

Memorandum

City of Lawrence

Planning Department

TO: Planning Commission
FROM: Planning Staff
DATE: May 19, 2014
RE: ITEM NO. 4: CONDITIONAL USE PERMIT; METEOROLOGICAL TOWER;
2060 E 1600 ROAD ALSO KNOWN AS THE KU FIELD
STATION (SLD)

The Lawrence Airport Advisory Board met on Wednesday, May 14, 2014 and considered the above referenced item as it relates to the Lawrence Municipal Airport. The Board voted to recommend approval of the request, subject to the following conditions:

1. The height in the Planning Commission Report match FAA study of 116' for the tower and 10' for the lightning rod for a total of 126';
2. The tower is lighted, painted in conformance with FAA tower study and Kansas law; and
3. The old tower (500' away) comes down concurrent with the erection of the Neon tower.

These conditions would be in addition to the staff recommendation included in the staff report as follows:

- 1) Provision of a revised site plan drawing to show the dimension of the proposed improvements to the nearest property lines.
- 2) The provision of a revised site plan that adds the following notes to the face of the drawing:
 - a) *"A sign shall be posted on the tower or the exterior fence around the base of the tower with the name and telephone number of the tower owner/operator."*
 - b) *"Use of this tower shall be limited to meteorological equipment only and will not be allowed for use by telecommunication providers."*
 - c) *"If the ownership/operation of the tower changes the property owner (KU) shall notify planning staff to update the appropriate records."*
 - d) *"This tower may not be used by private communication carriers unless a new CUP has been submitted for review and approval per section 12-319-4.31 of the Zoning Regulations to include due notice to property owners, public hearing by the Planning Commission and approval by the County Commission."*

PLANNING COMMISSION REPORT
Regular Agenda – Public Hearing Item

PC Staff Report
5/19/2014

ITEM NO. 4: CONDITIONAL USE PERMIT; METEOROLOGICAL TOWER; 2060 E 1600 ROAD ALSO KNOWN AS THE KU FIELD STATION (SLD)

CUP-14-00052: Consider a Conditional Use Permit for a 116' tall meteorological tower with a 10' antenna for monitoring and collecting atmospheric, soil and water data, located at the University of Kansas Field Station, 2060 E 1600 Rd. Submitted by National Ecological Observatory Network [NEON], for University of Kansas Endowment Association, property owner of record.

STAFF RECOMMENDATION: Staff recommends approval of the Conditional Use Permit for the meteorological tower and forwarding it to the County Commission subject to the following conditions:

- 1) Provision of a revised site plan drawing to show the dimension of the proposed improvements to the nearest property lines.
- 2) The provision of a revised site plan that adds the following notes to the face of the drawing:
 - a) "A sign shall be posted on the tower or the exterior fence around the base of the tower with the name and telephone number of the tower owner/operator."
 - b) "Use of this tower shall be limited to meteorological equipment only and will not be allowed for use by telecommunication providers."
 - c) "If the ownership/operation of the tower changes the property owner (KU) shall notify planning staff to update the appropriate records."
 - d) "This tower may not be used private communication carriers unless a new CUP has been submitted for review and approval per section 12-319-4.31 of the Zoning Regulations to include due notice to property owners, public hearing by the Planning Commission and approval by the County Commission."

Reason for Request:

"NEON will create a new national observatory to collect ecological and climatic observations across the continental United States, including Alaska, Hawaii and Puerto Rico. NEON has partitioned the U.S. into 20 eco-climatic domains, each of which represents different regions of vegetation, landforms, climate and ecosystem performance. Within these domains, NEON infrastructure and sensor systems will be used to collect site-based data about climate and atmosphere, soils, streams and ponds and a variety of organisms. The goal of NEON is to enable understanding and forecasting of the impacts of climate change, land use change and invasive species on continental scale ecology by providing infrastructure to support research, education and environmental management in these areas. The NEON approach will standardize scientific ecological efforts and will enable integrated observatory operations at a continental scale. NEON is funded by the National Science Foundation.

NEON has entered into a land use agreement with the University of Kansas and the University of Kansas Endowment Association allowing NEON to construct an ecological monitoring tower, instrument hut, access paths, soil sensors and arrays, and deploy instrumentation to collect data. The site will be in place for approximately 10-12 years and then decommissioned. NEON is requesting a conditional use permit so that the project can move forward with the construction and operation of this site location."

ATTACHMENTS

1. Site plan

2. Map of KU Field Station
3. Northeast Area Land Use Map
4. NEON general information
5. Letter from NEON to the Airport Advisory Board

KEY POINTS

- This application is considered a meteorological tower but is unrelated to applications made for wind data collection located along the Highway 56 corridor.
- Per Section 12-319-4.31 of the Zoning Regulations for the Unincorporated Territory of Douglas County, *radio, television, telecommunication and microwave towers* are uses which may be approved as a Conditional Use.
- This use – meteorological tower - is not specifically listed in the Zoning Regulations but is considered by staff to be a similar use.
- This structure is temporary and does not include fixed foundation and permanent land alterations.
- This property abuts both Jefferson and Leavenworth Counties. Both counties have been notified of the request and do not have any comments.

DESCRIPTION OF USE

Request is for the installation of a 116 foot structure (meteorological tower) with a 10' antenna (126') to monitor and collect data as a cooperative research project with the University of Kansas. The purpose of the equipment will be to specifically collect atmospheric, soil and water data. The application provided this description to further describe the data collected:

Atmosphere, Soil and Water

Climate and atmosphere have a strong impact on ecosystems across the continental United States. NEON will make constant, automated measurements of these systems using electronic sensors mounted on towers in natural and managed areas. The instruments will monitor physical and chemical climate properties, including:

- Fluxes between ecosystems and the atmosphere—because chemicals and pollutants that are introduced into the atmosphere can impact the capacity of ecosystems to supply food, fuel, and fiber.
- Canopy microclimate—because the uppermost level of a forest, the canopy, has variations of climate, vegetation, and animals that are of special scientific interest.
- Air pollution—because dust and pollutants caused by human activity can have significant impacts on the health and productivity of ecosystems.
- Carbon—because increasing concentrations of carbon dioxide in the atmosphere indicate that the amount of carbon released exceeds the Earth's capacity to absorb it, an important factor in global warming

Additional sensors located near each tower will record soil properties, such as moisture and temperature, and measure water chemistry.

The construction of the tower is intended to disturb as little as possible the existing vegetation. The path to the tower will be a 4' wide gravel base. Some portions of the path may include a prefabricated boardwalk where stream crossings are needed.

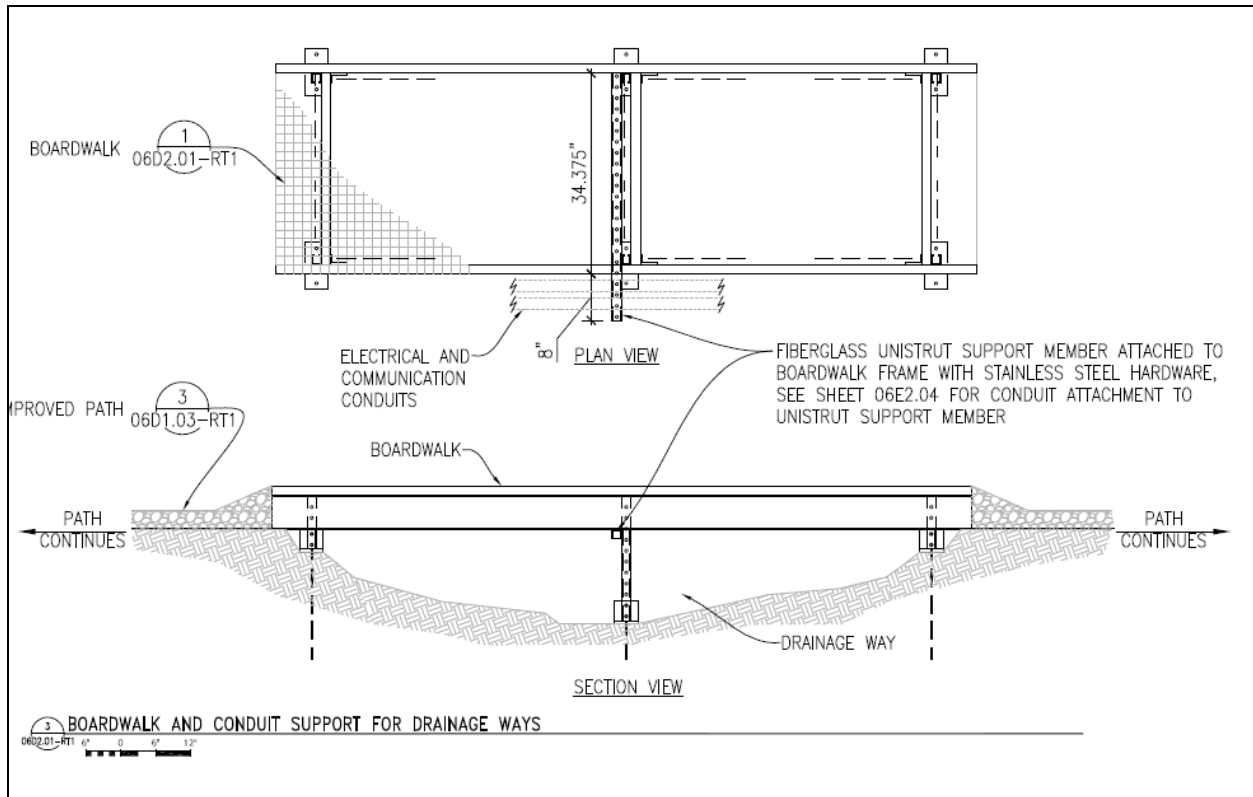


Figure 1: Boardwalk Section

In addition to the tower and boardwalk the proposed improvement will include a prefabricated structure for equipment.

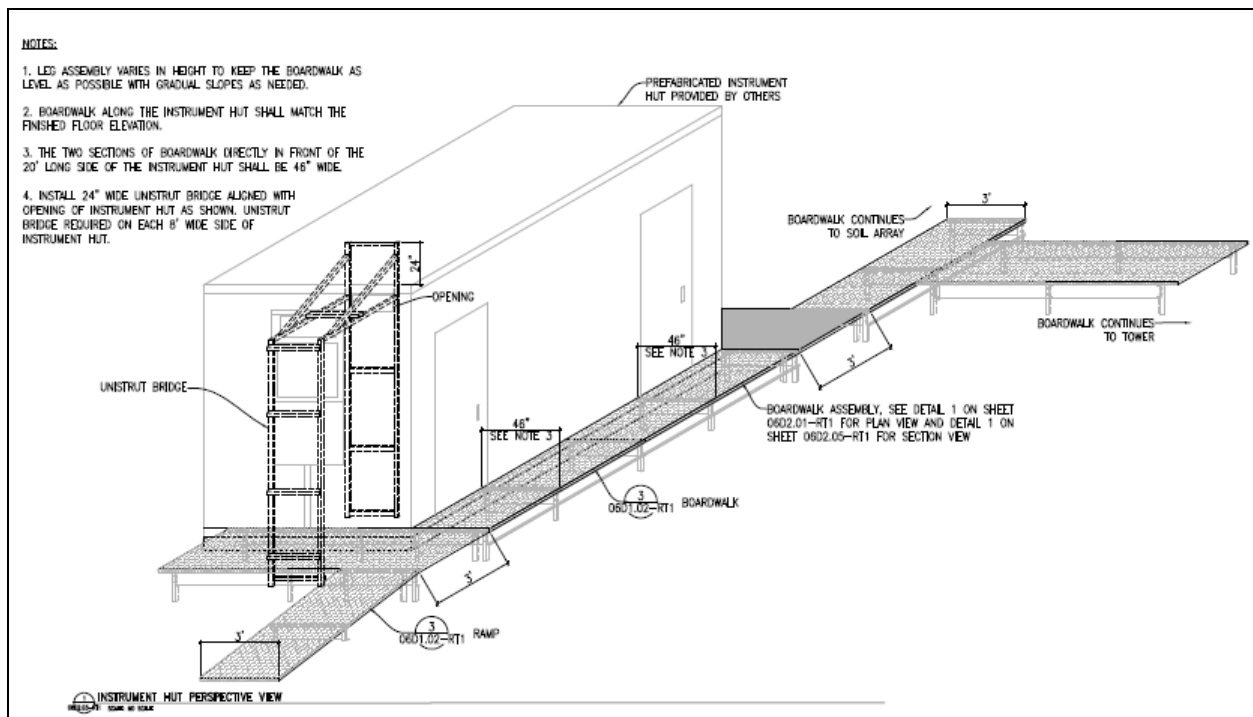


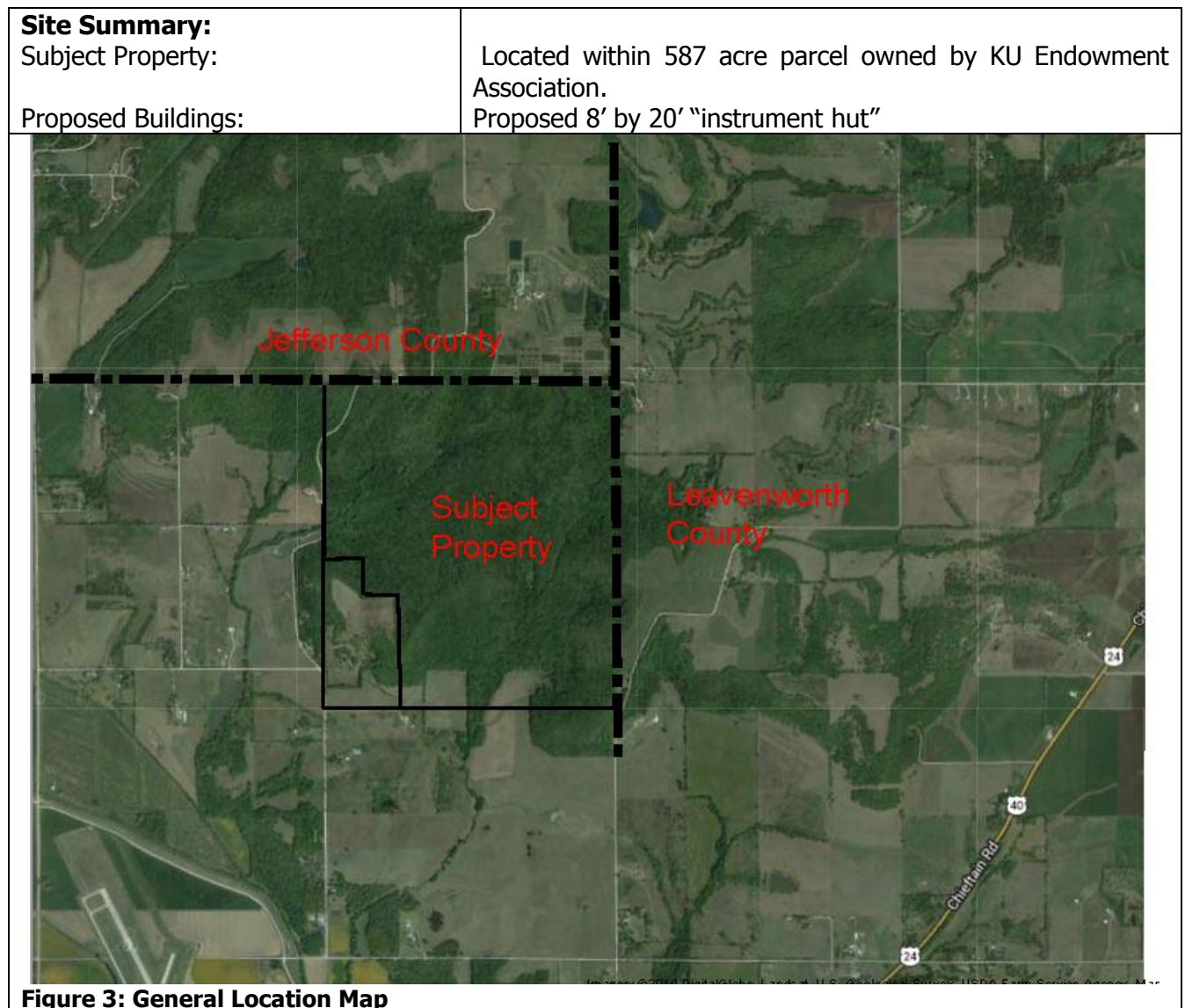
Figure 2: Mechanical Equipment Building

ASSOCIATED CASES/OTHER ACTION REQUIRED

- Board of County Commissioners' approval of the Conditional Use.
- Zoning and Codes Office issuance of a Conditional Use Permit when plans have been released to the Zoning and Codes Office and conditions of approval have been met.

PUBLIC COMMENT

- Area property owners called asking for more detail regarding the location, use and intent of the proposed tower.
- Airport Advisory Board has indicated concerns and is working with the applicant to address issues. Staff will report to the Planning Commission the summary of the Board's meeting.



GENERAL INFORMATION	
Current Zoning and Land Use:	A (County-Agricultural) District; 587-acre parcel known as the KU Field Station
Surrounding Zoning and Land Use:	<p>A (County-Agricultural) District to the south and east within Douglas County. Agricultural and rural land.</p> <p>In Jefferson County to the north: AG (Agricultural) District. Existing land uses include the Armitage Education Center and areas of the KU Field Station.</p> <p>In Leavenworth County to the east: RR-5 (Rural-Agricultural and Residential; 5 acre minimum lots)</p>

I. ZONING AND USES OF PROPERTY NEARBY

This property is located in the northeast corner of Douglas County. The KU field station and facilities encompass a large area in Douglas, Jefferson and Leavenworth counties. The primary land use is agricultural in the surrounding area.

Section 12-319-4.31(d)(5) recommends that towers be located in commercial, industrial or agricultural zoning districts. The subject property is zoned Agricultural.

Staff Finding – Nearby properties are zoned A (Agricultural) in Douglas County, Rural Agricultural and Residential in Leavenworth County, and Agricultural in Jefferson County. Surrounding land uses include KU Field Station to the north as well as agricultural uses to the east, west and south. Scattered residential uses are located along county roads. The proposed tower would be located in a recommended district.

II. CHARACTER OF THE AREA

This property is located within Grant Township. The northeast portion of Grant Township is dominated by areas of steep slopes and dense vegetation. KU Endowment is a significant property owner in this area. Rural homes are clustered along the county roads. The predominate land use in the area is agricultural.

A significant land use in the area is the Lawrence Municipal Airport. The airport is located in the central portion of Grant Township. The Airport includes various overlay zones that extend vertically above and outward from the airport to protect the associated flight paths. The airport has a direct impact on surrounding land. Structures (including trees) of a certain height at a certain distance from the airport must not exceed specific height requirements.

Another significant feature of the area is the presence of several natural features including floodplain, Class I and Class II Soils, and areas with significant slope. The subject property is located in a portion of Grant Township that includes steeper topography.

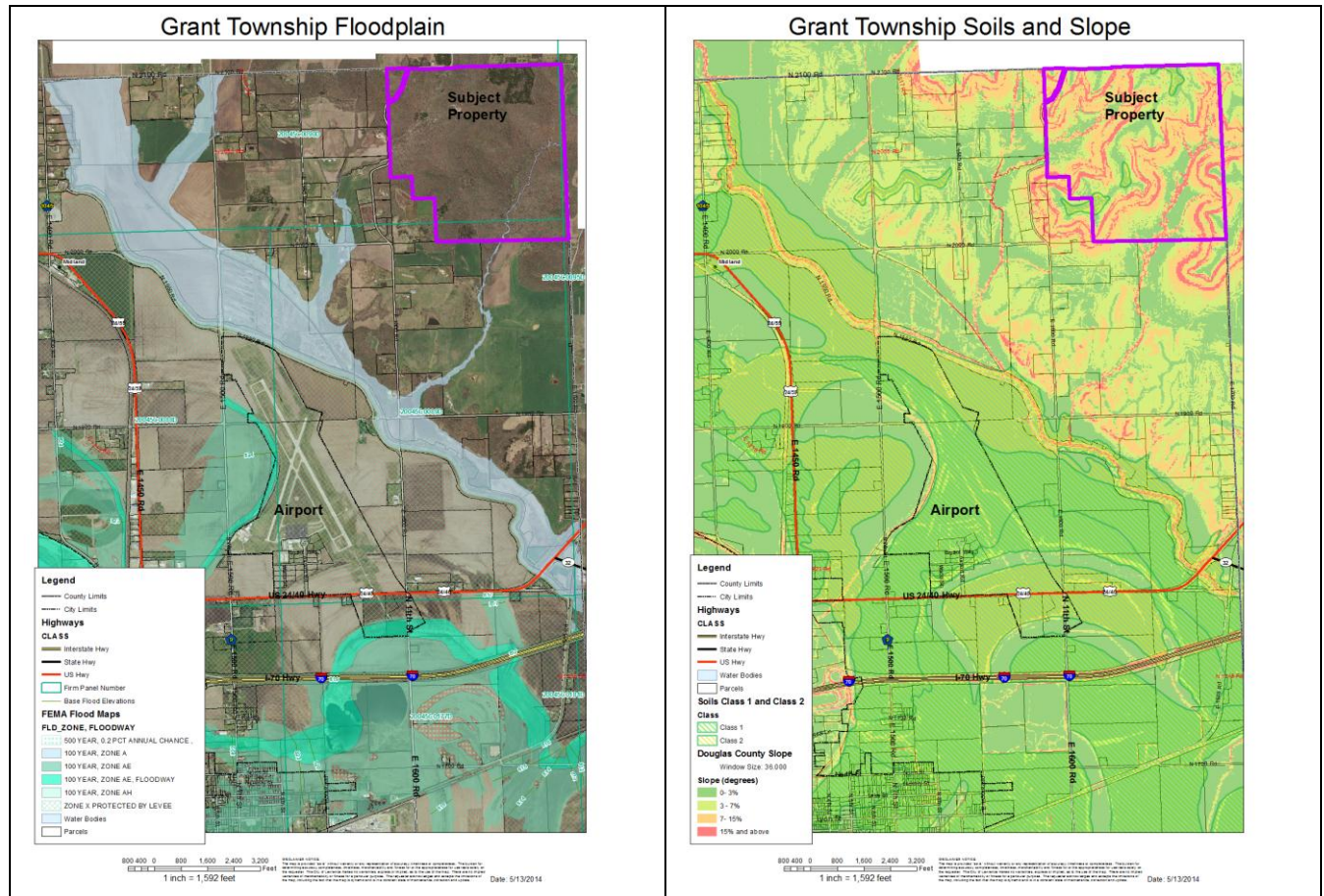


Figure 4: Area Land Features

Staff Finding – This area is rural in nature, with agricultural lands, and residential homes along County roads. The KU Field Station is a significant land use in the northeast corner of Grant Township. Other significant land uses that define this area are the Lawrence Municipal Airport and the regulatory floodplain.

III. SUITABILITY OF SUBJECT PROPERTY FOR THE USES TO WHICH IT HAS BEEN RESTRICTED

Applicant's response: *"The site location that has been selected is part of the University of Kansas field station and meets all requirements of a NEON site. The ongoing use of the land is for academic research and data collection and the mission of the NEON project aligns with the designated use of the subject property. The 126' tower will be located within the boundary of the subject property and will be locked and gated."*

The current zoning designation for the property is A (Agricultural) District. A variety of agriculture-related uses are allowed in this district. The proposed request will not alter the underlying zoning district. KU staff indicated that this site within the "Domain of the Prairie Peninsula" is an unmanupliated area generally free of other urbanizing impacts. The area is undergoing forestation within a largely agricultural area.

Towers are allowed in the A (Agricultural) District with approval of a Conditional Use Permit. The A (Agricultural) District is a recommended base district for towers. This structure removable. The tower would remain for the duration of the agreement between KU Endowment and NEON for research purposes. Additionally, the tower could be acquired by KU for continued operation at the

end of the NEON project. If the ownership/operation of the tower changes staff recommends the property owner notify staff to update the application with current ownership. This tower should not be reused for cellular commination equipment.

A key consideration of the suitability of the tower is the ability of the proposed structure to comply with minimum aviation requirements. The applicant has been meeting with the Airport Advisory Board to assess the impact of the proposed tower on the Lawrence Municipal Airport. The applicant has stated that the tower will be painted and lighted in accordance with FAA regulations. The Airport Advisory Board is scheduled to meet on May 14, 2014 to further discuss the proposed application. Staff will report the outcome of this meeting to the Planning Commission at their regular meeting.

Staff Finding – The property is suitable for agricultural uses. A Conditional Use Permit (CUP) does not change the underlying zoning; therefore, the suitability of the property for agricultural uses will not be altered. Additional review is required to assure the suitability of the proposed structure with the proximity of the airport.

IV. LENGTH OF TIME SUBJECT PROPERTY HAS REMAINED VACANT AS ZONED

Staff Finding – The property has been zoned A (Agricultural) since the adoption of the zoning in 1966.

V. EXTENT TO WHICH REMOVAL OF RESTRICTIONS WILL DETRIMENTALLY AFFECT NEARBY PROPERTY

Applicant's Response: *"The construction and operation of the NEON site within the research property should have little to no adverse impact on nearby property. The site location is within the field station property boundary and will not restrict usage of roads. There are no property owners other than the University of Kansas Endowment Association within 1000' of the proposed project area."*

Section 12-319-1.01 of the County Zoning Regulations recognize that *"....certain uses may be desirable when located in the community, but that these uses may be incompatible with other uses permitted in a district...when found to be in the interest of the public health, safety, morals and general welfare of the community may be permitted, except as otherwise specified in any district from which they are prohibited."*

This request is for a 126' tower that will support meteorological data collecting equipment. Access to the site shall be limited to regular service and maintenance of the tower and associated equipment as well as access for research purposes. This tower is not intended for access by the general public. Regular publically accessible trails and areas within the KU property will continue to be available and will not be altered by this project.

No detrimental effects are anticipated on adjacent properties or to the existing trails from the approval of this Conditional Use Permit for this structure for the purpose of data collection.

Impact on the Lawrence Municipal Airport is still being assessed. Staff will report any new information on or before the public hearing as available.

Staff Finding – But for the proximity of the Lawrence Municipal Airport, there should be no detrimental effect on surrounding property.

VI. RELATIVE GAIN TO THE PUBLIC HEALTH, SAFETY AND WELFARE BY THE DESTRUCTION OF THE VALUE OF THE PETITIONER'S PROPERTY AS COMPARED TO THE HARDSHIP IMPOSED UPON THE INDIVIDUAL LANDOWNERS

Applicant's Response: *"The mission of the National Ecological Observation Network is to enable understanding and forecasting of the impacts of climate change, land use change and invasive species on continental-scale ecology – by providing infrastructure and consistent methodologies to support research and education in these areas.*

The proposed installation of a 126' tower, instrument hut, and soil monitoring sensors will support the mission of this project and aligns with the current land use of the site as a field station focused on scientific research. The ground disturbance associated with construction of the tower and instrument hut is less than 1 acre and the contracts are held to rigid environmental standards. There are no cranes or large pieces of heavy machinery used during construction and special attention is paid to preserving the local ecology of the site.

The data collected at this site will be freely available to the public through NEON's data portal and will provide information on local ecology. There will be little damage to the University of Kansas Field Station property and there are no individual landowners within 1000' of the proposed project area. Therefore, it's unlikely that any damage or hardship will be imposed on individual landowners."

The purpose of this criterion is to compare the effect of denial of the request on the public health, safety and welfare to the effect on the individual landowner.

The purpose of this request is to construct a tower with appropriate equipment for continued monitoring of data for research purposes. The location of the tower is such that is surrounded on all sides by property owned by KU Endowment Association and part of the KU Field Station. Staff concurs with the applicant's finding that the location of the tower is a significant distance from any private property and thus unlikely to impact the property.

Data will be publically available to researchers, scientists and others interested in ecological information. The facility will also support integrated research for the University of Kansas programs.

Staff Finding – Approval of the request will facilitate a continental wide network of equipment and data collection.

VII. CONFORMANCE WITH THE COMPREHENSIVE PLAN

Applicant's Response: *"NEON's request to construct an ecological monitoring site does not fit within the development areas described in the Horizon 2020 plan as it's not residential, commercial or industrial in nature. It does align with the sustainability goal and would provide real time data about the local, physical environment which could be used to evaluate future environmental or sustainability plans."*

The subject property is located within an identified Urban Growth Area for the City of Lawrence. A sector plan has been adopted for the area that includes the subject property known as the *Northeast Area Plan*.

Chapter 16 of *Horizon 2020* addresses environmental policies applicable to Lawrence and Douglas County. The plan states that the recommendations are "intended to foster a healthy environment that contributes to a growing economy and a livable community." The overall policy applicable to this development project states:

"We will strive to ensure the sustainability of our physical environment, both natural and built, the health of our economy and the efficient and effective functioning of our community"(Chapter 1, Horizon 2020).

Chapter 16 of *Horizon 2020* identifies the following resources and provides applicable policies:

Water Resources:	Watershed protection, public water supply reservoirs, water quality, floodplain management and aquatic habitats.
Land Resources:	Rural woodlands, urban forests, native prairies, agricultural soils, slopes, and open spaces.
Air Resources:	Excess greenhouse gases, air quality, and indoor pollution.
Resource Management:	Low cost raw materials, such as sand gravel, timber oil, gas, and stone
Waste Management:	Solid waste and hazardous waste to reduce reuse and recycle materials produced in Douglas County.

