



BID PACKAGE NUMBER: 2025-0801

PROJECT NAME: GOLDEN PLAINS UNIFIED SCHOOL DISTRICT – TRANQUILLITY HIGH SCHOOL – AQUATIC CENTER SITEWORK

DATE: October 3, 2025

OWNER: Golden Plains Unified School District

CONTACT: Blanca Mercedes, bmercedes@gpusd.org, 559.500.9642

ADDENDUM NO. 03

TO: All Registered Bidders

This Addendum forms a part of the Contract Documents for the Project described above and modifies the original Bidding Documents, including Addendum No. 001 and Addendum No. 002 as noted herein. All provisions of the original Bid and Contract Documents remain in effect except as specifically revised by this Addendum. Each bidder must acknowledge receipt of this Addendum on the Bid Form. Failure to acknowledge receipt of this Addendum in the Bid Form may cause the Bid to be rejected.

Specific changes in this addendum are as follows:

1. Issuance of DSA Approved Plans

The DSA-approved plans for the Tranquillity High School Aquatic Center Sitework Project have been issued and are hereby incorporated into the Contract Documents. Due to file size, the plans are not attached to this Addendum but are posted on the District's website under the **Addenda No. 03** section at the following location: [Construction & Modernization Projects - Golden Plains Unified School District](#)

For bidder reference, the District has also posted a supplemental set of DSA-approved plans that clouds and identifies all revisions made from the original bid set. This set of plans and specifications are part of the Contract Documents, and bidders are required to review them in full when preparing their proposals.

Receipt and review of these plans shall be deemed acknowledged by the bidder upon acknowledgment of Addendum No. 03 on the Bid Form.



2. Replacement of “Bid Forms”

The section entitled “Bid Forms” contained in the original Bid # 2025-0801 GOLDEN PLAINS UNIFIED SCHOOL DISTRICT – TRANQUILLITY HIGH SCHOOL – AQUATIC CENTER SITEWORK BID PACKAGE (pages 16-19) is hereby deleted in its entirety and replaced with the revised Bid Bid Form attached hereto as Exhibit A to this Addendum.

Bidders shall utilize and comply with the revised Bid Form in preparing and submitting their proposals. Any conflicting provisions contained in the original Bid Documents are superseded by this revision.

3. Replacement of Project Manual, “Table of Contents”

The section entitled “Table of Contents” contained in the original GPUSD Tranquillity High School Aquatic Center Modernization Increment 1, Project Manual is hereby deleted in its entirety and replaced with the revised Table of Contents attached hereto as Exhibit B to this Addendum.

4. Addition of Specification Section 011000 – Summary of Work

The Project Manual is hereby revised to include a new specification section entitled:

- Section 011000 – Summary of Work

This new section is attached hereto as Exhibit C to this Addendum and shall be incorporated into the Contract Documents in its entirety.

5. Addition of Specification Section 011200 – Multiple Contract Summary

The Project Manual is hereby revised to include a new specification section entitled:

- Section 011200 – Multiple Contract Summary

This new section is attached hereto as Exhibit D to this Addendum and shall be incorporated into the Contract Documents in its entirety.

6. Addition of Specification Section 012300 – Alternates

The Project Manual is hereby revised to include a new specification section entitled:

- Section 012300 – Alternates



This new section is attached hereto as Exhibit E to this Addendum and shall be incorporated into the Contract Documents in its entirety.

7. Addition of Specification Section 131110 – Swimming Pool Deck Recirculation Equipment

The Project Manual is hereby revised to include a new specification section entitled:

- Section 131110 – Swimming Pool Deck Recirculation Equipment

This new section is attached hereto as Exhibit F to this Addendum and shall be incorporated into the Contract Documents in its entirety.

8. Addition of Specification Section 131115 – Swimming Pool Deck Equipment

The Project Manual is hereby revised to include a new specification section entitled:

- Section 131115 – Swimming Pool Deck Equipment

This new section is attached hereto as Exhibit G to this Addendum and shall be incorporated into the Contract Documents in its entirety.

9. Pre-Bid Requests for Information (RFIs) and Responses

The following RFIs were received by the District prior to the RFI deadline. Responses are provided below. Responses shall be incorporated into the Contract Documents and shall take precedence where in conflict with prior documents.

RFI-001: Please provide an actual existing topographic plan showing what has been and has not been removed, demolished or excavated. As an example demo for the existing teaching pool required for installation of piping, removal of existing pool piping, removal of existing electrical, removal of existing foundations, etc. inefficient.

Response: Please see attached updated topographic plan under Exhibit H

RFI-002: Please advise of any landscape issues where watering will need to be maintained at existing turf or planter areas with the irrigation that is being removed now. It is not showing to replace turf.



Response: Please refer to the attached plan for landscaped areas located within the temporary fenced construction zone but outside the limits of new work. These areas will serve as laydown space during construction and will not require maintenance during the project. Irrigation lines in these areas have already been cut and capped by the District prior to project start. See DSA approved plans.

RFI-003: Please advise of any timing or impact to existing landscape areas with the disconnection and relocation of the existing irrigation booster pump. This will be a long process, and we need to know if watering will need to be maintained by other means and the extent. Does it serve the entire campus or just a select area. We realize that cut overs are specified in the DIV 1 section however, this is generic language. There are multiple critical cutovers that will take extended time.

Response: The irrigation booster pump currently serves the entire high school campus. The campus watering schedule is as follows:

- October – February: lawns watered once or twice, omitted during rain events
- February – June: lawns watered once or twice weekly
- June – September: lawns watered every other day

It is recommended that this work be scheduled for completion prior to the end of June to minimize disruption and to allow for cutover durations of one week or less. Any cutover activities requiring more than one week will be reviewed with the District's Construction Manager and will either be managed directly by the District or addressed through a contract change order.

RFI-004: Please advise if backfill of the existing pool will be performed by this contract as nothing is called for in the documents to do so. Do you have a site that is already DTSC tested to get the soil.

Response: Backfill of existing pool will be performed under this contract. See response to RFI 42. DTSC tested site is the responsibility of the contractor.

RFI-005: Please advise if the existing building has been compacted after demolition of foundations.

Response: Existing site has not been compacted after demolition.

RFI-006: Are there any UG utilities still in place at the building pad and around the pool that need to be removed. If please provide the extent?



Response: All existing utilities have been capped outside the construction area. Abandoned utility piping remains within construction area.

RFI-007: Has an underground location been performed. If not should that be part of our scope?

Response: Underground locating services shall be a part of contractors scope.

RFI-008: On sheet C2.02-1 West of the new pool building there are several notes that say protect utilities and remove utilities. The civil plan does not match the electrical plan or the architectural plan for removal and or protection of these utilities please review and clarify which drawings are correct.

Response: Utility removal and protection shall be coordinated with their perspective sheets. For example, for electrical, the electrical plan shall be referenced for extents of demolition required. See note 10 on the Demolition plan for reference.

RFI-009: The demolition drawing calls for sewer to be disconnected at the gymnasium and then reconnected to a new sewer line to be installed. Please advise as to the timing by which this work will need to be done as we assume the gymnasium will be in constant use during school and summer. The timing of this is critical as site utilities will go in first along with the storm drain that is following the same path to do it at separate times would cause extra cost.

Response: The Contractor shall coordinate all required shutdowns of the sewer system and cutovers with and the District. Active sewer line shutdowns are considered critical and shall be limited to school breaks or weekends unless otherwise approved in writing by the District. The Contractor shall submit a detailed shutdown plan to the District and Construction Manager no less than five (5) business days prior to the proposed shutdown to allow sufficient time for review and approval by all stakeholders. Shutdowns shall be scheduled in alignment with the attached school calendar in Exhibit I. Be advised, that the Tranquillity High School Cafeteria is active during the summer months for summer school and summer feed.

RFI-010: Please advise as to the timing of removal of the baseball home run fence for work under this contract. Is there a specific time of year where this work can be done and not affect games or practice.



Response: The softball field adjacent to the future Aquatic Center is used only during the high school softball season which runs from mid January – early May. Work should be limited to take place outside of this timeline. Contractor shall coordinate this work in advance with the District.

RFI-011: To the West and the east of the new pool it shows to remove existing irrigation. However it does not show to replace all turf in these areas. In fact architectural, civil, and landscape drawings do not match for the patch back of turf in these areas. Please advise of the need to install new turf in these areas after new irrigation has been installed. Also for the pool project we will need a place to store excess spoils to backfill the pool. One of these areas should be considered. Please advise if the school has a preference as all turf will need to be replaced after the dirt is stored. This clarification is to avoid extra costs at a later date and allow for all bidders to figure the same scope of work.

Response: See updated drawings that indicate the extent of the Turf to removed and replaced.

RFI-012: Sheet C.01-1: Storm drain is not shown to the area of the splash pad and slides. This requirement is shown to be needed on the pool drawings. Please review and advise of added storm drain needed.

Response: Review SP6.1, drains are located as needed and some portions of the waterslide area are being slopped off of the pool deck in coordination with the Civil Drawings. No additional drains will be added.

RFI-013: Summary of work notes a schedule is included but we have not located it. Please advise when building Q and building Q will be built. We understand from the job walk that we need to build the pads for this work, however, this is not called for in the civil or architectural drawings. In fact there is no phasing or stopping points shown for this work. For example, site concrete around the buildings is shown to be installed up to the building line, storm drain is called to be connected, electrical panels are called to be installed, trench drain between the buildings is called to be installed. Also, fencing along the building and up to the building will restrict the construction of building Q, mow strip for the fencing will also be an issue along with fine grading for our work after the buildings are built. From the job walk we know that this work will be performed simultaneously. This causes a couple of issues to the workflow and insurance requirements that will be required between the two contractors performing work on the exact same site at the exact same time. Please advise of timing and contractual requirements.



Response: The Sitework Contractor is responsible for performing all grading, preparing the building pads, and installing site utilities to a point 5 feet outside of each building footprint. In addition, the Sitework Contractor is responsible for all concrete flatwork, landscaping, and fencing as shown on the contract documents.

The Sitework Contractor's schedule runs from November 3, 2025, through September 18, 2026. Construction of the buildings will commence only after completion of the building pads and adjacent site utilities by the Sitework Contractor. The building construction duration is anticipated to be approximately 22 weeks.

The District will coordinate phasing to ensure no simultaneous work conflicts between the Sitework Contractor and the Building Contractor. Any required interface will be managed through the District's Construction Manager and the weekly coordination meetings where both contractors are to be present. (Reference Special Conditions requiring weekly coordination meetings and schedule updates)

RFI-014: On sheet C.01-1, there is a 20 foot tall section of fence called at the perimeter of the slide equipment. However, there is only a six foot fence around the slide equipment on the interior near the splash pad. Please advise the purpose of the 20 foot section of fence or the need for a taller ornamental fence on the interior near the splash pad. Also, screen is only called to go to a height of 8'

Response: 20' tall fence is for security and safety of the users. The interior 4' fence surrounding the slide serves a security fence to keep users from underneath the slide. See updated drawings for the height of the screen.

RFI-015: Sheet C.01-1: Near the booster pump civil and architectural show different aggregate base configurations to be installed, please review and coordinate these two drawing. In addition, given the depth of over 7 feet of sewer and storm drain utilities, a greater area will be disturbed than shown. Please advise if additional work will be needed outside of the aggregate base shown now.

Response: The contractor shall protect the surrounding improvements shown to be protected on the Demolition Plan. If protection of these elements isn't possible based on the method the contractor intends to use, then the Geotechnical engineer shall be consulted for other options.



RFI-016: C6.01-1 on the northeast side of building P. Civil shows water with a water valve going into the building, however, plumbing and pool drawings do not show a connection for water here. Please review and confirm the need for water piping.

Response: Updated the plan to show sewer instead of water per the P1.14-1 plan.

RFI-017: On the northwest side of the building there is a sewer stub going into the building, however, plumbing and pool drawings do not show a need for this equipment. Please advise if this piping is required.

Response: See Plumbing Plan Sheet P1.14-1.

RFI-018: At the pool slide area the pool drawings call for the need for water to stub to this location, however, the civil drawings do not show any water to this location and neither did the pool drawings. Please advise how this area will be served with water as required by the pool drawings.

Response: The teaching pool has an 3/4" autofill water line that connects to the supply line head out connection of the backflow preventer located at the equipment room. A backflow preventer shall be installed on the northerly side of Building P as shown on the attached Utility Plan, Sheet C6.01-1. See supplemental drawing for added back flow preventer and water connection Exhibit 'J'.

RFI-019: The pool drawings call for two drinking fountains. 1 to the north of the pool and one near the slide and splash pad. The civil drawings provide a detail for this work, however, the detail was not called out on the civil plans anywhere and is not shown on the plumbing drawings. Please confirm that drinking fountains are required and cut the proper details on the plans as needed.

Response: Drinking fountains are required and the detail is provided on A/CX102.-1

RFI-020: If the drinking fountains are required there does not appear to be any place to drain the drinking fountains. Please advise if dry wells will be required or if sewer will be extended for these drinking fountains.

Response: Sheet C6.01-1 showers drain line connecting to storm drain line. Detail A/CX1.02-1 has been updated

RFI-021: For this sheet the same questions occur for limits of construction in relation to building Q. Please advise as to limits of construction.



Response: See response for RFI 13 regarding Building Q. With respect to Building P, the work associated with this building is included in this sitework bid package.

RFI-022: Sheet CX1.01-1: The structural drawings call for over excavation of building to two feet below the foundation and also shows geofabric with base rock prior to bringing back the excavation to pad level. The civil drawings do not show any such excavation or geofabric. The soils report notes expansive soil that could have an impact overtime on things built on the site. Please advise as how to address the potential for expansive soil throughout the site or if this is a concern.

Response: The site concrete has different requirements and does not require the geofabric. The concrete details show the use of rebar to address expansive soils per the geotech report, therefore the concrete details we show are sufficient.

RFI-023: Sheet CX1.04-1: It appears that chain link rolling gates are shown on the site plan, however, we cannot find a detail for the chain link rolling gates on the drawings please advise if a detail can be provided

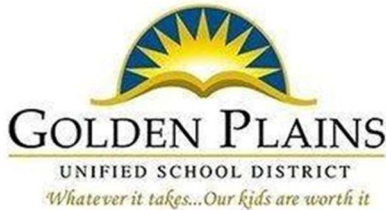
Response: The chainlink roll gate detail is on Sheet CX1.03-1. Sheet C3.01-1 identifies a gate legend that also references the detail

RFI-024: Sheet A1.10-1, Note 3 calls for demolition and reconnection of the solar feed across this site. Please advise of the location of the existing pathway for solar and advise of any solar shutdown requirements that may affect the school as well as the acceptable duration for this work to be accomplished and the solar to be inoperative.

Response: The existing pathway for the solar feed shall be verified in the field by the Contractor through utility locating. Any required solar shutdowns must be coordinated with the District a minimum of 72 hours in advance. Shutdowns shall be scheduled outside of instructional hours (e.g., evenings, weekends, or school breaks) and are expected to be of minimal duration. Any extended outage requires prior written approval from the District. Please refer to the attached school calendar in Exhibit I when planning this work.

RFI-025: A new gas line is also installed which will require the shutdown of gas to the campus. Please advise of acceptable timing and duration for the shutdown and cut over for this work and any impact it may have on the school.

Response: The Contractor shall coordinate all required gas shutdowns and cutovers with both the serving utility and the District. Gas shutdowns are considered critical and shall be



limited to school breaks or weekends. No exceptions. Gas shut downs shall be limited to a maximum duration of one day unless otherwise approved in writing by the District. Any anticipated impacts to campus operations shall be reviewed and scheduled in advance with the District's Construction Manager. The Contractor shall submit a detailed shutdown plan to the District and Construction Manager no less than five (5) business days prior to the proposed shutdown to allow sufficient time for review and approval by all stakeholders. Shutdowns shall be scheduled in alignment with the attached school calendar in Exhibit I.

RFI-026: Note 2.54 calls to remove portion of existing earth for trenching to accommodate new utility work. Please clarify the quantity of "existing earth" required for trenching as opposed to removing the top base rock that is there and allowing trenching to be done normally by sewer and storm drain contractor.

Response: Revised legend and keynote to indicate the removal of gravel and earth to accommodate new work.

RFI-027: Sheet A1.11-1: There is an alternate noted for the Timing system. Notes call for future scoreboards. We have typically only seen one scoreboard for a pool. Please advise as to the reason for two scoreboards. Also, there is no timing wiring or equipment shown for this project including future pathways. Please advise if timing will be required in the future for this facility as it should be included prior to pouring all concrete at the site.

Response: The reason for two future scoreboard locations is because it is undetermined at this time where the future scoreboard will want to be, thus we are providing underground conduit for powering the scoreboard in these to potential locations. The planned timing system will be an on-deck wireless system.

RFI-028: Sheet a 2.10-1 At the shower area it shows a double CMU wall with a chase for plumbing. Once the plumbing is installed there will be no access to this area for maintenance thru the CMU. Please advise if this should be a framed wall to allow for access at a later date.

Response: The shower components are accessed through the front by removing the shower closure panel. Proceed per plan.

RFI-029: Sheet a 3.00-1 At multiple elevations it calls for a 9 foot concession ceiling. From reviewing the other drawings, this is an open ceiling and this is not the concession stand, please confirm.



Response: Concession ceiling height annotation does not belong in this scope and has been removed from the plans.

RFI-030: Sheet a 4.00-1. Again detail 51 calls for a concession ceiling to be at 9 feet in the pool equipment room. Please confirm this is not needed and is an error.

Response: Concession ceiling height annotation does not belong in this scope and has been removed from the plans.

RFI-031: At the surge tank in detail 31 there is no waterproofing shown on the top of the slab only on the CMU walls. Please advise if waterproofing is required or if a special concrete mix will be used to create a waterproof system.

Response: No waterproofing is required on top of the slab.

RFI-032: Sheet a 7.00 dash 1. There is no sealer shown for the CMU. This may cause efflorescence to occur on the CMU over time please advise if a sealer should be installed.

Response: CMU sealer can be found in the specifications manual. Additionally, see sheet A3.00-1 for additional remark letter 'E'.

RFI-033: Sheet A8.01: Detail 3 calls for one inch depressed by 9 inch tall lettering centered and leveled along the full length of the bench face. Please advise where this occurs and the lettering that should be installed. This will affect pricing and should be defined to allow for accurate competitive bidding.

Response: Depressed lettering in concrete benches has been removed.

RFI-034: Sheet A8.01: Detail 7 calls for a painted logo for a full manufacturers range of colors. Please advise of the type of paint and if a sealer will be required to maintain the paint over its lifetime. Additional information and specifications are required to bid this properly. We would recommend staining the concrete for a better result and longevity.

Response: The paint material can be found in the exterior painting specification. Additionally, we added note 3 to the detail to provide non-skid aggregate per manufacturers recommendations.

RFI-035: Sheet A8.01: Details 13,14,15 and 16 show pictures of building elevations of work to be performed. Please advise of any work that needs to be performed or is this just showing the existing condition for DSA approval.



Response: These details are only being shown for DSA approval.

RFI-036: Sheet 8.10-1 Detail 31 calls for self adhering waterproof membrane over base rock. Please advise if this is the proper product to install over base rock and then pour concrete on top for water proofing

Response: Waterproofing details on sheet A8.10-1 are sufficient.

RFI-037: Sheet A8.201 Detail 41 calls for metal plate with kynar 500 finish. Structural calls for a fabricated pan. Please advise if the kynar 500 should be factory applied or should be painted in the field.

Response: Standard Kynar 500 finish is factory applied.

RFI-038: Sheet S 2.01-1 The pool piping plans call for the piping to be supported from the roof structure above. Please advise if the wood structure for the roof has been calculated for the pool piping loads.

Response: Piping loads have been calculated.

RFI-039: Sheet S 2.01-1 It does not appear that any housekeeping pads are shown as required on the pool drawings. Please review and coordinate required pads.

Response: No housekeeping pads needed.

RFI-040: Sheet S4.00-1: Detail 11 Calls for over excavation 5 foot outside of the building and to excavate existing soils to a depth of 24 inches minimum below existing native grade and 12 inches below the deepest footing filled with moisture condition compacted engineered fill to pad grade. It also calls for Tensar interax and XSLT geogrid with 12 inches of Class 2 aggregate base over the top. This will create a 12 foot excavation that will require 12 feet of excavation and slope outside the perimeter of the building at its deepest point. Please advise if this over excavation is required throughout the building for the deepest point or if it can be stepped as it is shown for each surge tank and pump area.

Response: The intent of the gravel raft system is to mitigate the potential for surface manifestation and bearing loss in the event of an earthquake. Because of this, the gravel raft system is recommended under all proposed structure improvements. (e.g. – building P & Q, 10-lane swimming pool, shade structure, scoreboard, water slide) The gravel raft system cannot be stepped, it should be a uniform level layer at the level of the lowest footing, furthermore the depths of the gravel raft may be different from improvement to



improvement because the footing depths vary. Additionally, as indicated in detail 11 the gravel base needs to be a uniform 12" deep, thus allowing for engineered fill soil per the geotechnical report. Lastly, Over excavation below the gravel raft system is not necessary, the bottom of the excavation would just need to be scarified and recompacted in accordance with the geotechnical report.

RFI-041: Sheet S4.00-1: Detail 43 calls for cementitious coating inside of the pit. However, the architectural drawings call for a waterproofing system. Please advise which system should be used. There is also a spec for cementitious material.

Response: The interior of the pit and tanks shall be a cementitious coating.

RFI-042: On the mechanical drawings there is flue ductwork shown to exit the building through the CMU. However, there are no details of how this duct should be supported or how it should penetrate and finish outside of the wall. Please advise as to the proper detail.

Response: See updated sheets M0.00-1 and M1.14-1.

RFI-043: On the mechanical floor plan it shows an exhaust fan penetrating the roof. This is not shown on the structural drawings. Please confirm that the load for the exhaust fan and the penetration have been taken into account in the design as well as any blocking or headers that are needed for the penetration. There is a detail shown on the mechanical drawings but we need to confirm that this is sufficient for the structural engineer.

Response: Details are sufficient and work in conjunction with details on S6.00-1.

RFI-044: On the structural drawings the surge pit and balance tank shows a slab going across the entire area. However, it does not show access to the surge and balance tank for piping and maintenance. The pool drawings do not show access as well. Please advise of the type of access door and opening that will be required for access into those tanks.

Response: See foundation plan on sheet S2.00-1 for hole in slab requirements. See A2.10-1, keynote 13.08. Additionally, revise keynote 13.08 as follows:

"SURGE TANK ACCESS HATCH. PROVIDE BILCO SINGLE LEAF TYPE FT-30 OR APPROVED EQUAL"

RFI-045: FHA201-1 The conduit at building G and building B appears to be surface mounted on the exterior of the building. Please confirm that this is correct. If not, please note that



this should be penetrating the building and run inside the ceiling space to get to the FACP at building B.

Response: The conduits at building G are to be surface mounted and our plans call for painting/finishing to match building.

RFI-046: Sheet SP 1.01-1 It was noted in the job walk that the Myrtha pool will be provided by the owner. However, the drawings do not call for this to be owner furnished and contractor installed. Only the spec in the summary of work makes mention. Please provide a complete material list of what was ordered and is on site for the contractor's installation. Also, provide a list of any items that need to be provided by the contractor that are not going to be provided by the owner and that should be contractor furnished contractor installed related to the Myrtha pool and any equipment. We encountered this on our last Myrtha project and there were many hoes in the order.

Response: Please see attached Exhibit 'K'. Additionally, on the layout equipment schedule and finish schedule on SP1.0-1 and SP1.2-1 indicate which items are to be provided by Myrtha and which items are to be provided by the contractor.

RFI-047: The teaching pool soil fill to get to the new elevation of the bottom of the pool is called to "see the geotechnical report". The geotechnical report does not appear to call for any requirements for the pool backfill itself on top of the existing gunite. Please advise with the requirements for this backfill

Response: Fill would have to come as import and follow the criteria for imported engineered fill identified in Geotech report or a 2-sack sand cement slurry can be used as well.

RFI-048: Sheet SP 5.1-1 Shows water slide controller and splash pad controllers that require power. However, no power is shown on the electrical drawings. Please advise as to the power requirement for these areas and controllers.

Response: Please refer to LSP 9 and LSP 11, which are for the Waterslide controller and the splashpad controller. Please refer to SP4.0 as needed to identify equipment.

RFI-049: Sheet SP 6.01-1 The civil drawings show 1 connection point for all slot drains for both pools. However, the pool drawings appear to show other connections. Please advise if one connection for all slot drains is sufficient.

Response: Provide one connection point for all slot drains as shown in civil drawings.



RFI-050: We would like to know if swimming pool deck equipment as well as swimming pool mechanical equipment specifications will be issued on this project?

Response: Please see attached specification sections 131110 – Swimming Pool Recirculation Equipment and 131115 Swimming Pool Deck Equipment under Exhibits ‘F’ and ‘G’, respectively.

RFI-051: Detail B on sheet CX1.04-1 shows the welding sleeve for the 20' tall Chain Link fence, with a 8 5/8" OD post, but lists the weight of a 6 5/8" post. Which is to be used? Please confirm that the line and end post for the 20' tall CL fence are all 8 5/8".

Response: A 8-5/8" OD post (28.58 lb/ft) shall be used.

RFI-052: Spec section 323113 2.1 D 2 a - calls for 8' tall Privacy Screen. CX1.04-1 shows it at 10' on the 20' tall CL fence. Are 2 different height Privacy Screens required, or one constant 8' level?

Response: The privacy screen shall be 8'-0" tall and securely fastened to the chain link fence with a binding strip on top and center.

RFI-053: CX1.04-1 keynote 17 calls for 1" MESH X 9 GAUGE SLATTED GALVANIZED FABRIC. CL privacy slats are not manufactured to fit a 1" mesh. Since the fence applicable to this section is already calling for Privacy Screen, are privacy slats required? If slats are required will a standard 3.5" x 5" 9ga mesh with privacy slats be acceptable?

Response: No slats are required. Remove "slatted". Use 1" mesh with privacy screen where required per plans.

RFI-054: With the 9 bid items and 6 alternates, there is a lot of pricing to fill in on bid day. Would it be acceptable to fill in the base bid total and the alternates at the time of bid and submit the remaining item costs within 24 hours of the bid?

Response: The District has extended the bid due date from October 3, 2025, 3PM to October 17, 2025, 3PM to allow additional time for preparation of proposals. All base bid and alternate prices, including deductive alternates, are to be submitted with the bid at the time of bid opening. This ensures compliance with Public Contract Code requirements for competitive bidding and allows for a fair and transparent evaluation of all bidders.

RFI-055: What is the estimated value for this project?



Response: The publicly advertised construction budget for this sitework bid package is estimated to be between \$5.8 million to \$6.5 million.

RFI-056: It was mentioned on the job walk of September 11th, but can you confirm there will be temporary hook ups for power and water available to the contractor for construction and that the owner will cover the cost of usage?

Response: During the September 11 and September 15 job walks, Contractors were shown potential sources for temporary water and power in their existing “as-is” condition. The Contractor is responsible for all work necessary to extend and connect these services to the project site, including any required distribution, wiring, or piping. The District will not provide additional provisions beyond those identified during the job walks. The District will, however, cover the cost of utility usage for the duration of the project. All temporary utility connections and related work shall be coordinated in advance with the District’s Construction Manager.

RFI-057: Detail A/CX.01-1 calls for 5in deep concrete flatwork with # 3 at 18” OC rebar reinforcement and 4000psi concrete for regular duty concrete. Is this correct?

Response: Yes the regular duty concrete requires reinforcement per the geotechnical report recommendations due to expansive soils.

RFI-058: Specification section 033000 section 2.13.A.5 calls for color pigment. Please advise where color pigment would be required on the project if applicable.

Response: No color pigment shall be used. Strike in its entirety Section 0330000 “CAST-IN-PLACE CONCRETE” PART 2.05E ‘COLOR PIGMENT’, PART 2.13.A.5 ‘COLOR PIGMENT’. Additionally, Strike in its entirety Section 0333000 “ARCHITECTURAL CONCRETE” PART 2.3.A.1

RFI-059: Specification section 011000-1.5-C calls Owner Furnished Contractor Installed (OFCl) of Myrtha Pool 10 Lane System Components. Can a list of all components to be OFCl be provided for this project?

Response: Please see attached Exhibit ‘K’.

RFI-060: Could you please confirm Increment 2 (Building Q) is not part of this contract? On title sheet, project description, it states Increment 2 but does not clarify. Are the utilities, building pads for increment 2 performed under increment 1?



Response: Construction of Increment 2, Buildings Q, will be performed under a separate contract. The Sitework Contractor, under this contract, is responsible for grading the entire site, including preparation of the building pads for Buildings Q and R. The Sitework Contractor is also responsible for bringing site utilities and electrical services to within 5 feet of each building footprint, as well as completing all concrete flatwork, landscaping, and fencing as shown in the contract documents. The Increment 2 Contractor is responsible for final connections of utilities into the Buildings Q and R.

RFI-061: Is there a bid form available for this project?

Response: Yes. A revised bid form has been provided in this Addendum, reference Exhibit 'A'.

RFI-062: Will there be any requirements for add/alternate pricing on this project?

Response: Yes. Deduct alternates are required for this project. This requirement is identified on the revised bid form included in this Addendum, reference Exhibit 'A'. Also refer to the new specification section 012300, Alternates, included in Exhibit 'E'. Pricing for deduct alternates must be submitted at bid time.

RFI-063: Will there be any phasing requirements on increment 1 part of the project?

Response: No phasing is required by the District. However, the Sitework Contractor must work in close coordination with the Design/Build Contractor for Buildings Q and R, as well as the District's Construction Manager. The Sitework Contractor's schedule is November 3, 2025, through September 18, 2026. Work includes grading, preparation of the building pads, and installation of site utilities to a point 5 feet outside of each building footprint. This scope must be completed early enough to allow the Building Contractor to commence their work without delay. Building Contractor to mobilize within 2 weeks of pad completion. The building construction duration is anticipated to be approximately 22 weeks.

RFI-064: Is there a designated laydown area for the general contractor & subcontractors?

Response: Please refer to the attached Site Logistics Plan originally included in the Job Walk Agenda for the September 11 and September 15 site conferences. Reference Exhibit 'L' included in this Addendum. In addition, landscaped areas located within the temporary fenced construction zone but outside the limits of new work may be used as laydown space during construction. These areas will not require maintenance during the project. Irrigation lines in these areas were cut and capped by the District prior to project start.



RFI-065: Should the contractor carry any allowances for the project?

Response: Yes. An allowance for unforeseen conditions must be included in the Contractor's base bid. This requirement is indicated on the revised bid form included in this Addendum No. 003 per Exhibit 'A'.

RFI-066: Specification section 042200-2.1-A-4 refers to "Pre-Faced Units" is this section applicable to this project?

Response: Pre-faced units are not applicable to this project. Strike in its entirety Section 042200 "CONCRETE UNIT MASONRY" PART 2.1.A.4

RFI-067: Specification section 042200-2.1-A-4 refers to CMU units with integral water repellent, Specification section 042200 2.1 A 4 does this section apply to this project. If so can a list of approved manufacturers be provided. Else, can standard cement CMU be used with a water repellent coating applied over the surface?

Response: Integral water repellent is not applicable to this project. Strike in its entirety Section 042200 "CONCRETE UNIT MASONRY" PART 2.1.A.5

Additionally, see PART 2.5.A. of Section 042200 "CONCRETE UNIT MASONRY" for sealer requirements.

RFI-068: Plan sheet A3.00-1 detail 53 east shower elevation references detail A8.20-1 detail 42 section is referenced, however, this section does not show how the tile terminates on the CMU chase wall. Please advise.

Response: Tile finish is to terminate at 8'-8" as indicated on the drawings, which is effectively the top CMU block of the chase wall.

RFI-069: Can the exterior shower tile be set with thin set directly on the CMU wall or will there be any waterproofing requirements? (provide details if possible top of tile, base of wall etc.).

Response: Waterproofing and tile assembly method can be found in specifications section 093013.



RFI-070: The slab at the exterior shower is shown as flat, does it need to slope to the floor drain show on plan sheet P1.14-1-2? & is the concrete in this area the same as all other flatwork in the surrounding area?

Response: The edges of the exterior shower per grading plan sheet C5.01-1 are purposely designed to be flat to contain shower drainage. See GENERAL NOTE 'C' on sheet A2.10-1 for sloping requirements.

RFI-071: What are the insurance requirements for this project? (builder's risk, flood, earthquake, fire, auto & limits etc.).

Response: Insurance requirements are set forth in the original bid documents posted to the District website: 00 2025-0801 GPUUSD THS Aquatic Center Sitework Bid Package – Contract Docs, Insurance. Builder's Risk and Earthquake insurance are not required.

RFI-072: Was the SWPPP plan requirements and costs be covered by the Design/Build contractor hired for increment 2 of the project to include increment 1 (NOI, NOT, QSP, QSD, there could be some overlap and/or confusion with the CA Regional Water Board)?

Response: All SWPPP requirements for the project fall within the scope of the Increment 1 Sitework Contractor, including preparation and filing of the NOI/NOT, as well as provision of a QSP and QSD. The Increment 2 Design/Build Contractor is responsible only for maintaining the SWPPP measures installed by the Increment 1 Sitework Contractor during their work. Once the Increment 2 Contractor takes over their portion of the work, they are responsible for any required updates, inspections, and reporting associated with the SWPPP for their scope.

RFI-073: Is the scoreboard shown on plan sheets SB0.1-1 through SB0.9-1 used for a competition timing system for the competition pool or a scoreboard for softball field? If for the competition pool, is it to be included in the pool contractors scope of work? If so, please provide detailed spec and equipment list for a competitive timing system. If there is a competitive timing system for swimming, is Colorado Timing System considered an equal to Daktronics? Deduct Alternate #5 states "Delete Above Ground Equipment and Components of Timing System at Competition Pool." What equipment does this include?

Response: The SB sheet scoreboard is for the softball field. See response to RFI 27.

RFI-074: There are no details provided for the Teaching Pool Myrtha Pool wall attachment system. Please provide.



Response: See detail 5/SP2.4-1 of the DSA approved plans.

RFI-075: Is there a 4" perforated drain pipe & observation well required for both the Teaching Pool & Competition Pool? If so, please provide observation well location and detail (section view).

Response: Detail of well is shown on 6/SP2.3 The observation well is not an engineered piece and the location is not critical and is intended to be field located. Standard practice is to place the well within 5'-0" of the pool wall flush in deck. Please provide submittal for approval for the location of the well.

RFI-076: Please provide Owner Furnished Myrtha Materials List for review for both the competition pool & teaching pool.

Response: Please see attached Exhibit 'K'.

RFI-077: There are no deferred submittals listed on plan sheet G0.00-1. That said, the Division 131176 spec states that the contractor is to submit engineered shop drawings for approval of the waterslide tower and associated footings. Has the waterslide flume tower and associated footing drawings shown on WS1.01 – WS1.20-1 been approved by the building department, DSA, and Health department already? Or is it the Contractor's responsibility to produce additional engineered shop drawings for waterslide tower and footings and submit for final approval through local jurisdictions having authority?

Response: Correct there are no deferred submittals. Waterslide tower, slide flume and associated footings, have been approved by the authorities having jurisdiction (Division of the State Architect DSA, Fresno County Health Department).

RFI-078: The project schedule shows anticipated start date of November 3, 2025 and completion date of September 18, 2026. Did the District account for the lead time of the waterslide tower & flume? Currently, the typical lead time on the waterslide flume & tower fabrications and transportation is approximately 6 months. This does not take into account installation nor DOSH approval process before project completion date. We suggest the project completion date be extended to accommodate waterslide procurement process and installation/final approval.

Response: Please note the updated project schedule shows a start date of September 10 2025 and updated to September 25th 2026. The District and design team have obtained all



necessary approvals of all state and local agencies. Please refer to DSA approved plan. If necessary, DOSH approvals is the responsibility of the contractor.

RFI-079: Is a hose bibb required at the top of the waterslide tower? Dosh typically requires this on waterslides.

Response: Contractor to include hose bib with vacuum break secured 18" above waterslide platform, connected to backflow preventor.

RFI-080: Deductive alternate #4 states: "Delete Above Ground Equipment and Components at Splash Pad." Please provide more specific information for this deduction. We need a list of above ground equipment items and "components" that are included in this deductive alternate.

Response: Items 1, 3, 4, 5, and 7 from the Splashpad Feature Schedule on SP1.4 shall be deducted from the bid. Also, all equipment labeled "Splashpad Equipment" on SP4.0 shall be deducted. Contractor to include all spray features and all play feature foundations per SP2.2. All piping to deducted features shall be brought to the surface and plugged, and all piping into the equipment room shall be capped. Equipment room pipe supports and electrical conduit shall be installed to accommodate future splashpad piping and equipment. Rain diverter shall be set to Storm Drain.

RFI-081: Please advise if the following spec sections are missing from the contract documents: "13 11 10 Swimming Pool Recirculation Equipment", "13 11 22 Swimming Pool Shotcrete," "13 11 15 Swimming Pool Deck Equipment". We do not see typical pool equipment listed on the plans or specs ((ie pool covers, water chemistry test kits, pool safety equipment (required by health department), pool maintenance equipment, etc.)).

