Stillwater Township School

Stillwater, NJ

NEW JERSEY

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Environetics Group Architects, PC

Wall and Floor Cracking Investigation & Report





ENV Project No. 23147
April 16, 2024

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Prepared for:

Stillwater Township Board of Education
904 Stillwater Road
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STATEMENT OF PURPOSE

The purpose of this report is to understand the cause of various cracks within the building's walls and floors in the 1988 Classroom and Gymnasium Addition as follows:

1. Assess existing conditions and deficiencies of the building exterior and interior fabric and document deterioration and deficiencies.
2. Perform Geotechnical investigations of the existing soil conditions.
3. Make recommendations for remedial actions and repairs.

This report is a study; therefore, it does not generate the documents required to execute the repairs mentioned herein. The drawings and specifications that would be the basis of bidding, contracts and permits would be prepared subsequent to this report. This report examines the evidence of distressed architectural fabric, determines possible remedial actions, makes recommendations for action, and projects probable costs. It is a summary of existing conditions, an exploration of possible treatment, and a recommended plan of action.

The statements and opinions expressed herein are solely for the use and information of Stillwater Board of Education. The opinions reflect the professional judgments of registered Architects and engineers and licensed professionals and performing services that are usual and customary. These services are performed with care and skill ordinarily used by other registered architects, engineers and licensed professionals when dealing with similar structures at the same time and in the same or similar localities. Conclusions drawn in this report are based on those conditions and surfaces that were accessible to the unaided visual observations of the Architect, engineers and licensed professionals testing contracted. No warranties or guarantees can be inferred from, or implied by, the statements or opinions contained in this report.

SCOPE AND METHODOLOGY

Since its construction in 1988, the Classroom and Gymnasium Addition has experienced on-going cracking. There have been previous investigations, crack monitoring and repairs that have not successfully prevented additional cracking. The existing conditions will be assessed and analyzed, with repair and restoration treatments recommended.

The scope of the work was as follows:

1. Perform a site visit to observe and review the existing conditions.
   Site visits and investigations were performed as follows:
   a. ENV-Environetics Group Architects, P.C., on December 11, 2023 by Maria Pereira and Julia Monaco
      Accompanied by Jeffrey L. Morris – Boswell Engineering (Civil Engineer); Brian Scott, Environetics Design (Structural Engineer)
   b. Sor Consulting Engineers, Inc., on November 27-29, 2023 Performing Test Pits and Borings (Geotechnical Engineers)
   c. PipeWorks Services Inc. on December 11, 2023, video inspection of storm drain line

2. Review of existing available building plans, documentation and previous reports
3. Prepare narrative report documenting observations, recommendations and conclusions, including photographic documentation, etc.

PROJECT TEAM

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General Building Description

Stillwater School is located on an approximately 9.5-acre lot located on the east side of Stillwater Road (County Road 521) in Stillwater, NJ. The building is located roughly in the center of the lot with grass fields to the north and south. There are paved roads and parking areas immediately to the south of the building, along the south lot line, along the east side of the building and to the west of the building. There is a stream along the southeast property line.

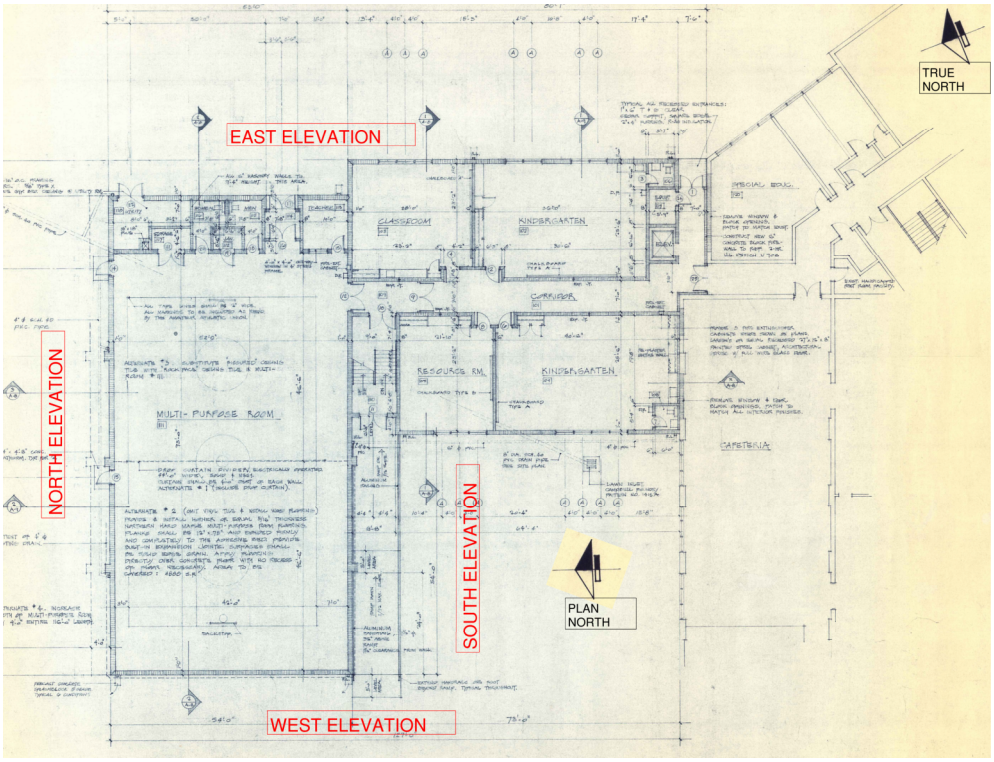
The original portion of the building was constructed in 1941, with additions in 1956, 1966, and 1988. The exterior walls are constructed of masonry with brick and painted stucco finish. All roofs are hip asphalt shingle with aluminum hanging gutters and leaders. Stormwater leaders are collected below ground and routed to outflow into the stream at the southeast end of the lot.

The lower level houses the Gymnasium, Cafeteria, Maker Space and Music Room, classrooms, BOE Office and mechanical rooms. The upper level (1st Floor) contains classrooms, the media center, and school offices.

The approximate building area is as follows:

Lower Level:	35,200 SF
Upper Level:	29,160 SF
Total:	64,360 SF

For the purpose of this report, the following are references are used:



1988 Addition Description and History

The 1988 Addition, which is the subject of this investigation and evaluation, is the northeastern-most portion of the building. It is connected to the older portions of the school on both levels. It houses the Gym and classrooms on the lower level and classrooms on the upper level. The addition includes a hydraulic elevator. The addition area is as follows:

Lower Level:	10,938 SF
Upper Level:	4,684 SF
Total:	15,622 SF

The Addition was designed by Charles Schaffer & Associates of Newton, NJ, Charles Schaffer architect. Documents indicate that the project design team included the following:
MEP Engineering: Lloyd Engineering Co., Warren, NJ, John M. Lloyd PE
Structural Engineering: Jorgenson Associates Consultant Engineers, Sparta, NJ (no name or license # shown, firm name stamped on structural drawings only.
Geotechnical Engineer: Melick-Tully & Associates Inc. South Bound Brook, NJ, William Strubel and Charles Melick PE

The General Contractor was Vanas Construction Co., Bogota, NJ. (formerly of Hawthorne, NJ)

Construction Documents available for review for this investigation include the following:

1. "Additions and Alterations at Stillwater Township Elementary School", dated 6/10/86, Drawing Sheets A-1 (Site), A-2 to A-9 (Architectural), S-1 to S-5 (Structural), HVAC-1 and 2, ME-1 (MEP). Notations on some drawing sheets indicate that there were revised drawing sheets issued in October and December of 1986, but those sheets were not available for review. Some sheets appear to be missing from the set (Plumbing, Electrical)
2. Project Manual and Technical Specifications, undated but presumably issued for Bidding.
3. Geotechnical Report "Soils & Foundation Investigation Proposed Addition to Elementary School Stillwater, NJ", dated May 6, 1986 by Melick-Tully & Associates Inc, including borings.

The addition has masonry bearing walls constructed of CMU with 4" brick and stucco finish exterior face. Foundation walls are primarily filled, reinforced CMU walls with poured concrete walls at the north end of the Gym where the floor slab is below grade. The roof is constructed of prefabricated wood trusses and rafters with plywood sheathing and asphalt shingles. The upper-level floor is constructed of steel joists with a concrete and steel deck slab. The lower-level slab is reinforced concrete on crushed stone and vapor barrier with compressible filler at the foundation wall joints. The construction drawings call for the installation of insulation in the CMU cells of the exterior walls and R-30 batt insulation in the roof joists, above the gypsum board installed for fire protection. The exterior walls do not have a cavity space. Expansion and control joints are shown on the drawings and are currently installed on all elevations, at approximately 40' or less on the brick elevations and 30' or less on the stucco elevations.

Interior finishes generally consist of VCT on all floors, acoustical panel ceilings, and painted CMU walls. Toilets have ceramic tile walls and floors.

The Addition walls are supported on continuous concrete wall footings with column/pilaster foundations. The wall footings are 30" wide x 11" thick, set at 36-28" below grade. The column/pilaster footings are approximately 5' x 5' x 11" thick, set 44" below grade. These dimensions and elevations are consistent with the original design as shown on the 1988 Addition construction drawings.

History of Cracking

Documents indicate that the Gym Addition was constructed in 1987. The actual completion date is unavailable in the documentation available for this investigation and report.

By April of 1989, cracking was evident in the Addition, particularly on the north (side) wall of the Gym. At that time, the District engaged the services of Heikki K. Elo Consulting Engineers P.C. of Easton, PA to investigate the cracking. Mr. Elo initially identified 3 potential causes for the Gym cracking: (1) settling foundations due to being built on previous fill layers, (2) improperly installed or missing horizontal reinforcing in the CMU wall, and (3) missing vertical expansion joints in the northeast (side) wall.

By May 24, 1989, Mr. Elo concluded (1) the foundations had not settled based on elevation readings his office took, (2) wall reinforcing was properly installed based on test holes, and (3) only 2 of the 4 expansion joints shown on the architectural construction drawings were installed, cracks were developing at the locations of the missing expansion joints, and the 2 expansion joints installed were not true expansion joints through the full wall depth (the exterior joints were only through the depth of the plaster and the interior joints were ½" deep saw cuts of the masonry that did not even align with the exterior plaster joints). He concluded that the joints installed were inadequate and that 4 expansion joints as designed were needed to control cracking in the northeast wall of the Gym.

Correspondence indicates that after several meetings, the Mr. Elo, the architect and the general contractor were in agreement that the cracking was not considered structural in nature, needed to be corrected, that Vanas Construction would perform the work in the summer of 1989 and would bear the cost of the repairs.

Charles Schaffer & Associates prepared a corrective detail dated 07/10/1989, Drawing A-1, "Expansion Joint Installation Stillwater School". This detail called for the installation of 2 expansion joints on the northeast wall. the expansion joint design was a 3-piece steel assembly, consisting of a "T" that was installed through the newly cut joint in the wall and two pieces that are welded to the projecting leg on the other side, forming an "I". The expansion joint cover would be caulked on both sides to make it weatherproof. The repair work was completed as of 8/18/1989.

During the summer of 1989, the District documented cracking visible in the classroom areas of the Addition. A list of cracking visible in almost every room of the Addition was forwarded to Charles Schaffer on July 20, 1989 by the District with a request to have them addressed by Vanas during the summer while they were on site doing the expansion joints. There was also a direct request from the District to Vanas to perform the repairs in the classrooms before they do the Gym expansion joints. The cracks were mostly noted to be "in corners, outside walls. 8/18/89 correspondence from Vanas Construction notes that "it was agreed that the vast majority of the cracks described by the Board of Education were settlement hair-line cracks" and "were, in no way, causing structural problems" and "these cracks do not fall under our realm of responsibility". It does note that since they were there, they raked the cracks and filled them with silicone caulk and made them ready for painting.

Since the 1989 repair work, cracks again became visible in the Gym and beginning in November of 2016 a crack monitoring program was implemented for the District by Parette Somjen Architects (PSA). This

included the installation of crack meters at 5 locations on the north and eastern walls of the Gym. These crack monitors were observed for 3 years, and PSA concluded that there was “minor to no movement”.

On 12/19/19 PSA recommended a repair method for the monitored cracks and any other cracks that were not specifically monitored which consisted of (1) routing cracks to ½” width and minimum of 1” depth, (2) filling cracks with grout and sealant (SIKA AnchorFix 3001 was recommended), and (3) painting to match adjacent walls. The District employed a contractor and repaired interior and exterior cracks in 2020.

Cracks have reappeared again, both new cracks and re-opened previously repaired ones.

Observed Conditions

Cracking was observed on exterior and interior walls and the floor perimeter in all areas of the 1988 Addition. The following assessment documents and evaluates the existing cracking visible in the various areas.

The wall cracking observed was generally of the following types:

1. Mortar Joint Cracking: Diagonal and Horizontal cracks that generally followed the mortar joints in the CMU and sometimes included vertical cracks of concrete masonry units themselves. *[PIC 1, 2]* These cracks also appeared/telegraphed in a matching pattern on the stucco surfaces.
2. Masonry Unit Cracking: Vertical cracks through the body of the concrete units themselves. *[PIC 3]*
3. Vertical Corner Cracking: Cracks in at the vertical intersection of walls, sometimes causing a gap or separation between the walls. *[PIC 4]*

All of these types of cracks can be caused by settlement or uneven settlement, thermal expansion, earth movement, water infiltration or a combination of these issues. Horizontal cracks, masonry unit cracking, and significant vertical corner cracking are the most serious and can indicate structural issues exist.

4. Hairline Stucco Cracks: Telegraphing hairline cracks in stucco following the mortar joints of the CMU behind. *[PIC 1]* These types of cracks are generally caused by thermal expansion and/or water infiltration and are not a structural issue.

The floor cracking observed was generally of the following type:

1. Perimeter Cracking: Cracking along the perimeter joint with walls and at door thresholds, visible in the floor finishes. *[PIC 5]* These types of cracks are generally caused by settlement or uneven settlement of the walls and floor slab. These types of cracks or gaps in the concrete slab typically telegraph through and appear as cracks in the vinyl tile flooring.
2. Diagonal Cracking: Cracks radiating from the exterior wall into the area of the concrete slab. *[PIC 6]* These are more serious cracks which often have changes in elevation to either side of the crack and are generally caused by settlement or issues with the below slab soils conditions. These types of cracks typically telegraph through the floor finish and appear as cracks in the vinyl tile.

GYM Area

Exterior Elevations: Cracks were visible and noted on all exterior elevations except for the Classroom portion of the West Elevation.

- On the South elevation, recently repaired cracks between the pilasters were observed to have minor flaking of the repaired stucco, indicating continued movement in the masonry. *[PIC 7]*
- On the West elevation of the Gym, a small amount of hairline mortar joint diagonal cracking was observed but the stucco is intact. Additionally, hairline stucco cracking was observed at the corner of the building, but the stucco is intact. *[PIC 8]* The existing caulk in the existing control joint was brittle and cracked and should be replaced.
- On the North elevation, hairline stucco cracking was observed at the corner of the building at the top of the hill, but the stucco is intact. New hairline mortar joint cracking appears to be forming in the wall areas at the bottom of the hills (east side of building), but the stucco is intact. *[PIC 9, 10. 11, 13]* An existing patched area under the window is poorly finished and unsightly. *[PIC 12]*

The existing caulk in the existing expansion joint covers was brittle and has shrunk and should be replaced. *[PIC 12]*

- On the East elevation of the Gym, new significant vertical cracking is visible in the stucco from the mechanical room door to the louver above and horizontal cracking in the stucco near the horizontal conduit between the corridor exit alcove and mechanical room door. The cracking is significantly large to permit water infiltration that will compromise the integrity of the stucco finish. *[PIC 14, 15, 16, 17, 18, 19]* Vertical cracking is visible at the side and ceiling of the corridor exit alcove. *[PIC 20]* Additionally, hairline stucco cracking was observed at the corner of the building, but the stucco is intact. The existing caulk in the control and expansion joints was brittle and cracked and should be replaced. *[PIC 20]*

Interior Walls: Cracks were visible and noted as follows:

- In the Gym space, additional cracking was observed in areas where cracks were previously repaired, particularly in the southwest corner. *[PIC 21, 22]*
- Hairline vertical cracks, including cracked CMU units, were observed on the north, south and east walls. *[PIC 23, 24]*
- Extensive and significant vertical wall and corner cracking was observed in the office, vestibule, *[PIC 25, 26, 27, 28, 75]* storage, mechanical room *[PIC 30, 31, 32, 33]* and toilet rooms *[PIC 34, 35, 36, 37, 38, 39]* at the east end of the Gym. No previous attempts to make repairs appear to have been attempted in these areas. Significant cracks are visible throughout and particularly in all of the corners of the spaces. Vertical corner cracking is most severe (1/4" or more) along the exterior wall of the building. In the toilet rooms, this has caused significant cracking of the wall tiles and gaps at the wall intersection. *[PIC 38]* Some of these gaps have been caulked but the cracking continues to expand and the gaps are reappearing.
- The existing caulk in the expansion joint covers was brittle and has shrunk and should be replaced. *[PIC 40]*

Floors: Floor cracking was visible throughout the Gym areas as follows:

- Perimeter floor cracking was visible around the entire perimeter of the Gym room at the exterior wall. *[PIC 5, 40, 41, 42]* The vinyl tile was cracked and/or portions missing. Some cracking extended up to 4" into the room. This cracking could be caused by cracking in the concrete slab itself or wall and slab movement causing gaps in the substrate and compressible joint filler.
- Significant floor cracking was observed in the rooms at the east end of the Gym. The floor tile was cracked and not level and there were unusually large gaps at the perimeter base joint that had been filled or caulked. *[PIC 36, 43, 45, 48, 49]*
- Significant cracks were observed along the entire east interior wall at the door thresholds. There was extensive cracking of vinyl tile and in some door openings, there was no tile or compressible joint filler material, leaving a ¼" gap that appear to be the full depth of the concrete slab. *[PIC 44]*
- At both exit doors in the north wall, there was significant cracking. At one location, the crack begins at the door jamb and extends into the room diagonally for approximately 3' and there is a noticeable dip and change in elevation at the crack. At the other door, a significant crack with a minor change in elevation runs parallel to the exterior wall for the full width of the door. *[PIC 6, 46, 47]*

Two-Story Classroom Area

Exterior Elevations: Cracks were visible and noted on the East elevation as follows:

- Significant vertical cracking is visible in the stucco from the windowsills to grade at all windows. The cracking is large and there is a significant amount of missing stucco material which permits water infiltration that will further compromise the integrity of the stucco finish. *[PIC 50, 51, 52, 53, 54]* Cracking was observed in the mortar joints of both the upper and lower stone band and where the Classroom area meets the Gym portion of the building. The brick portions of the elevation are mostly intact. There is some diagonal step cracking on the side of the Classroom area overlooking the Gym in the mortar joints. *[PIC 55, 56]* Additionally, the joints between the cast stone windowsills and the stucco were eroded and open and there is some minor damage to the sills. *[PIC 57]* The existing caulk in the control and expansion joints was brittle and cracked and should be replaced, including the small expansion joint where the addition meets the older portion of the school. *[PIC 57]*

Interior Walls: Cracks were observed as follows:

- Vertical corner cracking was observed in all 2nd floor classrooms and some of the 1st floor spaces. These cracks were visible on the exterior walls and were generally hairline cracks. It should be noted that cracks in at least some of these locations have been previously repaired by raking and caulking (Vanas Construction, 1989). *[PIC 58, 59, 60, 61, 62]*
- The classroom bathrooms that are adjacent to the exterior walls do not currently have any visible cracking. It should be noted that these bathrooms were fully renovated very recently and the CMU walls are fully covered by ceramic tile.
- Vertical wall cracking was observed in the wall adjacent to the Gym portion of the addition on both floors. The cracking corresponds with the cracks visible on the upper level of the exterior wall. it should be noted that there are plumbing lines inside the CMU wall in certain locations that serve a classroom sink and some pipes have already leaked due to wall movement. *[PIC 63, 64]*
- Vertical wall cracking was visible in the stairwell walls both above and below the finished ceiling. The cracks follow the mortar joints but also include a number of CMUs with vertical cracks. The cracks below the ceiling were recently repaired but are beginning to re-open. The cracks above the ceiling were not repaired and are significant and large, ¼" wide or larger. *[PIC 65, 66, 67, 68]*

Floors: Limited floor cracking was visible in the Classroom area as follows:

- Minor perimeter floor cracking was visible along the 1st floor exterior wall of the east elevation and in the corridor at the south end of the addition and elevator. The vinyl tile was cracked. This cracking could be caused by cracking in the concrete slab itself or wall and slab movement causing gaps in the substrate and compressible joint filler. *[PIC 69, 70, 71, 72]*
- Significant cracking and settlement was observed at the exterior concrete slab at the south end corridor exit. There were visible gaps between the slab and alcove walls and the slab appeared to have settled unevenly recently. *[PIC 73, 74]*

Evaluation

The type of floor and wall cracks observed in the 1988 Addition are not unusual but the quantity and extended time during which they are occurring is unusual, concerning and requires additional investigation.

The types of cracks observed typically are caused by one or more of the following:

1. Settlement of the Building: Building settlement cracking is not unusual and is typically small or "hairline" cracks and typically are not indicative of structural issues. Settlement can occur due to soil under a building compacting under the weight of the structure. The soil type, water content, location, inadequate or uneven compaction of the soil and natural causes such as flooding, windstorms or earthquakes could all have an impact and cause settlement. Some small amount of settlement is to be expected for a short period of time after construction or after a significant event that may impact subsurface soil conditions, for example a flood, significant change in stormwater drainage patterns or conditions in the vicinity, or a broken water line under the building.
2. Inadequate or improper Expansion and Control Joints: Expansion and control joints are installed in building walls and floors to prevent and/or control cracking. Expansion joints are intended to allow for movement of materials, they are the full depth of the wall or floor, allow for expansion and contraction, prevent cracking, are filled with material that allows for movement such as silicone or rubber and also provide a weather seal with plates or covers on both sides of the wall or top of the floor finish. The quantity and width of the expansion joints is dependent on the length of the walls and slabs and the materials and assembly. The widths are 1" minimum. Expansion joints in walls and floors are also needed where new construction joins an existing structure. Control joints are intended to control cracking and are essentially planned cracks which allow for movement caused by temperature changes and drying and shrinkage of materials. A control joint is a continuous groove formed or cut into a wall or floor slab forming a plane of weakness to control the location of the eventual cracking and to plan and hide the look of an uncontrolled crack. They are generally smaller than expansion joints (1/2" or less typically) and the quantity and locations are dependent on the material.

Previous investigations and interventions reviewed and addressed the issues of reinforcement and expansion joints. As part of the 1989 repairs discussed earlier, Mr. Elo concluded wall reinforcing was properly installed based on test holes and we have no information to disagree with that conclusion. At the same time, two additional expansion joints were installed in the north wall of the Gym. This seems to have lessened the amount of cracking in this wall except at the east corner. The "expansion" joints constructed in other areas of the building (west and south walls, and at the connection to the existing building) are approximately ½" wide and too narrow to function as true expansion joints. The joints in the Gym stucco and brick and stucco of the Classroom area appear to be functioning as control joints and limiting the cracking in the brick and stucco on the west elevation.

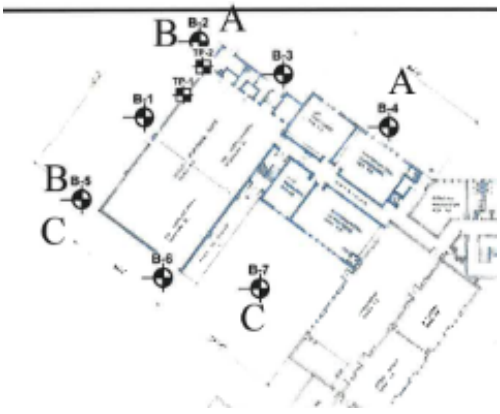
The issues with the expansion and control joints do not provide a reasonable explanation for the extent of the cracks, particularly along the east and north elevations and the cracks, separation and gaps that have appeared in the corners of walls intersection with the exterior wall and at the perimeter of the floor slab. Normal settlement of the building also does not appear to be a reasonable explanation due to the severity

of the cracking and the regular appearance of new cracks since the Addition's construction over 35 years ago, pointing to the existence of a problematic subsurface soils condition, requiring an investigation, borings and tests performed by a qualified geotechnical engineer. SOR Consulting Engineers was engaged to perform the investigation and prepared a report dated December 12, 2023.

Subsurface Conditions

The original geotechnical report for the Addition was dated May 6, 1986 and prepared by Melick-Tully & Associates Inc. and a copy was available for review. That report concluded that the area of the addition was fill placed during the construction of the original school building, with fill ranging from 14'-19' below grade at the south (lower) end of the site and 10'-11' at the northeastern (upper) portion of the site and 24' at the northwestern end. The fill was considered *medium dense to dense* sand-silt-gravel mixture and the natural soil was *medium dense* stratified deposits of sand and silt. Groundwater was encountered at a depth of 19'6" - 21'6". (Pg. 5) Melick-Tully concluded that the addition could be safely supported by conventional shallow foundations supported on either the in-place fill or natural soils materials. They recommended modifications to the steep slope at the southeastern corner of the addition to support the foundation and minimize erosion after construction, including adding controlled compacted fill to a distance of 10' beyond the building. Additionally, they recommended that a subsurface drainage system be installed at below grade walls. (Pg. 6) Site preparation was described in pages 6-9, including removal of topsoil, site grading and excavation to subgrade level, compaction of subgrade soil to a "firm and unyielding consistency", placement of fill and backfill materials in lifts and compaction to 95% of maximum dry density. The foundation design criteria was described in pages 9-10, estimating that foundations designed and installed in accordance with their recommendations would experience post-construction settlement of ½" or less.

Sor Consulting Engineers performed 7 borings up to a depth of 44': 2 borings along the (Plan) East elevation, 3 along the North elevation, 2 along the West elevation of the Gym and 1 in the courtyard area. Additionally, they excavated 2 test pits along the North wall of the Gym to a depth of 4' below grade.



The subsurface conditions encountered by the Sor Consulting Engineers consisted of 4"-6" of topsoil, fill material to depths of 8'-30" and natural soil that was silty sand. The fill material was primarily grayish brown silty sand with some gravel in a *medium compact to loose* condition to a depth of 4'-6' and then *loose to very loose* below that. The silty sand natural soil is in a *medium dense* condition. Groundwater was encountered at depths of 22'-32' below grade. (Pg. 3-4) The test pits revealed that the Addition is

supported on continuous wall footing at a depth of 38" below grade with column footings at 44" below grade. The soil below the foundations is *loose to very loose* fill. (Pg. 4)

We note the discrepancy in the condition of the subsurface fill that the Addition sits on between the original Melick-Tully & Associates Inc. geotechnical report and the new report by Sor Consulting Engineers. The Melick-Tully report noted the fill to be generally in a *medium dense to dense* while the Sor report found the fill to be *medium compact to loose* condition to a depth of 4'-6' and then *loose to very loose* below that. Both reports found the natural soils to be similar and in a similar condition. Groundwater was found to be at a similar elevation. The current investigation and available information do not account for this discrepancy or allow us to come to a reasonable or probable explanation for this difference in subsurface conditions 30 years later. Further forensic investigation would be needed to establish the reason(s) for the different conditions found in the two geotechnical reports.

Civil (Storm Water Drain Lines)

The original construction drawings available indicate that a PVC storm drain line runs from a lawn inlet in the courtyard area on the west side of the addition, diagonally under the Addition and to an outlet to the stream on the east side of the addition. On 12/11/2023 a video inspection of this drain line was performed by PipeWorks Services Inc. to verify the condition of the pipe. A camera was inserted in the area drain and advanced approximately 150' in the pipe. The inspection indicated that the PVC pipe was clear and appeared intact to a distance of 150', which is outside of the Addition footprint, near the fence enclosure. At a few locations, it appeared that the pipe was "misaligned", but the pipe was clean of debris or standing water in the immediate area, indicating that the pipe fittings seem to be intact. At approximately 150' feet from the area drain and past the Addition footprint, the pipe was blocked by debris and there was standing water in the pipe. This indicates that there may be a debris blockage or possibly a break in the pipe outside of the building and near the pipe outlet. This drainpipe does not seem to be a factor in subsurface conditions under the Addition.

Conclusions and Recommendations

Based on their findings, Sor Consulting Engineers has concluded that the Addition foundations and floor slabs are supported on fill material that is in a *loose* condition. The fill material which existed on site before the construction of the Addition does not appear to have been placed and compacted in a controlled manner and has settled unevenly, causing distress to the Addition which is appearing as cracks in the walls and floors. Furthermore, Sor has concluded that the fill is not capable of providing adequate support for the Addition and that the walls and slab will continue to be in distress due to differential settlement. (Pg. 5)

Additionally, Sor believes that below slab utility lines such as storm water, sanitary sewer, and electric pipes could have been compromised by the on-going settlement. Any existing leaks in the utility lines will have contributed or exacerbated the subsidence or settling of the fill material. The available plans only show the one storm water drain line which has been inspected but further investigation is needed to identify and locate any utility and storm water pipes below the floor slab and adjacent to and along the perimeter of the Addition.

On December 11, 2023, Boswell Engineering performed an inspection of the areas around the school addition to check for any settlement which could be attributed to a broken or offset drainage pipe or roof drains. We did not find any such settlement along the walls or the interior floor.

The video inspection was performed by Pipeworks Services Inc. on December 11, 2023. The video revealed some minor misaligned joints and a blockage at the downstream end of the pipe. The video inspection recommended hydro jetting the drain to remove the blockage. We concur with the recommendation.

Although the Subsurface Investigation Report did not identify any damage to the roof drain, we recommend that a further evaluation be performed during any remedial action. The evaluation should include the roof drain as well as all roof leader connections.

It does not seem that the six (6”) inch storm drain or the roof drain are a cause of the current problem, but additional foundation settlement could cause the pipes to shear, which can lead to additional damage.

The condition of the subsurface soil and the Addition itself indicates that the settlement is still occurring and will continue to occur for the foreseeable future. This continued settlement, if not addressed, will cause further deterioration and at some point, compromise the building structural elements and below slab utilities. The Addition’s footings, foundation walls and exterior walls will be under increasing stress that may lead to structural cracking and displacement, compromising the structural integrity of the structure and requiring costly reconstruction. Additionally, below grade and in-wall utility pipes and conduits can become stressed and break, compromising building infrastructure and requiring more costly repairs.

The stresses on the Addition are not uniform in all areas and building elements and future deterioration will most likely be uneven and unpredictable. It is recommended that building stabilization repairs be

performed within the next 12-24 months to lessen the risk of structural cracking and displacement compromising the structural integrity of the Addition.

1. **Building Foundation Stabilization:**

To stabilize the Addition foundations and footings, two approaches are recommended by Sor Consulting Engineers:

A. Foundation Support: HELICAL PILE

This solution entails re-supporting the foundations by installing helical piles along the sides of the 1988 Addition that extend through the unsuitable soil and at least 7' into the natural soils below. The pile lengths would be 20-35 feet below the existing foundations. The piles would be attached to the existing concrete foundation by steel brackets. This type of foundation pile consists of steel augers with a central pipe shaft that is drilled into the soil using special drilling equipment. The auger and shaft are designed and sized for the specific soil conditions and to withstand the required loads and stresses and the shaft is filled with concrete. It is anticipated that piles will be needed approximately 5-10' apart on all or part of each side of the addition.

Sub-surface utility pipes, conduits and structures adjacent to the work area must be located, inspected and repaired as needed prior to the work.

Upon completion of the helical pile foundation installation, the site and landscaping around the 1988 addition must be restored. The area should be graded, new topsoil should be installed, and the area re-seeded. All disturbed asphalt paving should be restored and concrete pads at exit doors should be replaced.

B. Concrete Floor Slab Support: IN-PLACE SOIL STABILIZATION BY COMPACTION GROUTING

To support the ground floor concrete floor slabs, in-place compaction grouting is recommended because the existing floor slab can remain in place. With this method, small diameter holes are drilled in the concrete slab, 5'-7' apart and extending down into the suitable soil. The depth will be 10'-30' deep, depending on the location of the hole. Portland cement-based grout is then pressure injected into the soil in stages from the bottom to the underside of the slab to fill any voids and consolidate and densify the fill material and also filling any voids directly under the concrete slab. After this process, the concrete floor slab can be patched, re-leveled and new finish installed.

As an alternative to patching the concrete slab, after the grouting work is completed, the entire floor slab can be removed and replaced with a new reinforced concrete slab supported on the grouted soil and compacted crushed stone. This would provide a stable and level surface for new synthetic or wood sports flooring.

Below slab utility pipes, conduits and structures must be located, inspected and repaired as needed prior to the work. They must be monitored to ensure that grout does not enter and plug them.

2. **Underground Utility Piping:**

All underground pipes and conduits under the floor slab and around the immediate perimeter of the Addition must be identified and inspected for any cracks and failures. Identification can be accomplished by primarily non-destructive means and many of the pipe inspections may be performed by video inspection techniques. Any failures or cracks must be repaired as part of the stabilization work since it will require removal of the concrete slab to access the pipes. This work must be performed to ensure the integrity of the stabilization grouting repairs and to prevent any future compromising of the soil due to water infiltration.

3. **Storm Drainage System:**

All underground storm water pipes, roof drainage pipes and leader connections around the perimeter of the Addition must be identified, evaluated for any damage and repairs made as needed. The evaluation can be made primarily through non-destructive video inspections. Blockages can be removed by hydro jetting.

4. **Masonry and Floor Crack Repairs:**

Upon completion of the above priority repairs, it is recommended that the cracks in the interior and exterior building be repaired. Repairs to the exterior walls should be performed first in order to maintain a weathertight building envelope and prevent further water infiltration into the building wall system. Even once the building is stabilized and movement stops, continued water infiltration into the cracks will further compromise the masonry and stucco and lead to loss of building fabric due to the effects of freeze-thaw cycle. Once the exterior repairs are completed, the interior repairs can be performed.

A. Exterior Masonry Repairs: Currently, the exterior masonry is in fairly good condition with little significant damage to bricks. Most of the cracking is following the mortar joints which makes repairs simpler and less costly. The cracks in the brick portion of the East elevation should be repaired by raking the mortar joints and re-pointing them, grouting the hairline cracks in the bricks and cast stone bands, and replacing the cracked bricks. These are common masonry restoration techniques. The cast stone bands above and below the brick and the stone windowsills thought the Addition exhibit loss of mortar, which is not uncommon for 30+ year old masonry, particularly for the horizontal joints of the windowsills. All of the mortar joints of the band and sills throughout the addition should be repointed to prevent future water infiltration. All existing expansion joints should be raked, and new sealant installed.

B. Window & Door Perimeter Sealant: All of the existing caulk at the perimeter of doors, windows and louvers appears to be deteriorated and at the end of its useful life. The old sealant should be raked and new sealant installed.

C. Stucco Repairs: The cracks in the stucco surfaces throughout the Addition should be repaired to prevent water infiltration and further deterioration and loss of stucco material. There are two options with regards to the stucco:

1) Spot Repairs: All cracks should be repaired by raking the crack to an appropriate depth and width and then filled with an appropriate cementitious repair compound. Large areas of cracking may require patch repairs which entail the "squaring off" and removal of all of the deteriorated stucco until sound stucco is reached and infilled with matching stucco material. Hairline crack areas should be cleaned and coated with a high-performance coating designed to fill hairline cracks in masonry and cementitious stucco material and protect the material from water infiltration and has a paint-like appearance. There are a number of restoration products that are breathable and appropriate available from multiple manufacturers. This approach would leave a patchwork of repairs, but the high-performance coating could be applied to all stucco, minimizing the aesthetic impact.
   This approach will require regular maintenance and vigilance to maintain the integrity and appearance of the stucco. It should be inspected for cracks and spot repairs made promptly (most likely a 1–2-year cycle) and to replace the coating at the end of its life cycle (7-10 years depending on the product).

2) Stucco Replacement: All stucco throughout the Addition would be removed to the CMU substrate and a new cementitious stucco system or synthetic stucco system installed. AN EIFS system may be an option and would add a thin layer of insulation, improving energy efficiency slightly and preventing the telegraphing of the mortar joints as the stucco ages. Alternatively, the stucco of the entire North and East elevations would be removed and replaced with a cementitious stucco with a synthetic stucco topcoat that could also be applied to the south and west elevations after cracks are repaired, providing a uniform appearance.
   This approach is more costly but will provide a solution that will require less maintenance for the next 20 years.

D. Floor Cracking Repairs: At the Gym and Corridor Exit Doors, the floor slab will require repairs and leveling. At all other areas, the repairs required are at the perimeter. At minimum throughout the Gym and 1st floor classrooms, the vinyl base and VCT tile should be removed, the perimeter joint/crack should be raked, new compressible filler installed, compaction grouting holes patched, and new VCT and vinyl base installed. The new base and tile installation should not bridge the perimeter joint and should accommodate the gap allowing for natural movement. Additionally, particularly at the Gym, a cementitious self-leveler may need to be installed before the floor finish is installed to provide a level playing surface.
   This work would provide the opportunity to consider the installation of a synthetic multipurpose athletic floor system in lieu of VCT that would be more appropriate for the space's use as a gymnasium.
   At the toilet rooms, the cracked ceramic tile should be removed, the joint/crack should be raked, new compressible filler installed, and new tile installed. If temporary repairs are performed, it is recommended that finished aluminum cove base angles be surface installed to cover gaps and cracked tiles replaced with new tile matching as closely as possible.

E. Interior Wall Crack Repairs: Once the structure is stabilized and the exterior cracks are repaired, the interior cracking can be repaired. It is recommended that cracks that extend above the

finished ceiling be rough filled/repaired to maintain stability in the masonry. Recommended repairs are as follows:

1) Mid Wall Cracking in CMU Walls: Generally, these cracks can be repaired by raking the cracks and grouting and painting the wall. A small amount of CMU replacement will be required. The repaired cracks will be less noticeable.

2) Corner Cracking in CMU Walls: Generally, these cracks can be repaired by raking the joint, installing backer rod as needed and installing a paintable sealant. Larger cracks in areas where aesthetically acceptable, painted steel or finished aluminum angle trim may be installed to cover the corner.

3) Cracking in Tiled Walls of Toilet Rooms: The cracking in the toilet room tiles is extensive and replacement of the tile is recommended. Existing wall tiles should be removed, cracks in the CMU filled and new tile installed, using metal corner angle and cove base trim that can accommodate any residual minor movement. If replacement is not feasible and repairs are performed, it is recommended that finished aluminum corner angles and cove base be surface installed to cover gaps and cracked tiles replaced with new tile matching as closely as possible.

Due to the extent and nature of the work and the time required to perform it, ENV recommends that the District consider undertaking a full renovation of the gymnasium at the same time. All of the equipment, finishes and systems are approximately 35 years old and at, or near, the end of their useful life. Additionally, much of the equipment and finishes do not meet current Building Code or energy efficiency standards and recommendations or are inadequate for the space's use. As examples, the existing ventilation system does not meet new standards and requirements for ventilation and does not provide air conditioning, and the existing VCT flooring does not provide a playing surface that meets the recommended levels of vibration dampening that maximizes comfort and minimizes the risk of injury. A full renovation of the gymnasium should include the following:

1. Replacement of the existing mechanical systems with new HVAC that provides cooling and has integrated controls that maximize comfort and energy efficiency.
2. Installation of new LED lights and finished ceiling.
3. Installation of a new athletic wood flooring system and recessed concrete slab to accommodate the system thickness.
4. Replacement of the existing windows with new thermally broken aluminum windows with insulated low-E glass and other coatings to reduce solar heat gain and glare.
5. Install new gymnasium equipment, including bleachers with Code compliant aisles and ADA seating; retractable backstops; curtain divider; wall pads and scoreboard.
6. Painting walls, Doors and Frames and replacement of exterior doors, frames and hardware.

Preliminary Schedule

It will be necessary to prepare plans and specifications for the project. Bid documents for the foundation and concrete slab stabilization must be prepared by a structural engineer and geotechnical engineer. Installation of helical pile foundations and compaction grouting must be performed by specialty contractors that have experience in this work to ensure successful stabilization of the Addition.

The work will be extensive, will take a significant amount of time to perform and will be disruptive to normal school operations, requiring that the spaces be vacated for five (5) months while the helical foundations, compaction grouting, and new flooring is installed. Consideration will have to be given to phasing the work to minimize the time the spaces are not available for school use with priority given to the stabilization work and performing the minimum restoration work needed to permit the use of the spaces.

The classrooms and offices in the 1988 Addition must be vacated for a period of time during the school year for the stabilization repair work. Due to the lack of available swing space in the rest of the school building, the rental and use of Temporary Classroom Units (TCU) for approximately six (6) months will be necessary. A minimum of 5 classrooms with bathrooms and one unit that can be used for offices will be needed. The TCU's can be located in an existing parking area and will need to be connected to existing building electric, plumbing, sanitary, technology and fire alarm systems. The Project Budget should include costs for TCU rental, delivery and installation, footings, utility connections, stairs and ramps, and removal at the completion of the repairs to the 1988 Addition.

ENV anticipates that the work should be phased as follows:

1. Stabilization and Floor Restoration Work: This would include the installation of all helical foundations, compaction grouting and flooring replacement in all 1st floor areas of the Addition.
2. Exterior Crack Repairs/Façade work: This work should be performed after completion of the stabilization. This work may be performed during certain portions of the school year because it is exterior work, if the District chooses. This work is weather and temperature sensitive and can typically be performed from April through October.
3. Interior Repairs: This work would include interior wall crack repairs and renovation of bathrooms. It would be expected that this work would be done during summer break.

Options for Bidding and Contracting the work are as follows:

1. Three (3) Bids: All of the work needed can be Bid and performed as three separate projects: (1) Stabilization, (2) Exterior Crack Repairs, and (3) Interior Repairs. The chief benefits of this approach would be to spread the cost over several budget years; providing the most flexibility for scheduling and phasing of the work; and allowing specialty contractors to bid only on their phase of the work. This would not be expected to provide a savings in construction costs since any reduction in subcontractor mark-up costs would be offset by increased mobilization and general condition costs. Additionally, there would be increased architectural and engineering costs to prepare three separate bid packages and provide construction administration for three projects.
2. Two (2) Bids: The work would be performed as two separate projects: (1) Stabilization and (2) Exterior and Interior Crack Repairs. Again, the costs could be spread over several budget years;

provide some phasing and scheduling flexibility; and allow specialty contractors to bid directly on their phase of the work. The interior and exterior crack repair work requires much of the same specialty experience. There could be minor savings in construction costs and architectural and engineering costs when compared to the option above, since all of the crack repairs would be done under one contract, providing savings on mobilization and general conditions.

3. One (1) General Construction (GC) Bid: All of the work would be bid at one time to general contractors who would employ the required specialty subcontractors. The Bid would include the required job phasing and we would anticipate that the construction period would be at least 14 months to include two summers, with long stretches of no work being performed. This approach would be expected to provide a very small cost savings overall, primarily in Architectural/Engineering costs.

Phase: Stabilization and Floor Finishes	
Preparation of Construction Drawings	12 Weeks
Bidding	5 Weeks
Construction	20 Weeks
For Optional Gym Renovation Work Add the Following to Above Schedule	
Preparation of Construction Drawings	4 Weeks
Bidding	No Change
Construction	10 Weeks
Phase: Exterior Crack Repairs	
Preparation of Construction Drawings	8 Weeks
Bidding	5 Weeks
Construction	8 Weeks
Phase: Interior Crack Repairs & Bathroom Renovation	
Preparation of Construction Drawings	10 Weeks
Bidding	5 Weeks
Construction	10 Weeks

Cost Estimate

The estimate below represents a **total cost estimate** for the required and optional work describes in this report, including TCU rental, Gymnasium renovation, and potential referendum cost for funding.

PRELIMINARY COST ESTIMATE

ENV

ARCHITECTURE | INTERIOR DESIGN | ENGINEERING

Stillwater Township School

1988 Addition

Renovation of Gym, Wall and Floor Crack Repairs 4.12.24

Cost Estimate including Referendum Breakdown and Local and State Share Funding

	Quantity		Unit Cost	Estimated Cost	Comment
Helical Pile Foundations - East Elevation (20'-30'+ depth)	15	EA	$12,000	$180,000	
Helical Pile Foundations - North Elevation (15'-20'+ depth)	14	EA	$8,000	$112,000	
Helical Pile Foundations - West Elevation (20'+ depth)	15	EA	$10,000	$150,000	
Helical Pile Foundations- South Elevation (20'+ depth)	6	EA	$10,000	$60,000	
Site Restoration	1	Allowance	$35,000	$35,000	
				$0	
Concrete Floor Slab Compaction Grouting- GYM	5,860	SF	$25	$146,500	
Concrete Floor Slab Compaction Grouting- Classrooms	5,078	SF	$25	$126,950	
Concrete Slab Patching & Leveling- GYM	5,860	SF	$8	$46,880	
Concrete Slab Patching & Leveling- Classrooms	5,078	SF	$8	$40,624	
Storm Drainage Investigation & Repairs	1	Allowance	$25,000	$25,000	
GYM & Office VCT Floor Removal & Replacement	5,310	SF	$12	$63,720	
Classrooms & Corridor VCT Floor Removal & Replacement	5,078	SF	$12	$60,936	
Toilet Room Floor Patching Repairs Allowance	1	Allowance	$5,000	$5,000	
Perimeter Underground & Under slab Utility Investigation & Repairs Allowance	1	Allowance	$75,000	$75,000	
				$0	
East Elevation Classroom Stucco Replacement	1,080	SF	$20	$21,600	
East Elevation Brick/Cast Stone Repairs & Pointing	500	SF	$50	$25,000	
East Elevation GYM Stucco Repairs	972	SF	$22	$21,384	
North Elevation GYM Stucco Repairs	1,950	SF	$22	$42,900	
West Elevation GYM Stucco Repairs	810	SF	$20	$16,200	
West Elevation Classroom Stucco Repairs	876	SF	$20	$17,520	
South Elevation Stucco Repairs	810	SF	$20	$16,200	
Caulking and Sealant Allowance	1	Allowance	$10,000	$10,000	
ADDITIONAL COSTS FOR STUCCO REPLACEMENT	*7,308*	*SF*	*$15*	$109,620	
ADDITIONAL COSTS FOR EIFS IN LIEU OF STUCCO	*7,308*	*SF*	*$20*	$146,160	
GYM Area Wall Crack Repairs	5,860	SF	$15	$87,900	
GYM Toilet Room Renovations	2	EA	$70,000	$140,000	
Classroom Area Wall Crack Repairs	10,156	SF	$5	$50,780	
Gymnasium Renovations (refer to Gymnasium Worksheet)	5,860	SF	$244	$1,428,300	
TCU Rental 20'-0"x64'-0" Flex Unit (2 classrooms per Modular Unit)	3	EA	$400,000	$400,000	Rental for Installation and Breakdown of 3 Modular Units
Rental Includes Stairs, Ramps and Skirting				$0	
Sanitary Services	1	EA	$6,000	$6,000	
Electric, Plumbing, Sanitary Connections	1	EA	$35,000	$35,000	
Technology Connection and Wiring	1	EA	$25,000	$25,000	
Fire Alarm Connection & Wiring	1	EA	$7,500	$7,500	
Disconnection, Removal and Site Restoration	1	EA	$15,000	$15,000	
Sub Total Construction				**$3,749,674**	

Soft Costs					
Architectural/Engineering Fees (10%)				$374,967	
Expenses				$30,000	
Environmental Remediation Allowance				$25,000	
Bond Sale				$100,000	
Legal Fees				$25,000	
Permits, DOE Application				$10,000	
Construction Contingency (15%)				$562,451	
Design Contingency (2%)				$74,993	
Escalation @ 3%				$112,490	
Referendum Cost (see below)				$105,500	
Sub Total Soft Costs				**$1,420,402**	
Total Project Cost				**$5,170,076**	All Costs are eligible for 40% State Share Funding
Local Share 60% of Project Costs				**$3,102,046**	
State Share 40% of Project Costs				**$2,068,030**	
Referendum Costs					Referendum costs are eligible for 40 state share funding and are included in the project costs
Architectural/Engineering Fees				$35,000	
Expenses				$3,500	
Environmental Testing Soil				$7,500	
Bonding Attorney				$8,500	
Financial Planner				$6,000	
Legal Fees				$7,500	
Permits, DOE Application				$7,500	
Election Costs				$30,000	
				$0	
				$0	
Total Referendum Costs				**$105,500**	

The estimate below is a breakdown of the existing gymnasium renovation costs.

PRELIMINARY COST ESTIMATE

ARCHITECTURE | INTERIOR DESIGN | ENGINEERING

Stillwater Township School
1988 Addition
Gymnasium Renovation
COST ESTIMATE

04.12.2024

	Quantity		Unit Cost	ESTIMATED COST	
New HVAC System	5,860	SF	$135	$791,100	
New Ceilings and LED Lights	5,860	SF	$15	$87,900	
New Wood Athletic Floor System	5,860	SF	$20	$117,200	
New Reinforced Concrete Slab	5,860	SF	$25	$146,500	
New Windows	150	SF	$130	$19,500	
Painting	5,860	SF	$10	$58,600	
Replacement of Exterior Doors	6	Leaf	$7,500	$45,000	
Bleachers (5 Rows, 60' Long)	1	EA	$40,000	$40,000	
Gym Wall Pads	1	EA	$15,000	$15,000	
Retractable Main Backstops, 2 Cross Court Pairs	1	EA	$50,000	$50,000	
Curtain Divider	1	EA	$50,000	$50,000	
Scoreboard	1	EA	$7,500	$7,500	
Sub Total Construction				**$1,428,300**	
Soft Costs					
Architectural/Engineering Fees (10%)				$142,830	
Expenses				$14,000	
Legal Fees				$7,500	
Permits, DOE Application				$5,000	
Construction Contingency (15%)				$214,245	
Design Contingency (2%)				$28,566	
Escalation @ 4%				$57,132	
Sub Total Soft Costs				**$469,273**	
Project Total Cost				**$1,897,573**	

The estimate below is a breakdown of the total cost for phased construction, assuming no Referendum and including Gym Renovation costs in Phase 3.

PRELIMINARY COST ESTIMATE

ENV
ARCHITECTURE | INTERIOR DESIGN | ENGINEERING

Stillwater Township School
1988 Addition
Wall and Floor Cracking Repairs
COST ESTIMATE - PHASED CONSTRUCTION

04.12.2024

	Quantity		Unit Cost	ESTIMATED COST	PHASE TOTAL
PRIORITY 1- FOUNDATION STABILIZATION AND ASSOCIATED WORK					
Helical Pile Foundations - East Elevation (20'-30'+ depth)	15	EA	$12,000	$180,000	
Helical Pile Foundations - North Elevation (15'-20'+ depth)	14	EA	$8,000	$112,000	
Helical Pile Foundations - West Elevation (20'+ depth)	15	EA	$10,000	$150,000	
Helical Pile Foundations- South Elevation (20'+ depth)	6	EA	$10,000	$60,000	
Site Restoration	1	Allowance	$35,000	$35,000	
				$0	
Concrete Floor Slab Compaction Grouting- GYM	5,860	SF	$25	$146,500	
Concrete Floor Slab Compaction Grouting- Classrooms	5,078	SF	$25	$126,950	
Concrete Slab Patching & Leveling- GYM	5,860	SF	$8	$46,880	
Concrete Slab Patching & Leveling- Classrooms	5,078	SF	$8	$40,624	
				$0	
Storm Drainage Investigation & Repairs	1	Allowance	$25,000	$25,000	
GYM & Office VCT Floor Removal & Replacement	5,310	SF	$12	$63,720	
Classrooms & Corridor VCT Floor Removal & Replacement	5,078	SF	$12	$60,936	
Toilet Room Floor Patching Repairs Allowance	1	Allowance	$5,000	$5,000	
Perimeter Underground & Under slab Utility Investigation & Repairs Allowance	1	Allowance	$75,000	$75,000	
TCU Rental 20'-0"x64'-0" Flex Unit (2 classrooms per Modular Unit)	3	EA	$400,000	$400,000	
Rental Includes Stairs, Ramps and Skirting				$0	
Sanitary Services	1	EA	$6,000	$6,000	
Electric, Plumbing, Sanitary Connections	1	EA	$35,000	$35,000	
Technology Connection and Wiring	1	EA	$25,000	$25,000	
Fire Alarm Connection & Wiring	1	EA	$7,500	$7,500	
Disconnection, Removal and Site Restoration	1	EA	$15,000	$15,000	
				$0	
Sub Total Construction				**$1,616,110**	
Soft Costs					
Architectural/Engineering Fees (10%)				$161,611	
Expenses				$15,000	
Environmental Remediation Allowance				$25,000	
Bond Sale				$100,000	
Legal Fees				$25,000	
Permits, DOE Application				$8,000	
Construction Contingency (15%)				$242,417	
Design Contingency (2%)				$32,322	
Escalation @ 3%				$48,483	
Sub Total Soft Costs				**$657,833**	
Phase Total Cost				**$2,273,943**	**$2,273,943**

PRIORITY 2- EXTERIOR CRACK REPAIRS/FAÇADE REPAIRS					
East Elevation Classroom Stucco Replacement	1,080	SF	$20	$21,600	
East Elevation Brick/Cast Stone Repairs & Pointing	500	SF	$50	$25,000	
East Elevation GYM Stucco Repairs	972	SF	$22	$21,384	
North Elevation GYM Stucco Repairs	1,950	SF	$22	$42,900	
West Elevation GYM Stucco Repairs	810	SF	$20	$16,200	
West Elevation Classroom Stucco Repairs	876	SF	$20	$17,520	
South Elevation Stucco Repairs	810		$20	$16,200	
Caulking and Sealant Allowance	1	Allowance	$10,000	$10,000	
ADDITIONAL COSTS FOR STUCCO REPLACEMENT	*7,308*	*SF*	*$15*	$109,620	
ADDITIONAL COSTS FOR EIFS IN LIEU OF STUCCO	*7,308*	*SF*	*$20*	$146,160	
Sub Total Construction				**$426,584**	
Soft Costs					
Architectural/Engineering Fees (10%)				$42,658	
Expenses				$10,000	
Permits				$1,000	
Construction Contingency (15%)				$63,988	
Design Contingency (2%)				$8,532	
Escalation @ 3%				$12,798	
Sub Total Soft Costs				**$138,975**	
Phase Total Cost				**$565,559**	**$565,559**
PRIORITY 3- Interior Repairs					
GYM Area Wall Crack Repairs	5,860	SF	$15	$87,900	
GYM Toilet Room Renovations	2	Each	$70,000	$140,000	
Classroom Area Wall Crack Repairs	10,156	SF	$5	$50,780	
OPTIONAL GYMNASIUM RENOVATIONS					
Gymnasium Renovations (refer to Gymnasium Worksheet)	5,860	SF	$244	$1,428,300	
Sub Total Construction				**$1,706,980**	
Soft Costs					
Architectural/Engineering Fees (10%)				$170,698	
Expenses				$5,000	
Permits				$1,000	
Construction Contingency (15%)				$256,047	
Design Contingency (2%)				$34,140	
Escalation @ 3%				$51,209	
Sub Total Soft Costs				**$518,094**	
Phase Total Cost				**$2,225,074**	**$2,225,074**
Project Total Cost					**$5,064,576**

Cost Estimate- Building Replacement

For purpose of comparison and evaluation, a preliminary cost estimate to demolish and rebuild the 1988 Addition is as follows:

PRELIMINARY COST ESTIMATE

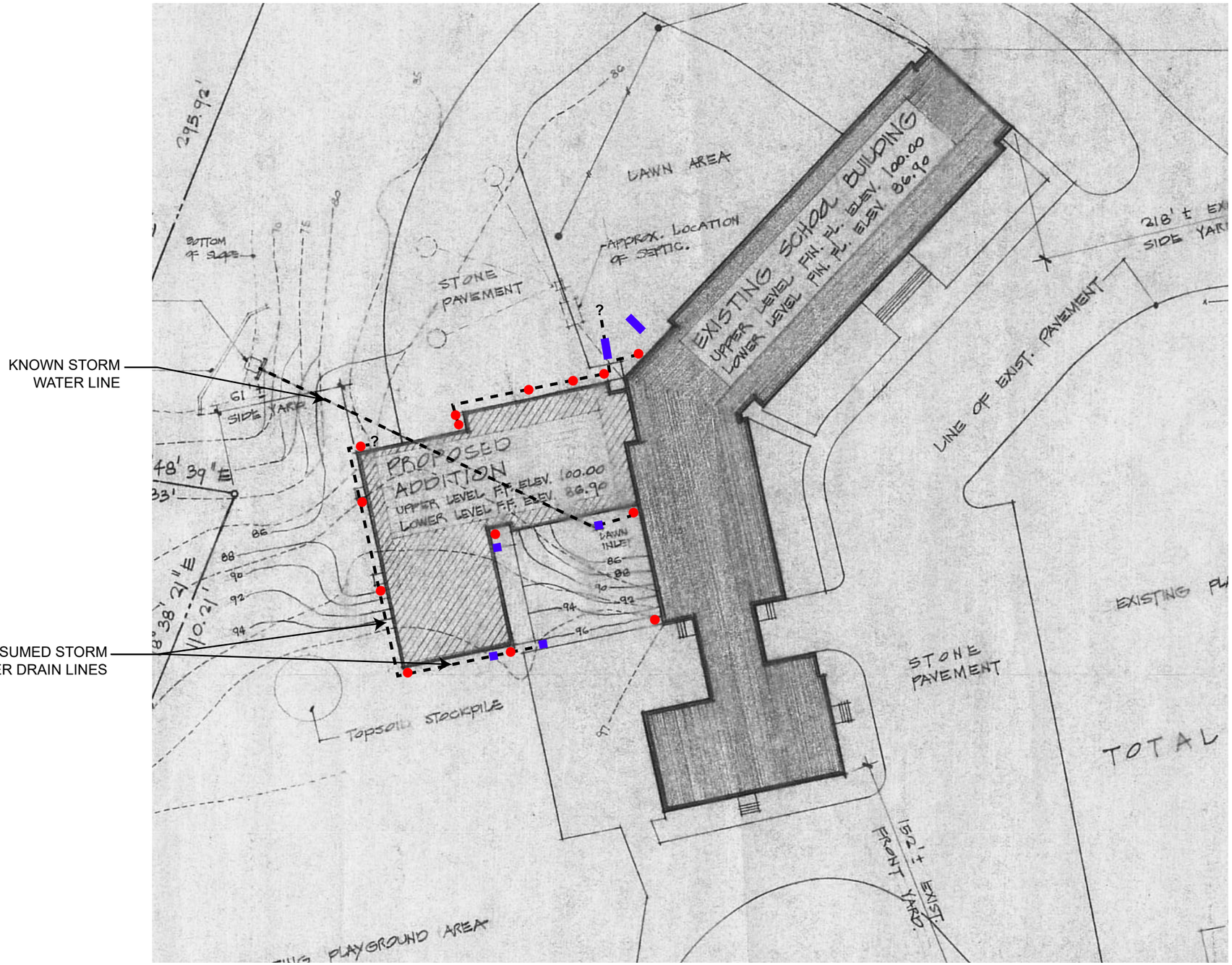
ARCHITECTURE | INTERIOR DESIGN | ENGINEERING

Stillwater Township School
1988 Addition
Demolition and Reconstruction of Existing Gym and Addition 04.12.2024
COST ESTIMATE

	Quantity		Unit Cost	ESTIMATED COST	
Addition Demolition	16,016	SF	$30	$480,480	
Gymnasium	5,860	SF	$400	$2,344,000	
Classrooms (2-Story, 5,078 SF Footprint)	10,156	SF	$500	$5,078,000	
Elevator	1	EA	$500,000	$500,000	
Gym Equipment	1	Allowance	$150,000	$150,000	
Sub Total Construction				**$8,552,480**	
Soft Costs					
Architectural/Engineering Fees (10%)				$855,248	
Expenses				$80,000	
Legal Fees				$40,000	
Permits, DOE Application				$25,000	
Construction Contingency (15%)				$1,282,872	
Design Contingency (2%)				$171,050	
Escalation @ 4%				$342,099	
Sub Total Soft Costs				**$2,796,269**	
Project Total Cost				**$11,348,749**	

APPENDIX 1-EXISTING CONDITIONS DOCUMENTATION PLANS AND ELEVATIONS

Drainage Plan Diagram	1 page
Exterior Elevation Diagram	2 pages
Plan Diagrams	2 pages
Interior Elevation Diagrams	1 page



ROOF DRAIN

AREA DRAIN

01 DRAWING NUMBER

SCALE: 1"=100'
0 50' 100' 200' 300'

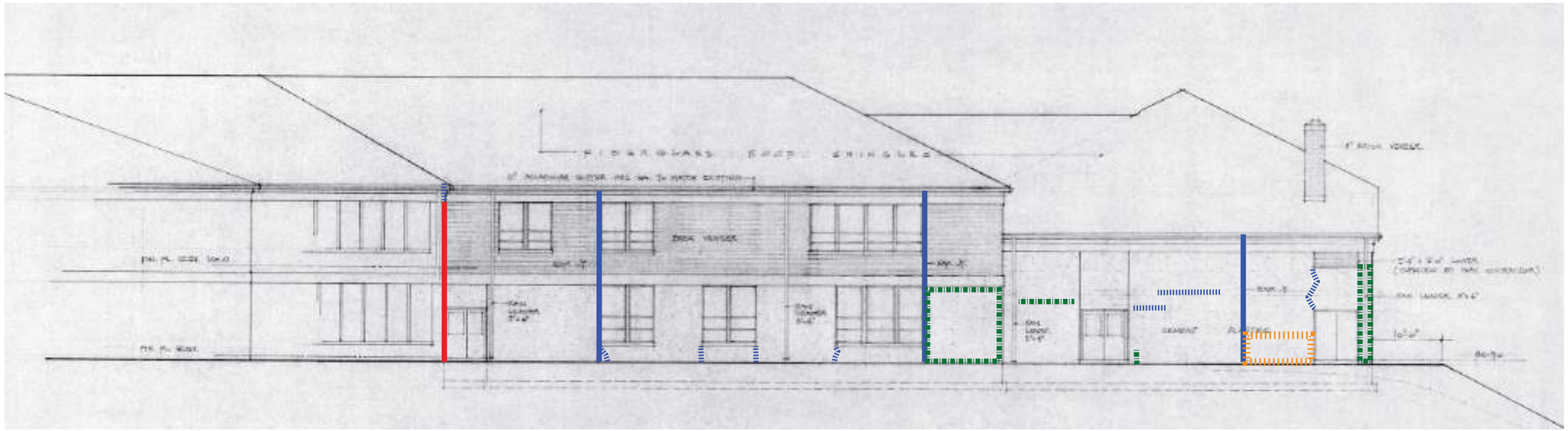
DRAINAGE PLAN

N

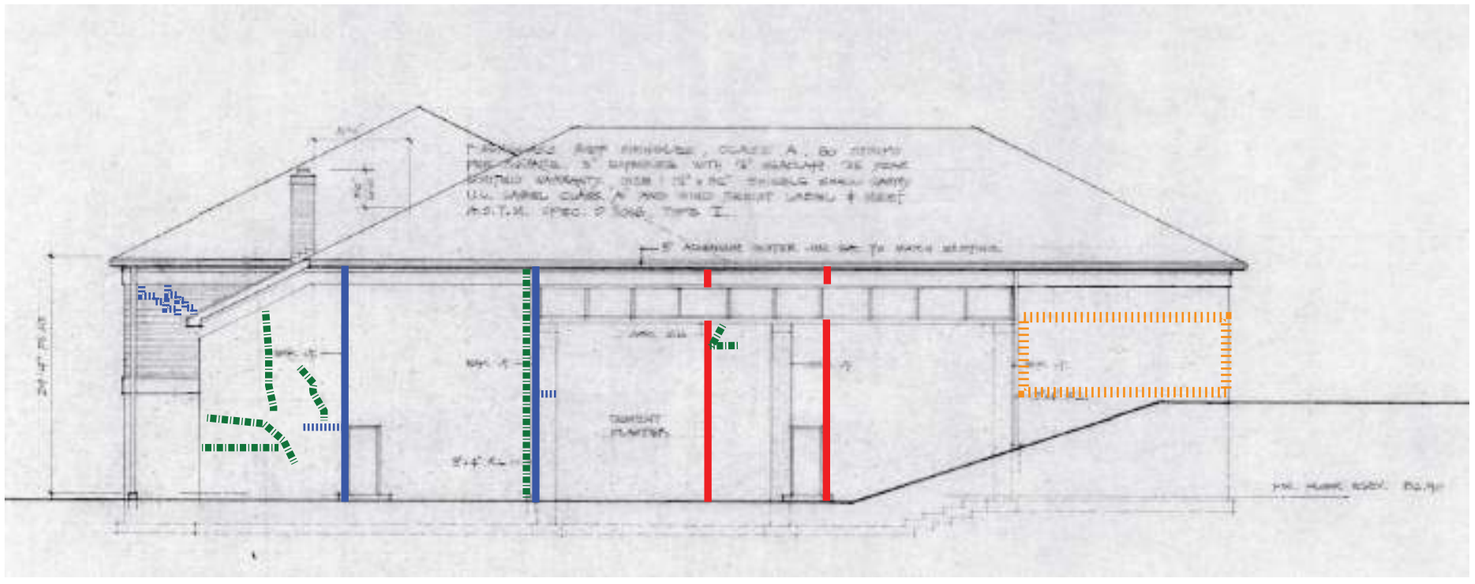
ENV
ARCHITECTURE
INTERIOR DESIGN
ENGINEERING
180 SYLVAN AVENUE SUITE 3 - ENGLEWOOD CLIFFS NJ 07632

STILLWATER TOWNSHIP ELEMENTARY SCHOOL
904 STILLWATER RD, STILLWATER TOWNSHIP, NJ 07875

STILLWATER SCHOOL DISTRICT



EAST ELEVATION



NORTH ELEVATION

- EXISTING CONTROL JOINT
- EXISTING EXPANSION JOINT
- AREA OF HAIRLINE CRACKS
- REPAIRED CRACK
- CRACK

02
DRAWING NUMBER

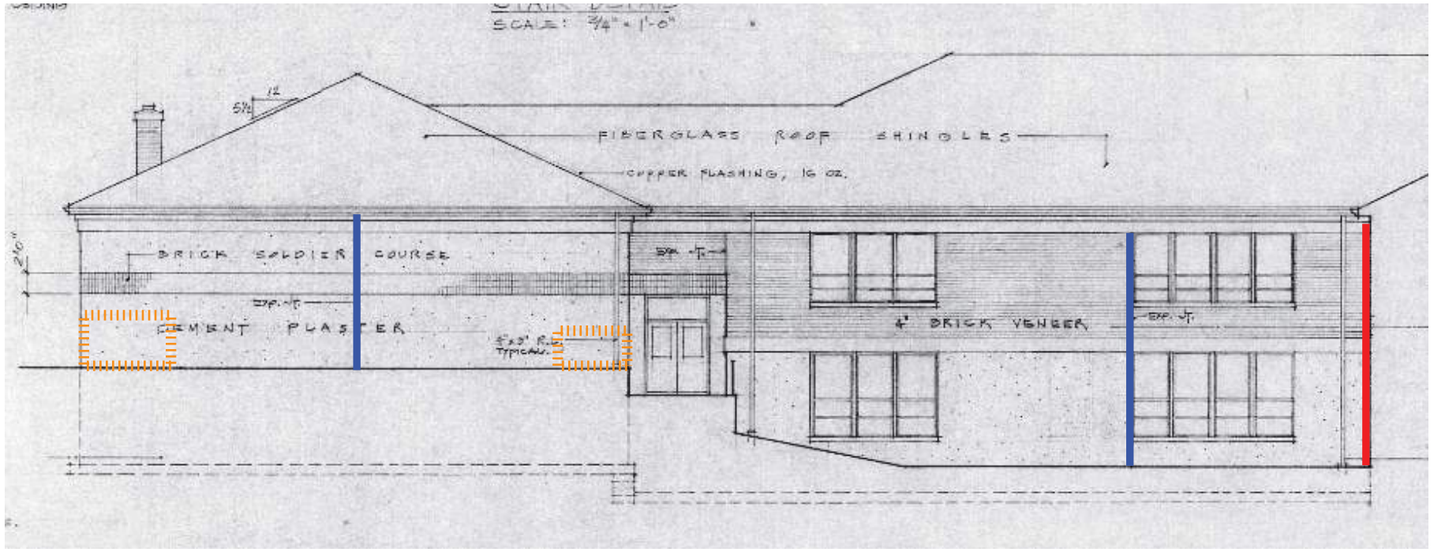
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EXTERIOR ELEVATIONS

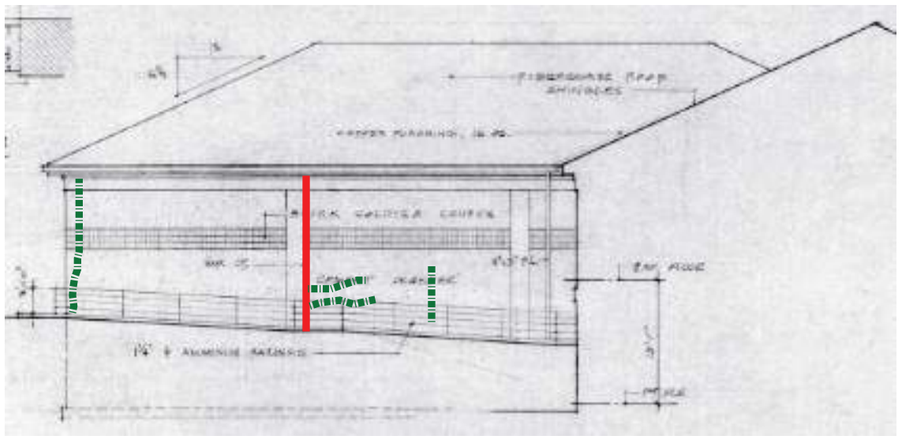
ENV
ARCHITECTURE
INTERIOR DESIGN
ENGINEERING
180 SYLVAN AVENUE SUITE 3 - ENGLEWOOD CLIFFS NJ 07632

STILLWATER TOWNSHIP ELEMENTARY SCHOOL
904 STILLWATER RD, STILLWATER TOWNSHIP, NJ 07875

STILLWATER SCHOOL DISTRICT



WEST ELEVATION



SOUTH ELEVATION

EXISTING CONTROL JOINT
EXISTING EXPANSION JOINT
AREA OF HAIRLINE CRACKS
REPAIRED CRACK
CRACK

03 DRAWING NUMBER

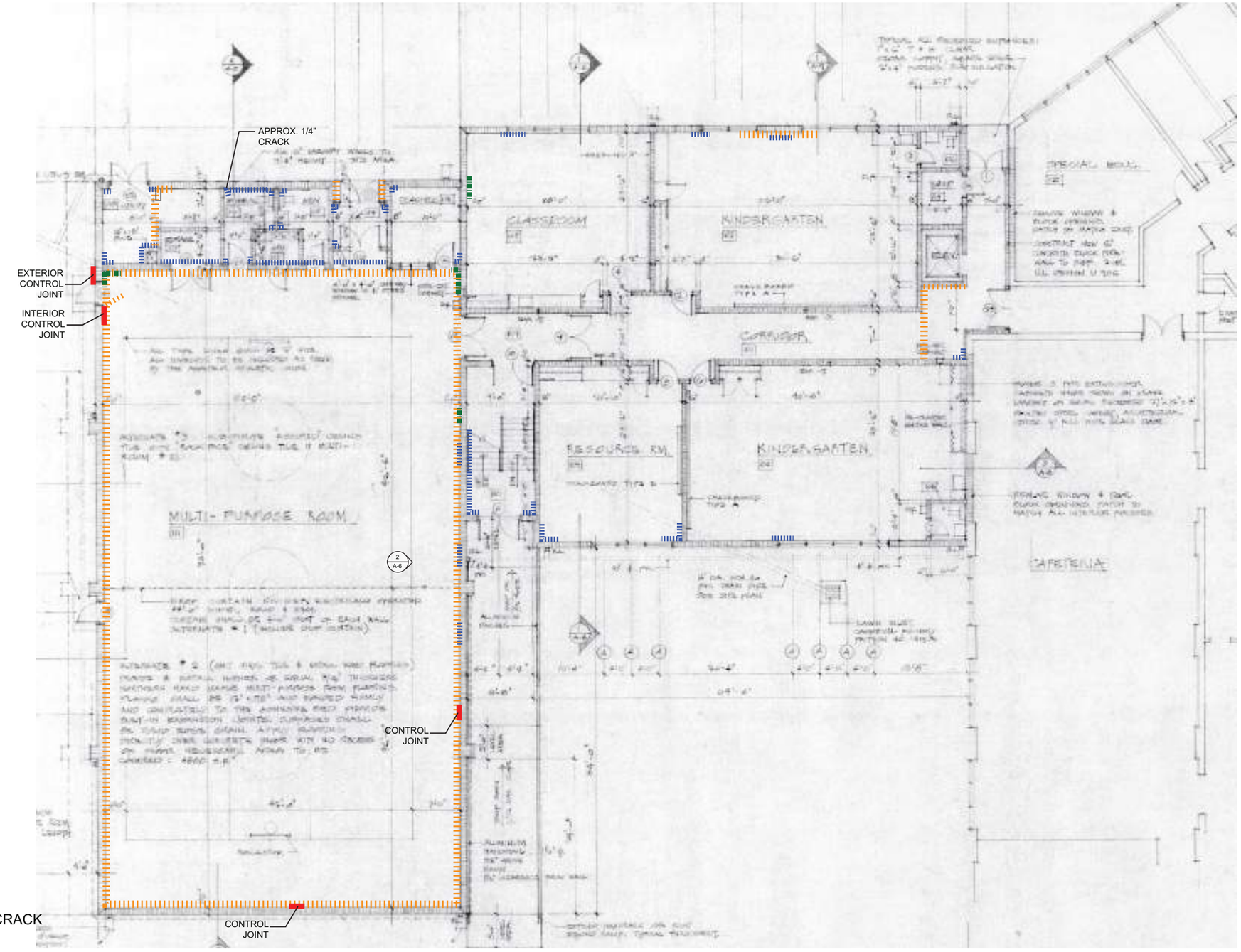
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EXTERIOR ELEVATIONS

ENV
ARCHITECTURE
INTERIOR DESIGN
ENGINEERING
180 SYLVAN AVENUE SUITE 3 - ENGLEWOOD CLIFFS NJ 07632

STILLWATER TOWNSHIP ELEMENTARY SCHOOL
904 STILLWATER RD, STILLWATER TOWNSHIP, NJ 07875

STILLWATER SCHOOL DISTRICT



EXPANSION/ CONTROL JOINT

FLOOR LEVEL CRACK

PREVIOUSLY REPAIRED WALL CRACK

WALL CRACK

04 DRAWING NUMBER

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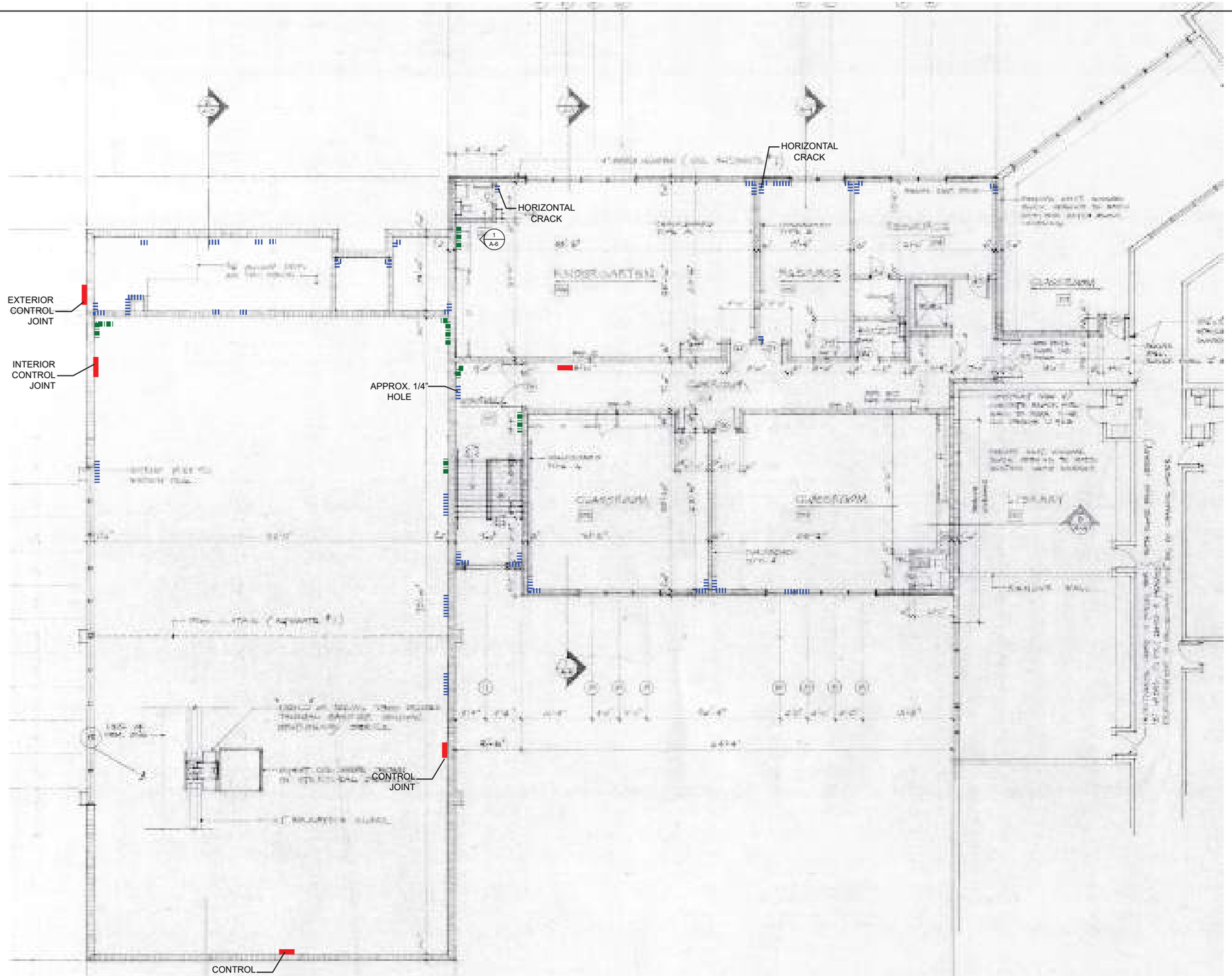
LOWER LEVEL PLAN

N

E N V
ARCHITECTURE
INTERIOR DESIGN
ENGINEERING
180 SYLVAN AVENUE SUITE 3 - ENGLEWOOD CLIFFS NJ 07632

STILLWATER TOWNSHIP ELEMENTARY SCHOOL
904 STILLWATER RD, STILLWATER TOWNSHIP, NJ 07875

STILLWATER SCHOOL DISTRICT



EXPANSION/ CONTROL JOINT

FLOOR LEVEL CRACK

PREVIOUSLY REPAIRED WALL CRACK

WALL CRACK

05
DRAWING NUMBER

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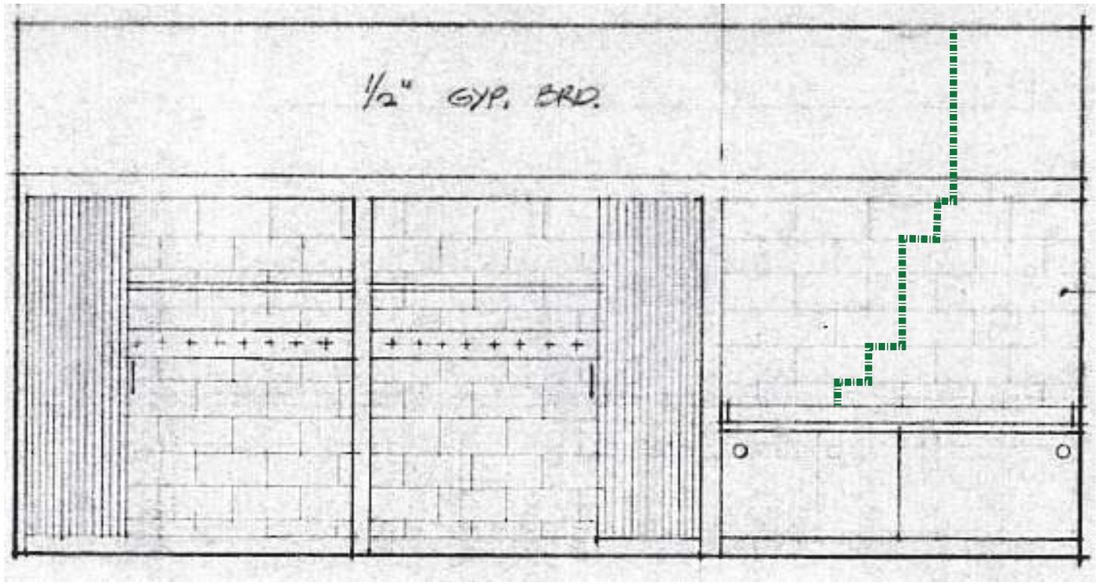
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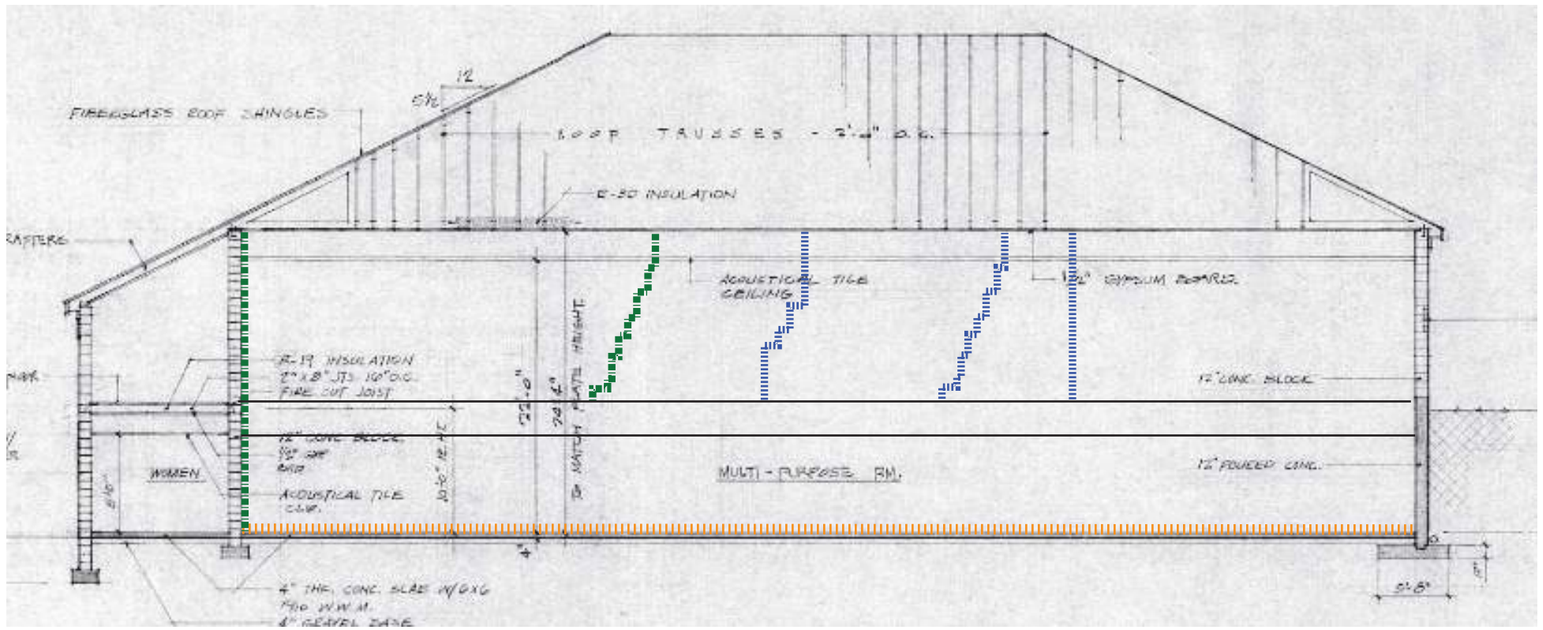
E N V
ARCHITECTURE
INTERIOR DESIGN
ENGINEERING
180 SYLVAN AVENUE SUITE 3 - ENGLEWOOD CLIFFS NJ 07632

STILLWATER TOWNSHIP ELEMENTARY SCHOOL
904 STILLWATER RD, STILLWATER TOWNSHIP, NJ 07875

STILLWATER SCHOOL DISTRICT



1. ROOM 204 INTERIOR ELEVATION



2. INTERIOR ELEVATION

EXPANSION JOINT
FLOOR CRACK
REPAIRED CRACK
CRACK

07 DRAWING NUMBER

SCALE: 1"=100'
0 50' 100' 200' 300'

INTERIOR ELEVATIONS

N

ENV
ARCHITECTURE
INTERIOR DESIGN
ENGINEERING
180 SYLVAN AVENUE SUITE 3 - ENGLEWOOD CLIFFS NJ 07632

STILLWATER TOWNSHIP ELEMENTARY SCHOOL
904 STILLWATER RD, STILLWATER TOWNSHIP, NJ 07875

STILLWATER SCHOOL DISTRICT

APPENDIX 2-PHOTOGRAPHS



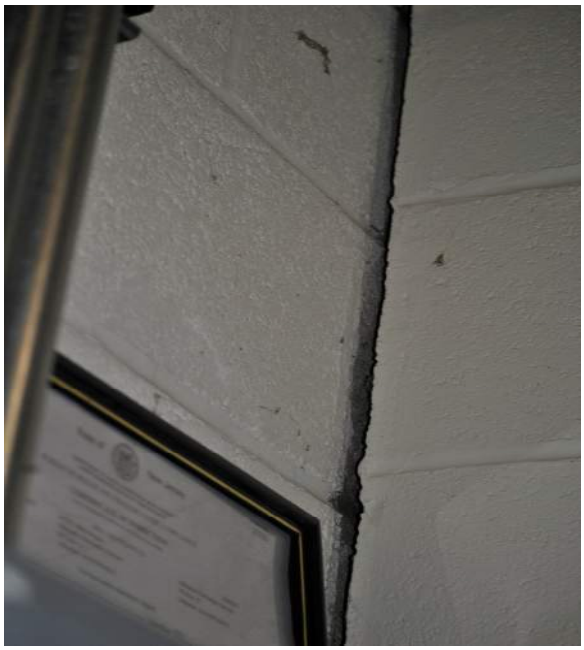
PIC 1



PIC 2



PIC 3



PIC 4

APPENDIX 2-PHOTOGRAPHS



PIC 5



PIC 6



PIC 7



PIC 8

APPENDIX 2-PHOTOGRAPHS



PIC 9



PIC 10



PIC 11



PIC 12

APPENDIX 2-PHOTOGRAPHS



PIC 13



PIC 14



PIC 15



PIC 16

APPENDIX 2-PHOTOGRAPHS



PIC 17



PIC 18



PIC 19

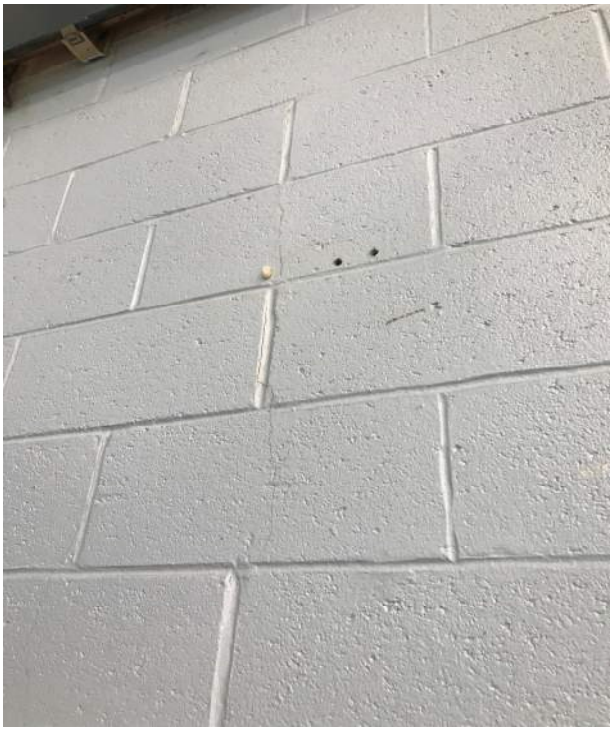


PIC 20

APPENDIX 2-PHOTOGRAPHS



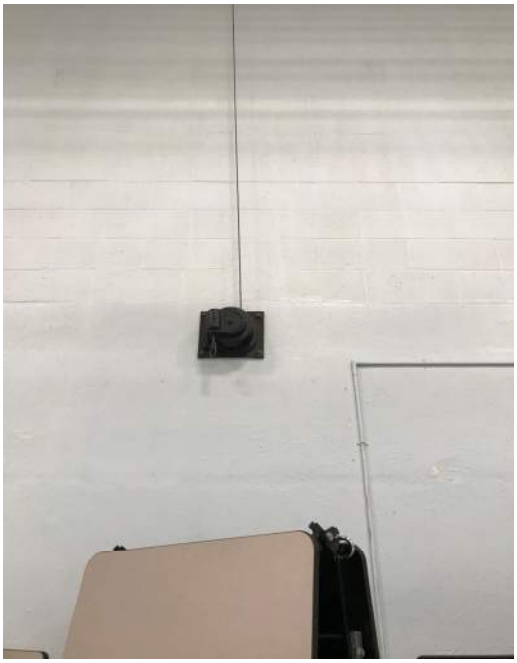
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PIC 22



PIC 23

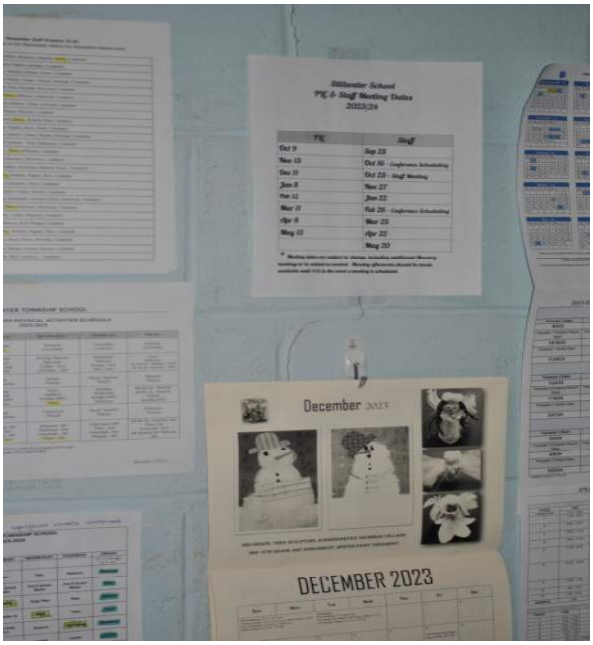


PIC 24

APPENDIX 2-PHOTOGRAPHS



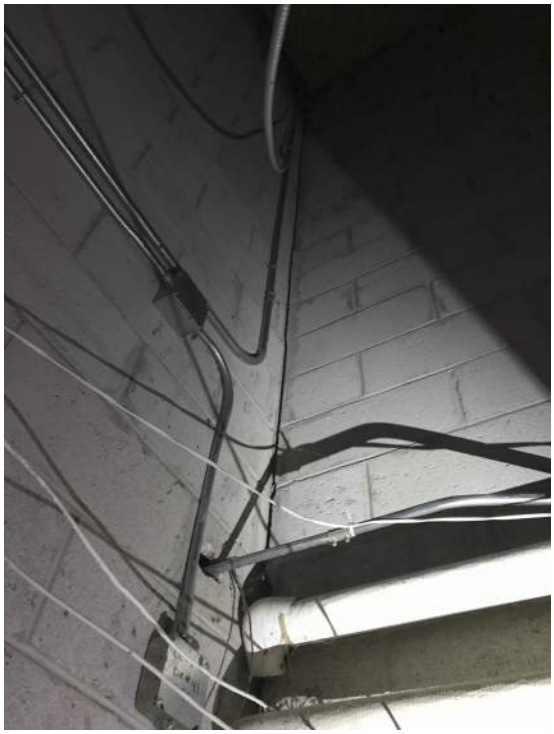
PIC 25



PIC 26



PIC 27



PIC 28

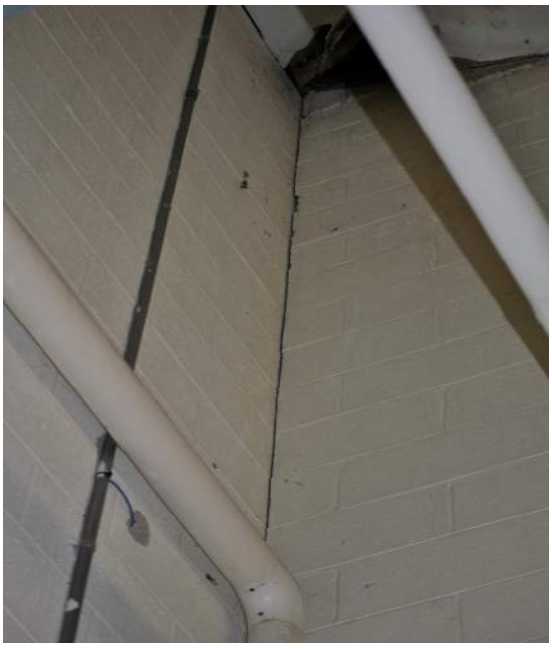
APPENDIX 2-PHOTOGRAPHS



PIC 29



PIC 30



PIC 31



PIC 32

APPENDIX 2-PHOTOGRAPHS



PIC 33



PIC 34



PIC 35



PIC 36

APPENDIX 2-PHOTOGRAPHS



PIC 37



PIC 38



PIC 39



PIC 40

APPENDIX 2-PHOTOGRAPHS



PIC 41



PIC 42



PIC 43



PIC 44

APPENDIX 2-PHOTOGRAPHS



PIC 45



PIC 46



PIC 47



PIC 48

APPENDIX 2-PHOTOGRAPHS



PIC 49



PIC 50



PIC 51



PIC 52

APPENDIX 2-PHOTOGRAPHS



PIC 53



PIC 54



PIC 55



PIC 56

APPENDIX 2-PHOTOGRAPHS



PIC 57



PIC 58



PIC 59



PIC 60

APPENDIX 2-PHOTOGRAPHS



PIC 61



PIC 62



PIC 63



PIC 64

APPENDIX 2-PHOTOGRAPHS



PIC 65



PIC 66



PIC 67



PIC 68

APPENDIX 2-PHOTOGRAPHS



PIC 69



PIC 70



PIC 71



PIC 72

APPENDIX 2-PHOTOGRAPHS



PIC 73



PIC 74



PIC 75

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SUBSURFACE INVESTIGATION REPORT
STILLWATER ELEMENTARY SCHOOL - SETTLEMENT
STILLWATER, NEW JERSEY

FOR

ENV
ENGLEWOOD CLIFFS, NEW JERSEY

Prepared by: **Sor Consulting Engineers, Inc.**
98 Sand Park Road
Cedar Grove, New Jersey 07009

Report No. 23-C-54
Job No. 23-C-50
December 12, 2023

SOR CONSULTING ENGINEERS, INC.

