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Nickajack Industrial Park Development Plan

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CE 400 SENIOR DESIGN PROJECT

For Chancellor's Honors Program

Project Overview

For my senior design project, my group and I were tasked with designing an industrial site. The project is in coordination with a team of civil engineering undergraduates and the Southeast Tennessee Development District, through the University of Tennessee's Smart Communities Initiative program. Design of the industrial site included an engineering feasibility study on the currently undeveloped parcel of land. The team designed stormwater management infrastructure and tie-ins to existing utility infrastructure, analyzed the existing transportation network and recommended roadway improvements to accommodate new traffic generated by the development, performed analysis and design for the proposed building structures and foundations, and prepared complete construction drawings. Ultimately, the engineering computational work was expressed through a technical report.

For this project I was specifically tasked with the role of project leader. I took on the job of coordinating between all disciplines and our stakeholders, leading weekly project meetings, and providing technical assistance to all disciplines as necessary. Along with the role of project lead, I worked as technical editor for the final report, construction drawings, posters, and video presentation. As the technical editor, I compiled each discipline's report into a single final deliverable to provide a cohesive technical document. The technical editing required many revisions throughout the semester that addressed grammatical errors, formatting errors, and technical content clarifications. The final product included an in-depth and conclusive technical report and revised construction drawings.

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Nickajack Industrial Park Development

CE 400
University of Tennessee

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SECTION 1: PROJECT DESCRIPTION

The objective of this project is to apply engineering analysis to evaluate the Nickajack Port Authority's property for industrial development potential through coordination with the Southeast Tennessee Development District. The site under consideration consists of 92 acres and is located at 849 Port Road in South Pittsburg, a city within Marion County, TN. The 92 acres owned by the Nickajack Port Authority are within the Nickajack Port Industrial Park which consists of 1,200 acres. For several years, Marion County and the SETDD have been actively seeking to attract new industry and employment opportunities to the industrial park. This project aims to use engineering analysis to determine the most efficient site development and layout. All analysis conducted will be used to develop cost estimates to be used in promotional and marketing material for the solicitation of development of the site by an industrial partner.

Prior to beginning, the Southeast Industrial Development Association (SEIDA) provided the following documents, copies of which can be found in the Appendix A:

- General Info Package
- Existing Infrastructure Map
- Nickajack Port Project Activity – Industry Interests
- S&ME Geotechnical Report
- Rail Spur Preliminary Concept Drawings (Barge Wagoner Sumner & Cannon, Inc.)
- LIDAR data (not in appendix)

SECTION 2: PROJECT CONTACT INFORMATION

This project is a cooperative effort between the University of Tennessee's Smart Communities Initiative (SCI) and the Southeast Tennessee Development District (SETDD). The University of Tennessee's SCI program aims to partner communities and universities to improve the health and vitality of communities[1]. This development of the Nickajack Port Authority's property by an industrial partner will bring new jobs to the area, which will in turn increase the vitality of the community's economy. Primary points of contact are provided in the table below.

Name	Organization	Email	Phone
Dr. Jennifer Retherford	UT CEE	jretherf@utk.edu	(865) 974-2503
Kelly Ellenburg	UT SCI	kellenb@utk.edu	(865) 974-9577
Chuck Hammonds	SETDD	chammonds@sedev.org	(423) 424-4264
Stephanie Watkins	SEIDA	swatkins@sedev.org	(423) 424-4243
Sarah Williams	SEIDA	swilliams@sedev.org	(423) 424-4297
David Abbott	Nickajack Port Authority	david.abbott@TowerCommunityBank.com	(423) 942-2151

Responsible for performing engineering analysis to evaluate the Nickajack property for industrial development through coordination with the Southeast Tennessee Development District and the University of Tennessee's Smart Communities Initiative is a team of seven UT civil engineering students. The student team and their contact information is shown below.

Name	Discipline	Email	Phone
Andrew Fulkerson	Site Civil & Construction	afulkers@vols.utk.edu	(770) 561-9670
Seth Gilliland	Transportation	setegill@vols.utk.edu	(615) 522-7291
Brooklynn Isom	Water Resources	bisom2@vols.utk.edu	(423) 258-2177
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[1] http://servicelearning.utk.edu/smart-communities-initiative/

SECTION 3: SUMMARY OF EXISTING CONDITIONS

Located in the city of New Hope, Marion County, Tennessee, the Nickajack Industrial site is approximately 30 miles southwest of Chattanooga, and within two hours of five major metropolitan cities: Nashville, Knoxville, Huntsville, Birmingham, and Atlanta. Two towns are located nearby, New Hope and South Pittsburg, with populations of 1,070 and 3,110, respectively, per the U.S. Census Bureau's 2014 population estimates. The site is located approximately four miles from the town of South Pittsburg, TN. ***Figure 1*** illustrates the sites regional proximity. Currently, 6 acres of the Nickajack Port Authority Property is leased by Tennessee Scrap Recycling.

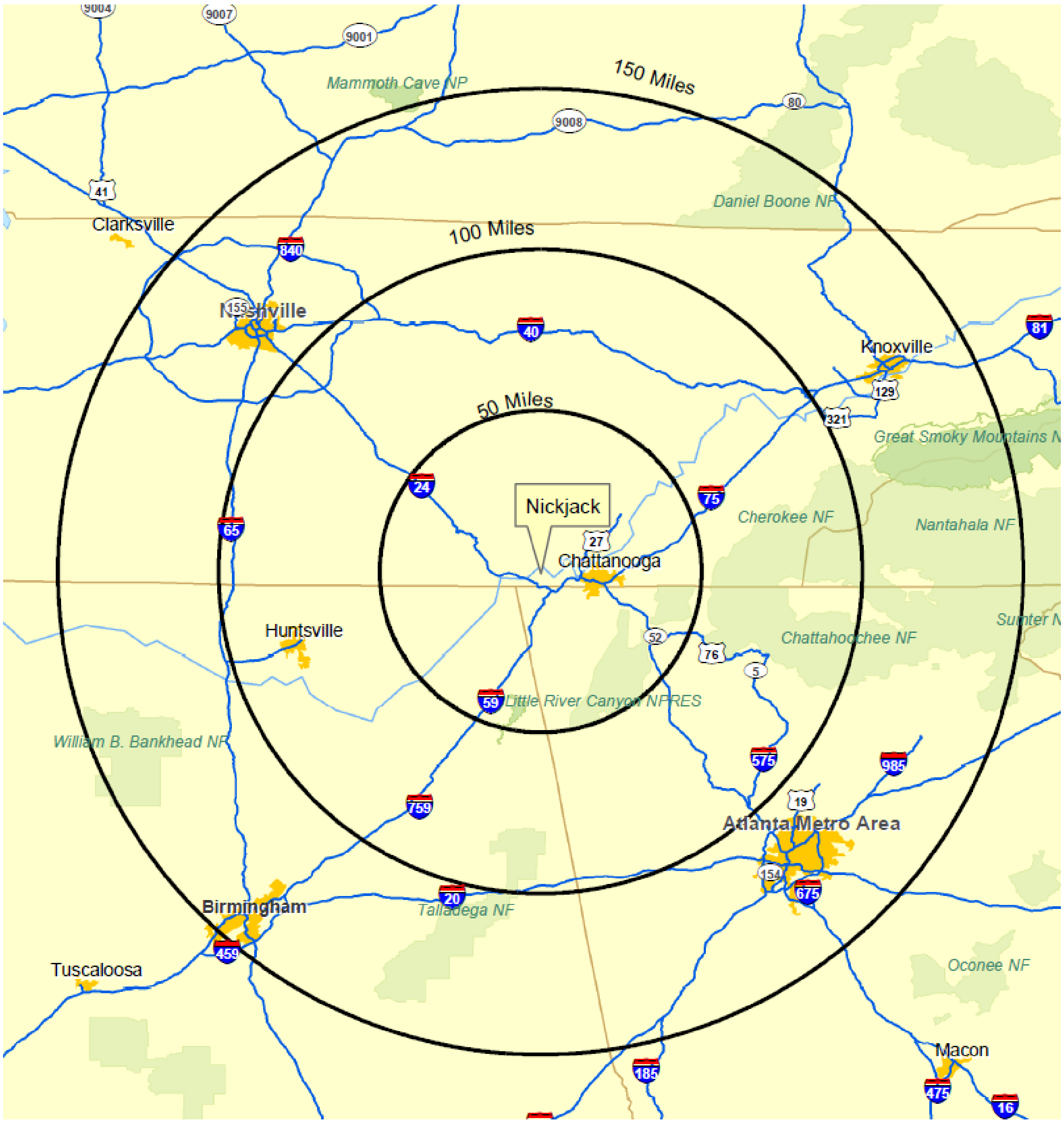


Figure 1: Regional Proximity of Nickajack Port Site

ROAD, WATER, AND RAILWAY CONNECTIVITY

The Nickajack site is bordered by S.R. 156 to the south, a minor connector road to the west, foothills to the east, and the Tennessee River to the north, as shown in ***Figure 2.*** State Route 156 is functionally classified as a rural major collector on the Surface Transportation Program system. It extends in a west/east orientation across Marion County, providing access to Alternate US 41 on the west side and Interstate 24 on the east side. State Route 156 has two travel lanes with 11' travel lanes and 2' shoulders. The posted speed limit on S.R. 156 is 45 miles per hour. According to the Tennessee Department of Transportation (T.D.O.T.), S.R. 156 had an average annual daily traffic of 1,764 in the year 2014. The Nickajack property is located approximately six miles from U.S. Interstate 24.

Figure 2: Nickajack Port Authority Industrial Site

(Image Courtesy of Google Earth)

The site is bordered to the north by the Tennessee River and is equipped with minimal port facilities, containing two mooring cells for barges and a platform. The port is administered by the Nickajack Port Authority and is located on the Tennessee River. The port's location on the Tennessee River allows for convenient access to the Tennessee-Tombigbee Waterway, which is a national marine highway (M-65). The Tennessee-Tombigbee Waterway links to 4,500 miles of navigable waterways serving mid-America and in total serves 23 states throughout the South and Midwest United States. The Tennessee-Tombigbee Waterway also provides a link between foreign and domestic ports, through

deep water ports on the Gulf of Mexico. In its current state, the port is only capable of loading and unloading goods by crane. Improvement of the port facilities is outside of the scope of this project, and any necessary development will fall to the industrial partner. ***Figure 3*** shows the port access point from the Nickajack property, as well as an aerial view of the entire port.

Figure 3: Nickajack Port Facilities

A portion of the Nickajack property is crossed by a CSX rail line. The CSX rail line cuts the corner of the Nickajack Port Authority property and proceeds to cross S.R. 156, DOT crossing inventory number 943225J. The rail crossing at S.R. 156 is an active, at-grade crossing. Typical of active crossings, the crossing is equipped with actuated gates, flashers, and bells to warn traffic of train crossings. Along with the active warning devices, the crossing is fully equipped with all advanced warning signs and pavement

markings required by the Manual on Uniform Traffic Control Devices. The fully equipped CSX at-grade crossing with S.R. 156 can be seen in Figure 4 and Figure 5. Trains using the crossing and passing through the Nickajack property have a maximum speed of 30 miles per hour. The U.S. DOT Crossing Inventory Form indicates that there is an estimated daily 2 train crossings from 6 AM to 6 PM. The inventory indicated no night time train activity. The U.S. DOT Crossing Inventory Form can be found in Appendix A. Along with the existing CSX railroad, the Southeast Tennessee Development District has a preliminary design completed for a new rail spur to serve the entire Nickajack Port Industrial Park. The preliminary concept plans created by Barge, Waggoner, Sumner, & Cannon, Inc. (BWSC) include a new turnout and storage extending into both the neighboring Colonial Chemical Company and the Nickajack Port Authority property. The storage on the port property is 1650 ft., which will accommodate 30 standard train cars. The preliminary concept plans for the potential rail spur can be found in Appendix A.

Figure 4: CSX At-grade Railroad Crossing, looking east

Figure 5: CSX At-grade Railroad Crossing, looking west

UTILITY INFRASTRUCTURE

The site has full access to water lines, sanitary sewer lines, and natural gas lines. Located on the site is a 12" diameter water main, 8" and 12" sewer lines, and a pump station. The water and sewer lines are owned and maintained by the City of South Pittsburg. Along with water and sewer, the site is served by Marion Natural Gas with a 6" gas main. Electric power transmission lines provided by the Sequachee Valley Electric Company include 161KV and 500KV. Location of existing infrastructure is shown on a map below provided by SEIDA. The site contains minimal stormwater infrastructure. A ditch runs the length of S.R. 156 nearest the site and a drainage culvert passes underneath Port Rd.

