

WASTEWATER SYSTEM IMPROVEMENTS FOR CITY OF WEST PALM BEACH, FLORIDA

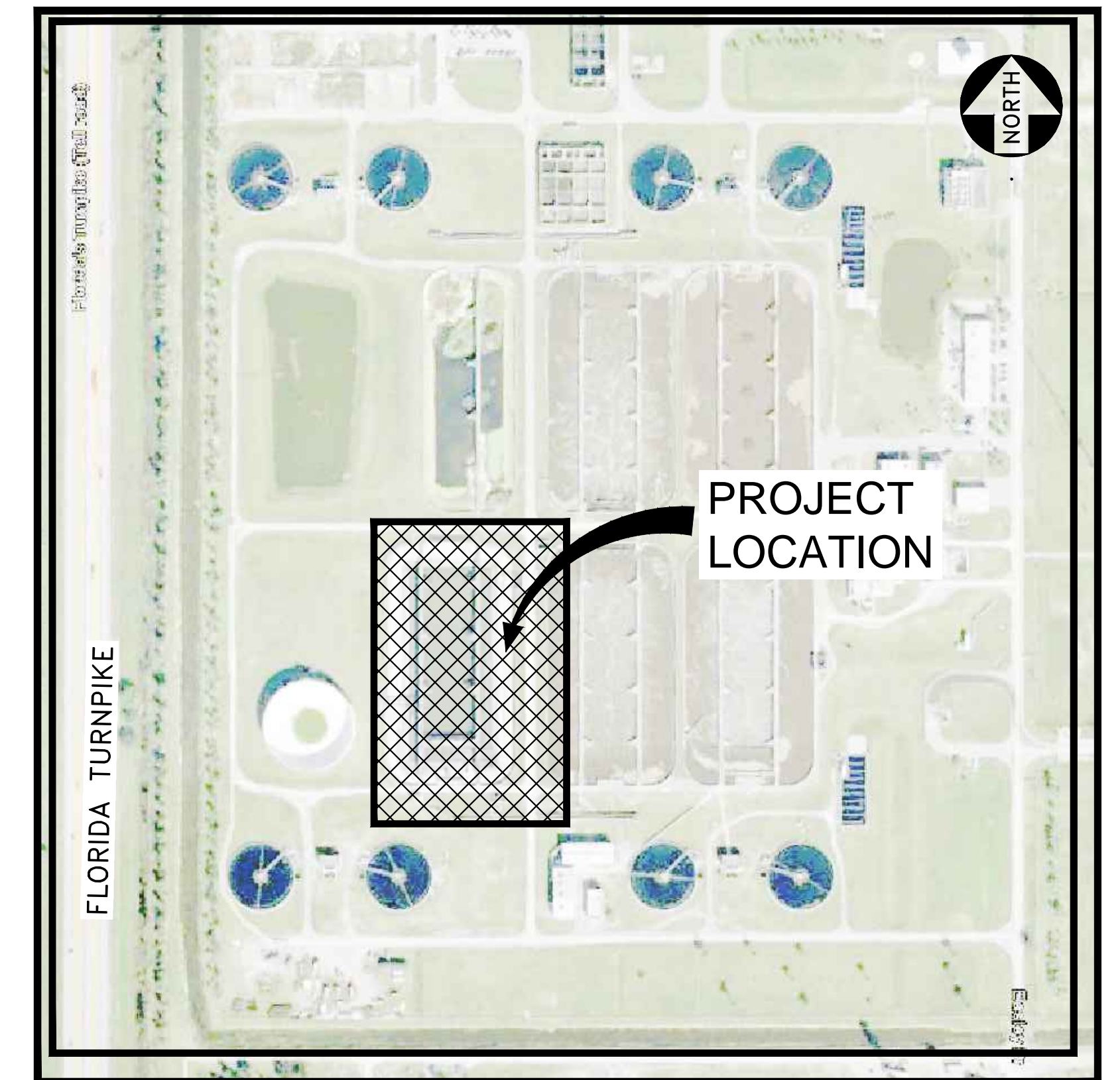
TOWNSHIP 43, RANGE 42 AND SECTION 11



VICINITY MAP



EAST CENTRAL REGIONAL
WATER RECLAMATION FACILITY (ECRWRF)
OPERATIONS BOARD



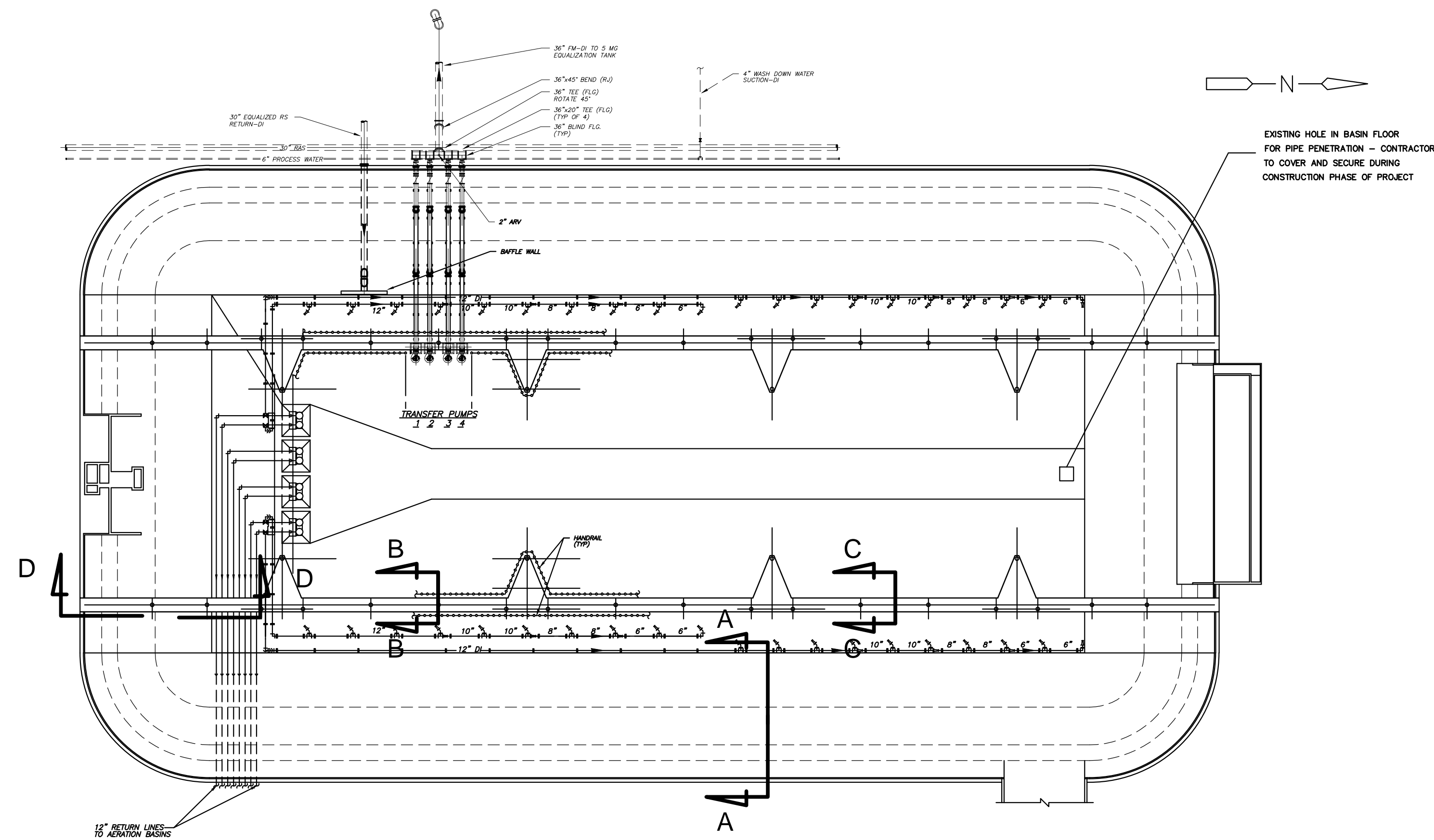
KEY MAP

STRUCTURAL REPAIR OF THE FLOW EQUALIZATION BASIN