Geotechnical Engineering - Materials Testing - Forensic Studies

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Kamil Sor, Ph.D.
Orhun Sor, P.E.
Atilla Sencar, P.E.

December 12, 2023
Job No. 23-C-50
Report No. 23-C-54

ENV
180 Sylvan Avenue, Suite 3
Englewood Cliffs, NJ 07632

Attention: Daniel Grant, Executive Director
E-Mail: dgrant@env-nj.com

Re: Subsurface Investigation Report
Stillwater Elementary School - Settlement
Stillwater, New Jersey

INTRODUCTION

Sor Consulting Engineers, Inc. (SCE) is pleased to present the results of a subsurface investigation performed for the existing gymnasium addition of Stillwater Township Elementary School located at 904 Stillwater Road in Stillwater, New Jersey.

Based on information provided to us, the entire building addition including gymnasium has experienced structural distress as evidenced by wall and slab cracking. The cracks were repaired some time ago, however, hairline cracks re-appeared.

We understand it is desired to investigate the subsurface soil conditions along the building walls and remediate the structural distress.

PURPOSE AND SCOPE OF WORK

The purpose of this study was to:

- perform a non-destructive utility survey around the building to attempt to locate any existing buried utilities and other subsurface features. The study concentrated at the boring locations.

- explore the subsurface conditions immediately adjacent to the gymnasium building addition area;
- estimate the geotechnical engineering properties of the encountered subsurface materials;
- determine the cause of the distress;
- determine the depth of existing footings and examine its support conditions; and
- present recommendations and guidelines regarding feasible solutions to stabilize the structure.

To accomplish this, a subsurface exploration program consisting of seven (7) standard test borings and two test pits, was conducted at the site on November 27, 28 and 29, 2023. The borings were advanced using small narrow gauge rubber track mounted drilling equipment and extended to a maximum 44 feet beneath the existing ground surface. Soil samples suitable for identification and laboratory testing purposes were extracted from the borings in accordance with the procedures of the Standard Penetration Test (ASTM-D1586). Two test pits were excavated with a rubber tire backhoe. The test pit exploration was performed along the gymnasium wall and exposed the existing wall and column foundation for measurements and examination of foundation support materials and conditions. The test pits extended to a maximum depth of 4 feet below existing grade. Upon completion, the boring and test pit explorations were backfilled so as not to leave any open holes.

The boring was performed by Environmental Technical Drilling, Inc. and the test pits by D. Willis Excavating Company under the direct technical observation of a licensed geotechnical engineer from Sor Consulting Engineers. Our representative located the borings and test pit at the site, prepared logs of the explorations as the drilling and excavation proceeded, measured the foundation dimensions, documented the foundation support materials and conditions and supervised the soil sampling and field testing operations so as to obtain the appropriate subsurface information. The locations of the

explorations are shown relative to the existing conditions shown on the Exploration Location Plan contained in Appendix I of this report. Detailed descriptions of the encountered subsurface conditions as well as foundation sketches are presented on the individual boring and test pit logs contained in Appendix II. The soils encountered in the borings and test pit were visually classified in accordance with the Burmeister Soil Classification System also included in Appendix II.

All soil samples were returned to our soil mechanics laboratory where they were further examined. Moisture content and mechanical grain size distribution tests were performed on selected samples to assist in soil identification and estimation of their engineering soil properties. Laboratory test results are presented in Appendix III.

The results of the subsurface exploration and laboratory testing programs as well as our observations of existing building conditions have provided the basis for our engineering analyses, conclusions and geotechnical recommendations. The following discussions of our findings and recommendations are subject to the limitations contained in Appendix IV of this report.

SITE CONDITIONS

Surface Features: At the area of the gymnasium the ground surface slopes down by approximately 10 feet from west to east towards the entrance to the gymnasium. Approximately 10 feet from the corner of the gymnasium a substantial grade change exists by approximately 20 feet downward. Based on the observed topography, it appears that the entire latest addition of the school had been filled to obtain the present grades.

Subsurface Conditions: The subsurface conditions encountered in the explorations performed for this study consisted of the following generalized strata in order of increasing depths and are illustrated on the subsurface profiles A-A, B-B and C-C as shown in Appendix I.

1. Topsoil: A thin layer of topsoil ranging from 4 to 6 inches was encountered in each of the explorations.

2. Fill: Fill consisting primarily of grayish brown silty sand with gravel was encountered beneath the topsoil. The fill extended to an approximate depths of 8 to 30 feet beneath the ground surface. In several of the borings, it was difficult to distinguish fill materials from the lower natural soils. Standard Penetration Test (N) values obtained from the borings indicate that the fill is in a medium compact to loose condition at the upper 4 to 6 feet and became loose to very loose below these depths.
3. Silty Sand: Grayish brown silty sand with varying amounts of gravel was encountered beneath the fill and extended to the maximum depths explored. N values obtained from the borings indicate that the silty sand is generally in a medium dense condition.

Groundwater was encountered at depths of 22 to 32 feet below surface in the borings performed for the study, at approximate elevation of +64 feet. Due to the substantial topographic relief at the site, it should be anticipated that groundwater levels will vary significantly and may experience fluctuations due to seasonal variations in precipitation, temperature and/or surface water runoff.

Existing Foundations: Two test pits were excavated along the side of the gymnasium to expose the existing foundations. The specific conditions encountered at the explored locations are presented on the individual test pit logs. In general, the test pits revealed that the side of the structure is supported on a continuous wall footing with column foundations. The wall footing was measured to be approximately 30 inches wide, 11 inches in thickness and establish at a depth of 38 inches below surface. The column footing was approximately 5'x5' and 11 inches thick and established at a depth of 44 inches below surface. The foundations were established on the loose to very loose fill soil.

Subsurface Utility Survey: The area around the structure within accessible areas of the proposed exploration area was scanned using ground penetrating radar (GPR) equipment. The scanning detected electric line, fuel line, roof drain, sanitary lines, well

water line and storm sewer lines. Approximate utility locations are shown on the attached utility drawings, in appendix V.

CONCLUSIONS AND RECOMMENDATIONS

Based on our findings, it appears that the building foundations and floor slabs in the area investigated are supported on fill material. N values obtained from the borings revealed that the fill is in a loose condition. The fill does not appear to have been placed and compacted in a controlled manner. We believe that the fill material has settled in an uneven manner causing the building distress. It is our opinion that the fill is not capable of providing adequate support for the building walls and floor slab without the potential for continued distress. In addition, we believe that as a result of ongoing settlement, support for sub-slab utilities such as sanitary sewer, electric and roof and other drainage pipes may have been compromised and causing these utilities to leak. Leaks in underground utilities may have further contributed to or exacerbated subsidence of the fill material.

Two methods of building stabilization were considered to remediate the subsoils and re-support the building foundations and slab; compaction grouting and helical piles. To this end, helical piles for foundation support or compaction grouting for floor slab support would be more appropriate since these solutions would either bypass the unsuitable bearing materials and re-support the existing building foundations/floor slab or would densify the existing soft soils. Detailed discussions of helical piles and compaction grouting are presented below.

Helical Piles for Foundation Support: This solution would consist of re-supporting the foundations on helical piles that extend through the unsuitable fill into the competent natural soils. The piles would be attached to the existing foundations by brackets. Helical auger piles are installed by screwing the pile in-place using smaller high torque specialty drilling equipment. It is our professional opinion that helical auger piles designed for an allowable axial capacity of up to 10 tons would be appropriate to support the existing foundations. We estimate that pile lengths would be approximately

20 to 35 feet beneath the existing foundations. Helical piles should have multiple helices with a minimum helix diameter of 10 inches and a minimum shaft diameter of 3½ inches. Helices should be structural quality steel conforming to ASTM-A36 and shaft pipe should conform to API 5CT Grade J55 pipe or ASTM-D252 Grade 2 requirements. Shaft pipe should be grouted solid with 4000 psi concrete upon pile completion and acceptance. Provided the auger piles extend at least 7 feet into the suitable bearing medium dense natural silty sand, they may be designed for a lateral capacity of up to 2 ton per pile and an uplift capacity of 5 tons per pile. The capacity of piles may be increased by a factor of 1/3 for temporary loads (e.g. wind, earthquake). The piles can be mechanically connected to the existing foundations with steel brackets. We estimate that post-construction settlements of the building foundations supported on piles would be negligible. Piles should be installed by a specialty contractor having demonstrated experience in the installation of helical auger piles. Helical pile installation should be by qualified manufacturer certified helical pile specialists using industry recognized equipment and means and methods.

In-Place Soil Stabilization of Slabs by Compaction Grouting: The in-place soil could be stabilized by a program of grouting. This would involve leaving the existing floor slab in-place and drilling a series of small diameter holes through the interior slab and at approximately 5 to 7 feet apart and extending down into the suitable bearing natural soil. Based on the subsurface data, drill depths are anticipated to be approximately 10 to 30 feet. The size of the stabilized area should be approximately 5 feet wider than the affected building area. Actual drill depths will vary depending on subsurface conditions. As with the deep support system option, obstructions may be encountered in the existing fill which may require special equipment or techniques to advance the grout pipes to the proper depths. A Portland cement based grout typically consisting of a high mobility mixture of Portland cement, fine aggregate, fly ash and water could be pressure injected into the soil under controlled pressure to fill any voids in the existing fill, and consolidate and densify the fill into a more uniform support material. The grout is injected into the fill under tightly controlled fluid pressures in

stages from the bottom of the drill hole up to the underside of the slab thus creating a continuous grout column surrounded by densified fill. Any voids that exist directly below the slab could also be filled with grout to re-establish direct contact between the bottom of the slab and the underlying subbase. The integrity of any sub-slab utilities would have to be verified and the utilities monitored to prevent loss of grout and possible plugging of the conduits. A monitoring system is recommended to measure and monitor potential slab movements and the potential movements of adjacent building elements and existing utilities. After stabilization of the fill and filling any sub-slab voids, the floor slab may be either re-leveled or reconstructed. It is our opinion that the grouting option would stabilize the existing fill in-place, allow the existing slab and foundations to remain during construction and cause the least amount of building disturbance and disruption. We recommend that the grouting be performed by a specialty contractor having demonstrated experience with such applications.

Remedial Construction Considerations

- There are numerous utility lines (electric, drainage and sewer) traversing the affected area. All existing subsurface utilities within the remedial work area should be located and clearly marked prior to the commencement of work.
- It is possible that subsurface piping, especially at joints and connections may have been damaged. It is essential that all floor drains, sanitary piping and any other subsurface conduits be tested, and if necessary, repaired prior to the remedial work to assure that they are functioning properly.

RECOMMENDED SERVICES

It will be necessary to prepare plans, specifications and contract documents for the project repairs and construction. These documents should be prepared by a structural engineer with the participation of a geotechnical engineer as consultant. The contract documents should be sufficiently descriptive and complete so that qualified contractors, experienced in this type of work, may submit reliable bids for the repairs.

The repair work will require close observation and oversight by an experienced engineer. We recommend that Sor Consulting Engineers, Inc. be retained to provide on-site geotechnical engineering observation services during the remediation phase of the work. This is to observe compliance with the geotechnical considerations and recommendations presented herein and to allow design changes in the event subsurface conditions differ from those anticipated prior to start of construction.

Sor Consulting Engineers appreciates the opportunity to be of assistance. Please do not hesitate to contact us if there are any questions concerning this report. The following appendices are attached and complete this report:

Appendix I	-	Exploration Location Plan
		Subsurface Profiles – Sections A-A, B-B and C-C
Appendix II	-	Test Boring Logs 1 through 7
		Test Pit Log 1 and 2
		Burmeister Soil Classification System
Appendix III	-	Laboratory Test Results
Appendix IV	-	Limitations
Appendix V	-	GPRS Job Summary Sheets

Respectfully submitted,

SOR CONSULTING ENGINEERS, INC

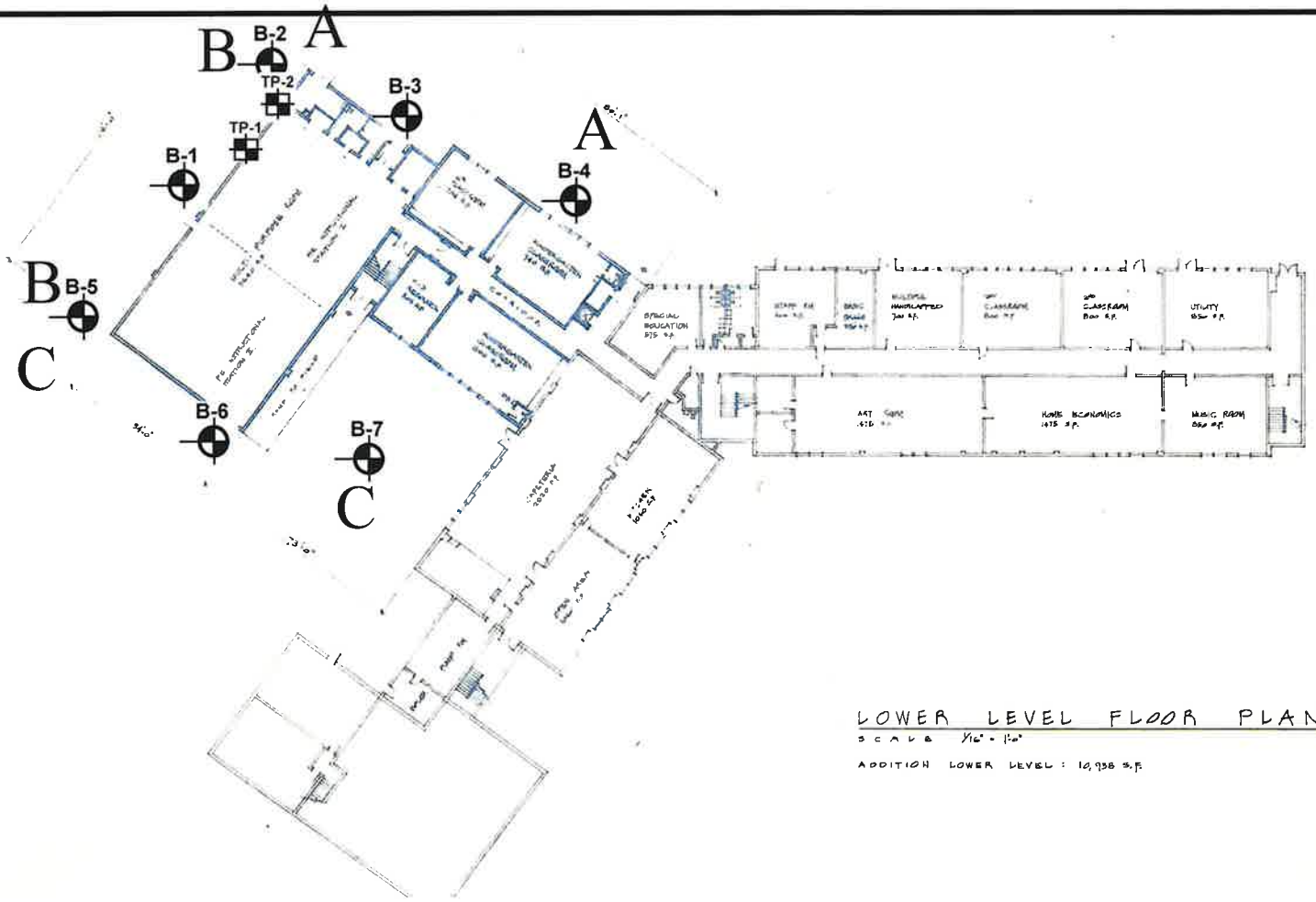
Atilla Sencar, P.E.
Senior Engineer

AS/gs

APPENDIX I

EXPLORATION LOCATION PLAN

SUBSURFACE PROFILES – SECTIONS A-A, B-B AND C-C



LEGEND

TP-1 — Number and approximate location of geotechnical test pit performed by SCE for this study.

B-1 — Number and approximate location of geotechnical boring performed by SCE for this study.

NOTES

1. This drawing is part of Sor Consulting Engineers, Inc. Report No. 23-C-54 and should be read together with the report for complete evaluation.
2. General Layout was obtained from a plan provided by the Client.

EXPLORATION LOCATION PLAN
ENV
STILLWATER ELEMENTARY SCHOOL-SETTLEMENT
STILLWATER, NEW JERSEY

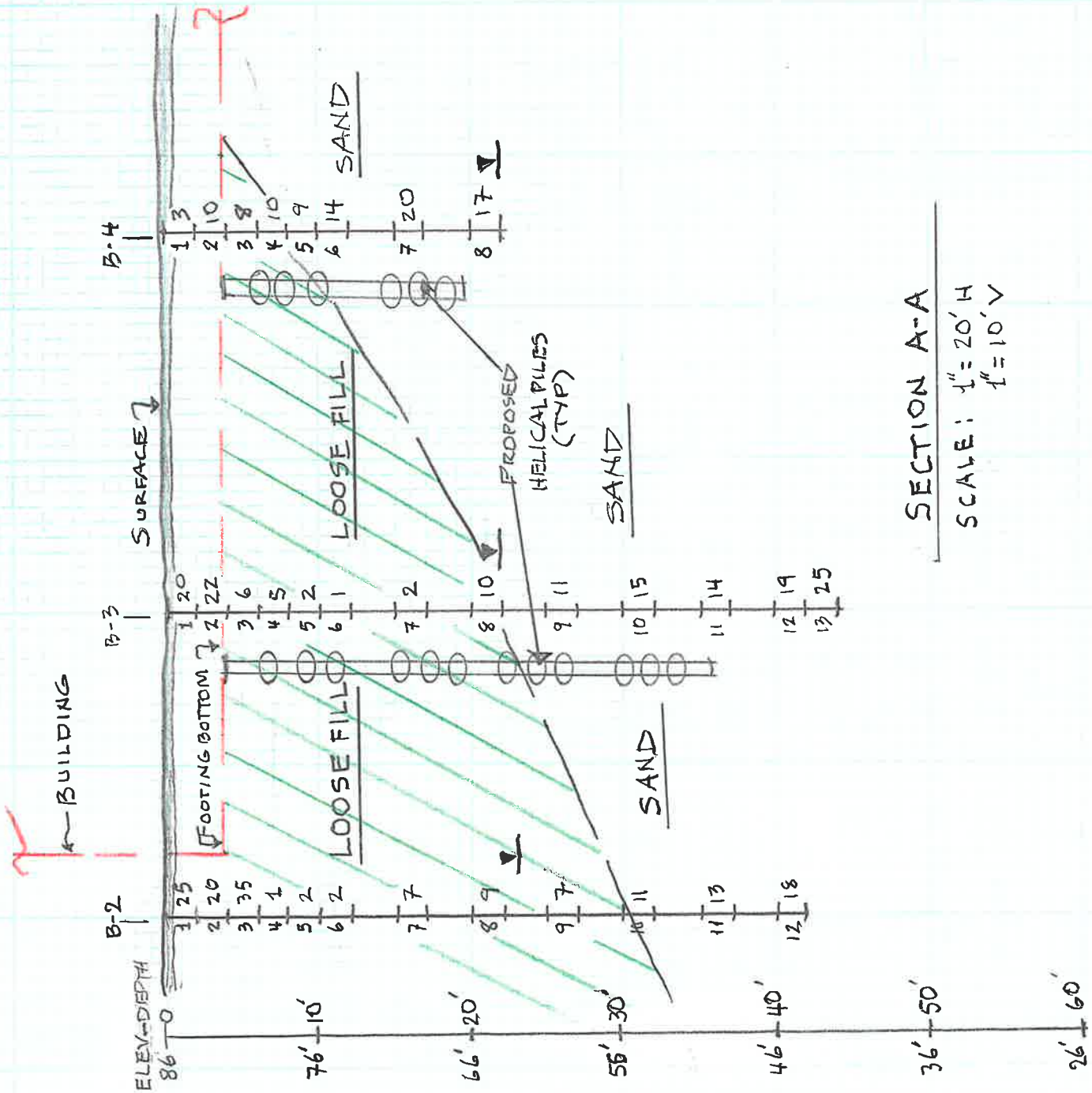
SOR CONSULTING ENGINEERS, INC.
Geotechnical Engineering – Materials Testing – Forensic Studies
98 Sand Park Road, Cedar Grove, New Jersey 07009

Prepared By : A.S..	Approved By :	DRAWING NO.
Date : 12/8/2023	Date :	23-C-50-1
Scale : NTS	Report No. : 23-C-54	Sheet No. 1 of 1

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SOR TESTING LABORATORIES, INC.
Geotechnical Engineering – Materials Testing – Forensic Studies

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(973) 239-6001 Fax (973) 239-8380

CLIENT....ENV..... PROJECT..Stillwater Elem. School
SUBJECT ...Soil Profiles..... PROJECT NUMBER...23-C-50.....
BY .A.S. DATE 12/11/23 CHECKED BY ..... DATE ..... SHEET NUMBER .....1.... OF ..3....

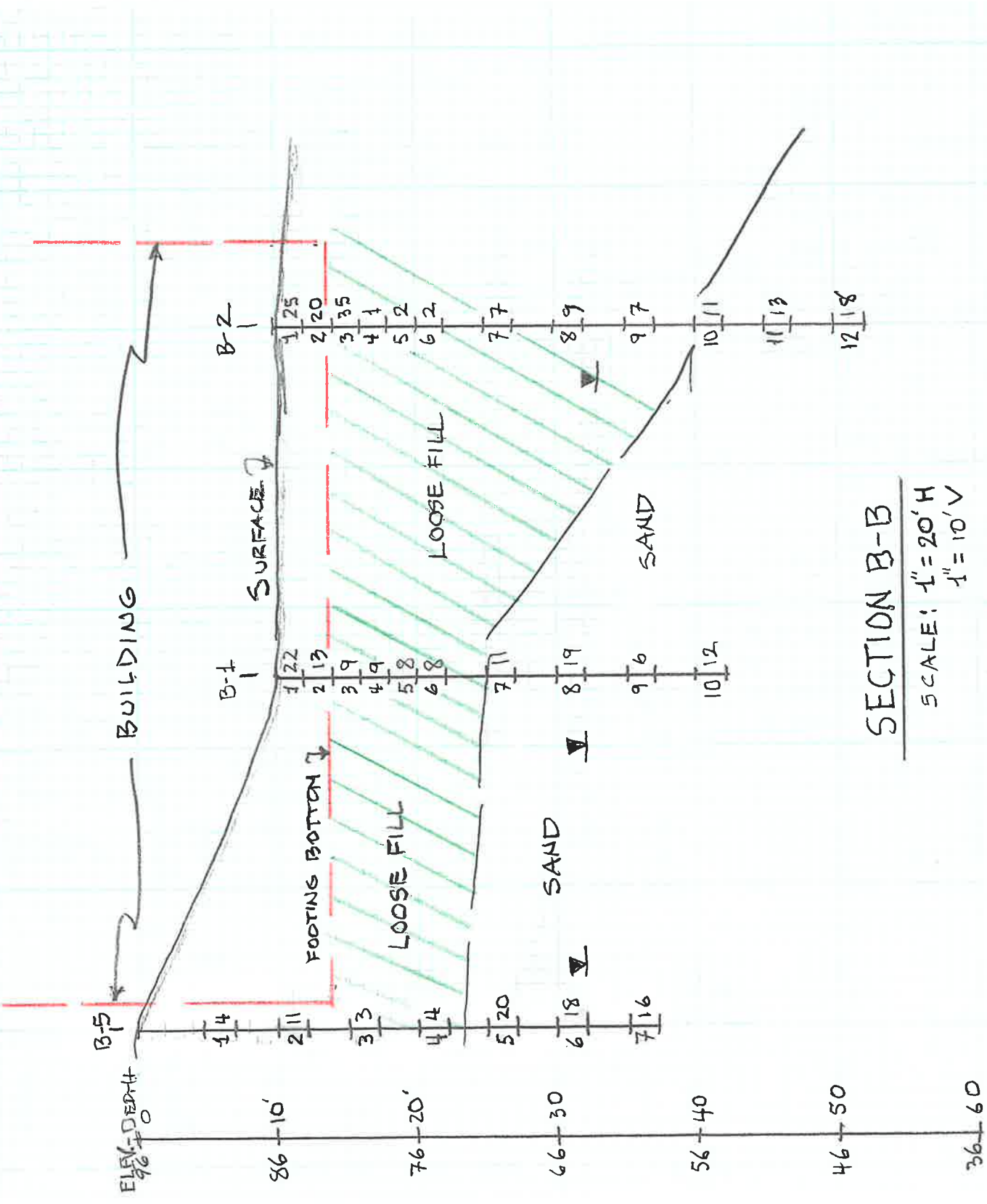


SECTION A-A
SCALE: 1"=20'H
1"=10'V

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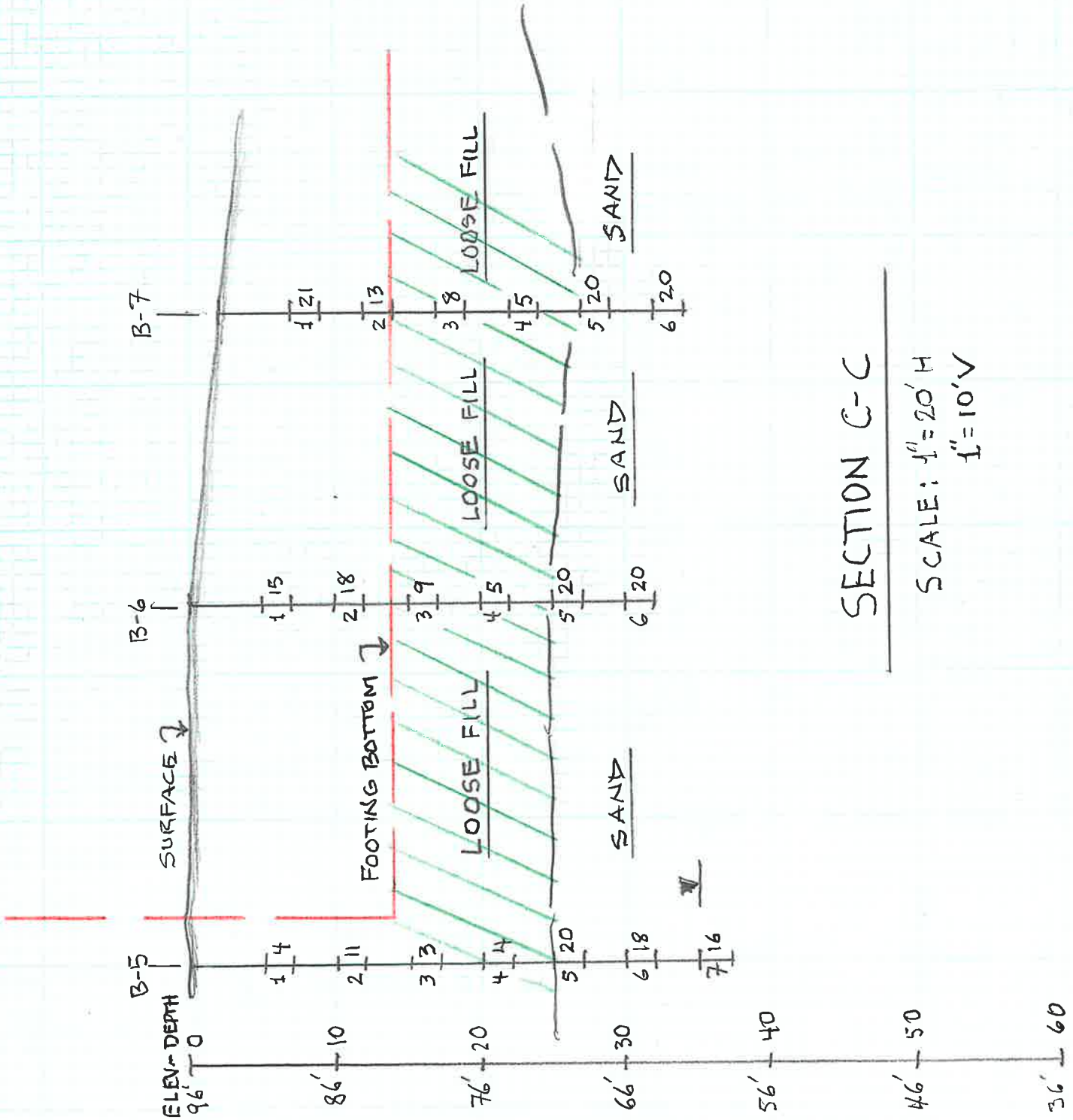
CLIENT ENV PROJECT Stillwater Elem. School
SUBJECT SOIL PROFILE PROJECT NUMBER 23-C-50
BY A.S. DATE 12/11/23 CHECKED BY ..... DATE ..... SHEET NUMBER 2 OF 3



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CLIENT ENV PROJECT Stillwater Elem. School
SUBJECT Soil PROFILES PROJECT NUMBER 23-C-50
BY A.S DATE 12/11/23 CHECKED BY ..... DATE ..... SHEET NUMBER 3 OF 3



SECTION C-C
SCALE: 1"=20' H
1"=10' V

APPENDIX II

TEST BORING LOGS 1 THROUGH 7

TEST PIT LOG 1 AND 2

BURMEISTER SOIL CLASSIFICATION SYSTEM

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING	B-1
CLIENT	ENV	GSE	+ 86' (±)
PROJECT	Stillwater Elementary School - Settlement	DATUM	Ground Surface
LOCATION	Stillwater, New Jersey	DATE START	11/28/23
		DATE FINISH	11/28/23
		JOB NO.	23-C-50
		REPORT NO.	23-C-54
			Sheet 1 of 2

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS		
28-Nov		22'-0"		DIA.	4 1/4"	2" OD		
				WT.		140 lb.		
				FALL		30"		

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
1		S-1	0-2'	3 7 15 14	22	Topsoil 4" Grayish brown coarse to fine Sand, little Silt, and medium to fine Gravel (Probable Fill)	
2							
3		S-2	2'-4'	6 6 7 8	13	Same	
4							
5		S-3	4'-6'	6 5 4 7	9	Same	W=5.2%
6							
7		S-4	6'-8'	10 3 6 9	9	Same	
8							
9		S-5	8'-10'	9 4 4 7	8	Same	
10							
11		S-6	10'-12'	6 5 3 7	8		
12							
13							
14							
15						15'-0"	
16		S-7	15'-17'	10 6 5 7	11	Grayish brown coarse to fine SAND, little Silt, some coarse to fine Gravel	
17							
18							
19							
20							
21		S-8	20'-22'	9 10 9 8	19	Same	
22							
23							
24							
25							
26		S-9	25'-27'	5 2 4 4	6	Same (wet)	
27							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: ETD, Inc.
DRILLING EQUIPMENT: Geoprobe 7822 DT
SCE REPRESENTATIVE: A. Sencar

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING	B-1
CLIENT	ENV	GSE	+ 86' (±)
PROJECT	Stillwater Elementary School - Settlement	DATUM	Ground Surface
LOCATION	Stillwater, New Jersey	DATE START	11/28/23
		DATE FINISH	11/28/23
		JOB NO.	23-C-50
		REPORT NO.	23-C-54
			Sheet 2 of 2

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS		
28-Nov		22'		DIA.	4 1/4"	2" OD		
				WT.		140 lb.		
				FALL		30"		

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
28							
29							
30							
31		S-10	30'-32'	5 6 6 6	12	Grayish brown coarse to fine Sand, little Silt some medium to fine Gravel (wet)	
32							
33						Test Boring Completed at 32'-0"	
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							
51							
52							
53							
54							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: ETD, Inc.
DRILLING EQUIPMENT: Geoprobe 7822 DT
SCE REPRESENTATIVE: A. Sencar

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING B-2

CLIENT	ENV	GSE	+ 86' (±)
PROJECT	Stillwater Elementary School - Settlement	DATUM	Ground Surface
LOCATION	Stillwater, New Jersey	DATE START	11/28/23
		DATE FINISH	11/28/23
		JOB NO.	23-C-50
		REPORT NO.	23-C-54
			Sheet 1 of 2

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS		
28-Nov		23'		DIA.	4 1/4"	2" OD		
				WT.		140 lb.		
				FALL		30"		

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
1		S-1	0-2'	5 12 13 6	25	Topsoil 5" Grayish brown coarse to fine SAND, little Silt, and coarse to fine Gravel (Fill)	
2							
3		S-2	2'-4'	7 9 11 14	20	Same	
4							
5		S-3	4'-6'	10 22 13 7	35	Same wit boulders	
6							
7		S-4	6'-8'	7 1 0 0	1	Same	
8							
9		S-5	8'-10'	2 1 1 0	2	Same	
10							
11		S-6	10'-12'	2 1 1 1	2	Same	
12							
13							
14							
15							
16		S-7	15'-17'	3 4 3 3	7	Same with wood	
17							
18							
19							
20							
21		S-8	20'-22'	5 5 4 5	9	Same	
22							
23							
24							
25							
26		S-9	25'-27'	3 3 4 3	7	Same (wet)	
27							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR	ETD, Inc.
DRILLING EQUIPMENT	Geoprobe 7822 DT
SCE REPRESENTATIVE	A. Sencar

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING B-2

CLIENT	ENV	GSE	+ 86' (±)
PROJECT	Stillwater Elementary School - Settlement	DATUM	Ground Surface
LOCATION	Stillwater, New Jersey	DATE START	11/28/23
		DATE FINISH	11/28/23
		JOB NO.	23-C-50
		REPORT NO.	23-C-54
			Sheet 2 of 2

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS		
28-Nov		23'		DIA.	4 1/4"	2" OD		
				WT.		140 lb.		
				FALL		30"		

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
28							
29						29'-0"	
30							
31		S-10	30'-32'	5 5 6 8	11	Gray coarse to fine SAND, and coarse to fine Gravel (wet)	
32							
33							
34							
35							
36		S-11	35'-37'	6 6 7 9	13	Same	
37							
38							
39							
40							
41		S-12	40'-42'	7 9 9 11	18	Same	
42							
43						Test Boring Completed at 42'-0"	
44							
45							
46							
47							
48							
49							
50							
51							
52							
53							
54							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR	ETD, Inc.
DRILLING EQUIPMENT	Geoprobe 7822 DT
SCE REPRESENTATIVE	A. Sencar

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING B-3

CLIENT	ENV	GSE	+ 86' (±)
PROJECT	Stillwater Elementary School - Settlement	DATUM	Ground Surface
LOCATION	Stillwater, New Jersey	DATE START	11/28/23

GROUND WATER					CAS.	SAMP.	CORE	TUBE		
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS				
28-Nov		22'		DIA.	4 1/4"	2" OD			JOB NO.	23-C-50
				WT.		140 lb.			REPORT NO.	23-C-54
				FALL		30"			*Sheet 1 of 2*	

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
1		S-1	0-2'	1 8 12 18	20	Topsoil 6" Grayish brown coarse to fine SAND, little Silt, and coarse to fine Gravel Probable Fill)	
2							
3		S-2	2'-4'	16 10 12 9	22	Same	
4							
5		S-3	4'-6'	5 3 3 3	6	Same	
6							
7		S-4	6'-8'	3 3 2 2	5	Same	
8							
9		S-5	8'-10'	2 1 1 1	2	Same	
10							
11		S-6	10'-12'	0 0 1 1	1		
12							
13							
14							
15							
16		S-7	15'-17'	2 1 1 1	2	Same	
17							
18							
19							
20							
21		S-8	20'-22'	4 5 5 8	10	Same 21'-0" Grayish brown coarse to fine SAND, little Silt, some fine Gravel	
22							
23							
24							
25							
26		S-9	25'-27'	5 6 5 5	11	Same (wet)	
27							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: ETD, Inc.
DRILLING EQUIPMENT: Geoprobe 7822 DT
SCE REPRESENTATIVE: A. Sencar

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING	B-3
CLIENT	ENV	GSE	+ 86' (±)
PROJECT	Stillwater Elementary School - Settlement	DATUM	Ground Surface
LOCATION	Stillwater, New Jersey	DATE START	11/28/23
		DATE FINISH	11/28/23
		JOB NO.	23-C-50
		REPORT NO.	23-C-54
			Sheet 2 of 2

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS		
28-Nov		22'		DIA.	4 1/4"	2" OD		
				WT.		140 lb.		
				FALL		30"		

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
28							
29							
30							
31		S-10	30'-32'	9 9 6 6	15	Grayish brown coarse to fine SAND, little Silt, and medium to fine Gravel	
32							
33							
34							
35							
36		S-11	35'-37'	5 6 8 9	14	Same	W=14.3%
37							
38							
39							
40							
41		S-12	40'-42'	8 8 11 13	19	Same	
42							
43		S-13	42'-44'	10 12 13 12	25	Same	
44							
45						Test Boring Completed at 44'-0"	
46							
47							
48							
49							
50							
51							
52							
53							
54							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: ETD, Inc.
DRILLING EQUIPMENT: Geoprobe 7822 DT
STL REPRESENTATIVE: A. Sencar

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING	B-4
CLIENT	ENV	GSE	+ 86' (±)
PROJECT	Stillwater Elementary School - Settlement	DATUM	Ground Surface
LOCATION	Stillwater, New Jersey	DATE START	11/29/23
		DATE FINISH	11/29/23
		JOB NO.	23-C-50
		REPORT NO.	23-C-54
			Sheet 1 of 1

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS		
29-Nov		22'		DIA.	4 1/4"	2" OD		
				WT.		140 lb.		
				FALL		30"		

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
1		S-1	0-2'	1 2 1 2	3	Topsoil 6" Grayish brown coarse to fine SAND, little Silt, some coarse to fine Gravel (Fill)	
2							
3		S-2	2'-4'	3 4 6 4	10	Same	
4							
5		S-3	4'-6'	4 4 4 6	8	Same	
6							
7		S-4	6'-8'	6 5 5 7	10	Same	
8						8'-0"	
9		S-5	8'-10'	5 4 5 8	9	Grayish brown coarse to fine SAND, trace Silt little medium to fine Gravel	W=7.9%
10							
11		S-6	10'-12'	8 7 7 8	14	Same	
12							
13							
14							
15							
16		S-7	15'-17'	10 10 10 10	20	Same	
17							
18							
19							
20							
21		S-8	20'-22'	5 9 8 10	17	Same (wet at tip)	
22							
23						Test Boring Completed at 22'-0"	
24							
25							
26							
27							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: ETD, Inc.
DRILLING EQUIPMENT: Geoprobe 7822 DT
SCE REPRESENTATIVE: A. Sencar

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING B-5

CLIENT	ENV	GSE	+ 96' (±)
PROJECT	Stillwater Elementary School - Settlement	DATUM	Ground Surface
LOCATION	Stillwater, New Jersey	DATE START	11/29/23
		DATE FINISH	11/29/23
		JOB NO.	23-C-50
		REPORT NO.	23-C-54
			Sheet 1 of 2

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS		
29-Nov				DIA.	4 1/4"	2" OD		
				WT.		140 lb.		
				FALL		30"		

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
1						Topsoil 6"	
2						Grayish brown coarse to fine SAND, little Silt, and medium to fine Gravel (Fill)	
3							
4							
5							
6		S-1	5'-7'	1 3 1 2		Same	
7							
8							
9							
10							
11		S-2	10'-12'	2 8 3 3	11	Same	
12							
13							
14							
15							
16		S-3	15'-17'	1 2 1 2	3	Same	W=9.6%
17							
18							
19							
20							
21		S-4	20'-22'	1 2 2 2	4	Same	
22							
23						23'-0"	
24							
25							
26		S-5	25'-27'	10 11 9 14	20	Grayish brown coarse to fine SAND, little Silt, some medium to fine Gravel	
27							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR	ETD, Inc.
DRILLING EQUIPMENT	Geoprobe 7822 DT
SCE REPRESENTATIVE	A. Sencar

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING B-5

CLIENT	ENV	GSE	+ 96' (±)
PROJECT	Stillwater Elementary School - Settlement	DATUM	Ground Surface
LOCATION	Stillwater, New Jersey	DATE START	11/29/23
		DATE FINISH	11/29/23
		JOB NO.	23-C-50
		REPORT NO.	23-C-54
			Sheet 2 of 2

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS		
29-Nov		32'		DIA.	4 1/4"	2" OD		
				WT.		140 lb.		
				FALL		30"		

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
28							
29							
30							
31		S-6	30'-32'	6 9 9 8	18	Grayish brown coarse to fine SAND, little Silt, and coarse to fine Gravel	
32							
33							
34							
35							
36		S-7	35'-37'	7 8 8 7	16	Same (wet)	
37							
38						Test Boring Completed at 37'-0"	
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							
51							
52							
53							
54							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: ETD, Inc.
DRILLING EQUIPMENT: Geoprobe 7822 DT
SCE REPRESENTATIVE: A. Sencar

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING B-6

CLIENT	ENV	GSE	+ 96' (±)
PROJECT	Stillwater Elementary School - Settlement	DATUM	Ground Surface
LOCATION	Stillwater, New Jersey	DATE START	11/29/23
		DATE FINISH	11/29/23
		JOB NO.	23-C-50
		REPORT NO.	23-C-54
			Sheet 1 of 2

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS		
29-Nov		32'-0"		DIA.	4 1/4"	2" OD		
				WT.		140 lb.		
				FALL		30"		

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
1						Topsoil 6"	
2						Grayish brown coarse to fine SAND, little Silt, some coarse to fine Gravel (Fill)	
3							
4							
5							
6		S-1	5'-7'	5 7 8 9	15	Same	
7							
8							
9							
10							
11		S-2	10'-12'	8 8 10 13	18	Same	
12							
13							
14							
15							
16		S-3	15'-17'	8 6 3 12	9	Same	
17							
18							
19							
20							
21		S-4	20'-22'	4 3 2 6	5	Gray medium to fine SAND, trace Silt	
22						24'-0"	
23							
24							
25							
26		S-4	25'-27'	8 9 11 13	20	Gray coarse to fine SAND, ltle Silt, and coarse to fine Gravel	
27							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR	ETD, Inc.
DRILLING EQUIPMENT	Geoprobe 7822 DT
SCE REPRESENTATIVE	A. Sencar

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING B-6

CLIENT	ENV								GSE	+ 96' (±)
PROJECT	Stillwater Elementary School - Settlement								DATUM	Ground Surface
LOCATION	Stillwater, New Jersey								DATE START	11/29/23
GROUND WATER					CAS.	SAMP.	CORE	TUBE	DATE FINISH	11/29/23
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS				
29-Nov				DIA.	4 1/4"	2" OD			JOB NO.	23-C-50
				WT.		140 lb.			REPORT NO.	23-C-54
				FALL		30"			Sheet 2 of 2	

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
28							
29							
30							
31		S-6	30'-32'	10 9 11 14	20	Gray medium to fine Sand, little Silt, and medium to fine Gravel	
32							
33						Test Boring Completed at 32'-0"	
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							
51							
52							
53							
54							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR: ETD, Inc.
DRILLING EQUIPMENT: Geoprobe 7822 DT
SCE REPRESENTATIVE: A. Sencar

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING B-7

CLIENT	ENV	GSE	+ 95' (±)
PROJECT	Stillwater Elementary School - Settlement	DATUM	Ground Surface
LOCATION	Stillwater, New Jersey	DATE START	11/29/23
		DATE FINISH	11/29/23
		JOB NO.	23-C-50
		REPORT NO.	23-C-54
			Sheet 1 of 2

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS		
29-Nov		NE		DIA.	4 1/4"	2" OD		
				WT.		140 lb.		
				FALL		30"		

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
1						Topsoil 5"	
2						Grayish brown coarse to fine SAND, little Silt, and coarse to fine Gravel (Fill)	
3							
4							
5							
6		S-1	5'-7'	10 10 11 11	21	Same	
7							
8							
9							
10							
11		S-2	10'-12'	4 6 7 9	13	Same	
12							
13							
14							
15							
16		S-3	15'-17'	3 4 4 5	8	Grayish brown fine SAND, some Silt	W=5.6%
17							
18							
19							
20							
21		S-4	20'-22'	1 2 3 4	5	Same	
22							
23							
24						23'-6"	
25							
26		S-5	25'-27'	5 8 12 15	20	Gray coarse to fine SAND, little Silt, and coarse to fine Gravel	
27							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

DRILLING CONTRACTOR	ETD, Inc.
DRILLING EQUIPMENT	Geoprobe 7822 DT
SCE REPRESENTATIVE	A. Sencar

SOR CONSULTING ENGINEERS, INC.	TEST BORING LOG	BORING B-7

CLIENT	ENV	GSE	+ 95' (±)
PROJECT	Stillwater Elementary School - Settlement	DATUM	Ground Surface
LOCATION	Stillwater, New Jersey	DATE START	11/29/23
		DATE FINISH	11/29/23
		JOB NO.	23-C-50
		REPORT NO.	23-C-54
			Sheet 2 of 2

GROUND WATER					CAS.	SAMP.	CORE	TUBE
DATE	TIME	DEPTH	CASING	TYPE	HAS	SS		
29-Nov		NE		DIA.	4 1/4"	2" OD		
				WT.		140 lb.		
				FALL		30"		

DEPTH (ft.)	CASING BLOWS	SAMPLE TYPE/NO.	DEPTH	SAMPLER BLOWS PER 6"	N VALUE	DESCRIPTION	REMARKS
28							
29							
30							
31		S-6	30'-32'	7 10 10 14	20	Grayish brown medium to fine Sand, little Silt, some medium to fine Gravel	
32							
33						Test Boring Completed at 32'-0"	
34							
35							
36							
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50							
51							
52							
53							
54							

S - SPLIT SPOON SAMPLER
U - UNDISTURBED SAMPLE
C - CORE DRILLED

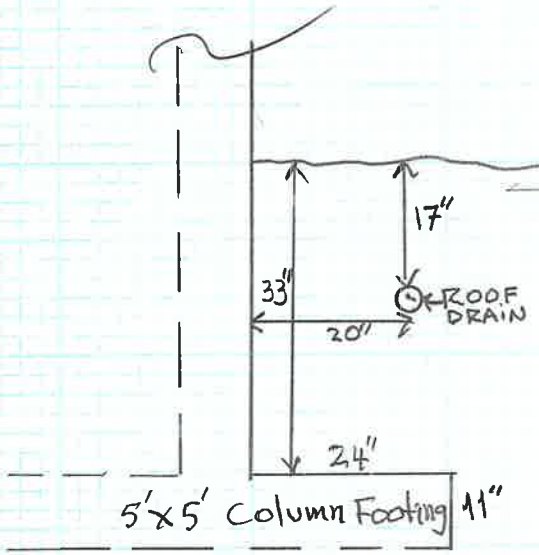
DRILLING CONTRACTOR: ETD, Inc.
DRILLING EQUIPMENT: Geoprobe 7822 DT
SCE REPRESENTATIVE: A. Sencar

SOR CONSULTING ENGINEERS, INC.
SOR TESTING LABORATORIES, INC.
Geotechnical Engineering – Materials Testing – Forensic Studies

98 Sand Park Road, Cedar Grove, NJ 07009
(973) 239-6001 Fax (973) 239-8380

CLIENT ENV PROJECT Stillwater Elem. School
SUBJECT Test Pit 1 PROJECT NUMBER 23-C-50
BY A.S. DATE 11/27/23 CHECKED BY ..... DATE ..... SHEET NUMBER 1 OF 1

TP-1



Grayish brown silty gravelly Sand with cobbles and boulders (Fill)

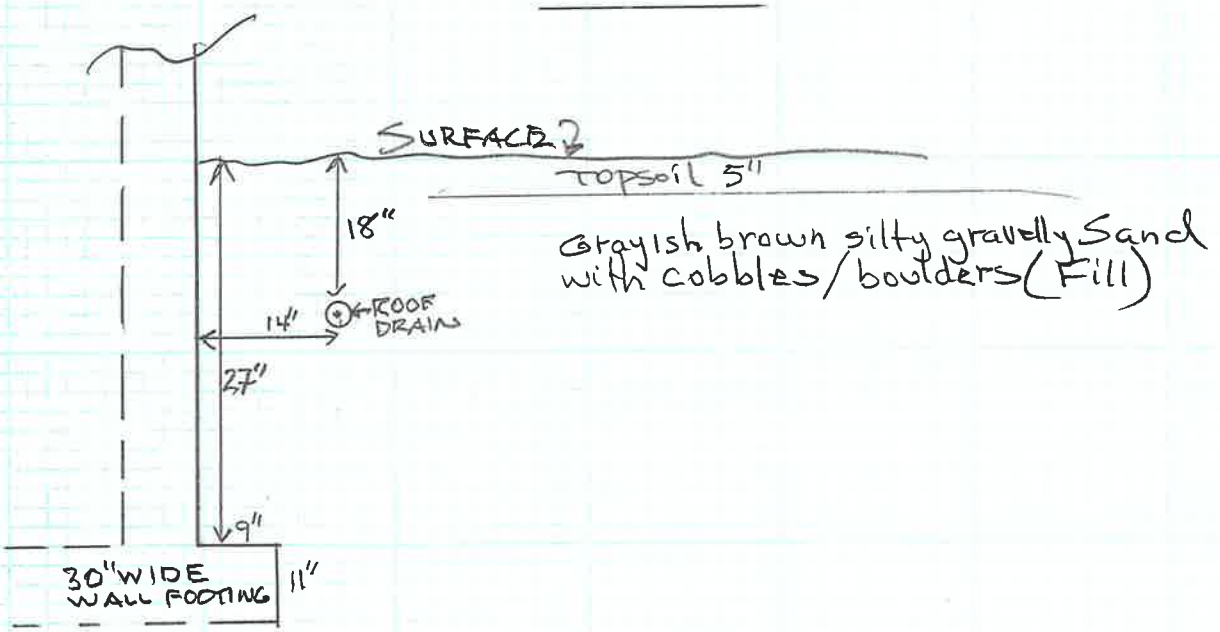
Test Pit Completed at 4'-0"

SOR CONSULTING ENGINEERS, INC.
SOR TESTING LABORATORIES, INC.
Geotechnical Engineering – Materials Testing – Forensic Studies

98 Sand Park Road, Cedar Grove, NJ 07009
(973) 239-6001 Fax (973) 239-8380

CLIENT ENV PROJECT Stillwater Elem. School
SUBJECT Test Pit 2 PROJECT NUMBER 23-C-50
BY A.S. DATE 11/27/23 CHECKED BY ..... DATE ..... SHEET NUMBER 1 OF 1

TP-2



Test Pit Completed at 4'-0"

APPENDIX III

LABORATORY TEST RESULTS

SOR TESTING LABORATORIES, INC.

98 Sand Park Road - Cedar Grove, NJ 07009
Tel.: (973) 239-6001 Fax: (973) 239-8380 http://www.sorlabs.com

PARTICLE SIZE DISTRIBUTION TEST REPORT

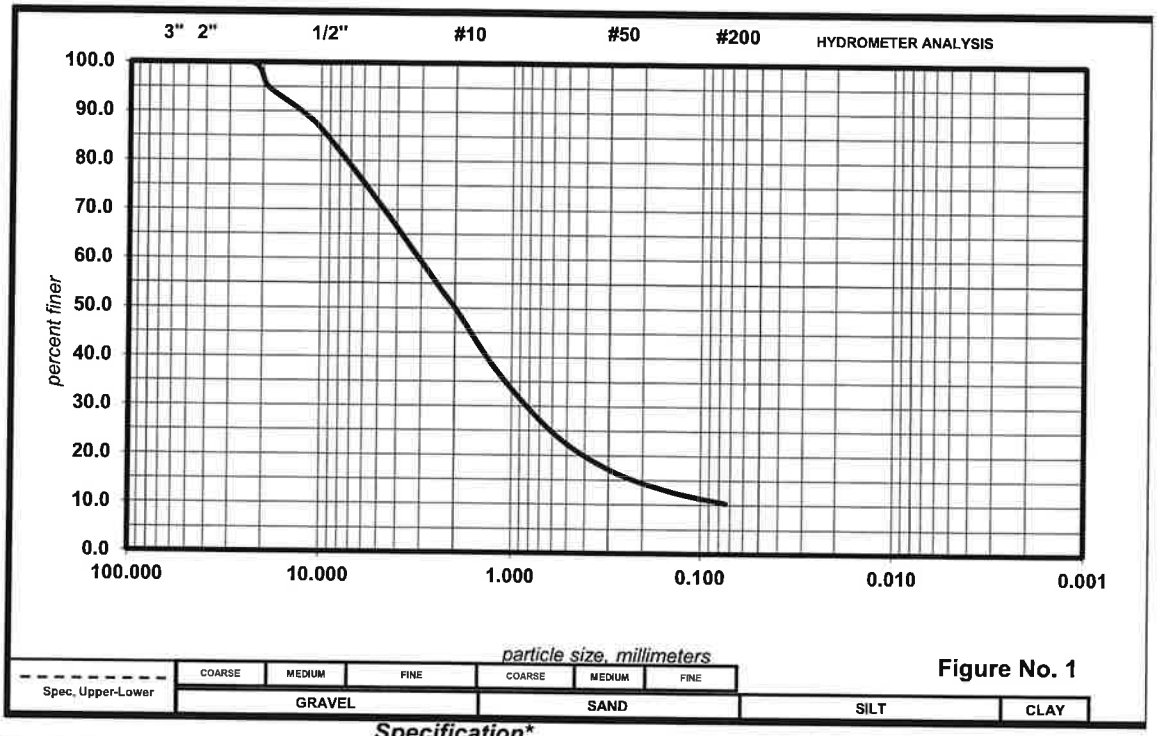


Figure No. 1

Specification*

Sieve Size	% Finer	Min.(%)	Max.(%)
3" (75 mm)			
2 1/2" (63 mm)			
2" (50 mm)			
1 1/2" (38.1 mm)			
1" (25 mm)	100.0		
3/4" (19 mm)	95.0		
5/8" (16 mm)			
1/2" (12.5 mm)	90.1		
3/8" (9.5 mm)	85.6		
5/16" (8 mm)			
1/4" (6.3 mm)			
#4 (4.75 mm)	70.4		
#6 (3.35 mm)			
#8 (2.36 mm)	53.9		
#10 (2 mm)			
#14 (1.4 mm)			
#16 (1.18 mm)	37.0		
#20 (850 µm)			
#30 (600 µm)	24.5		
#40 (425 µm)			
#50 (300 µm)	17.1		
#60 (250 µm)			
#100 (150 µm)	12.9		
#200 (75 µm)	10.4		

Sample Identification

Sample No.: B-1, S-3
Lab No.: A23-154-01
Source/Location: 4'-6'
Description: Gray.Br. cf Sand, little Silt, and mf Gravel

sample description in accordance with Burmister System

LL :	PL :	PI :

As received Moisture Content: 5.2 %

Classification:
USCS: [SW-SM]
AASHTO:

Remarks:
Sample received in lab on November 30, 2023

Client: ENV
Project: Stillwater Elementary School Settlement
Location: Stillwater, New Jersey
Date: 4-Dec-23
Job No.: 23-C-50 **Report No.:** 23-C-54

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PARTICLE SIZE DISTRIBUTION TEST REPORT

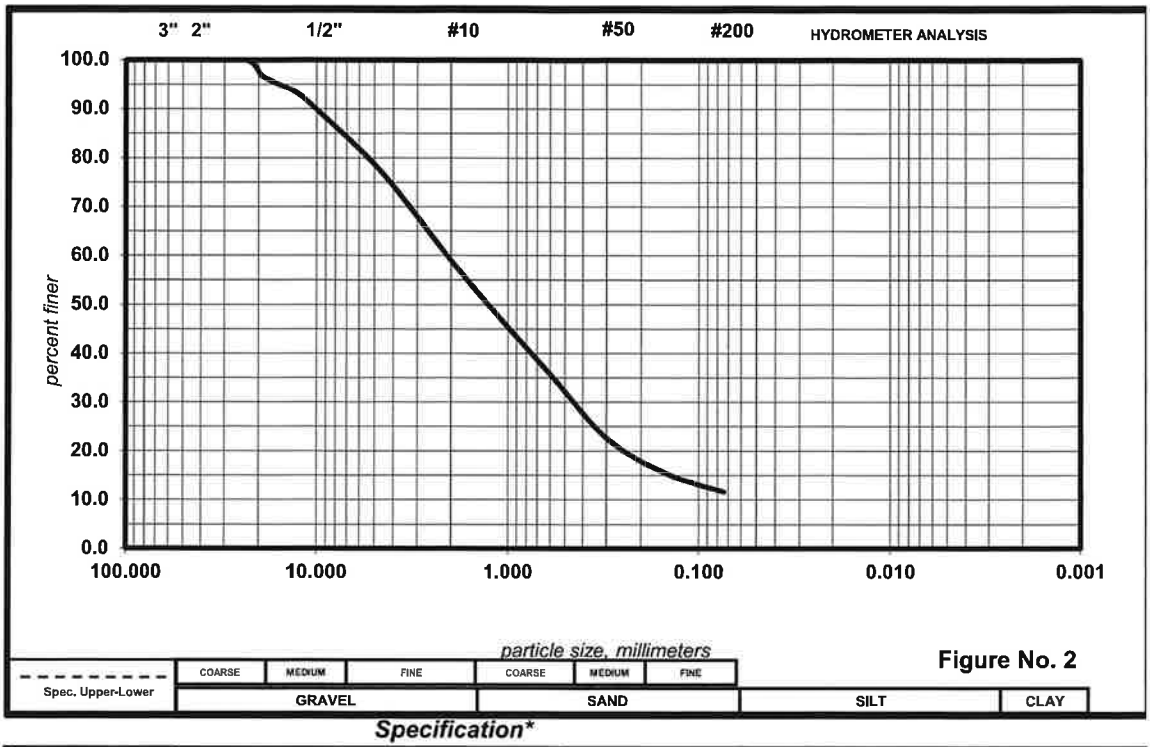


Figure No. 2

Specification*

Sieve Size	% Finer	Min.(%)	Max.(%)
3" (75 mm)			
2 1/2" (63 mm)			
2" (50 mm)			
1 1/2" (38.1 mm)			
1" (25 mm)	100.0		
3/4" (19 mm)	96.5		
5/8" (16 mm)			
1/2" (12.5 mm)	93.3		
3/8" (9.5 mm)	89.1		
5/16" (8 mm)			
1/4" (6.3 mm)			
#4 (4.75 mm)	77.7		
#6 (3.35 mm)			
#8 (2.36 mm)	62.8		
#10 (2 mm)			
#14 (1.4 mm)			
#16 (1.18 mm)	48.7		
#20 (850 µm)			
#30 (600 µm)	35.4		
#40 (425 µm)			
#50 (300 µm)	22.5		
#60 (250 µm)			
#100 (150 µm)	15.4		
#200 (75 µm)	11.7		
-			

Sample Identification

Sample No.: B-3, S-11
Lab No.: A23-154-02
Source/Location: 35'-37'
Description:
Brown.Gray cf Sand, little Silt, and mf Gravel

sample description in accordance with Burmister System

LL :	PL :	PI :

As received Moisture Content: 14.3 %

Classification:
USCS: [SW-SM]
AASHTO:

Remarks:
Sample received in lab on November 30, 2023

Client: ENV
Project: Stillwater Elementary School Settlement
Location: Stillwater, New Jersey
Date: 4-Dec-23
Job No.: 23-C-50 **Report No.:** 23-C-54

SOR TESTING LABORATORIES, INC.

98 Sand Park Road - Cedar Grove, NJ 07009
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PARTICLE SIZE DISTRIBUTION TEST REPORT

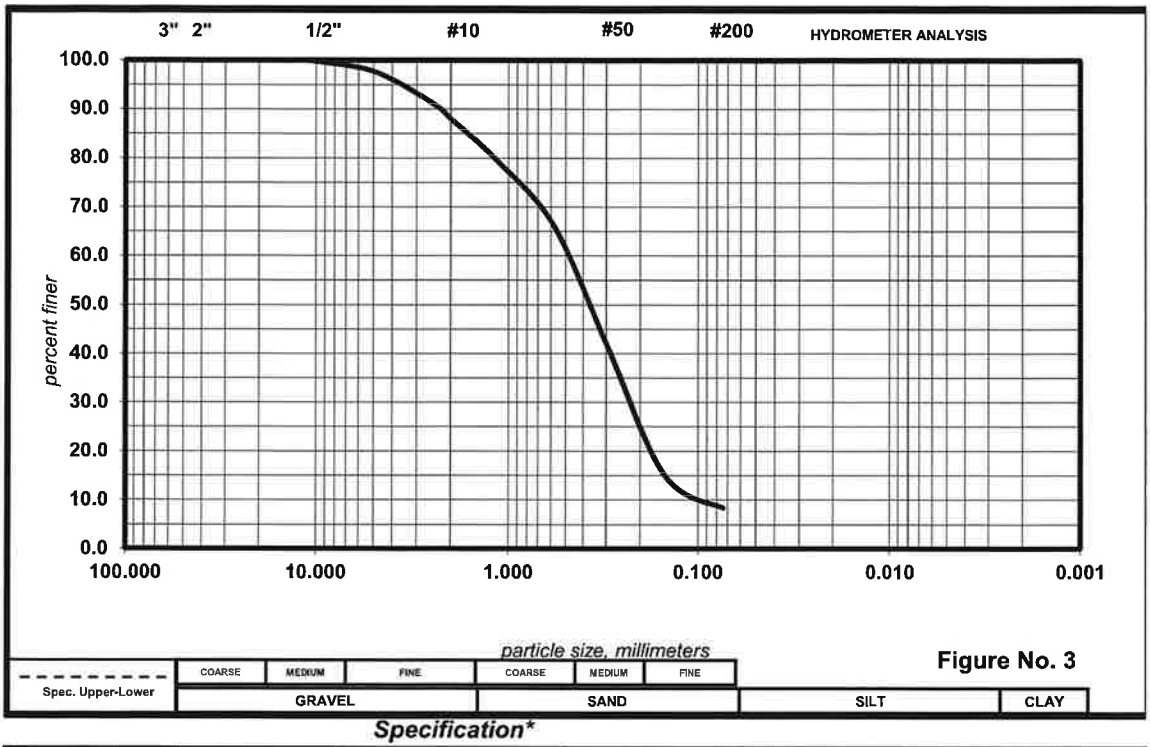


Figure No. 3

Specification*

Sieve Size	% Finer	Min.(%)	Max.(%)
3" (75 mm)			
2 1/2" (63 mm)			
2" (50 mm)			
1 1/2" (38.1 mm)			
1" (25 mm)			
3/4" (19 mm)			
5/8" (16 mm)			
1/2" (12.5 mm)	100.0		
3/8" (9.5 mm)	99.6		
5/16" (8 mm)			
1/4" (6.3 mm)			
#4 (4.75 mm)	97.4		
#6 (3.35 mm)			
#8 (2.36 mm)	90.7		
#10 (2 mm)			
#14 (1.4 mm)			
#16 (1.18 mm)	80.0		
#20 (850 µm)			
#30 (600 µm)	66.7		
#40 (425 µm)			
#50 (300 µm)	41.6		
#60 (250 µm)			
#100 (150 µm)	15.1		
#200 (75 µm)	8.4		
-			

Sample Identification

Sample No.: B-4, S-5
Lab No.: A23-154-03
Source/Location: 8'-10'
Description:
Lt.Br. cf SAND, trace Silt, little mf Gravel

sample description in accordance with Burmister System

LL :	PL :	PI :

As received Moisture Content: 7.9 %

Classification:
USCS: [SP-SM]
AASHTO:

Remarks:
Sample received in lab on November 30, 2023

Client: ENV
Project: Stillwater Elementary School Settlement
Location: Stillwater, New Jersey
Date: 4-Dec-23
Job No.: 23-C-50 **Report No.:** 23-C-54

SOR TESTING LABORATORIES, INC.

98 Sand Park Road - Cedar Grove, NJ 07009
Tel.: (973) 239-6001 Fax: (973) 239-8380 http://*www.sorlabs.com*

PARTICLE SIZE DISTRIBUTION TEST REPORT

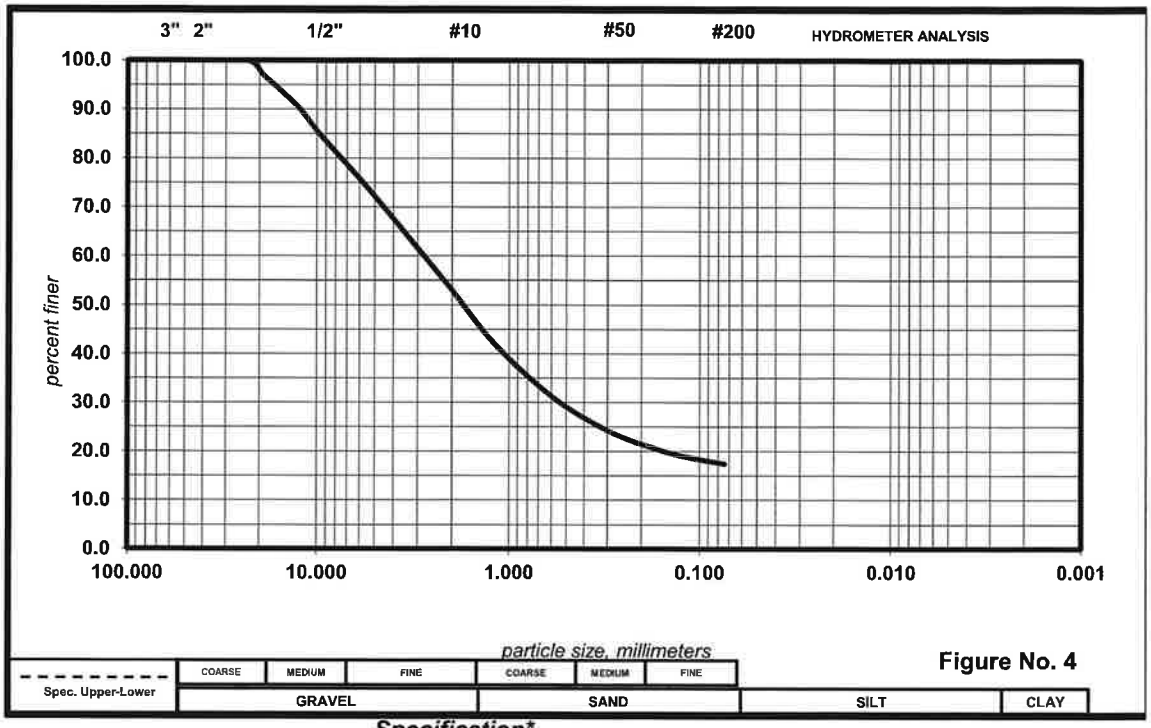


Figure No. 4

Specification*

Sieve Size	% Finer	Min.(%)	Max.(%)
3" (75 mm)			
2 1/2" (63 mm)			
2" (50 mm)			
1 1/2" (38.1 mm)			
1" (25 mm)	100.0		
3/4" (19 mm)	96.9		
5/8" (16 mm)			
1/2" (12.5 mm)	90.7		
3/8" (9.5 mm)	84.6		
5/16" (8 mm)			
1/4" (6.3 mm)			
#4 (4.75 mm)	71.2		
#6 (3.35 mm)			
#8 (2.36 mm)	56.6		
#10 (2 mm)			
#14 (1.4 mm)			
#16 (1.18 mm)	42.0		
#20 (850 µm)			
#30 (600 µm)	31.1		
#40 (425 µm)			
#50 (300 µm)	24.2		
#60 (250 µm)			
#100 (150 µm)	19.9		
#200 (75 µm)	17.4		
-			

Sample Identification

Sample No.: B-5, S-3
Lab No.: A23-154-04
Source/Location: 15'-17'
Description:
Dark Br. cf Sand, little Silt, and mf Gravel

sample description in accordance with Burmister System

LL :	PL :	PI :

As received Moisture Content: 9.6 %

Classification:
USCS: [SM]
AASHTO:

Remarks:
Sample received in lab on November 30, 2023

Client: ENV
Project: Stillwater Elementary School Settlement
Location: Stillwater, New Jersey
Date: 4-Dec-23
Job No.: 23-C-50 **Report No.:** 23-C-54

SOR TESTING LABORATORIES, INC.

98 Sand Park Road - Cedar Grove, NJ 07009
Tel.: (973) 239-6001 Fax: (973) 239-8380 http://www.sorlabs.com

PARTICLE SIZE DISTRIBUTION TEST REPORT

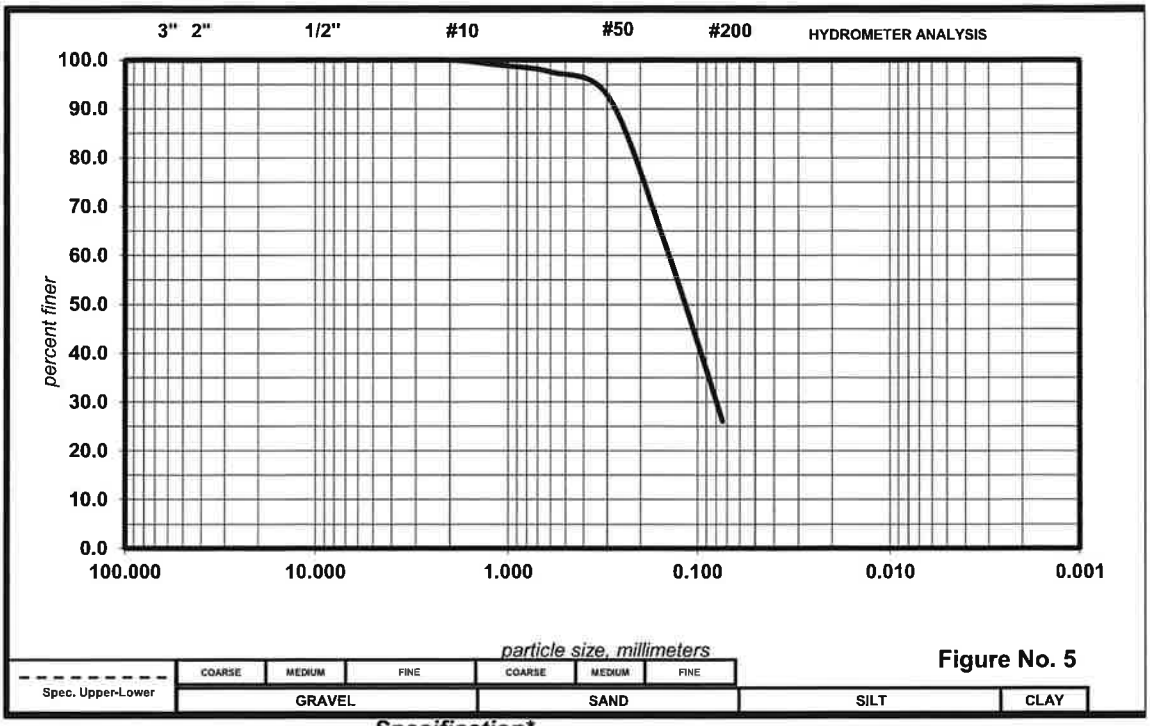


Figure No. 5

*Specification**

Sieve Size	% Finer	Min.(%)	Max.(%)
3" (75 mm)			
2 1/2" (63 mm)			
2" (50 mm)			
1 1/2" (38.1 mm)			
1" (25 mm)			
3/4" (19 mm)			
5/8" (16 mm)			
1/2" (12.5 mm)			
3/8" (9.5 mm)			
5/16" (8 mm)			
1/4" (6.3 mm)			
#4 (4.75 mm)			
#6 (3.35 mm)			
#8 (2.36 mm)			
#10 (2 mm)	100.0		
#14 (1.4 mm)			
#16 (1.18 mm)	99.0		
#20 (850 µm)			
#30 (600 µm)	97.5		
#40 (425 µm)			
#50 (300 µm)	92.5		
#60 (250 µm)			
#100 (150 µm)	63.0		
#200 (75 µm)	26.0		

Sample Identification

Sample No.: B-7, S-3
Lab No.: A23-154-05
Source/Location: 15'-17'
Description: Yel.Br. fine SAND, some Silt,

sample description in accordance with Burmister System

LL :	PL :	PI :

As received Moisture Content: 5.6 %

Classification:
USCS: [SC]
AASHTO:

Remarks:
Sample received in lab on November 30, 2023

Client: ENV
Project: Stillwater Elementary School Settlement
Location: Stillwater, New Jersey
Date: 4-Dec-23
Job No.: 23-C-50 **Report No.:** 23-C-54

APPENDIX IV

LIMITATIONS

LIMITATIONS

The conclusions and recommendations contained in this geotechnical report no. 23-C-54 are based upon the applicable standards of our profession at the time this report was prepared.

The analyses and recommendations submitted in this report are based in part upon the data obtained from seven widely-spaced test borings, and two test pits performed for this study. The stratification lines shown on the individual logs of the subsurface explorations represent the approximate boundaries between soil types. However, the transition between soil types may be gradual.

In our opinion, the number of explorations performed for this study are adequate for a general understanding of the site subsurface conditions. However, the nature and extent of variations between the explorations may not become evident until construction. If, during construction, variations become evident, it will be necessary to re-evaluate the recommendations of this report.

This report may be referred to or included in the project specifications for general information purposes only, but should not be solely used as the technical specifications for the work.

This geotechnical engineering report was prepared for the project by Sor Consulting Engineers, Inc. for design purposes only, and may not be sufficient to prepare an accurate bid. Contractors utilizing the information in the report should do so with the express understanding that its scope is limited to design considerations. Prospective bidders should obtain the owner's permission to perform whatever additional explorations or data gathering they deem necessary to prepare their bid accurately.

This report has been prepared in accordance with generally accepted geotechnical engineering practices for the exclusive use of ENV and/or their authorized representatives for specific application to the gymnasium building addition of the Stillwater Elementary School located at 904 Stillwater Road in Stillwater, New Jersey. No other warranty, expressed or implied, is made.

APPENDIX V

GPRS JOB SUMMARY SHEETS

JOB SUMMARY

Service Completed Date: 11/28/2023

Customer: ENVIRONMENTAL TECHNICAL DRILLING INC

Phone Number:

Billing Address	City	State	Zip
408 CRANBERRY RD	FARMINGDALE	NJ	07727

Job Details

Jobsite Location	City	State	Zip
904 Stillwater Road	Stillwater Township	NJ	07860

Work Order Number 614019-117031 **Customer Service Phone Num**

Job Num **PO Num**

Project Manager: Beau Braun **Email:** Beau.Braun@gprsinc.com

Thank you for using GPRS on your project. We appreciate the opportunity to work with you. If you have questions regarding the results of this scanning, please contact the lead GPRS technician on this project.

EQUIPMENT USED

The following equipment was used on this project:

- **Underground GPR Antenna:** This GPR Antenna uses frequencies ranging from 250 MHz to 450 MHz and is mounted in a stroller frame that rolls over the surface. Data is displayed on a screen and marked in the field in real-time. The surface needs to be reasonably smooth and unobstructed to obtain readable scans. Obstructions such as curbs, landscaping, and vegetation will limit the efficacy of GPR. The total effective scan depth can be as much as 8' or more with this antenna but can vary widely depending on the soil conditions and composition. Some soil types, such as clay, may limit maximum depths to 3' or less. As depth increases, targets must be larger to be detected, and non-metallic targets can be challenging to locate. The depths provided should always be treated as estimates as their accuracy can be affected by multiple factors. For more information, please visit: Link
- **EM Pipe Locator:** Electromagnetic Pipe and Cable Locator. Detects electromagnetic fields. Used to actively trace conductive pipes and tracer wires, or passively detect power and radio signals traveling along conductive pipes and utilities. For more information, please visit: Link
- **GPS:** This handheld unit offers accuracy down to 4 inches; however, the accuracy achieved will depend on the satellite environment at the time of collection and is not considered survey-grade. Features can be collected as points, lines, or areas and then exported as a KML/KMZ or overlaid on a CAD drawing. For more information, please visit: Link
- **Traceable Rodder:** The rodder has a copper wire encased in fiberglass. The device is pushed through accessible pipes before placing a current on the wire, and the signal is then traced from the surface. The maximum traceable depth is 10' depending on the soil conditions, and the maximum distance is 200'. The line can be pushed through a pipe with direct access, such as a sewer line at a cleanout or a storm drain catch basin. It may not be able to be pushed through deeper pipes within manholes. GPRS will not access electrical conduits. The signal cannot be located through metallic pipes. For more information, please visit:

JOB SUMMARY

WORK PERFORMED

GPRS performed the following work on this project:

UNDERGROUND UTILITY

- The total area scanned was approximately 2000 square feet.
- The effective depth of GPR will vary throughout a site depending on a variety of factors such as surface type, surface conditions, soil type, and moisture content. At this site, the maximum effective GPR depth was approximately 2-4 feet.

RESULTS AND NOTES

Located Utilities	Electric, Water, Storm Sewer, Sanitary Sewer, Other Gas
Client's Scope of Work	Scan for all utilities inside multiple scopes of work. And also Marc main waterline from the well and the waterline that branches out of the side of the building running to the garden.
Additional Notes	Inside of the scope of work multiple utilities were found. All utilities that were found were marked with corresponding colors. Red for electric, blue for water, Green for storm sanitary sewer, and yellow for gas. When depths were found they were written inside of the line. Arrows at the end of lines mean the lines continue and "EOI" at the end of lines means end of information and I was unable to locate that utility past that point. Near the oil tank I was able to locate the two oil lines entering the building as well as the electric feeding the oil tank. Near the corner of the building I was able to find the electric that feeds the shed behind the oil tank. That line is running to the left of the tank straight into the corner of the shed. I was unable to locate storm lines around the oil tank because of my traceable rodder getting stuck once I entered the pipe and I was unable to see them with GPR because of them being PVC and close to the building. Near the bathrooms in the second location that was scanned I was able to trace storm lines coming from the catch basin to multiple roof drains. Near the same location I was unable to trace the sanitary line running out to the septic tank we were unable to open up clean outs inside of the bathroom and was unable to see the line with GPR. Client will avoid this area because we were unable to find the septic line. In the third area near the other oil tanks I was able to find the septic line running straight into the school and was also able to find the roof drains running to the catch basin. On the side of the school was able to locate the waterline running out to the street to the trench there's a conduit that is ran with it but contains no wires inside. Near the front of the school I was able to locate the word wind branching from the well into the side of the school. Please say 2 to 3 feet off all marks and drill with caution.

Client performed 811 Location Request:	No	Limitations Encountered:	Surface Obstructions
		Marking Medium:	Spray Paint
Findings Walkthrough done with client:	Yes	Client Provided Drawings:	No

JOB SUMMARY

Image 1



Image 2



Image 3



Image 4



APPENDIX 4- STORM LINE INSPECTION REPORT

Storm Water Line Inspection Report Stillwater Township School PipeWorks Services, Inc.	3 pages
Inspection Video	

PipeWorks services, inc.
PLUMBING | HVAC | ELECTRIC
WATER CONDITIONING | INSULATION
DR. ENERGY SAVER DEALER

33 River Road, Chatham NJ 07928
Telephone: (973) 635-3111

Plumbing License 10420
HVAC License 19HC00015100
Electrical License 34EB00680800
Contractor # 13VH01214700
SPFA Member 51502650

Invoice 93761432
Invoice Date 12/11/2023
Completed Date 12/11/2023
Technician Mike Gelmi
Customer PO
Payment Term Due Upon Completion
Due Date 12/11/2023

Billing Address
Stillwater Township School
904 Stillwater Road
Newton, NJ 07860 USA

Job Address
Stillwater Township School
904 Stillwater Road
Newton, NJ 07860 USA

Description of Work

Arrived on site to video inspect 6 inch storm drain located in the back side of the building

Remove catch basin into access storm drain

Found PVC piping going downstream from the outlet of the catch basin

During the first initial video inspection, it was found that there is PVC piping. We did notice some areas between the joints. That are misaligned. It is unsure of what type of material they used to connect the pipes together.

When we continue the push the camera at approximate 150 feet, we were unable to push the camera any further. We started to notice some standing water and debris that has accumulated in the storm drain.

We located an attempted to locate this area where we believe it is downstream behind the building, going out towards a possible creek

I located this area which is approximate 4 to 6 feet deep located in the back of the building.

Unable to push the camera any further, At this time, if customer would like to proceed with an additional camera, we would recommend reevaluating the line with a different type of camera as well as possible Hydro jetting to flush out the system to get a better visual of the condition of the line.

Please see email for video

Task #	Description	Quantity	Your Price	Your Total
EVAL-100	Evaluate the condition of your Main/Branch Line using a video recording camera through an existing access point. The $475.00 will be for the first hour and each additional hour in case it is needed will result an additional cost of $385.00	1.00	$475.00	$475.00

Paid On	Type	Memo	Amount
12/15/2023	Check	balance	$506.47

Potential Savings	$71.25
Sub-Total	$475.00
Tax	$31.47
Total Due	$506.47
Payment	$506.47
Balance Due	$0.00

I hereby authorize Pipe Works Services Inc. to complete the above work at the quoted price.

NOTICE TO CONSUMER
All pricing is valid for 30 days. You may cancel this contract at any time before midnight of the third business day after receiving a copy of this contract. If you wish to cancel this, you must either:
1. Send a signed and dated written notice of cancellation by registered or certified mail, return receipt requested; or
2. Personally deliver a signed and dated written notice of cancellation to:
Pipe Works Services
33 River Road
Chatham, NJ 07928
Attention: Sales Manager
973-635-3111
If you cancel this contract within the three-day period, you are entitled to a full refund of your money. Refunds must be made within 30 days of the contractor's receipt of the cancellation notice.

I hereby waive my legal right to cancel this contract because I have an urgent need for the services listed above, and I therefore do not wish to delay performance of the services set forth in this contract for three business days.