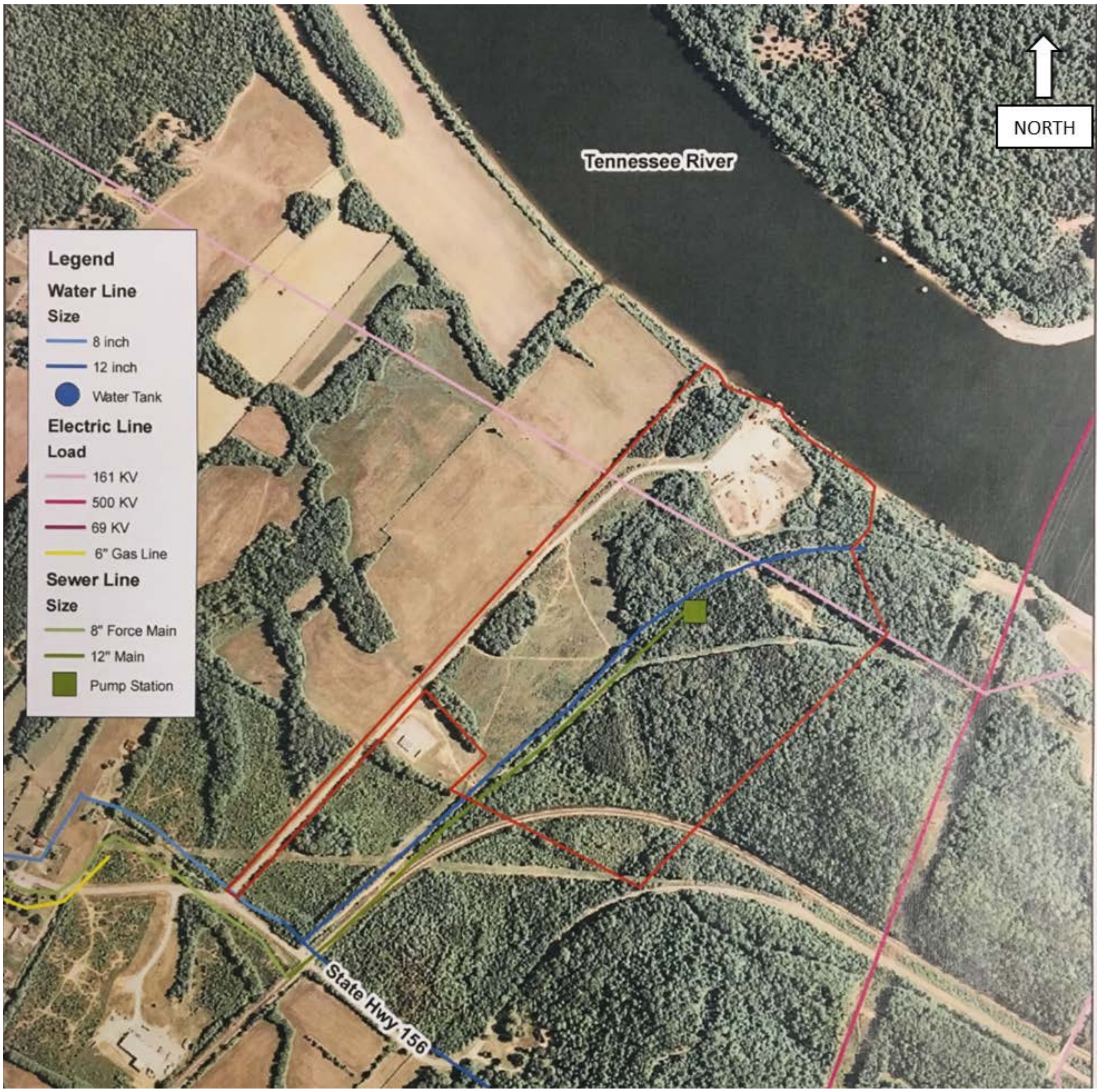


Figure 6: Location of Existing Infrastructure

SECTION 4: WORK ACTIVITY ASSIGNMENTS

In order to evaluate the Nickajack site for industrial development potential, a broad realm of engineering services is required. The majority of the companies interested in the Nickajack site in recent years have been automotive related manufacturers. Prior to beginning engineering analysis, research was conducted on the site as well as surrounding areas used for development of automotive and other industrial facilities. The manufacturing industries that have been interested in the site typically require development areas of approximately 30 acres and building facilities ranging from 100,000 to 300,000 square feet. Based on this knowledge, a grading plan was created for 44 acres to accommodate the development of all infrastructure. Structural design and analyses were performed for a steel 150,000 square foot manufacturing facility and a 30,000 square foot concrete office facility. Spread footings were designed for both buildings. A parking lot and access road design, including all striping and signing plans, was developed. The anticipated trip generation was calculated and then signal and stop sign warrants were performed using the generated traffic. Stormwater infrastructure was designed to manage the necessary levels of runoff, and pipes were sized to tie into existing water and sewer lines. After all design and analysis, a cost estimate and project schedule were created using *RSMeans Cost Data.*

SITE CIVIL AND CONSTRUCTION

The Nickajack Industrial Development site is undeveloped and requires site civil preparations. All site civil plans and quantities are based on data collected through two site visits and documents provided by the SEIDA. LIDAR data was also provided for the 92 acre Nickajack site. Programs such as Carlson Civil Suite, AutoCAD Civil 3D, and Microsoft Excel were used to provide the site civil services. A existing conditions drawing, general design layout, grading and drainage plan, and site utility were developed through the use of the LIDAR data and the collected survey data.

The general design layout was used to display the location of the new site elements. The new parking lot, new roads, new office, new manufacturing facility, and new loading area were all displayed on the layout. The new parking lot is approximately 33 feet from Port Road with two entrances at the front as well as a new road that extends from the side of the parking lot to Port Road. The new manufacturing facility is located behind the parking lot and is connected by a 10 foot wide sidewalk along the length of the front of the building. The new loading area is connected to the back side of facility and is 200 feet wide. A new road is located on the southwest side of the loading area and connects to Port Road. The new office building is located near the west corner of the new facility and is connected to the parking lot by a 10 foot wide sidewalk.

The grading plan was developed through the use of the LIDAR data and the collected survey data. AutoCAD Civil 3D was used to develop the existing grade of the site through the use of the LIDAR data and the survey information that was collected. The new site elements were displayed and assigned elevations. The manufacturing facility and office was set at an elevation of 626 feet to ensure that it was placed below the existing surface in order to place it on suitable soil. The parking lot was graded with a two percent slope with the center of the parking lot having an elevation of 625.8 feet and sloping

downwards towards the corners of the parking lot closest to the road. The new grading extended around the site elements with a grade of four percent and a grade of two percent for the loading area.

The grading plan was used to generate the cut and fill requirements of the site. AutoCAD Civil 3D was used to compare the existing grade surface to the new grade surface. The cut and fill quantities were generated with a cut of 176,678.14 cubic yards and a fill of 13,543.83 cubic yards. The quantities generated a net cut of 163,134.31 cubic yards for the grading requirements.

The development of the site civil and construction drawings were accurately designed to allow for proper construction of the Nickajack site. The features in AutoCAD Civil 3D allowed for accurate dimensioning and representation of the site civil services required.

STRUCTURAL DESIGN ACTIVITIES

The facilities designed for the Nickajack Industrial Site include a 150,000 sq. ft. manufacturing facility and a 30,000 sq. ft. office and research facility. The buildings on the nickajack industial site were designed with Ram structural system.

DESIGN APPROACH

The key aspect of the design for the Nickajack site was to establish a cost estimate. In order to identify a unit price per square foot for the two proposed structures, a preliminary schematic plan was required for the manufacturing facility and the office/research facility. Keeping an open floor plan was the main goal of the design of the manufacturing facility due to the unknowns of the potential operator of the Nickajack site. Columns were aligned in a three bay system allowing for two outer bays with 75 feet of open space and with an interior high bay spacing of 100 feet. These large spans allow for ample spacing for various types of machinery and assembly lines. Since the company operating the facility is still to be determined, the structure utilizes this open-flow concept, where there are as few columns as possible with large open spaces. In contrast, the office can incorporate a more traditional floor plan that accommodates relatively standard column spacing. The office space does not require large open spaces and thus was only designed with 25 foot spans.

Structural steel and concrete were both considered as suitable building materials for the Nickajack site. The two structures were designed to demonstrate a cost comparison between the use of steel or concrete. The manufacturing facility was designed as a steel structure and has an open layout inside the structure. The steel building was designed to withstand roof loads in accordance with ASCE 7-2010. Additionally, the design incorporates an estimated weight for a large crane system as a likely component of the facilities operations. The choice to use steel for this structure was made due to the relatively low axial loading applied to columns for a building of this type. The main advantage of using steel is the ability to span long distances without using many columns, thus keeping the floor space in the facility open to mixed uses. The office and research facility was designed as a concrete structure. The concrete members were designed in accordance with ACI 318-11. Since the presence of more columns in this facility is not detrimental to space usage, the use of concrete beams and columns are more feasible than in the manufacturing facility. Concrete members are typically cheaper than steel members, and this will make the office facility for cost efficient. Ultimately, the cost estimate for each structure provides a relative comparison in the cost difference between concrete and structural steel. This comparison is not perfect since concrete could not be used to span the bays in the manufacturing facility. However, price per square foot information will still be valuable for the office or for other needed buildings by the potential owner.

COMPUTATION OF LOADS

The calculated loads are in accordance with the 2010 edition of *Minimum Design Loads for Buildings and Other Structures* by the American Society of Civil Engineers. The structures in New Hope, Tennessee were classified as Risk Category II. The Risk Category II classification was identified based on the use of

the structure. The building is not an agriculture facility, temporary facility, or minor storage facility which describes a Risk Category I building. A Risk Category III building represents a substantial hazard to human life in the event of failure such as: public assembly, schools, universities, or occupancy greater than 250. Therefore, both the office/research facility and the manufacturing facility are Risk Category III. Exposure Category D was selected for both buildings because the area is unobstructed and exposed to wind flowing over open water for a distance of at least one mile. Both of the structures also do not have any permanent openings and therefore is classified as an enclosed structure. Additionally, the design incorporates an estimated weight for a large crane system as a likely component of the facilities operations. The crane systems used in the design process of the building are manufactured by EMH Company, Model: 2LK10 EM6500L6. This crane model, with a 96 ft. span and 33 ft. lift, has a 15 foot wheel base. With 30 ft. spans and a 15 ft. wheel base, the interior columns were designed to support the load of two crane systems due to the tributary areas, with half of the weight of both cranes going to each interior column. The loads evaluated were: dead load, live load, snow load, and wind load. The load calculations are summarized in these sections.

Dead Loads

In order to complete entire structural analysis, the dead load case must be identified and dead load case must be identified and dead loads sufficiently applied to the structure. The self- weight of all structural elements including beams, columns, and decking were all calculated through RAM structural System. In addition to these weights, superimposed dead loads were added to the structures include: roofing, ceiling, mechanical, plumbing, and other non-structural elements of the roof structure were included in the analysis model. These values for the manufacturing facility were estimated on the decking for Vulcraft 3VLI22, weight 1.77 psf. Another specific dead load to the manufacturing facility is 0.1 k/ft upper wall dead load to account for the wall cladding and windows of the upper level wall. The roof dead loads were estimated to be 10 psf for the manufacturing facility and 6 psf for the office/research facility based on ASCE 7-10 Chapter 3.

Live Loads

The roof live loads for both of the buildings are in accordance with ASCE 7-10 Chapter 4. The design of both roofs are ordinary and flat based on a drainage system that does not allow water to be held on the roofs has a corresponding load of 10 psf.

The live loads specifically considered for the manufacturing facility consisted of: the crane load, interior column live load, and the interior edge column live load. The crane has a wheel load of 73,295 pounds, so the interior columns were designed to withstand 146.59 kips, two times the wheel load per column.

The live loads specifically considered for the office/ research building consisted of offices, and corridors above the first floor. The live loading minimum requirements were 50 psf for the offices and 80 psf for the corridors above the first floor.

