anticipated disturbance during foundation installation. Drilled straight-shaft foundations should extend a minimum of 35 feet bgs.

Long-term settlement of the drilled straight-shaft foundations, designed and constructed in accordance with the recommendations presented in this report, should be about one inch or less.

DRILLED, STRAIGHT SHAFT FOUNDATION DESIGN PARAMETERS:

Depth Below Existing Grade	Effective Unit Weight	Net Allowable End Bearing Pressure	Allowable Side Friction	Allowable Passive Pressure (FS=2)	Coefficient of Subgrade Reaction	Cohesion	Angle of Internal Friction
(ft)	(pcf)	(psf)	(psf)	(psf/ft)	(pci)	(psf)	(degree)
0 – 4	110	Ignore					
4 – 10	110	3,000	180	170	750	1,000	--
10 – 20	105	2,400	145	190	500	800	--
20 – 25	120	16,000	800	245	90	--	35
25 – 32	110	2,400	900	220	25	--	31
>32	125	20,000	1,250	250	225	--	40

The above-indicated cohesion, friction angle, and lateral subgrade modulus are ultimate values without factors of safety. The end bearing, skin friction, and passive resistance are allowable parameters with factors of safety of 3 and 2 (passive resistance). The values given in the above table are based on our borings and past experience with similar soil types. Lateral resistance and friction in the upper 4 feet should be ignored due to the potential effects of frost action, desiccation, and drilling disturbance. The drilled piers must extend 5 feet, or one pier diameter, whichever is greater, into the bearing strata to achieve the full listed capacity.

Piers should be considered to work in group action if the horizontal spacing is less than six pier diameters. A minimum practical horizontal spacing between piers of at least three diameters should be maintained, and adjacent piers should bear at the same elevation. The capacity of individual piers must be reduced when considering the effects of group action. Capacity reduction is a function of pier spacing and the number of piers within a group. If group action analyses are necessary, capacity reduction factors can be provided for the analyses.

The drilling contractor should be experienced in the subsurface conditions observed at the site, and the excavations should be performed with equipment capable of providing a clean bearing area. The drilled straight-shaft foundation should be installed in general accordance with the procedures presented in "Drilled Shafts: Construction Procedures and Design Methods," by Reese, L. C. and O'Neill, M. W., FHA Publication No. FHWA-IF-99-025, 1999 and "Standard Specification for the Construction of Drilled Piers", ACI Publication No. 336.1-01, 2001.

Drilling to design depths should be possible with a conventional heavy-duty single flight power auger. Casing or drilling slurry may be required to properly drill and clean piers. Drilled shaft

concrete should be placed soon after completion of drilling and cleaning. Due to potential sloughing and raveling of the native soils, foundation concrete quantities may exceed calculated geometric volumes. Casing used for shaft construction should be withdrawn in a slow continuous manner maintaining a sufficient head of concrete to prevent the creation of voids in shaft concrete.

Perched groundwater was initially observed during dry drilling at a depth of about 25 feet. Water must not be allowed to accumulate in the bottom of the excavations. The contractor should be prepared to remove water from the excavations if necessary. We recommend that provisions be incorporated into the plans and specifications to control sloughing and/or groundwater seepage during shaft construction, should it occur.

To reduce the potential for water seepage into the shaft excavation and to minimize disturbance to the bearing area, we recommend that concrete and steel be placed as soon as possible after footing excavations are completed. Preferably, the excavations should be backfilled with concrete within about 2 to 4 hours of completion of the drilling and in no case should an excavation be left open overnight. The concrete placed in the excavations should have a 6-inch to 8-inch slump with a plus or minus one inch tolerance. The bottom of each excavation should be free of all loose materials and/or water, and the bearing surface should be evaluated immediately prior to placing concrete.

If casing is used, removal of the casing should be performed with extreme care and under

4.3.3 Lateral Earth Pressures

For soils above any free water surface, recommended equivalent fluid pressures for unrestrained foundation elements when using on-site lean clay as backfill are:

- Active .....43 psf/ft
- Passive.....342 psf/ft
- Coefficient of base friction 0.35*

*The coefficient of base friction should be reduced to 0.25 when used in conjunction with passive pressure.

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

- At rest.....63 psf/ft

The lateral earth pressures herein do not include any factor of safety and are not applicable for submerged soils/hydrostatic loading. Additional recommendations may be necessary if such conditions are to be included in the design.

Fill against foundations should be compacted to densities specified in the Earthwork section of this report. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Overcompaction may cause excessive lateral earth pressures which could result in wall movement.

4.4 Seismic Considerations

Description	Value
2009 International Building Code Site Classification (IBC) [1]	C[2]
Site Latitude	33.5438
Site Longitude	-105.5829
Spectral Response Accelerations SMs and SM1 SMs = FaSs and SM1 = FvS1 Site Class C - Fa = 1.2, Fv = 1.7	
SM_S Spectral Acceleration for a Short Period (0.2 sec)	0.287g
SM1 Spectral Acceleration for a 1-Second Period	0.129g
SDs = 2/3 x SMs and SD1 = 2/3 x SM1	
SD_S Spectral Acceleration for a Short Period (0.2 sec)	0.191g

S_{D1} Spectral Acceleration for a 1-Second Period	0.086g

[1] Note: In general accordance with the *2009 International Building Code,* Table 1613.5.2.

[2] Note: The 2009 International Building Code (IBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100 foot soil profile determination. The borings extending to a maximum depth of 41½ feet, and this seismic site class definition considers that dense soil may be encountered below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.

4.5 Floor Slab

4.5.1 Design Recommendations

Description	Value
Interior floor system	Slab-on-grade concrete.
Floor slab support	Minimum 3 feet of approved on-site or imported soils placed and compacted in accordance with Earthwork section of this report.
Modulus of subgrade reaction	100 pounds per square inch per inch (psi/in)

Construction of floor slabs on compacted fills (minimum 3 feet) composed of approved on-site or imported soils is considered acceptable for the project.

In areas of exposed concrete, control joints should be saw cut into the slab after concrete placement in accordance with ACI Design Manual, Section 302.1R-37 8.3.12 (tooled control joints are not recommended). Additionally, dowels should be placed at the location of proposed construction joints. To control the width of cracking (should it occur) continuous slab reinforcement should be considered in exposed concrete slabs.

Positive separations and/or isolation joints should be provided between slabs and all foundations, columns or utility lines to allow independent movement. Interior trench backfill placed beneath slabs should be compacted in accordance with recommendations outlined in the Earthwork section of this report. Other design and construction considerations, as outlined in the ACI Design Manual, Section 302.1R are recommended.

4.5.2 Construction Considerations

A minimum of 3 feet of approved on-site or imported engineered fill is recommended below slabs-on-grade. The engineered fill should extend horizontally a minimum distance of 5 feet beyond the outside edge of perimeter footings. Some differential movement of a slab-on-grade floor system is possible should the subgrade soils become elevated in moisture content. Such movements are anticipated to be within general tolerance for normal slab-on-grade construction. To reduce potential slab movements, the subgrade soils should be prepared as outlined in the Earthwork section of this report.

4.6 Pavements

The new pavement section is based on a laboratory correlated R-value for the sandy lean clay soil conditions generally consistent with those encountered in the pavement soil boring.

Design of pavements for the project have been based on the procedures outlined in the Design of Hot Mix Asphalt Pavements by the National Asphalt Pavement Association (NAPA) and ACI for PCC pavement. Assumed traffic criteria used for pavement thickness design includes single 18-kip equivalent standard axle loads (ESAL's) of about 80,000 for heavy vehicle (school bus) access and drives. Actual design traffic loading should be verified. Reevaluation of the recommended pavement section may be necessary if the actual traffic varies from the assumed criteria outlined above. Recommendations are as follows:

Traffic Area	Alternative	Recommended Pavement Section Thickness (inches)			
		Asphalt Concrete Surface	Portland Cement Concrete	Aggregate Base Course	Total
Heavy Vehicle (School Bus) Load Areas	A	4-1/2	---	6	10-1/2

Concrete construction and placement for the parking and drive areas (i.e. curb and gutter, drainage ditches, etc.) should be in accordance with the New Mexico Department of Transportation guidelines.