Customer Signature_____ Date_____

Any service work required and/or needed beyond this estimate shall be an additional charge.

WAIVER OF JURY TRIAL/LIMITATION OF DAMAGES/ATTORNEY'S FEES/DEADLINE FOR LEGAL ACTION - You and Pipe Works Services, Inc. both waive the right to a jury trial. In the event of litigation over the collection of money due per this agreement, the prevailing party shall be entitled to collect all courts costs, reasonable attorney fees, and all other reasonable expenses incurred in the litigation. Neither you nor Pipe Works Services, Inc. is liable for any consequential, incidental, indirect, punitive, treble, speculative, or special damages of any kind whatsoever. Neither you nor Pipe Works Services, Inc. may bring any action against the other more than two (2) years after the date hereof.

_____
Initials

Upon completion of all work, it is agreed that the customer can hold back a maximum of $200 until all inspections are completed. Inspections must be scheduled as soon as the customer receives their completed permits. Once inspections are completed the money held back is due immediately.

You agree to pay us in full for all amounts due, including sales taxes, promptly upon completion of the work and receipt of our invoice. Outstanding balances, beyond the allowable $200 held for inspections, will accrue interest at eighteen percent (18%) per annum (1.5% per month) on all bills unpaid 30 days from the date of the invoice until paid. You agree to place a deposit with us upon signing. If credit or payment terms are agreed to, then you authorize us to obtain any information regarding your credit history. All Products will remain our property until we have received payment in full. Failure to make full payment on time will entitle us, in our sole discretion, to remove all Products and/or materials, including those in use, and you authorize us to enter upon the property, on reasonable notice, to remove the same.

Incentives are available for energy efficiency measures on a first come, first-served basis subject to the availability of funds. These utility incentive programs reserve the right to change any portion of the programs or end these programs without notice. Program availability, program terms, and equipment eligibility may change without notice at the discretion of the companies. Submission of any application does not give rise to any obligation to make any incentive payment by the Companies and their parents, subsidiaries, affiliates, agents, contractors, employees, officers, and directors.
Pipe Works Services, Inc. is not liable for rescinded offerings previously approved for the customer if the programs change, reduce funding or a program ends. The agreed upon price must be paid by you regardless of whether the program changes or funds are not received from the utility. It is your responsibility to maintain eligibility and receive payment.
For utility projects that were pre-approved, the incentive request form and/or the online bill repayment form must be signed by the customer and submitted to Pipe Works Services, Inc. prior to installation being scheduled upon offer acceptance, or the offer will expire. Utility programs reserve the right to cancel or rescind the incentive offerings when the required final documentation has not been received prior to the expiration of the offer which is 60 days of offer acceptance.

Any savings are estimates and results may vary. Pipe Works Services, Inc. does not guarantee the amount of energy or money you may save by implementing the recommended changes/upgrades.

Pipe Works Services, Inc. does not offer tax advice. Any tax credit information provided herein is provided for informational purposes only and is not intended to substitute for expert advice from a professional tax/financial planner or the Internal Revenue Service (IRS). For tax advice, please contact your tax adviser or the IRS.

HOLD HARMLESS AGREEMENT
I hereby acknowledge that in requesting the drain cleaning/plumbing services recommended to me today, that I understand that the condition of the plumbing system, pipes and/or all of the connecting supporting systems cannot readily be determined and that these systems may be deteriorated by age, exposure to acid or other chemicals, or even wear and tear. Largely, the plumbing system is an unknown, concealed condition.

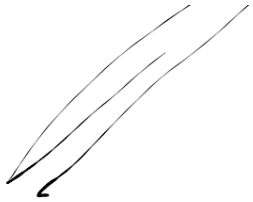
In the case that Pipe Works Services, Inc's sewer equipment/video inspection equipment happens to get stuck due to the poor condition of your sewer line, the cost to remove, repair or replace will be the responsibility of the homeowner.

Therefore, in consideration of the drain cleaning/plumbing services I have requested to be performed, I hereby release and discharge Pipe Works Services, its officers, principals, directors, employees, agents and contractors (hereinafter collectively, "Pipe Works") from any claim of property damage, including consequential damages, in connection with or arising out of the drain cleaning/plumbing services performed. I further agree to indemnify and hold Pipe Works harmless against any such claims made by any third party.

I represent and warrant that I am the owner or duly authorized agent of the owner(s) of the premises where the work is being performed and accept full responsibility.

I represent and affirm that I am of full age and that I have the right to contract in my own name.

I represent and affirm that I have read the foregoing and agree to same.



12/11/2023
I hereby acknowledge that the quoted work was done completely, in a satisfactory manner, and I acknowledge receipt of my copy.
LIMITED WARRANTY: All materials, parts, and equipment are warranted by the manufacturers' or suppliers' written warrant only. All labor performed by the above named company is warranted for 30 days or as otherwise indicated in writing. The above named company makes no other warranties, express or implied, and its agents or technicians are not authorized to make any such warranties on behalf of above named company.



12/11/2023

APPENDIX 5- HISTORICAL CORRESPONDENCE & DOCUMENTATION

"Additions and Alterations at Stillwater Township Elementary School," dated 6/10/86, Civil, Architectural, Structural by Charles Schaffer & Associates	14 Drawings
Project Manual and Technical Specifications, undated by Charles Schaffer & Associates	247 pages
Geotechnical Report "Soils & Foundation Investigation Proposed Addition to Elementary School Stillwater, NJ", dated May 6, 1986 by Melick-Tully & Associates Inc	27 pages
1989 Cracking investigation and repair documentation	9 pages
2019 Crack Monitoring Memorandum Parette Somjen Architects	27 pages

12-8-86

8350

SOIL EROSION & SEDIMENT CONTROL NOTES

I. General.
1. All soil erosion and sediment control measures shall be in accordance with "Standards for Soil Erosion and Sediment Control in New Jersey" as amended (N.J.S.A. 4:24-42).
2. Areas of land disturbance shall be held to a minimum and all soil removal, grading and construction shall proceed in such a manner as to prevent disturbed soils from being carried off the site.
3. Soil Conservation District shall be notified at least 48 hours prior to any land disturbance. 383-3600.

II. Areas of project
1. Total Tract - 9.559 Acres
2. Proposed disturbance: 0.50 acre

III. Construction Sequence/Duration
1. Project to begin upon receipt of necessary approvals.
A. INSTALLATION OF SEDIMENTATION BARRIERS (1 day)
B. REMOVAL OF TREES (5 DAYS)
C. STRIPPING OF TOPSOIL (1 DAY)
D BUILDING CONSTRUCTION (280 days)
E. FINAL GRADING & REMOVAL OF CONTROL DEVICES (2 DAYS)
F SEEDING (2 days)

IV. Soil Erosion & Sediment Control Measures
1. Stripped topsoil shallbe stockpiled as shown on Sht's. and temporally seeded with rye grass.
2. All disturbed areas not to be constructed on shall immediately (within 30 days) shall be temporally seeded or mulched.
3. Drainage structure shall be protected as shown on drawing.
4. A supply of hay bales and anchoring stakes shall be kept on site and installed in accordance with the detail shown hereon in areas where sedimentation run off becomes evident.

V. Stabilization
1. Temporary - rye grass seed at rate of 0.9 lbs/1000 s.f.
2. Permanent
A. Seedbed preparation - apply fertilizer (10-20-10) at rate of 21 lbs./1000 s.f., also also release nitrogen (38-0-0) at rate of 7 lbs./1000 sq. ft., also limestone at rate of 235 lbs./1000 s.f.

Kentucky-31 tall fescue o.7 lbs./1000 s.f.
Spreading fescue o.7 lbs./1000 s.f.
Kentucky bluegrass o.7 lbs./1000 s.f.

C. Irrigation - none
D. Topdressing - none
3. Mulching - If mulching is used as alternative to temporary seedings or due to off season construction, mulch shall be wheat or straw applied at rate of 70 - 90 lbs./1000 s.f. Mulch shall be anchored.
4. Mulching shall be applied to all seeded areas.
On slopes greater than 5%, the mulch must be bound.

VI. DURING LAND DISTURBANCE ACTIVITIES AND DURING CONSTRUCTION, ANY ADDITIONAL CONTROL MEASURES AS DEEMED NECESSARY TO PREVENT EROSION AND CONTROL OF SEDIMENT BEYOND THOSE SHOWN ON THE APPROVED PLANS SHALL BE INSTALLED AS DIRECTED BY THE TOWNSHIP ENGINEER OF SUSSEX COUNTY SOIL CONSERVATION DISTRICT.

VII THE CONTRACTOR WILL OBTAIN THE DISTRICT ISSUED REPORT OF COMPLIANCE PRIOR TO OCCUPANCY.

TAX LOT 10, BLOCK 3306
LANDS OF ROY BISCHOFF, INC.
MASONRY SUPPLIES, RETAIL.

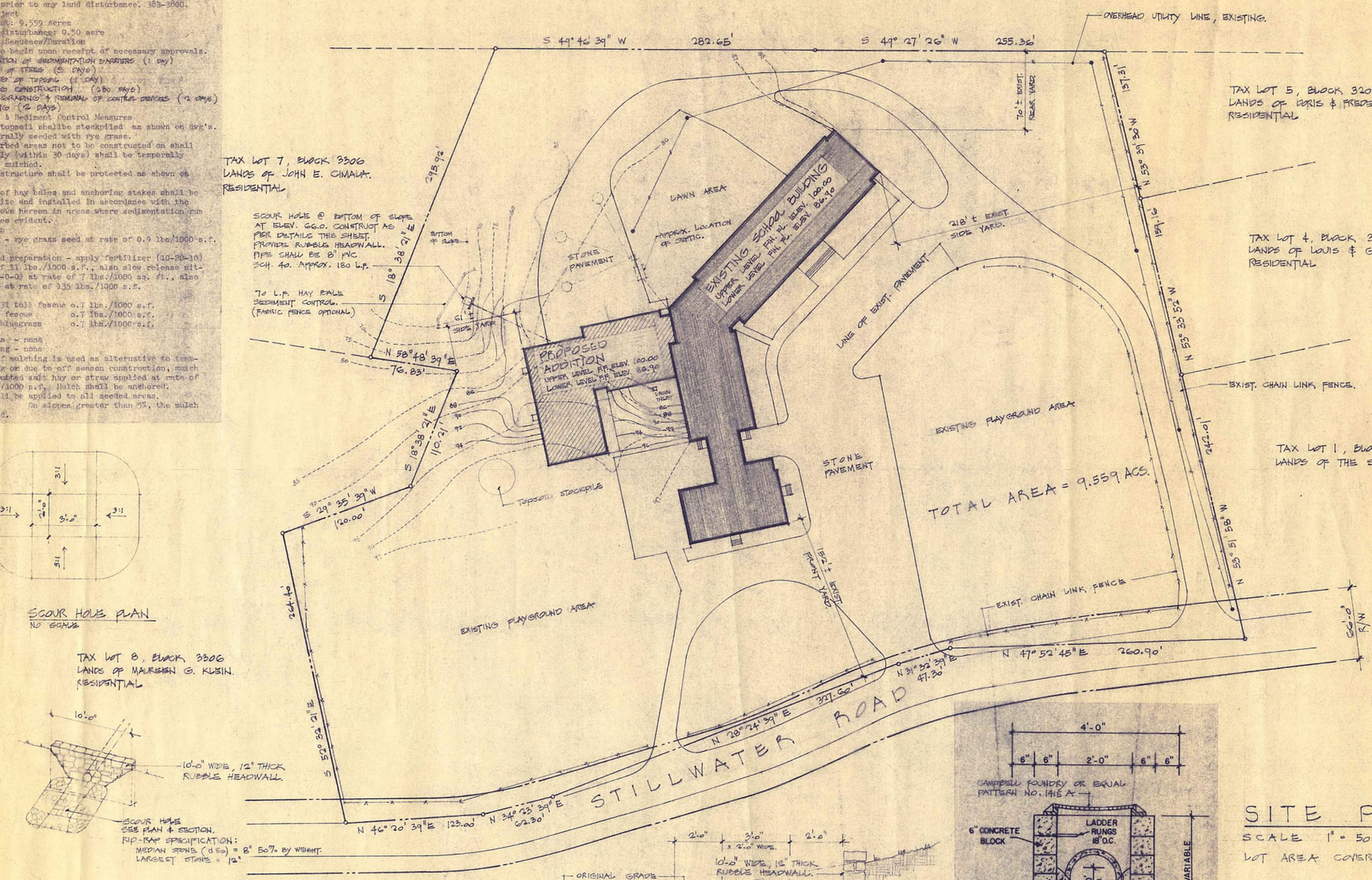
TAX LOT 7, BLOCK 3306
LANDS OF JOHN E. CIMALA.
RESIDENTIAL

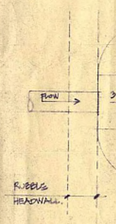
TAX LOT 5, BLOCK 3202A
LANDS OF DORIS & FREDERICK HUPP
RESIDENTIAL

TAX LOT 4, BLOCK 3202A
LANDS OF LOUIS & GRETNA FINKELSTEIN
RESIDENTIAL

TAX LOT 1, BLOCK 3202A
LANDS OF THE STILLWATER PRESBYTERIAN CHURCH.

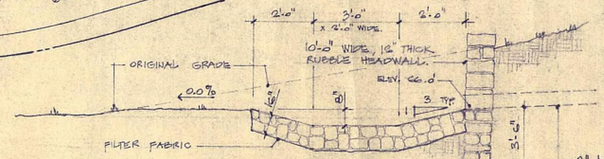
TAX LOT 8, BLOCK 3306
LANDS OF MAUREEN G. KLEIN.
RESIDENTIAL





SCOUR HOLE PLAN
NO SCALE

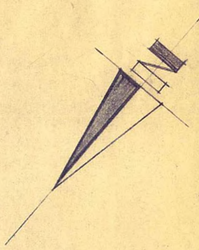
STONE RIP-RAP AREA ELEVATION
NO SCALE

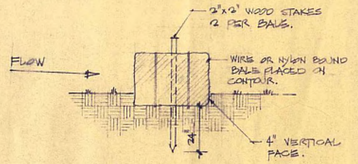


STONE RIP-RAP AREA SECTION
NO SCALE

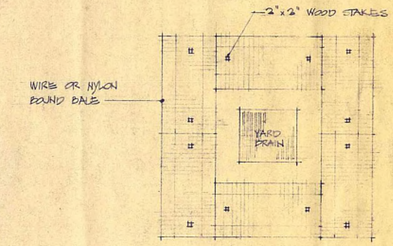
8" ϕ PVC SCH. 40 PIPE @ 4.7% SLOPE.

LAWN INLET DETAIL
NO SCALE





STRAW BALE DIKE EMBEDDING DETAIL
No SCALE



STRAW BALE FILTER @ YARD DRAIN
NO SCALE

SITE PLAN
SCALE 1" = 50'-0"
LOT AREA COVERAGE: .08 %

SHT. A-1 REVISED: 12-5-86
SHT. A-1 REVISED: 10-18-86
ENTIRE SET REVISED: 12-8-86

A-1 Drawing

CHARLES SCHAFFER & ASSOCIATES
architect · planner
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ADDITION & ALTERATION FOR STILLWATER TOWNSHIP ELEM. SCHOOL
STILLWATER, NEW JERSEY

DATE 9-11-85
drawn by M.E.
ck'd by C.S.

NJ C.7620
PA 8515 B

ADDITION & ALTERATION for STILLWATER TOWNSHIP ELEMENTARY SCHOOL

LOWER LEVEL FLOOR PLAN

SCALE — 1/8" = 1'-0"

FLOOR AREA OF LOWER LEVEL ADDITION : 10,938 S.F.

CLASSROOM 103

KINDERGARTEN 102

CORRIDOR 101

RESOURCE RM. 105

KINDERGARTEN 104

MULTI-PURPOSE ROOM 111

SPECIAL EDUC. 120

CAFETERIA

EXIST. HANDICAPPED REST ROOM FACILITY.

UTILITY 118

WOMEN 116

MEN 115

STORAGE 117

JAN. 112

TEACHER 113

EQUIP. 119

ELEV.

CHALKBOARD "A"

CHALKBOARD TYPE A

CHALKBOARD TYPE B

EXP. JT.

D.F.

FIRE-EXT. CABINET

RECESSED ENTRIES

R.L.

R.H.

LEVEL AREA

RAMP DN. 1/12 MAX. SLOPE

ALUMINUM RAILING

ALUMINUM HANDRAIL 32" ABOVE RAMP 1½" CLEARANCE FROM WALL.

EXTEND HANDRAILS ONE FOOT BEYOND RAMP. TYPICAL THROUGHOUT.

TYPICAL ALL RECESSED ENTRANCES: 1"x6" T & G CLEAR CEDAR SOFFIT, SQUARE EDGE. 2"x4" FURRING. R-30 INSULATION.

REMOVE WINDOW & BLOCK OPENING. PATCH TO MATCH EXIST.

CONSTRUCT NEW 6" CONCRETE BLOCK FIRE-WALL TO RECEIVE 2-HR. U.L. DESIGN U 906

PROVIDE 3 FIRE EXTINGUISHER CABINETS WHERE SHOWN ON PLANS. LARSEN'S OR EQUAL RECESSED 27"x 12"x 8" PAINTED STEEL CABINET, ARCHITECTURAL SERIES W/ FULL WIRE GLASS DOOR.

RE-PLASTER ENTIRE WALL

REMOVE WINDOW & DOOR. BLOCK OPENINGS. PATCH TO MATCH ALL INTERIOR FINISHES.

ALL 6" MASONRY WALLS TO 9'-4" HEIGHT THIS AREA.

2"x 8" 16" O.C. FRAMING RAFTERS. 5/8" TYPE X FIRECODE GYP. BRD. CEILING @ UTILITY RM.

8" ϕ SCH. 40 PVC PIPE

4" ϕ SCH. 40 P.V.C. PIPE

4'-0" x 4'-0" GIRL-WAY WINDOW IN 4" STEEL FRAME.

ALL TAPE LINES SHALL BE 2" WIDE. ALL MARKINGS TO BE INCLUDED AS REQ'D BY THE AMATEUR ATHLETIC UNION.

ALTERNATE #3. SUBSTITUTE "FISSURED" CEILING TILE WITH "ROCK FACE" CEILING TILE IN MULTI-PURPOSE ROOM # 111.

3'-4" x 4'-8" CONC. PLATFORM. TYP. FOR 2.

DROP CURTAIN DIVIDERY, ELECTRICALLY OPERATED. 44'-0" WIDE, SOLID & MESH. CURTAIN SHALL BE 4'-0" CHAT OF EACH WALL. ALTERNATE # 1 (INCLUDE DROP CURTAIN).

ALTERNATE # 2 (OMIT VINYL TILE & INSTALL MAPLE FLOORING) PROVIDE & INSTALL HORNER OR EQUAL 5/16" THICKNESS NORTHERN HARD MAPLE MULTI-PURPOSE ROOM FLOORING. PLANKS SHALL BE 12" x 7/8" AND BONDED FIRMLY AND COMPLETELY TO THE ADHESIVE BED. PROVIDE BUILT-IN EXPANSION JOINTS. SURFACES SHALL BE SOLID BIRCH GRAIN. APPLY FLOORING DIRECTLY OVER CONCRETE FLOOR WITH NO RECESS OF FLOOR NECESSARY. AREA TO BE COVERED : 4880 S.F.

EXTENT OF 4" ϕ FOOTING DRAIN.

ALTERNATE # 4. INCREASE WIDTH OF MULTI-PURPOSE ROOM BY 4'-0" ENTIRE 116'-0" LENGTH.

BACKSTOP

PRECAST CONCRETE SPLASHBLOCK @ GRADE TYPICAL @ CONDITIONS

8" DIA. SCH. 40 PVC DRAIN PIPE SEE SITE PLAN.

LAWN INLET CAMPBELL FOUNDRY PATTERN NO. 1415-A

133'-1"

53'-0"

80'-1"

64'-4"

127'-0"

54'-0"

73'-0"

116'-0"

105'-0"

44'-8"

47'-0"

16'-4"

42'-6"

54'-0"

CHARLES SCHAFFER & ASSOCIATES
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ADDITION & ALTERATION FOR STILLWATER TWP. SCHOOL

STILLWATER, NEW JERSEY

71 C 7620
job 8615 B

A-2 drawing

date

drawn by M.S.

ck'd by CHAS

UPPER LEVEL FLOOR PLAN

SCALE ——— 1/8" = 1'-0"

FLOOR AREA OF UPPER LEVEL: 4684 S.F.

KINDERGARTEN 204

RESOURCE 205

RESOURCE 206

CLASSROOM 207

CORRIDOR 208

STAIRWELL 110

CLASSROOM 202

CLASSROOM 203

LIBRARY 210

ELEV.

CLOSET

HNDCP.

EXP. JT.

3/4" PLYWOOD DECK FOR HVAC SERVICE.

EXTEND PIER TO WINDOW SILL.

PROP CURTAIN. (ALTERNATE #1)

4" BRICK VENEER (SEE ALTERNATE #7)

REMOVE EXIST. BRICK

REMOVE EXIST. WINDOWS. BLOCK OPENING TO MATCH EXISTING. MATCH BLOCK COURSING.

NEW VINYL FLOOR THIS AREA.

REMOVE WALL. HEADER SHALL 2" BELOW HUNG CLG.

3 1/2" x 3 1/2", 18 GA. STAINLESS STEEL CORNER GUARDS. FULL HEIGHT.

CONSTRUCT NEW 6" CONCRETE BLOCK FIRE-WALL TO ROOF. 2-HR. U.L. DESIGN U 906

REMOVE EXIST. WINDOWS. BLOCK OPENING TO MATCH EXISTING. MATCH COURSING.

REMOVE WALL.

INVESTIGATE BEAMS IN FIELD FOR 12" LABEL, 1/2 YR. (BEAMS & FRAMES) REPLACEMENT IF NECESSARY WILL BE BY CHANGE ORDER. (BOTH PLANS FROM LIBRARY)

"DESCO" OR EQUAL 3500 SERIES THERMAL BARRIER WINDOW. STATIONARY SERIES.

LINE OF CEM. SILL

SUPPORT COL. WHERE SHOWN ON STRUCTURAL DRAWINGS.

1" INSULATING GLASS.

CHALKBOARD TYPE A

CHALKBOARD TYPE B

CHALKBOARD TYPE A

CHALKBOARD TYPE A

133'-1"

53'-0"

80'-1"

13'-4" 4'-0" 4'-0" 4'-0" 26'-5" 4'-0" 10'-8" 4'-0" 9'-8"

43'-2"

25'-10"

20'-0"

28'-10"

13'-4"

21'-0"

14'-0"±

52'-0"

27'-2"

35'-2"

64'-4"

54'-0"

73'-0"

127'-0"

116'-0"

75'-0"

25'-0"

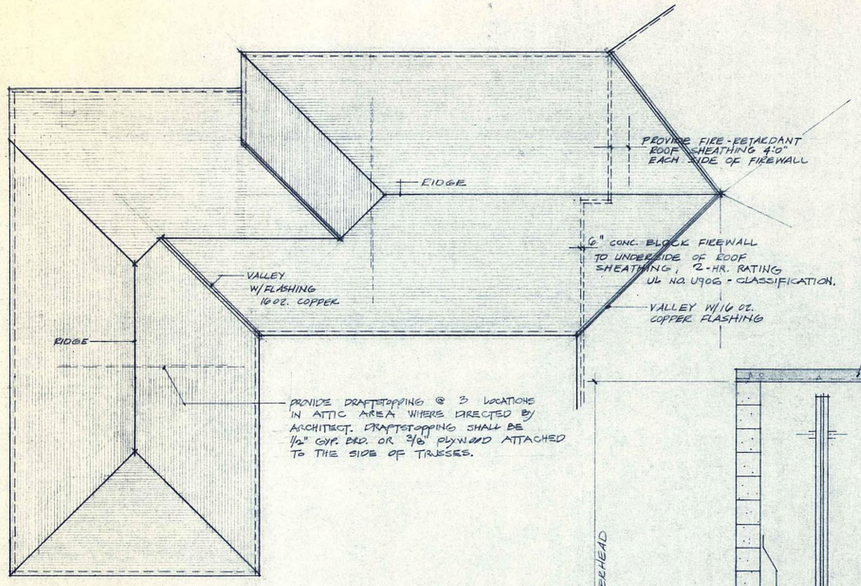
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architect. planner
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ADDITION & ALTERATION FOR STILLWATER TWP. School
STILLWATER, NEW JERSEY

date 6-10-86
drawn by WE
ck'd by CHAS

nj C 7620
pa 8615 B

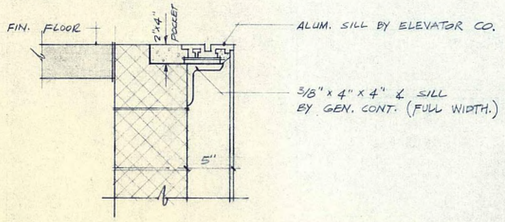
A-3
drawing



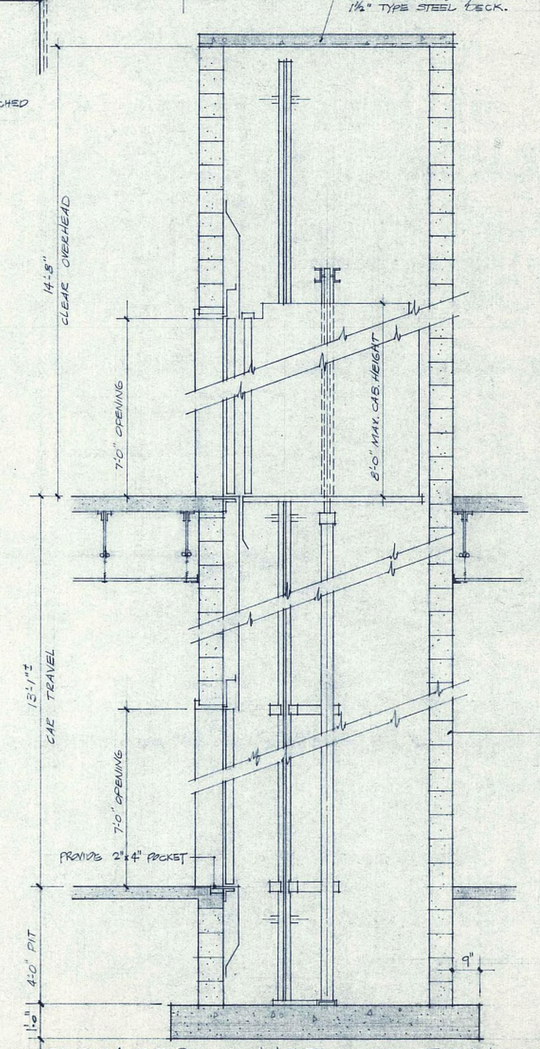
ROOF PLAN
SCALE — 1/16" = 1'-0"

NOTE:
BARRIER-FREE REQUIREMENTS FOR ELEVATOR SHALL BE AS OUTLINED IN APPENDIX "D" OF N.J. BARRIER-FREE CODE.

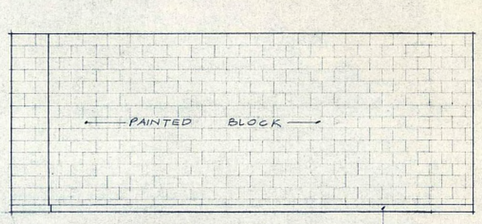
ELEVATOR PLAN
SCALE — 1/2" = 1'-0"



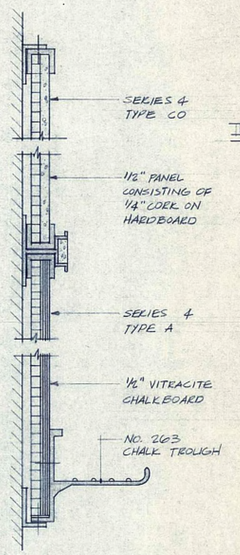
SILL DETAIL
SCALE — 1 1/2" = 1'-0"



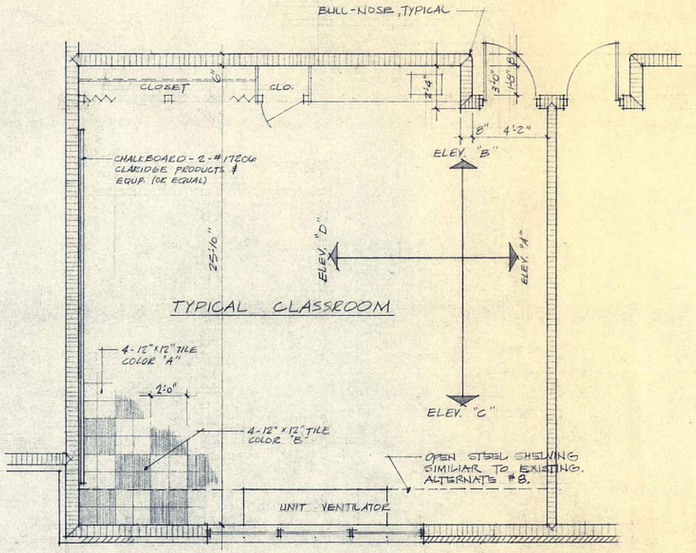
ELEVATOR SHAFT SECTION
SCALE — 1/2" = 1'-0"



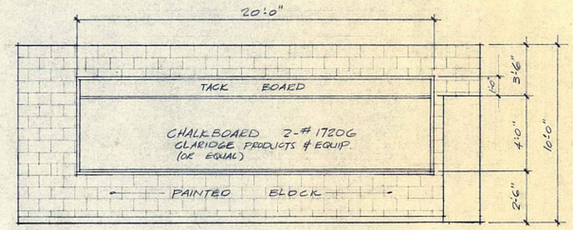
ROOM ELEVATION "A"
SCALE 1/4" = 1'-0"



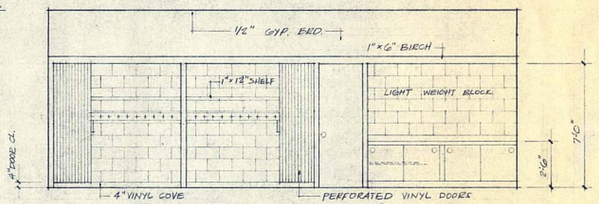
CHALK & TACK BOARD DETAIL
SCALE — 1/2" = 1"
BOTH FROM CLARIDGE PRODUCTS & EQUIPMENT OR EQUAL



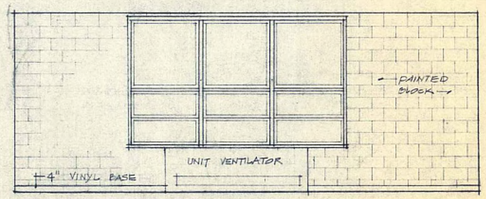
TYPICAL CLASSROOM PLAN
SCALE 1/4" = 1'-0"



ROOM ELEVATION "D"
SCALE 1/4" = 1'-0"



ROOM ELEVATION "B"
SCALE 1/4" = 1'-0"



ROOM ELEVATION "C"
SCALE 1/4" = 1'-0"

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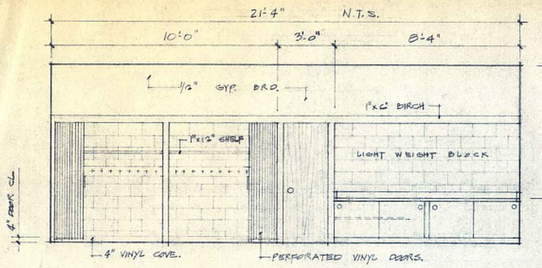
8350

A-4 drawing

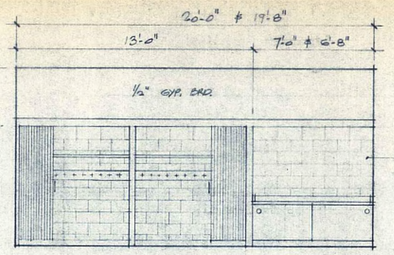
date 6-10-82
drawn by KML
ck'd by CHAS

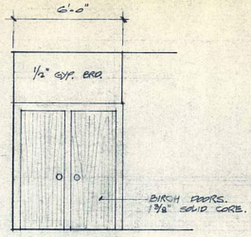
nj C 1620
pa 8615 B

ADDITION & ALTERATION FOR:
STILLWATER TWP. SCHOOL
STILLWATER, NEW JERSEY

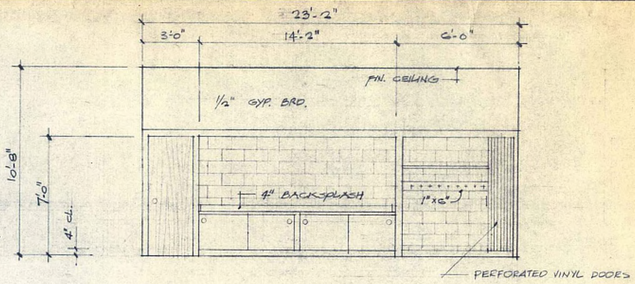


ROOM # 202 WALL ELEVATION
SCALE — 1/4" = 1'-0"

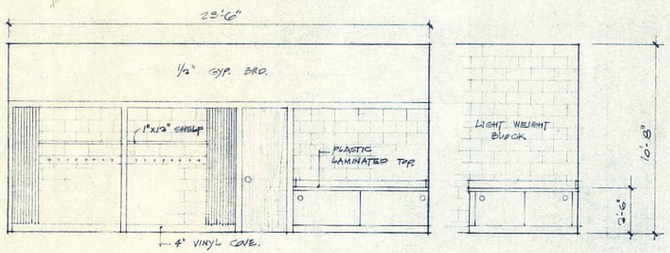




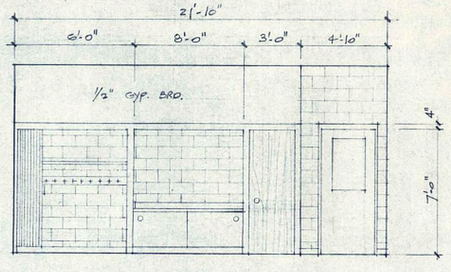
ROOM #204 & #104 WALL ELEVATIONS
SCALE — 1/4" = 1'-0"



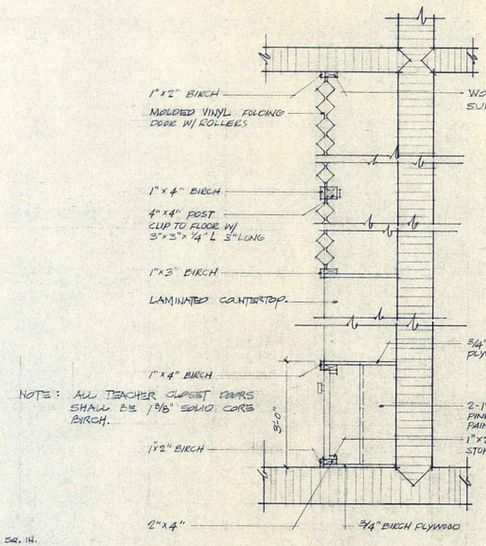
ROOM #103 WALL ELEVATION
SCALE — 1/4" = 1'-0"



ROOM #102 WALL ELEVATIONS
SCALE — 1/4" = 1'-0"

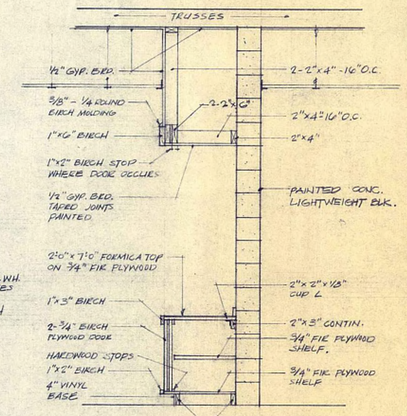


ROOM #105 WALL ELEVATION
SCALE — 1/4" = 1'-0"

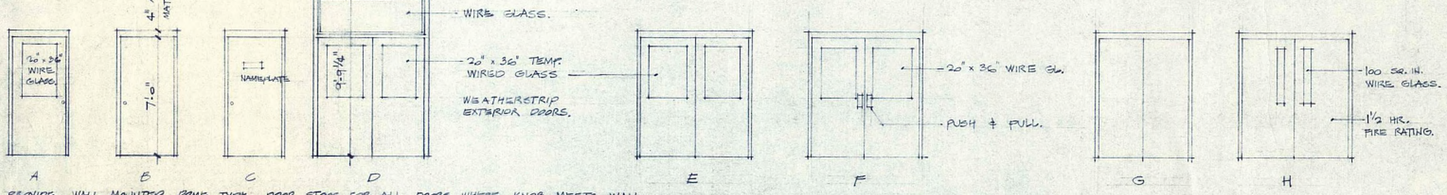


NOTE: ALL TEACHER CLOSET DOORS SHALL BE 1 3/8" SOLID CORE BIRCH.

TYPICAL CABINET PLAN SECTION SCALE — 1/2"=1'-0"



TYPICAL CABINET SECTION
SCALE — 1/2" = 1'-0"



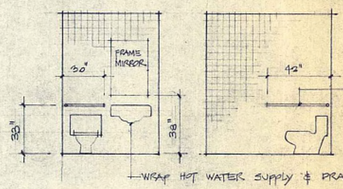
PROVIDE WALL MOUNTED DOME TYPE DOOR STOPS FOR ALL DOORS WHERE KNOB MEETS WALL.
HARDWARE NUMBERS REFER TO RUSSWIN LOCKSETS, OR APPROVED EQUAL. ALL DOORS SHALL HAVE 1½ PR. HINGES.

DOOR SCHEDULE

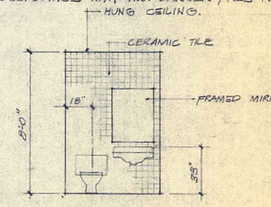
NO.	SIZE	TYPE	MATERIAL	HARDWARE	JAMB	REMARKS	DOORS & FRAMES FIRE RATING
1	2'-3 1/2"x7'-0"x1 3/4"	E	METAL	PANIC HARDWARE	METAL	CLOSERS, MORTISE LOCK	
2	3'-0"x7'-0"x1 3/4"	A	METAL	#4340 8/8	"		20 MIN.
3	2'-6"x7'-0"x1 3/4"	D	METAL	#4320	"		
4	3'-0"x7'-0"x1 3/4"	A	METAL	#4340 8/8	"		20 MIN.
5							
6	3'-0"x7'-0"x1 3/4"	A	METAL	#4340 8/8	"		20 MIN.
7	2'-0"x7'-0"x1 3/4"	B	METAL	#4320	"		
8	3'-0"x7'-0"x1 3/4"	A	METAL	#4340 8/8	"		20 MIN.
9	2'-3'-0"x7'-0"x1 3/4"	F	METAL	PANIC HARDWARE	"	CLOSERS, VERTICAL RODS.	20 MIN.
10	"	F	METAL	PANIC HARDWARE	"	CLOSERS, VERTICAL RODS.	1 1/2 HR.
11	"	D	METAL	PANIC HARDWARE	"	CLOSERS, VERTICAL RODS.	
12	"	F	METAL	PANIC HARDWARE	"	"E" LABEL, CLOSERS, VERT. RODS.	1 1/2 HR.
13	3'-0"x7'-0"x1 3/4"	B	METAL	PANIC HARDWARE	"	"	
14	"	B	METAL	PANIC HARDWARE	"	"	
15	"	A	METAL	#4340 8/8	"		
16	2'-3'-0"x7'-0"x1 3/4"	F	METAL	PANIC HARDWARE	"	CLOSERS, VERTICAL RODS.	20 MIN.
17	"	E	METAL	PANIC HARDWARE	"	CLOSERS MORTISE LOCK	
18	"	C	METAL	#4320	"	PROVIDE CLOSER, NAMEPL.	
19	3'-0"x7'-0"x1 3/4"	B	METAL	#4352	"		
20	"	C	METAL	#4320	"	PROVIDE CLOSER, NAME PL.	
21	2'-3'-0"x7'-0"x1 3/4"	G	METAL	#4352	"	ONE LEAF TO HAVE HEAD & FOOT BOLT.	
22	2'-2'-0"x6'-8"x1 3/4"	G	METAL	#4352	"	ONE LEAF W/HEAD & FOOT BOLT	
23	2'-3'-0"x7'-0"x1 3/4"	H	METAL	PANIC HARDWARE	"	"E" LABEL, CLOSERS, VERT. RODS	1 1/2 HR.
24	3'-0"x7'-0"x 1 3/4"	B	METAL	#4352	"	"C" LABEL	3/4 HR.
25	"	A	METAL	#4340 8/8	"		20 MIN.
26	2'-3'-0"x7'-0"x1 3/4"	F	METAL	PANIC HARDWARE	"	CLOSERS, VERTICAL RODS	1 1/2 HR.
27	3'-0"x7'-0"x1 3/4"	B	METAL	#4320	"		
28	3'-0"x7'-0"x1 3/4"	A	METAL	#4340 8/8	"		20 MIN.
29	3'-0"x7'-0"x1 3/4"	A	METAL	#4340 8/8	"		20 MIN.
30	3'-0"x7'-0"x1 3/4"	A	METAL	#4340 8/8	"		20 MIN.
31	3'-0"x7'-0"x1 3/4"	A	METAL	#4340 8/8	"		20 MIN.
32	"	C	METAL	#4320	"		20 MIN.
33	"	A	METAL	#4340 8/8	"		20 MIN.
34	2'-6"x7'-0"x1 3/4"	B	METAL	#4352	"		
35	2'-3'-0"x7'-0"x1 3/4"	H	METAL	PANIC HARDWARE	"	"E" LABEL, CLOSERS, VERT. RODS	1 1/2 HR.
36	2'-6"x7'-0"x1 3/4"	B	METAL	#4320	"		

ROOM FINISH SCHEDULE

NO.	FLOOR	BASE	WALLS NORTH	WALLS EAST	WALLS SOUTH	WALLS WEST	CEILING	REMARKS
101	VINYL TILE	VINYL	PAINT	PAINT	PAINT	PAINT	8'-0" HUNG CLG.	PAINT WALL DIFFERENT COLOR TO 48".
102	VINYL TILE	"	"	"	"	"	10'-8" HUNG CLG.	STAIN BIRCH DOOR & CABINETWORK.
103	"	"	"	"	"	"	"	"
104	"	"	"	"	"	"	"	"
105	"	"	"	"	"	"	"	"
106	CERAMIC TILE	CERAMIC	CERAMIC T.	CERAMIC T.	CERAMIC T.	CERAMIC T.	8'-0" HUNG CLG.	
108	"	"	"	"	"	"	"	
109	VINYL TILE	VINYL	PAINT	PAINT	PAINT	PAINT	"	PAINT WALL DIFFERENT COLOR TO 48".
110	"	"	"	"	"	"	SAME AS 2ND FL.	PAINT WALL DIFFERENT COLOR 48" ABOVE STAIR LINE.
111	VINYL TILE	VINYL	"	"	"	"	22'-0" HUNG CLG.	SEE ALTERNATE FLOOR FIN. PAINT WALL DIFF. COLOR TO 9'-4".
112	VINYL TILE	VINYL	PAINT	PAINT	PAINT	PAINT	8'0" HUNG CLG.	2'-0"x2'-0" CLG. GRID.
113	"	"	"	"	"	"	8'-2" HUNG CLG.	
114	"	"	"	"	"	"	7'-0" HUNG CLG.	PAINT WALL DIFFERENT COLOR TO 48".
115	CERAMIC TILE	CERAMIC	CERAMIC T.	CERAMIC T.	CERAMIC T.	CERAMIC T.	8'-0" HUNG CLG.	
116	CERAMIC TILE	CERAMIC	CERAMIC T.	CERAMIC T.	CERAMIC T.	CERAMIC T.	8'-0" HUNG CLG.	
117	VINYL TILE	VINYL	PAINT	PAINT	PAINT	PAINT	1/2" GYP. BRD.	FINISH COAT SPACKLE @ CLG. 10'-0" CLG.
118	NO FINISH	—	—	—	—	—	"	10'-0" CLG. - 2'x6'-16" O.C. FRAMING
119	"	—	—	—	—	—	—	PAINT INTERIOR SIDE OF DOOR & FRAME.
201	VINYL TILE	"	"	"	"	"	8'-0" HUNG CLG.	PAINT WALL DIFFERENT COLOR TO 48"
202	VINYL TILE	"	"	"	"	"	10'-8" HUNG CLG.	STAIN BIRCH DOOR & CABINETWORK
203	"	"	"	"	"	"	"	"
204	"	"	"	"	"	"	"	"
205	"	"	"	"	"	"	"	
206	CERAMIC TILE	CERAMIC	CERAMIC T.	CERAMIC T.	CERAMIC T.	CERAMIC T.	8'-0" HUNG CLG.	
207	"	"	"	"	"	"	"	
208	VINYL TILE	VINYL	PAINT	PAINT	PAINT	PAINT	10'-0" HUNG CLG.	
209	—	MATCH EXIST.	PATCH TO MATCH - REPAINT ENTIRE RM.				ALTER EXIST.	THE INTENT IS TO MATCH EXIST. CONDITIONS & FINISHES.
210	CARPET	—	"	"	"	"	NEW HUNG CLG.	PATCH TILE @ REMOVED WALL. CARPET BY OTHERS.
211	CERAMIC TILE	CERAMIC	CERAMIC T.	CERAMIC T.	CERAMIC T.	CERAMIC T.	8'-0" HUNG CLG.	
120	—	—	RE-PAINT	—	—	—	—	RE-PAINT NORTH WALL ACCENT COLOR



HANDICAP LAVATORY ELEVATIONS
SCALE — 1/4" = 1'-0" RMS.: 112, 116, 207
ALL REST ROOMS ACCESSORIES SHALL BE MOUNTED IN ACCORDANCE WITH N.J. BARRIER FREE REGULATIONS.



TYPICAL LAVATORY ELEVATION
SCALE — 1/4" = 1'-0"
TYPICAL FOR ROOM #106, 107, 108, 206, 211

ROOM ELEVATIONS, ROOM & DOOR SCHEDULES
SCALE : AS NOTED

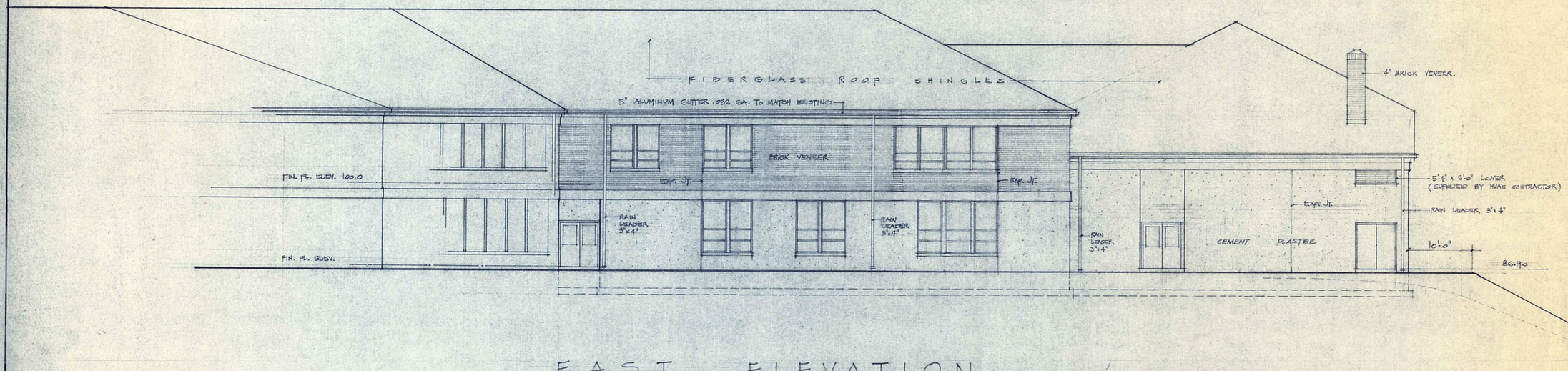
CHARLES SCHAFFER & ASSOCIATES
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ADDITION & ALTERATION FOR
STILLWATER TWP. SCHOOL
STILLWATER, NEW JERSEY

date 6-10-86
drawn by KML
ck'd by CHAS

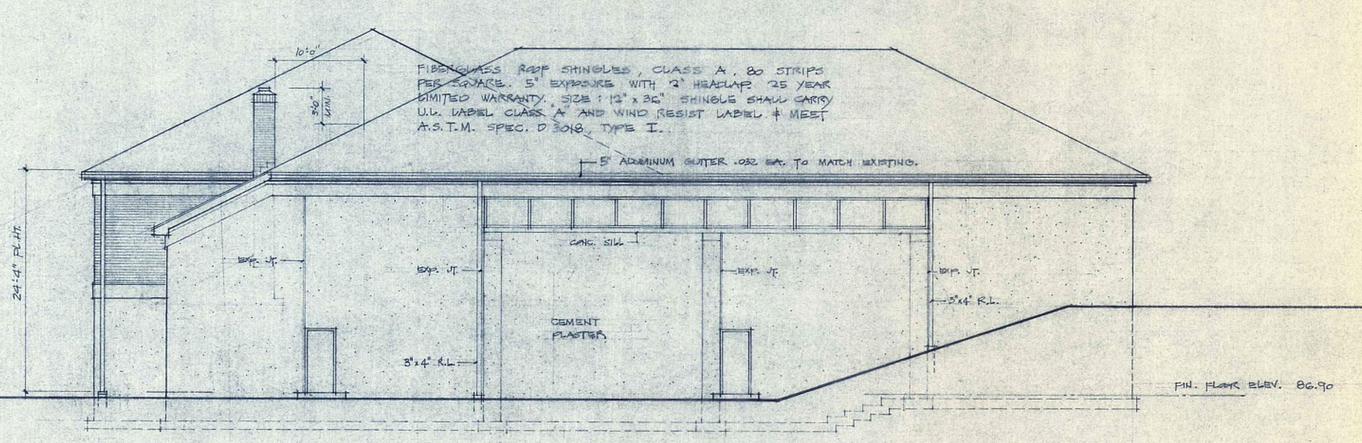
nj C 7620
pa 8615 B

A-5 drawing



EAST ELEVATION

SCALE 1/8" = 1'-0"



NORTH ELEVATION

SCALE 1/8" = 1'-0"

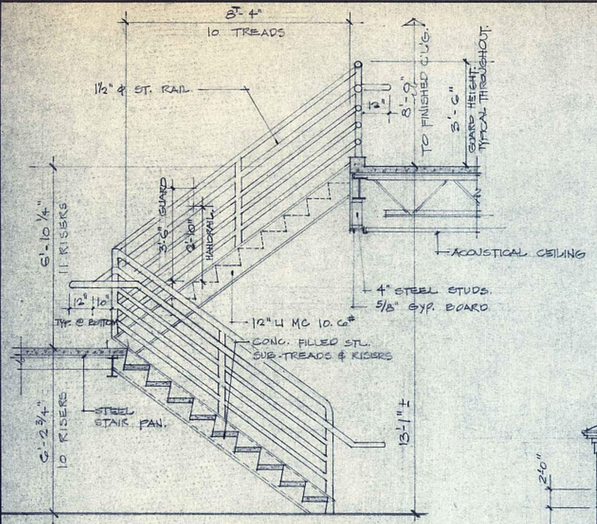
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ADDITION & ALTERATION FOR
STILLWATER TWP SCHOOL
STILLWATER, NEW JERSEY

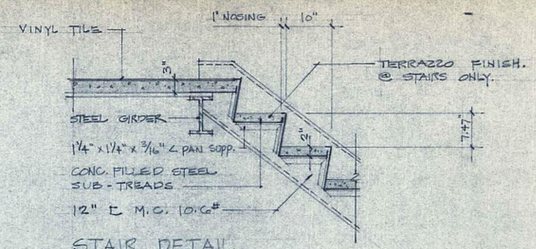
date 6-10-86
drawn by M.E.
ck'd by CHAS

nj C 7620
pa 8615 B

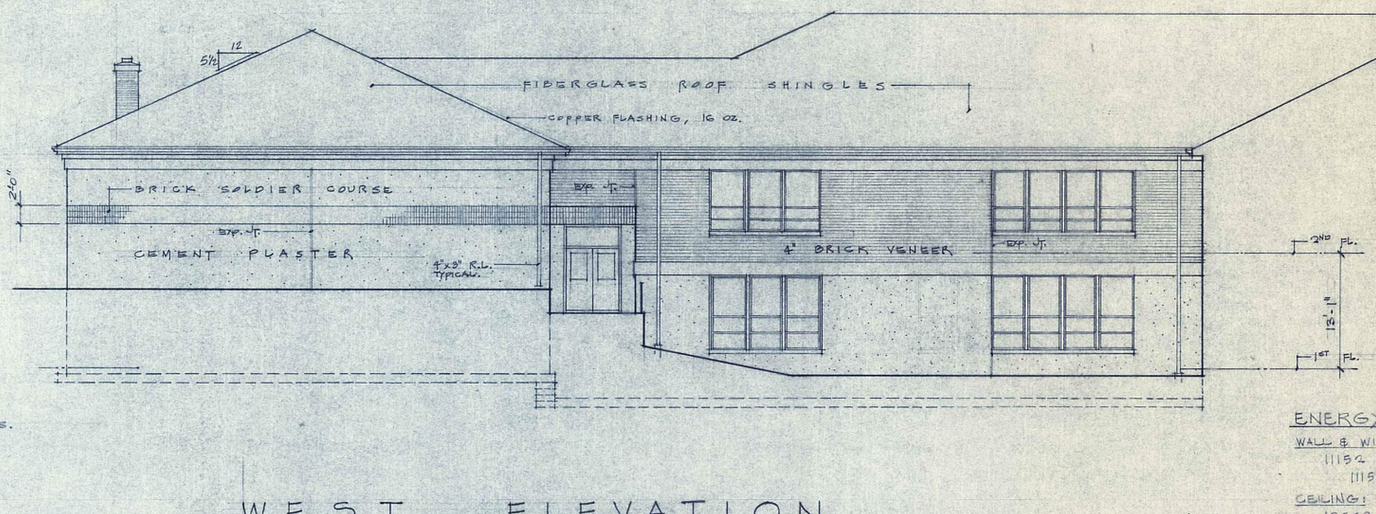
A-6
drawing



SECTION @ STAIR
SCALE: 3/8" = 1'-0"



STAIR DETAIL
SCALE: 3/4" = 1'-0"



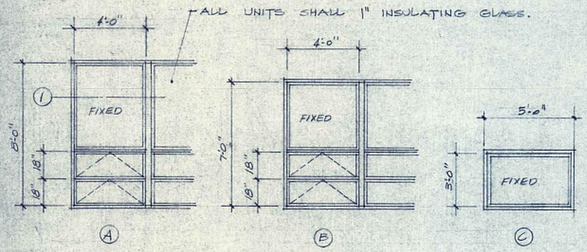
WEST ELEVATION
SCALE 1/8" = 1'-0"

CONSTRUCTION DATA:

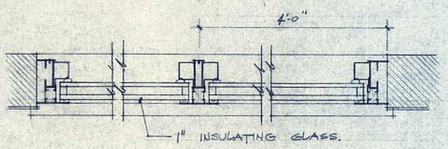
USE GROUP: E-EDUCATIONAL & A-3 ASSEMBLY.
CONSTRUCTION TYPE: 3B
TOTAL ENCLOSED VOLUME: 398,084 C.F.
NEW FLOOR AREA:
LOWER LEVEL: 10,938 S.F.
UPPER LEVEL: 4,684 S.F.
TOTAL: 15,622 S.F.

ENERGY CODE COMPLIANCE

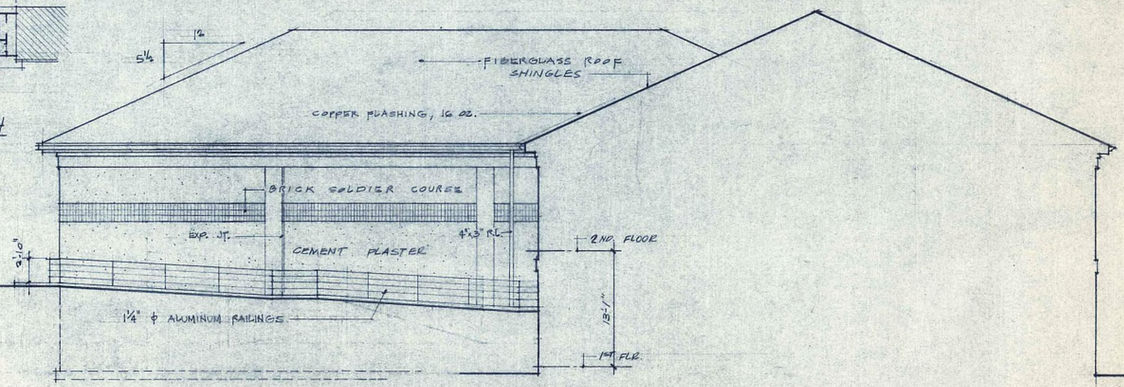
WALL & WINDOW:
11152 S.F. x .17 U-FACTOR = 1895.8 U_o ACTUAL
11152 S.F. x .28 = 3122.6 U_o ALLOWABLE
CEILING:
12569 S.F. x .03 U-FACTOR = 377.1 U_o ACTUAL
12569 S.F. x .076 = 955.2 U_o ALLOWABLE
FLOOR:
44 S.F. x .03 U-FACTOR = 1.3 U_o ACTUAL
44 S.F. x .08 = 2.5 U_o ALLOWABLE
TOTAL ACTUAL: 2274.2 U_o
TOTAL ALLOWED: 4081.3 U_o



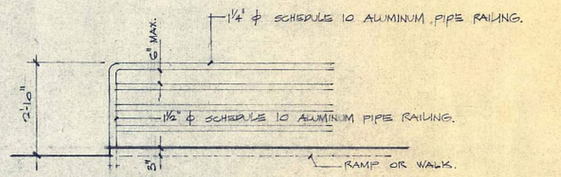
DESCO - 2500 SERIES THERMAL BARRIER WINDOWS OR EQUAL
AWNING & FIXED UNITS - PROVIDE SCREENS AS REQ'D.
SCALE ——— 1/4" = 1'-0"



① JAMB SECTION @ FIXED SASH
SCALE 3/4" = 1'-0"



SOUTH ELEVATION
SCALE 1/8" = 1'-0"



EXTERIOR ALUMINUM PIPE RAILING
SCALE ——— 1/2" = 1'-0"
RAILINGS SHALL BE DESIGNED TO RESIST A SIMULTANEOUS VERTICAL AND HORIZONTAL THRUST OF 50 POUNDS PER L.F. APPLIED AT THE TOP.

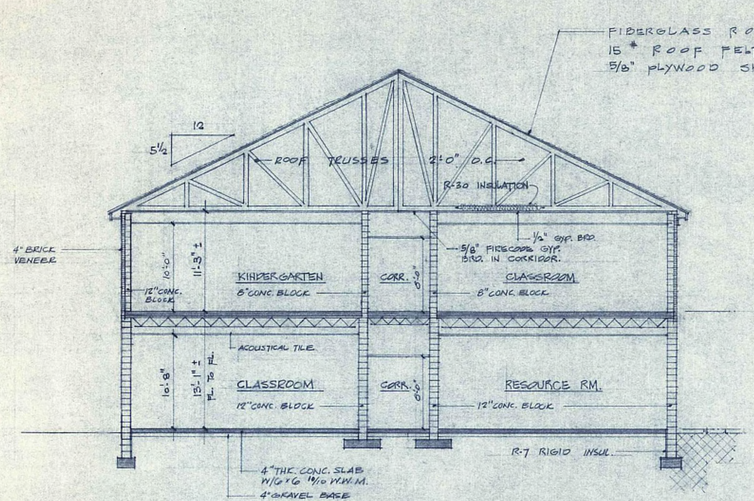
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ADDITION & ALTERATION FOR
STILLWATER TWP. SCHOOL
STILLWATER, NEW JERSEY

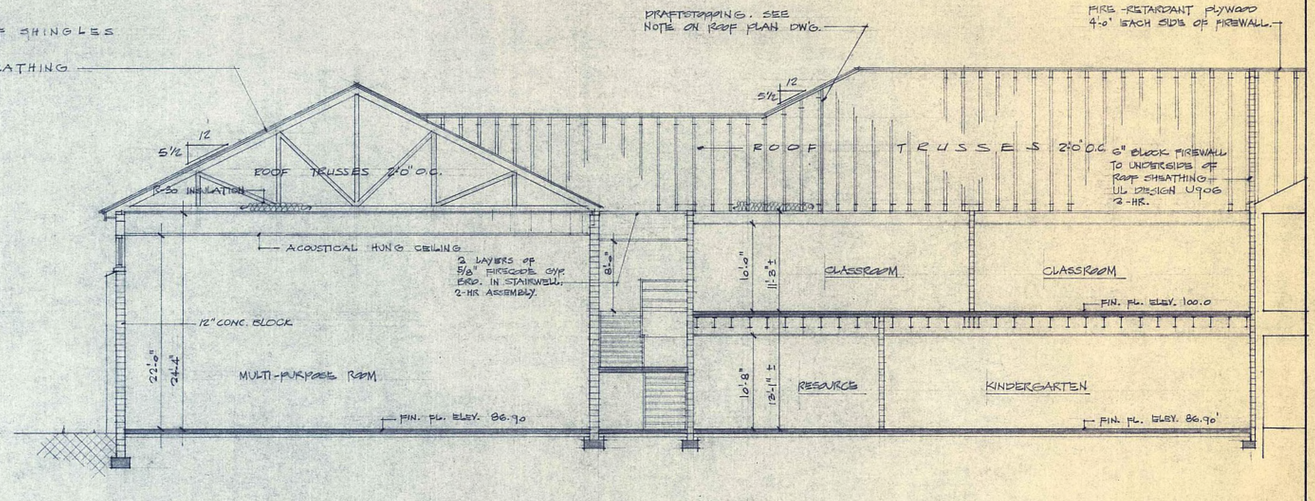
date 6-10-86
drawn by M.E.
ck'd by CHAS.

A-7
drawing

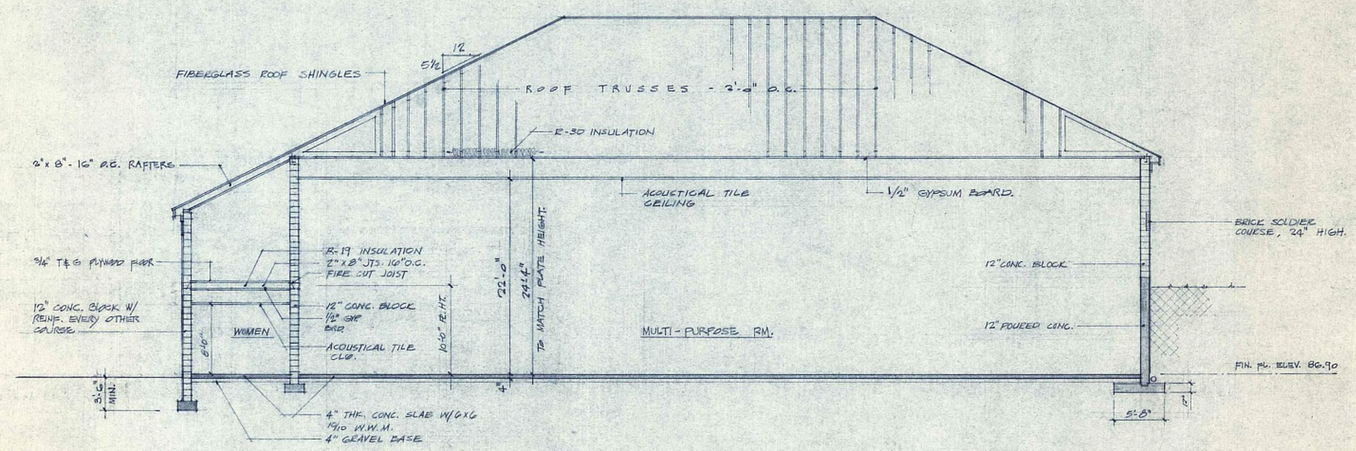
nj. C 1520
pa 8615 B



SECTION
SCALE 1/8" = 1'-0"
1 A-8



SECTION
SCALE 1/8" = 1'-0"
3 A-8



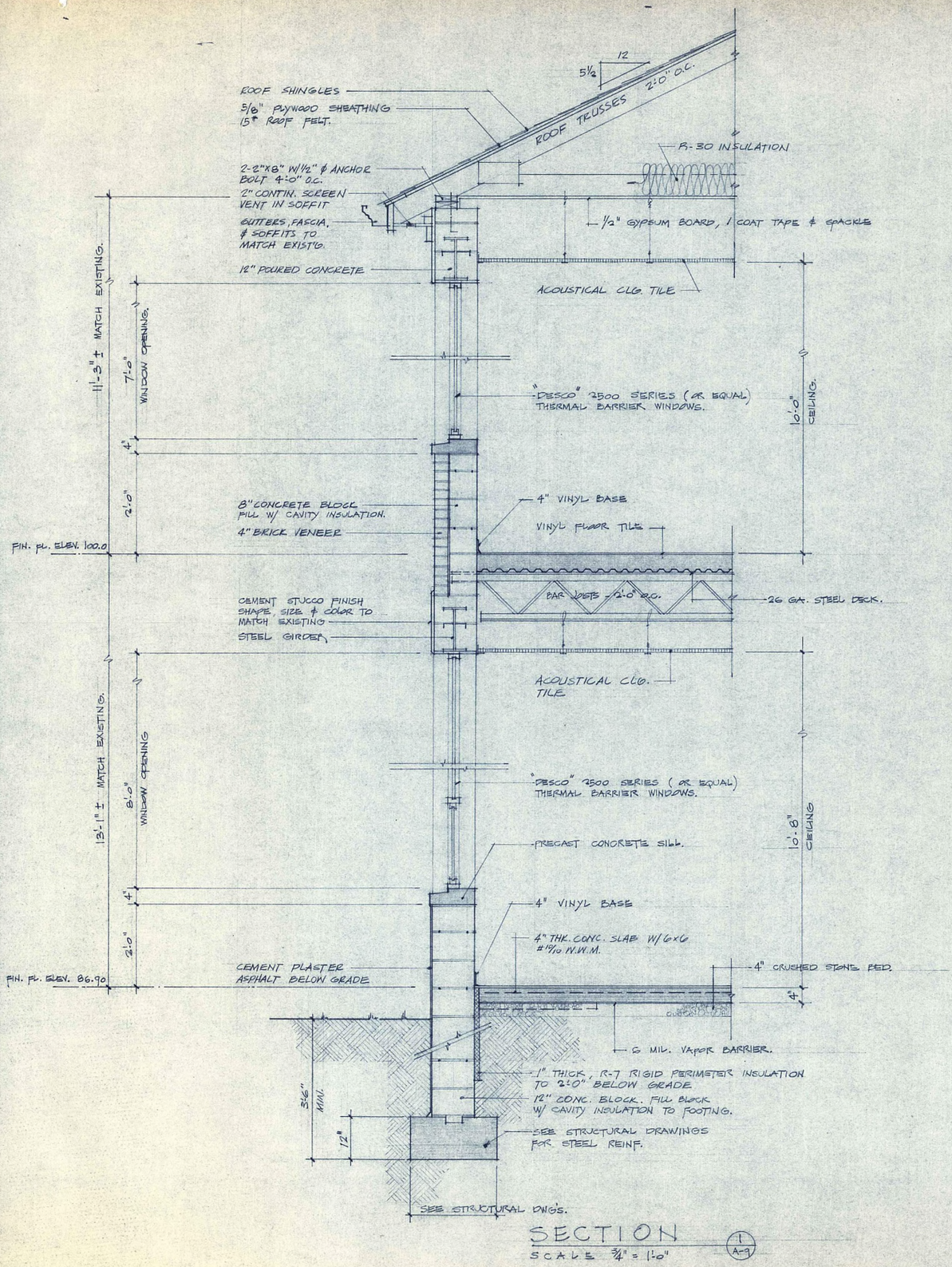
SECTION
SCALE 1/8" = 1'-0"
2 A-8

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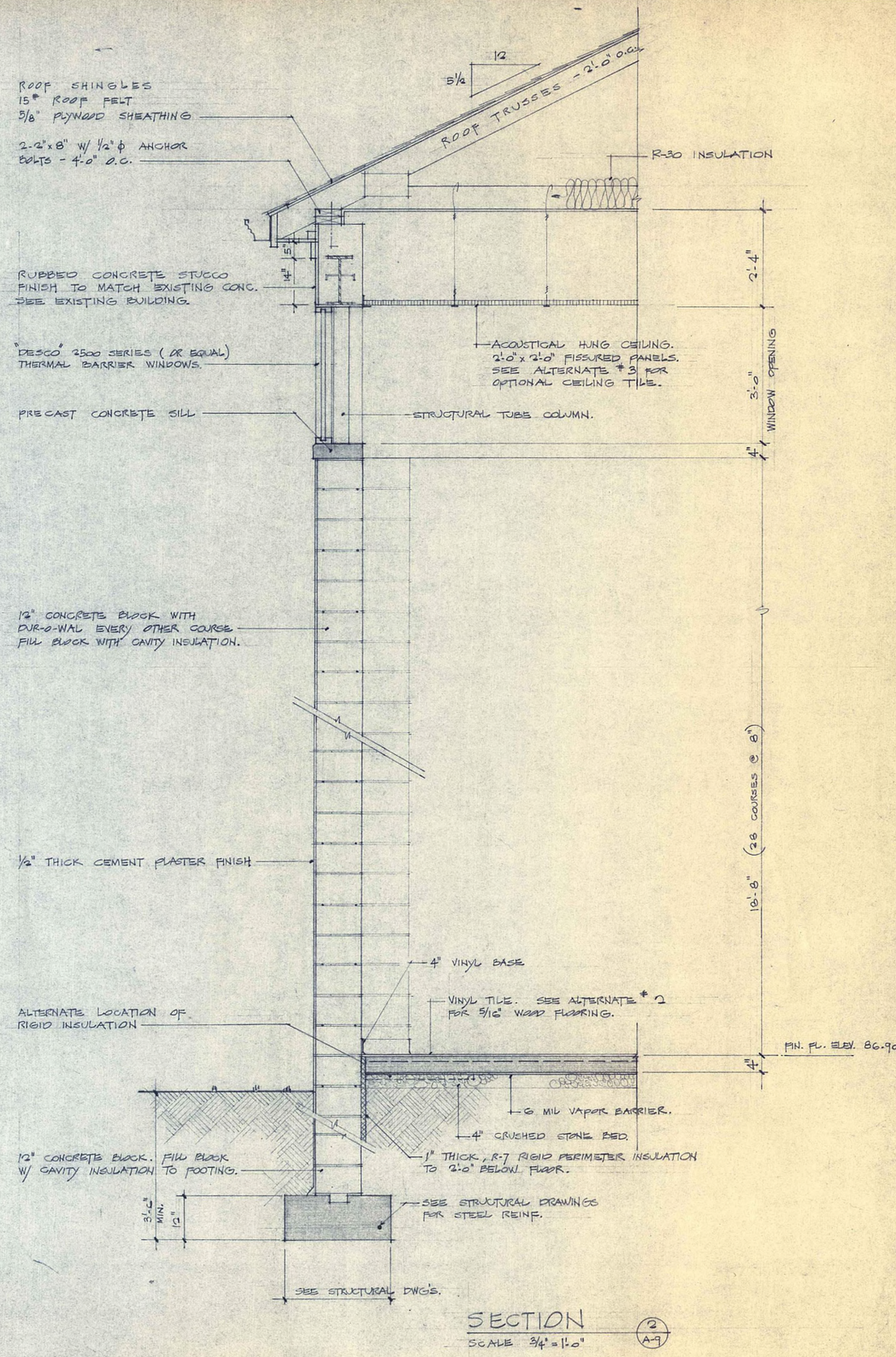
ADDITION & ALTERATION FOR
STILLWATER TWP. SCHOOL
STILLWATER, NEW JERSEY

date 6-10-86
drawn by M.E.
ck'd by CHAS

A-8
drawing



SECTION
SCALE ¾" = 1'-0" (1 / A-9)



SECTION
SCALE ¾" = 1'-0" (2 / A-9)

WALL SECTIONS

SCALE : AS NOTED

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nj C 7620
pa 8615 B

date 2-10-86
drawn by M.E.
ck'd by CHAS

ADDITION & ALTERATION FOR
STILLWATER TWP. SCHOOL
STILLWATER, NEW JERSEY

A-9 drawing

CONTRACTOR NOTE:
BRACE ALL C.M.U. WALL DURING CONSTRUCTION FOR STABILITY.

DESIGN LOADS: (2ND FLOOR)

DEAD LOADS:	2" TERRAZZO	26 P.S.F.
	3" CONC. SLAB	37.5 P.S.F.
	26GA METAL DECKING	2.0 P.S.F.
	MESH	0.5 P.S.F.
	JOIST	6.0 P.S.F.
	CEILING	1.5 P.S.F.
	MECH. MISC.	6.5 P.S.F.
		80.0 P.S.F.
LIVE LOADS:	CORRIDOR	80.0 P.S.F.
	CLASSROOM	40.0 P.S.F.
DESIGN LOADS: (ROOF)		
SNOW LOAD:		30.0 P.S.F.

PROVIDE SMOOTH SURFACE SLOPING AS SHOWN.

DETAIL AT TOP OF PILASTER

PLAN 8/1
SCALE: 3/4"=1'-0"

SECTION 6/1
SCALE: 3/4"=1'-0"

SECTION 9/1
SCALE: 3/4"=1'-0"

FOUNDATION PLAN
SCALE: 1/8"=1'-0"

NOTE:
1. BOTTOM OF FTG SHOWN (-x'-x") WHICH IS DISTANCE BELOW LOWER LEVEL FLOOR EL 86.90, SEE GENERAL NOTES FOR OTHER CRITERIA.
2. F.S INDICATE "FOOTING STEP"
3. (T.M.E) INDICATE "TO MATCH EXISTING"
4. LOWER LEVEL FINISH FL. = 86.90. DEPRESSED AREA SHOWN (. . . .) FOR THIS ELEVATION.

SECTION 1/1
SCALE: 3/4"=1'-0"

SECTION 2/1
SCALE: 3/4"=1'-0"

SECTION 3/1
SCALE: 3/4"=1'-0"

SECTION 7/1
SCALE: 3/4"=1'-0"

SECTION 7A/1 HAS EXTERIOR GRADE AS PER 4 ABOVE

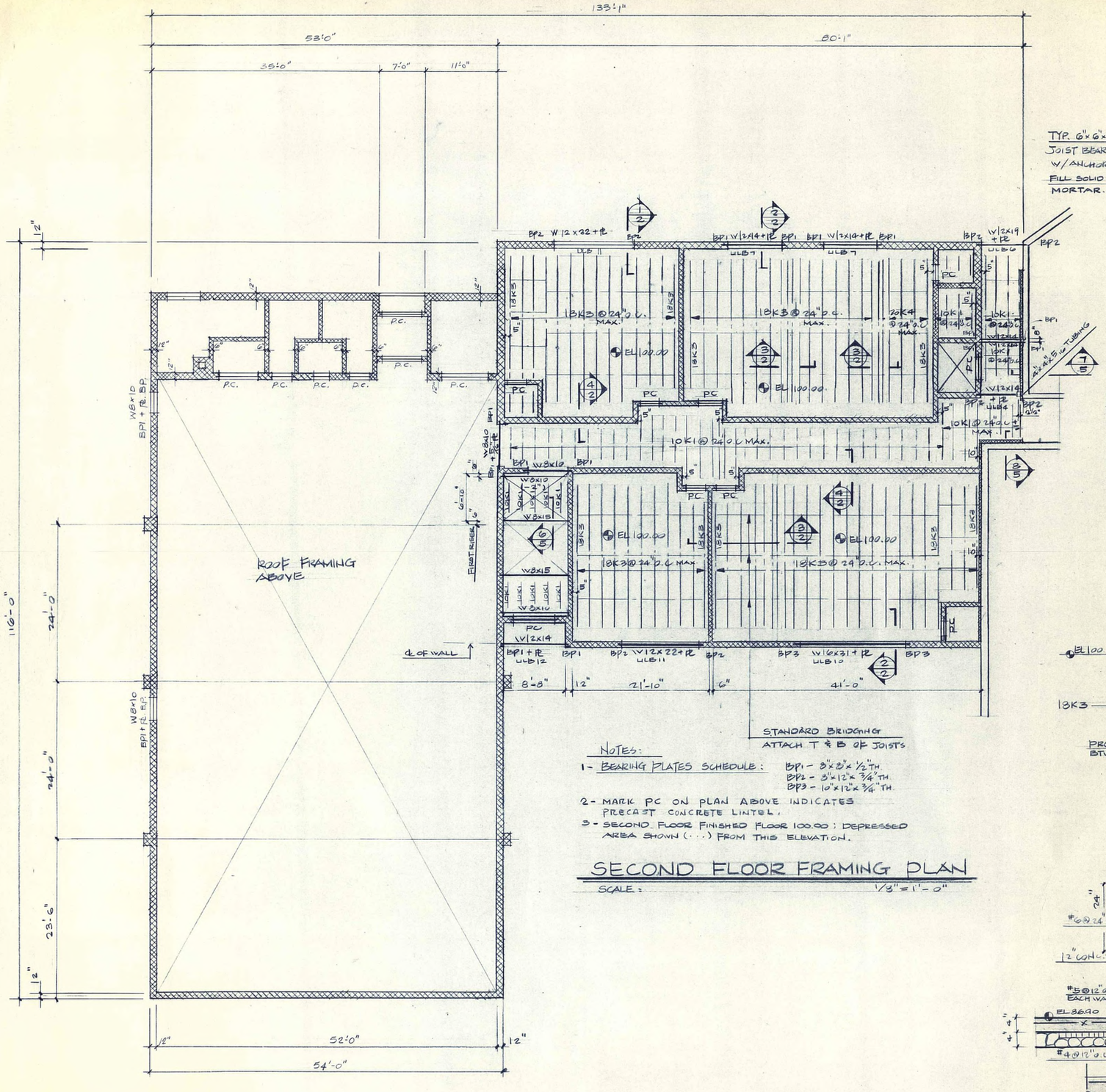
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ADDITION & ALTERATION FOR
STILLWATER TWP. SCHOOL
STILLWATER, NEW JERSEY

date 6-26-86
drawn by HJ
ck'd by CHAS

N.J. C. 7620
pa 8615 B

S-1
drawing.



NOTES:

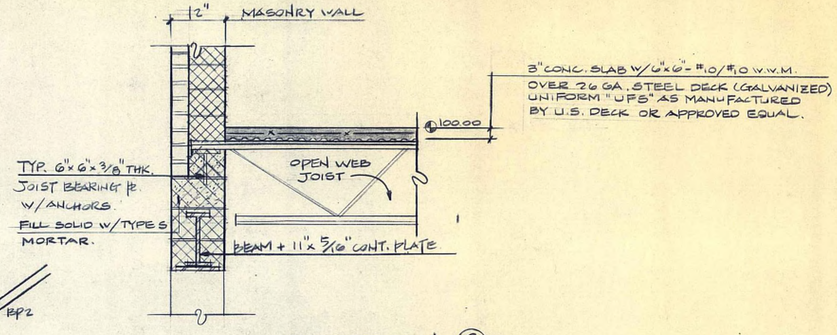
1- BEARING PLATES SCHEDULE: BP1 - 8"x8"x 1/2" TH.
BP2 - 8"x12"x 3/4" TH.
BP3 - 10"x12"x 3/4" TH.

2- MARK PC ON PLAN ABOVE INDICATES PRECAST CONCRETE LINTEL.

3- SECOND FLOOR FINISHED FLOOR 100.00; DEPRESSED AREA SHOWN (. . .) FROM THIS ELEVATION.

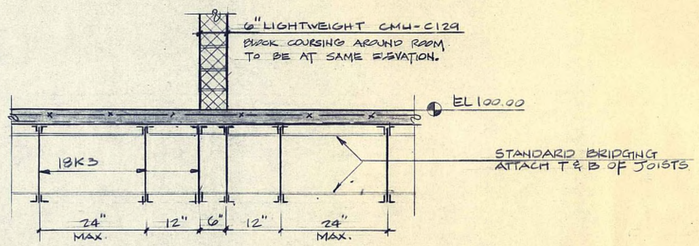
SECOND FLOOR FRAMING PLAN

SCALE: 1/8"=1'-0"



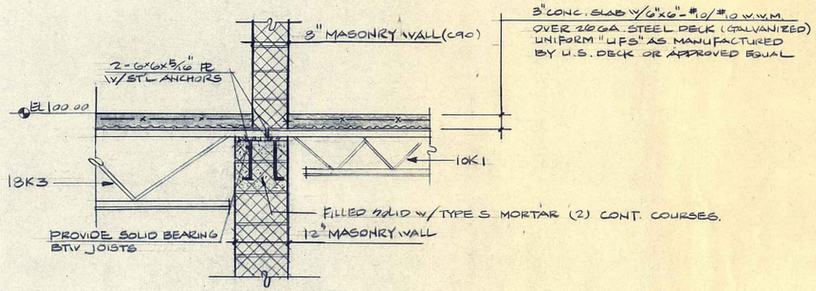
SECTION 2/2

SCALE 3/4"=1'-0"



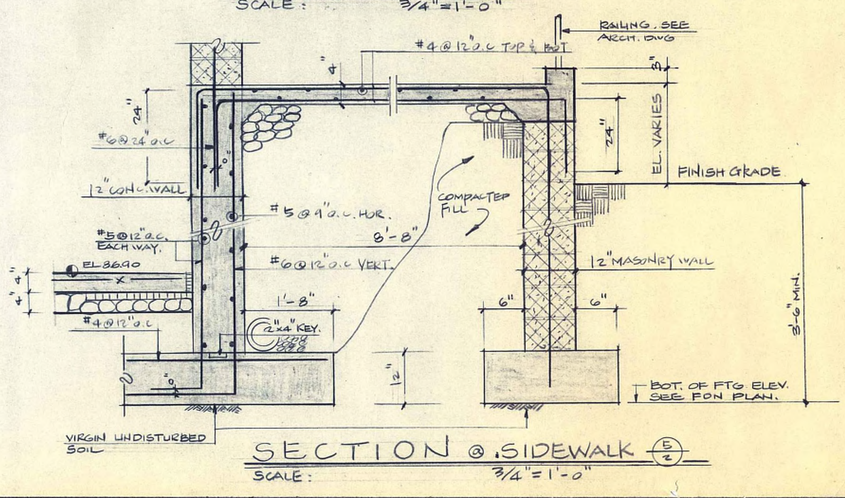
SECTION 3/2

SCALE: 3/4"=1'-0"



SECTION 4/2

SCALE: 3/4"=1'-0"



SECTION @ SIDEWALK 5/2

SCALE: 3/4"=1'-0"

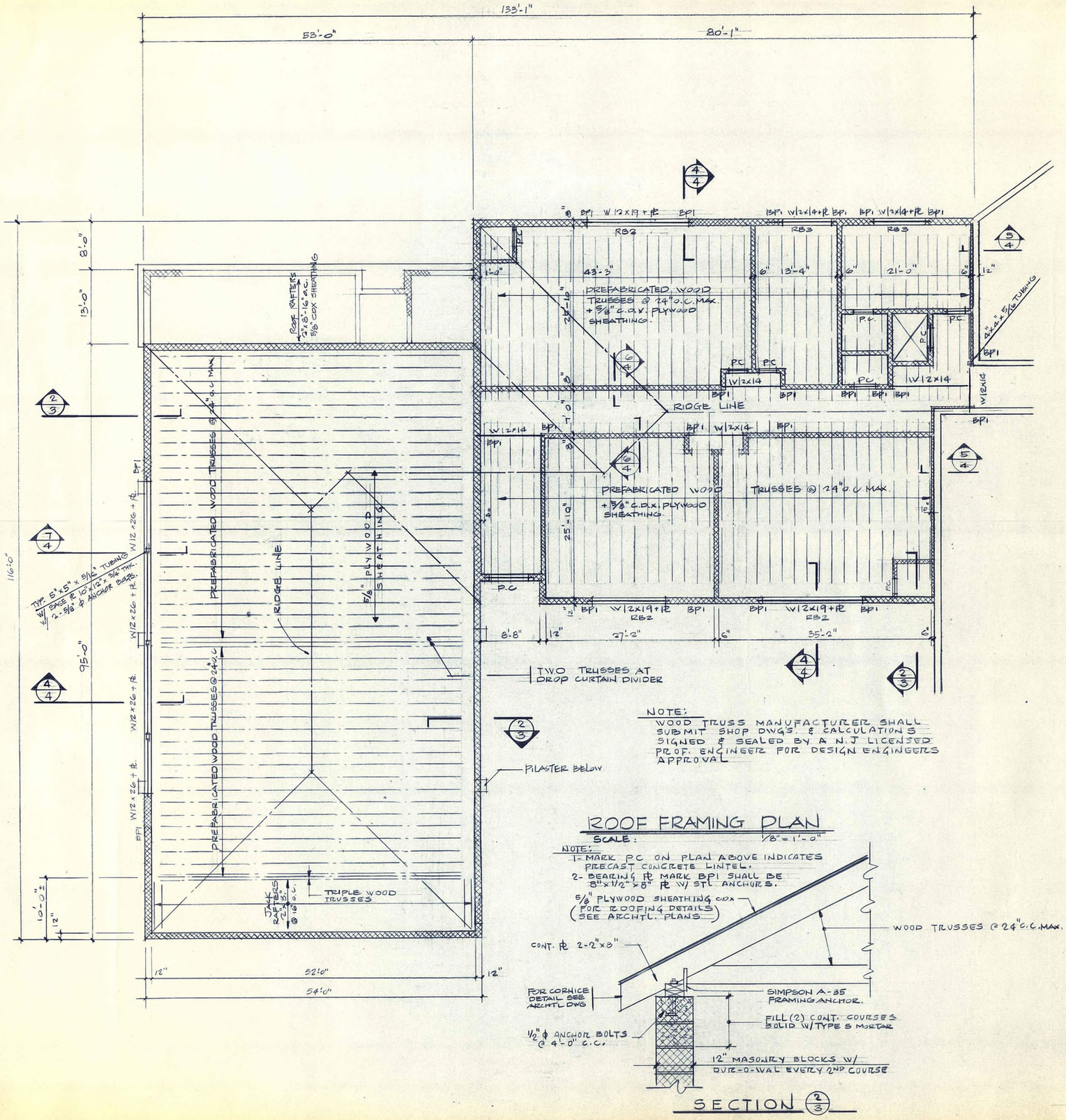
JORGENSON ASSOCIATES
CONSULTING ENGINEERS
4 LEWIS LANE
SPARTA, NJ 07871
nj C 7820
pa 8615 B

S-2 drawing

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ADDITION & ALTERATION FOR STILLWATER TWP. SCHOOL
STILLWATER, NEW JERSEY

date 7-26-86
drawn by HJ
ck'd by CHAS



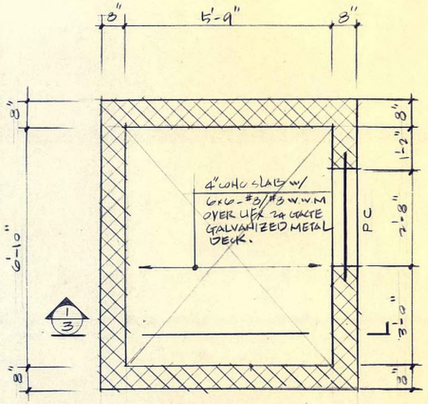
NOTE:
WOOD TRUSS MANUFACTURER SHALL SUBMIT SHOP DWGS. & CALCULATIONS SIGNED & SEALED BY A N.J. LICENSED PROF. ENGINEER FOR DESIGN ENGINEERS APPROVAL

ROOF FRAMING PLAN

SCALE: 1/8" = 1'-0"

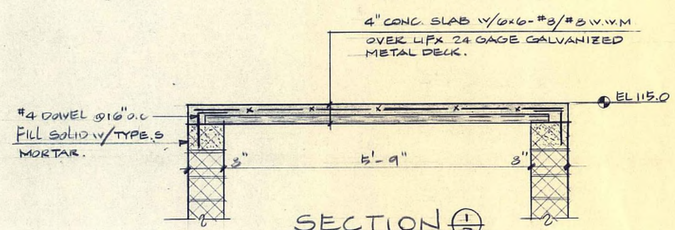
NOTE:
1- MARK PC ON PLAN ABOVE INDICATES PRECAST CONCRETE LINTEL.
2- BEARING PL MARK BP1 SHALL BE 8"x1/2"x8" PL W/ STL. ANCHORS.