Response: Please see attached specification sections 131110 – Swimming Pool Recirculation Equipment & 131115 Swimming Pool Deck Equipment per Exhibits 'F' and 'G', respectively.

Additionally, there is no need for specification section 131122 – SWIMMING POOL SHOTCRETE.

RFI-082: What items, if any, are Owner Provided and Contractor Installed?

Response: Myrtha modular pool system. Please see Exhibit 'K' for additional information.



RFI-083: With respect to Notes 10 and 11 on Sheet E201-1 for the MV cable, how many cables are there?

Response: (4) #1 medium voltage cables.

RFI-084: Can you please confirm whether the work depicted on FA201-1 Fire Alarm Site Plan is redundant to the work depicted on the below 3 prints:

E201-1 Overall Site Plan, Notes 7, 8, and 9

E202-1 Enlarged Site Plan, Notes 10 and 13

E401-1 Building P – Power and Lighting, Notes 27 and 30

Response: E201-1 Overall Site Plan, Notes 7, 8, and 9 - Notes 7 & 9 are redundant. Utilize what is being called out on the electrical plans E201-1. Note 8 is calling out for the conduit sizes on E201-1 and FA 201-1 is calling out the wire types in that conduit for fire alarm so it is needed.

E202-1 Enlarged Site Plan, Notes 10 and 13 - Notes 10 & 13 on E202-1 are also calling out conduit sizes, where as FA-201-1 is calling out the wire types for fire alarm in that conduit so it is needed.

E401-1 Building P – Power and Lighting, Notes 27 and 30- The same goes for E401-1, conduit sizes are being called out, where as the FA sheets are calling out for the wire sizes in that conduit so it is needed.

RFI-085: For Building P, is EMT sufficient throughout the building, or are some areas requiring corrosion resistance, and if so, which areas, and which is the preferred method to obtain corrosion resistance; Ocal or stainless conduit?

Response: For the inside of the pool building, PVC Schedule 80 is preferred. For the exterior of the building, rigid steel conduit is preferred and areas high up on the exterior where no damage can occur EMT is fine.

RFI-086: Is there a Responsibility Matrix that can be provided detailing scope for the EC vs Pool Contractor?

Response: It is the responsibility of general contractor to coordinate the scope of work between electrical sub contractors.

RFI-087: Sheet E401-1, Note 33 states, “Contractor shall install Verkada CCTV Camera with ¾” conduit and Cat 6A cable to IDF. Contractor shall coordinate exact make/model with IT Department”. Please advise of the camera make/model. Are these cameras being provided



by others or do we include in our proposal? Would you like us to provide the 1 year licensing for each camera?

Response: These cameras are a part of the bid, and shall be bid per plans. Please provide a submittal for final approval by the District.

RFI-088: Plans call for rebar cages (A/CX1.03-1) for the 8' high chain link fence with posts footings 7' deep. Standard footing depth is half height of fence and standard footing diameter is 3X diameter of post. Do they really want 7' deep footings with rebar for an 8' high chain link fence ? This will GREATLY increase cost and is completely unnecessary.

Response: The footing design criteria is based on the parameters provided in the geotechnical report, which has been reviewed and approved by the California Geological Survey and Division of the State Architect; therefore; it is advised that bidders provide pricing based on the approved design.

RFI-089: There are a few places on the plans in the 8' high fence where two posts are so close together that they will be in the same hole and two rebar cages will not fit (for example, gates near building Q).

Response: The line work for the fencing is diagrammatic and do not specifically define the exact location of all line post or gate post. The criteria for layout of the fence posts shall follow the maximum spacing as specified on CX1.03-1 and CX1.04-1. With that said, we understand the concern, but it does not change the material pricing, labor, or schedule, thus would best be coordinated with field conditions, by the contractor, and provide as a submittal for review by the design team.

RFI-090: Detail (A/CX1.04-1) - #17 in legend calls for 1" mesh X 9 gauge slatted galvanized fabric. This is not a manufactured item, it cannot be done. You can have 1" mesh or slatted fabric, but not both. For slatted fabric we recommend Viewguard Plus with galvanized wire (see attached). Please revise details to specify whether chain link is slatted or 1".

Response: Privacy mesh shall be used. refer to updated DSA approved drawings.

RFI-091: The plans call out windscreen or slatted fabric on the fence around the pool. This is a HUGE safety concern because if someone has entered the pool area and is drowning, they can't be seen from outside the pool area. We never install visibility barriers around pools at schools.

Response: Provide privacy screening per plan.



RFI-092: 5. S.401-1 calls out 20' fence posts as 8 5/8"OD and 12' deep footings with rebar. The backstops at that site are 30' high with 6 5/8"OD posts 9' deep footings and have no rebar. Please confirm that 20' high fence to be constructed with bigger posts and footings than existing 30' high fence.

Response: Contractor to install new fencing per approved plans.

RFI-093: There are multiple gates in G0.02-1 that lack any notation.

Response: Refer to sheet C3.01-1 for gate annotations and schedule.

RFI-094: On page C3.01-1, there is a section titled "Limits of Concrete Improvements by Others." Could you please clarify who is considered "others" in this context? Is this section relevant to this project?

Response: 'Others' refers to the Aquatics pool deck drawings. see sheets SP6.0-1, SP6.1-1, SP6.2-1, SP6.3-1.

RFI-095: The water fountain depicted on page C3.01-1 lacks a cooling mechanism. Please verify this information.

Response: Cooling mechanism is not available on the outdoor fountains selected. Proceed as planned .

RFI-096: On page A2-10-1, item 3.11 is missing from the plans.

Response: See 24/A2.10-1 for keynote annotation.

RFI-097: On page 4.00-1, note 10.05 specifies a "1/2" THK. GALVANIZED METAL PLATE CANOPY CENTERED OVER." Could you please clarify if a thickness of 1/2 inch is mandatory?

Response: 1/2" thickness is mandatory per the structural calculations.

RFI-098: The scoreboard structure does not indicate the color profile. The scoreboard manufacturer does not provide the structure. Is the contractor required to provide shop drawings and manufacturing Specifications prior to fabrication? Please provide clarification on this matter.

Response: Refer to SB sheets of the DSA approved plans.

RFI-099: Is there a slot drain or dropout for the splash pad?



Response: The splashpad as independent drains. During the swim season, these drain to the surge tank. On the off season, we have a valve box that allows the owners to switch the flow from the surge tank to the storm drain.

RFI-100: Please verify that the slot drain requires 6” Sch 40 PVC or another material. Additionally, please provide the method of attaching stainless steel anchors to the drain pipe.

Response: Material confirmed. Anchors are screwed directly into the piping. Note, an experience pool deck contractor is required on this project.

RFI-101: Who is responsible for preparing the soils report after excavation for the competition pool?

Response: All third party inspections including special inspections, geotechnical observations are contracted direct through the District.

RFI-102: Is it safe to assume that all the components on the plans that have the verbiage “Myrtha” are OFCI?

Response: See previous responses regarding OFCI items. Also see Exhibit ‘K’ for Myrtha Pools provided items.

RFI-103: Please provide additional information about the patio depicted on page C3.01-1.

Response: There is no reference to patio on sheet C3.01-1. Refer to DSA approved plans.

RFI-104: Please confirm that the Painted Concrete Logo will be painted on top of the concrete.

Response: Correct the logo will be painted on top of the concrete per specification section 099114 Exterior Painting.

RFI-105: The page SP2.1 is missing.

Response: SP2.1-1 is included in the plan set. Refer to DSA approved plans.

RFI-106: Could you please provide the extent of new chainlink fencing that is not clear, particularly with the large footprint of the enclosed area? A clear distinction between new fencing and existing fencing would be helpful. Additionally, could you please provide further information regarding the climb resistance fence fabric, as indicated on page A1.11?



Response: Refer to sheet C3.01-1 of DSA approved plans.

RFI-107: There are potential two locations for scoreboards. Please verify the number of scoreboards required for this project.

Response: There is only (1) softball scoreboard required for this project. See SB sheet of DSA approved plans.

RFI-108: The scoreboard structure is not supplied by the scoreboard supplier and needs to be engineered and manufactured. Is there DSA-approved shop drawings for this structure? If not, this needs to be done and approved by the contractor.

Response: Refer to SB sheets of the DSA approved plans.

RFI-109: What is the finish for decorative fence around the water slide?

Response: Refer to F/CX1.04-1 and specifications section 323119 – DECORATIVE METAL FENCES AND GATES.

RFI-110: Please provide the location and extent of the 20' high fence. Is there a rebar cage required for the 12' footing?

Response: Refer to keynote 10 on detail A/CX1.04-1.

RFI-111: What subcontractor installed the pathway conduits from FACP, MDF and Switchgear to the pull boxes located at the west corner of the site?

Response: Sebastian (electrical sub contractor) is responsible for the scope to provide conduit pathways from MDF, FACP, and main switch gear to pull boxes.

10. **Changes to Prior Addenda:** This Addendum No. 03 supplements and revises the documents as previously modified by Addenda Nos. 01 and 02. Except as modified herein, all provisions of prior addenda remain unchanged and in full force and effect.

11. **Other Documents:** None.

Each bidder shall acknowledge receipt of this Addendum on the Bid Form. Failure to do so may render the bid non-responsive.



EXHIBIT A

3. BID FORMS

Board of Education of the Golden Plains Unified School District

Dear Members of the Board of Education:

The undersigned, doing business under the name of _____, having carefully examined the location of the proposed work, the local conditions of the place where the work is to be done, the Notice to Bidders, the General Conditions, the Instructions to Bidders, the Plans and Specifications, and all other Contract Documents for the proposed installation services associated with the GOLDEN PLAINS UNIFIED SCHOOL DISTRICT – TRANQUILLITY HIGH SCHOOL AQUATIC CENTER – SITEWORK BID PACKAGE ("Project"), and having accurately completed the Bidder's Questionnaire, proposes to perform all work and activities in accordance with the Contract Documents, including all of its component parts, and to furnish all required labor, materials, equipment, transportation and services required for the construction of the Project in strict conformity with the Contract Documents, including the Plans and Specifications, as follows:

Bid Item	Description	Cost of Item
1	General Conditions and General Requirements	
2	Sitework (grading, site utilities, hardscape, landscape, fences/gates, site electrical, etc.)	
3	Pool Equipment Building	
4	10-Lane Competition Pool	
5	Learn to Swim Pool	
6	Slide	
7	Splash Pad	
8	Scoreboard	
9	Shade Structure	
10	Unforeseen Conditions Allowance	\$ 120,000
	TOTAL:	

BASE BID:

For the sum of

Dollars (\$ _____).

DEDUCTIVE ALTERNATES:

Deductive Alternate #1: Delete Cast-in-Place Concrete Seat Walls

Subtract _____ Dollars (\$ _____)

Deductive Alternate #2: Delete Steel Hoist in Pool Equipment Building

Subtract _____ Dollars (\$ _____)

Deductive Alternate #3: Delete Shade Structure

Subtract _____ Dollars (\$ _____)

Deductive Alternate #4: Delete Above Ground Equipment and Components at Splash Pad

Subtract _____ Dollars (\$ _____)

Deductive Alternate #5: Delete Above Ground Equipment and Components of Timing System at Competition Pool

Subtract _____ Dollars (\$ _____)

Deductive Alternate #6: Delete pathway for power, low voltage and fire alarm systems from MDF, FACP and Main Switchgear to pull boxes at northwest corner of site

Subtract _____ Dollars (\$ _____)

Deductive Alternate #7: Delete Medium Voltage pathway and cabling

Subtract _____ Dollars (\$ _____)

The undersigned has checked carefully all the above figures and understands that the District is not responsible for any errors or omissions on the part of the undersigned in making this bid.

Enclosed find certified or cashier's check no. _____ of the
_____ Bank _____ for
_____ Dollars (\$) or Bidder's Bond of the
_____ surety company in an amount of not less than ten percent
(10%) of the entire bid. The undersigned further agrees, on the acceptance of this proposal,
to execute the Contract and provide the required bonds and insurance and that in case of
default in executing these documents within the time fixed by the Contract Documents, the
proceeds of the check or bond accompanying this bid shall be forfeited and shall become the
property of the District.

Contractor agrees to commence the work within the time specified in the Notice to Proceed.
It is understood that this bid is based upon completing the work within the number of calendar
days specified in the Contract Documents.

ADDENDA:

Receipt of the following addenda is hereby acknowledged:

Addendum # _____ Dated: _____ Addendum # _____ Dated: _____
Addendum # _____ Dated: _____ Addendum # _____ Dated: _____
Addendum # _____ Dated: _____ Addendum # _____ Dated: _____

Respectfully submitted,

Company: _____

Address: _____

By: _____

(Please Print Or Type)

Signature: _____

Title: _____

Date: _____

Telephone: _____

Contractor's License No: _____ Expiration Date _____

Required Attachments:

- Subcontractor List Form
- Workers' Compensation Certificate
- Non-Collusion Declaration
- Bid Bond (or Cashier's or Certified Check)



EXHIBIT B

SECTION 000110
TABLE OF CONTENTS

INTRODUCTORY INFORMATION

000101	PROJECT TITLE PAGE
000102	SEALS PAGE
000110	TABLE OF CONTENTS

**DIVISION 00
CONTRACT REQUIREMENTS**

PROVIDED BY OWNER

**DIVISION 01
GENERAL REQUIREMENTS**

010000	GENERAL REQUIREMENTS
011000	SUMMARY OF WORK
011200	MULTIPLE CONTRACT SUMMARY
012300	ALTERNATES
012500	SUBSTITUTION PROCEDURES
012600	CONTRACT MODIFICATION PROCEDURES
012900	PAYMENT PROCEDURES
013100	PROJECT MANAGEMENT AND COORDINATION
013200	CONSTRUCTION PROGRESS DOCUMENTATION
013233	PHOTOGRAPHIC DOCUMENTATION
013300	SUBMITTAL PROCEDURES
014000	QUALITY REQUIREMENTS
014200	REFERENCES
015000	TEMPORARY FACILITIES AND CONTROLS
016000	PRODUCT REQUIREMENTS
017300	EXECUTION
017419	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
017700	CLOSEOUT PROCEDURES
017823	OPERATIONS AND MAINTENANCE DATA
017839	PROJECT RECORD DOCUMENTS
017900	DEMONSTRATION AND TRAINING
018113	SUSTAINABLE DESIGN REQUIREMENTS – CALGREEN NON-RESIDENTIAL MANDATORY

**DIVISION 02
EXISTING CONDITIONS**

023000 SUBSURFACE INVESTIGATION
024119 SELECTIVE DEMOLITION

**DIVISION 03
CONCRETE**

031000 CONCRETE FORMING AND ACCESSORIES
032000 CONCRETE REINFORCING
033000 CAST-IN-PLACE CONCRETE
033300 ARCHITECTURAL CONCRETE

**DIVISION 04
MASONRY**

040513 MASONRY MORTARING
040516 MASONRY GROUTING
042200 CONCRETE UNIT MASONRY

**DIVISION 05
METAL**

051200 STRUCTURAL STEEL FRAMING

**DIVISION 06
WOOD AND PLASTICS**

061000 ROUGH CARPENTRY
061700 SHOP FABRICATED STRUCTURAL WOOD

**DIVISION 07
THERMAL AND MOISTURE PROTECTION**

071326 SELF-ADHERING SHEET WATERPROOFING
072100 THERMAL INSULATION
072600 VAPOR RETARDERS
075419 POLYVINYL-CHLORIDE (PVC/TPA) ROOFING
076200 SHEET METAL FLASHING AND TRIM
079200 JOINT SEALANTS

**DIVISION 08
OPENINGS**

081613 FIBERGLASS DOORS & FRAMES
087100 DOOR HARDWARE

**DIVISION 09
FINISHES**

- 093013 CERAMIC TILING
- 099114 EXTERIOR PAINTING (MPI STANDARDS)
- 099124 INTERIOR PAINTING (MPI STANDARDS)

**DIVISION 10
SPECIALTIES**

- 101423 ROOM-IDENTIFICATION PANEL SIGNAGE

**DIVISION 11
EQUIPMENT**

(NOT USED)

**DIVISION 12
FURNISHINGS**

(NOT USED)

**DIVISION 13
SPECIAL CONSTRUCTION**

- 131100 SWIMMING POOL CONTRACTOR GENERAL REQUIREMENTS
- 131105 SWIMMING POOL REQUIRED TESTING AND INSPECTIONS
- 131109 SWIMMING POOL STARTUP
- 131110 SWIMMING POOL RECIRCULATION EQUIPMENT
- 131111 SWIMMING POOL PIPING
- 131115 SWIMMING POOL DECK EQUIPMENT
- 131116 SWIMMING POOL UNDERWATER LIGHTS
- 131120 SWIMMING POOL CAST-IN-PLACE CONCRETE
- 131121 SWIMMING POOL DECK CAST-IN-PLACE CONCRETE
- 131124 SWIMMING POOL MANUFACTURER
- 131125 SWIMMING POOL CEMENTITIOUS WATERPROOFING
- 131130 SWIMMING POOL SEALANTS AND CAULKING
- 131145 SWIMMING POOL TRIM TILE
- 131176 WATERSLIDES
- 131180 SPRAY GROUNDS

**DIVISION 14
CONVEYING EQUIPMENT**

(NOT USED)

DIVISION 15 - 20

(RESERVED)

**DIVISION 21
FIRE SUPPRESSION**

(NOT USED)

**DIVISION 22
PLUMBING**

220000 PLUMBING

**DIVISION 23
HEATING, VENTILATING, AND AIR CONDITIONING**

230000 HEATING, VENTILATION, AND AIR-CONDITIONING

230013 GENERAL MECHANICAL REQUIREMENTS

**DIVISION 25
INTEGRATED AUTOMATION**

(NOT USED)

**DIVISION 26
ELECTRICAL**

260500 GENERAL ELECTRICAL REQUIREMENTS

260513 MEDIUM VOLTAGE CABLE

260519 LINE VOLTAGE WIRE AND CABLE

260526 GROUNDING

260533 OUTLET, JUNCTION AND PULL BOXES

260542 CONDUITS, RACEWAYS AND FITTINGS

260543 UNDERGROUND DUCTS

260544 IN-GRADE PULL BOXES

260923 DISTRIBUTED DIGITAL LIGHTING CONTROL
SYSTEMS

260924 DIGITAL LIGHTING MANAGEMENT RELAY CONTROL
PANEL

262200 TRANSFORMERS

262416 PANELBOARDS AND DISTRIBUTION PANELS

262726 DEVICES WIRING

**DIVISION 26
ELECTRICAL (CONTINUED)**

262816 CIRCUIT BREAKERS
265100 LIGHTING

**DIVISION 27
COMMUNICATIONS**

271000 STRUCTURED CABLING

**DIVISION 28
ELECTRONIC SAFETY AND SECURITY**

283100 NETWORKED FIRE ALARM AND MASS NOTIFICATION
SYSTEM

**DIVISION 31
EARTHWORK**

311100 SITE CLEARING
312000 EARTHWORK
312222 SOIL MATERIALS
312333 TRENCH EXCAVATION AND BACKFILL

**DIVISION 32
EXTERIOR IMPROVEMENTS**

320190 EXISTING LANDSCAPE PROTECTION
321126 AGGREGATE BASE
321313 SITE CONCRETE IMPROVEMENTS
321315 SITE CONCRETE REINFORCEMENT
323113 CHAIN LINK FENCING
323119 DECORATIVE METAL FENCES AND GATES
328400 IRRIGATION SYSTEMS
329000 LANDSCAPE PLANTING

**DIVISION 33
UTILITIES**

331200 WATER UTILITIES
333000 SITE SEWER SYSTEMS
334000 STORM DRAINAGE

APPENDIX

- No. 1 GEOTECHNICAL AND GEOHAZARD INVESTIGATION
REPORT
- No. 2 GEOTECHNICAL AND GEOHAZARD SUPPLEMENTAL
DESIGN LETTER
- No. 3 DSA 403 C: CALGREEN CODE SUBMITTAL
CHECKLIST

END OF SECTION



EXHIBIT C

SECTION 011000
SUMMARY OF WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Work performed by Owner.
5. Work under Owner's separate contracts.
6. Owner's product purchase contracts.
7. Owner-furnished/Contractor-installed (OFI) products.
8. Contractor-furnished/Contractor-installed (CFI) products.
9. Contractor's use of site and premises.
10. Coordination with occupants.
11. Work restrictions.
12. Specification and Drawing conventions.
13. Miscellaneous provisions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Section 017300 "Execution" for coordination of Owner-installed products.

1.2 PROJECT INFORMATION

A. Project Identification: 791 Tranquillity High School Aquatic Center Modernization.

1. Project Location: 6052 Juancha Ave, Tranquillity, CA 93668.

B. Owner: Golden Plains Unified School District.

1. Owner's Representative: Victor Martinez, vmartinez@gpusd.org.

C. Architect: Tony Pavone, AGD Architects, tony@andrewgoodwin.us.

D. Construction Manager: Central Valley Construction Management.

1. Construction Manager Representative: Blanca Mercedes, bmercedes@centralvalleycm.com.
2. Construction Manager has been engaged for this Project to serve as an advisor to Owner and to provide assistance in administering the Contract for construction between Owner and Contractor, according to a separate contract between

Owner and Construction Manager.

- a. Construction Manager also serves as Project coordinator, as defined in Section 011200 "Multiple Contract Summary."

E. Design-BUILDER: SAS Constructions.

1. Design-builder has been engaged for Increment 2 Building 'Q' of this Project to provide architectural and engineering services and to serve as Project's constructor of the buildings. The terms "design-builder" and "Contractor" are synonymous.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of this Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. Increment 1 project scope includes new cmu masonry pool equipment building, Myrtha Modular 10-lane competition pool, Myrtha renovation learn to swim pool, 20-foot water slide, kids splash and play area, softball scoreboard, perimeter fencing, landscape, associated site lighting, utilities within 5 feet of Building 'Q' and other Work indicated in the Contract Documents.

B. Type of Contract:

1. Project will be constructed under coordinated, concurrent multiple contracts. See Section 011200 "Multiple Contract Summary" for a list of multiple contracts, a description of work included under each of the multiple contracts, and the responsibilities of Project coordinator.

1.4 WORK UNDER OWNER'S SEPARATE CONTRACTS

A. Work with Separate Contractors: Cooperate fully with Owner's separate contractors, so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under Owner's separate contracts.

B. Concurrent Work: Owner has awarded separate contract(s) for the following construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.

1. Electrical Pathways: To Sebastian Corp for conduit pathways for low voltage systems and fire alarm from MDF and FACP in Building 'B' to in-grade pull boxes, and conduit pathways for power from main switch gear to in-grade pull boxes. See 2/E201-1 for additional information.
2. Medium Voltage Pathway and Cabling: To Air Sun Inc. for relocation of medium voltage pathway and cabling from in-grade pull box at point of connection on campus property near Daniels Ave. to new in-grade pull box. See sheet E201-1 keynotes 10, 11, 12 and 17.

3. Increment 2: To SAS Constructions for construction of building Q.

1.5 OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFCI) PRODUCTS

- A. Owner's Responsibilities: Owner will furnish products indicated and perform the following, as applicable:
 1. Provide to Contractor Owner-reviewed Product Data, Shop Drawings, and Samples.
 2. Provide for delivery of Owner-furnished products to Project site.
 3. Upon delivery, inspect, with Contractor present, delivered items.
 - a. If Owner-furnished products are damaged, defective, or missing, arrange for replacement.
 4. Obtain manufacturer's inspections, service, and warranties.
 5. Inform Contractor of earliest available delivery date for Owner-furnished products.
- B. Contractor's Responsibilities: The Work includes the following, as applicable:
 1. Designate delivery dates of Owner-furnished products in Contractor's construction schedule, utilizing Owner-furnished earliest available delivery dates.
 2. Review Owner-reviewed Product Data, Shop Drawings, and Samples, noting discrepancies and other issues in providing for Owner-furnished products in the Work.
 3. Receive, unload, handle, store, protect, and install Owner-furnished products.
 4. Make building services connections for Owner-furnished products.
 5. Protect Owner-furnished products from damage during storage, handling, and installation and prior to Substantial Completion.
 6. Repair or replace Owner-furnished products damaged following receipt.
- C. Owner-Furnished/Contractor-Installed (OFCI) Products:
 1. Myrtha Pool System components for 10-lane swimming pool and learn to swim pool.

1.6 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Limits on Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 1. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for

storage of materials.

- a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.7 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy Project site and existing adjacent building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 - 1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.
 - 2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to between 7:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
 - 1. Weekend Hours: Submit a written request to the Architect for work hours outside of the indicated on-site work hours..
 - 2. Early Morning Hours: Submit a written request to the Architect for work hours outside of the indicated on-site work hours..
 - 3. Work in Existing Building: Shall be coordinated with Owner and site staff. Submit a written request to the Architect for work hours outside of the indicated on-site work hours..
 - 4. Work outside of the indicated on-site work hours are subject to review by the

Owner

- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
 - 1. Notify Architect Construction Manager Owner not less than two business days in advance of proposed utility interruptions.
 - 2. Obtain Architect's Construction Manager's Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Architect Construction Manager Owner not less than two business days in advance of proposed disruptive operations.
 - 2. Obtain Architect's Construction Manager's Owner's written permission before proceeding with disruptive operations.
- E. Smoking and Controlled Substance Restrictions: Use of tobacco products , alcoholic beverages, and other controlled substances on Project site is not permitted.
- F. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
 - 1. Maintain list of approved screened personnel with Owner's representative.

1.9 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 - 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 - 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.

- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
 - 1. The most restrictive requirements shall apply where conflicts occur between Division 00 Contracting Requirements and Division 01 General Requirements; Architect shall make the final decision on which requirement(s) are applicable.
- D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings.
 - 3. Provide heavy duty commercial grade products and materials where requirements for materials and products indicated on the Drawings are not specified.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION



EXHIBIT D

SECTION 011200
MULTIPLE CONTRACT SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes a summary of each contract, including responsibilities for coordination and temporary facilities and controls.
 - 1. Increment 1 Site Work Contract
 - 2. Increment 2 Building Q Contract
 - 3. Electrical Pathways Contract
 - 4. Medium Voltage Contract
- B. Specific requirements for Work of each contract are also indicated in individual Specification Sections and on Drawings.
- C. Related Requirements:
 - 1. Section 011000 "Summary" for the Work covered by the Contract Documents, restrictions on use of Project site, phased construction, coordination with occupants, and work restrictions.
 - 2. Section 013100 "Project Management and Coordination" for general coordination requirements.

1.2 PROJECT COORDINATOR

- A. Coordinators: The Contractor for each contract shall appoint a project coordinator to be responsible for coordination of each contractor's work with other contractors.

1.3 PROJECT COORDINATOR RESPONSIBILITIES

- A. Project Coordinator shall perform project coordination activities including, but not limited to, the following:
 - 1. Work between contracts
 - 2. Access to shared or common work spaces.
 - 3. Temporary facilities and controls.
 - 4. Interruptions, approved or otherwise, of permanent and temporary utilities, including those necessary to make connections for temporary services.
 - 5. Construction and operations of the Work with work performed by each Contract.
 - 6. Prepare coordination drawings in collaboration with each contractor to coordinate work by more than one contract.
 - 7. Provide quality-assurance and quality-control services specified in Section 014000 "Quality Requirements."
 - 8. Sequence of activities to accommodate tests and inspections, and coordinate

- schedule of test and inspections as applicable to respective Work.
9. Information necessary to adjust, move, or relocate existing utility structures affected by construction.
 10. Locate existing permanent benchmarks, control points, and similar reference points, and establish permanent benchmarks on Project Site
 11. Provide progress cleaning of common areas and coordinate progress cleaning of areas or pieces of equipment where more than one contractor as worked.
 12. Protection of the Work.
 13. Completion of interrelated punch list items.
 14. DSA Project Closeout Procedures.

1.4 GENERAL REQUIREMENTS OF CONTRACTS

- A. Extent of Contract: Unless the Agreement contains a more specific description of the Work of each Contract, requirements indicated on Drawings and in Specification Sections determine which contract includes a specific element of Project.
1. Unless otherwise indicated, the work described in this Section for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Contract Documents.
 2. Trenches and other excavation for the work of each contract shall be the work of each contract for its own work.
 3. Painting for the work of each contract shall be the work of each contract for its own work.
- B. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Section 015000 "Temporary Facilities and Controls," each contractor is responsible for the following:
1. Installation, operation, maintenance, and removal of each temporary facility necessary for its own normal construction activity, and costs and use charges associated with each facility, except as otherwise provided for in this Section.
 2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
 3. Its own field office, complete with necessary furniture, utilities, and telephone service.
 4. Its own storage and fabrication sheds.
 5. Temporary enclosures for its own construction activities.
 6. Staging and scaffolding for its own construction activities.
 7. General hoisting facilities for its own construction activities, up to 2 tons.
 8. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials.
 9. Progress cleaning of work areas affected by its operations on a daily basis.
 10. Secure lockup of its own tools, materials, and equipment.
 11. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
- C. Temporary Heating, Cooling, and Ventilation: Contractor of each contract is responsible for temporary heating, cooling, and ventilation, including utility-use charges, temporary meters, and temporary connections.

1.5 INCREMENT 1 SITE WORK CONTRACT

- A. Work of the Site Work Contract includes, but is not limited to, the following:
1. Remaining work not identified as work under other separate contracts.
 2. Selective demolition of site improvements as indicated on drawings and as necessary to accommodate the completion of the Work.
 3. Site preparation: site clearing, earthwork including over excavation and backfill in preparation for construction of building pads for buildings P and Q, pre-manufactured shade structure, waterslide and splashpad equipment
 - a. Excavation for building Q footings after pads have been prepared shall be the responsibility of the Increment 2 Building contractor.
 4. Site improvements including: fencing, gates, lighting, landscape, irrigation and utilities
 5. Site utilities, trenching, backfill, and patching.
 6. Modular pool construction
 7. Dive pool conversion
 8. Pool equipment building
 9. Softball field scoreboard
 10. Water slide
 11. Shade structure
 12. Splash pad
 13. Concrete paving and walks
- B. Temporary facilities and controls of the Increment 1 Site Work Contract include, but are not limited to, the following:
1. Temporary facilities and controls that are not otherwise specifically assigned to other separate contracts.
 2. Sediment and erosion control.
 3. Temporary toilet, wash, and drinking facilities, including disposable supplies.
 4. Temporary signs and project identification.
 5. General waste disposal facilities.
 6. Temporary fire-protection facilities.
 7. Warning signs, barricades and lights.
 8. Site enclosure fencing and gates.
 9. Security enclosure and lockup.
 10. Environmental protection.
 11. Daily restoration of Owner's existing facilities used as temporary facilities.
- C. Plumbing Work of the Increment 1 Site Work Contract includes, but is not limited to, the following:
1. Site water distribution, sewers, and storm drainage as indicated on the drawings.
 - a. Site water distribution, sewers, and storm drainage shall extend within 5 feet of Building 'Q' and shall be connected to points of connection for Increment 2 building 'Q' contract.

- 1) Under slab utilities of buildings are the responsibility of the Increment 2 building contractor.
2. Coordination and permitting of sewer and storm drainage tie into City right-of-way.
- D. Electrical Work of Increment 1 Site Work Contract includes, but is not limited to, the following:
 1. Electrical cabling from Building 'B' to in-grade pull boxes, as indicated on the drawings and summary of work.
 - a. Conduit Pathways from Building 'B' to in-grade pull boxes as indicated on sheet E201-1 and enlargement detail 2/E201-1 are the responsibility of the Electrical pathways contractor.
 - b. Medium Voltage pathway and cabling as indicated on sheet E201-1 are the responsibility of the Medium voltage contractor.
 2. Remaining work not identified as work under other contracts.
 3. Site electrical distribution.
 4. Site lighting
 5. Pre-manufactured shade structure lighting.
 6. Scoreboard distribution and energizing
 7. Site communications and security.
 8. Electrical service and distribution.
 9. Fire alarm systems and devices.

1.6 INCREMENT 2 BUILDING CONTRACT

- A. Work of Increment 2 Buildings Contract includes, but is not limited to, the following.
 1. On site construction of buildings as indicated on the DSA approved Increment 2 drawings.
 2. Under slab waste piping as indicated on the drawings.
 3. Floor sinks, floor drains, and trap primer piping shall be furnished, set in place and cast in slabs under this portion of the work.
 4. Excavation and over-excavation for footings.
 5. Cast-in-place concrete footings and slab
 6. Plumbing, Mechanical and Electrical work as indicated on drawings
 7. Removal of excess soil excavated

1.7 ELECTRICAL PATHWAYS CONTRACT

- A. Work of Electrical Pathways Contract includes, but is not limited to, the following.
 1. Above and below grade conduit pathways from Building 'B' and Main Switch gear to in-grade pull boxes identified on sheet E201-1.
 2. Excavation for trenching.

3. Re-compaction of soil.
4. Removal of excess soil excavated.

1.8 MEDIUM VOLTAGE CONTRACT

A. Work of Medium Voltage Pathway and Cabling Contract includes, but is not limited to, the following.

1. Removal of existing cabling
 - a. Site work contractor to remove abandoned conduit.
2. Conduit pathway and cabling as indicated by keynotes 10, 11, 12 and 17 on sheet E201-1
3. Excavation for trenching.
4. Re-compaction of soil.
5. Removal of excess soil excavated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION



EXHIBIT E

SECTION 012300 ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include, as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other Work of the Contract.
- C. Schedule: A Part 3 "Schedule of Alternates" Article is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF DEDUCT ALTERNATES

- A. Deduct Alternate No. 1: Delete Cast-in-place concrete seat walls.
 - 1. Description: Delete cast-in-place concrete benches as indicated on drawing sheet A1.11-1
- B. Deduct Alternate No. 2: Delete Steel Hoist in Pool equipment building
 - 1. Description: Delete steel hoist as indicated on drawings sheets A2.10-1 and S2.00-1
- C. Deduct Alternate No. 3: Delete Shade Structure
 - 1. Description: Delete Shade Structure and lighting as indicated on drawings sheets A1.11-1, E202-1, SH0.1-1, SH0.2-1, SH0.3-1, SH0.4-1, SH0.5-1, SH0.6-1, SH0.7-1 and SH0.8-1
- D. Deduct Alternate No. 4: Delete Above ground equipment and components at splash pad
 - 1. Description: Delete above ground splash pad equipment and components indicated on drawings sheets A1.11-1, SP1.4-1, and SP1.5-1
- E. Deduct Alternate No. 5: Delete Above ground equipment and components of timing system at competition pool
 - 1. Description: Delete above ground equipment and components of timing system at competition pool as indicated on the drawings
- F. Deduct Alternate No. 6: Delete pathway for power, low voltage and fire alarm systems
 - 1. Description: Delete above ground and below grade conduit pathways from Building 'B' and Main Switch gear to in-grade pull boxes as indicated on drawing sheet E201-1 and enlargement drawing 2/E201-1
- G. Deduct Alternate No. 7: Delete Medium Voltage pathway and cabling
 - 1. Description: Delete below grade medium voltage pathway and cabling as indicated on drawing sheets A1.10-1, and E201-1

END OF SECTION



EXHIBIT F

SECTION 131110
SWIMMING POOL RECIRCULATION SYSTEMS

PART 1 - GENERAL

1.1 COORDINATION AND CLARIFICATION

- A. Coordinate with other contractors or subcontractors all work relating to this section.
- B. The Contractor must establish with other contractors or subcontractors, having related work in this section, that all work necessary to complete the pool(s) as shown on the drawings and in the specifications is included in the base bid and alternates to the Owner.
- C. If in doubt regarding the responsibility for work covered in this section and/or discovery of errors or omissions in the bidding documents, the Contractor shall notify the Architect through channels established by the specifications and request a clarification ten (10) days prior to the bid date.

1.2 SUBMITTALS

- A. All submittals shall be made in accordance with the requirements of Division 1 - General Requirements and in strict compliance with the following procedures and guidelines.

1.3 CONTRACTOR'S ALTERNATE PROPOSAL

- A. Contractor shall submit their bid to the owner based on materials, equipment and methods as specified in this section. Approval of any substitution of material is not guaranteed.
- B. Any proposed substitutions shall include a mechanical drawing incorporating all required changes in layout, piping and valves. The cost of such changes shall be included in the price of the substitute. Contractor to confirm voltage prior to ordering pump. All motors shall be capable of continuously running without overloading at any point on the characteristic curve of the pump without overload or harm. Contractor shall confirm by 1/4 inch scale shop drawing that the pumps and filters to be provided will fit in the available space and can be removed for servicing.

1.4 WARRANTIES

- A. The Contractor warrants to the Owner and Architect that materials and equipment provided under the contract will be of good quality and new unless otherwise required or permitted by the contract documents, that the work will be free from defects not inherent in the quality required or permitted, and that the work will conform with the requirements of the contract documents. Work not conforming to these requirements, including substitutions not properly approved and authorized will be considered defective. The Contractor's warranty will exclude remedies for damage or defect caused by abuse, improper or insufficient maintenance, improper operations, modifications not executed by the Contractor or improper wear and tear under normal use. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of

materials and equipment. All warranties shall be for a period of one year from the date of substantial completion or the owner begins using the pool unless otherwise specified.