Based on the applicant's summary, approval of the request will allow monitoring of many of these elements and provide current and real-time data regarding atmosphere, soil and water conditions.

It should be clear that this application is for a Conditional Use Permit for the construction of a tower (structure) to support equipment for the purpose of data collection only. This application is not related to wind study or wind farm applications. The tower structure has been evaluated by staff with respect to its land use impact similar to a communication tower. Communication towers are generally incorporated in Chapter 10 Communities Facilities of *Horizon 2020*.

Staff Finding – The comprehensive plan does not provide any specific land use recommendations regarding towers. A Conditional Use Permit can be used to allow specific non-residential uses subject to approval of a site plan. This tool allows proportional development in harmony with the surrounding area. The proposed request is consistent with the Comprehensive Plan.

STAFF REVIEW

Section 12-319-4.31 allows radio, television, telecommunication, and microwave towers in Douglas County subject to approval of a Conditional Use Permit when the structures are more than 100' tall. This section also provides guidelines and standards intended to be used during the review of towers related to communication equipment. This request is for a tower that will support specific data collection equipment and not cellular or radio communication equipment. Some provisions of the Code address co-location requirements which are not applicable to this request and would not be expected to be added to the structure if approved.

This tower structure has a comparable height to communication towers. Land use concerns include adequate setback and proximity to other land uses.

Tower Removal

Communication towers require that if the equipment is removed and the tower is vacant for 3 years then the tower owner would be required to remove the structure. All towers are required to provide a sign on the structure or fence around the base of the tower identifying the tower owner/operator with a name and phone number. This application is requested for the purpose of data collection. A sign should be added to the tower site providing contact information as required for similar structures towers.

Setback

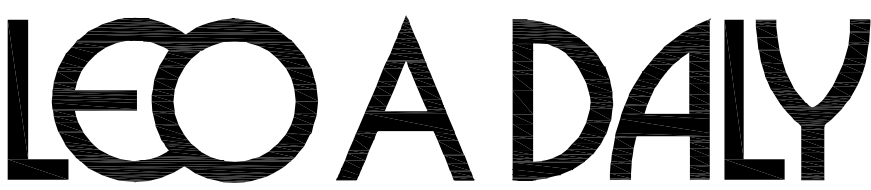
The County Zoning Regulations require the tower to be setback a distance equal to the height of the tower from any property line except that the setback may be reduced if documentation from a registered engineer is submitted certifying the fall zone of the tower in event of a failure or collapse. The proposed structure exceeds the setback requirements and is more than 200' from the nearest property line.

Lighting

No lighting per FAA is required for this structure. However, the applicant has stated the structure will be both painted and lit to increase visibility of the structure in proximity to the Lawrence Municipal Airport.

Conclusion

This request is for the construction of a tower for the exclusive use of data collection. Staff recommends approval of the Conditional Use Permit subject to conditions related to signage and dimensioning. Staff also recommends that cellular communications be prohibited from this structure unless a new Conditional Use Permit application is submitted for review and approval prior to installation.



Domain 06 Prairie Peninsula
University of Kansas Field
Station (UKFS)

Project site:
-Relocatable Tower 1 (RT1), Douglas Co., KS

National Ecological
Observatory Network

1685 38th Street
Boulder, CO 80301

Daly Project No. 003-10073-406
NEON Project No. 04.08.C.0008
JANUARY 28, 2014

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EST. 1915

ATLANTA
AUSTIN
DALLAS
DENVER
FORT WORTH
HONG KONG
HONOLULU
HOUSTON
LAS VEGAS
LOS ANGELES
MIAMI
MINNEAPOLIS
OMAHA
PHOENIX
SAN ANTONIO
WACO
WASHINGTON, DC

RELOCATABLE TOWER 1 GENERAL NOTES:

1. DOMAIN 06 IS CALLED PRAIRIE PENINSULA. RELOCATABLE TOWER 1 FOR DOMAIN 06 IS LOCATED WITHIN DOUGLAS COUNTY, KANSAS.
2. THE PREVAILING WINDS FOR RELOCATABLE TOWER 1 OF DOMAIN 06 ARE CLOCKWISE FROM 80° TO 230° (MAJOR) AND 280° TO 350° (SECONDARY).
3. DUE TO THE NATURE OF THIS PROJECT, THE SITE MUST BE DISTURBED TO THE MINIMUM EXTENT POSSIBLE. UNDER NO CIRCUMSTANCES WILL LOOSE TRASH/DEBRIS BE ALLOWED. THE SITE MUST BE LEFT IN CLEAN AND ORDERLY CONDITION AT THE END OF EACH WORK DAY. ONLY UTILIZE THE CLEARED/IMPROVED PATH INDICATED AT THE SITE FOR SITE ACCESS. CUTTING THROUGH FIELDS OR CREATING ALTERNATE PATHWAYS WILL NOT BE ALLOWED. THE ONLY VEHICLES ALLOWED TO PROCEED FURTHER THAN THE INDICATED PARKING AREA (STAGING AREA) FOR THE SITE WILL BE SMALL 4-WHEEL ATV OR MINI TRACK LOADER/SKID STEER TYPE VEHICLES. ALL CONSTRUCTION EQUIPMENT MUST FIT WITHIN THE CONSTRUCTION LIMITS. ALL VEHICLES TO BE USED MUST BE PRE-APPROVED BY NEON. IF ANY AREA IS DISTURBED OUTSIDE OF THE SPECIFIED CONSTRUCTION LIMITS, STOP WORK AND NOTIFY NEON IMMEDIATELY. NO ACTION SHALL BE TAKEN WITHOUT PRIOR APPROVAL BY NEON.
4. A STAGING AREA HAS BEEN IDENTIFIED FOR THE SITE. THIS AREA IS WHERE CONTRACTORS CAN PARK AND STORE ITEMS. THE PROJECT SITE IS ACCESSIBLE TO THE PUBLIC THEREFORE THE CONTRACTOR SHALL SECURE ITEMS AS REQUIRED FOR SAFETY AND THE PREVENTION OF THEFT. THE STAGING AREA, AS WELL AS THE PROJECT SITE, SHALL BE KEPT CLEAN AND DISTURBANCE SHALL BE KEPT TO A MINIMUM. SEE NEON CONTRACT FOR SPECIAL CONDITIONS AND SITE DISTURBANCE PENALTIES.
5. THE AUXILIARY PORTAL IS THE LOCATION WHERE THE ELECTRICAL TRANSFORMER, TRANSFER SWITCH, METER PEDESTAL AND COMMUNICATIONS PEDESTAL ARE SET FOR ELECTRICAL AND COMMUNICATION SERVICES TO ENTER THE SITE AND BE ROUTED TO THE INSTRUMENT HUT, BY CONTRACTOR.
6. VEHICLES AND EQUIPMENT SHALL BE WASHED PRIOR TO MOBILIZATION TO SITE (OR WHEN LEAVING/RETURNING TO SITE).

National Ecological
Observatory Network
1685 38th Street
Boulder, CO 80301



8600 Indian Hills Drive
Omaha, NE 68114-4039 USA
Tel 402-391-8111 Fax 402-391-8564



KEY PLAN

REVISIONS

NO.	DESCRIPTION	DATE

FILE LOG

ACTIVITY	BY
Manager	EAH
Design	JTC
Draw	JTC
Check	AAH

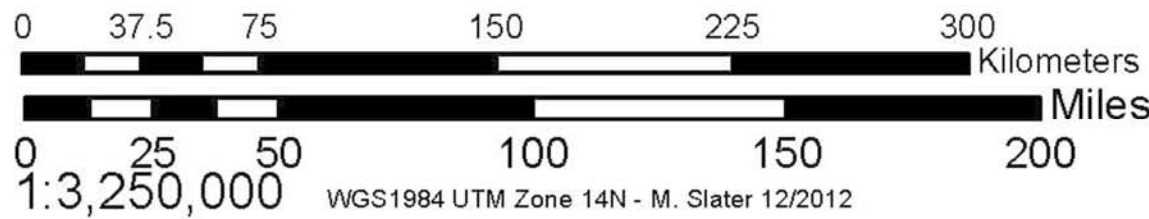
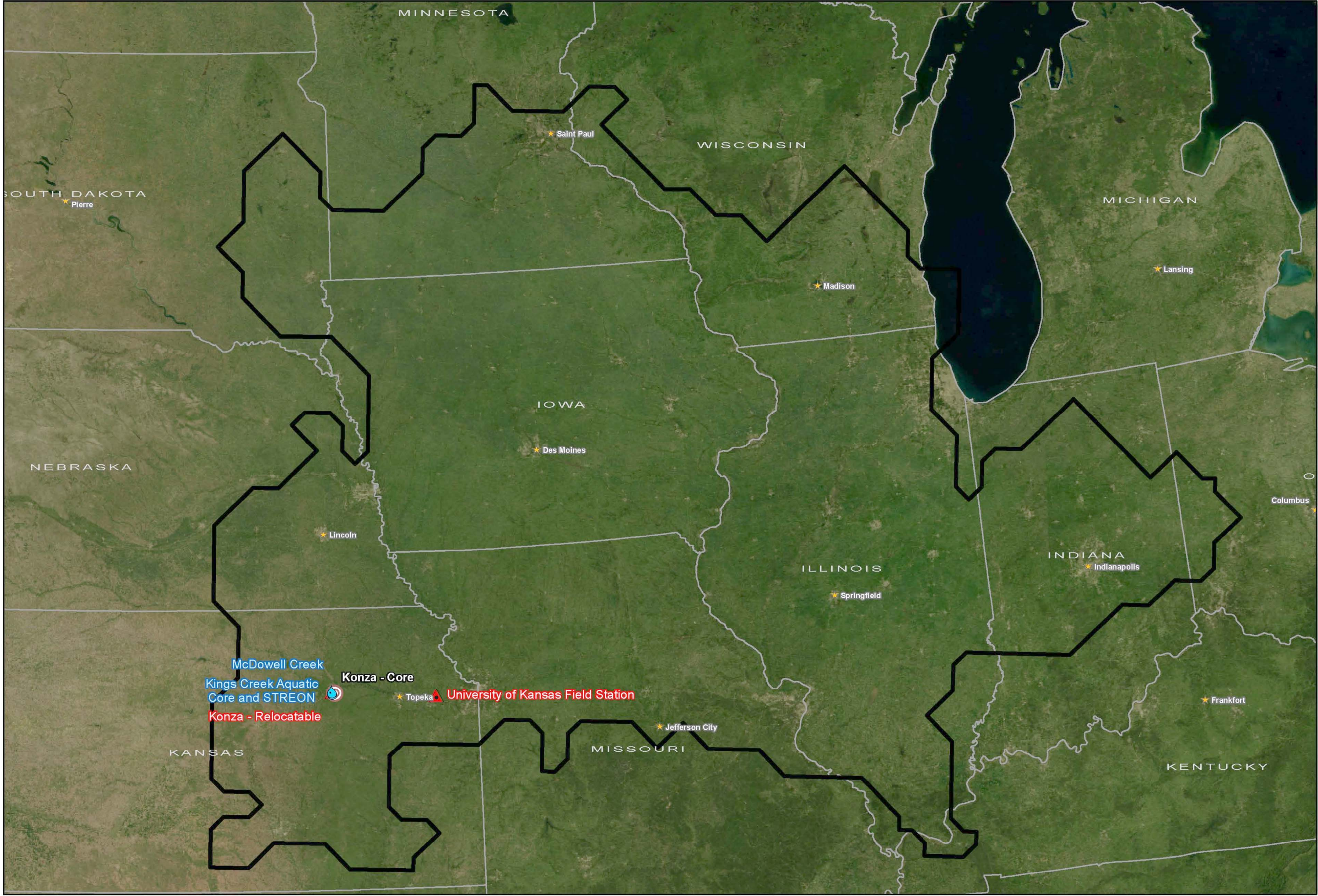
Daly Project No. 003-10073-406
NEON Project No. 04.08.C.0008
JANUARY 28, 2014

DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
GENERAL NOTES

06G1.00

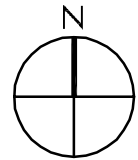


Domain 6
Prairie Peninsula



- Candidate Aquatic Site
- Candidate Core Tower
- Candidate Relocatable Tower

1
06C0.02 DOMAIN MAP



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Boulder, CO 80301

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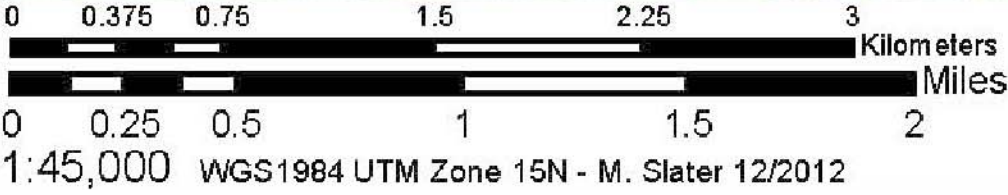
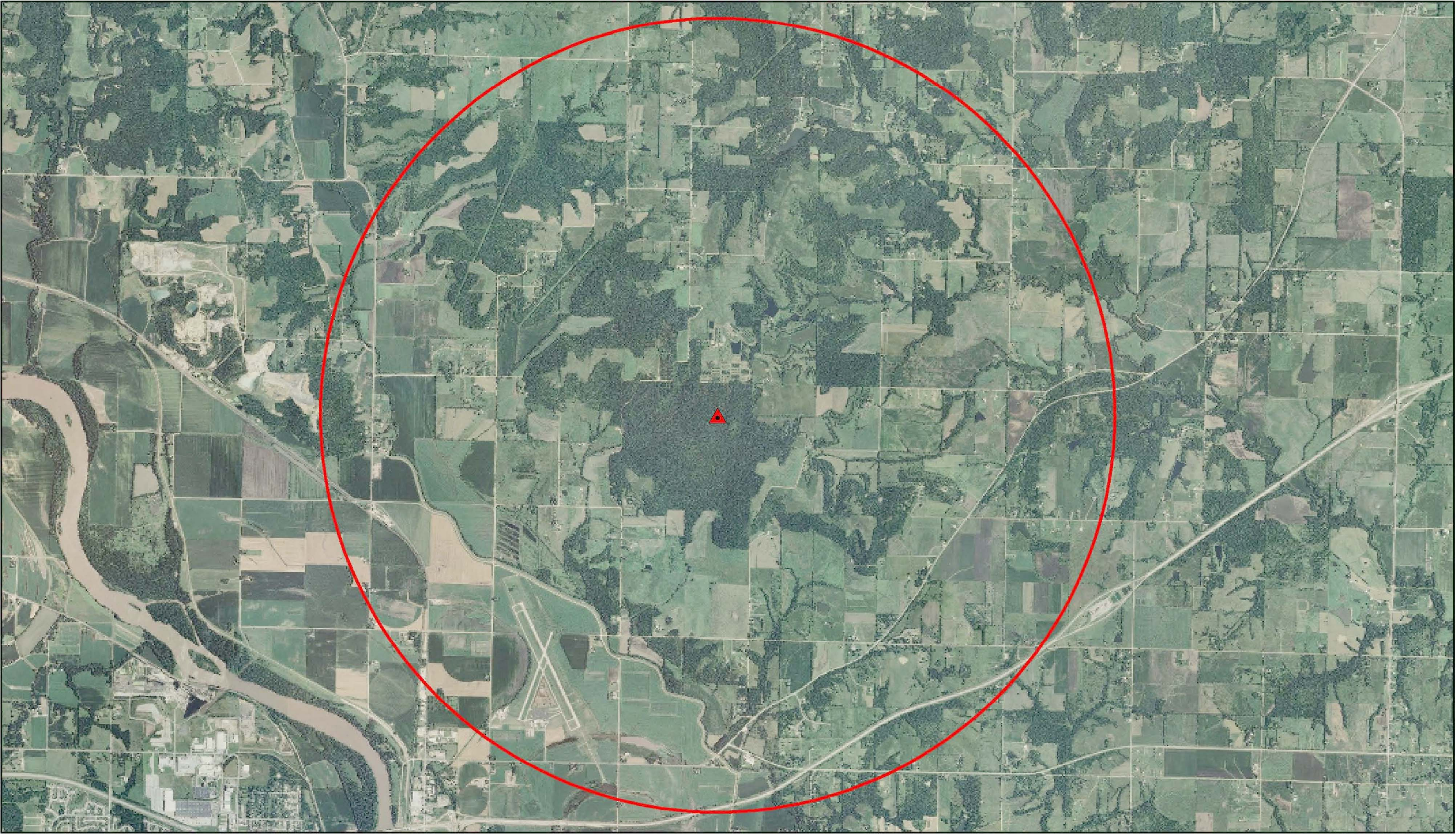
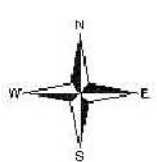
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JANUARY 28, 2014

DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
DOMAIN MAP

06C0.02



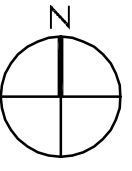
University of Kansas Field Station
Domain 6 - Prairie Peninsula



▲ Candidate Relocatable Tower 5k Buffer

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1 RELOCATABLE TOWER 1 VICINITY MAP
06C2.00



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Boulder, CO 80301

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8600 Indian Hills Drive
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KEY PLAN

REVISIONS

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FILE LOG

ACTIVITY	BY
Manager	EAH
Design	JTC
Draw	JTC
Check	AAH

Daly Project No. 003-10073-406
NEON Project No. 04.08.C.0008
JANUARY 28, 2014

DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
VICINITY MAP

06C2.00



CONTROL POINT TABLE				
POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
6	271292.508	2109899.804	1084.163	5/8" IRON ROD SET WITH ALUMINUM CAP
7	271353.189	2110072.143	1074.542	
8	269925.04	2109799.969	1057.755	5/8" IRON ROD SET WITH ALUMINUM CAP
9	269927.807	2109682.405	1053.789	

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Boulder, CO 80301

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Tel 402-391-8111 Fax 402-391-8564



KEY PLAN

REVISIONS

[illegible]

FILE LOG

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Draw	JTG
Check	AAH

Daly Project No. 003-10073-406
NEON Project No. 04.08.C.0008
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DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
LOCATION MAP AND SURVEY

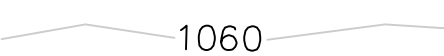



06C2.01

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7	271353.189	2110072.143	1074.542	
8	269925.04	2109799.969	1057.755	5/8" IRON ROD SET WITH ALUMINUM CAP
9	269927.807	2109682.405	1053.789	

NOTES:

1. COORDINATES AS SHOWN ARE BASED ON NAD 1983 (2011), KANSAS NORTH ZONE (1501), ELEVATIONS AS SHOWN ARE NAVD 1988, GEIOD 2012A.

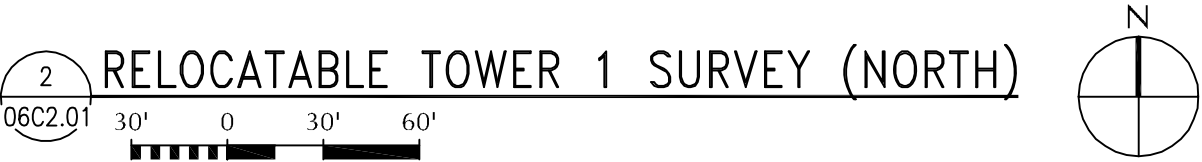
LEGEND

- 1060
- MAJOR CONTOUR
- 
- MINOR CONTOUR
- 
- CONTROL POINT
- 
- TREE

EXISTING PARKING AREA

N 2100 RD
(COUNTY LINE)

RELOCATABLE TOWER 1 SURVEY (NORTH)



JEFFERSON COUNTY

DOUGLAS COUNTY

N 2100 RD
(COUNTY LINE)

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ACTIVITY	BY
Manager	EAH
Design	JTC
Draw	JTC
Check	AAH

Daly Project No. 003-10073-406
NEON Project No. 04.08.C.0008
JANUARY 28, 2014

DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
SURVEY

06C2.01A

1. THE ELECTRICAL SERVICE IS BY THE UTILITY COMPANY UP TO THE METER PEDESTAL AT THE AUXILIARY PORTAL. FROM THE METER PEDESTAL TO THE INSTRUMENT HUT AND BEYOND THE SERVICE IS PRIVATE AND SHALL BE INSTALLED BY THE GENERAL CONTRACTOR. SEE SHEET 06E2.05 FOR ELECTRICAL ONE LINE DIAGRAM.

3. SEE ELECTRICAL PLANS FOR ELECTRIC CONSTRUCTION.

5. ALL LATITUDE/LONGITUDES NOTED ARE TAKEN FROM THE CENTER POINT.

BOUNDARY OFFSET FROM THE EDGE OF THE TOWER. SEE PLAN 06C2.03 FOR OFFSET. THE CONSTRUCTION LIMITS ARE SET TO 10 FEET FROM THE CENTER POINT.

APPROXIMATELY 5' X 6' WIDE X UP TO 7' DEEP. FENCE WITH CONSTRUCTION FENCE. COORDINATE SHALL BE PROVIDED BY FIELD SUPERVISOR. CONTRACTOR SHALL BE RESPONSIBLE FOR FILL HORIZON PIT UPON COMPLETION OF THE PROJECT. THERE SHALL BE A 3' WIDE PATH WITH A 2' MINIMUM GRADE THROUGHOUT THE PATH. ACCESS PATH TO PIT WILL BE PROVIDED BY EXCAVATION.

EXISTING POWER POLE TIE INTO EXISTING POWER SOURCE BY OTHERS LAT 39° 02' 38.82" LON 95° 11' 07.14"

UNDERGROUND ELECTRICAL SERVICE AND COMMUNICATION CONDUIT BY OTHERS, APPROX. 1,390 LF

STAGING/PARKING AREA LAT 39° 02' 39.44" LON 95° 11' 30.28"

SOIL HORIZON (SEE NOTE 6) LAT 39° 02' 30.19" LON 95° 12' 17.06"

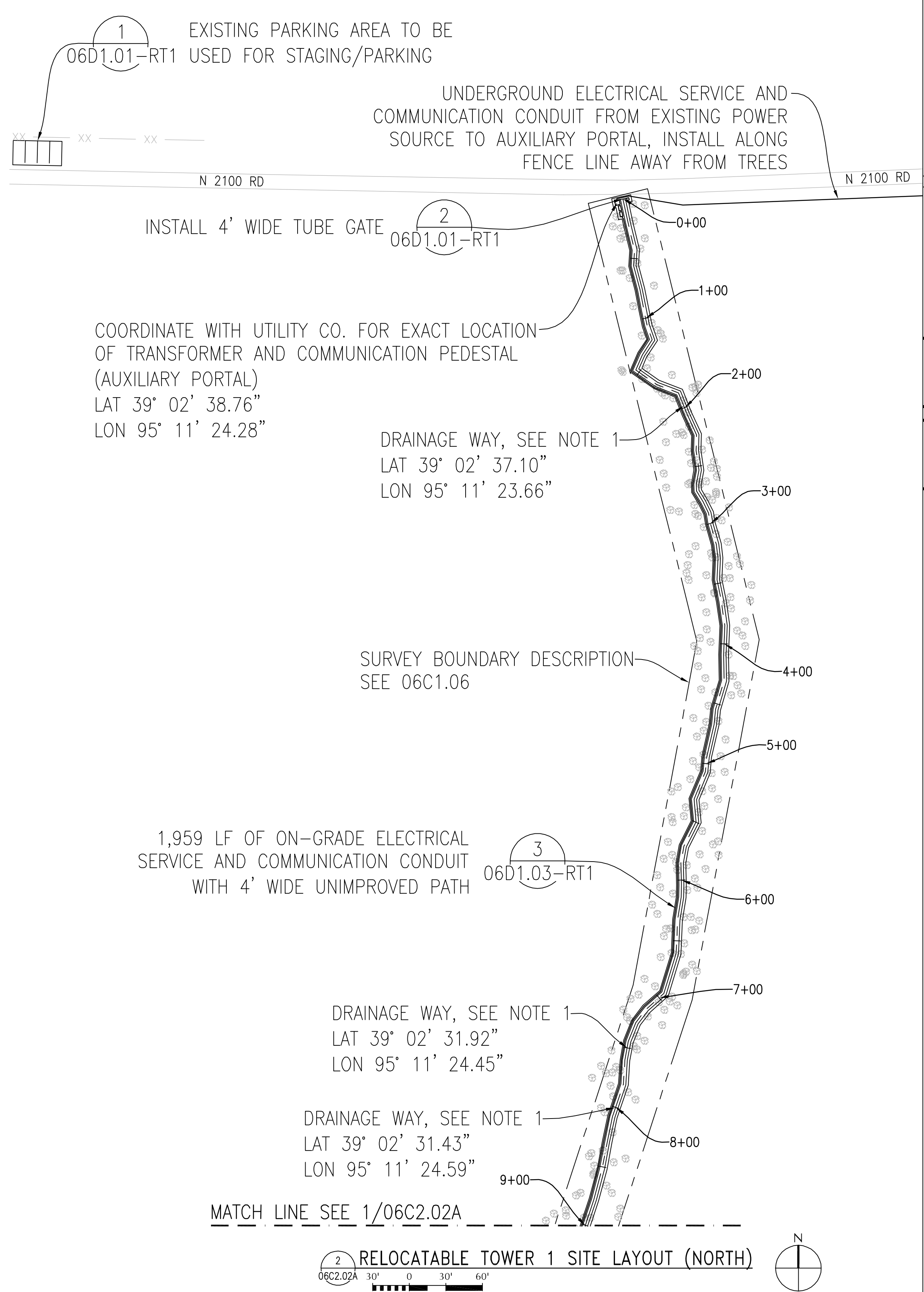
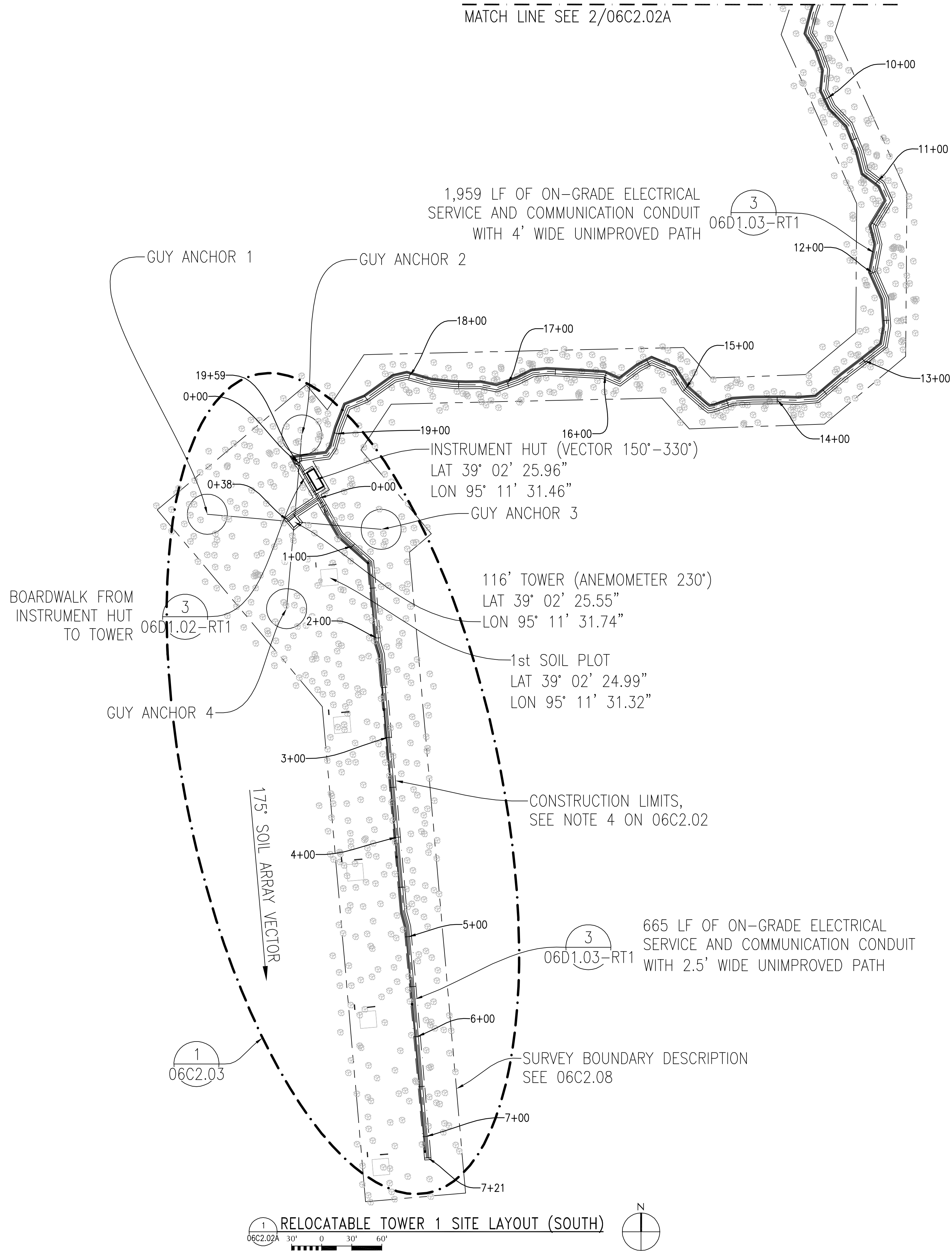
NORTHEAST CORNER OF SECTION 4, T12S, R20E

RELOCATABLE TOWER 1 OVERALL SITE LAYOUT

06C2.02

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NOTES:

1. THE DRAINAGE WAYS ARE LOW SPOTS WHERE RUNNING WATER COULD BE FLOWING DURING WET TIMES. A 10' LENGTH OF BOARDWALK SHALL BE LAID ONTO THE GROUND FOR SAFE CROSSING AND TO ATTACH THE ELECTRICAL AND COMMUNICATION CONDUITS TO. SEE DETAIL 3/06D2.01-RT1.