Aggregate base course should be placed in lifts not exceeding six inches and should be compacted to a minimum of 95% Modified Proctor Density (ASTM D1557).

Asphaltic concrete mix designs should be submitted prior to construction to verify their adequacy. Asphalt material should be placed in maximum 3-inch lifts and should be compacted to a minimum of 93% Maximum Theoretical Density (AASHTO T-209).

Future performance of pavements constructed at this site will be dependent upon several factors, including maintaining stable moisture content of the subgrade soils, conditioning of the existing fill and providing for a planned program of preventative maintenance.

Recommendations for pavement construction presented depend upon compliance with recommended material specifications. To assess compliance, observation and testing should be performed under the direction of the geotechnical engineer.

Pavement design methods are intended to provide structural sections with adequate thickness over a particular subgrade such that wheel loads are reduced to a level the subgrade can

support. The support characteristics of the subgrade for pavement design do not account for settlement induced movements of subgrade such as the soils encountered on this project. Thus, the pavement may be adequate from a structural standpoint, yet still experience cracking and deformation due to settlement related movement of the subgrade. It is, therefore, important to minimize moisture changes in the subgrade to reduce settlement.

Future performance of pavements constructed on the native or engineered fill soils at this site will be dependent upon several factors, including:

- maintaining stable moisture content of the subgrade soils.
- providing for a planned program of preventative maintenance.

Pavements could crack in the future primarily because of settlement of the soils when subjected to an increase in moisture content to the subgrade. The cracking, while not desirable, does not necessarily constitute structural failure of the pavement.

The performance of all pavements can be enhanced by minimizing excess moisture which can reach the subgrade soils. The following recommendations should be considered at minimum:

- site grading at a minimum 2 percent grade away from the pavements.
- the subgrade and the pavement surface have a minimum 1/4 inch per foot slope to promote proper surface drainage.
- consider appropriate edge drainage and pavement underdrain systems.
- install pavement drainage surrounding areas anticipated for frequent wetting.
- install joint sealant and seal cracks immediately.
- compaction of any utility trenches for landscaped areas to the same criteria as the pavement subgrade.
- seal all landscaped areas in or adjacent to pavements to minimize or prevent moisture migration to subgrade soils.
- place compacted, low permeability backfill against the exterior side of curb and gutter.

4.7 Slopes

For permanent unprotected slopes in compacted fill areas the recommended maximum configurations for on-site materials are as follows:

Material	**Maximum Slope Horizontal:Vertical**
Native Sandy Lean Clay Soils	2:1

If steeper slopes are required for site development, stability analyses should be completed to design the grading plan.

The face of all slopes should be compacted to a minimum of 95% of modified proctor density (ASTM D1557). Alternately, fill slopes can be over-built and trimmed to compacted material. If any slope in cut or fill will exceed 25 feet in height, the grading design should include mid-height benches to intercept surface drainage and divert flow from the face of the embankment.

Consideration should be given to providing erosion control for the unprotected slopes. The above recommended slope configuration may be adequate against slope stability failure, but erosion of the sandy lean clay soils may compromise the structural integrity of the slope.

5.0 GENERAL COMMENTS

Terracon should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Terracon also should be retained to provide observation and testing services during grading, excavation, foundation construction and other earth-related construction phases of the project.

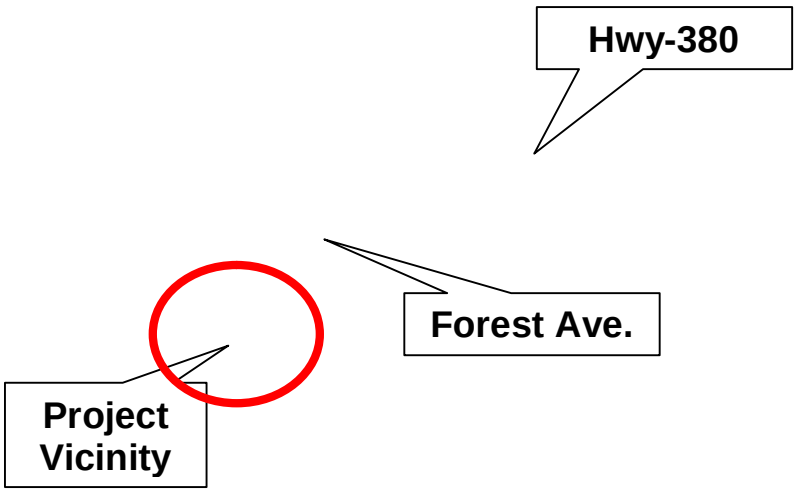
The analysis and recommendations presented in this report are based upon the data obtained from the borings performed at the indicated locations and from other information discussed in this report. This report does not reflect variations that may occur between borings, across the site, or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. If variations appear, we should be immediately notified so that further evaluation and supplemental recommendations can be provided.

The scope of services for this project does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

This report has been prepared for the exclusive use of our client for specific application to the project discussed and has been prepared in accordance with generally accepted geotechnical engineering practices. No warranties, either express or implied, are intended or made. Site safety, excavation support, and dewatering requirements are the responsibility of others. In the event that changes in the nature, design, or location of the project as outlined in this report are planned, the conclusions and recommendations contained in this report shall not be considered valid unless Terracon reviews the changes and either verifies or modifies the conclusions of this report in writing.

APPENDIX A

FIELD EXPLORATION



SOURCE: U.S. GEOLOGICAL SURVEY QUADRANGLES INCLUDE: CAPITAN, NM (1/1/2004).

N

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES.

Project Mngr:	DB
Drawn By:	DB
Checked By:	JDC
Approved By:	JDC

Project No.	68145079
Scale	As Shown
File No.	Location Map
Date:	09/11/14

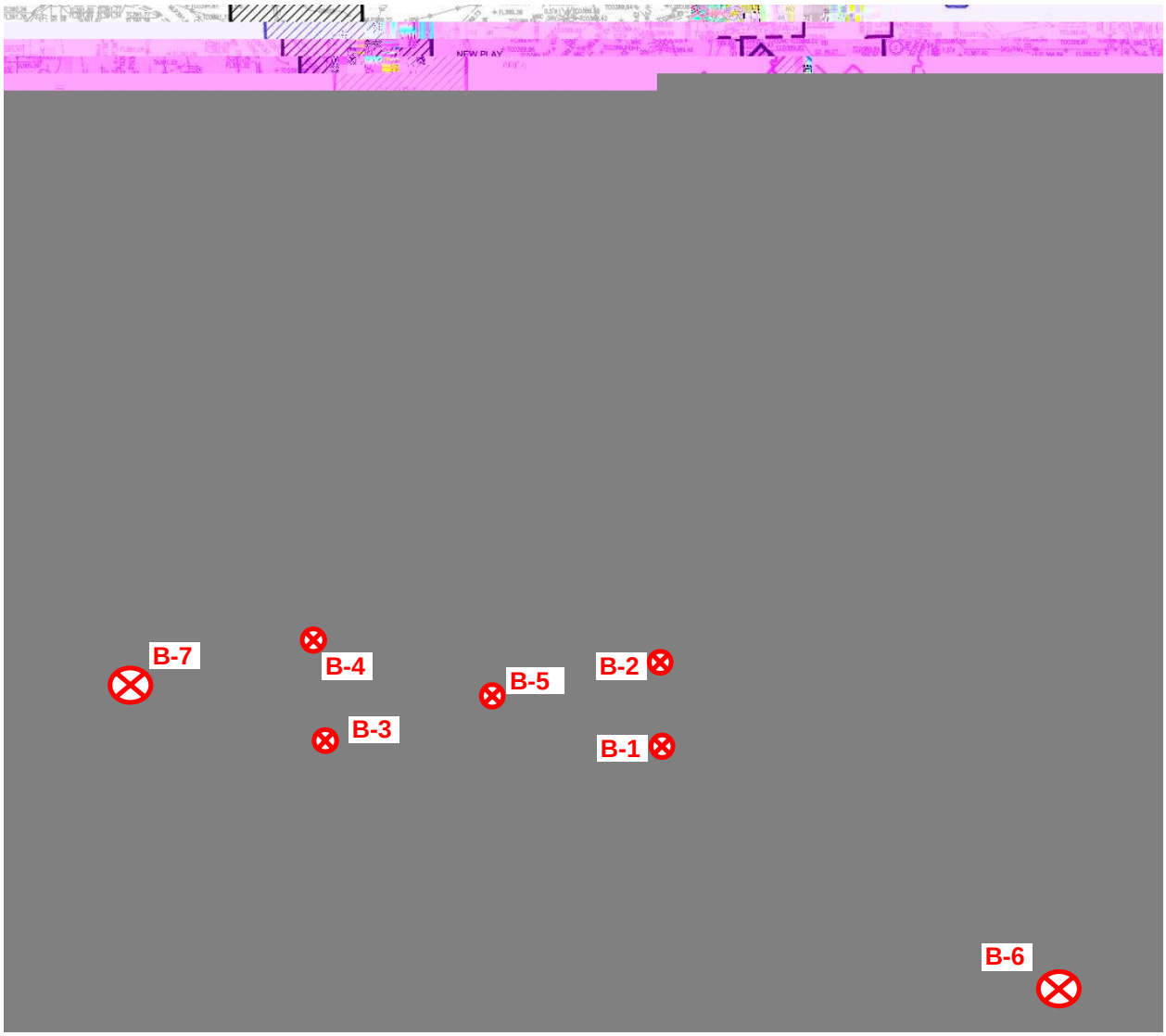
Terracon
Consulting Engineers & Scientists
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico 88005
575.527.1700 Fax: 575.527.1092