SECTION (2/3)



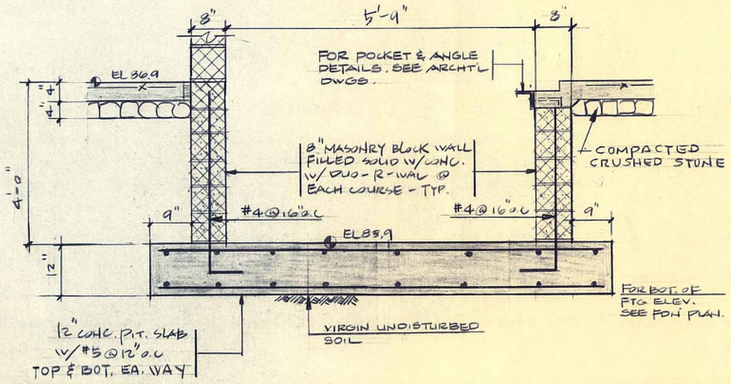
ELEVATOR SHAFT ROOF FRAMING PLAN

SCALE: 1/2" = 1'-0"



SECTION (1/3)

SCALE: 3/4" = 1'-0"



SECTION AT ELEV. PIT.

SCALE: 3/4" = 1'-0"

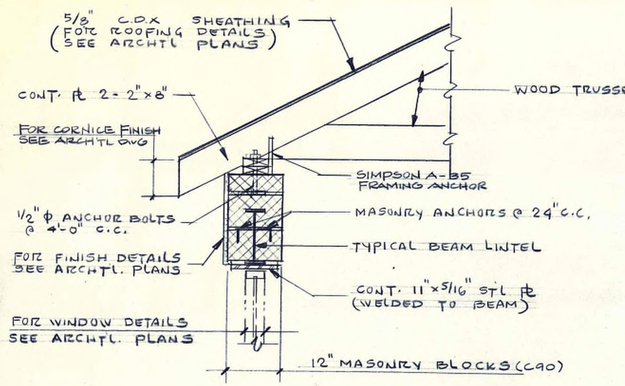
JOHNSON ASSOCIATES
CONSULTING ENGINEERS
4 LEWIS LANE
SPARTA, N.J. 07871
nj C 7620
pa 8615 B

S-3
drawing

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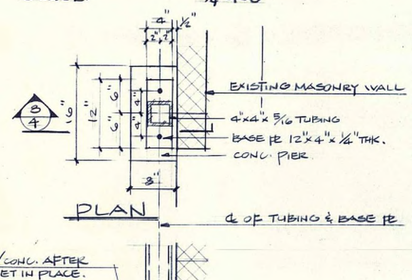
date 9-26-86
drawn by HJ
ck'd by CHAS

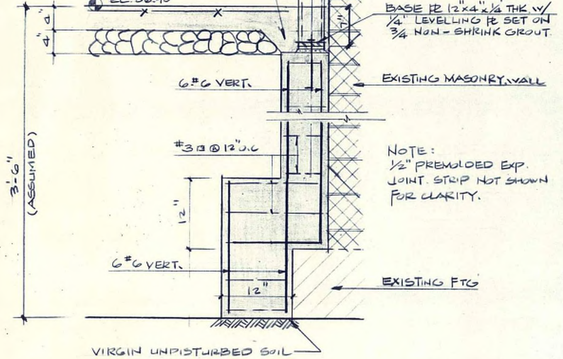
ADDITION & ALTERATION FOR
STILLWATER TWP. School
STILLWATER, NEW JERSEY



SECTION 4/4

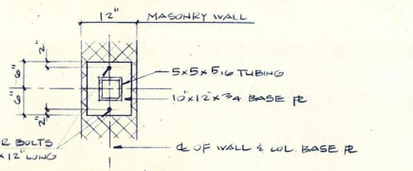
SCALE: 3/4"=1'-0"





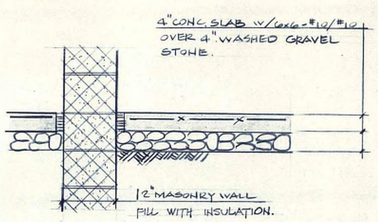
SECTION 7/4

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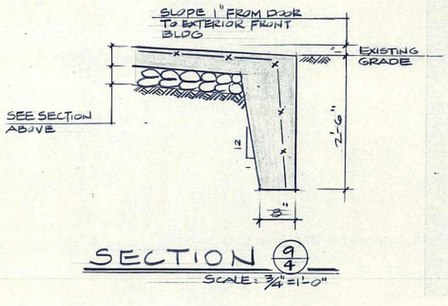
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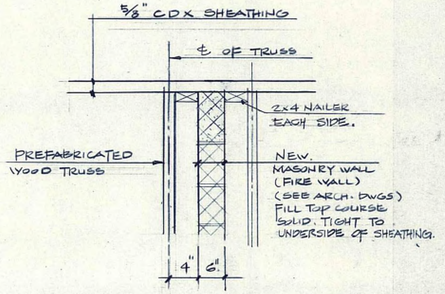
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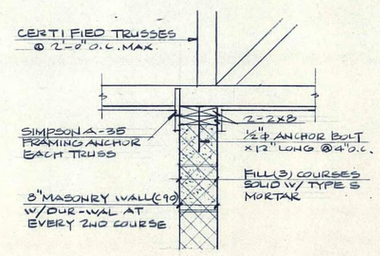
SECTION 9/4

SCALE: 3/4"=1'-0"



SECTION 5/4

SCALE: 3/4"=1'-0"



SECTION 6/4

SCALE: 3/4"=1'-0"

STANDARD OPEN-WEB STEEL JOIST NOTES

1. All steel joist details are to comply with Bar Joist Institute Code.
2. All wall bearing joists should have minimum 5" bearing.
3. Provide ~~5 - 1/4" x 5~~ bearing plate loose under all wall bearing joists which are supplied by the Steel Contractor and set by the Mason Contractor. SEE PLANS FOR SIZE AND THICKNESS.
4. Provide one course of solid blocks or 4 courses of brick under all wall bearing joist construction.
5. Joists should have 2-1/2" minimum bearing on structural steel. Weld or bolt all joists bearing on structural steel.
6. Frame openings in joist construction with heavier or double joists and steel headers.
7. All steel joists are to receive two shop coats of paint as per specifications.
8. Provide standard anchors for all wall bearing steel joists.
9. Extend bottom chords of all open-web steel joists at column lines and tie to columns or beams.
10. Provide bottom chord extensions on all open-web steel joists supporting hung ceiling.
11. Bridging shall be horizontal type as specified in the Steel Joist nstitute Specifications and size shall be as per S.J.I. Specifications.
12. Metal deck for all ~~roof~~ construction shall be ~~1-1/2" Type B INRYCO (galvanized) or approved equal, and shall be welded at 12" o.c., maximum to supporting members through manufacturer's standard approved welding washers. Side laps are to be bottom-punched @ 3'-0" o.c. maximum. 26 GA. UNIFORM 'UFS' INSTALLED IN ACCORDANCE WITH S.D.I. SPECIFICATION~~.
13. ~~Metal roof deck joints are to be staggered.~~
14. Do not suspend or support concentrated loads from or on joists without the Architect's Approval. However, when so approved, loads shall be suspended from or supported on top chords at panel points and distributed to aminimum of two joists.

LINTEL NOTES

1. Bearing for steel lintels to equal depth of main member, min. 6".
2. ~~Allow for window boxes as per architect's details.~~
3. All double Ls back to back to be bolted. Bolts 4' - 0" cc min. 2 bolts per lintel.
4. Provide bearing plates for lintels made up of channel or beams. Supply 4" x 3-1/2" x 5/16" Ls to 5' - 0", 5" x 3-1/2" x 5/16" Ls up to 8' -0", 6" x 3-1/2" x 5/16" Ls for longer openings, with 6 bearing each end over all recesses in masonry walls for radiators, electrical boxes, drinking fountains, etc. One angle over 4" of recess depth.
5. All loose light steel lintels weighing less than 200 lbs. to be supplied by steel contractor, and set by general contractor.
6. Submit complete schedule of lintels with erection plans, showing mark, masonry opening, length of each component part and dimensioned section. Make lintel number same as design lintel numbers with sub-marks A,B,C, etc. for different lengths.
7. ~~Concinuous reinforcing bars to lap 40 dia. lap to be located at supports for bottom bars and between supports for top bars~~.
8. Anchored Ls at openings only to bear on masonry 2" each end. Anchors for anchored Ls to be Peerless Wedge inserts.
9. ~~Stirrups noted for continuous lintels are for each end each span.~~
10. ~~Provide 1 - 15-2 times length of openings top and sides of all windows and other openings in conc. foundation walls~~.
9. PROVIDE 3 COURSES x 24" FILLED MASONRY (TYPE S MORTAR) BELOW ALL BEARING PLATES (TYP.)

STRUCTURAL STEEL

1. The Structural Steel Contractor shall verify the foundation construction for anchor bolt location, elevation of top of concrete and/or leveling plates and bearing plates, alignment, etc., prior to the start of erection.
2. All Structural Steel Framing shall conform with the latest standard of A.I.S.C., in connection with the manufacture, detailings, fabrication, deliver and erection of all structural steel shapes. Said framing assembly and erection shall, also, comply with the requirements for welded, bolted, riveted connections for buildings, as outlined by A.I.S.C.
3. All Structural Steel Shop Work is to be welded or bolted with 3/4" high strength bolts. Field work connections are to be bolted with 3/4" high strength bolts.
4. ~~Where beams cantilever over columns, provide 2 stiffeners on each side of the beam~~.
5. ~~True shear connections shall be provided at all points of cantilever suspension~~.
6. Beams bearing on walls shall be provided with bearing plates and and anchored with bolts as approved by the Engineer.
7. General Contractor shall grout under all column base plates with an "Approved" non-shrink grout after columns are set and plumbed, prior to the installation of supported decking.
8. Provide temporary bracing as required to resist wind, construction loads, etc., during construction.
9. All Structural Steel is to be A36, except as noted otherwise.
10. Provide standard bearing plates and government anchors for all wall bearing structural steel.
11. Provide 9/16" ϕ holes for all blocking attached to steel.
12. All Structural Steel Shop Work is to be riveted or welded; field work, column connections, splices and beam-to-beam connections are to be bolted in accordance with latest A.I.S.C., Specifications for Buildings.
13. Leveling plates and bearing plates are to be supplied by Steel Contractor and are to be set by the Mason Contractor.
14. All columns are to have standard bearing plates and 1/4" leveling plates, cap plates, unless noted otherwise on plan.
15. All Structural Steel should have one shop coat of Rust Inhibitive Paint.
16. Provide welded masonry anchors 2' - 0" cc to all beams faced with masonry and where required, also at columns.
17. Provide two 3/4" x 1' - 6" anchor bolts under all beam bearing plates and columns base plates, noted otherwise.

GENERAL NOTES

1. General Contractor shall verify all conditions and check all measurements on the job and shall be responsible for same.
2. All work shall be done in accordance with the current Building Code of all Governing Authorities.
3. The Structural Drawings shall be used in conjunction with Specifications, Architectural and Mechanical Drawings.
4. All openings in walls, floors, roof, etc., are to be located and sized as per Mechanical Requirements, even if not shown as such on the Structural and Architectural Drawings.
5. All walls shall be adequately braced until floors they support are completely installed and are structurally sound.
6. Approval of Shop Drawings shall not relieve Contractor of any Contract Requirements, even if such items are not shown on the Shop Drawings.
7. All Revisions to Shop Drawings after first submission must be so identified on subsequent submissions.
8. All concrete details and construction are to comply with ~~1971~~ LATEST A.C.I. Code and Local Codes.
9. Concrete to be 3000# concrete, one part cement to 5-1/2 parts fine and coarse aggregate, measured separately by volume and is to develop a minimum strenth of 3000 p.s.i. in 28 days. Minimum cement 6 bags per cubic yard, unless noted.
10. Reinforcing to be deformed bars, ~~A432~~, A615 submit Mill Reports. All bars are to be wired in place.
11. ~~Solid slabs noted as 4 cc to be 4" concrete slabs reinforced with 6 x 6 - 6 x 6 and temperature bars~~.
12. ~~Provide 1 anchor for slabs 1/4" for every 10' + 0" of span or as per specification~~.
13. All floors on ground or fill 4" concrete slab reinforced with W.W.M. 6 x 6 - 8 - 8 laid on porous fill except where otherwise specified. C.M.L. VAPOR BARRIER. Maximum pour 400 square feet between joints or cuts. ~~Boiler room slab 6" thick reinforced with W.W.M. 6 x 6 - 8 - 8 top and bottom.~~
14. ~~Frame floor openings in slabs less than 24" with extra bars equal in area to 1-1/2 times area of bars cut by opening~~.
15. ~~Provide #4 nosing bar for each concrete step~~.
16. Concrete cover for reinforcing - 3" for footings - 2" for walls - 1-1/2" for beams and columns and 3/4" for slabs.
17. Details and dimensions shown in any section apply to all similar sections, unless noted otherwise.
18. Provide vertical metal slots 24" cc for brick anchors where concrete is faced with brick more than 12" high.
19. Minimum bearing of concrete on masonry walls, except where noted otherwise, 12" for spandrel beams - 8" for beams and 4" for slabs.
20. Cast 1/2" diameter, bolts 2' - cc in concrete for wood-blocking where required.
21. ~~Where pipe sleeves pass through concrete beams provide additional stirrup each side of sleeve, maximum 40" of cross-sectional area~~.
22. ~~Top end steel in beams and slabs at non-continuous ends that is extended into an adjacent slab for anchorage shall be extended 3ϕ, min. 2'-0" beyond centerline of support~~.
23. ~~Grind corners of all exposed beams and columns to 3/8" radius or provide 3/4" chamfer~~.
24. ~~All accessories shall have plastic legs~~.
25. Provide flashing reglets in all concrete work as required by Architect.
26. Minimum concrete cover for reinforcing:
    Concrete deposted on ground 3" formed concrete exposed to round or weather 2".
27. Bottom of footings are to be a minimum of 3' - 6" below grade and 1' - 6" below existing grade, whichever is greater in any case, carry to sound undistured soil. SEE FOUNDATION PLAN FOR MINIMUM ELEV. OF BOTTOM OF FOOTINGS
28. SHOULD THERE BE ANY CONFLICT BETWEEN SECTION/DETAILS/PLANS/SPECIFICATION. CONTRACTOR IS TO USE THE MORE COSTLY SECTION/DETAILS/PLANS/SPECIFICATION FOR CONSTRUCTION.

FOUNDATION NOTES

1. All footings shall rest on undisturbed soil of | ton per square feet bearing capacity minimum.
2. All filled areas shall be compacted layer-by-layer and are to be not less than 95% maximum density at optimum moisture content.
3. Provide stepped footings as per detail where necessary.
4. Back-filling against foundation walls shall not be permitted until floors they support have been completely installed, unless otherwise approved by the Engineer.
5. Provide 4" porous fill under all concrete slabs on earth.
6. All column footings shall be centered under column center line, unless otherwise noted.
7. All footing dowels are to be the same size, number and grade as vertical reinforcement in piers or walls which the footings support.
8. ~~Footing MKD FS-6 marked on plan indicate 8' 6"x8' 6" in size. For depth and reinforcing see footing schedule~~.
9. Drop Top of any footing as reqd. for mechanical or bearing conditions and provide pier W/Reinf. as shown.
10. ~~Unit Price to be submitted W/Base bid and approved by architect or owner~~.
11. ~~Soil Tests to be made by qualified soil engineer @ all Foundations and report submitted to design engineer for approval before pouring of that footing~~.
12. All concrete in the footing shall be of stone concrete with a minimum compressive strength of 3000 PSI @ 28 days.
13. All reinforcing shall be of A615-60 with a min. yield strength of 60,000 PSI.
14. ~~For General Notes see structural dwg. #S-4~~

JURGENSEN ASSOCIATES
CONSULTING ENGINEERS
4 LEWIS LANE
SPARTA, N.J. 07871

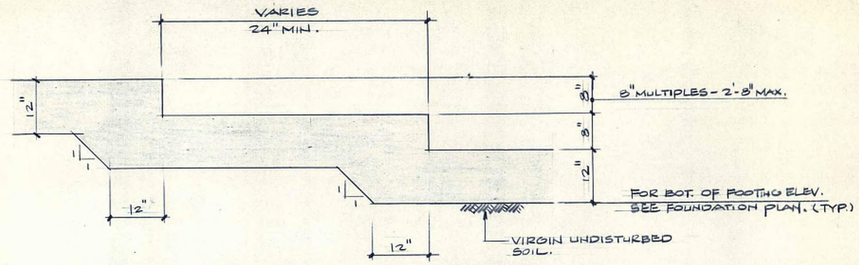
CHARLES SCHAFFER & ASSOCIATES
architect. planner
288 NEWTON - SPARTA ROAD • NEWTON • NEW JERSEY 201 383-7355

date 9-26-86
drawn by H.J.
ck'd by CHAS

ADDITION & ALTERATION FOR
STILLWATER TWP SCHOOL
STILLWATER, NEW JERSEY

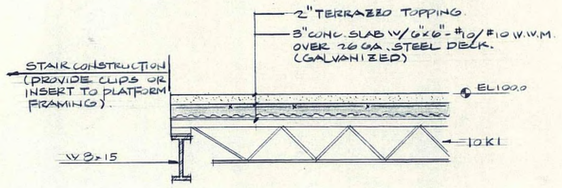
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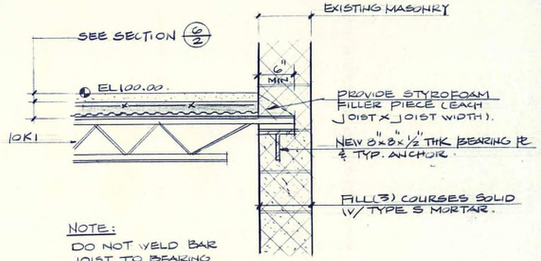
TYP. STEP FOOTING DETAIL

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SECTION 6/5

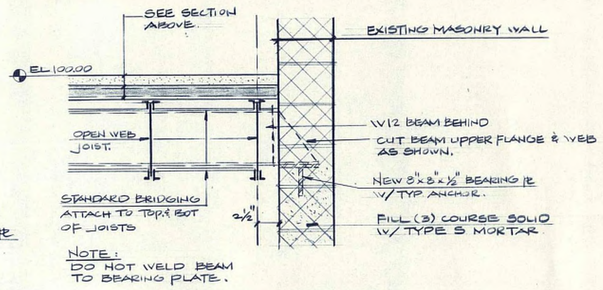
SCALE: 3/4"=1'-0"



NOTE:
DO NOT WELD BAR JOIST TO BEARING PLATE.

SECTION 8/5

SCALE: 3/4"=1'-0"



NOTE:
DO NOT WELD BEAM TO BEARING PLATE.

SECTION 7/5

SCALE: 3/4"=1'-0"

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S-5
drawing

CHARLES SCHAFFER & ASSOCIATES
architect. planner
280 NEWTON - SPARTA ROAD - NEWTON - NEW JERSEY 201 - 383 - 7355

date 9-22-86
drawn by HJ
ck'd by CHAS

ADDITION & ALTERATION FOR
STILLWATER TWP. SCHOOL
STILLWATER, NEW JERSEY

nj C 7620
pa 8615 B

ADDITIONS AND ALTERATIONS
STILLWATER TOWNSHIP SCHOOL
STILLWATER, NEW JERSEY

CHARLES SCHAFFER & ASSOCIATES

ARCHITECT-PLANNER
288 NEWTON-SPARTA ROAD
NEWTON, NEW JERSEY 07860

STILLWATER TOWNSHIP SCHOOL

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STILLWATER TOWNSHIP SCHOOL

DIVISION I

GENERAL

00100

ADVERTISEMENT FOR BIDS

FOR THE

ADDITION AND ALTERATIONS TO THE

STILLWATER TOWNSHIP EMEMENTARY SCHOOL

STILLWATER, NEW JERSEY

SEALED proposals will be received until the prevailing time 2:00 (a.m.) (p.m.) on Tuesday, Oct. 21, 1986 at the Board of Education office, Stillwater Road, Stillwater, New Jersey at which time they will be publicly opened and read aloud for the:

ADDITION AND ALTERATIONS TO THE
STILLWATER TOWNSHIP ELEMENTARY SCHOOL
STILLWATER ROAD, STILLWATER, NEW JERSEY

Bids must be hand delivered or sent certified mail with return receipt requested. Bids shall be submitted as either a lump sum bid or any of the four following areas: General Construction, Electrical, Plumbing, Heating and Ventilating.

Complete sets of Contract Documents for all the work may be examined at the office of the Architect, Charles Schaffer & Associates, 288 Newton-Sparta Road, Newton, New Jersey 07860. Deposit for these documents shall be $75.00 per set, limit three sets per contractor. Checks shall be made payable to the Stillwater Board of Education. Checks will only be returned to contractors that have submitted Bids and have returned the complete sets of Documents in good condition within ten (10) days of opening of Bids. Each Bidder must submit, with his bid, the following:

1. A Certified Check, Cashier's Check, or Bid Bond for ten (10%) percent of the bid not in excess of $20,000.00 payable to the order of the Stillwater Board of Education.

2. Statement setting forth names and addresses of stockholders, person, or entity having 10% or more of proprietary interest in the bidder, or a statement that no stockholders, person or entity has more than 10% proprietary interest in the bidders.

3. Consent of Surety.

4. Prequalification Certificate.

After Notification of Award, the successful Bidder(s), shall furnish a Performance and Payment Bond, in the amount of 100% of the accepted bid, and required Insurance Certificates.

Bidders are required to comply with the requirements of the State of

New Jersey, Public Laws of 1975, Chapter 127 and Public Laws of 1977, Chapter 33, and Chapter 114. Prevailing wage laws shall include the Davis Bacon Act.

The Stillwater Board of Education reserves the right to reject any or all Bids and to advertise for new Bids and to waive any informalities in the proposals and to accept or reject any or all Alternates if in its opinion, is the best interest of the Stillwater Board of Education.

BY ORDER OF THE
STILLWATER BOARD OF EDUCATION
STILLWATER, NEW JERSEY

DORIS LANTZ
BOARD SECRETARY

INSTRUCTIONS TO BIDDERS

The Stillwater Board of Education invites your bid for the category indicated as per the enclosed specifications.

In addition to the detailed specifications of bidding enclosed herewith, your attention is drawn to the following general requirements.

Submission of Bid

1. Bids are returnable not later than the time and date on the enclosed legal notice, in the office of the Board Secretary, Stillwater Road, Stillwater, New Jersey.
   (Board Secretary/School Business Administrator; address of Board of Education)

2. All bids must be on the official bid form and enclosed in an envelope which must be sealed, addressed to Stillwater B of E, P.O. Box 12, Stillwater, New Jersey 07875, and marked Bid for:
   (location and address of Board of Education)

Contract #1	General Construction
Contract #2	Electrical
Contract #3	Plumbing
Contract #4	Heating and Ventilating
Contract #5	All trades (combination of all of above)

3. Prices quoted must be net and exclusive of all federal, state, municipal sales and excise taxes and include the cost of delivery and shipping.

4. Affirmative Action Questionnaire, Ownership Disclosure Statement (Chapter 33, P.L. 1977), and Non-Collusion Affidavit must be completed and submitted with the bid summary.

5. In setting forth specifications, it is the intention of the Board of Education to offer equal opportunity to all bidders. Items referred to by number or company name are for descriptive purposes and are to be used to denote a minimum standard of quality only. Any bidder wishing to submit alternates to the specifications must clearly specify this on the bid.

Security

1. A Cashier's or Certified Check for ten percent (10%) of the total bid price not to exceed $20,000.00 or a bid bond made payable to the Stillwater Board of Education, must accompany each bid.

   Bid deposits will be returned to uncuccessful bidders three (3) days after the awarding of contracts and the approval of the successful bidders' performance bond. Unless otherwise indicated, the bid deposit of the successful bidder will be returned upon satisfactory completion of the contract or after receipt of a performance payment bond.

2. _____ A performance payment bond is required.

The bidder to whom the Contract has been awarded shall furnish and deliver within ten (10) days after receipt of Notice of Award, a Performance Payment Bond satisfactory to the Owner. Performance Payment Bond shall be in the amount of one hundred percent (100%) of the Contract amount. The surety on such bond shall be a Surety Company satisfactory to the owner and authorized to do business in the State of New Jersey.

Rejection of Bids

1. The Board of Education reserves the right to:

A. Reject any and all bids received.

B. Reject any and all changes in the bid form or specifications.

C. Waive any immaterial informalities when it is deemed to be in the best interest of the Board of Education.

Award

1. The Board of Education reserves the right to:

A. Award bids on an item-by-item basis or in total. If the sum total of the amounts bid by the lowest responsible bidder for each branch is less than the amount bid by the lowest responsible bidder for all the work and materials, the <county> will award separate contracts for each of such branches to the lowest responsible bidder therefor, but if the sum total of the amount bid by the lowest responsible bidder for each branch is not less than the amount bid by the lowest responsible bidder for all the work and materials, the <county> will award a single overall contract to the lowest responsible bidder for all of such work and materials. (40A:11-16)

B. Award the bid on the second lowest responsible bidder if the original low bidder does not perform or deliver within the timeliness established in the specifications. Any additional resultant costs to the Board will be the responsibility of the original low bidder.

2. Any bid submitted will be binding for sixty (60) days subsequent to the bid opening. This could be extended beyond the sixty (60) days if consensus is reached by all bidders.

Insurance

1. Prior to the start of any work, the successful bidder shall furnish a Certificate of Insurance to the owner showing the following minimum insurance requirements in forms and with insurance companies

acceptable to the owner. Further, it is agreed that no less than 30 days notice will be given to the owner prior to cancellation, termination, or material alterations of said insurance.

A. Workers Compensation and Employer's Liability in accordance with the statutory requirements. Contractor shall require all subcontractors to similarly provide the same coverage. "All States" Endorsement shall be attached and the Employer's Liability Insurance shall carry a minimum limit of $500,000.00 each occurrence.

B. Comprehensive General Liability Insurance including Products/ Completed Operations, X,C, & U exclusion deleted so as to provide completed blasting and excavation coverage, Broad Form Property Damage, Broad Form Contractual Liability and General Liability Broadening Endorsement-Personal Injury Employee/Employer exclusion deleted with the following minimum limits of liability:

Bodily Injury	- $500,000.00 each occurrence
Property Damage	- $500,000.00 each occurrence

1. The completed Operations coverage shall be written so as to protect the owner in the event of damage to the owner's and/ or any other person's property and for Bodily Injury or death in the amounts shown. This insurance shall be maintained for the duration of the guarantee period.

2. Contractual Liability coverage will indicate that it includes the contractual obligations stipulated in the contract.

C. Comprehensive Automobile Liability insurance with the following minimum limits of liability:

Bodily Injury	- $500,000.00 each occurrence
Property Damage	- $500,000.00 each occurrence

1. This insurance is to apply to all owned, non-owned and hired automobiles used by Contractor in the performance of the work.

D. Umbrella Liability Insurance with the following minimum limits of liability:

$1,000,000.00 each occurrence/aggregate for project.

E. The insurance coverages outlined above are to include the owner as an additional insured with respect to its liability arising out of operations performed under this contract or purchase order.

F. The owner shall provide All Risk Builders Risk Insurance, including but not limited to fire, extended coverage, vandalism, and malicious mischief. This insurance shall be in the name of the Owner, the Contractor, and the subcontractors and shall cover the work, materials and equipment which are on the site and incorporated in the work to the full extent of their insurable value. Before work is started, the Owner shall furnish the Contractor a Certificate of Insurance or a copy of the endorsement showing evidence that the interests of all parties mentioned above are

protected by the policy in a like manner as the Owner and that they are not subject to subrogation by the insurance company. A loss caused by hazards insured by this All Risk Insurance and not covered due to the application of deductibles shall be for the account of the Contractor.

G. No policies of insurance shall contain any exclusions relating to the work to be performed pursuant to the contractual documents.

Indemnity

The successful bidder shall assume the entire responsibility and liability in and for any and all damages and/or injuries of any kind of nature whatsoever, to all persons, whether employees or otherwise and to property growing out of or resulting from the services performed as hereinfore set forth and provided for in these specifications, and for any and all damages and/or injuries of any kind which shall occur in connection therewith and agreed to indemnify, defend and save harmless the Board of Education, its agents, servants and employees from and against any and all loss, expenses including legal fees and disbursements, damages and/or injuries growing out of or resulting from or occurring in connection with the execution of the work herein provided for and including by way of example and not by way of limitation, any losses, expenses, including legal fees and disbursements, damages or injuries occurring in connection with, or resulting from the use by the successful bidder, its agents or employees, of any equipment, stock, appliance, implements, works, tools or machinery or any other property owned, rented, borrowed by or assigned to the Board of Education arising under any law whatever, which may be in effect in the locality in which the work is situated or otherwise.

Form of Contract

The Form of agreement which the successful bidder will be required to execute is the AIA "STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR", A101. A copy of this document is available for perusal at the office of the Architect.

Subcontracts

The Board of Education will recognize only the successful bidder for the proper execution of the entire work under the contract. No subcontractor will perform any work without prior written notification to and approval by the Board of Education. Approval of a subcontractor by the Board in no way relieves the contractor from full responsibility for fulfilling all conditions of the contract.

Billing

Billing is to be completed at the end of the month or upon shipment or completion of services rendered. The billing is to be accompanied by a Board of Education affidavit which must be signed and then submitted

to the Office of the Board Secretary/School Business Administrator.

Prequalification

At the time of submitting bids for construction work, the bidder must be prequalified by the Department of the Treasury, Division of Building and Construction as required by N.J.S.A. 18A:18-8 through 18A:18-18 as qualified to bid on the public work to which the bid related, and there must be included with the bid an affidavit of the bidder stating the type and amount of work for which the bidder has been so qualified, and that there has been no material adverse change in qualification information, the amount of uncompleted work under contract, and the date of qualification.

A form of affidavit for such purposes can be obtained by the bidder from the Department of the Treasury,Division of Building and Construction, Prequalification Section, Trenton, New Jersey.

00310

FORM OF PROPOSAL

TO: STILLWATER TOWNSHIP BOARD OF EDUCATION
Stillwater Soad
P.O. Box 12
Stillwater, NJ 07875

The undersigned hereby declares that he has carefully examined the Advertisement for which bids were advertised to be received on _____, _____ 1986 at _____ (a.m./p.m.) prevailing time, and having examined the requirements for bidders and specifications and drawings prepared by Charles Schaffer & Associates, 288 Newton-Sparta Road, Newton, New Jersey, Architect, will cbntract to furnish and deliver all the items and work mentioned in said Proposal, as per the specifications, at the lump sum bid listed.

The undersigned will provide all necessary machinery, tools, apparatus and other means for construction and do all work and furnish all the materials and services for the Addition and Alterations to the Stillwater Township Elementary School, Stillwater, New Jersey, for the lump sum of the following applicable contracts:

Contract #1	General Construction
Contract #2	Electrical
Contract #3	Plumbing
Contract #4	Heating and Ventilating
Contract #5	All Trades (combination of all of above)

ALTERNATE PRICES

Add or deduct to applicable items as described in the Alternate Section. If bidding more than one contract, specify which contract alternate is applicable to.

Accompanying this Proposal is a Certified Check, Cashiers Check or Bid Bond (underline which is attached), in the amount of 10% of the total lump sum bid (not over $20,000.00), made payable to the Stillwater Board of Education, in the sum of _____, which the undersigned agrees is to be forfeited as liquidated damages, and not as a penalty, if the contract is awarded to the undersigned, and the undersigned shall fail to execute the contract for the work or furnish the bond required. Otherwise, the check will be returned to the undersigned. Proposal forms will not be accepted unless signed by the Owner or authorized corporate officer. The undersigned is an individual, a partnership, a corporation (underline appropriate title) under the laws of the State of _____.

Contract #1 - General Construction ----------$_____

Contract #2 - Plumbing ----------$_____

Contract #3 - Heating & Ventilation ----------$_____

Contract #4 - Electrical----------$_____

Contract #5 - All Trades (combination of all of the above) ----------$_____

ALTERNATE PRICES:

Add or deduct to applicable items as described on the Drawings. If bidding more than one contract, specify which contract alternate is applicable to.

1. Alternate No. 1: Removal of brick veneer at lower level as noted on Drawing A-6. DEDUCT: $_____

2. Alternate No.2: Substitute wood flooring in place of vinyl tile in multi-purpose room as noted on Drawing A-2. ADD: $_____

3. Alternate No. 3: Substitute fissured ceiling tile with rock face tile as noted on Drawing A-2. ADD: $_____

4. Alternate No. 4: Omit all terrazzo flooring in cooridors and substitute with vinyl tile as specified in tile section. One color throughout corridors. DEDUCT: $_____

5. Alternate No. 5: Delete lockers and benches in change rooms #114 and #119 and basketball backstops as well as court tape lines. DEDUCT: $_____

6. Alternate No. 6: Provide multi-purpose room sound system as noted on Drawing E-1 and notes on Drawing E-2. ADD: $_____

7. Alternate No. 7: Delete all open shelving cabinets each side of unit ventilators in all classrooms as shown on Drawings HVAC-1 and HVAC-2. DEDUCT: $_____

Respectfully submitted,

Title of Person Signing

NAME OF BIDDER (TYPED OR PRINTED)

ADDRESS

AUTHORIZED SIGNATURE (SIGNED)

CITY, STATE, ZIP CODE

DATE

TELEPHONE NUMBER

THIS FORM MUST BE COMPLETED AND SUBMITTED WITH YOUR BID.

00410

BID BOND

KNOW ALL MEN BY THESE PRESENTS:

That,.....

.....

of.....State of.....

hereinafter called the Principal, and.....

hereinafter called the Surety, are held and firmly bound unto.....

.....

.....

of.....State.of.....

hereinafter called the Obligee, in the sum of.....

.....Dollars; for the payment whereof the Obligee...the Principal bind.....heirs, executors, administrators, successors, and assigns, and the Surety binds itself, its successors and assigns, firmly by these presents.

Signed, sealed and dated this_____day of_____,1986.

Whereas the Principal is herewith submitting the accompanying bid dated_____ _____for.....

.....

Now, therefore, the condition of this obligation is such that if the bid be accepted as to any or all of the items of material and workmanship proposed to be furnished thereby, or as to any portion of the same, and if the Principapl will, within the period specified therefore, or, if no period be specified, within then (10) days after notice of the award of the contract,enter into contract with the Obligee, to furnish all work and material at the prices offered by said bid, and will furnish bond with good and sufficient surety or sureties, as may be required, for the faithful and proper fulfillment of such contract, then this obligation shall be void. And the Surety hereby binds itself and its successors to pay to the Obligee, in case the Principal fails to enter into such contract, and give such bond within the period specified therefore, or, if no period be specified, within then (10) days after such notice of award of contract the difference in money between the amount of the bid of the Principal on the work and material so accepted, and the amount for which the Obligee may contract with others for such work and material, if the latter amount be in excess of the former, but in no event shall the Surety's liability exceed the penal sum hereof.

In Witness Whereof, this instrument has been executed by the duly authorized representatives of the Principal and the Surety.

_____(Seal)
Principal

_____
BY:

_____
Surety

By:_____
Attorney

00420

FORM OF CORPORATE OWNERSHIP DISCLOSURE

SECTION I OR II BELOW MUST BE COMPLETED AND ON FILE IN THE OFFICE OF THE STILLWATER BOARD OF EDUCATION BEFORE ANY CONTRACTUAL AGREEMENT CAN BE ENTERED WITH ANY VENDOR.

SECTION I

I do hereby certify that _____
(name of vendor)

is not a corporation or partnership.

_____
AUTHORIZED SIGNATURE

SECTION II

I, _____,
(name and designation of authorized officer)

_____
(name of corporation)

OR

I, _____, a partner in
(name)

_____
(name of partnership)

do hereby certify that the following is a list of names and addresses of all stockholders in the corporation, or any person, or persons having an interest in the partnership who own 10% or more of its stock of any class or of all individual partners in the partnership who own a 10% or greater interest therein. And, I further certify that if one of more of such stockholders or partners is itself a corporation or partnership, that there is also set forth herein the names and addresses of the stockholders holding 10% or more of that corporation's stock or the individual partners owning a 10% or greater interest in that pertnership, as the case may be.

NAME	ADDRESS	INTEREST

And, I further certify that this statement is complete and continued unto the names and addresses of every noncorporate stockholder and individual partner exceeding the 10% ownership criteria has beenlisted.

00420 Form of Corporate Ownership Disclosure

And, I further certify this statement is made in compliance with Chaper 33, Laws of New Jersey of 1977.

(Signature and designation of corporate officer or partner)

00430

FORM OF AFFIRMATIVE ACTION AFFIDAVIT

STATE OF NEW JERSEY, COUNTY OF _____

I, _____ OF THE _____, of _____

_____, in the County of _____,

State of _____, of full age, being duly sworn according to law on my oath depose and say that:

1. I am _____ of the firm of _____,
   President, Partner, Owner
   a bidder making a proposal upon the above named project.

2. _____ does not have 50 employees or more inclusive of
   (Name of Firm)
   all officers and employees of every type.

3. I am familiar with the affirmative action requirements of N.J.S.A. 10:5-31 et seq. and rules and regulations issued by the Treasurer, State of New Jersey, pursuant thereto.

4. _____ has complied with all the affirmative action
   (Name of Firm)
   requirements of the State of New Jersey, including those required by N.J.S.A. 10:5-31 et seq. and the rules and regulations issued by the Treasurer, State of New Jersey, pursuant thereto.

5. I am aware that if the above stated firm does not comply with N.J.S.A. 10:5-31 et seq. and rules and regulations issued pursuant thereto, that no monies will be paid by the Stillwater Board of Education until an affirmation action plan is approved. I am also aware that the contract may be terminated and the above stated firm may be debarred from all public contracts for a period of five (5) years.

6. In the event my workforce increases to 50 employees, I must contact the State Affirmative Action Office and complete an Employee Information Report.

_____
Signature of Authorized Representative

_____
Name and Title

Subscribed and sworn before me this
_____ day of _____, 1986.

_____
(Seal) Notary Public of New Jersey

My commission expires _____, 19__

THIS FORM MUST BE COMPLETE: SIGNED AND SUBMITTED WITH BID

00440

FORM OF NON-COLLUSION AFFIDAVIT

STATE OF NEW JERSEY, COUNTY OF _____, I,

_____ of the _____
City, Town, Borough

of, _____, in the County of _____,

State of _____, of full age, being duly sworn according to law on my oath depose and say that:

I am _____ of the firm of _____,

the bidder making the Proposal for the above named projects, and that I executed the said Proposal with full authority to do so; that said bidder has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named project; and that all statements contained in said Proposal and in this affidavit are true and correct, and made with full knowledge that the Stillwater Board of Education relies upon the truth of the statements contained in said Proposal and in the statements contained in this affidavit in awarding the contract for the said project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by _____
Name of Contractor

(N.J.S.A. 52:32-15)

Subscribed and sworn before me this

_____ day of _____, 1986

_____
(Seal) Notary Public of New Jersey

My commission expires _____, 19____

THIS FORM MUST BE COMPLETE:SIGNED AND SUBMITTED WITH BID

PERFORMANCE - PAYMENT BOND

THE STATE OF _____

COUNTY OF _____

Know all men by these presents: That we (1)_____ (2)_____ of _____ hereinafter called Principal and (3) _____ of _____ State of _____ hereinafter called the Surety, are held and firmly bound unto (4) _____ hereinafter called Owner, and unto all persons, firms and corporations who may furnish materials for, or perform labor upon the building or improvements hereinafter referred to in the penal sum of _____ Dollars ($_____) in lawful money of the United States to be paid in (5)_____ for the payment of which sum well and truly be made, we bind ourselves, or heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that Whereas, the Principal entered into a certain contract with (6) _____ A. D. 19__, a copy of which is hereto attached and made a part hereof for the construction of: (7)_____ in connection with (6)_____.

NOW, THEREFORE, if the Principal shall (1) well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of said Contract during the original term of said Contract and any extensions thereof that may be granted by the Owner, with or without the Contract, and (2) promptly make payment to all persons supplying labor and material to the Principal or to any Sub-contractor of the Principal in the prosecution of the work provided for in said Contract (failing which such persons shall have a direct right of action against the Principal and surety under this obligation), and (3) well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said Contract that mayhereafter be made, and promptly make payment to all persons supplying labor and material to the Principal or to any Sub-contractors of the Principal in the prosecution of the work provided for in such modifications (failing which such persons shall have a direct right of action against the Principal and surety under this obligation), notice to the surety of all duly authorized modifications being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, this instrument is executed in _____ _____ counterparts, each one of which shall be deemed an original, this the _____ day of _____, 19__.

ATTEST:

_____ (Principal) Secretary

_____ Principal

BY _____

_____ Witness as to Principal

_____ Address

_____ Address

ATTEST:

_____ Surety

_____ (Surety) Secretary (SEAL)

BY _____ Attorney-in-fact

_____ Witness to Surety

_____ Address

_____ Address

.....

NOTE: Date of Bond must not be prior to date of Contract.

(1) Correct name of Contractor
(2) A Corporation, a Partnership or an Individual, as case may be.
(3) Correct name of Surety.
(4) Correct name of Owner.
(5) County and State.
(6) Owner
(7) Name of Job
(8) Type of Work

THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A201

General Conditions of the Contract for Construction

THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES; CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH RESPECT TO ITS MODIFICATION

1976 EDITION

TABLE OF ARTICLES

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4. CONTRACTOR
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10. PROTECTION OF PERSONS AND PROPERTY
11. INSURANCE
12. CHANGES IN THE WORK
13. UNCOVERING AND CORRECTION OF WORK
14. TERMINATION OF THE CONTRACT

This document has been approved and endorsed by The Associated General Contractors of America.

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ARTICLE 1

CONTRACT DOCUMENTS

1.1 DEFINITIONS

1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents consist of the Owner-Contractor Agreement, the Conditions of the Contract (General, Supplementary and other Conditions), the Drawings, the Specifications, and all Addenda issued prior to and all Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a written interpretation issued by the Architect pursuant to Subparagraph 2.2.8, or (4) a written order for a minor change in the Work issued by the Architect pursuant to Paragraph 12.4. The Contract Documents do not include Bidding Documents such as the Advertisement or Invitation to Bid, the Instructions to Bidders, sample forms, the Contractor's Bid or portions of Addenda relating to any of these, or any other documents, unless specifically enumerated in the Owner-Contractor Agreement.

1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. This Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification as defined in Subparagraph 1.1.1. The Contract Documents shall not be construed to create any contractual relationship of any kind between the Architect and the Contractor, but the Architect shall be entitled to performance of obligations intended for his benefit, and to enforcement thereof. Nothing contained in the Contract Documents shall create any contractual relationship between the Owner or the Architect and any Subcontractor or Sub-subcontractor.

1.1.3 THE WORK

The Work comprises the completed construction required by the Contract Documents and includes all labor necessary to produce such construction, and all materials and equipment incorporated or to be incorporated in such construction.

1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part.

1.2 EXECUTION, CORRELATION AND INTENT

1.2.1 The Contract Documents shall be signed in not less than triplicate by the Owner and Contractor. If either the Owner or the Contractor or both do not sign the Conditions of the Contract, Drawings, Specifications, or any of the other Contract Documents, the Architect shall identify such Documents.

1.2.2 By executing the Contract, the Contractor represents that he has visited the site, familiarized himself with the local conditions under which the Work is to be performed, and correlated his observations with the requirements of the Contract Documents.

1.2.3 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work. The Contract Documents are complementary, and what is required by any one shall be as binding as if required by all. Work not covered in the Contract Documents will not be required unless it is consistent therewith and is reasonably inferable therefrom as being necessary to produce the intended results. Words and abbreviations which have well-known technical or trade meanings are used in the Contract Documents in accordance with such recognized meanings.

1.2.4 The organization of the Specifications into divisions, sections and articles, and the arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

1.3 OWNERSHIP AND USE OF DOCUMENTS

1.3.1 All Drawings, Specifications and copies thereof furnished by the Architect are and shall remain his property. They are to be used only with respect to this Project and are not to be used on any other project. With the exception of one contract set for each party to the Contract, such documents are to be returned or suitably accounted for to the Architect on request at the completion of the Work. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's common law copyright or other reserved rights.

ARTICLE 2

ARCHITECT

2.1 DEFINITION

2.1.1 The Architect is the person lawfully licensed to practice architecture, or an entity lawfully practicing architecture identified as such in the Owner-Contractor Agreement, and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Architect means the Architect or his authorized representative.

2.2 ADMINISTRATION OF THE CONTRACT

2.2.1 The Architect will provide administration of the Contract as hereinafter described.

2.2.2 The Architect will be the Owner's representative during construction and until final payment is due. The Architect will advise and consult with the Owner. The Owner's instructions to the Contractor shall be forwarded

through the Architect. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified by written instrument in accordance with Subparagraph 2.2.18.

2.2.3 The Architect will visit the site at intervals appropriate to the stage of construction to familiarize himself generally with the progress and quality of the Work and to determine in general if the Work is proceeding in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. On the basis of his on-site observations as an architect, he will keep the Owner informed of the progress of the Work, and will endeavor to guard the Owner against defects and deficiencies in the Work of the Contractor.

2.2.4 The Architect will not be responsible for and will not have control or charge of construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, and he will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Architect will not be responsible for or have control or charge over the acts or omissions of the Contractor, Subcontractors, or any of their agents or employees, or any other persons performing any of the Work.

2.2.5 The Architect shall at all times have access to the Work wherever it is in preparation and progress. The Contractor shall provide facilities for such access so the Architect may perform his functions under the Contract Documents.

2.2.6 Based on the Architect's observations and an evaluation of the Contractor's Applications for Payment, the Architect will determine the amounts owing to the Contractor and will issue Certificates for Payment in such amounts, as provided in Paragraph 9.4.

2.2.7 The Architect will be the interpreter of the requirements of the Contract Documents and the judge of the performance thereunder by both the Owner and Contractor.

2.2.8 The Architect will render interpretations necessary for the proper execution or progress of the Work, with reasonable promptness and in accordance with any time limit agreed upon. Either party to the Contract may make written request to the Architect for such interpretations.

2.2.9 Claims, disputes and other matters in question between the Contractor and the Owner relating to the execution or progress of the Work or the interpretation of the Contract Documents shall be referred initially to the Architect for decision which he will render in writing within a reasonable time.

2.2.10 All interpretations and decisions of the Architect shall be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings. In his capacity as interpreter and judge, he will endeavor to secure faithful performance by both the Owner and the Contractor, will not show partiality to either, and will not be liable for the result of any interpretation or decision rendered in good faith in such capacity.

2.2.11 The Architect's decisions in matters relating to artistic effect will be final if consistent with the intent of the Contract Documents.

2.2.12 Any claim, dispute or other matter in question between the Contractor and the Owner referred to the Architect, except those relating to artistic effect as provided in Subparagraph 2.2.11 and except those which have been waived by the making or acceptance of final payment as provided in Subparagraphs 9.9.4 and 9.9.5, shall be subject to arbitration upon the written demand of either party. However, no demand for arbitration of any such claim, dispute or other matter may be made until the earlier of (1) the date on which the Architect has rendered a written decision, or (2) the tenth day after the parties have presented their evidence to the Architect or have been given a reasonable opportunity to do so, if the Architect has not rendered his written decision by that date. When such a written decision of the Architect states (1) that the decision is final but subject to appeal, and (2) that any demand for arbitration of a claim, dispute or other matter covered by such decision must be made within thirty days after the date on which the party making the demand receives the written decision, failure to demand arbitration within said thirty days' period will result in the Architect's decision becoming final and binding upon the Owner and the Contractor. If the Architect renders a decision after arbitration proceedings have been initiated, such decision may be entered as evidence but will not supersede any arbitration proceedings unless the decision is acceptable to all parties concerned.

2.2.13 The Architect will have authority to reject Work which does not conform to the Contract Documents. Whenever, in his opinion, he considers it necessary or advisable for the implementation of the intent of the Contract Documents, he will have authority to require special inspection or testing of the Work in accordance with Subparagraph 7.7.2 whether or not such Work be then fabricated, installed or completed. However, neither the Architect's authority to act under this Subparagraph 2.2.13, nor any decision made by him in good faith either to exercise or not to exercise such authority, shall give rise to any duty or responsibility of the Architect to the Contractor, any Subcontractor, any of their agents or employees, or any other person performing any of the Work.

2.2.14 The Architect will review and approve or take other appropriate action upon Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for conformance with the design concept of the Work and with the information given in the Contract Documents. Such action shall be taken with reasonable promptness so as to cause no delay. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

2.2.15 The Architect will prepare Change Orders in accordance with Article 12, and will have authority to order minor changes in the Work as provided in Subparagraph 12.4.1.

2.2.16 The Architect will conduct inspections to determine the dates of Substantial Completion and final completion, will receive and forward to the Owner for the Owner's review written warranties and related documents required by the Contract and assembled by the Contractor, and will issue a final Certificate for Payment upon compliance with the requirements of Paragraph 9.9.

2.2.17 If the Owner and Architect agree, the Architect will provide one or more Project Representatives to assist the Architect in carrying out his responsibilities at the site. The duties, responsibilities and limitations of authority of any such Project Representative shall be as set forth in an exhibit to be incorporated in the Contract Documents.

2.2.18 The duties, responsibilities and limitations of authority of the Architect as the Owner's representative during construction as set forth in the Contract Documents will not be modified or extended without written consent of the Owner, the Contractor and the Architect.

2.2.19 In case of the termination of the employment of the Architect, the Owner shall appoint an architect against whom the Contractor makes no reasonable objection whose status under the Contract Documents shall be that of the former architect. Any dispute in connection with such appointment shall be subject to arbitration.

ARTICLE 3

OWNER

3.1 DEFINITION

3.1.1 The Owner is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Owner means the Owner or his authorized representative.

3.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

3.2.1 The Owner shall, at the request of the Contractor, at the time of execution of the Owner-Contractor Agreement, furnish to the Contractor reasonable evidence that he has made financial arrangements to fulfill his obligations under the Contract. Unless such reasonable evidence is furnished, the Contractor is not required to execute the Owner-Contractor Agreement or to commence the Work.

3.2.2 The Owner shall furnish all surveys describing the physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site.

3.2.3 Except as provided in Subparagraph 4.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

3.2.4 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness to avoid delay in the orderly progress of the Work.

3.2.5 Unless otherwise provided in the Contract Documents, the Contractor will be furnished, free of charge, all copies of Drawings and Specifications reasonably necessary for the execution of the Work.

3.2.6 The Owner shall forward all instructions to the Contractor through the Architect.

3.2.7 The foregoing are in addition to other duties and responsibilities of the Owner enumerated herein and especially those in respect to Work by Owner or by Separate Contractors, Payments and Completion, and Insurance in Articles 6, 9 and 11 respectively.

3.3 OWNER'S RIGHT TO STOP THE WORK

3.3.1 If the Contractor fails to correct defective Work as required by Paragraph 13.2 or persistently fails to carry out the Work in accordance with the Contract Documents, the Owner, by a written order signed personally or by an agent specifically so empowered by the Owner in writing, may order the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of the Owner to stop the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Subparagraph 6.1.3.

3.4 OWNER'S RIGHT TO CARRY OUT THE WORK

3.4.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within seven days after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, after seven days following receipt by the Contractor of an additional written notice and without prejudice to any other remedy he may have, make good such deficiencies. In such case an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting such deficiencies, including compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and the amount charged to the Contractor are both subject to the prior approval of the Architect. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

ARTICLE 4

CONTRACTOR

4.1 DEFINITION

4.1.1 The Contractor is the person or entity identified as such in the Owner-Contractor Agreement and is referred to throughout the Contract Documents as if singular in number and masculine in gender. The term Contractor means the Contractor or his authorized representative.

4.2 REVIEW OF CONTRACT DOCUMENTS

4.2.1 The Contractor shall carefully study and compare the Contract Documents and shall at once report to the Architect any error, inconsistency or omission he may discover. The Contractor shall not be liable to the Owner or

the Architect for any damage resulting from any such errors, inconsistencies or omissions in the Contract Documents. The Contractor shall perform no portion of the Work at any time without Contract Documents or, where required, approved Shop Drawings, Product Data or Samples for such portion of the Work.

4.3 SUPERVISION AND CONSTRUCTION PROCEDURES

4.3.1 The Contractor shall supervise and direct the Work, using his best skill and attention. He shall be solely responsible for all construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract.

4.3.2 The Contractor shall be responsible to the Owner for the acts and omissions of his employees, Subcontractors and their agents and employees, and other persons performing any of the Work under a contract with the Contractor.

4.3.3 The Contractor shall not be relieved from his obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Architect in his administration of the Contract, or by inspections, tests or approvals required or performed under Paragraph 7.7 by persons other than the Contractor.

4.4 LABOR AND MATERIALS

4.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

4.4.2 The Contractor shall at all times enforce strict discipline and good order among his employees and shall not employ on the Work any unfit person or anyone not skilled in the task assigned to him.

4.5 WARRANTY

4.5.1 The Contractor warrants to the Owner and the Architect that all materials and equipment furnished under this Contract will be new unless otherwise specified, and that all Work will be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty is not limited by the provisions of Paragraph 13.2.

4.6 TAXES

4.6.1 The Contractor shall pay all sales, consumer, use and other similar taxes for the Work or portions thereof provided by the Contractor which are legally enacted at the time bids are received, whether or not yet effective.

4.7 PERMITS, FEES AND NOTICES

4.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and for all other permits and governmental fees, licenses and inspections necessary for the proper execution and completion of the Work which are customarily secured after execution of the Contract and which are legally required at the time the bids are received.

4.7.2 The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the performance of the Work.

4.7.3 It is not the responsibility of the Contractor to make certain that the Contract Documents are in accordance with applicable laws, statutes, building codes and regulations. If the Contractor observes that any of the Contract Documents are at variance therewith in any respect, he shall promptly notify the Architect in writing, and any necessary changes shall be accomplished by appropriate Modification.

4.7.4 If the Contractor performs any Work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Architect, he shall assume full responsibility therefor and shall bear all costs attributable thereto.

4.8 ALLOWANCES

4.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by these allowances shall be supplied for such amounts and by such persons as the Owner may direct, but the Contractor will not be required to employ persons against whom he makes a reasonable objection.

4.8.2 Unless otherwise provided in the Contract Documents:

.1 these allowances shall cover the cost to the Contractor, less any applicable trade discount, of the materials and equipment required by the allowance delivered at the site, and all applicable taxes;

.2 the Contractor's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the original allowance shall be included in the Contract Sum and not in the allowance;

.3 whenever the cost is more than or less than the allowance, the Contract Sum shall be adjusted accordingly by Change Order, the amount of which will recognize changes, if any, in handling costs on the site, labor, installation costs, overhead, profit and other expenses.

4.9 SUPERINTENDENT

4.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during the progress of the Work. The superintendent shall represent the Contractor and all communications given to the superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be so confirmed on written request in each case.

4.10 PROGRESS SCHEDULE

4.10.1 The Contractor, immediately after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information an estimated progress sched-

ule for the Work. The progress schedule shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

4.11 DOCUMENTS AND SAMPLES AT THE SITE

4.11.1 The Contractor shall maintain at the site for the Owner one record copy of all Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record all changes made during construction, and approved Shop Drawings, Product Data and Samples. These shall be available to the Architect and shall be delivered to him for the Owner upon completion of the Work.

4.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

4.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

4.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.

4.12.3 Samples are physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

4.12.4 The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the Work or in the work of the Owner or any separate contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.

4.12.5 By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

4.12.6 The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data or Samples under Subparagraph 2.2.14 unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submission and the Architect has given written approval to the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Architect's approval thereof.

4.12.7 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Architect on previous submittals.

4.12.8 No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been approved by the Architect as provided in Subparagraph 2.2.14. All such portions of the Work shall be in accordance with approved submittals.

4.13 USE OF SITE

4.13.1 The Contractor shall confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with any materials or equipment.

4.14 CUTTING AND PATCHING OF WORK

4.14.1 The Contractor shall be responsible for all cutting, fitting or patching that may be required to complete the Work or to make its several parts fit together properly.

4.14.2 The Contractor shall not damage or endanger any portion of the Work or the work of the Owner or any separate contractors by cutting, patching or otherwise altering any work, or by excavation. The Contractor shall not cut or otherwise alter the work of the Owner or any separate contractor except with the written consent of the Owner and of such separate contractor. The Contractor shall not unreasonably withhold from the Owner or any separate contractor his consent to cutting or otherwise altering the Work.

4.15 CLEANING UP

4.15.1 The Contractor at all times shall keep the premises free from accumulation of waste materials or rubbish caused by his operations. At the completion of the Work he shall remove all his waste materials and rubbish from and about the Project as well as all his tools, construction equipment, machinery and surplus materials.

4.15.2 If the Contractor fails to clean up at the completion of the Work, the Owner may do so as provided in Paragraph 3.4 and the cost thereof shall be charged to the Contractor.

4.16 COMMUNICATIONS

4.16.1 The Contractor shall forward all communications to the Owner through the Architect.

4.17 ROYALTIES AND PATENTS

4.17.1 The Contractor shall pay all royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and shall save the Owner harmless from loss on account thereof, except that the Owner shall be responsible for all such loss when a particular design, process or the product of a particular manufacturer or manufacturers is specified, but if the Contractor has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to the Architect.

4.18 INDEMNIFICATION

4.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner and the Architect and their agents and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from the performance of the Work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom,

and (2) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Paragraph 4.18.

4.18.2 In any and all claims against the Owner or the Architect or any of their agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, the indemnification obligation under this Paragraph 4.18 shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' or workmen's compensation acts, disability benefit acts or other employee benefit acts.

4.18.3 The obligations of the Contractor under this Paragraph 4.18 shall not extend to the liability of the Architect, his agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the Architect, his agents or employees provided such giving or failure to give is the primary cause of the injury or damage.

ARTICLE 5

SUBCONTRACTORS

5.1 DEFINITION

5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform any of the Work at the site. The term Subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Subcontractor or his authorized representative. The term Subcontractor does not include any separate contractor or his subcontractors.

5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform any of the Work at the site. The term Sub-subcontractor is referred to throughout the Contract Documents as if singular in number and masculine in gender and means a Sub-subcontractor or an authorized representative thereof.

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

5.2.1 Unless otherwise required by the Contract Documents or the Bidding Documents, the Contractor, as soon as practicable after the award of the Contract, shall furnish to the Owner and the Architect in writing the names of the persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner or the Architect, after due investigation, has reasonable objection to any such proposed person or entity. Failure of the Owner or Architect to reply promptly shall constitute notice of no reasonable objection.

5.2.2 The Contractor shall not contract with any such proposed person or entity to whom the Owner or the Architect has made reasonable objection under the provisions of Subparagraph 5.2.1. The Contractor shall not be required to contract with anyone to whom he has a reasonable objection.

5.2.3 If the Owner or the Architect has reasonable objection to any such proposed person or entity, the Contractor shall submit a substitute to whom the Owner or the Architect has no reasonable objection, and the Contract Sum shall be increased or decreased by the difference in cost occasioned by such substitution and an appropriate Change Order shall be issued; however, no increase in the Contract Sum shall be allowed for any such substitution unless the Contractor has acted promptly and responsively in submitting names as required by Subparagraph 5.2.1.

5.2.4 The Contractor shall make no substitution for any Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

5.3 SUBCONTRACTUAL RELATIONS

5.3.1 By an appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities which the Contractor, by these Documents, assumes toward the Owner and the Architect. Said agreement shall preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that the subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the Contractor-Subcontractor agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with his Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the Subcontract, copies of the Contract Documents to which the Subcontractor will be bound by this Paragraph 5.3, and identify to the Subcontractor any terms and conditions of the proposed Subcontract which may be at variance with the Contract Documents. Each Subcontractor shall similarly make copies of such Documents available to his Sub-subcontractors.

ARTICLE 6

WORK BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS

6.1.1 The Owner reserves the right to perform work related to the Project with his own forces, and to award

separate contracts in connection with other portions of the Project or other work on the site under these or similar Conditions of the Contract. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, he shall make such claim as provided elsewhere in the Contract Documents.

6.1.2 When separate contracts are awarded for different portions of the Project or other work on the site, the term Contractor in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

6.1.3 The Owner will provide for the coordination of the work of his own forces and of each separate contractor with the Work of the Contractor, who shall cooperate therewith as provided in Paragraph 6.2.

6.2 MUTUAL RESPONSIBILITY

6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall connect and coordinate his Work with theirs as required by the Contract Documents.

6.2.2 If any part of the Contractor's Work depends for proper execution or results upon the work of the Owner or any separate contractor, the Contractor shall, prior to proceeding with the Work, promptly report to the Architect any apparent discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acceptance of the Owner's or separate contractors' work as fit and proper to receive his Work, except as to defects which may subsequently become apparent in such work by others.

6.2.3 Any costs caused by defective or ill-timed work shall be borne by the party responsible therefor.

6.2.4 Should the Contractor wrongfully cause damage to the work or property of the Owner, or to other work on the site, the Contractor shall promptly remedy such damage as provided in Subparagraph 10.2.5.

6.2.5 Should the Contractor wrongfully cause damage to the work or property of any separate contractor, the Contractor shall upon due notice promptly attempt to settle with such other contractor by agreement, or otherwise to resolve the dispute. If such separate contractor sues or initiates an arbitration proceeding against the Owner on account of any damage alleged to have been caused by the Contractor, the Owner shall notify the Contractor who shall defend such proceedings at the Owner's expense, and if any judgment or award against the Owner arises therefrom the Contractor shall pay or satisfy it and shall reimburse the Owner for all attorneys' fees and court or arbitration costs which the Owner has incurred.

6.3 OWNER'S RIGHT TO CLEAN UP

6.3.1 If a dispute arises between the Contractor and separate contractors as to their responsibility for cleaning up as required by Paragraph 4.15, the Owner may clean up and charge the cost thereof to the contractors responsible therefor as the Architect shall determine to be just.

ARTICLE 7

MISCELLANEOUS PROVISIONS

7.1 GOVERNING LAW

7.1.1 The Contract shall be governed by the law of the place where the Project is located.

7.2 SUCCESSORS AND ASSIGNS

7.2.1 The Owner and the Contractor each binds himself, his partners, successors, assigns and legal representatives to the other party hereto and to the partners, successors, assigns and legal representatives of such other party in respect to all covenants, agreements and obligations contained in the Contract Documents. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due or to become due to him hereunder, without the previous written consent of the Owner.

7.3 WRITTEN NOTICE

7.3.1 Written notice shall be deemed to have been duly served if delivered in person to the individual or member of the firm or entity or to an officer of the corporation for whom it was intended, or if delivered at or sent by registered or certified mail to the last business address known to him who gives the notice.

7.4 CLAIMS FOR DAMAGES

7.4.1 Should either party to the Contract suffer injury or damage to person or property because of any act or omission of the other party or of any of his employees, agents or others for whose acts he is legally liable, claim shall be made in writing to such other party within a reasonable time after the first observance of such injury or damage.

7.5 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

7.5.1 The Owner shall have the right to require the Contractor to furnish bonds covering the faithful performance of the Contract and the payment of all obligations arising thereunder if and as required in the Bidding Documents or in the Contract Documents.

7.6 RIGHTS AND REMEDIES

7.6.1 The duties and obligations imposed by the Contract Documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

7.6.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of any right or duty afforded any of them under the Contract, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

7.7 TESTS

7.7.1 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Architect timely notice of its readiness so the Architect may observe such inspection, testing or approval. The Contractor shall bear all costs of such inspections, tests or approvals conducted by public authorities. Unless otherwise provided, the Owner shall bear all costs of other inspections, tests or approvals.

7.7.2 If the Architect determines that any Work requires special inspection, testing, or approval which Subparagraph 7.7.1 does not include, he will, upon written authorization from the Owner, instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in Subparagraph 7.7.1. If such special inspection or testing reveals a failure of the Work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Architect's additional services made necessary by such failure; otherwise the Owner shall bear such costs, and an appropriate Change Order shall be issued.

7.7.3 Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered by him to the Architect.

7.7.4 If the Architect is to observe the inspections, tests or approvals required by the Contract Documents, he will do so promptly and, where practicable, at the source of supply.

7.8 INTEREST

7.8.1 Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing at the place of the Project.

7.9 ARBITRATION

7.9.1 All claims, disputes and other matters in question between the Contractor and the Owner arising out of, or relating to, the Contract Documents or the breach thereof, except as provided in Subparagraph 2.2.11 with respect to the Architect's decisions on matters relating to artistic effect, and except for claims which have been waived by the making or acceptance of final payment as provided by Subparagraphs 9.9.4 and 9.9.5, shall be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then obtaining unless the parties mutually agree otherwise. No arbitration arising out of or relating to the Contract Documents shall include, by consolidation, joinder or in any other manner, the Architect, his employees or consultants except by written consent containing a specific reference to the Owner-Contractor Agreement and signed by the Architect, the Owner, the Contractor and any other person sought to be joined. No arbitration shall include by consolidation, joinder or in any other manner, parties other than the Owner, the Contractor and any other persons substantially involved in a common question of fact or law, whose presence is required if complete relief is to be accorded in the arbitration. No person other than the Owner or Contractor shall be included as an original third party or additional third party to an arbitration whose interest or responsibility is insubstantial. Any consent to arbitration involving an additional person or persons shall not constitute consent to arbitration of any dispute not described therein or with any person not named or described therein. The foregoing agreement to arbitrate and any other agreement to arbitrate with an additional person or persons duly consented to by the parties to the Owner-Contractor Agreement shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

7.9.2 Notice of the demand for arbitration shall be filed in writing with the other party to the Owner-Contractor Agreement and with the American Arbitration Association, and a copy shall be filed with the Architect. The demand for arbitration shall be made within the time limits specified in Subparagraph 2.2.12 where applicable, and in all other cases within a reasonable time after the claim, dispute or other matter in question has arisen, and in no event shall it be made after the date when institution of legal or equitable proceedings based on such claim, dispute or other matter in question would be barred by the applicable statute of limitations.

7.9.3 Unless otherwise agreed in writing, the Contractor shall carry on the Work and maintain its progress during any arbitration proceedings, and the Owner shall continue to make payments to the Contractor in accordance with the Contract Documents.

ARTICLE 8

TIME

8.1 DEFINITIONS

8.1.1 Unless otherwise provided, the Contract Time is the period of time allotted in the Contract Documents for Substantial Completion of the Work as defined in Subparagraph 8.1.3, including authorized adjustments thereto.

8.1.2 The date of commencement of the Work is the date established in a notice to proceed. If there is no notice to proceed, it shall be the date of the Owner-Contractor Agreement or such other date as may be established therein.

8.1.3 The Date of Substantial Completion of the Work or designated portion thereof is the Date certified by the Architect when construction is sufficiently complete, in accordance with the Contract Documents, so the Owner can occupy or utilize the Work or designated portion thereof for the use for which it is intended.

8.1.4 The term day as used in the Contract Documents shall mean calendar day unless otherwise specifically designated.

8.2 PROGRESS AND COMPLETION

8.2.1 All time limits stated in the Contract Documents are of the essence of the Contract.

8.2.2 The Contractor shall begin the Work on the date of commencement as defined in Subparagraph 8.1.2. He shall carry the Work forward expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

8.3 DELAYS AND EXTENSIONS OF TIME

8.3.1 If the Contractor is delayed at any time in the progress of the Work by any act or neglect of the Owner or the Architect, or by any employee of either, or by any separate contractor employed by the Owner, or by changes ordered in the Work, or by labor disputes, fire, unusual delay in transportation, adverse weather conditions not reasonably anticipatable, unavoidable casualties, or any causes beyond the Contractor's control, or by delay authorized by the Owner pending arbitration, or by any other cause which the Architect determines may justify the delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

8.3.2 Any claim for extension of time shall be made in writing to the Architect not more than twenty days after the commencement of the delay; otherwise it shall be waived. In the case of a continuing delay only one claim is necessary. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the Work.

8.3.3 If no agreement is made stating the dates upon which interpretations as provided in Subparagraph 2.2.8 shall be furnished, then no claim for delay shall be allowed on account of failure to furnish such interpretations until fifteen days after written request is made for them, and not then unless such claim is reasonable.

8.3.4 This Paragraph 8.3 does not exclude the recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9

PAYMENTS AND COMPLETION

9.1 CONTRACT SUM

9.1.1 The Contract Sum is stated in the Owner-Contractor Agreement and, including authorized adjustments thereto, is the total amount payable by the Owner to the Contractor for the performance of the Work under the Contract Documents.

9.2 SCHEDULE OF VALUES

9.2.1 Before the first Application for Payment, the Contractor shall submit to the Architect a schedule of values allocated to the various portions of the Work, prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used only as a basis for the Contractor's Applications for Payment.

9.3 APPLICATIONS FOR PAYMENT

9.3.1 At least ten days before the date for each progress payment established in the Owner-Contractor Agreement, the Contractor shall submit to the Architect an itemized Application for Payment, notarized if required, supported by such data substantiating the Contractor's right to payment as the Owner or the Architect may require, and reflecting retainage, if any, as provided elsewhere in the Contract Documents.

9.3.2 Unless otherwise provided in the Contract Documents, payments will be made on account of materials or equipment not incorporated in the Work but delivered and suitably stored at the site and, if approved in advance by the Owner, payments may similarly be made for materials or equipment suitably stored at some other location agreed upon in writing. Payments for materials or equipment stored on or off the site shall be conditioned upon submission by the Contractor of bills of sale or such other procedures satisfactory to the Owner to establish the Owner's title to such materials or equipment or otherwise protect the Owner's interest, including applicable insurance and transportation to the site for those materials and equipment stored off the site.

9.3.3 The Contractor warrants that title to all Work, materials and equipment covered by an Application for Payment will pass to the Owner either by incorporation in the construction or upon the receipt of payment by the Contractor, whichever occurs first, free and clear of all liens, claims, security interests or encumbrances, hereinafter referred to in this Article 9 as "liens"; and that no Work, materials or equipment covered by an Application for Payment will have been acquired by the Contractor, or by any other person performing Work at the site or furnishing materials and equipment for the Project, subject to an agreement under which an interest therein or an encumbrance thereon is retained by the seller or otherwise imposed by the Contractor or such other person.

9.4 CERTIFICATES FOR PAYMENT

9.4.1 The Architect will, within seven days after the receipt of the Contractor's Application for Payment, either issue a Certificate for Payment to the Owner, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor in writing his reasons for withholding a Certificate as provided in Subparagraph 9.6.1.

9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on his observations at the site as provided in Subparagraph 2.2.3 and the data comprising the Application for Payment, that the Work has progressed to the point indicated; that, to the best of his knowledge, information and belief, the quality of the Work is in accordance with the Contract Documents (subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to the results of any subsequent tests required by or performed under the Contract Documents, to minor deviations from the Contract Documents correctable prior to completion, and to any specific qualifications stated in his Certificate); and that the Contractor is entitled to payment in the amount certified. However, by issuing a Certificate for Payment, the Architect shall not thereby be deemed to represent that he has made exhaustive or continuous on-site inspections to check the quality or quantity of the Work or that he has reviewed the construction means, methods, techniques,

sequences or procedures, or that he has made any examination to ascertain how or for what purpose the Contractor has used the moneys previously paid on account of the Contract Sum.

9.5 PROGRESS PAYMENTS

9.5.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents.

9.5.2 The Contractor shall promptly pay each Subcontractor, upon receipt of payment from the Owner, out of the amount paid to the Contractor on account of such Subcontractor's Work, the amount to which said Subcontractor is entitled, reflecting the percentage actually retained, if any, from payments to the Contractor on account of such Subcontractor's Work. The Contractor shall, by an appropriate agreement with each Subcontractor, require each Subcontractor to make payments to his Subsubcontractors in similar manner.

9.5.3 The Architect may, on request and at his discretion, furnish to any Subcontractor, if practicable, information regarding the percentages of completion or the amounts applied for by the Contractor and the action taken thereon by the Architect on account of Work done by such Subcontractor.

9.5.4 Neither the Owner nor the Architect shall have any obligation to pay or to see to the payment of any moneys to any Subcontractor except as may otherwise be required by law.

9.5.5 No Certificate for a progress payment, nor any progress payment, nor any partial or entire use or occupancy of the Project by the Owner, shall constitute an acceptance of any Work not in accordance with the Contract Documents.

9.6 PAYMENTS WITHHELD

9.6.1 The Architect may decline to certify payment and may withhold his Certificate in whole or in part, to the extent necessary reasonably to protect the Owner, if in his opinion he is unable to make representations to the Owner as provided in Subparagraph 9.4.2. If the Architect is unable to make representations to the Owner as provided in Subparagraph 9.4.2 and to certify payment in the amount of the Application, he will notify the Contractor as provided in Subparagraph 9.4.1. If the Contractor and the Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which he is able to make such representations to the Owner. The Architect may also decline to certify payment or, because of subsequently discovered evidence or subsequent observations, he may nullify the whole or any part of any Certificate for Payment previously issued, to such extent as may be necessary in his opinion to protect the Owner from loss because of:

.1 defective work not remedied,
.2 third party claims filed or reasonable evidence indicating probable filing of such claims,
.3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment,
.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum,
.5 damage to the Owner or another contractor,
.6 reasonable evidence that the Work will not be completed within the Contract Time, or
.7 persistent failure to carry out the Work in accordance with the Contract Documents.

9.6.2 When the above grounds in Subparagraph 9.6.1 are removed, payment shall be made for amounts withheld because of them.

9.7 FAILURE OF PAYMENT

9.7.1 If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents any amount certified by the Architect or awarded by arbitration, then the Contractor may, upon seven additional days' written notice to the Owner and the Architect, stop the Work until payment of the amount owing has been received. The Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, which shall be effected by appropriate Change Order in accordance with Paragraph 12.3.

9.8 SUBSTANTIAL COMPLETION

9.8.1 When the Contractor considers that the Work, or a designated portion thereof which is acceptable to the Owner, is substantially complete as defined in Subparagraph 8.1.3, the Contractor shall prepare for submission to the Architect a list of items to be completed or corrected. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. When the Architect on the basis of an inspection determines that the Work or designated portion thereof is substantially complete, he will then prepare a Certificate of Substantial Completion which shall establish the Date of Substantial Completion, shall state the responsibilities of the Owner and the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, and shall fix the time within which the Contractor shall complete the items listed therein. Warranties required by the Contract Documents shall commence on the Date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion. The Certificate of Substantial Completion shall be submitted to the Owner and the Contractor for their written acceptance of the responsibilities assigned to them in such Certificate.

9.8.2 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Architect, the Owner shall make payment, reflecting adjustment in retainage, if any, for such Work or portion thereof, as provided in the Contract Documents.

9.9 FINAL COMPLETION AND FINAL PAYMENT

9.9.1 Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will

promptly make such inspection and, when he finds the Work acceptable under the Contract Documents and the Contract fully performed, he will promptly issue a final Certificate for Payment stating that to the best of his knowledge, information and belief, and on the basis of his observations and inspections, the Work has been completed in accordance with the terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor, and noted in said final Certificate, is due and payable. The Architect's final Certificate for Payment will constitute a further representation that the conditions precedent to the Contractor's being entitled to final payment as set forth in Subparagraph 9.9.2 have been fulfilled.

9.9.2 Neither the final payment nor the remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that all payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or his property might in any way be responsible, have been paid or otherwise satisfied, (2) consent of surety, if any, to final payment and (3), if required by the Owner, other data establishing payment or satisfaction of all such obligations, such as receipts, releases and waivers of liens arising out of the Contract, to the extent and in such form as may be designated by the Owner. If any Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify him against any such lien. If any such lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all moneys that the latter may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

9.9.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by the issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than the retainage stipulated in the Contract Documents, and if bonds have been furnished as provided in Paragraph 7.5, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

9.9.4 The making of final payment shall constitute a waiver of all claims by the Owner except those arising from:

.1 unsettled liens,
.2 faulty or defective Work appearing after Substantial Completion,
.3 failure of the Work to comply with the requirements of the Contract Documents, or
.4 terms of any special warranties required by the Contract Documents.

9.9.5 The acceptance of final payment shall constitute a waiver of all claims by the Contractor except those previously made in writing and identified by the Contractor as unsettled at the time of the final Application for Payment.

ARTICLE 10

PROTECTION OF PERSONS AND PROPERTY

10.1 SAFETY PRECAUTIONS AND PROGRAMS

10.1.1 The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work.

10.2 SAFETY OF PERSONS AND PROPERTY

10.2.1 The Contractor shall take all reasonable precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

.1 all employees on the Work and all other persons who may be affected thereby;
.2 all the Work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors or Sub-subcontractors; and
.3 other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

10.2.2 The Contractor shall give all notices and comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.

10.2.3 The Contractor shall erect and maintain, as required by existing conditions and progress of the Work, all reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent utilities.

10.2.4 When the use or storage of explosives or other hazardous materials or equipment is necessary for the execution of the Work, the Contractor shall exercise the utmost care and shall carry on such activities under the supervision of properly qualified personnel.

10.2.5 The Contractor shall promptly remedy all damage or loss (other than damage or loss insured under Paragraph 11.3) to any property referred to in Clauses 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, any Subcontractor, any Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable and for which the Contractor is responsible under Clauses 10.2.1.2 and 10.2.1.3, except damage or loss attributable to the acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to his obligations under Paragraph 4.18.

10.2.6 The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and the Architect.

10.2.7 The Contractor shall not load or permit any part of the Work to be loaded so as to endanger its safety.

10.3 EMERGENCIES

10.3.1 In any emergency affecting the safety of persons or property, the Contractor shall act, at his discretion, to prevent threatened damage, injury or loss. Any additional compensation or extension of time claimed by the Contractor on account of emergency work shall be determined as provided in Article 12 for Changes in the Work.

ARTICLE 11

INSURANCE

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 The Contractor shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the Contractor's operations under the Contract, whether such operations be by himself or by any Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

.1 claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts;

.2 claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;

.3 claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;

.4 claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the Contractor, or (2) by any other person;

.5 claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom; and

.6 claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

11.1.2 The insurance required by Subparagraph 11.1.1 shall be written for not less than any limits of liability specified in the Contract Documents, or required by law, whichever is greater.

11.1.3 The insurance required by Subparagraph 11.1.1 shall include contractual liability insurance applicable to the Contractor's obligations under Paragraph 4.18.

11.1.4 Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. These Certificates shall contain a provision that coverages afforded under the policies will not be cancelled until at least thirty days' prior written notice has been given to the Owner.

11.2 OWNER'S LIABILITY INSURANCE

11.2.1 The Owner shall be responsible for purchasing and maintaining his own liability insurance and, at his option, may purchase and maintain such insurance as will protect him against claims which may arise from operations under the Contract.

11.3 PROPERTY INSURANCE

11.3.1 Unless otherwise provided, the Owner shall purchase and maintain property insurance upon the entire Work at the site to the full insurable value thereof. This insurance shall include the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work and shall insure against the perils of fire and extended coverage and shall include "all risk" insurance for physical loss or damage including, without duplication of coverage, theft, vandalism and malicious mischief. If the Owner does not intend to purchase such insurance for the full insurable value of the entire Work, he shall inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance which will protect the interests of himself, his Subcontractors and the Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by failure of the Owner to purchase or maintain such insurance and to so notify the Contractor, then the Owner shall bear all reasonable costs properly attributable thereto. If not covered under the all risk insurance or otherwise provided in the Contract Documents, the Contractor shall effect and maintain similar property insurance on portions of the Work stored off the site or in transit when such portions of the Work are to be included in an Application for Payment under Subparagraph 9.3.2.

11.3.2 The Owner shall purchase and maintain such boiler and machinery insurance as may be required by the Contract Documents or by law. This insurance shall include the interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Work.

11.3.3 Any loss insured under Subparagraph 11.3.1 is to be adjusted with the Owner and made payable to the Owner as trustee for the insureds, as their interests may appear, subject to the requirements of any applicable mortgagee clause and of Subparagraph 11.3.8. The Contractor shall pay each Subcontractor a just share of any insurance moneys received by the Contractor, and by appropriate agreement, written where legally required for validity, shall require each Subcontractor to make payments to his Sub-subcontractors in similar manner.

11.3.4 The Owner shall file a copy of all policies with the Contractor before an exposure to loss may occur.

11.3.5 If the Contractor requests in writing that insurance for risks other than those described in Subparagraphs 11.3.1 and 11.3.2 or other special hazards be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

11.3.6 The Owner and Contractor waive all rights against (1) each other and the Subcontractors, Sub-subcontractors, agents and employees each of the other, and (2) the Architect and separate contractors, if any, and their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other perils to the extent covered by insurance obtained pursuant to this Paragraph 11.3 or any other property insurance applicable to the Work, except such rights as they may have to the proceeds of such insurance held by the Owner as trustee. The foregoing waiver afforded the Architect, his agents and employees shall not extend to the liability imposed by Subparagraph 4.18.3. The Owner or the Contractor, as appropriate, shall require of the Architect, separate contractors, Subcontractors and Sub-subcontractors by appropriate agreements, written where legally required for validity, similar waivers each in favor of all other parties enumerated in this Subparagraph 11.3.6.

11.3.7 If required in writing by any party in interest, the Owner as trustee shall, upon the occurrence of an insured loss, give bond for the proper performance of his duties. He shall deposit in a separate account any money so received, and he shall distribute it in accordance with such agreement as the parties in interest may reach, or in accordance with an award by arbitration in which case the procedure shall be as provided in Paragraph 7.9. If after such loss no other special agreement is made, replacement of damaged work shall be covered by an appropriate Change Order.

11.3.8 The Owner as trustee shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within five days after the occurrence of loss to the Owner's exercise of this power, and if such objection be made, arbitrators shall be chosen as provided in Paragraph 7.9. The Owner as trustee shall, in that case, make settlement with the insurers in accordance with the directions of such arbitrators. If distribution of the insurance proceeds by arbitration is required, the arbitrators will direct such distribution.

11.3.9 If the Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion thereof, such occupancy or use shall not commence prior to a time mutually agreed to by the Owner and Contractor and to which the insurance company or companies providing the property insurance have consented by endorsement to the policy or policies. This insurance shall not be cancelled or lapsed on account of such partial occupancy or use. Consent of the Contractor and of the insurance company or companies to such occupancy or use shall not be unreasonably withheld.

11.4 LOSS OF USE INSURANCE

11.4.1 The Owner, at his option, may purchase and maintain such insurance as will insure him against loss of use of his property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of his property, including consequential losses due to fire or other hazards however caused, to the extent covered by insurance under this Paragraph 11.4.

ARTICLE 12

CHANGES IN THE WORK

12.1 CHANGE ORDERS

12.1.1 A Change Order is a written order to the Contractor signed by the Owner and the Architect, issued after execution of the Contract, authorizing a change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time.

12.1.2 The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Change Order, and shall be performed under the applicable conditions of the Contract Documents.

12.1.3 The cost or credit to the Owner resulting from a change in the Work shall be determined in one or more of the following ways:

- **.1** by mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- **.2** by unit prices stated in the Contract Documents or subsequently agreed upon;
- **.3** by cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- **.4** by the method provided in Subparagraph 12.1.4.

12.1.4 If none of the methods set forth in Clauses 12.1.3.1, 12.1.3.2 or 12.1.3.3 is agreed upon, the Contractor, provided he receives a written order signed by the Owner, shall promptly proceed with the Work involved. The cost of such Work shall then be determined by the Architect on the basis of the reasonable expenditures and savings of those performing the Work attributable to the change, including, in the case of an increase in the Contract Sum, a reasonable allowance for overhead and profit. In such case, and also under Clauses 12.1.3.3 and 12.1.3.4 above, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data for inclusion in a Change Order. Unless otherwise provided in the Contract Documents, cost shall be limited to the following: cost of materials, including sales tax and cost of delivery; cost of labor, including social security, old age and unemployment insurance, and fringe benefits required by agreement or custom; workers' or workmen's compensation insurance; bond premiums; rental value of equipment and machinery; and the additional costs of supervision and field office personnel directly attributable to the change. Pending final determination of cost to the Owner, payments on account shall be made on the Architect's Certificate for Payment. The amount of credit to be allowed by the Contractor to the Owner for any deletion

or change which results in a net decrease in the Contract Sum will be the amount of the actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase, if any, with respect to that change.

12.1.5 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if the quantities originally contemplated are so changed in a proposed Change Order that application of the agreed unit prices to the quantities of Work proposed will cause substantial inequity to the Owner or the Contractor, the applicable unit prices shall be equitably adjusted.

12.2 CONCEALED CONDITIONS

12.2.1 Should concealed conditions encountered in the performance of the Work below the surface of the ground or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the Contract Documents, or should unknown physical conditions below the surface of the ground or should concealed or unknown conditions in an existing structure of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this Contract, be encountered, the Contract Sum shall be equitably adjusted by Change Order upon claim by either party made within twenty days after the first observance of the conditions.

12.3 CLAIMS FOR ADDITIONAL COST

12.3.1 If the Contractor wishes to make a claim for an increase in the Contract Sum, he shall give the Architect written notice thereof within twenty days after the occurrence of the event giving rise to such claim. This notice shall be given by the Contractor before proceeding to execute the Work, except in an emergency endangering life or property in which case the Contractor shall proceed in accordance with Paragraph 10.3. No such claim shall be valid unless so made. If the Owner and the Contractor cannot agree on the amount of the adjustment in the Contract Sum, it shall be determined by the Architect. Any change in the Contract Sum resulting from such claim shall be authorized by Change Order.

12.3.2 If the Contractor claims that additional cost is involved because of, but not limited to, (1) any written interpretation pursuant to Subparagraph 2.2.8, (2) any order by the Owner to stop the Work pursuant to Paragraph 3.3 where the Contractor was not at fault, (3) any written order for a minor change in the Work issued pursuant to Paragraph 12.4, or (4) failure of payment by the Owner pursuant to Paragraph 9.7, the Contractor shall make such claim as provided in Subparagraph 12.3.1.

12.4 MINOR CHANGES IN THE WORK

12.4.1 The Architect will have authority to order minor changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order, and shall be binding on the Owner and the Contractor. The Contractor shall carry out such written orders promptly.

ARTICLE 13

UNCOVERING AND CORRECTION OF WORK

13.1 UNCOVERING OF WORK

13.1.1 If any portion of the Work should be covered contrary to the request of the Architect or to requirements specifically expressed in the Contract Documents, it must, if required in writing by the Architect, be uncovered for his observation and shall be replaced at the Contractor's expense.

13.1.2 If any other portion of the Work has been covered which the Architect has not specifically requested to observe prior to being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work be found in accordance with the Contract Documents, the cost of uncovering and replacement shall, by appropriate Change Order, be charged to the Owner. If such Work be found not in accordance with the Contract Documents, the Contractor shall pay such costs unless it be found that this condition was caused by the Owner or a separate contractor as provided in Article 6, in which event the Owner shall be responsible for the payment of such costs.

13.2 CORRECTION OF WORK

13.2.1 The Contractor shall promptly correct all Work rejected by the Architect as defective or as failing to conform to the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including compensation for the Architect's additional services made necessary thereby.

13.2.2 If, within one year after the Date of Substantial Completion of the Work or designated portion thereof or within one year after acceptance by the Owner of designated equipment or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct it promptly after receipt of a written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. This obligation shall survive termination of the Contract. The Owner shall give such notice promptly after discovery of the condition.

13.2.3 The Contractor shall remove from the site all portions of the Work which are defective or non-conforming and which have not been corrected under Subparagraphs 4.5.1, 13.2.1 and 13.2.2, unless removal is waived by the Owner.

13.2.4 If the Contractor fails to correct defective or non-conforming Work as provided in Subparagraphs 4.5.1, 13.2.1 and 13.2.2, the Owner may correct it in accordance with Paragraph 3.4.

13.2.5 If the Contractor does not proceed with the correction of such defective or non-conforming Work within a reasonable time fixed by written notice from the Architect, the Owner may remove it and may store the materials or equipment at the expense of the Contractor. If the Contractor does not pay the cost of such removal and storage within ten days thereafter, the Owner may upon ten additional days' written notice sell such Work at auction or at private sale and shall account for the net proceeds thereof, after deducting all the costs that should have been borne by the Contractor, including compensation for the Architect's additional services made necessary thereby. If such proceeds of sale do not cover all costs which the Contractor should have borne, the difference shall be charged to the Contractor and an appropriate Change Order shall be issued. If the payments then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference to the Owner.