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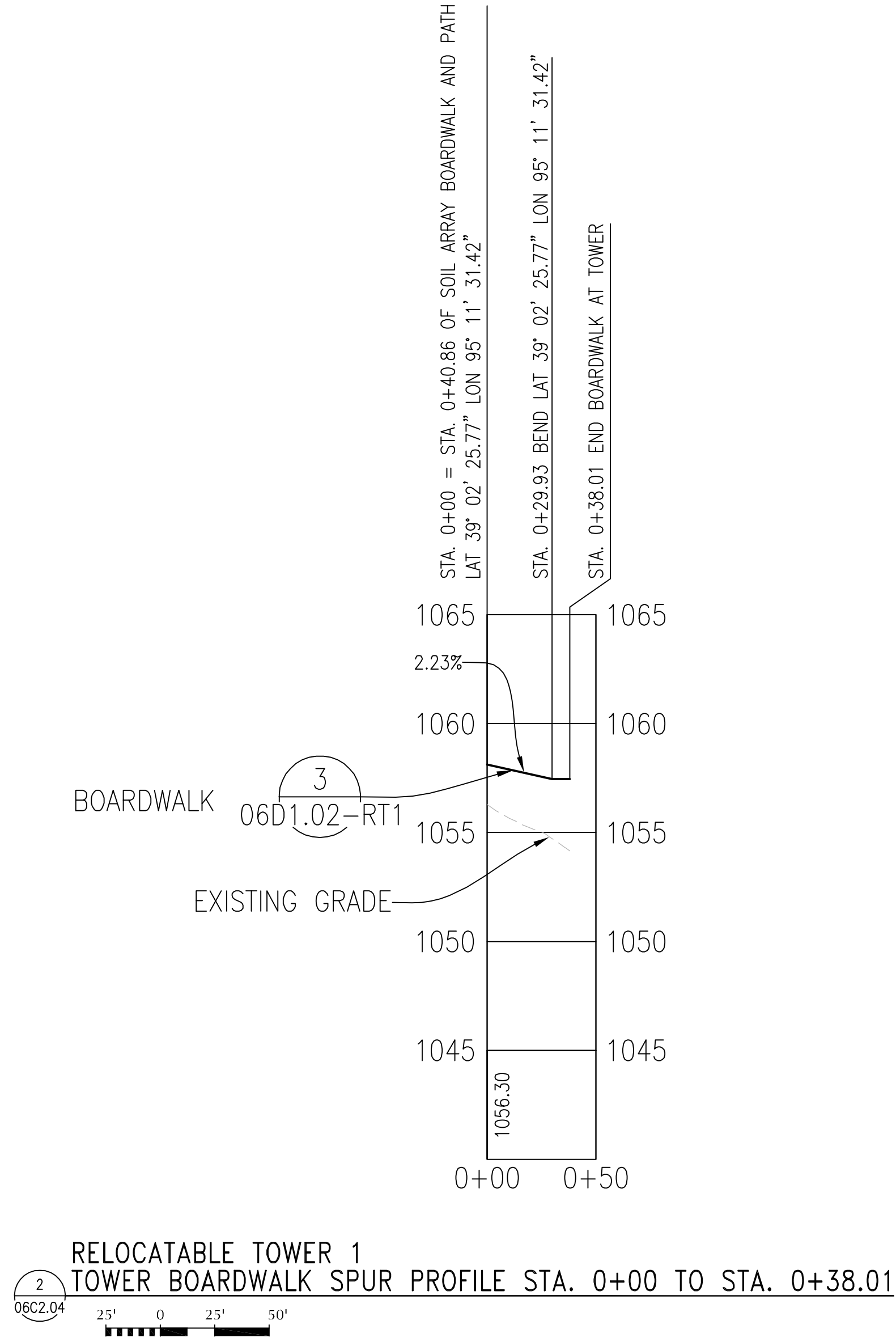
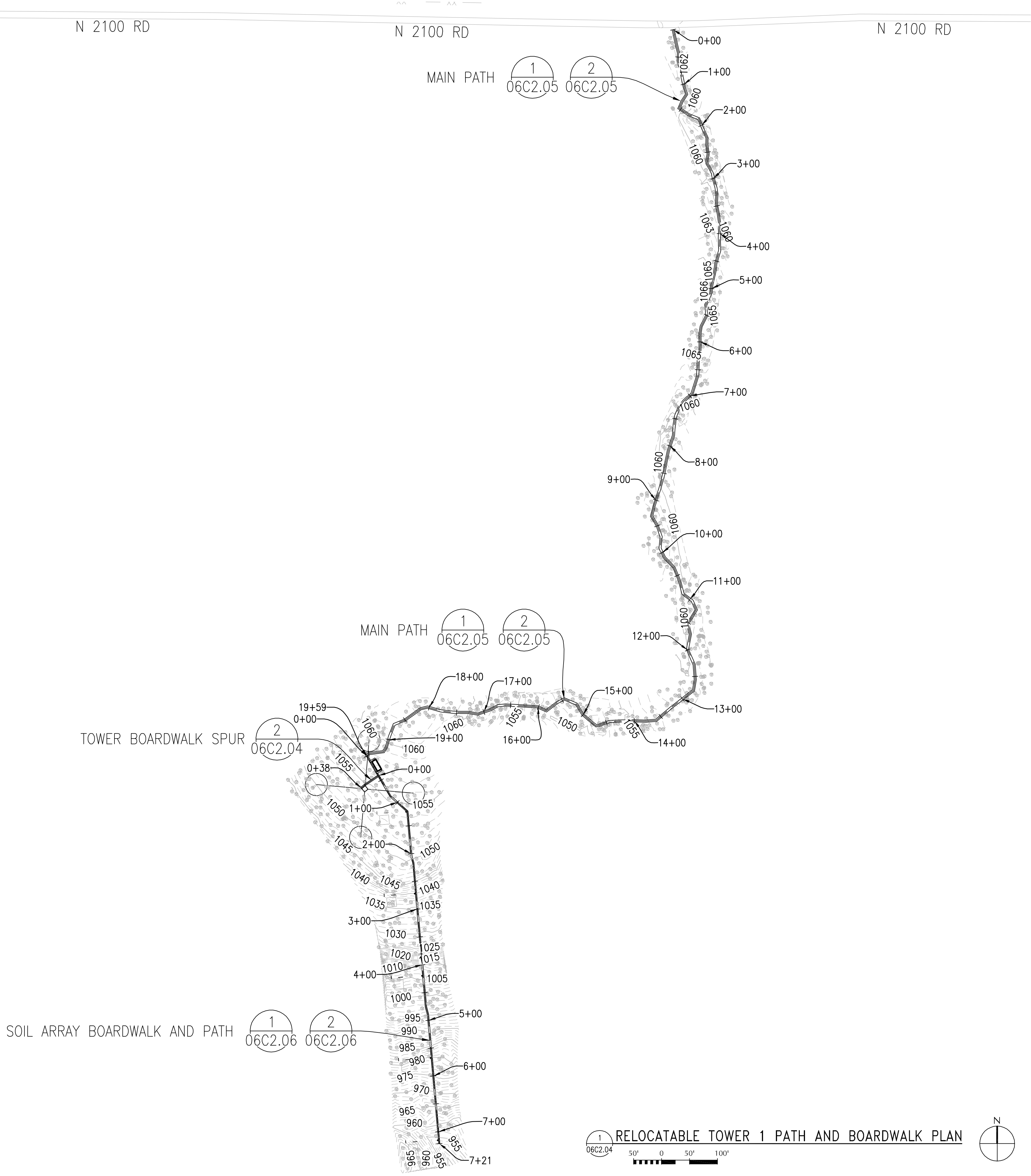
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Manager	EHH
Design	JTC
Draw	JTC
Check	AAR

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NEON Project No. 04.08.C.0008
JANUARY 28, 2014

DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
SITE LAYOUT

06C2.02A

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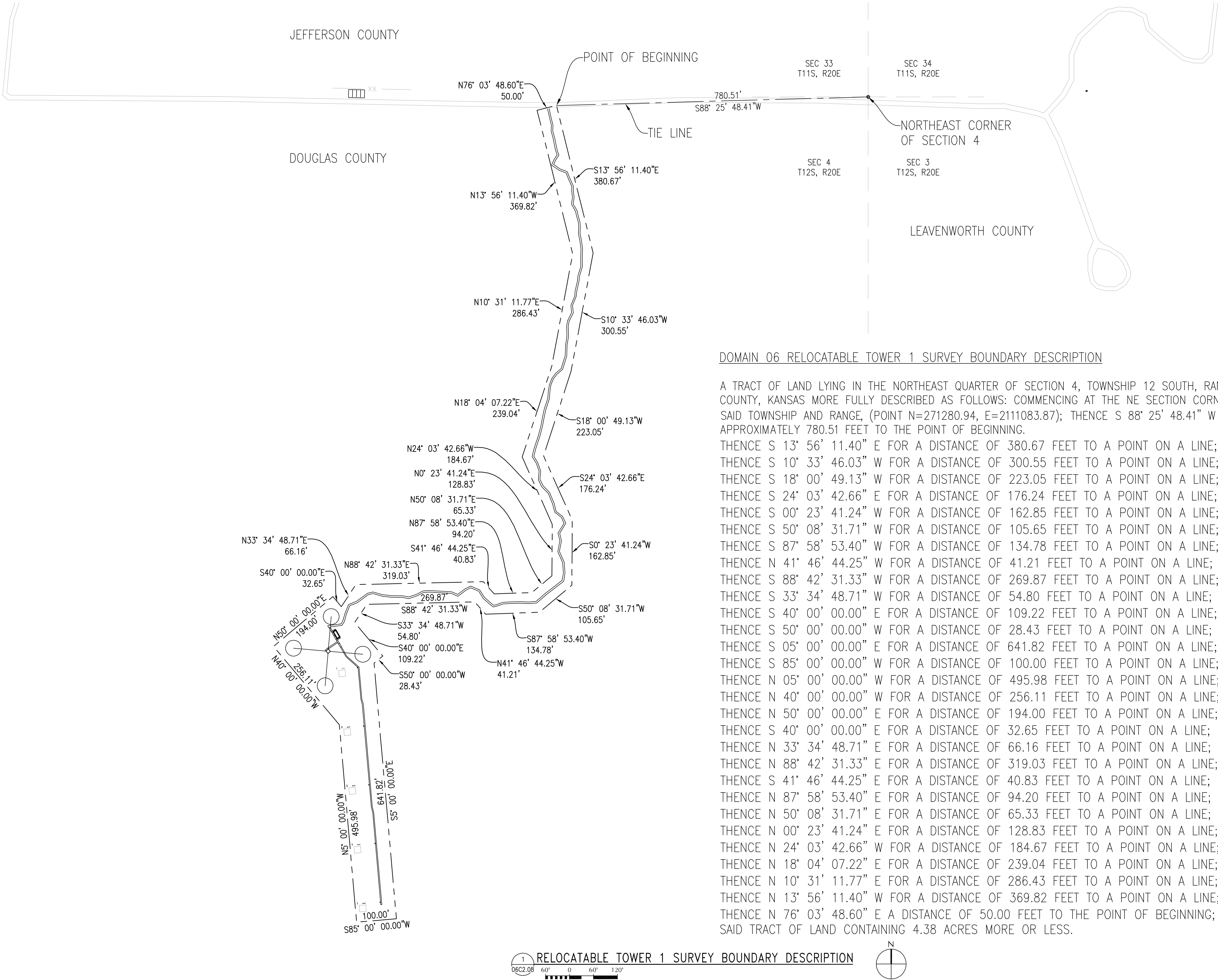
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DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
PATH AND BOARDWALK PLAN

06C2.04

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DOMAIN 06 RELOCATABLE TOWER 1 SURVEY BOUNDARY DESCRIPTION

A TRACT OF LAND LYING IN THE NORTHEAST QUARTER OF SECTION 4, TOWNSHIP 12 SOUTH, RANGE 20 EAST, DOUGLAS COUNTY, KANSAS MORE FULLY DESCRIBED AS FOLLOWS: COMMENCING AT THE NE SECTION CORNER OF SECTION 4 OF SAID TOWNSHIP AND RANGE, (POINT N=271280.94, E=2111083.87); THENCE S 88° 25' 48.41" W A DISTANCE OF APPROXIMATELY 780.51 FEET TO THE POINT OF BEGINNING.

THENCE S 13° 56' 11.40" E FOR A DISTANCE OF 380.67 FEET TO A POINT ON A LINE;
THENCE S 10° 33' 46.03" W FOR A DISTANCE OF 300.55 FEET TO A POINT ON A LINE;
THENCE S 18° 00' 49.13" W FOR A DISTANCE OF 223.05 FEET TO A POINT ON A LINE;
THENCE S 24° 03' 42.66" E FOR A DISTANCE OF 176.24 FEET TO A POINT ON A LINE;
THENCE S 00° 23' 41.24" W FOR A DISTANCE OF 162.85 FEET TO A POINT ON A LINE;
THENCE S 50° 08' 31.71" W FOR A DISTANCE OF 105.65 FEET TO A POINT ON A LINE;
THENCE S 87° 58' 53.40" W FOR A DISTANCE OF 134.78 FEET TO A POINT ON A LINE;
THENCE N 41° 46' 44.25" W FOR A DISTANCE OF 41.21 FEET TO A POINT ON A LINE;
THENCE S 88° 42' 31.33" W FOR A DISTANCE OF 269.87 FEET TO A POINT ON A LINE;
THENCE S 33° 34' 48.71" W FOR A DISTANCE OF 54.80 FEET TO A POINT ON A LINE;
THENCE S 40° 00' 00.00" E FOR A DISTANCE OF 109.22 FEET TO A POINT ON A LINE;
THENCE S 50° 00' 00.00" W FOR A DISTANCE OF 28.43 FEET TO A POINT ON A LINE;
THENCE S 05° 00' 00.00" E FOR A DISTANCE OF 641.82 FEET TO A POINT ON A LINE;
THENCE S 85° 00' 00.00" W FOR A DISTANCE OF 100.00 FEET TO A POINT ON A LINE;
THENCE N 05° 00' 00.00" W FOR A DISTANCE OF 495.98 FEET TO A POINT ON A LINE;
THENCE N 40° 00' 00.00" W FOR A DISTANCE OF 256.11 FEET TO A POINT ON A LINE;
THENCE N 50° 00' 00.00" E FOR A DISTANCE OF 194.00 FEET TO A POINT ON A LINE;
THENCE S 40° 00' 00.00" E FOR A DISTANCE OF 32.65 FEET TO A POINT ON A LINE;
THENCE N 33° 34' 48.71" E FOR A DISTANCE OF 66.16 FEET TO A POINT ON A LINE;
THENCE N 88° 42' 31.33" E FOR A DISTANCE OF 319.03 FEET TO A POINT ON A LINE;
THENCE S 41° 46' 44.25" E FOR A DISTANCE OF 40.83 FEET TO A POINT ON A LINE;
THENCE N 87° 58' 53.40" E FOR A DISTANCE OF 94.20 FEET TO A POINT ON A LINE;
THENCE N 50° 08' 31.71" E FOR A DISTANCE OF 65.33 FEET TO A POINT ON A LINE;
THENCE N 00° 23' 41.24" E FOR A DISTANCE OF 128.83 FEET TO A POINT ON A LINE;
THENCE N 24° 03' 42.66" W FOR A DISTANCE OF 184.67 FEET TO A POINT ON A LINE;
THENCE N 18° 04' 07.22" E FOR A DISTANCE OF 239.04 FEET TO A POINT ON A LINE;
THENCE N 10° 31' 11.77" E FOR A DISTANCE OF 286.43 FEET TO A POINT ON A LINE;
THENCE N 13° 56' 11.40" W FOR A DISTANCE OF 369.82 FEET TO A POINT ON A LINE;
THENCE N 76° 03' 48.60" E A DISTANCE OF 50.00 FEET TO THE POINT OF BEGINNING;
SAID TRACT OF LAND CONTAINING 4.38 ACRES MORE OR LESS.

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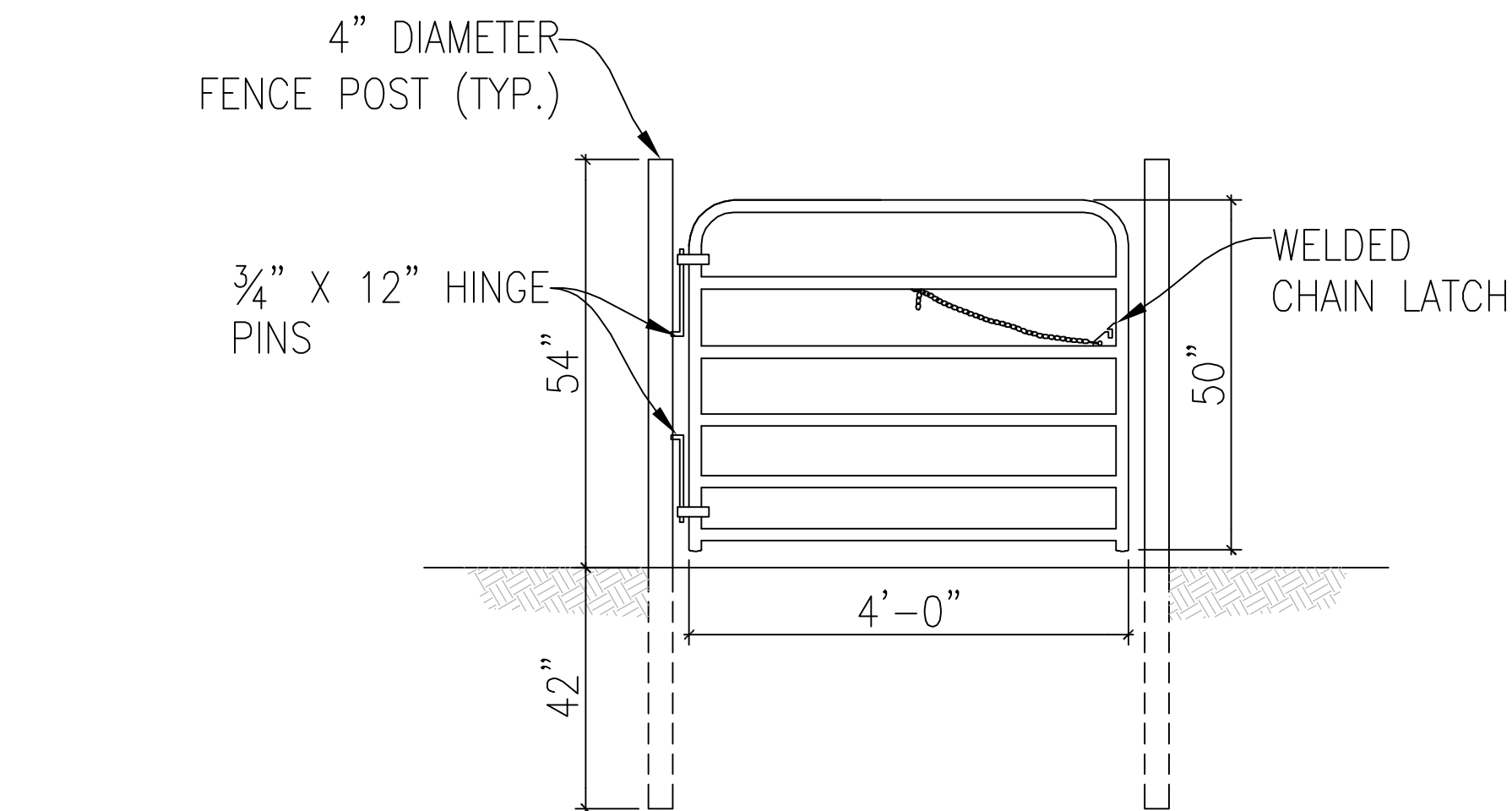
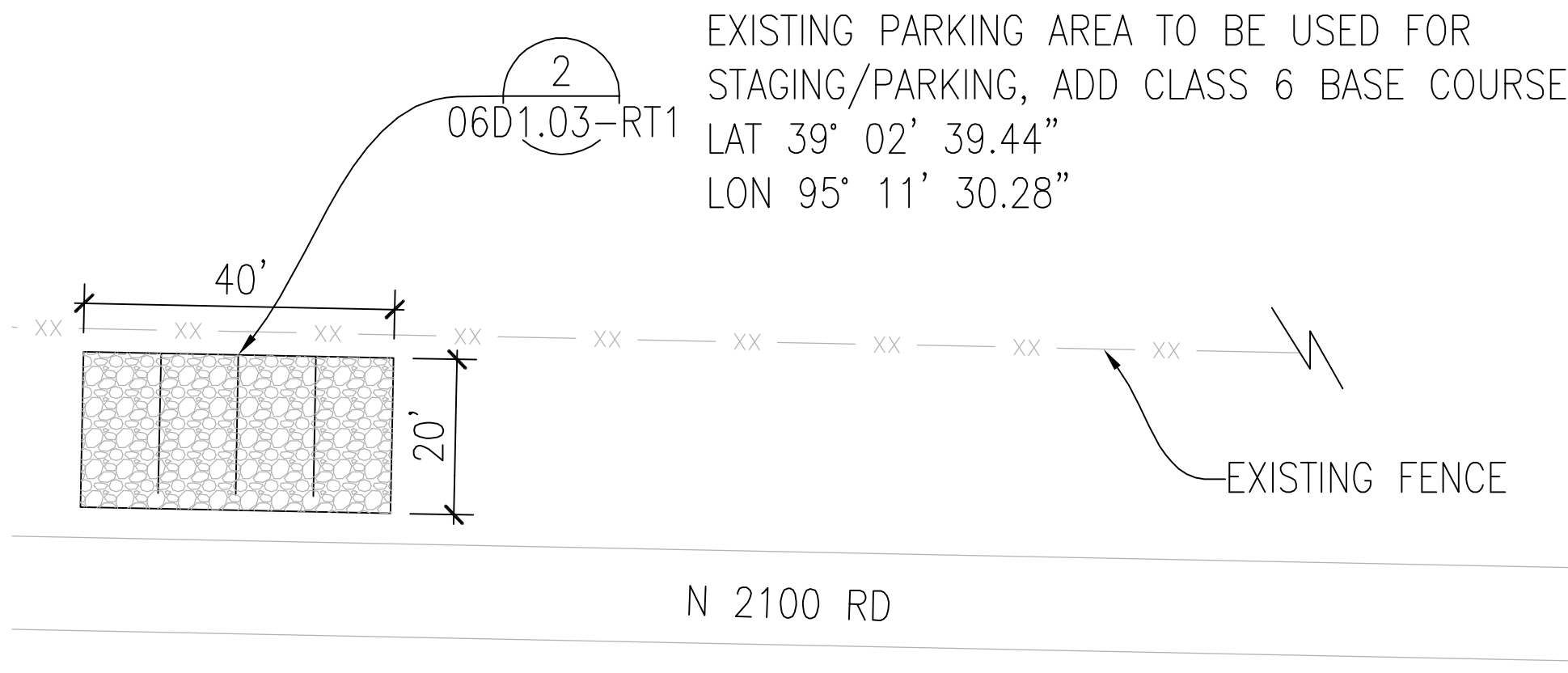
ACTIVITY	BY
Manager	EAH
Design	JTC
Draw	JTC
Check	AAH

Daly Project No. 003-10073-406
NEON Project No. 04.08.C.0008
JANUARY 28, 2014

DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
SURVEY BOUNDARY DESCRIPTION

06C2.08

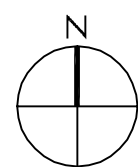
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NOTES:
1. INSTALL 4' TUBE GATE. ALIGN CENTER OF GATE WITH CENTER OF PATH.

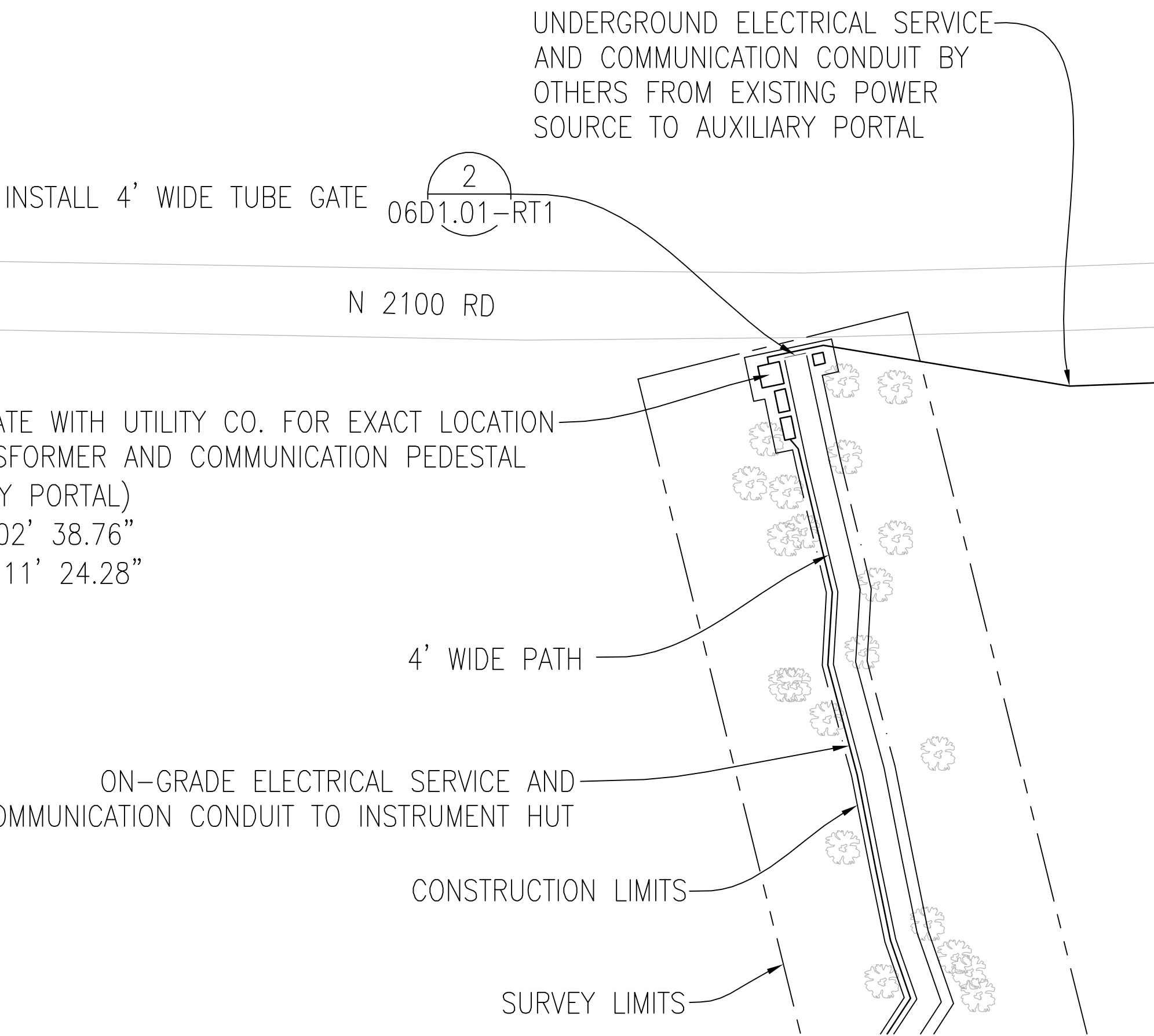
2 4' TUBE GATE
06D1.01-RT1 SCALE: NO SCALE

1 ENLARGED RELOCATABLE TOWER 1 STAGING/PARKING AREA
06D1.01-RT1 10' 0 10' 20'



NOTES:

1. SEE OVERALL SITE LAYOUT ON SHEET 06C2.02 FOR THE APPROXIMATE DISTANCE AND RELATIVE LOCATION OF THE STAGING/PARKING AREA IS FROM THE TOWER SITE.



