

**GOLF COURSE RESTORATION PLANS
IDOT DETENTION POND PROJECT**

**DEERPATH GOLF COURSE
CITY OF LAKE FOREST, IL**



Deerpath Golf Course
500 West Deerpath Road
Lake Forest, IL 60045
(A City of Lake Forest facility)



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Table of Contents	Sheet
PROJECT CONTEXT	1
FEATURE SHAPING PLAN	2
DRAINAGE PLAN	3
GOLF COURSE GRASSING PLAN	4
NATIVE GRASSING PLAN	5
CONSTRUCTION DETAILS	6
SITE IRRIGATION PLAN	1
IRRIGATION DETAILS	2
APPENDIX - ASBUILT	3

PROJECT SUMMARY AND RESPONSIBILITIES OF OTHERS

The scope of work contained in these project documents entails the restoration of the Deerpath Golf Course following the construction of two detention basins, which are part of a larger IDOT-funded improvement project occurring on the golf course and along Deerpath Road. For sake of clarity, the basins will be referred to on these pages as West Basin (located on Holes 17/18) and East Basin (located on Hole 1).

Under separate contract, IDOT has employed Berger Excavating as the general contractor in charge of completing all initial site preparation, earthmoving and major drainage components for the project, which includes the following detailed tasks:

- Site setup - temporary site fencing, staging, erosion control, tree removal, turf removal, hardscape removal, irrigation cut and cap
- Topsoil management - topsoil strip and replace in all basin areas and golf fairways and roughs; topsoil strip and stockpile for future use by Restoration Contractor to complete feature work (see map below)
- Mass earth moving - mass excavation, subgrade rough shaping
- Major drainage - installation of major drains and structures entering, exiting, and between the detention basins
- Wall construction - installation of retaining wall along West Basin

The above work is scheduled for completion in the Winter of 2021 (January to April/May), with the following detailed dates of completion and turnover to the Restoration Contractor.

- Completed by April 1 - All site prep, topsoil management, mass grading and major drainage install in both basin areas.
- Completed by May 1 - Retaining wall on West Basin.

The map presented below represents the anticipated condition of the work area when it is ready for turnover to the Restoration Contractor. The remaining sheets of this plan set outline the details of the restoration work to be completed.

SCOPE OF WORK FOR RESTORATION CONTRACTOR

The remainder of these plan documents illustrate the scope of work to be completed by the golf course Restoration Contractor. In general, the scope of the restoration work will include the following:

WEST BASIN AREA

- Feature shaping of green, tees and bunkers - As shown on the plan below, the mass grading contractor will be completing the rough grading for ALL areas but will only be replacing topsoil on the basin areas, roughs and fairways. For the tees, green and bunkers, the mass grading contractor shall complete rough grading only, and will pile topsoil for these areas in the stockpile location shown. The Restoration Contractor shall complete all finish shaping and topsoil replacement on golf features per the direction of these plans and the Golf Course Architect.
- Feature drainage and construction - The Restoration Contractor shall install all solid drainage and structures associated with the green and bunkers, and complete all material placement for the tees, green and bunkers.
- Irrigation - The Restoration Contractor shall perform all new irrigation installation. This includes immediate reconnection of the primary communication cable to the maintenance building prior to spring startup of the system. See irrigation plans for more details.
- Golf course grassing - The Restoration Contractor shall perform all golf turf and cartpath installation services, including removal of silt fence.
- Detention basin plantings - The Restoration Contractor (or qualified sub-contractor) shall install all native plantings.

MAJOR DRAINAGE EASEMENT AND EAST BASIN AREA

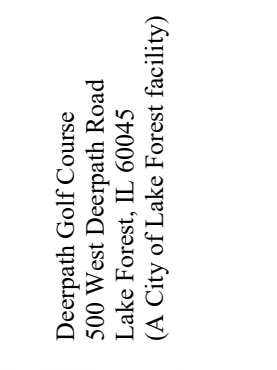
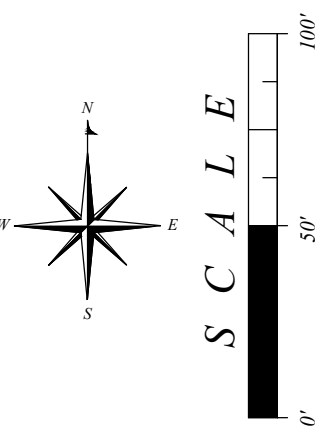
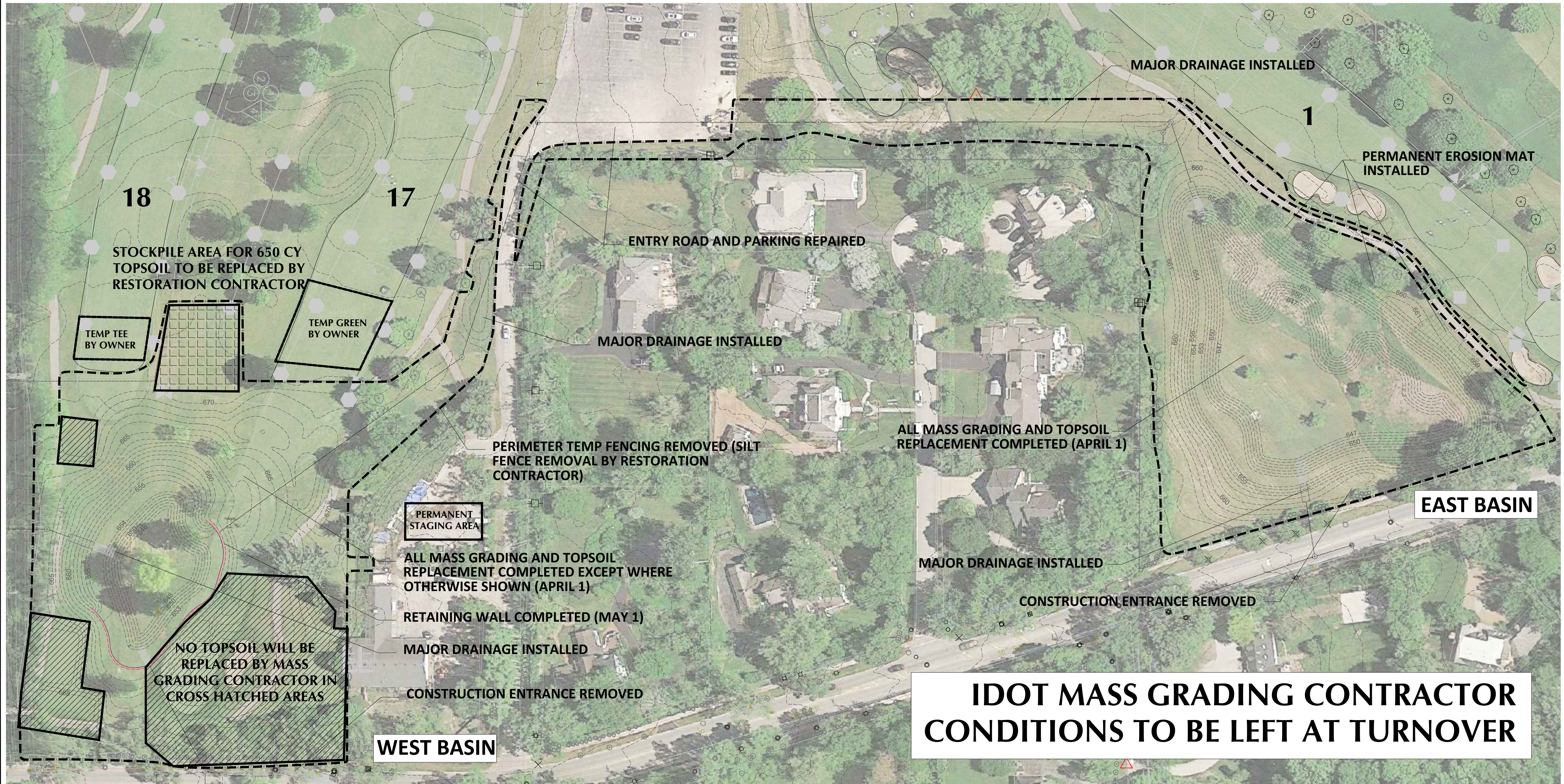
- Feature shaping - The mass grading contractor shall be responsible for all earth moving, rough shaping, major drainage and topsoil replacement in the East Basin area and major drainage easement. The Restoration Contractor shall be responsible for final clean-up prior to grassing, which may include minor shaping adjustments to ensure proper tie-ins along adjacent golf course edges.
- Minor drainage - The Restoration Contractor shall install all solid drainage to tie-in existing golf course structures to the new basin area
- Golf course grassing - The Restoration Contractor shall perform all golf turf installation services, including removal of silt fence.
- Detention Basin Plantings - The Restoration Contractor (or qualified sub-contractor) shall install all native plantings.

STAGING AND HAULING

The permanent staging area for the project shall be located in the maintenance parking lot. This includes all materials, trailers, fuel and idle equipment that will be on the job for extended periods of time. Contractor shall be responsible for fencing or otherwise protecting all items in the staging area from theft and vandalism. Temporary staging and equipment locations may be utilized on the golf course at the Owner's discretion, but equipment and material may only stay in these areas for a maximum of 24 hours and shall not be left within flood prone areas. Any spoils left from temporary material storage in either permanent or temporary staging areas must be cleaned up in their entirety once removed.

Whenever possible, the Restoration Contractor shall keep all hauling operations and construction traffic within the limits of the temporary fencing. It shall be the responsibility of the Contractor to keep markings intact and direct all construction traffic through these designated areas.

If access is needed outside of the fenced area, these hauling locations must be approved by the Owner. It is the responsibility of the Contractor to note the condition of all haul road and staging locations prior to the start of construction and to monitor their use during the project. All areas must be returned to their existing condition at the completion of the job, including repair of any asphalt or concrete damage, re-grading of turf areas to level grade, re-grassing of turf areas, and removal of all flags, ropes or other debris. Any turf area requiring regrading and subsequent regrassing must be seeded unless otherwise approved by the Owner.



PROJECT CONTEXT
 DEERPATH GOLF COURSE
 CITY OF LAKE FOREST, IL

Remarks:	
By:	
Date:	11-23-21

Sheet No.
1
 CONTEXT

NOTES

Work limits as shown have been pre-established based on the mass grading work that will precede this restoration work. Note that the Restoration Contractor will be responsible for removing all silt fence, which encompasses the entire perimeter of the project (work limits as shown also represent silt fence).

Final location of golf course features shall be verified in the field by the Golf Course Architect. The Golf Course Architect reserves the right to make alterations in the grading to improve playability and golf values.

Hole 17 green shall be built using 8" of 6:3:1 mix placed over subgrade. The chipping green and Hole 18 tees shall receive 4" of 7:2:1 mix.

Refer to the Project Context Plan (Sheet 1) for the areas of the project where topsoil is to be replaced by the Restoration Contractor. In essence, these areas include the green on Hole 17 and tees on Hole 18. In these areas, the Restoration Contractor shall replace a 6" layer of topsoil following subgrade shaping. No topsoil shall be replaced until final grades are approved. In those locations where additional minor grading is proposed (beginning of 18 fairway and along the entry drive), the Restoration Contractor shall manage topsoil as needed to make the proposed excavations while ending up with a 6" topsoil layer when complete. The remaining areas within the work limits will be graded and topsoiled by the mass grading contractor. These areas will not require grading or shaping by the Restoration Contractor, however, all new fairway and rough areas shall be fine graded where needed to remove any undesirable depressions, abrupt tie-ins, and/or to provide adequate surface drainage toward structures.

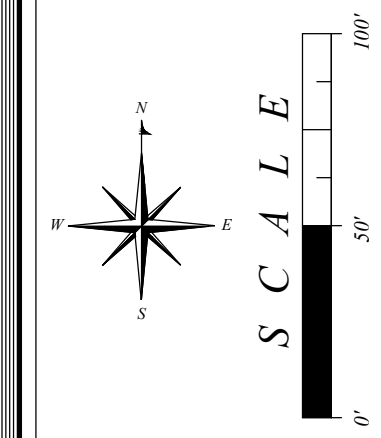
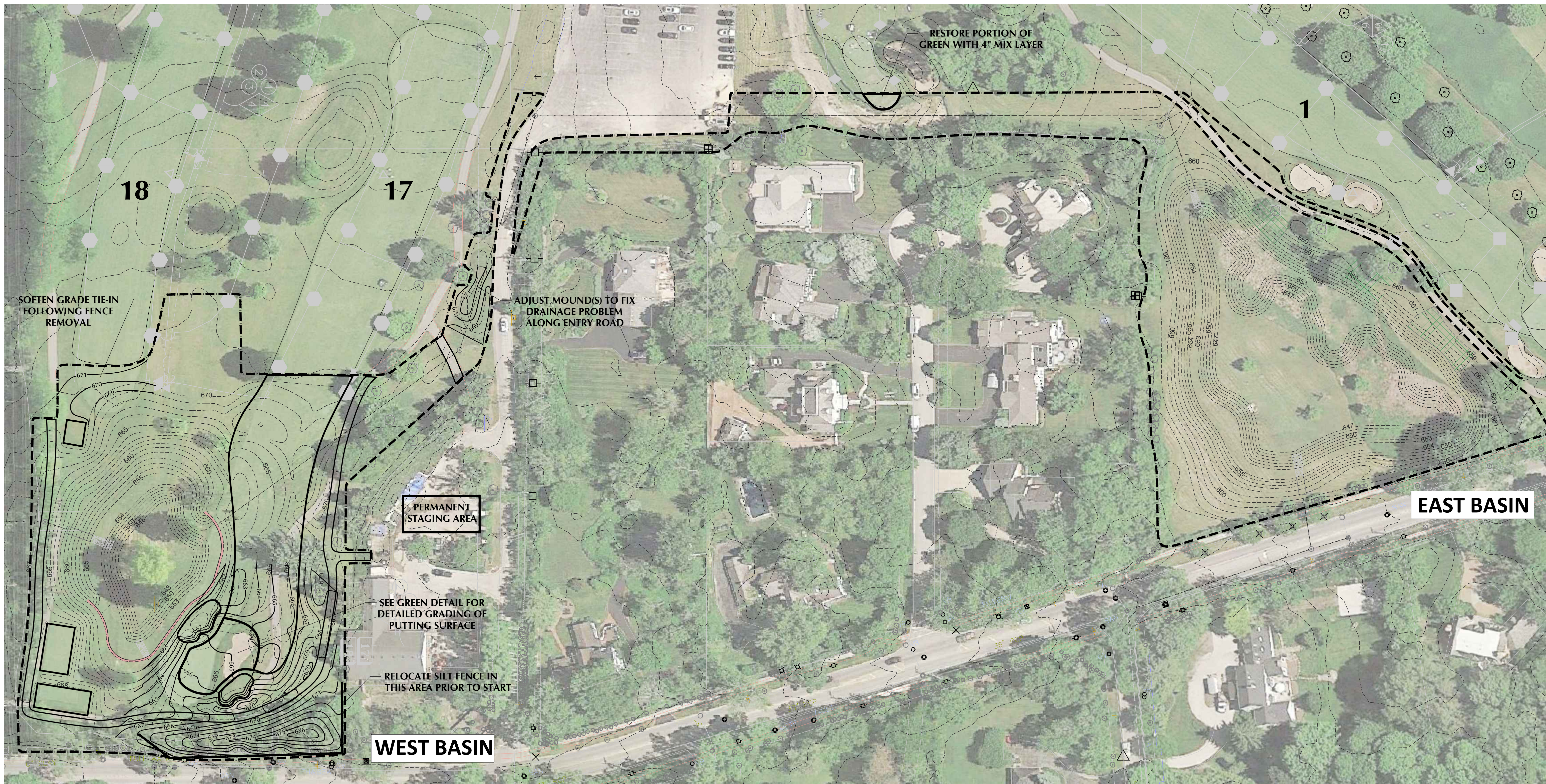
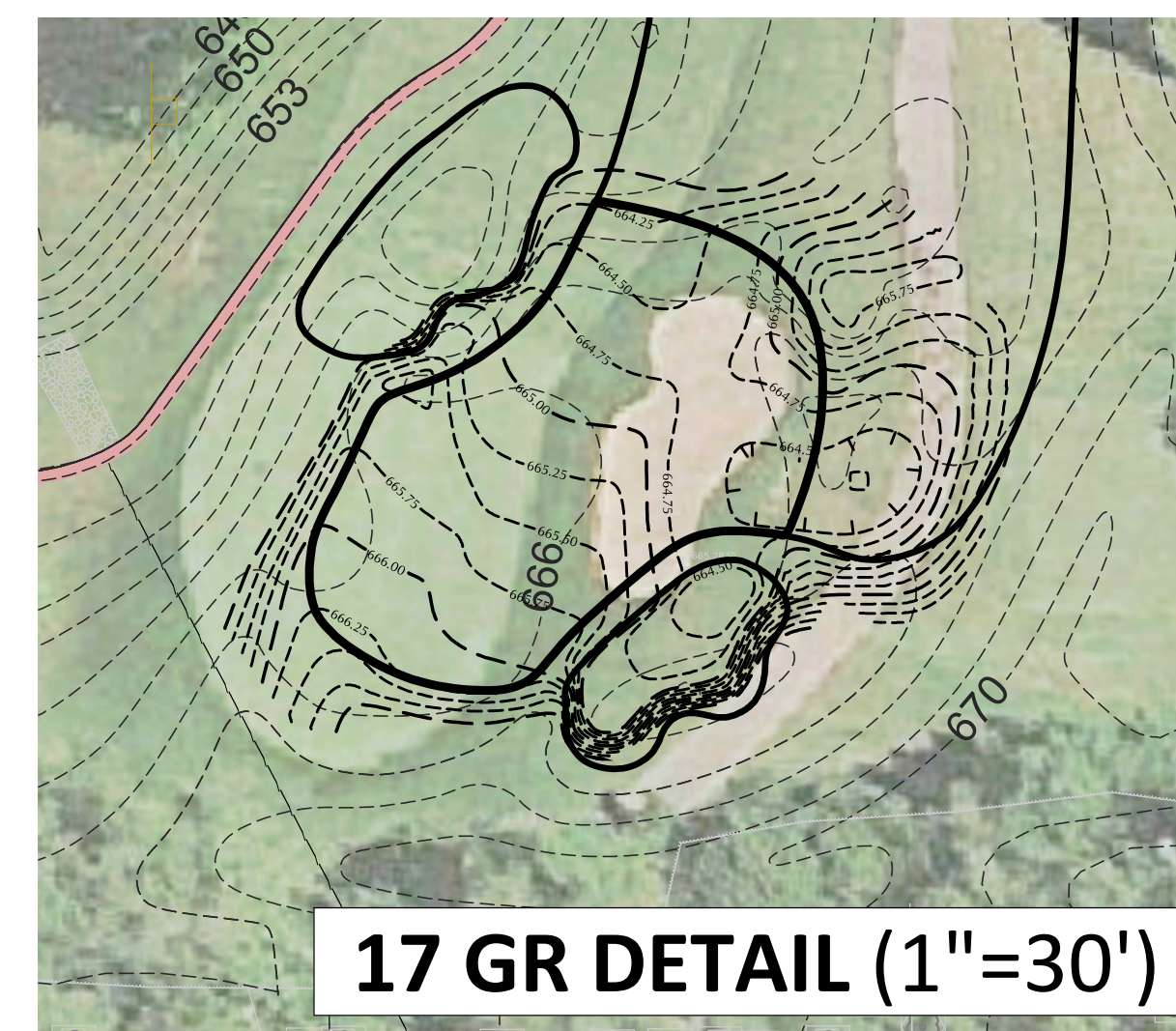
Earthwork quantity estimates for Hole 17 green are available upon request, however all final earthwork calculations are the responsibility of the Contractor, who shall supply all materials and work necessary to complete the project as drawn and specified. All earthwork shall be balanced on site, no material shall be hauled away.