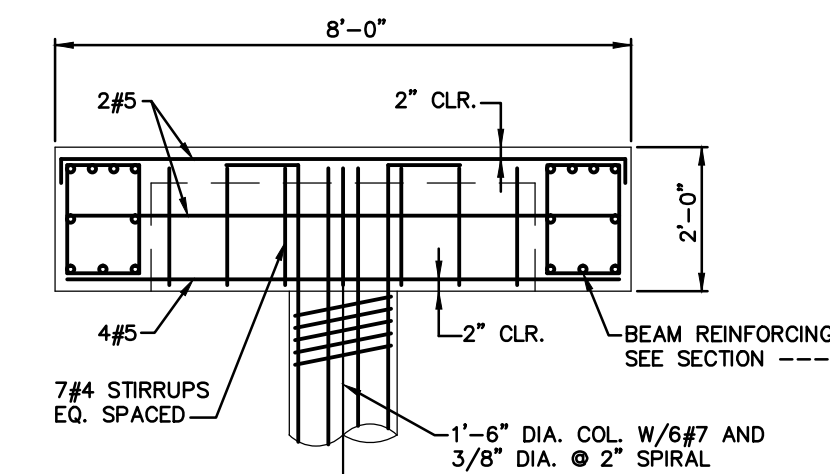
OCTOBER 2011

SHEET INDEX

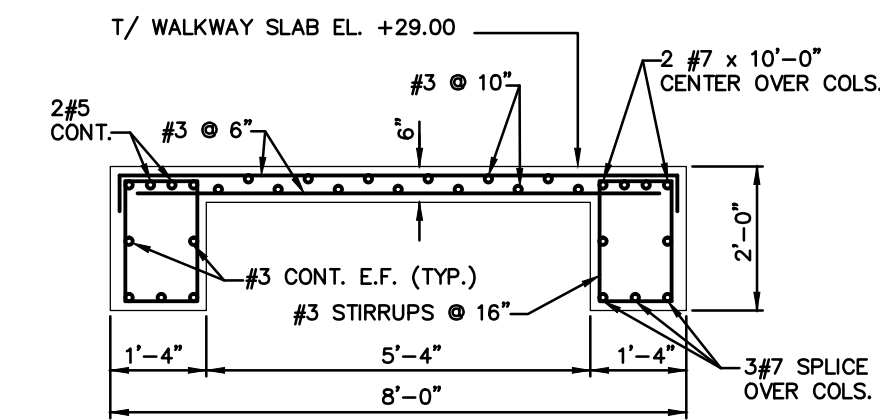
SHEET NO.	SHEET TITLE/DESCRIPTION
SHEET 1	COVER
SHEET 2	EXISTING SITE PLAN, SECTIONS AND DETAILS
SHEET 3	COLUMN BASE REPAIRS
SHEET 4	CONCRETE SPALLING REPAIRS, WALKWAYS AND COLUMNS



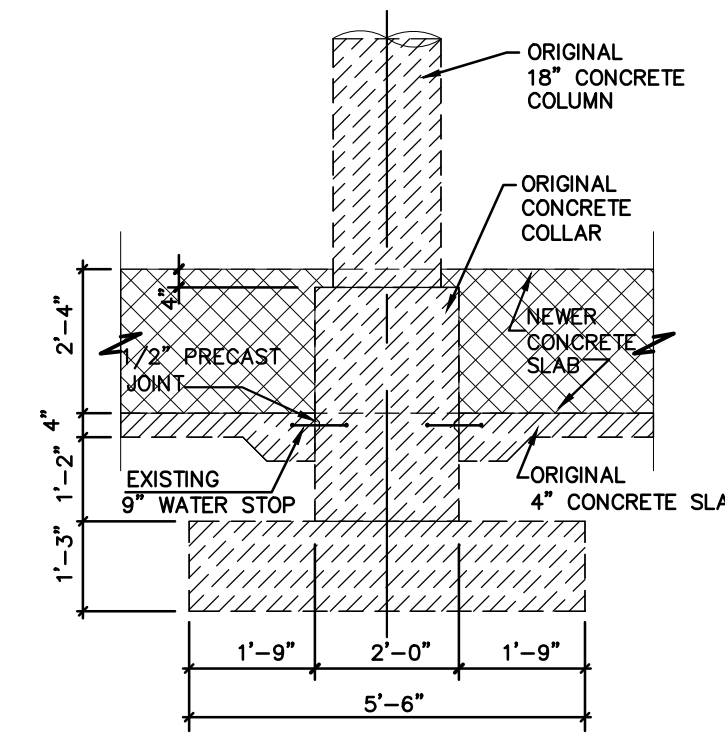
FLOW EQUALIZATION BASIN PLAN
SCALE 1"=40'