Snow Load

The snow load is another gravity load that must be considered for the manufacturing facility and office building. Based on ASCE 7-10 Chapter 7 Figure 7-1 Ground Snow Loads a snow load of 10 psf was denoted.

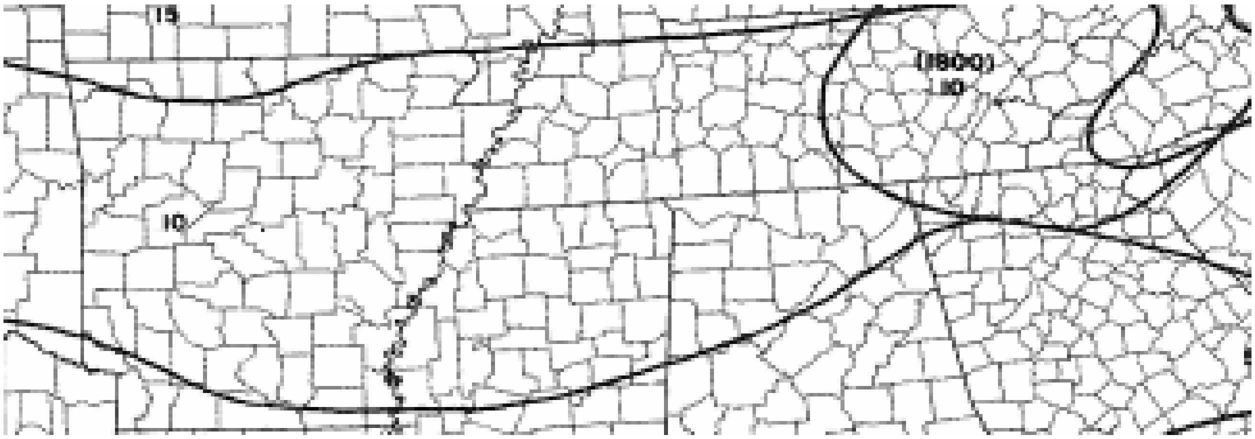


FIGURE 7: Ground Snow Loads

(ASCE 7-10 Chapter 7 Figure 7-1)

Wind Load

The wind load is another gravity load that must be considered for the manufacturing facility and office building. Based on ASCE 7-10 Chapter 26 Figure 26.5-1A Basic Wind Speeds for Occupancy Category II Buildings and Other Structures the wind speed denoted is 115 mph.

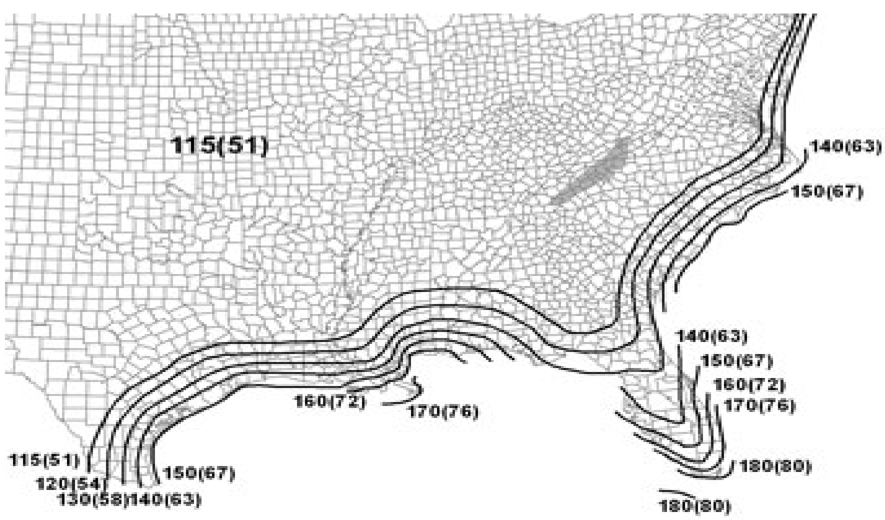


FIGURE 8: Basic Wind Speeds for Occupancy Category II Buildings and Other Structures

(ASCE 7-10 Chapter 26 Figure 26.5-1A)

Roof Dead Load	10	psf
Roof Live Load	10	psf
Upper Wall Dead Load	0.1	k/ft
Interior Column Live Load	150	kips
Interior Edge Column Live Load	75	kips

TABLE 1: Manufacturing Facility Gravity Loads

Roof Dead Load	10	psf
Roof Live Load	6	psf
Offices Live Load	50	psf
Corridors Above First Floor Live Load	80	psf

TABLE 2: Office/ Research Facility Gravity Loads

DESIGN ANALYSIS

Structural design for the steel manufacturing facility was performed by RAM Structural System. The loading inputs combined with design requirements listed by the International Building Code 2012 and the AISC Steel Construction Manual, 14th ed. (LRFD) yielded the sizing of beams, columns, and joists for the manufacturing facility structure through RAM. Since RAM Structural System did not allow for moving loads, the sizes for the interior columns under the load of the crane system were calculated assuming a crane load at every interior column. Moment frames were added along both axes of the building in order to resist lateral forces. The wind force on the building is a very large component of the lateral force on the long side of the building (along column lines A-D) and was designed as large members (W14x370 & W12x279) in order to resist this load.

Structural design for the concrete office/research facility was also performed by RAM Structural System. With the live and dead loads determined and the design requirements denoted yielded the sizing of the beams and columns for the office/research building structure through RAM. Lateral beams and columns were added on all four sides of the office building in order to resist the lateral forces. The deflection and slenderness ratios of the beams and columns were checked according to ACI 318-11 and the most efficient beams and columns were designed.

GEOTECHNICAL AND FOUNDATION DESIGN ACTIVITIES

The subsurface conditions of the Nickajack site were examined through a series of borings located throughout the property. Testing by S&ME revealed the site contained mostly fat clay soil with a maximum bearing capacity of 3,000psf. Allowable bearing pressure is determined by satisfying both bearing capacity and settlement criteria and changes based on geometry of footing, loading conditions, depth of footing, and possible water tables. Settlement was determined by using Schmertmann's method and was rarely a controlling parameter, most likely due to the footing's relatively close distance to rock. The rock quality of the site was of poor quality, 43 rock quality design, and had allowable bearing pressure of 16,000 to-21,000. The extra capacity from some footings being in contact with rock was ignored for conservative reasons. These criteria were analyzed before design of the shallow foundations.

Shallow foundations were designed for the warehouse and office building. It was decided that square spread footings would be used for both the warehouse and office building. The footings were designed to withstand shear and flexure forces. The two modes of shear failure were calculated by using equations 1 and 2: both based on theory from ACI 318-08 section 11.11.1. Equation 1 calculates one-way shear by finding the ratio of the outer area excluded by the failure planes to the total area, which reflects the percentage of applied loads transferred through the critical planes. Equation 2 calculates two-way shear by finding the ratio of the outer area excluded by the failure planes to the total area, which reflects the percentage of applied loads transferred through four critical planes at a distance d/2 from the applied loads. The nominal shear capacity must be greater than the factored shear force found from equations 1 and 2. The nominal one and two way shear was computed by using sections 11.3.1.1 and 11.12.2.1 from ACI 318-99. This requirement determines the footing's thickness and depth. Equations 1 and 2 were referenced from ACI 318-08.

$$\boldsymbol{V_{uc}} = \left(\sqrt{(P_u + \frac{6Mu}{B})^2 + {V_u}^2}\right)\left(\frac{B-\boldsymbol{c}-\boldsymbol{2d}}{B}\right) \qquad \textbf{(1)}$$

$$\boldsymbol{V_{uc}} = \left(\frac{\boldsymbol{P_u}}{\boldsymbol{4}} + \frac{\boldsymbol{Mu}}{\boldsymbol{c+d}}\right)\left(\frac{\boldsymbol{B}^{\,2} - (\boldsymbol{c}+\boldsymbol{d})^2}{\boldsymbol{B^2}}\right) \qquad \textbf{(2)}$$

The strength of the concrete used in all footings is 4,000psf. The footings were designed for flexure using equations 3 and 4. The governing equation for flexure is Mu< φMn, which is used to find the required steel. Both equations 3 and 4 are based on the principle that while in flexure, a member should be balanced by compressive and tensile forces in the top and bottom of the member's cross section. These compressive and tensile forces are translated through the top and bottom sections of the concrete being stressed and differ in proportional size based on the amount of strain allowed by 9.3.3.1 of ACI 318-14 for each section.

$$\boldsymbol{M_n} = (\boldsymbol{AsFy})\left(\boldsymbol{d} - \frac{\boldsymbol{a}}{\boldsymbol{2}}\right) \qquad \textbf{(3)}$$

$$\boldsymbol{A_s} = \left(\frac{\boldsymbol{f'c\ b}}{\boldsymbol{1.176fy}}\right)\left(\boldsymbol{d} - \sqrt{(}\boldsymbol{d^2} - \frac{\boldsymbol{2.353Muc}}{\boldsymbol{\varphi f'_c b}}\right) \qquad \textbf{(4)}$$

Equation 3 expresses the member's nominal moment capacity as a function of the resistive force of the steel multiplied by the member's area steel in either the extreme tensile and/or compressive sections. Equation 4 is derived from equating factored moment to the nominal moment and solving for the area of steel needed for equilibrium. Equation 4 was used to check the area of steel required for flexure. Minimum steel requirements were checked using ACI 318-08 10.5.4.

ROADWAY DESIGN AND TRAFFIC ENGINEERING ACTIVITIES

This project required analysis of the existing transportation network, as well as the design of an internal network to serve the Nickajack Industrial site. Analysis of the existing transportation network is summarized in Section 3 of this report. Traffic engineering and roadway design activities for this project included determining site-generated traffic and trip generation, which were used to design a parking lot and related access roads. In addition to the main parking lot, a separate access road was developed for truck access connecting Port Road to the loading dock parking lot in the back of the manufacturing facility. A separate access road to the port was developed connecting it with the loading dock parking lot. A striping and signage plan was also developed for each road and parking lot, including modifications to the existing Port Road.

SITE INTERCONNECTIVITY

The Nickajack Industrial site transportation network was designed to rely on the adjacent Port Road. The parking lot serving the manufacturing facility and the office building was designed in front of the two structures and bordered by Port Road. Three access roads extend from the parking lot to Port Road for traffic circulation. Surrounding the parking lot is a sidewalk that fronts not only the parking lot, but also both of the structures on the site.

A separate truck access road was designed intersecting at Port Road and leading to the back of the manufacturing facility. A large paved area is proposed for the rear of the manufacturing facility to accommodate loading docks for trucks. On the northern side of the facility, the road extends toward and connects with the port. In the final design there are two access points at the port, one being Port Road itself and the other being the access road from the back of the manufacturing facility.

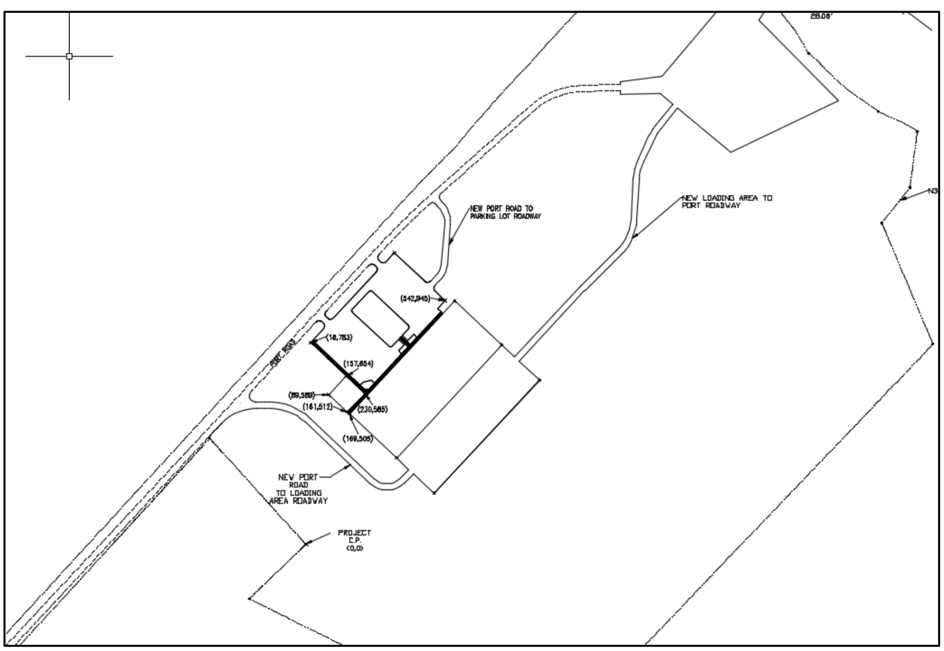


FIGURE 9: Site Layout Showing the Location of the Transportation Infrastructure

PARKING CAPACITY

In order to accommodate a 150,000 square foot manufacturing facility and a 30,000 gross square foot research and development facility, a parking lot was designed. The maximum daily parking demand was determined using the Institute of Transportation Engineers' (ITE) *Parking Generation Handbook*. For a manufacturing site, the given rate of 1.02 parked vehicles per 1,000 square feet for a Manufacturing Facility (Land Use Number 140 in the manual) was used. The peak hour parking demand during a weekday is 153 parked vehicles. The peak hour parking generation rate of a 30,000 square foot office was found to be 102 parked vehicles based on the regression given in the manual for a General Office Building (Land Use 710). The total peak parking demand on a weekday for both the manufacturing facility and the office building was 255 parked vehicles. In order to allow for 85% usage of the parking lot, 300 spaces were designed. The extra 15% accommodates visitors to the site who do not utilize the parking lot on a regular basis.