SITE LOCATION MAP

NEW CAPITAN HIGH SCHOOL
150 FOREST AVENUE
CAPITAN, NEW MEXICO

FIG No.

A-1



Source:

Dekker Perich Sabatini

N

⊗ Approximate Boring Location

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES.

Project Mngr:	DB
Drawn By:	DB
Checked By:	JDC
Approved By:	JDC

Project No.	68145079
Scale	Not to Scale
File No.	Boring Location
Date:	9/11/14

Terracon Consulting Engineers & Scientists
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico 88005
575.527.1700 Fax: 575.527.1092

BORING LOCATION PLAN

NEW CAPITAN HIGH SCHOOL
150 FOREST AVENUE
CAPITAN, NEW MEXICO

FIG No.

A-2

Field Exploration Description

A total of seven (7) test borings were drilled at the site on August 25, 2014. The borings were drilled to depths of about 5 to 41-1/2 feet below the ground surface at the approximate locations shown on the attached Boring Location Plan, Exhibit A-2. The test borings were located as follows:

Borings	Location	Depth (feet)
B-1 thru B-5	Structure Footprint	21-1/2 to 41-1/2
B-6	Retention Pond Area	16-1/2
B-7	Bus Drive and Access	5

The test borings were advanced with a truck-mounted CME-75 drill rig utilizing 8-inch diameter hollow-stem augers.

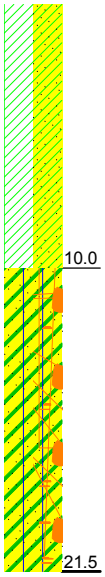
The borings were located in the field by using the proposed site plan and an aerial photograph of the site, and measuring from existing property lines. The accuracy of boring locations should only be assumed to the level implied by the method used.

Lithologic logs of each boring were recorded by the field geologist during the drilling operations. At selected intervals, samples of the subsurface materials were taken by driving split-spoon or ring-barrel samplers. Bulk samples of subsurface materials were also obtained.

Penetration resistance measurements were obtained by driving the split-spoon and ring-barrel samplers into the subsurface materials with a 140-pound automatic hammer falling 30 inches. The penetration resistance value is a useful index in estimating the consistency or relative density of materials encountered.

A CME automatic SPT hammer was used to advance the split-barrel sampler in the borings performed on this site. The effect of the automatic hammer's efficiency has been considered in the interpretation and analysis of the subsurface information for this report.

Groundwater conditions were evaluated in the borings at the time of site exploration.


10.0
21.5

BORING LOG NO. B-2

PROJECT: NEW CAPITAN HIGH SCHOOL

CLIENT: CAPITAN MUNICIPAL SCHOOLS
CAPITAN, NEW MEXICO

SITE: 150 FOREST AVE
CAPITAN, NEW MEXICO

GRAPHIC LOG	LOCATION See Exhibit A-2 DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	Percent Fines
	LEAN CLAY WITH SAND (CL), brown, very stiff								
					2-6-10 N=16				
	hard	5			9-12-20 N=32				
	10.0	10			8-12-9 N=21	6		21-15-6	27
	SILTY CLAYEY SAND WITH GRAVEL (SC-SM), brown, medium dense								
		15			5-7-8 N=15				
	20.0								
	SILTY GRAVEL (GM), light brown, dense 21.5	20			14-22-24 N=46				
	Boring Terminated at 21.5 Feet	25							
		30							
		35							
		40							
		45							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

Boring Started: 8/25/2014 | Boring Completed: 8/25/2014

Drill Rig: CME 75 | Driller: Enviro-Drill

Project No.: 68145079 | Exhibit: A-5

BORING LOG NO. B-3

PROJECT: NEW CAPITAN HIGH SCHOOL

CLIENT: CAPITAN MUNICIPAL SCHOOLS
CAPITAN, NEW MEXICO

SITE: 150 FOREST AVE
CAPITAN, NEW MEXICO

LOCATION See Exhibit A-2

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	Percent Fines
SANDY LEAN CLAY (CL), trace gravel, brown, soft to medium stiff									
				X	1-1-3 N=4				
soft		5		X	1-2-1 N=3	36		31-17-14	65
trace gravel, stiff		10		X	2-5-5 N=10				
		15		X	3-5-9 N=14				
very stiff		20		X	5-7-9 N=16				
21.5									
Boring Terminated at 21.5 Feet		25							
		30							
		35							
		40							
		45							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

Boring Started: 8/25/2014 | Boring Completed: 8/25/2014

Drill Rig: CME 75 | Driller: Enviro-Drill

Project No.: 68145079 | Exhibit: A-6

BORING LOG NO. B-4

PROJECT: NEW CAPITAN HIGH SCHOOL

CLIENT: CAPITAN MUNICIPAL SCHOOLS
CAPITAN, NEW MEXICO

SITE: 150 FOREST AVE
CAPITAN, NEW MEXICO

GRAPHIC LOG	LOCATION See Exhibit A-2 / DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	Percent Fines
	LEAN CLAY WITH SAND (CL), brown, stiff				5-5-4 N=9				
	carbonate indurated	5			8-8	13	98		
	10.0								
	SILTY CLAYEY SAND WITH GRAVEL (SC-SM), light brown, medium dense	10			9-8-10 N=18				
		15			7-6-9 N=15				
	21.5	20			13-11-10 N=21				
	Boring Terminated at 21.5 Feet	25							
		30							
		35							
		40							
		45							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

Boring Started: 8/25/2014 | Boring Completed: 8/25/2014

Drill Rig: CME 75 | Driller: Enviro-Drill

Project No.: 68145079 | Exhibit: A-7

BORING LOG NO. B-5

PROJECT: NEW CAPITAN HIGH SCHOOL

CLIENT: CAPITAN MUNICIPAL SCHOOLS
CAPITAN, NEW MEXICO

SITE: 150 FOREST AVE
CAPITAN, NEW MEXICO

GRAPHIC LOG	LOCATION See Exhibit A-2 DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	Percent Fines
	LEAN CLAY WITH SAND (CL), brown, stiff				2-4-8 N=12				
		5			5-11	22	102		
	10.0								
	SANDY SILT (ML), brown, medium stiff	10			3-3-4 N=7				
	trace gravel, stiff	15			5-6-5 N=11				
	20.0								
	SILTY CLAYEY SAND WITH GRAVEL (SC-SM), light brown to brown, dense	20			11-20-22 N=42	9		23-18-5	26
	25.0								
	SILTY GRAVEL (GM), light brown, loose, wet, water bearing at 25'	25	▽		2-1-5 N=6				
	medium dense, moist	30			6-9-9 N=18				
	32.0								
	SANDSTONE, black, very dense	35			50/2" N=50/2"				
		40			50/2" N=50/2"				
	41.5								
	Boring Terminated at 41.5 Feet	45							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