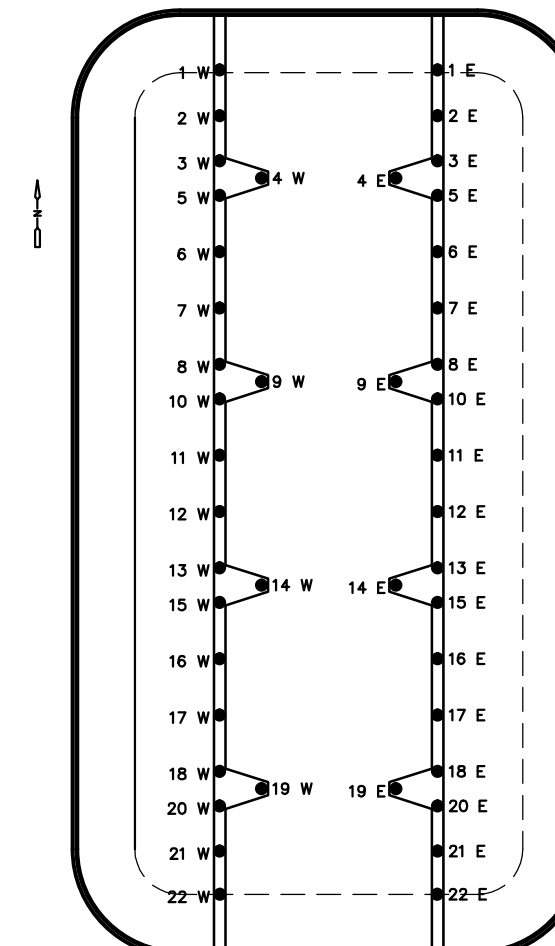
SECTION "B-B"
SCALE 3/8" = 1'-0"
THRU WALKWAY AT COLUMN



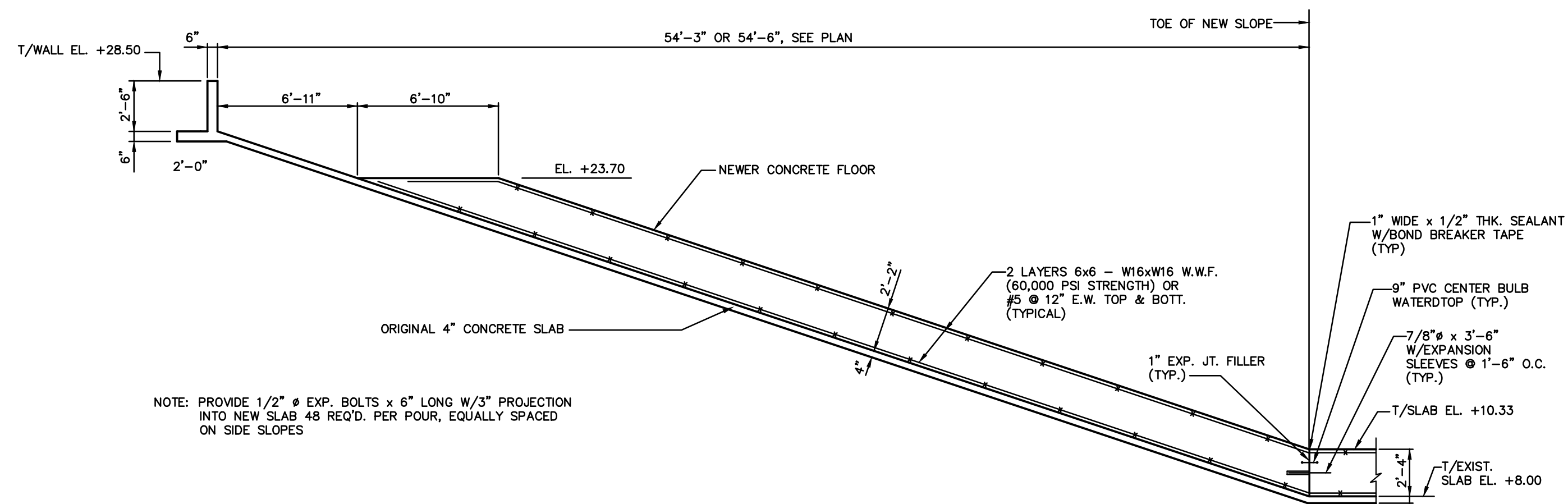
SECTION "C-C"
SCALE 3/8" = 1'-0"
THRU WALKWAY BETWEEN COLUMNS