PARKING GEOMETRY AND FEATURES

The parking spaces were sized according to ITE's parking lot design templates. Each space is 18 feet long and 8.5 feet wide. In order to accommodate two-way traffic in the aisles, 26-ft wide lanes were designed between parking aisles. Surrounding parking lot and access roads is a standard 6-inch extruded curb designed according to the Tennessee Department of Transportation's (TDOT) specifications. Extending from the curb to the edge of the buildings, a 10 foot wide sidewalk was specified per TDOT Standards. These standards included designing a minimum concrete thickness of 4 inches and grading of 2% away from the structure.

In addition to regular parking spaces, the Americans with Disabilities Act (ADA) Standards were implemented for the parking lot. For a lot with between 201 and 300 parking spaces, 7 spaces must be built according to ADA Standards. These spaces must be at least 96 inches wide (8 ft.) in order to accommodate cars. Since the parking spaces were originally designed to be 8.5 feet wide, no modification in width was required for accessibility. A 60 inch wide access aisle was included with the accessible parking spaces. In addition to the accessible car parking spaces, one accessible van parking space was designed according to ADA Standards. Accessible ramps were designed connecting the parking lot and the sidewalk. The ramps are 36 inches wide with 1:10 slope flares on either side. Each accessible aisle was fitted with a ramp.

Located in the center of the parking lot, a large rest area was included in the design for the benefit of the employees. Connecting the rest area to the concrete sidewalk is a raised speed table designed according to ITE specifications. The table is 10 feet wide with a 1:10 slope ramp on either side.

SIGNAGE AND STRIPING

The Port Road modifications included adding striping to the road in order to facilitate the flow of traffic. Per TDOT specifications, an industrial road should have 12-foot lanes in each direction. Since Port Road met that specification at the beginning of the project, no modifications were made to the dimensions of

the road. A double solid yellow line is painted onto the center of the road, and single solid white lines bound the lanes. This striping plan applied to each new road designed for the site.

All intersections will future a 2’ by 10’ stop bar painted on the asphalt in addition to the word “STOP.” A stop sign was added to each intersection per the *Manual of Uniform Traffic Control Devices* (MUTCD) specifications (code R1-1). Locations of stop bars and signs can be found in the site drawings in the transportation section.

TRAFFIC SIGNAL WARRANT

In order to determine if the increased traffic from the Nickajack site warranted the installation of traffic controls at the intersection of Port Road and Highway 156, a traffic control signal needs study was undertaken according to the MUTCD. Three warrants were considered: Eight-Hour Vehicular Volume, Four Hour Vehicular Volume, and Peak Hour.

In order to measure traffic volumes at the Nickajack site, pneumatic tubes were installed on Highway 156 near the intersection with Port Road. Traffic was counted from March 1, 2016 to March 14, 2016. The data obtained from the pneumatic tubes can be found in Appendix C of this report. The traffic generation for the minor street approach was taken from the relevant ITE Trip Generation categories, which can be found in Appendix B.

The intersection of Port Road and Highway 156 was evaluated using the MUTCD traffic signal warrants mentioned above. Highway 156 was considered the major street, and Port Road was considered the minor street. Volumes from the peak hour trip generation for the manufacturing facility and the office were used as the side street volumes. The volumes from the intersection at the Nickajack site are sufficiently small such that warrants are unsatisfied. For Highway 156, the maximum traffic in one hour on any given day was 165 vehicles per hour (vph), which occurred at 3 PM. Not only did the peak hour of the highway not align with the peak hour of trip generation of the industrial site, but the peak of 156 vph fell far below the minimum 350 vph required by the MUTCD. The other two warrants required determining whether the peak hour(s) of the minor and major roads exceed a base threshold on a graph.

Since none of the warrants were met, a signalized intersection is not necessary for the development of the industrial site. However, in the future, if more land fronting Port Road were developed, traffic counts could increase to the point of justifying the installation of a traffic signal at the intersection with Highway 156.

HYDROLOGY AND STORMWATER MANAGEMENT ACTIVITIES

The Nickajack Industrial site requires several developments including stormwater management systems and utility connections. A wetland and stream survey was gathered using SEIDA documents and LIDAR data. Runoff accumulation was calculated for both pre and post development to determine the effects of development and the necessary method for managing stormwater. Catch basins and drainage culverts were designed to accommodate stormwater runoff. In addition to stormwater management, design was performed to connect the new development to existing utility infrastructure including: water, sewer, and electric.

With the location of this property being partially in a floodplain, avoidance of placing the infrastructure, such as new roads, the new parking lot, and the new office and manufacturing facility, in the flood zone would have been ideal. Due to location constraints of the site being located in a floodplain, a small portion of the road connecting the manufacturing and port facilities disrupts the flood plain.

FIGURE 10: Flood Plain Disrupted by New Access Road

PERMITTING AND ORDINANCES

Upon speaking to Marion County planner, Michael Frixen, it was confirmed that there were no local ordinances in place; this provides that it is acceptable for the small portion of the road connecting the manufacturing and port facilities to be in a flood plain. Regulations for development were found to be per TDEC and the State of Tennessee's NPDES Permit for Industrial Activities. Stormwater compliances during the construction of the site follow the Tennessee Erosion and Sediment Control Handbook - A Stormwater Planning and Design Manual for Construction Activities.

DEVELOPMENT PROCESS

EPA regulations state that stormwater holding potential industry-related pollutants cannot be discharged into the Tennessee River. Therefore, in order to treat the runoff for a ten-year, twenty-four storm, catch basins were designed to meet pre-development conditions in order to eliminate exceeding

runoff accumulation once new infrastructure has been built. Catch basins were designed and are to be constructed alongside the north left and right corners of the parking lot, and the south left and right corners of the designed loading dock parking area. Location of the catch basins was based off the grading direction of the roads and parking lot, which determines the direction of stormwater runoff flow. Catch basins were designed based on pre-development runoff volume, at 32 inches by 32 inches by four feet deep with a 2.5-inch thick concrete wall. Excess stormwater will be piped from catch basins toward either stream, with both streams discharging into the Tennessee River.

The runoff for existing conditions, resulting from a ten year, twenty-four hour storm, were computed by performing a pre-development analysis, which required the curve number, impervious percentage, initial abstraction, time of concentration and lag time, and the area of the watershed. The curve number was calculated using the composite number method, and the peak runoff was calculated using the Soil Conservation Service curve number method and HEC-HMS. The area that was graded for the Nickajack site is 44.35 acres (0.0693 square miles) and has 50% woods in good condition and 50% open space in good condition. The foundation is made up of silty clays, which gives a hydrologic soil group of group D. Chapter 9, Hydrologic Soil-Cover Complexes, from Part 630 Hydrology National Engineering Handbook was used for curve number selection and tabulated values were identified from this reference. The curve number was calculated using the Discrete Method as 78.5. The rainfall depth (P) for a ten year, twenty-four hour storm for the city of New Hope, Tennessee, where the Nickajack site is located, is 5.30” per NOAA’s National Weather Service.

Peak runoff, Q was calculated using the SDS Curve Number Method. One parameter that HEC-HMS incorporates in the analysis that the SCS curve number method does not is the lag time. Lag time is equal to sixty percent of the time of concentration. The time of concentration, t_c, was computed using the Kirpich equation, from which lag time was solved.

For the post development analysis, surface runoff must not exceed the runoff experienced at existing conditions. In the area of the property graded, which is 44.35 acres, the proposed site layout will result in 20% of impervious area and 80% of pervious area for developed conditions The Discrete Method was used to determine for the post-development curve number and the peak runoff. Time of concentration was calculated using the Kirpich equation, from which lag time was calculated. Peak flow was calculated using the Rational Method, which incorporates the runoff coefficient, the rainfall intensity, and the drainage area. Peak flow for each watershed within the site layout was calculated to determine the sizing of pipe for each section. The peak flow was calculated at 2.98 ft^3/second for developed conditions. Using the peak flow, the pipe size of all pipes connected to catch basins was determined by Manning’s equation. Manning’s roughness coefficient was determined from “Manning’s n for Closed Conduits Flowing Partly Full (Chow, 1959)” as 0.013 for trowel finish concrete pipe. The slope was evaluated as 2%, and the cross-sectional area of the required pipe computed was 76.2 in^2. Using these parameters, pipe diameter was calculated to be 10 inches. Each flow separately leads out of the catch basins and into the pipes, and is eventually combined for maximum flow by going into one pipe and into either stream, ultimately leading out of the Nickajack site.

SANITARY SEWER SYSTEM

Along with stormwater pipes, a sanitary pipe and a sewer pipe are to be connected to water and sewer lines. Effluent is required to be treated on site to certain levels, stated below, in order to send to a water or wastewater treatment plant. Required treatment levels per the Industrial Pretreatment Program must reach a total dissolved solids level of 5450 mg/L, a pH of between 5.5 and 10.5, and a biochemical oxygen demand and total suspended solids concentration of less than 300 mg/L before being discharged into the sanitary and sewer system. If levels surpass specifications listed, pretreatment on site will be necessary.

By tying into the existing utilities, the manufacturing facility and office building is provided with sanitary water and sewage uses. The flow in the main sewer line is travelling toward the existing pump station on the site, which is toward the Tennessee River, and the flow in the main water line is flowing in the opposite direction.

A six-inch diameter, one-inch thick corrugated metal pipe was used to tie into the main water line in order to provide sanitary water. This pipe will further be connected to a utility box, including a gate vale, a flow meter, and a double backflow preventer, within close proximity to the manufacturing facility. The utility box contains the appropriate equipment, stated above, to provide sanitary water tie-ins to the manufacturing and office buildings. From the utility box, the water line will tie into the southeast corners of both the manufacturing facility and the office building. The flow of sanitary water is governed by fire protection. Using Bernoulli's energy equation, the velocity of the flow in the pipe was calculated at 20.5 feet/second by using a 60 psi pressure, a 696 feet water tank elevation and a 624 feet manufacturing facility elevation, from which the fire flow rate of 1808 gallons per minute was computed by multiplying the velocity with the cross sectional area of the 6-inch pipe, with the pressure in the line being at least 60 psi.

The new connecting four-inch diameter, one-inch thick corrugated metal sewer pipe was tied into an existing manhole, ran toward the building and then connected to a proposed new manhole in order to tap into the southeast corners of the manufacturing building and the southwest side of the office building. The connecting sewer line is a gravity flow system, which requires a downhill slope from the new manhole to the existing manhole of ¼ of an inch per foot.

For electricity, a proposed new utility pole was added to the site, connecting to an existing one.

COST ESTIMATES AND PROJECT SCHEDULING

COST ESTIMATES

The purpose of this project is to market and promote the development of the Nickajack Port Authority site. To allow potential builders to better understand the components required for development and the costs associated, estimated costs were obtained using RSMEANS data. The cost estimation process required detailed quantity take-off exercises and careful use of various RSMEANS categories. The rough order of magnitude cost estimate to develop the Nickajack Port Authority site was determined to be $5,779,576.6.