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DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
CIVIL DETAILS

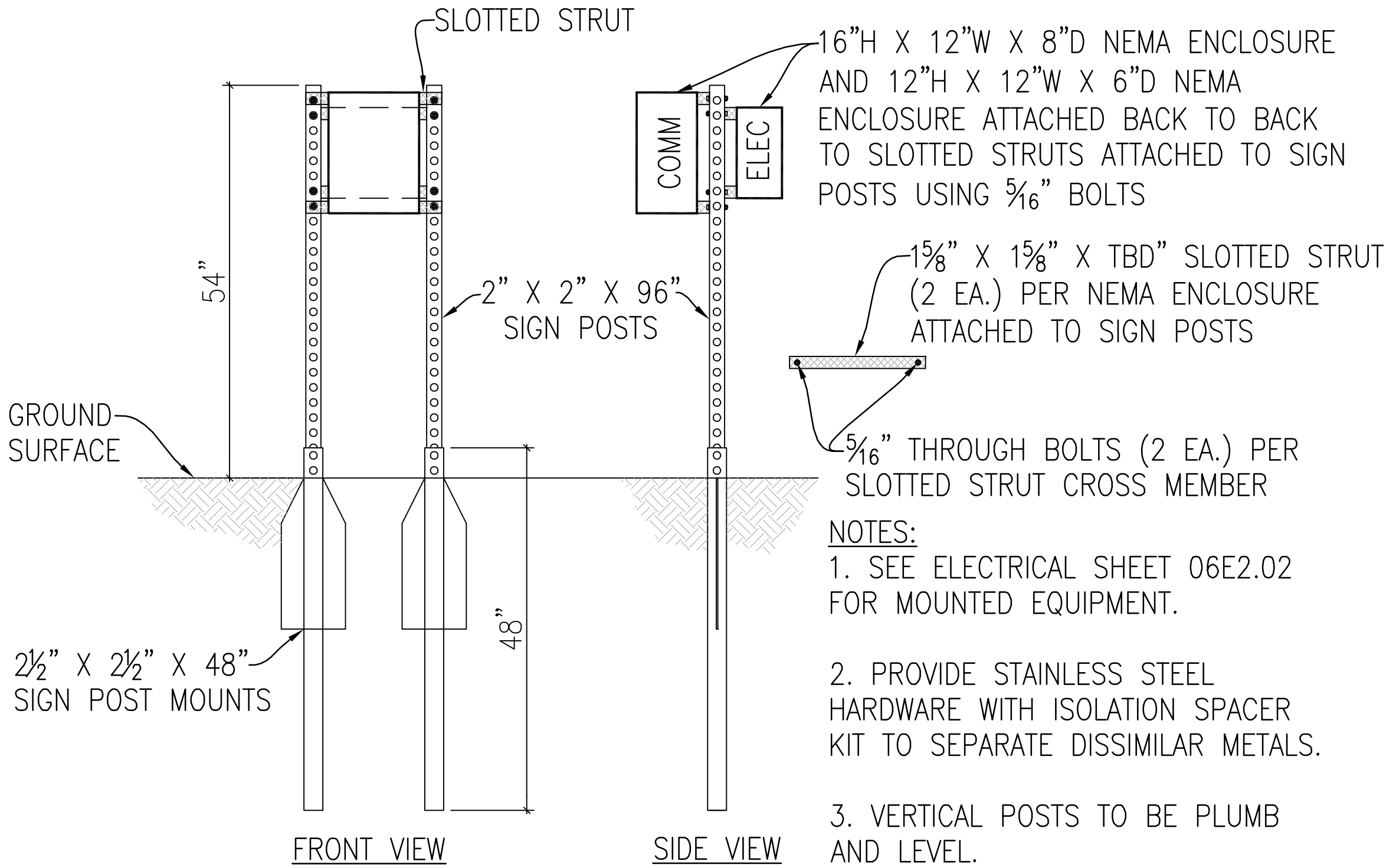
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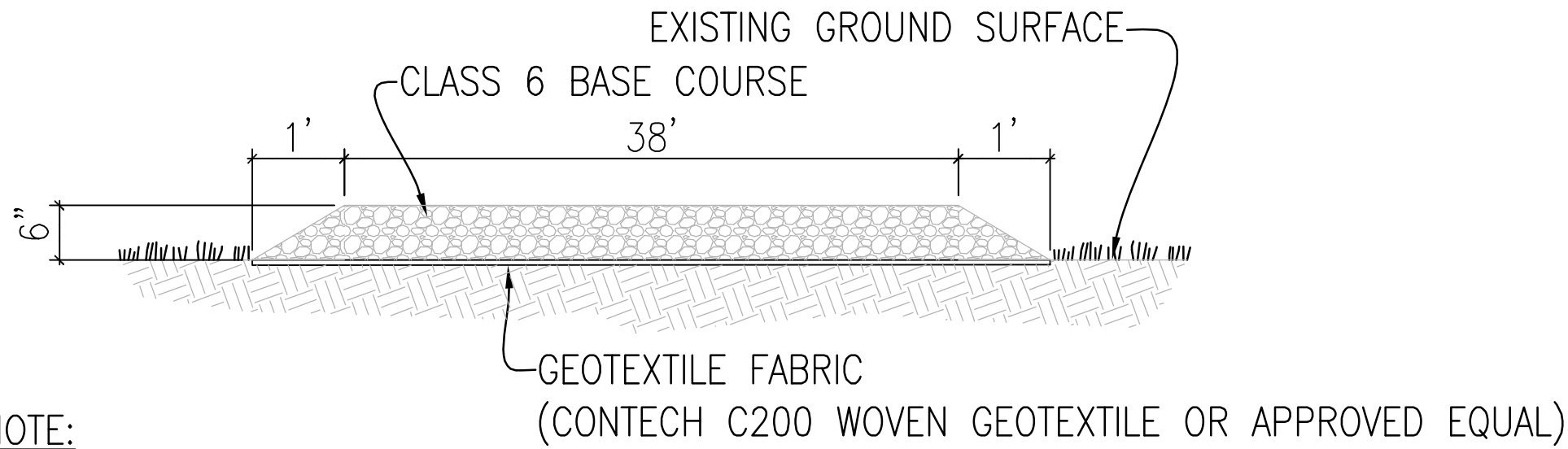
1. TRENCH MUST BE NO LESS THAN 4" WIDE.
2. MINIMUM COVER SHALL BE NO LESS THAN 12".

06D1.02-RT1  DRAINAGE TRENCH CROSS SECTION
SCALE: NO SCALE

-



1 SOIL ARRAY DEVICE POST DETAIL
06D1.03-RT1 SCALE: NO SCALE



2 STAGING/PARKING AREA WITH CLASS 6 BASE COURSE AND FABRIC
06D1.03-RT1 SCALE: NO SCALE



3 UNIMPROVED PATH
06D1.03-RT1 SCALE: NO SCALE

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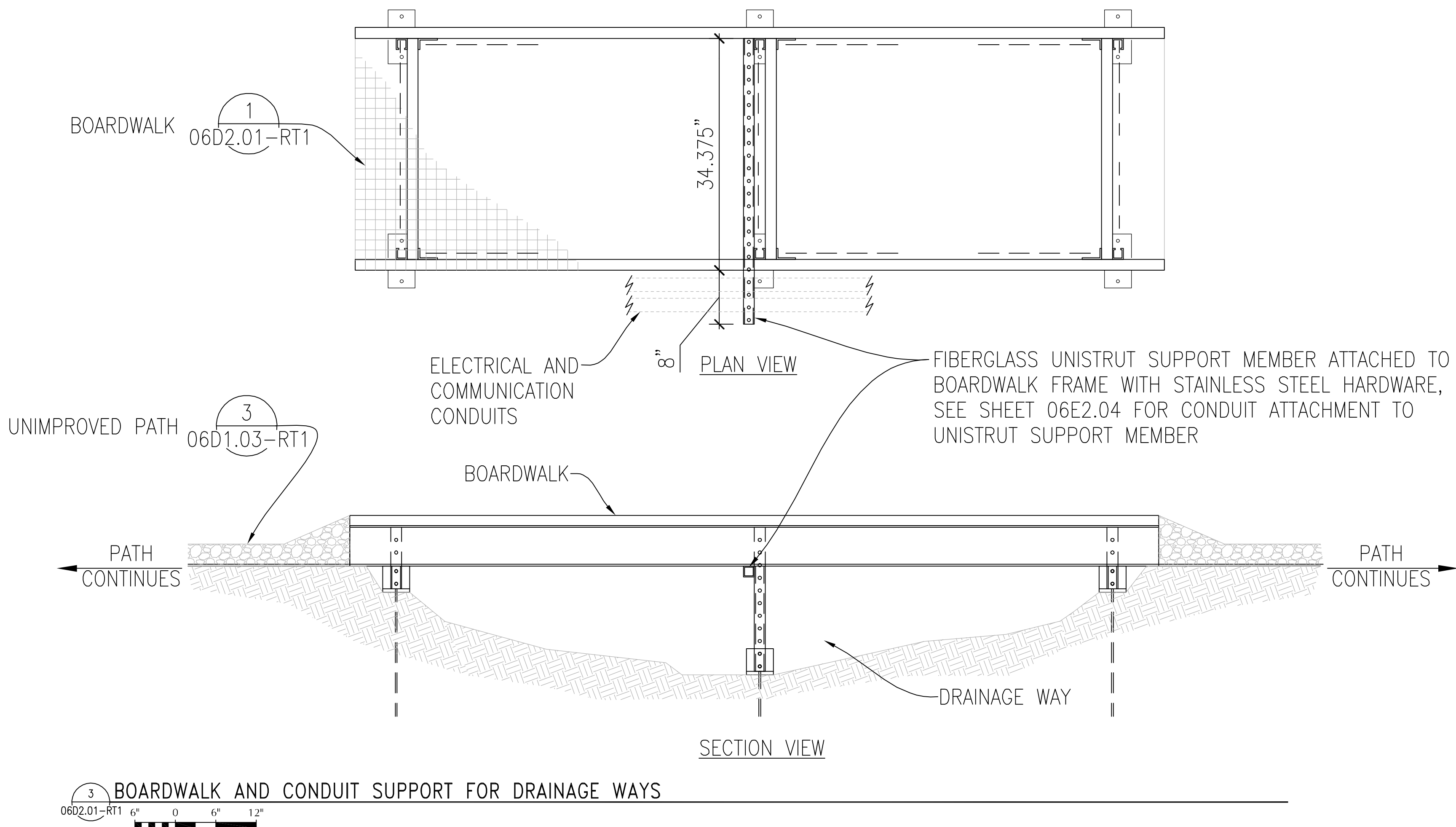
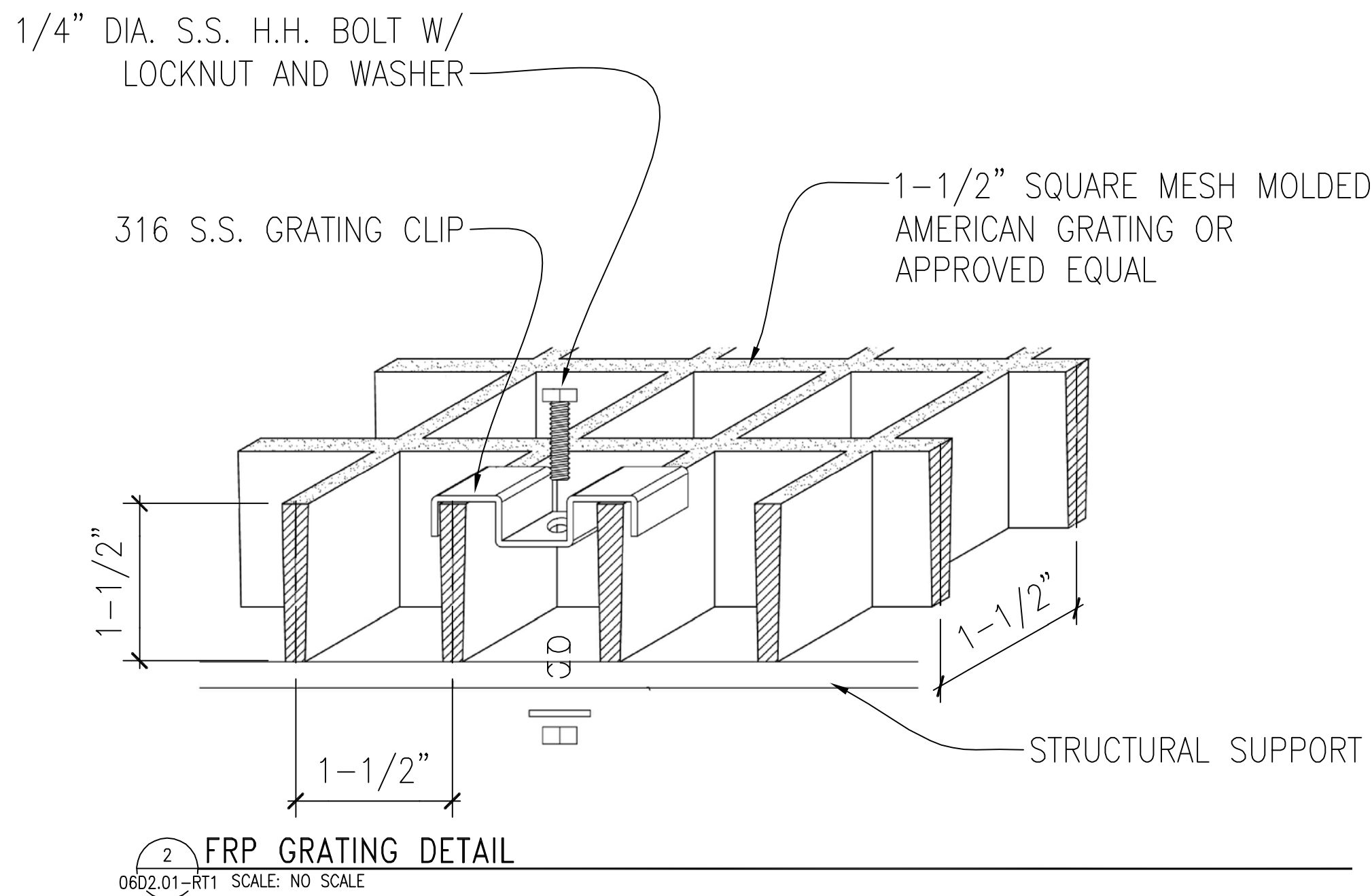
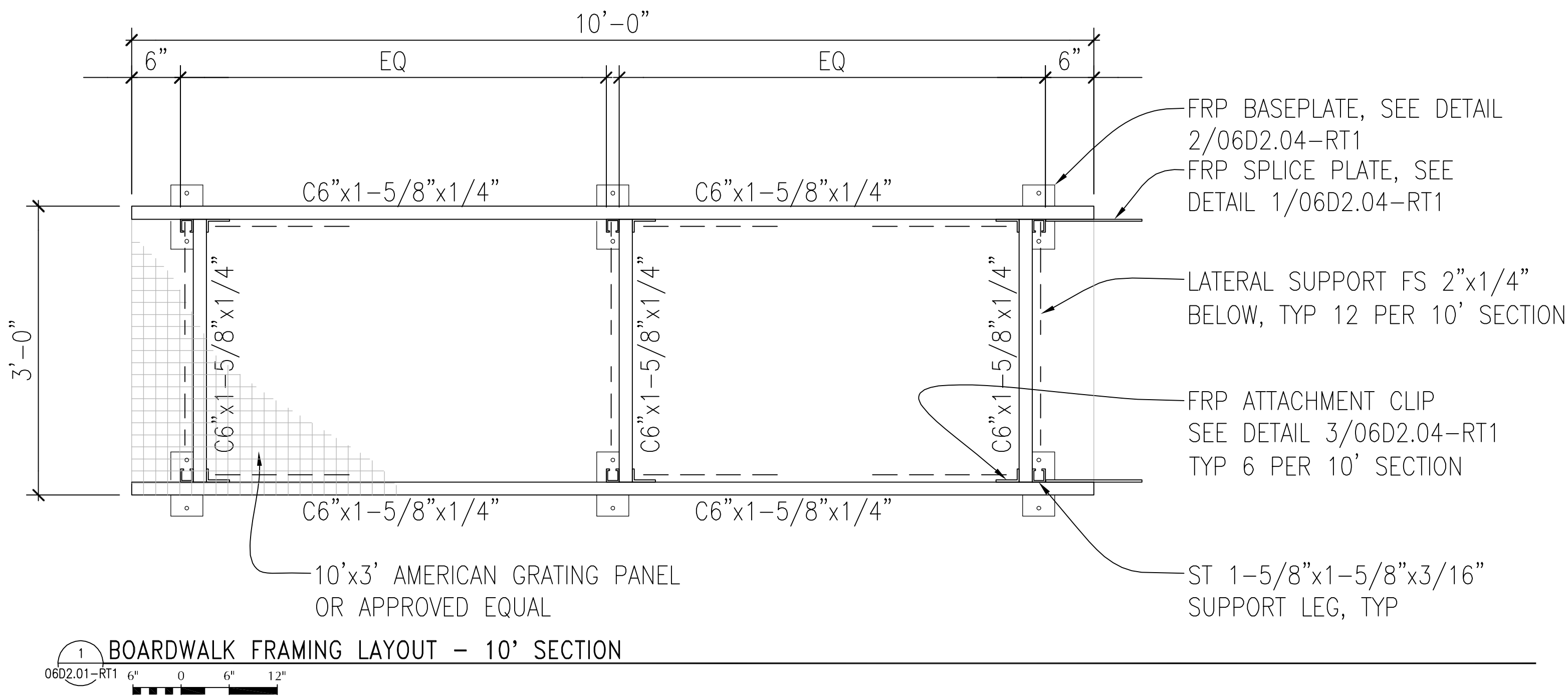
FILE LOG

ACTIVITY	BY
Manager	EAH
Design	EAH
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NEON Project No. 04.08.C.0008
JANUARY 28, 2014

DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
CIVIL DETAILS

06D1.03-RT1



NOTES:

- ALL MATERIAL AND PARTS TO BE FRP (FIBERGLASS REINFORCED POLYESTER) BY AMERICAN GRATING OR APPROVED EQUAL, UNLESS OTHERWISE NOTED.
- DECKING TO BE 3' WIDE FIBERGLASS PANELS BY AMERICAN GRATING OR APPROVED EQUAL.
- STRUCTURAL MEMBERS TO BE IFR (INTERMITTENT FLAME RESISTANT), PULTRUDED, COLOR: GRAY.
- ALL HARDWARE TO BE 316 STAINLESS STEEL.
- THE TWO SECTIONS OF BOARDWALK DIRECTLY IN FRONT OF THE 20' LONG SIDE OF THE INSTRUMENT HUT SHALL BE 46" WIDE.

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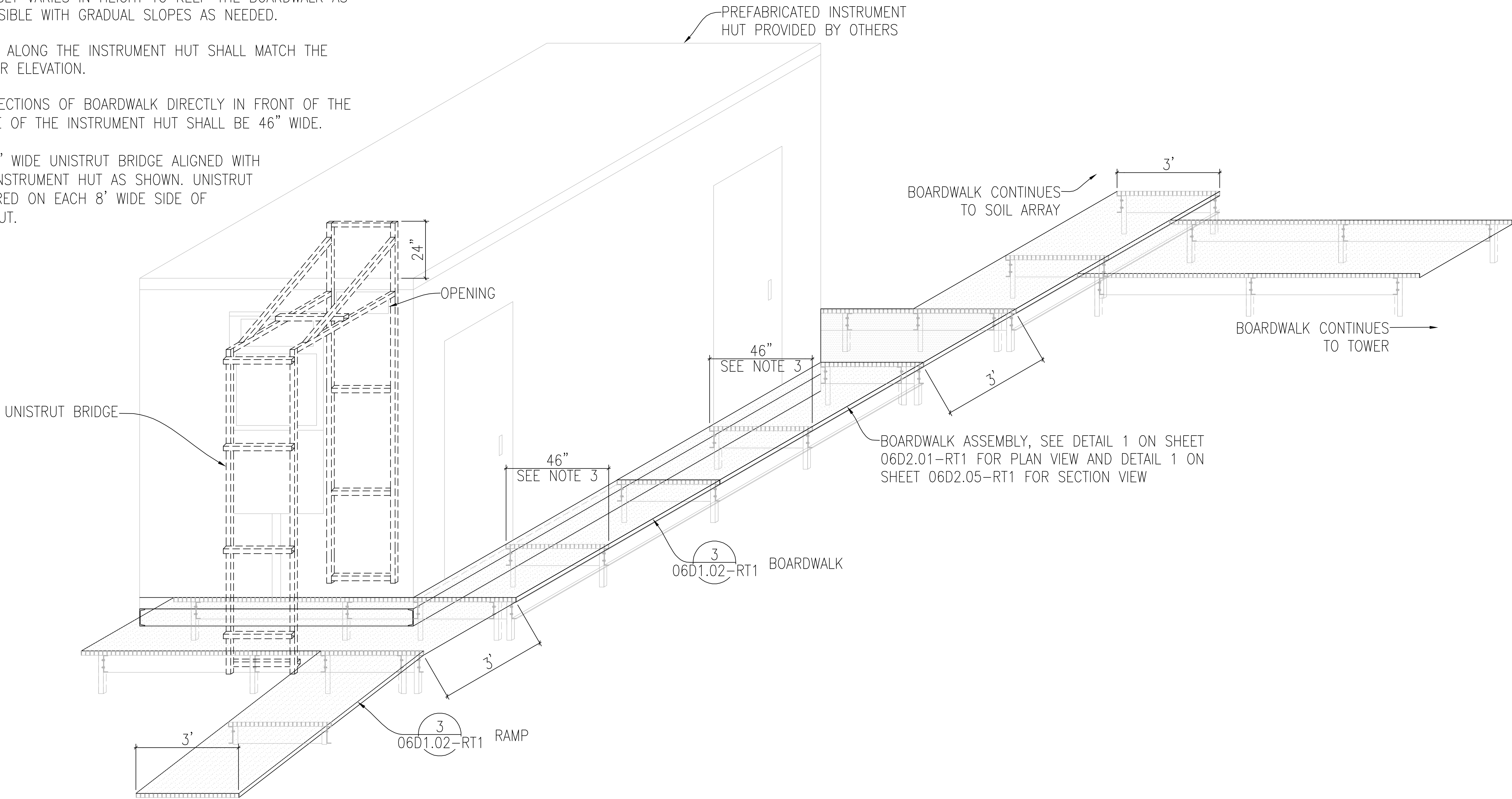
Daly Project No. 003-10073-406
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DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
FRP BOARDWALK DETAILS

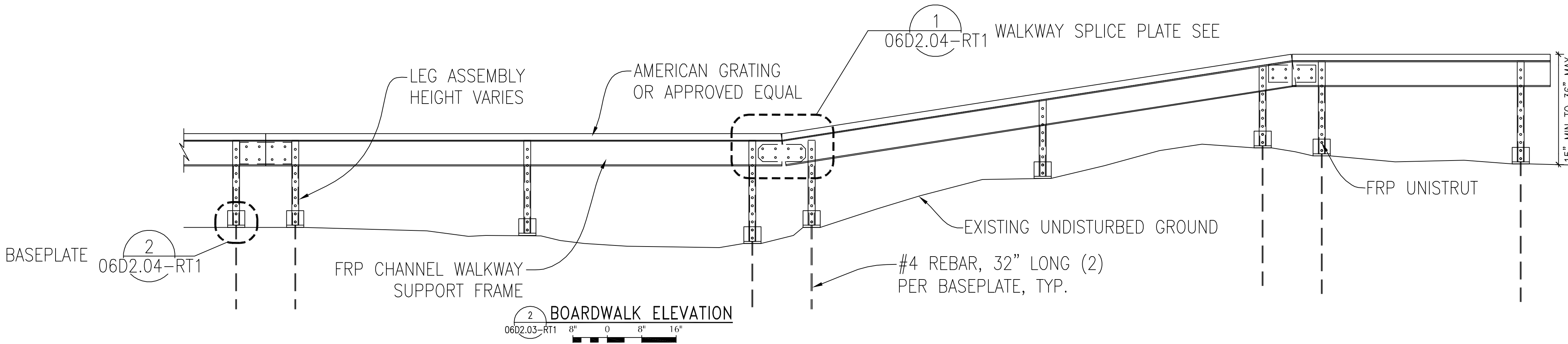
06D2.01-RT1

NOTES:

1. LEG ASSEMBLY VARIES IN HEIGHT TO KEEP THE BOARDWALK AS LEVEL AS POSSIBLE WITH GRADUAL SLOPES AS NEEDED.
2. BOARDWALK ALONG THE INSTRUMENT HUT SHALL MATCH THE FINISHED FLOOR ELEVATION.
3. THE TWO SECTIONS OF BOARDWALK DIRECTLY IN FRONT OF THE 20' LONG SIDE OF THE INSTRUMENT HUT SHALL BE 46" WIDE.
4. INSTALL 24" WIDE UNISTRUT BRIDGE ALIGNED WITH OPENING OF INSTRUMENT HUT AS SHOWN. UNISTRUT BRIDGE REQUIRED ON EACH 8' WIDE SIDE OF INSTRUMENT HUT.



1 INSTRUMENT HUT PERSPECTIVE VIEW
06D2.03-RT1 SCALE: NO SCALE



2 BOARDWALK ELEVATION
06D2.03-RT1 8" 0 8" 16"

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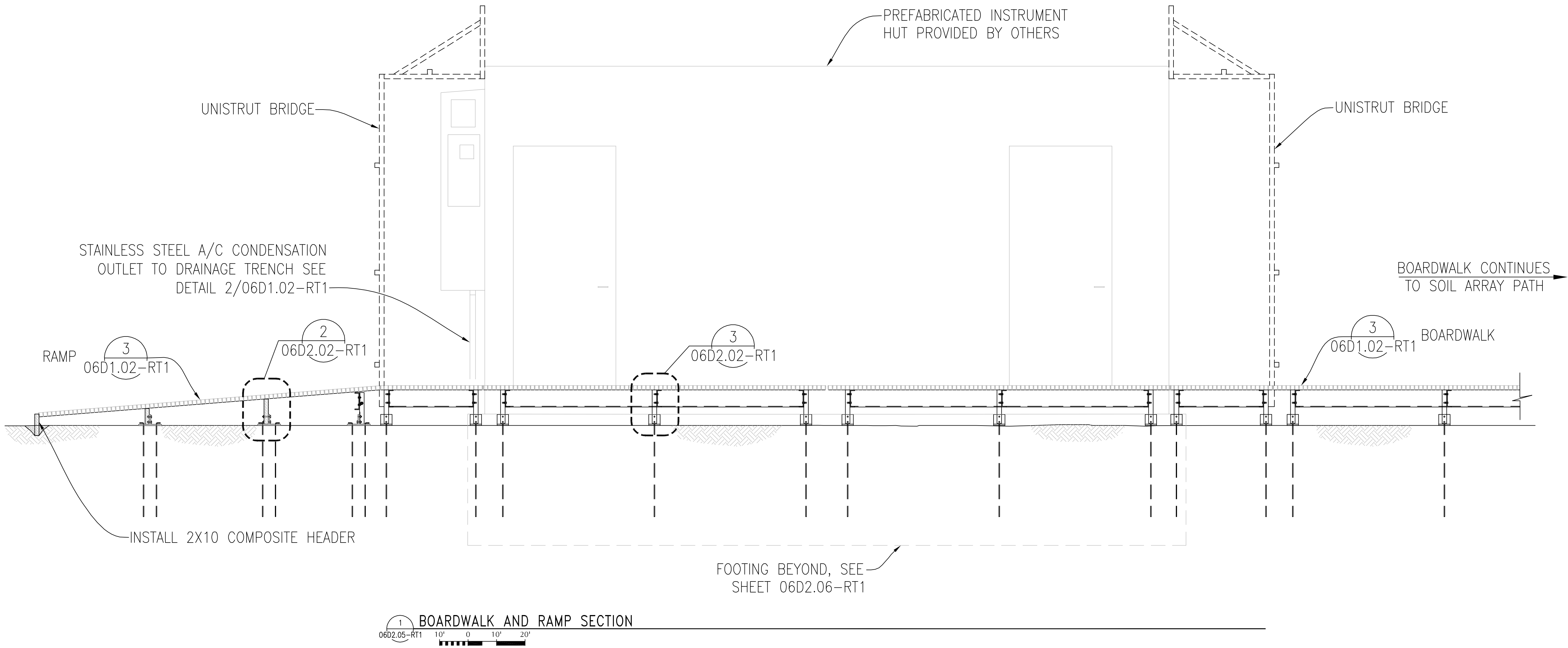
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FRP BOARDWALK DETAILS

06D2.03-RT1

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1 BOARDWALK AND RAMP SECTION
06D2.05-RT1

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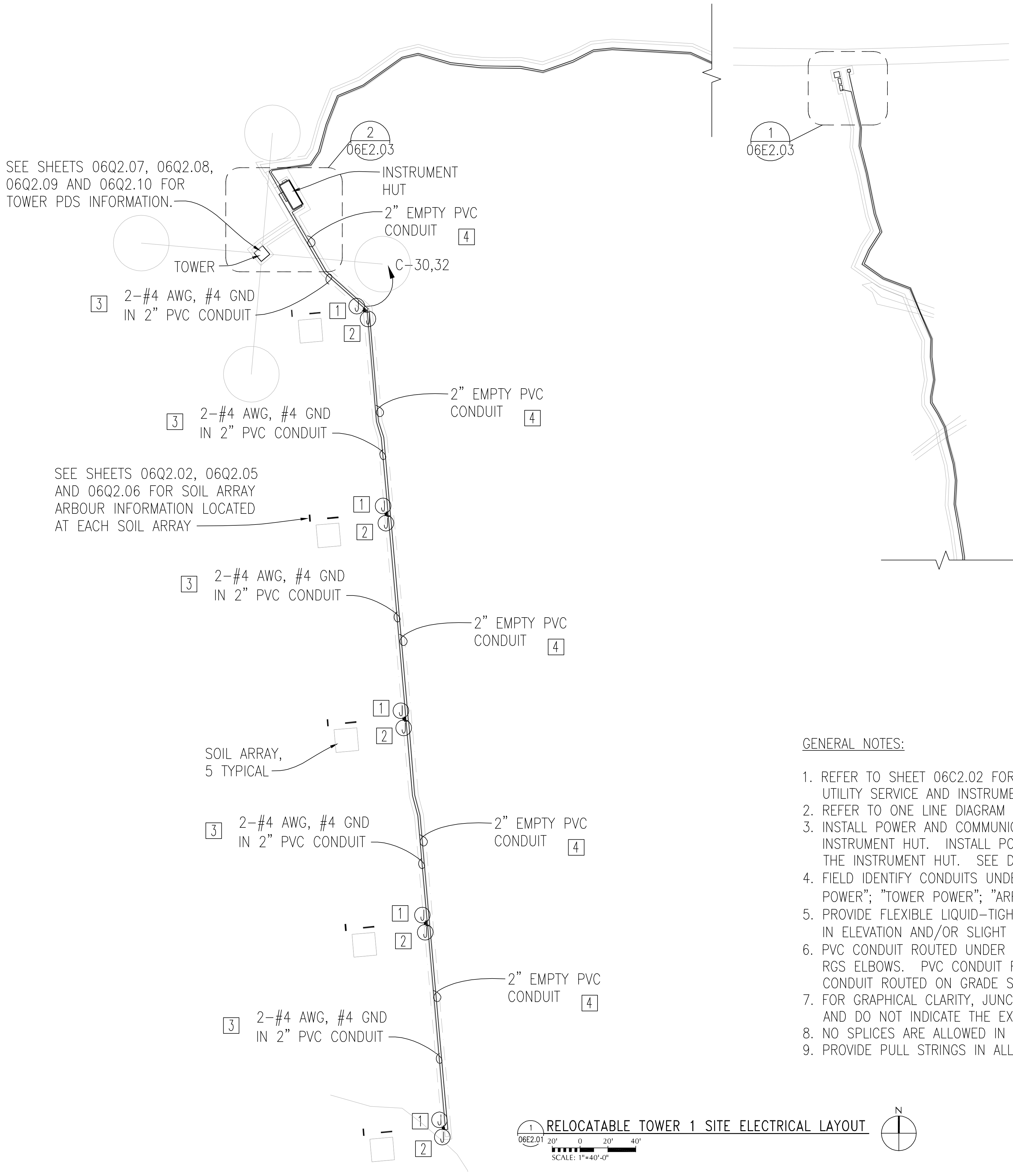
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DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
BOARDWALK AND RAMP SECTION

06D2.05-RT1

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KEYED NOTES:

- 1 INSTALL POWER TERMINAL UNIT MOUNTED TO DEVICE POST ASSEMBLY. LOOP POWER CIRCUIT SHOWN FROM INSTRUMENT HUT PANEL THROUGH EACH POWER BOX. REFER TO DETAILS 1, 2 AND 3 ON SHEET 06E2.02.
- 2 INSTALL DATA BOX MOUNTED TO DEVICE POST ASSEMBLY. REFER TO DETAIL 3 ON SHEET 06E2.02.
- 3 BRANCH POWER CIRCUIT. ROUTE ON GRADE NEXT TO PATH. REFER TO GENERAL NOTE 3.
- 4 COMMUNICATION CONDUIT. ROUTE ON GRADE NEXT TO PATH. REFER TO GENERAL NOTE 3.