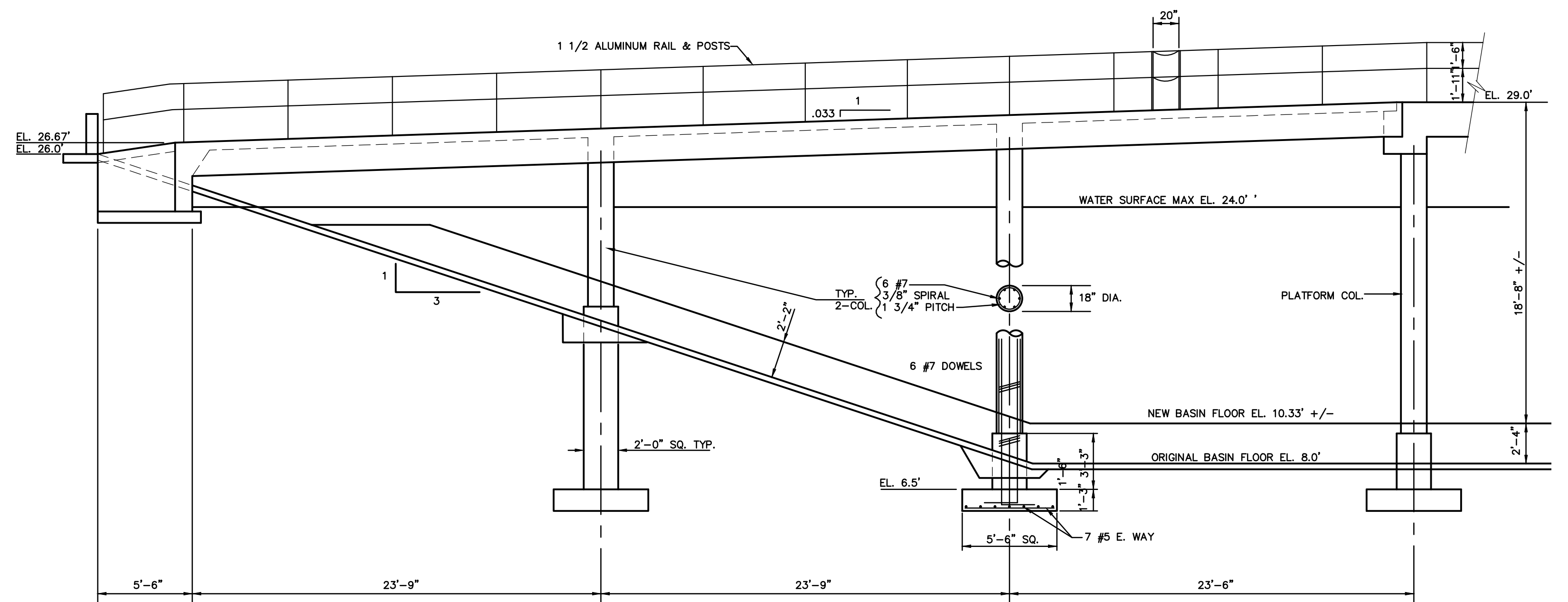
SECTION THRU COLUMN AND FOOTING
SCALE 3/8" = 1'-0"



COLUMN NUMBERING GUIDE



SECTION "A-A"
SCALE 3/16" = 1'-0"



SECTION "D - D"
SCALE 3/16" = 1'-0"

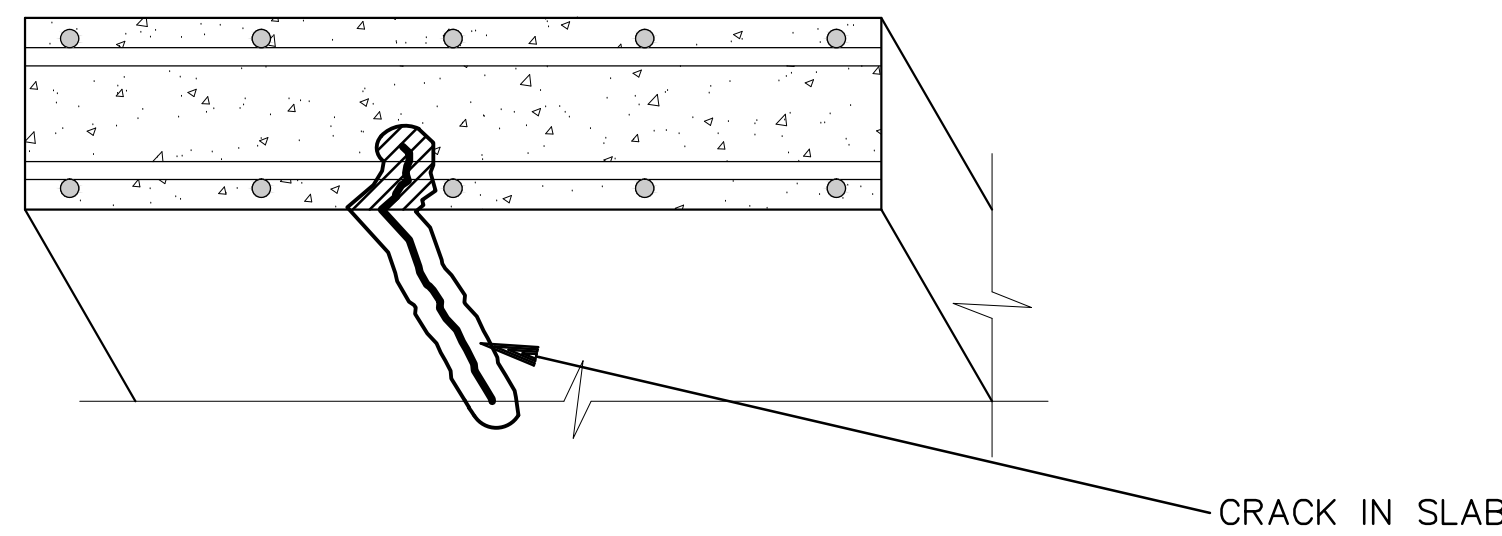
NOTE:
INFORMATION SHOWN ON THIS SHEET WAS OBTAINED FROM DRAWINGS
PREPARED BY ROBERT & COMPANY, INC, POST BUCKLEY SCHUH AND
JERNIGAN, INC. AND CDM AND ARE FOR REFERENCE ONLY.