The Owner shall be responsible for the provision of vertical and horizontal benchmarks on the project site if needed. Contractor to locate and protect survey control and reference points.

Locations of existing irrigation and utilities as shown on the plan are approximate. Prior to mass grading, the Owner shall cut and cap all irrigation lines and salvage any existing irrigation materials within construction limits. Restoration Contractor shall confirm locations of all irrigation tie-ins with Owner and coordinate location of all public utilities. Location markings must be preserved by the Restoration Contractor, who shall be responsible for repair of any damages caused by his crews or sub-contractors to properly marked utilities.

LEGEND

- EXISTING CONTOUR - - - - 666 - - - -
- EXISTING IRRIGATION ● - - - - ●
- LIMITS OF WORK [- - - -]
- PROPOSED CONTOUR — 666 —
- PROPOSED 1/4 CONTOUR - - - - 666.25 - - - -
- SILT FENCE RELOCATE —●—●—●—●—



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FEATURE SHAPING / GRADING
DEERPATH GOLF COURSE
CITY OF LAKE FOREST, IL

By:	12/1/21
Date:	12/1/21
Remarks:	100% Review/Plan set

NOTES

Tile in bunkers shall be 4" perforated N-12, backfilled with gravel. Tile in greens shall be 2" slit drainage placed on 6' centers. Slit drainage trenches shall be cut into subgrade and generally be 3" wide x 6"-8" deep and backfilled with the same 6:3:1 mix used to build the green profile (8" deep).

All 4" or larger tile outside of bunkers and greens shall be solid N-12 pipe, backfilled with native soil, and shall be a minimum 18" deep with a minimum 0.5% pitch toward the outlet. Where necessary due to outlet limitations, pipe may be installed flatter than 0.5% and have a 12" minimum soil cover, but these areas must be approved by the Owner and/or Golf Course Architect.

If applicable, the Restoration Contractor shall be responsible for lifting and replacing of sod in locations outside of the construction limits where drainage is being installed. Where sod is not salvageable, contractor shall replace with new sod at the Owner's discretion, approval, and additional expense.

If it is required to cross existing cartpaths with new drantile, the Restoration Contractor shall saw cut the existing asphalt over the top of the trench, install drainage, replace 4" gravel base and install 2" asphalt cold patch. The final surface shall be rolled and blended smoothly where it meets existing asphalt.

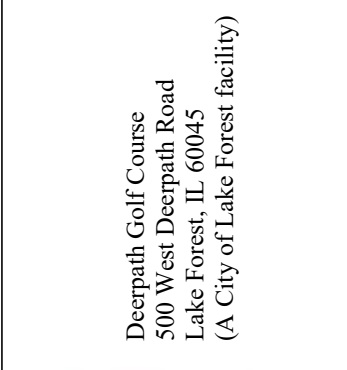
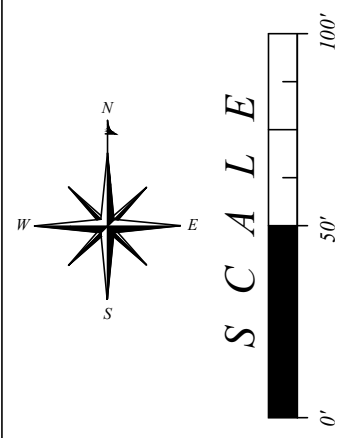
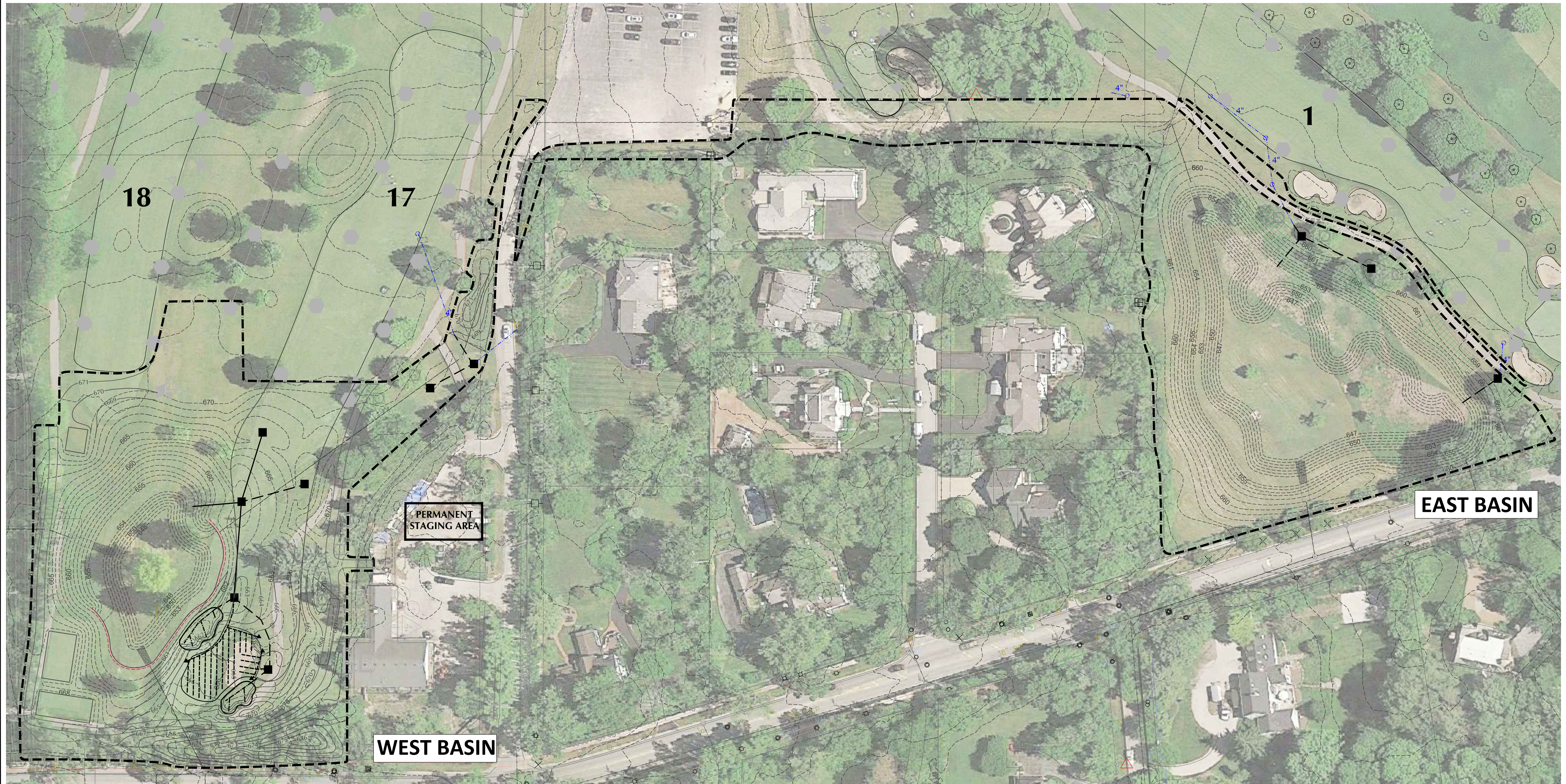
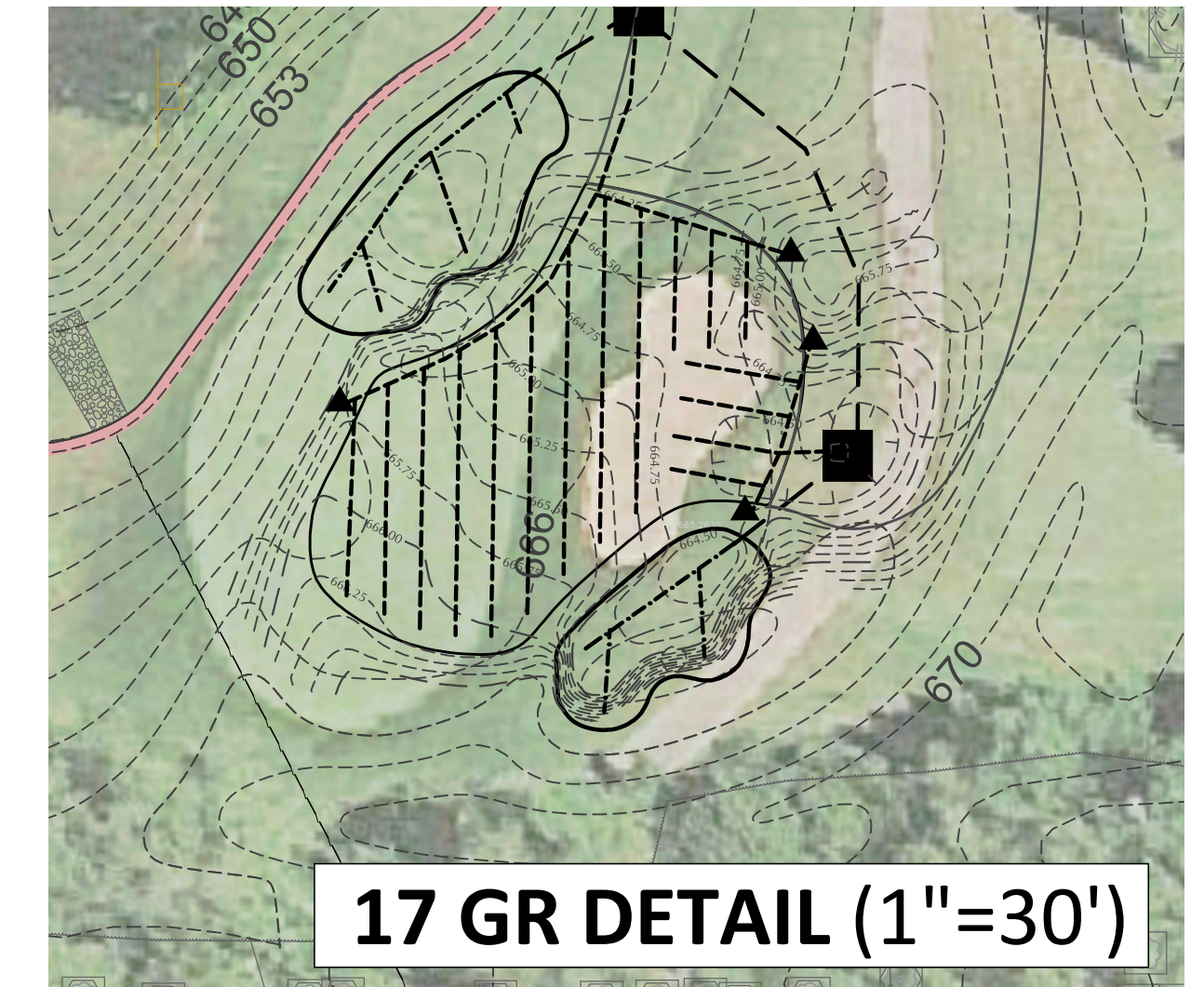
Grass depression areas shall be graded with slopes that pitch at a minimum 2.0% (max 4%) toward the basin.

Where existing drantile is shown to be extended with new pipe, the Restoration Contractor shall be responsible for testing the existing drainage system following tie-ins to ensure that it is functioning properly, which shall be reviewed and approved by the Owner. Where new drainage is tied into an existing tile, a new basin shall be installed a proper fitting shall be used for the connection ("y" or "t").

All existing functional drantile encountered during construction shall remain undisturbed or shall be tied into the new drainage system. Where applicable, existing basin rims shall be adjusted to meet any new grades.

LEGEND

EXISTING CONTOUR	--- 666 ---	2" TURF-FLO DRAINAGE	-----
EXISTING IRRIGATION	●-----●	4" N-12 PERF DRAINAGE	- - - - -
EXISTING DRAINAGE	-----	4" N-12 SOLID DRAINAGE	- - - - -
PROPOSED CONTOUR	--- 666 ---	6" N-12 SOLID DRAINAGE	-----
PROPOSED 1/4 CONTOUR	--- 666.25 ---	4" INSPECTION	▲
		12" CATCH BASIN	■
			◆



DRAINAGE
DEERPATH GOLF COURSE
 CITY OF LAKE FOREST, IL

Date:	11-11-21
By:	11/11/21
Remarks:	

Sheet No.
3
DRAINAGE

NOTES

Restoration Contractor shall remove all silt fence and restore trenches. Temporary construction fence shall be removed by the mass grading contractor, but turf shall be restored by the Restoration Contractor.