The quantity take-off was organized into groups that contained items related to each other. The main categories were clearing and grubbing, earthwork, utilities, office, manufacturing, utilities, misc., and parking lot and roads. The manufacturing facility group consisted of steel items such as beams, columns, and joists. The spread footing quantities were also included so that all sub-structure and super-structure materials were displayed. The office group consisted of concrete slabs, beams, spread footings and columns. The items for concrete structures consisted of cost and quantity data for formwork, reinforcement, and concrete placement. The manufacturing facility and office were set as categories to effectively compare and analyze the costs and materials needed. The manufacturing facility had an estimated cost of $1,304,501.3 and the office had an estimated cost of $858,783.60.

The parking lot and roads group consisted of items associated with the complete construction of these elements of the site. The group contained items for pavement of the roads, parking areas, as well as detailed items needed to construct the parking lot. The category was one of the costlier groups at $2,003.64. At an estimated cost of $5,779,576.60, the quantity takeoff and cost estimation provided an approximate cost for the development of the Nickajack site

PROJECT SCHEDULE

With the quantity take-off information and RSMEANS duration values, Microsoft Project was used to generate a proposed project schedule and construction duration. The project schedule is impacted by the wet seasons and cold seasons due to the restrictions on certain activities, such as placing concrete and asphalt. Unfavorable weather conditions could increase the duration of the project when proposed activities are halted, therefore lengthening the duration of the entire project. The variable weather of this region could result in cold winters or increased rainfall periods. The detailed project schedule and activity durations will be found in Appendix D.

The durations for all activities were determined by utilizing the quantities from the proposed design and information from RSMEANS. Multiple crews were used for activities that required an excess amount of work that would greatly lengthen the project. There are certain completion deadlines for activities that will insure that the project be completed in an appropriate time by the contractor. The development of all design activities described within this report are estimated to take 192 days.

The completion of the earthwork requirements is one of the major features of the project and has a duration of 55 days. The earthwork tasks consist of excavation, removal of stripping, backfill, and compaction that occur simultaneously. The completion of these tasks are critical to the project schedule because they are predecessors to other site elements such as the construction of the office, manufacturing facility, and parking lots. As specified in the preliminary geotechnical report, there is a possibility for the removal of rock beneath the surface of the manufacturing facility. The need for rock removal is a possibility that could greatly increase the duration of the project. The completion of the earthwork tasks allows for construction of the roads, parking areas, office, and manufacturing building. These tasks are able to be completed concurrently so that the construction time can be reduced.

Overall the project schedule represents a construction process that allows for the completion of major elements of the site simultaneously. Although the construction time is significantly reduced, the construction of these site elements may be affected by the work areas being too congested with workers. The close proximity of the manufacturing facility, office building, and parking areas creates a tight workspace that could interfere with the construction duration of these features.

SECTION 5: REFERENCES

1. http://servicelearning.utk.edu/smart-communities-initiative/
2. *AISC Steel Construction Manual 14th Edition Load and Resistance Factor Design*
3. *ASCE 7: Minimum Design Loads for Buildings and Other Structures*
4. *ACI 318-14*
5. *IBC 2012*
6. Institute of Transportations Engineers' *Trip Generation Manual, 9th edition*
7. Institute of Transportation Engineers' *Parking Generation, 4th edition*
8. *Manual on Uniform Traffic Control Devices, 2009*
9. *A Policy on Geometric Design of Highways and Streets*
10. *Tennessee Erosion and Sediment Control Handbook - A Stormwater Planning and Design Manual for Construction Activities*
11. *RSMeans Cost Data*

APPENDICES

APPENDIX A: GENERAL INFORMATION

A. General Info Package
B. Existing Infrastructure Map
C. BWSC Conceptual Rail Spur Drawings
D. Nickajack Port Project Activity – Industry Interests
E. S&ME Geotechnical Report
F. U.S. DOT Crossing Inventory Form
G. South Pittsburg Zoning Regulations

APPENDIX B: CALCULATIONS

A. Cut and Fill Volume Calculations
B. Structural Steel Calculations
C. Structural Concrete Calculations
D. Foundation Calculations
E. Parking Generation Calculations
F. Trip Generation Calculations
G. Stormwater Calculations
H. Sanitary Calculations

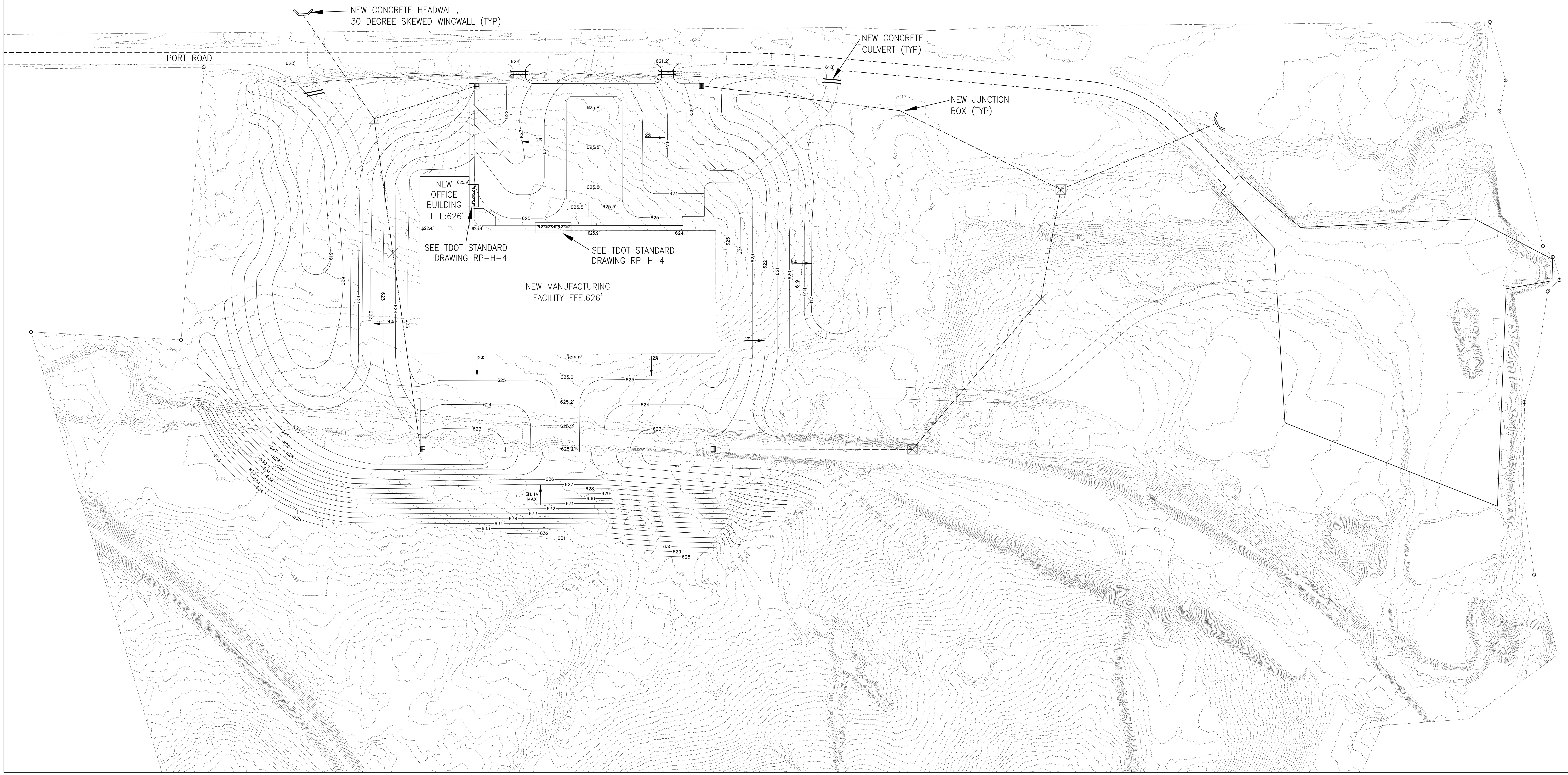
APPENDIX C: REPORTS

A. HEC-HMS Pre-development and Post-development Analysis Report
B. Traffic Counts

APPENDIX D: QUANTITY TAKE-OFF AND COST ESTIMATE WORKSHEETS

A. Quantity Take-Off and Cost Estimate Spreadsheet
B. Project Schedule

LEGEND	
	PROPERTY LINE
	EXIST MAJOR CONTOURS
	EXIST MINOR CONTOURS
	NEW CONTOUR
	NEW 10" DIA CONCRETE PIPE
	SLOPE
626'	SPOT ELEVATION
	NEW CATCH BASIN
	NEW HEADWALL
	NEW JUNCTION BOX
	NEW CONCRETE CULVERT



Very Good Engineering Co.

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Knoxville, TN 37916

Marion County
Nickajack Industrial Site

Port Road
New Hope, TN 37380

SHEET CONTENTS

SITE GRADING PLAN

Revisions

No.	Date	Comments
1	2/21/16	1SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/27/16	100% CD UPDATE

SCALE

1:100

DATE PREPARED

2/21/16

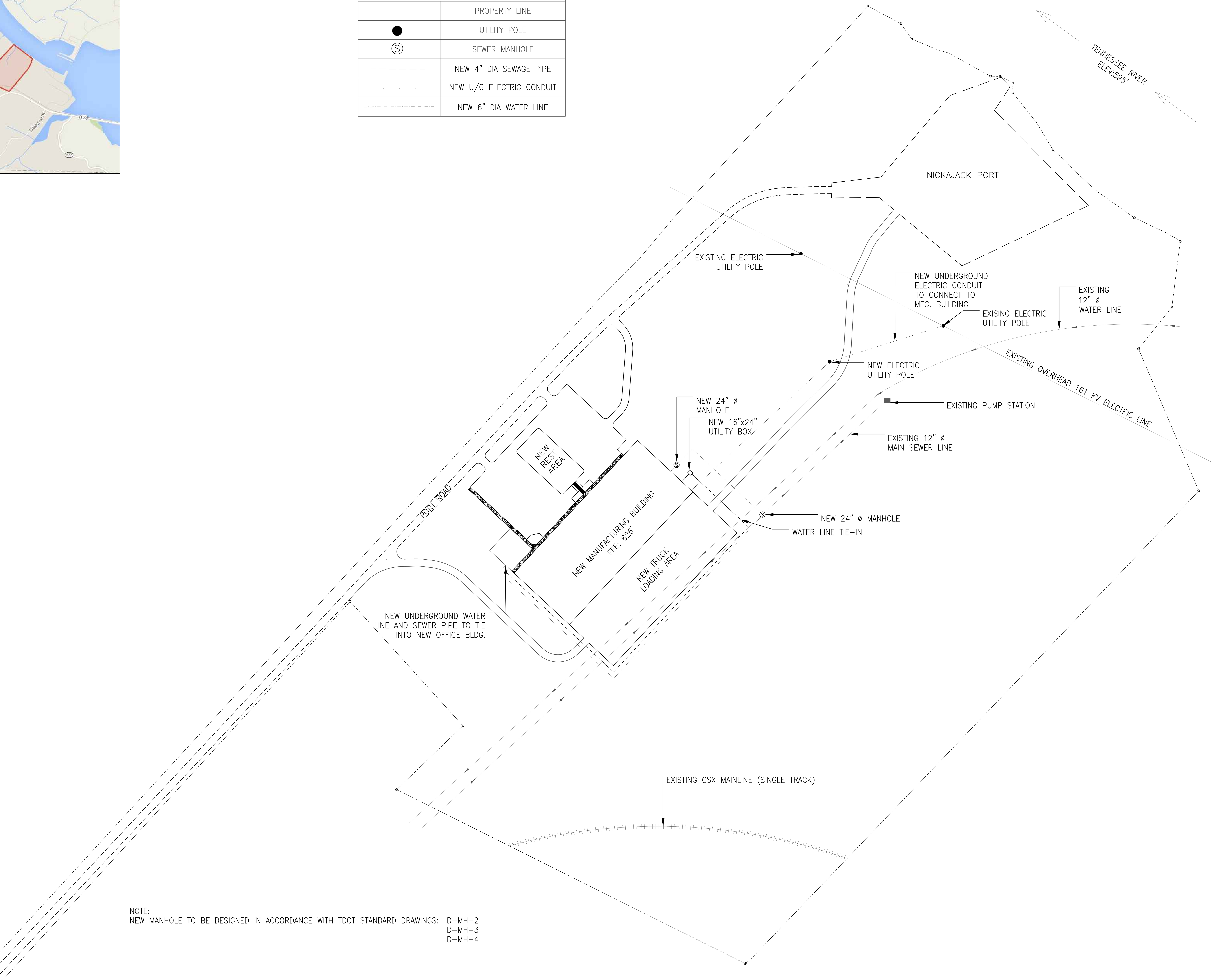
DRAWN BY

A. FULKERSON

SHEET #

C101

LEGEND	
—·—·—·—	PROPERTY LINE
●	UTILITY POLE
Ⓢ	SEWER MANHOLE
— — — —	NEW 4" DIA SEWAGE PIPE
— — —	NEW U/G ELECTRIC CONDUIT
—·—·—	NEW 6" DIA WATER LINE