NOTE:
THIS SHEET IS INTENDED TO SHOW THE APPROXIMATE HEIGHT
OF THE WALKWAY ABOVE THE BOTTOM OF THE TANK

PREPARATION OF THE FLOW EQUALIZATION BASIN

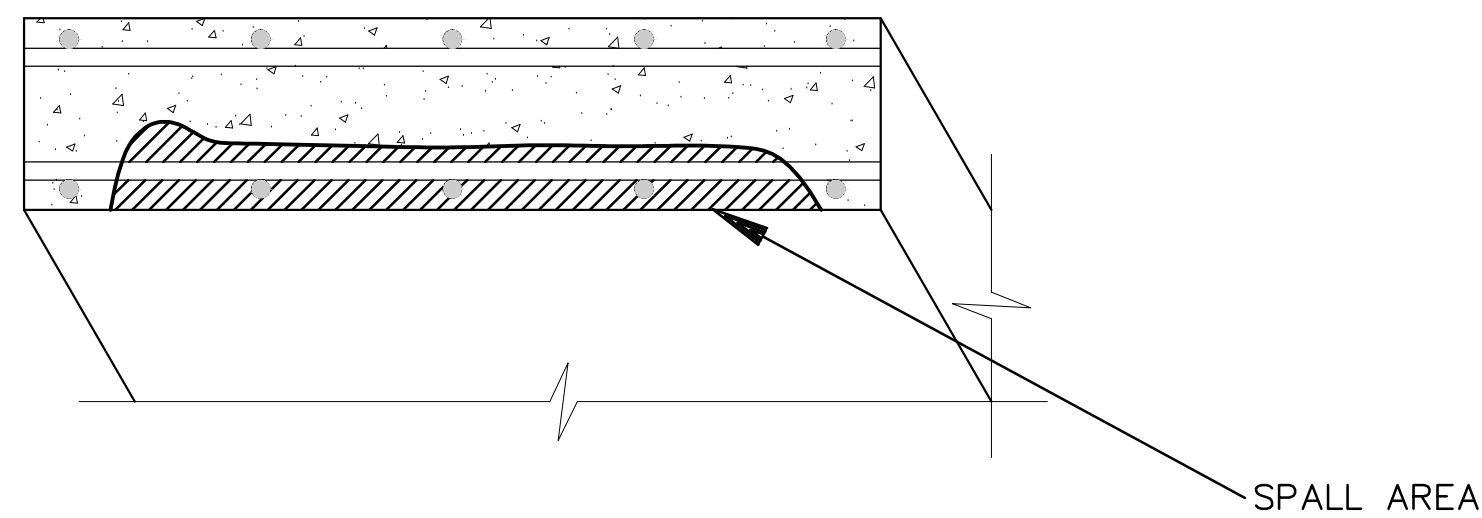
1. The Contractor shall provide a minimum 7-day notice to Owner prior to the draining the Flow Equalization Basin and taking it out of service for conducting the work in the basin.
2. The Contractor must be aware that the ECRWRF is a wastewater treatment plant that must remain in service at all times. The Flow Equalization Basin is used to reduce peak wastewater flows to the ECRWRF treatment processes. In the event of abnormally high wastewater flows to the ECRWRF, or other unexpected situations, the Owner may require that the Flow Equalization Basin be placed back into normal operation, and filled with wastewater. If directed, the Contractor shall remove all equipment, materials, supplies and personnel from the basin so that it can be placed into operation. The Contractor's schedule and compensation may be modified as a result of this action as mutually agreed by the Contractor and Owner.
3. Upon notification by the Contractor, the Owner shall use the existing pumps to drain the Flow Equalization Basin. The Contractor shall be responsible for cleaning the basin of remaining solids, grease and residue, as well as disinfection of the basin to prepare it for entry of personnel and equipment. The Contractor shall visit the site prior to submitting his bid to determine the extent of solids and grease removal and cleaning required. The Owner will make available to the Contractor, a source of undisinfected process water and hose connections available to the Contractor for their use. The Owner shall also operate the existing submersible pumps to help remove solids and water from the basin after the Contractor has hosed this material to the sumps located on the south side of the basin at the location of the pumps. The Contractor may be required to use a degreasing agent to assist with cleaning of the basin sidewalls, columns and floor, and a disinfectant to make the basin suitable for entry of personnel and equipment.
4. Personnel entering the basin shall wear boots, gloves and protective clothing at all times and shall take appropriate precautions to eliminate exposure to raw wastewater and solids in the basin.
5. The Contractor shall pressure wash the bases of all the support columns for inspection by the Engineer to determine which columns require Type 1A and 1B repairs. The Contractor shall then make the required measurements of the selected columns for fabrication of the escutcheon plates.
6. After the basin is cleaned and disinfected, the Contractor shall provide sump pumps and hoses to remove water entering the basin from the leaks at the column penetrations and rain water that enters the basin. The Owner will periodically use the large submersible pumps if requested by the Contractor.
7. Contractors shall remove and dispose of the 15 existing unused aerator support and guide columns located in the basin.
8. If repairs are made to under side of walkway surface while the tank is in service, the maximum water level in the tank will be 18.0' NGVD.
9. The Flow Equalization Basin will be out of service for a maximum of a two-month period for completion of all concrete repair work below a water depth of elevation 18 feet and all erection of scaffolding, etc. The two-month partial completion time frame (April 30, 2012 to June 30, 2012) will initiate after the notice is provided to Owner and the basin is taken off-line and made available to the Contractor.
10. After the basin is cleaned and disinfected, and prior to conducting any concrete repair work, the Contractor shall request a meeting with the Engineer to determine the types and extent of repairs needed, and the quantity of each type of repair required.