All grassing outlines shall be located and/or verified in the field by the Golf Course Architect.

All prep work, seeding and sodding shall be completed by the Restoration Contractor.

Tee surfaces shall be laser-leveled to a 1% slope, preferably from front to back, unless site conditions or shot values dictate otherwise, which will be determined by the Golf Course Architect.

Fairways, tees and green(s) shall be sodded using bentgrass. Where indicated, rough areas shall be sodded using a bluegrass blend. Remaining roughs shall be seeded and hydromulched using a bluegrass blend and Flexterra mulch. See specifications for details on varieties and application rates.

Bunker subgrade shall be lined with aggregate liner. See Construction Details and specifications for more info on bunker construction.

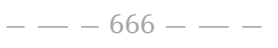

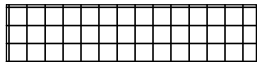





Contractor shall be responsible for all cartpath work. Paths shall be installed with a 2" layer of asphalt on 4" of crushed stone.

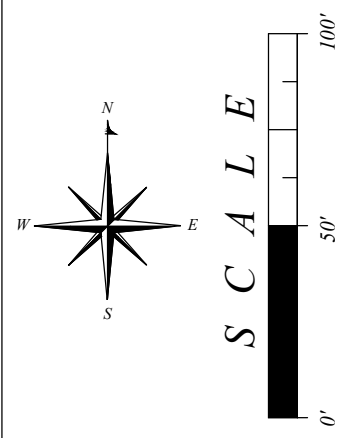
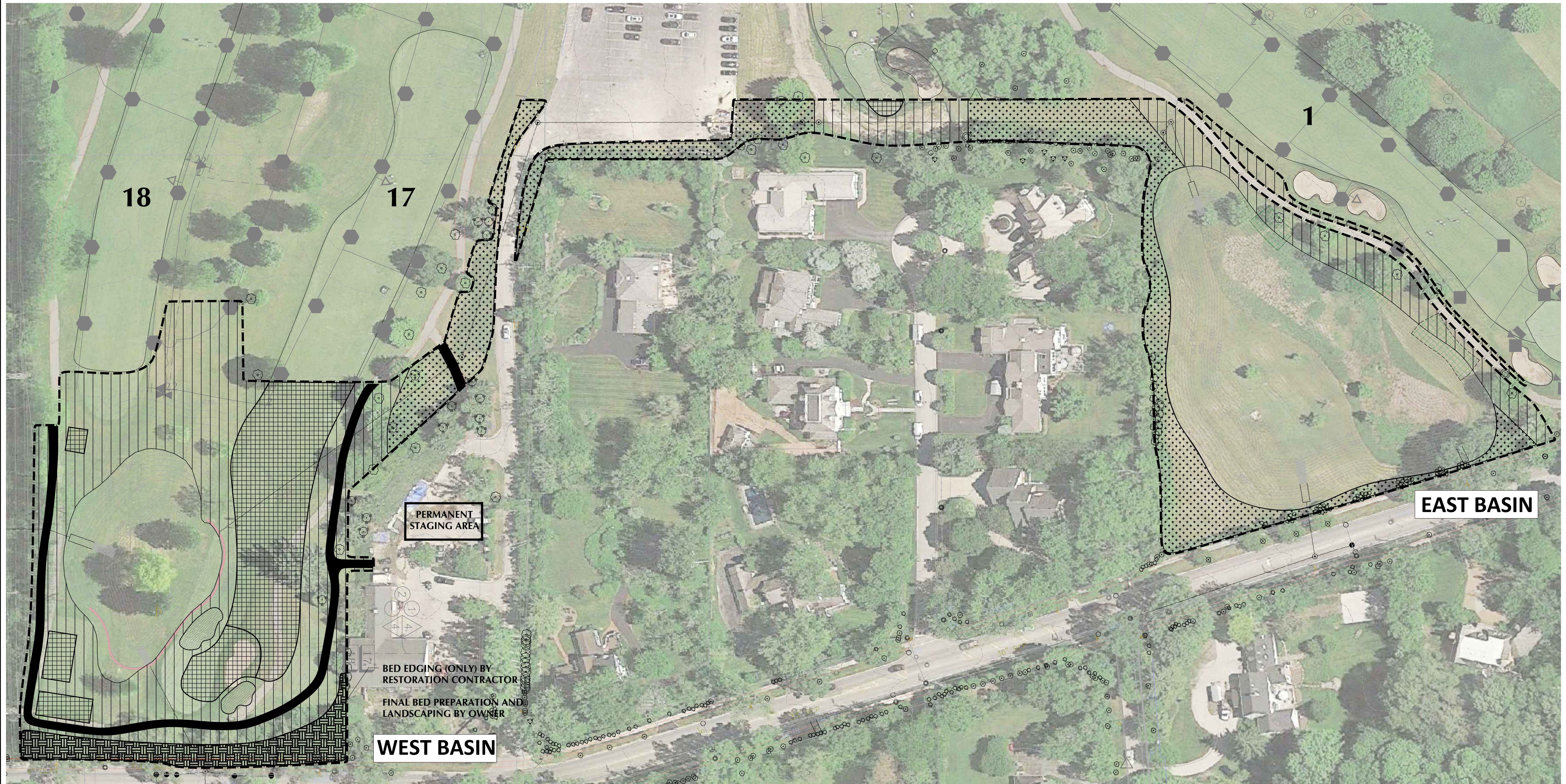
All drain tile lines run outside of the construction limits, if applicable, shall be stripped and replaced with existing sod. Where sod is not salvageable, new sod shall be used.

Landscape beds to be edged (4" vertical face) by the Restoration Contractor. Final bed design, preparation and install by the Owner.

Native plantings in pond basin areas are shown on Sheet 5.

LEGEND

- EXISTING CONTOUR  666
- EXISTING IRRIGATION 
- BENTGRASS SOD 
- BLUEGRASS SOD 
- BLUE SEED AND BLANKET 
- BUNKER SAND 
- ASPHALT PATHS 
- LANDSCAPING BEDS (BY OWNER) 



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LAKE FOREST, IL 60045
(A City of Lake Forest facility)



GOLF COURSE GRASSING
DEERPATH GOLF COURSE
CITY OF LAKE FOREST, IL

Remarks:	
By:	
Date:	11-11-21

Sheet No.
4
GRASSING (GOLF)

NOTES

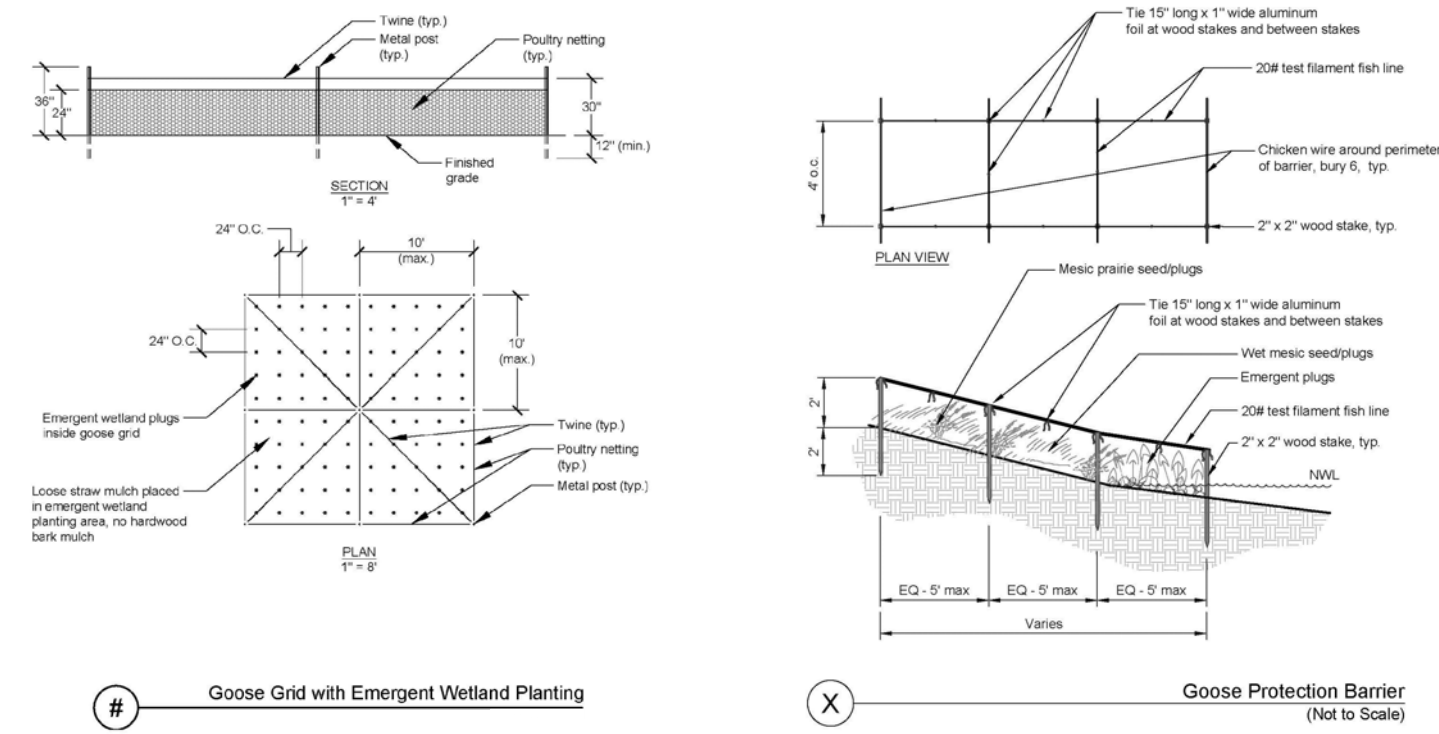
See project specifications for all notes regarding Native Plantings. Native planting quantity estimates shown here are for reference only. All final quantity calculations are the responsibility of the Restoration Contractor, who shall supply all materials and work necessary to complete the project as drawn and specified.

Plant enclosures (goose protection barrier) shall be placed around all plug/plant areas.

Prairie seed mix shall be covered with S75BN Erosion Control Blanket following planting.

LEGEND

- PICKEREL WEED LILY ZONE
- SHORELINE (WEST BASIN)
- SHORELINE (EAST BASIN)
- SHORT EMERGENT
- TALL EMERGENT
- SLOPE PRAIRIE



PICKEREL WEED ZONE (plants installed in one row - 10' on center)

Species	Common Name	Quantity
<i>Pontederia cordata</i>	Pickerel Weed	142

LILY ZONE (plants installed in groups of 3 tubers - 10' on center)

Species	Common Name	Quantity
<i>Nymphaea cordata</i>	White Water Lily	427

SHORT PRAIRIE GRASS SEED MIX (0.51 AC.)

Species	Common Name	Seeding Rate (lbs/Ac)	Quantity (lbs)
<i>Bouteloua curtipendula</i>	Side-oats Grama	10.00	5.10
<i>Elymus canadensis</i>	Canada Wild Rye	3.00	1.53
<i>Elymus virginicus</i>	Virginia Wild Rye	1.00	0.51
<i>Panicum virgatum</i>	Switch Grass	1.00	0.51
<i>Schizachyrium scoparium</i>	Little Bluestem	10.00	5.10
<i>Sporobolus heterolepis</i>	Prairie Drop Seed	0.25	0.13
<i>Avena sativa</i>	Seed Oats	32.00	16.32

SHORT EMERGENT PLUGS (0.16 AC.)

Species	Common Name	Rate (Plugs/Acre)	Quantity
<i>Acorus americanus</i>	Sweet Flag	1,000	160
<i>Carex comosa</i>	Riverbank Sedge	500	80
<i>Iris virginica</i>	Blue Flag	1,000	160
<i>Juncus effusus</i>	Soft Rush	500	80
<i>Sagittaria latifolia</i>	Common Arrowhead	500	80

TALL EMERGENT PLUGS (0.24 AC.)

Species	Common Name	Rate (Plugs/Acre)	Quantity
<i>Schoenoplectus acutus</i>	Hardstem Bulrush	1,000	240
<i>Schoenoplectus purpureus</i>	Chairmaker's Rush	500	120
<i>Schoenoplectus tabernaemontani</i>	Great Bulrush	1,000	240
<i>Scirpus atrovirens</i>	Dark Green Rush	500	120
<i>Sparganium eurycarpum</i>	Bur Reed	500	120

SHORELINE PLUG ZONE WEST BASIN (425 LF)

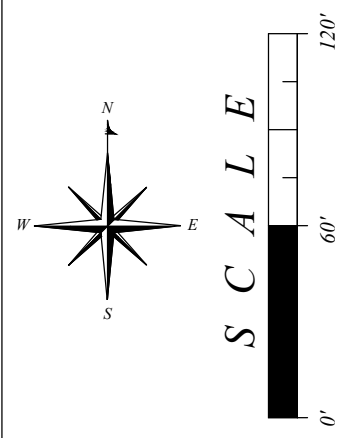
Species	Common Name	Quantity
<i>Carex vulpinoidea</i>	Fox Sedge	212

SHORELINE PLUG ZONE EAST BASIN (1,000 LF)

Species	Common Name	Quantity
<i>Carex amoryi</i>	Riverbank Sedge	167
<i>Carex lacustris</i>	Lake Sedge	167
<i>Scirpus atrovirens</i>	Dark Green Bulrush	167

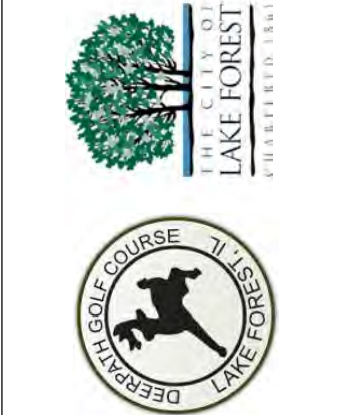
Upper shoreline planting row (plants installed on slope approx 1-1/2' vertical feet above NWL - 2' on center)

Species	Common Name	Quantity
<i>Carex amoryi</i>	Riverbank Sedge	167
<i>Carex vulpinoidea</i>	Fox Sedge	167
<i>Spartina pectinata</i>	Prairie Cord Grass	167