13.2.6 The Contractor shall bear the cost of making good all work of the Owner or separate contractors destroyed or damaged by such correction or removal.

13.2.7 Nothing contained in this Paragraph 13.2 shall be construed to establish a period of limitation with respect to any other obligation which the Contractor might have under the Contract Documents, including Paragraph 4.5 hereof. The establishment of the time period of one year after the Date of Substantial Completion or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which his obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to his obligations other than specifically to correct the Work.

13.3 ACCEPTANCE OF DEFECTIVE OR NON-CONFORMING WORK

13.3.1 If the Owner prefers to accept defective or non-conforming Work, he may do so instead of requiring its removal and correction, in which case a Change Order will be issued to reflect a reduction in the Contract Sum where appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 14

TERMINATION OF THE CONTRACT

14.1 TERMINATION BY THE CONTRACTOR

14.1.1 If the Work is stopped for a period of thirty days under an order of any court or other public authority having jurisdiction, or as a result of an act of government, such as a declaration of a national emergency making materials unavailable, through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing any of the Work under a contract with the Contractor, or if the Work should be stopped for a period of thirty days by the Contractor because the Architect has not issued a Certificate for Payment as provided in Paragraph 9.7 or because the Owner has not made payment thereon as provided in Paragraph 9.7, then the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner payment for all Work executed and for any proven loss sustained upon any materials, equipment, tools, construction equipment and machinery, including reasonable profit and damages.

14.2 TERMINATION BY THE OWNER

14.2.1 If the Contractor is adjudged a bankrupt, or if he makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, or if he persistently or repeatedly refuses or fails, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he fails to make prompt payment to Subcontractors or for materials or labor, or persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction, or otherwise is guilty of a substantial violation of a provision of the Contract Documents, then the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may, without prejudice to any right or remedy and after giving the Contractor and his surety, if any, seven days' written notice, terminate the employment of the Contractor and take possession of the site and of all materials, equipment, tools, construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the Work is finished.

14.2.2 If the unpaid balance of the Contract Sum exceeds the costs of finishing the Work, including compensation for the Architect's additional services made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be certified by the Architect, upon application, in the manner provided in Paragraph 9.4, and this obligation for payment shall survive the termination of the Contract.

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SUPPLEMENTARY CONDITIONS

1. GENERAL CONDITIONS

The "General Conditions of the Contract for Construction", AIA Document A201, 13th edition, April, 1976, Articles 1 thru 14 inclusive, is part of this Contract.

2. FAMILIARITY WITH THE WORK

It is the obligation of the bidder to ascertain for himself all facts concerning conditions to be found at the location of the project, including all physical characteristics above or on the surface of the ground, to fully examine the plans and read the specifications, to consider fully these and other matters, which can in any way affect the Work under this Contract and to make the necessary investigations relating thereto, and he agrees to this obliation in signing the Contract. The Owner assumes no responsibility whatsoever with respect to ascertaining for the contractor such facts concerning physical characteristics at the site of the project. The Contractor agrees that he will make no claim for, and has no right to, additional payment or extension of time for completion of the Work or any other concession because of a misinterpretation or failure on his part to fully acquaint himself with all conditions relating to the Work.

3. EXECUTION OF THE CONTRACT

The Bidder to whom the contract is awarded shall, within ten (10) days of the date of the award, execute and deliver the necessary documents entering into the Contract with the Owner.

4. AMENDMENTS TO THE GENERAL CONDITIONS OF THE CONTRACT

A. Article 9--Certificates for Payments

Add the following paragraphs:

1. In making such partial payments for the Work, there shall be retained ten percent (10%) of the estimated amount until final completion and acceptance of all work covered by the Contract, including the completion of all corrective or punch list items.

2. No materials, supplies or equipment for the Work shall be purchased subject to any chattel mortgage or under a conditional sale or other agreement by which an interest therein or in part thereof is retained by the seller or supplier. The Contractor warrants good title to all materials, supplies and equipment installed or incorporated

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SUPPLEMENTARY CONDITIONS

4. AMENDMENTS TO THE GENERAL CONDITIONS OF THE CONTRACT

A. Article 9--Certificate of Payments

2. in the work, and agrees upon completion of all work to deliver the premises, together with all improvement and appurtenances constructed or placed thereon by him to the Owner free from any claims, liens or charges, and further agrees that neither he nor any person, firm or corporation furnishing any materials or labor for any work covered by this Contract shall have any right to a lien upon the premises or any improvement or appurtenance thereon. Nothing contained in this paragraph however, shall defeat or impair the rights of such persons furnishing materials or labor under any bond given by the Contractor for their protections, or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the Owner.

3. All materials and work covered by partial payments made shall thereupon become the sole property of the Owner, but this provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or the restoration of any damaged work, or as the waiver of the right of the Owner to require the fulfillment of all terms to the Contract.

4. Upon completion and acceptance of all work required hereunder, the amount due the Contractor under this Contract shall be paid upon certification by the Architect, after the Contractor shall have furnished the Owner with a release, if required, of all claim against the Owner arising under and by virtue of this Contract.

5. MATERIALS

A. Where materials are specified andonly one brand is specified the Contractor may submit other brands for consideration. The Architect's decision concerning such substitution will be final.

B. Wherever in the specification the phrases "shall conform to applicable requirements of A.S.T.M. Standards or Federal Specifications" occurs, the latest edition, as amended, of the A.S.T.M. or Federal specifications listed as governing

PART

5. MATERIALS

each material shall be accepted as establishing the technical qualities and testing methods which shall be complied with.

6. LAYOUT OF THE WORK

Each contractor shall lay out his own work and shall be responsible for all measurements of the building, and other work executed by him under the Contract. He must exercise proper precaution to verify the figures shown on the drawings before laying out the work and will be held responsible for any errors resulting from his failure to exercise such precaution. The layout of the site work will be the responsibility of the Contractor for all work as shown on site drawings prepared by Charles Schaffer and Associates, Newton, New Jersey.

7. HOLD HARMLESS CLAUSE

The Contractor shall be liable for all damages sustained by reason of any defective or improper construction of said Work or of any wrongful act by the Contractor, its agents, servants or employees, committed or suffered to be done in the performance of this Contract, and shall also be liable for any damage or injury caused to third parties through any such negligence or wrongful act. The Contractor agrees to make payment of all proper charges for labor and materials required in the performance of the aforesaid work and indemnify and save harmless the Owner, its officers, agents and servants, and each and every one of them against and from all suits and cost of every name and description, including royalty fees and claims for the use of patented materials, and from all damages to which the Owner or any of its officers, agents or servants, may be put by reason of injury to the person or property of others resulting from carelessness in the performance of the aforesaid work, either through the negligence of said contractor or through improper or defective materials or supplies used by the Contractor in the performance of the aforesaid work, or through an act or omission of the Contractors, or its agents, servants or employees.

8. LOST OR STOLEN MATERIALS

The Contractor shall be entirely responsible for the protection of all materials and/or equipment stored at the project site for incorporation in the building, or which have been incorporated into the building. He shall replace all such materials and equipment which may be lost or stolen at his expense whether or not such materials or equipment have been entirely or partially paid for by the Owner.

END OF "SUPPLEMENTARY CONDITIONS"

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TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide temporary facilities and controls needed for the Work including, but not necessarily limited to:

1. Temporary utilities such as heat, water, electricity, and telephone;
2. Field office for the Contractor's personnel;
3. Sanitary facilities;
4. Encloaures such as tarpaulins, barricades, and canopies.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

2. Except that equipment furnished by subcontractors shall comply with requirements of pertinent safety regulations, such equipment normally furnished by the individual trades in execution of their own portions of the Work are not part of this Section.

3. Permanent installation and hookup of the various utility lines are described in other Sections.

1.2 PRODUCT HANDLING

A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

PART 2 - PRODUCTS

2.1 UTILITIES

A. Water:

Owner to provide water as required to perform the construction operations called for. Contractor to provide hoses, nozzles, etc.

B. Electricity:

1. Contractor to provide area distribution boxes so located that the individual trades may furnish and use 100 ft. maximum length extension cords to obtain power and light-

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TEMPORARY FACILITIES AND CONTROLS

PART 2 - PRODUCTS

2.1 UTILITIES

B. Electricity:

1. ing at points where needed for work, inspection and safety.

2. Owner will pay for electricity used in construction.

C. Heating:

Provide and maintain heat necessary for proper conduct of operations needed in the Work.

D. Telephone:

1. Make necessary arrangements and pay costs for installation and operation of telephone service to the Contractor's office at the site.

2. Make the telephone available to the Architect for use in connection with the Work.

2.2 FIELD OFFICES AND SHEDS

A. Contractor's facilities:

Provide a field office enclosure adequate in size and accommodation for Contractor's offices, supply and storage.

B. Sanitary facilities:

1. Provide temporary sanitary facilities in the quantity required for use by all personnel.

2. Maintain in a sanitary condition at all times.

2.3 ENCLOSURES

A. Provide and maintain for the duration of construction all scaffolds, tarpaulins, canopies, warning signs, steps, platforms, bridges, and other temporary construction necessary for proper completion of the Work in compliance with pertinennt safety and other regulations.

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TEMPORARY FACILITIES AND CONTROLS

PART 3 - EXECUTION

3.1 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.

B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Architect.

END OF "TEMPORARY FACILITIES AND CONTROLS"

STILLWATER TOWNSHIP SCHOOL

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PRODUCT HANDLING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

2. Additional procedures also may be prescribed in other Sections of these Specifications.

1.2 QUALITY ASSURANCE

A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.3 MANUFACTURER"S RECOMMENDATIONS

A. Except as otherwise approved by the Architect, determine and comply with manufacturer's recommendations on product handling, storage, and protection.

1.4 PACKAGING

A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.

1. Maintain packaged materials with seals unbroken and labels intact until time of use.

2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.

PRODUCT HANDLING CONTINUED:

1.4 PACKAGING

B. The Architect may reject as non-complying such material and products that do not bear indentification satisfactory to the Architect as to manufacturer, grade, quality, and other pertinent information.

1.5 PROTECTION

A. Protect finished surfaces, including jambs and soffits of openings used as passageways, through which equipment and materials are handled.

B. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.

C. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.

1.6 REPAIRS AND REPLACEMENTS

A. In event of damage, promptly make replacements and repairs to the approval of the Architect and at no additional cost to the Owner.

B. Additional time required to secure replacements and to make repairs will not be considered by the Architect to justify an extension in the Contract Time of Completion.

END OF "PRODUCT HANDLING"

STILLWATER TOWNSHIP SCHOOL

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CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

2. In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these Specifications.

1.2 QUALITY ASSURANCE

A. Conduct daily inspection , and more often if necessary, to verify that requirements for cleanliness are being met.

B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

A. General:

1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.

2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.

3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.

4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

B. Site:

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.

2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of subparagraph 3.1-A-1 above.

3. Maintain the site in a neat and orderly condition at all times.

C. Structures:

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.

CLEANING CONTINUED:

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

C. Structures:

2. Weekly, and more often if necessary, sweep interior spaces clean.

a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.

3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.

4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.

a. "Clean", for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Architect, may be injurious to the finish floor material.

3.2 FINAL CLEANING

A. "Clean", for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.

B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.1 above.

PART 3 - EXECUTION

3.2 FINAL CLEANING

C. Site:

1. Unless otherwise specifically directed by the Architect, broom clean paved areas on the site and public paved areas adjacent to the site.

2. Completely remove resultant debris.

D. Structures:

1. Exterior:

a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.

b. Remove all traces of splashed materials from adjacent surfaces.

c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.

d. In the event of stubborn stains not removable with water, the Architect may require light sandblasting or other cleaning at no additional cost to the Owner.

2. Interior:

a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.

b. Remove all traces of splashed material from adjacent surfaces.

c. Remove paint droppings, spots, stains, and dirt from finished surfaces.

PART 3 - EXECUTION

3.2 FINAL CLEANING

E. Schedule final cleaning as approved by the Architect to enable the Owner to accept a completely clean Work.

3.3 CLEANING DURING OWNER'S OCCUPANCY

A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Architect in accordance with the General Conditions of the Contract.

END OF "CLEANING"

STILLWATER TOWNSHIP SCHOOL

DIVISION II

TECHNICAL SPECIFICATIONS

STILLWATER TOWNSHIP SCHOOL

02110

SITE CLEARING

PART 1 - GENERAL

1.1 SCOPE

A. The work required under this Section consists of Site Clearing and related items necessary to complete the Work indicated on drawings and described in Specifications, including, in general, but not limited to the following:

1. Removal of trees and other vegetation.

2. Protection of existing trees.

3. Topsoil stripping.

4. Clearing and stripping.

5. Removing above-grade improvements.

6. Removing below-grade improvements.

7. Notification of all corporations, authorities, firms and individuals owning or controlling utility lines running to or on to the property.

8. Erect and maintain all barriers in accordance with all local and state requirements. Snow fencing or equivalent is allowed.

1.2 BIDDING DOCUMENTS

The General Conditions, Supplementary Conditions and all other applicable requirements of Division 1 of these Specifications shall govern the work of this Section.

1.3 JOB CONDITIONS

A. Protection of Existing Improvements:

Provide protection to existing improvements. Restore damaged improvements to their original condition.

B. Existing septic seepage pit locations are not presently known and may have to be altered or relocated to clear building location. All work necessary to relocate pit shall be performed by change order.

PART 2 - EXECUTION

2.1 SITE CLEARING

A. General:

Remove vegetation, improvements, or obstructions interfering with installation of new construction.

B. Stockpile Topsoil:

Stockpile topsoil in storage pile areas where directed. Construct storage piles to freely drain surface water.

C. Clearing and Grubbing:

Clear site of trees, shrubs and other vegetation, except for those indicated to be left standing. Completely remove stumps, roots, and other debris protruding through ground surface.

D. Depressions:

Fill all holes and depressions in the ground caused by clearing and grubbing.

E. Removal of Improvements;

Remove above-grade and below-grade improvements necessary to permit construction, and other work as indicated.

3.1 DISPOSAL OF WASTE MATERIALS

A. Burning on Owner's Property:

Burning is not permitted on Owner's property.

B. Removal from Owner's Property:

Remove waste materials from Owner's property and dispose of off site.

END OF "SITE CLEARING"

STILLWATER TOWNSHIP SCHOOL

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EARTHWORK

PART 1 - GENERAL

1.1 SCOPE

The work required under this section consists of Earthwork and related items necessary to complete the work indicated on drawings and described in specifications, including, in general, but not limited to the following:

A. Excavation for site and building, including paved areas.

B. Preparation of subgrade for building slabs, walks and pavements.

C. Drainage fill course for support of walks and pavements.

D. Furnishing and installing controlled fill materials.

E. General filling, backfilling and compaction.

F. Control of surface water and ground water which may affect the work.

G. Grading.

H. Soil Erosion Control.

1.2 BIDDING DOCUMENTS

A. The General Conditions, Supplementary Conditions and all other applicable requirements of Division 1 of these Specifications shall govern the work of this section.

1.3 QUALITY ASSURANCE

A. Codes and Standards:

Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.

1.4 JOB CONDITIONS

A. Site Information:

Data on indicated subsurface conditions are not intended

PART 1 - GENERAL

1.4 JOB CONDITIONS

A. Site Information

as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn therefrom by Contractor. Data are made available for convenience of Contractor. Additional test borings and other exploratory operations may be made by Contractor at no cost to Owner. A copy of the test borings is on file at the office of the Architect.

B. Existing Utilities:

Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

C. Use of Explosives:

The use of explosives is not permitted. Do not bring explosives onto site or use in work without prior written permission from authorities having jurisdiction. Contractor is solely responsible for handling, storage, and use of explosive materials when their use is permitted.

PART 2 PRODUCTS

2.1 MATERIALS

A. Definitions:

1. Satisfactory Soil materials are defined as those complying with American Association of State Highway and Transportation Officials (AASHTO) M145, soil classification Groups A-1, A-2-4, A-2-5, and A-3.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Definitions:

2. Unsatisfactory soil materials are those defined as AASHTO M145 soil classification Groups A-2-6, A-2-7, A-4, A-5, A-6, and A-7; also, peat and other highly organic soils.

B. Backfill and Fill Materials:

Satisfactory soil materials free of clay, rock or gravel larger than 2" in any dimension, debris, waste, frozen materials, vegetable and other deleterious matter.

C. Fill Below Floor Slabs or Exterior Paving:

Bank run gravel free of organic material; sand and gravel containing less than 20% silt.

D. Drainage Fill:

Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, with 100% passing a 1-1/2" sieve not more than 5% passing a No. 4 sieve.

PART 3 - EXECUTION

3.1 EXECUTION

Execution consists of removal and disposal of material encountered when establishing required finish grade elevations.

A. Excavation Classification:

The following classifications of excavation will be made when unanticipated rock excavation is encountered in work. Do not perform such work until material to be excavated has been cross-sectioned and classfied by Architect. Such excavation will be paid on the basis of contract conditions relative to changes in work.

PART 3 - EXECUTION

3.1

A. Excavation Classification:

1. Earth excavation includes removal and disposal of material of any classification indicated in data on subsurface conditions, and other materials encountered that are not classified as rock excavation or unauthorized excavation.

2. Rock excavation consists of removal and disposal of materials encountered that cannot be excavated with a 3/4 cubic yard capacity power shovel without drilling and blasting, or requiring use of special equipment, except such materials that are classified as earth excavation.

3. Rock payment shall be at an agreed upon unit price

4. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be at Contractor's expense. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Architect. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Architect.

B. Additional Excavation:

When excavation has reached required subgrade elevations, notify Architect who will make an inspection of conditions. If unsuitable bearing materials are encountered at required subgrade elevations, carry excavations deeper and replace excavated materials as dir-

PART 3 - EXECUTION

3.1

B. Additional Excavation continued:

ected by Architect. Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.

C. Stability of Excavations:

Slope sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

D. Dewatering:

Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and and surrounding area. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations. Convey water removed from excavations and rain water to collecting or runoff areas. Establish and maintain temporary drainage ditches and other diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.

E. Material Storage:

Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage. Locate and retain soil materials away from edge of excavations. Dispose of excess soil material and waste material as herein specified.

PART 3 - EXECUTION

3.1

F. Excavation for Structures:

Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

G. Excavation for Pavements:

Cut surface under pavements to comply with cross-sections, elevations and grades as shown.

H. Excavation for Trenches:

Dig trenches to the uniform width required for particular item to be installed, sufficiently wide to provide ample working room. Excavate trenches to depth indicated or required. Carry depth of trenches for piping to establish indicated flow lines and invert elevations. Beyond building perimeter, keep bottoms of trenches sufficiently below finish grade to avoid freeze-ups. Where rock is encountered, carry excavation 6" below required elevations and backfill with a 6" layer of crushed stone or gravel prior to installation of pipe. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for entire body of pipe. Backfill trenches with concrete where trench excavations pass within 18" of column or wall footings and which are carried below bottom of such footings, or which pass under wall footings. Place concrete to level of bottom of adjacent footing. Do not backfill trenches until tests and inspections have been made and backfilling authorized by Architect. Use care in backfilling to avoid damage or displacement of pipe systems.

PART 3 EXECUTION

3.1

I. Cold Weather Protection:

Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F. (1C).

3.2 COMPACTION

A. General:

Control soil compaction during construction where required providing minimum percentage of density specified for each area classification.

B. Percentage of Maximum Density Requirements:

Compact soil to not less than the following percentages of maximum dry density for soils which exhibit a well-defined moisture density relationship determined in accordance with ASTM D 1557; and not less than the following percentages of relative density, determined in accordance with ASTM D 2049, for soils which will not exhibit a well-defined moisture-density relationship.

1. Structures:

Compact top 12" of subgrade and each layer of backfill material at 95% maximum dry density or 90% relative dry density. Existing soil removed from excavated area, may be used as compacted fill.

2. Building Slabs and Steps:

Compact top 12" of subgrade and each layer of backfill or fill material at 95% maximum dry density or 90% relative dry density.

3. Lawn or Unpaved Areas:

Compact top 6" of subgrade and each layer of backfill or fill material at 90% maximum dry density.

PART 3 - EXECUTION

3.2 COMPACTION

B. Percentage of Maximum Density Requirements:

4. Walkways:

Compact top 6" of subgrade and each layer of backfill or fill material at 95% maximum dry density or 90% relative dry density.

5. Pavements:

Compact top 12" of subgrade and each layer of backfill or fill material at 95% maximum dry density or 90% relative dry density for cohesive soil material.

C. Moisture Control:

Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to prevent free water appearing on surface during or subsequent to compaction operations. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

1. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value.

3.3 BACKFILL AND FILL

A. General:

If fill is required, place acceptable fill material in layers to required subgrade elevations, for each area classification listed below.

1. Under landscaped areas use satisfactory excavated or borrow material.

PART 3 - EXECUTION

3.3 BACKFILL AND FILL

A. General:

2. Under walks and pavements use bank run gravel, satisfactory excavated or borrow material, or combination of both.

3. Under building slabs, use bank run gravel.

4. Backfill excavations as promptly as work permits, but not until completion of the following:

a. Acceptance of construction below finish grade including, where applicable, waterproofing, perimeter insulation, and foundation drains.

b. Inspection, testing, approval and recording locations of underground utilities.

c. Removal of concrete formwork.

d. Removal of trash and debris.

e. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

B. Ground Surface Preparation:

Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

C. Placement and Compaction:

Place backfill and fill materials in layers not more than 8" in loose depth for material compacted by heavy compaction equipment, and not more than 4" in loose depth for material compacted by hand-operated tampers. Before compaction,

PART 3 - EXECUTION

3.3 BACKFILL AND FILL

C. Placement and Compaction:

moisten or aerate each layer as necessary to provide optimum moisture content. Compact each layer to required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice. Place backfill and fill materials evenly adjacent to structures, to required elevations. Take care to prevent wedging action of backfill against structures by carrying material uniformly around structure to approximately same elevation in each lift.

3.4 GRADING

A. General:

Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surface within specified tolerances according to site plan and building elevations.

B. Grading Outside Building Lines:

Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Finish surfaces free from irregular surface changes, and as follows:

1. Lawn or Unpaved Areas:

Finish areas to receive topsoil to within not more than 0.10' above or below required subgrade elevations.

2. Walks:

Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 0.10' above or below required subgrade elevation.

PART 3 - EXECUTION

3.4 GRADING

B. Grading Outside Building Lines:

3. Pavements:

Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 1/2" above or below required subgrade elevation.

C. Grading Surface of Fill Under Building Slabs:

Grade smooth and even, free of voids, compacted as specified, and to required elevation.

D. Compaction:

After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.

3.5 PAVEMENT SUBBASE COURSE

A. General:

Subbase consists of placing subbase material in layers of specified thickness, over subgrade to support a pavement base course.

B. Grade Control:

During construction, maintain lines and grades including crown and cross-slope of subbase course.

C. Shoulders:

Place shoulders along edges of subbase course to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each subbase course layer. Compact and roll at least a 12" width of shoulder simultaneously with compacting and rolling of each layer of subbase course.

PART 3 - EXECUTION

3.5 PAVEMENT SUBBASE COURSE

D. Placing:

Place subbase course materials on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting subbase material during placement operations. When a compacted subbase course is shown to be 6" thick or less, place material in a single layer. When shown to be more than 6" thick, place material in equal layers, except no single layer more than 6" or less than 3" in thickness when compacted.

3.6 BUILDING SLAB DRAINAGE COURSE

A. General:

Drainage course consists of placement of drainage fill material, in layers of indicated thickness, over subgrade surface to support concrete building slabs.

B. Placing:

Place drainage fill material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations. When a compacted drainage course is shown to be 6" thick or less, place material in a single layer.

3.7 MAINTENANCE

A. Protection of Graded Areas:

Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

PART 3 - EXECUTION

3.7 MAINTENANCE

B. Reconditioning Compacted Areas:

Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

3.8 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Removal from Owner's Property:

Remove waste materials including trash and debris, but not including excavated soil, and dispose of it off Owner's property.

3.9 SOIL EROSION CONTROL

All work shall be in accordance with the "Standards for Soil Erosion and Sediment Control in New Jersey" as promulgated by the New Jersey State Soil Conservation Committee.

END OF "EARTHWORK"

STILLWATER TOWNSHIP SCHOOL

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CONCRETE AND CEMENT WORK

PART 1 - GENERAL

1.1 SCOPE

A. Provide all labor, material and equipment necessary to complete all cast-in-place concrete work, without restricting the generality of the foregoing; the following items of work are included:

1. Interior and exterior column footings and piers.

2. Wall footings.

3. Interior floor slabs on grade and porous fill under slabs on grade.

4. Inserts and anchors.

5. Setting of inserts, anchors, anchor bolts, and other items to be built in and specified under other sections.

6. Reinforcing steel and wire mesh, including mesh for slabs on grade.

7. Form work.

8. Frost protection.

9. Equipment foundations and pads.

10. Vapor barrier under interior slab on grade.

11. Concrete fill around steel columns and beams.

12. Waterproof concrete.

13. Non-slip finish application.

1.2 APPLICABLE PUBLICATIONS: (Use latest edition of publications cited below):

A. Conform to the provisions and recommendations of the publications listed below:

B. Federal Specifications:

1. HH-I-524B Insulation Board, Thermal, (Polystyrone).

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CONCRETE AND CEMENT WORK

PART 1 - GENERAL

1.2 APPLICABLE PULICATIONS:

B. Federal Specifications:

2.	SS-C-1302B	Concrete Patching & Leveling Compounds
3.	TT-C-00800	Curing Compound, Concrete, for New and Existing Surfaces.

C. U.S. Department of Commerce, National Bureau of Standards (NBS) Product Standards:

1.	PS 1-66, re-printed July, 1970 with amendments	Softwood Plywood, Construction and Industrial
2.	PS-17-69	Polyethylene Sheeting (Construction, Industrial and Agricultural Applications).

D. American Concrete Institute (ACI), Standards:

1.	ACI211.1-74	Recommended Practice for Selecting Proportions of Normal Weight Concrete.
2.	ACI 301-72	Specifications for Structural Concrete for Buildings
3.	ACI-318-77	Building Code Requirements for Reinforced Concrete, with Commentary.
4.	ACI-347-68	Recommended Practice for General Formwork.

E. American Society for Testing and Materials (A.S.T.M.) Publications:

1.	A 82-72	Cold-Drawn Steel Wire for Concrete Reinforcment.
2.	A 185-73	Welded Steel Wire Fabric for Concrete Reinforcement.
3.	A 615-74a	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

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CONCRETE AND CEMENT WORK

PART 1 - GENERAL

1.2 APPLICABLE PUBLICATIONS:

E. American Society for Testing and Materials (A.S.T.M.) Publications:

4.	C 31-69	Making and Curing Concrete Compressive and Flexural Strength Test Specimens in the Field.
5.	C 33-74	Concrete Aggregates.
6.	C 39-72	Compressive Strength of Cylindrical Concrete Specimens.
7.	C 94-74	Ready-Mixed Concrete
8.	C 143-71	Slump of Portland Cement Concrete.
9.	C 150-74	Portland Cement.
10.	C 171-69	Sheet Materials for Curing Concrete.
11.	C 172-71	Sampling Fresh Concrete.
12.	C 173-74	Air Content of Freshly Mixed Concrete by the Volumetric Method.
13.	C 260-73	Air-Entraining Admixtures for Concrete.
14.	C 209-74	Liquid Membrane-Forming Compounds for Curing Concrete.
15.	C 494-71	Chemical Admixtures for Concrete.
16.	D 1751-73	Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (non-extruding and Resilient Bituminous Types).

1.3 QUALITY ASSURANCE

A. The Contractor shall be responsible for concrete design mixes and for all costs relating thereto. The Contractor shall obtain the services of an independent Testing Laboratory approved by the Architect. Testing work shall be in conformance with the above mentioned standards and this Section of the Specifications.

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CONCRETE AND CEMENT WORK

PART 1 - GENERAL

1.3 QUALITY ASSURANCE

B. Inspection and Testing of Concrete:

1. Inspection and testing will be made of the concrete plant, facilities, materials, batching, and delivery of concrete (for slump, air content, etc.). Inspection and testing will be by a Testing Laboratory engaged by the Contractor. Reports based upon inspection and testing by the Testing Laboratory will be prepared and sent to the Contractor and the Architect. These reports may be utilized by the Contractor, at his own responsibility, to properly control his concrete operation, so that the requirements of the Specifications are met. The Contractor shall notify the Testing Laboratory at least 48 hours in advance of anticipated concrete pours.

2. The Testing Laboratory will make six (6) cylinders for each 100 cubic yards of concrete or portion thereof, or for each day's pour, whichever is the smaller amount for each specified strength of concrete. Two (2) such cylinders shall be tested for breaking strength at 7 days, and three (3) cylinders at 28 days. One (1) cylinder will be kept as a spare to be tested (at age 42 days) if previous cylinders fail to meet these strength requirements. The Contractor shall notify the laboratory of pouring operations for proper coordination. Cylinders will be tested in accordance with the latest issue of the American Society for Testing Materials Standard Method of Test for Compressive Strength of Molded Concrete Cylinders (Serial Designation C-39). Specimens tested at 7 days should show at least 65% of the specified 28-day strength and specimens tested at 28 days should show at least 100% of the specified 28-day strength. Frequent slump tests will be made in the field to check consistency of concrete.

3. The Testing Laboratory will keep specific and accurate records of where the concrete being poured is placed and which concrete is represented by the identified test cylinders. Reports will clearly state where the concrete was placed which the test cylinders shown thereon represent. The Laboratory will submit 7-day and 28-day reports on the required cylinders. The 28-day reports will also indicate the 7-day strengths as

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CONCRETE AND CEMENT WORK

PART 1 - GENERAL

1.3 QUALITY ASSURANCE

B. Inspection and Testing of Concrete:

3. previously submitted, as well as the 28-day strengths. All reports will indicate the cement factor, air and concrete temperatures, admixture and amount of admixture, air content, weight of cylinders, and slump. The Testing Laboratory will send reports to the Contractor with copies to the Architect.

4. Authority of Testing Laboratory:

a. Technicians representing the Testing Laboratory will inspect the materials and the manufacture of concrete and will report their findings to the Contractor and the Architect. When it appears that the material furnished or work performed by the Contractor fails to fulfill specification requirements, the technicians shall direct the attention of the Contractor and the Architect to such failure.

b. The Testing Laboratory field and plant technicians shall not act as foremen nor perform other duties for the Contractor. Work will be checked as it progresses, but failure to detect any defective work or materials shall not in any way prevent later rejections when such defect is discovered, nor shall it obligate the Architect and Engineer for final acceptance. Technicians are not authorized to revoke, alter, relax, enlarge, or replace any requirement of the Specifications, nor to approve or accept any portion of the Work.

5. Contractor's Cooperation for Test Specimens:

a. The Contractor shall cooperate in the making of tests, furnishing the concrete for test cylinders, also suitable storage space at the jobsite where test specimens can be cast and properly protected until removed by the laboratory for testing.

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CONCRETE AND CEMENT WORK

PART 1 - GENERAL

1.4 SUBMITTALS

A. All shop drawings showing reinforcement, bending and steel lists, shall be submitted to proper authority and, after review, modification shall be made on shop drawings and they shall be submitted in accordance with the requirements of the Supplementary General Conditions. The shop drawings for reinforcement in concrete work shall follow, in principle, the recommendations of the American Concrete Institute in the Manual of Standard Practice for Detailing Reinforced Concrete Structures (ACI-315 latest edition). Sufficient time shall be allowed by the Contractor for the proper checking by Architect and Engineer and at least fifteen (15) working days for review by the Architect and Engineer, for each shop drawing submitted. Shop drawings shall be prepared by only the competent detailers regularly employed in this capacity. Contractor shall submit shop drawings in the sequence of construction.

B. Submittals shall be provided for the following:

1. Mix Designs.

2. Mill Reports.

3. Reinforcing Steel Shop Drawings.

4. Manufacturer's data on materials and accessories proposed for use.

1.5 CONCRETE PROPORTIONING AND PRELIMINARY CONCRETE MIX DESIGNS

A. Preliminary Concrete Mix Designs:

1. The Contractor shall be solely responsible for the preliminary concrete mix designs which shall conform to all requirements of ACI-318-77, Chapter 4, and these Specifications.

2. Reports of material tests of concrete ingredients and preliminary mix designs shall be made, completed, and shall be reviewed by the Architect not less than 15 days before concrete work is to proceed. Preliminary design mixes and tests shall be made for each and every

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CONCRETE AND CEMENT WORK

PART 1 - GENERAL

1.5 CONCRETE PROPORTIONING AND PRELIMINARY CONCRETE MIX DESIGNS

A. Preliminary Concrete Mix Designs:

2. mix required or used for this project, including mixes with specified air-entraining agents. Additional tests shall be made if any change is made in the proportions of materials or admixtures.

3. Cement samples shall be of the same brand, type and source, and aggregate samples shall be of the same source, grading and mineral composition of the materials to be used in actual construction. Approval of the concrete materials will be conditional on acceptable results of preliminary tests.

4. The Contractor shall certify in writing to the Architect that he is satisfied with the mix designs prepared in accordance with the Specifications, and that he accepts and approves same for his use in the structure.

B. Concrete Proportioning:

1. Compressive strength for concrete shall be as indicated on the drawings. No changes shall be made in the approved design mix without the approval of the Architect.

2. The maximum slump of concrete as per ASTM C-143 shall be 3 inches for slabs on grade and 4 inches for all other concrete.

3. Admixtures:

a. General: It shall be the responsibility of the Contractor to see that the manufacturers of any admixtures supply complete written directions for the use of their products relative to amounts, manner in which they are added, etc.

b. All admixtures shall be used in strict accordance with the manufacturer's directions.

c. Admixtures may be used in concrete as follows:

(1) Densifiers or water reducers. Type of densifiers used will be determined by ambient temperature ranges and manufacturer's recommendation.

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CONCRETE AND CEMENT WORK

PART 1 - GENERAL

1.5 CONCRETE PROPORTIONING AND PRELIMINARY CONCRETE MIX DESIGNS

3. Admixtures:

d. Concrete with water reducer and air-entraining admixtures shall not be added to the concrete together; but shall be added separately to different components of the concrete mix when both are required.

e. An air entraining admixture shall be used for concrete exposed to soil or weather, to obtain a maximum of six (6) percent with a range of 4 to 6 percent of entrained air.

f. For interior concrete, including slabs, air content shall not exceed 3 percent.

1.6 ENFORCEMENT OF STRENGTH REQUIREMENTS AND ACCEPTANCE

A. If an individual test as per ACI 318 fails below the specified compressive strength by more than 500 psi, submit core tests in accordance with ACI 318, Article 4.8.4. The entire verification procedure, including core borings and evaluation tests shall be performed by the inspection and Testing Agency and be paid for by the Contractor. When the ultimate compressive strength of any cylinder falls below the specified strength for the class of concrete specified, the design mix and water content shall be adjusted to produce the specified strength for concrete that is subsequently placed. Such changes shall be made without delay. The Architect shall have the right to require strengthening or replacement of those portions of the structure of which such job test cylinders indicate concrete strengths less than the minimum specified.

B. Cores shall have a diameter of approximately 3 times the maximum size of coarse aggregate and shall be secured, capped, and tested in accordance with ASTM C42. If the average and minimum strength of cores so made and tested are less than the minimum values required, the Architect shall have the right to require replacement of those portions of the structure of which the core are representative.

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CONCRETE AND CEMENT WORK

PART 1 - GENERAL

1.7 JOB CONDITIONS

A. Comply with the recommendations of ACI 305 and ACI 306 respectively when placing concrete during hot and cold weather.

B. Placing of concrete during periods of temperature extremes including the special precautionary procedures to be used, shall be subject to the approval of the Architect.

C. When the predicted atmospheric temperature for concrete placing is below 32 degrees F., during the months of October through March, concrete including aggregates and water shall be heated to 60 degrees F. to 75 degrees F.

D. Salt, chemicals, or other materials shall not be mixed with the concrete to prevent freezing.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Standard Aggregates: ASTM C-33

1. Concrete aggregates shall consist of natural sands, gravels or crushed rock. Such aggregates shall not contain soft, friable, thin, flaky, elongated or laminated particles in excess of three (3) percent or containing shale in excess of one and one-half (1-½) percent, or silt and crushed dust finer than the No. 100 standard sieve in excess of two (2) percent. When all three groups of such deleterious materials are present in the aggregates, the combined amounts shall be less than five (5) percent of the combined aggregates. These percentages shall be based on weight of the combined aggregate.

2. The size of the coarse aggregate shall not exceed one-fifth of the narrowest dimension between forms of the member for which the concrete is to be used, or three-fourths of the minimum clear spacing between reinforcing bars. Coarse aggregate shall be what is classified as Size 67, 1 inch to No. 4.

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CONCRETE AND CEMENT WORK

PART 2 - PRODUCTS

2.1 MATERIALS

B. Admixtures:

1. Air entraining admixtures: ASTM C-260.

2. Other admixtures: Admixture other than air entraining agent shall conform to ASTM C-494 and shall be compatible with the mix at job temperatures.

C. Cement: ASTM C-150, Types 1, 11, 111 non-air entraining.

1. The cement, Type 1, 11 or Type 111, shall not contain any ingredients as shown by cement mill certificates which would cause more than 2% air to be entrained in the concrete when the cement is used in the concrete mix.

D. Concrete Patching Compound: Federal Specifications SS-C-1302, Class B.

E. Curing Compound: Federal Specification TT-C-800, Type 1, Class 2 for outdoor use, Type 11, Class 1, for indoor use.

F. Expansion Joint Filler: Premolded, rigid bituminous saturated fiber type, ASTM D-1751, thickness indicated on the drawings.

G. Metal Accessories: Include all spacers, chairs, bolsters, ties and other devices necessary for properly placing, spacing, supporting and fastening reinformcement in place.

H. Metal accessories shall be galvanized or provided with plastic covered legs where legs will be exposed in finished concrete surfaces. Accessories shall conform to requirements of the CRSI "Manual".

I. Reinforcing Bars: ASTM A-615 Grade 60, except pier ties may be Grade 40.

J. Vapor Barrier: Polyethylene sheeting conforming to Product Standard PS17, minumum 6 mil thickness.

K. Welded Wire Fabric: ASTM A-185.

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CONCRETE AND CEMENT WORK

PART 2 - PRODUCTS

2.1 MATERIALS

L. Grout: Approved shrinkage compensating non-metallic grout, capable of achieving a minimum compressive strength of 5,000 psi in five (5) days.

M. Waterproof Concrete: Anti-Hydro Co. Spc. No. 1-1 at balconies and plaza.

N. Non-Slip Finish: Anti-Hydro Co. Spec. No. 5-1 Heavy Duty Floor Hardening Emery Shake in color selected by Architect. Install at all interior and exterior stair treads, plaza and balcony floors.

PART 3 - EXECUTION

3.1 READY-MIXED CONCRETE

A. Ready-mixed concrete shall be mixed and delivered to the project accordance with ASTM C-94. In case of conflict between requirements of ACI 301 and ASTM C-94, those of ACI shall govern. Concrete shall be produced in batching plants inspected and approved under the certification program of the National Ready-Mix Concrete Association.

B. The ready-mix concrete producer shall furnish delivery tickets with each load of concrete delivered to the project. The delivery tickets shall indicate the delivery date and time dispatched; name and location of project; name of Contractor; name of ready-mixed concrete producer; truck number; number of cubic yards of concrete in load; class of concrete; type and brand name of cement; admixtures in concrete; if any, gallons of water and the maximum size of aggregate.

3.2 TYPES OF FORMS

A. Exposed surfaces for all flat surfaces such as slabs, curbs, piers and walls, use plastic coated plywood form from 60-60 high density Douglas fir, thoroughly cleated and tied together with approved corrosion-resistant devices. All edges of forms shall be supported and securely fastened.

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CONCRETE AND CEMENT WORK

PART 3 - EXECUTION

3.2 TYPES OF FORMS

B. Forms for Concealed Surfaces: Any approved material to form true, rigid forms with grout-tight joints.

3.3 FORM CONSTRUCTION

A. The design and engineering of the formwork, as well as its construction, shall be the responsibility of the Contractor. Conform to ACI 347 "Recommended Practice for Concrete Formwork".

B. The inside surface of wood board forms shall be soaked with clean water prior to placing concrete. Plywood forms shall be treated with an approved form oil. All excess oil shall be wiped off with rags to leave the surface of the forms just oily to the touch.

C. Form removal shall be in accordance with ACI 301.

3.4 REINFORCING STEEL AND WIRE MESH

A. Reinforcing steel shall be fabricated to the shapes and dimensions shown. Reinforcing steel shall not be spliced at points of maximum stress. Laps shall be wire-tied, and not less than 40 diameters. Splices in adjacent bars shall be staggered. Except as otherwise indicated, reinforcing details, the number, type and spacing of supports and minimum concrete covering over steel shall conform to ACI-318.

B. Wire mesh reinforcement shall be continuous, except as otherwise indicated, and shall have joints lapped at least one full mesh. Lapping of sheets at ends shall be staggered to avoid continuous joints.

C. After any substantial delay in the work previously started, reinforcing steel shall be inspected and cleaned free from mortar prior to proceeding with the work.

D. All reinforcing steel shall be pre-cut and pre-bent off site in an approved fabricating shop by an approved Subcontractor for reinforcing steel fabrication.

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CONCRETE AND CEMENT WORK

PART 3 - EXECUTION

3.5 VAPOR BARRIER UNDERLAYMENT

Install vapor barrier over drainage fill under all interior slabs-on-grade. Side and end laps shall be not less than 4 inches. Seal laps with an approved synthetic polymer sealing compound recommended by the vapor barrier manufacturer. Repair any tears and perforations with vapor barrier material and seal with compound.

3.6 BUILDING IN ITEMS WORK OF OTHER TRADES

Items such as sleeves, hangers, piping, electrical conduits, and anchors, shall be properly placed and secured in position before concrete is placed. Items that require inspection, shall have been inspected and items that require testing shall have been tested and approved before concrete is placed.

3.7 EQUIPMENT, FOUNDATIONS, PADS AND BASES

A. Foundations, pads, bases and other concrete for equipment provided under other Sections shall be provided. See Mechanical and Electrical Drawings for pad sizes not shown on Architectural Sheet.

B. Be responsible for layout and dimensional coordination with all equipment approved for use. Dimensions and details, where shown, are based on those relating to equipment specified. Build in all anchors, bolts and similar items furnished by others.

3.8 ANCHOR BOLTS AND BASE PLATES

Anchor bolts for structural steel shall be set to dimensions shown on approved shop drawings.

3.9 CONVEYING CONCRETE:

A. Concrete shall be conveyed from the mixer to the forms as quickly as possible by methods which will prevent segregate and loss of materials.

B. Delivery carts or buggies where used shall be kept on temporary runways built over the construction and runway supports shall not bear upon reinforcing steel or fresh concrete.

PART 3 - EXECUTION

3.9 CONVEYING CONCRETE

C. Conveyors and pumps shall be capable of expeditiously placing concrete at the rate most advantageous to good workmanship.

D. Pumps if utilized, shall be operated and maintained so that a continuous stream of conrete is delivered into the forms without air pockets, segregation, or changes in slump. When pumping is completed, concrete to be used remaining in the pipeline shall be ejected without contamination of concrete or segregation of ingredients. After each operation, equipment shall be thoroughly cleaned, and the flusing water shall be wasted outside the forms.

E. Pumps and piping and other conveying equipment so constructed to allow contact of concrete with aluminum during conveying and pumping shall not be used.

3.10 PLACING CONCRETE

A. Concrete shall be deposited in a continuous manner and as rapidly as practicable until the minimum specified unit of construction has been completed.

B. Before placing concrete, all debris, water and ice shall be removed from the spaces to be occupied by the concrete. Wood forms shall be thoroughly wetted (except in freezing weather) or oiled, and the reinforcement cleaned of ice or other coatings. Unless otherwise provided, concrete footings and exterior slabs and foundations shall be placed directly on undisturbed surfaces that are thoroughly moinstened but not muddy at the time concrete is placed. There shall be no free water present at footing bottoms between time of final excavation to grade and concrete placement.

C. Concrete shall be deposited in the forms as nearly as practicable in its final position to avoid rehandling. Special care shall be exercised to prevent splasing of forms or reinforcement with concrete in advance of pouring.

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CONCRETE AND CEMENT WORK

PART 3 - EXECUTION

3.10 PLACING CONCRETE

D. Concrete shall be thoroughly compacted with the aid of mechanical internal vibrating equipment, supplemented by hand spading, rodding, and tamping. Spare vibrators shall be on hand at all times. Vibration shall be applied directly to the concrete unless otherwise approved by the Architect. The intensity shall be sufficient to cause flow or settlement of the concrete into place.

E. Concrete shall not be allowed to drop freely more than seven (7) feet in concealed work nor more than five (5) feet in exposed work, nor in a manner which shall cause segregation of the materials.

3.11 CONSTRUCTION JOINTS

A. Construction joints not specifically indicated shall be so made and located as to avoid impairment of the strength of the structure. Where a construction joint is to be made, the surface of the placed concrete shall be keyed or roughened and thoroughly cleaned and all laitance removed. In addition, vertical joints shall be thoroughly wetted and slushed with a coat of neat cement grout immediately before placing the new concrete. Joints shall be perpendicular to the main reinforcement.

B. No horizontal joints shall be made in footings.

C. Placement of concrete shall be at such rate that surfaces of concrete not carried to joint levels will not have attained initial set before additional concrete is placed thereon. The Contractor shall have a means at hand to bring any pour to an emergency construction joint provided with the proper shear key and/or dowels if an interruption in the supply of concrete or inclement weather makes such a procedure necessary.

3.12 SLABS

A. The installation of underground and embedded items shall be approved before slabs are placed. Pipes and conduits shall be installed below the concrete unless otherwise detailed and approved. The subgrade shall be leveled and uniformly compacted to a true and even surface.

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CONCRETE AND CEMENT WORK

PART 3 - EXECUTION

3.12 SLABS

B. Concrete shall be placed in checkerboard pattern to the required thickness, compacted, screeded to grade, and prepared for the specified finish. Slope to floor drains where they occur.

C. Provide depressed areas for setting beds as shown.

D. While concrete is being placed, wire mesh shall be carefully checked and corrected to insure its proper placement in the slab.

E. Do not place concrete on frozen or partially frozen subgrade.

3.13 FINISH OF CONRETE SURFACES

A. Smooth finish consisting of removal of fins, surfaces dressed and ground reasonably smooth will be required on all exposed exterior concrete surfaces.

B. Ordinary Surface Finish will be required on all exterior concrete surfaces below grade and to which backfill will be applied; on all interior concrete surfaces which will not be exposed in the finished construction. Upon removal of forms, all tie wire holes, etc., shall be filled with cement mortar and troweled smooth.

C. Floor Slabs:

1. Finished floor slabs surfaces shall be completed within a level tolerance as per ACI 301 unless otherwise noted. Floor slabs not receiving fill shall be given a smooth even steel troweled finish, conforming to ACI 301. The floor slabs shall be screeded and darbled and steel troweled followed by a second steel troweling to burnish and polish the finish.

2. Floor slabs receiving fill shall be screeded and slightly roughened as per ACI 301 for bonding of fill.

PART 3 - EXECUTION

3.13 FINISH OF CONCRETE SURFACES

C. Floor Slabs:

3. Where finishes do not meet the requirements of this Specification, Contractor shall refinish surfaces using two (2) component epoxy compounds as manufactured by Sika Chemical Corporation, or equal, all applied as per manufacturer's recommendations, or grind where required.

4. Grinding to achieve specified finish shall be performed as required.

D. Protection: Floors shall be kept closed to traffic or other work until the finish has hardened sufficiently to withstand, without damage, any use to which it may be subjected. Finish shall be protected from premature drying beginning immediately after troweling is finished. The protection shall be maintained for at least 7 days and shall consist of a layer of reinforced paper or polyethylene film placed over the entire floor area, all seams lapped and sealed, or apply a curing compound as specified.

3.14 CURING

A. Special precautions shall be taken to keep all surfaces of newly placed concrete from losing moisture rapidly especially when such concrete is exposed to prevailing temperatures, of over 70 degrees F., or when the surface is exposed to drying winds. When the air temperature is over 70 degrees F., newly placed conrete shall be protected from the direct rays of strong sunlight and other sources of radiant heat.

B. Wherever practicable, provisions shall be made for maintaining concrete continuously moist for a period of at least 7 days after placement of the concrete. This requirement applied to vertical as well as horizontal surfaces.

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CONCRETE AND CEMENT WORK

PART 3 - EXECUTION

3.14 CURING

C. The moist curing of concrete shall be initiated as soon as practicable after the concrete is placed.

D. Curing compound applied to floor slabs in accordance with the manufacturer's recommendations may be used on concrete surfaces for curing purposes. This shall be applied as soon as the concrete may be walked on. Overnight waiting is not permitted. Curing compounds shall be applied over clean surfaces in strict conformance with the manufacturer's recommendations. Coverage shall result in a continuous membrane, conforming to Federal Spec. TT-C-800, 30 percent solids minimum. Curing compound must be compatible with floor finishes to be applied under other sections of this Specification, and shall be used only if there are no deleterious effects on floor finishes.

E. Precautions shall be taken to prevent freezing of curing water, and injury to the surface during the period of curing.

END OF "CONCRETE AND CEMENT WORK"

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UNIT MASONRY

PART 1 - GENERAL

1.1 SCOPE

The work required under this section consists of Unit Masonry and related items necessary to complete the work indicated on drawings and described in specifications, including, in general, but not limited to the following:

A. Brick
B. Concrete Block
C. Masonry ties and reinforcing
D. Built-in work
E. Mortar
F. Grout and set bearing plates and anchor bolts

1.2 BIDDING DOCUMENTS

The General Conditions, Supplementary Conditions and all other applicable requirements of Division 1 of these Specifications shall govern the work of this section.

1.3 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other applicable requirements of Division 1, apply to work of this section.

1.4 DESCRIPTION OF WORK

Extent of each type of masonry work is indicated on drawings and schedule.

1.5 QUALITY ASSURANCE

A. Fire Performance Characteristics:

Where fire-resistance ratings are indicated for unit masonry work, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with ASTM E-119 by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.

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UNIT MASONRY

1.6 JOB CONDITIONS

A. Protection of Work:

During erection, cover top of walls with waterproof sheeting at end of each days' work. Cover partially completed structures when work is not in progress.

B. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

C. Do not apply uniform floor or roof loading for at least 12 hours after building masonry walls or columns.

D. Do not apply concentrated loads for at least 3 days after building masonry walls or columns.

E. Staining:

Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry. Protect base of walls from rainsplashed mud and mortar splatter by means of coverings spread on ground and over wall surface.

F. Protect sills, ledges and projections from droppings of mortar.

G. Cold Weather Protection:

1. Do not lay masonry units which are wet or frozen.

2. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.

3. Remove all masonry determined to be damaged by freezing conditions.

4. Do not lay masonry when the temperature of the outside air is below 40 degrees F. unless suitable means approved by the Architect are provided to heat materials, protect work from cold and frost and insure that mortar will harden without freezing. No anti-freezing ingredient shall used in mortar.

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UNIT MASONRY

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Manufacturer:

Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.

B. Masonry Unit Characteristics:

Provide units complying with standards referenced and requirements indicated.

2.2 BRICK

A. Merritt Brick, Flemington, New Jersey. Red Smooth McAvoy to match existing.

B. Architect will verify color and make final color selection in field. Brick to be ordered by Contractor.

2.3 CONCRETE MASONRY UNITS

A. Size:

Manufacturer's standard units with nominal face dimensions of 16" long x 8" (15 5/8" x 7 5/8" actual), unless otherwise indicated.

B. Special Shapes:

Provide where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.

C. Hollow Loadbearing:

ASTM C-90, Grade N.

D. Solid Loadbearing:

ASTM C-145, Grade N.

E. Weight Classification:

Lightweight units above grade (Less than 105 lbs. per cu. ft., oven dry weight of concrete).

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UNIT MASONRY

PART 2 - PRODUCTS

2.3 CONCRETE MASONRY UNITS

F. Weight Classification:

Normal weight units below grade (125 lbs. per cu. ft. or more, oven dry weight of concrete).

G. Cure units by atmospheric drying for not less than 30 days before installation, to comply with ASTM C-90, Type II.

H. Exposed Faces:

Provide manufacturer's standard color and texture.

2.4 MORTAR MATERIALS

A. Portland Cement:

ASTM C-150 Type I, except Type III may be used for cold weather construction.

B. Masonry Cement:

ASTM C-91.

C. Hydrated Lime:

ASTM C-207, Type S.

D. Aggregate for Mortar:

ASTM C-144, except for joints less than ¼" use aggregate graded with 100% passing the No. 16 sieve.

E. Aggregate for Grout:

ASTM C-404.

F. Water:

Clean and potable.

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UNIT MASONRY

PART 2 - PRODUCTS

2.5 MASONRY ACCESSORIES

A. Horizontal Joint Reinforcing and Ties for Masonry:

1. Provide welded wire units prefabricated in straight lengths of not less than 10', with matching corner ("L") and intersecting ("T") units. Fabricate from cold-drawn steel wire complying with ASTM A -82, with deformed continuous side rods and plain cross rods, into units with widths of approximately 2" less than nominal width of walls and partitions as required to position side rods for full embedment in mortar with mortar coverage of not less than 5/8" on joint faces exposed to exterior and not less than ½" elsewhere. Provide the following type of joint reinforcing unless otherwise indicated.

2. Truss type with diagonal cross rods spaced not more than 16" o.c.

B. Wire Sizes:

Fabricate with 9 gauge side and cross rods, unless otherwise indicated.

C. Wire Finish:

Provide manufacturer's standard mill galvanized finish or hot dip galvanized finish.

D. Masonry Veneer Anchors:

Hot-dipped galvanized metal straps 24" o.c. horizontally and vertically.

E. Concrete Inserts for Masonry:

1. Unit Type: Furnish cast-iron or malleable iron inserts of the type and size shown, hot-dip galvanized after fabrication with 1.5 oz. zinc coating, ASTM A -153, Class B-2.

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UNIT MASONRY

PART 2 - PRODUCTS

F. Flashing for Masonry

1. Provide concealed flashings, shown to be built into masonry.

2. Provide concealed flashings as follows: Virgin polyvinyl chloride with plasticizers and other modifiers, formed into uniform flexible sheets not less than 20 mils thick and black in color, unless otherwise indicated.

G. Miscellaneous Masonry Accessories:

1. Reinforcing Bars: Deformed steel, ASTM A -615, Grade 60 for bars No. 3 to No. 18.

2. Bond Breaker Strips: 15-lb. asphalt roofing felt complying with ASTM D -226 or 15-lb., coal-tar roofing felt complying with ASTM D-227.

3. Plastic Weepholes: Unless otherwise indicated, provide ¼" round x 4" long medium density polyethylene plastic tubes to form weepholes.

4. Premolded Control Joint Strips: Solid rubber strips with a shore A durometer hardness of 60 to 80, designed to fit standard sash block and maintain lateral stability in masonry wall, size and configuration as indicated.

2.6 MORTAR AND GROUT MIXES

A. Do not lower the freezing point of mortar by use of admixtures or anti-freeze agents. Do not use calcium chloride in mortar or grout.

B. Mortar for Unit Masonry:

Comply with ASTM C-270, Proportion Specification, for types of mortar required, unless otherwise indicated.

C. Limit cementitious materials in mortar to Portland cement-lime.

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UNIT MASONRY

PART 2 - PRODUCTS

2.6 MORTAR AND GROUT MIXES

D. Use Type M mortar for masonry below grade and in contact with earth, and where indicated.

E. Use Type N mortar for exterior, above grade loadbearing and non-loadbearing walls; for interior loadbearing walls; and for other applications where another type is not indicated.

F. Grout for Unit Masonry:

Comply with ASTM C-476 for grout for use in construction of reinforced and non-reinforced unit masonry. Use grout of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout.

G. Cement Plaster Mix:

1 part Portland Cement
¼ part lime
3 part sand

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Thickness:

Build masonry construction to the full thickness shown.

1. Cut masonry units with motor-driven saw designed to cut masonry with clean sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible. Use dry cutting saws to cut concrete masonry units.

2. Wet clay brick which have ASTM C -67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which ensure that units are nearly saturated but surface dry when laid.

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UNIT MASONRY

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Thickness:

3. Do not wet concrete masonry units.

B. Pattern Bond: Match coursing, bonding, color and texture of new masonry work with existing work.

1. Layout walls in advance for accurate spacing of surface bond patterns, with uniform joint widths and to properly locate openings, movement type joints, returns and offsets. Avoid the use of less-than-half size units at corners, jambs, and wherever possible at other locations.

2. Lay-up walls plumb and with courses level, accurately spaced and coordinated with other work.

C. Stopping and Resuming Work:

Rack back ½ masonry unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if specified to be wetted), and remove loose masonry units and mortar prior to laying fresh masonry.

D. Built-in Work:

As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with mortar.

1. Fill space between hollow metal frames and masonry solidly with mortar.

2. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

3. Fill cores with grout 3 courses (24") under bearing plates, beams, lintels, posts and similar conditions unless otherwise indicated.

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UNIT MASONRY

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

E. Intersecting Loadbearing Walls:

If carried up separately, block vertical joint with 8" maximum offsets and provide rigid steel anchors spaced not more than 4'-0" o.c. vertically, or omit blocking and provide rigid steel anchors at no more than 2'-0" o.c. vertically. Form anchors of galvanized steel not less than 1 1/2" x ¼" x 2'-0" long with ends turned up not less than 2" or with cross-pins. If used with hollow masonry units, embed ends in mortar filled cores.

F. Non-Loadbearing Interior Partition Walls:

Build full height of story to underside of solid structure above, unless otherwise indicated.

3.2 MORTAR BEDDING AND JOINTING

A. Lay brick and solid concrete masonry units with completely filled bed, head and collar joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not sluch head joints.

B. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with concrete or grout. For starting courses on footings where cells are not grouted, spread out full mortar bed including areas under cells.

C. Joints:

Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not otherwise indicated, lay walls with 3/8" joints. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials. Tool exposed joints slightly concave using a jointer larger than joint thickness. Rake out mortar in preparation. for application of caulking or sealants where shown.

PART 3 - EXECUTION

3.2 MORTAR BEDDING AND JOINTING

D. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.

3.3 CAVITY WALLS

A. Keep cavity clean of mortar droppings and other materials during construction. Strike joints facing cavity, flush.

B. Tie exterior wythe to back-up with individual metal ties spaced not more than 24" o.c. vertically and 24" o.c. horizontally. Stagger in alternate courses.

C. Provide weepholes in exterior wythe of cavity, composite and veneer walls located immediately above ledges and flasing, spaced 2'-0" o.c., unless otherwise indicated. Cover cavity side of weepholes with copper or plastic insect screen.

3.4 HORIZONTAL JOINT REINFORCING

Provide continuous horizontal joint reinforcing as shown and specified. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8"on exterior side of walls and ½" at other locations. Lap reinformcement a minimum of 6". Do not bridge control and expansion joints with reinforcing, unless otherwise indicated. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions. Space continuous horizontal reinforcing at 16" o.c. vertically.

A. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcing placed in 2 horizontal joints approximately 8" apart, both immediately above lintels and below sills. Extend reinforcing a minimum of 2'0" beyond jambs of opening, bridging control joints where provided.

3.5 ANCHORING MASONRY WORK:

A. Provide anchoring devices of the type indicated. If not indicated, provide standard type for facing and back-up involved.

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UNIT MASONRY

PART 3 - EXECUTION

3.5 ANCHORING MASONRY WORK:

B. Anchor masonry to structural members where masonry abuts or faces such members to comply with the following:

1. Provide an open space not less than 1" in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.

2. Anchor masonry to structural members with metal ties embedded in masonry joints and attached to structure. Provide anchors with flexible tie sections, unless otherwise indicated.

3. Space anchors as shown, but not more than 24" o.c. vertically and 36" o.c. horizontally.

3.6 LINTELS

A. Install loose lintels of steel and other materials where shown.

B. Provide precast and reinforced masonry lintels where shown and wherever openings of more than 1'-0" are shown without structural steel or other supporting lintels. Provide precast or formed-in-place masonry lintels. Thoroughly cure precast lintels before handling and installation. Temporarily support formed-in-place lintels.

C. Provide minimum bearing of 8" at each jamb, unless otherwise indicated.

3.7 CONTROL AND EXPANSION JOINTS.

Provide vertical expansion, control and isolation joints in masonry where shown. Build-in related masonry accessory items as the masonry work progresses.

3.8 FLASHING OF MASONRY WORK

Provide concealed flashings in masonry work at, or above, all shelf angles, lintels, ledges and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior. Prepare masonry surfaces smooth and free from projections which could puncture flashing. Place through-wall flashing on bed of mortar and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar.

PART 3 - EXECUTION

3.8 FLASHING OF MASONRY WORK

A. Extend flashings the full length of lintels and shelf angles and minimum of 4" into masonry each end. Extend flashing from a line ½" in from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4", and through the inner wythe to within ½" of the interior face of the wall in exposed work. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2". At heads and sills turn up ends not less than 2" to form a pan.

B. Provide weepholes in the head joints of the same course of masonry bedded in the flashing mortar.

C. Install reglets and nailers for flashing and other related work where shown to be built into masonry work.

3.9 REPAIR, POINTING AND CLEANING

A. Remove and replace masonry units which are loose, chipped, broken stained or otherwise damaged,or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing:

During the tooling of joints, enlarge any voids or holes, except weepholes, and completely fill with mortar. Point-up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of caulking or sealant compounds.

C. Clean exposed brick masonry surfaces by the bucket and brush hand cleaning method or by high pressure water method in accordance with manufacturer's instructions.

D. Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings.

END OF "UNIT MASONRY"

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STRUCTURAL STEEL

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section shall include all labor, materials, appliances, and services necessary for the furnishing, fabrication, delivery and erection on the site of all structural steel work enumerated herein and indicated on the Structural Drawings, subject to the requirements hereinafter specified.

1. Column base plates, columns, anchor bolts and nuts for column bases.

2. Roof beams and girders.

3. Erection of and connections for all work under this Section.

4. Painting as hereinafter specified.

5. Grouting of base plates.

6. All other items of structural steel and related work reasonably inferred as needed to make work of this Section complete, including furnishing of loose steel lintels weighing less than 200 lbs. This Section shall furnish and install all lintels weighing over 200 lbs.

B. Related work described elsewhere:

1. Concrete and cement: Section 03010

2. Metal decking: Section 05300

1.2 CONTRACT DRAWINGS

A. The Contract Drawings indicate the general arrangement and dimensions of the Structural iron and steel. In general, the Structural Drawings are made to scale, but scale dimensions shall not be used.

B. If any inconsistencies or disagreements are found, they shall be immediately referred to the Architect.

C. This Contractor shall, in all cases, furnish the exact Sections, weights, and kinds of material called for, and must follow the exact details, methods and instructions

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STRUCTURAL STEEL

PART 1 - GENERAL

1.2 CONTRACT DRAWINGS

C. called for by these Specifications and the accompanying Drawings to their full extent and purpose, unless otherwise agreed in writing.

D. Substitutions of other shapes of equivalent strength and not greater dimensions than those shown on the Drawings will be allowed, subject to the approval of the Architect. Any such increase in weight will be at the expense of this Contractor.

1.3 SHOP DRAWINGS

A. This Contractor shall prepare and submit to the Architect, as required by the Supplementary General Conditions, erection plans and checked detail shop drawings.

B. Shop drawings shall not be submitted in bulk, and shall be submitted sufficiently in advance to allow at least 15 working days for checking and approval. Initial submission of shop drawings shall consist of one sepia and two prints.

C. This Contractor shall alone be responisble for correctness of fit and strength of details. The Architect's approval or revision of shop details does not relieve this Contractor of this responsibility.

D. The omission from Contractor's shop drawings of any material shown on Contract Drawings, or called for in this Section, shall not relieve this Contractor from furnishing same, or money equivalent, even though such drawings are returned approved.

1.4 INSPECTION AND TESTS

A. Mill and Shop: The material to be furnished under this Specification shall be subject to inspection and tests in the mill and shop. Such inspection shall include the identification of tested material, the checking of all fabrication for compliance with approved shop drawings and these Specifications, and inspection of shop painting. However, inspection in the mill or shop shall not relieve the Contractor of his responsibility to furnish satisfactory materials.

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STRUCTURAL STEEL

PART 1 - GENERAL

1.4 INSPECTION AND TESTS

B. Field inspection shall include the inspection after delivery at the site of all material, fabrication and shop painting, and all work connected with the erection and field painting of the steel structure.

C. Shop and field inspection will be performed by a Testing Laboratory engaged and paid by the Contractor. The Contractor shall notify the Testing Laboratory at least one (1) week in advance of the start of shop fabrication, and at least one (1) week in advance of the start of field erection.

D. Welding inspection: All welding to be done on any part of the structure shall be performed under the supervision of a representative of the Testing Laboratory. All full penetration welds shall be checked using the ultrasonic method.

E. Inspection and acceptance or failure to inspect shall in no way relieve the Contractor or the mill and shops from their responsibility to furnish satisfactory material strictly in accordance with Contract Plans and Specifications.

F. High strength bolt inspection: The Testing Laboratory shall be provided with use of a calibrated torque wrench as well as the manpower required to operate same for the purpose of checking high strength bolts. Adequate platforms and scaffolding shall be provided by the Contractor to insure the safe performance of this operation.

1.5 WORKMANSHIP

A. Steel work shall conform to AISC Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings and to AISI Specification for the Design of Cold-Formed Steel Structural Members.

B. Welding shall be in accordance the current Code for Arc and Gas Welding Society and in addition shall meet all requirements of the Local Building Code and rules or other regulations. Proper required certifications that all welded work meets the requirements as herein specified, shall be furnished to the Director and all other authorities having jurisdiction over this work.

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STRUCTURAL STEEL

PART 1 - GENERAL

1.5 WORKMANSHIP

C. Holes for the attachment or passage of work by other trades shall be provided as required. Submit shop drawings showing size and location for approval before cutting structural members.

D. Bearing ends of columns shall be milled at right angles to the axis of the column. Abutting surfaces shall be closely fitted.

E. Assembled parts shall be brought into close contact, and drift pins shall be used only for bringing members into position, not to enlarge or distort holes.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural steel beams, girders, and columns shall conform to ASTM Standard Specifications for Structural Steel for Bridges and Buildings ASTM 36, Grade 36.

B. High strength bolts, nuts and washers shall conform to the Standard Specification of ASTM Designation A-325, current Edition. Unfinished bolts, nuts and washers shall conform to "American Standard Regular".

C. Tubular steel members shall conform to ASTM A500, Grade B, minimum yield point 46 psi.

D. Shop paint for steel, not required to be galvanized shall be "Apex Basic Lead Silico Chromate Primer, Type II for steel shop priming made by Apex Color Works, Inc.

E. Grout for base plates shall be pre-packaged shrinkage compensating grout, non-metallic type having a minimum cube strength of 5000 psi in compression at age 5 days at the consistency to be used in the work.

F. Affidavits shall be furnished by the manufacturer, certifying that all materials delivered to the project conform to these Specifications.

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STRUCTURAL STEEL

PART 3 - EXECUTION

3.1 CONNECTIONS

A. All connections shall be AISC Standard framed or equivalent. All shop connections shall be high tensile bolted or welded. All field connections to and within 3'-0" of columns, moment connections, and for all beams carrying mechanical room loads, shall be bolted with High-strength bolts or welded. All other field connections may be bolted with A307 bolts or welded. Minimum bolt size shall be 3/4".

B. Connections of cold-formed steel members to structural steel beams shall be welded.

C. Connections shall make full provision for stresses caused by eccentric loads.

D. Knife type connection shall be prohibited.

3.2 SHOP AND FIELD WELDING

A. All welding shall fully comply with requirements of American Welding Society's "Code for Arc and Gas Welding in Building Construction", as amended to date. Welding operators shall show evidence of satisfactory qualification within twelve months prior to work on this project, except that shop personnel continuously employed as welders may be accepted on basis of satisfactory reports dated not more than two (2) years prior to job. Evidence of welding procedure qualification by Contractor shall be submitted for approval of Architect. All welders working on this Project shall have identifying symbol, and on each weldment made, welder shall stamp his symbol for identification.

B. Welding equipment shall be maintained in good working condition at all times, and shall be capable of adjustment in a full range of current settings. Welding cables shall be of adequate size for currents involved, and grounding methods shall be such as to assure proper machine performance. A sequence of joint welding will be outlined by the Testing Laboratory to control shrinkage and member alignment, and this outline shall be rigidly adhered to.

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STRUCTURAL STEEL

PART 3 - EXECUTION

3.2 SHOP AND FIELD WELDING

C. Use American Welding Society's recommended electrodes for use on particular type of steel being worked, unless otherwise authorized or directed by the Testing Laboratory. When sealed containers or electrodes are opened, place in a furnace, at proper temperature, to eliminate electrodes picking up moisture, and issue to welders in small quantities. Size of electrodes to be used in shop and field shall be approved before use.

D. Surfaces to be welded shall be free from loose scale, slag, rust, grease, paint and other foreign material, except that mill scale which withstands vigorous wire brushing may remain. Joint surfaces shall be free from fins and tears caused by shearing in shop. Preparation of edges by gas cutting shall, wherever practicable, be done with a mechanically guided torch.

E. Cover bead or finish pass on all welds shall show a smooth and uniform surface with reinforcement of 1/16" (inch) to 1/8" (inch). (Drawings indicate areas that require weld reinforcement to be ground flush). Finished weldments shall show no surface voids or cracks, and there shall be no undercutting of base metal at fusion line.

F. To ensure soundness for butt welds that carry stress approaching maximum allowable working stress, extend ends of butt welds past edges of joined parts by means of short extension bars providing a similar joint preparation and having a width not less than thickness of thicker part joined. Where material is not more than 3/4" (inch) in thickness, extension bars may be omitted and side welds applied to fill out ends of same reinforcement as faces of weld. If extension bars are required to be removed due to fire-proofing or some other matter, leave ends of welds smooth and flush with edges of abutting parts. Contractor shall be responsible for shrinkage and distortion in all butt welds.

G. Execute no welding until joint elements are bolted in intimate contact or to required roof opening. Weld heavy sections and those having a high degree of restraint with low hydrogen type electrodes as directed by Architect or Laboratory. Splice no members without prior approval.

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STRUCTURAL STEEL

PART 3 - EXECUTION

3.2 SHOP AND FIELD WELDING

H. Execute no welding when temperature of base metal is lower than 32 degrees F. At temperatures between 32 degrees F and 40 degrees F., heat surface of all areas within 3" (inches) of point where a weld is to be started to temperature at least warm to hand before welding is started.

I. Preheat steel as recommended in AISC and Welding Codes.

J. Contractor shall be responsible for shrinkage and distortion in all welds.

K. Any welds, connections, bolting or other items found unacceptable as result of the above inspection and testing, shall be corrected by the Contractor at his expense, including additional testing that may be required as determined by the Engineer.

3.3 BOLTING

A. Generally, all bolting shall conform to applicable provisions of AISC Specifications for the Design, Fabrication and Erection of Structural Steel Buildings. Where structural joints are made using high strength bolts with hardened washers and nuts tightened to a high tension, the materials, methods of installation and tension control, type of wrenches to be used, and inspection methods, shall conform to Specifications for "Structural Joints using ASTM A-325 Bolts", as approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.

B. High strength bolts shall have a suitable identifying mark placed on top of heads before leaving factory. Execute tightening of nuts with properly calibrated wrenches or by turn-of-nut method. Minimum bolt tension for size of bolt used shall be in accordance with tables listed in referenced standards. When calibrated wrenches are used, check each wrench for accuracy at least once daily or actual conditions of application. Mark bolts that have been completely tightened with an identifying symbol.

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STRUCTURAL STEEL

PART 3 - EXECUTION

3.3 BOLTING

C. Return wrench to tough-up bolts previously tightened, which may have been loosened by tightening of subsequent bolts, until all are tightened to prescribed amount. Joint shall first be properly compacted by bringing a sufficient number of bolts to a snug, tight condition such as can be produced with an impact wrench. Make certain that bevel or plain washers are inserted under bolt heads or nuts bearing on beveled or flat surfaces before bolts are tightened. The Testing Laboratory shall approve procedure for calibration of wrenches and installation of bolts, and observe field installation to determine that these procedures are followed.

3.4 ERECTION

A. Prior to erection, licensed survey shall be provided showing location and projection of anchor bolts, and elevation of top of pier or footing.

B. This shall include the furnishing of all column anchor bolts to be concreted in by others, the setting of all columns and bases, and erection of all structural steel.

C. All columns shall be set true and plumb and temporarily braced wherever necessary. Structural steel beams are typically braced only after joists are welded into place.

D. As erection progresses, the work shall be securely braced and bolted up to take care of all dead load, wind and erection stresses.

E. The Contractor shall assume all responsibility for any defective work, or claims by others due to improper work, or erection of this work.

3.5 PAINTING

A. Shop Painting: All steel work shall be thoroughly cleaned of loose scale, rust and foreign matter, and be dry when painted. All steel work shall be given one shop coat. Paint shall be applied thoroughly and evenly and well worked into the joints and open spaces.

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STRUCTURAL STEEL

PART 3 - EXECUTION

3.5 PAINTING

B. Parts inaccessible after assembly, shall ge given two (2) coats of shop paint.

C. Contact surfaces shall be cleaned before assembly, but not painted.

D. After erection, steel shall have field connections and abraded places touched up with shop coat paint.

3.6 GROUTING BASE PLATES

A. Drypack or pour grout under a "head" into the space between base plates and concrete piers or footings. Take care to completely fill the space without leaving voids or excessive air pockets. Moist cure the grout for 5 days minimum after casting.

B. The Testing Laboratory shall take cube samples of grout being placed for compression tests, to verify that compressive strength specified has been attained.

C. Deficient grout shall be removed and recast.

END OF "STRUCTURAL STEEL"

STILLWATER TOWNSHIP SCHOOL

05220

OPEN WEB STEEL JOISTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

Work of this Section shall conform to the requirements of the Contract Documents.

1.2 DESCRIPTION

Furnish all plant, labor, materials and supervision to complete installation of open web steel joists and related work as shown and specified herein.

1.3 STANDARD SPECIFICATIONS - LATEST EDITION

A. Standard Specifications and Load Tables for Open Web Steel Joists-Steel Joist Institute and American Institute of Steel Construction.

B. Specification for the Design, Fabrication and Erection of Structural Steel for Buildings-American Institute of Steel Construction.

C. Basic Code for Welding in Building Construction of American Welding Society.

1.4 CERTIFICATION OF MILL TEST REPORTS

Wherever this Specification requires conformity to ASTM, Federal or any other standard specification, a certified statement that the material conforms to the applicable specification, or a certified copy of mill test report, shall be submitted by the Contractor to the Architect. This requirement may be waived at the discretion of the Architect.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The steel used for joist fabrication shall conform to ASTM-441 or equal with minimum yield point for "H" Series to be not less than 50,000 psi.

B. Welding electrodes for field welding shall conform to ASTM-A233 Series-E70.

C. Steel Joists

1. Steel joists shall conform to the Standard Specifications and Load Tables for Open Web Steel Joists of the S.J.I. and the A.I.S.C.

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OPEN WEB STEEL JOISTS

PART 2 - PRODUCTS

2.1 MATERIALS

C. Steel Joists:

2. Joists shall be standard parallel chord "K" Series as indicated on the Drawings and as specified herein.

3. Joists and bridging shall receive one shop coat of red lead primer, conforming with Federal Specification TTP-636.

4. Horizontal bridging shall be steel angles.

2.2 SHOP DRAWINGS

A. The Contractor shall prepare shop drawings consisting of erection diagram and assembly and attachment details.

B. The Contractor shall submit the completed and checked shop drawings for approval. The Architect reserves the right to modify these details, if, in his opinion, such modification is deemed to be necessary, and the fabrication shall be in accordance with such revised or modified details. Drawings "not approved" or "approved as noted" shall be resubmitted for approval.

C. The approval of shop drawings shall in no way relieve the Contractor of his responsibility for their completeness and accuracy.

D. The shop drawings shall be approved by the Architect prior to the beginning of any fabrication, except that the Contractor may proceed with fabrication on the basis of "Approved as Noted" drawings, provided that the noted corrections are made.

E. The number and distribution of shop drawings submitted for approval shall be as specified in the General Conditions.

PART 3 - EXECUTION

3.1 ERECTION

A. Joists shall be installed as indicated on the Drawings and in accordance with the Standard Specifications for Open Web Steel Joists of the S.J.I. and the A.I.S.C.

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OPEN WEB STEEL JOISTS

PART 3 - EXECUTION

3.1 ERECTION

B. Joists shall be connected to structural steel members and steel bearing plates by welding per S.J.I Standard Specifications.

C. Bridging shall be welded to top and bottom chords of joists and shall be secured at ends by anchors to masonry walls or by welding to structural steel.

D. Joists shall not be loaded until bridging is installed.

E. All welds shall be brushed, cleaned and primed with a red lead base primer after installation is complete.

END OF "OPEN WEB STEEL JOISTS"

STILLWATER TOWNSHIP SCHOOL

05300

METAL DECKING

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work covered by this Section shall include all labor, material, equipment, appliances and services necessary for the furnishing, fabrication, delivery and installation of Metal Floor Decks, sheet metal closures, edge strips, accessories, welding and other fastening devices complete in accordance with this Sepcification and where shown or called for on Architectural or Structural Drawings.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

2. Concrete and cement work: Section 03010

3. Structural steel: Section 05120

4. Miscellaneous metal: Section 05500

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. When the materials of this Section are used as part of an assembly indicated on the Drawings in which fire-resistive construction ratings are required, demonstrate approval by Underwriters' Laboratories, Inc., and the governmental agencies having jurisdiction.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

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METAL DECKING

PART 1 - GENERAL

1.4 DESIGN

A. Decking and form units shall be designed and manufactured in accordance with current "Basic Design Specifications for Steel Deck Construction" as adopted by the Steel Deck Institute (S.D.I.) and with modifications as indicated on Drawings and specified herein.

B. Section design properties shall be computed in accordance with applicable requirements of current edition of American Iron and Steel Institute's "Specification for the Design of Light Gauge Cold-Formed Steel Structural Members". Deck and form units shall conform to manufacturer's published load tables.

1.5 SHOP DRAWINGS

A. This Contractor shall prepare and submit shop drawings to the proper authority and after review, modification shall be made on shop drawings and they shall be submitted in accordance with the requirements of the Supplementary General Conditions. The shop drawings shall show the type and gauge of steel units being supplied, where it is to be located, necessary fabrication to fit into the job and how it cooperates with other parts of the construction. These drawings shall also show or call for all flasing which is to be supplied by this Contractor.

B. Sufficient time shall be allowed by the Contractor for the proper checking by Architect and Engineer and at least 15 working days for review by the Architect or Engineer, for each shop drawing submitted. Contractor shall submit shop drawings in the sequence of construction.

1.6 HOLES FOR OPENINGS

Decking and Form Units shall be cut by this Contractor to fit openings which are located and dimensioned on Drawings or supplied by other trades prior to final approval of shop drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The metal floor deck shall be as manufactured by United Steel Procucts, "Uniform" UFS 26 gauge or approved equal. The steel shall have received, before being formed, a

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METAL DECKING

PART 2 - PRODUCTS

2.1 MATERIALS

A. metal protective coating of zinc conforming to A.S.T.M. A-525-71. (Wiped Coating) and to Federal Specification QQ-S-775d Type 1.

B. Decking and form units shall span over three or more supports except where structural steel layout does not permit.

C. Provide edge strips, closure pieces, and accessory materials as shown on Drawings.

PART 3 - EXECUTION

3.1 ERECTION

A. The erection of the metal decking shall be performed according to the manufacturer's standards.

B. Place metal decking on supporting beams and joists and adjust to final position with proper bearings, end and side laps before being permanently secured. If the supporting members are not properly aligned or sufficiently aligned to permit proper bearing of the decking and form units, bring the matter to the attention of the Architect. The Decking units are not to be placed until the necessary corrections are made.

C. The decking and form units shall be placed in straight alignment for the entire length of run of cells and with close registration of the cells of one unit with those of abutting unit and with minimum of space between ends of abutting units.

D. Secure decking to the steel framework at ends of unit and at each intermediate support by welds not less than 3/4" inch diameter, spaced not more than 12" (inches) across width of unit. Where two units abut, each unit shall be so fastened to the steel framing. Welds shall be free of sharp points or edges. All welds, promptly upon completion, shall be given a protective coat of rust inhibiting paint.

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METAL DECKING

PART 3 - EXECUTION

3.1 ERECTION

E. Welded connections to steel supports shall be fusion type thru curved welding washers performed by competent welders who have qualified by tests as prescribed by the American Welding Society to perform the type of work required.

F. End laps shall be 3" (inches) minimum and over supports. Side joints shall be interlocked and mechanically fastened, or welded; type and spacing of fastenings shall be determined by span and gauge of decking as recommended by manufacturer but spacing shall be 3'-0" maximum.

3.2 FLASHING AND ACCESSORIES

A. Furnish, install and weld in position sheet metal flashing and accessories as shown on Drawings.

B. Furnish, install and weld in position reinforced sheet metal angle or channel sections at all deck edges and openings unless otherwise approved by the Architect.

C. Accessories shall be of same material and finish as deck units and of manufacturer's standard design and recommended gauges.

3.3 PROTECTION

A. Field paint top surfaces of weld areas and damaged spots in galvanized coating of deck with zinc rich paint having a zinc content of at least 95% of 2 mil minimum dry film thickness.

B. Protect deck from damage, dents, distortion throughout construction period.

C. At completion of operations, remove all dunnage, debris, excess materials resultant from work of this Section. Leave entire installation in condition satisfactory to receive other trades' work.

END OF "METAL DECKING"

STILLWATER TOWNSHIP SCHOOL

05500

METAL FABRICATIONS

PART 1 GENERAL

1.1 DESCRIPTION

The work required under this section consists of metal fabrications and related items necessary to complete the work indicated on drawings and described in specifications, including, in general, but not limited to the following:

A. Steel loose lintels
B. Steel stairs
C. Ladder
D. Miscellaneous covers, plates, and grating
E. Railings
F. Louvers
G. Expansion Joint Covers
H. Miscellaneous steel anchors, bolts, clips, fastenings, sleeves, inserts, and equipment supports.
I. Shop painting and field touch up.

1.2 BIDDING DOCUMENTS

The General Conditions, Special Conditions, and all other applicable requirements of Division 1 shall govern the work of this Section.

1.3 QUALITY ASSURANCE

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.

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METAL FABRICATIONS

1.4 SUBMITTALS

B. Shop Drawings: Submit shop drawings for fabrication and erection of the following:

1. Steel stairs
2. Railing

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Surfaces, General

For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.

B. Steel Plates, Shapes and Bars: ASTM A 36.

C. Steel Bar Grating: ASTM A568 or ASTM A36.

D. Steel Tubing: Cold formed, ASTM A500; or hot rolled, ASTM A501.

E. Structural Steel Sheet: Hot-rolled, ASTM A570; or cold-rolled ASTM A611, Class 1; of grade required for design loading.

F. Galvanized Structural Steel Sheet: ASTM A446, of grade required for design loading.

G. Steel Pipe: ASTM A53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.

H. Grey Iron Castings: ASTM A48, Class30.

I. Malleable Iron Castings: ASTM A47, grade as selcted by fabricator.

J. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

K. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A47, or cast steel, ASTM A27. Provide bolts, washers and shims as required, hot-

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METAL FABRICATIONS

PART 2 - PRODUCTS

2.1 MATERIALS

K. dip galvanized, ASTM A153.

L. Metallic Non-Shrink Grout: Pre-mixed, factory-packaged, ferrous aggregate grout complying with CE CRD-C588, Type M.

M. Fasteners:

1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.

2. Bolts and Nuts: Regular hexagon head type, ASTM A307, Grade A.

3. Lag Bolts: Square head type, FS FF-B-561

4. Machine Screws: Cadmium plated steel, FS FF-S-92.

5. Wood Screws: Flat head carbon stee, FS FF-S-111.

6. Plain Washers: Round, carbon steel, FS FF-W-92.

7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.

8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.

9. Lock Washers: Helical spring type carobn steel, FS FF-W-84.

N. Paint:

1. Metal Primer Paint:

Red lead mixed pigment, alkyd varnish, linseed oil paint, FS TT-P-86, Type II; or red lead iron oxide, raw linseed oil, alkyd paint, Steel Structures Painting Council (SSPC) Paint 2-64; or basic lead silico chromate base iron oxide, linseed oil, alkyd paint, FS TT-P-615, Type II.

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METAL FABRICATIONS

PART 2 - PRODUCTS

N. Paint:

2. Primer: selected must be compatible with finish coats of paint. Coordinate selection of metal primer with finish paint requirements specified in Division 9.

3. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, complying the Military Specifications MIL-P 21035 (Ships).

2.2 FABRICATION, GENERAL

A. Workmanship:

Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.

1. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

2. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, and blend with adjoining surfaces.

3. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, Phillips flat-head (countersunk) screws or bolts.

4. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

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METAL FABRICATIONS

PART 2 - PRODUCTS

2.2 FABRICATION-GENERAL

B. Galvanizing:

1. Provide a zinc coating for those items shown or specified to be galvanized, as follows:

a. ASTM A 153 for galvanizing iron and steel hardware.

b. ASTM A123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.

c. ASTM A 386 for galvanizing assembled steel products.

2. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weepholes where water may accumulate.

C. Shop Painting:

1. Shop paint miscellaneous metal work, except members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded, and galvanized surfaces, unless otherwise specified.

2. Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2 "Hand Tool Cleaning", or SSPC SP-3 "Power Tool Cleaning", or SSPC SP-7 "Brush-Off Blast Cleaning".

3. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions, and at a rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.

PART 2 - PRODUCTS

4. Apply one shop coat to fabricated metal items, except apply 2 coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

2.3 MISCELLANEOUS METAL FABRICATIONS

A. Rough Hardware:

Furnish bent or otherwise custom fabricated bolts; plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections. Manufacture or fabricate items of sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

B. Ladder:

1. Alaco 560, or approved equal. Alaco Ladder, Co., Chino, CA, including all necessary hardware and fittings.

C. Loose Bearing and Leveling Plates:

Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists, and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanize after fabrication.

D. Loose Steel Intels:

Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit where indicated. Provide not less than 8" bearing at each side of openings, unless otherwise shown.

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METAL FABRICATIONS

PART 2 - PRODUCTS

2.3 MISCELLANEOUS METAL FABRICATIONS

E. Miscellaneous Framing and Supports:

1. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.

2. Fabricate miscellaneous units to sizes, shapes and profiles shown or if not shown, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

3. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed. Except as otherwise shown, space anchors 24" o.c. and provide minimum anchor units of 1 ¼" x ¼ x 8" steel straps.

F. Miscellaneous Steel Trim:

Provide shapes and sizes for profiles shown. Except as otherwise noted, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.

G. Aluminum Railing:

Connectorail System by Julius Blum & Co., Inc., Carlstadt, New Jersey. Provide and install in accordance with manufacturer's recommenaations and in accordance with Drawings. Pipe to be schedule 40, anodized.

H. Brackets, Flanges, Fittings and Anchors:

Provide wall brackets, end closures, flanges, miscellaneous

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METAL FABRICATIONS

PART 2 - PRODUCTS

2.3 MISCELLANEOUS MEATAL FABRICATIONS

H. fittings and anchors for interconnection of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.

I. Steel Framed Stairs

1. General:

Construct stairs to conform to sizes and arrangements shown; join pieces together by welding unless otherwise indicated Provide complete stair assemblies including metal framing, hangers, columns, railings, newels, balusters, struts, clips, brackets, bearing plates and other components for the support of stairs and platforms and as required to anchor and contain the stairs on the supporting structure.

2. Stair Framing:

Fabricate stringers of structural steel channels, or plates, or a combination thereof, as shown. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members as shwon. Bolt or weld headers to strings and newels and framing members to strings and headers; fabricate and join so that bolts, if used do not appear on finish surfaces. Finish product shall be adequate to support, without vibration, a uniform distributed live load of 100 pounds per square foot. Where masonry walls support steel stairs, provide temporary supporting struts designed for erection of steel stair components before installation of masonry.