**REPAIR OF
CONCRETE SPALLING AT COLUMNS AND DECKS
TYPES 2, 3, 4 & 5**



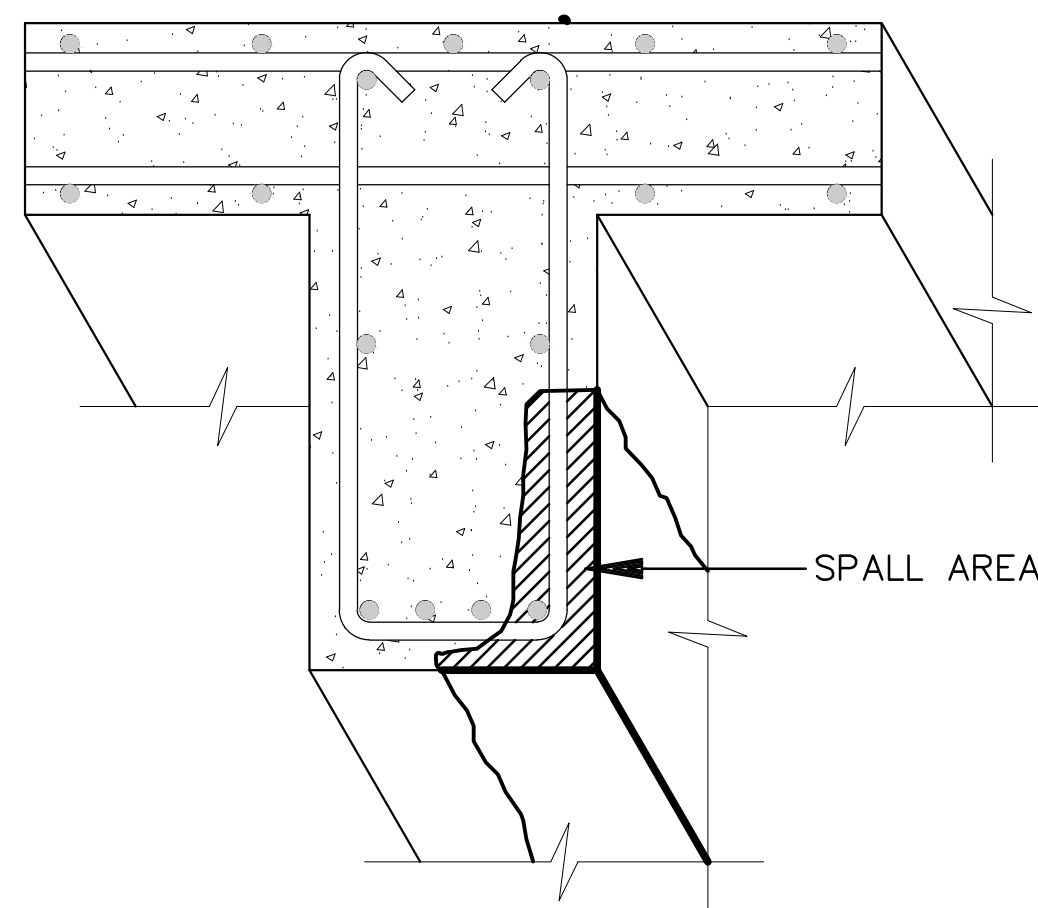
TYPE 2 REPAIR - SLABS

- A. CRACK REPAIR AS SPECIFIED
- B. CRACK REPAIR WITH SUPPLEMENTAL REINFORCING BARS
- C. CRACK REPAIR WITH EPOXY INJECTION



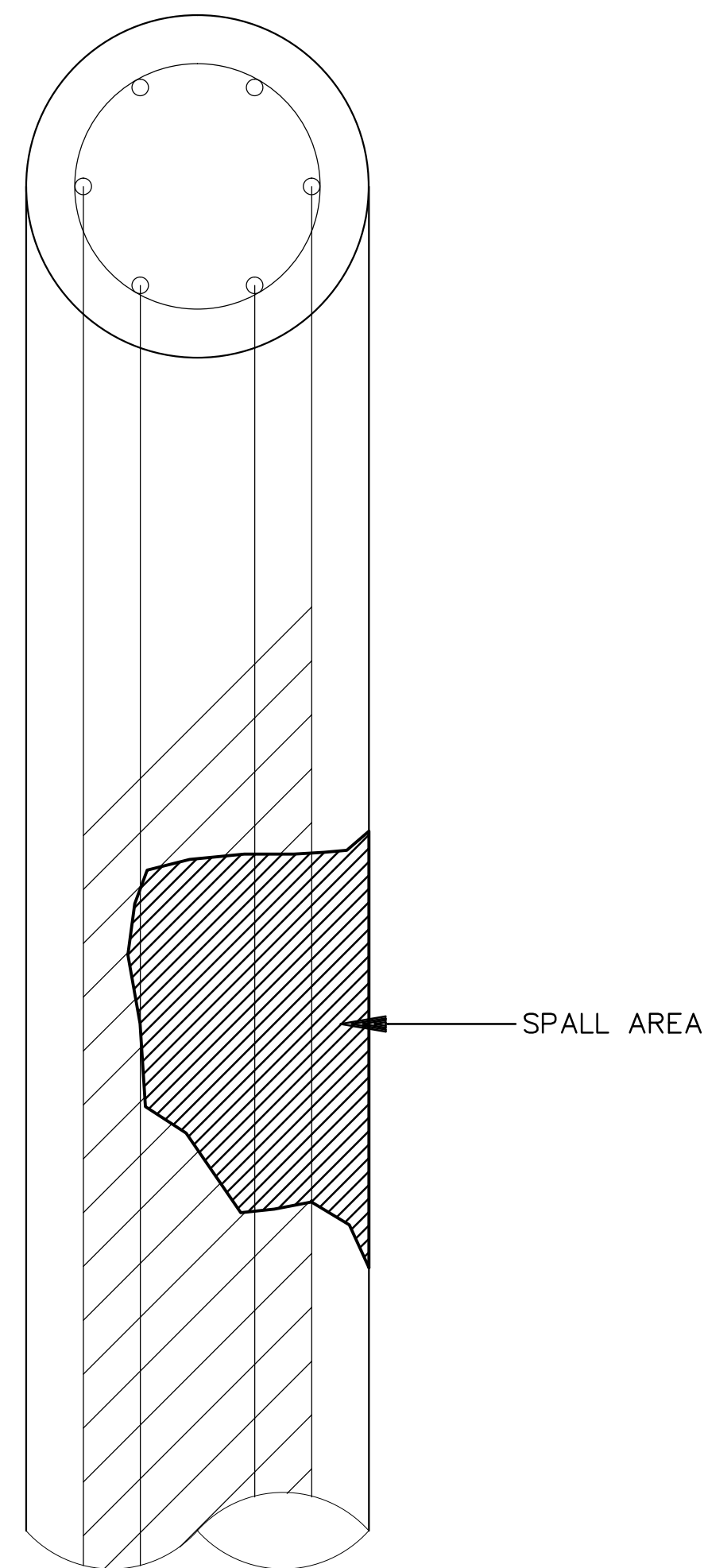
TYPE 3 REPAIR - SLABS

- A. SLABS WITH LARGE SPALLED AREA REPAIRED AS SPECIFIED
- B. SLABS SPALLED AREA THAT REQUIRE SUPPLEMENTAL REINFORCING
- C. SLABS SPALLED WITH UNFORSEEN CRACKS REPAIR WITH EPOXY INJECTION



TYPE 4 REPAIR - BEAMS

- A. BEAMS WITH SPALLING REPAIRED AS SPECIFIED
- B. BEAMS WITH SPALLING THAT REQUIRE SUPPLEMENTAL REINFORCING
- C. BEAMS WITH CRACKS REPAIR WITH EPOXY INJECTION



TYPE 5 REPAIR - CONCRETE COLUMNS

- A. COLUMNS WITH SPALLING REPAIR AS SPECIFIED
- B. COLUMNS WITH SPALLING THAT REQUIRE SUPPLEMENTAL REINFORCING
- C. COLUMNS WITH CRACKS REPAIR WITH EPOXY INJECTION