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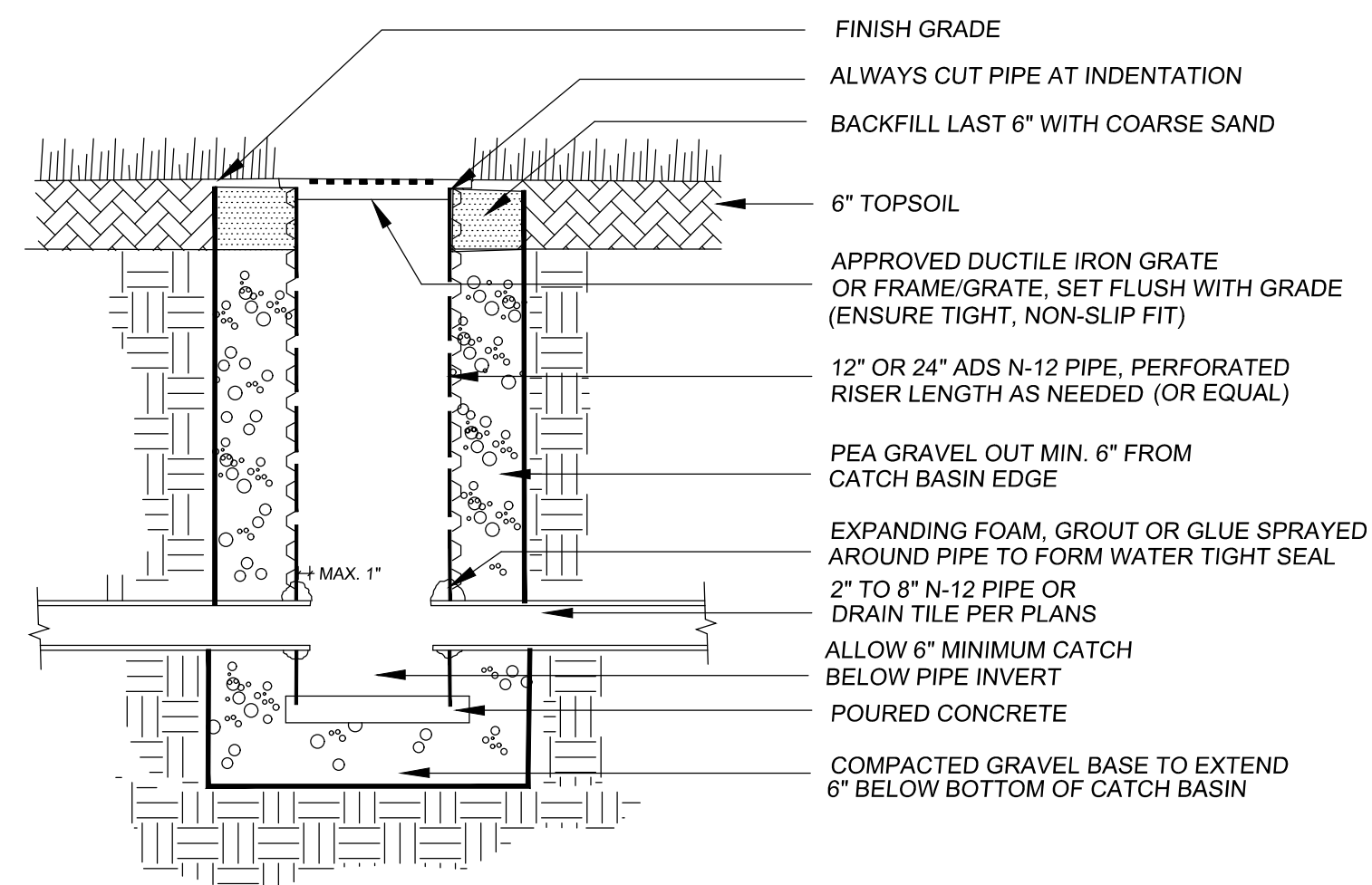
Deerpath Golf Course
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 LAKE FOREST, IL (A City of Lake Forest facility)



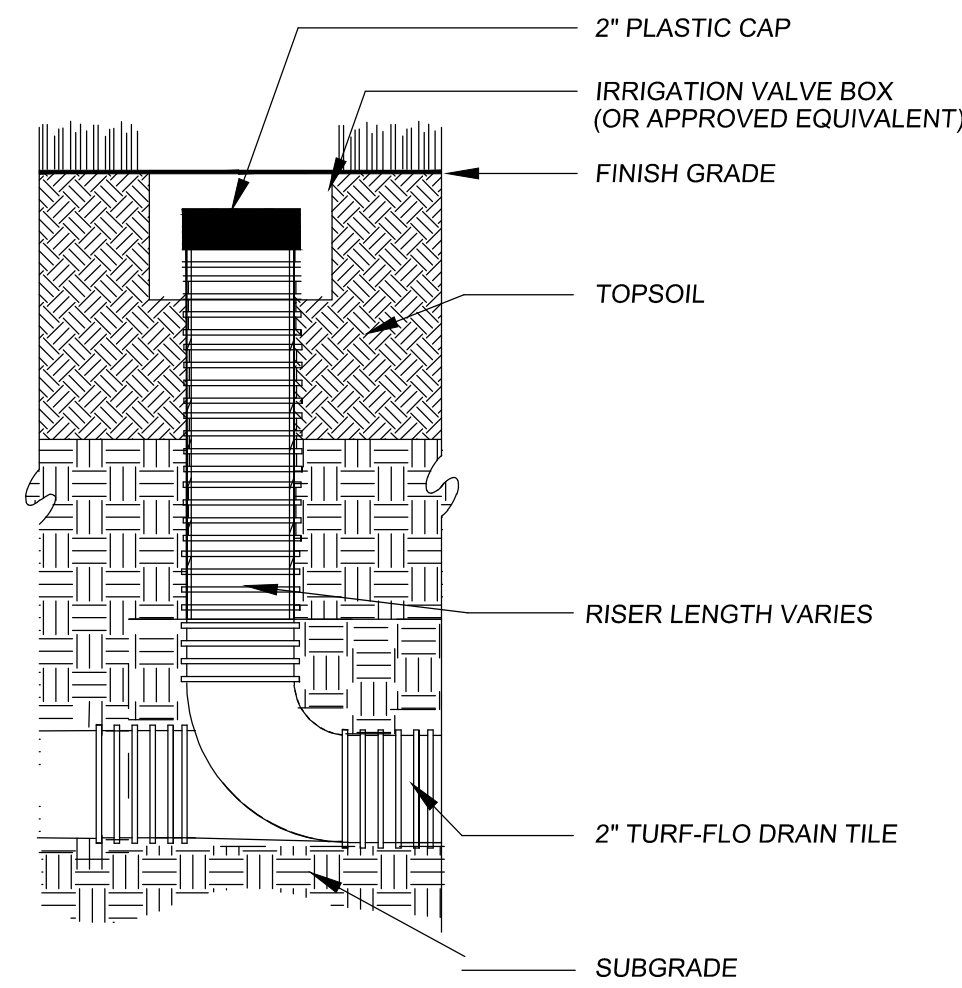
POND NATIVE GRASSING
DEERPATH GOLF COURSE
 CITY OF LAKE FOREST, IL

By:	12/21/21
Date:	12/21/21
Remarks:	100% Review. Final set out. Construction details.

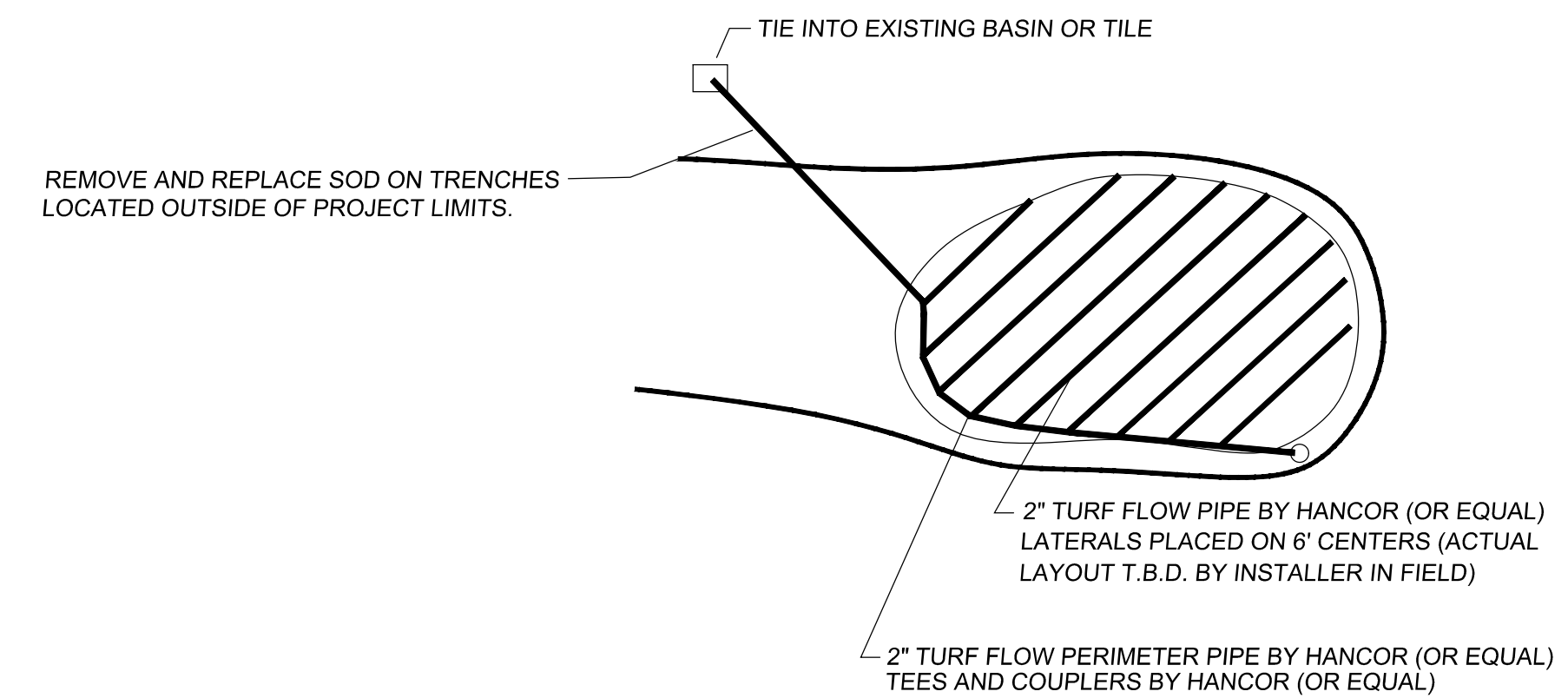
Sheet No.
5
 GRASSING (POND)