PART 3 - EXECUTION

3.1 PREPARATION:

Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

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METAL FABRICATIONS

PART 3 - EXECUTION

3.2 INSTALLATION

General:

A. Fastening to In-Place Construction:

Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.

B. Cutting, Fitting and Placement:

Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from establsihed lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete masonry or similar construction.

C. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touchup shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

D. Field Welding:

Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

E. Setting Loose Plates:

Clean concrete and masonry bearing surfaces of any bond-reducing materials, and roughen to improve bond to surfaces.

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METAL FABRICATIONS

PART 3 - INSTALLATION

3.2

E. Clean bottom surface of bearing plates. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut off flush with the edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

F. Gratings

Weld non-removable units to supporting members or framework. Secure removable units to supporting members or framework with galvanized machine screws, or manufacturer's standard saddle or clip units.

3.3 ADJUST AND CLEAN

A. Touch Up Painting:

Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting.

END OF "METAL FABRICATIONS"

STILLWATER TOWNSHIP SCHOOL

06100

ROUGH CARPENTRY AND TRUSSES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Install wood framing as indicated on the drawings, specified herein, and needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

2. Section 06200: Finish Carpentry

3. Section 06400: Architectural Woodwork

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

2.1 GRADE STAMPS

A. Identify framing lumber by the grade stamp of an approved grading and inspection association.

B. Identify plywood as to species, grade, and glue type by the stamp of the American Plywood Association.

C. Identify other materials of this section by the appropriate stamp of the agency approved in advance by the Architect.

06100

ROUGH CARPENTRY AND TRUSSES

PART 2 - PRODUCTS

2.2 MATERIALS

A. Provide materials in the quantities needed for the Work shown on the Drawings, and meeting or exceeding the following standards of quality:

1. Framing Members (except wood trusses): Douglas Fir or Hem-Fir; Modulus of Elasticity, E=1,400,000 psi min., Fb-1,200 psi min., seasoned lumber with 19% maximum moisture content at time of dressing, or kiln-dried lumber with 15% maximum moisture content.

2. Plywood:

a. Sheathing: CDX exterior; or standard sheathing with exterior glue. Fire retardant roof sheathing where indicated on plans.

3. Prefabricated Wood Trusses:

Provide wood trusses as shown on Drawings to accurate dimension of field measurements. Provide all necessary bridging, bracing, etc., as specified by truss manufacturer. Trusses shall be constructed and installed in strict accordance with the Truss Plate Institute, National Design Specification for Wood Construction, and all other applicable design institute specifications. Submit to Architect New Jersey licensed engineer-certified shop drawings and specifications. Design criteria shall be as noted on drawings.

4. Miscellaneous Lumber:

Provide wood for support or attachment of other work including cant strips, bucks, nails, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes indicated, worked into shapes shown, grade shall be construction grade of any species.

5. Preservative Treatment:

Where lumber is indicated as "Treated", or is specified

06100

ROUGH CARPERNTRY AND TRUSSES

PART 2 - MATERIALS

A.

5. herein to be treated, comply with AWPB Standard LP-2. After treatment, kiln-dry to a maximum moisture content of 19%. Treat indicated items and the following:

a. Wood sills, sleepers, blocking, furring, stripping and similar concealed members in contact with masonry or concrete.

b. Wood framing members less than 8" above grade.

B. Miscellaneous Materials:

Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers, and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommending nails. For nailing schedule, follow BOCA Appendix E, "Recommended Fastening Schedule". Where rough carpentry work is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners and anchorages with a hop-dip zinc coating (ASTM A-153). Wood connector specified on the Contract Drawings, shall be as manufactured by Simpson Company or approved equal.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 WORKMANSHIP

A. Produce joints which are tight, true and well nailed, with members assembled in accordance with the Drawings and with pertinent codes and regulations.

B. Selection of lumber pieces:

1. Carefully select the members.

3.2 WORKMANSHIP

B.

2. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing, and will allow making of proper connections.

3. Cut out and discard defects which render a piece unable to serve its intended purpose and function.

4. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.

C. Do not shim any framing component.

3.3 GENERAL FRAMING

A. General:

1. In addition to framing operations normal to the fabrication and erection indicated on the Drawings, install wood blocking and backing required for the work of other trades.

2. Set horizontal and sloped members with crown up.

3. Do not notch, cut, or bore members for pipes,ducts, or conduits, or for other reasons except as shown on the Drawings or as specifically approved in advance by the Architect.

B. Bearings:

1. Make bearings full unless otherwise indicated on the Drawings.

2. Finish bearing surfaces on which structural members are to rest so as to give sure and even support.

3. Where framing members slope, cut or notch the ends as required to give uniform bearing surface.

06100

ROUGH CARPENTRY AND TRUSSES

PART 3 - EXECUTION

3.4 BLOCKING AND BRIDGING

A. Install blocking as required to support items of finish and to cut off concealed draft openings, both vertical and horizontal, between ceilings and dloor areas.

B. Bridging:

1. Install wood cross bridging (not less than 2" x 3" nominal), metal cross bridging of equal strength, or solid blocking between joists where the span exceeds 8'0".

2. Provide maximum distance of 8'0" between a line of bridging and a bearing.

3. Cross bridging may be omitted for roof and ceiling joists where the omission is permitted by Code, except where otherwise indicated on the Drawings.

4. Install solid blocking between joists at points of support and wherever sheathing is discontinuous. Blocking may be omitted where joists are supported on metal hangers.

3.5 ALIGNMENT

A. On framing members to receive a finished surface, align the finish subsurface to vary not more than 1/8" from the plane of surfaces of adjacent furring and framing members.

3.6 TRUSS BRACING

All trusses shall be securely braced both during erection and after permanent installation in accordance with "Bracing Wood Trusses: Commentary and Recommendations" (BWT-76) as published by the Truss Plate Institute. Erection bracing shall hold trusses straight and plumb and in safe condition until decking and permanent truss bracing has been fastened forming a structurally sound roof framing system. All erection and permanent bracing shall be installed and all trusses permanently fastened before application of any loads. See truss design drawings for any additional special bracing requirements. During erection, the company supplying the certified wood trusses shall have an inspector at the construction site witnessing and supervising the truss erection; placing and final installation. Said inspector shall be knowledgable and qualified in truss installation.

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ROUGH CARPENTRY AND TRUSSES

PART 3 - EXECUTION

3.7 INSTALLATION OF PLYWOOD SHEATHING

A. Placement:

1. Place plywood with face grain perpendicular to supports and continuously over at least two supports, except where otherwise shown on the Drawings.

2. Center joints accurately over supports, unless otherwise shown on the Drawings.

B. Protect plywood from moisture by use of waterproof coverings until the plywood in turn has been covered with the next succeeding component or finish.

3.8 FASTENING

A. Nailing:

1. Use only common wire nails or spikes as required by Appendix C. BOCA except where otherwise specifically noted on the Drawings.

2. For conditions not covered in BOCA, Appendix C, provide penetration into the piece receiving the point of not less than ½ the length of the nail or spike, provided, however, that 16d nails may be used to connect two pieces of 2" (nominal) thickness.

3. Nail without splitting wood.

4. Prebore as required.

5. Remove split members and replace with members complying with the specified requirements.

B. Bolting:

1. Drill holes 1/16" larger in diameter than the bolts being used.

2. Drill straight and true from one side only.

3. Do not bear bolts threads on wood, but use washers under head and nut where both bear on wood, and use washers under all nuts.

06100

ROUGH CARPENTRY AND TRUSSES

PART 3 - EXECUTION

3.8 FASTENING

C. Screws:

1. For lag screws and wood screws, prebore holes same diameter as root of threads, enlarging holes to shank diameter for length of shank.

2. Screw, do not drive, lag screws and wood screws.

END OF "ROUGH CARPENTRY"

06200

FINISH CARPENTRY

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Install wood trim and other items not specifically described as being installed under other Sections of these Specifications.

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

2. Section 06100: Rough Carpentry.

3. Section 06400: Architectural Woodwork.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

A. Closet Shelving:

1. Shelves 11 ½" wide or less: Douglas Fir-Hemlock, B and Better grade; or Ponderosa Pine, B and Better grade.

2. Shelves wider than 11 ½": 3/4" thick, A-D, group 1, interior plywood with 1" x 3", #1 Pine bands on visible edges.

B. Multi-Purpose Room East Wall:

1. 3/4" x 10" clear cedar bevel siding, 8" exposure.
2. 1" x 8" clear cedar boards.

06200

FINISH CARPENTRY

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 WORKMANSHIP

A. Produce joints which are true, tight, andwell nailed with all members assembled in accordance with the Drawings.

B. Jointing:

1. Make joints to conceal shrinkage; miter exterior joints; cope interior joints; miter or scarf end-to-end joints.

2. Install trim in pieces as long as possible, jointing only where solid support is obtained.

3. Finger-jointed pieces are permitted where finish will be painted.

C. Fastening:

1. Install items straight, true, level, plumb, and firmly anchored in place.

2. Where blocking or backing is required, coordinate as necessary with other trades to ensure placement of required backing and blocking in a timely manner.

3. Nail exterior trim with galvanized nails, making joints to exclude water and setting in waterproof glue or the sealant described in Section 07920 of these Sepcifications.

4. Nail trim with finish nails of proper dimension to hold the member firmly in place without splitting the wood.

5. On exposed work, set nails for putty.

6. Screw, do not drive, wood screws; except that screws may be started by driving and then screwed home.

06200

FINISH CARPENTRY

PART 3 - EXECUTION

3.3 INSTALLATION OF OTHER ITEMS

A. Install items in strict accordance with the Drawings, and the recommended methods of the manufacturer as approved by the Architect, anchoring firmly into position at the prescribed location, straight, plumb, and level.

3.4 FINISHING

A. Sandpaper finished wood surfaces thoroughly as required to produce a uniformly smooth surface, always sanding in the direction of the grain; except do not sand wood which is designed to be left rough.

B. No coarse grained sandpaper mark, hammer mark, or other imperfection will be accepted.

3.5 CLEANING UP

A. Keep the premises in a neat, safe, and orderly condition at all times during execution of this portion of the Work, free from accumulation of sawdust, cut-ends, and debris.

B. Sweeping:

1. At the end of each working day, and more often if necessary, thoroughly sweep surfaces where refuse from this portion of the Work has settled.

2. Remove the refuse to the area of the jobsite set aside for its storage.

3. Upon completion of this portion of the Work, thoroughly broom clean all surfaces.

END OF "FINISH CARPENTRY"

STILLWATER TOWNSHIP SCHOOL

06200

ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide architectural woodwork where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Codes and Standards:

1. Comply with pertinent codes and regulations of governmental agencies having jurisdiction.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

A. Fabricate architectural woodwork to "premium grade" standards of the Architectural Woodwork Institute.

B. Built-In Cabinets:

1. On exposed portions, provide birch veneer plywood for natural finish.

2. On semi-exposed portions, clear grade fir plywood cabinet liner and shelves.

3. Finish hardware.

06400

ARCHITECTURAL WOODWORK

PART 2 - PRODUCTS

C. Finishing:

Site finish or mill finish architectural woodwork in accordance with pertinent provisions of Section 09900 of these Specifications.

2.3 COUNTERTOPS

A. Types and sizes:

1. Shop fabricate coutertops and splashes to the types and dimensions shown on the Drawings.

2. Where splashes are called for, provide 4" high coved splash and no-drip leading edge.

B. Cover tops and splashes with Wilsonart laminated plastic, or equal approved in advance by the Architect, in colors and patterns selected by the Architect from standard colors and patterns of the approved manufacturer.

2.4 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 FIELD MEASUREMENTS

A. Take necessary measurements in the field to assure proper dimensions for the Work of this Section.

06400

ARCHITECTURAL WOODWORK

PART 3 - EXECUTION

3.3 FABRICATION

A. Fabricate the work of this Section in strict accordance with the approved shop drawings and the referenced standards.

3.4 INSTALLATION

A. Install the work of this Section in strict accordance with the approved Shop Drawings and the referenced standards, anchoring all items firmly into position.

END OF "ARCHITECTURAL WOODWORK"

07110

DAMPPROOFING AND VAPOR BARRIERS

PART 1 - GENERAL

1.1 SCOPE

The work required under this Section consists of dampproofing and vapor barriers and related items necessary to complete the work indicated on Drawings and described on Specifications, including, in general, but not limited to the following:

A. Bituminous dampproofing.

B. Sheet plastic vapor barriers.

1.2 BIDDING DOCUMENTS

The General Conditions, Supplementary Conditions and all other applicable requirements of Division 1 of these Specifications shall govern the work of this Section.

1.3 GENERAL REQUIREMENTS

A. All materials shall be applied by men skilled in this trade. All work shall conform to the requirements of Specifications of the manufacturer of the material being used.

B. Care shall be exercised before, during and after installation not to damage the applied materials. All finished work shall be approved before covering with any other material or construction.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Mastic for trowel grade dampproofing: Bituminous, asbestos reinforced, trowel grade, conforming to requirements of Federal Specification SS-C-153, Type I, and shall be one of the following brands:

1. Dehydratine 10 mastic - A. C. Horn Co.
2. Hydrocide mastic - Sonneborn Building Products, Inc.
3. Karnak 86 - Lewis Asphalt Engineering Corp.
4. Insul-Mastic No. 4010 - Nicholson & Galloway
5. Minwax Trowel Coat - Minwax Co., Inc.

07110

DAMPPROOFING AND VAPOR BARRIERS

PART 2 - PRODUCTS

2.1 MATERIALS

B. Primer:

As recommended by the mastic manufacturer.

C. Plastic Vapor Barrier:

6-mil polyethylene film

D. All materials shall be delivered to the site in original sealed containers with manufacturer's label intact.

PART 3 - EXECUTION

3.1 DAMPPROOFING

A. Dampproofing shall be applied in accordance with the manufacturer's instructions.

B. Before application, all ties shall be cut back, and all holes, cracks, honeycombs, and the like shall be filled with mortar. All fins and other projections shall be removed and walls shall be thoroughly cleaned.

C. Surfaces shall be primed in accordance with manufacturer's recommendations.

D. Dampproofing shall be applied smoothly and evenly to a uniform thickness, without holidays, pinholes or thin spots.

E. Dampproofing shall be applied with a trowel to provide a well-bonded, continuous membrane of uniform thickness, using not less than one (1) gallon per 50 sq. ft. of surface.

3.2 PLASTIC VAPOR BARRIERS

A. Plastic sheets shall be lapped 6" and sealed with tape or mastic. Turn sheets up on walls approximately 4". Strength and weight edges and laps to maintain their positions until concrete is placed. Provide wood runways for wheeled equipment for transporting concrete. Do not displace or puncture sheets.

STILLWATER TOWNSHIP SCHOOL

07110

DAMPPROOFING AND VAPOR BARRIERS

PART 3 - EXECUTION

3.2 PLASTIC VAPOR BARRIERS

B. Vapor barrier shall be located below all interior concrete slabs on grades.

END OF "DAMPPROOFING AND VAPOR BARRIERS"

STILLWATER TOWNSHIP SCHOOL

07210

BUILDING INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide building insulation where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplemenatary Conditions, and sections in Division 1 of Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide the following building insulation where shown on the Drawings or otherwise needed to achieve the degree of insulation required under pertinent regulations or governmental agencies having jurisdiction.

1. 6" thick Kraft-faced glass fiber batts with an insulation-only value of R-19.

2. 9" thick Kraft-faced glass fiber batts with an insulation-only value of R-30.

3. 1 ½" thick, Dow Styrofoam, or approved equal, R-7.5 insulation value. No molded bead polystyrene rigid insulation will be permitted.

07210

BUILDING INSULATION

PART 2 - PRODUCTS

2.1 MATERIALS

A.

4. Zonolite block wall insulation by W.R. Grace & Co., or approved equal.

2.2 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Remove, or protect against, projections in construction framing which may damage or prevent proper insulation.

3.2 INSTALLATION

A. Install the work of this Section in strict accordance with the original design, requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the Architect, anchoring all components firmly into position.

B. Loose masonry wall insulation shall be poured into the concrete block core or wall cavity. Pours may be made at any convenient interval without bridging, but the height of any pour shall not exceed 20 feet. Weepholes shall be filled with glass fiber, rope or copper screen to prevent insulation leakage.

END OF " BUILDING INSULATION"

STILLWATER TOWNSHIP SCHOOL

07600

FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide flashing and sheet metal not specifically described in other Sections of these Specifications but required to prevent penetration of water through the exterior shell of the building.

B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary drafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the Work of this Section.

B. Standard commercial items may be used for flashing, trim, reglets, and similar purposes provided such items meet or exceed the quality standards specified.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

2.1 MATERIALS AND GAUGES

A. Where sheet metal is required, and no material or gauge is indicated on the Drawings, provide the highest quality and gauge commensurate with the referenced standards.

2.2 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

07600

FLASHING AND SHEET METAL

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 WORKMANSHIP

A. General:

1. Form sheet metal accurately and to the dimensions and shapes required, finishing molded and broken surfaces with true, sharp, and straight lines and angles and, where intercepting other members, coping to an accurate fit and soldering securely.

2. Unless otherwise specifically permitted by the Architect, turn exposed edges back ½".

B. Form,fabricate, and install sheet metal so as to adequately provide for expansion and contraction in the finished Work.

C. Weatherproofing:

1. Finish watertight and weathertight where so required.

2. Make lock seam work flat and true to line, sweating full of solder.

D. Joints:

1. Join parts with rivets or sheet metal screws where necessary for strength and stiffness.

E. Nailing:

1. Whenever possible, secure metal by means of clips or cleats, without nailing through the exterior metal.

2. In general, space nails, rivets, and screws not more than 8" apart and, where exposed to the weather, use lead washers.

07600

FLASHING AND SHEET METAL

PART 3 - EXECUTION

3.2 WORKMANSHIP

E. Nailing:

3. For nailing into wood, use barbed roofing nails 1 ¼" long by 11 gauge.

4. For nailing into concrete, use drilled plugholes and plugs.

3.3 EMBEDMENT

A. Embed metal in connection with roofs in a solid bed of sealant, using materials and methods described in Section 07920 of these Specifications or other materials and methods approved in advance.

END OF "FLASHING AND SHEET METAL"

STILLWATER TOWNSHIP SCHOOL

07920

SEALANTS AND CAULKING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Throughout the Work, seal and caulk joints where shown on the Drawings and elsewhere as required to provide a positive barrier against passage of moisture and passage of air.

B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

B. Do not retain at the jobsite material which has exceeded the shelf life recommended by its manufacturer.

PART 2 - PRODUCTS

2.1 SEALANTS

A. Provide products especially formulated for the propsed use where indicated and where otherwise required for a complete and proper installation.

B. Colors:

1. Colors for each sealant installation will be selected by the Architect from standard colors normally available from the specified manufacturer.

07920

SEALANTS AND CAULKING

PART 2 - PRODUCTS

2.1 SEALANTS

B. Colors

2. Should such standard color not be available from the approved manufacturer except at additional charge, provide such colors at no additional cost to the Owner.

3. In concealed installations, and in partially or fully exposed installations where so approved by the Architect, use standard color sealant.

2.2 PRIMERS

A. Use only those primers which have been tested for durability on the surfaces to be sealed and are specifically recommended for this installation by the manufacturer of the sealant used.

2.3 BACKUP MATERIALS

A. Use only those backup materials which are specifically recommended for this installation by the manufacturer of the sealant used, which are non-absorbent, and which are non-staining.

2.4 MASKING TAPE

A. For masking around joints, provide an appropriate masking tape which will effectively prevent application of sealant on surfaces not scheduled to receive it, and which is removable without damage to substrate.

2.5 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this

07920

SEALANTS AND CAULKING

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Concrete and ceramic tile surfaces:

1. Install only on surfaces which are dry, sound, and well brushed, wiping free from dust.

2. At open joints, remove dust by mechanically blown compressed air if so required.

3. To remove oiland grease, use sandblasting or wire brushing.

4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.

5. Remove laitance and mortar from joint cavities.

B. Steel surfaces:

1. Steel surfaces in contact with sealant:

a. Sandblast as required to achieve acceptable surface for bond.

b. If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale and rust.

c. Use solvent to remove oil and grease, wiping the surfaces with clean white rags only.

2. Remove protective coatings on steel by sandblasting or by using a solvent which leaves no residue.

C. Aluminum surfaces:

1. Aluminum surfaces in contact with sealant:

a. Remove temporary protective coatings, dirt, oil and grease.

07920

SEALANTS AND CAULKING

PART 3 - EXECUTION

3.2 PREPARATION

C. Aluminum surfaces:

1.

b. When masking tape is used for protective cover, remove the tape just prior to applying the sealant.

2. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are non-staining.

3.3 INSTALLATION OF BACKUP MATERIAL

A. When using backup of tube or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose of rod backup stock.

B. Installation tool:

1. For installation of backup material, provide a blunt-surfaced tool of wood or plastic, having shoulders designed to ride on the adjacent finished surface and a protusion of the required dimensions to assure uniform depth of backup material below the sealant.

2. Do not, under any circumstances, use a screwdriver or similar tool for this purpose.

3. Using the approved tool, smoothly and uniformly place the backup material to the depth indicated on the Drawings or otherwise required, compressing the backup material 25% to 50% and securing a positive fit.

3.4 PRIMING

A. Use only the primer approved by the Architect for the particular installation, applying in strict accordance with the manufacturer's recommendations as approved by the Architect.

07920

SEALANTS AND CAULKING

PART 3 - EXECUTION

3.5 INSTALLATION OF SEALANTS

A. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, or as otherwise directed by the Architect, and verify that the required proportion of width of joint to depth of joint has been secured.

B. Equipment:

1. Apply sealant under pressure with power-actuated hand gun or by other appropriate means.

2. Use guns with nozzle of proper size, and providing sufficient pressure to completely fill the joints as designed.

C. Thoroughly and completely mask joints where the appearance of primer or sealant on adjacent surfaces would be objectionable.

D. Install the sealant in strict accordance with the manufacturer's recommendations, thoroughly filling joints to the recommended depth.

E. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.

F. Cleaning Up:

1. Remove masking tape immedately after joints have been tooled.

2. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.

3. Upon completion of the work of this Section, promptly remove from the jobsite all debris, empty containers, and surplus material derived from this portion of the Work.

END OF "SEALANT AND CAULKING

08100

STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide steel doors and frames, complete in place with finish hardware installed, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

2. Section 08710: Finish hardware.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessarycrafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

B. Delivery:

1. Deliver doors in manufacturer's original containers, clearly marked with manufacturer's name, brand name, size, and thickness.

2. Inspect hollow metal work upon delivery for damage. Minor damages may be repaired provided finish items are equal in all respects to new work and acceptable to Architect; otherwise, remove and replace damaged items as directed.

08100

STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.3 PRODUCT HANDLING

C. Storage:

1. Frames shall be stored in an upright position under cover on wood sills or on floors in a manner that will prevent rust and damage. Avoid creating a humidity chamber by using a plastic or canvas shelter and not venting the area covered.

2. All doors shall be individually packaged in cartons, completely covering entire door to prevent damage or marring of the finish. Doors shall be stored in an upright position under cover on wood sills or on floors in a manner that will prevent rust and damage. Avoid creating a humidity chamber by using a plastic or canvas shelter and not venting the area convered.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide steel doors of the types, designs and thicknesses shown on the Door Schedule in the Drawings, UL 20 minute labeled unless otherwise indicated or required.

B. Manufacturer: Furnish and install steel doors and frames as manufactured by Amweld Building Products, Niles, Ohio. Doors to be provided with glazing as shown on Drawings and all exposed surfaces shall be cleaned, treated with a bonding chemical and given one baked-on shop coat of gray synthetic primer.

C. Site finish steel doors in accordance with provisions of Section 09900 of these Specifications.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

08100

STEEL DOORS AND FRAMES

PART 3 - EXECUTION

3.2 INSTALLATION

A. Fitting and machining:

1. Pressed steel frames shall be installed by the General Contractor. Installation shall be plumb, straight, and true; rigidly secured in place and properly braced. Frames shall be anchored to concrete floors with power actuated bolts. The frame installer shall be responsible for the squareness of the frame in place.

2. Machine doors for surface hardware in accordance with recommendations of the hardware and door manufacturers.

B. Receive and retain custody of finish hardware furnished for the work of this Section under Section 08710 of these Specifications and, except as otherwise directed by the Architect, install all such finish hardware in strict accordance with the recommendations of the manufacturer.

C. Replace or rehang doors which are hingebound and do not swing or operate freely.

END OF "STEEL DOORS AND FRAMES"

STILLWATER TOWNSHIP SCHOOL

08210

WOOD DOORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide wood doors, complete in place with finish hardware installed, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related Work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

2. Section 08710: Finish Hardware

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

B. Delivery:

1. Deliver doors to site after plaster and cement are dry, and after the building has reached average prevailing humidity of its locality.

2. Seal all four edges of unfinished doors when delivered to the jobsite.

C. Storage:

1. Stack flat on 2" x 4" lumber, laid 12" from ends and across center.

2. Under bottom door and over top of stack, provide plywood or corrugated cardboard to protect door surfaces.

08210

WOOD DOORS

PART 1 - GENERAL

1.3 PRODUCT HANDLING

C. Storage:

3. Store doors in area where there will be no great variations in heat, dryness, and humidity.

D. Do not drag doors across one another; lift doors and carry them into position.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide, flush birch solid core wood doors, 1 3/8" thickness, as shown on the Door Schedule in the Drawings, UL 20 minute labeled unless otherwise indicated or required.

B. Grade:

Except as may be shown otherwise on the Drawings, fabricate the work of this Section to "custom grade" standards of the referenced organization.

C. Site finish or mill finish wood doors in accordance with provisions of Section 09900 of these Specifications.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Fitting and machining:

1. Unless doors are completely fitted and machined at the mill, fitthem for width by planing and fit them for height by sawing:

08210

WOOD DOORS

PART 3 - EXEUCTION

3.2 INSTALLATION

A. Fitting and machining:

1.

a. Bottom: ½" clearance maximum.
b. Top: 1/8"clearance maximum.
c. Lock edge and hinge edge: Bevel 1/8" in 2" maximum.

2. Machine doors for hardware in accordance with recommendations of the hardware manufacturers.

3. Provide each door with 1½ pair hinges.

B. Receive and retain custody of finish hardware furnished for the work of this Section under Section 08710 of these Specifications and, except as otherwise directed by the Architect, install all such finish hardware in struct accordance with the recommendations of the manufacturer.

C. Replace or rehang doors which are hingebound and do not swing or operate freely.

END OF "WOOD DOORS"

STILLWATER TOWNSHIP SCHOOL

08710

FINISH HARDWARE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included:

1. Furnish finish hardware required to complete the Work as shown on the Drawings and as specified herein.

2. Furnish trim attachments and fastenings, specified or otherwise required, for proper and complete installation.

3. Deliver to the jobsite those items of finish hardware scheduled to be installed at the jobsite; and deliver to other points of installation those items of finish hardware scheduled to be factory installed.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

2. Installation of finish hardware is described in other Sections of these Specifications.

1.2 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

B. Individually package each unit of finish hardware, complete with proper fastenings and appurtenances, clearly marked on the outside to indicate contents and specific locations of the Work.

08710

FINISH HARDWARE

PART 2 - PRODUCTS

2.1 GENERAL

A. Fasteners:

1. Furnish necessary screws, bolts, and other fasteners of suitable size and type to anchor the hardware in position for long life under hard use.

2. Where necessary, furnish fasteners with toggle bolts, expansion shields, sex bolts, and other anchors approved by the Architect, according to the material to which the hardware is to be applies and according to the recommendations of the hardware manufacturer.

3. Provide fasteners which harmonize with the hardware as to finish and material.

B. Where butts are required to swing 180 degrees, furnish butts of sufficient throw to clear the trim.

C. Furnish silerncers for door frames at the rate of three for each single door and two for each door or pair of doors; except weather-stripped doors and doors with light seals or sound seals.

2.2 KEYING

A. Factory key and masterkey locks and cylinders as directed by the Architect.

B. Furnish two keys for each lock, 10 masterkeys for all sets.

2.3 ACCEPTABLE PRODUCTS

A. Single source for items:

1. Except as specifically otherwise approved in advance by the Architect, furnish for each item only the product of a single manufacturer as specified in the Door Schedule.

2. To the maximum extent practicable, furnish similar items only as the product of a single manufacturer.

B. Provide the finishes shown on the Schedule.

08710

FINISH HARDWARE

PART 2 - PRODUCTS

2.4 OTHER MATERIALS

Provide other materials, not specifically described, but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 DELIVERIES

Stockpile items sufficiently in advance to assure their availability, and make necessary deliveries in a timely manner to assure orderly progress of the total Work.

3.2 COORDINATION

Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the Work of this Section.

3.3 FINISH HARDWARE SCHEDULE

A. Furnish hardware groups in the amounts indicated on the Door Schedule.

B. All locksets shall be as manufactured by Russwin or equal, Stilepaser series, Ashford Design. Finish shall be 10D Bronze Anodized Hardcoat Aluminum.

C. Panic Hardware: as manufactured by Russwin, or equal, Designer Bolt 500 Series, Vertical rod style on double doors, rim style on single doors. Finish shall be 10D Bronze Anodized Hardcoat Aluminum.

D. Closers: As manufactured by Russwin, or equal, 2820 Series, with backstop arm.

E. Hinges: Stanley FBB179 Line, flush ball bearing hinges, average frequency quality, 5 knuckle design. Finish to be Bronze.

F. Provide Bronze wall-mounted dome-style stops with rubber insert at all locations where doors may strike walls or other finished surface.

08800

WINDOWS AND GLAZING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide windows, window accessories, glazing and glazing accessories where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

B. During storage and handling of glass, provide cushions at edges to prevent impact damage.

C. Delivery:

1. Deliver windows to site after roof shingles are in place.

2. Deliver windows in manufacturer's original containers or packaging, clearly marked with manufacturer's name, brand name, size, and identifying symbol on the covering.

D. Storage:

1. Stand windows upright such that one unit will not be in a position to damage frame or glass of adjacent units.

2. Provide sheets of plywood over windows to prevent glass breakage and damage to frames by falling objects, etc.

08800

WINDOWS AND GLAZING

PART 1 - GENERAL

1.3 PRODUCT HANDLING

D. Storage:

3. Store windows in area where they will not be damaged by inclement weather, and support on floor surface in a manner that will prevent rust and damage. Avoid creating a humidity chamber by using a plastic or canvas shelter and not venting the area covered.

PART 2 - PRODUCTS

2.1 GLASS

A. General:

1. For all glass, provide the glazing in pre-manufactured units of the type and thickness shown on the Drawings or specified herein.

2. Where type or thickness, or both, are not shown on the Drawings or specified herein, provide type and thickness directed by the Architect.

B. Tempered glass:

1. Provide tempered glass where indicated on the Drawings, and elsewhere as required by governmental agencies having jurisdiction.

2. Glass for tempering:

a. For float glass, use type I, class I, quality q3.

3. Sizes and cutting:

a. Prior to tempering, cut glass to required sizes as determined by accurate measurements of the openings to be glazed, making allowances for required edge clearances.

b. Cut and process edges in accordance with the glass manufacturer's recommendations.

08800

WINDOWS AND GLAZING

PART 2 - PRODUCTS

2.1 GLASS

B. Tempered glass:

3. Sizes and cutting:

c. Do not cut or treat edges in the field.

4. Fully tempered glass:

a. Comply with Fed. Spec. DD-G-1403 and ANSI Z97.1.
b. Wherever possible, locate tong marks along an edge which will be concealed in the glazing system.
c. Permit minimum warpage practicable.

2.2 PRE-MANUFACTURED UNITS

A. Windows as shown on Drawings by DeSco Thermal Barrier Windows, DeSmet, S.D.

2.3 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Clean glazing channels, stops, and rabbets to receive the glazing materials, making free from obstructions and deleterious substances which might impair the work.

1. Remove protective coatings which might fail in adhesion or interfere with bond of sealants.

2. Comply with manufacturer's instructions for final wiping of surfaces immediately prior to application of primer and glazing compounds or tapes.

08800

WINDOWS AND GLAZING

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

B.

3. Prime surfaces to receive glazing compounds in accordance with manufacturer's recommendations.

3.2 INSTALLATION

A. Glazing:

1. Inspect each piece of glass immediately prior to start of installation.

a. Do not install items which are improperly sized, have damaged edges, or are scratched, abraded, or damaged in any other manner.

b. Do not remove labels from glass until so directed by the Architect.

c. Install glass so distortion waves, if present, run in the horizontal direction.

2. Locate setting blocks at sills one quarter of the width of the glass in from each end of the glass, unless otherwise recommended by the glass manufacturer.

a. Use blocks of proper size to support the glass in accordance with manufacturer's recommendations.

b. Provide spacers for all glass sizes larger than 50 united inches, to separate glass from stops; except where continuous glazing gaskets or felts are provided.

i. Locate spacers no more than 24" apart, and no closer than 12" to a corner.

ii. Place spacers opposite one another.

iii. Make bite of spacer on glass ¼" or more.

3. Set glass in a manner which produces the greatest possible degree of uniformity in appearance.

08800

WINDOWS AND GLAZING

PART 3 - EXECUTION

3.2 INSTALLATION

A. Glazing:

4. Do not use two different glazing materials in the same joint system unless the jointused is approved in advance by the Architect.

5. Mask, or otherwise protect, surfaces adjacent to installation of sealants.

6. Miter-cut and seal the joints of glazing gaskets in accordance with the manufacturer's recommendations, to provide watertight and airtight seal at corners and other locations where joints are required.

B. Pre-manufactured windows:

1. Frame opening to proper dimensions, level, plumb and square.

2. Install units making sure that sills and heads are level, jambs are plumb, shim where necessary. Check for squareness of unit before final anchoring in wall.

3. Protect complete unit during construction. Check installation and operation of unit before application of interior trim.

3.3 PROTECTION

A. Protect glass from breakage after installation by promptly installing streamers or ribbons, suitably attached to the framing and held free from glass. Do not apply warning markings, streamers, ribbons, or toher items directly to the glass except as specifically directed by the Architect.

END OF "WINDOWS AND GLAZING"

STILLWATER TOWNSHIP SCHOOL

09260

GYPSUM WALLBOARD SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide gypsum drywall and accessories where shown on the Drawings, as specified herein, and as needed for a complete an proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

2. Section 06100: Rough Carpentry.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

2.1 GYPSUM WALLBOARD

A. General:

1. Provide gypsum wallboard complying with Fed. Spec SS-L-30D, in 48" widths and in such lengths as will result in a minimum of joints.

2. Regular wallboard: Provide type III, grade S, class 1, ½" thick as shown on the Drawings.

2.2 METAL TRIM

A. Form from zinc-coated steel not lighter than 26 gauge, complying with Fed. Spec. QQ-S-775, type I, class d or e.

09260

GYPSUM WALLBOARD SYSTEMS

PART 2 PRODUCTS

2.2 METAL TRIM

B. Casing beads:

1. Provide channel-shapes with an exposed wing, and with a concealed wing not less than 7/8" wide.

2. The exposed wing may be covered with paper cemented to the metal, but shall be suitable for joint treatment.

C. Corner beads:

Provide angle shapes with wings not less than 7/8" wide and perforated for nailing and joint treatment, or with combination metal and paper wings bonded together, not less than 1 ¼" wide and suitable for joint treatment.

2.3 JOINTING SYSTEM

A. Provide a jointing system, including reinforcing tape and compound, designed as a system to be used together and as recommended for this use by the manufacturer of the gypsum wallboard approved for use on this Work.

B. Jointing compound may be used for finishing if so recommended by its manufacturer.

2.4 FASTENING DEVICES

A. For fastening gypsum wallboard in place on wood, use 1-¼" type W bugle-head screws, or use annular ring type nails complying with ASTM C-514 and of the length required by BOCA, Appendix C.

2.5 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General:

1. Install the gypsum wallboard in accordance with the Drawings and with the separate boards in moderate contact but not forced into place.

2. At internal and external corners, conceal the cut edges of the boards by the overlapping covered edges of the abutting boards.

3. Stagger the boards so that corners of any four boards will not meet at a common point except in vertical corners.

B. Ceilings:

1. Install the gypsum wallboard to ceilings with the long dimension of the wallboard at right angles to the supporting members.

2. Wallboard may be installed with the long dimension parallel to supporting members that are spaced 16" or 24" o.c. when attachment members are provided at end joints.

C. Walls:

1. Install the gypsum wallboard to studs at right angles to the furring or framing members.

2. Make end joints, where required, over framing or furring members.

D. Attaching:

1. Drive the specified screws with clutch-controlled power screwdrivers, spacing the screws 12" on centers at ceilings and 16" on centers at walls, or as required by BOCA.

09260

GYPSUM WALLBOARD SYSTEMS

PART 3 - EXECUTION

3.3 JOINT TREATMENT

A. General:

1. Inspect areas to be joint treated, verifying that the gypsum wallboard fits snugly against supporting framework.

2. In areas where joint treatment and compound finishing will be performed, maintain a temperature of not less than 55 degrees for 24 hours prior to commencing the treatment, and until joint and finishing compounds have dried.

3. Apply the joint treatment and finishing compound by machine or hand tool.

4. Provide a minimum drying time of 24 hours between coats, with additional drying time in poorly ventilated areas.

B. Embedding compounds:

1. Apply to gypsum wallboard joints and fastener heads in a thin uniform layer.

2. Spread the compound not less than 3" wide at joints, center the reinforcing tape in the joint, and embed the tape in the compound. Then spread a thin layer of compound over the tape.

3.4 CORNER TREATMENT

A. Internal corners: Treat as specified for joints, except fold the reinforcing tape lengthwise through the middle and fit neatly into the corner.

B. External corners:

1. Install the specified corner bead, fitting neatly over the corner and securing with the same type fasteners used for installing the wallboard.

2. Space the fasteners approximately 6" on centers, and drive throught the wallboard into the framing or furring member.

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GYPSUM WALLBOARD SYSTEMS

PART 3 - EXECUTION

3.4 CORNER TREATMENT

B. External Corners:

3. After the corner bead has been secured into position, treat the corner with joint compound and reinforcing tape as specified for joints, feathering the joint compound out from 8" to 10" on each side of the corner.

3.5 OTHER METAL TRIM

A. General:

1. The drawings do not purport to show all locations and requirements for metal trim.

2. Carefully study the Drawings and the installation, and provide all metal trim normally recommended by the manufacturer of the gypsum wallboard approved for use in this Work.

3.6 CLEANING UP

A. In addition to other requirements for cleaning, use necessary care to prevent scattering gypsum wallboard scraps and dust, and to prevent tracking gypsum and joint finishing compound onto floor surfaces.

B. At completion of each segment of installation in a room or space, promptly pick up and remove from the working area all scrap, debris, and surplus material of this Section.

END OF "GYPSUM WALLBOARD SYSTEMS"

09310

CERAMIC TILE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide ceramic tile where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

2.1 CERAMIC TILE

A. Provide ceramic tile and accessories complying with Tile Council of America Specification 137.1,in colors and patterns selected by the Architect from standard colors and patterns of the approved manufacturers.

B. Floor tile:

1. Provide coefficient of friction not less than 0.50 when tested in accordance with ASTM F-489, ASTM F-609, and the National Bureau of Standards Technical Note 895.

2. Provide unglazed 1" x 1", group 2, price range C, manufactured by American Olean, or equal products approved in advance by the Architect.

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CERAMIC TILE

PART 2 - PRODUCTS

2.1 CERAMIC TILE

C. For base and wall surfaces provide glazed units, 4-¼" x 4¼", manufactured by American Olean, or equal products approved in advance by the Architect.

D. Provide standard accessory shapes as required.

2.2 SETTING MATERIALS

A. Comply with pertinent recommendations contained in the Tile Council of America "Handbook for Ceramic Tile Installations".

B. Latex-Portland Cement Mortar:

1. Provide a commercially prepared mixture of Portland Cement and special latex additive for use as a bond coat for setting tile.

2. Comply with ANSI A118.4.

C. Organic adhesive:

1. Provide a prepared organic material, ready to use with no further addition of liquid or powder, which cures or sets by evaporation.

2. Comply with ANSI A136.1, using type I where exposed to prolonged water presence and using type II at all other locations.

D. Special tile setting mortars will be considered by the Architect when complete technical data is submitted in advance.

2.3 GROUT

A. Comply with pertinent recommendations contained in the Tile Council of America "Handbook for Ceramic Tile Installation", in colors selected by the Architect from standard colors available from the approved manufacturers.

B. Commercial Portland cement grout:

1. Provide a commercially prepared mixture of Portland

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CERAMIC TILE

PART 2 - PRODUCTS

2.3 GROUT

B. Commercial Portland cement grout:

1. cement and other ingredients producing a water-resistant, dense, uniformly colored material.

2. Secure the Architect's specific approval of the proposed material prior to use.

2.4 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which the work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General:

1. Comply with ANSI A108.1, ANSI A108.2, and the "Handbook for Ceramic Tile Installation" of the Tile Council of America, except as otherwise directed by the Architect or specified herein.

2. Maintain minimum temperature limits and installation practices recommended by material manufacturers.

3. Do not install tile floors over membrane until the membrane has been tested and accepted.

B. Limits of tile:

1. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruptions.

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CERAMIC TILE

PART 3 - EXECUTION

3.2 INSTALLATION

B. Limits of tile:

2. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment.

C. Joining pattern:

1. Lay tile in grid pattern unless otherwise indicated on the Drawings or directed by the Architect.

2. Align joints when adjoining tiles on floor, base, trim, and walls are the same size.

3. Layout tile work, and center the tile fields both directions in each space or on each wall area.

4. Adjust to minimize tile cutting.

5. Provide uniform joint widths.

D. Provide expansion and control joints where shown on the Drawings, and where otherwise recommended by the "Handbook for Ceramic Tile Installation" of the Tile Council of America, sealing in accordance with Section 07920 of these Specifications.

E. Cleaning:

1. Upon completion of placing and grouting, clean the work of this Section in accordance with recommendations of the manufacturers of the materials used.

2. Protect metal surfaces, cast iron, and vitreous items from effects of acid cleaning.

3. Flush surfaces with clean water before and after cleaning.

F. Provide tile surfaces clean and free from cracked, broken, chipped, unbonded, and otherwise defective units.

G. Provide required protection of tile surfaces to prevent damage and wear prior to acceptance of the Work by the Owner.

END OF "CERAMIC TILE"

STILLWATER TOWNSHIP SCHOOL

09510

ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide acoustical ceilings where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

Comply with pertinent provisions of Section 01640.

1.4 EXTRA STOCK

A. Deliver to the Owner for his use in future modifications, and extra stock of approximately 10% of each type of acoustical material installed, packaging each type of material separately, distinctly marked, and adequately protected against deterioration.

PART 2 - PRODUCTS

2.1 "T" GRID SYSTEM

A. Provide a complete system of supporting members, anchors, wall cornices, adapters for light fixtures and grilles, and accessories of every type required for a complete suspended "T" grid system of the arrangements shown on the Drawings, in color or colors selected by the Architect from standard colors of the approved manufacturer, and complying with pertinent requirements of Underwriters Laboratories, Inc., and the

governmental agencies having jurisdiction.

B. Acceptable products:

1. Chicago Metallic Corp., 5501 Downey Boulevard, Vernon, California 90058, (213) 582-1100. Equal products of other manufacturers may be used when approved in advance by the Architect.

2.2 ACOUSTICAL CEILING PANELS

A. USG Acoustical Products Co., Chicago, Ill. Ceiling system shall be 2' x 4' lay-in Auratone "Fissured" pattern, standard lay-in panels.

B. For ALTERNATE BID #3, provide 2' x 4' Auratone Rock Face ceiling panels by USG Acoustical Products Co. in standard pattern in Multi-Purpose room, both change rooms and lobby.

C. Equal products of other manufacturers may be substituted when approved in advance by the Architect.

2.3 OTHER MATERIALS

Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION, GENERAL

A. Except as modified by requirements of governmental agencies having jurisdiction, recommendations of the manufacturer as approved by the Architect, or specific directions of the Architect, install in accordance with ASTM C636 and the pertinent UL Design Requirements.

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ACOUSTICAL CEILINGS

PART 3 - EXECUTION

3.2 INSTALLATION, GENERAL

B. Lateral bracing:

1. Provide lateral bracing as required by pertinent codes and regulations.

2. Secure lateral bracing to structural members. Secure at right angles to the direction of the partition and four ways in large ceiling areas.

C. Provide retaining clips for ceiling boards in multi-purpose room.

D. Make all grid level within a tolerance of one in 1000 and straight within a tolerance of one in 1000.

3.3 INSTALLATION OF ACOUSTICAL MATERIALS

A. "T" grid system: Install acoustical ceiling boards so linearity of facing is as shown on Drawings, or otherwise directed by the Architect.

3.4 CLEANING UP

In addition the other stipulated requirements for cleaning, completely remove finger prints and traces of soil from the surfaces of grid and acoustical materials, using only those cleaning materials recommended for the purpose by the manufacturer of the material being cleaned.

END OF "ACOUSTICAL CEILINGS"

STILLWATER TOWNSHIP SCHOOL

09660

RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide resilient tile flooring where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

Comply with pertinent provisions of Section 01640.

1.4 EXTRA STOCK

Deliver to the Owner for his use in futuremodifications an extra stock of approximately 10% of each color and pattern in each material installed under this Section, packaging each type of material separately, distinctly marked, and adequately protected against deterioration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Provide colors and patterns as selected by the Architect from standard colors and patterns of the approved manufacturer in the specified type. Two colors will be selected and used in a pattern as shown on the Drawings.

B. Adhesives:

1. Provide waterproof and stabilized type adhesive as recommended by the manufacturer of the material being installed.

2. Asphalt emulsions and other non-waterproof adhesives will not be acceptable.

C. Concrete slab primer:

Provide non-staining type as required and as recommended by the manufacturer of the material being installed.

2.2 RESILIENT MATERIALS

A. Reinforced vinyl tile:

1. As manufactured by Kentile, Architectural series, 12" x 12" x 3/32", or equal products of other manufacturers when approved in advance by the Architect.

B. Vinyl wall base:

Kencove, as manufactured by Kentile. Provide 4" height base in 96' rolls. Provide and use preformed inside and outside corners as appropriate. Equal products of other manufacturers may be used when approved in advance by the Architect.

2.3 OTHER MATERIALS

Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION

A. Subfloors:

1. Verify that substrate is smooth, level, at required finish elevation, and without more than 1/8" in 10'-0" variation from level or slopes shown on the Drawings.

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RESILIENT TILE FLOORING

PART 3 - EXECUTION

3.2 PREPARATIONS

A. Subfloors:

2. Prior to laying materials, broom clean or vacuum the surfaces to be covered, and inspect the subfloors.

B. Priming:

1. Apply concrete slab primer if so recommended by the resilient tile manufacturer.

2. Apply in accordance with the manufacturer's recommendations as approved by Architect.

3.3 INSTALLATION

A. General:

1. Install materials only after finishing operations, including painting, have been completed and after permanent heating system is operating.

2. Verify that moisture content of concrete slabs, building air temperature, and relative humidity are within the limits recommended by the manufacturers of the materials used.

3. Maintain reference markers, holes, and openings that are in place or plainly marked for future cutting by repeating on the finish surface as marked in the subfloor. Use chalk or other non-permanent marking device.

B. Installing resilient tiles:

1. Place units with adhesive cement in strict compliance with the manufacturer's recommendations as approved by the Architect.

a. Butt units tightly to vertical surfaces, nosings, edgings, and thresholds.

b. Scribe as necessary around obstructions and to produce neat joints.

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RESILIENT TILE FLOORING

PART 3 - EXECUTION

3.3 INSTALLATION

B. Installing resilient tiles:

1. c. Place tiles tightly laid, even, and in straight parallel lines.

d. Extend units into toe spaces, door reveals, and in closets and similar spaces.

2. Lay units from center marks established with principal walls, discounting minor offsets, so that units at opposite edges of the room are of equal width.

a. Adjust as necessary to avoid use of cut widths less than 3" wide at room perimeters.

b. Lay units square to axes of the room or space.

3. Match units for color and pattern by using materials from cartons in the same sequence as manufactured and packaged.

4. Lay in ashlar pattern with grain in all units running the same direction, unless otherwise directed by the Architect.

5. Place resilient edge strips tightly butted to units and secured with adhesive, providing at all unprotected edges unless otherwise shown.

3.4 CLEANING AND PROTECTING

Remove excess adhesive and other blemishes from exposed surfaces, using neutral cleaner recommended by the manufacturer of the resilient materials.

END OF "RESILIENT TILE FLOORING"

STILLWATER TOWNSHIP SCHOOL

09700

TERRAZZO FLOORING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide terrazzo flooring where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work: Documents affecting work of this Section include but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of Specifications.

1.2 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Monolithic terrazzo system consisting of ½" thick cementitious terrazzo topping installed directly over the concrete slab. Standard chip sizes shall be used; color to be determined by Architect from manufacturer's standard colors.

B. Divider strips in material recommended by manufacturer, as required for a proper installation, spaced as directed by Architect and recommended by manufacturer.

C. Other supplies and materials required for a proper installation.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and

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TERRAZZO FLOORING

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Coordinate as necessary with other trades to assure proper and adequate provision in the Work of those trades for interface with the Work of this Section.

B. All work to be executed in accordance with the complete specifications of the N.T.M.A., to be found in the technical manual of this Association.

C. Install divider strips and control joints in accordance with trade practice in the selected approved grid. Top of strips shall be positioned above finish floor to allow for grinding.

D. Placing Terrazzo: After underbed has hardened and the divider strips are firmly set, place terrazzo mixture into the panels formed by the divider strips. Seed additional chips over this surface. Compact with rollers, extracting all excess cement and water. Finish by rolling or troweling surface.

E. Curing: Immediately after placement of terrazzo topping, apply curing liquid or cover with polyethylene or paper. Surface to remain covered until topping has developed sufficient strength to prevent dislodging of marble chips in the grinding operations.

F. Grinding, Initial: Initial grinding shall commence when the terrazzo topping has hardened sufficiently to prevent dislodging of the marble chips, using 24 grit stones or finer or with comparable diamond plates. This process requires that the final initial grind be completed with 80 or finer grit stones before the grouting process.

G. Grouting: After the floor surface has been cleaned free of all grinding residue, machine or hand grout, using identical Portland cement and color pigment, if required.

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TERRAZZO FLOORING

PART 3 - EXECUTION

3.2 INSTALLATION

H. Curing Grout: As soon as grouting has been completed, apply curing liquid or cover with polyethylene. Grout should cure for the minimum of 72 hours.

I. Final Grinding: Final grinding shall be with the use of 80 or finer grit stones, removing all grout from the surface. Upon completion, the terrazzo surface shall show a minimum of 70% marble chip exposure.

J. Cleaning, Sealing, Protection

Clean surface with a neutral cleaner. Rinse and allow surface to dry before application of a penetrating-type terrazzo sealer. The floor shall be protected from damage during the balance of the construction period.

END OF "TERRAZZO FLOORING"

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PAINTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included:

Paint and finish the exterior and interior exposed surfaces listed on the Painting Schedule in Part 3 of this Section, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Devision 1 of thses Specifications.

2. Priming or priming and finishing of certain surfaces may be specified to be factory-performed or installer-performed under pertinent other Sections.

C. Work Not Included:

1. Unless otherwise indicated, painting is not required on surfaces in concealed areas and inaccessible areas such as furred spaces, foundation spaces, utility tunnels, pipe spaces, and duct shafts.

2. Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials will not require painting under this Section except as may be so specified.

3. Do not paint moving parts of operating units; mechanical or electrical parts such as valve operators, linkages, sensing devices, and motor shafts, unless otherwise indicated.

4. Do not paint over required labels or equipment identification, performance rating, name or nomenclature plates.

PART 1 - GENERAL

1.1 DESCRIPTION

D. Definitions:

1. "Paint", as used herein, means coating systems materials including primers, emulsions, epoxy, enamels, sealers, fillers, and other applied materials whether used as prim, intermediate or finish coats.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

B. Paint Coordination:

1. Provide finish coats which are compatible with the prime coats and actually used.

2. Review other Sections of these Specifications as required, verifying the prime coats to be used and assuring compatibility of the total coating system for the various substrata.

3. Upon request, furnish information on the characteristics of the specific finish materials to assure that compatible prime coats are used.

4. Provide barrier coats over noncompatible primers, or remove the primer and reprime as required.

5. Notify the Architect in writing of anticipated problems in using the specified coating systems over prime-coatings supplied under other Sections.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

1.4 JOB CONDITIONS

A. Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 45 degrees F., unless otherwise permitted

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PAINTING CONTINUED

PART 1 - GENERAL

1.4 JOB CONDITIONS

A. by the manufacturer's printed instructions as approved by the Architect.

B. Weather conditions:

1. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces, unless otherwise permitted by the manufacturer's printed instructions as approved by the Architect.

2. Applications may be continued during inclement weather only within the temperature limits specified by the paint manufacturer as being suitable for use during application and drying periods.

PART 2 - PRODUCTS

2.1 PAINT MATERIAL

A. Acceptable materials:

1. The Painting Schedule in Part 3 of this Section is based, in general, on products of the Benjamin-Moore Company.

2. Equal products of other manufacturers approved in advance by the Architect, may be substituted in accordance with provisions of the Contract.

3. Where products are proposed other than those specified by name and number in the Painting Schedule, provide a new painting schedule compiled in the same format used for the Painting Schedule included in this Section.

B. Undercoats and thinners:

1. Provide undercoat paint produced by the same manufacturer as the finish coat.

2. Use only the thinners recommended by the paint manufacturer, and use only to the recommended limits.

PAINTING CONTINUED

PART 2 - PRODUCTS

2.1 PAINT METERIAL

B. Undercoats and thinners:

3. Insofar as practicable, use undercoat, finish coat, and thinner material as parts of a unified system of paint finish.

2.2 COLOR SCHEDULES

A. The Architect will prepare a color schedule with samples for guidance in Painting.

B. The Architect may select, allocate, and vary colors on different surfaces throughout the Work, subject to the following:

1. Exterior work: A maximum of two different colors will be used for trim, doors, miscellaneous work, and metal work.

2. Interior work: A maximum of 4 different pigmented colors will be used, with variations for trim and wall surfaces.

2.3 APPLICATION EQUIPMENT

A. For application of the approved paint, use only such equipment as is recommended for applicaiton of the particular paint by the manufacturer of the particular paint, and as approved by the Architect.

B. Prior to use of application equipment, verify that the proposed equipment is actually compatible with the material to be applied, and that integrity of the finish will not be jeopardized by use of the proposed equipment.

2.4 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this

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PAINTING CONTINUED

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 MATERIALS PREPARATION

A. General:

1. Mix and prepare paint materials in strict accordance with the manufacturer's recommendations as approved by the Architect.

2. When materials are not in use, store in tightly covered containers.

3. Maintain containers used in storage, mixing and application of paint in a clean condition, free from foreign materials and residue.

B. Stirring:

1. Stir materials before application, producing a mixture of uniform density.

2. Do not sitr into the material any film which may form on the surface, but removed the film and, if necessary, strain the material before using.

3.3 SURFACE PREPARATION

A. General:

1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturer's recommendations as approved by the Architect.

2. Remove removable items which are in place and are not scheduled to receive paint finish; or provide surface-applied protection prior to surface preparation and painting operations.

3. Following completion of painting in each space or area, reinstall the removed items by using workmen who are skilled in the necessary trades.

PAINTING CONTINUED

PART 3 - EXECUTION

3.3 SURFACE PREPARATION

A. General:

4. Clean each surface to be painted prior to applying paint of surface treatment.

5. Remove oil and grease with clean cloths and cleaning solvent of low toxicity and flash point in excess of 200 degrees F., prior to start of mechanical cleaning.

6. Schedule the cleaning and painting so that dust and other contaminents from the cleaning process will not fall onto wet newly painted surfaces.

B. Preparation of wood surfaces:

1. Clean wood surfaces until free from dirt, oil, and other foreign substances.

2. Smooth finished wood surfaces exposed to view, using the proper sandpaper. Where so required, use varying degrees of coarseness in sandpaper to produce a uniformly smooth and unmarred wood surface.

3. Unless specifically approved by the Architect, do not proceed with painting of wood surfaces until the moisture content of the wood is 12% or less as measured by a moisture meter approved by the Architect.

C. Preparation of metal surfaces:

1. Thoroughly clean surfaces until free from dirt, oil, and grease.

2. On galvanized surfaces, use solvent for the initial cleaning, and then treat the surface thoroughly with phosphoric acid etch. Remove etching solution completely before proceeding.

3. Allow to dry thoroughly before application of paint.

PAINTING CONTINUED

PART 3 - EXECUTION

3.3 SURFACE PREPARATION

D. Preparation of masonry surfaces:

1. The painting contractor shall be wholly responsible for the quality of his work, and is not to commence any part of it until surface is in proper condition.

2. If the painting contractor considers any surface unsuitable for proper finishing, he is to notify the Architect of this fact in writing. He is not to apply any material until corrective measures have been taken, or the Architect has instructed him to proceed.

3. All surfaces are to be clean; if for any reason the surface connat be cleaned, this condition shall be promptly reported to the General Contractor and Architect.

4. The prime coat should be applied soon after surface preparation has been completed, to prevent contamination of the substrate.

3.4 PAINT APPLICATION

A. General:

1. Touchup shop-applied prime coats which have been damaged, and touchup bare areas prior to start of finish coats application.

2. Slightly vary the color of succeeding coats.

3. Sand and dust between coats to remove defects visible to the unaided eye from a distance of five feet.

4. On removable panels and hinged panels, paint the back sides to match the exposed sides.

B. Drying:

1. Allow sufficient drying time between coats, modifying the period as recommended by the material manufacturer to suit adverse weather conditions.

PART 3 - EXECUTION

3.4 PAINT APPLICATION

B. Drying:

2. Consider oil-base and oleo-resinous solvent-type paint as dry for recoating when the paint feels firm, does not deform or feel sticky under moderate pressure of the thumb, and when the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.

C. Brush applications:

1. Brush out and work the brush coats onto the surface in an even film.

2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.

D. Miscellaneous surfaces and procedures:

1. Exposed mechanical items:

a. Finish electric panels, access doors, conduits, pipes, ducts, grilles, registers, vents and items of similar nature to match the adjacent wall and ceiling surfaces, or as directed.

b. Paint visible duct surfaces behind vents, registers, and grills flat black.

c. Wash metal with solvent, prime, and apply two coats of alkyd enamel.

2. Exposed pipe and duct insulation:

a. Apply one coat of latex paint on insulation which has been sized or primed under other Sections; apply two coats on such surfaces when unprepared.

b. Match color of adjacent surfaces.

c. Remove band before painting, and replace after painting.

PAINTING CONTINUED

PART 3 - EXECUTION

3.4 PAINT APPLICATOIN

D. Miscellaneous surfaces and procedures:

3. Hardware: Paint prime coated hardware to match adjacent surfaces.

4. Interior: Use "stipple" finish where enamel is specified.

3.5 PAINTING SCHEDULE

A. Provide the following paint finishes.

B. Exterior metal, ferrous:

1. First coat: Iron Clad Retardo, rust inhibitive paint.
2. Second coat: 1 coat Impervo Enamel.

C. Exterior wood:

1. First coat: Moorwhite primer.
2. Second coat: Moore's Eggshell Finish House Paint.

D. Interior Masonry wall paint:

1. Flat (above 4'-0" from floor and above 9'-4" in multi-purpose Room).

a. Prime Coat: Moorcraft Block Filler
B. Finish Coat: 2 coats Alkyd Sani-Flat

2. Gloss (to 4'-0" from floor and to 9'-4" in Multi-purpose room).

E. Interior metal doors, windows, etc.

1. Prime Coat: Ironclad Retardo Rust Inhibitive Paint
2. Finish: 1 coat Impervo Enamel.

F. Built-In Cabinets:

1. Stain and varnish:

a. First coat: Benwood Architectural Penetrating Stain

09900

PAINTING CONTINUED

PART 3 - EXECUTION

3.5 PAINTING SCHEDULE

F. Built-In Cabinets

1. Stain and varnish

b. Second coat: Benwood Urethane finish Low Lustre
c. Third coat: " " " " "

G. Cedar in Multi-Purpose Room

1. Seat and Varnish

a. First coat: Benwood Paste Wood filler
b. Second Coat: Benwood Urethane Finish Low Lustre
c. Third Coat: " " " " "

END OF "PAINTING"

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METAL TOILET PARTITIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included:

Provide floor-mounted metal toilet partitions system where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workment who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

A. Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

2.1 METAL TOILET PARTITIONS

A. Provide metal toilet partitions, and urinal screens if so indicated on the Drawings, in the dimensions and arrangements shown, and with the following attributes.

1. Door panels:
   a. Not less than 1" thick and not less than 22 gauge steel.
2. Partitions:
   a. Not less than 1" thick and not less than 20 gauge steel.
3. Pilasters:
   a. Not less than 1 1/4" thick and not less than 20 gauge steel.
4. Design:
   a. Floor-mounted. May be secured to wall as required for stability.

10162 -

METAL TOILET PARTITIONS

PART 2 - PRODUCTS

2.1 METAL TOILET PARTITIONS

A.

5. Finish:
   a. Baked enamel in colors selected by the Architect from standard colors of the approved manufacturer.

2.2 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 ECECUTION

3.1 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Install the work of this Section in strict accordance with the original design, pertinent requirements of governmental agencies having jurisdiction, and the mnnufacturer's recommended installation procedures as approved by the Architect, anchoring all components firmly into position for long life under hard use, plumb, level and square.

C. Except for compartments for the handicapped, adjust doors to remain at a uniformly open position when unlocked.

D. Touchup scratches and abrasions to be permanently and completely invisible to the unaided eye from a distance of five feet.

END OF "METAL TOILET PARTITIONS"

STILLWATER TOWNSHIP SCHOOL

10620

DIVIDER CURTAIN AND FOLDING DOORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide gymnasium divider curtain system and folding doors where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work: Documents affecting work of this Section include, but are not necessarily limited to General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

2.1 DIVIDER CURTAIN

Provide #680 Flex-Wall Gymnasium Divider with hoist system, 54'-0" long, by Porter Equipment Co., 9555 Irving Park Road, Schiller Park, Illinois 60176, or approved equal.

2.2 FOLDING DOORS

Panelfold "Accent", vinyl folding type as manufactured by Panelfold, Inc., Miami, Florida, or approved equal. Installation by authorized representative of the manufacturer. Color to be selected by Architect from manufacturer's standard colors.

2.3 OTHER MATERIALS

Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

10620

DIVIDER CURTAIN AND FOLDING DOORS

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Install the work of this Section in strict accordance with pertinent requirements of governmental agencies having jurisdiction, with the manufacturer's recommendations as approved by the Architect, anchoring components firmly into position.

END OF "DIVIDER CURTAIN AND FOLDING DOORS"

STILLWATER TOWNSHIP SCHOOL

10800

TOILET ROOM ACCESSORIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide toilet room accessories where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.

B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

1.2 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

2.1 TOILET ROOM ACCESSORIES

A. Provide the following products of Bobrick Washroom Equipment Company, or equal approved in advance by the Architect.

1. Surface-mounted toilet paper holder:

a. Number: B-273
b. Size: 7" wide x 2" high x 5" deep
c. Mount: 24"
d. Install (1) one at each toilet

2. Mirror over lavatory:

a. Number: B-290-2436
b. Size: 16" wide x 22" high
c. Install (1) one at each lavatory.

3. Towel dispensers and soap dispensers will be provided by Owner and installed by Contractor.

10800

TOILET ROOM ACCESSORIES

PART 2 - PRODUCTS

2.2 OTHER MATERIALS

Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject of the approval of the Architect.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.

B. Install each item in its proper location, firmly anchored into position, level and plumb, and in accordance with the manufacturer's recommendations.

END OF "TOILET ROOM ACCESSORIES"

STILLWATER TOWNSHIP SCHOOL

10900

ACCESSORIES AND SPECIALTIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: The work under this Section consists of equipment and accessories and related items necessary to complete the work indicated on Drawings and described in the Specifications, including, in general, but not limited to the following:

1. Chalkboards/Tackboards.
2. Door signs.
3. Lockers.
4. Change Room benches.
5. One-way window.
6. Basketball Backstop

B. Related work: Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Sepcifications.

1.2 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 PRODUCT HANDLING

Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS AND EXECUTION

2.1 CHALKBOARDS/TACKBOARDS

A. Manufacturer: Claridge Products & Equipment, Inc., Harrison, Arkansas, or approved equal.

B. Model:

1. Tackboards, Series 4, Typeco, ¼" cork on ¼" hardboard.
2. Chalkboards, Series 4, Type A, ½" Vitracite.
3. Chalk Trough, No. 263.

10900

ACCESSORIES AND SPECIALTIES

PART 2 - PRODUCTS AND EXECUTION

2.1 CHALKBOARDS/TACKBOARDS

C. Installation: Provide complete unit installed per manufacturer's specifications and recommendations. Install plumb and level in workmanlike manner. Coordinate with painter and flooring installer.

2.2 DOOR SIGNS

Door identification signs will be supplied and installed by the Owner.

2.3 LOCKERS

A. Manufacturer: The Interior Steel Equipment Co., Cleveland, Ohio, or approved equal.

B. Double Tier Standard, 12" width, 15" depth, 60" frame, standard handle, color as selected by Architect.

2.4 CHANGE ROOM BENCHES

A. Manufacturer: The Interior Steel Equipment Co., Cleveland, Ohio, or approved equal.

B. 1-¼" northern hard maple with 1-3/4" steel tubing pedestal welded to 10 gauge base and top.

C. Installation: Anchor to floor in accordance with manufacturer's recommendations.

2.5 ONE-WAY WINDOW

A. Manufacturer: Globe-Amerada Glass Co., Elk Grove Village, Illinois, or approved qqual.

B. 48" x 72", laminated transparent mirror in steel frame. Install glazing in frame according to manufacturer's specifications. Mount unit securely, plumb and level in opening.

10900

ACCESSORIES AND SPECIALTIES

2.6 BASKETBALL BACKSTOP

A. Manufacturer: Hussey Seating Co., North Berwick, Maine, or approved equal.

B. Model 700E ceiling-suspended swing-up backstop with #722 wood rectangular backboard. Also provide #730 Adjust-A-Goal and #725 Electric Winch

C. Backstop frame to be forward folding. Front frame to consist of two vertical supports hinged to the overhead pipe and terminate at the lower edge of the backboard. Front and rear frames shall be fabricated from 2" x 2" x11 gauge square section members securely welded into rigid vibrationless structure. Rear frame shall consist of two vertical supports hinged to the overhead pipe, and set at 30 degrees from the front frame members. Rear frames shall terminate in two specially designed tubular slide assemblies each having a fully enclosed plastic bearing surface.

D. Electric winch to be ½ hp., 110 v., single phase, reversible capacitor-start, with overload protection. Shall be coupled to a worm gear reducer through a V-belt. Winch operation shall be controlled by a wall mounted dual key switch through limit switches pre-wired to the winch assembly.

E. Adjust-A-Goal shall provide adjustment of backboard for any height between 8'-0" to 10'-0" goal height above the floor. Unit is controlled from the floor by a manually operated acme threaded rod.

END OF "ACCESSORIES AND SPECIALTIES"

STILLWATER TOWNSHIP SCHOOL

11200

EQUIPMENT/ELEVATOR

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Provide elevator and other accompanying equipment as indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.

These specifications are intended to cover the complete installation of the elevator plant in a first-class workmanlike manner and to include all work and material in accordance with the drawings and as specified. All work and material shall conform to the requirements of the American Standard Safety Code for Elevators, Dumbwaiters, and Escalators, latest edition, the National Electric Code, and any local codes which may govern the requirements of the installation.

B. Related work: Documents affecting the work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and sections in Division 1 of these Specifications.

C. Permits and Inspections: The Elevator Contractor shall obtain and pay for necessary municipal or state inspection and permits as required and make tests as called for by the regulations of such authorities.

D. Guarantee: The Elevator Contractor shall guarantee that the materials and workmanship of the apparatus installed by him under these specifications shall be first-class in every respect, and that he will make good any defects, not due to ordinary wear and tear or improper use, which may develop within one year from date of completion of the equipment.

1.2 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.3 SUBMITTALS

Before beginning work, the Elevator Contractor shall prepare all drawings necessary to show the general arrangement of the elevator

11200

EQUIPMENT/ELEVATOR

PART 1 - GENERAL

1.3 SUBMITTALS

equipment. These drawings must be properly approved by the Architect before installation of the elevator. The material so furnished by the Owner or Architect shall include the guarantee of hoistway size and confirmation of current characteristics.

1.4 PRODUCT HANDLING

Comply with pertinent provisions of Section 01640.

PART 2 - PRODUCTS

2.1 ELEVATOR

Complete installation of elevator plant by CEMCO, #CM-100, oil-hydraulic type, or approved equal. To include all work and material in accordance with the Drawings and as specified.

A. One (1) hydraulic passenger elevator

1. Capacity: 1500 pounds
2. Speed: 100 feet per minute
3. Travel: First floor to second floor
4. Landings: Two (2)
5. Openings: Two (2) in line
6. Operation: Selective,Collective
7. Platform Size: 5'-0" x 5'-0"
8. Signals: New Jersey Barrier Free required & plaque on door.

B. Power Unit

1. Type: A power unit especially designed and manufactured for this service shall be furnished. It shall include a constant displacement rotary screw-type pump, motor, V belt drive assembly, oil reservoir, hydraulic control unit, fill strainer, tank strainer in the suction line, oil level gauge and drip pan. The power unit shall be located near the hoistway at the lowest landing.

2. Valves: Control valve including safety check valve, up direction valve with high pressure relief including up

11200

EQUIPMENT/ELEVATOR

PART 2 - PRODUCTS

2.1 ELEVATOR

B. Power Unit:

2. Valves: leveling and soft stop features, lowering valve including down leveling and manual leveling feature shall be mounted in a compact unit assembly. Control valves shall be solenoid operated and designed to open and close gradually to give smooth control. All valves shall be readily accessible for adjustment.

3. Automatic Two-Way Leveling: An automatic two-way leveling device shall be provided so that the car will approach landing stops at reduced speed from either direction of travel. The leveling device shall, within its zone, be entirely independent of the operating device and shall automatically stop and maintain the car approximately level with the landing, regardless of change in load.

4. Piping and Oil: Piping shall be provided from power unit to cylinder complete with necessary fittings. Oil of proper grade for this service shall be provided.

5. Hydraulic Muffler: A muffler shall be provided in the oil line near the power unit. The muffler shall be designed to reduce pulsation and noise which may be present in the flow of the hydraulic fluid.

6. Platen Plate Isolation: The platen plate shall be mounted on suitable sound dampeners designed to isolate the platen plate from the car frame.

7. Power Unit Isolation: The power unit shall be mounted on vibration sound dampeners designed to isolate the unit from the building structure.

8. Low Oil Control: A low oil control feature shall be provided designed to automatically cause an up traveling car to descend to the lowest terminal landing if the system does not have a sufficient reservoir of oil.

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EQUIPMENT/ELEVATOR

PART 2 - PRODUCTS

2.1 ELEVATOR

B. Power Unit:

9. Controller: The Controller shall be of the electro-magnetic type. It shall be designed to control starting, stopping and prevent damage to the motor from overload or excess current and to automatically cut off the power supply and bring the car to rest in the event of the operation of any of the safety devices.

C. Car, Frame, and Platform:

1. The car frame which supports the elevator platform and enclosure shall be made of structural steel members. Platform shall consist of a steel frame filled with suitable subfloor and a finished floor by others. Underside of platform shall be suitably fireproofed.

2. The car shall be equipped with an electronic photo electric cell actuated by a dual light ray across the entrance to the car. Interruption of the light ray shall prevent the door from closing or cause them to stop and reopen if they are in the process of closing.

The photo cells shall cause the doors to remain open as long as the flow of traffic continues and permit them to close shortly after the last person passes through the door opening.

D. Switches, Buttons and Controls:

1. Emergency Stop Switch: An emergency stop switch shall be provided in the car, designed to cut off current supply to motor and down direction valves and bring the car to rest independent of the regular operating devices.

2. Car Operating Panel: A flush mounted operating panel shall be furnished in the car containing call registration buttons for each landing, emergency stop switch, alarm button and light switch.

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PART 2 - PRODUCTS

2.1 ELEVATOR

D. Switches, Buttons and Controls:

3. Hall Buttons: A riser of flush mounted buttons shall be provided. A single button shall be furnished at each terminal and up-down buttons at all intermediate landings.

4. Terminal Limit Switches: Terminal limit switches shall be provided in the hoistway designed to automatically stop the car at the terminal landings.

5. Illuminated Hall Buttons: Call registration lights shall be provided in each hall push button unit. When a button is pressed, it shall illuminate, signalling to the waiting passenger that the call has been registered. Each button shall remain illuminated until the call has been answered.

6. Illuminated Car Buttons: Call registration lights shall be provided in each car button. When a button is pressed, it shall illuminate, signalling the waiting passenger that the call has been registered. Each button shall remain illuminated until the call has been answered.

7. Car Position Indicator: An electric multi-light position indicator shall be provided in the car, directly over entrance. The position of the car in the hoistway shall be indicated by illumination of the numeral corresponding to the floor at which the elevator is stopped or passing.

END OF "EQUIPMENT/ELEVATOR"

SECTION 15

PLUMBING

15-01 GENERAL:

a. The Plumbing Contractor shall furnish all labor, materials, equipment, transportation, permits, inspections, and incidentals required to install and complete all plumbing work as shown on the drawing or specified herein or both.

b. All work shall be subject to the terms and conditions of the contract and applicable portions of the General Conditions and Special Conditions.

c. All work and materials shall be in strict accordance with these drawings and specifications even though they may be in excess of the applicable codes, ordinances and regulations.

15-02 WORK INCLUDED: The work shall include but is not limited to the following:

a. Sanitary drainage system to existing sptic system

b. Floor drains and specialty fittings.

c. Floor waste system, including traps as shown on the drawings.

d. Cold water supply system.

e. Chilled water fountain and piping.

f. Hot water supply system.

g. Oil fired hot water heater.

h. Plumbing fixtures installed and connected in all areas as shown and scheduled on the drawings.

i. Counter sinks installed and connected as shown.

j. Insulation, on all hot water and cold water pipes.

k. Non-freeze wall hydrants.

l. Fuel oil system.

SECTION 15, PLUMBING

15-03 WORK BY OTHERS: The following work, which is incidental to the installation, will be executed by others under the direction of the Plumbing Contractor:

a. Execute all required masonry and carpentry work, cutting, patching, furrings, plastering, etc., except as noted herein.

b. Execute all required excavation work, backfilling, grading, etc., for water, drains, sewers, storm water, etc.

c. Finished painting of piping, supports and insulation, except as herein noted.

d. Toilet ventilation (by Heating Contractor).

e. Access panels in ceilings, walls and trench for access to valves and equipment.

f. Flashing for vents at roof (by General Contractor).

g. Electrical feeds to circulating pumps and water cooler, etc. (by Electrical Contractor).

15-04 DRAWINGS:

a. The general location of the apparatus and the details of the work are shown on the accompanying drawings, which form a part of this specification. Exact locations are to be determined at the building as the work progresses and shall be subject to the Owner's, Architect's and/or Engineer's approval.

b. Anything shown on the drawing and not mentioned in the specifications, or vice versa, shall be furnished as if it were both shown and specified.

c. Due to the small scale of the drawing, it is not possible to indicate all offsets, fittings and accessories which may be required. The contractor will be required to investigate the structural and finish conditions affecting his work and shall arrange such work accordingly, furnishing such fittings, traps, valves and accessories as may be required to meet such conditions.

d. All questions as to the interpretation or extent of the drawings and specifications shall be referred to the Engineer. Failure to do this shall not relieve the Contractor of the responsibility to provide all materials and work in accordance with the intent of these plans and specifications at no extra charge.

SECTION 15, PLUMBING

15-05 GENERAL CONDITIONS:

a. All materials entering into the installation must be new and of the quality specified, otherwise to be of the best commercial quality obtainable for the purpose. All parts of the work and the erection thereof must be performed in the best and most substantial manner in accordance with the standards of the trade and all applicable codes.

b. The Contractor shall visit the site and building during construction and shall take such measurments as necessary for him to determine that actual conditions follow these plans and specifications such that he may properly install his work without interferences or work hold-ups.

c. Any item inadvertently omitted from the plans and specifications but which is necessary for the proper completion and operation of the work shall be supplied by the Plumbing Contractor at no additional charge.

d. The Plumbing Contractor shall be responsible for performing all operations in connection with this work and the satisfactory operation and tightness of all water, drainage and venting systems under this contract.

15-06 SHOP DRAWINGS:

a. Show drawings of all major equipment, showing certified dimensions, complete installation details and material data, shall be submitted in six (6) copies to the Architect and/or Engineer for approval within 30 days after award of contract. Final approval must be received in writing before equipment is shipped.

b. Approvals will be for type, quality and specification only; quantities and dimensions shall be the responsibility of the Plumbing Contractor.

c. Data submitted shall include at least the following:

(1) Plumbing fixtures, including all specialty fixtures.

(2) Floor drains.

(3) Chilled water drinking fountains.

(4) Valves.

(5) Wall Hydrants.

(6) Shock absorbers.

15-06 SHOP DRAWINGS: (Continued)

(7) Insulation.

(8) Circulating pumps.

(9) Hot water heater.

d. Provide at least two (2) neatly bound sets of maintenance books, instruction books, and parts list pertaining to all equipment. Each shall include names, addresses and telephone numbers of nearest available source of repair service and parts, individual equipment guarantee and valve charts.

15-07 SUBSTITUTIONS:

a. Where the words, "equal" and "or approved equal" appear in these specifications, substitutions may be made only upon specific approval of the Architect and/or Engineer before the equipment is ordered.

b. In all cases, the right is reserved to require adequate proof of the equality of the substitute before permitting its use.

c. The Contractor shall assume the cost of and the responsibility for any changes in the work as shown on the contract drawing which may be occasioned by approval of materials and equipment other than that specified.

15-08 CODES, PERMITS AND INSPECTIONS:

a. The installation shall comply with all local codes and laws applying to plumbing installations in effect at the site and regulations of any other governmental body or agency having jurisdiction, all in accordance with the National Standard Plumbing Code-1903.

b. The Plumbing Contractor shall obtain and pay for all permits, inspections and licenses required.

c. After completion of the work, the Plumbing Contractor shall furnish to the Architect for the Owner a certificate of final inspection and approval from the Inspector having jurisdiction.

15-09 COOPERATION BETWEEN TRADES:

a. The Plumbing Contractor shall give full information to the General Contractor and other Contractors, sufficiently in advance of this work, so that all necessary work by the other

15-09 COOPERATION BETWEEN TRADES: (Continued)

trades may be planned and installed without any delays. The Plumbing Contractor shall furnish and locate all sleeves, supports, anchors, etc., so that the General Contractor may install the same in place. The Plumbing Contractor shall locate all necessary access panels, vent stacks thru roof and electrical outlets to complete work in advance without delay to the other trades. The Plumbing Contractor shall advise the General Contractor of required partition thickness and furring to conceal cast iron hubs.

b. In case of failure to give proper information as noted above, the Plumbing Contractor will be required to do his own cutting and patching, or have same done by the General Contractor, but in no case shall there be any additional expense to the Owner.

15-10 EXTRA WORK ORDERS - CREDITS: No extra work will be paid for unless authorized by the Owner and/or Architect in writing. Where extra work is required, the Contractor shall provide an itemized account of the work invcolved and shall take into consideration any credits due or work omitted for any reason. Estimates shall clearly list such omitted work with proper credit given for same.

15-11 CHARTS AND TAGS:

a. All shut-off valves and control valves shall be marked by means of a 1" round or octagonal brass tag or disc with permanently indented 1/2" filled color code numerals. In addition to valve numbers, each tag shall identify the system it controls with color code lettering as large as possible. "CW" for cold water, "HW" for 140^{o} water. Blue filled for cold water and red filled for all hot water. Tags shall be mounted to valve stems with copper or brass "S" hooks.

b. Fixture stops shall not be tagged.

c. Valve charts shall be provided for each piping system showing a complete listing of all tags, giving number, location, function and color code of pipes they control. Upon completion of the work, one (1) copy of each chart, sealed in a rigid backboard with clear lacquer, placed under glass and framed, shall be hung where directed. Two (2) additional unmounted copies shall be provided, one for each bound maintenance book.

15-12 PAINTING:

a. All exposed iron work, in the mechanical room, including hangers, cleanouts, etc. shall be painted two (2) coats of black asphaltum.

15-12 PAINTING: (Continued)

b. All ferrous metal hangers and supports concealed above ceilings, in walls, trenches, pipe spaces and in chases shall be painted one (1) coat before being installed and one (1) coat on all exposed surfaces after installation with black asphaltum.

15-13 MATERIALS:

a. Soil and Waste Pipe: All sanitary, waste, soil, sewer, and vent lines of one and one quarter inch (1-1/4") and larger shall be PVC, DWV, Schedule 40 PVC Sewer Pipe PSM-SDR35 plastic pipe. The piping shall be assembled as per manufacturers recommendations. The Contractor, at his option, may use copper or cast iron soil pipe all as per 1983 National Standard Plumbing Code. All joints shall be watertight and root proof.

b. Galvanized Pipe: Galvanized steel pipe and galvanized cast iron screw fittings may be used for all waste, drain and vent piping under three (3) inches. All galvanized steel vent stacks shall terminate under roof and a C. I. Manhoff fitting and C. I. extension shall go thru roof. The Contractor, at his option, may elect to substitute cast iron (as above) or Type "K" copper drainage tubing for galvanized steel. Waste and drain line fittings shall be drainage pattern.

c. Water Piping: Interior cold and hot water piping above floors shall be Type "L" hard drawn copper tubing with cast bronze or copper solder type fittings. Piping buried in earth or concrete floors shall be soft annealed Type "K" copper tubing continuous without any fittings. Piping concealed in masonry block or stud walls shall have silver solder joints. Immediate exposed piping at fixtures shall be I.P.S. copper or brass, threaded and all chrome plated. Provide shock absorbers and expansion loops or joints as indicated or otherwise required to control pipe movement and any water hammer noise.

d. Cleanouts: Cleanouts shall be installed for sanitary and vent piping at base of all risers, at changes in direction, where shown on plans, and as otherwise required.

(1) Wall Cleanouts: Provide and install in cast iron tee fittings, a cast iron caulking ferrule for soil pipe hub, with bronze raised heat plug, polished brass round flush access cover. Masonry wall ferrules shall be Smith #4402, Zurn #1305-1 or Wade #W-8450-RL.

(2) Floor Cleanouts: Provide and install cast iron lacquired floor cleanouts with double drainage flange and weepholes, 4" inside caulk connections, rough brass "T" handle,

15-13 MATERIALS: (Continued)

internal closure plug and polished brass rim with scoriated cover plate fastened with screws to cast iron adjustable collar with rolled thread. Cleanouts shall be Smith #4313-TP, Zurn #1327-5, or Wade #W-8190 series.

e. Valves: All valves shall be Kennedy, Walworth, Jenkins Bros. or approved equal. They shall be installed where indicated and otherwise required to provide for complete operation and drainage of the system. Gate valves shall be used for shut-offs and drains; globe valves shall be used for throttling and plug type for balancing. Solder or screw type may be used up to 2" size, screw type only for 2-1/2" size and over.

(1) Gate Valves: Up and including 2" size, 125 lb. SWP and 200 lb. WOG, bronze body, wedge disc, non-rising stem, inside screw, Kennedy #427 or #427SJ. Stop and drain valves shall be Kennedy #427W or #427SJW 2-1/2" size and larger, 150 lb. rising stem. Kennedy #80 shut-off valves at water entrance shall be iron body, bronze mounted, O.S. and Y, bolted bonnet, solid disc, Kennedy #0601 or #0611.

(2) Globe Type: 150 lb. SWP and 300lb. WOG bronze body renewable composition disc for water service, union bonnet, rising stem, Kennedy #89 and #89SJ.

(3) Check Type: 125 lb. SWP 200 lb. WOG, bronze body, swing, check, regrindable seat, Kennedy #440 or #440SJ. Over 2" 200 lb. SWP #400 WOG or Kennedy #444.

f. Hangers: Hangers shall be provided for all piping. Maximum support spacing for brass, copper or steel piping shall be the following: 1/2" and 3/4" sizes shall be 5'-0" on centers. 1", 1-1/4", and 1-1/2" size shall be 6'-0" on center. 2" size and up shall be 8'-0" on centers. Maximum support spacing for cast iron piping shall be 5'-0" on centers, or at least one (1) hanger per 5'-0" length of pipe. Maximum support spacing for copper tubing shall be the following: 1/2" and 3/4" sizes shall be 5'-0" on centers. 1" and 1-1/4' sizes shall be 6'-0" on centers and 1-1/2" and 2" sizes 8'-0" on centers. Support underground piping on piers of brick or concrete.

g. Sleeves: Sleeves of steel pipe shall be furnished for straight runs of piping through masonry walls, masonry or stud partitions and floors. When piping is not insulated the sleeves shall be two sizes larger than pipe size. When piping is insulated the sleeves shall be large enough to allow approximately 1/4" space all around, between sleeve and insulation passing through sleeve. Sleeves will be grouted in place by the General Contractor under the direction of the Plumbing Contractor.

15-13 MATERIALS: (Continued)

h. Plates: Chrome-plated, one piece wall, floor and ceiling escutcheon plates shall be provided on all uncovered piping in finished rooms.

i. Unions: Provide unions or flanges at all equipment and fixtures to permit removal of piping. Unions shall be Rockwood Manufacturer, Type 601, Dart Co., or approved equal.

j. Wall Hydrant: Provide and install where indicated a non-freeze 3/4" connection, Woodford Company, Model #64 with vacuum breaker and backflow preventer. Include three (3) key operators per hydrant. Zurn, or approved equal is acceptable.

k. Domestic Water Shut-Offs: Provide gate valve at base of all domestic water risers, stop and check valves on all supplies to shower valves, and gate and check valves on all circulating hot water return branches to main.

l. Install stop valves at all water service mains, branch mains, risers, and branches to groups of fixtures.

15-14 FIXTURES:

a. Where specified, fixtures of Eljer Co., Manufacturer of description and quality listed, or approved equal, shall be furnished and installed complete with all wall hangers, stops, fittings and connections. Fixtures manufactured by American Standard, Kohler, Eljer, of equal quality, will be accepted.

b. All fixtures shall be free from all imperfections, smooth, watertight and complete in every respect.

c. Traps: Provide chrome plated traps for all fixtures and equipment, whether supplied or not.

d. Fixture Hangers and Stops: All fixtures shall have key stops on supplies and mounting hangers or brackets for wall hung types. Also, provide key stops on supplies to all fixtures not supplied but connected under this contract.

15-15 SHOCK ABSORBERS: Shock absorbers shall be provided as shown on the plans or as otherwise required. They shall be Zurn Industries, "Shoktrol" or approved equal.

15-16 EXPANSION JOINTS, LOOPS AND ANCHORS: Provide expansion joints and loops on hot water supply lines where required to control expansion and contraction. Joints shall be packless monel metal bellows type in brass casing with union type connections and with pressure rating of 100 PSI, Fulton Sylphon

15-16 EXPENSION JOINTS, LOOPS AND ANCHORS: (Continued)

Co..#aaa-M, or approved equal. Provide rigid anchors where required. Anchors shall be bolted collars held by angular braces in direction of piping. Provide guides on each side of all expansion joints.

15-17 CIRCULATING PUMP:

a. Install in Mechanical Room, circulating pump with valves as detailed. Pumps shall be Bell & Gossett, Armstrong or Taco Co. as per equipment list. All bronze construction, or approved equal.

b. Provide Minneapolis-Honeywell aquastat #L4006A or equal Penn Control Co. in each return line to control each pump operation.

c. The Electrical Contractor will completely wire the pump and control.

15-18 INSULATION:

a. Insulation shall be provided for all hot water and cold water supply pipes, except immediate exposed connections to fixtures, with Owens-Corning Fiberglas 25:HP or approved equal 1" thick heavy density pipe insulation, covered and sealed as per manufacturers recommendations for hot water piping.

b. Hot Water

(1) Concealed hot water piping shall have a heavy density, molded fiberglass insulation, 1" thick with factory applied standard canvas cover pasted over, equal to BDH Mono-Kover. All laps, joints and seams must be sealed with lap cement.