- B. The Contractor shall agree to repair or replace any defective or non-complying work at no cost to the Owner upon written notification from the Owner within the warranty period. Pro-rated warranties are not acceptable.
- C. Submit all warranties covering, but not limited to the following:
 - 1. Defects in material, manufacture and installation of the filtration, backwash, chlorination, pH adjustments and cleaning systems, including controls for a period of one (1) year.
 - 2. Defects in material, workmanship, and installation of the pool pumps for a period of one (1) year.
 - 3. Chemical Controllers
 - a. Controller shall be covered by a standard manufacturer's 5 year warranty.
 - b. ORP and pH sensors shall be covered by a standard manufacturer's 2 year warranty.
 - c. Other sensors and flow cell components shall be covered by a standard manufacturer's 1 year warranty.
 - 4. Manufacturer's minimum eighteen (18) month warranty against defective materials, components and workmanship in the Variable Frequency Drive system effective the date of supply.
 - 5. Manufacturer's minimum fifteen (15) year warranty on the filter tank and lining against defective materials or workmanship of the tank and components. (Additional warranty time may be purchased from the manufacturer.) Prorated warranties are not acceptable.
 - 6. Manufacturer's minimum one (1) year warranty against defective materials, components and workmanship in the sanitizing feed system.
 - 7. Manufacturer's minimum one (1) year warranty against defective materials, components and workmanship in the pH buffer feed system.
 - 8. Heaters
 - a. The Competition Pool heating systems titanium heat exchanger shall have a manufacturer's five (5) year limited warranty. The Controller shall have a manufacturer's five (5) year warranty. The BOILER heat exchanger assembly shall carry a ten (10) year limited warranty.
 - b. The Teaching Pool heater shall be furnished with a 3 Year Limited Warranty. This warranty shall provide three years of protection on the heat exchanger and two full years on all other components.
 - 9. Ultraviolet Disinfection System
 - a. A factory trained representative of the manufacturer shall perform all warranty work.
 - b. Manufacturer to warranty Ultraviolet chamber and Spectra Control panel for a period of 5 years (subject to any contractual maintenance requirements) excluding lamps, quartz and seals.
 - c. Medium pressure Ultraviolet bulbs shall be warranted for a period of 8,000 hours.
 - d. Intermittently operated lamps (≥ 1 on/off cycles per day) will be replaced free of charge should failure occur prior to 4,000 hours and replacement will be prorated between 4,000 and 8,000 hours.

- e. Manufacturer must maintain spare or replacement parts in the USA for same day or no longer than next day delivery in North America, other areas based on expedited delivery available.
- f. A Service Agreement (twice per year maintenance) from a qualified factory certified distributor shall be available to initiate the service in order to maintain the five-year warranty.

PART 2 - PRODUCTS

2.1 COMPETITION POOL OVERFLOW SYSTEM

- A. It is the intent of the specifications that the perimeter overflow system and surface cleaning be maintained under all conditions of normal operation and that no water be discharged to waste except when cleaning the filters or emptying the pool.
- B. Manufactured Perimeter Overflow System
 - 1. Refer to Specification 131124 for perimeter overflow system and associated items including grating and dropouts.

2.2 TEACHING POOL SKIMMING OVERFLOW SYSTEM

- A. Provide skimming system consisting of units as shown on the drawings. Skimmers shall be located to ensure maximum skimming action.
- B. The piping and other pertinent components of skimming equipment shall be designed for a total capacity of the required filter flow of the recirculation system, and no skimmer shall be designed for a flow-through rate of less than 30 gallons per minute or 5 gallons per minute per lineal inch of weir.
- C. The skimmer weirs shall be automatically adjustable and shall operate freely with continuous action to variations in water level over a range of at least 4 inches. The weirs shall operate at all flow variations. The weir shall be of such buoyancy and design so as to develop an effective velocity.
- D. An easily removable and cleanable basket or screen through which all overflow water must pass shall be provided to trap large solids.
- E. The skimmer equalizer line shall be sealed.
- F. The skimmer shall be of sturdy, corrosion-resistant materials.
- G. Each skimmer shall be equipped with a variable orifice trimming device to allow balancing of flow.
- H. Skimmers shall be NSF approved.
- I. Pool skimmers shall be Sta-Rite Model U-3 #08650-1403 white, or equal. Hayward Model SP1082-1 skimmer is an approved equal.

2.3 RECIRCULATION_FITTINGS

A. Competition Pool Main Suction Outlets (Main Drains)

1. Myrtha Compatibility: Sump shall have a collar or fitting specifically intended to fit with the Myrtha PVC Membrane System.
2. Sump & Grate: Unblockable SOFA certified to APSP/ANSI/ICC-16 2017, NSF/ANSI/CAN 50-2020, and USPC. RPD field certification is not required. Corrosion resistant and non-conductive.
3. Sump: Molded from certified high-grade PVC with water stop, 10-in coupling, pressure plate and 2 - 2" bottom fittings for hydrostatic relief valves as part of the molded product. The coupling can be reduced to either 8-in or 6-in based on engineering calculations. See minimum length before reduction chart. The maximum certified flow must not be exceeded. Markings required by law are imprinted inside the sump regarding manufacturer, model number, service life and born on date.
4. Grate: flat 18-in x 36-in grate formed of UV-stabilized molded PVC, certified to APSP/ANSI/ICC-16 2017, NSF/ANSI/CAN 50-2020, and USPC. The top surface of the grate has a textured design for slip resistance. Grate sections are 0.20-in (5mm) wide and 1-in (25.4mm) avg. Depth for load strength requirements. Space between grate bars does not exceed 0.39-in (10mm). Grate provides a minimum 62% open area for unrestricted water flow. The manufacture date and marking required by standards is molded into each grate.
5. Installation: Follow manufacturer supplied installation instructions and warnings. Grate must be installed within sump using only the 316 SS ¼"-20x1.25" machine screws (tested to APSP/ANSI/ICC-16 2017) as supplied by manufacturer.
6. Main Drain Suction Outlets shall have a minimum 10-year manufacturer warranty.
7. Main Drain Suction Outlets shall be manufactured by Daldorado LLC or approved equal.
8. Basis of Design: Daldorado DalMAX-SG-183628

B. Teaching Pool Main Suction Outlets (Main Drains)

1. Myrtha Compatibility: Sump shall have a collar or fitting specifically intended to fit with the Myrtha PVC Membrane System.
2. Sump & Grate: Unblockable SOFA certified to APSP/ANSI/ICC-16 2017, NSF/ANSI/CAN 50-2020, and USPC. RPD field certification is not required. Corrosion resistant and non-conductive.
3. Sump: Molded from certified high-grade PVC with water stop, 10-in coupling, pressure plate and 2 - 2" bottom fittings for hydrostatic relief valves as part of the molded product. The coupling can be reduced to either 8-in or 6-in based on engineering calculations. See minimum length before reduction chart. The maximum certified flow must not be exceeded. Markings required by law are imprinted inside the sump regarding manufacturer, model number, service life and born on date.
4. Grate: flat 24-in x 24-in grate formed of UV-stabilized molded PVC, certified to APSP/ANSI/ICC-16 2017, NSF/ANSI/CAN 50-2020, and USPC. The top surface of the grate has a textured design for slip resistance. Grate sections are 0.20-in (5mm) wide and 1-in (25.4mm) avg. Depth for load strength requirements. Space between grate bars does not exceed 0.39-in (10mm). Grate provides a minimum

- 62% open area for unrestricted water flow. The manufacture date and marking required by standards is molded into each grate.
5. Installation: Follow manufacturer supplied installation instructions and warnings. Grate must be installed within sump using only the 316 SS 1/4"-20x1.25" machine screws (tested to APSP/ANSI/ICC-16 2017) as supplied by manufacturer.
 6. Main Drain Suction Outlets shall have a minimum 10-year manufacturer warranty.
 7. Main Drain Suction Outlets shall be manufactured by Daldorado LLC or approved equal.
 8. Basis of Design: Daldorado DalMAX-SG-242421-BEAST
- C. Provide hydrostatic relief valves consisting of a 2" cyclac relief valve connected to a FPT commercial style Schedule 80 PVC collector tube. The collection tube shall have seepage holes, 3/8 inch in diameter, and shall be screwed securely to the valve body. The hydrostatic relief valve shall be designed to seal with minimum pressure and shall have a non-plugging, self-cleaning raised valve seat. Hydrostatic relief valve to be Hayward Number SP1056 with collector tube model Hayward Number SP1055, or approved equal.
- D. Wall inlet fittings shall be Hayward Model SP-1421-E (1 inch opening) cyclac directional inlet mounted in Hayward Model SP-1022S or approved equal from Sta-Rite or Swintime.
- E. Adjustable floor inlet fittings shall be provided each consisting of an ABS plastic body and adjusting top plate with a positive locking device. A spanner wrench shall be provided to facilitate flow adjustment. The inlet body shall be provided with a 2-inch cyclac solvent weld connection and internal NPT threads to facilitate line pressure testing. Floor inlet fittings shall be Sta-Rite No. 8417-0000-White or approved equal.
- F. Anti-vortex plates shall be provided at the suction points of the main recirculation pump(s) in the surge tank. Each plate shall be connected to the suction pipe via a PVC flange and shall be 1/2 in. thick with minimum dimension of at least 2.5 times the connecting pipe diameter. The plate shall be located 4 inches above the finished floor of the surge tank. Four (4) 3/4 in. stainless steel threaded rods, nuts, anchor bolts and washers shall be used to fix the offset distance and provide a secure base for the suction pipe.
- ## 2.4 HAIR AND LINT STRAINER
- A. Provide a hair and lint strainer, for each pump that does not come with one attached, of fiberglass or epoxy coated stainless steel construction with a clear observation top in the sizes (or pipe sizes) indicated on the drawings. Verify and coordinate pipe and pump suction sizes in the field. Strainer to be of a low pressure drop full-open or a tapered eccentric reducing type. Straight reducing type strainers will not be acceptable without the addition of an approved tapered eccentric reducer between the strainer and the pump (in which case, sufficient space in the pump pit must be verified). Provide a stainless steel basket with at least 4 times the free open area as the inlet pipe, and one spare basket with each strainer.
1. Basis of Design: 10" x 6" Reducing Hair and Lint Strainer as manufactured by Aquify. Mermade, Neptune/Benson Inc., or Fluidtrol may also be considered

knowing that an alternate strainer may require changes to the pump housekeeping pad or pipe elevations.

- a. Any changes required due to the proposal of an alternate strainer shall be at the expense of the Contractor.
- b. Contractor is responsible for coordinating penetration locations and housekeeping pad dimensions due to the proposal of an alternate strainer.

B. Strainer Support

1. Provide a floor mounted support on the influent side of the strainer. Support shall be mounted directly to the integral flange of the strainer.
2. Pipe support base plate, threaded rod, base cup, adjustment cap and saddle shall all be made of 304 stainless steel.
3. Basis of Design: Adjustable Pipe Support (Flange Style) Item Number 364-589X as manufactured by Trumbull Manufacturing or approved equal.

2.5 PUMPING EQUIPMENT

- A. Contractor to confirm voltage prior to ordering all pumps. All motors shall be capable of continuously running without overloading at any point on the characteristic curve of the pump without overload or harm.
- B. Contractor shall confirm by 1/4 inch scale shop drawing that the pumps to be provided will fit in the available space and can be removed for servicing.
- C. All pumps shall be certified by the National Sanitation Foundation (NSF) and bear the certification mark.
- D. All recirculation pumps over 10 horsepower shall be provided by the same manufacturer.
- E. Pump motors shall be totally enclosed, fan cooled (TEFC) and premium efficiency of the horsepower and speed specified. A pump requiring larger horsepower shall not be acceptable.
- F. Pump casing shall be cast iron fitted with a replaceable bronze case wear ring. Mechanical seals shall be provided specific for a clear, mildly chlorinated water application. Pump impeller shall be enclosed type of cast bronze, statically and dynamically balanced, and trimmed for the specified design conditions. All bronze materials shall be suitable for use in a chlorinated environment. Suction and discharge flanges shall be provided and tapped for gauge connections. Provide steel or cast iron bases.
- G. Provide a coating to protect all non-bronze pumps from corrosion. Coating shall be fusion bonded epoxy coating on all wetted parts. Sandblast to bare, white metal. Thickness shall be 8 to 12 mils (heavy film). Verify thickness by non-destructive testing. Coat parts as recommended by manufacturer, including preheating parts to 400 degrees and electrostatic deposition or fluidized bed technique. Provide primers if required to resist chlorinated water <10 ppm. Coating shall be Scotchkote 134 manufactured by FUSECOTE or approved equal.
- H. Competition Pool Recirculation Pump

1. Basis of Design: Paco 50957 LC Centrifugal Pump as manufactured by Grundfos or approved equal.
2. Provide one (1) horizontally mounted close centrifugal pump, as shown on the drawings and described in these specifications. Each pump is to be of a straight centrifugal, end suction, bronze fitted, close coupled type, capable of pumping 1000 GPM against 60 ft. TDH with an efficiency of no less than 83%. It shall be provided with a 20 HP, 1800 RPM, 460 VAC, 3 phase, 60 cycle electrically driven motor meeting these specifications. Pump motor to be suited for use with a VFD. Pump impeller to be maximized with respect to motor rating and size.

I. Teaching Pool Recirculation Pump

1. Basis of Design: Model Number CHK-50 High Performance Commercial Bronze Pump as manufactured by Pentair or approved equal.
2. Provide one (1) horizontally mounted centrifugal pump, as shown on the drawings and described in these specifications. Each pump is to be of a straight centrifugal, end suction, bronze fitted, close coupled type, capable of pumping 115 GPM against 78 ft. TDH with a NEMA premium efficiency motor. It shall be provided with a 5 HP, 3500 RPM, 460 VAC, 3 phase, 60 cycle electrically driven motor meeting these specifications. Pump motor to be suited for use with a VFD. Pump impeller to be maximized with respect to motor rating and size.

J. Waterslide Pump

1. Basis of Design: Paco 50957 LC Centrifugal Pump as manufactured by Grundfos or approved equal.
2. Provide one (1) horizontally mounted close centrifugal pump, as shown on the drawings and described in these specifications. Each pump is to be of a straight centrifugal, end suction, bronze fitted, close coupled type, capable of pumping 1000 GPM against 40 ft. TDH with an efficiency of no less than 83%. It shall be provided with a 20 HP, 1800 RPM, 460 VAC, 3 phase, 60 cycle electrically driven motor meeting these specifications. Pump motor to be suited for use with a VFD. Pump impeller to be maximized with respect to motor rating and size.
3. Furnish two emergency shutoff switches for the waterslide pump. The system shall include clearly labeled emergency shutoff switches for all waterslide pumps per Article 680-38 of the NEC. One switch shall be located at the top of the slide. The second switch shall be installed near the end of the slide. The wiring shall be done per Division 16/26 and coordinated with the pool wiring.

K. Splashpad Recirculation Pump

1. Basis of Design: Model Number CHK-50 High Performance Commercial Bronze Pump as manufactured by Pentair or approved equal.
2. Provide one (1) horizontally mounted centrifugal pump, as shown on the drawings and described in these specifications. Each pump is to be of a straight centrifugal, end suction, bronze fitted, close coupled type, capable of pumping 135 GPM against 75 ft. TDH with a NEMA premium efficiency motor. It shall be provided with a 5 HP, 3500 RPM, 460 VAC, 3 phase, 60 cycle electrically driven motor meeting these specifications. Pump motor to be suited for use with a VFD. Pump impeller to be maximized with respect to motor rating and size.

L. Splashpad Feature Pump

1. Basis of Design: Model Number CHK-50 High Performance Commercial Bronze Pump as manufactured by Pentair or approved equal.
2. Provide one (1) horizontally mounted centrifugal pump, as shown on the drawings and described in these specifications. Each pump is to be of a straight centrifugal, end suction, bronze fitted, close coupled type, capable of pumping 235 GPM against 65 ft. TDH with a NEMA premium efficiency motor. It shall be provided with a 5 HP, 3500 RPM, 460 VAC, 3 phase, 60 cycle electrically driven motor meeting these specifications. Pump motor to be suited for use with a VFD. Pump impeller to be maximized with respect to motor rating and size.
3. Furnish an emergency shutoff switch for the water features. The system shall include a clearly labeled emergency shutoff switch for all water features pumps per Article 680-38 of the NEC. The Architect shall approve the location of the switch(es). The wiring shall be done per Division 16/26 and coordinated with the pool wiring.

M. Sump Pump

1. Provide one (1) portable utility pump(s). The pump(s) shall be a 1 HP, 3600 RPM, 115/230 volt, 1 phase, 60 cycle unit capable of 60 GPM at 25 ft. TDH. Pump to be a Godwin GSP10 or equal.

N. Pump Gauges

1. Pressure gauges shall be installed on the discharge side of the pumps.
2. Compound gauges shall be provided at the intake port of the pumps, after the hair and lint strainer.
3. Gauges shall be liquid filled, 316L stainless steel bourdon tube type with a minimum 2-1/2 inch diameter dial, high impact polypropylene or stainless steel case, corrosion resistant white scale with black divisions and numerals, 300 Series stainless steel heavy duty rotary bushed movement, black enameled balanced Micrometer pointer.
4. Basis of Design: Gauges shall be as manufactured by Weksler Instrument Corporation or approved equal.
5. Scale ranges shall be selected to indicate the normal system operating pressure of each system or location within the system. Pressure ranges shall be calibrated in psig (0-60 psi) and compound gauge shall be calibrated in inches of mercury (0-30 in Hg / 0-60 psi).
6. A stainless steel filter type pressure snubber shall be provided for each pressure gauge installed consisting of a 3/8 inch diameter by 1/8 inch thick micro metallic stainless steel filter and placed in the line just before the pressure gauge. Provide isolation brass valves or brass gauge cocks at each gauge for easy replacement and maintenance.

- O. Provide link seals for all pipe penetrations as indicated on the drawings. Locations will include the surge tank, the pump pit, foundation wall penetrations (if expansive soils are present) and other locations as noted. Link seals shall be provided in the sizes and quantities shown on the drawings and installed to provide a flexible watertight penetration. Metal parts shall be made of 316L stainless steel. Links shall form a continuous rubber seal that is tightened with a series of stainless steel bolts to form a

watertight seal. Link seals shall be manufactured by Thunderline Corporation, Calpico Inc. or approved equal. The Contractor is to provide factory plastic wall sleeves of the appropriate sizes designed for the specific application and seal size and type. Each sleeve is to have an integrated water stop.

2.6 Variable Frequency Drives

A. Competition Pool Recirculation Pump VFD

1. Basis of Design: SPCS by H2O Technologies
2. Provide VFD starters for the competition pool recirculation pump(s). VFD shall be a product of SPCS by H2O Technologies, or approved equal.
3. It is the Contractor's responsibility to ensure that all equipment is provided with the correct operating voltage and that all interconnected electrical and electronic equipment shall adequately communicate and operate the specified pumping equipment. All equipment installations shall meet or exceed the requirements of the National Electric Code and all other local and state regulations.
4. Specified equipment in this section shall be mounted in accordance with manufacturer's requirements and in a suitable location where indicated on the plans or approved by the Architect/Engineer. All electronic equipment installed shall be housed in a NEMA 3R enclosures. The programmable and display features of all electronic equipment shall be accomplished via keypads and touch screen displays.
5. The VFD shall convert incoming fixed frequency three phase AC power into an adjustable frequency and voltage output to control the speed of a three phase AC squirrel cage induction motor.
 - a. The VFD input power section shall utilize a full wave 6-pulse bridge design incorporating diode rectifiers to convert the fixed AC line voltage and frequency to fixed DC voltage. The drive input power section is insensitive to phase sequence of the AC line voltage.
 - b. The VFD output power section shall change fixed DC voltage to adjustable frequency AC voltage utilizing insulated gate bipolar transistors (IGBT's) producing a PWM output. Soft-switching IGBTs and gate control design shall be utilized to reduce motor terminal dV/dt and allow for motor cable lead lengths as follows without the need for drive output reactors or filters.
 - 1) Motors with 1000V insulation ratings: up to 66ft in cable length
 - 2) Motors with 1300V insulation ratings: up to 165ft in cable length for drives rated 5Hp and smaller, up to 328ft in cable length for drives rated 7.5Hp and above
 - 3) Motors with 1600V insulation ratings: up to 165ft in cable length for drives rated 5Hp and smaller, up to 1312ft in cable length for drives rated 7.5Hp and above.
6. The VFD shall be of open type construction with the availability of additional covers to meet Type 1 enclosure requirements.
 - a. The VFD shall be mounted in the panel with a sealed flange mounting that places the VFD heat sinks outside the cabinet for better heat transfer.
 - b. All customer control and power wiring terminals/connections shall be clearly identified; handwritten labels are not acceptable.
7. The VFD shall contain a selectable energy savings function that, when selected, automatically reduces the drive output voltage at steady state operation to the level only required to meet the torque requirement of the load. This function shall also

reduce power consumption of the drive to maximize energy savings for both the drive and the motor. The energy savings function shall automatically deactivate during acceleration or deceleration of the load.

8. The VFD shall be capable of adjusting the pump motor speed based upon specific flow requirements. A 4-20 milliamp output signal from a Programmable chemical feed control, Programmable Aquatic Controller, PLC, electronic flow meter transmitter or other electronic device shall supply the required flow information to the VFD to regulate motor speed. The VFD shall be capable of interfacing to this analog output signal be commissioned to achieve a 'constant flow' condition. The VFD shall also be provided with a keypad to adjust the pump speed in the case of an electronic communication failure.
9. The VFD shall include a built-in Line Filter to mitigate harmonic distortions being transmitted back through the supply lines.
10. The VFD shall utilize DC link reactors to filter out bus ripple and provide smooth DC power to the transistor section.
11. The VFD shall utilize IGBT transistors to produce a pulse width modulated output. SCR output stages are not acceptable.
12. The VFD shall have a full load amp rating which exceeds or meets NEC Table 430-150. The VFD shall be able to provide full rated output current continuously and shall be able to provide 110% of its variable torque rating and 150% of its constant torque rating for one minute.
13. The VFD shall utilize space vector control to reduce motor harmonics and torque ripple.
14. The VFD shall include the ability to reliably protect the pump from any of the following abnormal pump conditions: Run Dry/Loss of Prime; Cavitation; Dead head/Closed Valve; Worn impeller; Blocked Filter; Bearing Failure/Wear Detection. Protection using measured current (Amps), as a method for these protective features shall not be acceptable.
15. The VFD shall contain a backlit graphic liquid crystal display (LCD) and a five-digit LED display. The LCD screen shall display up to 5 lines of text to provide a display for: programming, diagnostics, I/O check, operation status, maintenance information, copy function, and communication debugging. The LED display shall provide indication of output frequency, output current, output voltage, percent torque, input power, load factor, and motor output.
 - a. The keypad shall provide a separate Local-Remote key to allow switching between local and remote operation modes for the drive.
 - b. The keypad shall be common across the entire product series.
 - c. The keypad shall be capable of copying drive parameters between different rated drives within the product series.
 - d. The keypad shall be able to contain three sets of parameter data for copying to different drives or for different application set-ups.
 - e. Data protection shall be provided to prevent unauthorized persons from changing the drives parameters through the keypad.
16. All VFD panels shall be provided with a bypass function to allow for pump motor operation by bypassing the variable frequency drive. Bypass mechanism internal to the VFD only is not acceptable. The bypass circuit shall be separate from the VFD drive circuit and be housed in the same enclosure as the VFD. Bypass mechanism requiring a separate panel are not acceptable.
 - a. Two Motor Contactors shall be included. Contactor A is required when in VFD mode and Contactor B is required to bypass the VFD. In 'VFD'

- operation, contactor A is engaged, and contactor B is open. When in 'Bypass' mode, contactors A is open and contactor B is engaged.
- b. All contactors shall be appropriately rated for the supply voltage and pump motor specified and shall be in accordance with NEC standards.
 - c. Contactor B shall include an appropriately rated Motor Overload.
 - d. Resettable pump motor overload protection shall be provided for both the VFD and across the line sources of power to all motors.
17. A Control Power Transformer shall be included to provide the necessary control voltage required to operate the Motor Contactors.
 18. The VFD panel shall include a door mounted 3-position selector switch. The switch shall be labeled: VFD MODE-OFF-BYPASS MODE.
 19. The VFD panel shall be manufactured in accordance with and approved to UL508.
 20. The VFD panel shall require the inclusion of an appropriately rated Line Reactor to reduce harmonic distortion. The Line Reactor shall be housed in the VFD panel.
 21. The VFD panel shall include additional contacts for interface with a remote start/stop panel and emergency stop function.
 22. The VFD panel shall include additional contacts that provide a 110vac output when either contactor is closed.
 23. The VFD panel shall include a Main Circuit Breaker disconnect.
 24. The VFD shall be UL listed to accept a supply voltage of -15% / + 10% of its stated supply rating.
 25. The VFD shall be electronically lockable in order to prevent unauthorized or unintended program changes.
 26. Motors to which the VFD is to be installed shall be inverter rated or have a minimum insulation of "Class F".
 27. User Interface for initial programming and day to day operation.
 - a. The VFD panel shall be designed to interface with a programmable aquatic control, programmable chemical control or intelligent chemical feed control system.
 - 1) The VFD panel shall respond to input signals from this system for daily operation and maintaining flow rate
 - b. The VFD panel shall be programmable to operate in PID mode if no intelligent chemical control system is available.
 - 1) A 4-20mA or 0-10VDC scaled signal is to be provided for PID operation
 28. Equipment specified in this section shall be programmed and tested under power after connection to the required motor by a factory trained technician. All low voltage control wiring connections to the respective pool systems shall be provided by the Swimming Pool Contractor. Line voltage and/or high voltage connections and interlocks shall be provided by the Electrical Contractor.
 29. Provide VFD starters for the competition pool recirculation pump(s). VFD shall be a product of SPCS by H2O Technologies, or approved equal.

B. Other Pump VFD's

1. Provide VFD's meeting the specifications below for the following pumps:
 - a. Teaching Pool Recirculation Pump
 - b. Waterslide Pump
 - c. Splashpad Recirculation Pump
 - d. Splashpad Feature Pump
2. Basis of Design: AcuDrive XS as manufactured by Pentair
3. The Acu Drive Model Number to match Pump Horsepower.

- a. Fused Bypass and Disconnect
 - b. Battery back-up
 - c. Nema 12 Enclosure
 - d. Onsite start-up by pre-authorized, factory trained service center
4. Additional Features to be included:
- a. Flowmeter input. Acu Drive can monitor and control the requested flow. Flowmeter kit that includes flowmeter, 10" saddle, 4-20mA transmitter, and mount.
 - b. Extended 6 year warranty. With the extended warranty, the Acu Drive shall be covered against defect. Parts and Onsite labor is covered through the duration of the 6 year period.
 - c. Acu Drive Features and Functions. The manufacturer of the VFD specified shall demonstrate a continuous period of manufacturing and development of VFD's for a minimum of 35 years.
 - d. An Automatic Energy Optimization (AEO) selection feature shall be provided in the VFD to minimize energy consumption in variable torque applications. Feature shall optimize motor magnetization voltage. This feature shall dynamically adjust output voltage in response to load, independent of speed. Output voltage adjustment based on frequency alone is not acceptable for single motor VT configurations.
5. An Automatic Motor Adaptation (AMA) function shall measure motor stator resistance and reactance to optimize performance and efficiency. It shall not be necessary to spin the motor shaft or decouple the motor from the load to accomplish this optimization. Additionally, the parameters for motor resistance and motor reactance shall be user-programmable.
6. The VFD shall have temperature controlled cooling fans for quiet operation, minimized internal losses, and greatly increased fan life. The ambient operating temperature of the VFD shall be -10°C to 50°C (14 to 122°F), with a 24 hour average not to exceed 45°C. Storage temperatures shall be -13° F (-25° C) to 149/158° F (65/70° C).
7. Protective Features:
- a. VFD shall have sealed electronics which used a heat sync to extract heat from drive. The VFD shall have temperature controlled cooling fans for quiet operation, minimized internal losses, and greatly increased fan life. The drive's electronics do not come into direct contact with ambient air, therefore a ventilation fan and filter is unnecessary. Drives that incorporate the use of a ventilation fan and filter shall not be equal.
 - b. All Acu Drive components are designed to last for 10 years and longer. There is no need for preventative maintenance, filter cleaning or replacing.
 - c. VFD shall have input surge protection utilizing MOV's, spark gaps, and Zener diodes to withstand surges of 2.3 times line voltage for 1.3 msec.
 - d. VFD shall include circuitry to detect phase imbalance and phase loss on the input side of the VFD.
 - e. VFD shall have built-in DC Coils to reduce voltage ripple and increase capacitor life. Drives without DC Coils shall provide a 5% input line reactor, which reduces overall efficiency.
 - f. Automatic "No-Flow Detection" shall be available to detect a no-flow situation. Dry-pump detection shall be available to detect if the pump has run dry and trip the drive. A timer shall be included to prevent nuisance tripping. End-of-Pump curve detection shall stop motor when the pump is operating outside of its programmed pump curve.

- g. VFD shall auto-derate the output frequency by limiting the output current before allowing the VFD to trip on overload. This is most important in 208V applications, where a drop in voltage with call excessive amperage spikes. The Acu Drive will protect the motor and itself from this type of damaging conditions.
- 8. Interface Features:
 - a. VFD shall provide an alphanumeric backlit display keypad (LCP) which may be remotely. VFD may be operated with keypad disconnected or removed entirely. Keypad may be disconnected during normal operation without the need to stop the motor or disconnect power to the VFD.
 - b. VFD Keypad shall offer an INFO key that, when pressed, shall offer the contents of an onboard manual for the feature that is currently in the display. The contents shall explain the feature and how the settings can be made.
 - c. Keypad shall provide an integral H-O-A (Hand-Off-Auto) and Local-Remote selection capability, and manual control of speed locally without the need for adding selector switches, potentiometers, or other devices.
 - d. VFD Display shall have the ability to display 5 different parameters about the VFD or load including: GPM, amps, RPM's, KWh, PSI, savings calculator, output voltage, or other values from a list of 92 different parameters.
 - e. A red FAULT light, a yellow WARNING light and a green POWER-ON light shall be provided. These indications shall be visible both on the keypad and on the VFD when the keypad is removed.
 - f. Two-level password protection shall be provided to prevent unauthorized changes to the programming of the VFD. The parameters can be locked via a digital input and/or the unit can be programmed not to allow an unauthorized user to change the parameter settings.
 - g. A quick setup menu with factory preset typical parameters shall be provided on the VFD to facilitate commissioning. Use of macros shall not be required.
 - h. VFD shall offer as standard an internal clock. The internal clock can be used for: Timed Actions, Energy Meter, Trend Analysis, date/time stamps on alarms, Logged data, Preventive maintenance, or other uses. It shall be possible to program the clock for Daylight Saving Time / summertime, weekly working days or non-working days including 20 exceptions (holidays etc.). It shall be possible to program a Warning in case clock has not been reset after a power loss.
- 9. Drive Inputs:
 - a. All inputs and outputs shall be optically isolated. Isolation boards between the VFD and external control devices shall not be required.
 - b. There shall be six fully programmable digital inputs for interfacing with the systems external control and safety interlock circuitry. Two of these inputs shall be programmable as inputs or outputs.
 - c. The VFD shall have two analog signal inputs. Inputs shall be programmable for either 0 -10V or 0/4-20 mA. Acu Drive receives and sends signals to heater, chemical controller, and/or automatic valves in order to maintain proper working conditions.
 - d. Drive shall be able to connect to auto backwash controller and automatically change to set backwash speed when called for. Separate speeds within backwash mode may also be used.
 - e. A digital flow meter with 4-20mA output can be connected to drive, and GPM may be displayed on drive screen.

- f. Drive shall be capable of using pressure transducers to monitor and control programs using PSI inputs.
- 10. Operation:
 - a. Four complete programming parameter setups shall be provided, which can be locally selected through the keypad or remotely selected via digital input(s), allowing the VFD to be programmed for up to four alternate control scenarios without requiring parameter changes.
 - b. Drive has up to eight programmable speeds that can be set to facility specific parameters. Separate speeds for backwash, off hours, or seasonal conditions may be initiated by relay input, sensor input, time, or manually. Drive may also send signals out to protect other mechanical equipment such as heaters during backwash.
 - c. Drive shall have ability to communicate remotely via Ethernet, Mod Bus, and RS 485 connections. Keypad may also be mounted remotely.
- 11. Quality Assurance:
 - a. The manufacturer shall be both ISO-9001 and ISO-14001 certified. Pentair Acu Drive XS is UL 508 listed.
 - b. To ensure quality and minimize failures on the jobsite, all VFD's shall be completely tested by the manufacturer. The VFD shall operate a dynamometer at full load and speed under elevated.

2.7 FILTRATION EQUIPMENT

A. Competition Pool Filtration System

- 1. Basis of Design: Model EPD-S408 as manufactured by EPD.
- 2. The filter system shall be of the pressure type, horizontal in its configuration, suitable for a single grade of filter media, and shall bear the listing mark of the National Sanitation Foundation (NSF Standard 50 for a maximum flow of 20 gallons per minute per square foot of filter area with a maximum pressure loss across any filter tank, when clean, of 6.1 psi.
- 3. The filter system shall consist of 4 filter tank(s). Each tank with a total effective filter area of 16.5 square feet. The system will therefore have a total effective filter area of 66 square feet. Each filter tank in the system shall be backwashed individually, using clean filtered water from the adjacent tank(s). Reverse flow backwash of the filter system with raw unfiltered source water will not be acceptable. To minimize waste line sizes and reduce impact on wastewater disposal systems, the maximum allowable backwash flow rate of the entire filter system shall not exceed 202 gallons per minute.
- 4. Filter Vessel
 - a. The filter vessel(s) shall be 36 inches (.914m) in diameter with a side shell length of 77.5 inches, allowing for ease of installation, specified flow and backwash rates as well as ease of service.
 - b. Dished and flanged heads shall be butt welded to each end of the side shell. The side shell and heads shall be carbon steel, 3/16 inch (4.762mm) thick and suitable for a working pressure of 50 psi (345 kPa) with a safety factor of 4 to 1 and a vacuum of 25 inches (63.5 cm) of mercury. Tanks fabricated of filament wound fiberglass and/or reinforced plastic will not be acceptable methods and/or materials of construction. Tanks fabricated of stainless steel will not be allowed unless they meet all provisions of this specification; i.e. material thickness, welds, coatings, etc.

- c. All welds shall be continuous, uniform and performed on the inside and outside of all joints with in the tank(s). Jig locator and hold down fixtures shall be utilized to assure continuity of tanks and their fitting locations.
 - d. An 11" inch Minimum access manway with yoke, cover and gasket shall be fitted at the front end of the tank, providing ease of access for media loading and service. Side and top located manways shall not be allowed as they limit tank interior access.
 - e. The filter vessel shall be fitted with two (2) 4-inch bottomed flanges located in the top side shell to serve as influent and effluent plumbing connections. A 2.5-inch bottomed flanged port shall be located in the lower portion of the tank to serve as winterizing and/or media dump port connection. Another 2.5-inch port shall be located in the upper most portion of the side shell to serve as a manual air relief valve/port connection. All four Duplex Bottomed Flanges shall contain threaded bottomed fastener ports to allow connection of companion flanges to the outside of the vessel without allowing fastening bolts to penetrate to the inside of the vessel.
 - f. The filter vessel shall be supported by four (4) gusseted strap type legs which shall accommodate seismic zone 4 installation. All necessary mounting hardware shall be provided along with an anchor bolt setting template for ease and accuracy of filter vessel installation.
5. Protective Coatings
- a. All interior and exterior surfaces of the filter tank and its penetrations shall be grit blasted to white metal. All interior and outer flanged surfaces shall be bound with a seamless coating of "Envirobond"™ LLD Polyethylene NSF Standard 61 listed material. There will be no separation between the lining and the tank allowed. The material must maintain a minimum of .20 inch thickness inside the vessel and flow smoothly out through the flange openings and onto the flange faces. All wetted surfaces will be inspected for proper mil thickness and holidays.
 - b. The tank exterior surface shall be coated with 3 to 5 mils of an industrial grade polyurethane high gloss B finish coat.
6. Internal Distribution and Collection System
- a. The internal components shall be hydraulically balanced to prevent migration of the filter media during the filtration cycles and must uniformly fluidize the media in the backwash cycle without channeling or breakthrough at any one location.
 - b. The influent distribution system shall consist of no less than then (10) hydraulic distribution lenses, which shall be fabricated of ABS plastic and PVC pipe and fittings. Distribution systems consisting of slotted pipes, or splash plates, will not be acceptable.
 - c. The collection system shall consist of a one piece, molded collection header, schedule 80 piping and molded ABS "V" slotted 12" long threaded laterals. The laterals shall be capable of retaining a #30 grade filter media with minimum head loss. Laterals, which are made from plastic pipe with saw, cut slots or covered pipes will not be allowed. A minimum of twenty (20) molded laterals shall be utilized in each filter tank, assuring an even and complete fluidization of filter media during the backwashing cycle. The combined open area of the laterals shall not exceed a velocity of 6-feet per second at the designed filter flow rate. All internal components, including main headers, must be removable for repair and/or replacement should damage occur.