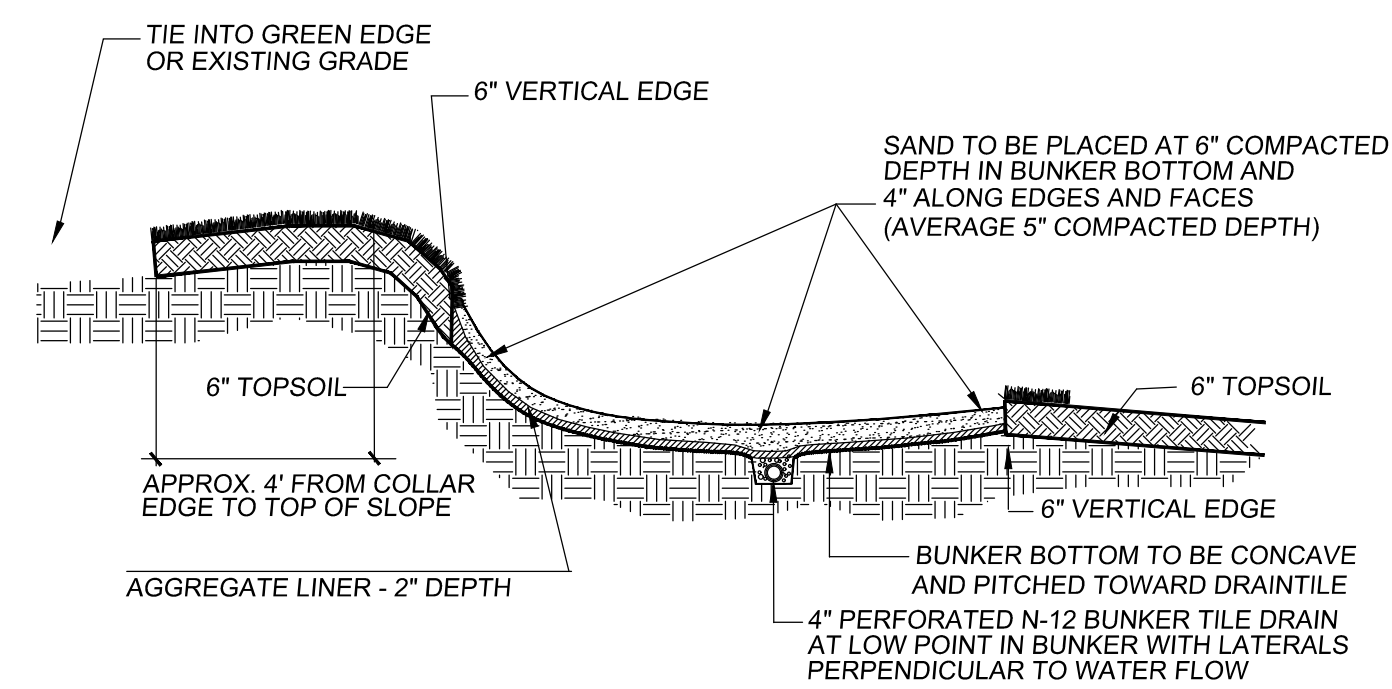
12" N-12 CATCH BASIN



2" INSPECTION

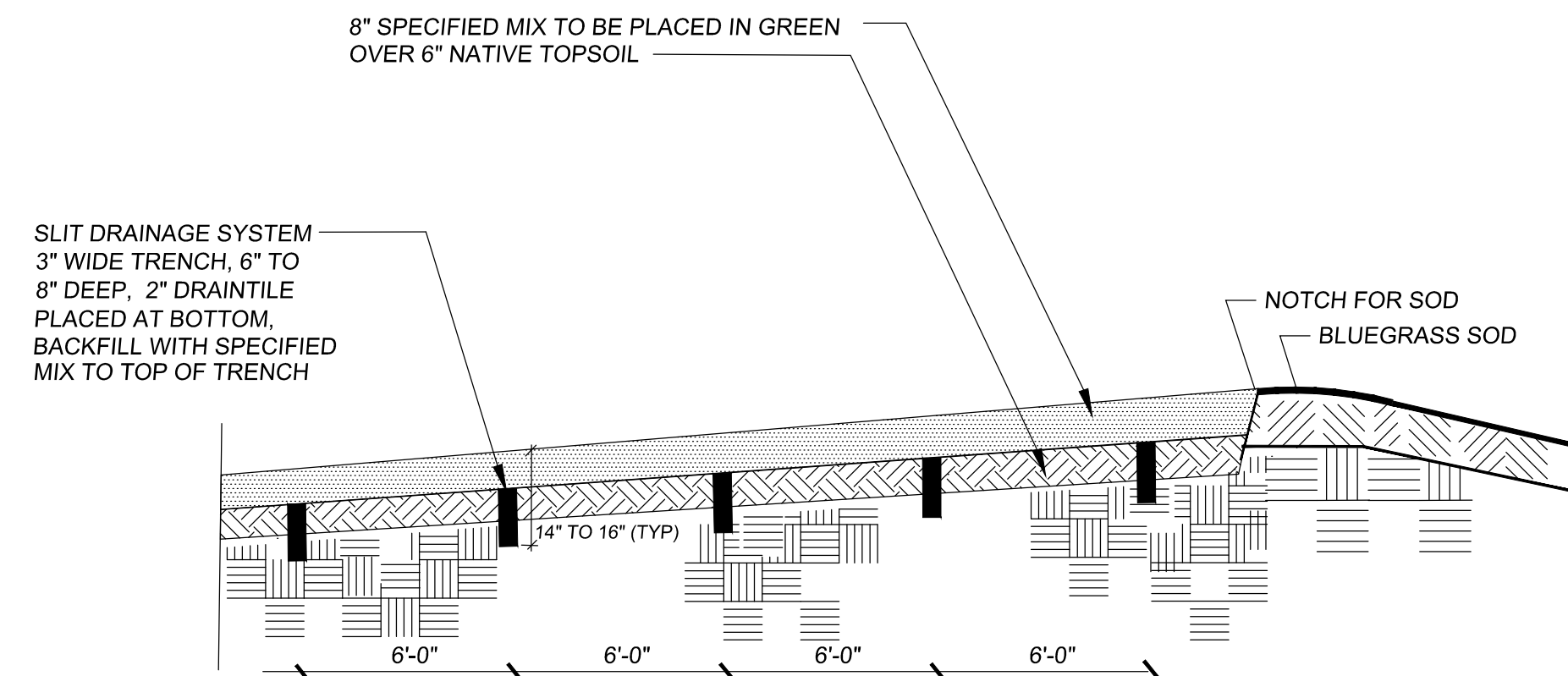


2" GREENS SLIT DRAINAGE

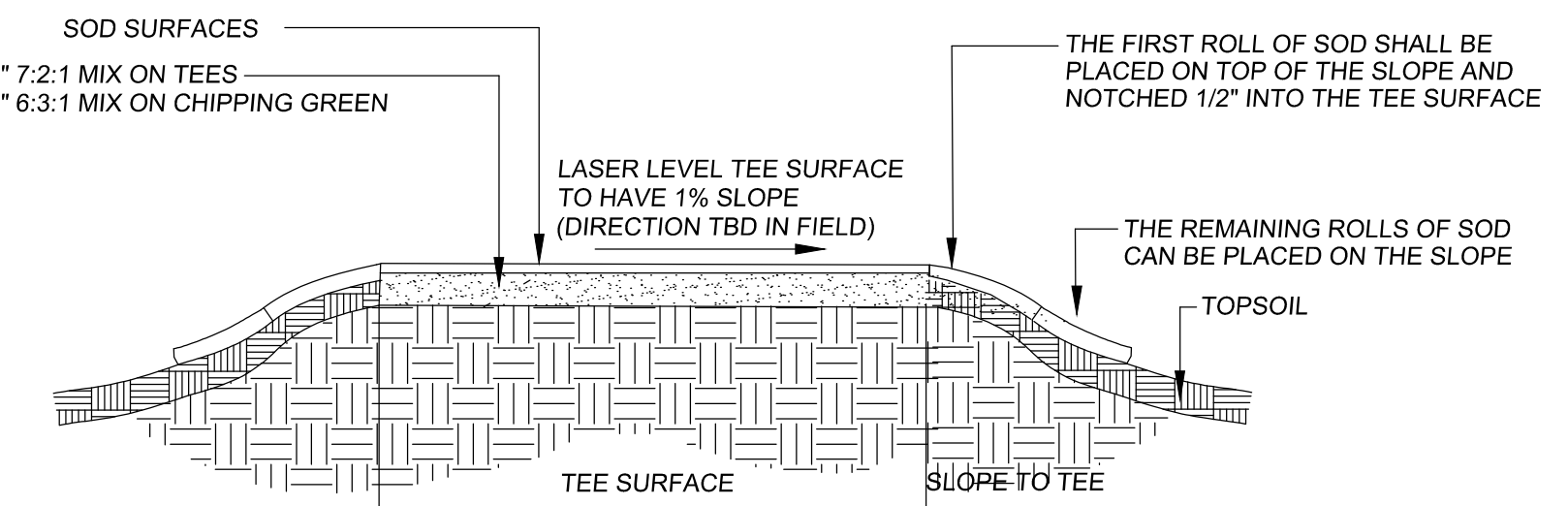


* ARCHITECT'S RECOMMENDED EQUATION FOR INTERIOR DRAINTILE QUANTITIES: 75 sf per 1,000 sf of bunker

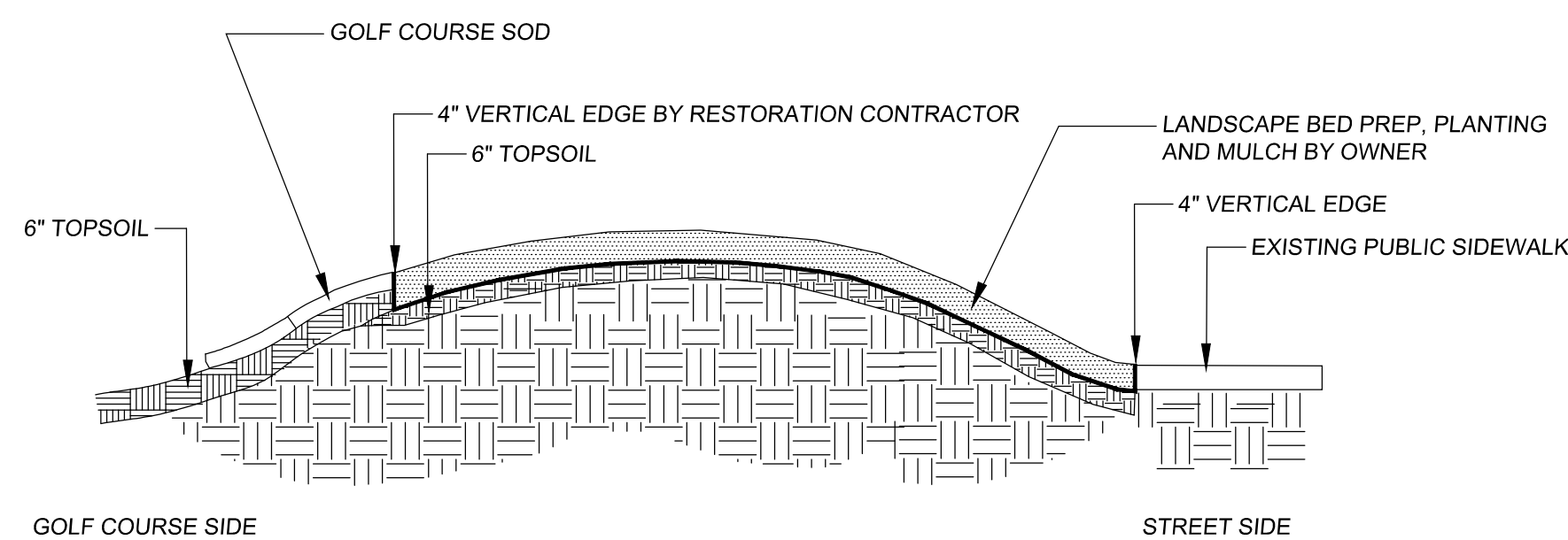
TYPICAL BUNKER CONSTRUCTION



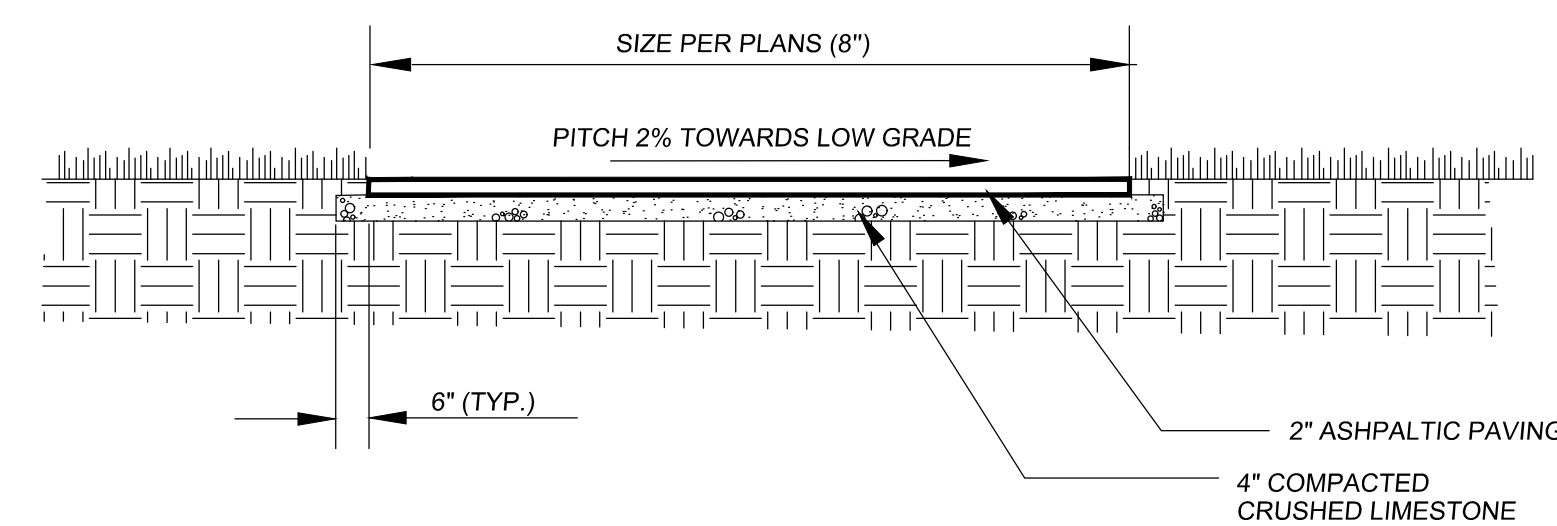
HOLE 17 GREEN CONSTRUCTION



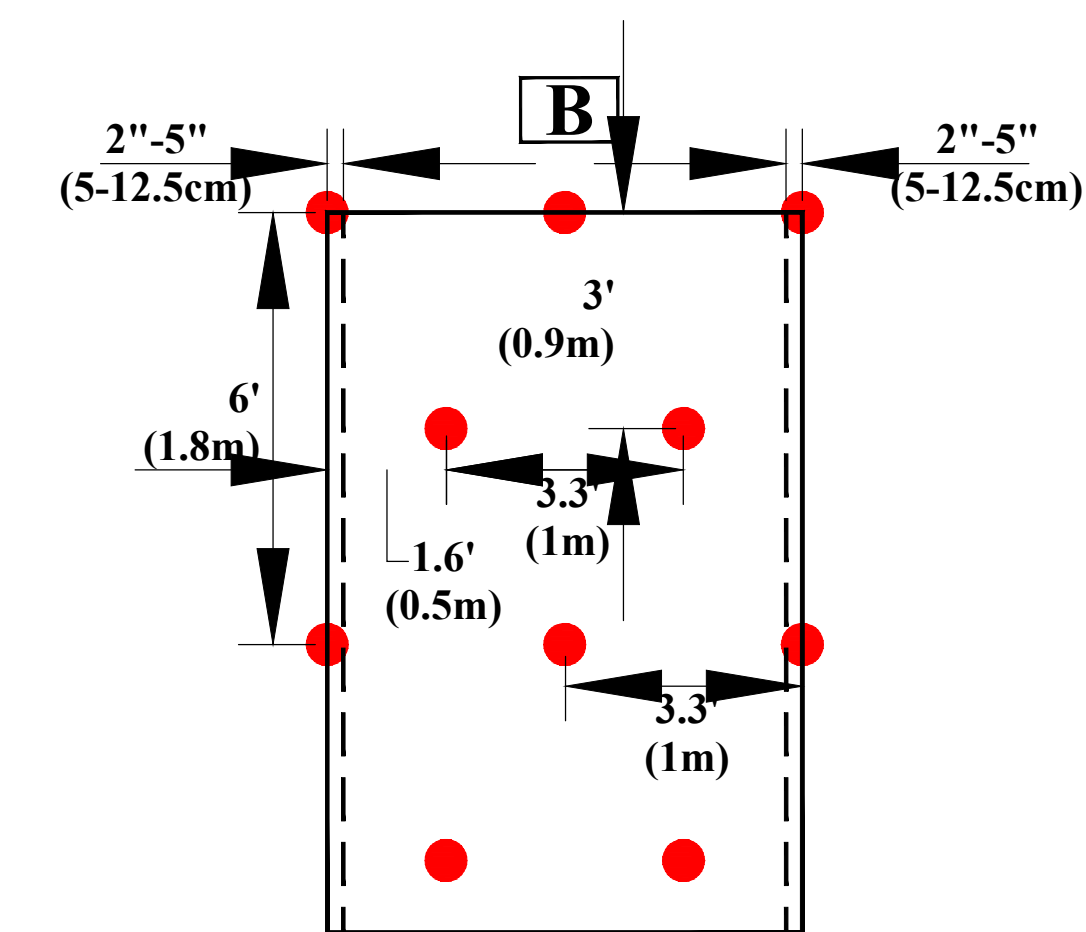
TEE CONSTRUCTION - SAND MIX (AND CHIPPING GREEN REPAIR)



LANDSCAPE BED EDGING



ASPHALT CARTPATH



1.15 Staples per SQ.YD.

EROSION CONTROL STAPLE PATTERN 3:1

N.T.S.



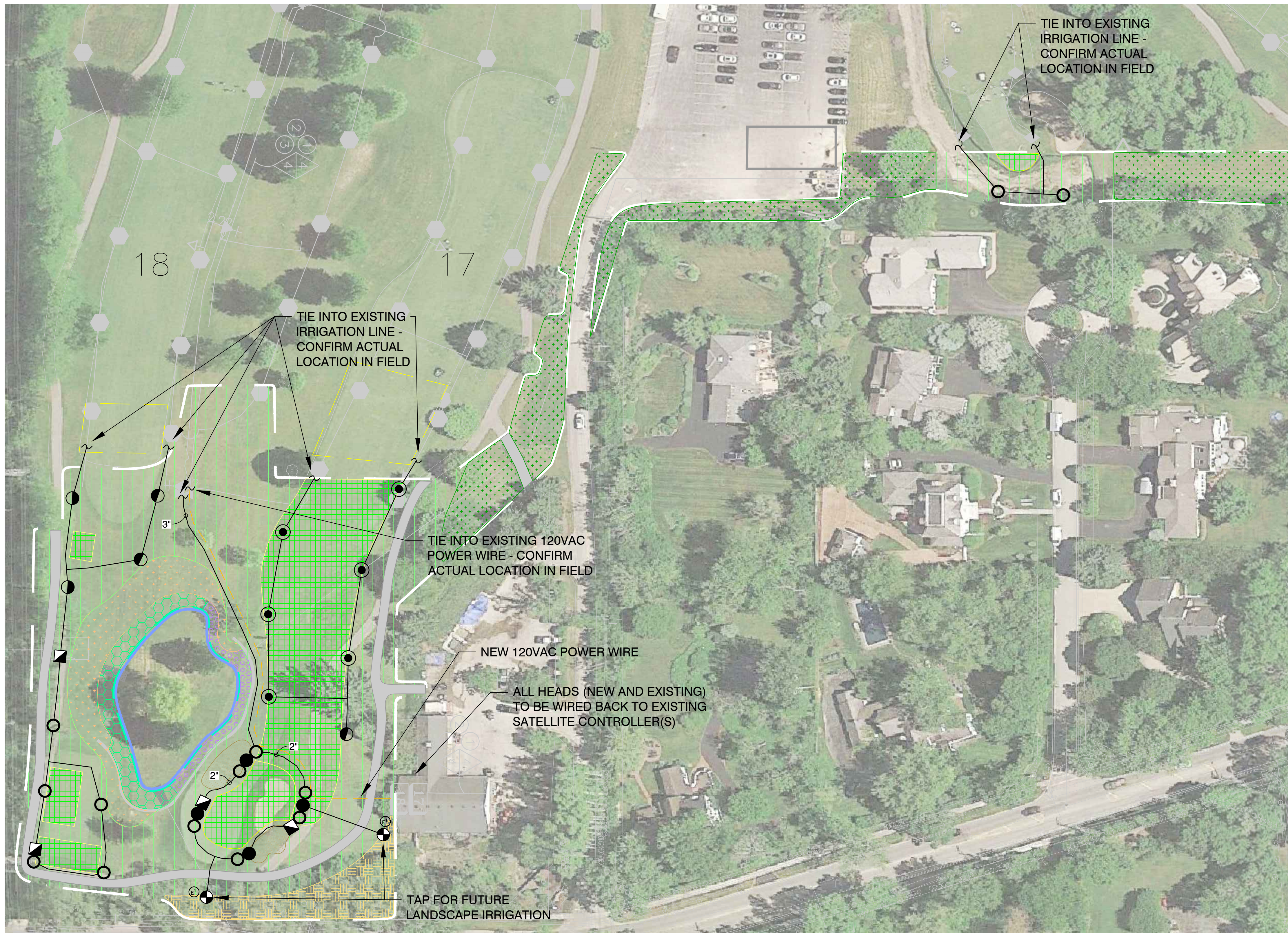
Deerpath Golf Course
500 West Deerpath Road
LAKE FOREST, IL
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CONSTRUCTION DETAILS
DEERPATH GOLF COURSE
CITY OF LAKE FOREST, IL

Remarks:	
By:	
Date:	

Sheet No.
6
DETAILS



LEGEND

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY
●	Rain Bird A-702-E-80-32 Valve in Head Rotor for golf applications. Standard Nozzles. Full Circle Arc. Pressure Regulation 80psi.	4
○	Rain Bird A-752-E-80-36 Valve in Head Rotor for golf applications. Standard Nozzles. Full Part Circle Arc. Pressure Regulation 80psi.	13
⊙	Rain Bird A-800-E-80-56 Classical Circle Valve in Head Rotor for golf applications. Electric Valve. Full Circle Arc. Pressure Regulation 80psi.	6
●	Rain Bird A-850-E-80-24 Classical Circle Rotor for golf applications. Electric Valve in Head. Adjustable Arc 40 to 240 degrees. Pressure Regulation 80psi.	5
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY
■	Rain Bird S-9C 1" Brass Quick-Coupling Valve, with Corrosion-Resistant Stainless Steel Spring, Thermoplastic Rubber Cover, and 1 Piece Body.	4
⊙	Extra Wire Drop	
—	Irrigation Lateral Line - PVC Class 200 SDR 21 All 21" Lines Otherwise Noted	2,041.11
---	New 120vac Power Wire	

Note: All Quantities Are For Reference Only. Contractor Responsible For Actual Bid Counts.