(2) Exposed hot water piping same as concealed, except a field applied additional 6 OZ. canvas cover shall be pasted over factory applied jacket.

15-19 DOMESTIC HOT WATER HEATER: Install as shown on the drawings water heaters with piping and valves as detailed. Heaters shall be Ruud Company as per equipment list, Jackson, A.O.Smith, or approved equal.

15-20 INSTALLATION AND WORKMANSHIP:

a. All plumbing must be installed in accordance with the plan and specifications, except as otherwise required by local and state requirements.

15-20 INSTALLATION AND WORKMANSHIP: (Continued)

b. Pitch sanitary waste, drains, and storm water piping 1/8" per foot, minimum, as indicated.

c. Pitch all water piping to drain and to drain valves. Provide drain valves at all low points, for bleeding down system.

d. Vents shall be provided in accordance with plan and specifications, except as otherwise required by state and local requirements.

e. Sizes of branches, risers and connections shall be as indicated, with fixture connections and same size as fixture outlets.

f. Protect fixtures from damage during construction.

g. Fire protection and fire stopping shall be provided at all openings as required by the Massachusetts prevailing code.

15-21 TESTS:

a. All drainage and supply systems shall be tested in accordance with any laws or ordinances that apply. Each drainage and water system shall be tested with water and proved tight before any of the work is covered up.

b. Each stack and leader shall have all openings or branches plugged and shall be filled with water to top of vent through roof and allowed to stand at least one hour for inspection before draining.

c. All water piping shall be tested to a pressure of 125 lb. per square inch for at least 30 minutes. Pressure drop in this period shall not exceed two lbs.

d. Before each test is made on domestic water piping, the Contractor shall flush clean the system ready for test. After final test, all valves, flush valves, check valves, strainers, circulating pump, hot water heater, etc., shall be opened and all foreign material flushed or wiped clean. The Contractor shall submit a statement in writing to the Owner that all flushing has been completed and that the fixtures are free from foreign material.

e. The Architect and/or Engineer shall be advised in advance of all tests, and the Contractor shall submit a statement in writing to the Architect that all tests have been completed in accordance with specifications and codes.

15-22 CLEANING:

a. Upon completion of the work the Plumbing Contractor shall thoroughly clean and flush all piping systems to the sewer with water (see TESTS, above).

b. All fixtures and equipment shall be thoroughly cleaned in accordance with manufacturer's instructions.

c. The Contractor shall take effective measures to protect all materials, fixtures and fittings from loss or damage and all pipe openings from obstruction throughout the construction. He shall be responsible for protecting his equipment and materials against dust, mortar, weather, etc., during the construction period.

d. All dirt and debris resulting from the work shall be thoroughly taken up and removed from the premises. All fixtures, fittings, and equipment shall be cleaned for inspection and left in the best possible condition.

15-23 GUARANTEE AND WARRANTY:

a. The Plumbing Contractor shall and hereby does warrant and guarantee that all work executed under this section is in accordance with all accepted standards of the trade and will be free from defects of materials and workmanship for a period of one (1) year from the date of the final certificate. The one (1) year warranty including all parts, labor, and materials shall also be provided by the equipment manufacturer or the manufacturer's representative.

b. The Plumbing Contractor shall further warrant that all materials furnished and work executed by his is in accordance with all applicable laws and regulations.

SECTION 15A

HEATING AND VENTILATING

15A-01 GENERAL REQUIREMENTS:

a. This Contractor, hereinafter referred to as the Heating and Ventilating (HV), shall furnish all labor, materials, equipment, transportation, permits, licenses, etc. He shall provide complete new heating systems, base board radiation, hot water boiler, ventilating, exhaust systems, split system air conditioner for interior office, and including all accessory materials as shown on the drawings or specified herein or both.

b. All applicable parts of the General Conditions and Supplementary General Conditions form a part of this Division and shall govern the work performed under it.

c. All work and materials shall be in strict accordance with these specifications and these drawings even though they may be in excess of the applicable codes, ordinances and regulations.

15A-02 WORK INCLUDED:

The work covered by this Specification shall include, but is not limited to, the following:

a. Thru-the-wall unit ventilators in all rooms as shown on the drawings and including matching book cases.

b. Hot water boiler and all accessories.

c. Circulator zone pumps.

d. Cabinet Heaters.

e. Baseboard radiation, with thermostats.

f. Exhaust fans in Toilets, All Purpose Rooms, and all other areas as shown.

g. Heating & Ventilating unit for Multi-Purpose room.

h. Diffusers, registers, grilles and louvers.

i. Duct fire-dampers and balancing dampers.

j. Sheet metal duct and all accessories.

SECTION 15A, HEATING, VENTILATING AND AIR CONDITIONING:

15A-02 WORK INCLUDED: (Continued)

k. Piping systems, hot water suply, hot water return and etc.

l. Hangers and supports.

m. Sleeves and plates.

n. Testing and adjusting.

o. Insulation.

p. Automatic temperature controls.

q. Painting, except that under "Incidental Work by Others"

r. Electrical for Controls only. Power to equipment by Electrical Contractor.

15A-03 INCIDENTAL WORK BY OTHERS:

The following items, incidental to the installation of the work, will be executed by others under the direction of the HVAC Contractor. All work by General Contractor, except as noted.

a. Excavation, backfilling, grading.

b. Cutting, patching, etc., incidental to the installation.

c. Lintels, furring, chases, etc.

d. Door undercuts.

e. Ceiling access panels to duct dampers, fire dampers and balancing dampers.

f. All finished painting or decorating, except as specified herein.

g. Electric work, except as specified herein.

15A-04 GENERAL CONDITIONS:

a. All materials entering into the installation must be new and of the quality specified, otherwise to be of the best commercial quality obtainable for the purpose. All parts of the work and the erection thereof must be performed in the best and most substantial manner in accordance with the standards of the trade and all applicable codes.

SECTION 15A, HEATING, VENTILATING AND AIR CONDITIONING:

15A-04 GENERAL CONDITIONS: (Continued)

b. The Contractor shall visit the site and building during construction and shall take such measurements as necessary for him to determine that actual conditions follow these plans and specifications such that he may properly install his work without interferences or work hold-ups.

c. The HVAC Contractor shall be responsible for performing all operations in connection with this work and the satisfactory operation and tightness of all drainage and air handling systems under this contract.

d. These drawings are intended to indicate diagrammatically the extent, general character and approximate locations of the work included. Work indicated but having minor details obviously omitted or not shown shall be furnished complete to perform the function intended without additional cost to the Owner.

15A-05 SUBSTITUTIONS:

a. Where the words, "equal", and "or approved equal", appear in these specifications, substitutions may be made only upon specific approval by the Architect and/or Engineer before the equipment is ordered. Six (6) copies of Shop Drawing Data must be submitted whether required under, "Shop Drawings", or not.

b. In all cases the right is reserved to require adequate proof of the equality of the substitute before permitting its use.

c. The Contractor shall assume the cost of, and the entire responsibility for any changes in the work as shown on the Contract Drawings which may be occasioned by approval of materials and equipment other than that specified.

15A-06 DRAWINGS:

a. The general location of the apparatus and the details of the work are shown on the accompanying drawings which forms a part of this specification. Exact locations are to be determined at the building as the work progresses and shall be subject to the Owner's and/or Engineer's approval.

b. Anything shown on the drawing and not mentioned in the specifications, or vice versa, shall be furnished as if it were both shown and specified.

15A-06 DRAWINGS: (Continued)

c. Due to the small scale of the drawing, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor will be required to investigate the structural and finish conditions affecting his work and shall arrange such work accordingly, furnishing such ductwork fittings and accessories as may be required to meet such conditions.

d. All questions as to the interpretation or extent of the drawing and specifications shall be referred to the Engineer. Failure to do this shall not relieve the Contractor of responsibility to provide all materials and work in accordance with the intent of these plans and specifications at no extra charge.

e. Record, "As Built" Drawings of all changes to the Contract Plans shall be kept during construction and two (2) clean sets of prints neatly marked in red shall be turned over to the Architect upon completion of the project for the Owner's use.

15A-07 SHOP DRAWINGS:

a. Shop drawings of all major equipment showing certified dimensions, complete installation details and material data shall be submitted in six (6) copies to the Architect and/or Engineer for approval before ordering.

b. Approvals will be for type, quality and specification only. Quantities and dimensions shall be the responsibility of the HVAC Contractor.

c. Data submitted shall include the following:

(1) Thru-wall unit ventiltors.

(2) Cabinet heaters.

(3) Circulator pumps

(4) Baseboard radiation.

(5) Exhaust fans, Toilets, Multi Purpose Room, etc.

(6) Diffusers, grilles, registers and louvers.

(7) Fire dampers

15A-07 SHOP DRAWINGS: (Continued)

(8) Space heating controls and diagrams.

d. At the completion of the work the HVAC Contractor shall make available to the Architect one (1) complete set, and to the Owner two (2) complete sets of operating and maintenance instructions for the following:

(1) Air conditioner unit.

(2) Heat ventilating unit

(3) Unit ventilators and cabinet heaters.

(4) Exhaust fans.

(5) All controls.

e. Record drawings, indicating any and all changes during construction, shall be kept by the HVAC Contractor and turned over to the Architect upon completion of work.

15A-08 CODES, PERMITS, INSPECTIONS:

a. The installation shall comply with all local codes and laws applying to installations in effect at the site and regulations of any other governmental body or agency having jurisdiction and with the regulations of the State of Massachusetts Building Code. The work shall be done in accordance with additional codes: N.F.P.A. - 101, 1083; N.F.P.A. - #90A - 1975 (Ductwork), and all prevailing state and local codes.

b. The HVAC Contractor shall obtain and pay for all permits, inspections, and licenses required.

15A-09 CUTTING, PATCHING AND SLEEVES:

a. All cutting, patching, plastering, chasing, furring, slots, lintels, grounds, etc., incidental to the installation of the apparatus in the building will be executed by the General Contractor under the directions of the HVAC Contractor.

b. The HVAC Contractor shall furnish and install sleeves at the proper time in progress of Construction, and shall request chases and openings for passage of piping and ductwork.

15A-10 PAINTING:

a. All exposed iron and steel work and all concealed iron

15A-10 PAINTING: (Continued)

and steel pipe, hangers, supports and anchors installed above ceilings, in partitions, chases or sleeves shall be painted two (2) coats of black asphaltum.

b. All exposed piping in finished areas shall be thoroughly cleaned sataisfactory for finish painting.

c. Excute any painting specifically noted on equipment.

d. All other painting or decorating will be executed by others.

15A-11 HEATING AND AIR CONDITIONING:

a. The HVAC Contractor shall provide and install a complete system of heating and ventilating for the Multi Purpose Room, including blower unit, coils, ductwork, diffusers, grilles, insulation and controls as shown and scheduled on the drawings.

b. The HVAC contractor shall provide and install in all shown Class Rooms the unit ventilators and matching book cases from wall to wall, with controls. Cabinet heaters shall be installed in the ceilings of the Locker Rooms as shown. A complete system of piping supply and return with controls as shown and scheduled shall be installed.

c. A complete system of heating baseboard shall be furnished and installed as shown and scheduled.

d. Initial start-up and instruction to the Owner or his representative shall be made under the direction of a Factory Representative who shall make all final settings and adjustments.

15A-12 BASEBOARD RADIATORS:

a. Provide and install baseboard radiators in all rooms, cooridors and areas as shown on the drawing. The heaters shall be of the type, manufacturer and capacity, including built-in thermostats, as scheduled on the drawing.

15A-13 EXHAUST FANS:

a. Exhaust fans shall be located in all rooms, Multi

15A-13 EXHAUST FANS: (Continued)

Purpose room, toilets, and all locations as shown on the drawings. They shall be of the type, manufacturer, size and include controls, as scheduled and noted on the drawing. Please note all special requirements and equipment.

b. Exhaust fans shall have certified ratings authorized by A.M.C.A. or be tested in accordance with A.M.C.A. methods.

c. Fans will be completely wired by the Electrical Contractor.

15A-14 SHEETMETAL DUCT WORK:

a. All heating and ventilating ducts shall be constructed of best bloom galvanized steel, or of aluminum alloy 3003-H14 duct aluminum. Ducts shall have airtight joints, long radius elbows with center-line radius equal to 1-1/2 times duct width or square elbows with turning vanes, be sized as indicated and substantially supported to prevent vibration and sagging.

b. All duct work shall be constructed and installed in accordance with the current issue of the ASHRAE Guide for, "Rectangular Low Pressure Ducts", and shall be not less than the minimum gauge scheduled below, except as otherwise specified or required.

Rectangular Widest Side(In.)	Steel	Alum.	Round Dia.(In.)	Steel	Alum.
12 or less	26	24 (.020)	8 or less	26	24 (.020)
13 to 30	24	22 (.025)	9 to 13	14	22 (.025)
31 to 54	22	20 (.030)	14 to 22	22	20 (.032)

Steel.....USSG (United States Standard Gauge)
Aluminum.....B & S (Brown and Sharp Gauge)

c. All duct work shall be installed with clearances or protection from combustible materials and construction shall be provided in accordance with the requirements of NFPA Standard 90A.

d. Provide approved fire dampers, in accordance with NFPA Standard 90A, as shown on the drawing and where required by NFPA Standard 90A. Provide access openings at fire dampers where necessary to permit replacing of fusible link. Through the wall installations shall be as per the typical detail shown on the drawing.

e. Turning vanes shall be installed in all square turn

15A-14 SHEETMETAL DUCT WORK: (Continued)

elbows, Carnes, Duro-Dynes, Tuttle & Bailey, or equal, double turning vanes.

f. Flexible connections shall be Elgen Silent Duct, SDC-4 Duro-Dyne, 24 gauge, "Metal-Fab", with 16 oz. asbestoseal fabric, or equal, where ducts connect to air handling equipment.

g. The General Contractor will provide all floor, roof openings and flashing.

h. Openings or spaces around duct passing through fire walls shall be sealed draft-tight on both sides of wall with asbestos rope, asbestos cement or other fire-resistant compounds.

15A-15 REGISTERS, DIFFUSERS AND GRILLES: Equipment manufactured by Carnes or Anemostat Register Company will be approved, provided it meets the specifications on the drawing. Trade name and model referred to hereinafter are to illustrate the specific equipment. All fire dampers, shown on the drawings, shall have UL 555-73 rating as required by the 1984 BOCA Code.

15A-16 PIPING MATERIALS:

a. All piping materials shall be new.

b. Unions 1-1/2" and smaller shall be Dart 300 lb. malleable iron screwed, bronze-to-bronze ground joint. Insulating unions shall be EPCO Sales, Inc. dielectric pipe unions, used in all connections of dis-similar metal piping or tubing, or approved equal brand.

c. Drain water piping shall be hard drawn copper water tube, Type "L". Install insulating unions between all steel and copper piping.

d. Piping shall be installed in accordance with the best practice of the trade for the various systems. Piping shall be located generally as shown on the drawings; however, relocations will be permitted to provide better clearances, function or appearance.

e. Fire protection and fire stopping shall be provided at all pipe openings through fire walls.

f. All refrigerant piping material shall be seamless copper, soft annealed tubing.

15A-17 HANGERS, SUPPORTS AND SLEEVES:

a. Piping suspended from overhead shall be supported by

15A-17 HANGERS, SUPPORTS AND SLEEVES: (Continued)

approved clevis type band with adjusting nut.

b. Hanger spacing shall not exceed six (6) ft. on centers and shall lsupport piping without any sagging.

15A-18 ELECTRICAL WORK:

a. The HVAC Contractor shall provide and erect all motors and provide controllers, switches, motor starters, etc., as herein specified, shown on plan or otherwise required. All motors shall be provided with thermal overload protection.

b. The HVAC Contractor shall check the available current characteristics with the Electrical Contractor before placing orders for all electrical equipment.

c. The Electrical Contractor will furnish, install and feed all disconnect switches as indicated, except as noted.

d. All wiring shall be THW copper installed in conduit except low voltage control wiring, which shall be minimum 18 AWG copper.

e. All wiring shall be installed in accordance with the latest edition of the National Electrical Code, Utility Company and local code requirements.

15A-19 INSULATION:

a. Insulate all supply and return duct work with two (2) inches Owens-Corning Fiberglas with vapor barrier. Seal all joints with a non-combustible vapor barrier presssure sensitive adhesive tape.

b. Insulate all refrigerant lines with three-quarter inch (3/4") thick Armstrong Armaflex, or approved equal.

15A-20 CONTROLS: The HVAC Contractor shall furnish, install and adjust all complete automatic temperature heating, and cooling control systems as indicated and diagrammed on the drawing. There shall be a complete set of independent controls for each system.

a. General: Furnish and install electronic and electric temperature controls, including a pre-wired control center, manufactured by the Barber-Colman Co. The A.T.C. mfg. shall furnish all necessory temperature control wiring diagrams, supervision of the controls installation and a one year service guarantee of these controls. The contractor shall provide the

15A-20 CONTROLS: (Continued)

necessary manpower to assist the A.T.C. mfg. to checkout and start up the control systems.

All controls must be provided by a direct factory sales office or factory authorized, commerical products sales representative with a fully staffed, factory trained service department. Dealers, distributors and wholesalers of control products shall not be acceptable.

All temperature control wiring shall be installed in accordance with the National and Local Electrical Codes and with one Electrical Section of these speecifications. All control motors shall be of the oil immersed type. All room thermostats shall have removeable set point adjusters and protective metal wire guards.

See the schematic temperature control wiring diagrams on the plans.

b. Pre-wired Control Center (CC-1): Provide a pre-wired control center, CC-1, which shall be located in the New Boiler Room. CC-1 shall be totally enclosed, constructed of code gauge steel with hinged locking door and grey paint finish. CC-1 shall house the necessary numbered terminal strips, relays, seven day time clocks, low voltage control transformer, low voltage overload break, electronic controller, door mounted switches and other required control accessories.

c. Zone Controls: Zone 1 shall consist of the Classroom Area, which houses unit ventilators, cabinet heaters, classrooms exhaust air fan and a toilet exhaust air fan. Zone one shall be programmed by a separate seven day time clock in CC-1 and "Day-Auto-Night" selector switch on the Front of CC-1.

Zone 2 shall consist of the Activities Area, which houses HV-1, a minimum exhaust air fan, a maximum exhaust air fan, a toilet exhaust air fan, cabinet heaters and radiatior.

For each exhaust fan, provide an "On-Auto-Off" selector switch on the Front of CC-1.

d. Hot Water Controls: Provide pump selector switches "P-1: P-1A" and "P-2: P-2A" on the front of CC-1. When the outdoor air temperature shall be above 60 F, P-1, P-1A, P-2, P-2A and the hot water boiler shall remain off, when the outdoor air shall be below 60 F the two selected pumps shall run continuously and the boiler shall mantain 200^{o}F. hot water through its integral operating and safety controls.

15A-20 CONTROLS: (Continued)

The moterized, three way, hot water mixing control valve shall be proportionately positioned by the fully adjustable, outdoor air reset, electronic controller in CC-1. The hot water temperature shall be varied inversely with outdoor air temperature. The hot water temperature shall be initially scheduled for 120°F at 60°F out- door air temperature.

Provide an emergency, manual overide three way control valve positioner in CC-1.

e. Cabinet Heaters Controls: Each cabinet heater fan meter shall be energized by its line voltage room heating thermostat. Each cabinet heater thermostat shall be interlocked to its zone control system so as to maintain an approximate control during night operation.

f. Classroom Zone Controls: The toilet exhaust air fan and the class room exhaust air fan shall run continuously, during day operation and shall remain off, during night operation.

All of the classroom unit ventilaters shall have similar systems of control. One night room heating thermostat, set at 55°F, shall energize all of the classroom unit ventilators, during night operation.

Each classroom unit ventilator shall be controlled in accordance with A.S.H.R.A.E. Cycle II. An electronic space temperature controller shall proportionately position the hot water coil control valve and the outdoor air damper through an electronic supply air temperature senser and a low limit mixed air temperature controller, set at 58°F. Whenever the hot water coil control valve shall be fully opened the outdoor air jumper shall be fully closed. When the supply air fan shall not be running, The separate control valve and damper actuators shall be of the spring safe type. The unit ventilator components shall be provided with factory harness wiring complete with matching plug-in connections. The A.T.C. mfr., shall pay the unit ventilator Mfr. to provide sampling chambers for the space temperature sensors, mount the damper actuators and provide control power outlets.

g. Activities Zone Controls: The toilet exhaust air fan and HV-1 shall run continuously, during day operation and shall remain off during night operation. The minimum exhaust air fan shall run, when HV-1 shall be running and its dampers shall be postioned for minimum or more outdoor air. The maximum exhaust fan shall run, when HV-1 shall be running and its dampers shall be positioned for 80% or more outdoor air, When HV-1 shall not be running, its dampers shall remain in full recirculation

15A-20 CONTROLS: (Continued)

position, its hot water coil control valve shall remain fully opened and the minimum and maximum exhaust air fans shall remain off.

HV-1 shall be interlocked to be off whenever the building fire-alarm panel shall be activated. In addition, provide manual reset type supply air (200°F) and return air (125°F) firestats to stop HV-1.

When HV-1 shall be running and the return air temperature shall be below 64°F, the dampers shall remain in full recirculation position and the hot water coil control valve shall remain fully opened. When HV-1 shall be running and the return air temperature shall be above 64°F, the dampers shall position for minimum or more outdoor air and electronic room thermostat shall proportionately position the motorized, three way, hot water coil control valve. When the hot water coil control valve shall be closed and upon further demand for cooling, the dampers shall be proportionately positioned from minimum to 100% outdoor air through a mixed air low limit temperature controller, set at 58°F.

During day operation the Multi Purpose room radiation control valve shall be satisfied and until space temperature shall be satisfied before the ventilation shall be energized. During night operation the radiation control valve shall be opened and closed by the night room heating thermostat, set at 55°F.

15A-21 TEMPORARY SERVICE: Any temporary heat required during construction will be provided by the General Contractor; however, the HVAC Contractor shall make the permanent heating system available as soon as practical.

15A-22 TESTING AND ADJUSTING:

a. After the installation is completed and before insulation is applied, the Contractor shall test all systems under normal operating conditions. The systems shall be thoroughly cleaned and the apparatus left in perfect working order. The Contractor shall provide all labor for tests.

b. Upon completion of the work called for in these specifications, the HVAC Contractor shall provide the necessary expert mechanics or engineers for the adjustment and operation of the systems to the end that the plant may be turned over to the Owner in perfect working order, and the Owner shall be instructed in the operation of all equipment. All air outlets shall be adjusted to within 5% of the specified CFM.

15A-22 TESTING AND ADJUSTING: (Continued)

c. The HVAC Contractor shall be responsible for the tightness and proper operation of the installation for one (1) year from the date of acceptance.

d. The HVAC Contractor shall re-adjust each system as required during the next period of heavy heating and cooling demand following the completion of the work.

15A-23 PROTECTION AND CLEANING:

a. The Contractor shall take effective measures to protect all materials, machinery, fixtures and fittings from loss or damage, and all pipe openings from obstruction, throughout the construction. He shall be responsible for protecting his equipment and materials against dust, mortar, weather, etc. during this construction period.

b. All dirt and debris resulting from the work shall be thoroughly taken up and removed from the premises. All fixtures, fittings, machinery and equipment shall be cleaned for inspection and left in the best possible condition.

15A-24 GUARANTEE AND WARRANTY:

a. The Heating, Ventilating and Air Conditioning Contractor shall and hereby does warrant and guarantee that all work executed by him is in accordance with all accepted standards of the trade and will be free from defects of materials and workmanship for a period of one (1) year from the date of final acceptance by the Architect. The one (1) year warranty including all parts, labor, and materials shall also be provided by the equipment manufacturer or the manufacturer's representative.

b. The Heating, Ventilating and Air Conditioning Contractor shall further warrant that all materials furnished and work executed is in accordance with all state and local laws, regulations, ordinances, etc.

Prepared by:

LLOYD ENGINEERING
Consulting Engineers
Warren, New Jersey
Project # 8614
June, 1986

SECTION 16

ELECTRICAL

16-01 GENERAL:

a. The work covered by this Section for the Electrical Contractor includes the furnishing of all labor, material, equipment and incidentals, and the performing of all operations in connection with the electrical installations as indicated on the drawing and/or herein specified. All work shall be subject to the terms and conditions of the Contract and applicable sections of the General Conditions and Special Conditions of the Specifications.

b. All work and material shall be in strict accordance with these plans and specifications, even though they may be in excess of applicable codes and regulations.

c. The Electrical Contractor shall coordinate with the local utility company to provide the service entrances (both electrical and telephone) as indicated and specified so as to be in the best interests of the Owner.

16-02 WORK INCLUDED: The work covered by this section shall include, but not be restricted to the following:

a. New primary service from the existing "DP" (600 amp) to the new service panels.

b. New telephone service and conduit.

c. Service switchboard equipment.

d. Lighting and power panels and disconnect switches.

e. Fixtures and lamps.

f. Temporary light and power.

g. Wiring devices and plates.

h. All equipment connections including unit ventilators, water coolers, exhaust fans and all electrical accessories.

i. Nameplates.

j. Branch circuit wiring and conduit as required.

k. Grounding system.

16-02 WORK INCLUDED: (Continued)

l. Fire and smoke alarm system.

m. Emergency lighting system.

n. Intercom, public address, and sound systems.

o. Exit lights.

p. Relocate outdoor lighting fixtures.

q. System and equipment maintenance and instruction data.

r. Shop drawings.

s. Record plans of, "As-Built", construction.

16-03 WORK BY OTHERS:

The following items, incidental to the work included in this Section, will be executed by others under the direction of the Electrical Contractor. (All work by the General Contractor and other grades, except as noted.)

a. Wiring of certain plumbing and heating equipment, hereinafter specified under, "Equipment Connections".

b. Excavation, backfilling, grading, etc.

c. Cutting and patching.

d. Finished painting.

e. Costs of electric power used by all trades during the construction period (by Owner).

f. Motors, starters and/or controllers (by HVAC Contractor).

g. Telephone wiring and equipment (by telephone company).

16-04 DRAWINGS:

a. These Specifications are accompanied by plans of the building showing the location of outlets, switches, controls, devices, panels, service and feeder distribution, telephone and signaling system outlets, fire and smoke detectors, public address system, and equipment. Schematic wiring diagrams, working drawings and certain details are also shown. The drawings, are intended to indicate diagrammatically the extent,

16-04 DRAWINGS: (Continued)

general character and approximate locations of the work included. Work indicated but having minor details obviously omitted or not shown shall be furnished complete to perform the function intended without additional cost to the Owner.

b. The Architectural, and Mechanical Drawings shall be followed and this Section of the work fitted thereto. If any departures from the Contract Drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted, as soon as practical and within thirty (30) days after award of the Contract, to the Architect for approval. No departures shall be made without the prior written approval of the Architect or his authorized agent.

c. The drawings and these specifications are complementary each to the other and any items specified but not shown, or vice versa, shall be referred to the Architect and/or Engineer for clarification and shall consequently be furnished and installed as if both shown and specified.

d. Record, "As-Built", Drawings of all changes to the Contract Plans shall be kept during construction and two (2) clean sets of prints neatly marked in red shall be turned over to the Architect upon completion of the project for the Owner's use.

16-05 GENERAL CONDITIONS:

a. All materials and equipment installed in the work, together with installation, shall be in accordance with the current issues of the following:

(1) National Electrical Manufacturers Association.

(2) American Standards Association

(3) Underwriters Laboratories, Inc.

(4) National Electrical Code (latest edition).

(5) Local utility company regulations.

(6) State of New Jersey Electrical Codes.

b. Substitutions:

(1) Where the words, "or equal", "or approved equal", appear in these Specifications, substitutions may be made only upon specific written approval of the Architect and/or Engineer before the equipment is ordered. Six (6) copies of Shop Drawing

16-05 GENERAL CONDITIONS: (Continued)

Data shall be submitted whether required under, "Shop Drawings", or not.

(2) In all cases the right is reserved to require adequate proof of the quality of the substitute before permitting its use.

(3) The Contractor shall assume the cost of the entire responsibility for any changes in the work as shown on the Contract Drawings or required by the Specifications which may be occasioned by approval of materials and equipment other than that specified.

c. Defective new equipment or equipment damaged in the course of installation or test shall be replaced or repaired in a manner meeting the approval of the Architect or Engineer.

d. Wiring, grounding and receptacle installation shall be in acordance with NEC, 1984, Article 250.

16-06 SHOP DRAWINGS:

The Electrical Contractor shall submit six (6) copies each of detailed Shop Drawings (cuts, brochures, drawings, etc.) of the following to the Architect and/or Engineer for approval:

a. Lighting and power panels with breaker schedule and trip settings.

b. Disconnect switches.

c. Lighting switches, receptacles and plates.

d. Receptacles and plates.

e. Lighting fixtures.

f. Exit lights and emergency lights.

g. Fire and smoke detector system.

h. Communications systems.

i. Public Address system.

16-07 CODES, PERMITS, INSPECTIONS:

a. The installation shall comply with all laws applying to electrical installation in effect at the site, with regulations

16-07 CODES, PERMITS, INSPECTIONS: (Continued)

of any other governmental body or agency having jurisdiction and with the regulations of the latest edition of the National Electrical Code where such regulations do not conflict with those laws.

b. The Contractor shall obtain and pay for all permits required by the ordinances at the site. After completion of the work, the Contractor shall furnish to the Architect, for the Owner, a certificate of final inspection and approval from the Inspection Bureau having jurisdiction.

16-08 TEMPORARY LIGHT AND POWER:

a. The Electrical Contractor shall furnish and install temporary wiring for use of all trades throughout the building as required during construction, including adequate G.F.I. outlets, voltage and phases, and switches.

b. The General Contractor will make necessary arrangements with the Owners for costs of electric current used by all trades during the construction period.

c. No lamps shall be furnished under this specification for use by any other trades.

16-09 SITE VISITATION:

a. Due to the nature of the work, certain details of the building may not be shown or specified, but it shall be the responsibility of the Contractor to visit the site as well as examine the drawings and specifications to satisfy himself with the actual conditions to be encountered.

b. Failure to do this shall be the responsibility of the Contractor, as no additional payments or extras will be allowed for conditions encountered in the execution of the work in accordance with the intent of the plans and specifications.

16-10 WORK PROGRESS:

a. The Contractor shall coordinate his work with the progress of the building and other trades such that he shall complete his work as soon as conditions permit and so that interruptions of building functions will be at a minimum.

b. Waste material shall be removed promptly from the premises. All material and equipment stored on the premises shall be kept in a neat and orderly fashion. No material shall be stored where exposed to weather conditions.

16-10 WORK PROGRESS: (Continued)

c. The Electrical Contractor shall erect and maintain at all times necessary safeguards for the protection of life and property of Owner's staff, clients, and the public.

16-11 EXTRA WORK ORDERS - CREDITS:

a. No extra work will be paid for unless authorized by the Owner and/or Architect in writing. Where extra work is required, the Contractor shall provide an itemized account of the work involved and shall take into consideration any credits due or work omitted for any reason. Estimates shall clearly list such omitted work with proper credit given for same.

b. Amounts of credits for work omitted and/or substitutions shall be approved by the Engineer, Architect and/or Owner. All credit submittals and approvals shall be in writing.

16-12 MATERIALS:

a. Disconnect Switches:

(1) Provide all disconnect switches, fusible or non-fusible, as shown on the plans, including switches for mechanical equipment.

(2) All disconnect switches shall be general or heavy duty cartridge fusible or non-fusible type, as required for the particular equipment. General Electric Type TG, TC, or TH, Hubbel, Crouse Hinds or approved equal.

b. Fuses: Provide and install, "One Time", cartridge fuses for all fusible disconnect switches. Provide fuse sizes indicated for disconnect switches at service entrance panelboard. Deliver two (2) complete sets of spare fuses for all switches to the Owner.

c. Nameplates: The Contractor shall furnish and install on each lighting and power panel, main switch, distribution panel, all disconnect switches (furnished under Mechanical or Electrical Sections), emergency lighting and fire alarm panels, exhaust fan switches, exit and outside light switches a nameplate of embossed plastic material inscribed with the purpose of the particular piece of equipment. Nameplates may be attached with adhesive of a permanent nature.

d. Conduit and Wiring Systems:

(1) Except as noted, all wiring shall be run in rigid steel conduit which shall be concealed in floors, walls, roof

16-12 MATERIALS: (Continued)

construction and partitions, except where specifically required to run exposed. Concealed horizontal conduits generally shall be run above ceilings and in walls. Exposed conduit shall follow the lines of the building and shall be run close to the walls and beam soffits. Wiring run in or under slab shall be run in rigid steel coated with asphaltum or be PVC. All feeders to lighting panels shall be in rigid steel.

(2) Conduit systems shall be installed in accordance with the applicable provisions of The National Electrical Code. Rigid steel conduit shall be zinc coated. Electric metallic tubing shall be installed in accordance with provisions of the latest edition ofThe National Electrical Code.

(3) Conduits and wiring shall be kept at least six (6) inches from parallel runs of flues, steam pipes or hot water pipes. Rigid conduit shall have supports spaced not more than 8 feet, 6 feet for EMT, and shall be installed with runs parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings. Conduit shall be installed so as not to interfere with access panels in the ceilings. Conduit bends and offsets shall be avoided where possible, but, where necessary, shall be made with an approved hickey or conduit-bending machine. Expansion fitting or other approved devices shall be used to provide for expansion and contraction where conduit crosses expansion joints.

(4) Wooden plugs inserted in masonry or concrete shall not be used as a base to fasten conduit supports. Conduit shall be supported on approved types of galvanized wall brackets, ceiling trapeze, strap hangers, or pipe straps, secured by means of toggle bolts on hollow masonry units or expansion bolts in concrete or brick, machine screws on metal surfaces and wood construction. Nails shall not be used as means of fastening boxes or conduits.

(5) Conduit shall be installed in such manner as to insure against trouble from the collection of trapped condensation.

(6) Conduit shall be securely fastened to all cast or sheet metal outlets, junction and pull boxes with galvanized locknuts and bushings, care being observed to see that the full number of threads project through to permit the bushing to pull tight against the end of conduit after which the locknut shall be made up sufficiently tight to draw the bushing into firm electrical contact with the box.

16-12 MATERIALS: (Continued)

e. Conductors:

(1) A complete system of conductors shall be installed in the raceway systems. Line voltage branch circuit conductors shall be minimum #12, AWG copper.

(2) Conductors, smaller than #8, installed in ordinarily dry locations shall be thermoplastic insulated, Type TW or THW. Conductors installed in wet locations, such as in underground raceways in concrete or masonry slab in direct contact with earth, or in raceways regularly subject to moisture or condensation shall be thermoplastic insulated specifically designed for such applications. Type TWH, copper, and larger shall be stranded.

(3) Conductors larger than #10 gauge and feeders to panels and motors shall be Type THW or THWN 600 V rated, copper in all locations.

(4) Home runs may be combined in one conduit, provided all connections are in accordance with The National Electrical Code requirements and the maximum unbalanced current in the neutral does not exceed the capacity of the conductor. Conductors shall be continuous from outlet to outlet and no splices shall be made except within outlet or junction boxes. Junction boxes may be utilized where required or as shown on the drawings.

(5) Wire connectors or insulating material or solderless pressure connectors, properly taped, shall be utilized for all splices in wiring where possible. Soldered joints insulated with tape shall not be used.

(6) Low voltage wiring shall not be less than No. 18 gauge copper for control or signal systems.

(7) Fire alarm cable shall be Type "E", not less than No. 18 gauge copper as manufactured by Philadelphia Insulated Wire Company, or approved equal.

f. Grounding:

(1) The main building service switch shall be provided with a system ground to the metal water main entrance or to a ground rod system (at the Contractor's option) and in accordance with local, utility company and N.E.C. requirements.

(2) Connection to the metal water pipe for ground conductor shall be made with an approved ground clamp or lug

16-12 MATERIALS: (Continued)

connection. The ground conductor shall be protected in conduit and the conduit properly grounded.

(3) In the event the water main joints do not provide a continuous electrical path, a ground rod system must be utilized. The ground rod shall be 5/8" diameter, iron, copper clad and driven to a depth of not less than 8 feet. The system ground shall be tested after installation and shall have a measured resistance of not more than 25 OHMS to ground. The interior domestic water system shall be grounded to the ground rod system.

(4) All equipment shall be grounded in accordance with the latest N.E.C. requirements.

(5) Run a bare copper #12 (minimum size) grounding wire, or as sized on plans, in conduit in addition to circuit neutral wire. Run ground wire to all receptacle and equipment outlets and connect to both outlet box and ground terminal of the receptacles. Connections to outlet box and receptacle shall be by screwed connection. The entire bare grounding system shall be interconnected at the separate cabinet grounding strips and terminated at the main service switch, ground and sized per the plans.

(6) Provide insulated grounding bushings for attachment at service entrance conduit and for all conductors larger than #4 with bonding jumpers from bushings to system ground.

(7) All electric panels will have grounding terminal boards for collecting branch circuit ground cables.

g. Outlet and Junction Boxes:

(1) Cast metal or cadmium plates sheet steel boxes of a class to satisfy the conditions for each outlet shall be used. Boxes shall be installed in a rigid and satisfactory manner, either by wood screws on dry walls, expansion shields on masonry, or machine screws on steel work. Fixture outlet boxes at ceilings shall be of the 4" octagonal concrete type. Fire alarm and telephone outlet boxes shall be not less than 4" square fitted with appropriate covers where necessary to set flush mounted. One piece gang boxes not less than 2" deep shall be utilized where necessary.

(2) Pull boxes shall be constructed of code-gauge galvanized sheet metal of not less than the minimum size recommended by the National Electrical Code. Boxes shall be

16-12 MATERIALS: (Continued)

furnished with screw-fastened covers. When several feeders pass through a common pull box, they shall be tagged to indicate clearly their electrical characteristics, circuit number, panel designation and terminal point.

h. Equipment Connections:

(1) Equipment connections shall be made with liquid tight flexible metal conduit or rigid steel conduit. Controllers for motors, disconnect switches and all control, protective and signal devices for motor circuits shall be connected and left in operating condition. The number and size of conductors between motors and control or protective apparatus shall be as recommended by the manufacturer of the apparatus. Where equipment is furnished and installed by other trades for connection to the electrical system, this Contractor shall supervise such installation. All work shall conform to the National Electrical Code requirements.

(2) The HVAC Contractor and the Plumbing Contractor will furnish and install all their equipment, and shall furnish all electrical devices and control apparatus required for their trade, except as indicated.

(3) The Electrical Contractor shall completely wire all heating, ventilating, air conditioning and plumbing equipment. The Electrical Contractor shall obtain all control devices and wiring diagrams from the HVAC Contractor and the Plumbing Contractor, except as otherwise indicated in this section of the specifications or as indicated on the drawings.

i. Lighting and Power Panels:

(1) New lighting and power panels shall be as per electric riser diagrams with bolted Type TE circuit breakers (amp. rating on end of handle), General Electric Type NLAB, Square "D", Gould, or approved equal. Provide main lugs and mains, and numbers and rating of circuits as scheduled on the drawings. Cabinets shall be flush mounted and shall have keyed lock and typed directory inside door to identify circuits, except as noted. The lighting and power loads shall be balanced on all phases. Provide spare breakers and spaces as scheduled. All panels shall be of the same manufacturer.

(2) Each cabinet box shall be provided with a separate grounding strip, bolted to box interior, to provide for the separate equipment grounding system.

j. Switches, Receptacles and Plates: All switches and receptacles shall be spec grade, ivory color, NEC approved types.

16-12 MATERIALS: (Continued)

(1) Duplex outlets, 20 ampere, 125 volt, 3 wire, 2 pole, grounding (with self grounding clip), NEMA 5-20R, Arrow Hart, Pass and Seymour, Leviton, or Harvey Hubbell. (Mount 18" AFF unless otherwise noted.)

(2) Switch lighting, 120 volt, 20 ampere, single pole, spec grade, quiet action, ivory, UL listed, NEMA performance standards. Arrow Hart, Hubbell, Pass and Seymour or Leviton.

(3) Switch lighting same as above, but 3-way. Arrow Hart, Hubbell, Pass and Seymour or Leviton, or Harvey Hubbell.

(4) Exhaust fan switch with pilot light, (SPEF) single pole, (two gang box) with single plate for switch and pilot light. Switch same as Item 3, Pilot light 7.5 watt, 120 volt, with red jewel. Pass and Seymour #1377,Arrow Hart #1377.

(5) Wall plates shall be satin finish stainless steel, Type 430. Plates shall be single or duplex for receptacles and shall be single or double gang as required. Plates shall be Hubbell, Pass and Seymour, Arrow Hart.

(6) Clock recessed recaptacles: Standard grade, Hubbell 5233 with hanger rates 15A-125 volt, Arrow Hart, Pass and Seymour, or equal.

(7) Duplex outlets, with ground fault protection, shall be installed in all toilets and outside installations as shown and scheduled on the drawings.

16-13 LIGHTING FIXTURES:

a. The Contractor shall furnish, install and connect complete to the building wiring system ready for satisfactory operation all lighting fixtures for the building. The number and type of lighting fixtures are as shown and scheduled on the drawings.

b. In general, all lighting fixtures shall bear the UL label rated for Class "P" service and be ETL certified. Fluorescent ballasts shall be high power factor type and ETL certified under CBM specifications, or, "Bonus Line", rated Class "P" with sound level "A" rating.

c. Provide all necessary caps, straps, hangers, canopies, etc. as required. Study the architectural plans as required for proper installation of all fixtures. Failure to do this will not relieve the Contractor of the responsibility to furnish and install all necessary materials, etc.

16-13 LIGHTING FIXTURES: (Continued)

d. All fixtures shall have installed herein a lamp of wattage noted which shall be of the inside frost incandescent filament type or cool white fluorescent type, Metal Halide or Quartz, as required for each unit. Lamps shall be rated for 120 volts or, if noted, 130 volts. All lamps shall be furnished by the Contractor.

16-14 SWITCHBOARD:

a. The Contractor shall provide a panelboard where indicated at the existing service entrance in the Mechanical and Electrical Room, of sufficient size to properly contain, without crowding, the equipment indicated thereon. The panelboard shall be constructed of wood, 3/4" minimum thickness, set out from wall on wood or steel brackets. Panelboard and brackets shall be painted two (2) coats of black enamel paint before any equipment is mounted thereon. All equipment shall be bolted thereon.

b. The circuit breaker panelboard, shall be factory assembled circuit breaker type rated 600 volts A.C. with main circuit breaker as sized on the drawing. The panels shall be Square "D", Gould, Cutler-Hammer, Westinghouse, or approved equal, and shall be bolted on.

c. All breakers shall be moulded case, quick make-quick break (with amp. rating on end of toggle handle), as scheduled on the plans. All 2 and 3 pole breakers shall have common trips. Provide spaces as indicated. All breakers shall be UL listed. All breakers above 100 amperes shall be of the interchangeable trip type.

d. The Panelboard shall be constructed of galvlanized sheet steel with wiring and gutter space per NEC. All terminals shall be suitable for copper.

e. The Panelboard shall contain ground lugs and bus and shall be UL listed for service entrance and shall be so labeled.

16-15 TELEPHONE SYSTEM:

a. Owner shall furnish necessary telephone system in accordance with the requirements of the Telephone Utility Company and shall verify the layout with the telephone company before installation. The Electrical Contractor shall install all service conduit to locations as shown on the drawing.

b. Conduits from the panelboard to all telephone outlet boxes shall be 3/4" with fish wires.

16-15 TELEPHONE SYSTEM: (Continued)

c. Outlet boxes shall have stainless steel plates with cord hold. Hubbell #91781, Arrow Hart, Pass and Seymour, or approved equal.

16-16 FIRE ALARM SYSTEM:

a. General: The Electrical Contractor shall furnish and install a complete coded fire alarm system, matching existing and as per designs and riser diagram on the drawings. The system shall conform to the requirements set forth in National Fire Protection Association Standards and be listed by Underwriters Laboratories. Equipment and accessories shall be the standard product of a single manufacturer. Catalog numbers and model designations which appear herein indicate design, quality, and operating characteristics. All equipment shall be in compliance with the applicabale NFPA standards. The system shall be direct connected to the local fire department by telephone lines (by Owner). As per NFPA-7-1977, NFPA-72A, 72B, 72C-1955.

b. Ionization and Photocell Smoke Detectors: Triple chamber Beta ionization and photocell smoke detectors shall be furnished. All detectors shall be UL listed and shall be of the same manufacturer as the control unit.

c. Wiring: All wiring shall be Fire Alarm Cable Type "E" and installed in strict compliance with the latest edition of the National Electrical Code, all state and local electrical codes. Systems shall test free from grounds, open and short circuits.

16-17 BATTERY EMERGENCY LIGHTING:

a. Battery emergency lighting shall be self-contained units consisting of sealed batteries, solid state charger, solid state relay switch, test switch, mounting bracket and indicating lamp.

b. Sealed batteries shall provide 90 minutes operation minimum of two heads upon loss of normal AC power. Batteries shall be guaranteed for a period of not less than five (5) years or manufacturer's standard guarantee.

c. Units shall be as listed on the drawings with power input of 120 volts, single phase.

d. Units shall comply with NEC and NFPA requirements. Wiring to heads and from unit to AC junction box shall be in conduit (no cord leads).

16-18 EXIT LIGHTS:

Exit lights shall be supplied and installed as shown on the drawings. They shall be Halo and Kendall as listed, Dual Lite Co., Exide, or approved equal.

16-19 PAGING, AND INTERCOM SYSTEMS: The Electrical Contractor shall supply and install complete intercom system as shown on the drawings and riser diagram, to match existing.

16-20 CLOCKS:

a. The Electrical Contractor shall furnish and install electric wall mounted clocks as shown on the plans. The clocks shall be mounted 7'6" AFF on clock receptacles as specified in Section 15.

b. Clocks shall be IBM Type 58, GE, Seth Thomas, or approved equal.

16-21 TESTS:

After the interior wiring system installation is completed, and at such time as the Architect or Owner may direct, the Contractor shall conduct an operating test for approval. The equipment shall be demonstrated to operate in accordance with the requirements of this specification. The test shall be performed in the presence of the Owner, Architect and/or Engineer or their authorized representative. The Contractor shall furnish all instruments and personnel required for the tests and the Owner will furnish the necessary electric power.

16-22 GUARANTEE AND WARRANTY:

a. The Electrical Contractor shall and hereby does warrant and guarantee that all work executed under this Section is in accordance with all accepted standards of the trade and will be free from defects of materials and workmanship for a period of one (1) year from the date of final certificate.

b. The Electrical Contractor shall further warrant that all materials furnished and work executed is in accordance with all applicable state and local laws, regulations, ordinances, etc.

Report
Soils and Foundation Investigation
Proposed Addition to Elementary School
Stillwater, New Jersey
Stillwater Township Board of Education

MELICK-TULLY
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ROBERT E. SCHWANKERT, P.E.

May 6, 1986

Charles Schaffer and Associates
288 Newton-Sparta Road
Newton, New Jersey 07860

Attention: Mr. Charles Schaffer, Architect

Gentlemen:

Report
Soils and Foundation Investigation
Proposed Addition to Elementary School
Stillwater Township, New Jersey
Stillwater Township Board of Education

INTRODUCTION

This report presents the results of a soils and foundation investigation performed for a proposed addition to the existing Stillwater Elementary School in Stillwater Township, New Jersey. The school is located adjacent to and south of Stillwater Road.

PROPOSED CONSTRUCTION

We understand that the proposed addition will be a two story structure which will occupy a footprint area of approximately 18,145 square feet. The building will be of slab-on-grade construction, and no basement areas are planned.

Detailed structural design information made available to us indicate that the structure will be supported by continuous wall foundations imposing loads of approximately 2,500 pounds per linear foot.

The lowest level floor will reportedly be established at Elevation +86.9 feet, and will match the level of the existing school floor. Grading plans made available for our review indicate that the existing surface elevations throughout the addition area generally range from +86 feet to +96 feet.

PURPOSE AND SCOPE OF WORK

The purpose of our services was to:

1) explore the subsurface soil and groundwater conditions in the proposed addition area;

2) estimate the relevant engineering properties of the encountered materials;

3) evaluate the site foundation requirements considering the anticipated structural loads and encountered subsurface conditions;

4) recommend an appropriate foundation type for support of the proposed facilities and present detailed foundation design and installation criteria;

5) present recommendations relative to the support and subdrainage of the proposed lowest level floor slab;

6) estimate the post-construction settlements of the recommended floor and foundation systems; and

7) discuss earthwork considerations consistent with the recommended building area solutions, including: estimated depths of excavation required to remove unsuitable materials;

anticipation and management of groundwater; material and placement requirements for controlled compacted fill and backfill, etc.

To accomplish these purposes, a subsurface exploration program consisting of eight test borings was performed throughout the proposed addition area. The borings were advanced using truck-mounted hollow stem auger drilling equipment and extended to depths ranging from approximately 24 to 29 feet below the existing surface grades.

All field work was performed under the direct technical observation of a geotechnical engineer from Melick-Tully and Associates, Inc. Our representative located the borings in the field, maintained continuous logs of the explorations as the work proceeded, and supervised the soil sampling operations so as to develop the desired subsurface information.

Representative soil samples suitable for identification purposes were extracted from the borings at closely spaced intervals in accordance with the procedures of the Standard Penetration Test. The soil samples were brought to our office and examined in our soil mechanics laboratory. Due to the relatively distinct nature of the encountered materials, laboratory testing was not deemed necessary.

The approximate locations of the borings are shown relative to the existing and proposed site features on the Plot Plan, Plate 1. Detailed descriptions of the

encountered materials are presented on the individual Logs of Borings, Plates 2A through 2H. The soils were visually classified in accordance with the Unified Soil Classification System shown on Plate 3.

The results of the subsurface exploration program and visual examination of the soil samples have provided the basis for our engineering analyses and design recommendations. The following discussions of our findings and recommendations are subject to the limitations attached as an Appendix to this report.

SITE CONDITIONS

Surface Features: The proposed addition will abut the eastern face of the existing school. The addition area reportedly was graded and filled during construction of the existing school. The surface of the proposed addition area is currently terraced with an overall change in grade on the order of ten feet. The northern portion of the addition area is relatively flat and landscaped, while the southern portion of the addition area is paved.

The available topographic data indicates that the northern higher elevated addition area varies from approximately Elevation +95 to +96 feet. The surface slopes moderately downward to the lower terrace, the surface of which is at about Elevation +86 feet. The

existing surface grades adjacent to the southeastern corner of the building addition continues to slope moderately to steeply downward toward the southeast.

Subsurface Conditions: The results of our subsurface investigation confirmed the presence of fill material throughout the addition area. In several of the borings, it was difficult to distinguish previously placed fill materials from the lower natural soils. However, based on our best estimate following examination of the soil samples in our laboratory, it appears that the lower southern portion of the addition area is blanketed by fill materials extending to depths on the order of 14 to 19 feet below the existing surface grades. The northern elevated addition area appears to be blanketed by surface fill extending to depths on the order of 10 to 11 feet below grade near the eastern addition limit, to depths of at least 24 feet below grade along the northwestern limits of the addition area.

The fill generally consisted of medium dense to dense sand-silt-gravel mixtures containing occasional cobbles and boulders. The natural soils encountered beneath the surface fill consisted of stratified deposits of sand and silt which extended to the maximum depth explored, 29 feet. The natural soils were found to be medium dense in consistency.

Groundwater was encountered in the test borings performed within the southern area at depths on the order of 19.5 to 21.5 feet below the surface grades, at approximately Elevation +66.5 to +67 feet.

CONCLUSIONS AND RECOMMENDATIONS

General: Based on the results of our study, it is our opinion that:

1) The proposed addition may be safely supported by conventional shallow foundations which derive their support from either the in-place fill materials or natural soils. These materials also will provide adequate support for the ground floor slab.

2) Modifications to the existing steep slope adjacent to the southeastern corner of the addition will be required to provide adequate support for new foundations and to minimize erosion following construction. The modifications would include the installation of controlled compacted fill to at least Elevation +86 feet to a distance of ten feet beyond the addition limit. Recommendations relative to material and placement requirements for compacted fill, and permanent slope criteria will be presented in subsequent sections of this report.

3) Excavated site soils generated during the earthwork construction will be suitable for reuse as compacted fill and backfill.

4) A subsurface drainage system should be installed adjacent to below-grade walls to preclude groundwater related problems after construction.

Further discussions of each of these items are presented in subsequent sections of this report.

Site Preparation and Earthwork: The existing surface vegetation and topsoil, as well as the existing surface pavement should be completely removed from within and at

least five feet beyond the limits of the proposed addition. The topsoil will not be suitable for reuse as compacted fill or backfill, but may be used in landscaped areas to the extent possible or be legally disposed of off-site. Existing asphalt pavement removed from within the limits of the addition area could be reused as compacted fill provided the asphalt is broken into pieces not larger than six inches.

The available topographic data indicates that minimal site grading will be required in the southern portion of the addition area, while cuts of up to ten feet below the existing surface grades will be required throughout the northern addition area to attain the ground floor subgrade level. The excavated soils are anticipated to consist of relatively well-graded granular soils containing varying percentages of gravel, cobbles and boulders. These materials will be suitable for reuse as compacted fill or backfill during construction of the proposed addition. It is recommended, however, that the maximum particle size for compacted fill and backfill be limited to six inches.

Following the removal of topsoil, and or excavation to attain the planned subgrade levels, the exposed subgrade soils in areas to remain at-grade or to receive compacted fill should be thoroughly compacted to a firm and unyielding consistency using a heavy vibratory compactor (Raygo "Rascal 400" or equivalent). Subgrade soils within

a distance of ten feet of the existing building should be proofrolled with the vibrator turned off or with portable compaction equipment (Bomac BW 65 or equivalent) to prevent disturbance to the existing structure. Any areas which cannot be compacted to a dense and unyielding consistency should be selectively excavated to suitable subgrade soils and backfilled with controlled compacted fill. Minimal overexcavation of unstable subgrade materials is anticipated.

The available topographic data indicates that a relatively steep slope exists adjacent to the southeastern corner of the addition area. In this area, it is recommended that the existing top of the slope be extended laterally for a distance of at least ten feet beyond the addition area, and that the existing slope be flattened to 1 vertical:2 horizontal. All fill placed atop the existing slope should be "benched" into the existing grades to provide an adequate bond between the existing sloping soils and new fill materials. This procedure also will permit new fill materials to be installed in relatively horizontal layers.

Any imported fill materials required to complete the fill installation should consist of relatively well-graded granular soils containing less than 15 percent by weight passing a U.S. Standard No. 200 sieve and a maximum particle size of four inches. All excavated on-site or

imported soils proposed for use as compacted fill or backfill should be examined and approved by an experienced geotechnical engineer prior to placement.

All controlled compacted fill placed in the addition area and atop the existing slope should be placed in horizontal layers on the order of 8 to 12 inches in loose thickness and be uniformly compacted to at least 95 percent of maximum dry density as determined by the ASTM D-1557 test procedure.

Attainment to the ground floor subgrade level within the northern portion of the addition will require excavation of up to 12 feet below the existing surface grades. We recommend that temporary excavation slopes be maintained at 1 horizontal on 1 vertical, or flatter, and in accordance with the governing safety codes.

Groundwater most likely will not be encountered during the earthwork construction. However, localized trapped or perched water seepage may be encountered, at least on a seasonal basis. We estimate that groundwater seepage will be local, and could be controlled by pumping from ditches and/or sumps.

Foundation Design Criteria: The proposed building addition may be supported by conventional shallow foundations which derive their support from recompacted fill materials or undisturbed natural soils. Considering

that a majority of the building area will be underlain by substantial thicknesses of existing fill materials, we recommend that net bearing pressures be limited to 2,000 pounds per square foot.

All exterior foundations should be established at least three feet below the adjacent exterior grades to provide protection against frost penetration. Interior foundations in permanently heated portions of the structure may be established at convenient depths beneath the ground floor slab. Foundations constructed adjacent to the existing structure should be established at the same elevations of the existing foundations.

We estimate that foundations designed and installed in accordance with our recommendations will experience maximum post-construction settlements on the order of one-half of one inch, or less.

Below-Grade Structural Walls: Following construction, we understand that the lower level of the addition will extend to depths of up to 15 feet below the final exterior grades. Consequently, we recommend that a continuous perimeter foundation drain be installed around the exterior of below grade walls in order to collect and dispose of localized groundwater seepage which may accumulate after construction. In addition, we recommend that vertical drainage (Enkadrains, or equivalent) be installed adjacent

to the exterior of the below grade walls and connect to the foundation drains to prevent the buildup of hydrostatic pressures behind the walls. The subsurface drainage systems should be hydraulically connected to the site stormwater drainage system, if possible.

We recommend that below grade structural walls be backfilled with approved on-site excavated soils or imported materials as previously recommended. The backfill soils should be placed in layers on the order of six to eight inches in loose thickness and be uniformly compacted to at least 92 percent of their maximum dry density as determined by the ASTM D-1557 test procedure.

Assuming that the perimeter drainage system is installed as recommended, and the backfill materials are placed as specified, lateral earth pressures exerted on below grade walls may be approximated by assuming the soils are a fluid with a unit weight of 40 pounds per cubic foot. In addition, temporary surcharge loads imposed during construction should be considered in the design of the walls.

Ground Floor Slab Design Criteria: Following the site preparation procedures previously described, the ground floor slab may be constructed at grade deriving its support from natural undisturbed soils or recompacted fill materials.

We recommend that a minimum four inch thick layer of clean 3/4 inch crushed stone be placed beneath the ground floor slab to provide a capillary break between the subgrade soils and the bottom of the concrete slab.

Post-construction floor slab settlements are anticipated to be negligible.

The following Plates and Appendix are attached and complete this report:

Plate 1 - Plot Plan
Plates 2A through 2H - Logs of Borings
Plate 3 - Unified Soil Classification System
Appendix - Limitations

Respectfully submitted,

MELICK-TULLY and ASSOCIATES, INC.

William M. Strubel

Charles T. Melick, P.E.

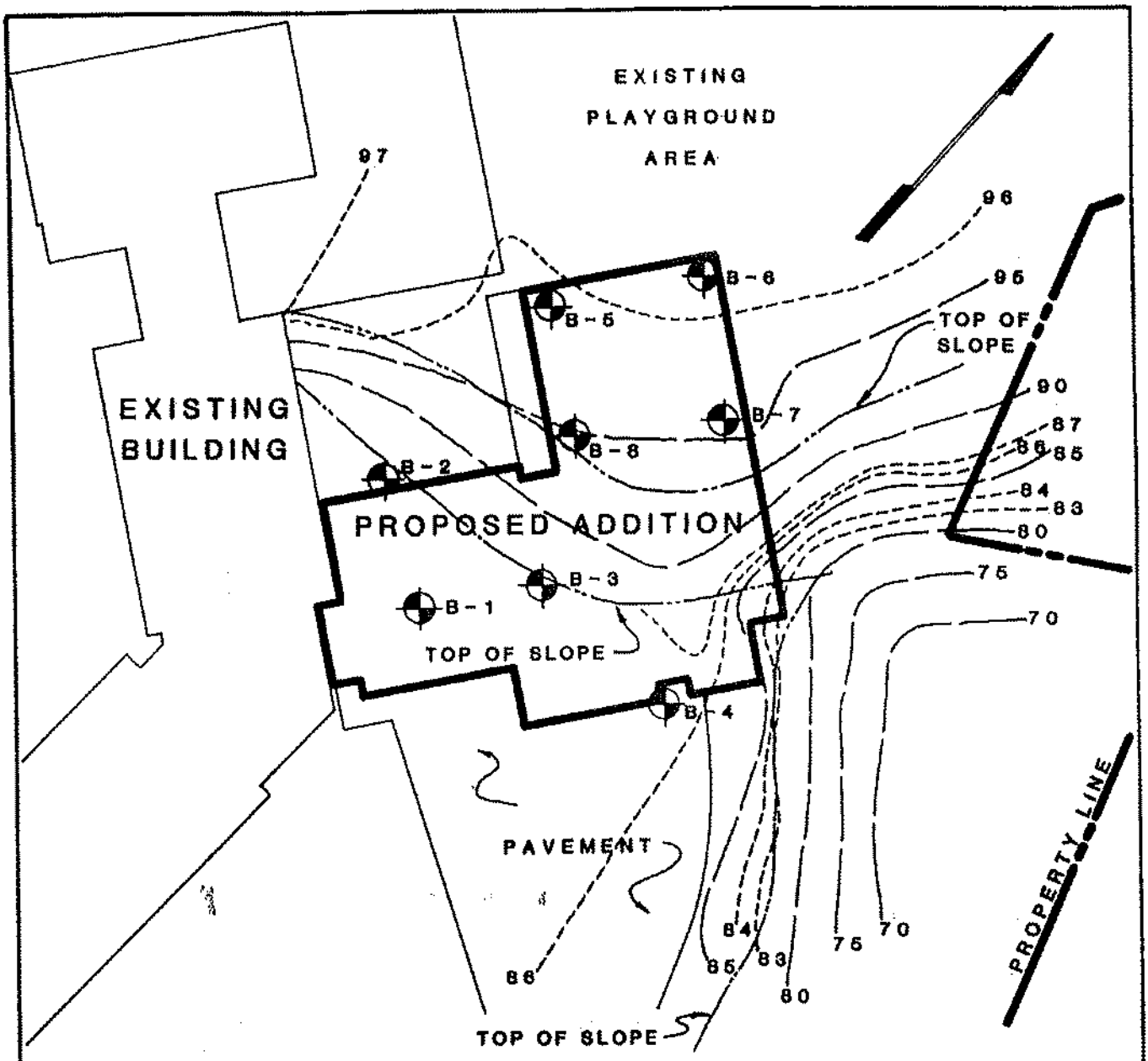
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(3 copies submitted)

REVISIONS BY ____ DATE ____

FILE 3227-001 3240

BY DEM DATE 4-30-86

CHECKED BY WMS



PLOT PLAN

SCALE 1":::50'

PROPOSED ADDITION TO ELEMENTARY SCHOOL

STILLWATER TOWNSHIP, NEW JERSEY

STILLWATER TWSP. BOARD OF EDUCATION

KEY:

B-1 NUMBER AND APPROX. LOCATION OF BORINGS PERFORMED FOR THIS STUDY.

NOTES

1. This drawing is part of Melick-Tully and Associates, Inc. Report No. 3227-001 and should be read together with the report for complete evaluation.
2. General layout and topography was obtained from a drawing prepared by Charles Schaffer & Associates entitled "Site Plan", Drawing No. 1 of 7, dated 9-11-85.

PLATE 1

LOG OF BORING

BORING NO. 1
SURFACE ELEV. +86 ft.(+)
COMPLETION DATE 4/24/86

WATER LEVEL :21'-2"
DATE :4/24/86
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	SYMBOL	DESCRIPTION
0	■	26		1-1/2" Asphalt
	■	49		FILL - Gray-brown fine to coarse sand, little silt, little fine gravel (medium dense)
5	■	56		
	■	15		FILL - Light brown fine to medium sand, little silt with occasional cobbles (medium dense)
	■	15		FILL - Gray brown fine to coarse sand, little silt, little to some fine to coarse gravel (medium dense to very dense)
10	■	16		
	■	20		
15	■	55		
20			SP/SM	Light brown fine to medium sand, trace silt with frequent thin layers of fine to coarse sand, and fine gravel (medium dense) (wet)
	■	15		
	■	17		
25	■	17		BORING COMPLETED @ 25'-0"
30				
35				
40				
45				
50				

LOG OF BORING

BORING NO. 2
SURFACE ELEV. +86 ft.(+)
COMPLETION DATE 4/24/86

WATER LEVEL :19'-6"
DATE :4/24/86
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	SYMBOL	DESCRIPTION
0				
	■	19		1-1/2" Asphalt
	■	14		FILL - Gray-brown fine to coarse sand, little silt, little fine gravel (medium dense)
5	■	13		
				FILL - Light brown fine to medium sand, trace silt (medium dense)
10	■	13		
15	■	18		
	■	18	SP/ML	Light brown fine to medium sand, trace silt with frequent thin layers of sandy silt (medium dense to dense)
20	■	18		
	■	23		
	■	37		
25				BORING COMPLETED @ 25'-0"
30				
35				
40				
45				
50				

LOG OF BORING

BORING NO. 3
SURFACE ELEV. +86 ft.(+)
COMPLETION DATE 4/25/86

WATER LEVEL :20'-0"
DATE :4/24/86
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	SYMBOL	DESCRIPTION
0	■	23		FILL - Gray-brown fine to coarse sand, little silt, little to some fine to coarse gravel with occasional cobbles and boulders (medium dense)
	■	22		
5	■	17		
10	■	15		
	■	15		
15	■	24	SP/ML	Light brown fine to medium sand, trace silt with frequent thin layers of sandy silt (medium dense)
	■	17		
20	■	11		
	■	10	SP	Gray-brown fine to coarse sand, trace silt, little fine gravel (medium dense)(wet)
25				BORING COMPLETED @ 24'-0"
30				
35				
40				
45				
50				

LOG OF BORING

BORING NO. 4
SURFACE ELEV. +86 ft.(+)
COMPLETION DATE 4/25/86

WATER LEVEL :19'-6"
DATE :4/25/86
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	SYMBOL	DESCRIPTION
0	■	23		1-1/2" Asphalt
	■	24		FILL - Gray-brown fine to coarse sand, some silt, little fine to coarse gravel with occasional cobbles (medium dense)
5	■	16		
10	■	16		
15	■	11		8" Dark brown silt, trace roots (buried topsoil)
			ML	Light brown silt, little fine to medium sand, trace fine to coarse gravel (medium dense) (wet)
20	■	16		
	■	19	SM	Gray-brown fine to coarse sand, some silt, little fine gravel (medium dense) (wet)
25				BORING COMPLETED @ 24'-0"
30				
35				
40				
45				
50				

LOG OF BORING

BORING NO. 5
SURFACE ELEV. +96 ft.(+)
COMPLETION DATE 4/25/86

WATER LEVEL : *
DATE :
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	SYMBOL	DESCRIPTION
0	■	7		4" Topsoil - Dark brown sandy silt with roots
	■	36		FILL - Brown silt, some little fine sand (loose)
5	■	45		FILL - Gray-brown fine to coarse sand, little silt little fine to coarse gravel (medium dense to dense)
10	■	20	ML	Light brown silt, some fine sand (medium dense) (wet)
			SP/SM	Light brown fine to medium sand, trace silt (medium dense)
15	■	13		
20	■	14	SM	Gray-brown fine to coarse sand, little silt, little fine gravel (medium dense)
	■	14		
25				BORING COMPLETED @ 24'-0" *GROUNDWATER LEVEL NOT ENCOUNTERED
30				
35				
40				
45				
50				

LOG OF BORING

BORING NO. 6
SURFACE ELEV. +96 ft.(+)
COMPLETION DATE 4/25/86

WATER LEVEL : *
DATE :
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	SYMBOL	DESCRIPTION
0	■	5		4" Topsoil - Dark brown sandy silt with roots
	■	30		FILL - Brown silt, trace fine sand (loose)
5	■	24		FILL - Gray-brown fine to coarse sand, trace silt, little to some fine to coarse gravel with occasional cobbles and boulders (medium dense to dense)
10	■	14		
15	■	19		
20	■	25		
	■	25		
25				BORING COMPLETED @ 24'-0" *GROUNDWATER LEVEL NOT ENCOUNTERED
30				
35				
40				
45				
50				

LOG OF BORING

BORING NO. 7
SURFACE ELEV. +95 ft.(+)
COMPLETION DATE 4/25/86

WATER LEVEL : *
DATE :
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	SYMBOL	DESCRIPTION
0	■	11		4" Topsoil - Dark brown sandy silt with roots
				FILL - Brown fine to medium sand, and silt, little fine gravel (medium dense)
5	■	15		FILL - Gray-brown fine to medium sand, trace silt, little to some fine to coarse gravel with occasional pockets of sandy silt (medium dense)
10	■	17		
15	■	16		
20	■	19		
25	■	45	SP/SM	Gray-brown fine to coarse sand, trace silt, little fine to coarse gravel (medium dense to dense)
	■	15		
30				BORING COMPLETED @ 29'-0" *GROUNDWATER LEVEL NOT ENCOUNTERED
35				
40				
45				
50				

LOG OF BORING

BORING NO. 8
SURFACE ELEV. +95 ft.(+)
COMPLETION DATE 4/25/86

WATER LEVEL : *
DATE :
CASING DEPTH :

DEPTH FT	SAMPLES	STANDARD PENETRATION RESISTANCE	SYMBOL	DESCRIPTION
0	■	22		3" Topsoil - Dark brown sandy silt with roots
				FILL - Gray-brown fine to coarse sand, little silt, little fine to coarse gravel with occasional pockets of sandy silt (medium dense to dense)
5	■	39		
10	■	25	SP/SM	Light brown fine to medium sand, trace silt (medium dense)
15	■	13		
20	■	26	SP/SM	Brown fine to medium sand, trace silt with frequent layers of sandy silt (medium dense)
	■	23		
25				BORING COMPLETED @ 24'-0" *GROUNDWATER LEVEL NOT ENCOUNTERED
30				
35				
40				
45				
50				

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

GRADATION *

% FINER BY WEIGHT	
TRACE	0% TO 10%
LITTLE	10% TO 20%
SOME	20% TO 35%
AND	35% TO 50%

COMPACTNESS * — SAND AND/OR GRAVEL

	RELATIVE DENSITY
LOOSE	0% TO 40%
MEDIUM DENSE	40% TO 70%
DENSE	70% TO 90%
VERY DENSE	90% TO 100%

CONSISTENCY * — CLAY AND/OR SILT

	RANGE OF SHEARING STRENGTH IN POUNDS PER SQUARE FOOT
VERY SOFT	LESS THAN 250
SOFT	250 TO 500
MEDIUM	500 TO 1000
STIFF	1000 TO 2000
VERY STIFF	2000 TO 4000
HARD	GREATER THAN 4000

* VALUES ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE. WHEN NO TESTING WAS PERFORMED, VALUES ARE ESTIMATED.

UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL CLASSIFICATION CHART



APPENDIX

APPENDIX

LIMITATIONS

A. SUBSURFACE INFORMATION

Locations: The locations of the explorations were approximately determined by Melick-Tully and Associates, Inc. using site data prepared by Charles Schaffer and Associates. Elevations of the explorations were approximately determined by interpolation between contours shown on topographic plans provided to us by the architect. The locations and elevations of the explorations should be considered accurate only to the degree implied by the method used.

Interface of Strata: The stratification lines shown on the individual Logs of the subsurface explorations represent the approximate boundary between soil types, and the transition may be gradual.

Field Logs/Final Logs: A field log was prepared for each exploration by a member of our staff. The field log contains factual information and interpretation of the soil conditions between samples.

We must emphasize that our recommendations are based on the final logs and the information contained therein, and not on the field logs.

The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and tests of the field samples. The final logs are included in the engineering report.

Water Levels: Water level readings have been made in the explorations at times and under conditions stated on the individual logs. These data have been reviewed and interpretations made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors at the time measurements were made.

Pollution/Contamination: Unless specifically indicated to the contrary in this report, the scope of our services was limited only to investigation and evaluation of the geotechnical engineering aspects of the site conditions, and did not include any consideration of potential site pollution or contamination resulting from the presence of chemicals, metals, radioactive elements, etc. This report offers no facts or opinions related to potential pollution/contamination of the site.

Environmental Considerations: Unless specifically indicated to the contrary in this report, this report does not address environmental considerations which may affect the site development, e.g., wetlands determinations, flora and fauna, wildlife, etc. The conclusions and recommendations of this report are not intended to supersede any environmental conditions which should be reflected in the site planning.

B. APPLICABILITY OF REPORT

This report has been prepared in accordance with generally accepted soils and foundation engineering practices for the exclusive use of Charles Schaffer and Associates for specific application to design of the proposed addition to the Stillwater Elementary School in Stillwater Township, New Jersey. No other warranty, expressed or implied, is made.

C. REINTERPRETATION OF RECOMMENDATIONS

Change in Location or Nature of Facilities: In the event that any changes in the nature, design or location of the facilities are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing.

Changed Conditions During Construction: The analyses and recommendations submitted in this report are based in part upon the data obtained from eight widely-spaced test borings performed for this study. The nature and extent of variations between the explorations may not become evident until construction. If variations then appear evident, it will be necessary to reevaluate the recommendations of this report.

Changes in State-of-the-Art: The conclusions and recommendations contained in this report are based upon the applicable standards of our profession at the time this report was prepared.

Use of Report by Prospective Bidders: This soil and foundation engineering report was prepared for the project by Melick-Tully and Associates, Inc. for design purposes only, and may not be sufficient to prepare an accurate bid. Contractors utilizing the information in the report should do so with the expressed understanding that its scope is limited to design considerations. Prospective bidders should obtain the owner's permission to perform whatever additional explorations or data gathering they deem necessary to prepare their bid accurately.

Construction Observation: We recommend that Melick-Tully and Associates, Inc. be retained to provide on-site soils engineering services during the earthwork construction and foundation phases of the work. This is to observe compliance with the design concepts and to allow changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

APR. 1 3 1989

HEIKKI K. ELO

CONSULTING ENGINEERS, P.C.

1101 NORTHAMPTON STREET — P.O. BOX 799 — EASTON, PA 18044 — TELEPHONE 215-258-0839

April 10, 1989
Mrs. Eva Kunz
Stillwater Board of Education
P.O. Box 12
Stillwater, N.J. 07875

Dear Mrs. Kunz:

On April 5, 1989 at your request I visited the Stillwater Elementary School, and inspected the new all purpose room. During this tentative investigation I concluded that potential structural problems exist:

1) The Northeast wall of the all purpose room has its foundations placed on top of thick layer of previous fill. It is conceivable that this layer has settled as a result of the new school construction. Any foundation settlement always introduces stresses which show up as cracks.

2) The structural drawings indicate horizontal reinforcement in form of "Dur-o-wall" placed at every other course. I chipped into the masonry joints with hammer and chisel but found no evidence of "Dur-o-wall". Admittedly, I was unable to reach a conclusive depth and hence it is possible that this reinforcing is placed at a greater than normal depth.

Horizontal reinforcing in walls is designed to prevent crack formation and if this reinforcing is missing vertical cracks as are evident in the all purpose room wall would result.

3) The architectural drawings call for four vertical expansion joints in the Northeast wall of the all purpose room. Only two of these expansion joints can be seen and the large crack is at midpoint between the two expansion joints that were installed.

A question comes to mind. Why were two of the proposed expansion joints eliminated?

I propose a more "in depth" investigation at the site and a correlation of the construction documents to verify the validity of my initial findings.

I will be available to come to the school during the week of April 17, 1989 when the school is closed. I estimate spending a full day at the school site and afterwards a second day to verify my findings with the drawings and then to prepare a report to the schoolboard. I estimate the cost of this work to be $1200.

Thank you for the opportunity to make this investigation.

Very truly yours

Heikki K. Elo, Consulting Engineers

Heikki K. Elo, P.E.

HEIKKI K. ELO
CONSULTING ENGINEERS, P.C.
1101 NORTHAMPTON STREET — P.O. BOX 799 — EASTON, PA 18044 — TELEPHONE 215-258-0839



May 26, 1989

Mrs. Eva Kunz
Stillwater Board of Education
P.O. Box 12
Stillwater, N.J. 07875

Dear Mrs. Kunz:

On April 17, 1989 I revisited Stillwater Elementary School to complete my investigation of the All Purpose Room, and to make actual measurements relating to the structure.

Following the format started in my report dated April 10, 1989 I state the following:

Item 1). Foundations may have settled:
My staff took elevation readings with 2/1000 foot accuracy along the entire length of the North wall. While the maximum deviation was 0.050 feet = 0.6 inches the individual departures reflect no significant pattern and hence, I have concluded that the foundations have not settled.

Item 2). Wall reinforcement is not in place:
To verify this my staff drilled with an electric masonry drill into the masonry joints of the North wall. These testholes proved that the wall reinforcing was properly installed.

Item 3). Masonry expansion joints are not adequate:
The architects drawing A-6 calls for 4 vertical expansion joints in the North wall. The purpose of such joints is generally to provide for the expansion and contraction of long walls. While permitting the wall to expand and to contract the expansion joint must also provide for weather tightness, and hence the joint element generally takes the shape of an accordion.

The Architect's selection of 4 expansion joints was correct because as ultimately only 2 joints were constructed the wall developed cracks near the two missing expansion joints.

New additions
renovations (...

FILE

To the detriment of the wall, the two expansion joints that were installed only existed in the exterior cement plaster coating. An attempt had been made to provide crack control in the masonry by making two vertical masonry saw cuts. These cuts were only 1/2 inch deep; the cuts did not match in their location the outside plaster expansion joints; and were totally inadequate to control the wall movement that is always to be expected in long straight walls.

To fully control the seasonal wall expansion and contraction the 110 foot long wall would have required four expansion joints and these joints should have extended through the entire 12 inch thick wall including its outside plaster weather coating. The joints that had been provided, proved to be useless.

I have added a copy of our drawing B-666 to this report. This drawing shows the outside view of the all purpose room wall and indicates the location of the expansion joints as they were proposed by the Architect and the cracks that eventually developed.

If the school board desires, I will be available to recommend corrective steps to bring the wall into sound condition.

Thank you for the opportunity to prepare this report.

Very truly yours

HEIKKI K. ELO, CONSULTING ENGINEERS, P.C.

Heikki K. Elo, P.E.

7-24-89

HEIKKI K. ELO

CONSULTING ENGINEERS, P.C.

1101 NORTHAMPTON STREET — P.O. BOX 799 — EASTON, PA 18044 — TELEPHONE 215-258-0839

Mrs. Eva Kunz
Stillwater Board of Education
P.O. Box 12
Stillwater, N.J. 07875

July 20, 1989

Dear Mrs. Kunz:

After the School Board meeting on June 20, 1989 I have met with your architect Mr. Charles Schaffer on four occasions to discuss potential methods of correcting the cracks in the All Purpose Room.

Mr. Schaffer has now completed a drawing that shows his suggested method of repair. I find this drawing acceptable with several minor notations, which Mr. Schaffer has agreed to make. His drawing is entitled A-1 dated 7/10/89.

The notations that I have asked for on this drawing are:

- The Board of Education will insist that all repairs that are made must have a workman-like finish. This means that if new paint is applied to an area, this area must be defined by existing vertical lines to avoid a patchy appearance.

- A cracked block is generally to be replaced. Even if the crack is minor it should be replaced or covered with fiberglass tape made for this purpose to prevent the original crack from reflecting through the paint.

- The same rules apply to outside plaster coating, and metal lath should be used to span the new plaster over the cracks. Outside painting should also follow clearly defined lines so that a minute color deviation doesnt become apparent.

- I had in my notes listed some cracks near the East door to the outside in the North Wall. If cracks exist in this area these should be attended to.

- The proposed expansion joint should be made in three pieces. The outside piece should be in the form of a T. It should be primed and painted before it is set in the wall and leaving the inside 1" unpainted for the purpose of facilitating welding of the two flange strips. These inside flanges should be ground, primed and painted. All edges of metal to block and plaster should be caulked on all sides to maintain weather-tightness.

With the above inclusions I believe sound and aesthetic repairs can be effected.

Very truly yours,

Heikki K. Elo, Consulting Engineers

cc: Charles Schaffer

Stillwater Township School

P.O. BOX 12
STILLWATER, N.J. 07875

JACQUELINE GIORDANO
Chief School Administrator

Telephone (201) 383-6171

July 25, 1989

Mr. Charles Schaffer
228 Newton-Sparta Road
Newton, N. J. 07860

Dear Charlie:

Attached you will find a listing of cracks that have formed in the new addition. I am sending you this so that you could be apprised and also so that you could review these and perhaps rectify them at the same time that Mr. Vanas will be here correcting Room 13. I know that you are aware of the cracks in Rooms 13 and 201. This listing was done July 20, 1989. Should you have any questions, please don't hesitate to call me.

I await your response regarding these.

Sincerely,

Jacqueline A. Giordano
Chief School Administrator

JAG:jc
cc: Dennis DeGroat, Bd. President
Randall Snook, Chairperson, B & G Committee
Eva Kunz, Bd. Secretary

FILE

STILLWATER TOWNSHIP SCHOOL

Cracks in wall in new addition:

Room # 2 - in corners, outside walls

Room # 3 - over bulletin board on back wall

Room # 5 - none

Room # 4 - over door by bathroom and corner

Room # 202 - both corners, outside wall and by window

Room # 203 - Both corners, outside wall and over windows

Room # 201 - corners over sink and corner right hand side, outside wall

Room # 205 - both corners, outside wall

Room # 208 - both corners, outside wall

Room # 13 - corner over office door. Outside wall in corner and over and between doors. Inside wall between basket ball backstops over door to hallway

Hallway Stairs - corner middle landing by exit door, upstairs landing in corner

Back door - outside back door, starts over door, right hand side

July 20, 1989

Stillwater Township
Board of Education

Telephone (201) 383-6171

P.O. Box 12
Stillwater, N.J. 07875

August 7, 1989

Mr. Robert Vanas
Vanas Construction
222 Warburton Avenue
Hawthorne, N. J. 07506

Dear Mr. Vanas:

The Stillwater Township Board of Education has retained a structural engineer, Heikki Elo, from Easton, Pa. to advise the board on procedures to follow for rectifying the cracks that have developed in the walls of the addition which you erected in 1987 at the Stillwater Township School.

Charles Schaffer has informed us that you and he have agreed to take the recommended corrective measures at no cost to the board of education, and that the work will be done in a timely fashion. Our concern is that the cracks that are in classrooms should be done first in order to give our custodians time to clean and prepare the rooms for the children. The gym wall would be secondary; however, it too should be completed by August 25, 1989. Our custodians have to clean the floor and surrounding areas in the gym. School opens on September 5.

Thank you for you cooperation and quick response to the problems.

STILLWATER TOWNSHIP BOARD
OF EDUCATION

Jacqueline A. Giordano
Chief School Administrator

Eva Kunz
Board Secretary

ek
cc: C. Schaffer

AUG. 21 1989

Vanas Construction Co., Inc.

GENERAL CONTRACTING
434 BROAD STREET-GLEN ROCK, NJ 07452 TELEPHONE: (201) 670-6111

August 18, 1989

Mr. Charles Schaffer
Charles Schaffer & Associates
288 Newton-Sparta Road
Newton, NJ 07860

Re: Stillwater Elementary School
Stillwater, NJ

Dear Mr. Schaffer:

Please accept this letter as our formal notification that the remedial work required regarding the expansion joints in the multi-purpose room has been completed as per the design requested, by your office, at the above referenced project.

At our meeting on 8/11/89, it was agreed that the vast majority of the cracks described by the Board of Education were settlement hair-line cracks generally found in masonry buildings and were, in no way, causing structural problems. Therefore, these cracks do not fall under our realm of responsibility. However, since we were at the school anyway, we raked out these cracks and filled them with siliconized paintable caulk so that the school could touch up with the matching paint that was left with the custodian at project close-out.

In addition, while working on the exterior wall of the gym, we plastered and recoated wall penetrations made by the owner while installing the scoreboard.

If you require any further information, please feel free to contact our office.

Very truly yours,

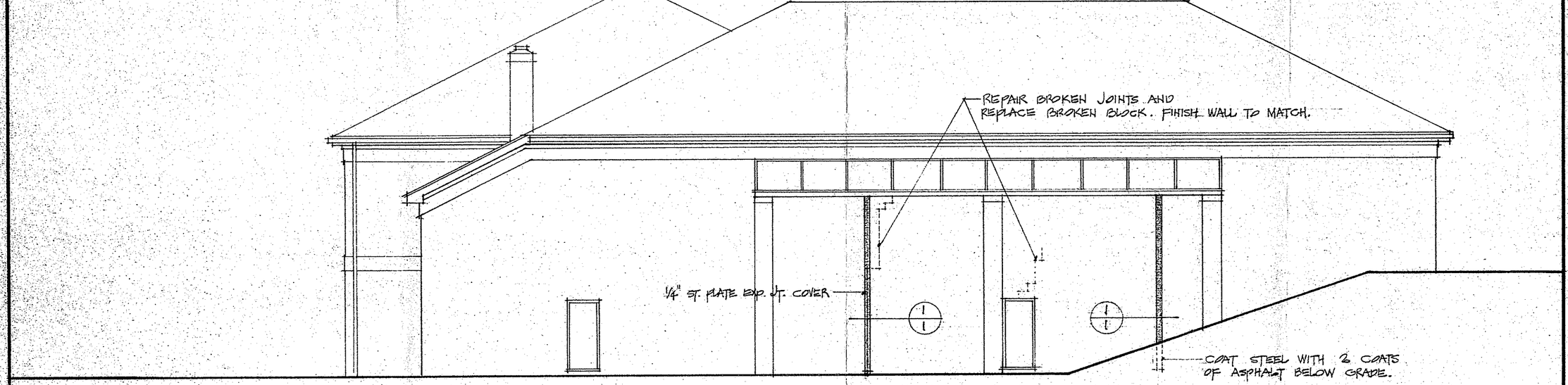
Glenn A. Vanas
VANAS CONSTRUCTION CO., INC.

GAV:brk

cc: Stillwater Board of Education

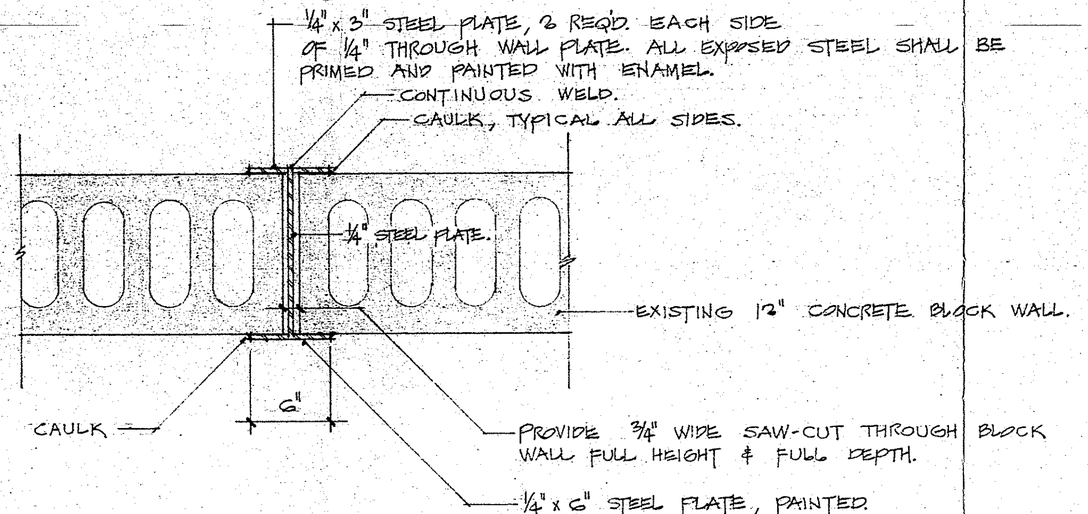
FILE

New Addition "CRACKS"



NORTH ELEVATION

SCALE: 1/8"=1'-0"



WALL SECTION @ EXPANSION JOINT (1/1)

SCALE: 1 1/2" = 1'-0"

A-1 drawing

nj C 7620
pa 8615 B

CHARLES SCHAFFER & ASSOCIATES
architect. planner
288 NEWTON - SPARTA ROAD • NEWTON • NEW JERSEY 201 . 383 . 7355

EXPANSION JOINT INSTALLATION
STILLWATER TOWNSHIP SCHOOL
STILLWATER, NEW JERSEY

date 7-10-89
drawn by M.E.
ck'd by CJS

PARETTE SOMJEN ARCHITECTS

MEMORANDUM

MEMORANDUM INFORMATION

Date of Issuance: November 22, 2019

Issued By: Joshua Thompson, AIA

Regarding: Wall Monitoring at Stillwater School

PSA Project No: 7087

DISTRIBUTION

William Kochis (BOE)
René Metzgar (BOE)
Joshua Thompson (PSA)
Lionel Camacho (PSA)
Tracy Boss (PSA)

REMARKS

On November 11, 2016, PSA installed meters to monitor (5) wall cracks as identified by BOE & PSA in previous walkthrough. PSA has been monitoring all meters & taking readings periodically. The following observations were noted at each meter from date of installation to most recent reading on November 13, 2019 (please note minor or no movement refers to a reading movement of less than 0.5mm).