TYPE 6 REPAIR - CONCRETE COLUMNS

- A. EXPANSION JOINTS LOCATED ON THE BASIN FLOOR
- B. EXPANSION JOINTS LOCATED ON THE BASIN FLOOR WITH LEAKS
- C. EXPANSION JOINTS LOCATED ON THE BASIN WALLS
- D. INTERFACE BETWEEN THE TOP OF THE CONCRETE OVERLAY AND ORIGINAL CONCRETE SLAB

1. REMOVAL OF UNSOUND CONCRETE

A. SCOPE

The existing equalization tank has noticeable cracking and spalling of the concrete columns and underside of the overhead walks. These areas shall be repaired as part of this project; the following specifications shall be followed. Concrete removal shall include the excavation into slabs, decks and columns to remove all concrete which has been affected by salts, moisture and rusting steel. The affected areas are predominantly the columns and the elevated walkways.

B. METHODS

Electrical and/or pneumatic hammer shall be used to excavate and remove loose or delaminated concrete above oxidized reinforcing steel. Undercut all exposed oxidized reinforcing bars. Provide a minimum 3/4" clearance between exposed rebar and surrounding concrete. Concrete shall be removed for the length to a point where the reinforcing bar is well bonded and no signs of corrosion. Care shall be taken not to damage rebar bond to surround concrete in areas where no oxidation exists.

C. QUALITY AND INSPECTION REQUIREMENTS

Upon completion of the surface preparation work the Engineer shall make an inspection of all areas where concrete has been removed.

D. ADDITIONAL DOCUMENTATION

See International Association of Concrete Repair Specialists Technical Guidelines.

2. SURFACE PREPARATION

A. SCOPE

All surfaces revealed by removal of unsound concrete shall be cleaned and prepared for seal coating and/or bonding adhesive.

B. METHODS

1. Reinforcing Bars

All reinforcing bars exposed by the concrete removal process shall be sand blasted to a near white grade finish with pneumatic equipment compatible with the size of the area to be prepared. The near white finish shall be accomplished on all reinforcing surfaces exposed by concrete removal. Therefore, clean the reinforcing bars to the interface with sound concrete.

2. Excavated Concrete Surface

The entire excavated concrete surface area shall be removed to expose sharp aggregate and until a uniform appearance and texture is obtained. The edge of each excavated area shall be a right angle to surface. Clean excavated area to insure surface is free of all loose aggregate, dirt or loose bond aggregates.

3. Wire Brush Operation

All wire brushing shall be performed to remove corrosion under controlled conditions whenever practical. Wire brushing shall be repeated if any sign of petroleum products should be discovered.

Other surface preparation methods are acceptable including high pressure water jetting, needle gun and mechanical grinders.

C. QUALITY AND INSPECTION REQUIREMENTS

Each excavated area will be inspected prior to rust stabilization or application of bonding adhesive. A cooperative effort shall be made on behalf of the Contractor and Engineer to coordinate the inspections of multiple areas at a common time on a mutually agreeable basis to minimize contractor delays.

3. NEUTRALIZING CORROSION AND SEALING REINFORCEMENT

A. SCOPE

All reinforcing steel exposed by the removal of unsound concrete shall be treated with a corrosion-neutralizing compound followed by a sealing coat of epoxy resin.

B. MATERIALS

1. Corrosion Neutralizer

A brush applicable liquid rust stabilizer "Sika Armatex 110 EPOCEM" or an approved equal shall be applied to all exposed reinforcing steel. Some sealers do not require rust stabilizers, refer to manufacturer specifications prior to applying a stabilizer.

2. Epoxy Resin Sealer

A brush applicable high modulus epoxy, "Corro-Tech G.P." as manufactured by Thortex or approved equal shall be applied to the exposed reinforcing steel. This product does not require a rust stabilization process.

C. METHODS

Upon satisfactory completion of reinforcement surface preparation the corrosion neutralizing process shall immediately follow. Using a stiff bristle brush apply "Sika Armatex 110 EPOCEM" full strength to the exposed reinforcing bars. Force the material into all bar crevices, especially where bars penetrate existing concrete, if required.

Reinforcing bars that have been cut of have lost 25 percent of more of their cross sectional area shall be supplemented by new in kind bars. New bars shall be lapped a minimum of 32 bar diameters to existing bars. A mechanical splicer shall be used when it is not possible to provide the minimum bar lap. No welding shall be performed (ACI 318-12). Payment for supplemental reinforcing shall be per linear foot (Type B repairs)

Intersecting reinforcement bars shall be tightly secured to each other using 0.006 in (1.6 mm) or heavier gauge tie wire and shall be adequately supported to prevent movement during concrete placement.

One thorough coating is sufficient to generate a chemical reaction to neutralize the rust causing the surface to turn a blue-black color. Three hours after application of the rust stabilizer, the reaction is complete and the epoxy sealing process should commence. The material is a two-component mix to be brush applied over the stabilized reinforcement to a minimum thickness of 5 mils. The material shall be mixed in small quantities and applied immediately as the pot life is a maximum of 90 minutes. The epoxy seal shall be inspected after twenty-four hours for rust bleeding and other signs such as bubbles indicating flaws in the seal coat. Rebar shall be coated again to ensure a seal against water infiltration. The contractor shall follow the manufacturer recommendations.

D. QUALITY AND INSPECTION REQUIREMENTS

The neutralization and sealing processes will be observed by the Engineer at stages to ensure critical areas are defined and the contractor fully understands the process.

4. EPOXY ADHESIVE INJECTION

A. SCOPE

Epoxy adhesive injection shall be required when a crack remains visible in sound concrete after completion of the surface preparation work. The most likely location of such a crack will be at or near to the bottom of the elevated walkways and the face of the columns. Each crack discovered by the contractor shall be brought to the attention of the Engineer who will advise contractor on type of repair method. Payment for epoxy injection shall be per linear foot (Type C repairs).

B. MATERIALS

1. Epoxy Injection Resin

The material shall be high solids, solvent free, low viscosity, two component high-strength adhesive. Sikadur 52 injection resin or approved equal shall be utilized to regenerate the bond along full depth cracks.