DESIGN NOTES

1. ALL PRODUCT APPLICATIONS AND INSTALLATIONS MUST MEET MANUFACTURER'S REQUIREMENTS.
2. FLOW RATES THROUGH PVC PIPING NOT TO EXCEED MANUFACTURER'S RECOMMENDATIONS.
3. PIPING AS SHOWN IS DIAGRAMMATIC IN NATURE. ALL PIPING TO BE LOCATED WITHIN OWNER'S PROPERTY LINES.
4. CONTRACTOR IS RESPONSIBLE FOR PROPER OPERATION OF IRRIGATION SYSTEM. SYSTEM SHALL NOT EXCEED MANUFACTURER'S RECOMMENDATIONS AND SHALL WATER ALL SEEDED AND SODDED AREAS NOTED. IRRIGATION PLAN IS INTENDED TO INCLUDE EVERYTHING NECESSARY TO THE PROPER OPERATION OF SAID IRRIGATION SYSTEM. IF ADJUSTMENTS ARE REQUIRED, CONTRACTOR SHALL MAKE ADJUSTMENTS FOR SAME.
5. IRRIGATION PLANS SHALL HAVE PRECEDENCE OVER IRRIGATION SPECIFICATIONS. ANY DISCREPANCIES BETWEEN THESE TWO DOCUMENTS MUST BE BROUGHT TO THE ATTENTION OF THE IRRIGATION CONSULTANT BEFORE INSTALLATION.
6. IT IS THE INTENT TO KEEP IRRIGATION WATER OFF OF ALL BUILDINGS, SIDEWALKS AND PARKING AREAS. IT WILL BE THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO FIELD TUNE EACH SPRINKLER AS TO KEEPING IRRIGATION ADJUSTED TO GRASSED AND SEEDDED AREAS ONLY. IT WILL ALSO BE THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO SUPPLY THE OWNER WITH AN OPERATING SCHEDULE THAT WORKS WITH EXISTING PLANS AND ANY FIELD ADJUSTMENTS.
7. IT IS THE INTENT OF THE IRRIGATION DESIGN TO ACHIEVE HEAD TO HEAD COVERAGE IN ALL GRASSED AND SEEDDED AREAS. IT WILL BE THE RESPONSIBILITY OF THE IRRIGATION CONTRACTOR TO ADJUST FOR SAME.
8. IRRIGATION PLANS ARE DIAGRAMMATIC IN NATURE CONTRACTOR WILL BE RESPONSIBLE FOR THE LOCATION OF ALL EQUIPMENT AS STAGED BY IRRIGATION CONSULTANT. SAID EQUIPMENT, WHEN FIELD LOCATED, MAY VARY FROM PROPOSED PLAN DUE TO SITE CONDITIONS AND CONTRACTOR WILL MAKE ADJUSTMENTS ACCORDINGLY AT NO ADDITIONAL COST TO OWNER.

PLUMBING NOTES:

1. ALL PIPING FITTINGS 2 1/2" OR LARGER SHALL BE OF HARCO DUCTILE IRON TYPE. ALL SPRINKLERS IN LINE SHALL BE MOUNTED ON 1/2" LASCO SWING JOINTS ON LASCO CLASS 200 PVC SERVICE TEES.
2. ALL PIPE SHALL BE CARRIED IN SEPARATE TRENCH.

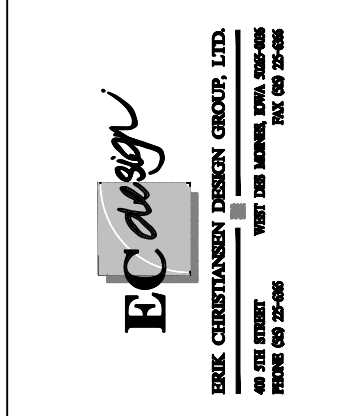
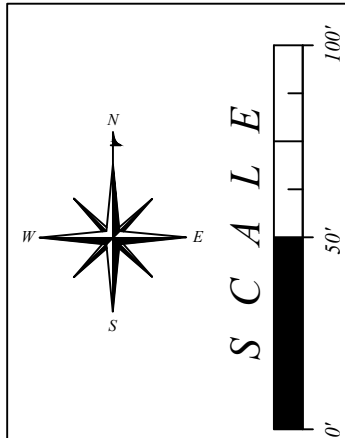
ELECTRICAL NOTES:

1. ALL 120 V.A.C. POWER SPLICES AT FIELD SATELLITES.
2. ALL POWER WIRE TAPS AND CONNECTIONS SHALL CONFORM TO WITH LOCAL AND STATE CODES AND PERFORMED BY LICENSED ELECTRICIAN.
3. 24" LOOP OF WIRE LOCATED BELOW EACH HEAD.
4. ALL 24 V.A.C. SECONDARY WIRING SHALL BE (RED) #14 HOT AND (WHITE) #12 COMMON. (ONE HOT WIRE PER HEAD)
5. ALL WIRE SHALL HAVE ENOUGH SLACK AS TO ACCOMMODATE FOR EXPANSION AND/OR CONTRACTION.
6. ALL WIRE TO BE UL APPROVED FOR DIRECT BURIAL.
7. ALL 120 V.A.C. PRIMARY, AND 24 V.A.C. SECONDARY POWER TO BE INSTALLED AS PER STATE AND LOCAL CODES. SIZED AS PER PLAN WITH GROUND WIRE; MEETING N.E.C. REQUIREMENTS.
8. ONE SPARE HOT WIRE TO EACH GREEN AND TEE COMPLEX.

PROGRAMMING NOTES:

1. FIELD SATELLITES SHALL CARRY APPROPRIATE STATION CARDS FOR INDIVIDUAL HEAD CONTROL OF ALL SPRINKLERS.
2. ALL SPRINKLERS SHALL HAVE ONE WIRE (HOT 24 V.A.C.) TO RESPECTIVE FIELD SATELLITE.
3. ALL SATELLITE LOCATIONS SHALL BE IN ACCORDANCE WITH RAIN FALL SURVEYS AND OUT OF 100 YEAR FLOOD PLAIN.

X	SATELLITE NUMBER
XX	APPROXIMATE STATION COUNT

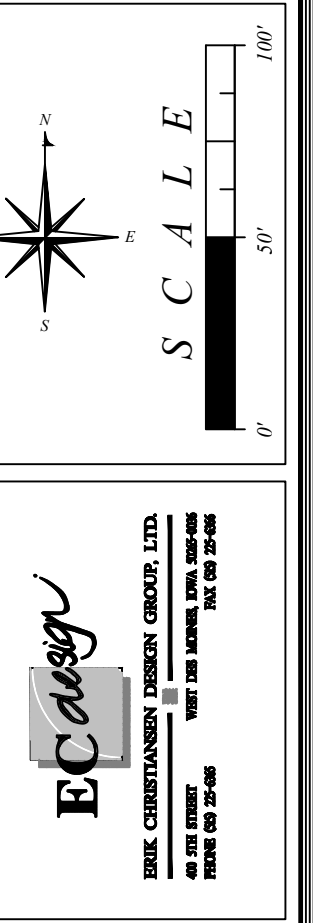


Deerpath Golf Course
500 West Deerpath Road
Lake Forest, IL 60045
(A City of Lake Forest facility)