Notes:

WATER LEVEL OBSERVATIONS

▽ *perched water bearing at 25'*

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

Boring Started: 8/25/2014 | Boring Completed: 8/25/2014

Drill Rig: CME 75 | Driller: Enviro-Drill

Project No.: 68145079 | Exhibit: A-8

BORING LOG NO. B-6

PROJECT: NEW CAPITAN HIGH SCHOOL

CLIENT: CAPITAN MUNICIPAL SCHOOLS
CAPITAN, NEW MEXICO

SITE: 150 FOREST AVE
CAPITAN, NEW MEXICO

GRAPHIC LOG	LOCATION See Exhibit A-2 DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	Percent Fines
	LEAN CLAY WITH SAND (CL), brown, stiff								
		5			3-3-7 N=10				
	very stiff	10			5-8-8 N=16	18		39-20-19	75
	stiff 16.5	15			6-4-5 N=9				
	Boring Terminated at 16.5 Feet	20							
		25							
		30							
		35							
		40							
		45							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

Boring Started: 8/25/2014 | Boring Completed: 8/25/2014

Drill Rig: CME 75 | Driller: Enviro-Drill

Project No.: 68145079 | Exhibit: A-9

BORING LOG NO. B-7

PROJECT: NEW CAPITAN HIGH SCHOOL

CLIENT: CAPITAN MUNICIPAL SCHOOLS
CAPITAN, NEW MEXICO

SITE: 150 FOREST AVE
CAPITAN, NEW MEXICO

GRAPHIC LOG	LOCATION See Exhibit A-2 DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	Percent Fines
	SANDY LEAN CLAY (CL), trace gravel, dark brown					12		34-19-15	55
	5.0 ***Boring Terminated at 5 Feet***	5 10 15 20 25 30 35 40 45							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Borings backfilled with soil cuttings upon completion.

Notes:

WATER LEVEL OBSERVATIONS

Terracon
1640 Hickory Loop, Suite 105
Las Cruces, New Mexico

Boring Started: 8/25/2014 | Boring Completed: 8/25/2014

Drill Rig: CME 75 | Driller: Enviro-Drill

Project No.: 68145079 | Exhibit: A-10

APPENDIX B

LABORATORY TESTING

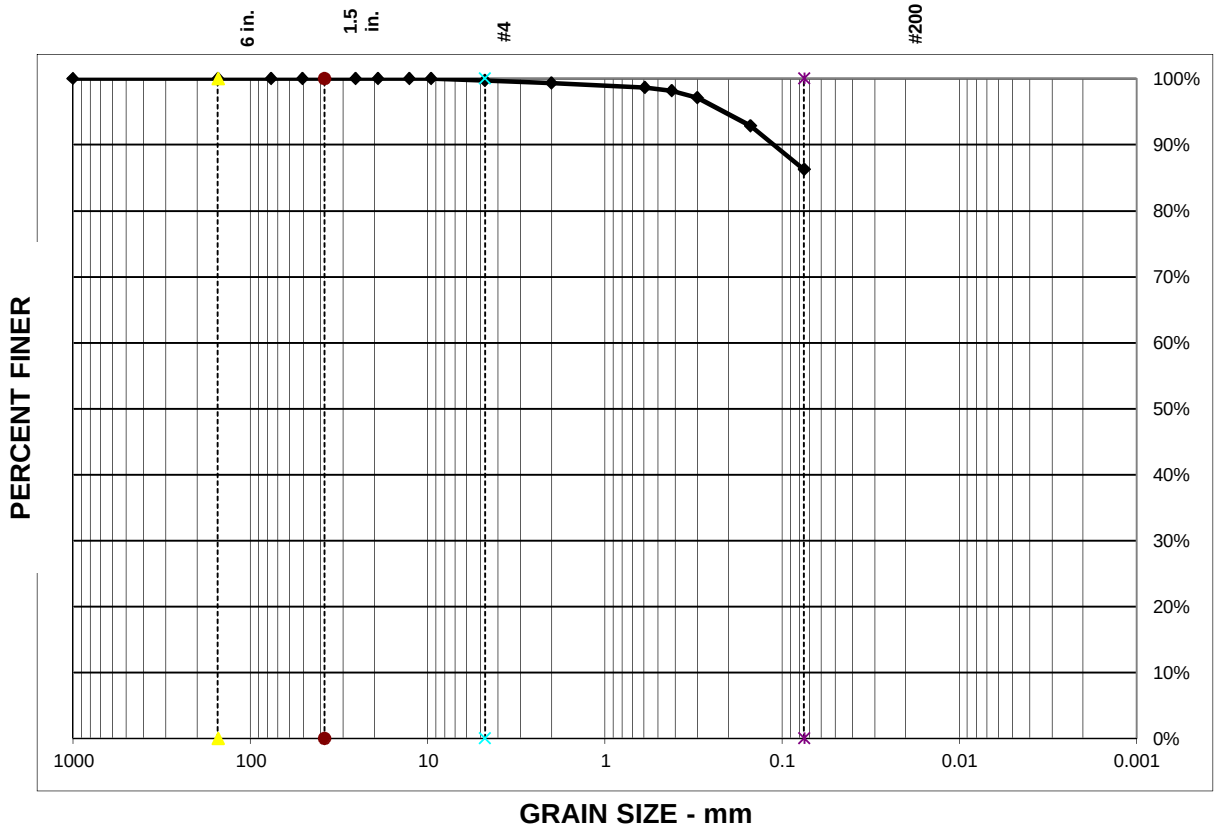
Laboratory Testing

Soil samples were tested in the laboratory to measure their dry unit weight and natural water content. Grain size analyses and consolidation testing were also performed on selected samples. The test results are provided on the boring logs and presented in Appendix B.

Descriptive classifications of the soils indicated on the boring logs are in accordance with the enclosed General Notes and the Unified Soil Classification System. Also shown are estimated Unified Soil Classification Symbols. A brief description of this classification system is attached to this report in Appendix C. All classification was by visual/manual procedures, (ASTM D2487). Selected samples were further classified using the results of Atterberg limit testing, (ASTM D4318). The Atterberg limit test results are also provided on the boring logs.

Procedural standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY

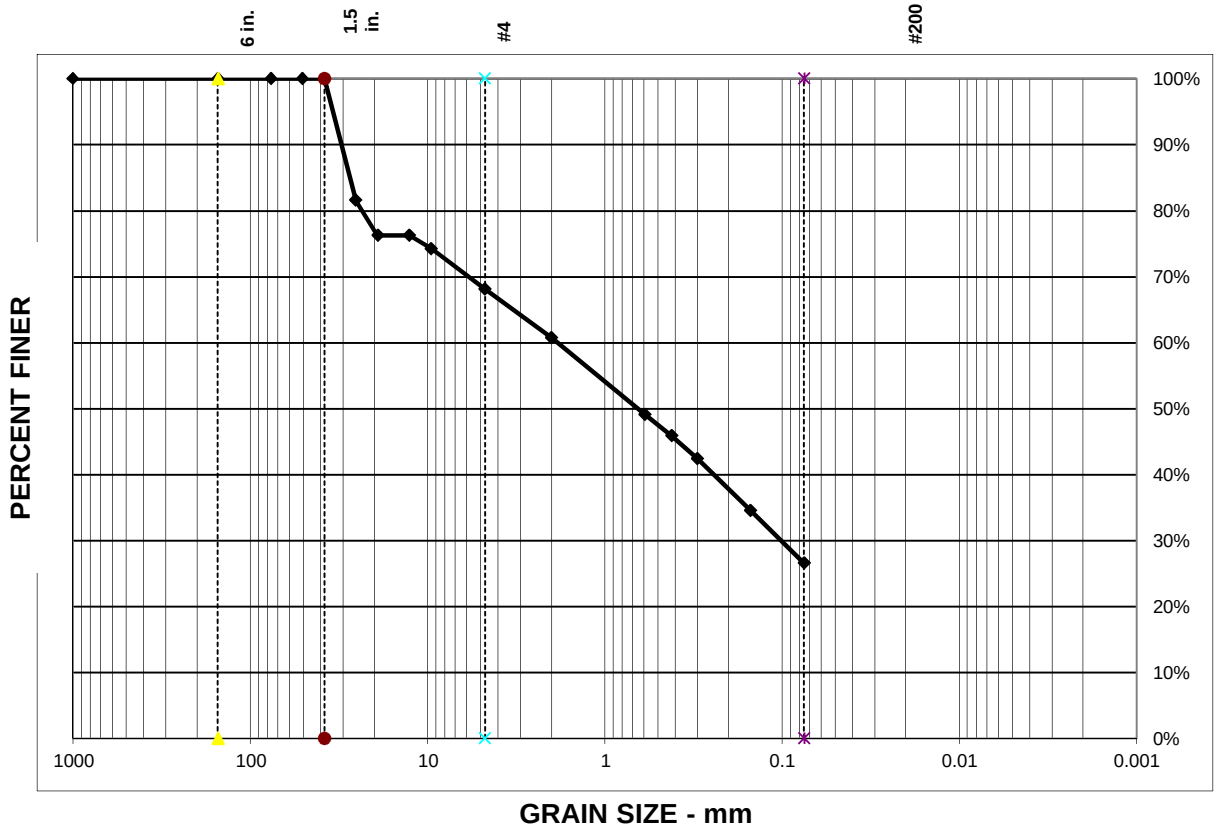
Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	100%	100%	100%	99%	98%	93%	86.2%
Specification								