NOTE:
NEW MANHOLE TO BE DESIGNED IN ACCORDANCE WITH TDOT STANDARD DRAWINGS: D-MH-2
D-MH-3
D-MH-4

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Port Road
New Hope, TN 37380

SHEET CONTENTS

SITE UTILITY PLAN

Revisions

No.	Date	Comments
1	2/21/16	1SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/27/16	100% CD UPDATE
4	4/29/16	100% CD UPDATE

SCALE
1:150

DATE PREPARED
2/21/16

DRAWN BY
A. FULKERSON
B. ISOM

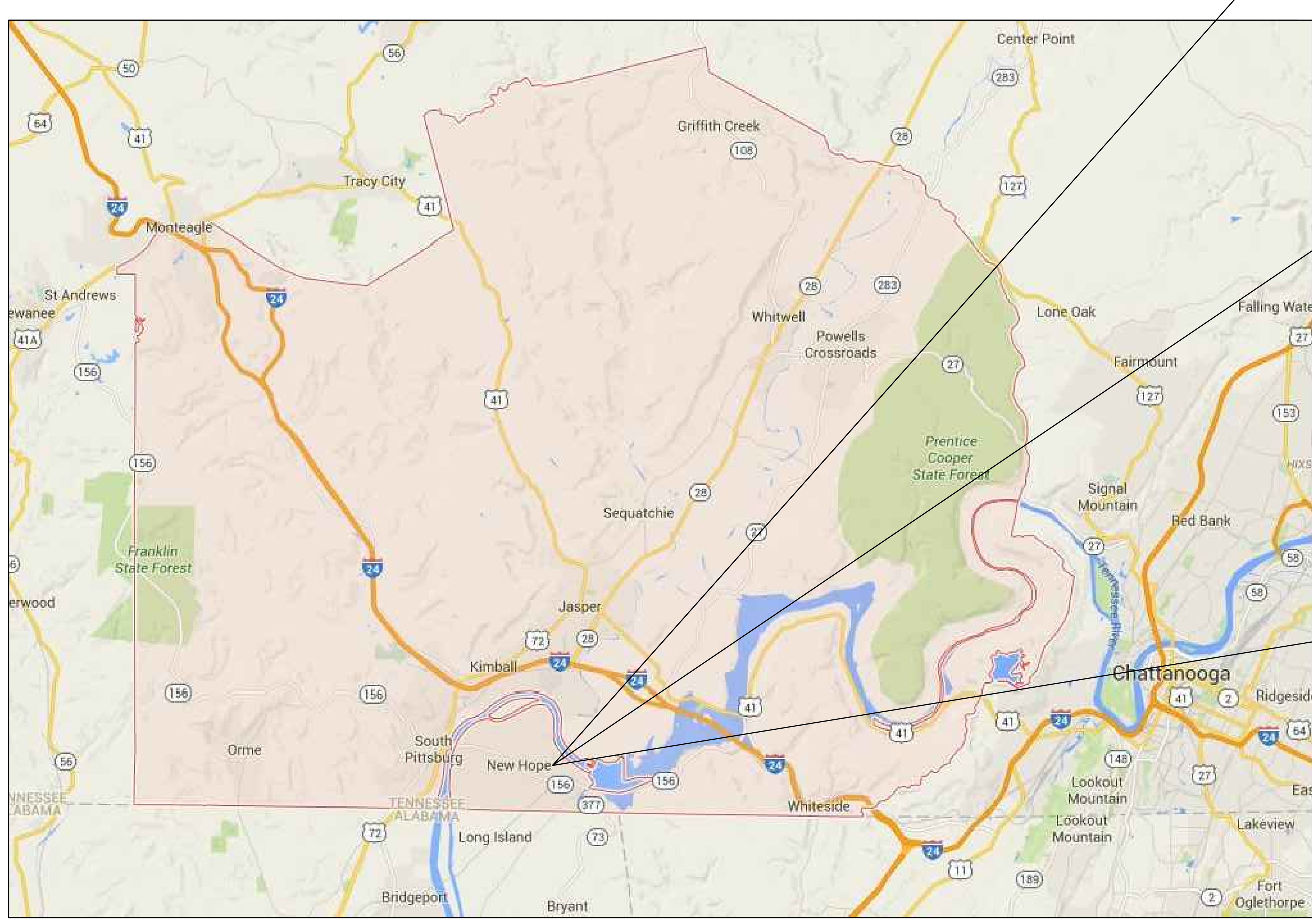
SHEET #
C201

NICKAJACK INDUSTRIAL SITE DEVELOPMENT PLAN

PORT ROAD (34°59'56"N 85°38'31"W)
NEW HOPE, TN

CE 400 SENIOR DESIGN PROJECT

CONTRIBUTORS: CATHERINE LOWE
BROOKLYNN ISOM, KRISTINA KING,
DREW FULKERSON, CHRIS ROYER,
JAYLYN JOHNSON, SETH GILLILAND



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SHEET CONTENTS

COVER SHEET

Revisions

No.	Date	Comments
1	2/21/16	SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/14/16	100% DD UPDATE

SCALE
–

DATE PREPARED
2/1/16

DRAWN BY
C. ROYER

SHEET #
G101

INDEX OF DRAWINGS

G – GENERAL INFORMATION

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G201	INDEX OF DRAWINGS AND GENERAL NOTES
G401	EXISTING CONDITIONS
G501	NEW SITE LAYOUT

C – SITE CIVIL

C101	GRADING PLAN
C201	UTILITY PLAN

T – TRANSPORTATION

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T102	PARKING LOT SIGNING AND STRIPING PLAN
T201	PORT ROAD MODIFICATIONS
T301	TRUCK ACCESS ROAD
T401	PORT ACCESS ROADS
RD01–TS–1	DESIGN STANDARD FOR LOCAL ROADS AND STREETS
T–M–1	DETAILS OF PAVEMENT MARKINGS FOR CONVENTIONAL ROADS AND MARKING ABBREVIATIONS
T–S–20	SIGN DETAILS
RP–S–7	DETAILS FOR CONCRETE SIDEWALKS
RP–NMC–10	STANDARD VERTICAL (NONMOUNTABLE) CONCRETE CURBS
RP–H–4	PERPENDICULAR CURB RAMP

W – WATER RESOURCES

D–CB–25LP	LOW PROFILE CONCRETE CATCH BASIN
D–MH–2	STANDARD MASONRY AND PRECAST NO. 3 MANHOLE
D–MH3	TYPICAL DESIGN OF LIDS FOR NO. 3 MANHOLE
D–MH–4	STANDARD NO. 3 MANHOLE CASTINGS AND STEPS
D–PB–1	STANDARD DETAILS FOR CONCRETE PIPE INSTALLATION

S – STRUCTURAL

S101	OFFICE BUILDING FOUNDATION PLAN
S102	MANUFACTURING BUILDING FOUNDATION PLAN
S103	FOOTING SCHEDULES AND DETAILS
S201	OFFICE BUILDING FIRST FLOOR LAYOUT
S202	OFFICE BUILDING SECOND FLOOR LAYOUT
S203	OFFICE BUILDING THIRD FLOOR LAYOUT
S204	OFFICE BUILDING COLUMN PLAN AND SCHEDULE
S205	OFFICE BUILDING BEAM SCHEDULE
S206	OFFICE BUILDING FRAME BEAM SCHEDULE
S207	OFFICE BUILDING DETAIL SHEET
S301	MANUFACTURING FACILITY FRAMING PLAN
S302	MANUFACTURING FACILITY COLUMN PLAN AND SCHEDULE
S303	MANUFACTURING FACILITY MOMENT FRAMES
S304	MANUFACTURING FACILITY DETAIL SHEET

GENERAL NOTES

1. THESE NOTES SHALL APPLY EXCEPT OTHERWISE INDICATED BY THE DRAWINGS OR SPECIFICATIONS.
2. WHERE A DETAIL IS SHOWN FOR ONE CONDITION, IT SHALL APPLY FOR ALL LIKE OR SIMILAR CONDITIONS EVEN THOUGH NOT SPECIFICALLY MARKED ON THE DRAWINGS.
3. GENERAL CONTRACTOR SHALL ENSURE THAT ALL MATERIALS ARE IN COMPLIANCE WITH THE PLAN AND SPECIFICATIONS.
4. THE CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO ORDERING MATERIALS. DISCREPANCIES BETWEEN FIELD MEASUREMENTS OF THE EXISTING CONDITIONS AND THE DIMENSIONS INDICATED ON THE CONTRACT DOCUMENTS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE DESIGN ENGINEER.
5. PRIOR TO COMMENCING CONSTRUCTION, THE CONTRACTOR SHALL EMPLOY A REGISTERED SURVEYOR TO LAY OUT AND STAKE THE FOLLOWING ITEMS ON SITE IN RELATION TO EXISTING PROPERTY LINES, SETBACKS, EASEMENTS, AND RIGHT–OF–WAYS FOR THE ARCHITECT, CIVIL ENGINEER, AND OWNERS FIELD REVIEW AND APPROVAL: A. THE BUILDINGS B. THE ACCESS ROADS, PARKING LOT, AND SIDEWALKS
6. COORDINATE THE SITE LAYOUT AND BUILDING WITH THE ARCHITECTURAL PLANS

DESIGN CRITERIA

1. BUILDING CODE: 2012 INTERNATIONAL BUILDING CODE
2. DESIGN CODE: ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES
3. ALL CONCRETE DESIGN IN ACCORDANCE WITH ACI318–14
4. FOUNDATION DESIGN IS BASED ON SUBSURFACE EXPLORATION DETAILED IN A PHASE I ENVIRONMENTAL SITE ASSESSMENT PREPARED BY S&ME ON MARCH 30, 2015. S&ME PROJECT NO. 1281–15–007.

CONSTRUCTION

1. THE SITE SHALL BE CLEARED AND GRUBBED WITHIN THE LIMITS OF EXCAVATION. COMPLETELY DISPOSE OF ALL MATERIALS RESULTING FROM CLEARING AND GRUBBING OFF–SITE. BURNING SHALL NOT BE PERMITTED UNLESS PRIOR APPROVAL IS OBTAINED BY THE LOCAL FIRE DEPARTMENT. THE CONTRACTOR MUST OBTAIN A PERMIT AND MEET ALL OF THE REQUIREMENTS AS SPECIFIED BY THE FIRE DEPARTMENT.
2. EROSION CONTROL DEVICES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE TENNESSEE EROSION AND SEDIMENT CONTROL HANDBOOK.
3. ALL NEWLY GRADED EARTHEN AREAS THAT ARE NOT TO BE PAVED, STABILIZED, OR SODDED SHALL BE SEEDED, FERTILIZED, AND MULCHED WITH 14 DAYS OF ATTAINMENT OF FINAL GRADE.
4. STRIP TOPSOIL FULL DEPTH (6–IN MIN) AND REMOVE FROM SITE IN A MANNER SATISFACTORY TO THE OWNER AND LOCAL GOVERNING AGENCIES.
5. DO NOT ALLOW WATER TO ACCUMULATE IN EXCAVATIONS OR POND ON SITE. PROVIDE NECESSARY MEASURES TO KEEP THE SITE FREE–DRAINING.
6. PROTECT AND MAINTAIN SUBGRADES UNTIL PLACEMENT OF THE FINAL SURFACE IS ACHIEVED.
7. DISTURBED AREAS SHALL BE STABILIZED IN AN EXPEDIENT MANNER TO MINIMIZE TIME OF EXPOSURE TO WEATHER.
8. THE DENSITY OF THE FILL SOILS SHOULD BE 90 PCF. FILL MATERIAL SHOULD CONTAIN NO ROCK LARGER THAN 4 INCHES OR ORGANIC MATERIAL.
9. THE FILL SHOULD BE PLACED IN THIN LIFTS WITH A MAXIMUM LOOSE THICKNESS OF 8 INCHES, THEN COMPACTED TO 95% OF STANDARD PROCTOR MAXIMUM DRY DENSITY.
10. BLASTING WILL BE REQUIRED APPROXIMATELY 4 TO 5 FEET AROUND THE AREA OF THE MANUFACTURING PLANT.