GENERAL NOTES:

- 1. REFER TO SHEET 06C2.02 FOR SITE LAYOUT AND SHEET 06C2.03 FOR DISTANCES AND RELATIONSHIPS OF UTILITY SERVICE AND INSTRUMENT HUT.
- 2. REFER TO ONE LINE DIAGRAM ON SHEET 06E2.05 FOR MORE INFORMATION.
- 3. INSTALL POWER AND COMMUNICATION CONDUITS ON GRADE FROM THE AUXILIARY PORTAL TO THE INSTRUMENT HUT. INSTALL POWER AND COMMUNICATION CONDUITS ON GRADE FROM THE SOIL ARRAYS TO THE INSTRUMENT HUT. SEE DETAILS ON SHEET 06E2.04.
- 4. FIELD IDENTIFY CONDUITS UNDER BOARDWALK AND ON GRADE WITH LABELS TO INDICATE USE. "ARRAY POWER"; "TOWER POWER"; "ARRAY COMM"; "TOWER COMM"; "SERVICE FEEDER"; "PHONE SERVICE".
- 5. PROVIDE FLEXIBLE LIQUID-TIGHT CONDUIT SECTION IN RACEWAY RUN UNDER BOARDWALK WHERE CHANGE IN ELEVATION AND/OR SLIGHT CHANGE IN DIRECTION PREVENTS STRAIGHT RUNS.
- 6. PVC CONDUIT ROUTED UNDER BOARDWALK OR BELOW GRADE SHALL BE SCHEDULE 40 WITH PVC COATED RGS ELBOWS. PVC CONDUIT ROUTED UP THE SIDE OF THE INSTRUMENT HUT SHALL BE SCHEDULE 80. CONDUIT ROUTED ON GRADE SHALL BE RGS.
- 7. FOR GRAPHICAL CLARITY, JUNCTION BOXES SHOWN INDICATE LOCATION WHERE THEY MAY BE REQUIRED AND DO NOT INDICATE THE EXACT QUANTITIES THAT ARE REQUIRED.
- 8. NO SPLICES ARE ALLOWED IN POWER CONDUCTORS BETWEEN ENCLOSURES.
- 9. PROVIDE PULL STRINGS IN ALL EMPTY COMMUNICATION CONDUITS.

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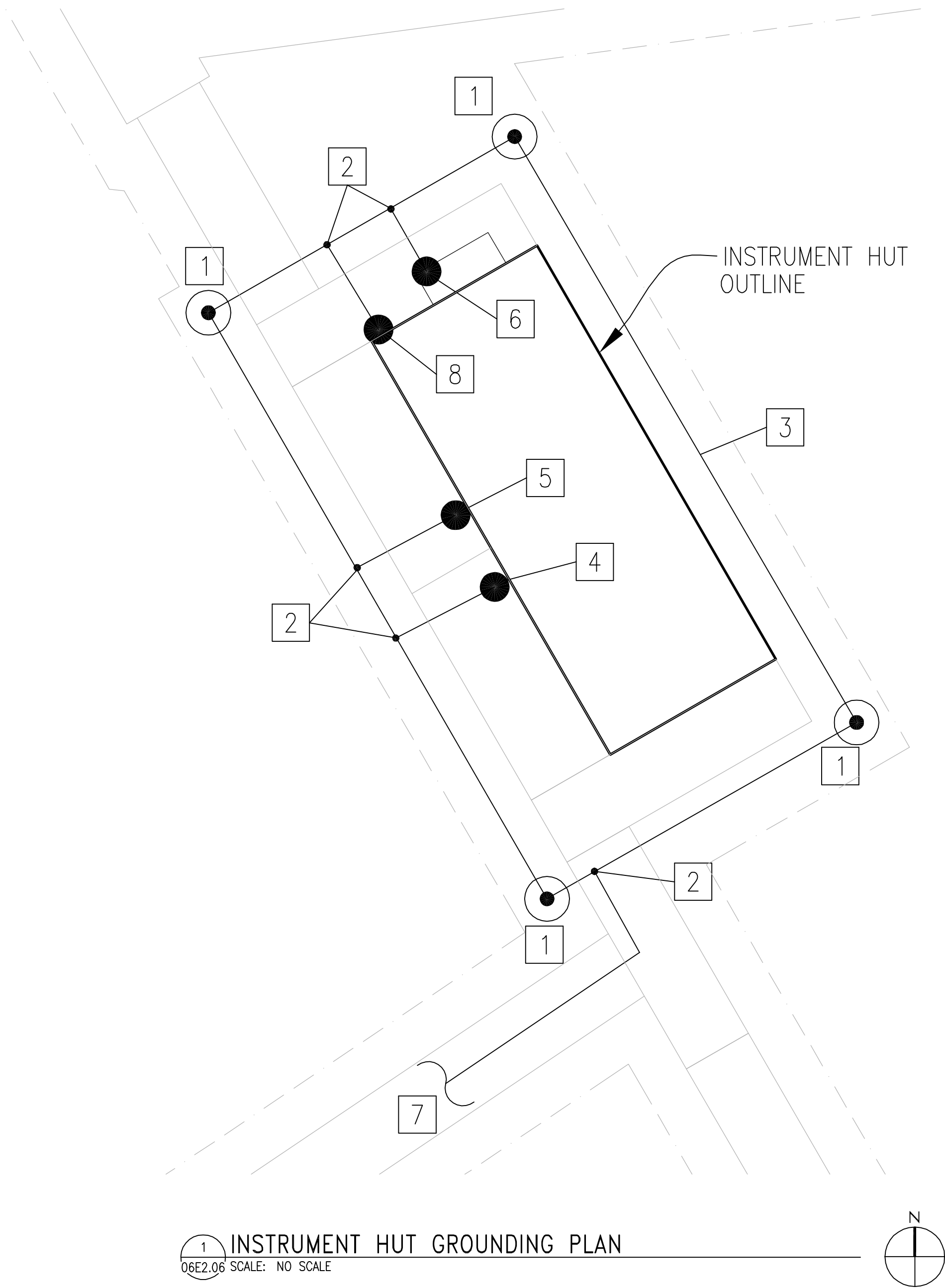
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DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
SITE ELECTRICAL LAYOUT

06E2.01

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KEYED NOTES:

- [1] 24" BY 24" BY 1/4" THICK COPPER GROUND PLATE. BURY HORIZONTALLY 24" BELOW GRADE WHERE POSSIBLE. EXOTHERMICALLY WELD TO COUNTERPOISE.
- [2] EXOTHERMICALLY WELDED CONNECTION.
- [3] BUILDING GROUND RING (COUNTERPOISE). #2 TINNED STRANDED COPPER CONDUCTOR RUN 24" MIN. BELOW GRADE WHERE POSSIBLE AND 2.5' OUT FROM PERIMETER OF BUILDING. EXTEND FURTHER FROM BUILDING AS SHOWN TO AVOID INSTALLING UNDER BOARDWALK. FOR NON-STANDARD SOIL ENVIRONMENTS, SEE MOTOROLA R56 SPECIFICATIONS AND CONFER WITH NEON CONSTRUCTION REPRESENTATIVE.
- [4] MAIN GROUND BAR CONDUCTOR. #2 TINNED STRANDED COPPER CONDUCTOR. CONNECT TO MAIN GROUND BAR INSIDE OF HUT. ROUTE THROUGH HUT PENETRATION PROVIDED, ROUTE DOWN SIDE OF HUT INSIDE OF 3/4" PVC CONDUIT, AND CONNECT TO COUNTERPOISE AS SHOWN. CONDUIT SHALL EXTEND FROM 16" BELOW GRADE TO 7' ABOVE FLOOR LEVEL.
- [5] ELECTRICAL PANEL GROUND BUSS BONDING CONDUCTOR. CONNECT TO GROUND BUSS IN PANEL 'H' AND COUNTERPOISE AS SHOWN. ROUTE IN 3/4" DIA. PVC CONDUIT FROM PANEL TO 16" BELOW GRADE.
- [6] HVAC EQUIPMENT GROUNDING CONDUCTOR. #2 TINNED STRANDED COPPER CONDUCTOR. CONNECT TO HVAC EQUIPMENT AND COUNTERPOISE AS SHOWN. ROUTE IN 3/4" PVC CONDUIT FROM HVAC UNIT TO 16" BELOW GRADE.
- [7] GROUND CONDUCTOR. #2 TINNED STRANDED COPPER CONDUCTOR MOUNTED TO UNDERSIDE OF BOARDWALK IN 1" PVC CONDUIT AND CONNECT TO TOWER GROUNDING SYSTEM.
- [8] UFER GROUND AND STEEL FRAME GROUND CONNECTION. PROVIDE 20 FEET OF BARE #4 AWG GROUND CONDUCTOR LOCATED IN BASE OF FOUNDATION, 2 INCHES FROM BOTTOM, AND STUB UP AT TOP OF FOUNDATION TO BOND TO STEEL FRAME OF INSTRUMENT HUT. CONTINUE BARE #4 AWG GROUND CONDUCTOR FROM STEEL FRAME TO COUNTERPOISE AS SHOWN.

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EST. 1915

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KEY PLAN

REVISIONS

NO.	DESCRIPTION	DATE

FILE LOG

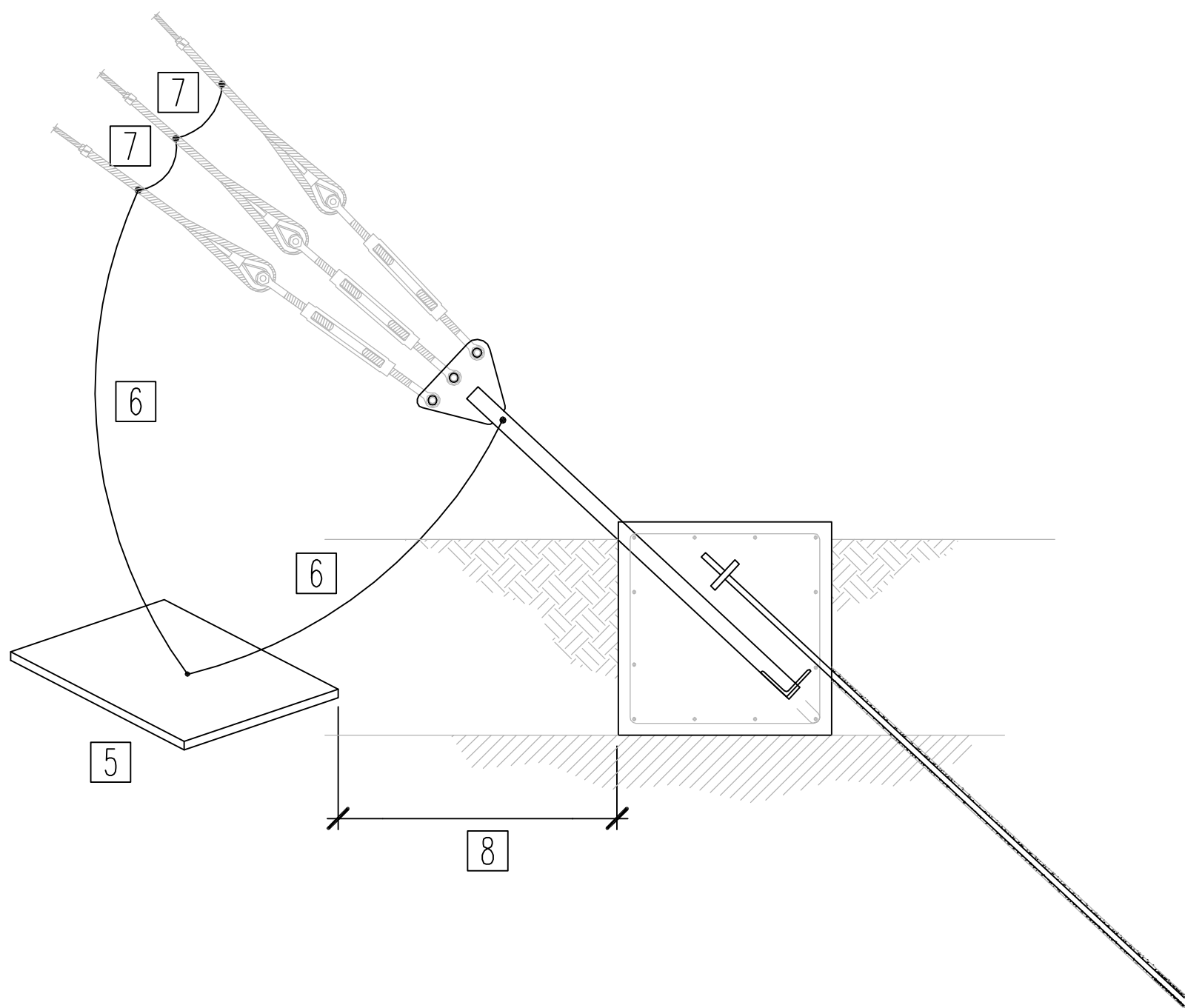
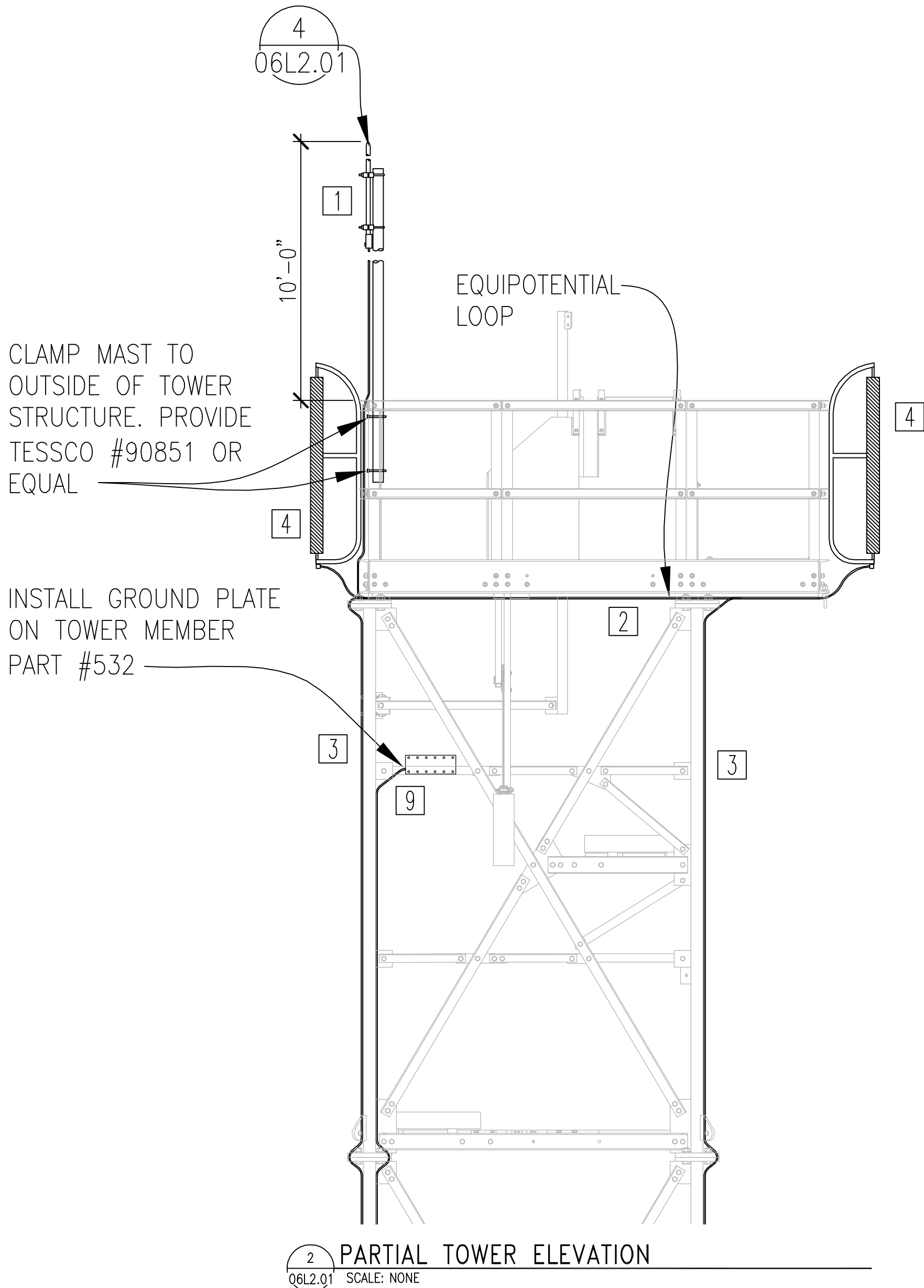
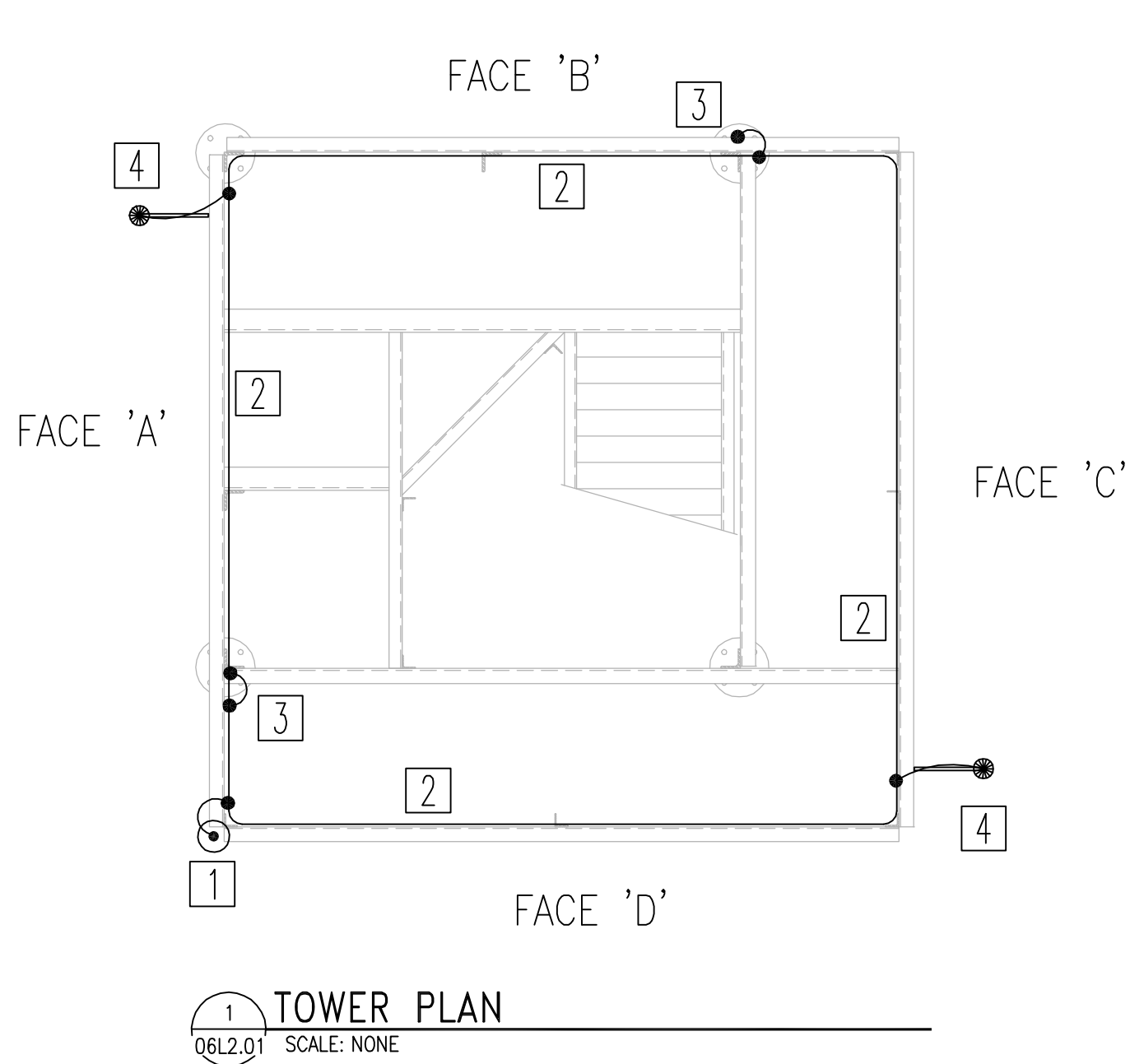
ACTIVITY	BY
Manager	EHH
Design	FLE
Draw	FLE
Check	AAB

Daly Project No. 003-10073-406
NEON Project No. 04.08.C.0008
JANUARY 28, 2014

DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
INSTRUMENT HUT
GROUNDING PLAN

06E2.06

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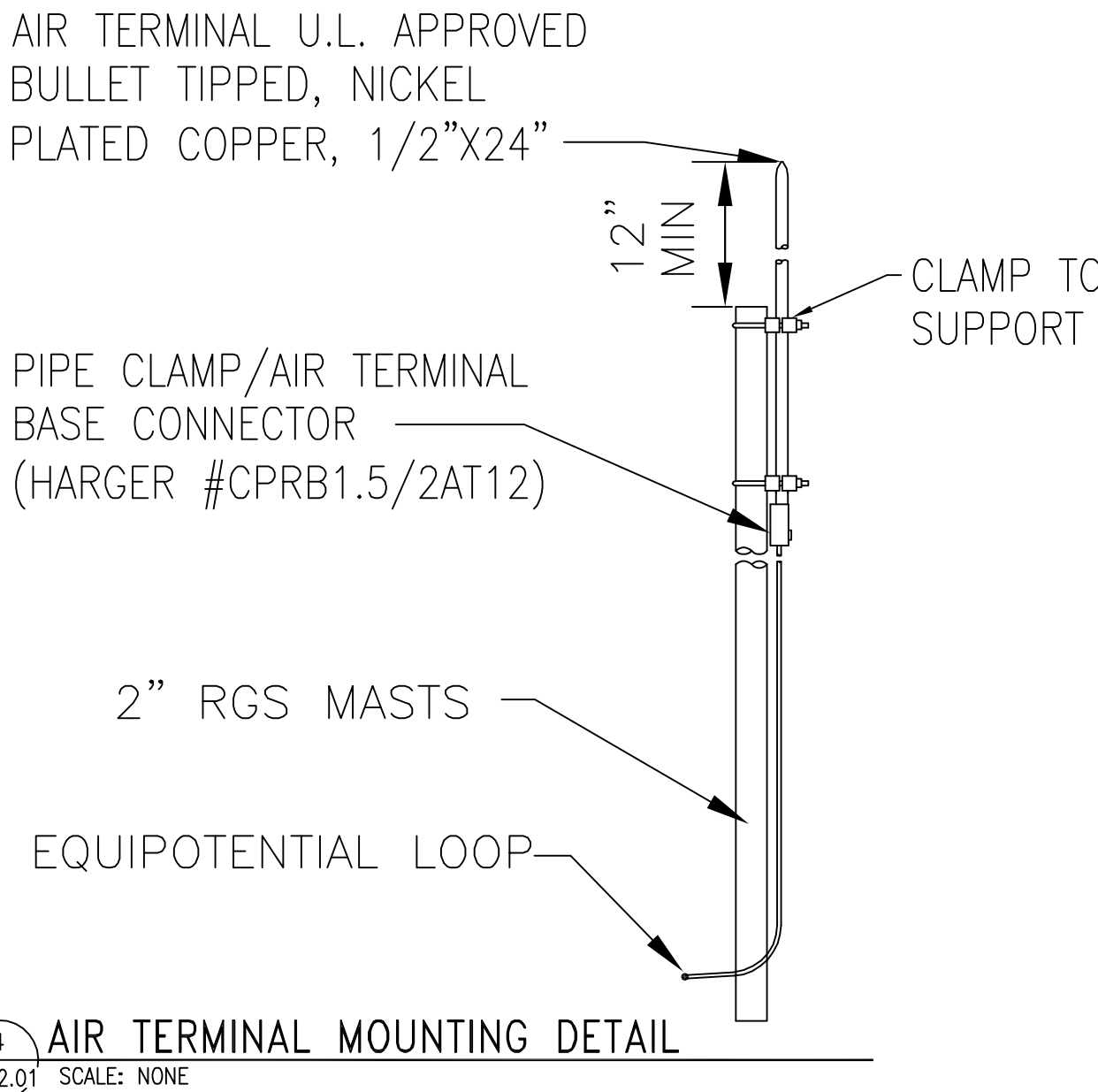


KEYED NOTES:

- 1 PROVIDE AIR TERMINAL AT CORNER OF TOWER AS SHOWN. AIR TERMINAL SHALL BE 1/2" DIAMETER SOLID COPPER.
- 2 PROVIDE STRANDED TINNED COPPER EQUIPOTENTIAL LOOP AT TOP OF TOWER TO INTERCONNECT AIR TERMINAL AND STATIC DISSIPATERS AS SHOWN. PROVIDE CABLE TO FLAT METAL CONNECTORS (HARGER #213T OR EQUAL) TO ATTACH LOOP CONDUCTOR TO TOWER STRUCTURE.
- 3 ROUTE STRANDED TINNED COPPER DOWN CONDUCTOR FROM TOP EQUIPOTENTIAL LOOP DOWN TOWER LEGS C/B AND A/D AS SHOWN AND CONNECT TO COUNTERPOISE. STRAP TO TOWER LEG EVERY 3 FEET WITH TIN PLATED BRONZE PIPE CLAMPS (HARGER CPC2.5/3 OR EQUAL). PROVIDE A LISTED CONDUCTIVE ANTI-OXIDANT COMPOUND BETWEEN THE CLAMP AND TOWER LEG TO SEPARATE DISSIMILAR METALS.
- 4 PROVIDE STATIC DISSIPATER; LIGHTNING PROTECTION SYSTEMS, INC. MODEL ALS-1000 STAINLESS STEEL OR EQUAL. LOCATE A MINIMUM OF 20" AND A MAXIMUM OF 24" FROM CLOSEST TOWER CORNER AS SHOWN AND SHALL NOT EXTEND MORE THAN 6" ABOVE HANDRAIL.
- 5 PROVIDE 24" BY 24" BY 1/4" THICK COPPER GROUND PLATE. INSTALL PLATE HORIZONTALLY 24" BELOW GRADE WHERE POSSIBLE. EXOTHERMICALLY WELD TO GROUNDING CONDUCTORS.
- 6 PROVIDE BARE STRANDED #2/0 TINNED COPPER GROUNDING CONDUCTOR FROM GROUND PLATE TO GUY WIRES AND GUY ANCHOR. MAINTAIN A CONTINUOUS VERTICAL DROP.
- 7 CONNECT GROUNDING CONDUCTOR TO GUY WIRES WITH STAINLESS STEEL CLAMPS AND COATED WITH A LISTED CONDUCTIVE ANTI-OXIDANT COMPOUND LOCATED ABOVE THE TURNBUCKLES.
- 8 LOCATE GROUND PLATE A MINIMUM OF 2'-0" FROM GUY ANCHOR FOUNDATION.
- 9 PROVIDE 24" BY 4" BY 1/4" GROUND PLATE WITH HOLES AT TOP OF TOWER. COORDINATE EXACT MOUNTING LOCATION WITH NEON STAFF. PROVIDE #2 XLP (SUNLIGHT RESISTANT) STRANDED COPPER GROUNDING CONDUCTOR WITH GREEN IDENTIFICATION TAPE FROM GROUND PLATE DOWN TOWER LEG AND CONNECT TO LOWER GROUND PLATE. STRAP GROUNDING CONDUCTOR TO TOWER EVERY 3 FEET WITH GALVANIZED METAL STRAPS.