7. Air Relief System
 - a. An internal automatic air bleed system shall be provided in the tank. An anti-plug protective shield screen shall be installed on each assembly. A manually operated external air relief valve shall be provided on the tank.
8. Winterizing/Drain and Media Dump Port
 - a. In the front of each vessel shall be located a $\frac{3}{4}$ -inch drain fitting which shall allow the evacuation of all water from the tank for the purpose of winterizing or service. A $\frac{3}{4}$ -inch o-ring seal plug adapter shall be provided for ease of removal and replacement. No media shall be allowed to leave the tank during the draining process.
 - b. The media dump port shall allow for the removal of all filter media from the vessel. This dump port shall be a minimum of 2-inches in diameter and shall be installed in the front of each filter vessel, allowing for easy access.
9. Backwash Valving And Piping
 - a. Backwash Valve
 - 1) One (1) two-way, three port 4-inch backwash valve shall be supplied on each filter tank. The valve body shall be machined from heavy cast bronze. Plastic valve bodies will not be considered for this industrial/commercial use. Victaulic type couplers shall be provided at each port of the valve for connection to the filter tank and manifold piping. Each valve shall be fitted with a nominal 6-inch diameter piston operated hydraulic cylinder to actuate the valve. Electrically or diaphragm actuated valves will not be allowed. External valve linkage will not be allowed for safety and potential maladjustment reasons. The internal piston shaft shall be type 302 stainless steel and shall be supported above and below the piston with Delrin guide bushings. A silicone impregnated felt wiper shall be provided for internal shaft quad ring lubrication. All exterior coating of the valve shall be in accordance with the exterior coating specification of the filter tank. All stainless steel components used in this assembly shall be passivated and rinsed after forming and machining.
 - 2) The backwash valve shall be designed to allow for continuous circulation pump operation during the cycling between filter and backwash of the filter system. This requirement is for the prevention of potential loss of circulation pump prime and/or damage to boiler, chemical feed systems and piping.
 - b. Priority Valve - Provided on all multiple tank filter systems.
 - 1) A hydraulically operated 6-inch or 8-inch IPS piston type, tamper proof, valve shall be supplied for use on the effluent manifold. The priority valve shall be made of PVC. A 10-inch electrical actuated valve shall be used with 10-inch manifolds. The priority valve shall be field adjustable, assuring the proper system flow rate and shall close upon command to restrict the effluent flow, allowing for the designed backwash flow rate. The priority valve shall operate automatically in concert with the system's backwash valves. External operating linkage or diaphragm actuated valves will not be allowed.
 - c. Piping
 - 1) The influent, effluent and waste manifolds shall be constructed of PVC Schedule 80 pipe and fittings. The influent and effluent manifolds shall be inch IPS. The manifolds shall be attached with victaulic type couplers fabricated of glass filled noryl to provide alignment,

flexibility and absorption of seismic stress as well as noise and vibration attenuation. The waste line shall be a 4-inch IPS manifold and shall be fitted with a waste control valve and clear 4-inch diameter sight glass assembly. The valve shall be of the tamper proof design and require a tool for backwash flow rate change. To minimize floor space requirements and provide unhindered access to filter control PLC, media dump port and manhole, backwash valves and manifold piping shall be located on top of filter tanks. All piping shall be factory assembled and pressure tested. The assemblies shall then be coated with a material to prevent ultra violet ray degradation of the plastic and shall color match all other system components.

- d. Backwash Flow Rate
 - 1) A 4-inch flow meter with plug shall be provided and installed on the backwash piping following the filter system, per the meter manufacturer's instructions. The flow meter saddle will be used at time of system start-up to verify backwash flow rate.
- 10. Automatic Backwash Control
 - a. An automatic backwash control system shall be provided (in conjunction with the automated water chemistry/mechanical room controller which shall allow for the automatic and manual manipulation of the filter backwash operation.
 - b. The backwash control system shall include a Filter Interface Panel manufactured by BECS Technology to be installed on the filter system influent piping manifold. The Filter Interface Panel shall utilize sealed solenoids with 4mm orifice and ½" push fittings.
 - c. The Filter Interface Panel shall include two (2) four-inch (4") pressure gauges to indicate influent and effluent pressure of the filter. The gauges shall be mounted with the solenoid block on a manufactured PVC backplate.
 - d. Differential pressure shall be calculated by the automatic backwash control system.
- 11. Pressure Supply System
 - a. An in-line "Y" strainer, 2-1/2 inch 0-100 psi pressure gauge and pressure regulator shall be supplied as part of the filter system. The pressure supply system shall clean and govern the pressure of the water used to actuate the filter system's automatic valves.
- 12. Pressure Amplification System
 - a. A Pressure Amplification System shall be provided and shall consist of a single suction centrifugal pump, hydro-pneumatic pressure sustaining tank, adjustable pressure switch, 50-feet of 3/8- inch Nylo Seal tubing and all necessary tubing connectors. This system shall use the filter system effluent water for actuation of backwash valves.
- 13. Pump
 - a. The housing and impeller shall be made of molded fiberglass reinforced thermoplastic. A mechanical seal shall be provided between the pump housing and the motor. The seal shall be a precision lapped, highly polished carbon-ceramic stainless steel shaft seal, assuring drip proof protection.
 - b. The motor shall be a ½ HP, single phase, 60 cycle, 3450 RPM, suitable for service with a 115 volt PLC Filter Controller or a ¾ HP, single phase, 50 cycle, 2800 RPM, suitable for service through a relay with the 24 volt output of the PLC Filter Controller. The motor shall be a NEMA "C" face square flange mounting with a drip proof enclosure. The motor shall be equipped with sealed ball bearings to provide for smooth, quiet operation.

- c. The booster pump shall be performance rated at five (5) gallons per minute at 93-feet of head.
- 14. Tank
 - a. Pressurized water shall be contained in a hydro-pneumatic steel tank which shall be lined with an epoxy coating. The tank will employ a flexing diaphragm separating wet and dry chambers. The steel tank shall be designed for maximum working pressure of one hundred (100) psi. Tank connection shall be 3/4- inch NPTM.
- 15. Pressure Switch
 - a. A pressure switch shall be mounted directly to the pump motor and shall be rated for the operation of a 1-1/2 HP motor at 115 volt, single phase. The switch will allow for adjustment of cut-in and cut-out pressure.
- 16. Check Valve
 - a. A 1/2-inch spring loaded check valve shall be supplied as part of the assembly. The check valve shall be installed on the pump suction and shall be designed to retain water pressure accumulated within the amplification system.
- 17. Tubing and Fittings
 - a. Fifty-feet of 3/8-inch Nylo Seal tubing and all necessary tubing to pipe fittings shall be supplied for the connection of the Pressure Amplification System to the filter system and the PLC Filter Controller.
- 18. Finish
 - a. The entire system shall be coated with an industrial grade polyurethane high gloss protective finish, similar in color to that of the filter system.
- 19. Certification
 - a. Certified engineering drawings and calculations will be required for structural strength of filter tank(s) and seismic loads. Proof of National Sanitation Foundation (NSF) and Underwriters Laboratories (UL) listing is also required.
- 20. Gauge Panel
 - a. A molded gauge panel shall be mounted on the automatic filter control panel. It shall be fitted with two (2) 4-1/2 inch diameter.
 - b. 0-100 psi pressure gauges and a field adjustable differential pressure gauge/switch.
- 21. Hardware
 - a. All fasteners (nuts, bolts and washers) employed in the system and components of the system shall be provided by the filter manufacturer, all of which shall be cadmium plated.
- 22. Instructions
 - a. Printed and bound operating, installation and service manuals with exploded parts lists shall be supplied with the filter system.
- 23. Start-Up
 - a. The manufacturer of the filtration system shall provide his services or those of his locally appointed factory representative for one day at the time of start-up of the filter system. The start-up shall include adjustments to the filter system and all of its controlling components, calibration and set-up of the filter controller and instructions to the owner and operators of the filter system.
 - b. The factory or its local service representative shall visit the filter system installation prior to the completion of one year of service. The factory/representative, with the owner and operator, will inspect all of the

filter system components for signs of wear/malfunction at that time. Any and all worn or malfunctioning items shall be replaced at no expense to the owner. The representative will thoroughly instruct the owner/operator on annual service procedures for the filtration system, all at no expense to the owner.

24. Filter Media

- a. The filter media shall be of a single grade and shall consist of uniformly graded silica sand with rough irregular edges, not rounded, which shall be free of limestone or clay. Twenty-one (21) cubic feet of media per tank will be required, support media (gravel) will not be allowed.
- b. #20 Sand
 - 1) Filter media shall be Grade #20, with angular grains, effective size .45 millimeter with a uniformity coefficient of 1.5 maximum.

MEDIA ANALYSIS

Sieve No. US Series	MM Opening Percent Retained On	Sieve (By Weight)
20 0.833	0.833 (0.333 in)	2
30 0.589	0.589 (0.023 in)	58
40 0.417	0.417 (0.016 in)	36
50 0.295	0.295 (0.012 in)	4

25. Packaging

- a. To protect and safeguard all components of the filter system, they shall be supplied in wooden crates to facilitate shipment, handling and /or storage on job site.

26. Warranty

- a. A twenty (20) year limited warranty covering the composite filter tank, a ten (10) year limited warranty covering all non-electronic components, and a one (1) year full warranty covering electrical components, shall be provided for the filter system(s) specified herein. The first three (3) years of the warranty period shall be unconditional on all non-electrical components. The fourth (4th) year through the end of the warranty period may be limited and prorated. On-site warranty is provided for one full year.
- b. Any items that are purchased and supplied as part of the filter system but are not manufactured directly by EPD shall carry the standard manufacturer's warranty as supplied with that particular item.

B. Teaching Pool Filtration System

1. Basis of Design: TR140C-3 as manufactured by Pentair
2. The filter system shall consist of high rate pressure sand filter tanks as shown on the drawings. Every aspect and component of the filter system must be certified by the National Sanitation Foundation (NSF) and bear the certification mark. The filter must have an engraved metal data plate permanently affixed on the face of the system that describes operational data and instructions and indicates startup date.

3. It is the intent of these specifications to describe a filtration system complete in every respect with all accessory items and supplied and warranted by one manufacturer.
4. The filter system specified herein shall be the standard cataloged product of a company regularly engaged in the manufacture of water treatment equipment. The purpose of this specification is to establish the minimum design, performance, quality, and service standards for the proposed equipment. The filter system with vertical filter tank as indicated, having a total effective filter area of 7.06 square feet, complete including slide valve, 0-60 psi pressure gage, air relief valve, backwash sight glass, and an internal distribution and collection system.
5. Vertically Oriented Fiberglass Tank
 - a. Provide 37-inch diameter two-piece filter tank, constructed of compression-molded fiberglass with O-ring seal and zinc plated bolts. Tank base shall be structural foam-molded polyethylene with holes for bolt down.
 - b. Basis of Design: Fiberglass filter shall be the product of Pentair Paragon Stark, or Neptune Benson provided they meet the specifications and layout. System design based upon Pentair.
 - c. Model: Pentair Triton TR140C-3,
6. The filter tank must incorporate all components and features as described in this section.
7. Two 2-inch connections in filter tank to serve as influent, and effluent connections.
8. One 1-1/2-inch capped nipple in lower front to serve as winterizing or media dump port connection.
9. One 8-inch port in the top of the tank to allow easy installation and maintenance of the sand bed.
10. Internal Distribution and Collection System: Equip tank with internal components that are hydraulically balanced to prevent migration of filter media during filtration cycle and that uniformly fluidizes media during backwash cycle without channeling or breakthrough at any location. Provide collection system of molded ABS and PVC.
11. Backwash Valving: Provide a PVC manual backwash slide valve on filter tank with two positions; filter to pool, and backwash to waste.
12. Filter Media: Uniformly graded silica sand free of clay or limestone, all Grade #20, effective size of 0.45 millimeter, maximum 1.4 uniformity index; media must have prior written approval of filter manufacturer. Provide 600 pounds of the filter media for each filter tank unless the manufacturer of filters approved for installation specifies a different quantity.
13. Hardware: Provide zinc-plated fasteners (nuts, bolts, washers, etc.) throughout entire system and components.
14. Manual: Furnish printed and bound manual covering the operation, servicing, and maintenance of filtration system, prepared by manufacturer.

C. Splashpad Filtration System

1. Basis of Design: two (2) TR100C-3 as manufactured by Pentair
2. The filter system shall consist of high rate pressure sand filter tanks as shown on the drawings. Every aspect and component of the filter system must be certified by the National Sanitation Foundation (NSF) and bear the certification mark. The filter must have an engraved metal data plate permanently affixed on the face of the system that describes operational data and instructions and indicates startup date.

3. It is the intent of these specifications to describe a filtration system complete in every respect with all accessory items and supplied and warranted by one manufacturer.
4. The filter system specified herein shall be the standard cataloged product of a company regularly engaged in the manufacture of water treatment equipment. The purpose of this specification is to establish the minimum design, performance, quality, and service standards for the proposed equipment. The filter system with vertical filter tank as indicated, having a total effective filter area of 4.91 square feet, complete including slide valve, 0-60 psi pressure gage, air relief valve, backwash sight glass, and an internal distribution and collection system.
5. Vertically Oriented Fiberglass Tank
 - a. Provide 31-inch diameter two-piece filter tank, constructed of compression-molded fiberglass with O-ring seal and zinc plated bolts. Tank base shall be structural foam-molded polyethylene with holes for bolt down.
 - b. Basis of Design: Fiberglass filter shall be the product of Pentair Paragon Stark, or Neptune Benson provided they meet the specifications and layout. System design based upon Pentair.
 - c. Model: Pentair Triton TR100C-3,
6. The filter tank must incorporate all components and features as described in this section.
7. Two 2-inch connections in filter tank to serve as influent, and effluent connections.
8. One 1-1/2-inch capped nipple in lower front to serve as winterizing or media dump port connection.
9. One 8-inch port in the top of the tank to allow easy installation and maintenance of the sand bed.
10. Internal Distribution and Collection System: Equip tank with internal components that are hydraulically balanced to prevent migration of filter media during filtration cycle and that uniformly fluidizes media during backwash cycle without channeling or breakthrough at any location. Provide collection system of molded ABS and PVC.
11. Backwash Valving: Provide a PVC manual backwash slide valve on filter tank with two positions; filter to pool, and backwash to waste.
12. Filter Media: Uniformly graded silica sand free of clay or limestone, all Grade #20, effective size of 0.45 millimeter, maximum 1.4 uniformity index; media must have prior written approval of filter manufacturer. Provide 600 pounds of the filter media for each filter tank unless the manufacturer of filters approved for installation specifies a different quantity.
13. Hardware: Provide zinc-plated fasteners (nuts, bolts, washers, etc.) throughout entire system and components.
14. Manual: Furnish printed and bound manual covering the operation, servicing, and maintenance of filtration system, prepared by manufacturer.

2.8 CHEMICAL TREATMENT SYSTEMS

A. Sodium Hypochlorite (Liquid Chlorine)

1. Feed systems for chlorine shall be peristaltic type pumps. Chemical feed pump(s) shall be provided and connected to the filtered water return lines to the pool(s) as shown on the pool plans. The pump(s) shall be capable of feeding a solution to the pool(s) to maintain chlorine (12% sodium hypochlorite) level against the back pressure involved and shall be fully adjustable while in operation.

2. The pump(s) shall be provided complete with fractional horsepower motor for 120V 60 Hz current, plastic feed lines, and fitting necessary for connections to the pool system piping.
3. All chemical pumps shall be electrically connected to and operated by the water chemistry controllers.
4. The chemical pump(s) shall be affixed with a metallic stamped label indicating the chemical being pumped and the pool to which it is connected.
5. Provide a non-metallic shelf support for the chemical feed pump(s).
6. Chemical feeders to be manufactured by LMI, ProMinent, G. H. Stenner & Co, or approved equal.
 - a. Competition Pool Chlorine Pumps (two required): Model 85M5 (85 gal/day)
 - b. Teaching Pool Chlorine Pump (one required): Model 45M5 (45 gal/day)
 - c. Splashpad Chlorine Pump (one required): Model 45M5 (45 gal/day)
7. All feeder systems to be provided with an injection check valve at point of tap in and strainers with foot valves for suction from 55-gallon drums, carboys or bulk tank. Bulk tank feed shall be from the top.
8. Provide one (1) 1000 gallon bulk chlorine solution tank in the chlorine storage area as shown on the drawings. Tank to be a double wall bulk tank constructed of polyethylene rigid support with top manway and vent. Tank shall be 64" outside diameter by 81" high. Manufacturer shall be Chemtainer, Industries, TC6481DC, or approved equal. Provide an "At-A-Glance" or approved equal gauge, correctly calibrated to the tank size.
9. Chemical feed lines shall be ½" polyethylene tubing shall be encased in SCH 80 PVC within 18" of chemical pump and 18" of injection point and shall be properly braced.

B. pH Buffering System (CO2)

1. Shop drawings complete with a piping diagram depicting the location in which the CO2 feeder is to be connected to the system shall be provided and approved prior to installation. Installation of the system shall be as specified in the manufacturer's directions and no exceptions shall be taken.
2. Bulk Storage
 - a. Provide a system for storing, regulating and feeding carbon dioxide for pH control. The system shall consist of CO2 storage tank(s), a lockable fill box for bulk delivery, a pressure reducing/regulating system, a feed and rate of flow adjustment control system, injection or mass transfer system, and all valves, tubing, fittings and appurtenances required for a complete and operable system. The system is to include the following components.
 - b. CO2 Storage Tanks
 - 1) Provide two (1) 750 lb mass storage tank(s) meeting ASME requirements, specifically designed and configured for use with CO2. The tank(s) shall be of an insulated, vacuum-jacketed double wall construction with a rated service pressure of at least 292 psig. The outer shell shall be stainless steel and given a 10 mil dry film thickness epoxy coating, the inner shell shall be of stainless steel.
 - 2) Each tank shall include shut off and pressure regulating valves, gauges for accurate output pressure control, a 350 psig pressure relief valve, and shall be provided with a dual pressure building/economizer regulator that includes a 7.5 amp, 120 VAC heater extending into the tank and the liquid CO2.

- 3) Usage rate capacity shall have a range of 3.2 pounds per day to 20 pounds per hour. Secure tank to building wall with a coped saddle and a 16 GA x 3" stainless steel strap bolted to wall.
- 4) Fill tank with CO2 for initial testing and operation, and provide full tank(s) at the time of Owner acceptance.
- 5) Tank shall have anchorage flange installed at the base of the tank. Rectangular tubes for ductile anchorage shall not be included in the anchorage flange.
- 6) The tank(s) shall be as manufactured by Taylor-Wharton, MVE, or approved equal.
- c. Remote Fill Box
 - 1) Provide a remote fill station capable of filling the tank(s) at the rate of approximately 30 to 50 pounds per minute in a manner that does not require entry to the storage room containing the CO2 tank(s). Length of tubing between remote fill box and bulk storage tank shall not be more than 20', unless otherwise noted. Each fill station shall consist of a flush mounted (recessed) lockable fill box located at the exterior of the building, as indicated, connected to the CO2 system. It shall include a quick disconnect and automatic closure coupling. Box shall be 8" x 8" x 2" and constructed of painted 16 gauge galvanized or stainless steel, or sized to module with exterior masonry.
 - 2) Tanks are to be connected to outside fill station(s), as indicated, with two lengths of 1/2 inch ODT copper for the purpose: one to transfer liquid to the tanks from a bulk delivery vehicle, and the other from the relief valves to the outside of the building. All copper tubing from remote fill box to storage tank shall be fitted with either double ferrule swage fittings, or silver soldered fittings.
3. Feed Systems
 - a. Tubing connection between bulk storage tank and mass transfer system shall be one of two methods: pressure rated 3/8" poly/tygon tubing (in runs over 10' enclosed PVC conduit) or 1/2 OD copper double ferrule swage fittings, or silver soldered fittings; refer manufacturer.
 - b. Competition Pool CO2 Feed System
 - 1) Basis of Design: pH-MTS CO2 Feed System as manufactured by EKO3.
 - 2) Provide one (1) system for the Competition Pool and Recreation Pool; a pre-plumbed and pre-wired, skid mounted, high efficiency CO2 feed and mass transfer system capable of feeding from 0 to 170 SCFH of CO2. System to include a 1 HP stainless steel / Noryl booster pump, motor starter, mass transfer venture style polyethylene injector, 12 to 15 gallon FRP contact chamber with interior diffusers, 120 VAC / 24 VAC transformer, adjustable feed rate flow controller, 24 VAC solenoid valve, feed indicator light, and all fittings, unions, valves, tubing, connectors and appurtenances required for a complete and operable installation. Skid is to be of non-corrosive materials and provided with drilled legs for bolting to the floor.
 - c. Teaching Pool CO2 Feed System
 - 1) Basis of Design: CO2 Controller 20-220 SCFH as manufactured by EKO3.
 - d. Splashpad CO2 Feed System

- 1) Basis of Design: CO2 Controller 20-220 SCFH as manufactured by EKO3.

C. pH Buffering System (Muriatic Acid)

1. Feed systems for muriatic acid shall be peristaltic type pumps. Chemical feed pump(s) shall be provided and connected to the filtered water return lines to the pool(s) as shown on the pool plans. The pump(s) shall be capable of feeding a solution to the pool(s) to maintain pH level against the back pressure involved and shall be fully adjustable while in operation.
2. The pump(s) shall be provided complete with fractional horsepower motor for 120V 60 Hz current, plastic feed lines, and fitting necessary for connections to the pool system piping.
3. All chemical pumps shall be electrically connected to and operated by the water chemistry controllers.
4. The chemical pump(s) shall be affixed with a metallic stamped label indicating the chemical being pumped and the pool to which it is connected.
5. Provide a non-metallic shelf support for the chemical feed pump(s).
6. Chemical feeders to be manufactured by LMI, ProMinent, G. H. Stenner & Co, or approved equal.
7. Competition Pool Chlorine Pumps (two required): Model 85M5 (85 gal/day)
8. Teaching Pool Chlorine Pump (one required): Model 45M5 (45 gal/day)
9. Splashpad Chlorine Pump (one required): Model 45M5 (45 gal/day)
10. All feeder systems to be provided with an injection check valve at point of tap in and strainers with foot valves for suction from 55-gallon drums, carboys or bulk tank. Bulk tank feed shall be from the top.
11. Provide one (1) 350 gallon bulk chlorine solution tank in the chlorine storage area as shown on the drawings. Tank to be a double wall bulk tank constructed of polyethylene rigid support with top manway and vent. Tank shall be 52" outside diameter by 56" high. Manufacturer shall be Chemtainer, Industries, TC5256DC, or approved equal. Provide an "At-A-Glance" or approved equal gauge, correctly calibrated to the tank size.
12. Chemical feed lines shall be 1/2" polyethylene tubing shall be encased in SCH 80 PVC within 18" of chemical pump and 18" of injection point and shall be properly braced.
13. Provide "Vapor Shield" vent check valve for the acid tank which seals container while allowing the liquid to be removed via pump. The Vapor-Shield shall prevent an internal vacuum and collapse of a sealed container. It will also prevent the pump from developing a vacuum-lock while attempting to remove the liquid from the sealed container. The Vapor-Shield shall prevent the release of any acid vapors. The Vapor-Shield body shall be constructed entirely from schedule 80 PVC with polypropylene tube fittings and factory-installed acid resistant viton sealant on all threaded connections. The diaphragm and o-rings shall be constructed of acid resistant viton. No metallic or materials not rated appropriate for use with acid shall be used. The Vapor-Shield shall be fitted with a 3/4" male NPT threaded fitting to allow for the installation onto any common: five (5) through fifty-two (52) gallon acid shipping container caps and lids. The unit shall be supplied with no less than fifteen (15) feet of 3/8" polyethylene tubing.

2.9 ULTRAVIOLET DECHLORAMINATION AND DISINFECTION SYSTEM

A. General

1. Ultraviolet Disinfection Equipment shall operate within the UVC electromagnetic spectrum emitting wavelengths in the range of 200nm to 400nm. This required wavelength will provide constant disinfection/inactivation of bacteria, algae, molds, viruses and destruction of Monochloramines, Trichloramines, and Dichloramines. Ultraviolet Lamp/Chamber and Spectra Touch Control Panel by ETS UV Systems. Any deviation/exception must be provided in writing to and approved by the designer prior to the bid date.
2. The UV System shall have a MET or equivalent (ETL, CSA, or UL) listing, be NSF-50 2016 certified and 3rd party validated to the USEPA UVDGM 2006 Guidelines.

B. Description

1. The Ultraviolet System shall be provided in a complete package to include a stainless steel chamber, Spectra Control System located in a NEMA 12 (IP52) rated panel, medium pressure lamp(s) designed to emit wavelengths within the UVC electromagnetic spectrum, automatic wiper system, and Project Commissioning by a Certified ETS WAFER™ Ultraviolet Technician.
2. Ultraviolet manufacturer to offer unit capability of a horizontal OR vertical installation application using state of art design and direct flow through characteristics. Unit shall be a medium pressure system with a flow rating of 211 US GPM @ 94% UVT. Any systems validated or designed for flows based on 98% UVT are not acceptable. Chamber and Control Cabinet shall be as indicated on the drawings.

C. Ultraviolet Lamp

1. Ultraviolet lamp shall be medium pressure high intensity. Each lamp shall be designed to emit continuous ultraviolet wavelengths in the range of 200nm to 400nm. This will provide optimal disinfection benefits and destruction of the Monochloramine, Dichloramine, and Trichloramine compounds. The lamps must be based on constantly treating the full recirculating flow rate, not on a side stream treatment. The system must be equipped with infinitely variable power control lamp intensity and dose. Power stepping not acceptable. The lamps shall be capable of turndown to 30% of the nominal rated power.

D. UV Reactor

1. The unit shall be constructed of 316L stainless steel electropolished and passivated to prevent corrosion within the harsh pool environment.
2. The Ultraviolet chamber shall come complete with the following equipment: Ultraviolet intensity monitor factory calibrated to provide intensity in mWcm², monitors providing percentage of lamp output not acceptable. It must include a built-in alarm system to notify operator when output level drops below required level of 60 mJ/cm² for indoor pools or 40mJ/cm² for outdoor pools (or operator set dosing levels).
3. UV Reactor will be a validated system with third party testing to a recognized international standard such as the USEPA DGM
4. Ultraviolet temperature monitoring system shall be provided to maintain system integrity in the event of flow interruptions to the chamber.

5. Ultraviolet chamber shall come complete with annealed quartz sleeve with "O" ring seals for water tightness. System shall be complete with advanced seal arrangement to reduce risk of quartz over-compression on the seal face.

E. UV Control System

1. Control cabinet shall be a Spectra Control unit and or pre-approved equal.
2. The power must be controllable to provide full power, half power and infinite variable power based on real time interface with changes in UVT, Flow Rate or Combined Chloramines. The power panel must house the electronic ballasts required to ignite and power the lamps.
3. Three levels of operation shall be provided to meet the needs of the operator and pool environment: Simple Control (start, stop and reset), Full Parameter Display, and Customized Operator Configuration.
4. Modes of operation shall be password protected to secure system critical setup functions. Control system shall have clearly identifiable start, stop, and reset controls (suitable for gloved operation) with Running and Fault LCD indicators.
5. The display shall include the following:
 - a. Ultraviolet calculated dose (derived from flow and intensity inputs),
 - b. Ultraviolet intensity (as a % and mW/cm²),
 - c. Lamp Current
 - d. Flow rate (accepts signal from optional flow meter – displayed as gallons per minute or m³/hour),
 - e. Chamber temperature (displayed as deg. F or deg. C),
 - f. Operation hour meter
 - g. Fault indicators to include Lamp fault, low Ultraviolet & temperature alarm, Ground fault trip, Wiper fault.
6. All alarm functions shall have simple text message displays to assist in fault finding

F. UV Control System - Interfaces

1. The Control system shall have a minimum of the following system interface control:
 - a. Remote operation
 - b. Process interrupt features (from valves, flow meters)
 - c. Low UV dose (configurable to shut down or alarm only)
 - d. Flow meter input
 - e. Auto-Restrike
 - f. Half to full power Ultraviolet setting with 24 hour/7 day settable timer
 - g. Variable power/Dose pacing interface
2. Control system shall have built in data-logging capabilities to record the following information:
 - a. Ultraviolet intensity required
 - b. Ultraviolet intensity measured
 - c. Lamp current
 - d. Chamber temperature
 - e. Flow rate (if flow meter is connected)
 - f. Time and date stamp, all alarms generated.
3. Control system must be able to be interfaced with a Chemistry Controller that can measure Total or Combined Chloramines in order to maintain the proper dosage required during the life of the lamp

- a. Control System must be able to interface with the Defender® filtration controller.
- b. Control System must be capable of interfacing with a SCADA system including Modbus.
- c. Control system must have a method of uploading data to a Web based portal

G. Automatic Wiper System

- 1. An automatic cleaning system shall be provided for cleaning of quartz sleeve and ultraviolet monitor probe. The system shall travel the entire length of the quartz sleeve twice per desired cleaning cycle. Precision molded wiper rings shall be provided to ensure thorough quartz tube cleaning and quartz tube protection. Wiper cycle shall be user selectable and adjustable within a range of 5 minutes to 24 hours depending on anticipated application and deposit build-up. At a minimum, the automatic wiper system shall have the following characteristics:
 - a. System shall utilize direct Belt Drive with square machined pulleys and acme threaded shaft to prevent slippage and pin shearing. Systems utilizing shear pins or complicated gear boxes will be unacceptable.
 - b. Wiper power supply shall be 24 volt DC for improved safety. Higher voltage not acceptable.
 - c. System shall incorporate Direct Shaft Encoding for positional location. Systems relying on external limit switches or internally located magnets will be unacceptable.
 - d. Wiper interval shall be operator selectable with optional override switch.
 - e. Wiper faults are to be indicated on the control system display.
 - f. Wiper System to utilize "Intelligent Operation" for automatic start-up commissioning.
 - g. Records wiper position at chamber ends. Position must be fixed and not dependent on a timed interval or component striking end of chamber.
 - h. Establish a travel run without setting limit adjustments to ensure system integrity and longevity.

H. Quality Assurance

- 1. All SYSTEM components shall be supplied to the CONTRACTOR by a single EQUIPMENT SUPPLIER.
- 2. The EQUIPMENT SUPPLIER shall have at least twenty (20) year experience providing medium pressure UV systems to the Aquatics market.
- 3. The EQUIPMENT SUPPLIER shall design, develop, manufacture and test the SYSTEM in a facility that is assessed and registered as conforming to the requirements of ISO 9001:2008 quality management system.

I. Warranty

- 1. A factory trained representative of the manufacturer shall perform all warranty work.
- 2. Manufacturer to warranty Ultraviolet chamber and Spectra Control panel for a period of 5 years (subject to any contractual maintenance requirements) excluding lamps, quartz and seals.
- 3. Medium pressure Ultraviolet bulbs shall be warranted for a period of 8,000 hours.

4. Intermittently operated lamps (≥ 1 on/off cycles per day) will be replaced free of charge should failure occur prior to 4,000 hours and replacement will be prorated between 4,000 and 8,000 hours.
5. Manufacturer must maintain spare or replacement parts in the USA for same day or no longer than next day delivery in North America, other areas based on expedited delivery available.
6. A Service Agreement (twice per year maintenance) from a qualified factory certified distributor shall be available to initiate the service in order to maintain the five-year warranty.

2.10 WATER CHEMISTRY MONITORING AND CONTROL SYSTEMS

A. Competition Pool

1. Basis of Design: BECSys7 manufactured by BECS Technology, Inc. or approved technically equal system capable of providing equal performance for all operating functions, shall be provided.
2. The water chemistry control system for the Swimming Pool shall provide continuous monitoring and control of sanitizers, oxidizers, pH, ORP, free chlorine, temperature, system flow rate, surge tank water levels, and water chemistry balance calculations. The controller shall manage a VFD on the recirculation pump with a programmable Fireman Cycle feature, which automatically turns off the Heater systems prior to shutting off the recirculation pump. The controller shall abort VFD turndowns upon declining water chemistry, and increase the circulation rate to satisfy minimum flow requirements of a heater. All high-voltage wiring shall be performed in a separate NEMA 4X enclosure that precludes access to the controller electronics. The control system shall optionally provide automatic control of the filtration system including backwash operation. Remote access shall be provided through EZConnect, without the need for port forwarding or a VPN. Installation of the system shall be per the manufacturer's specification and no exceptions shall be allowed. A factory trained/authorized representative shall provide training to the owner and the training shall be videotaped per 131109 of the project contract documents.
3. Certifications
 - a. The controller shall carry the following product certifications
 - 1) NSF / ANSI Standard 50;
 - 2) UL 61010-1
4. Sensors - The controller shall come with sensors meeting the following requirements.
 - a. pH
 - 1) The controller shall provide a measurement of pH by utilizing a sensor with the following characteristics:
 - i. 0 – 14 sensing range;
 - ii. ABS body with 1/2 in NPT process connection;
 - iii. minimum of 32 milliliters of inorganic electrolyte gel; organic electrolytes, susceptible to breakdown in the presence of strong oxidants, shall not be considered equal;
 - iv. a porous Teflon liquid junction to provide a stable, low impedance reference contact, and to prevent fouling and clogging of the liquid junction;
 - v. a silver / silver chloride (Ag / AgCl) reference element;

- vi. a general purpose glass membrane pH sensing element;
 - vii. operating temperature range of 0 °C to 80 °C;
 - viii. operating pressure range of 0 to 100 psiG.
- 2) The controller shall continuously monitor, display and data log pH with 0.1 or 0.01 resolution (programmable).
- b. ORP
 - 1) The controller shall provide a measurement of ORP by utilizing a sensor with the following characteristics.
 - i. -1000 to +1000 mV sensing range;
 - ii. ABS body with 1/2 in NPT process connection;
 - iii. minimum of 32 milliliters of inorganic electrolyte gel; organic electrolytes, susceptible to breakdown in the presence of strong oxidants, shall not be considered equal;
 - iv. a porous Teflon liquid junction to provide a stable, low impedance reference contact, and to prevent fouling and clogging of the liquid junction;
 - v. a silver / silver chloride (Ag / AgCl) reference element;
 - vi. a solid platinum or solid gold ORP sensing element with a minimum of 1 cm² surface area; platinum-plated and gold-plated sensing elements, which are susceptible to abrasives, shall not be considered equal;
 - vii. operating temperature range of 0 °C to 80 degrees °C;
 - viii. operating pressure range of 0 to 100 psiG.
 - 2) The controller shall continuously monitor, display and data log ORP with 1 mV resolution.
- c. Temperature
 - 1) The controller shall provide a measurement of water temperature by utilizing a sensor with the following characteristics:
 - i. 32 °F to 212 °F (0 °C to 100 °C) sensing range;
 - ii. 2 wire, 100 Ω resistive temperature detector (RTD) with a 0.00385 Alpha.
 - 2) The controller shall continuously monitor, display and data log temperature with 1 °F resolution.
- d. Circulation Flow Sensor
 - 1) The controller shall provide a measurement of pool circulation flow rate and volume by utilizing a flow sensor with the following characteristics:
 - i. 0 to 8800 gpm (0 to 33265 l/min) measuring range,
 - ii. paddle wheel flow sensor with a frequency output,
 - iii. dual O-ring seal,
 - iv. 25 ft cable,
 - v. saddle,
 - vi. Flow volume: 999 trillion gallons, 1 gallon resolution; 999 trillion liters, 1 liter resolution.
 - 2) The controller shall continuously monitor, display and data log flow rate with 0.1 gpm resolution.
- e. CP-1 Free Chlorine Sensor
 - 1) The controller shall provide a measurement of free chlorine by utilizing a sensor with the following characteristics:
 - i. 0.0 to 10.0 mg/l (ppm) measuring range,
 - ii. 32 °F to 176 °F operating temperature range,
 - iii. Replaceable cleaning beads,

- iv. Solid copper cathode and platinum anode for optimum stability and reliability.
 - 2) The sensor shall not utilize a membrane or electrolyte. Sensors utilizing a membrane and/or electrolyte, which must be replaced and/or replenished on a regular basis, shall not be considered equal. The controller shall continuously monitor, display and data log free chlorine with 0.1 mg/l resolution.
 - f. Filter Influent Pressure Transducer
 - 1) The controller shall provide measurement of filter influent pressure by utilizing a pressure transducer with the following characteristics:
 - i. 0 to 100 psiG measuring range,
 - ii. $< \pm 2\%$ span max @ 25 °C which includes linearity, hysteresis and repeatability,
 - iii. 0.25% static error band and 1.5% typical thermal error band,
 - iv. temperature compensated and fully calibrated,
 - v. stainless steel wetted components with plumbing connections of 1/4 in.
 - 2) The controller shall continuously monitor, display and data log pressure(s) with 1 psiG resolution.
 - g. Filter Effluent Pressure Transducer
 - 1) The controller shall provide measurement of filter effluent pressure by utilizing a pressure transducer with the following characteristics:
 - i. 0 to 100 psiG measuring range,
 - ii. $< \pm 2\%$ span max @ 25 °C which includes linearity, hysteresis and repeatability,
 - iii. 0.25% static error band and 1.5% typical thermal error band,
 - iv. temperature compensated and fully calibrated,
 - v. stainless steel wetted components with plumbing connections of 1/4 in.
 - 2) The controller shall continuously monitor, display and data log pressure(s) with 1 psiG resolution.
 - h. Surge Tank Level
 - 1) The controller shall provide a measurement of the surge tank water level by utilizing the BECSys SLS continuous level sensor with the following characteristics:
 - i. Piezoresistive pressure measurement of the water column,
 - ii. Automatically adjusts for changes in atmospheric pressure,
 - iii. Factory calibrated,
 - iv. Field configurable sensor length,
 - v. Solid-state; no moving parts that can wear out over time,
 - vi. Installation options for wall mount and stand pipe glass configurations.
 - 2) The controller shall continuously monitor, display and data log surge tank level with 0.4 in resolution or better. The controller shall use the surge tank level to control a water makeup valve to maintain water level (Autofill) and/or control a main drain modulating valve. Upon a Low Surge Tank Level Alarm the controller shall trigger an Emergency Off condition to turn off the circulation pump to prevent damage to the pump.
5. User Interface

- a. The standard display shall be a backlit transfective LCD with 14 line x 40 alpha/numeric graphical characters that will continuously display information related to the following:
 - 1) All installed sensor readings,
 - 2) Set points, with current control status,
 - 3) All active alarms, including time activated,
 - 4) Smart menus w/ integrated on-screen help.
 - b. Contrast adjustment of the backlit LCD shall be provided through clearly marked keys on the front-panel without the need for access to internal controller circuitry. After initial adjustment, controller shall monitor internal temperature and automatically adjust contrast to prevent LCD blackout in extreme ambient temperature conditions. Controllers that do not include front-panel contrast adjustment and automatic temperature compensation shall not be considered equal.
 - c. The standard user interface shall include single-touch access to Set Points, Relay Modes, Calibrations, Backwash status and settings, Menu access, and Reset Fail/Safes. An alphanumeric keypad shall be provided for ease of system configuration.
6. Control Functions
- a. Water Chemistry
 - 1) pH Control: The controller shall continuously control pH. Chemical feed shall be configurable for feed-up, feed-down, or dual feed and either on/off or time-based proportional feed.
 - 2) Sanitizer Control: The controller shall continuously control sanitizer based upon the ORP reading, the free chlorine sensor, or both with a bracketed control program. Chemical feed shall be configurable for either on/off or time-based proportional feed.
 - 3) Bracketed Sanitizer Control: With a free chlorine sensor, the controller shall be configurable for bracketed sanitizer control; The bracketed control algorithm shall allow either the ORP or ppm set point to be chosen as the primary control point, while using other parameter to create a secondary boundary (min and max settings) that must be maintained in addition to the primary control point.
 - 4) Sanitizer Booster Feed: The controller shall have a sanitizer booster program with selectable ORP and/or ppm set points with separate ending set points, allowing the option of the booster sanitizer to control to a lower set point while the primary system can recovers.
 - 5) UV Control: A Fireman Cycle feature shall turn off (ramp down) the UV relay 0 to 60 minutes (settable) prior to backwash initiation or recirculation pump shutdown.
 - 6) Ozone/Auxiliary: A Fireman Cycle feature shall turn off (ramp down) the Ozone/Auxiliary relay 0 to 60 minutes (settable) prior to backwash initiation or recirculation pump shutdown. The Ozone Fireman control and relay shall have the ability to be renamed in the menus to provide the Fireman Cycle feature for Auxiliary equipment instead of ozone as needed.
 - 7) Combined Chlorine UV Control: With free and total chlorine sensors, the controller shall provide turndown control of a UV system based upon combined chlorine set point; when combined chlorine is below set point the UV system will be turned down to decrease energy consumption and extend bulb life.