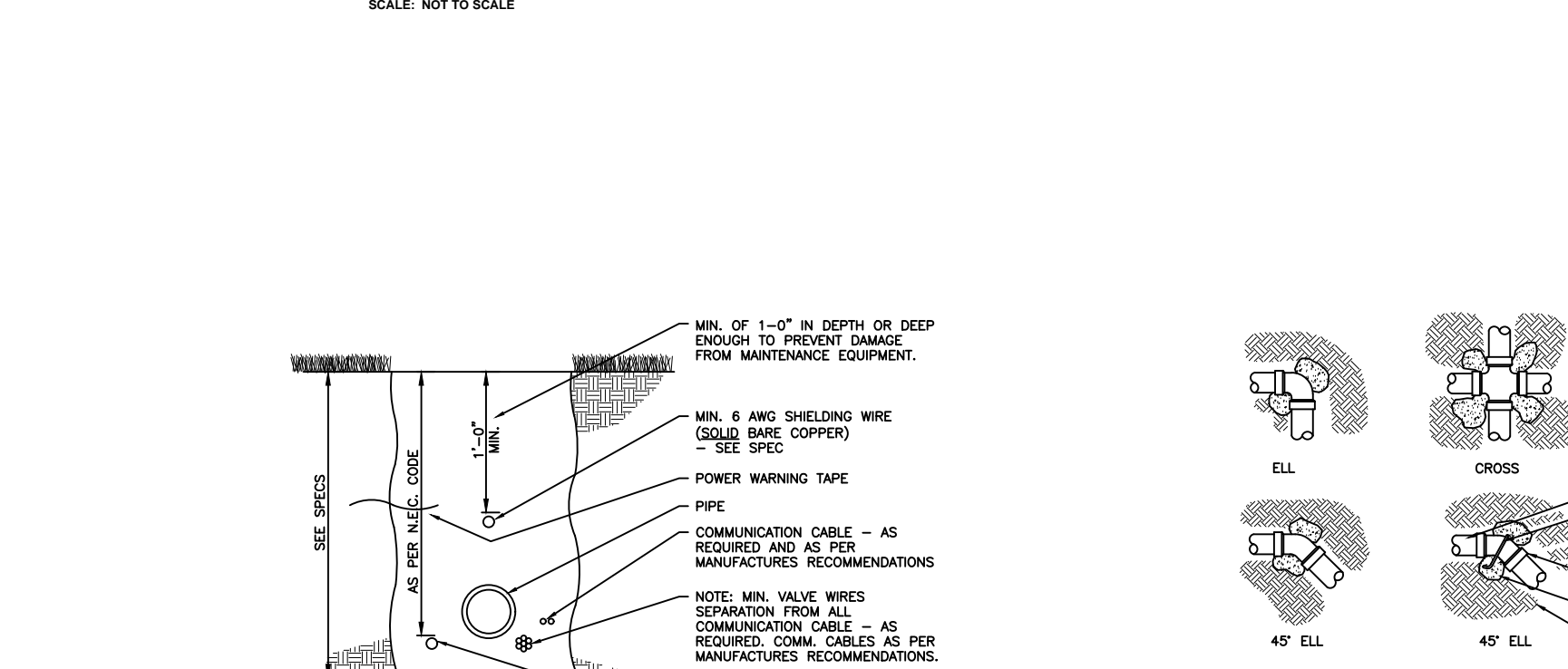
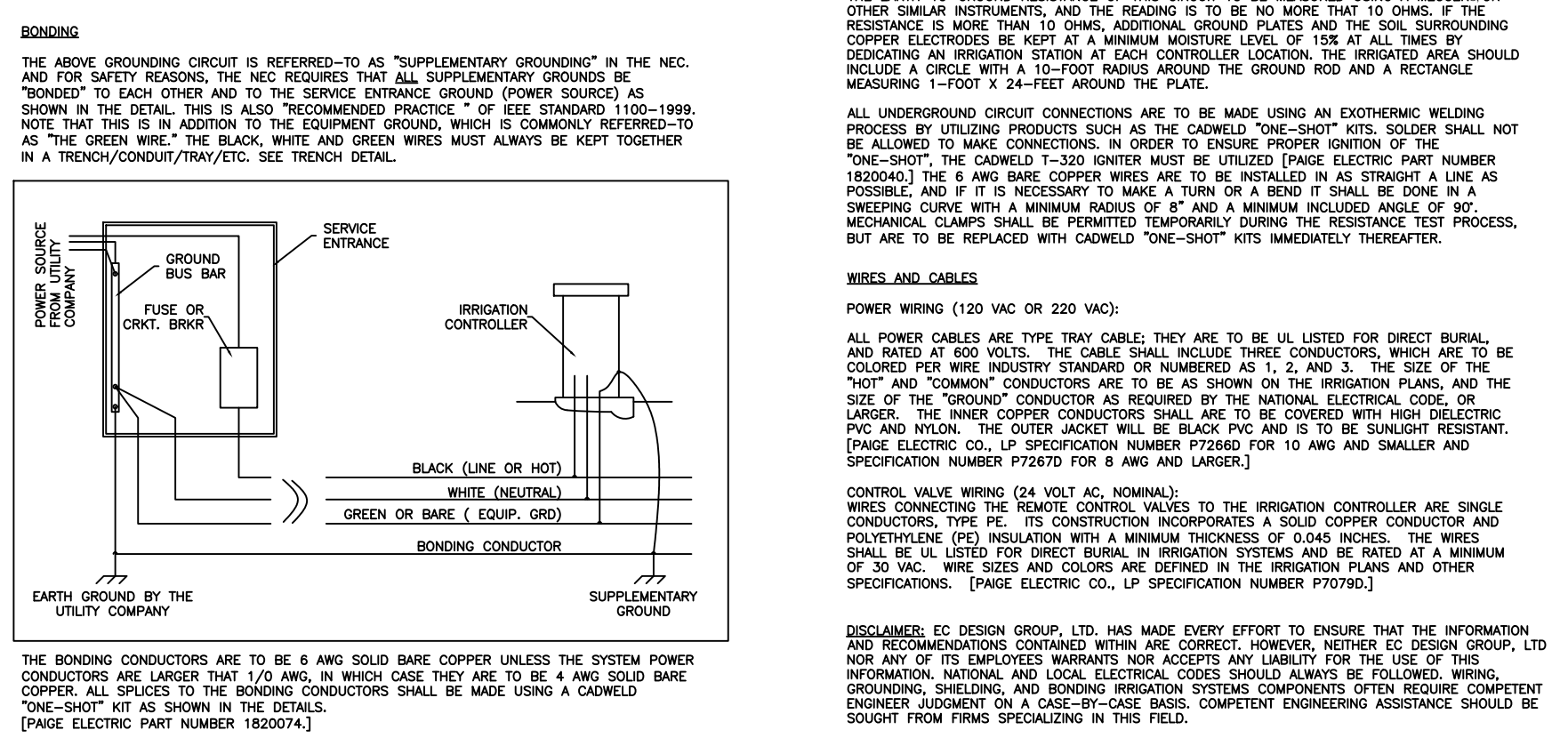
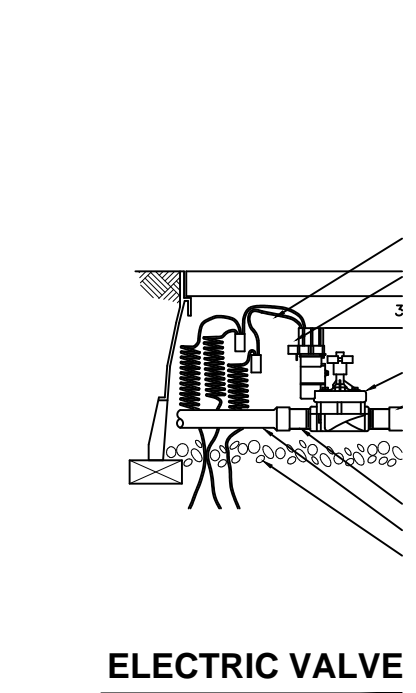
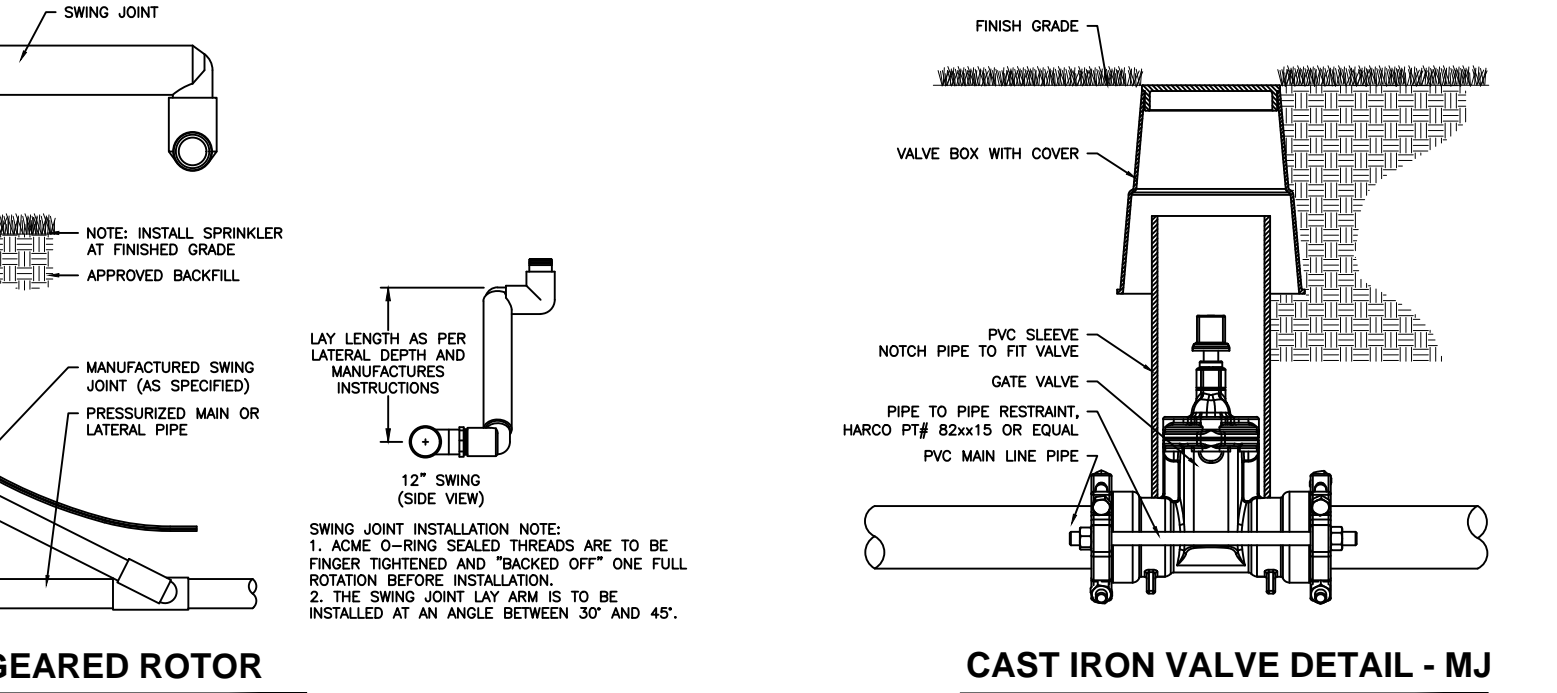
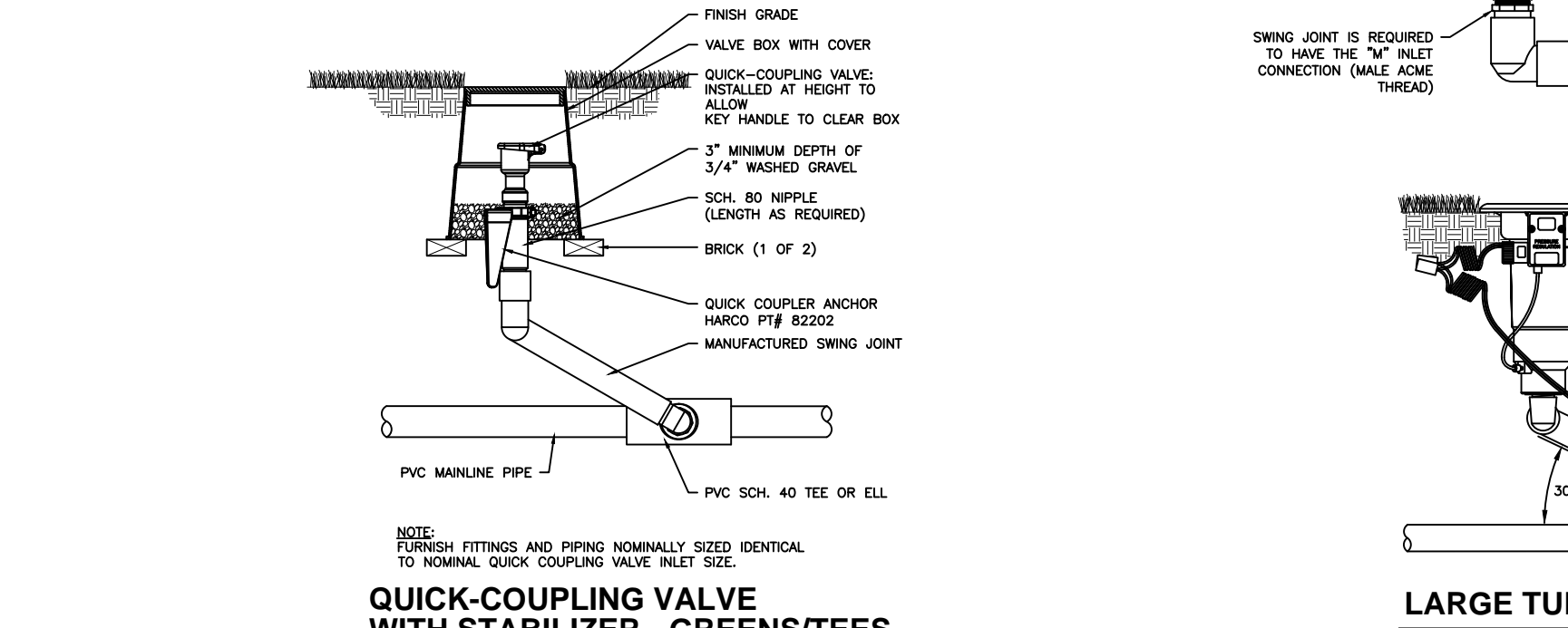
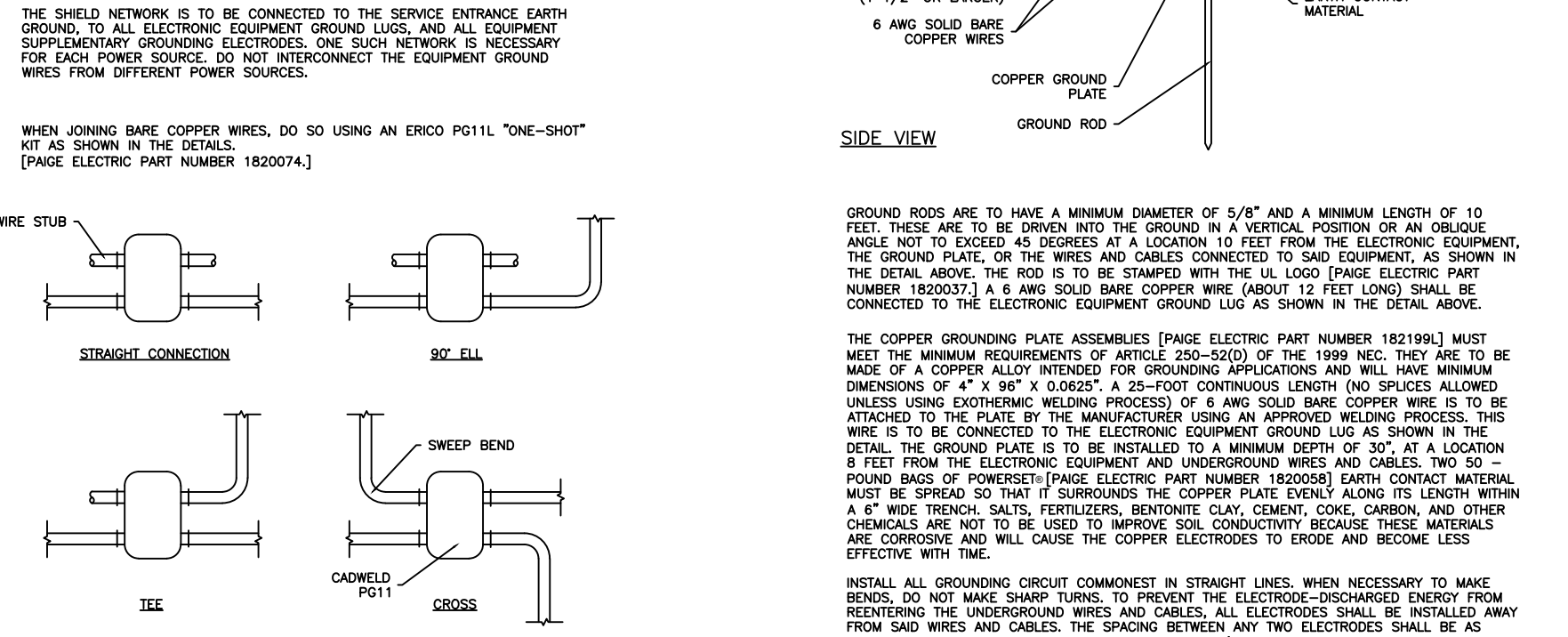
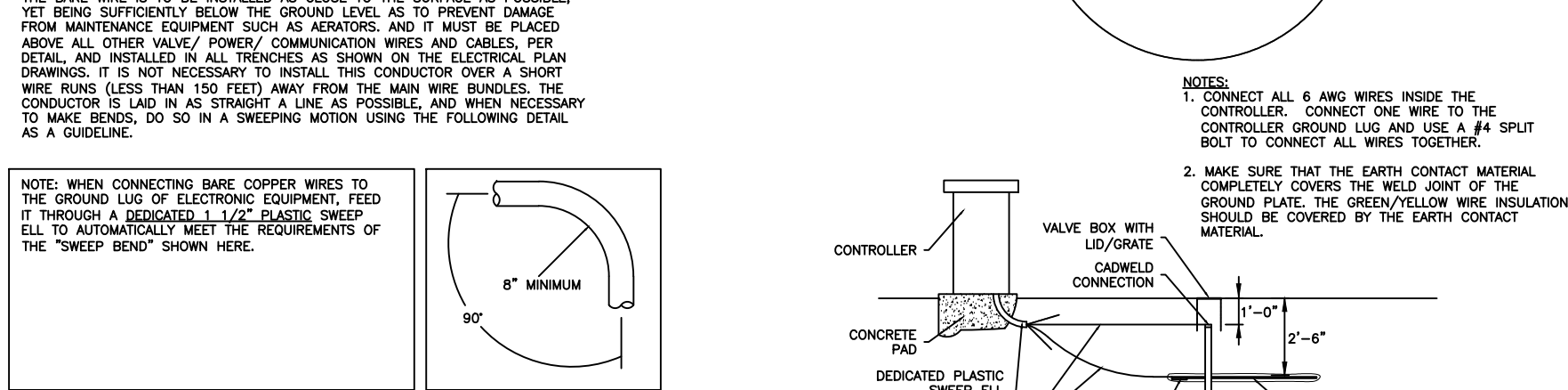
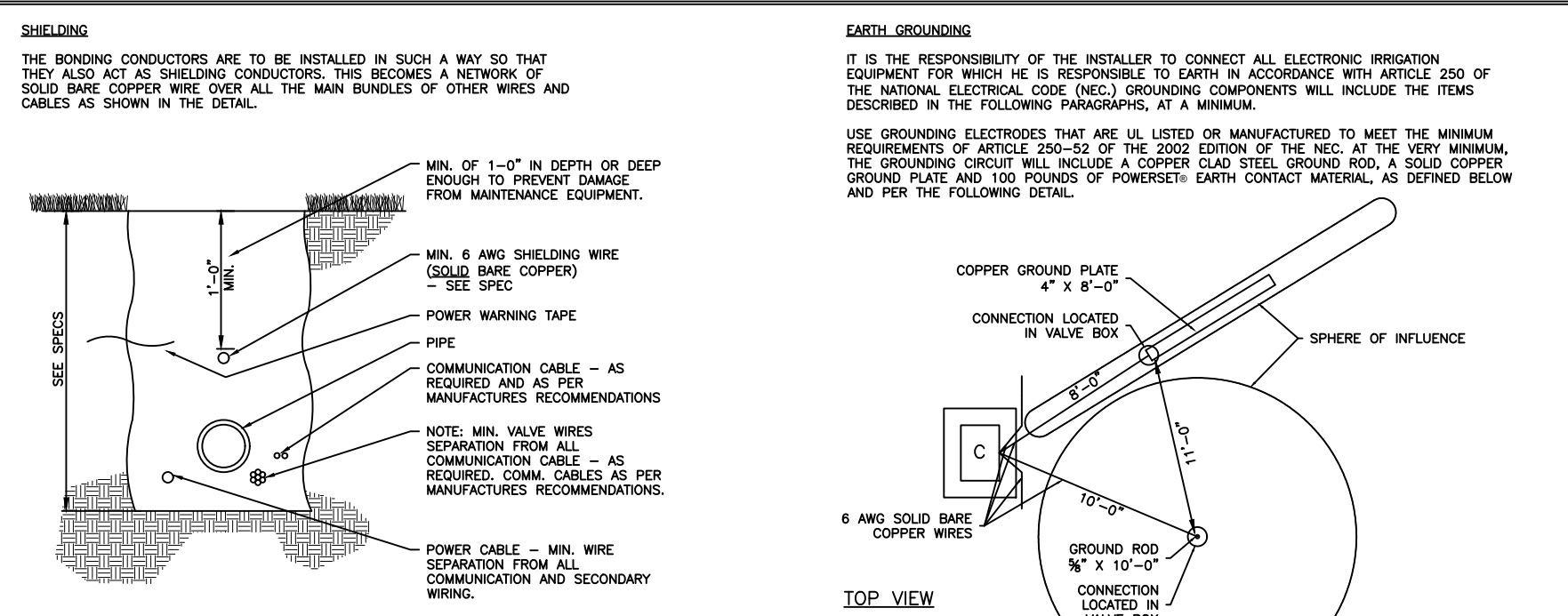
SITE IRRIGATION PLAN
DEERPATH GOLF COURSE
 CITY OF LAKE FOREST, IL

By:	IS
Date:	12/21/24



EC design

ERIK CHRISTIANSEN, ENGINEER, LICENSED PROFESSIONAL ENGINEER
 500 West Deerpath Road
 Lake Forest, IL 60045
 (A City of Lake Forest facility)



THRUST BLOCKING

STEP 1. MULTIPLY THE PRESSURE LEVEL DESIRED FOR TESTING BY THE APPROPRIATE VALUE SHOWN IN THE FOLLOWING TABLE.

PIPE DEAD END SIZE	90° ELBOW	45° ELBOW	22.5° ELBOW
1.2\"	2.84	4.16	2.25
1.5\"	4.56	6.45	3.50
2\"	6.65	9.40	5.10
2.5\"	9.80	13.9	7.51
3\"	12.8	18.1	9.81
4\"	16.2	23.0	12.4
5\"	24.7	35.0	18.9
6\"	34.8	49.2	26.7
8\"	59.0	83.5	45.2
10\"	91.5	130.0	70.0
12\"	129.0	182.0	98.5

BASED ON POUNDS PER PSI WORKING PRESSURE.