GENERAL NOTES:

1. PROVIDE CLASS II SYSTEM COMPONENTS FOR THIS TOWER.
2. CONDUCTORS SHALL MAINTAIN A HORIZONTAL OR DOWNWARD PATH FREE FROM "U" OR "V" POCKETS. CONDUCTORS SHALL NOT FORM AN ANGLE LESS THAN 90 DEGREES OR HAVE A BEND RADIUS LESS THAN 8 INCHES.
3. PROVIDE COPPER BRAID BONDING JUMPER FROM TOWER LEG TO GUY WIRE WITH STAINLESS STEEL CLAMPS AND COATED WITH A LISTED CONDUCTIVE ANTI-OXIDANT COMPOUND LOCATED BELOW THE SHACKLE.
4. PROVIDE 2 BOLT PARALLEL CONNECTORS (HARGER #204T OR EQUAL) TO SPLICE ABOVE GROUND LIGHTNING PROTECTION CONDUCTORS ON TOWER.
5. CONTRACTOR TO PROVIDE SHOP DRAWING OF LIGHTNING PROTECTION SYSTEM WITH ALL COMPONENTS USED FOR REVIEW.



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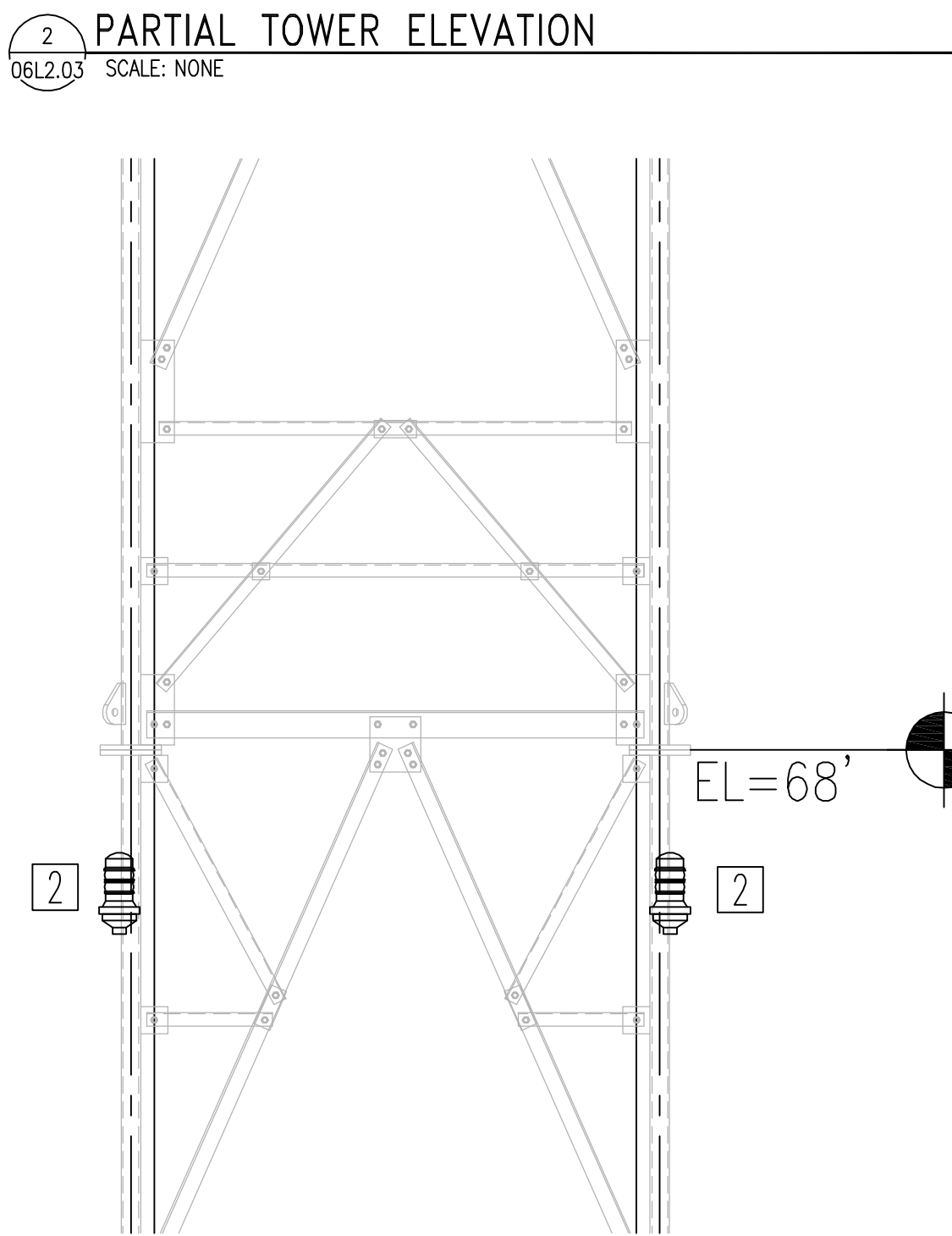
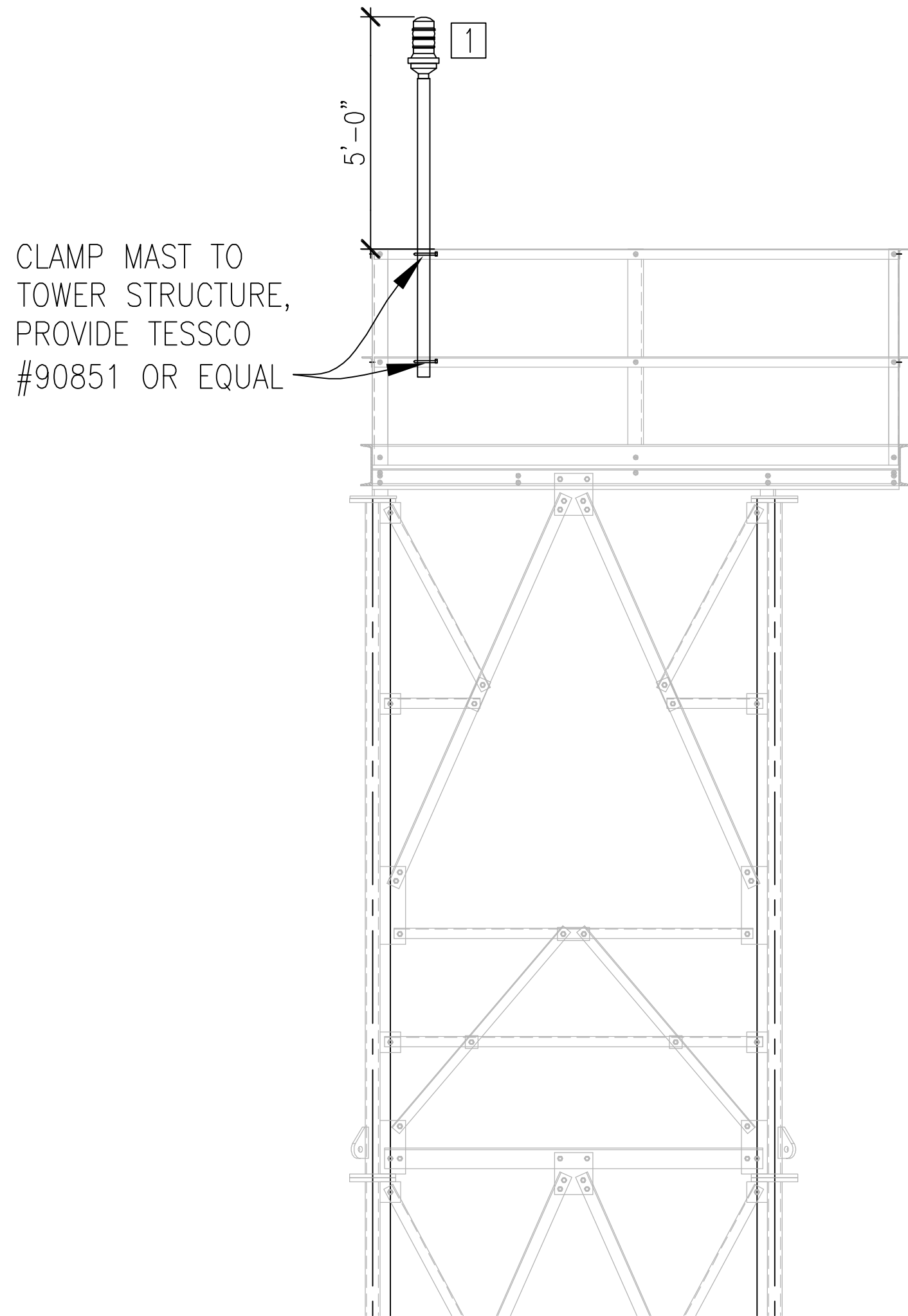
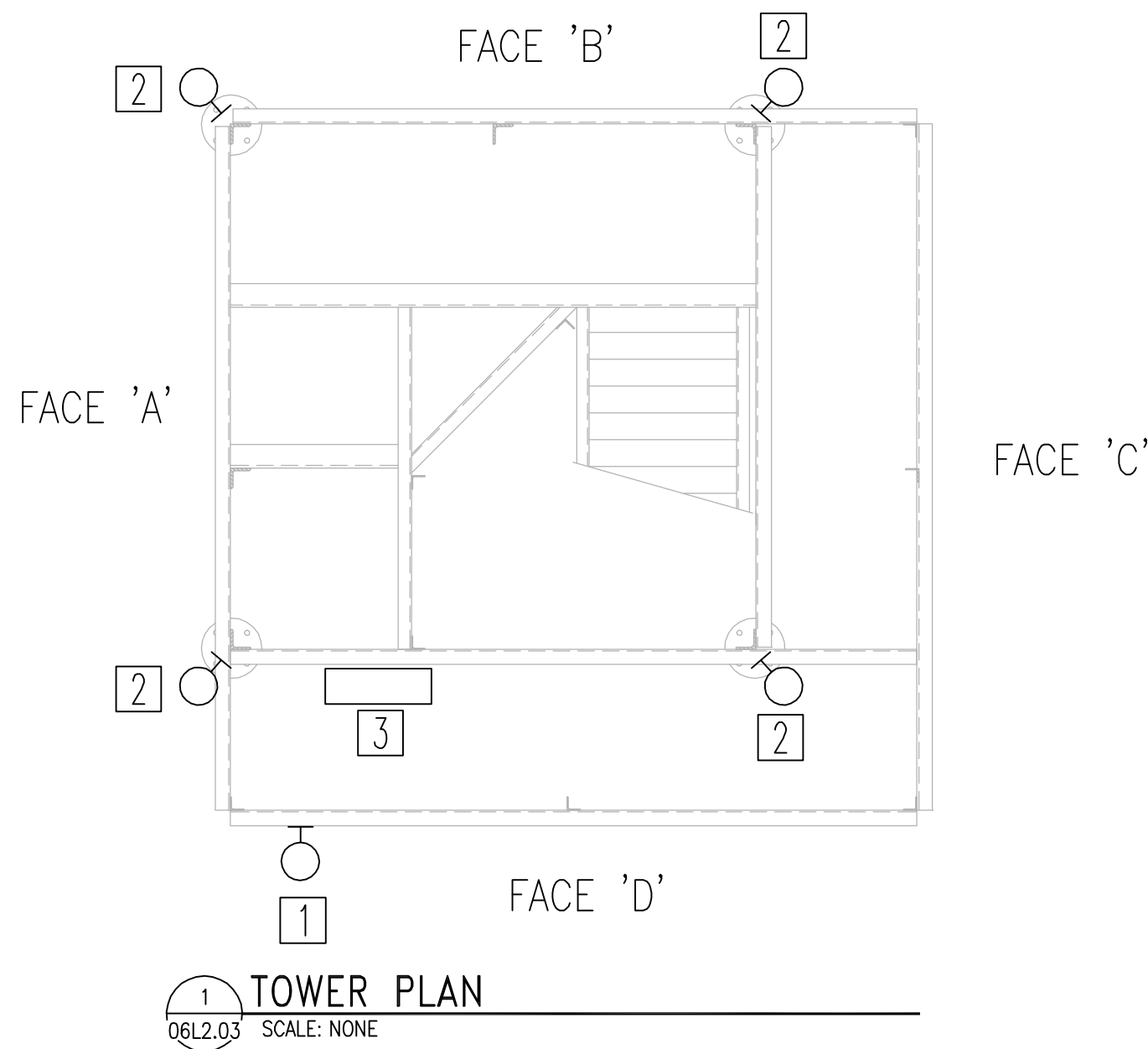
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ACTIVITY	BY
Manager	EAH
Design	FIE
Draw	JTC
Check	AAH

Daly Project No. 003-10073-406
NEON Project No. 04.08.C.0008
JANUARY 28, 2014

DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
TOWER LIGHTNING PROTECTION

06L2.01

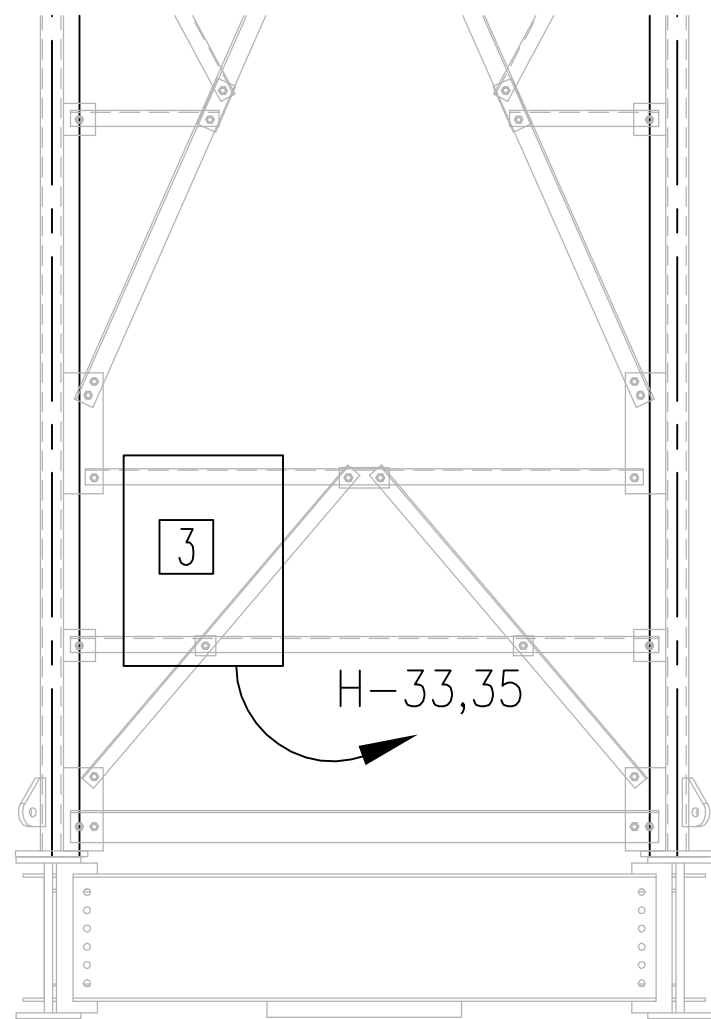


KEYED NOTES:

- 1 PROVIDE NEW L-864/L-865 FLASHING DUAL LIGHT (RED/WHITE) STROBE AT TOP OF TOWER ON SUPPORT MAST AS SHOWN. CONNECT TO CONTROLLER AT BASE OF TOWER. RED STROBE TO OPERATE AT NIGHT AND WHITE STROBE TO OPERATE DURING THE DAY. LOCATE A MINIMUM OF 20" AND A MAXIMUM OF 24" FROM CLOSEST TOWER CORNER AS SHOWN.
- 2 PROVIDE NEW L-810 OBSTRUCTION LIGHT AT MID-POINT OF TOWER AS SHOWN. LOCATE ONE LIGHT ON EACH LEG AND CONNECT TO CONTROLLER AT BASE OF TOWER.
- 3 PROVIDE NEW 9LC CONTROL SYSTEM AT BASE OF TOWER ON FACE D. COORDINATE EXACT MOUNTING LOCATION WITH NEON STAFF. CONNECT TO POWER CIRCUIT FROM INSTRUMENT HUT. ENCLOSURE SHALL BE NEMA 4 RATED. CONTROL SYSTEM TO CONTAIN PHOTOCELL FOR AUTOMATIC DAY/NIGHT SWITCHING OF STROBE.

GENERAL NOTES:

1. PROVIDE #10 AWG CONDUCTORS IN 1/2" RGS CONDUIT BETWEEN FAA OBSTRUCTION LIGHTS AND CONTROLLER PER MANUFACTURERS WIRING SCHEME. COORDINATE WITH NEON STAFF ON ROUTING OF CONDUIT.



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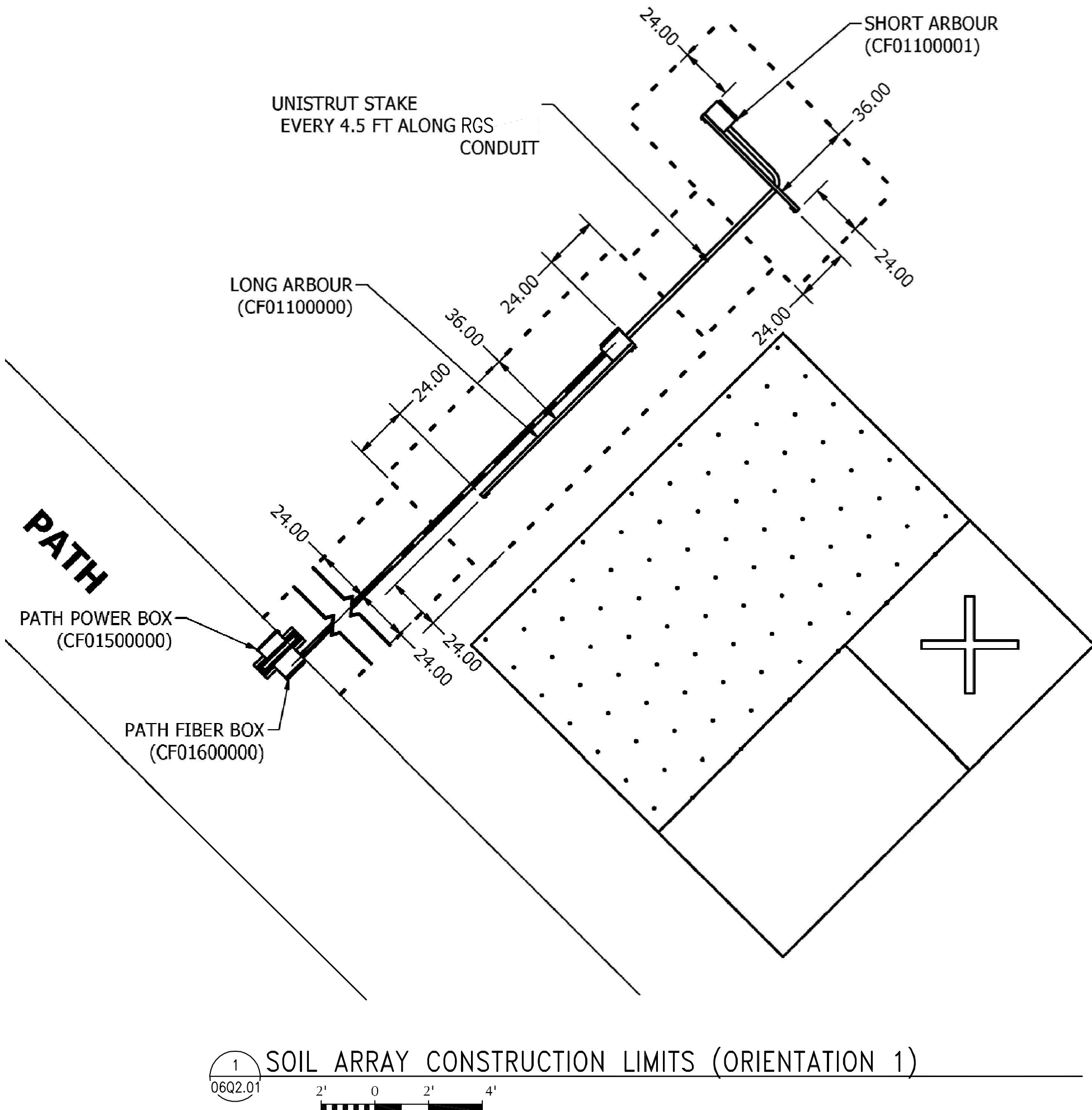
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Manager	EAH
Design	FILE
Draw	JTC
Check	AAH

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NEON Project No. 04.08.C.0008
JANUARY 28, 2014

DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
OBSTRUCTION LIGHTING

06L2.03

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N

LEGEND

- - - -

CONSTRUCTION LIMIT

=====

1.5" RGS METAL CONDUIT WITH
2-#12 AWG, #12 GND

⏏

GROUND ROD (STAINLESS STEEL)
5/8" DIA. X 10' LONG, BOND TO
ARBOUR ENCLOSURE W/ #6
CONDUCTOR

NOTES:

1. PLOT IS ORIENTATED PER LEO A DALY 100% DRAWINGS.
2. PLACE ONE UNISTRUT STAKE FOR EVERY 4.5 FT OF RGS CONDUIT.
3. ARBOURS SHOWN ARE NOT FULLY POPULATED AND ARE ONLY PRESENT TO DISPLAY INSTALLATION.
4. IF INSTALLATION WITHIN TOLERANCES IS NOT POSSIBLE CONTACT NEON ENGINEERING.
5. PATH POWER BOX FACES DOWN THE PATH TOWARDS THE TOWER.
6. CONDUIT MUST ALWAYS REMAIN 1m (39.37 IN) MINIMUM FROM PLOT.

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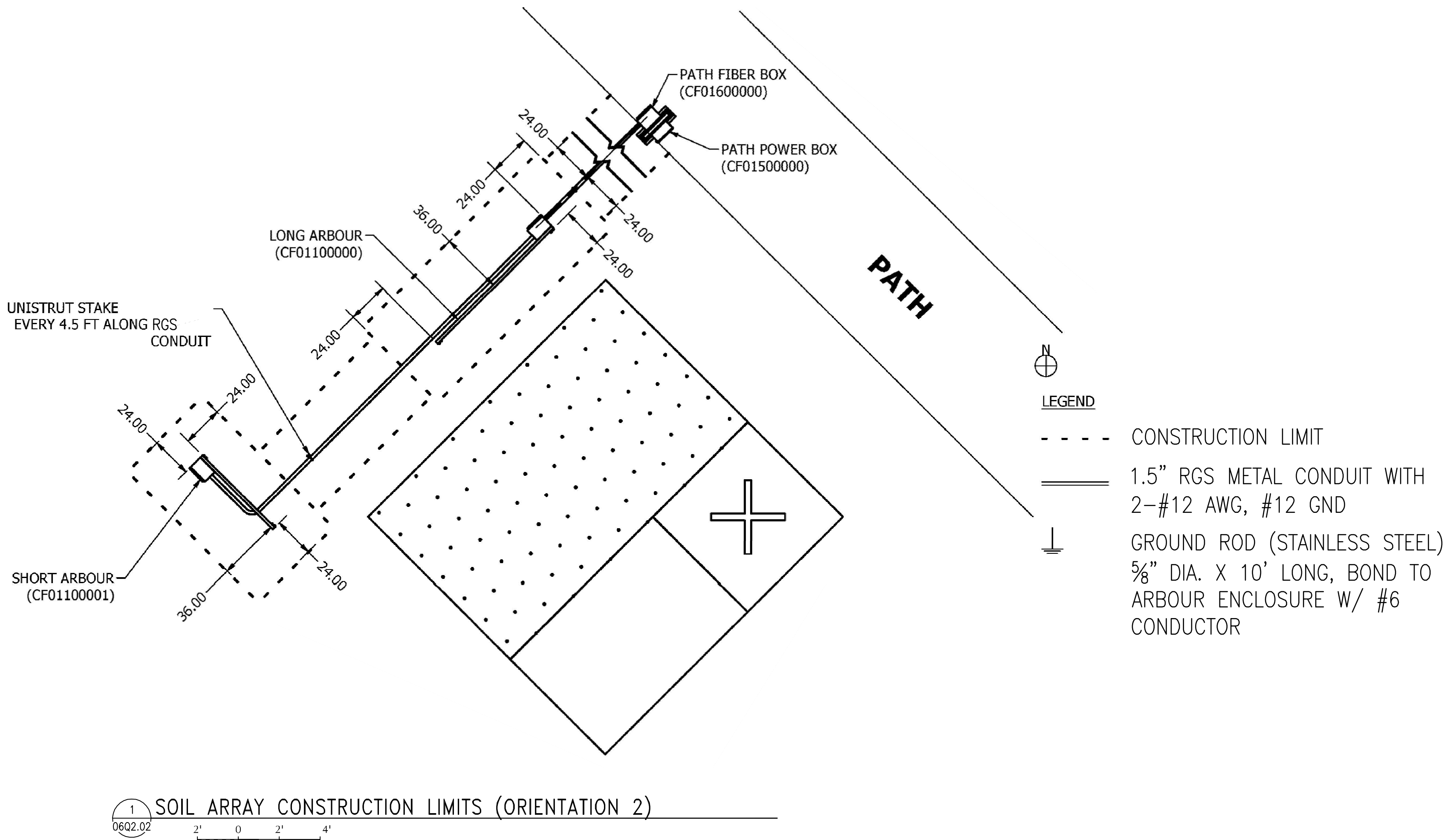
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Manager	EAH
Design	JTC
Draw	JTC
Check	AAH

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NEON Project No. 04.08.C.0008
JANUARY 28, 2014

DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
SOIL ARRAY POWER

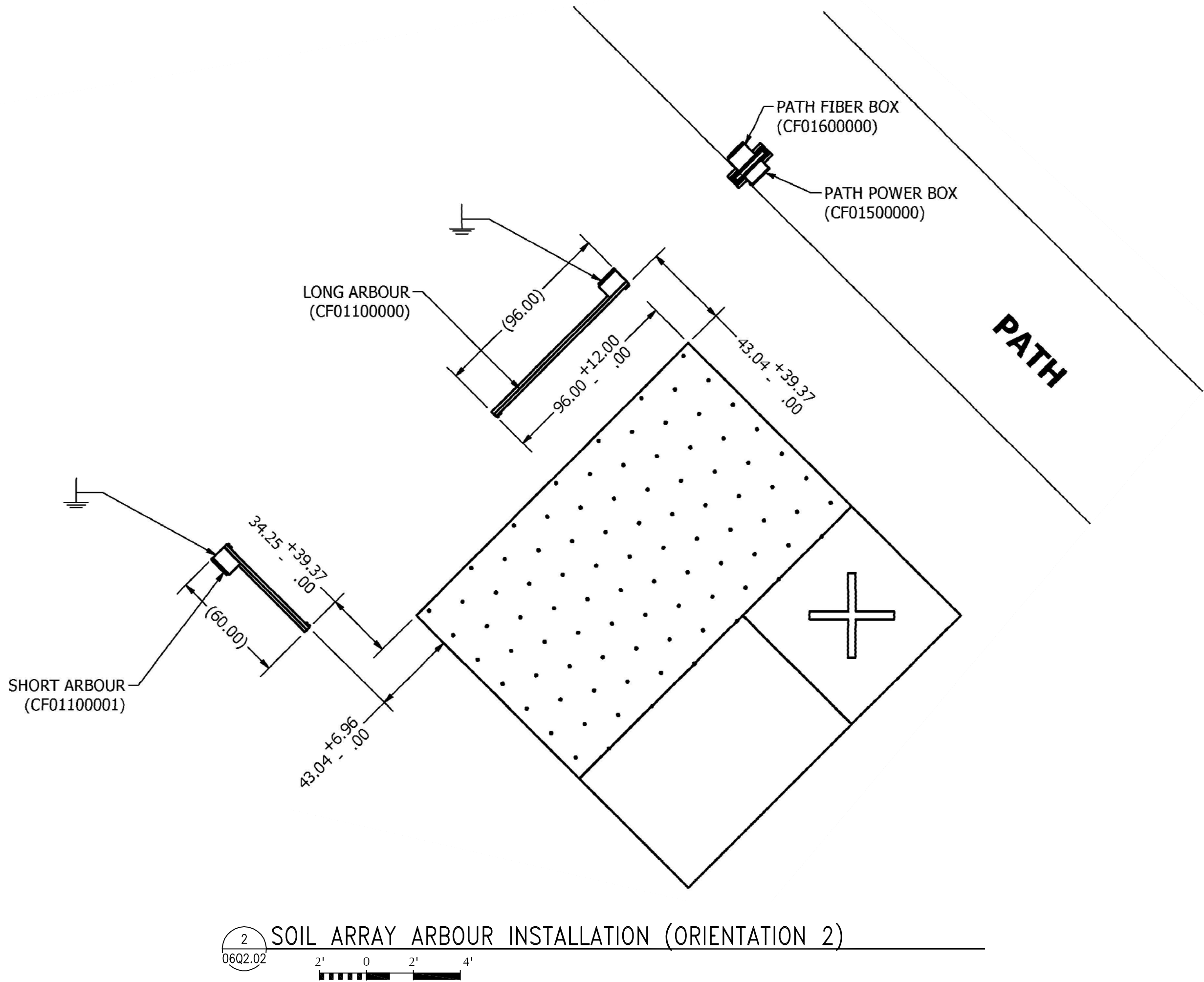
06Q2.01

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NOTES:

1. PLOT IS ORIENTATED PER LEO A DALY 100% DRAWINGS.
2. PLACE ONE UNISTRUT STAKE FOR EVERY 4.5 FT OF RGS CONDUIT.
3. ARBOURS SHOWN ARE NOT FULLY POPULATED AND ARE ONLY PRESENT TO DISPLAY INSTALLATION.
4. IF INSTALLATION WITHIN TOLERANCES IS NOT POSSIBLE CONTACT NEON ENGINEERING.
5. PATH POWER BOX FACES DOWN THE PATH TOWARDS THE TOWER.
6. CONDUIT MUST ALWAYS REMAIN 1m (39.37 IN) MINIMUM FROM PLOT.