- 8) Superchlorination: The controller shall have a programmable superchlorination function, based upon ORP or ppm superchlor setpoint, which is triggered manually.
 - 9) Dechlorination: The controller shall have a programmable dechlorination function, based upon ORP or ppm dechlor setpoint, which is triggered either manually or by the completion of the superchlorination function.
 - 10) LSI & RSI: The controller shall compute the Langelier Saturation Index and the Ryznar Saturation Index based upon current inputs and the Ca Hardness and Alkalinity entered by the operator.
- b. Expanded
- 1) Flow Monitoring: With a circulation flow sensor, the controller shall continuously monitor, display, and datalog system flow, maintaining a total flow volume. A Low Flow Alarm shall be operator settable, which can be programmed to disable chemical feeds. Controller shall also have a Minimum Flow Rate setting to turn off heater whenever system flow is less than this programmed minimum level.
 - 2) Heater Control: The controller shall perform on/off control of a heater based upon an operator settable temperature set point. A Fireman Cycle feature shall turn off the Heater 0 to 60 minutes (settable) prior to recirculation pump shutdown. The controller shall immediately turn off the Heater when system flow is less than the heater Minimum Flow Rate setting. The Heater control algorithm shall include an Energy Conservation mode, with on/off set time and secondary temperature set point.
 - 3) TDS Control: With a conductivity/TDS sensor, the controller shall provide selectable control of TDS through simultaneous draining of water prior to filtration and addition of fresh make-up water.
 - 4) Enzyme Feed: The controller shall include a programmable daily timed feed with start and end time, feed duration, and number of cycles to allow multiple feed cycles per day.
 - 5) Turbidity Control: With a turbidity sensor, the controller shall feed polymer based upon turbidity setpoint.
 - 6) Chemical Inventory Monitoring: With an acid and/or liquid chlorine level sensor, the controller shall continuously monitor, display, and data log liquid pH adjuster and chlorine inventory levels. The controller shall include low chemical level alarm points for each chemical being monitored.
 - 7) Backwash Tank Monitoring: With a backwash tank level sensor, the controller shall continuously monitor, display, and data log backwash holding tank level.
 - 8) Surge Tank Monitoring: With a surge tank level sensor, the controller shall continuously monitor, display, and data log surge tank level.
 - 9) Autofill: With a surge tank level sensor, the controller shall automatically control a water makeup relay to add makeup water to maintain pool level set point, based upon surge tanks (or equivalent) level, with an overfill delay feature. The controller shall provide a programmable alternate set point (4 event 28 day timer).
 - 10) Main Drain Modulating Valve Control: With a surge tank level sensor and electronically controlled main drain valve, the controller shall continuously modulate (control) the main drain valve via a 4-20 mA

- output signal. Two user-defined settings shall specify the range of modulation of the main drain valve, with the control signal scaled linearly between those two points.
- 11) Sensor Wash: The controller shall include a programmable sensor wash with start and end time, feed duration, and number of cycle to allow multiple feed cycles per day.
- c. Energy Conservation
 - 1) Alternate Setpoints: The controller shall have alternate Sanitizer, Heater, and Autofill setpoints, based upon a 4 event 28 day timer.
 - 2) Energy Conservation Mode: The controller shall have the capability to disable all mechanical and chemical functions during programmed conservation cycle. The Energy Conservation Mode shall include the ability to periodically monitor and satisfy all operation requirements based upon a programmed time schedule.
 - d. Automatic Backwash
 - 1) Backwash Initiation: The controller shall be user configurable to initiate backwash upon any of the following conditions:
 - i. Time, based upon a 24 hour, 7 day programmable calendar,
 - ii. Pressure Differential, taken from either a pressure differential switch or an operator settable low pressure differential setpoint based upon the differential between two installed pressure transducers,
 - iii. Low System Flow, an operator settable low flow setpoint based upon the installed system flow meter,
 - iv. Totalized filter water volume, an operator settable totalized filter water volume setpoint based upon the total system flow maintained by the controller from the installed system flow meter,
 - v. High filter effluent turbidity, an operator settable turbidity set point based upon the installed turbidity sensor,
 - vi. Manual, which only initiates backwash when manually activated by operator.
 - 2) Normal Operation: The controller shall be capable of controlling the backwash operation of up to 16 filters, with the following backwash features included as part of normal programming.
 - i. Inhibit Period, Operator settable daily time period during which backwash is prevented from being triggered.
 - ii. Backwash Frequency Fail Safe: Prevents an automatically triggered backwash from starting within this time period from the end of the previous backwash. Does not prevent a Manual initiation of backwash.
 - iii. Fireman Cycles: The controller shall provide 3 operator-settable independent Fireman Cycle settings for the Heater, UV and Ozone/Auxiliary controls. The controller shall automatically delay the start of the backwash operation until the Heater, UV and Ozone/Auxiliary controls have been deactivated and the corresponding Fireman Cycles have expired.
 - iv. Primary/Priority Valve Management: Primary/Priority valve control closes a Primary/Priority valve during backwash of a filter to increase the flow through the filter being backwashed.

- v. Alternate Lead Filter, In multiple filter systems, the controller shall automatically alternate the lead filter in each successive backwash cycle, in order to assure an effective full backwash of all filters in the system.
 - vi. Backwash duration: Operator settable length of time to backwash each filter.
 - vii. Dwell Time: Operator settable length of time to delay after each filter is backwashed.
- 3) Backwash Holding Tank management: The controller shall be capable of monitoring the backwash holding tank to prevent overflow, by adjusting the backwash cycle as follows:
 - i. Suspend backwash when the holding tank is full, allowing time for the holding tank to drain.
 - ii. Automatically resume backwash when the holding tank is empty.
 - iii. An operator settable timeout which monitors the amount of time the backwash holding tank takes to drain. If this timeout is exceeded, a limit timer alarm is activated and the backwash cycle cancelled.
- 4) Advanced Backwash Optimization: The controller shall be capable of the following advanced features as part of the normal backwash programming:
 - i. Backwash accessory: Turns on an additional relay before, during, and/or after backwash operations based upon operator settable parameters; useful for sites where application of a dechlorination agent to backwash water (holding tank) is required.
 - ii. Water Saving (Turbidity): The controller shall be capable of monitoring backwash effluent turbidity and ending a filter backwash early upon reaching a desired turbidity set point.
 - iii. Filter Isolation: During backwash suspension due to full backwash holding tank, allows suspended filter to be isolated from the system rather than being returned to filter mode to prevent the filter bed from recompacting, making the resumed backwash rapidly effective. Requires properly equipped filters.
- e. Main Recirculation Pump
 - 1) On/Off Control with Relay
 - i. Controller shall provide the capability to interface to and control a recirculation pump with a programmable relay. The controller shall provide 3 operator-settable independent Fireman Cycle settings and relays for the Heater, UV and Ozone/Auxiliary controls.
 - ii. The controller shall include the following capabilities, available as appropriate based upon installed sensors and implemented features.
 - a. Fireman Cycle: Upon the following events, the controller shall automatically delay recirculation pump shutdown until the Heater, UV and Ozone/Auxiliary controls have been deactivated and the corresponding Fireman Cycles have expired:
 - 1) Backwash Operations
 - 2) Energy Conservation mode (24 hr, 7 day function)

- 3) Manual off (per Operator)
- b. Immediate: Upon the following events, the controller shall immediately turn off the recirculation pump (and Heater, UV and Ozone/Auxiliary controls), without first satisfying Fireman Cycle timing requirements:
 - 1) Surge Tank Level Low Alarm: Turn off pump immediately (surge tank is almost empty)
 - 2) Strainer Vacuum High Alarm: Turn off pump immediately (possible entrapment)
 - 3) Emergency shut down, triggered by front-panel Emergency Off: Turn off pump immediately (per Operator)
- 2) Total Dynamic Head (TDH)
 - i. Controller shall provide the capability to continuously monitor the Total Dynamic Head (TDH) of the main recirculation pump, directly calculated by the controller from recirculation pump influent vacuum and filter influent pressure transducers (if installed). TDH shall be displayed on the user interface and recorded in data logs, with user-programmable High and Low TDH Alarm settings.
- 3) VFD Interface
 - i. Controller shall provide the capability to interface to and control a recirculation pump equipped with a Variable Frequency Drive (VFD) through a 4-20 mA signal. The controller programming shall allow the operator to manage the VFD entirely from the water chemistry controller, by providing the following capabilities:
 - a. Programmable setpoint specified as either flow rate, effluent filter pressure, or fixed setting,
 - b. Four programmable operator-triggered alternate profiles ("Manual Turndowns"),
 - c. Four programmable scheduled alternate profiles ("Scheduled Turndowns"),
 - d. Override setting for backwash,
 - e. Ramp up and ramp down settings,
 - f. Minimum output setting.
 - ii. The controller shall automatically abort a Manual or Scheduled Turndown upon declining water chemistry and return to the standard programmed circulation rate to maintain optimal water quality. Declining water chemistry is signaled by any of the following alarm conditions:
 - a. pH low alarm
 - b. pH high alarm
 - c. ORP low alarm
 - d. ORP high alarm
 - e. PPM low alarm
 - f. PPM high alarm
 - g. Temperature low alarm
 - h. Temperature high alarm
 - i. Total Cl High alarm
 - j. Combined Cl High alarm

- k. Turbidity high alarm
 - iii. During a VFD turndown the controller shall automatically increase the circulation flow rate to satisfy minimum flow rate requirements for a heater, UV and/or ozone unit. Each device shall have a dedicated minimum flow rate setting; when the controller logic determines that one of these units must be activated to achieve the programmed set point, the controller shall automatically increase the circulation flow rate (if necessary) while that device is activated. After the set point is satisfied, the controller shall return to the flow rate specified in the VFD turndown after any programmed Fireman's Cycles have elapsed.
 - iv. Remote access to current VFD status and all VFD parameters shall be provided through the BECSys for Windows PC software provided with controller. The name of each alternate profile shall be changeable by the operator, so that VFD menus and data log entries are intuitive and recognizable by the users of the system.
 - v. Systems that do not provide both local and remote management of the VFD through the equipment room controller shall not be considered equal.
- 7. Control Outputs
 - a. Relay Outputs
 - 1) Solid-State Relays
 - i. The controller shall come with a total of 4 integral line or dry contact 5A solid-state relay outputs capable of switching 3A under all normal operating conditions, accounting for the effects of the temperature gradient inside the NEMA 4X enclosure. Systems that utilize relays that are not de-rated must submit an engineering evaluation justifying the use of relays at their full, optimal-condition capacity. All solid-state relays shall have a provision for an electrical interlock with the circulation pump motor starter.
 - 2) Mechanical Relays
 - i. The controller shall come with a total of 5 mechanical relays:
 - a. 1 integral 8A dry contact mechanical relay, and
 - b. 4 integral 3A dry contact or line powered mechanical relays.
 - ii. Since mechanical relays have the inherent risk of failing in the closed (active) position, as a safety measure the controller shall preclude the ability to assign any of the integral mechanical relays to chemical feed functions. Systems that do not preclude mechanical relays from being configured for chemical feeds shall not be considered equal. All mechanical relays shall have a provision for an electrical interlock with the circulation pump motor starter.
 - b. 4-20 mA Outputs
 - 1) The controller shall come with eight separately isolated 4-20 mA output signals with a load capacity of 440 Ω per output channel. Each output signal shall be independently configurable for any of the following functions:
 - i. Any enabled input, scaled between two operator-defined end points,

- ii. VFD control of recirculation pump,
 - iii. Control of main drain modulating valve.
- 8. Safety Features
 - a. Manual-On limit
 - 1) The controller shall have built-in limits to the amount of time any relay control output may be forced on (i.e. in "Manual On" mode). This is an important safety feature to prevent control outputs from inadvertently being left forced on after service or diagnostics.
 - b. High/Low Alarm Settings & Control Lockouts
 - 1) The controller shall have programmable high and low alarm settings for pH, ORP, PPM, temperature, low flow & no flow and chemical overfeed, turbidity, pressure & vacuum, surge tank levels, chemical inventory.
 - 2) The controller shall have a programmable lockout of sanitizer feed upon pH high or low alarm.
 - c. No Flow Alarm & Flow Restored Delay
 - 1) The controller shall activate a No Flow alarm when the dedicated sample stream flow switch indicates there is insufficient flow through the sample stream. This No Flow alarm shall lockout all chemical feed control operations.
 - 2) The controller shall include a Flow Restored Delay, which shall extend the No Flow lockout user-programmable amount of time after the No Flow alarm ends (i.e. flow is restored). This feature is necessary to assure that the system has valid, stable sensor readings of circulating water prior to making chemical feed control decisions.
 - d. Feed Limit Alarms
 - 1) The controller shall trigger a FailSafe alarm if a chemical feed relay remains on longer than the programmable Feed Limit Timer. Chemical feeds shall automatically be disabled if the corresponding reading goes into a FailSafe alarm condition.
 - e. Emergency Off
 - 1) The controller shall have a dedicated Emergency Off button on the front panel of the system, which immediately halts all chemical feeds and control outputs when pressed. This feature shall be password protectable, which shall require entry of one of the Security passwords.
 - f. Safety shield
 - 1) The controller shall include a safety shield that precludes access to high voltage circuitry and wiring. Fuses shall be replaceable without removal of the safety shield.
- 9. Security
 - a. The controller shall have three security password levels: six for operators, two for managers and one for the distributor providing for a history of access identified by the user.
- 10. Local Alarms Indicators
 - a. The controller shall signal all alarm conditions with the following indicators:
 - 1) a bright red flashing LED on the front of the controller,
 - 2) activation of a master alarm signal provided as a dry contact relay enabling the use of 0-240 VAC alarms, and
 - 3) each active alarm listed on the LCD display along with time activated.
- 11. Remote Communication, Data Logging, Access & Alarm Notification
- 12. Gbit Ethernet with EZConnect™

- a. The controller shall come with an integral 1 Gbit Ethernet connection. Through this Gbit Ethernet connection the controller shall be capable of providing
 - 1) Local and remote Access via PC,
 - 2) Local and remote Mobile Access with an Android and iPhone Mobile App, and
 - 3) Alarm Notification via email or text message via an Ethernet connection to the Internet.
 - b. The controller shall have 512 MB NAND flash memory, which does not require a battery to preserve data logs during power outages, for input level recording and events. All input levels shall be recorded and maintained for 365 days on the controller, with a sample taken every minute. The controller shall record and maintain the events over the last 365 days recording all alarms, parameter changes, user logins, and operational cycles related to all control features. Systems that require a battery to preserve data logs during power outages shall not be considered equal.
 - c. Local and remote access shall be available through the BECSys EZConnect™ system. The EZConnect™ system eliminates the need for IT departments to make special router/firewall allowances for access to the controller from outside the network, such as port forwarding and VPNs. Controllers that require a VPN or port forwarding for remote access shall not be considered equal. Messages to/from the controller shall be protected with TLS encryption for maximum security. EZConnect™ shall be disableable, in which case traditional IP-based techniques can be used to access the controller.
- 13. Wi-Fi
 - a. The controller shall come with a BECSys Wi-Fi module, which allows wireless integration into existing Wi-Fi networks.
- 14. Remote Access
 - a. The controller manufacturer shall provide BECSys for Windows™ graphical remote operation software, for interactive connection to the controller from a PC. Remote operation software shall be Windows 10 compatible, and have all of the following operational modes:
 - 1) Site Data Base – for organizing and accessing multiple controllers on site, or at multiple sites.
 - 2) Graphical Operator's Console – to display current readings, setpoints, alarm points and control status in an easy-to-read graphical mode.
 - 3) Data Log Graphing – to review data logs with time-synchronized event data; data log traces shall be configurable, with color and line style selectable by operator.
 - 4) Full Menu Tree – All system parameters accessible through a full menu tree interface.
 - 5) Auto-Polling – to allow automatic download of data logs from all controllers in site database.
 - b. Mobile App
 - 1) The controller manufacturer shall provide BECSys Now! Mobile App for monitoring controllers from mobile devices. The Mobile App shall run on Android smartphones and tablets and also iPhones, iPads and iPod Touch devices. The Android App shall be available to download free of charge from Google Play. The IOS App shall be available to download free of charge from the Apple App Store. The App shall

include a Quick Status screen, displaying the status (Alarm, No Alarm, or Disconnected) of all controllers monitored by the user. Systems providing mobile access with a web page hosted on the controller shall not be considered equal, as this approach does not support a single-screen Quick Status display of all controllers monitored by the user.

- c. Alarm Notification
 - 1) The controller shall be capable of providing alarm notification to 8 different recipients. Each recipient shall be individually configurable to receive alarm notification by one of the following methods.
 - i. Email: Notification message shall include system type, serial number, location, system ID, all active alarms including the date and time each alarm was triggered, and current readings.
 - ii. Text Message: Notification message shall include system type, serial number, location, system ID, and all active alarms including the date and time each alarm was triggered.
- 15. Enclosure
 - a. Controller enclosure
 - 1) The controller shall be housed in a NEMA 4X polycarbonate enclosure.
- 16. Flow Cell
 - a. Lighted flow cell
 - 1) The flow cell shall have a polyethylene body with two 1/2 in NPT ports for pH and ORP sensors, two 1/4 in NPT ports for temperature sensor and sensor wash acid injection, integrated flow switch and clear acrylic front viewing windows. The flow cell shall also include a port for the CP-1 free chlorine sensor, if present. The flow cell shall be backlit to support inspection of sensors, and red LEDs shall illuminate to indicate a No Flow condition. The flow cell design shall provide precise sample flow rate and water velocity regulation past the sensors. The flow cell shall come provided with PVC 1/2 in isolation ball valves and PVC 1/4 in wet test valve.
 - 2) Each flow cell shall be equipped with a pressure-sensing device. The pressure sensor shall consist of a compound pressure/vacuum gauge manufactured in stainless steel, 2-1/2 in diameter, liquid filled with an operating pressure range of 0 to 60 psig and vacuum of 0 to -30 in/Hg.
 - b. Warranty, Start-up and Manuals
 - 1) Controller shall be covered by a standard manufacturer's 5 year warranty.
 - 2) ORP and pH sensors shall be covered by a standard manufacturer's 2 year warranty.
 - 3) Other sensors and flow cell components shall be covered by a standard manufacturer's 1 year warranty.
 - 4) The control system shall be provided with on-site start-up, on-site operator training, and 1 year on-site warranty service performed by a representative trained and authorized by the controller manufacturer.
 - 5) Manufacturer shall supply an Operation and Maintenance Manual describing features, operating instructions, maintenance procedures and replacement parts.

B. Teaching Pool

1. Basis of Design: BECSys5 manufactured by BECS Technology, Inc. or approved technically equal system capable of providing equal performance for all operating functions, shall be provided.
2. The water chemistry control system for the competition pool shall provide continuous monitoring and control of sanitizers, oxidizers, pH, ORP, free chlorine, total chlorine, combined chlorine, temperature, system flow rate, total dissolved solids (TDS), turbidity, chemical inventory levels, surge tank and backwash holding tank water levels, system pressures, strainer vacuum and water chemistry balance calculations. The controller shall manage a VFD on the recirculation pump with a programmable Fireman Cycle feature, which automatically turns off the Heater, UV and Ozone/Auxiliary systems prior to shutting off the recirculation pump. The controller shall abort VFD turndowns upon declining water chemistry, and increase the circulation rate to satisfy minimum flow requirements of a heater, UV and/or ozone system. Remote access shall be provided through EZConnect, without the need for port forwarding or a VPN. Installation of the system shall be per the manufacturer's specification and no exceptions shall be allowed. A factory trained/authorized representative shall provide training to the owner and the training shall be videotaped per 131151, Section 1.12 of the project contract documents. The specified controller, a BECSys5 manufactured by BECS Technology, Inc. or Chemtrol by SB Control Systems, Acutrol by Pentair, ProMinent, or technically equal system capable of providing equal performance for all operating functions, shall be provided.
3. Certifications
 - a. The controller shall carry the following product certifications
 - 1) NSF / ANSI Standard 50;
 - 2) UL 61010-1
4. Sensors - The controller shall come with sensors meeting the following requirements.
 - a. pH
 - 1) The controller shall provide a measurement of pH by utilizing a sensor with the following characteristics:
 - i. 0 – 14 sensing range;
 - ii. ABS body with 1/2 in NPT process connection;
 - iii. minimum of 32 milliliters of inorganic electrolyte gel; organic electrolytes, susceptible to breakdown in the presence of strong oxidants, shall not be considered equal;
 - iv. a porous Teflon liquid junction to provide a stable, low impedance reference contact, and to prevent fouling and clogging of the liquid junction;
 - v. a silver / silver chloride (Ag / AgCl) reference element;
 - vi. a general purpose glass membrane pH sensing element;
 - vii. operating temperature range of 0 °C to 80 °C;
 - viii. operating pressure range of 0 to 100 psiG.
 - 2) The controller shall continuously monitor, display and data log pH with 0.1 or 0.01 resolution (programmable).
 - b. ORP
 - 1) The controller shall provide a measurement of ORP by utilizing a sensor with the following characteristics.
 - i. -1000 to +1000 mV sensing range;
 - ii. ABS body with 1/2 in NPT process connection;

- iii. minimum of 32 milliliters of inorganic electrolyte gel; organic electrolytes, susceptible to breakdown in the presence of strong oxidants, shall not be considered equal;
 - iv. a porous Teflon liquid junction to provide a stable, low impedance reference contact, and to prevent fouling and clogging of the liquid junction;
 - v. a silver / silver chloride (Ag / AgCl) reference element;
 - vi. a solid platinum or solid gold ORP sensing element with a minimum of 1 cm² surface area; platinum-plated and gold-plated sensing elements, which are susceptible to abrasives, shall not be considered equal;
 - vii. operating temperature range of 0 °C to 80 degrees °C;
 - viii. operating pressure range of 0 to 100 psiG.
- 2) The controller shall continuously monitor, display and data log ORP with 1 mV resolution.
- c. Temperature
 - 1) The controller shall provide a measurement of water temperature by utilizing a sensor with the following characteristics:
 - i. 32 °F to 212 °F (0 °C to 100 °C) sensing range;
 - ii. 2 wire, 100 Ω resistive temperature detector (RTD) with a 0.00385 Alpha.
 - 2) The controller shall continuously monitor, display and data log temperature with 1 °F resolution.
- d. Circulation Flow Sensor
 - 1) The controller shall provide a measurement of pool circulation flow rate and volume by utilizing a flow sensor with the following characteristics:
 - i. 0 to 8800 gpm (0 to 33265 l/min) measuring range,
 - ii. paddle wheel flow sensor with a frequency output,
 - iii. dual O-ring seal,
 - iv. 25 ft cable,
 - v. saddle,
 - vi. Flow volume: 999 trillion gallons, 1 gallon resolution; 999 trillion liters, 1 liter resolution.
 - 2) The controller shall continuously monitor, display and data log flow rate with 0.1 gpm resolution.
- e. CP-1 Free Chlorine Sensor
 - 1) The controller shall provide a measurement of free chlorine by utilizing a sensor with the following characteristics:
 - i. 0.0 to 10.0 mg/l (ppm) measuring range,
 - ii. 32 °F to 176 °F operating temperature range,
 - iii. Replaceable cleaning beads,
 - iv. Solid copper cathode and platinum anode for optimum stability and reliability.
 - 2) The sensor shall not utilize a membrane or electrolyte. Sensors utilizing a membrane and/or electrolyte, which must be replaced and/or replenished on a regular basis, shall not be considered equal. The controller shall continuously monitor, display and data log free chlorine with 0.1 mg/l resolution.
- f. Acid Tank Level

- 1) The controller shall provide a measurement of the acid tank level by utilizing the BECSys LLS continuous level sensor with the following characteristics:
 - i. Piezoresistive pressure measurement of the water column,
 - ii. Automatically adjusts for changes in atmospheric pressure,
 - iii. Factory calibrated,
 - iv. Solid-state; no moving parts that can wear out over time.
 - 2) The controller shall continuously monitor, display and data log acid tank level with 0.4 in resolution or better.
 - g. Liquid Chlorine Tank Level
 - 1) The controller shall provide a measurement of the liquid chlorine tank level by utilizing the BECSys LLS continuous level sensor with the following characteristics:
 - i. Piezoresistive pressure measurement of the water column,
 - ii. Automatically adjusts for changes in atmospheric pressure,
 - iii. Factory calibrated,
 - iv. Solid-state; no moving parts that can wear out over time.
 - 2) The controller shall continuously monitor, display and data log liquid chlorine tank level with 0.4 in resolution or better.
5. User Interface
 - a. The standard display shall be a backlit transfective LCD with 14 line x 40 alpha/numeric graphical characters that will continuously display information related to the following:
 - 1) All installed sensor readings,
 - 2) Set points, with current control status,
 - 3) All active alarms, including time activated,
 - 4) Smart menus w/ integrated on-screen help.
 - b. Contrast adjustment of the backlit LCD shall be provided through clearly marked keys on the front-panel without the need for access to internal controller circuitry. After initial adjustment, controller shall monitor internal temperature and automatically adjust contrast to prevent LCD blackout in extreme ambient temperature conditions. Controllers that do not include front-panel contrast adjustment and automatic temperature compensation shall not be considered equal.
 - c. The standard user interface shall include single-touch access to Set Points, Relay Modes, Calibrations, Backwash status and settings, Menu access, and Reset Fail/Safes. An alphanumeric keypad shall be provided for ease of system configuration.
6. Control Functions
 - a. Water Chemistry
 - 1) pH Control: The controller shall continuously control pH. Chemical feed shall be configurable for feed-up, feed-down, or dual feed and either on/off or time-based proportional feed.
 - 2) Sanitizer Control: The controller shall continuously control sanitizer based upon the ORP reading, the free chlorine sensor, or both with a bracketed control program. Chemical feed shall be configurable for either on/off or time-based proportional feed.
 - 3) Bracketed Sanitizer Control: With a free chlorine sensor, the controller shall be configurable for bracketed sanitizer control; The bracketed control algorithm shall allow either the ORP or ppm set point to be chosen as the primary control point, while using other parameter to

- create a secondary boundary (min and max settings) that must be maintained in addition to the primary control point.
- 4) Sanitizer Booster Feed: The controller shall have a sanitizer booster program with selectable ORP and/or ppm set points with separate ending set points, allowing the option of the booster sanitizer to control to a lower set point while the primary system can recover.
 - 5) UV Control: A Fireman Cycle feature shall turn off (ramp down) the UV relay 0 to 60 minutes (settable) prior to backwash initiation or recirculation pump shutdown.
 - 6) Ozone/Auxiliary: A Fireman Cycle feature shall turn off (ramp down) the Ozone/Auxiliary relay 0 to 60 minutes (settable) prior to backwash initiation or recirculation pump shutdown. The Ozone Fireman control and relay shall have the ability to be renamed in the menus to provide the Fireman Cycle feature for Auxiliary equipment instead of ozone as needed.
 - 7) Combined Chlorine UV Control: With free and total chlorine sensors, the controller shall provide turndown control of a UV system based upon combined chlorine set point; when combined chlorine is below set point the UV system will be turned down to decrease energy consumption and extend bulb life.
 - 8) Superchlorination: The controller shall have a programmable superchlorination function, based upon ORP or ppm superchlor setpoint, which is triggered manually.
 - 9) Dechlorination: The controller shall have a programmable dechlorination function, based upon ORP or ppm dechlor setpoint, which is triggered either manually or by the completion of the superchlorination function.
 - 10) LSI & RSI: The controller shall compute the Langelier Saturation Index and the Ryznar Saturation Index based upon current inputs and the Ca Hardness and Alkalinity entered by the operator.
- b. Expanded
- 1) Flow Monitoring: With a circulation flow sensor, the controller shall continuously monitor, display, and datalog system flow, maintaining a total flow volume. A Low Flow Alarm shall be operator settable, which can be programmed to disable chemical feeds. Controller shall also have a Minimum Flow Rate setting to turn off heater whenever system flow is less than this programmed minimum level.
 - 2) Heater Control: The controller shall perform on/off control of a heater based upon an operator settable temperature set point. A Fireman Cycle feature shall turn off the Heater 0 to 60 minutes (settable) prior to recirculation pump shutdown. The controller shall immediately turn off the Heater when system flow is less than the heater Minimum Flow Rate setting. The Heater control algorithm shall include an Energy Conservation mode, with on/off set time and secondary temperature set point.
 - 3) TDS Control: With a conductivity/TDS sensor, the controller shall provide selectable control of TDS through simultaneous draining of water prior to filtration and addition of fresh make-up water.
 - 4) Enzyme Feed: The controller shall include a programmable daily timed feed with start and end time, feed duration, and number of cycles to allow multiple feed cycles per day.