UTILITY

1. LOCATE EXISTING UTILITIES. CALL THE TENNESSEE ONE CALL SYSTEM, AT 1–800–351–1111.
2. PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL CONTACT THE UTILITY OWNERS TO NOTIFY THEM OF WORK IN THE AREA AND REQUEST THEM TO PROPERLY LOCATE THEIR RESPECTIVE UTILITY. NOTIFICATION SHALL BE GIVEN AT LEAST THREE BUSINESS DAYS PRIOR TO COMMENCEMENT OF OPERATIONS AROUND THE UTILITY.
3. THE LOCATIONS OF EXITING UTILITIES SHOWN WITHIN THESE DRAWINGS ARE APPROXIMATE. THE EXACT LOCATIONS SHALL BE DETERMINED IN THE FIELD BY POTHOLING AND BY CONTACTING THE UTILITY COMPANIES INVOLVED.
4. PROVIDE ALL NECESSARY PROTECTIVE MEASURES TO SAFEGUARD THE EXISTING UTILITIES FROM DAMAGE DURING THE CONSTRUCTION OF THIS PROJECT. FURNISH ANY SPECIAL EQUIPMENT REQUIRED TO WORK OVER AND AROUND THE UTILITIES.
5. CONTRACTOR TO INSTALL ALL WATER LINES AND APPURTENANCES PER MANUFACTURERS SPECIFICATIONS.
6. TRENCH DESIGN AND SAFETY FOR PIPELINE CONSTRUCTION IS SOLELY THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL CONFORM TO ALL APPLICABLE LOCAL, STATE, AND OSHA REGULATIONS.

TRANSPORTATION

1. ASPHALT MIX DESIGN SHALL MEET MARSHALL DESIGN CRITERIA, PER TDOT SPECIFICATIONS WITH 10" OF BASE STONE, 3' OF "A" MIX, 2" OF "BM–2" MIX, AND 1.25" OF "D" MIX
2. UNLESS OTHERWISE SHOWN, ALL DIMENSIONS ARE IN FEET.
3. ALL ROADWAY DESIGN SHALL BE IN ACCORDANCE WITH THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) POLICY ON GEOMETRIC DESIGN HIGHWAYS AND STREETS, LATEST EDITION AND TDOT RD01–TS–1.
4. ALL PAVEMENT MARKINGS AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), LATEST EDITION AND TDOT T–M–1.
5. UNLESS OTHERWISE STATED, ALL SIGNAGE INCLUDED IN THE DRAWINGS CONSTITUTE NEW CONSTRUCTION AND TAKEN FROM TDOT T–S–20.

GEOTECHNICAL

1. COMPRESSIVE STRENGTH OF CONCRETE IS 4000 PSI UNLESS OTHERWISE NOTED.
2. CONTRACTOR SHALL PROVIDE A PLAN FOR TEMPORARY SHORING FOR FOUNDATION EXCAVATION AND SUBMIT TO THE ARCHITECT OR ENGINEER FOR APPROVAL. PLAN SHALL BE STAMPED BY A LICENSED ENGINEER.
3. CONTRACTOR SHALL CONTROL SURFACE AND SUBSURFACE WATER DURING CONSTRUCTION SO THAT THE FOUNDATION WILL BE CONSTRUCTED ON DRY SOIL/ROCK. NO FOUNDATION SHALL BE PLACED IN WATER OR FROZEN SUBSURFACE.
4. WHERE COMPACTED EARTH FILL IS REQUIRED, IT SHALL BE PLACED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEER'S REPORT.

WATER RESOURCES

1. STORM WATER INFRASTRUCTURE DESIGNED TO ACCOMMODATE A 10–YR 24–HR STORM.
2. IT SHALL BE THE RESPONSIBILITY OF THE DEVELOPER AND/OR CONTRACTOR TO PROCURE ALL APPLICABLE PERMITS, LICENSES AND CERTIFICATES RELATIVE TO STORMWATER TO COMPLETE THE PROJECT AND FOR THE USE OF SUCH WORK WHEN COMPLETE. COMPLIANCE SHALL BE AT ALL LEVELS, FEDERAL, STATE AND CITY, RELATING TO THE PERFORMANCE OF THIS WORK.
3. MATERIAL CERTIFICATION FOR ALL STROM MANHOLES, CATCH BASINS, AND CULVERTS SHALL BE PROVIDED TO THE APPROPRIATE INSPECTOR.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VEGETATING ALL DISTURBED AREAS PER TDEC REQUIREMENTS.

STRUCTURAL

REINFORCED CONCRETE

1. ALL CONCRETE WORK SHALL CONFORM TO ACI–318 "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE," ACI–315 "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES," AND CFSI "MANUAL OF STANDARD PRACTICE, LATEST EDITION."
2. ALL DESIGN LOADS, (I.E. LIVE, SNOW, WIND, AND DEAD) IN SECTION 4 WORK ACTIVITY ASSIGNMENTS – STRUCTURAL DESIGN ACTIVITIES OF THE CONTRACT DOCUMENT REPORT.
3. CONCRETE SHALL HAVE MAXIMUM WATER–CEMENT RATIO OF 0.45. CONCRETE MIX DESIGNS SHALL BE SUBMITTED AND APPROVED PRIOR TO CASTING OF ANY CONCRETE.
4. ALL CONCRETE PLACED SHALL BE CONSOLIDATED BY MECHANICAL VIBRATORS.
5. REINFORCING BARS SHALL CONFORM TO ASTM–A615, "STANDARD SPECIFICATION FOR DEFORMED AND PLAIN BILLET–STEEL CARDS FOR CONCRETE REINFORCEMENT." THE MINIMUM YIELD STRESS OF REINFORCING BARS SHALL BE 60 KSI.
6. CONCRETE SHALL BE STANDARD WEIGHT AND SHALL ATTAIN 28–DAY COMPRESSIVE STRENGTH OF 4000 PSI UNLESS OTHERWISE NOTED.
7. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615 GRADE 60.
8. CONTRACTOR SHALL PROVIDE CRACK CONTROL JOINTS IN ALL SLABS. LOCATION, IF NOT SHOWN ON THE DRAWINGS, SHALL BE APPROVED BY THE ARCHITECT.
9. BAR CHAIRS, HIGH CHAIRS, SUPPORT BARS, AND ALL OTHER ACCESSORIES SHALL BE PROVIDED IN ACCORDANCE WITH ACI & CRSI STANDARDS.
10. REINFORCING OF ALL CONCRETE MEMEBERS SHALL HAVE THE FOLLOWING CLEAR CONCRETE COVER:

CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	3"
CONCRETE EXPOSED TO EARTH OR WETHER	
#6 AND #7 BARS	2"
#5 AND #4 BARS	$1\frac{1}{2}$"
CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:	
SLABS, WALLS, AND JOISTS	$\frac{3}{4}$"
BEAMS, COLUMNS	
PRIMARY REINFORCEMENT, TIES, STIRRUPS	$1\frac{1}{2}$"

11. A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF COLUMNS AND BEAMS.
12. SAWN JOINTS IN SLABS–ON–GRADE SHALL BE ACCOMPLISHED WITHIN 24 HOURS OF SLAB PLACEMENT.
13. SHORES SHALL REMAIN IN PLACE OR SLABS AND BEAMS SHALL BE CONTINUOUSLY RESHORED AFTER REMOVAL OF FORMS UNTIL CONCRETE STRENGTH REACHES 70% OF THE SPECIFIED 28–DAY STRENGTH.
14. NO BACKFILLING SHALL BE PERFORMED UNTIL THE CONCRETE HAS REACHED 100% OF THE DESIGN STRENGTH.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL WORK SHALL CONFORM TO THE 13TH EDITION OF THE "STEEL CONSTRUCTION MANUAL" OF THE AISC.
2. FABRICATORS SHALL MAINTAIN CERTIFICATION FOR CATEGORY STANDARD BY THE AISC QUALITY CERTIFICATION PROGRAM. ERECTORS SHALL MAINTAIN CERTIFICATION FOR CATEGORY (CHOOSE SCE OR ACSE) BY THE AISC CERTIFICATION PROGRAM.
3. SHOP DRAWINGS FOR ALL STRUCTURAL STEEL SHALL BE SUBMITTED AND APPROVED PRIOR TO ANY FABRICATION. REPRODUCTION OF CONTRACT DRAWINGS IS NOT PERMITTED.
4. ALL CONNECTIONS SHALL BE THE RESPONSIBILITY OF THE STEEL FABRICATOR. ALL CONNECTIONS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF TN AND ENGAGED BY THE STEEL FABRICATOR. THE STEEL FABRICATOR'S CONNECTION DESIGNER SHALL SUBMIT CALCULATIONS TO THE STRUCTURAL ENGINEER OF RECORD FOR REVIEW. THE CALCULATIONS SHALL BE STAMPED WITH THE PROFESSIONAL REGISTRATION OF THE CONNECTION DESIGNER. THE CONNECTION DESIGNER SHALL REVIEW AND STAMP ALL SHOP DRAWINGS CONCERNING CONNECTION DESIGNS.
5. STRUCTURAL STEEL FRAMING SHALL BE ERECTED TRUE AND PLUMB IN ACCORDANCE WITH AISC CODE OF STANDARD PRACTICE. ANY FRAMING EXCEEDING TOLERANCES OF THE CODE OF STANDARD PRACTICE SHALL BE CORRECTED BY THE CONTRACTOR AT HIS EXPENSE AS DIRECTED BY THE STRUCTURAL ENGINEER.
6. THE STRUCTURAL STEEL ERECTOR SHALL PROVIDED TEMPORARY BRACING OF THE STRUCTURAL STEEL FRAMEWORK AGAINST ALL GRAVITY LOADS, STRUCTURE SELFWEIGHT, AND LATERAL LOADS SUCH AS WIND. THIS BRACING SHALL REMAIN IN PLACE UNTIL THE FINAL SYSTEM FOR RESISTING LATERAL LOADS IS IN PLACE AND EFFECTIVE AS APPROVED BY THE STRUCTURAL ENGINEER. THE ERECTOR SHALL ENGAGE A QUALIFIED PROFESSIONAL ENGINEER LICENSED IN THE LOCATION OF THE PROJECT TO DESIGN A PLAN AND SEQUENCE FOR ERECTION OF THE LATERAL STABILITY OF THE STRUCTURAL STEEL FRAME DURING CONSTRUCTION. THIS PROFESSIONAL ENGINEER SHALL SEAL THE PLANS AND SEQUENCE AND SUBMIT IT TO THE ENGINEER OF RECORD FOR REVIEW.
7. STEEL COLUMNS EXTENDING BELOW GRADE AND NOT ENCASED IN CONCRETE SHALL BE COATED WITH BITUMASTIC.