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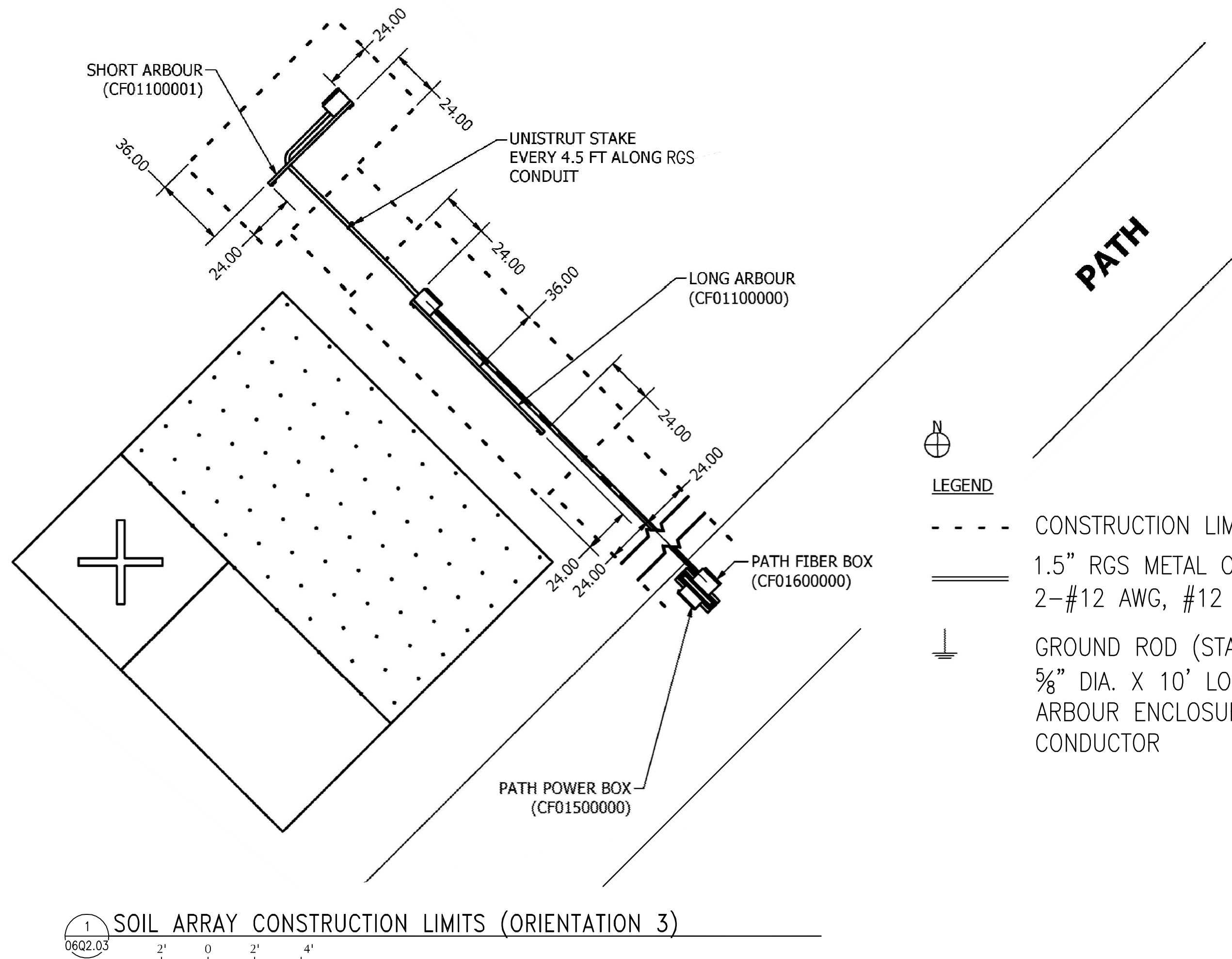
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Manager	EAH
Design	JTC
Draw	JTC
Check	AAH

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NEON Project No. 04.08.C.0008
JANUARY 28, 2014

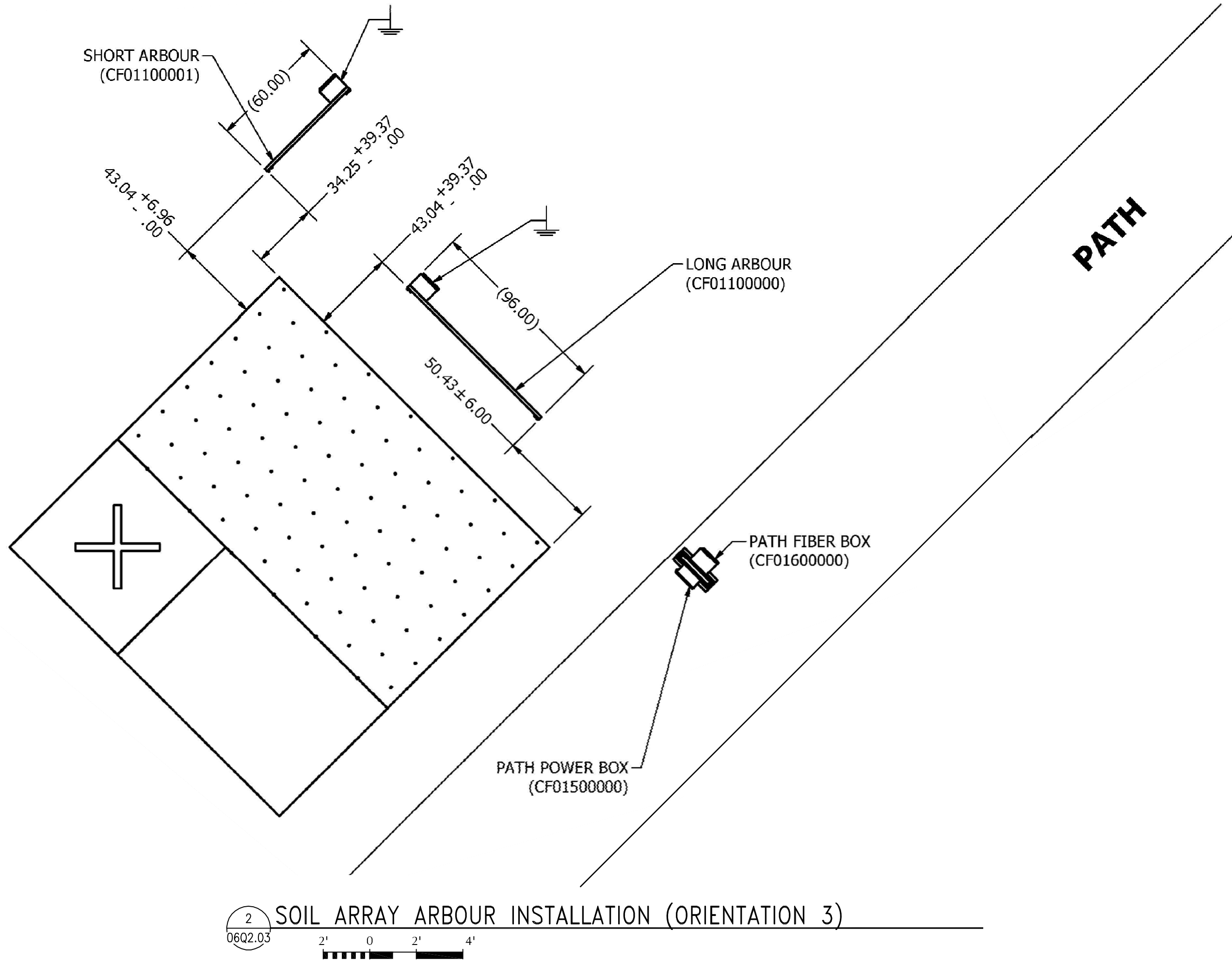
DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
SOIL ARRAY POWER

06Q2.02



NOTES:

1. PLOT IS ORIENTATED PER LEO A DALY 100% DRAWINGS.
2. PLACE ONE UNISTRUT STAKE FOR EVERY 4.5 FT OF RGS CONDUIT.
3. ARBOURS SHOWN ARE NOT FULLY POPULATED AND ARE ONLY PRESENT TO DISPLAY INSTALLATION.
4. IF INSTALLATION WITHIN TOLERANCES IS NOT POSSIBLE CONTACT NEON ENGINEERING.
5. PATH POWER BOX FACES DOWN THE PATH TOWARDS THE TOWER.
6. CONDUIT MUST ALWAYS REMAIN 1m (39.37 IN) MINIMUM FROM PLOT.



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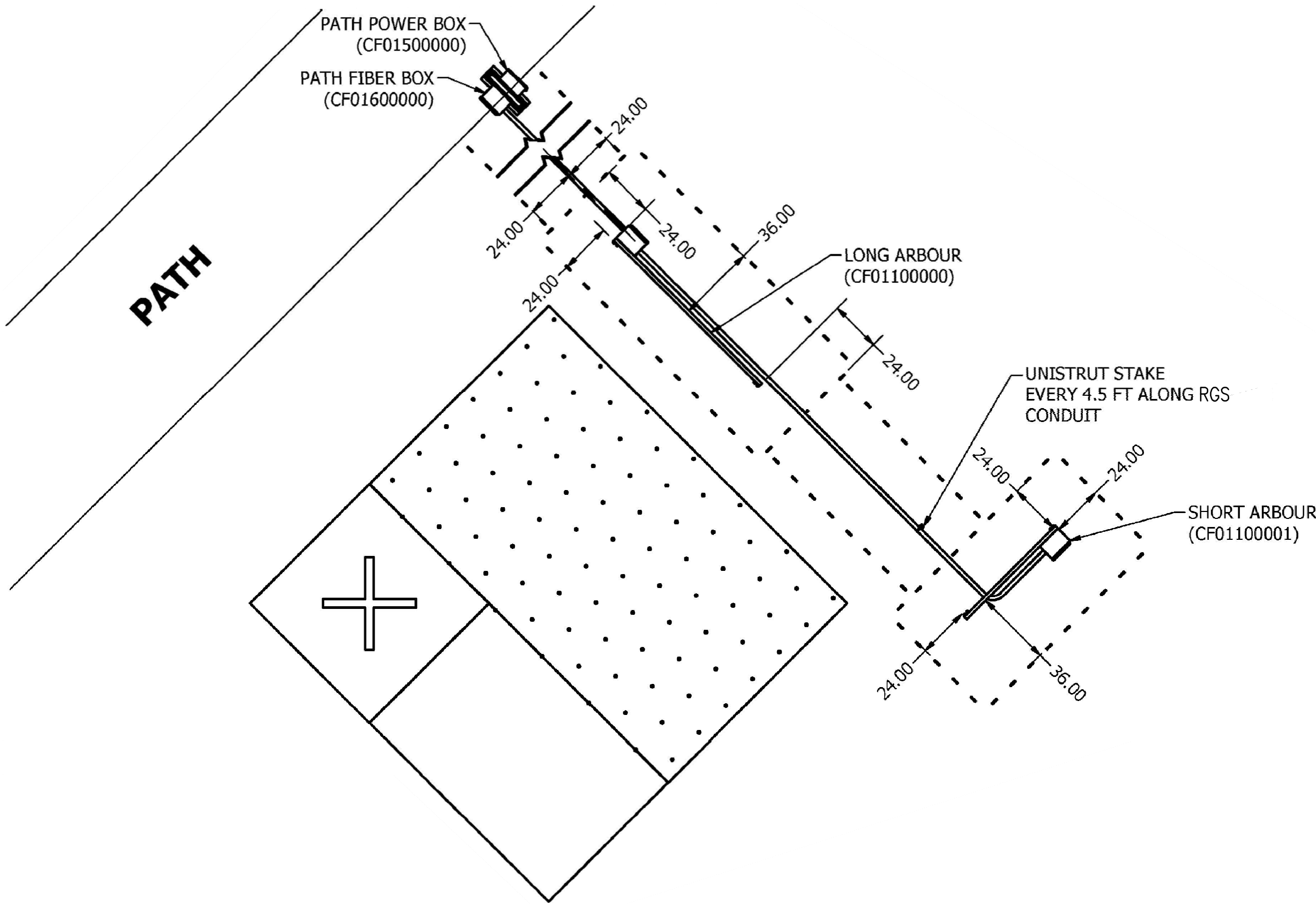
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Manager	EAH
Design	JTC
Draw	JTC
Check	AAH

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DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
SOIL ARRAY POWER

06Q2.03

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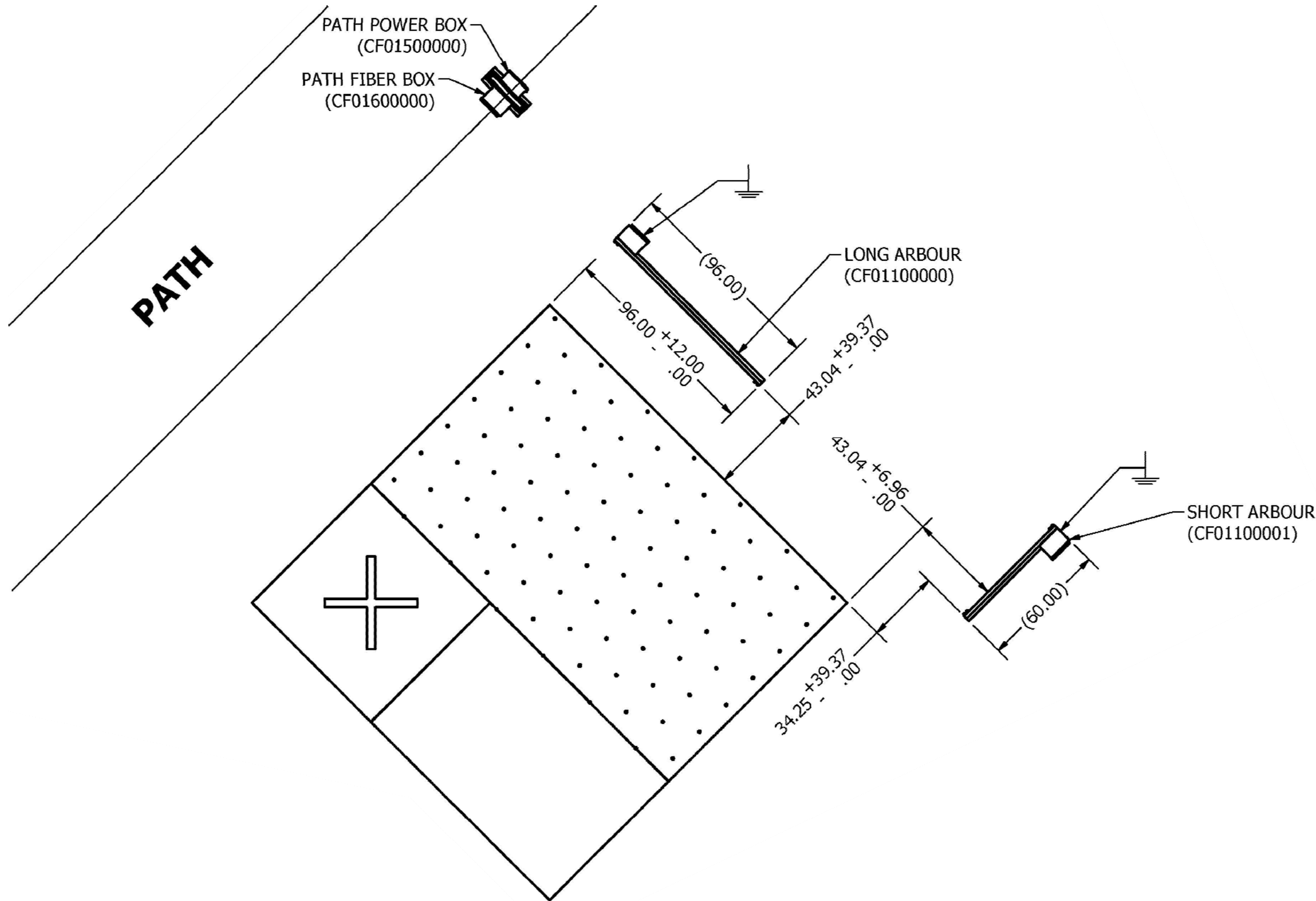


1 SOIL ARRAY CONSTRUCTION LIMITS (ORIENTATION 4)
06Q2.04

NOTES:

1. PLOT IS ORIENTATED PER LEO A DALY 100% DRAWINGS.
2. PLACE ONE UNISTRUT STAKE FOR EVERY 4.5 FT OF RGS CONDUIT.
3. ARBOURS SHOWN ARE NOT FULLY POPULATED AND ARE ONLY PRESENT TO DISPLAY INSTALLATION.
4. IF INSTALLATION WITHIN TOLERANCES IS NOT POSSIBLE CONTACT NEON ENGINEERING.
5. PATH POWER BOX FACES DOWN THE PATH TOWARDS THE TOWER.
6. CONDUIT MUST ALWAYS REMAIN 1m (39.37 IN) MINIMUM FROM PLOT.

- LEGEND
- CONSTRUCTION LIMIT
 - ==== 1.5" RGS METAL CONDUIT WITH 2-#12 AWG, #12 GND
 - ⊥ GROUND ROD (STAINLESS STEEL) 5/8" DIA. X 10' LONG, BOND TO ARBOUR ENCLOSURE W/ #6 CONDUCTOR



2 SOIL ARRAY ARBOUR INSTALLATION (ORIENTATION 4)
06Q2.04

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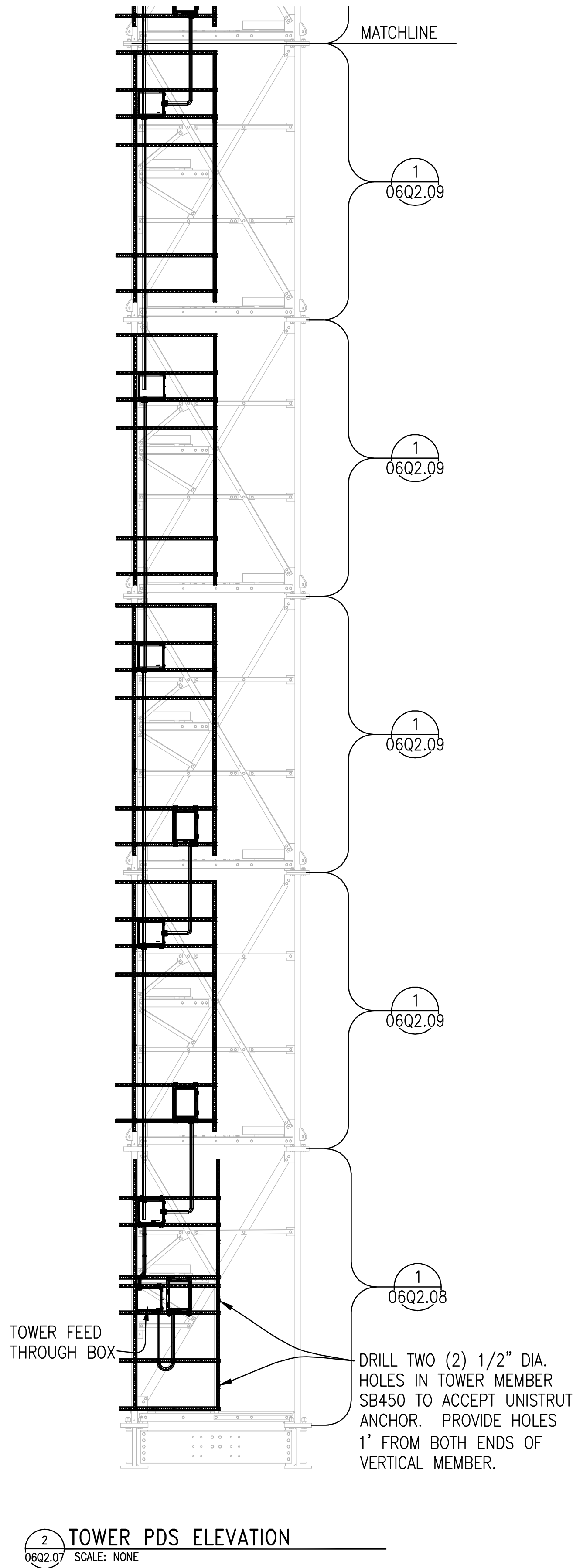
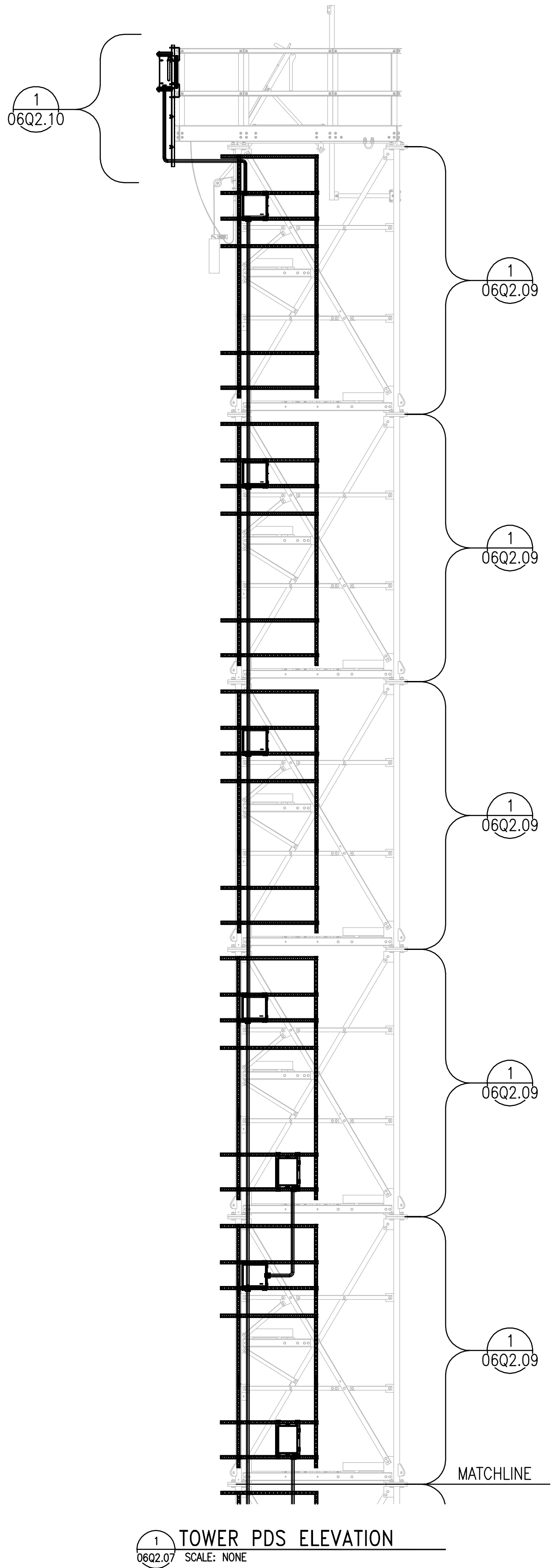
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Manager	EAH
Design	JTC
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DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
SOIL ARRAY POWER

06Q2.04

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GENERAL NOTES:

1. THIS SHEET IS FOR COORDINATION AND REFERENCE PURPOSES. REFER TO DETAIL SHEETS 06Q2.08, 06Q2.09, AND 06Q2.10 FOR INDIVIDUAL COMPONENTS.
2. COORDINATE EXACT PLACEMENT OF UNISTRUT MEMEBERS ON TOWER WITH NEON STAFF.