- 5) Turbidity Control: With a turbidity sensor, the controller shall feed polymer based upon turbidity setpoint.
 - 6) Chemical Inventory Monitoring: With an acid and/or liquid chlorine level sensor, the controller shall continuously monitor, display, and data log liquid pH adjuster and chlorine inventory levels. The controller shall include low chemical level alarm points for each chemical being monitored.
 - 7) Backwash Tank Monitoring: With a backwash tank level sensor, the controller shall continuously monitor, display, and data log backwash holding tank level.
 - 8) Surge Tank Monitoring: With a surge tank level sensor, the controller shall continuously monitor, display, and data log surge tank level.
 - 9) Autofill: With a surge tank level sensor, the controller shall automatically control a water makeup relay to add makeup water to maintain pool level set point, based upon surge tanks (or equivalent) level, with an overfill delay feature. The controller shall provide a programmable alternate set point (4 event 28 day timer).
 - 10) Main Drain Modulating Valve Control: With a surge tank level sensor and electronically controlled main drain valve, the controller shall continuously modulate (control) the main drain valve via a 4-20 mA output signal. Two user-defined settings shall specify the range of modulation of the main drain valve, with the control signal scaled linearly between those two points.
 - 11) Sensor Wash: The controller shall include a programmable sensor wash with start and end time, feed duration, and number of cycle to allow multiple feed cycles per day.
7. Energy Conservation
- 1) Alternate Setpoints: The controller shall have alternate Sanitizer, Heater, and Autofill setpoints, based upon a 4 event 28 day timer.
 - 2) Energy Conservation Mode: The controller shall have the capability to disable all mechanical and chemical functions during programmed conservation cycle. The Energy Conservation Mode shall include the ability to periodically monitor and satisfy all operation requirements based upon a programmed time schedule.
8. Main Recirculation Pump
- 1) On/Off Control with Relay
 - i. Controller shall provide the capability to interface to and control a recirculation pump with a programmable relay. The controller shall provide 3 operator-settable independent Fireman Cycle settings and relays for the Heater, UV and Ozone/Auxiliary controls.
 - ii. The controller shall include the following capabilities, available as appropriate based upon installed sensors and implemented features.
 - a. Fireman Cycle: Upon the following events, the controller shall automatically delay recirculation pump shutdown until the Heater, UV and Ozone/Auxiliary controls have been deactivated and the corresponding Fireman Cycles have expired:
 - 1) Backwash Operations
 - 2) Energy Conservation mode (24 hr, 7 day function)

- 3) Manual off (per Operator)
- b. Immediate: Upon the following events, the controller shall immediately turn off the recirculation pump (and Heater, UV and Ozone/Auxiliary controls), without first satisfying Fireman Cycle timing requirements:
 - 1) Surge Tank Level Low Alarm: Turn off pump immediately (surge tank is almost empty)
 - 2) Strainer Vacuum High Alarm: Turn off pump immediately (possible entrapment)
 - 3) Emergency shut down, triggered by front-panel Emergency Off: Turn off pump immediately (per Operator)
- 2) Total Dynamic Head (TDH)
 - i. Controller shall provide the capability to continuously monitor the Total Dynamic Head (TDH) of the main recirculation pump, directly calculated by the controller from recirculation pump influent vacuum and filter influent pressure transducers (if installed). TDH shall be displayed on the user interface and recorded in data logs, with user-programmable High and Low TDH Alarm settings.
- 3) VFD Interface
 - i. Controller shall provide the capability to interface to and control a recirculation pump equipped with a Variable Frequency Drive (VFD) through a 4-20 mA signal. The controller programming shall allow the operator to manage the VFD entirely from the water chemistry controller, by providing the following capabilities:
 - a. Programmable setpoint specified as either flow rate, effluent filter pressure, or fixed setting,
 - b. Four programmable operator-triggered alternate profiles ("Manual Turndowns"),
 - c. Four programmable scheduled alternate profiles ("Scheduled Turndowns"),
 - d. Override setting for backwash,
 - e. Ramp up and ramp down settings,
 - f. Minimum output setting.
 - ii. The controller shall automatically abort a Manual or Scheduled Turndown upon declining water chemistry and return to the standard programmed circulation rate to maintain optimal water quality. Declining water chemistry is signaled by any of the following alarm conditions:
 - a. pH low alarm
 - b. pH high alarm
 - c. ORP low alarm
 - d. ORP high alarm
 - e. PPM low alarm
 - f. PPM high alarm
 - g. Temperature low alarm
 - h. Temperature high alarm
 - i. Total Cl High alarm
 - j. Combined Cl High alarm

- k. Turbidity high alarm
 - iii. During a VFD turndown the controller shall automatically increase the circulation flow rate to satisfy minimum flow rate requirements for a heater, UV and/or ozone unit. Each device shall have a dedicated minimum flow rate setting; when the controller logic determines that one of these units must be activated to achieve the programmed set point, the controller shall automatically increase the circulation flow rate (if necessary) while that device is activated. After the set point is satisfied, the controller shall return to the flow rate specified in the VFD turndown after any programmed Fireman's Cycles have elapsed.
 - iv. Remote access to current VFD status and all VFD parameters shall be provided through the BECSys for Windows PC software provided with controller. The name of each alternate profile shall be changeable by the operator, so that VFD menus and data log entries are intuitive and recognizable by the users of the system.
 - v. Systems that do not provide both local and remote management of the VFD through the equipment room controller shall not be considered equal.
- 9. Control Outputs
 - a. Relay Outputs
 - 1) Solid-State Relays
 - i. The controller shall come with a total of 4 integral line or dry contact 5A solid-state relay outputs capable of switching 3A under all normal operating conditions, accounting for the effects of the temperature gradient inside the NEMA 4X enclosure. Systems that utilize relays that are not de-rated must submit an engineering evaluation justifying the use of relays at their full, optimal-condition capacity. All solid-state relays shall have a provision for an electrical interlock with the circulation pump motor starter.
 - 2) Mechanical Relays
 - i. The controller shall come with a total of 5 mechanical relays:
 - a. 1 integral 8A dry contact mechanical relay, and
 - b. 4 integral 3A dry contact or line powered mechanical relays.
 - ii. Since mechanical relays have the inherent risk of failing in the closed (active) position, as a safety measure the controller shall preclude the ability to assign any of the integral mechanical relays to chemical feed functions. Systems that do not preclude mechanical relays from being configured for chemical feeds shall not be considered equal. All mechanical relays shall have a provision for an electrical interlock with the circulation pump motor starter.
 - b. 4-20 mA Outputs
 - 1) The controller shall come with eight separately isolated 4-20 mA output signals with a load capacity of 440 Ω per output channel. Each output signal shall be independently configurable for any of the following functions:
 - i. Any enabled input, scaled between two operator-defined end points,

- ii. VFD control of recirculation pump,
 - iii. Control of main drain modulating valve.
- 10. Safety Features
 - a. Manual-On limit
 - 1) The controller shall have built-in limits to the amount of time any relay control output may be forced on (i.e. in "Manual On" mode). This is an important safety feature to prevent control outputs from inadvertently being left forced on after service or diagnostics.
 - b. High/Low Alarm Settings & Control Lockouts
 - 1) The controller shall have programmable high and low alarm settings for pH, ORP, PPM, temperature, low flow & no flow and chemical overfeed, turbidity, pressure & vacuum, surge tank levels, chemical inventory.
 - 2) The controller shall have a programmable lockout of sanitizer feed upon pH high or low alarm.
 - c. No Flow Alarm & Flow Restored Delay
 - 1) The controller shall activate a No Flow alarm when the dedicated sample stream flow switch indicates there is insufficient flow through the sample stream. This No Flow alarm shall lockout all chemical feed control operations.
 - 2) The controller shall include a Flow Restored Delay, which shall extend the No Flow lockout user-programmable amount of time after the No Flow alarm ends (i.e. flow is restored). This feature is necessary to assure that the system has valid, stable sensor readings of circulating water prior to making chemical feed control decisions.
 - d. Feed Limit Alarms
 - 1) The controller shall trigger a FailSafe alarm if a chemical feed relay remains on longer than the programmable Feed Limit Timer. Chemical feeds shall automatically be disabled if the corresponding reading goes into a FailSafe alarm condition.
 - e. Emergency Off
 - 1) The controller shall have a dedicated Emergency Off button on the front panel of the system, which immediately halts all chemical feeds and control outputs when pressed. This feature shall be password protectable, which shall require entry of one of the Security passwords.
 - f. Safety shield
 - 1) The controller shall include a safety shield that precludes access to high voltage circuitry and wiring. Fuses shall be replaceable without removal of the safety shield.
- 11. Security
 - a. The controller shall have three security password levels: six for operators, two for managers and one for the distributor providing for a history of access identified by the user.
- 12. Local Alarms Indicators
 - a. The controller shall signal all alarm conditions with the following indicators:
 - 1) a bright red flashing LED on the front of the controller,
 - 2) activation of a master alarm signal provided as a dry contact relay enabling the use of 0-240 VAC alarms, and
 - 3) each active alarm listed on the LCD display along with time activated.
- 13. Remote Communication, Data Logging, Access & Alarm Notification
- 14. Gbit Ethernet with EZConnect™

- a. The controller shall come with an integral 1 Gbit Ethernet connection. Through this Gbit Ethernet connection the controller shall be capable of providing
 - 1) Local and remote Access via PC,
 - 2) Local and remote Mobile Access with an Android and iPhone Mobile App, and
 - 3) Alarm Notification via email or text message via an Ethernet connection to the Internet.
 - b. The controller shall have 512 MB NAND flash memory, which does not require a battery to preserve data logs during power outages, for input level recording and events. All input levels shall be recorded and maintained for 365 days on the controller, with a sample taken every minute. The controller shall record and maintain the events over the last 365 days recording all alarms, parameter changes, user logins, and operational cycles related to all control features. Systems that require a battery to preserve data logs during power outages shall not be considered equal.
 - c. Local and remote access shall be available through the BECSys EZConnect™ system. The EZConnect™ system eliminates the need for IT departments to make special router/firewall allowances for access to the controller from outside the network, such as port forwarding and VPNs. Controllers that require a VPN or port forwarding for remote access shall not be considered equal. Messages to/from the controller shall be protected with TLS encryption for maximum security. EZConnect™ shall be disableable, in which case traditional IP-based techniques can be used to access the controller.
- 15. Wi-Fi
 - a. The controller shall come with a BECSys Wi-Fi module, which allows wireless integration into existing Wi-Fi networks.
- 16. Remote Access
 - a. The controller manufacturer shall provide BECSys for Windows™ graphical remote operation software, for interactive connection to the controller from a PC. Remote operation software shall be Windows 10 compatible, and have all of the following operational modes:
 - 1) Site Data Base – for organizing and accessing multiple controllers on site, or at multiple sites.
 - 2) Graphical Operator's Console – to display current readings, setpoints, alarm points and control status in an easy-to-read graphical mode.
 - 3) Data Log Graphing – to review data logs with time-synchronized event data; data log traces shall be configurable, with color and line style selectable by operator.
 - 4) Full Menu Tree – All system parameters accessible through a full menu tree interface.
 - 5) Auto-Polling – to allow automatic download of data logs from all controllers in site database.
 - b. Mobile App
 - 1) The controller manufacturer shall provide BECSys Now! Mobile App for monitoring controllers from mobile devices. The Mobile App shall run on Android smartphones and tablets and also iPhones, iPads and iPod Touch devices. The Android App shall be available to download free of charge from Google Play. The IOS App shall be available to download free of charge from the Apple App Store. The App shall

include a Quick Status screen, displaying the status (Alarm, No Alarm, or Disconnected) of all controllers monitored by the user. Systems providing mobile access with a web page hosted on the controller shall not be considered equal, as this approach does not support a single-screen Quick Status display of all controllers monitored by the user.

c. Alarm Notification

- 1) The controller shall be capable of providing alarm notification to 8 different recipients. Each recipient shall be individually configurable to receive alarm notification by one of the following methods.
 - i. Email: Notification message shall include system type, serial number, location, system ID, all active alarms including the date and time each alarm was triggered, and current readings.
 - ii. Text Message: Notification message shall include system type, serial number, location, system ID, and all active alarms including the date and time each alarm was triggered.

17. Enclosure

a. Controller enclosure

- 1) The controller shall be housed in a NEMA 4X polycarbonate enclosure.

18. Flow Cell

a. Lighted flow cell

- 1) The flow cell shall have a polyethylene body with two 1/2 in NPT ports for pH and ORP sensors, two 1/4 in NPT ports for temperature sensor and sensor wash acid injection, integrated flow switch and clear acrylic front viewing windows. The flow cell shall also include a port for the CP-1 free chlorine sensor, if present. The flow cell shall be backlit to support inspection of sensors, and red LEDs shall illuminate to indicate a No Flow condition. The flow cell design shall provide precise sample flow rate and water velocity regulation past the sensors. The flow cell shall come provided with PVC 1/2 in isolation ball valves and PVC 1/4 in wet test valve.
- 2) Each flow cell shall be equipped with a pressure-sensing device. The pressure sensor shall consist of a compound pressure/vacuum gauge manufactured in stainless steel, 2-1/2 in diameter, liquid filled with an operating pressure range of 0 to 60 psig and vacuum of 0 to -30 in/Hg.

b. Warranty, Start-up and Manuals

- 1) Controller shall be covered by a standard manufacturer's 5 year warranty.
- 2) ORP and pH sensors shall be covered by a standard manufacturer's 2 year warranty.
- 3) Other sensors and flow cell components shall be covered by a standard manufacturer's 1 year warranty.
- 4) The control system shall be provided with on-site start-up, on-site operator training, and 1 year on-site warranty service performed by a representative trained and authorized by the controller manufacturer.
- 5) Manufacturer shall supply an Operation and Maintenance Manual describing features, operating instructions, maintenance procedures and replacement parts.

C. Splash Pad

1. Basis of Design: BECSys5 manufactured by BECS Technology, Inc. or approved technically equal system capable of providing equal performance for all operating functions, shall be provided.
2. The water chemistry control system for the competition pool shall provide continuous monitoring and control of sanitizers, oxidizers, pH, ORP, free chlorine, total chlorine, combined chlorine, temperature, system flow rate, total dissolved solids (TDS), turbidity, chemical inventory levels, surge tank and backwash holding tank water levels, system pressures, strainer vacuum and water chemistry balance calculations. The controller shall manage a VFD on the recirculation pump with a programmable Fireman Cycle feature, which automatically turns off the Heater, UV and Ozone/Auxiliary systems prior to shutting off the recirculation pump. The controller shall abort VFD turndowns upon declining water chemistry, and increase the circulation rate to satisfy minimum flow requirements of a heater, UV and/or ozone system. Remote access shall be provided through EZConnect, without the need for port forwarding or a VPN. Installation of the system shall be per the manufacturer's specification and no exceptions shall be allowed. A factory trained/authorized representative shall provide training to the owner and the training shall be videotaped per 131151, Section 1.12 of the project contract documents. The specified controller, a BECSys5 manufactured by BECS Technology, Inc. or Chemtrol by SB Control Systems, Acutrol by Pentair, ProMinent, or technically equal system capable of providing equal performance for all operating functions, shall be provided.
3. Certifications
 - a. The controller shall carry the following product certifications
 - 1) NSF / ANSI Standard 50;
 - 2) UL 61010-1
4. Sensors - The controller shall come with sensors meeting the following requirements.
 - a. pH
 - 1) The controller shall provide a measurement of pH by utilizing a sensor with the following characteristics:
 - i. 0 – 14 sensing range;
 - ii. ABS body with 1/2 in NPT process connection;
 - iii. minimum of 32 milliliters of inorganic electrolyte gel; organic electrolytes, susceptible to breakdown in the presence of strong oxidants, shall not be considered equal;
 - iv. a porous Teflon liquid junction to provide a stable, low impedance reference contact, and to prevent fouling and clogging of the liquid junction;
 - v. a silver / silver chloride (Ag / AgCl) reference element;
 - vi. a general purpose glass membrane pH sensing element;
 - vii. operating temperature range of 0 °C to 80 °C;
 - viii. operating pressure range of 0 to 100 psiG.
 - 2) The controller shall continuously monitor, display and data log pH with 0.1 or 0.01 resolution (programmable).
 - b. ORP
 - 1) The controller shall provide a measurement of ORP by utilizing a sensor with the following characteristics.
 - i. -1000 to +1000 mV sensing range;
 - ii. ABS body with 1/2 in NPT process connection;

- iii. minimum of 32 milliliters of inorganic electrolyte gel; organic electrolytes, susceptible to breakdown in the presence of strong oxidants, shall not be considered equal;
 - iv. a porous Teflon liquid junction to provide a stable, low impedance reference contact, and to prevent fouling and clogging of the liquid junction;
 - v. a silver / silver chloride (Ag / AgCl) reference element;
 - vi. a solid platinum or solid gold ORP sensing element with a minimum of 1 cm² surface area; platinum-plated and gold-plated sensing elements, which are susceptible to abrasives, shall not be considered equal;
 - vii. operating temperature range of 0 °C to 80 degrees °C;
 - viii. operating pressure range of 0 to 100 psiG.
- 2) The controller shall continuously monitor, display and data log ORP with 1 mV resolution.
- c. Temperature
 - 1) The controller shall provide a measurement of water temperature by utilizing a sensor with the following characteristics:
 - i. 32 °F to 212 °F (0 °C to 100 °C) sensing range;
 - ii. 2 wire, 100 Ω resistive temperature detector (RTD) with a 0.00385 Alpha.
 - 2) The controller shall continuously monitor, display and data log temperature with 1 °F resolution.
- d. Circulation Flow Sensor
 - 1) The controller shall provide a measurement of pool circulation flow rate and volume by utilizing a flow sensor with the following characteristics:
 - i. 0 to 8800 gpm (0 to 33265 l/min) measuring range,
 - ii. paddle wheel flow sensor with a frequency output,
 - iii. dual O-ring seal,
 - iv. 25 ft cable,
 - v. saddle,
 - vi. Flow volume: 999 trillion gallons, 1 gallon resolution; 999 trillion liters, 1 liter resolution.
 - 2) The controller shall continuously monitor, display and data log flow rate with 0.1 gpm resolution.
- e. CP-1 Free Chlorine Sensor
 - 1) The controller shall provide a measurement of free chlorine by utilizing a sensor with the following characteristics:
 - i. 0.0 to 10.0 mg/l (ppm) measuring range,
 - ii. 32 °F to 176 °F operating temperature range,
 - iii. Replaceable cleaning beads,
 - iv. Solid copper cathode and platinum anode for optimum stability and reliability.
 - 2) The sensor shall not utilize a membrane or electrolyte. Sensors utilizing a membrane and/or electrolyte, which must be replaced and/or replenished on a regular basis, shall not be considered equal. The controller shall continuously monitor, display and data log free chlorine with 0.1 mg/l resolution.
- f. Balance Tank Level

- 1) The controller shall provide a measurement of the surge tank water level by utilizing the BECSys SLS continuous level sensor with the following characteristics:
 - i. Piezoresistive pressure measurement of the water column,
 - ii. Automatically adjusts for changes in atmospheric pressure,
 - iii. Factory calibrated,
 - iv. Field configurable sensor length,
 - v. Solid-state; no moving parts that can wear out over time,
 - vi. Installation options for wall mount and stand pipe glass configurations.
 - 2) The controller shall continuously monitor, display and data log surge tank level with 0.4 in resolution or better. The controller shall use the surge tank level to control a water makeup valve to maintain water level (Autofill) and/or control a main drain modulating valve. Upon a Low Surge Tank Level Alarm the controller shall trigger an Emergency Off condition to turn off the circulation pump to prevent damage to the pump.
5. User Interface
- a. The standard display shall be a backlit transfective LCD with 14 line x 40 alpha/numeric graphical characters that will continuously display information related to the following:
 - 1) All installed sensor readings,
 - 2) Set points, with current control status,
 - 3) All active alarms, including time activated,
 - 4) Smart menus w/ integrated on-screen help.
 - b. Contrast adjustment of the backlit LCD shall be provided through clearly marked keys on the front-panel without the need for access to internal controller circuitry. After initial adjustment, controller shall monitor internal temperature and automatically adjust contrast to prevent LCD blackout in extreme ambient temperature conditions. Controllers that do not include front-panel contrast adjustment and automatic temperature compensation shall not be considered equal.
 - c. The standard user interface shall include single-touch access to Set Points, Relay Modes, Calibrations, Backwash status and settings, Menu access, and Reset Fail/Safes. An alphanumeric keypad shall be provided for ease of system configuration.
6. Control Functions
- a. Water Chemistry
 - 1) pH Control: The controller shall continuously control pH. Chemical feed shall be configurable for feed-up, feed-down, or dual feed and either on/off or time-based proportional feed.
 - 2) Sanitizer Control: The controller shall continuously control sanitizer based upon the ORP reading, the free chlorine sensor, or both with a bracketed control program. Chemical feed shall be configurable for either on/off or time-based proportional feed.
 - 3) Bracketed Sanitizer Control: With a free chlorine sensor, the controller shall be configurable for bracketed sanitizer control; The bracketed control algorithm shall allow either the ORP or ppm set point to be chosen as the primary control point, while using other parameter to create a secondary boundary (min and max settings) that must be maintained in addition to the primary control point.

- 4) Sanitizer Booster Feed: The controller shall have a sanitizer booster program with selectable ORP and/or ppm set points with separate ending set points, allowing the option of the booster sanitizer to control to a lower set point while the primary system can recover.
 - 5) UV Control: A Fireman Cycle feature shall turn off (ramp down) the UV relay 0 to 60 minutes (settable) prior to backwash initiation or recirculation pump shutdown.
 - 6) Ozone/Auxiliary: A Fireman Cycle feature shall turn off (ramp down) the Ozone/Auxiliary relay 0 to 60 minutes (settable) prior to backwash initiation or recirculation pump shutdown. The Ozone Fireman control and relay shall have the ability to be renamed in the menus to provide the Fireman Cycle feature for Auxiliary equipment instead of ozone as needed.
 - 7) Combined Chlorine UV Control: With free and total chlorine sensors, the controller shall provide turndown control of a UV system based upon combined chlorine set point; when combined chlorine is below set point the UV system will be turned down to decrease energy consumption and extend bulb life.
 - 8) Superchlorination: The controller shall have a programmable superchlorination function, based upon ORP or ppm superchlor setpoint, which is triggered manually.
 - 9) Dechlorination: The controller shall have a programmable dechlorination function, based upon ORP or ppm dechlor setpoint, which is triggered either manually or by the completion of the superchlorination function.
 - 10) LSI & RSI: The controller shall compute the Langelier Saturation Index and the Ryznar Saturation Index based upon current inputs and the Ca Hardness and Alkalinity entered by the operator.
- b. Expanded
- 1) Flow Monitoring: With a circulation flow sensor, the controller shall continuously monitor, display, and datalog system flow, maintaining a total flow volume. A Low Flow Alarm shall be operator settable, which can be programmed to disable chemical feeds. Controller shall also have a Minimum Flow Rate setting to turn off heater whenever system flow is less than this programmed minimum level.
 - 2) Heater Control: The controller shall perform on/off control of a heater based upon an operator settable temperature set point. A Fireman Cycle feature shall turn off the Heater 0 to 60 minutes (settable) prior to recirculation pump shutdown. The controller shall immediately turn off the Heater when system flow is less than the heater Minimum Flow Rate setting. The Heater control algorithm shall include an Energy Conservation mode, with on/off set time and secondary temperature set point.
 - 3) TDS Control: With a conductivity/TDS sensor, the controller shall provide selectable control of TDS through simultaneous draining of water prior to filtration and addition of fresh make-up water.
 - 4) Enzyme Feed: The controller shall include a programmable daily timed feed with start and end time, feed duration, and number of cycles to allow multiple feed cycles per day.
 - 5) Turbidity Control: With a turbidity sensor, the controller shall feed polymer based upon turbidity setpoint.

- 6) Chemical Inventory Monitoring: With an acid and/or liquid chlorine level sensor, the controller shall continuously monitor, display, and data log liquid pH adjuster and chlorine inventory levels. The controller shall include low chemical level alarm points for each chemical being monitored.
 - 7) Backwash Tank Monitoring: With a backwash tank level sensor, the controller shall continuously monitor, display, and data log backwash holding tank level.
 - 8) Surge Tank Monitoring: With a surge tank level sensor, the controller shall continuously monitor, display, and data log surge tank level.
 - 9) Autofill: With a surge tank level sensor, the controller shall automatically control a water makeup relay to add makeup water to maintain pool level set point, based upon surge tanks (or equivalent) level, with an overfill delay feature. The controller shall provide a programmable alternate set point (4 event 28 day timer).
 - 10) Main Drain Modulating Valve Control: With a surge tank level sensor and electronically controlled main drain valve, the controller shall continuously modulate (control) the main drain valve via a 4-20 mA output signal. Two user-defined settings shall specify the range of modulation of the main drain valve, with the control signal scaled linearly between those two points.
 - 11) Sensor Wash: The controller shall include a programmable sensor wash with start and end time, feed duration, and number of cycle to allow multiple feed cycles per day.
7. Energy Conservation
- 1) Alternate Setpoints: The controller shall have alternate Sanitizer, Heater, and Autofill setpoints, based upon a 4 event 28 day timer.
 - 2) Energy Conservation Mode: The controller shall have the capability to disable all mechanical and chemical functions during programmed conservation cycle. The Energy Conservation Mode shall include the ability to periodically monitor and satisfy all operation requirements based upon a programmed time schedule.
8. Main Recirculation Pump
- 1) On/Off Control with Relay
 - i. Controller shall provide the capability to interface to and control a recirculation pump with a programmable relay. The controller shall provide 3 operator-settable independent Fireman Cycle settings and relays for the Heater, UV and Ozone/Auxiliary controls.
 - ii. The controller shall include the following capabilities, available as appropriate based upon installed sensors and implemented features.
 - a. Fireman Cycle: Upon the following events, the controller shall automatically delay recirculation pump shutdown until the Heater, UV and Ozone/Auxiliary controls have been deactivated and the corresponding Fireman Cycles have expired:
 - 1) Backwash Operations
 - 2) Energy Conservation mode (24 hr, 7 day function)
 - 3) Manual off (per Operator)

- b. Immediate: Upon the following events, the controller shall immediately turn off the recirculation pump (and Heater, UV and Ozone/Auxiliary controls), without first satisfying Fireman Cycle timing requirements:
 - 1) Surge Tank Level Low Alarm: Turn off pump immediately (surge tank is almost empty)
 - 2) Strainer Vacuum High Alarm: Turn off pump immediately (possible entrapment)
 - 3) Emergency shut down, triggered by front-panel Emergency Off: Turn off pump immediately (per Operator)
 - 2) Total Dynamic Head (TDH)
 - i. Controller shall provide the capability to continuously monitor the Total Dynamic Head (TDH) of the main recirculation pump, directly calculated by the controller from recirculation pump influent vacuum and filter influent pressure transducers (if installed). TDH shall be displayed on the user interface and recorded in data logs, with user-programmable High and Low TDH Alarm settings.
 - 3) VFD Interface
 - i. Controller shall provide the capability to interface to and control a recirculation pump equipped with a Variable Frequency Drive (VFD) through a 4-20 mA signal. The controller programming shall allow the operator to manage the VFD entirely from the water chemistry controller, by providing the following capabilities:
 - a. Programmable setpoint specified as either flow rate, effluent filter pressure, or fixed setting,
 - b. Four programmable operator-triggered alternate profiles ("Manual Turndowns"),
 - c. Four programmable scheduled alternate profiles ("Scheduled Turndowns"),
 - d. Override setting for backwash,
 - e. Ramp up and ramp down settings,
 - f. Minimum output setting.
 - ii. The controller shall automatically abort a Manual or Scheduled Turndown upon declining water chemistry and return to the standard programmed circulation rate to maintain optimal water quality. Declining water chemistry is signaled by any of the following alarm conditions:
 - a. pH low alarm
 - b. pH high alarm
 - c. ORP low alarm
 - d. ORP high alarm
 - e. PPM low alarm
 - f. PPM high alarm
 - g. Temperature low alarm
 - h. Temperature high alarm
 - i. Total Cl High alarm
 - j. Combined Cl High alarm
 - k. Turbidity high alarm

- iii. During a VFD turndown the controller shall automatically increase the circulation flow rate to satisfy minimum flow rate requirements for a heater, UV and/or ozone unit. Each device shall have a dedicated minimum flow rate setting; when the controller logic determines that one of these units must be activated to achieve the programmed set point, the controller shall automatically increase the circulation flow rate (if necessary) while that device is activated. After the set point is satisfied, the controller shall return to the flow rate specified in the VFD turndown after any programmed Fireman's Cycles have elapsed.
 - iv. Remote access to current VFD status and all VFD parameters shall be provided through the BECSys for Windows PC software provided with controller. The name of each alternate profile shall be changeable by the operator, so that VFD menus and data log entries are intuitive and recognizable by the users of the system.
 - v. Systems that do not provide both local and remote management of the VFD through the equipment room controller shall not be considered equal.
- 9. Control Outputs
 - a. Relay Outputs
 - 1) Solid-State Relays
 - i. The controller shall come with a total of 4 integral line or dry contact 5A solid-state relay outputs capable of switching 3A under all normal operating conditions, accounting for the effects of the temperature gradient inside the NEMA 4X enclosure. Systems that utilize relays that are not de-rated must submit an engineering evaluation justifying the use of relays at their full, optimal-condition capacity. All solid-state relays shall have a provision for an electrical interlock with the circulation pump motor starter.
 - 2) Mechanical Relays
 - i. The controller shall come with a total of 5 mechanical relays:
 - a. 1 integral 8A dry contact mechanical relay, and
 - b. 4 integral 3A dry contact or line powered mechanical relays.
 - ii. Since mechanical relays have the inherent risk of failing in the closed (active) position, as a safety measure the controller shall preclude the ability to assign any of the integral mechanical relays to chemical feed functions. Systems that do not preclude mechanical relays from being configured for chemical feeds shall not be considered equal. All mechanical relays shall have a provision for an electrical interlock with the circulation pump motor starter.
 - b. 4-20 mA Outputs
 - 1) The controller shall come with eight separately isolated 4-20 mA output signals with a load capacity of 440 Ω per output channel. Each output signal shall be independently configurable for any of the following functions:
 - i. Any enabled input, scaled between two operator-defined end points,
 - ii. VFD control of recirculation pump,

- iii. Control of main drain modulating valve.
- 10. Safety Features
 - a. Manual-On limit
 - 1) The controller shall have built-in limits to the amount of time any relay control output may be forced on (i.e. in "Manual On" mode). This is an important safety feature to prevent control outputs from inadvertently being left forced on after service or diagnostics.
 - b. High/Low Alarm Settings & Control Lockouts
 - 1) The controller shall have programmable high and low alarm settings for pH, ORP, PPM, temperature, low flow & no flow and chemical overfeed, turbidity, pressure & vacuum, surge tank levels, chemical inventory.
 - 2) The controller shall have a programmable lockout of sanitizer feed upon pH high or low alarm.
 - c. No Flow Alarm & Flow Restored Delay
 - 1) The controller shall activate a No Flow alarm when the dedicated sample stream flow switch indicates there is insufficient flow through the sample stream. This No Flow alarm shall lockout all chemical feed control operations.
 - 2) The controller shall include a Flow Restored Delay, which shall extend the No Flow lockout user-programmable amount of time after the No Flow alarm ends (i.e. flow is restored). This feature is necessary to assure that the system has valid, stable sensor readings of circulating water prior to making chemical feed control decisions.
 - d. Feed Limit Alarms
 - 1) The controller shall trigger a FailSafe alarm if a chemical feed relay remains on longer than the programmable Feed Limit Timer. Chemical feeds shall automatically be disabled if the corresponding reading goes into a FailSafe alarm condition.
 - e. Emergency Off
 - 1) The controller shall have a dedicated Emergency Off button on the front panel of the system, which immediately halts all chemical feeds and control outputs when pressed. This feature shall be password protectable, which shall require entry of one of the Security passwords.
 - f. Safety shield
 - 1) The controller shall include a safety shield that precludes access to high voltage circuitry and wiring. Fuses shall be replaceable without removal of the safety shield.
- 11. Security
 - a. The controller shall have three security password levels: six for operators, two for managers and one for the distributor providing for a history of access identified by the user.
- 12. Local Alarms Indicators
 - a. The controller shall signal all alarm conditions with the following indicators:
 - 1) a bright red flashing LED on the front of the controller,
 - 2) activation of a master alarm signal provided as a dry contact relay enabling the use of 0-240 VAC alarms, and
 - 3) each active alarm listed on the LCD display along with time activated.
- 13. Remote Communication, Data Logging, Access & Alarm Notification
- 14. Gbit Ethernet with EZConnect™

- a. The controller shall come with an integral 1 Gbit Ethernet connection. Through this Gbit Ethernet connection the controller shall be capable of providing
 - 1) Local and remote Access via PC,
 - 2) Local and remote Mobile Access with an Android and iPhone Mobile App, and
 - 3) Alarm Notification via email or text message via an Ethernet connection to the Internet.
 - b. The controller shall have 512 MB NAND flash memory, which does not require a battery to preserve data logs during power outages, for input level recording and events. All input levels shall be recorded and maintained for 365 days on the controller, with a sample taken every minute. The controller shall record and maintain the events over the last 365 days recording all alarms, parameter changes, user logins, and operational cycles related to all control features. Systems that require a battery to preserve data logs during power outages shall not be considered equal.
 - c. Local and remote access shall be available through the BECSys EZConnect™ system. The EZConnect™ system eliminates the need for IT departments to make special router/firewall allowances for access to the controller from outside the network, such as port forwarding and VPNs. Controllers that require a VPN or port forwarding for remote access shall not be considered equal. Messages to/from the controller shall be protected with TLS encryption for maximum security. EZConnect™ shall be disableable, in which case traditional IP-based techniques can be used to access the controller.
- 15. Wi-Fi
 - a. The controller shall come with a BECSys Wi-Fi module, which allows wireless integration into existing Wi-Fi networks.
- 16. Remote Access
 - a. The controller manufacturer shall provide BECSys for Windows™ graphical remote operation software, for interactive connection to the controller from a PC. Remote operation software shall be Windows 10 compatible, and have all of the following operational modes:
 - 1) Site Data Base – for organizing and accessing multiple controllers on site, or at multiple sites.
 - 2) Graphical Operator's Console – to display current readings, setpoints, alarm points and control status in an easy-to-read graphical mode.
 - 3) Data Log Graphing – to review data logs with time-synchronized event data; data log traces shall be configurable, with color and line style selectable by operator.
 - 4) Full Menu Tree – All system parameters accessible through a full menu tree interface.
 - 5) Auto-Polling – to allow automatic download of data logs from all controllers in site database.
 - b. Mobile App
 - 1) The controller manufacturer shall provide BECSys Now! Mobile App for monitoring controllers from mobile devices. The Mobile App shall run on Android smartphones and tablets and also iPhones, iPads and iPod Touch devices. The Android App shall be available to download free of charge from Google Play. The IOS App shall be available to download free of charge from the Apple App Store. The App shall

include a Quick Status screen, displaying the status (Alarm, No Alarm, or Disconnected) of all controllers monitored by the user. Systems providing mobile access with a web page hosted on the controller shall not be considered equal, as this approach does not support a single-screen Quick Status display of all controllers monitored by the user.

- c. Alarm Notification
 - 1) The controller shall be capable of providing alarm notification to 8 different recipients. Each recipient shall be individually configurable to receive alarm notification by one of the following methods.
 - i. Email: Notification message shall include system type, serial number, location, system ID, all active alarms including the date and time each alarm was triggered, and current readings.
 - ii. Text Message: Notification message shall include system type, serial number, location, system ID, and all active alarms including the date and time each alarm was triggered.
- 17. Enclosure
 - a. Controller enclosure
 - 1) The controller shall be housed in a NEMA 4X polycarbonate enclosure.
- 18. Flow Cell
 - a. Lighted flow cell
 - 1) The flow cell shall have a polyethylene body with two 1/2 in NPT ports for pH and ORP sensors, two 1/4 in NPT ports for temperature sensor and sensor wash acid injection, integrated flow switch and clear acrylic front viewing windows. The flow cell shall also include a port for the CP-1 free chlorine sensor, if present. The flow cell shall be backlit to support inspection of sensors, and red LEDs shall illuminate to indicate a No Flow condition. The flow cell design shall provide precise sample flow rate and water velocity regulation past the sensors. The flow cell shall come provided with PVC 1/2 in isolation ball valves and PVC 1/4 in wet test valve.
 - 2) Each flow cell shall be equipped with a pressure-sensing device. The pressure sensor shall consist of a compound pressure/vacuum gauge manufactured in stainless steel, 2-1/2 in diameter, liquid filled with an operating pressure range of 0 to 60 psig and vacuum of 0 to -30 in/Hg.
 - b. Warranty, Start-up and Manuals
 - 1) Controller shall be covered by a standard manufacturer's 5 year warranty.
 - 2) ORP and pH sensors shall be covered by a standard manufacturer's 2 year warranty.
 - 3) Other sensors and flow cell components shall be covered by a standard manufacturer's 1 year warranty.
 - 4) The control system shall be provided with on-site start-up, on-site operator training, and 1 year on-site warranty service performed by a representative trained and authorized by the controller manufacturer.
 - 5) Manufacturer shall supply an Operation and Maintenance Manual describing features, operating instructions, maintenance procedures and replacement parts.

2.11 FLOW METERS / SENSORS

A. Recirculation Rate Flow Meters

1. Flow Sensor (1 required for each body of water) shall be installed according to the manufacturer in the filtered water return lines to each of the pools. Flow sensor shall be GF Signet 2536 (blue cap) rotary paddlewheel flow sensor. Provide a 22 AWG shielded cable from the sensor to the systems chemical controller. Flow sensor accuracy shall be +/- 2% of reading.

B. Waterslide Flow Meter

1. Flow Sensor (1 required for each body of water) shall be installed according to the manufacturer in the filtered water return lines to each of the pools. Flow sensor shall be GF Signet 2536 (blue cap) rotary paddlewheel flow sensor. Provide a 22 AWG shielded cable from the sensor to the systems VFD. Flow sensor accuracy shall be +/- 2% of reading.

C. Splash Pad Feature Flow Meter

1. Flow Sensor (1 required for each body of water) shall be installed according to the manufacturer in the filtered water return lines to each of the pools. Flow sensor shall be GF Signet 2536 (blue cap) rotary paddlewheel flow sensor. Provide a 22 AWG shielded cable from the sensor to the systems VFD. Flow sensor accuracy shall be +/- 2% of reading.

D. Backwash Piping Flow Meter

1. Flow Sensors(1 required for each body of water) shall be a pilot, impact ball, variable area type with one piece, impact resistant machined acrylic plastic body. GPM scale to be permanently etched or imprinted on the meter. Flow rate indicator to be of stainless steel material. Scale range to be appropriate for specific flow rate. Pipe size to accommodate backwash rate. Manufacturer shall be Blue-White Industries or approved equal.

E. Fill Water Meters

1. Totalizing Flow Meter (1 required) shall be installed according to the manufacturer on the domestic fill water line after the backflow preventer prior to the fill manifolds. Flow sensor shall be GF Signet 2537 rotary paddlewheel flow sensor with remote digital display. Display to be labeled with the pool the meter is servicing.

2.12 FILL AND MAKE-UP WATER SYSTEM

A. Water Level Controllers

1. See water chemistry monitoring and control systems section.

B. Make-up Water Solenoid Valve (Cla-Val Solenoid)

1. Basis of Design: Make-up Water Solenoid Control Valve shall be Model 136-01/636-01 as manufactured by CLA-VAL, or approved equal.
2. Make-up water solenoid control valve shall utilize a three-way solenoid control to be normally closed. Size to pipe. Interlock with automatic water level control

system. Valve materials shall be ductile iron valve body and cover, cast iron disc retainer and diaphragm washer, bronze trim, Buna-n rubber seals, nylon reinforced Buna-n rubber diaphragm, stainless steel stem, nut and spring.

C. Water Hammer Arrestor

1. Basis of Design: Water Hammer Arrestors shall be HydraRester 657-F manufactured by Sioux Chief or approved equal.
2. Water hammer arresters shall have a volume of air to dissipate the kinetic energy generated in the piping system. Arresters shall be effective when installed at any angle. Arresters shall be approved for installation with no access panel required. Water hammer arresters shall be certified ANSI/ASSE 1010 2004.

2.13 SWIMMING POOL HEATERS

A. Competition Pool Heater

1. Basis of Design: The pool heater for the Competition Pool shall be the AQUAS POOL PACKAGE by LOCHINVAR Model APO2000N having a modulating input rating of 1,999,000 Btu/Hr.
2. The pool heater shall be operated on Natural Gas.
3. The package system shall be made of a BOILER plant with a Plate and Frame POOL HEAT EXCHANGER. The design of the system shall be such that pool water, shall be heated indirectly by the POOL HEAT EXCHANGER and is never directly heated by the boiler plant. The BOILER and the POOL HEAT EXCHANGER shall be completely factory piped and assembled and shall include a cast iron circulating pump, expansion tank, flow switch, ASME Certified pressure relief valve set for 50psi, automatic fill valve with pressure reducer and a temperature / pressure gauge. The entire package shall be skid mounted, pre-piped, assembled, and pressure tested and ready for installation.
4. The AQUAS POOL PACKAGE shall be as a high efficiency, condensing BOILER piped to a dedicated POOL HEAT EXCHANGER. The boiler side piping shall be stainless pipe with a CIRCULATING PUMP, and appropriate components and fittings for safe and efficient delivery of indirect, heat transfer to the pool water.
5. The CIRCULATING PUMP shall be constructed of cast iron and operate on a 120 volt, 60 Hz, 1 phase power supply (unless otherwise specified). The pump shall be factory wired to run with intermittent pump operation The EXPANSION TANK shall be of a bladder type design and shall be sized adequately to allow for the expansion of the boiler water when heated. The FLOW SWITCH shall be of a paddle type design and shall be wired to the internal boiler control safety circuitry so to not allow the boiler to operate when there is not sufficient flow. The AUTOMATIC FILL VALVE WITH PRESSURE REDUCER shall be factory set for 15 psi and shall allow fresh water to be added to the boiler system only when the water pressure has fallen below the pressure setting. The PRESSURE RELIEF VALVE shall be ASME Certified and have a setting of 50 psi. The TEMPERATURE AND PRESSURE GAUGE shall be capable of reading temperature in both degrees Fahrenheit and degrees Celsius. The Pressure units shall be read in pounds per square inch (psi). The entire assembly shall be mounted on a 3" channel iron skid to facilitate handling and installation.