% GRAVEL =	0%	**D_{85} =**	**D_{15} =**
% SAND =	13%	**D_{60} =**	**D_{10} =**
% SILT & CLAY =	86%	**D_{50} =**	**C_U =**
		D_{30} =	**C_C =**

Project Name: New Capitan High School
Project No.: 68145079
Sample Location: B1 at 2.5'
Liquid Limit: 40 Plasticity Index: 19
USCS Classification: CL
Material Description: Lean Clay with Sand

TERRACON
1640 Hickory Loop, Suite 105
Las Cruces, NM 88005
(575) 527-1700

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY

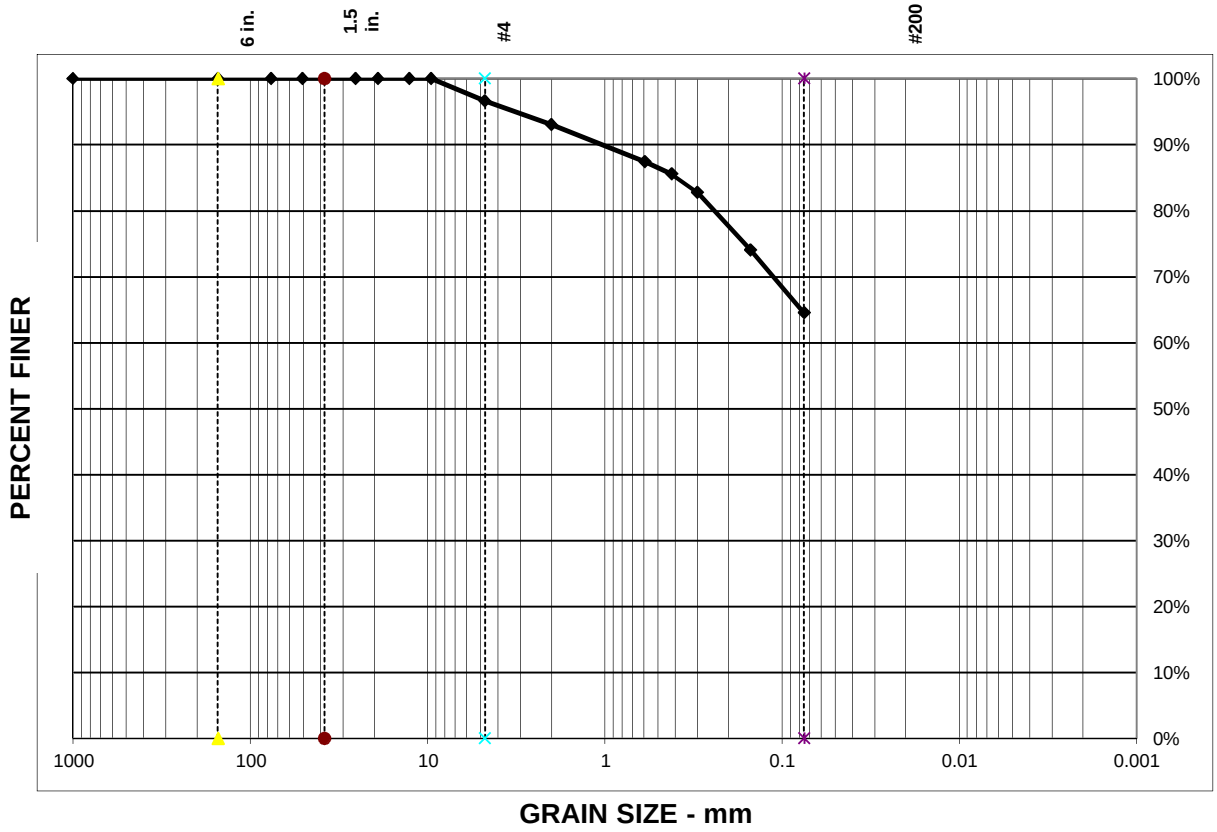
Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	76%	74%	68%	61%	46%	35%	26.6%
Specification								

% GRAVEL =	32%		**D_{85} =** 27.4	**D_{15} =**	
% SAND =	42%		**D_{60} =** 1.9	**D_{10} =**	
% SILT & CLAY =	27%		**D_{50} =** 0.7	**C_U =**	
			D_{30} = 0.1	**C_C =**	

Project Name: New Capitan High School
Project No.: 68145079
Sample Location: B2 at 10'
Liquid Limit: 21 Plasticity Index: 6
USCS Classification: SC-SM
Material Description: Silty, Clayey Sand with Gravel

TERRACON
1640 Hickory Loop, Suite 105
Las Cruces, NM 88005
(575) 527-1700

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY

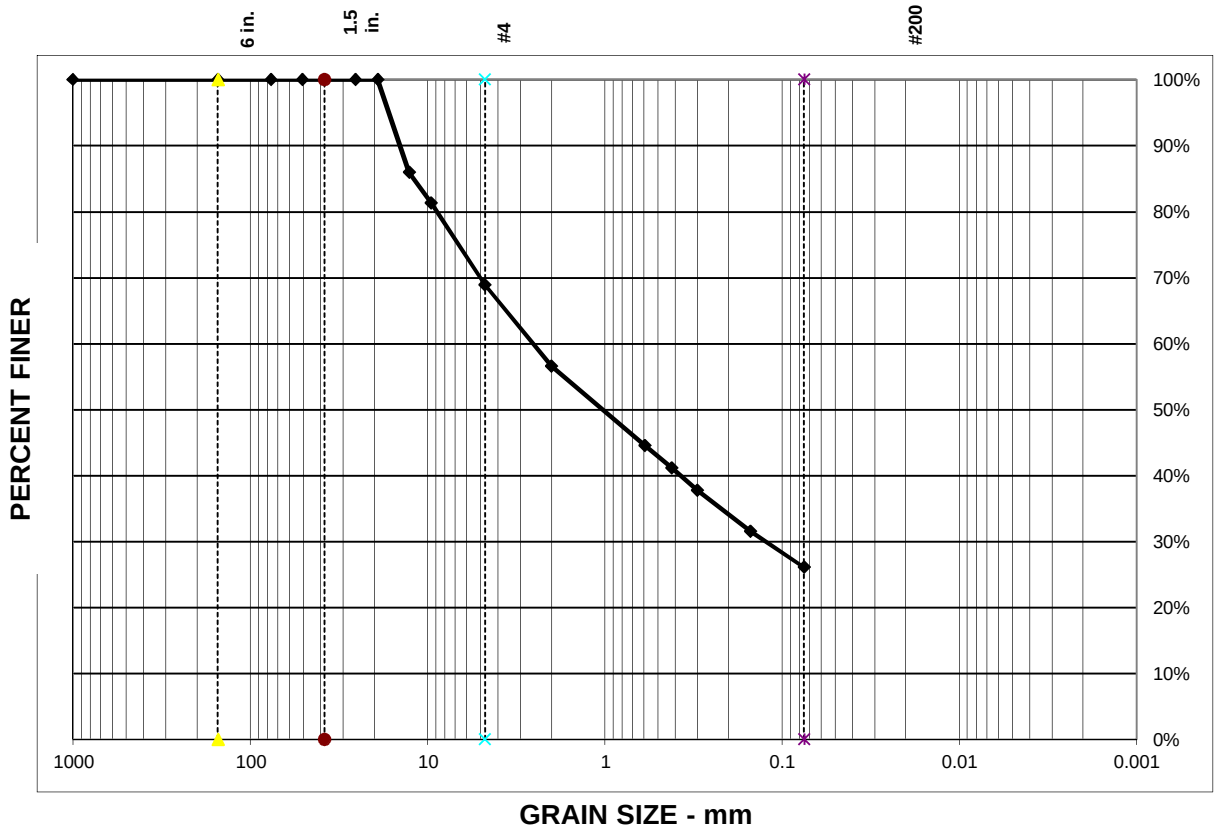
Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	100%	100%	97%	93%	86%	74%	64.5%
Specification								