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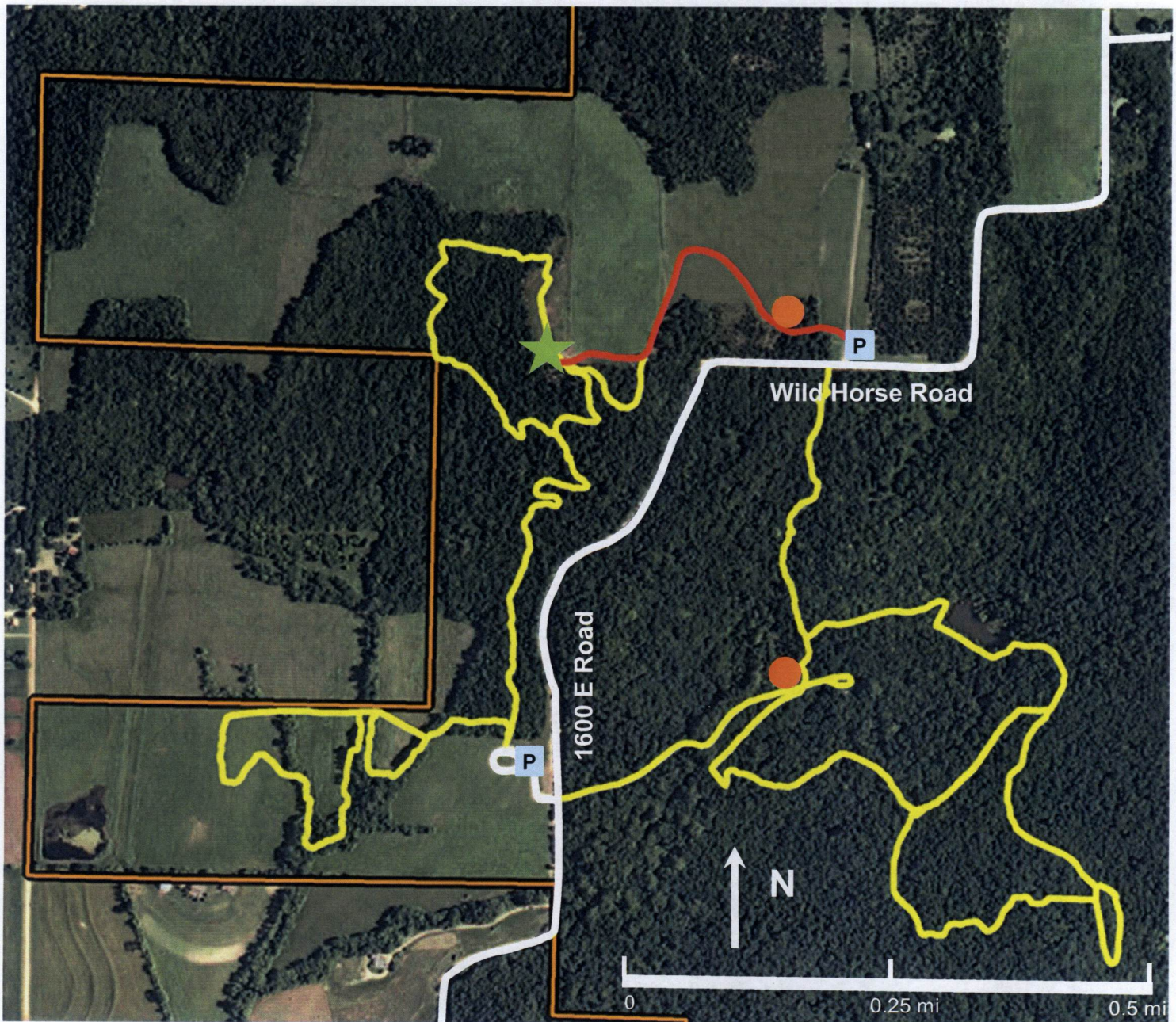
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Manager	EAH
Design	FILE
Draw	JTG
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DOMAIN 06 PRAIRIE PENINSULA
RT1-UKFS
TOWER PDS ELEVATION

06Q2.07

KU Field Station Trails System



Legend

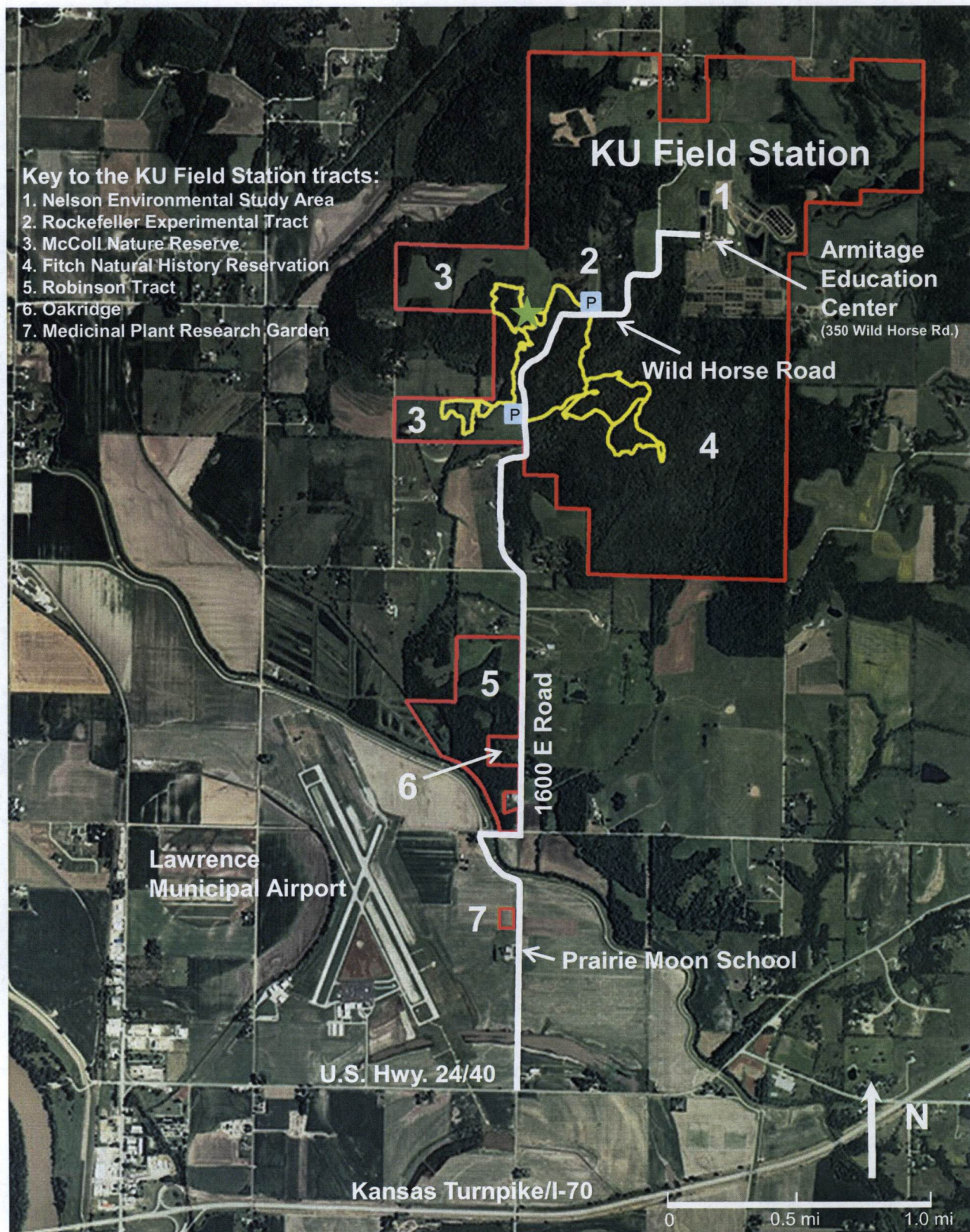
- ★ Kaw Valley Overlook
- P Trailhead with parking
- Trails
- Handicapped-accessible trail
- Gravel road
- Restroom/drinking fountain

Welcome to the KU Field Station

Please note that public access is restricted to the trails shown above, and subject to the following rules:

- ***Trails are open dawn to dusk ONLY.***
- ***Foot traffic ONLY.***
- ***Stay on the marked trails.***
- ***Dogs or other pets are not allowed (even if leashed).***
- ***Do not release wild or domestic animals or plants.***
- ***Do not disturb flags, markers, traps, or equipment.***
- ***Hunting or collecting of any kind is strictly prohibited.***
- ***Smoking, fires of any kind, and fireworks are prohibited.***
- ***Firearms and paint ball guns are prohibited.***
- ***Alcoholic liquors and cereal malt beverages are prohibited.***

Enjoy your visit, and thank you for respecting this natural environment and the research conducted here. For more information, contact the station field office (785-843-8573), Kansas Biological Survey administrative office (864-1500), or visit www.kufs.ku.edu.



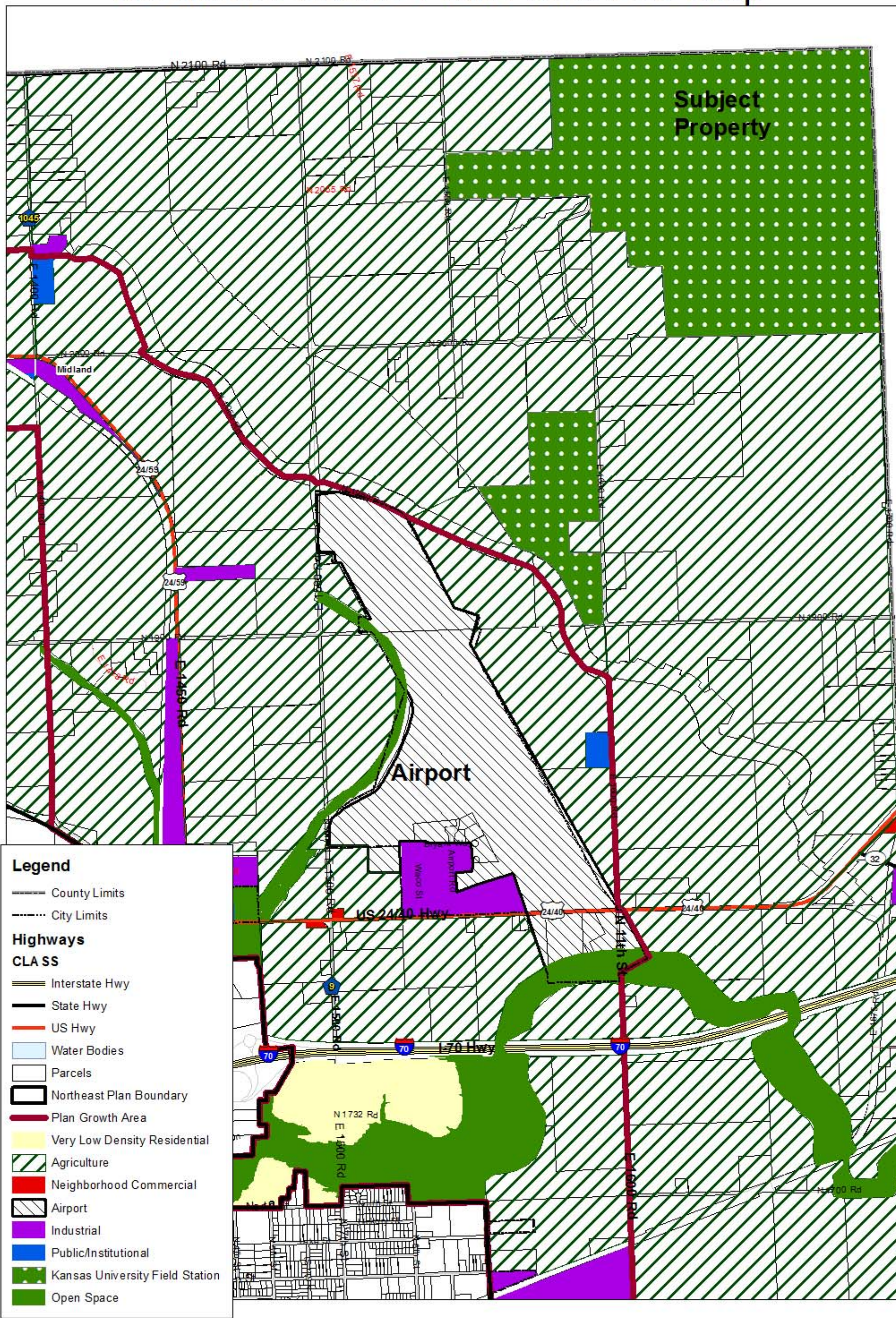
Legend

- ★ Kaw Valley Overlook
- P Trailhead with parking
- Gravel road
- Trails
- Field Station boundary

The mission of the University of Kansas Field Station is to foster scholarly research, environmental education, and science-based stewardship of natural resources.

The KU Field Station is operated by the Kansas Biological Survey.

Northeast Sector Plan Land Use Map



1 inch = 1,592 feet

DISCLAIMER NOTICE

The map is provided "as is" without warranty or any representation of accuracy, timeliness or completeness. The burden for determining accuracy, completeness, timeliness, merchantability and fitness for or the appropriateness for use rests solely on the requester. The City of Lawrence makes no warranties, express or implied, as to the use of the map. There are no implied warranties of merchantability or fitness for a particular purpose. The requester acknowledges and accepts the limitations of the map, including the fact that the map is dynamic and is in a constant state of maintenance, correction and update.

Date: 5/13/2014

Ecological Information for the Next Generation



Agriculture Systems

Climate Change

Forest Management

Invasion Biology

Urban Ecosystems





THE NATIONAL ECOLOGICAL OBSERVATORY NETWORK

Why NEON, why now?

The world is undergoing an era of rapid environmental change. Ecosystems are increasingly stressed by climate, invasive species, pollution, and land use change.

NEON is part of a bold effort to:

- **Understand and forecast continental-scale ecological change**
- **Inform natural resource decisions**
- **Engage the next generation of scientists**

Measuring the causes and effects of environmental change

The National Ecological Observatory Network (NEON) is a continental-scale observation system sponsored by the National Science Foundation.

It will collect and provide 30 years of ecological data on the causes and consequences of:

- **Climate change**
- **Land use change**
- **Invasive species**

Open-access data and resources

NEON will provide large amounts of freely available resources, specimens, and data. Its infrastructure can be used as a baseline for long-term ecological studies. NEON will also provide educational resources and citizen science programs to engage diverse communities in scientific discovery.

What NEON collects

NEON sites are strategically placed across the country to collect data on key drivers of ecological change and the impacts of these changes over time.

NEON provides data in the following key categories:

- **Atmospheric**
- **Soil**
- **Aquatic**
- **Biological**

Each site includes a variety of sensors placed in the soil, water and on a tower. Information is also collected on plants, animals, invertebrates, and microorganisms around the site. An airborne remote sensing platform flies over sites annually collecting aerial data.

NEON integrates its data with a variety of land data from external partners to model regional- and continental-scale ecology.

A DIGITAL RENDERING OF A NEON SITE



Above: NEON will monitor a range of plants, animals, invertebrates and microorganisms that are indicators of environmental change.

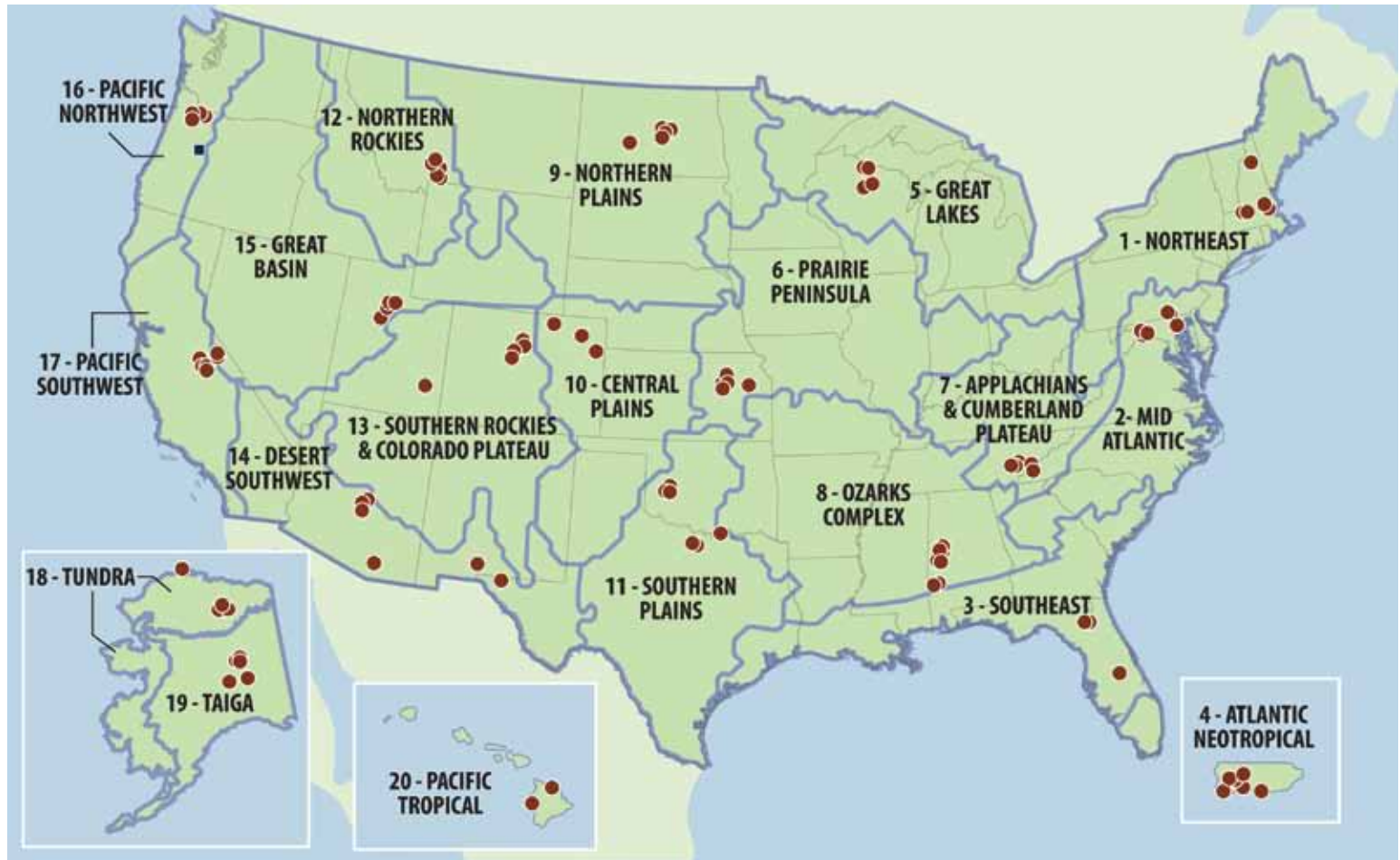
Deer mouse image courtesy of DavidCappaert, Michigan State University



“NEON is a shared vision by the scientific community designed to listen to the pulse of the U.S. ecosystem.”

NEON FIELD SITES

NEON will collect data from 106 sites across the United States (including Alaska, Hawaii and Puerto Rico). The sites were strategically selected to represent 20 eco-climatic domains, which include distinct landforms, vegetation, climate and ecosystem processes.



Learn more at www.neoninc.org

The National Ecological Observatory Network is a project solely funded by the National Science Foundation and managed under cooperative agreement by NEON, Inc. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

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May 6, 2014

Lawrence Municipal Airport
Airport Advisory Board
Lawrence, KS 66044

Dear Members of the Airport Advisory Board,

The National Ecological Observatory Network (NEON) project filed a conditional use permit application with the Lawrence Douglas County Planning Commission in February of 2014 requesting approval for the construction of an ecological monitoring tower at the University of Kansas Field Station. I am sending this letter to provide more background information on the project and the site location and to respectfully ask that the airport advisory board consider recommending our project for approval.

Background:

The NEON project is funded solely by the National Science Foundation and the site proposed at the University of Kansas Field Station will contribute to the mission of the project; to enable understanding and forecasting of the impacts of climate change, land use change and invasive species on continental-scale ecology by providing infrastructure and consistent methodologies to support research and education in these areas.

The site near Lawrence, Kansas is part of the Prairie Peninsula domain, which is primarily focused on science questions surrounding land use and agriculture, with two additional sites planned for construction at the Konza Prairie Biological Station near Manhattan, Kansas. The site selected at the University of Kansas Field Station will provide important ecosystem data due to its location within the transition zone between the eastern deciduous forest and tall grass prairie biomes. In addition, the KU Field Station has extensive databases of environmental conditions, some ongoing and others over 60 years old, which aid the broad NEON initiatives. The KU Field Station also has an active cadre of researchers and teachers who will use the NEON program resources, as well as the logistical support at its facilities north of Lawrence, which add to its desirability as a site to host the NEON project.

Site Location:

The Fitch Natural History Reservation represented a strong site for addressing the science questions of NEON, particularly those dealing with an area undergoing forestation that is in an agricultural landscape. The Fitch Reservation, which is nearly one square mile in extent, has been protected from disturbance since 1948 and has developed a nearly continuous forest canopy. An area of that size with a known land use history is rare in the region.

Despite its apparent homogeneous quality when viewed from the air, the habitat conditions on the Fitch Reservation vary considerably from place to place (i.e., microsite differences constrain the site selection). Slope, aspect, and elevation are all important environmental conditions; as is historic land use (before 1948) – these elements all interact to produce different forest types. After selecting the site from a series of “remote-laptop” techniques, our NEON science team made a trip to the field to verify that biotic and abiotic conditions were acceptable.

When selecting a location for our tower site, there are a number of factors NEON’s scientists take into account, one of the most important factors being the direction of prevailing winds. It’s also important to make sure the tower location is sited to avoid outside influences (agriculture operations, non-representative land use) and is capturing data from the intended ecosystem. In this case, it was important to locate the tower in a spot where the measurements are representative of an upwind area and that all the measurements can be done within the scientific area of interest.

The height of the tower is determined by evaluating the mean canopy height and then making sure the tower is tall enough to pick up measurements that are representative of the area. For the Fitch Reservation, the site is located on a ridge area (as opposed to valley floor or side slope positions that make up a great portion of the site). Once satisfied that environmental conditions were appropriate for the science objectives, we then considered logistics: security of the site, access, and utilities.

At this site NEON is proposing a 116’ tower with a 10’ lightning rod on the top and this tower will collect data on CO₂, Ozone, NO_x, and various aerosols. These data will be in addition to a suite of terrestrial data collections, and when looked at in relation to one another, will provide valuable scientific information about the impacts of land use change, climate change, and invasive species on local ecosystems. This data will be freely available to the public through a data portal on NEON’s webpage.

Evaluating Impacts to Aviation:

When evaluating a site location, NEON will work with the FAA to complete an obstruction evaluation if the site or proposed tower location and height fall within the guidance provided by the FAA in 14 CFR 77.9

- Construction or alteration requiring notice. In this instance, part (b) applies to the proposed NEON tower:

b) Any construction or alteration that exceeds an imaginary surface extending outward and upward at any of the following slopes:

(1) 100 to 1 for a horizontal distance of 20,000 ft. from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway more than 3,200 ft. in actual length, excluding heliports.

(2) 50 to 1 for a horizontal distance of 10,000 ft. from the nearest point of the nearest runway of each airport described in paragraph (d) of this section with its longest runway no more than 3,200 ft. in actual length, excluding heliports.

(3) 25 to 1 for a horizontal distance of 5,000 ft. from the nearest point of the nearest landing and takeoff area of each heliport described in paragraph (d) of this section.

Because the parameters of part b are fairly broad, we were able to determine that any placement of the tower within the Fitch Reservation, NEON's area of interest at the KU Field Station, would require an obstruction evaluation with the FAA. The map attached in Exhibit A further provides a visual overview of the tower placement in relation to the airport.

NEON will paint and light the proposed tower in accordance with FAA regulations and file notices at the start and end of construction to certify that the tower is registered in the FAA database and is compliant with all regulations. In addition, NEON will have staff located in Manhattan who will carry out routine tower maintenance to make sure all lights/paint stay in good working condition and who will work with permitting staff to notify FAA of any issues with the system.

Conclusions

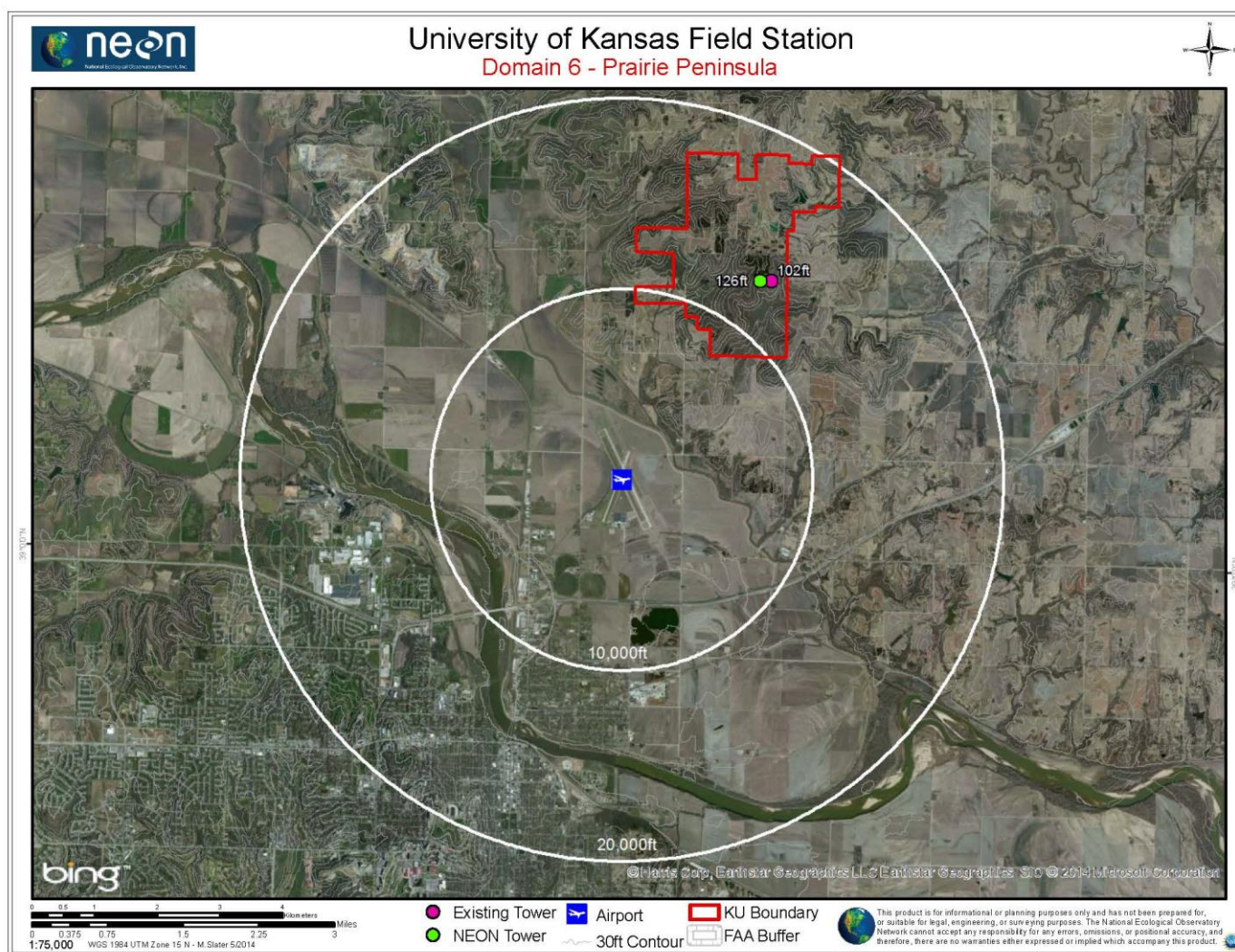
NEON recognizes that approval of our project will result in changes to the current takeoff minimum requirements on Runway 1 at the Lawrence Municipal Airport and will continue to work with the advisory board to communicate and provide additional information on our project. We sincerely appreciate the responsiveness and willingness of the advisory board to consider our project and take the time to learn

more about NEON. If there is any additional information that we can provide or any questions you'd like to discuss, please don't hesitate to contact me via email (lwright@neoninc.org) or by phone (720) 746-4897.

Regards,

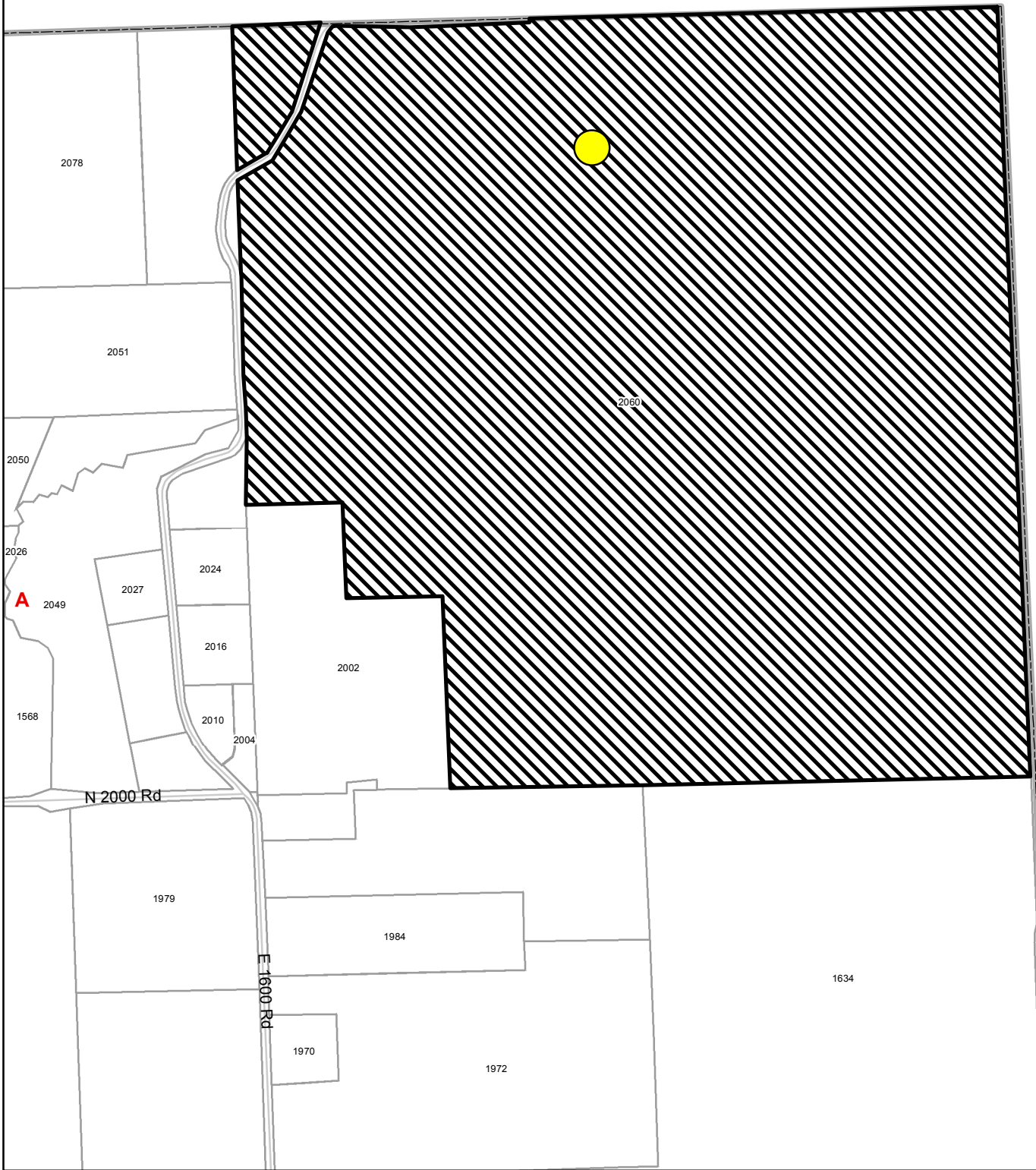
Liz Wright
Manager, Environmental Permitting
National Ecological Observatory Network

Exhibit A



Jefferson County

Leavenworth County



**CUP-14-00052: Conditional Use Permit for the National
Ecological Observatory Network site
Located at 2060 E 1600 Rd**