6. The POOL HEAT EXCHANGER shall be a STANDARD TITANIUM POOL HEAT EXCHANGER shall be of a plate and frame design constructed of a carbon steel frame and utilizing a TITANIUM plate pack with EPDM gaskets. It shall carry a five (5) year limited warranty.
7. The BOILER shall bear the ASME "H" stamp for 160 psi working pressure and shall be National Board listed. There shall be no banding material, bolts, gaskets or "O" rings in the header configuration. The stainless steel combustion chamber shall be designed to drain condensation to the bottom of the heat exchanger assembly. A built-in trap shall allow condensation to drain from the heat exchanger assembly. The BOILER heat exchanger assembly shall carry a ten (10) year limited warranty.
8. The BOILER shall be certified and listed by C.S.A. International under the latest edition of the harmonized ANSI Z21.13 test standard for the U.S. and Canada. The BOILER shall comply with the energy efficiency requirements of the latest edition of the ASHRAE 90.1 Standard and the minimum efficiency requirements of the latest edition of the BTS2000 Standard. All models shall operate up to 96.2% thermal efficiency with pool water temperatures below 100°F. The BOILER shall be certified for indoor installation.
9. The BOILER shall be constructed with a heavy gauge steel jacket assembly, primed and pre-painted on both sides. The combustion chamber shall be sealed and completely enclosed, independent of the outer jacket assembly, so that integrity of the outer jacket does not affect a proper seal. A burner/flame observation port shall be provided. The burner shall be a premix design and constructed of high temperature stainless steel with a woven metal fiber outer covering to provide modulating firing rates. The BOILER shall be supplied with a gas valve designed with negative pressure regulation and be equipped with a variable speed blower system, to precisely control the fuel/air mixture to provide modulating boiler firing rates for maximum efficiency. The BOILER, on packages with, 750,000 Btu/hr input shall be capable of full modulation firing with a turndown ratio of 15:1, on packages with 1,000,000 through 1,250,000 Btu/hr input shall be capable of full modulation firing with a turndown ratio of 20:1, on packages, with 1,500,000 through 2,000,000 Btu/hr input shall be capable of full modulation firing with a turndown ratio of 25:1. The BOILER shall operate in a safe condition at a de-rated output with gas supply pressures as low as 4 inches of water column.
10. The BOILER shall utilize a 24 VAC control circuit and components. The control system shall have an electronic display for boiler set-up, boiler status, and boiler diagnostics. All components shall be easily accessed and serviceable from the front and top of the jacket.
11. The BOILER shall feature the "SMART TOUCH" control with an LCD touch screen display. The BOILER shall have password security, pump delay with freeze protection, pump exercise, domestic hot water prioritization and PC port connection. The BOILER shall allow 0-10 VDC input connection for BMS control and have built-in "Cascade" to sequence and rotate while maintaining modulation of up to eight packages without utilization of an external controller. Supply voltage shall be 120 volt/60 hertz/ single phase.
12. The BOILER shall be equipped with two terminal strips for electrical connection. A low voltage connection board for safety and operating controls. A high voltage terminal strip shall be provided for Supply voltage.
13. The BOILER shall be installed and vented with a Direct Vent Sidewall system with a horizontal sidewall termination of both the vent and combustion air. The flue shall be PVC, CPVC or Stainless Steel sealed vent material terminating at the sidewall

with the manufacturers specified vent termination. A separate pipe shall supply combustion air directly to the BOILER from the outside. The air inlet pipe may be PVC, CPVC, ABS, Galvanized, Dryer Vent, or Stainless Steel sealed pipe. The air inlet must terminate on the same sidewall with the manufacturer's specified air inlet cap. The BOILER's total combined air intake length shall not exceed 100 equivalent feet. The BOILER's total combined exhaust venting length shall not exceed 100 equivalent feet. Foam Core pipe is not an approved material for exhaust piping.

14. The BOILER shall have an independent laboratory rating for Oxides of Nitrogen (NOx) of 20 ppm or less corrected to 3% O₂. The manufacturer shall verify proper operation of the burner, all controls and the heat exchanger by connection to water and venting for a factory fire test prior to shipping.
15. The BOILER shall operate at altitudes up to 4,500 feet above sea level without additional parts or adjustments.
16. The BOILER shall be suitable for use with polypropylene glycol, up to 50% concentration without contingencies.
17. The Firing Control System shall be M9 Direct Spark Ignition with Electronic Supervision
18. The BOILER shall be constructed in accordance with M7 California Code requirements.

B. Teaching Pool Heater

1. Basis of Design: The pool heater for the Teaching Pool shall be the EnergyRite Commercial Model ERN402 by LOCHINVAR having a modulating input rating of 399,000 Btu/Hr.
2. The pool heater shall be orificed for operation on Natural Gas.
3. The water containing section shall be of a "Fin Tube" design, with straight copper tubes having extruded integral fins spaced seven (7) fins per inch. The tubes shall terminate into a one piece rear header and a two piece front header with an integral by-pass assembly. The front header configuration shall allow access to the heat exchanger for the purposes of inspection, cleaning or repair. The heat exchanger shall have a drain for proper draining and winterization. The front header shall provide a 3/4" NPT connection for a field installed relief valve when required. Connection may be made directly to the front header with PVC or CPVC pipe. The heat exchanger shall be mounted in a stress free jacket assembly in order to provide a "free floating design" able to withstand the effects of thermal shock. The polymer front header shall have water connections for 2" pipe. The heat exchanger assembly shall carry a three (3) year limited warranty against failure caused by defective workmanship or material.
4. The combustion chamber shall be sealed and completely enclosed with Loch Heat® ceramic fiberboard insulation. The Loch-Heat material shall provide a high efficiency insulation barrier while providing low weight. The burners shall be constructed of high temperature stainless steel and fire on a horizontal plane. The heater shall have an integral combustion air blower to precisely control the fuel/air mixture for maximum efficiency. Operation of the combustion air blower and venting system shall be monitored by an air proving switch.
5. The heater shall be constructed with a heavy gauge pre-painted galvanized steel exterior jacket assembly. All steel jacket components must be galvanized on both sides.

6. The heater shall be certified and listed by CSA International under the latest edition of the appropriate ANSI test standard. The heater shall comply with the energy efficiency requirements of the latest edition of the ASHRAE 90.1 Standard. The heater shall operate at a thermal efficiency of up to 87%.
7. The heater shall have a factory supplied pumped bypass assembly to insure proper operation without condensation. The bypass assembly shall include a sealed all bronze pump. The bypass assembly shall be constructed of schedule 80 CPVC piping with brass inserts and an automatic three-way valve.
8. The heater shall be furnished with an integral by pass assembly to ensure proper operation without condensation. The by pass assembly shall be internally mounted inside the polymer front header. The by pass assembly shall be constructed with all corrosion resistant materials for long life. The by-pass shall automatically control water flow rates through the heat exchanger to maximize efficiency and prevent sweat and condensate problems. No auxiliary by-pass shall be required unless water flow rates exceed 100 GPM.
9. Standard operating controls shall include a digital electronic thermostat with independent settings for either pool or spa temperature control. The electronic temperature control shall ensure accurate temperature control to 1°F. A pool water safety high limit control shall be provided. The temperature controls shall be factory installed and weather proof. Adjustment of the temperature control shall be made without tools or the removal of any jacket panels. The heater shall have a master on/off switch inside the jacket enclosure.
10. The heater shall be field convertible to operate on either 120 VAC or 240 VAC. The standard control system shall include a direct-spark ignition system. The ignition system shall provide flame supervision for 100% safety shutdown. The heater shall be equipped with a 2-line, 16-character digital display to provide the status of operation and trouble shooting assistance on a control sensed malfunction. The control shall consist of the ignition control and a main gas valve with redundant valve seats and a (low gas pressure regulator on 250,000 – 400,000 models). Additional standard controls shall include a combination low air and blocked flue pressure switch to monitor fan operation, low voltage transformer for the control circuit and a convenient 24 volt terminal strip for easy connection of remote controls. The heater shall be provided with a built-in low water pressure switch to monitor water flow.
11. A 24 VAC control circuit and components shall be used. All components shall be easily accessed and serviceable.
12. The heater shall have an independent laboratory rating for Oxides of Nitrogen (NOx) of less than 30 ppm corrected to 3% O₂.
13. The heater shall be provided with the following venting system: (select one of the seven venting options):
 - a. Powered DirectAire: Installed indoors with an optional venting kit to allow use of a powered vent cap to exhaust flue products to the sidewall with a negative draft Type "B" vent and an additional air inlet pipe to draw combustion air from the sidewall. The flue pipe or air inlet pipe each shall not to exceed 75 equivalent feet in length.
14. The entire heater shall be furnished with a 3 Year Limited Warranty. This warranty shall provide three years of protection on the heat exchanger and two full years on all other components.
15. The heater shall be constructed to the requirements of the American Society of Mechanical Engineers and bear the "HLW" stamp with a 160 PSI working pressure and shall be National Board Listed. The glass-lined cast iron front header

assembly shall mount with bolts and seal with an EPDM gasket. The heat exchanger shall have multiple drains for proper draining and winterization. The front header shall have water connections for both 1-1/2" and 2" pipe. Pipe connections may be either threaded or slip fit.

PART 3 - EXECUTION

3.1 EXISTING CONDITIONS, INSPECTION AND PREPARATION

- A. Carefully examine all of the contract documents for requirements that affect the work of this section. Prior to starting any work, notify the General Contractor of defects requiring correction. Do not start work until conditions are satisfactory.
- B. Verify that all work by others, related to this section, has been completed. This includes all earthwork, concrete work, and mechanical, electrical and plumbing connections.
- C. Protect all materials and work completed by others from damage while completing the work in this section.

3.2 FIELD MEASUREMENTS

- A. Verify benchmark and pool location prior to layout.
- B. If field measurements differ from the construction drawing dimensions, notification shall be given to the Architect prior to proceeding with work.

3.3 EQUIPMENT AND SYSTEMS INSTALLATION

- A. The Contractor shall assemble and install all equipment, special parts and accessories as shown on pool drawings, specifications and shop drawings of the equipment suppliers.
- B. The Contractor shall provide all anchors and inserts to be imbedded in the deck including all fittings, inserts and structure sleeves and required anchorage as shown on the plans and as indicated in this section of the specifications. Equipment shall be set true and plumb, using factory jigs where available. Removable equipment items shall be easily removable from anchors and shall fit without noticeable wobble.
- C. Provide templates for all equipment anchors. Provide anchor bolts of the size and spacing as required by the equipment manufacturer. All anchor bolts shall be stainless steel Type 316L and of a length capable of adequate anchorage into rough slab-on-grade allowing for finish deck tile and setting bed. Anchors shall be set and cast into place during building concrete work. Inspect all anchor settings for horizontal and vertical alignment prior to placing concrete.
- D. The Contractor shall install all equipment and systems in accordance with manufacturer's directions. Equipment shall all be assembled and in place for final observation.
- E. All items necessary to complete this section are shown on the plans or described in the specifications including items that may be purchased by the Owner. Items are detailed

and specified as a guide for dimensional purposes. The Contractor must make provisions accordingly and submit shop drawings and submittals based on that data.

3.4 START-UP AND INSTRUCTION

- A. The Contractor shall supply the services of an experienced swimming pool operator/instructor for a period of not less than two days (total 16 hours) after the pool(s) have been filled and initially placed in operation. During this period, the Owner's representatives who will be operating the pool(s) shall be thoroughly instructed in all phases of the pool's operation. The Contractor shall deliver six (6) complete sets of operating and maintenance instructions for the swimming pool, structures, finishes and all component equipment. Prior to leaving the job, the Contractor shall obtain written certification from the designated Owner's representative acknowledging that the instruction period has been completed and all necessary operating information provided. The Contractor shall, in his contract, include the cost of two (2) additional days (total 16 hours) of instruction and operational check out by the qualified representative of the Contractor during the first season of operation.
- B. Written reports of each of these visits outlining the pool's operation, competence and performance of the pool's operation personnel, and other pertinent comments shall be submitted to the Owner and Architect/Engineer within one (1) week after each visit.
- C. The Contractor shall provide specific written procedures to be followed for emptying and refilling the pool as mentioned previously in this section. The procedures must be included in the bound volume of operating instructions and references in the front index with a note headed by the words: "CAUTION -- VERY IMPORTANT".

END OF SECTION



EXHIBIT G

SECTION 131115
SWIMMING POOL DECK EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Principal work items are:
 - 1. Swimming Pool related anchored deck equipment
 - 2. Swimming Pool related loose deck equipment

1.2 COORDINATION AND CLARIFICATION

- A. Coordinate with other contractors or subcontractors all work relating to this section.
- B. The Contractor must establish with other contractors or subcontractors, having related work in this section, that all work necessary to complete the pool(s) as shown on the drawings and in the specifications is included in the base bid and alternates to the Owner.
- C. If in doubt regarding the responsibility for work covered in this section and/or discovery of errors or omissions in the bidding documents, the Contractor shall notify the Architect through channels established by the specifications and request a clarification ten (10) days prior to the bid date.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver material in manufacturer's original, unopened containers and crates with all labels intact and legible.
- B. Deliver materials in sufficient time and quantity to allow continuity of work and compliance with approved construction schedule.
- C. Handle materials in a manner to prevent damage.
- D. Store all materials on clean raised platforms with weather protective coverings. Provide continuous protection of materials against damage or deterioration.
- E. Remove damaged materials from site.

1.4 WARRANTIES

- A. The Contractor warrants to the Owner and Architect that materials and equipment provided under the contract will be of good quality and new unless otherwise required or permitted by the contract documents, that the work will be free from defects not inherent in the quality required or permitted, and that the work will conform with the requirements of the contract documents. Work not conforming to these requirements, including substitutions not properly approved and authorized will be considered defective. The Contractor's warranty will exclude remedies for damage or defect caused by abuse, improper or insufficient maintenance, improper operations, modifications not executed by the Contractor or improper wear and tear under normal use. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of

materials and equipment. All warranties shall be for a period of one year from the date of substantial completion or the owner begins using the pool unless otherwise specified.

- B. The Contractor shall agree to repair or replace any defective or non-complying work at no cost to the Owner upon written notification from the Owner within the warranty period. Pro-rated warranties are not acceptable.
- C. Submit all warranties covering, but not limited to the following:
 - 1. All pool deck equipment and accessories against defects in material, manufacturer and installation for a period of one (1) year.
 - 2. Manufacturer's three (3) year warranty for the accessible lift frame, two (2) year manufacturer's warranty for accessible lift electronic components, and one (1) year manufacturer's warranty on accessible lift batteries.
 - 3. Manufacturer's minimum three (3) year warranty against defective materials, components and workmanship in the pool cover system and reels.

PART 2 - PRODUCTS

2.1 RAIL GOODS

- A. Existing rail goods are to be factory polished and reinstalled. Contractor to provide new anchors at deck locations as specified.
- B. Handrails
 - 1. New entry rails shall be provided as shown on the drawings, fabricated from one continuous piece of polished and buffed ASTM-A-554 grade 304L stainless steel, 1.500 inch OD x .120 inch wall thickness, polished and buffed to 320 grit finish and shall be passivated for maximum corrosion resistance. Bends shall be smooth and wrinkle free. Custom rails shall be as manufactured by Spectrum Products, or approved equal. Custom rail submittal drawings shall be complete with details of custom fabrication and installation information.
 - 2. Escutcheons shall be provided at all handrails and shall be of keyhole or oblong shape, similar to the casted, electro-polished stainless steel escutcheon with set screw by Spectrum Products, or approved equal.
 - 3. Anchor sockets for handrails at the stair entry shall be of the wedge type, cast bronze, 4 inches in depth and made to receive 1.50 inch OD tubing as manufactured by Spectrum Products, or approved equal. Contractor to confirm compatibility with existing handrails. The wedge shall be cast bronze, incorporate a stainless steel tightening bolt and flat washer, and be designed as the sacrificial element to the anchor system. All metallic components shall be passivated, in compliance with ASTM A967-99, incorporating organic acid passivation techniques for maximum corrosion resistance.
- C. Grab Rails
 - 1. New grab rails shall be provided as shown on the drawings, fabricated from one continuous piece of polished and buffed ASTM-A-554 grade 304L stainless steel, 1.900 inch OD x .145 inch wall thickness, polished and buffed to 320 grit finish and shall be passivated for maximum corrosion resistance. Bends shall be smooth and wrinkle free. Custom rails shall be as manufactured by Spectrum Products, or approved equal. Custom rail submittal drawings shall be complete with details of custom fabrication and installation information.

2. Anchor sockets for grab rails at all recessed steps shall be of the wedge type, cast bronze, 4 inches in depth and made to receive 1.90 inch OD tubing as manufactured by Spectrum Products, or approved equal. Contractor to confirm compatibility with existing recessed steps. The wedge shall be cast bronze, incorporate a stainless steel tightening bolt and flat washer, and be designed as the sacrificial element to the anchor system. All metallic components shall be passivated, in compliance with ASTM A967-99, incorporating organic acid passivation techniques for maximum corrosion resistance.
3. Escutcheons shall be provided at all grab rails and shall be of keyhole or oblong shape, similar to the casted, electro-polished stainless steel escutcheon with set screw by Spectrum Products, or approved equal.
4. Existing grab rails to be factory polished and reinstalled.

D. Stanchion Posts

1. Stanchion posts (backstroke) shall be provided as required and in the quantities shown on the drawings. The posts shall be a straight length of type 304L stainless steel tubing, 1.900 in. OD x .145 in. wall thickness x 8 ft. 0 in. overall length, polished and buffed to 320 grit finish. Stanchions shall be capped at one end with a closure plug containing a U-shaped hook and fitted with a stainless steel eyebolt attached to an adjustable nickel plated bronze sliding collar. Stanchion shall be as manufactured by or Spectrum Products catalog no. 23614 with Spectrum Products catalog no. 23625, sliding collar, with eyebolt or approved equal.
2. Anchor sockets for all stanchions shall be of cast bronze, sized to receive a full 6 inches penetration of 1.900 inch OD tubing as manufactured by Spectrum Products, or approved equal. Each anchor socket is to be provided with a flush threaded, vandal proof closure cap and a grounding lug with screw. Provide spanner wrenches for removing the closure cap.

- E. Stainless Steel Cleaner - Provide a stainless steel cleaner. The cleaner shall comprise of one (1) gallon of organic passivation solution. It shall be complete with instructions for proper maintenance of stainless steel surfaces and material safety data sheets for the passivation solution. The cleaner shall be the Spectra-Clean System 2 as manufactured by Spectrum Products. Product to be applied with 3M scouring pad, or approved equal.

2.2 ACCESSIBLE SWIMMING POOL LIFT

A. Pool lift (2 required)

1. Lift shall be a battery powered handicap lift with footrest assembly. Lift shall comply with the Americans with Disabilities Act Access Guidelines (ADAAG), be capable of lifting 400 lbs.
2. Provide two batteries and one battery charger.
3. Anchor shall be constructed of stainless steel and shall have a bonding lug, cover, spanner key/
4. The following accessories shall also be provided: seat belt, caddy, arm rest assembly, lift cover, stability vest, wireless controls, and spineboard attachment.
5. All stainless steel components shall be 304L and shall be passivated, pretreated and powder coated.
6. Lift to be a Splash Extended Reach Aquatic Lift manufactured by S.R. Smith or approved equal. Contractor to confirm pool lift fits on pool perimeter and operates correctly.

2.3 FLOATING LIFE-LINE (DEPTH TRANSITION)

- A. Lifeline shall be 1/2 inch nylon braided rope 25 yards in length with rope hooks. blue and white polyethylene rope with floats that are 5 inch diameter by 9 inch long. Floats to be spaced on two yard centers. All metallic rope hooks shall be stainless steel. Lifeline, floats, and rope end hooks to be EZ-Lock pool rope floats manufactured by Competitor.

2.4 COMPETITIVE SWIM EQUIPMENT

A. Starting Platforms

1. Single post starting platforms for the fully recessed gutter shall have number plates on both sides numbered 1 through 10. Spare block shall not be numbered.
2. Platform height shall be 29-1/2" inch above water level. Verify height of platform above water before ordering. The platform top shall be 24" wide x 32" deep. The top shall be permanently positioned at a 10° tilt towards the pool.
3. Each platform shall have an 8" x 16" intermediate side step. Contractor shall confirm step is on correct side (right or left) according to plans.
4. All surfaces shall have a non-skid textured finish.
5. Frames to be 2.5 square inch x .125 inch wall thickness 304 stainless steel tubing with a powder coated finish.
6. Backstroke bar shall be 1" diameter and allow both horizontal and vertical grab positions.
7. Each starting platform shall have two labels affixed stating "Warning-Execute Shallow Racing Dive - Impact with Pool Bottom can Cause Permanent Injury."
8. Platforms shall be Spectrum Xcellerator or approved equal.
9. Quantity: Eight (8) (7 including 1 spare)

B. Starting Platform Anchor

1. Anchor sockets for all starting platforms to be 2.5 square by 6" deep anchor constructed of cast 304L stainless steel. Each anchor socket is to be provided with a flush threaded, vandal proof closure cap and a grounding lug with screw. Provide spanner wrenches for removing the closure cap.
2. Anchor sockets to be compatible with platform specified in 13 1115.2.02.A.
3. Anchor sockets to be single post square expansion anchor manufactured by Spectrum Products, or approved equal.

C. Starting Platform Safety Covers

1. Starting platform safety covers (8 required) are designed to keep unwanted users off starting platforms. The cover is made of 1/16" thick tough, lightweight plastic with a UV stabilizer and fits 24" x 32" platform tops. The conical shape and safety orange color act as a deterrent of starting platform use. Each cover is provided with a bungee cord for securing cover platform top.

D. Floating Lane Lines

1. Competition floating lane lines shall be as described in these specifications. Floating lane lines shall be a non-turbulent type with wave quelling floats and 3/16" stainless steel coated cable. Floats shall be injection-molded polyethylene.
2. 25 Yard Floating Lane Lines - Colors to alternate the length of the pool with a contrasting solid color for the first and final 15 feet. Provide contrasting disks

located 15 meters from each end to meet resurfacing requirement. Contractor to submit product for color selection.

3. All floating lane lines shall be provided as completely assembled and installed with take up reel, type 304 stainless steel spring and cable lock, hooks, and wrench. 5/8" wrench shall be made of a forged steel shaft with a polished chrome finish.
4. Floating lane lines shall be pre-assembled and sized to fit the length of the pool.
5. The take up reel shall be constructed of type 304 stainless steel. The spool shall be a bronze nickel-plated casting with a nylon sleeve.
6. Floating lane lines shall be Competitor Swim Products, Competitor 4" Lanes or approved equal.
7. Quantity: Eleven (11)
8. Lane lines to be checked for fit by Contractor prior to site turnover.

E. Lane Line Storage Reel (Swimming)

1. Lane line storage reel shall be fabricated from a heavy-duty aluminum reel joined together by a 1-1/2 inch aluminum axle. This unit must ride easily on four hard rubber wheels. The Contractor is responsible for assembly. The correct number of storage reels shall be provided to store all floating lane lines.
2. Lane line storage reel to be Elite Stor-Reel manufactured by Competitor Swim Products with Competitor storage reel cover, or approved equal.
3. Quantity: One. Contractor to confirm this amount has sufficient capacity to store all floating lane lines at the same time.

F. Backstroke Flags

1. Backstroke flags shall be made of heavy duty vinyl material, triangular in shape (12" wide x 18" long), and alternating in color, heat sealed, butted end to end with vinyl coated stainless steel cable and take up reel. Submit for color review and approval. The cable shall be attached to a stainless steel take up reel at one end and a stainless steel tension spring end-fitting at the other.
2. Backstroke flags to be 12x18 flags as supplied by Recreonics or approved equal.

2.5 DIVING BOARDS

A. 1-Meter Diving Board Stand (ONE REQUIRED)

1. Diving stands for the one-meter springboards shall be installed as shown on the plans. The diving board stand shall consist of heavy aluminum castings dipped in erudite chromic acid solution, followed by a 20 mil coat of baked epoxy. Finish must be touched up in the field if damaged in shipping or assembly. The roller tube and tracks shall be heat-treated extruded aluminum processed by Alcoa Duranodic hard anodizing process. The bearings for the roller tube and slide shall be nylon with grease fittings, adjustable and field replaceable. The diving board anchor hinges and pins shall be heat treated aluminum forgings with a design tensile strength of 35,000 psi and shall receive Alcoa Duranodic hard anodizing. Hinges shall be designed to allow 180-deg. rotation of the diving board to the rear of the stand. Hinges shall be mounted on a transverse casting machined to allow 7 leveling positions in one-inch increments. The diving board anchor bolts shall be 5/8-inch diameter by 3-1/2 inch long silicon bronze. The diving stand shall be supplied with top and intermediate guard rails on two sides. The diving stand guard rails shall be stainless steel tubing firmly attached to the guard rail supports with stainless steel band fasteners. The rails shall extend to the edge of the swimming

pool and the rail ends shall be fitted with rubber safety tips. Fulcrum shall have an adjusting wheel at one end that can be turned by hand or foot.

2. Diving stands to be manufactured by Duraflex International Corp.
 - a. One meter stands shall be Durafirm catalog #70-231-400 and included with eight (8) bronze deck anchors, Durafirm catalog #70-231-905.

B. 3-Meter Diving Board Stand (ONE REQUIRED)

1. Diving stands for the three-meter springboards shall be installed as shown on the plans. The diving board stand shall consist of heavy aluminum castings dipped in erudite chromic acid solution, followed by a 20 mil coat of baked epoxy. Finish must be touched up in the field if damaged in shipping or assembly. The roller tube and tracks shall be heat-treated extruded aluminum processed by Alcoa Duranodic hard anodizing process. The bearings for the roller tube and slide shall be nylon with grease fittings, adjustable and field replaceable. The diving board anchor hinges and pins shall be heat treated aluminum forgings with a design tensile strength of 35,000 psi and shall receive Alcoa Duranodic hard anodizing. Hinges shall be designed to allow 180-deg. rotation of the diving board to the rear of the stand. Hinges shall be mounted on a transverse casting machined to allow 7 leveling positions in one-inch increments. The diving board anchor bolts shall be 5/8-inch diameter by 3-1/2 inch long silicon bronze. The diving stand shall be supplied with top and intermediate guard rails on two sides. The diving stand guard rails shall be stainless steel tubing firmly attached to the guard rail supports with stainless steel band fasteners. The rails shall extend to the edge of the swimming pool and the rail ends shall be fitted with rubber safety tips. Fulcrum shall have an adjusting wheel at one end that can be turned by hand or foot.
2. Diving stands to be manufactured by Duraflex International Corp.
 - a. Three meter stands shall be Durafirm catalog #70-231-400 and included with eight (8) bronze deck anchors, Durafirm catalog #70-231-905.

C. Diving Board Stand Anchors

1. Anchors for the diving board stands shall be all bronze threaded castings for respective 5/8" threaded anchor bolts. The stand shall be designed for mounting with the use of Durafirm bronze deck anchors.
2. Anchors (16 required) to be bronze deck anchors, Durafirm catalog #70-231-905.

D. Diving Boards

1. Diving boards (2 required) shall be an aluminum extrusion type springboard. The diving boards shall be a Maxi-Flex Model "B" diving board as manufactured by Duraflex International, Inc., model #66-231-330 or approved equal. The diving board shall be 16 ft long and 19-5/8 inches wide. The top surface shall be finished with three coats combined with a mixture of sand and white aluminum oxide to affect the non-skid surface with 200 perforations.

2.6 LIFEGUARD AND SAFETY EQUIPMENT

A. Lifeguard Chairs

1. Lifeguard chairs shall be movable and provided with a molded plastic seat 5 feet above the deck. The seat shall be capable of a 360-degree swivel and shall be

supported on a stainless steel tube structure. Platform shall be laminated wood coated with fiberglass and polyester resin, and have a non-skid surface. Access to the platform shall be by means of a sloping front ladder, 26" wide. Ladder steps shall be injection molded ABS, UV stabilized, 26" long x 5" wide with a raised slip resistant tread. The framework of the chair shall be rigidly bolted. Ladder and guard rails shall be manufactured of polished and buffed ASTM-A-554 grade 316 stainless steel, 1.50 inch OD x 0.083 inch wall thickness. All metallic components shall be passivated, in compliance with ASTM A967-99, incorporating organic acid passivation techniques for maximum corrosion resistance. 6" diameter wheels shall be attached to the bottom of the rear legs and means of attaching a rescue tube and umbrella shall be provided.

2. A platform ballast system shall be provided with each Discovery lifeguard chair. The ballast, when filled with water, shall weigh a minimum of 184-pounds and shall provide additional stability to portable lifeguard platforms. Ballast tank shall be fabricated of linear low-density polyethylene, employing a UV inhibitor and shall be flame polished and will be pantone 072 (safety blue) in color. The ballast tank will provide with a top-mounted fill port and side mount drain port, each with cover. The ballast tank will be attached to two, 1-inch square x 0.062 wall thickness, square stainless steel tubing. The 1-inch square tubing will be attached to the portable lifeguard platform. The ends of the square tubing will be close using 1-inch plugs. Attachment hardware will be 18-8 stainless steel.
3. Lifeguard chairs shall be the 5 Ft Discovery, by Spectrum Products, or approved equal.
4. Quantity: Four (4)

B. Spineboard

1. Spineboard shall be 72" long x 20" wide, constructed of 100% virgin high density polyethylene. The design shall provide stiffness and torsional rigidity while remaining lightweight. The spineboard shall accommodate up to 500 lbs and shall feature customizable buoyancy that allows users to adjust the buoyancy by inserting polyethylene foam rods (supplied with the spineboard). There shall be (10) handholds around the perimeter of the board. The spineboard shall be supplied with one (1) 2-piece head immobilizer, one (1) head strap, four (4) body straps, one (1) head immobilizer with head bed, and two (2) flotation rods.
2. Provide one (1) set of heavy duty stainless steel utility hooks per spineboard for storing the spineboard at a convenient and readily accessible location near the pool.
3. The spineboard shall be CJ Rescue 6 package as manufactured by CJ spineboard or approved equal.
4. Quantity: Two (2)

C. Rescue Tube

1. Provide one rescue tube for each lifeguard chair. Rescue tube to be manufactured by Bremen Corporation, or approved equal.
2. Quantity: Six (6)

2.7 THERMAL COVERS

- A. The swimming pool cover system shall be the standard catalogued product of a company regularly engaged in the manufacture of such products. Alternate swimming pool cover systems shall not be considered unless equal to the specified product and must be submitted for approval not less than ten (10) days prior to bid date. Submittal data must

include complete documentation relating to all the specified features and include manufacturer's sales literature, specification sheets, energy conservation audit, installation/maintenance manuals and engineering drawings.

- B. The swimming pool cover system shall be of the energy conservation type. The covers shall be supplied in panel sections, allowing for ease of storage, and ease of installation and removal. The cover panel materials shall withstand the commercial aquatic facility's environment. Panels shall receive edging materials to strengthen the panel and to allow for deployment and retrieval without damaging the panel's main body materials. All materials shall be ultraviolet stabilized to ensure long life. The cover panels shall be reversible, allowing for the panels to be rotated, using both sides and end to end, every other year, supporting additional panel life. Warning labels shall be affixed in four places to both sides of the panel and shall instruct in the panels proper use and warn patrons of hazards associated with covered swimming pools. Cover panel systems shall be supplied with a protector, for use when panels are not deployed.
- C. Basis of design: The swimming pool cover system and its accessory items shall be manufactured by Spectrum Products, or approved equal.
- D. Cover Material
 - 1. Material shall be woven, twelve by twelve count per inch, high-density polyethylene, ultraviolet stabilized film fabric, flame laminated to both sides of a 1/8-inch thick, closed cell, medium density, white, polyethylene foam. The woven polyethylene film fabric shall be coated on the exposed sides with an ultraviolet stabilized, chemically resistant polyethylene coating. The combination of film, foam and woven components shall be non-toxic, non-absorbent, non-permeable and buoyant. Color shall be blue on upper surface and black on under surface. In addition to the above, cover shall meet the following requirements:
 - 2. Cover Design Criteria
 - a. Cover panels shall be divided into widths suitable for convenient daily use (removal and deployment), totally covering the surface of the swimming pool without gaps or overlaps. Cover panels shall be compatible for use with storage reel(s) and not exceed a width equal to one foot less than the length of the storage reel winding tube on which it is to be stored.
 - 3. Edging
 - a. Protective-reinforcement edging shall be installed along ends and sides of each panel. A weighted non-metallic/non-corroding material shall be sewn into the panel protective edging. The weighted edge shall be flat and shall conform to the shape of the cover. Cover end edges shall be reinforced with a double layer of polyethylene-coated film fabric. The end edging shall be designed, in such a manner as, to prevent panels from diving when they are being pulled across the surface of the swimming pool. The encapsulated weighted edging shall be wrapped around the cover corners. The entire corner construction shall be reinforced with a 1/8-inch thick load dispersion plate. Both ends of each cover panel shall be equipped with no less than three (3) non-corrosive/metallic grommets and quick-release loops for easy connection to a storage reel or to the next cover panel.
 - 4. Sewing

- a. All sewing shall be double locking chain stitch, using ultraviolet stabilized, chemically resistant, 100% polyester thread. Main body seams shall be double overlap parallel double chain lock stitched. No butt, welded, glued or heat-sealed seams will be employed. All sewing shall be accomplished with computer-controlled machines, synchronizing speed with stitch length to assure uniformity and strength.

5. Warning Labels

- a. Warning labels consistent with the recommendations of the Federal Consumer Protection Agency shall be permanently affixed to each end of each cover panel and to the sides of perimeter panels on both side of the panel.

- E. The pool cover system shall be manufactured by Spectrum Products, or approved equal.
- F. Quantity: Full coverage of both Competition and Teaching Pools.
- G. The Portable Storage Reel Assembly shall be the Bitterroot III 15-foot triple tube storage reel model #50130 or approved equal. Storage reel shall be provided in the quantity required to store all pool covers.

2.8 SLOT DRAIN DROPOUT CATCH BASIN

- A. Catch Basin to be 12" x 12" square catch basins constructed of polypropylene treated with UV inhibitors. Catch basins are to be installed diagonally to align corners with deck joints.
- B. Catch basin grate to be 12" x 12" plastic grate made of high-density polyethylene (HDPE) treated with UV inhibitors.
- C. Catch basins and grate to be manufactured by NDS or approved equal.
- D. Quantity: Fourteen (14)

PART 3 - EXECUTION

3.1 EQUIPMENT AND SYSTEMS INSTALLATION

- A. The Contractor shall assemble and install all equipment, special parts and accessories as shown on pool drawings, specifications and shop drawings of the equipment suppliers.
- B. The Contractor shall provide all anchors and inserts to be imbedded in the deck including all fittings, inserts and structure sleeves and required anchorage as shown on the plans and as indicated in this section of the specifications. Equipment shall be set true and plumb, using factory jigs where available. Removable equipment items shall be easily removable from anchors and shall fit without noticeable wobble.
- C. Provide templates for all equipment anchors. Provide anchor bolts of the size and spacing as required by the equipment manufacturer. All anchor bolts shall be stainless steel Type 316L and of a length capable of adequate anchorage into rough slab-on-grade allowing for finish deck tile and setting bed. Anchors shall be set and cast into

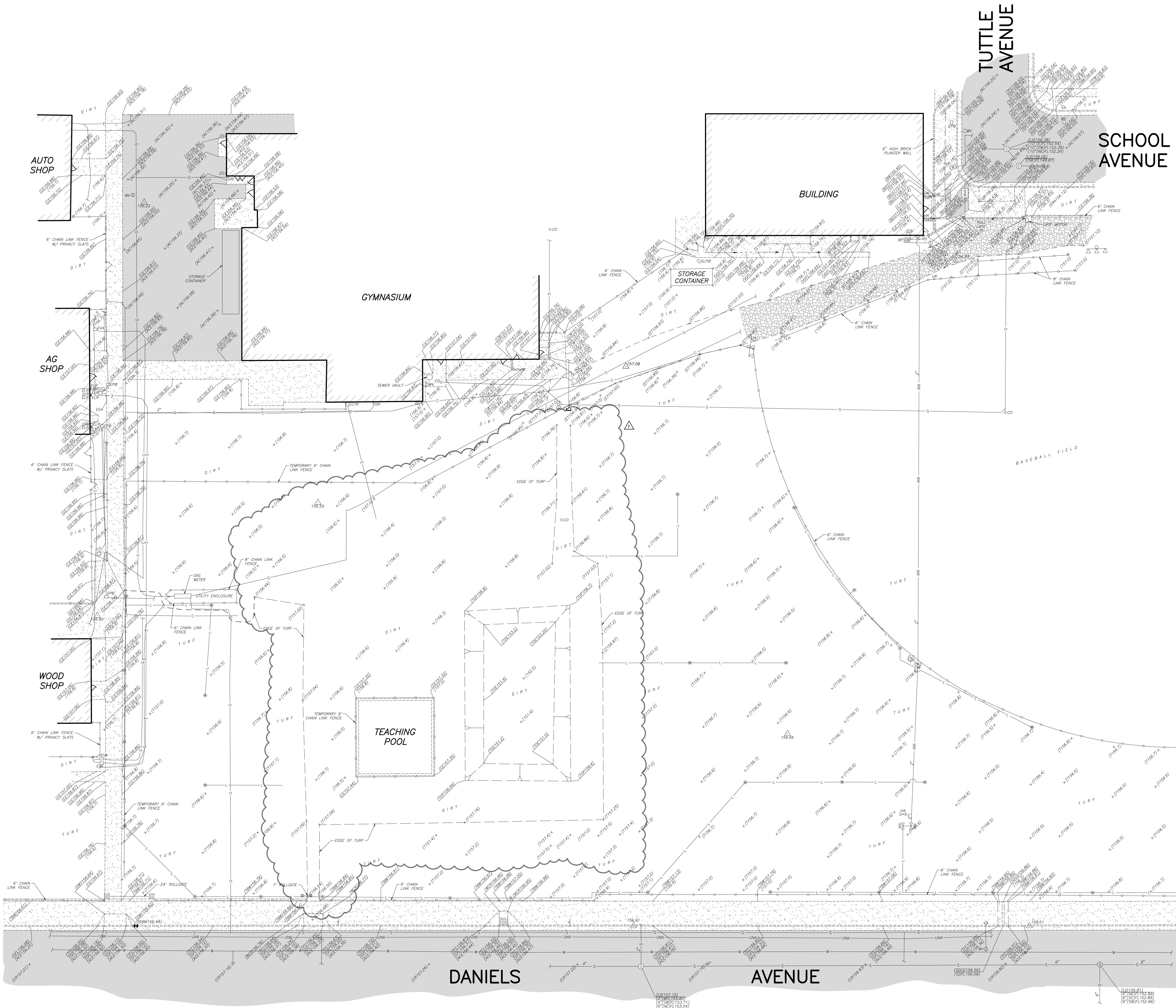
place during building concrete work. Inspect all anchor settings for horizontal and vertical alignment prior to placing concrete.