% GRAVEL =	3%		**D_{85} =**	0.4	**D_{15} =**
% SAND =	32%		**D_{60} =**		**D_{10} =**
% SILT & CLAY =	65%		**D_{50} =**		**C_U =**
			D_{30} =		**C_C =**

Project Name: New Capitan High School
Project No.: 68145079
Sample Location: B3 at 5'
Liquid Limit: 31 Plasticity Index: 14
USCS Classification: CL
Material Description: Sandy Lean Clay

TERRACON
1640 Hickory Loop, Suite 105
Las Cruces, NM 88005
(575) 527-1700

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY

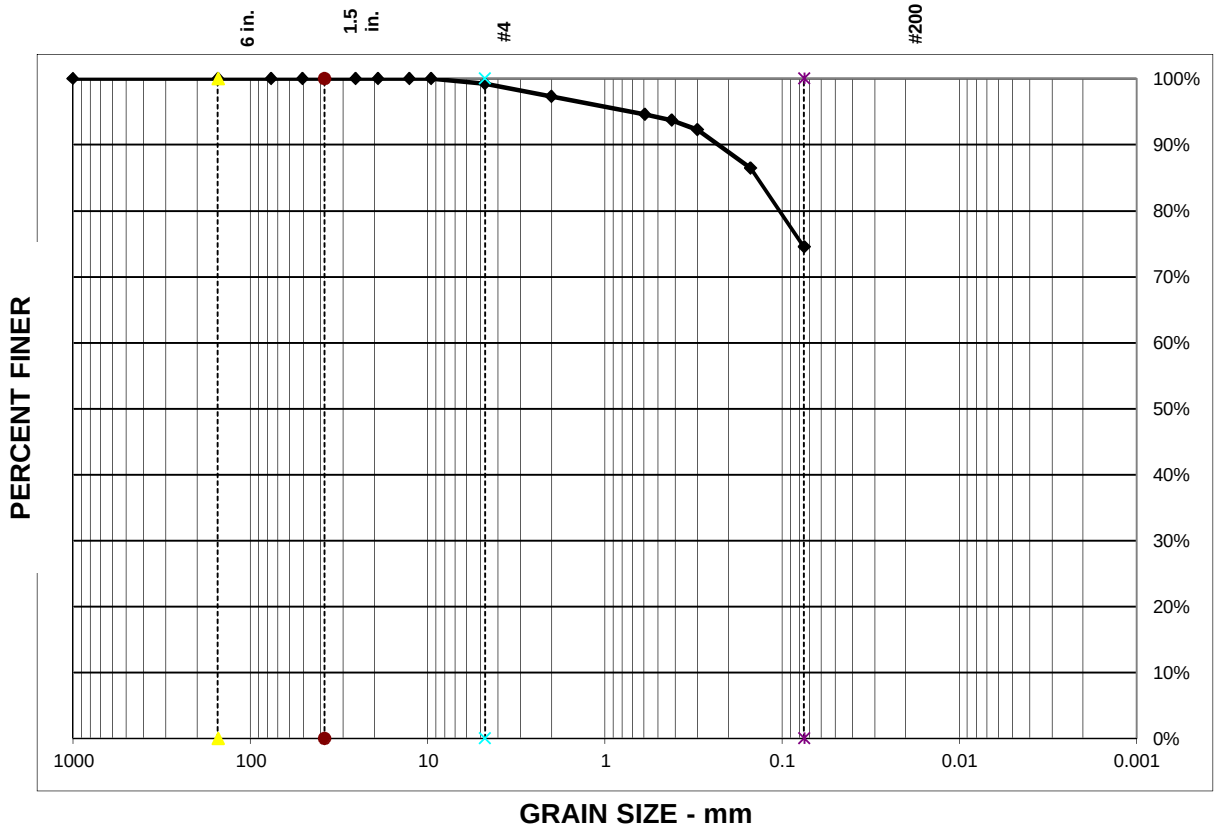
Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	100%	81%	69%	57%	41%	32%	26.1%
Specification								

% GRAVEL =	31%		**D_{85} =**	12.0	**D_{15} =**
% SAND =	43%		**D_{60} =**	2.5	**D_{10} =**
% SILT & CLAY =	26%		**D_{50} =**	1.0	**C_U =**
			D_{30} =	0.1	**C_C =**

Project Name: New Capitan High School
Project No.: 68145079
Sample Location: B5 at 20'
Liquid Limit: 23 Plasticity Index: 5
USCS Classification: SC-SM
Material Description: Silty, Clayey Sand with Gravel

TERRACON
1640 Hickory Loop, Suite 105
Las Cruces, NM 88005
(575) 527-1700

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY

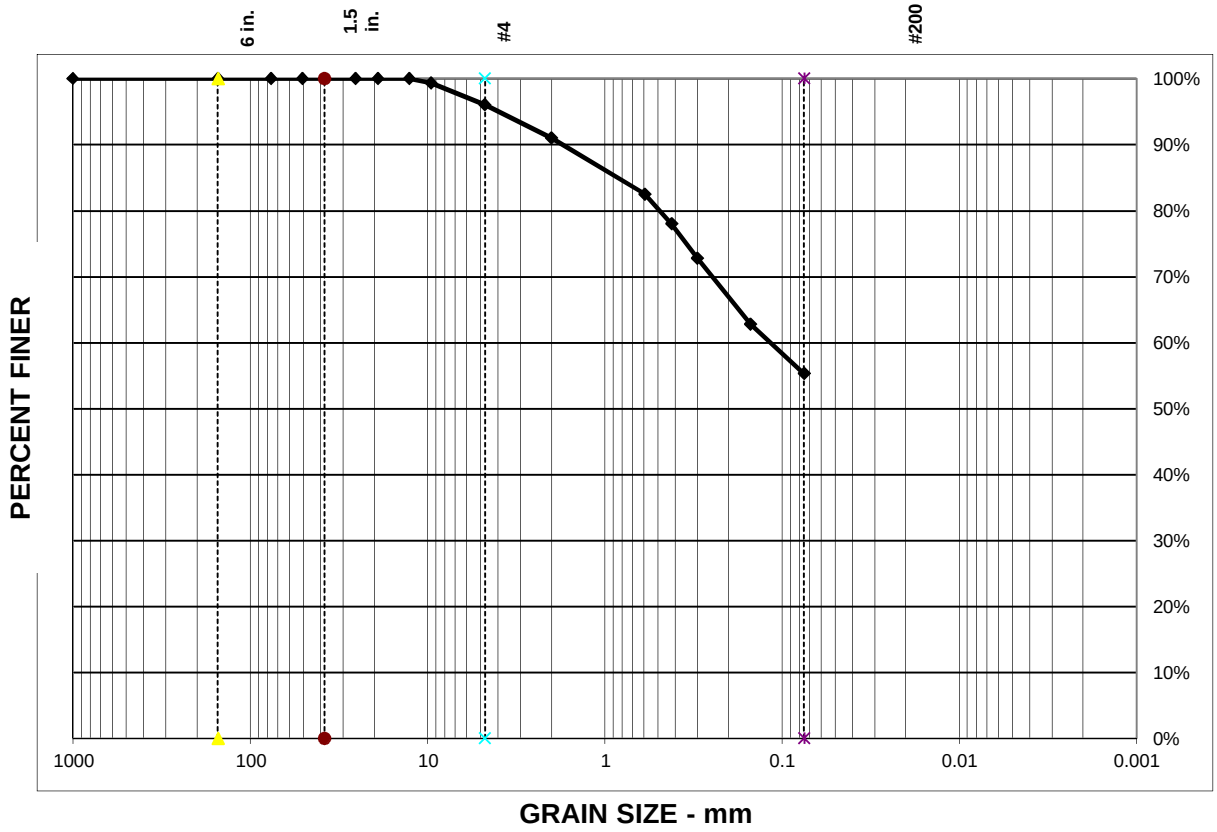
Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	100%	100%	99%	97%	94%	86%	74.5%
Specification								