2. Injection Ports and Crack Sealer

Prior to epoxy injection one-way polyethylene valves shall be located in the crack and secured by a high modulus gel epoxy adhesive, Sikadur 31 or approved equal, to seal the surface defining the void to be filled.

C. METHODS

After consultation with the Engineer concerning treatment of the specific crack discovered all dust, laitance, grease or any other foreign products must be removed. Drill injection ports into the crack at six to eight inch intervals to insure full penetration of adhesive. Contractor shall then make every effort to provide a clean port and crack prior to sealing and injection (flushing with water and drying with compressed air blast).

Injection valves shall be installed in each port throughout the length of the crack to be treated. Seal ports in place with epoxy gel adhesive and trowel gel into the crack along its entire length to close the injection cavity.

Injection should begin at one end of the crack and progress port by port to the opposite end. Pressure injection of neat epoxy adhesive shall be accomplished by two component injection units or injection syringe/caulking gun if pre-mixing is preferred. Pre-mix only an amount of material that can be used within twenty minutes, as product pot life is short. Maintain a slow steady pressure while injecting to allow the adhesive to make the fullest penetration possible throughout the crack; 50 psi is sufficient, cease pumping when resin appears in the adjacent port.

D. QUALITY AND INSPECTION REQUIREMENTS

Contractor shall be responsible for contacting Engineer to ensure his availability to monitor both the port placement and the injection process.

5. EPOXY MORTAR BACKFILL

A. SCOPE

All horizontal areas with depth to finish greater than one inch shall be backfilled to original concrete cross-section with epoxy mortar, preceded by an approved primer.

B. MATERIAL

1. Thortex Wall-Tech L.W. Primer

Thortex Wall-Tech Primer L.W. is a two component product that when applied IAW the manufacturers recommendation provides a tack coat to provide maximum penetration and adhesion for the epoxy mortar.

Thortex Wall-Tech L.W. Primer

Thortex Wall-Tech is a three component material epoxy mortar that is light weight and can be used as a backfill material on walls and overhead surfaces. It must be used in conjunction with Thortex Wall-Tech Primer in order to provide maximum adhesion and penetration.

C. METHODS

Surface areas to be repaired must be clean, dry and free from contamination. All loose spalled and eroded concrete shall be removed. All exposed rebar shall be coated as described above. The final surface shall be clean and roughened and all dust shall be removed.

Thortex Wall-Tech L.W. shall be applied to the damaged area in accordance with manufacturer's specifications. The material shall be applied by float or trowel while the primer is still tacky. The usable life of Wall-Tech Primer is 30 minutes, if time is exceeded reapply the primer IAW manufacturer's recommendation.

D. QUALITY AND INSPECTION REQUIREMENTS

Finish on slabs and ledges shall be a trowel finish at least compatible with the adjacent original surface. Rough surfaces will be reworked to the satisfaction of the Engineer.

The Engineer will make periodic visits to the site to verify methods and mix proportions throughout the project duration. The Engineer shall make final acceptance of the slabs.

6. WARRANTY:

All materials and fabrications to be furnished and/or installed by the Contractor, shall be approved by the Engineer, installed in concurrence with the manufacturer's recommendations, and shall be warranted for a period of one year from the date of final acceptance thereof, against defective materials, design and workmanship. Upon receipt of notice from the Owner of failure of any part of the warranted materials and fabrications during the warranty period, the affected material or fabrication shall promptly be replaced by the Contractor with new material or fabrications at no expense to the Owner. In the event that the Contractor fails to make the necessary replacement or repairs immediately after notification, the Owner may accomplish the work at the expense of the Contractor.

**REPAIR OF
EXPANSION AND CONSTRUCTION JOINT REPAIRS
TYPE 6**

1. ELASTOMERIC JOINT REPAIR

A. SCOPE

All expansion joints that show signs of leaking, cracking, separation from the joint edges, excessive shrinkage or other indication that the joint is no longer sealed shall be repaired as described below to eliminate possibility of leaks.

B. MATERIAL

1. FLEX - TECH 60 FG (Repair Type 6A and 6B)

Thortex Flexi-Tech 60 F.G. is a 60 Durometer high performance fluid elastomer which has been specifically developed for concrete expansion joints and is suitable for use on horizontal surfaces.

2. FLEX - TECH 60 EG (Repair Type 6C and 6D)

Thortex Flexi-Tech 60 E.G. is a 60 Durometer high performance paste grade elastomer which has been specifically developed for the repair of concrete expansion joints by trowel or putty knife and is suitable for use on vertical and overhead surfaces.

C. METHODS

1. JOINT PREPARATION

Remove the existing elastomeric material. All existing dirt, oil and grease must be removed and the surface wiped with Thortex Universal Cleaner. Concrete should be mechanically etched to produce a good profile, with sand blasting or an angle grinder being preferred. Where required, a closed-cell poly backer rod should be installed. All loose dust and particles should be blown clear of the prepared surface.

1. PRIMING

All areas to be repaired or resurfaced should be first primed with Thortex Flexi-Tech Primer. The primer should be applied with a soft bristled brush to give an even, but low coating thickness, taking care to avoid ponding of the primer. The primer should be allowed a minimum of 60 minutes and a maximum of 8 hours at 20°C (68°F) before applying the Thortex Flexi-Tech 60 F.G. or E.G.

2. APPLICATION

The mixed material should be applied evenly to the primed joint with a clean brush. When a second coat is required this should be applied as soon as possible, after the initial set and within 24 hours of the first coat being applied.

D. QUALITY AND INSPECTION REQUIREMENTS

The joints should be filled flush with the adjacent concrete. The Engineer will make periodic visits to the site to verify methods and mix proportions throughout the project duration. The Engineer shall make final acceptance of the work.

E. WARRANTY:

All materials and fabrications to be furnished and/or installed by the Contractor, shall be approved by the Engineer, installed in concurrence with the manufacturer's recommendations, and shall be warranted for a period of one year from the date of final acceptance thereof, against defective materials, design and workmanship. Upon receipt of notice from the Owner of failure of any part of the warranted materials and fabrications during the warranty period, the affected material or fabrication shall promptly be replaced by the Contractor with new material or fabrications at no expense to the Owner. In the event that the Contractor fails to make the necessary replacement or repairs immediately after notification, the Owner may accomplish the work at the expense of the Contractor.