- D. The Contractor shall install all equipment and systems in accordance with manufacturer's directions. Equipment shall all be assembled and in place for final observation.
- E. All items necessary to complete this section are shown on the plans or described in the specifications including items that may be purchased by the Owner. Items are detailed and specified as a guide for dimensional purposes. The Contractor must make provisions accordingly and submit shop drawings and submittals based on that data.

END OF SECTION



EXHIBIT H



SURVEY NOTES:

1. THIS TOPOGRAPHIC SURVEY LOCATES SPECIFIC PHYSICAL FEATURES OF THE SITE AND THEIR ELEVATION AS DETERMINED NECESSARY BY THE PROJECT ENGINEER. IT IS NOT A COMPLETE TOPOGRAPHIC SURVEY OF THE SITE. THE INFORMATION SHOWN REFLECTS THE DATA OBTAINED BY FIELD SURVEY CONDUCTED ON 06/20/2024.
2. UTILITY INFORMATION SHOWN HEREON IS BASED ON RECORD INFORMATION SUPPLIED TO THE ENGINEER BY UTILITY COMPANIES, PUBLIC AGENCIES AND THE PROPERTY OWNER. TOGETHER WITH OBSERVATION OF VISIBLE EVIDENCE BY A FIELD SURVEY, THE ENGINEER CAN MAKE NO GUARANTEE AS TO THE ACCURACY OR COMPLETENESS OF THE UNDERGROUND UTILITY FACILITIES SHOWN. PRIOR TO ANY SITE EXCAVATIONS, THE CONTRACTOR SHALL CONTACT THE OWNER AND UNDERGROUND SERVICE ALERT (USA) AND REQUEST THAT THEY IDENTIFY THE LOCATION OF ALL UNDERGROUND UTILITIES AT THE SITE.

SITE BENCHMARK:

CHISELED "X" ON TOP OF CURB APPROXIMATELY 98 FEET EAST OF THE EASTERLY CORNER OF THE WOOD SHOP BUILDING JUST NORTH OF THE DRIVE APPROACH

ELEV. = 156.48 NAVD88 DATUM

AGD
ARCHITECTURE | DESIGN

ANDREW GOODWIN DESIGNS
1238 MONTEREY STREET
SAN LUIS OBISPO, CA 93422
t: (805) 439-1611
www.andrewgoodwin.us

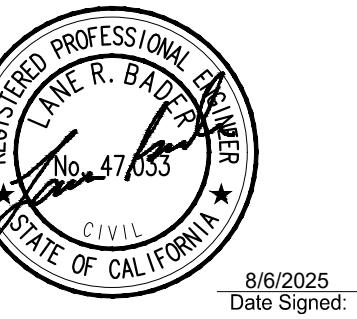
These drawings are instruments of service and are the property of Andrew Goodwin Designs, Inc. The information represented on these drawings are exclusively for the project indicated and shall not be transferred or otherwise reproduced without express written permission of Andrew Goodwin. Copyright 2023

REVISIONS

REV # | REV DATE | REV DESCRIPTION

09-23-25 ADDITIONAL TOPO

SEAL



PROJECT

TRANQUILLITY HIGH SCHOOL
AQUATIC CENTER
MODERNIZATION
6052 Juanche Ave,
Tranquillity, CA 93668

CLIENT

GOLDEN PLAINS
UNIFIED SCHOOL
DISTRICT

SHEET TITLE

TOPOGRAPHIC SURVEY

PHASE DESCRIPTION
100% CD - DSA SUBMITTAL
INCREMENT 1

DATE: 8/6/2025

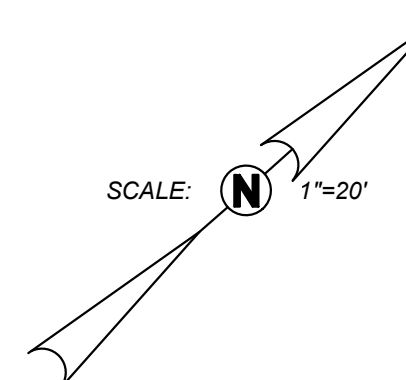
TECHNICIAN: SD

PROJECT MANAGER: LB

JOB NUMBER: 791

SHEET NUMBER

C1.01-1



SCALE: 1"=20'



**Blair,
Church
& Flynn**
CONSULTING ENGINEERS

480 Civic Avenue, Suite 300
Corte Madera, California 94929
Tel (925) 328-1400
Fax (925) 328-1500



EXHIBIT I

(180 Days)

2025-2026 School Calendar



IMPORTANT DATES

First Day of School: 08/11/2025
Last Day of School: 06/04/2026

KINDER PROMOTION

HES 6/2/2026 8:30 AM
SJES 6/2/2026 10:00 AM
CES 6/3/2026 8:30 AM
TES 6/3/2026 10:00 AM

EIGHTH GRADE PROMOTION

HES 6/1/2026 5:30 PM
SJES 6/1/2026 7:00 PM
CES 6/2/2026 5:30 PM
TES 6/2/2026 7:00 PM

HIGH SCHOOL GRADUATION

THS 6/4/2026 7:00 PM
RDR 6/4/2026 9:00 AM

BOARD OF EDUCATION MEETINGS

Every 2nd Tuesday of each month,
unless otherwise specified.

HOLIDAYS

Independence Day 7/4/2025
Labor Day 9/1/2025
Veterans Day 11/11/2025
Thanksgiving 11/27/2025
Christmas Eve 12/24/2025
Christmas 12/25/2025
New Year's Eve 12/31/2025
New Year's Day 1/1/2026
M.L. King Jr. Day 1/19/2026
Lincoln's Birthday 2/9/2026
Presidents Day 2/16/2026
Monday Following Easter 4/6/2026
Memorial Day 5/25/2026
Juneteenth 6/19/2026

THANKSGIVING BREAK

11/24/2025-11/28/2025

WINTER BREAK

12/22/2025-01/09/2026

SPRING BREAK

03/30/2026-04/06/2026

FIRST SEMESTER

End of 1st quarter- 10/10/2025

End of 2nd quarter-12/19/2025

SECOND SEMESTER

End of 3rd quarter-03/13/2026

End of 4th quarter-06/04/2026

STUDENT NON-SCHOOL DAY

*12/12/2025 *5/11/2026 *06/05/2026

PROFESSIONAL DEVELOPMENT

Duty Days 08/04/2025-08/05/2025 (Probationary)

Duty Days 08/06/2025-08/08/2025

Duty Day 12/12/2025

Duty Day 5/11/2026

Duty Day 06/05/2026

July 2025						
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		
August 2025						
S	M	T	W	T	F	S
						1
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
				20	18	15
September 2025						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				
				21	21	21
October 2025						
S	M	T	W	T	F	S
				1	2	3
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	
				23	23	23
November 2025						
S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30				14	14	14
December 2025						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			
				15	15	14

BACK TO SCHOOL NIGHT

HES/RDR 8/07/2025 5:30-7:00 PM
TES 8/06/2025 5:30-7:00 PM
THS 8/06/2025 5:30-7:00 PM
CES 8/07/2025 5:30-7:00 PM
SJES 8/07/2025 5:30-7:00 PM

OPEN HOUSE

HES/RDR 4/14/2026 5:30-7:00 PM
TES 4/18/2026 5:30-7:00 PM
THS 4/16/2026 5:30-7:00 PM
CES 4/14/2026 5:30-7:00 PM
SJES 4/13/2026 5:30-7:00 PM

Board Approved: 4/8/25

WWW.GPUSD.ORG

DRAFT A

January 2026						
S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
				14	14	14
February 2026						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
				18	18	18
March 2026						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				
				20	20	20
April 2026						
S	M	T	W	T	F	S
				1	2	3
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		
				18	18	18
May 2026						
S	M	T	W	T	F	S
						1
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31				20	20	19
June 2026						
S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				
				5	5	4

First Day of School (Early Release) 1:00P.M.

Last Day of School (Early Release) 1:00P.M.

End of Quarter

Early Release Wednesdays

Grades TK-8 1:45p.m., Grades 9-12 2:08p.m.

Wednesdays: Last Wednesday of every quarter:

District Lead TK-12 Teacher Preparation & Planning TK-8

Early Release 1:00p.m.

Parent Conference

TK-8 October 13-17, 2025 (Early Release)

January 20-23, 2026 (Early Release)

June 1st-June 4th Early Release

Grades TK-8 1:45p.m., Grades 9-12 2:08p.m.

Student non-school day/PL

Vacation

180 Instructional Days

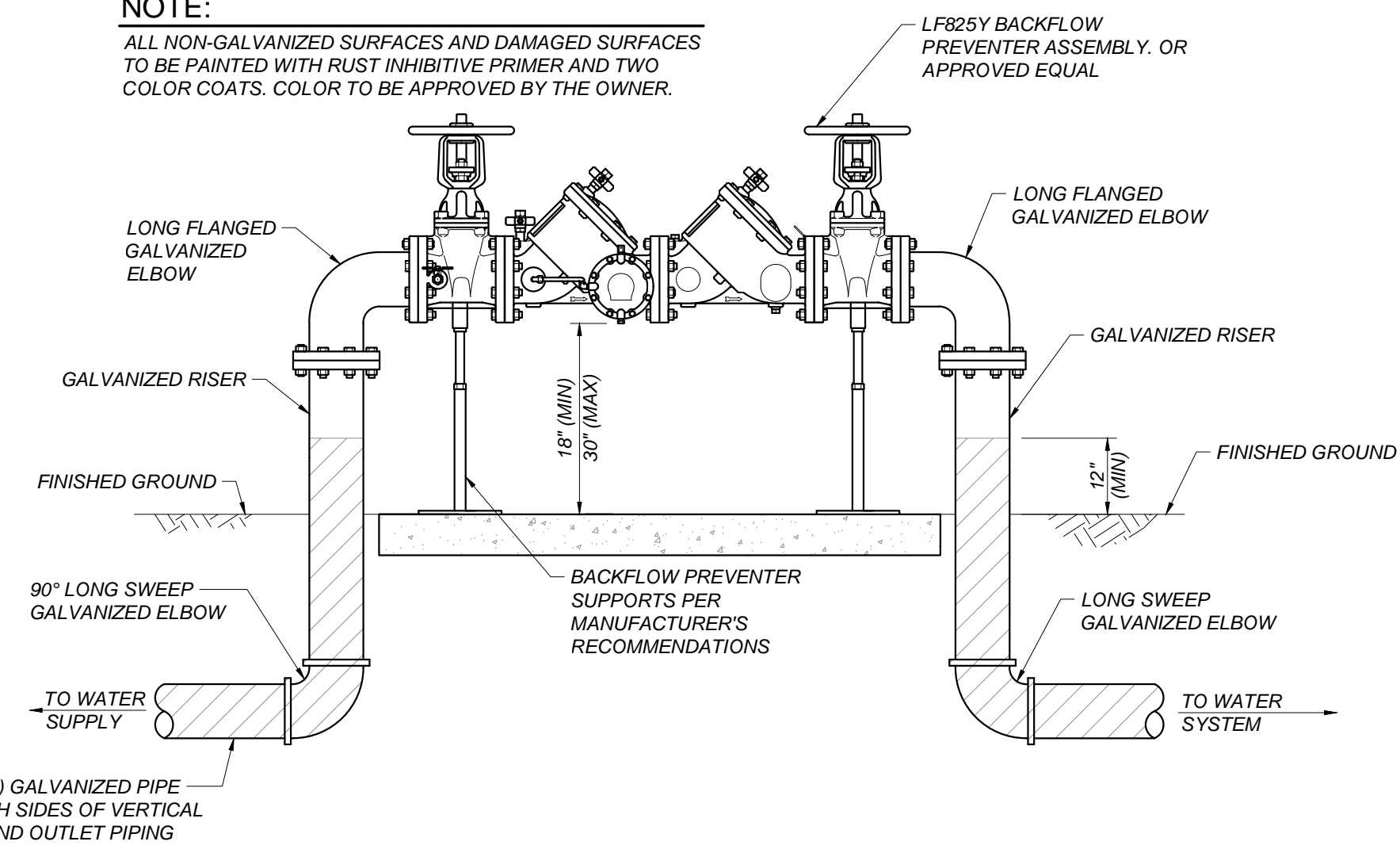
188 Teacher Contract Days (Probationary)

186 Teacher Contract Days (Permanent)

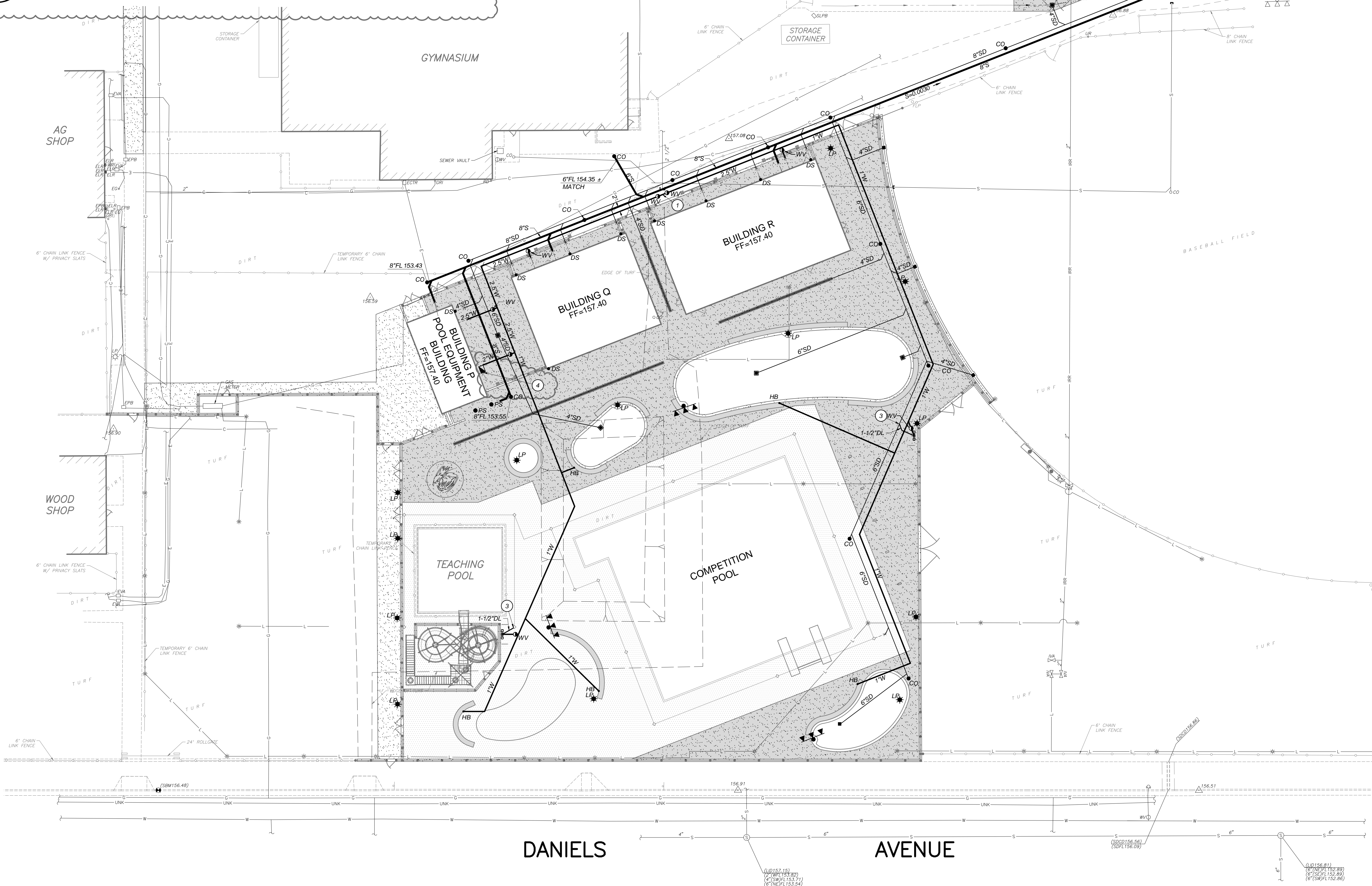


EXHIBIT J

NOTE:
ALL NON-GALVANIZED SURFACES AND DAMAGED SURFACES
TO BE PAINTED WITH RUST INHIBITIVE PRIMER AND TWO
COLOR COATS. COLOR TO BE APPROVED BY THE OWNER.



A
C6.01-1 BACKFLOW PREVENTER
NOT TO SCALE



UTILITY LEGEND:

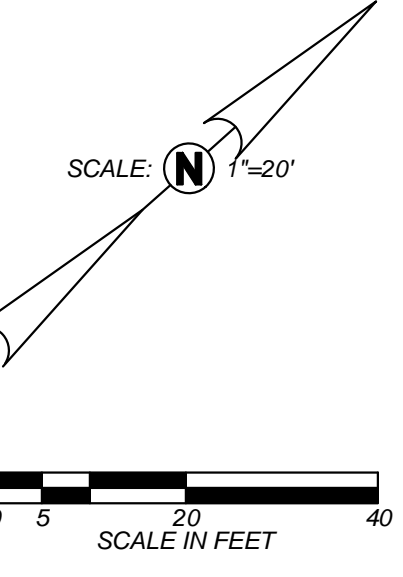
- 4" S SEWER MAIN, SIZE AS NOTED ON PLANS. PIPE BEDDING AND BACKFILL PER DETAIL (G/CX1.01-1)
- 1" W WATER MAIN, SIZE AS NOTED ON PLANS. MIN. 30" COVER. PIPE BEDDING AND BACKFILL PER DETAIL (G/CX1.01-1)
- SD STORM DRAIN PIPE. SEE GRADING PLAN
- DL DRAIN LINE, SIZE AS NOTED
- FF FINISHED FLOOR
- FL FLOWLINE
- DRINKING FOUNTAIN PER DETAIL (A/CX1.02-1)
- BACKFLOW PREVENTER PER DETAIL (A/C6.01-1)
- HOSE BIBB, SEE AQUATICS PLANS
- PS OUTDOOR COLUMN SHOWER, SEE ARCHITECTURAL PLANS
- WV WATER VALVE PER (B/CX1.02-1)
- CO SEWER CLEANOUT PER DETAIL (H/CX1.01-1)
- Cap END OF UTILITY LINE
- POINT OF CONNECTION TO EXISTING OR PROPOSED UTILITY. COORDINATE WITH PLUMBING PLANS PRIOR TO CONNECTION.
- Flowline SLOPE AND DIRECTION OF FLOW
- CONNECT TO EXISTING WATER LINE WITH WATER-TIGHT CONNECTION. VERIFY SIZE, DEPTH, AND LOCATION.
- CONNECT TO EXISTING SEWER LINE WITH WATER-TIGHT CONNECTION. VERIFY SIZE, DEPTH, AND LOCATION.
- CONNECT DRINKING FOUNTAIN DRAIN LINE TO STORM DRAIN UTILITY WITH WATER-TIGHT CONNECTION.
- SEE POOL PLAN FOR CONTINUATION

GENERAL SITE UTILITY NOTES:

- AS FIRST ORDER OF WORK, CONTRACTOR SHALL POTHOLE EXISTING UTILITIES AND NOTIFY ENGINEER IMMEDIATELY OF LOCATIONS, SIZE AND DEPTH.
- THE CONTRACTOR SHALL FIELD VERIFY THE EXACT LOCATION, SIZE, DEPTH, AND TYPE OF ALL EXISTING UTILITIES AND INTERFERENCES SITUATED ALONG THE ROUTE OF THE PROPOSED CONSTRUCTION PRIOR TO COMMENCEMENT OF EXCAVATION, FABRICATION, AND INSTALLATION. THE CONTRACTOR SHALL CONSTRUCT ALL IMPROVEMENTS IN SUCH A MANNER AS WILL PROTECT ALL EXISTING UNDERGROUND UTILITIES AND, IN THE EVENT OF ANY CONFLICTS, SHALL NOTIFY THE ENGINEER BEFORE PROCEEDING.
- SEE IRRIGATION PLANS FOR PROPOSED IRRIGATION PIPE ALIGNMENT.
- COORDINATE EXACT POINTS OF CONNECTION TO BUILDING PLUMBING AND NOTIFY THE ENGINEER OF ANY CONFLICT SO THAT ADJUSTMENTS CAN BE MADE IF NEEDED.
- SAWCUT EXISTING CONCRETE IMPROVEMENTS AS NECESSARY TO INSTALL NEW WATER OR SEWER IMPROVEMENTS. CONSTRUCT NEW CONCRETE IMPROVEMENTS TO MATCH EXISTING IMPROVEMENTS AND JOIN TOGETHER WITH DOWEL BARS PER DETAIL (C/CX1.01-1)
- INSTALLATION, TYPE, AND MANUFACTURER'S MODELS OF DOMESTIC WATER METERS, DRAIN INLETS/OUTLETS AND OTHER APPURTENANCES OF SITE UTILITY SYSTEMS SHALL BE DONE IN STRICT ACCORDANCE WITH GOVERNING AUTHORITY REQUIREMENTS.
- LAYOUT OF MATERIALS, EQUIPMENT AND SYSTEMS IS GENERALLY DIAGRAMMATIC UNLESS SPECIFICALLY DIMENSIONED. SOME WORK MAY BE SHOWN OFFSET FOR CLARITY. THE ACTUAL LOCATIONS OF ALL MATERIALS, PIPING, FITTINGS, EQUIPMENT SUPPORTS, ETC., SHALL BE CAREFULLY PLANNED PRIOR TO INSTALLATION OF ANY WORK TO AVOID ALL INTERFERENCES WITH EACH OTHER OR WITH STRUCTURAL, ELECTRICAL, PLUMBING AND MECHANICAL, ARCHITECTURAL OR ANY OTHER ELEMENTS. ALL CONFLICTS SHALL BE CALLED TO THE ATTENTION OF THE ARCHITECT AND THE ENGINEER PRIOR TO THE INSTALLATION OF ANY WORK OR THE ORDERING OF ANY EQUIPMENT.
- ANY INSPECTION TO BE MADE BY THE AUTHORITY HAVING JURISDICTION SHALL REQUIRE A MINIMUM OF 24 HOUR NOTICE.
- PURITY TESTS ARE REQUIRED ON ALL WATER SYSTEM INSTALLATIONS. CONTRACTOR TO COORDINATE WITH THE AUTHORITY HAVING JURISDICTION.
- IF THE TOP OF THE STEM OF ANY WATER GATE VALVE IS DEEPER THAN 4' BELOW FINISHED PAVEMENT GRADE, THE CONTRACTOR SHALL INSTALL A STEM EXTENSION SO THAT THE TOP OF THE STEM, WITH EXTENSION, SHALL BE NO DEEPER THAN 4' NOR SHALLOWER THAN 2' FROM FINISHED GRADE.
- BACKFILL UTILITY TRENCHES PER DETAIL (G/CX1.01-1)
- ADJUST EXISTING UTILITY LIDS TO FINISHED GRADE PER UTILITY COMPANY STANDARDS AND DETAIL (F/CX1.01-1) AND INSTALL TRAFFIC RATED LIDS WHERE LOCATED IN A TRAFFIC AREA.

COUNTY OF FRESNO GENERAL CONSTRUCTION NOTES

- AN ENCROACHMENT PERMIT IS REQUIRED FOR ANY WORK TO BE PERFORMED IN THE COUNTY OF FRESNO ROAD RIGHTS-OF-WAY. CONTACT THE COUNTY PERMIT ENGINEER AT (559) 680-4840 TO OBTAIN THE PERMIT. IF AN ENCROACHMENT PERMIT HAS NOT BEEN OBTAINED WITHIN 12 MONTHS OF THE APPROVAL DATE OF THESE PLANS, ADDITIONAL REVIEW AND REVISIONS TO THE PLANS MAY BE REQUIRED BEFORE THE PERMIT IS ISSUED.
- ALL CONTRACTORS ARE REQUIRED TO HAVE A \$6000.00 PERFORMANCE BOND ON FILE WITH THE COUNTY OF FRESNO'S MAINTENANCE & OPERATIONS DIVISION PRIOR TO OBTAINING AN ENCROACHMENT PERMIT.
- NO COUNTY OF FRESNO PUBLIC ROAD SHALL BE CLOSED WITHOUT PRIOR APPROVAL FROM THE COUNTY OF FRESNO'S MAINTENANCE ENGINEER.
- NO STORAGE OF EQUIPMENT OR MATERIALS WILL BE ALLOWED IN THE PUBLIC RIGHT-OF-WAY.
- NO OPEN EXCAVATION ALLOWED AFTER WORKING HOURS. ALL EXCAVATION AREAS TO BE PROPERLY SECURED WHEN WORK CREWS ARE AWAY FROM SITE. ALL EXCAVATIONS IN ROAD AND SHOULDER AREA TO BE STEEL PLATED.
- DIRT OR DEBRIS TRACKED ONTO EXISTING COUNTY ROADS FROM THIS PROJECT SHALL BE CLEANED OFF AT THE END OF EACH WORKING DAY TO THE SATISFACTION OF THE COUNTY INSPECTOR.
- ACCESS TO ALL PROPERTIES SHALL BE PROVIDED AND MAINTAINED AT ALL TIMES. UNLESS ARRANGEMENTS, IN WRITING ARE MADE WITH THE PROPERTY OWNERS TO DEVIATE FROM THIS REQUIREMENT.
- RESTORE ALL EXISTING DRAINAGE PATTERNS AND FACILITIES TO PRECONSTRUCTION CONDITIONS OR BETTER
- ALL SIGNING, DETOURING AND BARRICAADING SHALL CONFORM TO THE LATEST EDITION OF THE CALIFORNIA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES AND THE ACCEPTED TRAFFIC CONTROL PLAN.
- PURSUANT TO SECTIONS 8771(b) AND 877(C) OF THE GOVERNMENT CODE, ANY MONUMENTS THAT CONTROL THE LOCATIONS OF BOUNDARIES OR OTHERWISE PROVIDE HORIZONTAL OR VERTICAL SURVEY CONTROL WITHIN THE CONSTRUCTION AREA, SHALL BE LOCATED AND REFERENCED PRIOR TO CONSTRUCTION, AND A CORNER RECORD OR RECORD OF SURVEY OF THE REFERENCES SHALL BE FILLED WITH THE COUNTY SURVEYOR.
- CONTRACTOR SHALL SUBMIT TRAFFIC CONTROL PLAN FOR APPROVAL BY THE COUNTY OF FRESNO PRIOR TO ANY CONSTRUCTION IN PUBLIC RIGHT-OF-WAY.



811
Know what's below.
Call before you dig.

Blair Church & Flynn
CONSULTING ENGINEERS
485 Civic Avenue, Suite 200
Corte Madera, California 94029
Tel (650) 328-1400
Fax (650) 328-1500



ANDREW GOODWIN DESIGNS
1238 MONTEREY STREET
SAN LUIS OBISPO, CA 93422
t: (805) 439-1611
www.andrewgoodwin.us

These drawings are instruments of service and are the property of Andrew Goodwin Designs, Inc. The information represented on these drawings are exclusively for the project indicated and shall not be transferred or otherwise reproduced without express written permission of Andrew Goodwin. Copyright 2023

REVISIONS
REV # REV DATE REV DESCRIPTION



PROJECT
TRANQUILITY HIGH SCHOOL
AQUATIC CENTER
MODERNIZATION
6052 Juanche Ave,
Tranquility, CA 93668

CLIENT
GOLDEN PLAINS
UNIFIED SCHOOL
DISTRICT

SHEET TITLE
UTILITY PLAN
PHASE DESCRIPTION
100% CD - DSA SUBMITTAL INCREMENT 1
DATE:
8/6/2025
TECHNICIAN:
SD
PROJECT MANAGER:
LB
JOB NUMBER:
791
SHEET NUMBER
C6.01-1



EXHIBIT K

DATE: 10.01.2025
BUDGET #: 01LQ10012025



Myrtha Materials Budget Opinion

Tranquillity High School

PROJECT:

**Tranquillity High School
Tranquillity, CA**

CLIENT:

Golden Plains Unified School District

REFERENCE:

Material list



Lap pool

MYRTHA MATERIALS:

- 334'2" Myrtha Chemical Anchors
- 334'2" Myrtha "C" Channel Base Frame
- 334'2" Myrtha Liquid PVC
- 334'2" Myrtha Detergent
- 334'2" Ethyl Acetate
- 334'2" Bostic B40
- 334'2" MS Super
- 334'2" Myrtha Gutter Grating
- 6 x Myrtha Gutter Drop Outs
- 136'3" Myrtha California Ceramic wall, buttress and rim flow system @ 4.6ft panel
- 197'11" Myrtha California Ceramic wall, buttress and rim flow system @ 7' panel
- 3 x PVC Floor Compression anchors
- 3,300 sqft Myrtha PVC Membrane (Smooth)
- 1,000 sqft Myrtha PVC Membrane (Anti Slip)
- 1,000 sqft Myrtha Soft Walk
- 22 Lane Line Cup Anchors
- 20 PVC Acrylic Wall Targets
- 750' PVC Acrylic Floor markings
- 3 x Recessed Steps
- 2 x Side Wall Inlets
- 36 x Floor inlets
- 1 x Secondary Drain
- 18 x Under water light cut outs
- 75' PVC Acrylic Contrasting strip



Teaching pool

MYRTHA MATERIALS:

- 107'1" Myrtha Chemical Anchors
- 107'1" Myrtha Liquid PVC
- 107'1" Myrtha Detergent
- 107'1" Ethyl Acetate
- 107'1" Bostic B40
- 107'1" MS Super
- 3 x Skimmer cut outs
- 107'1" x 4ft Myrtha Renovation wall and rail system
- Hot wire cutter
- 3 x PVC Floor Compression anchors
- 790 sqft Myrtha PVC Membrane (Anti Slip)
- 790 sqft Myrtha Soft Walk
- 2 x Side wall inlets
- 3 x Floor inlets
- 1 x Secondary drain
- 4 x Under water light cut out
- PVC cove



EXCLUSIONS:

- Installation of components
- Mechanical systems
- Lights and niches
- Skimmers
- Water leveler
- Sumps and VGB grating
- All tile and setting materials
- Dal tile C701
- Stairs/ramps
- Starting blocks and anchors
- Timing systems
- Water polo deck equipment
- Plumbing
- Additional Structure Tiling
- Coping
- Concrete/footers/foam/depth reconfiguration
- Entry stair handrails
- Deck Mounted SS Grabrails or Handrails
- All waterline tile depth markers
- All attic stock material is excluded unless otherwise requested in writing at the time of bid
- Myrtha Specified tools not included unless requested



Myrtha Pools Conditions

SECTION 1: PURCHASE ORDER:

1. All purchase orders must be issued to A&T Europe S.p.A., Via Solferino 27, 46043 Castiglione d/Stiviere (MN), Italy. Please include W9 form when submitting the purchase order.
2. All taxes are payable by customer. Customer is responsible for all taxes in accordance with local, state and federal requirements.
3. **By Submitting purchase order, client agrees to our terms and conditions listed below.**

SECTION 2: PAYMENT TERMS:

4. **Payment Terms:** 20% deposit is required prior to the start of production drawings and manufacturing. 75% payment once delivered to site and inventoried, 5% retention due at substantial completion. The School District is to establish an escrow account for the 75% payment. Escrow Agreement Fee is paid for by Manufacturer. Payments are made either through a bank wire transfer, ACH or Check issued by a US bank. Checks are to made payable to **A&T Europe SPA** and mailed to Myrtha Pools USA, 1800 2nd Street #758, Sarasota, FL 34236.

Budget prices are valid for 90 days after quotation. Once a PO is issued and deposit made, if the order is cancelled, A&T has the right to retain half of the deposit to cover design, project management and restocking costs.

5. Delays in final payment causing on-site storage at manufacturer for more than 15 days are subject to fees- \$2500.00 USD per week will be applied after the 15-day grace period. Grace period begins once pool material is manufactured, packed and ready to ship. Any change in terms is at the discretion of Myrtha Pools USA.
6. **A&T Europe does not take any responsibility for any liquidated damages connected to the project.**



SECTION 3: SHIPPING/DELIVERY TERMS:

7. DDP (Delivery Duty Paid) site – A&T Europe S.p.A pays freight, duty, insurance, and brokerage.
8. Delivery – forecasted 120 Days from executed order by A&T Europe S.p.A / Myrtha Pools.
9. **A “Standard Delivery Terms and Conditions” form will need to be completed prior to shipping to confirm delivery address and any special arrangements.**
10. Shipping containers must be unloaded immediately upon delivery. No container will be dropped off. Other arrangements may be made directly with the freight forwarding company at the client’s expense. A&T Europe S.p.A. will not have any responsibility or expense.
11. **Missing/defective materials must be reported within 5 days upon receipt of delivery. It is the purchasers delegated representative responsibility to verify delivered goods against project drawings and bill of materials/packing lists.**

SECTION 4: DESIGN/TECHNICAL:

12. **No Final Formal Quote until there is a Final Bid set drawings.**
13. Items not specifically included in the referenced quotation are not included in the Net Sell Price.
14. Engineering services (signed and sealed structural analysis of the Myrtha wall system) as part of DSA (Division of State Architect) submittal requirements are included. The School District and their chosen aquatic consultant are responsible to provide Myrtha Pools the site Geotechnical Report and any and all other pertinent data with minimum 6 weeks prior to DSA submittal date. One round of responses to comments from DSA Backcheck is included
15. Myrtha’s structure is manufactured with AISI 441 Li stainless steel, which is ideal for our system, part of our patent and has one of the highest corrosion resistance available on the market. Our system is capable of being manufactured from other steel alloys upon request.



16. A&T Europe S.p.A. / Myrtha Pools reserves the right to make changes to the pool component design at their discretion.

SECTION 5: INSTALLATION:

17. Civil works, site works, excavation & hauling, concrete works, installation, sealing, backfill, deck construction, coping, electrical works, grounding works, mechanical works and commissioning works are not included in this supply only price.
18. Dewatering, if necessary, is the responsibility of others, not A&T Europe S.p.A. / Myrtha Pools.
19. Concrete footings and floor must have a helicopter or trowel finish, (smooth and glossy as detailed in our Myrtha installation manual and guide). Finish not meeting the Myrtha Pools standards, will be at the cost of others.
20. Installation of the Myrtha Pool components must be carried out by an authorized Myrtha installer or supervised by an authorized factory supervisor. Authorization of installers and supervisors is at the sole discretion of A&T Europe S.p.A. / Myrtha Pools. Installation by unauthorized technicians or against our recommendations will void or jeopardize the Myrtha Guarantee.
21. All fittings or accessories installed within the Myrtha Pool must be provided by A&T Europe S.p.A. or, where this is not practicable, must be approved for installation in writing by A&T Europe S.p.A. / Myrtha Pools. Lack of such approval will jeopardize the issuance of the Myrtha Guarantee.

NOTES:

A Certified Myrtha Services Technician can be made available for any direct onsite guidance or support, at a per daily rate. The daily rate will be dependent on the requirements. Please note that the Technician is provided to help train staff in the proper installation of the Myrtha Pool components. In addition, supervision is a requirement of the Guarantee for any non-certified installation companies. Please contact Myrtha Services USA for an estimate at 941-955-2591.



MYRTHA GUARANTEE:

Myrtha offers a 25-year Guarantee on Myrtha wall and structural components and 10-year guarantee on floor membrane. There is a one-year Guarantee on all other components. A draft conditions of the Guarantee can be made available upon request.





EXHIBIT L