% GRAVEL =	1%		**D_{85} =**	0.1	**D_{15} =**
% SAND =	25%		**D_{60} =**		**D_{10} =**
% SILT & CLAY =	75%		**D_{50} =**		**C_U =**
			D_{30} =		**C_C =**

Project Name: New Capitan High School
Project No.: 68145079
Sample Location: B6 at 10'
Liquid Limit: 39 Plasticity Index: 19
USCS Classification: CL
Material Description: Lean Clay with Sand

TERRACON
1640 Hickory Loop, Suite 105
Las Cruces, NM 88005
(575) 527-1700

GRAIN SIZE DISTRIBUTION GRAPH



TEST SUMMARY

Sieve Size	1 1/2"	3/4"	3/8"	#4	#10	#40	#100	#200
% Passing (Cumulative)	100%	100%	99%	96%	91%	78%	63%	55.4%
Specification								

% GRAVEL =	4%	**D_{85} =** 0.8	**D_{15} =**
% SAND =	41%	**D_{60} =** 0.1	**D_{10} =**
% SILT & CLAY =	55%	**D_{50} =**	**C_U =**
		D_{30} =	**C_C =**

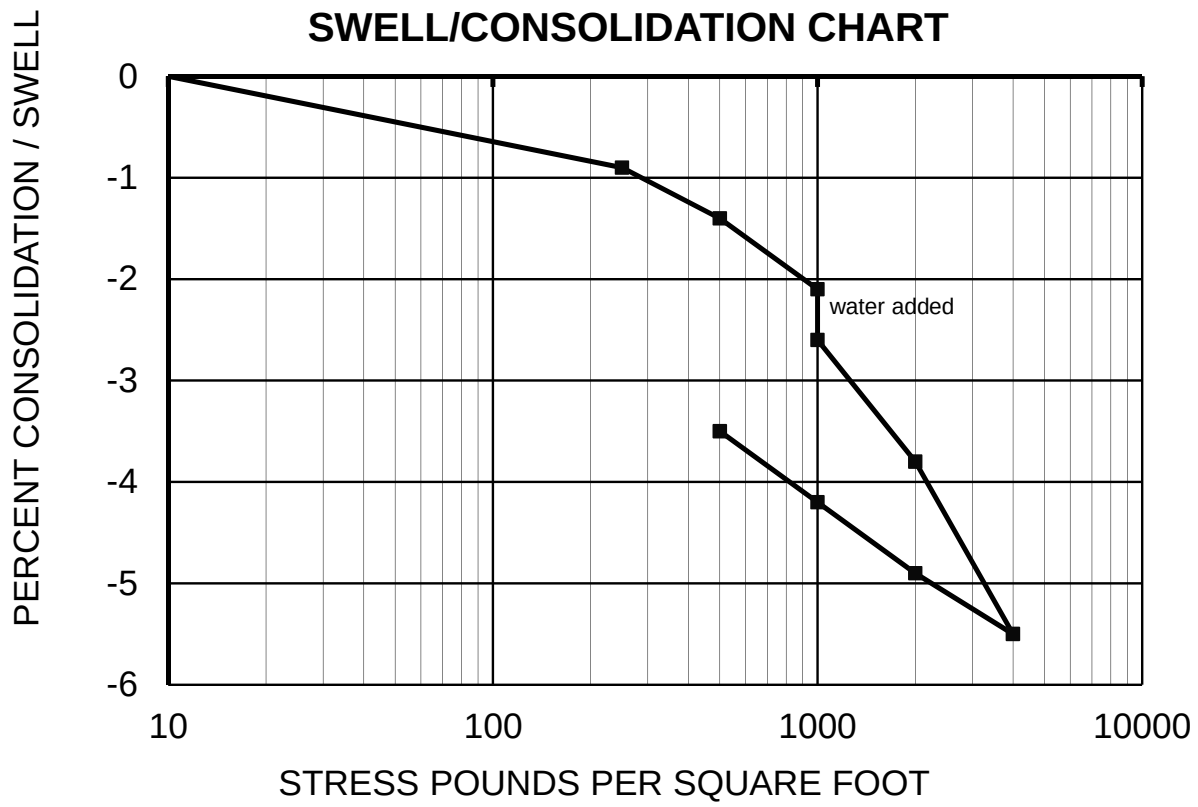
Project Name: New Capitan High School
Project No.: 68145079
Sample Location: B7 at 0-5'
Liquid Limit: 34 Plasticity Index: 15
USCS Classification: CL
Material Description: Sandy Lean Clay