Meter #01 - Appears to have minor or no movement since installation

Meter #02 - 2017-01-16: New meter re-install
- 2018-09-26: Meter appears to have been disturbed
- 2019-11-13: Meter appears to have been disturbed

Meter #03 - 2017-08-24: New meter re-install
- Appears to have minor or no movement since re-installation

Meter #04 - 2016-12-29: Appears to have movement 0.5mm along Y-Axis: minor or no movement along X-Axis
- No additional movement observed in subsequent readings

Meter #05 - 2019-11-13: Appears to have movement 0.5mm along X-Axis: minor or no movement along Y-Axis

Please review & forward internally as needed and notify us of any questions, comments or concerns within 3 business days. Should you require additional information, please do not hesitate to contact us.

Sincerely,
PARETTE SOMJEN ARCHITECTS, LLC

Joshua Thompson, AIA
Associate

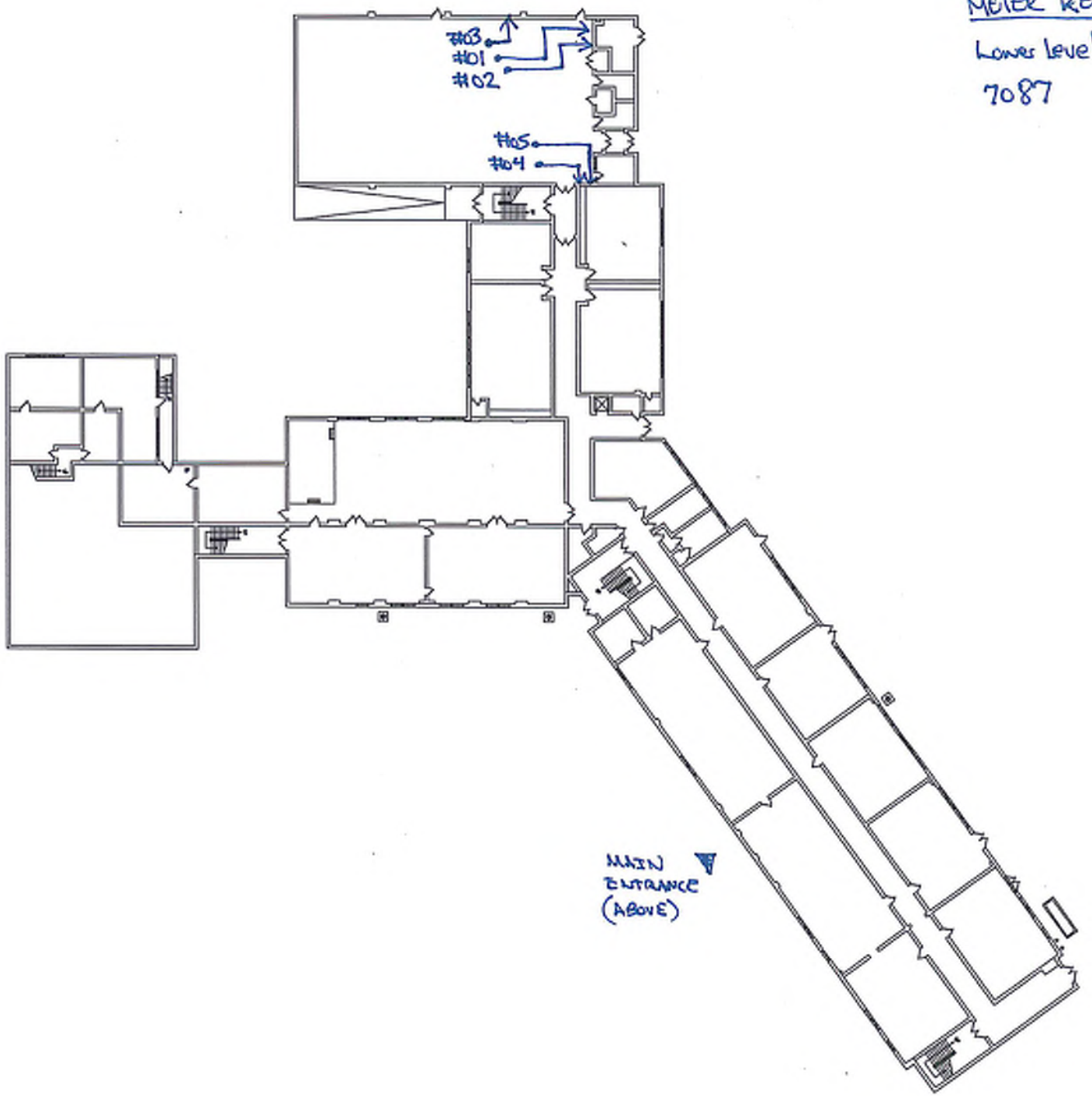
439 Route 46 East
Rockaway, NJ 07866
p 973 586 2400
f 973 586 2401
www.planetpsa.com

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METER KEY MAP

Lower Level - Gym

7087



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Corner Tell-Tale
Crack Monitoring Record

Project 7087

Location of Tell Tale Meter 01 Sound System

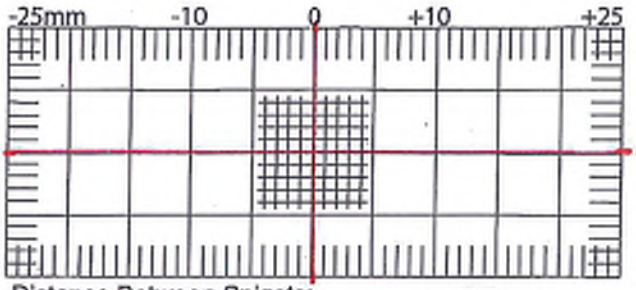
Indicate on the diagrams below the Tell-Tale movement at each reading after the crack widths have been measured using the Avongard Crack Width Gauge.

\+ Represents crack opening and.

\- Represents crack closing on the horizontal scale

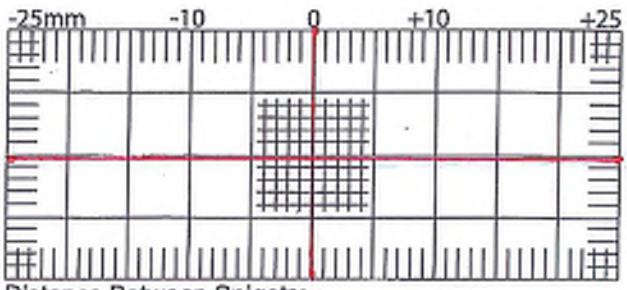
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Date of Reading: 2016-11-11



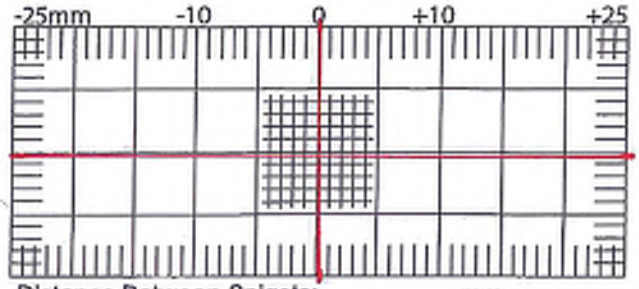
Distance Between Spigots: _____ mm

Date of Reading: 2017-02-21



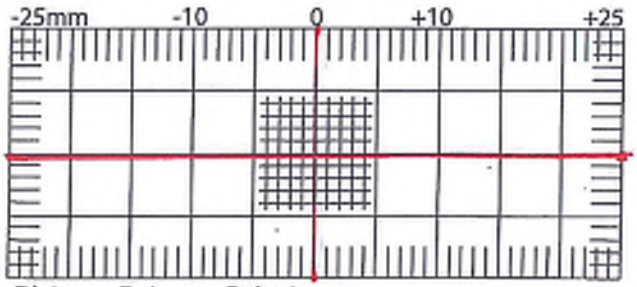
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Date of Reading: 2016-12-29



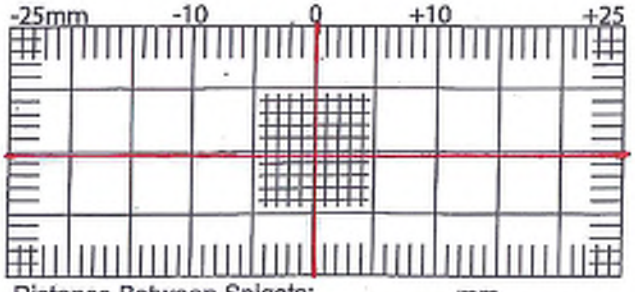
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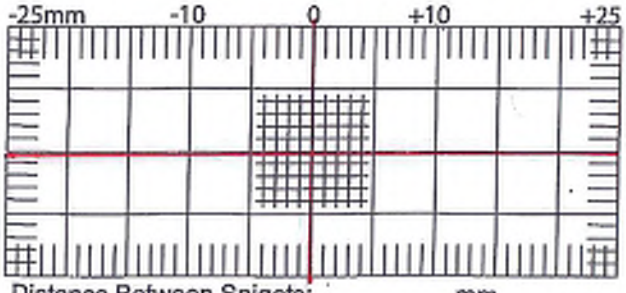
Distance Between Spigots: _____ mm

Date of Reading: 2017-01-16



Distance Between Spigots: _____ mm

Date of Reading: 2017-07-12



Distance Between Spigots: _____ mm

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Location of Tell Tale Meter 01 Sound System

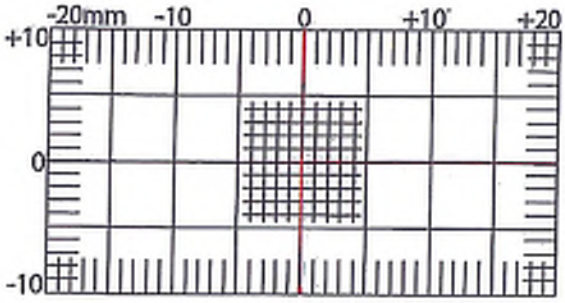
Standard Tell-Tale
Crack Monitoring Record

Indicate on the diagrams below the Tell-Tale movement at each reading after the crack widths have been measured using the Avongard Crack Width Gauge.

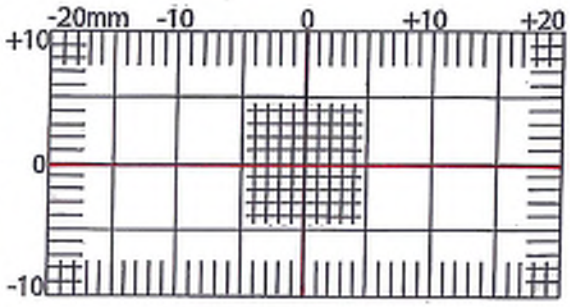
+ Represents crack opening and
- Represents crack closing on the horizontal scale.

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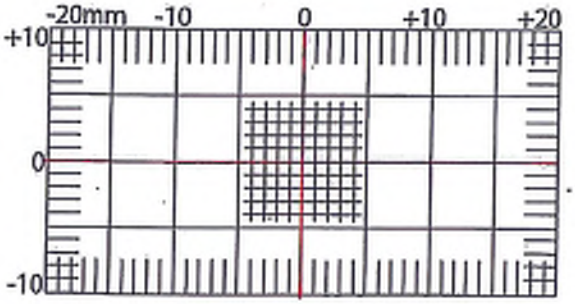
Date of Reading: 2017-07-12



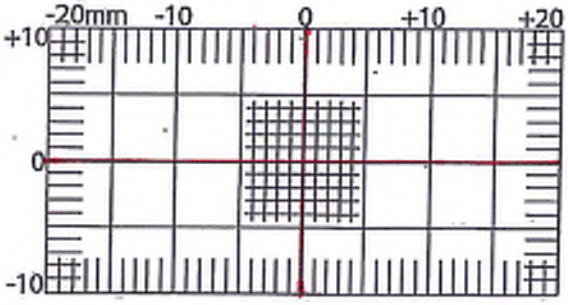
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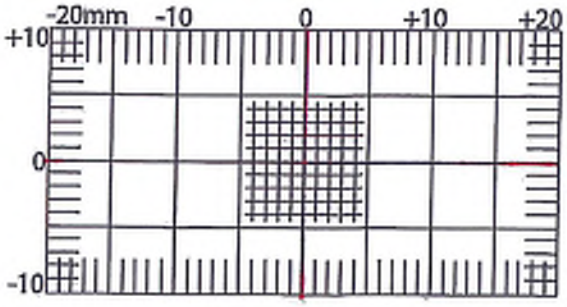
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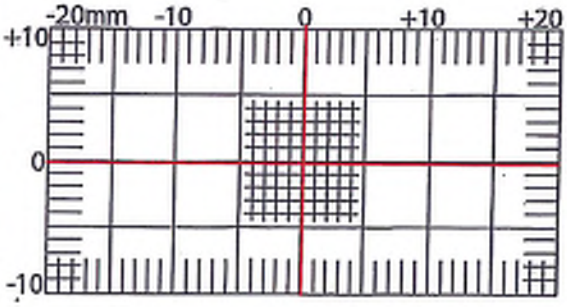
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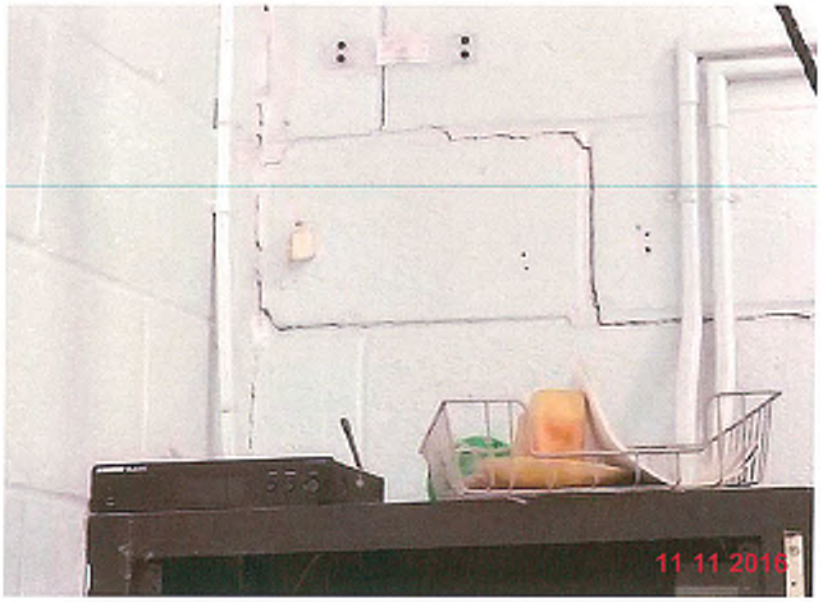
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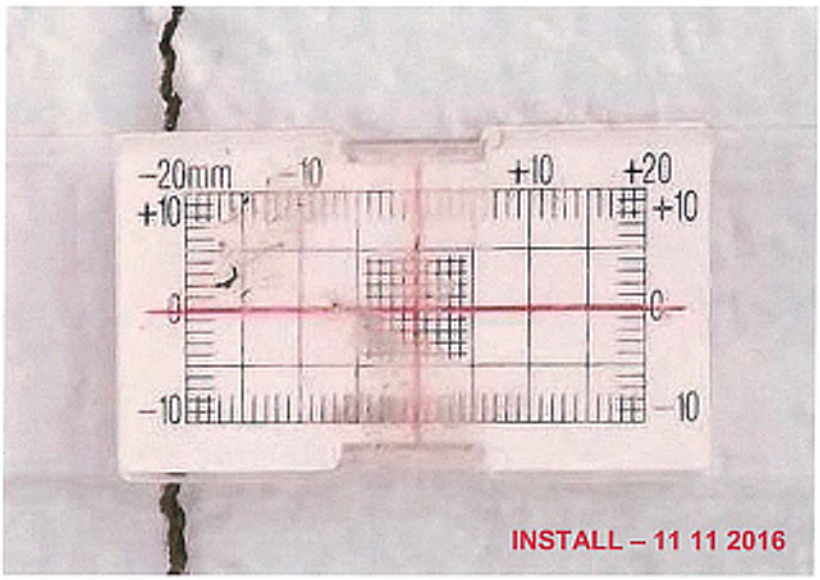


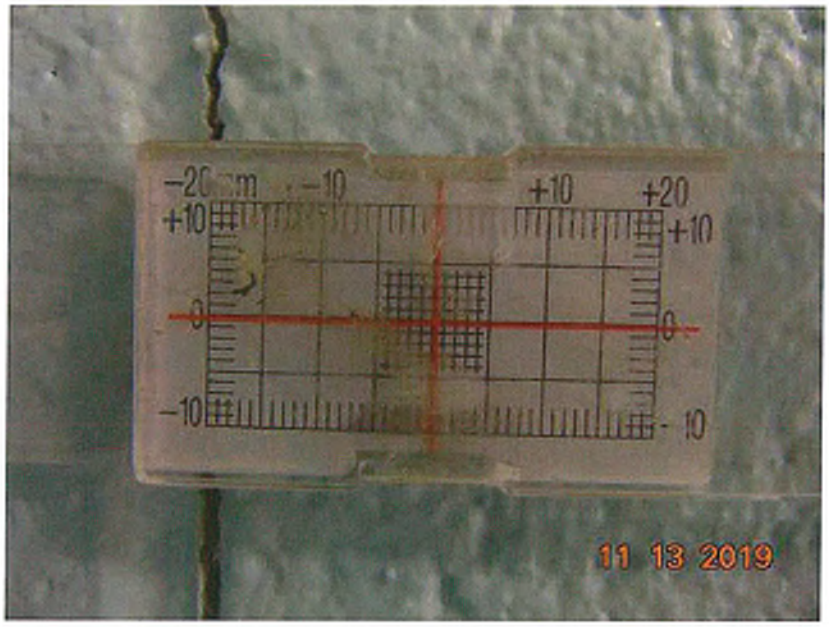
Date of Reading: 2019-11-13



METER #01


11 11 2016


-20mm -10 +10 +20
+10
0
-10
INSTALL – 11 11 2016


+10
0
-10
11 13 2019

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Location of Tell Tale Meter 02 Southeast

Corner Tell-Tale
Crack Monitoring Record

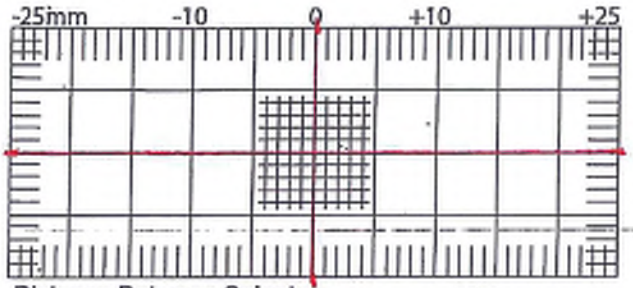
Indicate on the diagrams below the Tell-Tale movement at each reading after the crack widths have been measured using the Avongard Crack Width Gauge.

\+ Represents crack opening and.

\- Represents crack closing on the horizontal scale

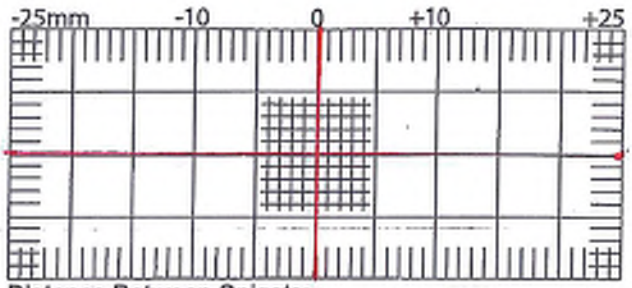
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Date of Reading: 2016-11-11



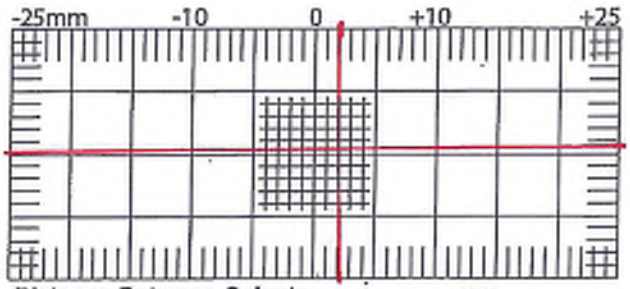
Distance Between Spigots: _____ mm

Date of Reading: 2017-02-21



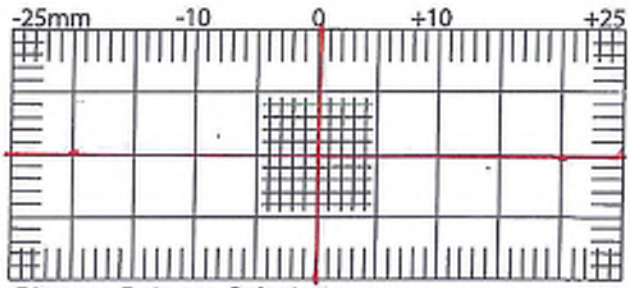
Distance Between Spigots: _____ mm

Date of Reading: 2016-12-29



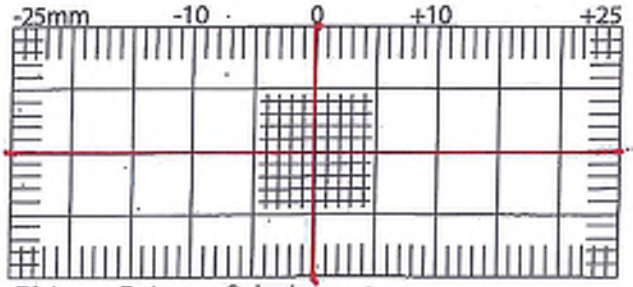
Distance Between Spigots: _____ mm

Date of Reading: 2017-04-21



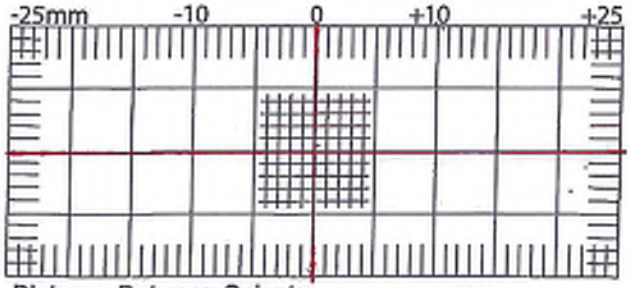
Distance Between Spigots: _____ mm

Date of Reading: 2017-06-16 (NEW INSTALL)



Distance Between Spigots: _____ mm

Date of Reading: 2017-07-12



Distance Between Spigots: _____ mm

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Location of Tell Tale Meter 02 Southeast

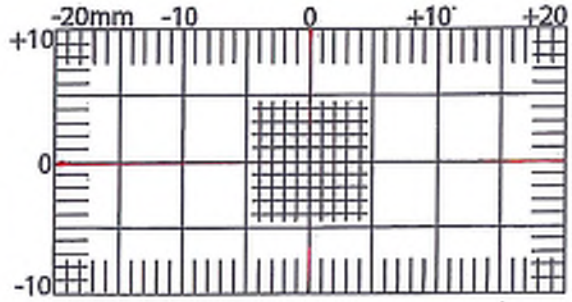
Standard Tell-Tale
Crack Monitoring Record

Indicate on the diagrams below the Tell-Tale movement at each reading after the crack widths have been measured using the Avongard Crack Width Gauge.

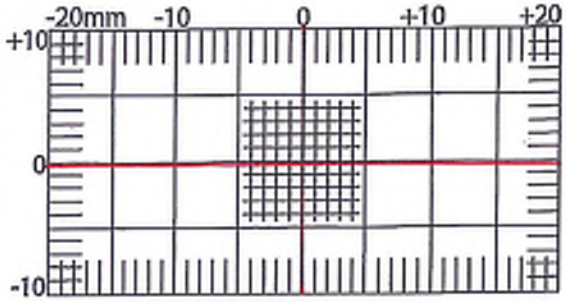
+ Represents crack opening and
- Represents crack closing on the horizontal scale

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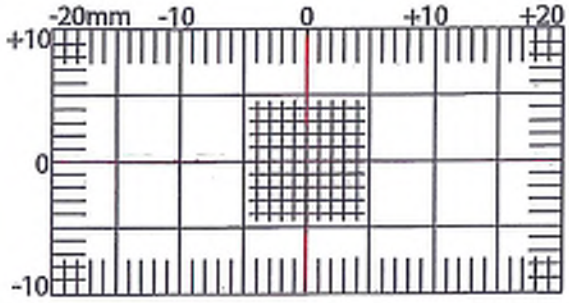
Date of Reading: 2017-07-12



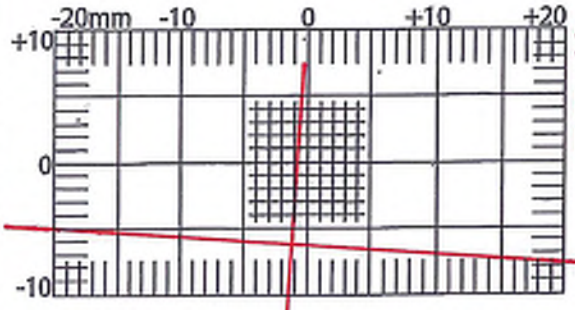
Date of Reading: 2017-12-06



Date of Reading: 2017-08-24

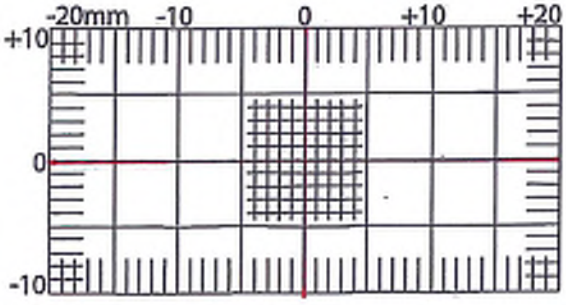


Date of Reading: 2018-09-26

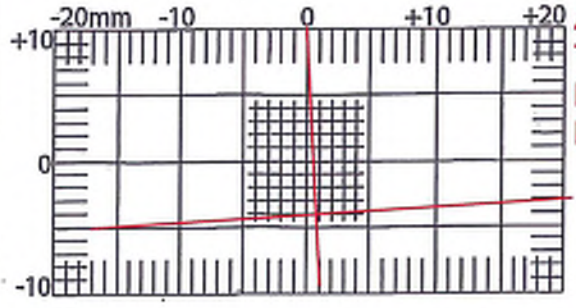


*METER APPEARS TO HAVE BEEN DISTURBED

Date of Reading: 2017-10-04



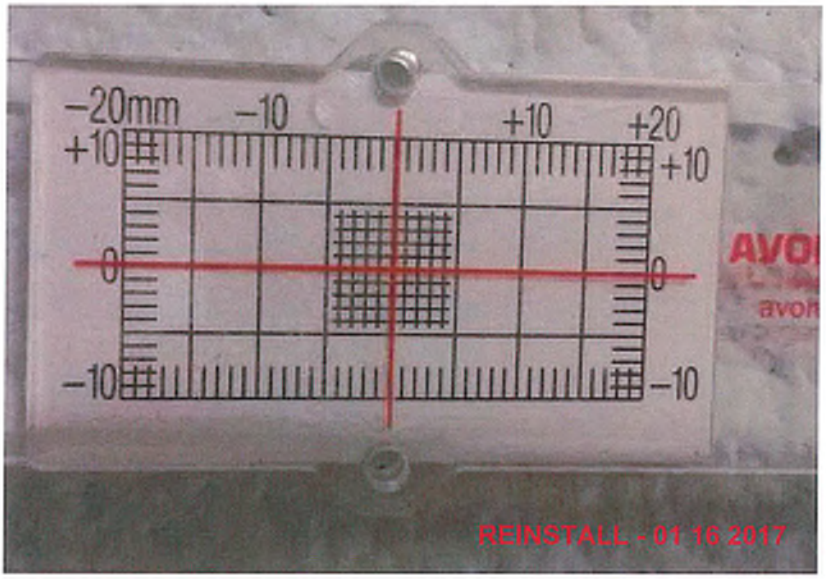
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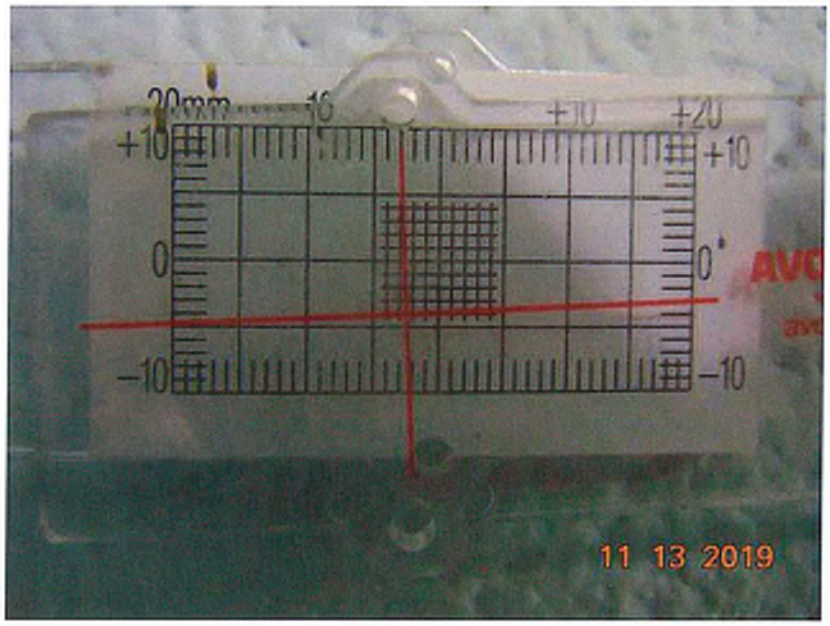


*METER APPEARS TO HAVE BEEN DISTURBED

METER #02


11 13 2019


-20mm
-10
+10
+20
+10
0
-10
REINSTALL - 01 16 2017


+10
0
-10
11 13 2019

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Location of Tell Tale Meter 03 Windows

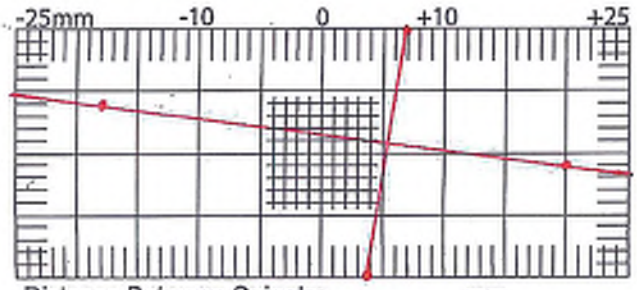
Corner Tell-Tale
Crack Monitoring Record

Indicate on the diagrams below the Tell-Tale movement at each reading after the crack widths have been measured using the Avongard Crack Width Gauge.

+ Represents crack opening and
- Represents crack closing on the horizontal scale

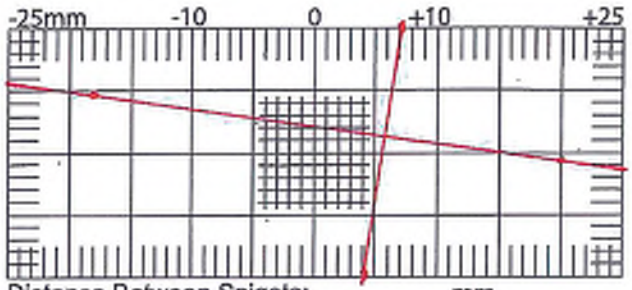
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Date of Reading: 2016-11-11



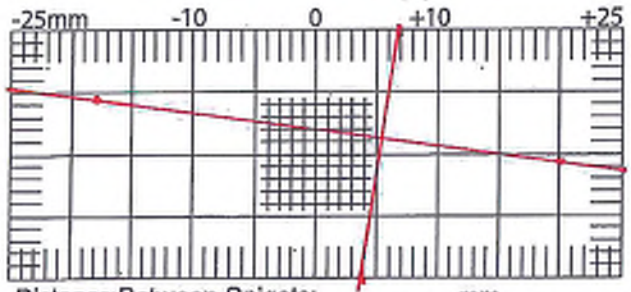
Distance Between Spigots: _____ mm

Date of Reading: 2017-02-21



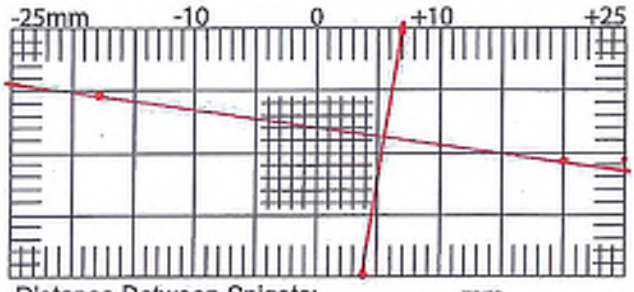
Distance Between Spigots: _____ mm

Date of Reading: 2016-12-29



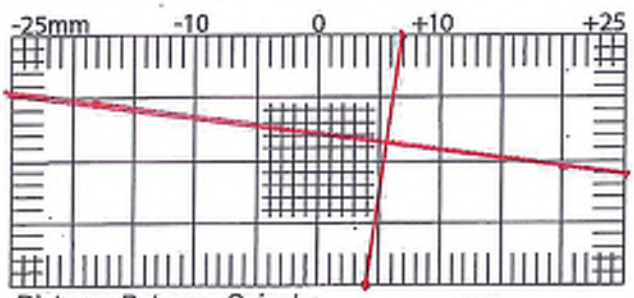
Distance Between Spigots: _____ mm

Date of Reading: 2017-04-21



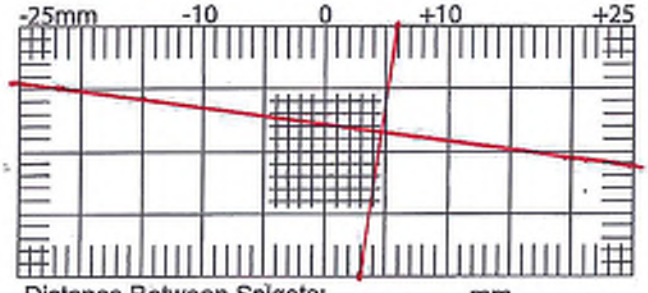
Distance Between Spigots: _____ mm

Date of Reading: 2017-01-16



Distance Between Spigots: _____ mm

Date of Reading: 2017-07-12



Distance Between Spigots: _____ mm

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Location of Tell Tale Meter 03 Windows

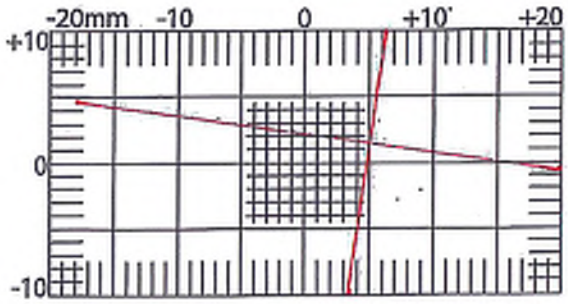
Standard Tell-Tale
Crack Monitoring Record

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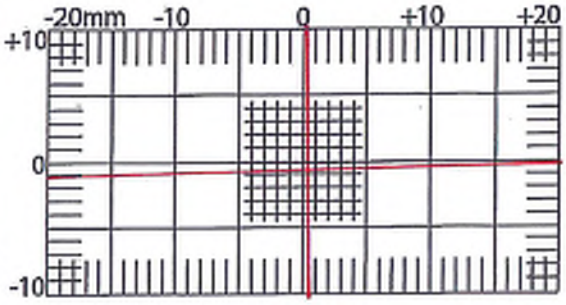
+ Represents crack opening and
- Represents crack closing on the horizontal scale

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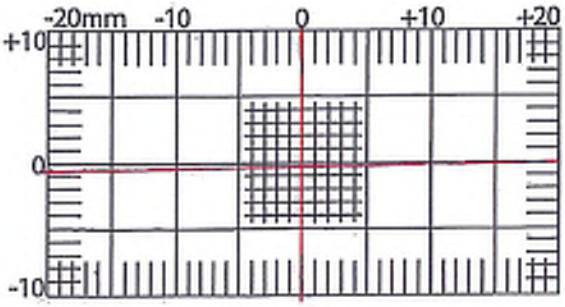
Date of Reading: 2017-08-24



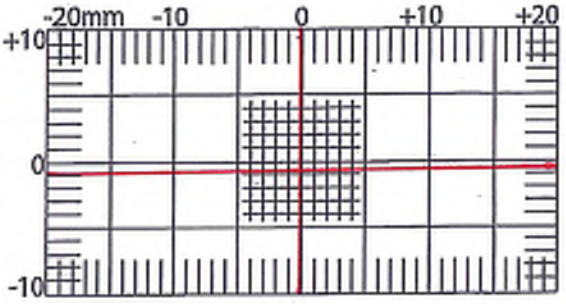
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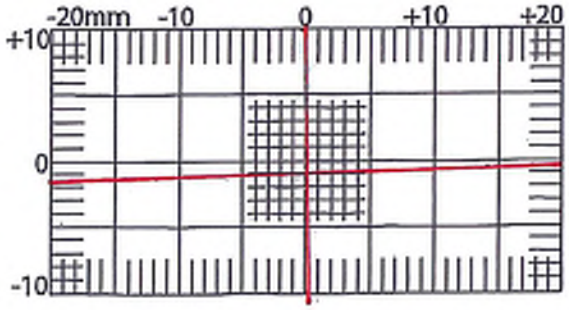
Date of Reading: 2017-08-24 (Replaced)



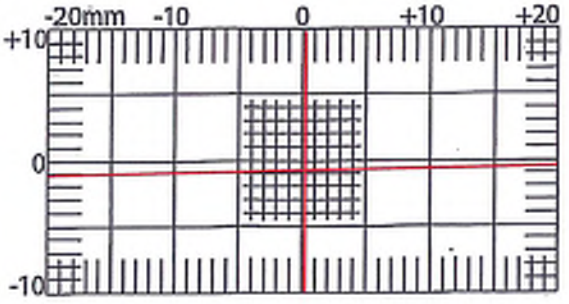
Date of Reading: 2018-09-26



Date of Reading: 2017-10-04

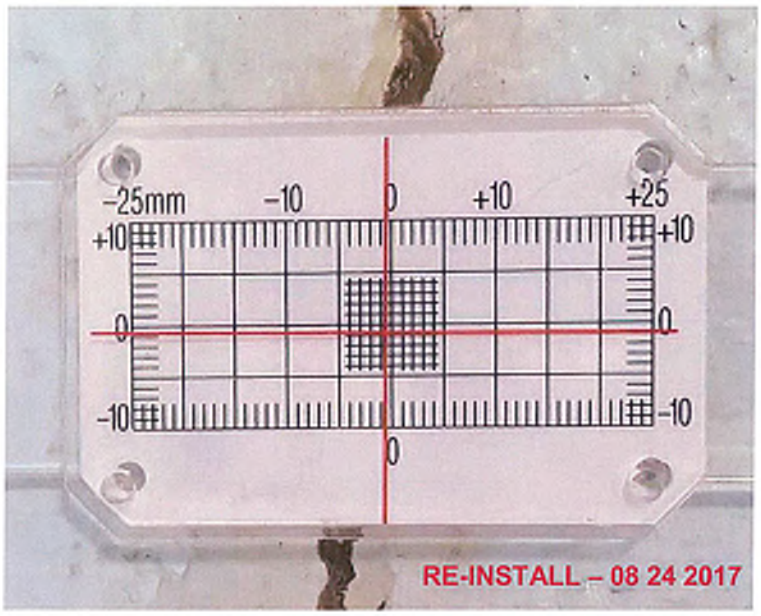


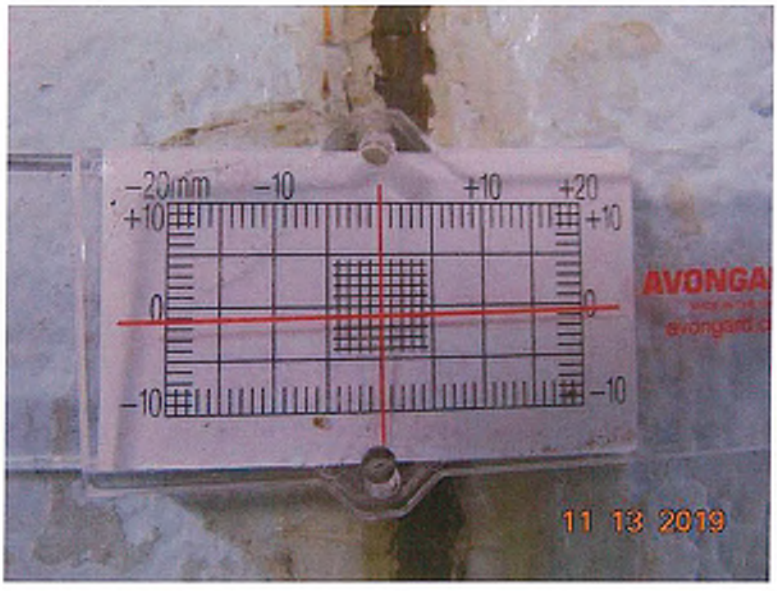
Date of Reading: 2019-11-13



METER #03


11 13 2019


-25mm
-10
0
+10
+25
+10
0
-10
RE-INSTALL – 08 24 2017


-20mm
-10
+10
+20
+10
0
-10
11 13 2019

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Project 7087

Location of Tell Tale Meter 04 Main Entry

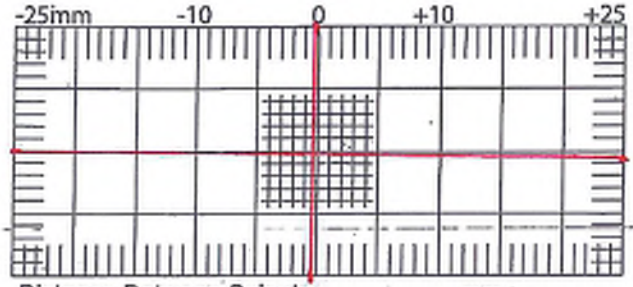
Corner Tell-Tale
Crack Monitoring Record

· Indicate on the diagrams below the Tell-Tale movement at each reading after the crack widths have been measured using the Avongard Crack Width Gauge.

+ Represents crack opening and.
- Represents crack closing on the horizontal scale

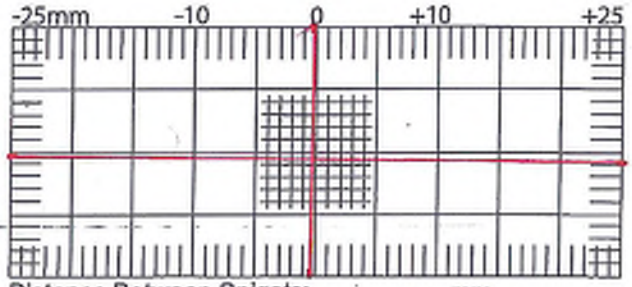
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Date of Reading: 2016-11-11



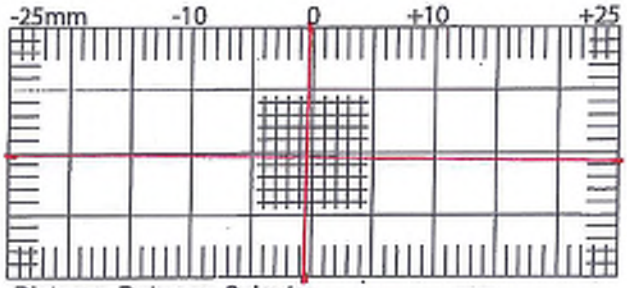
Distance Between Spigots: _____ mm

Date of Reading: 2017-02-21



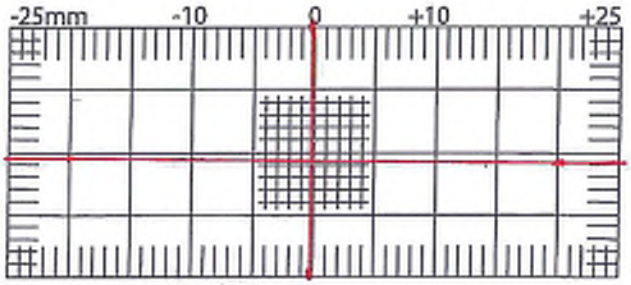
Distance Between Spigots: _____ mm

Date of Reading: 2016-12-29



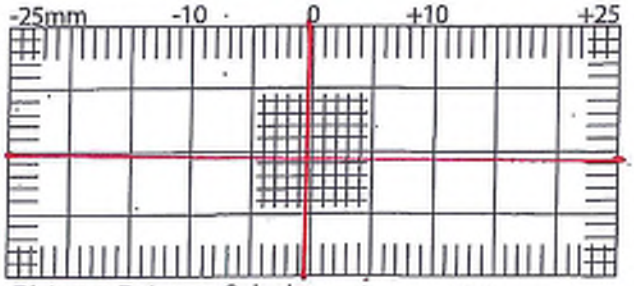
Distance Between Spigots: _____ mm

Date of Reading: 2017-04-21



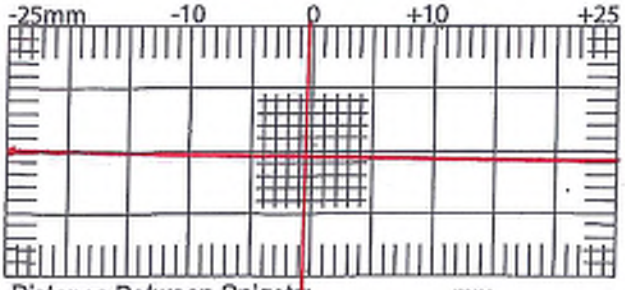
Distance Between Spigots: _____ mm

Date of Reading: 2017-01-16



Distance Between Spigots: _____ mm

Date of Reading: 2017-07-12



Distance Between Spigots: _____ mm

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Project 7087
Location of Tell Tale Meter 04 Main Entry

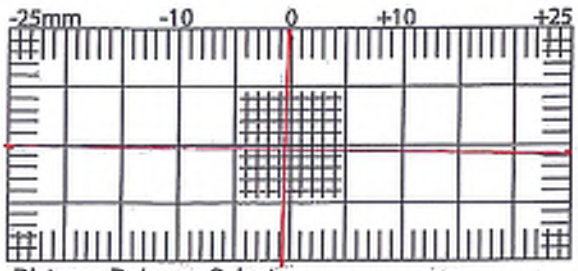
Corner Tell-Tale
Crack Monitoring Record

Indicate on the diagrams below the Tell-Tale movement at each reading after the crack widths have been measured using the Avongard Crack Width Gauge.

+ Represents crack opening and
- Represents crack closing on the horizontal scale

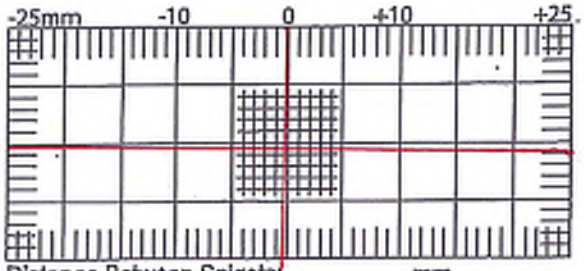
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Date of Reading: 2017-07-12



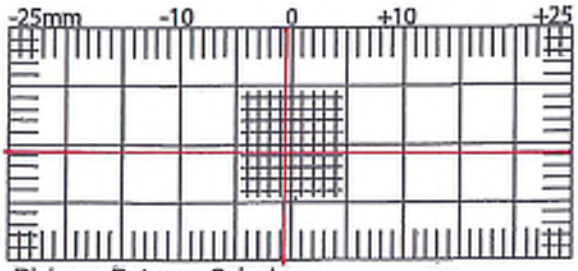
Distance Between Spigots: _____ mm

Date of Reading: 2017-12-06



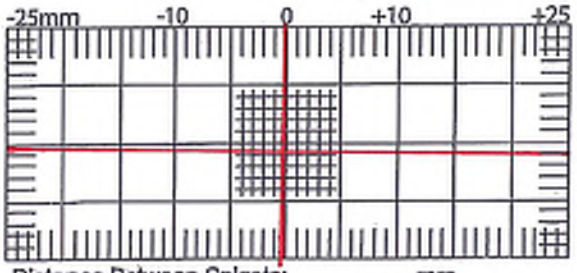
Distance Between Spigots: _____ mm

Date of Reading: 2017-08-24



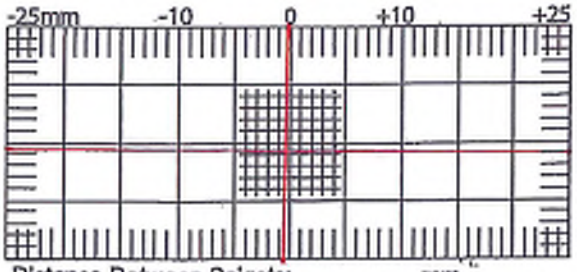
Distance Between Spigots: _____ mm

Date of Reading: 2018-09-26



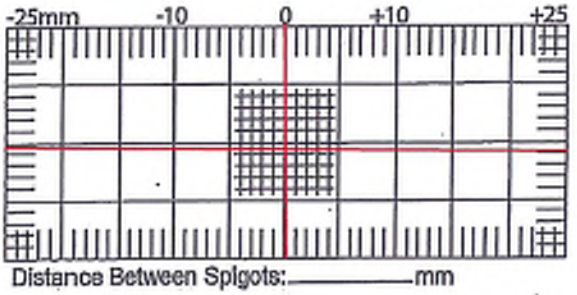
Distance Between Spigots: _____ mm

Date of Reading: 2017-10-04



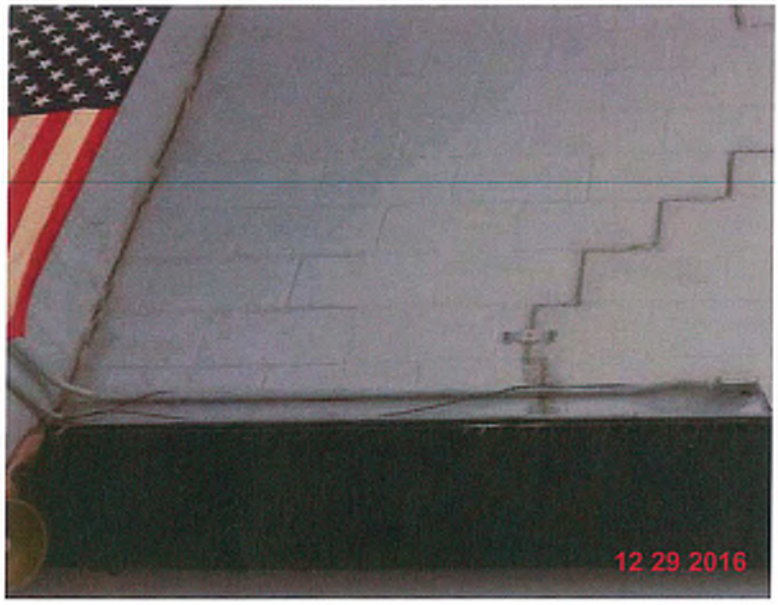
Distance Between Spigots: _____ mm

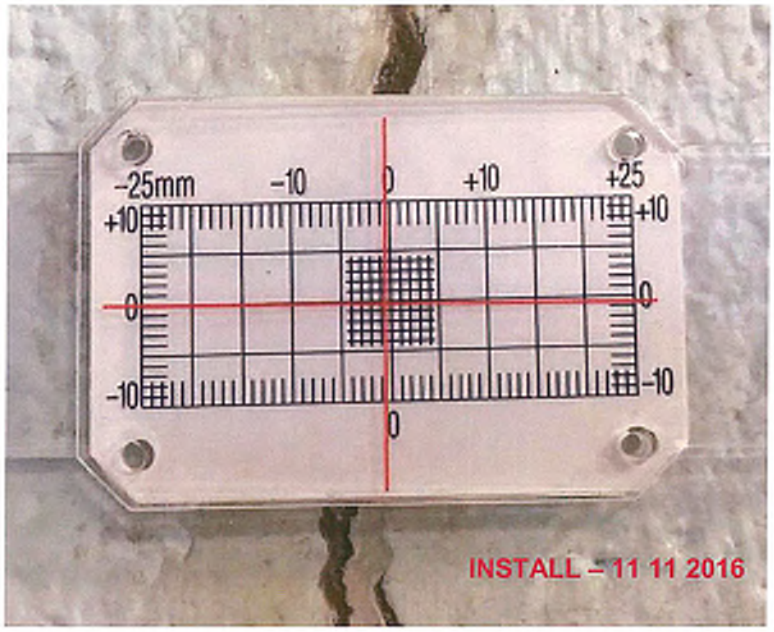
Date of Reading: 2019-11-13

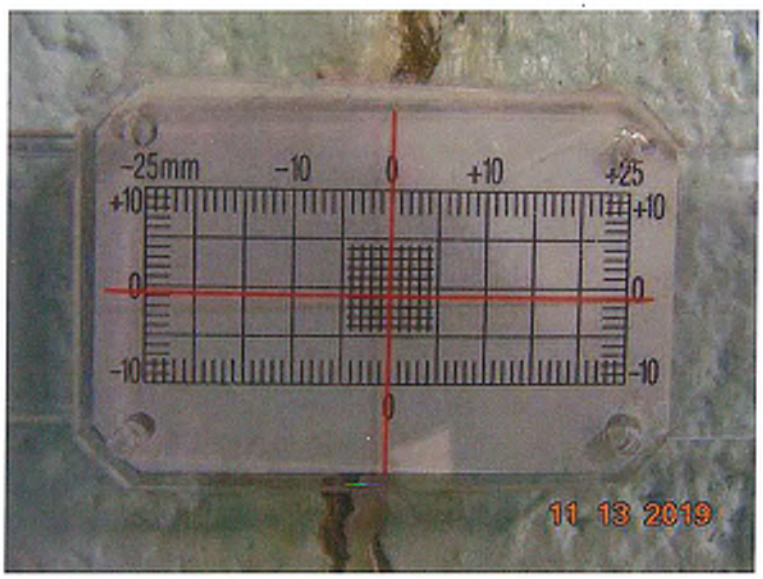


Distance Between Spigots: _____ mm

METER #04


12 29 2016


-25mm
-10
0
+10
+25
+10
0
-10
INSTALL – 11 11 2016


-25mm
-10
0
+10
+25
+10
0
-10
11 13 2019

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Location of Tell Tale Meter 05 Southwest

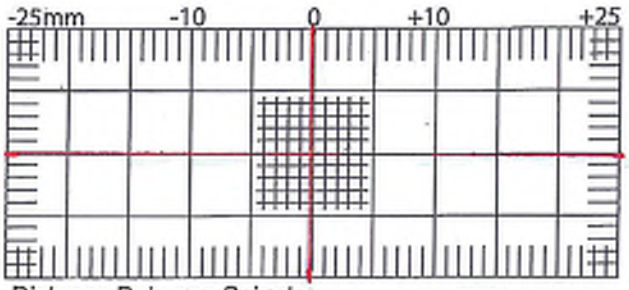
Corner Tell-Tale
Crack Monitoring Record

Indicate on the diagrams below the Tell-Tale movement at each reading after the crack widths have been measured using the Avongard Crack Width Gauge.

+ Represents crack opening and.
- Represents crack closing on the horizontal scale

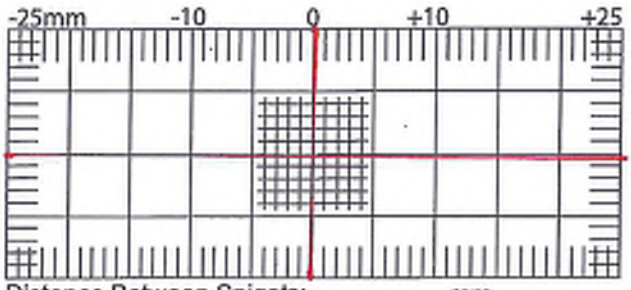
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Date of Reading: 2016-11-11



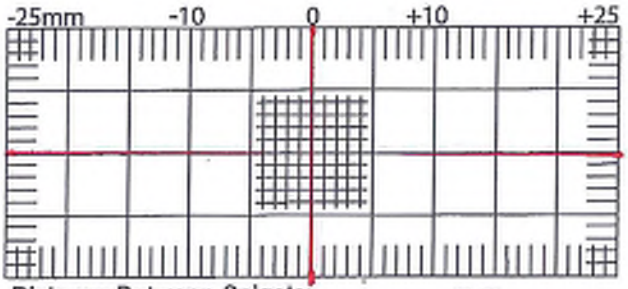
Distance Between Spigots: _____ mm

Date of Reading: 2017-02-21



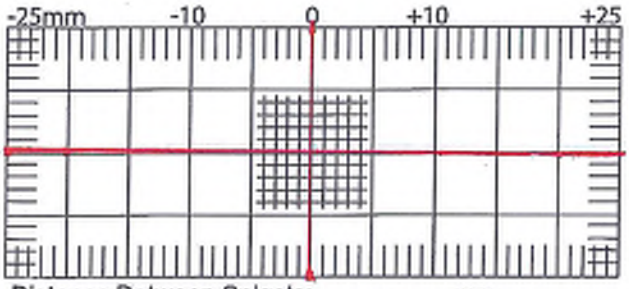
Distance Between Spigots: _____ mm

Date of Reading: 2016-12-29



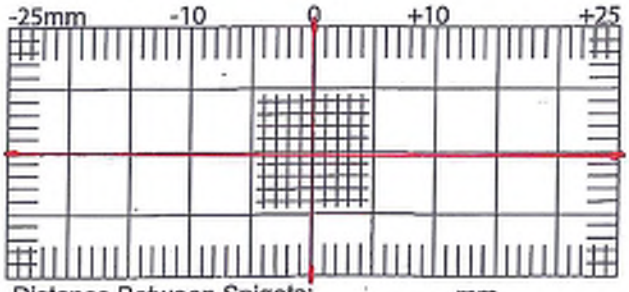
Distance Between Spigots: _____ mm

Date of Reading: 2017-04-21



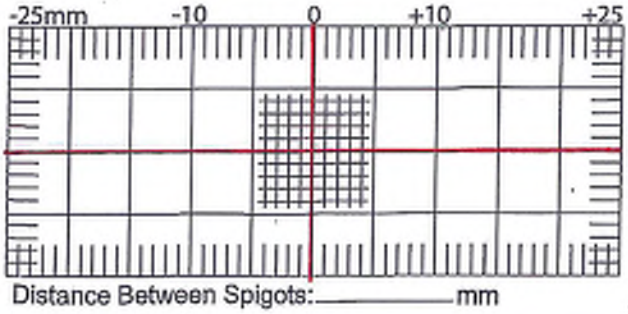
Distance Between Spigots: _____ mm

Date of Reading: 2017-01-16



Distance Between Spigots: _____ mm

Date of Reading: 2017-07-12



Distance Between Spigots: _____ mm

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Project 7087
Location of Tell Tale Meter 05 Southwest

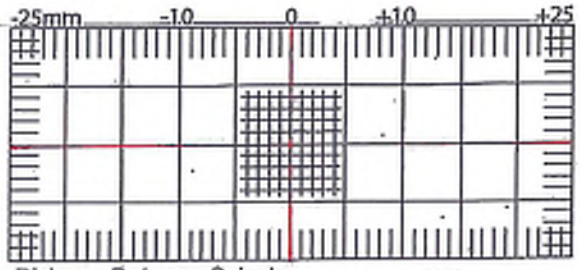
Corner Tell-Tale
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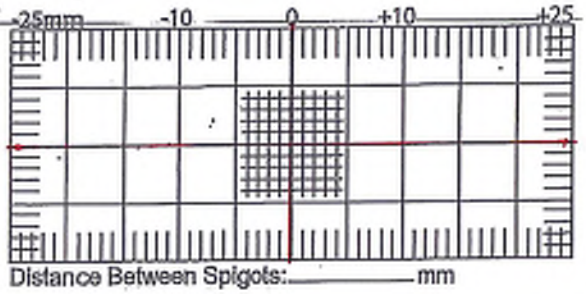
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Date of Reading: 2017-07-12



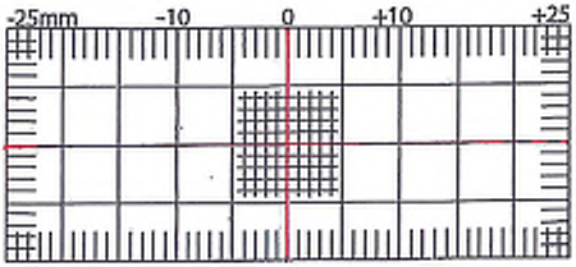
Distance Between Spigots: _____ mm

Date of Reading: 2017-12-06



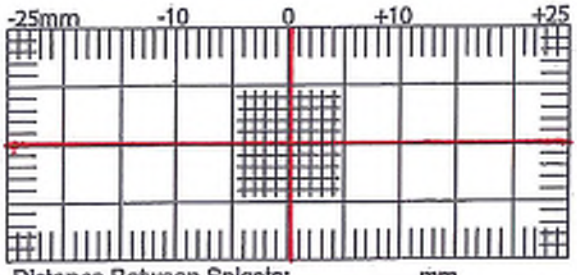
Distance Between Spigots: _____ mm

Date of Reading: 2017-08-24



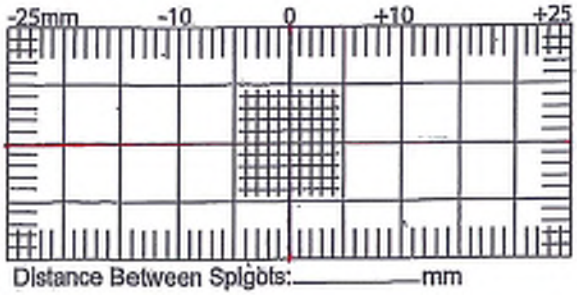
Distance Between Spigots: _____ mm

Date of Reading: 2018-09-26



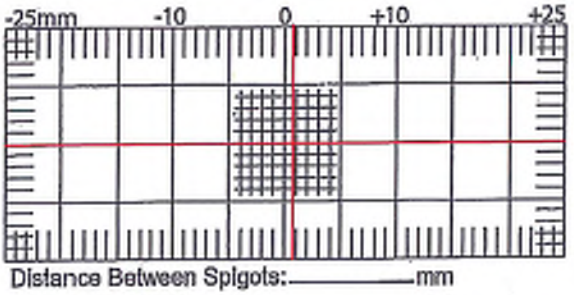
Distance Between Spigots: _____ mm

Date of Reading: 2017-10-04



Distance Between Spigots: _____ mm

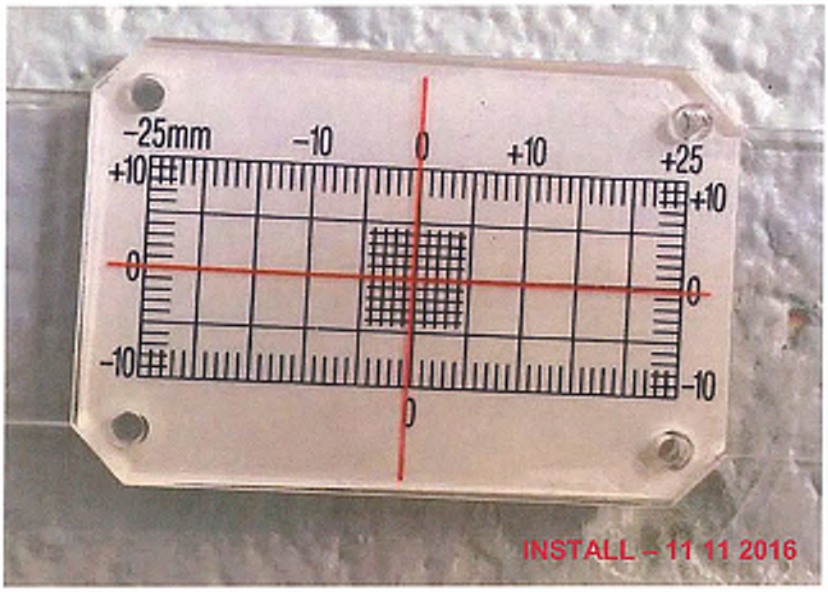
Date of Reading: 2019-11-13

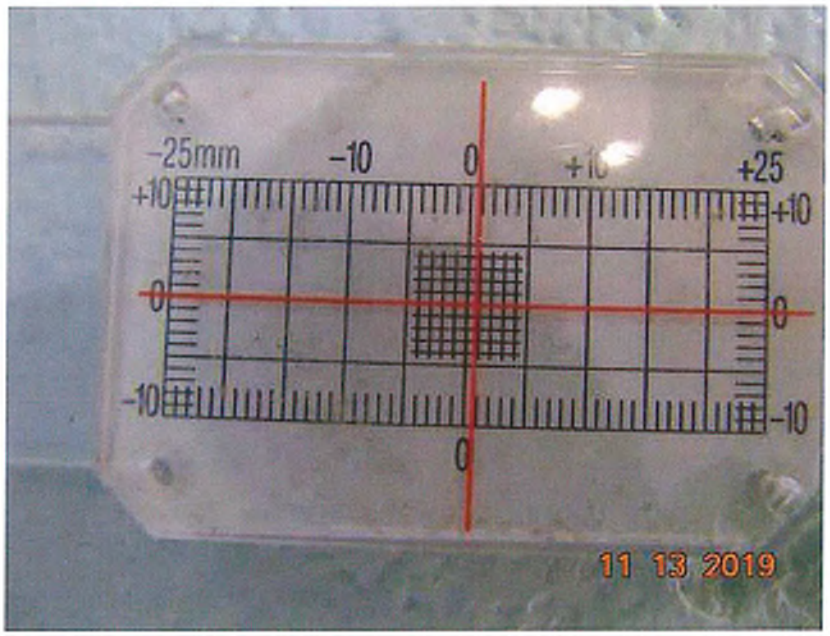


Distance Between Spigots: _____ mm

METER #05


C115
01 16 2017


-25mm
-10
0
+10
+25
+10
0
-10
INSTALL – 11 11 2016


-25mm
-10
0
+10
+25
+10
0
-10
11 13 2019

PARETTE SOMJEN ARCHITECTS

MEMORANDUM

MEMORANDUM INFORMATION

Date of Issuance: December 12, 2019

Issued By: Joshua Thompson, AIA

Regarding: Wall Monitoring at Stillwater School

PSA Project No: 7087

DISTRIBUTION

René Metzgar (BOE)
Michael Maggio (BOE)
Joshua Thompson (PSA)
Tracy Boss (PSA)

REMARKS

Regarding the wall cracks previously-identified in 11/22 memorandum, PSA recommends to District the following:

- All five (5) existing masonry cracks that were within the scope of the monitoring should be sealed in their entirety along their respective wall.
  - Existing masonry should be prepared as required to receive new materials, namely the cracks should be routed out to a 1/2" width, minimum 1" deep.
  - Cracks should then be infilled with new grout & sealant; PSA product recommendation to follow.
  - Walls should be finished with new paint at area of work to match adjacent surfaces.
- Once sealed & painted, BOE should visually monitor locations thereafter & advise PSA of further cracks and/or noticeable movement.

Note: The approach above may be taken for any wall cracks noticed in the gymnasium or adjacent areas even if they weren't specifically monitored as part of this project.

Please review & forward internally as needed and notify us of any questions, comments or concerns. Should you require additional information, please do not hesitate to contact us.

Sincerely,
PARETTE SOMJEN ARCHITECTS, LLC

Joshua Thompson, AIA
Associate

439 Route 46 East
Rockaway, NJ 07866
p 973 586 2400
f 973 586 2401
www.planetpsa.com

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Construction

Sika® AnchorFix-3001

High performance, 2 component adhesive anchor system use in cracked & uncracked concrete

Description	Sika AnchorFix-3001 adhesive anchor system has been specially formulated as a high performance, two component adhesive anchor system for threaded bars and reinforcing bars in both cracked and uncracked concrete.
Where to Use	■ Cracked & uncracked concrete ■ Hard natural stone ■ Solid rock ■ Solid masonry
Advantages	■ Fixing close to free edges ■ Versatile range of embedment depths ■ Anchoring without expansion forces
Packaging	20.2 fl. oz. (600 ml) or 50.7 fl. oz. (1500 ml) cartridges
Approvals	■ ESR to AC308 by ICC-ES (ESR-3608) ■ Certified to ANSI /NSF - 61 by IAPMO-R&T (file N-7858) ■ Sikadur AnchorFix-3001 has been tested according to ASTM C 881 Type I, IV, Class C, Grade 3

Typical Data

RESULTS MAY DIFFER BASED UPON STATISTICAL VARIATIONS DEPENDING UPON MIXING METHODS AND EQUIPMENT, TEMPERATURE, APPLICATION METHODS, TEST METHODS, ACTUAL SITE CONDITIONS AND CURING CONDITIONS.

Shelf Life
When stored correctly, the shelf life will be for 24 months from the date of manufacture.

Storage Conditions
Cartridges should be stored in their original packaging, the correct way up, in cool conditions (+50°F to +77°F) out of direct sunlight.

Working & Loading Times

Cartridge Temperature	T Work (minutes)	Base Material Temperature	T Load (hours)
+50°F to +59°F	20	+40°F to +49°F	24
		+50°F to +59°F	12
+59°F to +72°F	15	+59°F to +72°F	8
+72°F to +77°F	11	+72°F to +77°F	7
+77°F to +86°F	8	+77°F to +86°F	6
+86°F to +95°F	6	+86°F to +95°F	5
+95°F to +104°F	4	+95°F to +104°F	4
+104°F	3	+104°F	3

T Work is the typical time to gel at the highest temperature in the range
T Load is the typical time to reach full capacity

*The design professional on the job is ultimately responsible for the interpretation of the data provided above.

PRIOR TO EACH USE OF ANY SIKA PRODUCT, THE USER MUST ALWAYS READ AND FOLLOW THE WARNINGS AND INSTRUCTIONS ON THE PRODUCT'S MOST CURRENT PRODUCT DATA SHEET, PRODUCT LABEL AND SAFETY DATA SHEET WHICH ARE AVAILABLE ONLINE AT HTTP://USA.SIKA.COM/ OR BY CALLING SIKA'S TECHNICAL SERVICE DEPARTMENT AT 800.933.7452 NOTHING CONTAINED IN ANY SIKA MATERIALS RELIEVES THE USER OF THE OBLIGATION TO READ AND FOLLOW THE WARNINGS AND INSTRUCTIONS FOR EACH SIKA PRODUCT AS SET FORTH IN THE CURRENT PRODUCT DATA SHEET, PRODUCT LABEL AND SAFETY DATA SHEET PRIOR TO PRODUCT USE.

Construction

Physical Properties		
Property	Result	Method
Consistency	Pass	ASTM C 881
Gel Time	10 minutes**	ASTM C 881
Bond Strength (2 day cure)	2,500 psi	ASTM C 882
Bond Strength (14 day cure)	2,700 psi	ASTM C 882
Compressive Strength (7 day)	>13,000 psi	ASTM D 695
Compressive Modulus (7 days)	420,000 psi	ASTM D 695
Water Absorption	0.08%	ASTM D 570
Heat Deflection Temperature	122°F	ASTM D 468
Linear Coefficient of Shrinkage	0.0003 in/in	ASTM D 2566

*The design professional on the job is ultimately responsible for the interpretation of the data provided above.
**Note: Per section 5.2 "The purchaser may specify a minimum gel time of 5 minutes for Types I and IV when automatic proportioning, mixing and dispensing equipment are used."

Installation Specification									
Property	Symbol	Unit							
Threaded Rod Diameter	d_a	in	3/8	1/2	5/8	3/4	7/8	1	1-1/4
Drill Bit Diameter	d_o	in	1/2	9/16	3/4	7/8	1	1-1/8	1-3/8
Cleaning Brush Size	d_b	-	S14H/F	S16H/F	S22H/F	S24H/F	S27H/F	S31H/F	S38H/F
Nozzle Type	-	-	Q	Q	Q /QH	QH	QH	QH	QH
Extension Tube Required?	-	-	Y1 > 3.5" h_{ef}	Y1 > 3.5" h_{ef}	Y2 > 10" h_{ef}	Y2 > 10" h_{ef}	Y2 > 10" h_{ef}	Y2 > 10" h_{ef}	Y2 > 10" h_{ef}
Resin Stopper Required?	-	-	NO	NO	RS18 > 10" h_{ef}	RS18 > 10" h_{ef}	RS22 > 10" h_{ef}	RS22 > 10" h_{ef}	RS30 > 10" h_{ef}
Rebar Size	d_a	in	#3	#4	#5	#6	#7	#8	#10
Drill Bit Diameter	d_o	in	9/16	5/8	3/4	7/8	1	1-1/8	1-3/8
Cleaning Brush Size	d_b	-	S16H/F	S18H/F	S22H/F	S27H/F	S31H/F	S35H/F	S43H/F
Nozzle Type	-	-	Q	Q	Q /QH	QH	QH	QH	QH
Extension Tube Required?	-	-	Y1 > 3.5" h_{ef}	Y1 > 3.5" h_{ef}	Y2 > 10" h_{ef}	Y2 > 10" h_{ef}	Y2 > 10" h_{ef}	Y2 > 10" h_{ef}	Y2 > 10" h_{ef}
Resin Stopper Required?	-	-	NO	NO	RS18 > 10" h_{ef}	RS18 > 10" h_{ef}	RS22 > 10" h_{ef}	RS22 > 10" h_{ef}	RS30 > 10" h_{ef}
Maximum Tightening Torque	T_{max}	ft.lb	15	30	60	100	125	150	200

Y1 - requires 3/8" diameter extension tube fitted to Q nozzle
Y2 requires 9/16" diameter extension tube fitted to QH nozzle
RS22 - use 22mm diameter resin stopper
RS30 - use 30mm diameter resin stopper
***The design professional on the job is ultimately responsible for the interpretation of the data provided above.**

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Construction

Allowable Steel Strength for Threaded Rods									
		Carbon Steel ASTM F 1554 Grade 36 (A307 Gr.C)		Carbon Steel ASTM A 193 B7		Stainless Steel ASTM F 593 CW		Stainless Steel ASTM F 593 SH	
Anchor Diameter (in)		Allowable Tension, N_{sa}	Allowable Shear, V_{sa}	Allowable Tension, N_{sa}	Allowable Shear, V_{sa}	Allowable Tension, N_{sa}	Allowable Shear, V_{sa}	Allowable Tension, N_{sa}	Allowable Shear, V_{sa}
3/8"	lb	2,110	1,080	4,550	2,345	3,360	1,870	4,190	2,160
	kN	9.4	4.8	20.2	10.4	16.1	8.3	18.6	9.6
1/2"	lb	3,750	1,930	8,100	4,170	6,470	3,330	7,450	3,840
	kN	16.7	8.6	36.0	18.5	28.8	14.8	33.1	17.1
5/8"	lb	5,870	3,030	12,655	6,520	10,130	5,220	11,640	6,000
	kN	26.1	13.5	56.3	29.0	45.1	23.2	51.8	26.7
3/4"	lb	8,460	4,360	18,220	9,390	12,400	6,390	15,300	7,880
	kN	37.6	19.4	81.0	41.8	55.2	28.4	68.1	35.1
7/8"	lb	11,500	5,930	24,800	12,780	16,860	8,680	20,830	10,730
	kN	51.2	26.4	110.3	56.8	75.0	38.6	92.7	47.7
1"	lb	15,020	7,740	32,400	16,690	22,020	11,340	27,210	14,020
	kN	66.8	34.4	144.1	74.2	97.9	50.4	121.0	62.4
1 - 1/4"	lb	23,480	12,100	50,640	26,070	34,420	17,730	38,470	19,820
	kN	104.4	53.8	225.1	116.0	153.1	78.9	171.1	88.2

Allowable Tension, N_{sa} = 0.33 x f_u x nominal cross sectional area
Allowable Shear, V_{sa} = 0.17 x f_u x nominal cross section area
*The design professional on the job is ultimately responsible for the interpretation of the data provided above.

Allowable Steel Strength for Rebar			
		Carbon Steel ASTM A 615 Grade 60	
Rebar Size		Allowable Tension, N_{sa}	Allowable Shear, V_{sa}
#3	lb	3,280	1,690
	kN	14.6	7.5
#4	lb	5,831	3,004
	kN	25.9	13.4
#5	lb	9,111	4,693
	kN	40.5	20.9
#6	lb	13,121	6,759
	kN	58.4	30.1
#7	lb	17,859	9,200
	kN	79.4	40.9
#8	lb	23,326	12,016
	kN	103.8	53.4
#10	lb	37,623	19,381
	kN	167.4	86.2

*The design professional on the job is ultimately responsible for the interpretation of the data provided above.

Allowable Steel Strength for Rebar			
		Carbon Steel CAN/CSA-G30.18 Gr.400	
Rebar Size		Allowable Tension, N_{sa}	Allowable Shear, V_{sa}
10M	lb	4,016	2,069
	kN	17.9	9.2
15M	lb	8,052	4,148
	kN	35.8	18.5
20M	lb	11,960	6,161
	kN	53.2	27.4
25M	lb	19,975	10,290
	kN	88.9	45.8
30M	lb	28,121	14,486
	kN	125.1	64.4
35M	lb	40,089	20,652
	kN	178.3	91.9

Tension = 0.33 x f_u x nominal cross sectional area
Shear = 0.17 x f_u x nominal cross section area
*The design professional on the job is ultimately responsible for the interpretation of the data provided above.

1. Above values for reinforcing steel assume the design method is the same as a post-installed adhesive anchor,under the principles of anchor design (failure modes will be concrete breakout, pryout, steel failure, or adhesive bond) and not under the principles of reinforcing steel design (failure modes are typically splitting failure, inadequateber development etc..). CONSULT AN ENGINEERING DESIGN PROFESSIONAL PRIOR TO USE.

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Construction

Anchor Diameter	Embedment Depth	Allowable Concrete Capacity /Bond					
		Tension (lb)			Shear (lb)		
		f'_c=2,500psi	f'_c=4,000psi	f'_c=8,000psi	f'_c=2,500psi	f'_c=4,000psi	f'_c=8,000psi
3/8" or #3	2-3/8"	1,939	2,032	2,178	2,585	2,710	2,904
	4-15/16"	4,031	4,225	4,528	5,375	5,633	6,038
	7-1/2"	6,123	6,418	6,878	8,164	8,557	9,171
1/2" or #4	2-3/4"	2,527	2,649	2,839	3,369	3,531	3,785
	6-3/8"	5,858	6,140	6,581	7,811	8,187	8,774
	10"	9,186	9,631	10,323	12,252	12,842	13,764
5/8" or #5	3-1/8"	3,889	4,076	4,368	5,185	5,434	5,824
	7-13/16"	9,722	10,189	10,921	12,962	13,586	14,561
	12-1/2"	15,555	16,303	17,473	20,739	21,737	23,298
3/4" or #6	3-3/4"	5,200	5,450	5,841	6,933	7,267	7,788
	9-3/8"	13,000	13,625	14,603	17,333	18,167	19,471
	15"	20,799	21,800	23,365	27,732	29,067	31,153
1" or #8	4"	8,407	8,811	9,444	11,209	11,749	12,592
	12"	25,221	26,434	28,332	33,628	35,246	37,776
	20"	42,035	44,057	47,219	56,046	58,743	62,959
1-1/4" or #10	5"	10,529	11,035	11,828	14,039	14,715	15,771
	15"	31,588	33,106	35,484	42,117	44,144	47,312
	25"	52,646	55,180	59,140	70,195	73,573	78,853

1. The above values represent mean ultimate values and allowable w orking loads. The allowable working loads have been reduced us ing a safety factor of 4.0 for tension and 3.0 for shear , however, in some cases, such as life safety, safety factors of 10.0 or higher may be necessary.
2. Allowable loads must be checked against steel capacity. The lowest value controls.
3. Tabulated data is applicable to single anchors in normal weight concrete unaffected by edge or spacing reduction factors. V alues are valid for anchors installed into dry concrete in holes drilled with a hammer drill and ANSI carbide drill bit.
4. Linear interpolation is allowed.
*The design professional on the job is ultimately responsible for the interpretation of the data provided above.

In - Service Temperature	Reduction Factor*
40°F	1.0
68°F	1.0
110°F	0.9
130°F	0.7
150°F	0.5
166°F	0.4
176°F	0.3

*The design professional on the job is ultimately responsible for the interpretation of the data provided above.

**For intermediate temperatures, linear interpolation is allowed. Values must not be extraplated.

Coverage

Anchor size:		(in.)	5/16	3/8	1/2	5/8	3/4	1	1 1/4
Drill Hole Diameter:		(in.)	3/8	1/2	9/16	3/4	7/8	1 1/8	1 3/8
Embedment Depth:		(in.)	2 3/8	2 3/8	2 3/4	3 1/8	3 3/4	4	5
Estimated Number of Fixing *	Cartridge Volume	600 ml	176	99	67	33	20	11	6
		1500 ml	455	256	175	86	53	30	16

*Number of fixings assumes 30ml wastage in initial extrusion and holes filled to 3/4 full

Anchor size:		(in.)	5/16	3/8	1/2	5/8	3/4	1	1 1/4
Drill Hole Diameter:		(in.)	3/8	1/2	9/16	3/4	7/8	1 1/8	1 3/8
Embedment Depth:		(in.)	3 1/8	3 3/4	5	6 1/4	7 1/2	10	12 1/2
Estimated Number of Fixing *	Cartridge Volume	600 ml	134	62	37	16	10	4	2
		1500 ml	346	162	96	43	26	12	6

*Number of fixings assumes 30ml wastage in initial extrusion and holes filled to 3/4 full

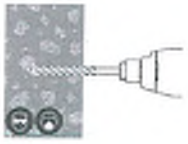
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Construction

Application

Installation Method (Solid Substrates)
Always refer to MPII on ICC-ESR-3608

1. Using the SDS Hammer Drill in rotary hammer mode for drilling, with a carbide tipped drill bit conforming to ANSI B212.15-1994 of the appropriate size, drill the hole to the specified hole diameter and depth.

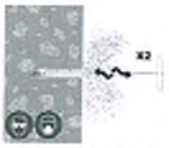


2. Select the correct Air Lance, insert to the bottom of the hole and depress the trigger for 2 seconds. The compressed air must be clean – free from water and oil – and at a minimum pressure of 90 psi (6 bar).



Perform the blowing operation twice.

3. Select the correct size Hole Cleaning Brush. Ensure that the brush is in good condition and the correct diameter. Insert the brush to the bottom of the hole, using a brush extension if needed to reach the bottom of the hole and withdraw with a twisting motion. *There should be positive interaction between the steel bristles of the brush and the sides of the drilled hole.*



Perform the brushing operation twice.

4. Repeat 2 (blowing operation) twice.
5. Repeat 3 (brushing operation) twice.
6. Repeat 2 (blowing operation) twice.
7. Select the appropriate static mixer nozzle, checking that the mixing elements are present and correct **(do not modify the mixer)**. Attach mixer nozzle to the cartridge. Check the Dispensing Tool is in good working order. Place the cartridge into the dispensing tool.



Note: The SAF-Q2 nozzle is in two sections. One section contains the mixing elements and the other section is an extension piece. Connect the extension piece to the mixing section by pushing the two sections firmly together until a positive engagement is felt.

Note: AnchorFix®-3001 may only be installed between the temperatures of 40°F and 104°F. The product must be conditioned to a minimum of 50°F. For gel and cure time data, refer to Table 14.

8. Extrude some resin to waste until an even-colored mixture is extruded, The cartridge is now ready for use.



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Construction

9. As specified in Figure 2, Table 11, and Table 12 , attach an extension tube with resin stopper (if required) to the end of the mixing nozzle with a push fit.
(The extension tubes may be pushed into the resin stoppers and are held in place with a coarse internal thread).



10. Insert the mixing nozzle to the bottom of the hole. Extrude the resin and slowly withdraw the nozzle from the hole. **Ensure no air voids are created** as the nozzle is withdrawn. Inject resin until the hole is approximately ¾ full and remove the nozzle from the hole.

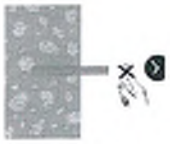


11. Select the steel anchor element ensuring it is free from oil or other contaminants, and mark with the required embedment depth. Insert the steel element into the hole using a back and forth twisting motion to ensure complete cover, until it reaches the bottom of the hole. Excess resin will be expelled from the hole evenly around the steel element and there shall be no gaps between the anchor element and the wall of the drilled hole.



12. Clean any excess resin from around the mouth of th hole.

13. Do not disturb the anchor until at least the minimum cure time has elapsed. Refer to the Table 14 Gel and Cure Times to determine the appropriate cure time.



14. Position the fixture and tighten the anchor to the appropriate installation torque.



Do not over-torque the anchor as this could adversely affect its performance.

Overhead Substrate Installation Method
Always refer to MPII on ICC-ESR-3608

1. Using the SDS Hammer Drill in rotary hammer mode for drilling, with a carbide tipped drill bit conforming to ANSI B212.15-1994 of the appropriate size, drill the hole to the specified hole diameter and depth.



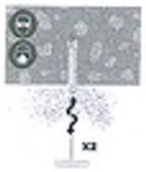
2. Select the correct Air Lance, insert to the bottom of the hole and depress the trigger for 2 seconds. The compressed air must be clean – free from water and oil – and at a minimum pressure of 90 psi (6 bar).



Perform the blowing operation twice.

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3. Select the correct size Hole Cleaning Brush. Ensure that the brush is in good condition and the correct diameter. Insert the brush to the bottom of the hole, using a brush extension if needed to reach the bottom of the hole, and withdraw with a twisting motion. *There should be positive interaction between the steel bristles of the brush and the sides of the drilled hole.*



Perform the brushing operation twice.

4. Repeat 2 (blowing operation) twice.

5. Repeat 3 (brushing operation) twice.

6. Repeat 2 (blowing operation) twice.

7. Select the appropriate static mixer nozzle checking that the mixing elements are present and correct **(do not modify the mixer)**. Attach mixer nozzle to the cartridge. Check the Dispensing Tool is in good working order. Place the cartridge into the dispensing tool.



Note: The SAF-Q2 nozzle is in two sections. One section contains the mixing elements and the other section is an extension piece. Connect the extension piece to the mixing section by pushing the two sections firmly together until a positive engagement is felt.

Note: AnchorFix®-3001 may only be installed between the Temperatures of 40°F and 104°F. The product must be Conditioned to a minimum of 50°F. For gel and cure time data, refer to Table 14.

8. Extrude some resin to waste until an even-colored mixture is extruded, The cartridge is now ready for use.



9. As specified in Figure 2, Table 11, and Table 12, attach an extension tube with resin stopper (if required) to the end of the mixing nozzle with a push fit. (The extension tubes may be pushed into the resin stoppers and are held in place with a coarse internal thread).



10. Insert the mixing nozzle to the bottom of the hole. Extrude the resin and slowly withdraw the nozzle from the hole. **Ensure no air voids are created** as the nozzle is withdrawn. Inject resin until the hole is approximately ¾ full and remove the nozzle from the hole.



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Construction

11. Select the steel anchor element ensuring it is free from oil or other contaminants, and mark with the required embedment depth. Insert the steel element into the hole using a back and forth twisting motion to ensure complete cover, until it reaches the bottom of the hole. Excess resin will be expelled from the hole evenly around the steel element and there shall be no gaps between the anchor element and the wall of the drilled hole.



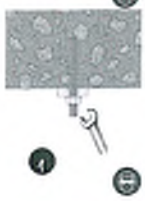
12. Clean any excess resin from around the mouth of the hole.

13. Do not disturb the anchor until at least the minimum cure time has elapsed. Refer to the Working and Load Timetable to determine the appropriate cure time.



14. Position the fixture and tighten the anchor to the appropriate installation torque.

    Do not over-torque the anchor as this could adversely affect its performance.



Limitations

The design professional on the job is ultimately responsible for the interpretation of the data provided above.

Note: Sika AnchorFix-3001 has been qualified for resisting long-term loads through the ICC-ES AC308 creep test for which an anchor is loaded and monitored for movement over time. According to AC308, anchors that pass the creep test are determined to be suitable for resisting long- term tensile loads.

- Installation of anchors in horizontal or upwardly inclined orientations to resist sustained tension loads shall be performed by personnel certified by an application certification program in accordance with ACI 318 D.9.2.2 or D.9.2.3
- Please refer to section 5.0 for conditions of use in the ICC Evaluation Report #3608. This report is available on Sika and ICC's websites.
- For a complete list of tools and accessories, refer to ICC ESR #3608
- Minimum application temperature: 40°F (4°C)
- Maximum application temperature: 104°F (40°C)

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