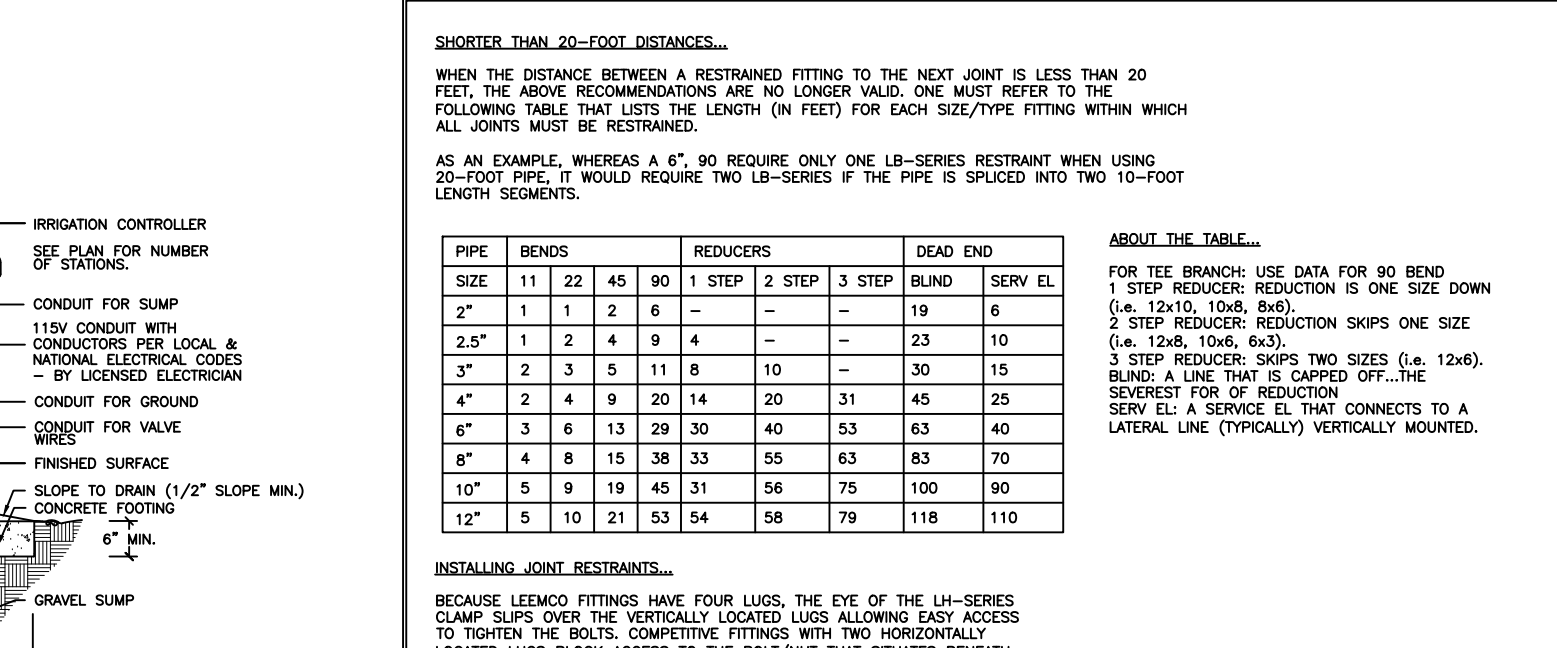
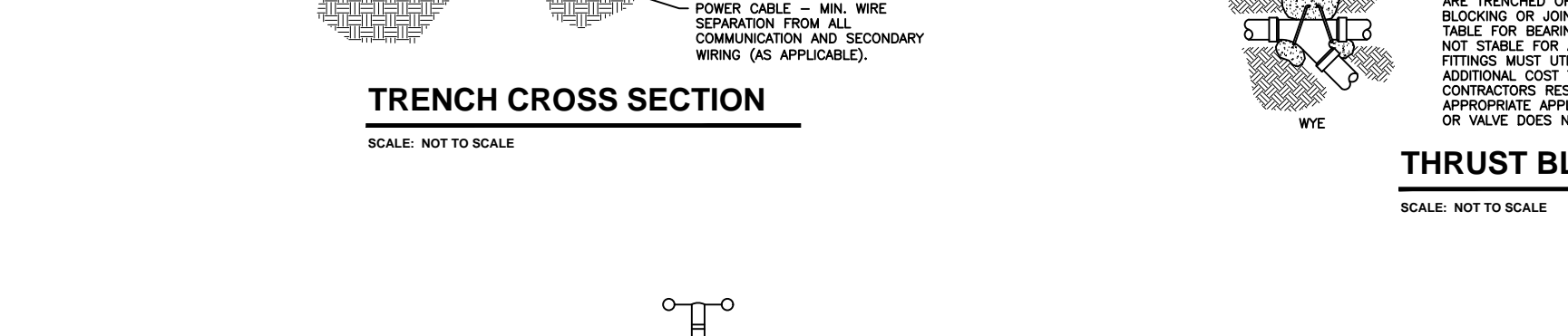
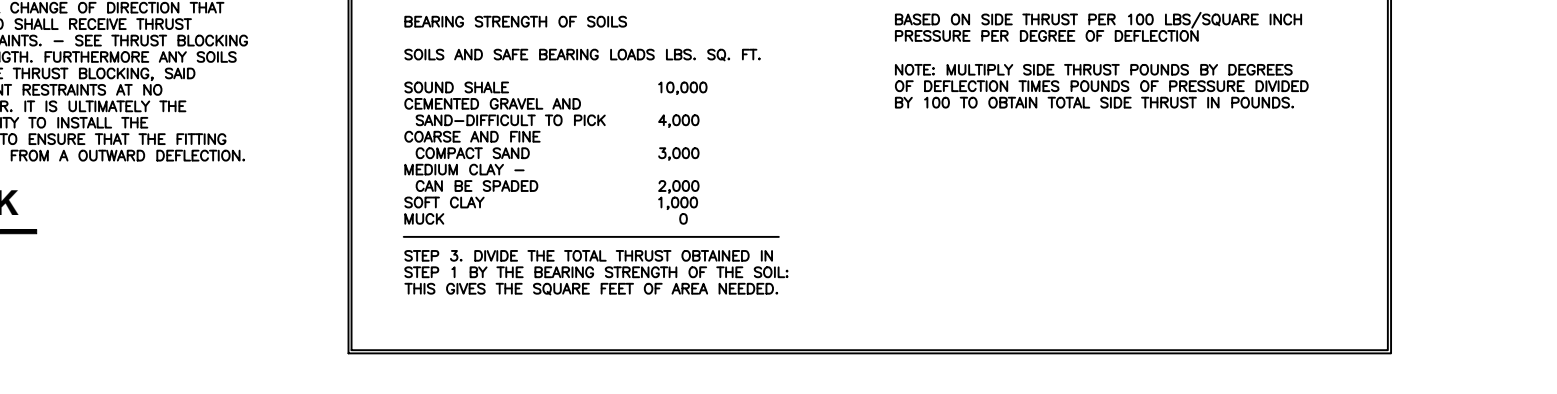
STEP 2. DETERMINE THE BEARING STRENGTH OF THE SOIL FROM THE TABLE BELOW.

PIPE SIZE INCHES	THRUST POINTS PER DEGREE
1.5\"	5.1
2\"	7.9
2.5\"	11.6
3\"	17.1
3.5\"	22.4
4\"	28.3
5\"	45.1
6\"	60.8
8\"	105.0
10\"	160.0
12\"	225.0

BASED ON SIDE THRUST PER 100 LBS./SQUARE INCH PRESSURE PER DEGREE OF DEFLECTION.

NOTE: MULTIPLY SIDE THRUST POINTS BY DEGREES OF DEFLECTION TIMES POUNDS OF PRESSURE DIVIDED BY 100 TO OBTAIN TOTAL SIDE THRUST IN POUNDS.

STEP 3. DIVIDE THE TOTAL THRUST OBTAINED IN STEP 2 BY THE BEARING STRENGTH OF THE SOIL. THIS GIVES THE SQUARE FEET OF AREA NEEDED.



SHORTER THAN 20'-FOOT DISTANCES.

WHEN THE DISTANCE BETWEEN A RESTRAINED FITTING TO THE NEXT JOINT IS LESS THAN 20 FEET, THE ABOVE RECOMMENDATIONS ARE NO LONGER VALID. ONE MUST REFER TO THE FOLLOWING TABLE THAT LISTS THE LENGTH (IN FEET) FOR EACH SIZE/TYPE FITTING WITHIN WHICH ALL JOINTS MUST BE RESTRAINED.

PIPE SIZE	REDUCERS				DEAD END		
	11 22 45 90	1 STEP	2 STEP	3 STEP	BLIND	SEW. EL.	SERV. EL.
2\"	1	2	6	-	-	19	6
2.5\"	1	2	4	9	4	-	23
3\"	2	3	5	11	8	10	30
4\"	2	4	9	20	14	20	31
6\"	3	6	13	28	30	40	53
8\"	4	8	15	38	33	55	63
10\"	5	9	18	48	31	58	75
12\"	5	10	21	53	54	58	79

ABOUT THE ILL-800

FOR TEE BRANCH, USE DATA FOR 90 DEGREE. 1-STEP REDUCER REDUCTION IS ONE SIZE DOWN (6- 12x6), 10x8 RED. 2-STEP REDUCER REDUCTION SKIPS ONE SIZE (6- 12x4, 10x6, 8x6). 3-STEP REDUCER SKIPS TWO SIZES (6- 12x4). BRANCH LINE THAT IS CAPPED OFF. THE SEWEREST FOR OF REDUCTION MUST BE A SERVICE EL THAT CONNECTS TO A LATERAL LINE (TYPICALLY) VERTICALLY MOUNTED.

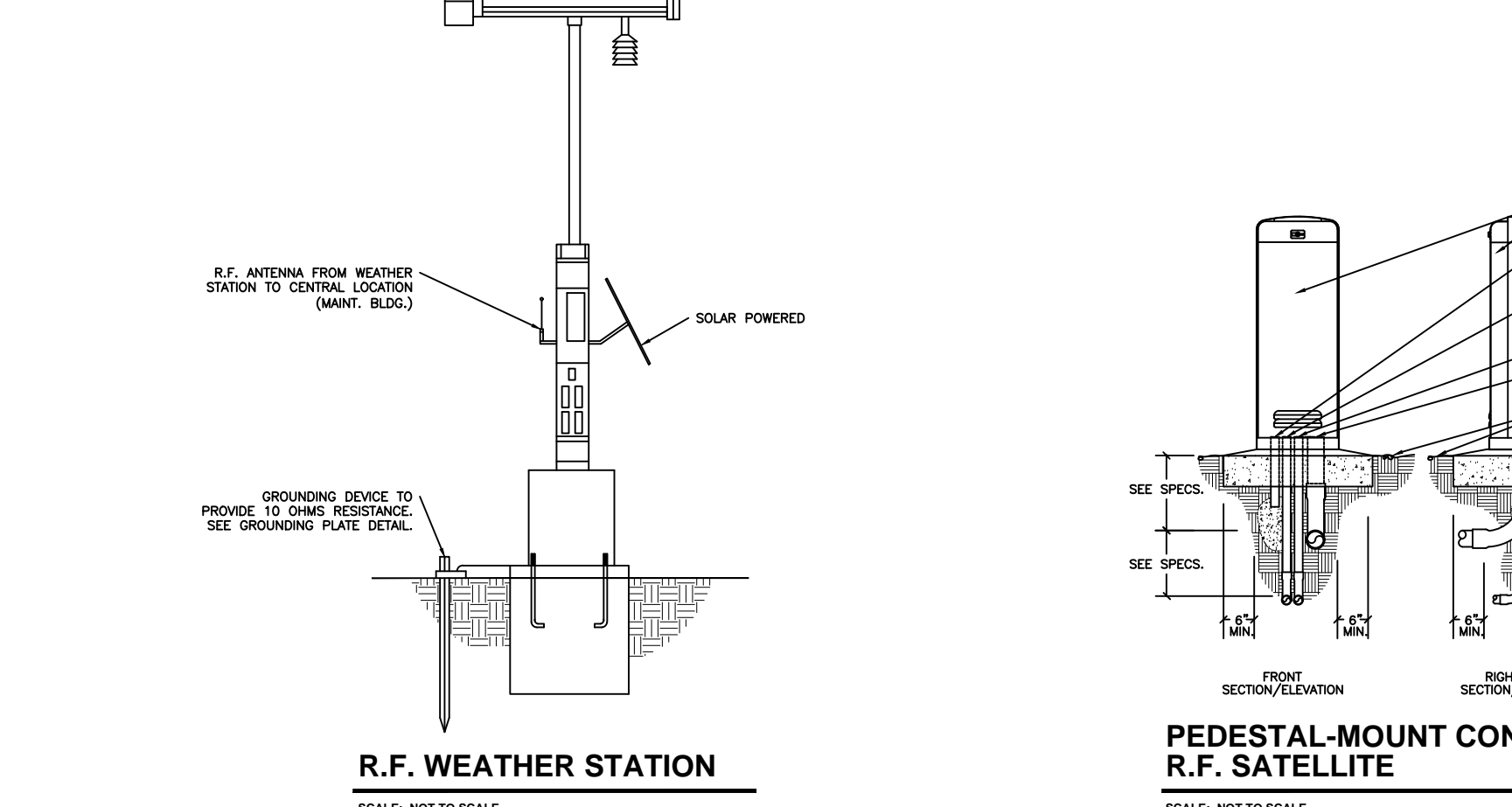
INSTALLING JOINT RESTRAINTS.

BECAUSE LEUCOS FITTINGS HAVE FOUR LUGS, THE EYE OF THE LH-SERIES CLAMP MUST OVER THE VERTICALLY LOCATED LUGS, ALLOWING EASY ACCESS TO TIGHTEN THE BOLTS. COMPETITIVE FITTINGS WITH TWO HORIZONTAL LUGS LOCATED BELOW ACCESS TO THE BOLT/NUT THAT SITUATES BENEATH THE FITTING. IN A NARROW TRENCH INSTALLING THE CLAMP BECOMES VERY DIFFICULT.

PIPE SIZE	NO. OF BOLTS	TORQUE FT.-LBS.
2\"	2	3/8 x 2.5\"
2.5\"	2	3/8 x 2.5\"
3\"	2	3/8 x 2.5\"
4\"	2	1/2 x 3\"
6\"	2	1/2 x 3.5\"
8\"	4	1/2 x 4\"
10\"	4	5/8 x 5.5\"
12\"	4	5/8 x 5.5\"

BOLT TIGHTENING.

BECAUSE OF THE LARGE SURFACE AREA OF THE CLAMPS, THERE IS NO DANGER OF CRACKING OR DAMAGING THE PIPE. TIGHTEN THE BOLTS WITH STANDARD 12\"



THRUST BLOCK

SCALE: NOT TO SCALE

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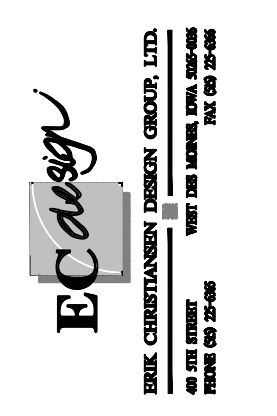
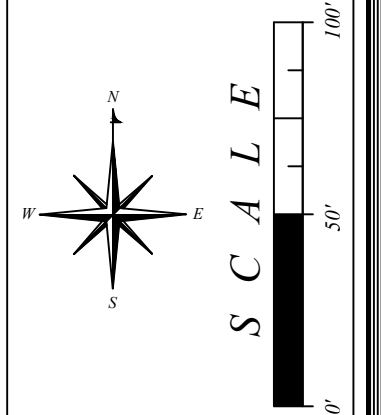
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Remarks:

By: _____

Date: _____



APPENDIX - AS-BUILT
DEERPATH GOLF COURSE
 CITY OF LAKE FOREST, IL

Remarks:	
By:	
Date:	

Sheet No.
3
 IRRIGATION