TERRACON
1640 Hickory Loop, Suite 105
Las Cruces, NM 88005
(575) 527-1700

NEW CAPITAN HIGH SCHOOL
CAPITAN, NEW MEXICO

TERRACON

1640 Hickory Loop, Suite 105
LAS CRUCES, NEW MEXICO 88005
(575) 527-1700
fax (575) 527-1092

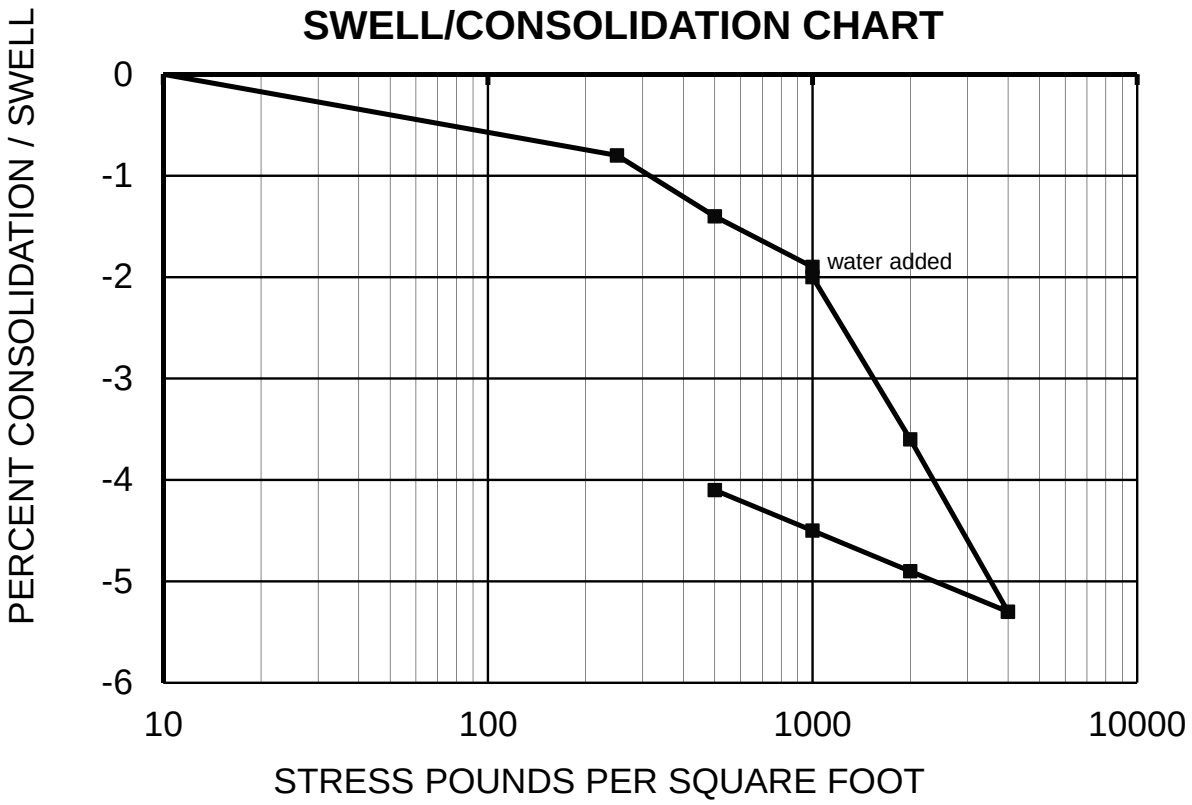


BORING B-1 @ 5'
LEAN CLAY WITH SAND
USCS Classification:
CL
DRY DENSITY= 113 lbs/ft3
MOISTURE CONTENT=
16.0%

NEW CAPITAN HIGH SCHOOL
CAPITAN, NEW MEXICO

TERRACON

1640 Hickory Loop, Suite 105
LAS CRUCES, NEW MEXICO 88005
(575) 527-1700
fax (575) 527-1092



BORING B-5 @ 5'
LEAN CLAY WITH SAND
USCS Classification:
CL
DRY DENSITY= 102 lbs/ft3
MOISTURE CONTENT=
22.0%

CHEMICAL LABORATORY TEST REPORT

Project Number: 68145079
Service Date: 09/08/14
Report Date: 09/08/14
Task:

Terracon
750 Pilot Road, Suite F
Las Vegas, Nevada 89119
(702) 597-9393

Client

Project

New Capitan High School

Sample Submitted By: Terracon (68) **Date Received:** 9/8/2014 Lab No.: 14-0477

Results of Resistivity Analysis

Sample Number	
Sample Location	B-3, B-4
Sample Depth (ft.)	2.5, 2.5
pH Analysis, AWWA 4500 H	7.96
Water Soluble Sulfate (SO4), AWWA 4500 E (mg/kg)	660
Resistivity, ASTM G-57, (ohm-cm)	543

Analyzed By: Kurt D. Ergun

Kurt D. Ergun
Chemist

APPENDIX C

SUPPORTING DOCUMENTS

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING


Auger


Split Spoon


Shelby Tube


Macro Core


Ring Sampler


Rock Core


Grab Sample


No Recovery

WATER LEVEL


Water Initially Encountered


Water Level After a Specified Period of Time


Water Level After a Specified Period of Time

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

(HP)	Hand Penetrometer
(T)	Torvane
(b/f)	Standard Penetration Test (blows per foot)
(PID)	Photo-Ionization Detector
(OVA)	Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification is based on the Unified Soil Classification System. Coarse Grained Soils have more than 50% of their dry weight retained on a #200 sieve; their principal descriptors are: boulders, cobbles, gravel or sand. Fine Grained Soils have less than 50% of their dry weight retained on a #200 sieve; they are principally described as clays if they are plastic, and silts if they are slightly plastic or non-plastic. Major constituents may be added as modifiers and minor constituents may be added according to the relative proportions based on grain size. In addition to gradation, coarse-grained soils are defined on the basis of their in-place relative density and fine-grained soils on the basis of their consistency.

LOCATION AND ELEVATION NOTES

Unless otherwise noted, Latitude and Longitude are approximately determined using a hand-held GPS device. The accuracy of such devices is variable. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance Includes gravels, sands and silts.			CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength, Qu, psf**	**Standard Penetration or N-Value Blows/Ft.**	**Ring Sampler Blows/Ft.**
Very Loose	0 - 3	0 - 6	Very Soft	less than 500	0 - 1	< 3
Loose	4 - 9	7 - 18	Soft	500 to 1,000	2 - 4	3 - 4
Medium Dense	10 - 29	19 - 58	Medium-Stiff	1,000 to 2,000	4 - 8	5 - 9
Dense	30 - 50	59 - 98	Stiff	2,000 to 4,000	8 - 15	10 - 18
Very Dense	> 50	≥ 99	Very Stiff	4,000 to 8,000	15 - 30	19 - 42
			Hard	> 8,000	> 30	> 42

RELATIVE PROPORTIONS OF SAND AND GRAVEL

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 15
With	15 - 29
Modifier	> 30

GRAIN SIZE TERMINOLOGY

Major Component of Sample	Particle Size
Boulders	Over 12 in. (300 mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 4.75 mm)
Sand	#4 to #200 sieve (4.75mm to 0.075mm
Silt or Clay	Passing #200 sieve (0.075mm)

RELATIVE PROPORTIONS OF FINES

Descriptive Term(s) of other constituents	Percent of Dry Weight
Trace	< 5
With	5 - 12
Modifier	> 12

PLASTICITY DESCRIPTION

Term	Plasticity Index
Non-plastic	0
Low	1 - 10
Medium	11 - 30
High	> 30

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or $1 > Cc > 3$ [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F,G,H]
			Fines classify as CL or CH		GC	Clayey gravel [F,G,H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or $1 > Cc > 3$ [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G,H,I]
			Fines classify as CL or CH		SC	Clayey sand [G,H,I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A" line [J]		CL	Lean clay [K,L,M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K,L,M,N]
			Liquid limit - not dried			Organic silt [K,L,M,O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K,L,M]
			PI plots below "A" line		MH	Elastic Silt [K,L,M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K,L,M,P]
			Liquid limit - not dried			Organic silt [K,L,M,Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

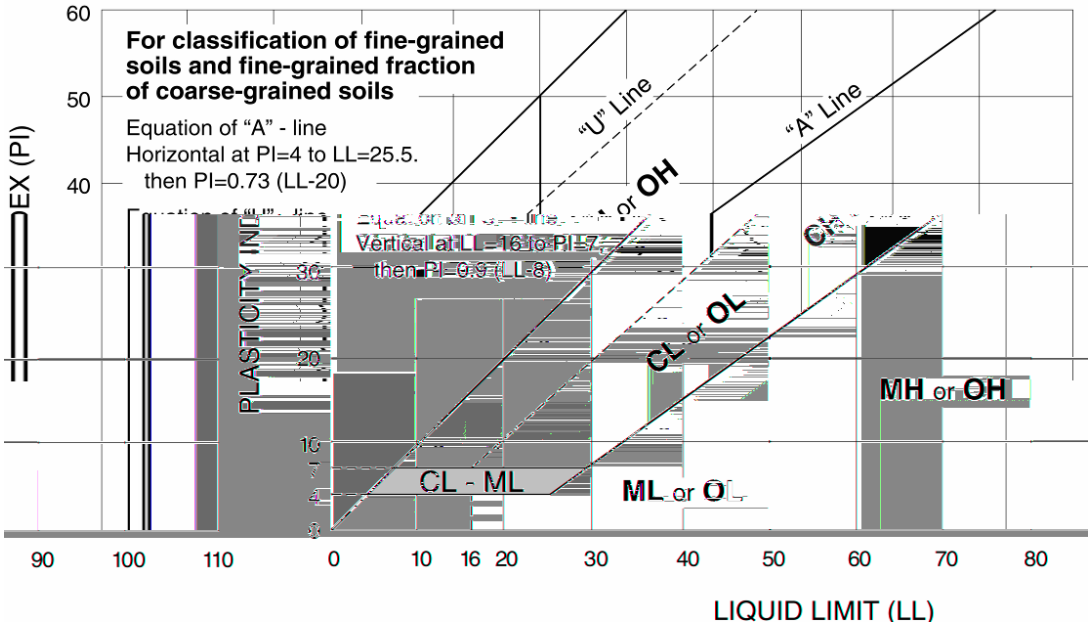
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



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