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SHEET CONTENTS

INDEX OF SHEETS & GENERAL NOTES

Revisions

No.	Date	Comments
1	2/21/16	SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/14/16	100% DD UPDATE
4	4/26/16	100% CD UPDATE

SCALE

–

DATE PREPARED

4/24/16

DRAWN BY

K. KING

SHEET #

G201

LEGEND	
—·—·—·—	PROPERTY LINE
— — — —	EXIST MAJOR CONTOURS
- - - - - -	EXIST MINOR CONTOURS
—·—·—·—	EXIST ROAD CENTERLINE

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SHEET CONTENTS

EXISTING CONDITIONS

Revisions

No.	Date	Comments
1	2/21/16	SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/27/16	100% CD UPDATE

SCALE

1:150

DATE PREPARED

2/21/16

DRAWN BY

A. FULKERSON

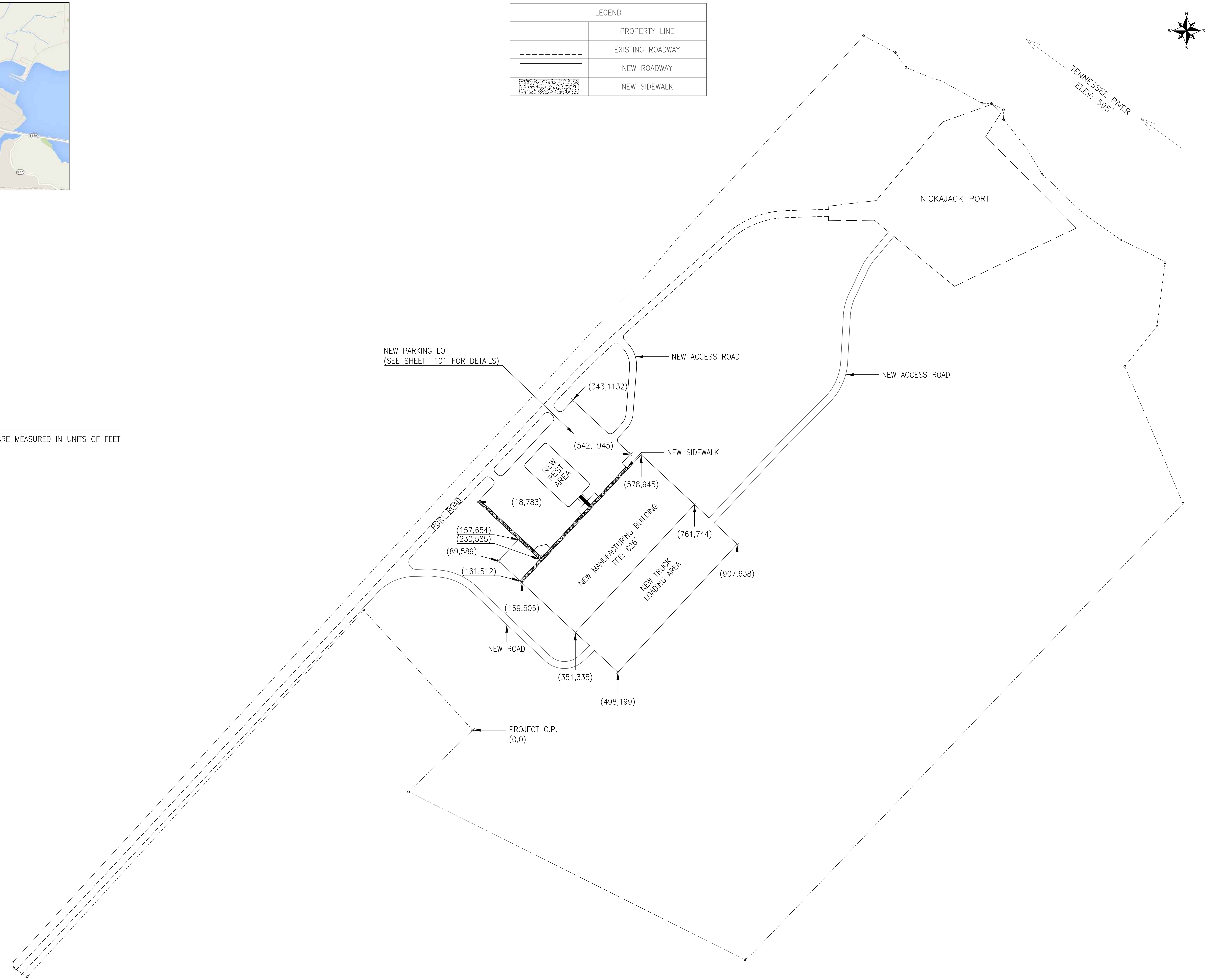
SHEET #

G301

LEGEND	
(solid line)	PROPERTY LINE
(dashed lines)	EXISTING ROADWAY
(double solid lines)	NEW ROADWAY
(hatched)	NEW SIDEWALK

NOTES:

1. ALL CARDINAL COORDINATES ARE MEASURED IN UNITS OF FEET



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SHEET CONTENTS

NEW SITE LAYOUT

Revisions

No.	Date	Comments
1	2/21/16	1SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/27/16	100% CD UPDATE

SCALE

1:150

DATE PREPARED

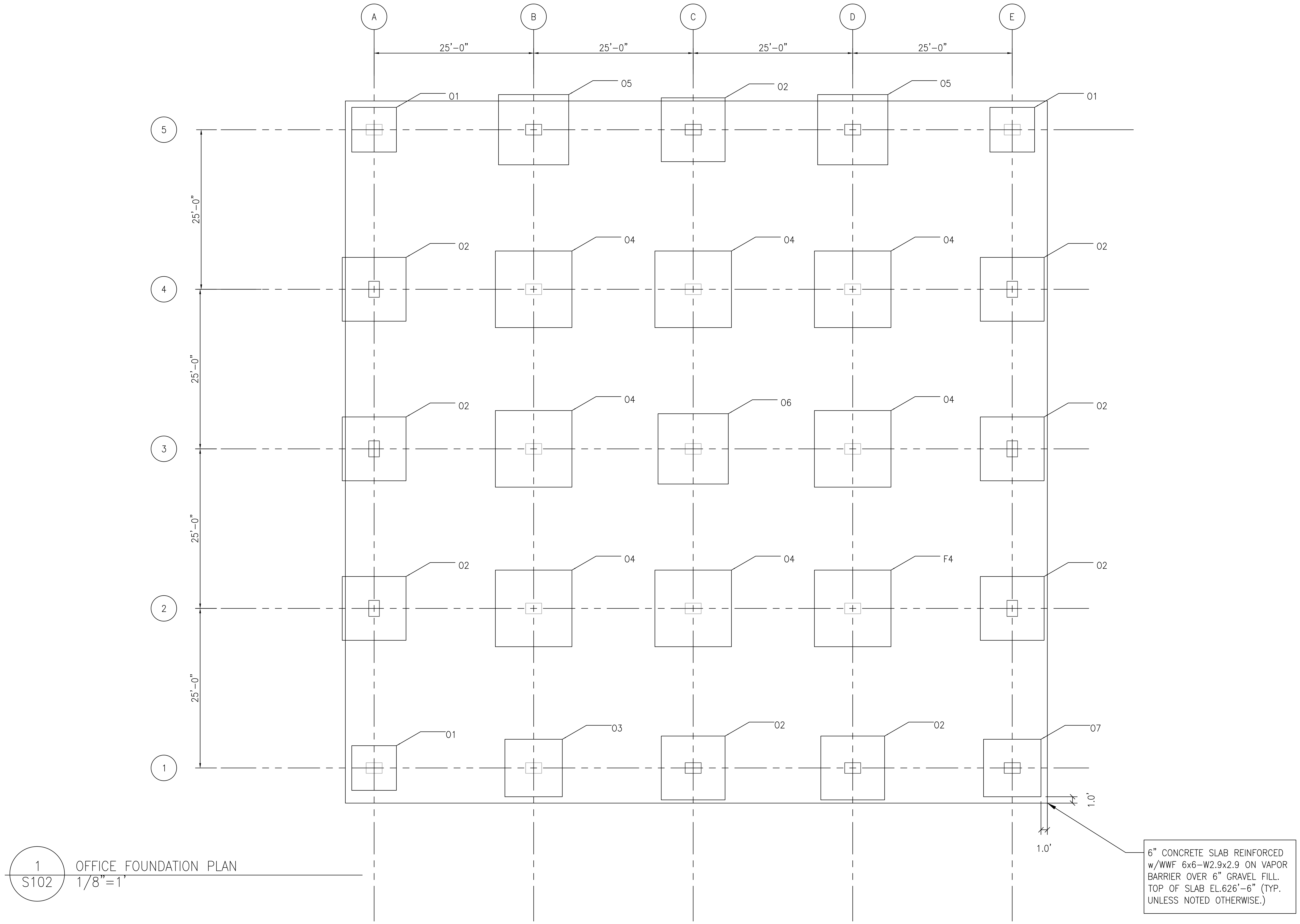
2/21/16

DRAWN BY

A. FULKERSON

SHEET #

G401



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SHEET CONTENTS

FOUNDATION PLAN FOR OFFICE BUILDING

Revisions

No.	Date	Comments

SCALE

$\frac{1}{8}$" = 1'

DATE PREPARED

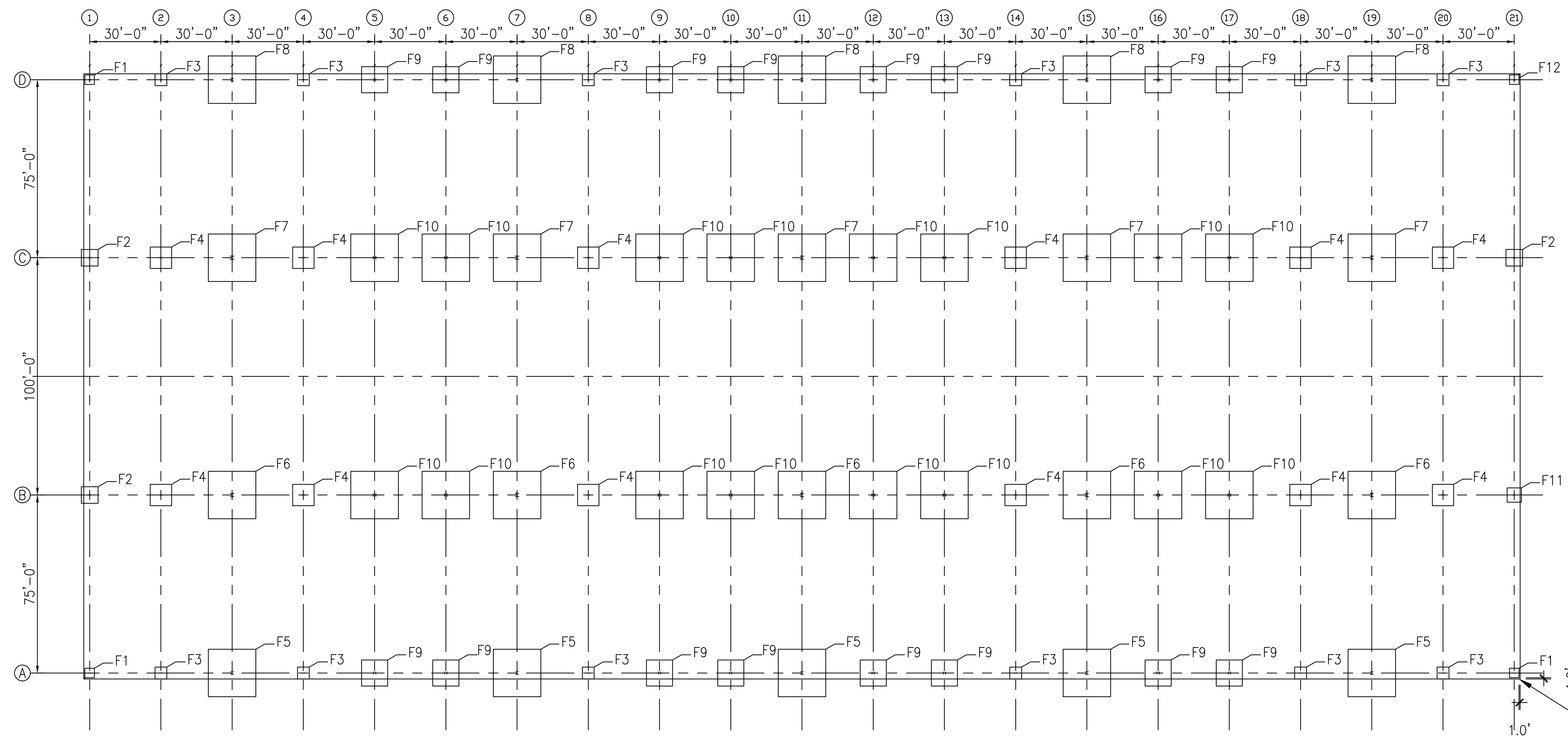
3/25/16

DRAWN BY

J. JOHNSON

SHEET #

S101



6" CONCRETE SLAB REINFORCED w/WWF 6x6–W2.9x2.9 ON VAPOR BARRIER OVER 6" GRAVEL FILL. TOP OF SLAB EL.626'–6" (TYP. UNLESS NOTED OTHERWISE.)

1
S101
MANUFACTURING FACILITY FOUNDATION PLAN
1/32"=1'

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SHEET CONTENTS

FOUNDATION PLAN FOR MANUFACTURING BUILDING

Revisions

No.	Date	Comments

SCALE

$\frac{1}{32}$" = 1'

DATE PREPARED

3/25/16

DRAWN BY

J. JOHNSON

SHEET #

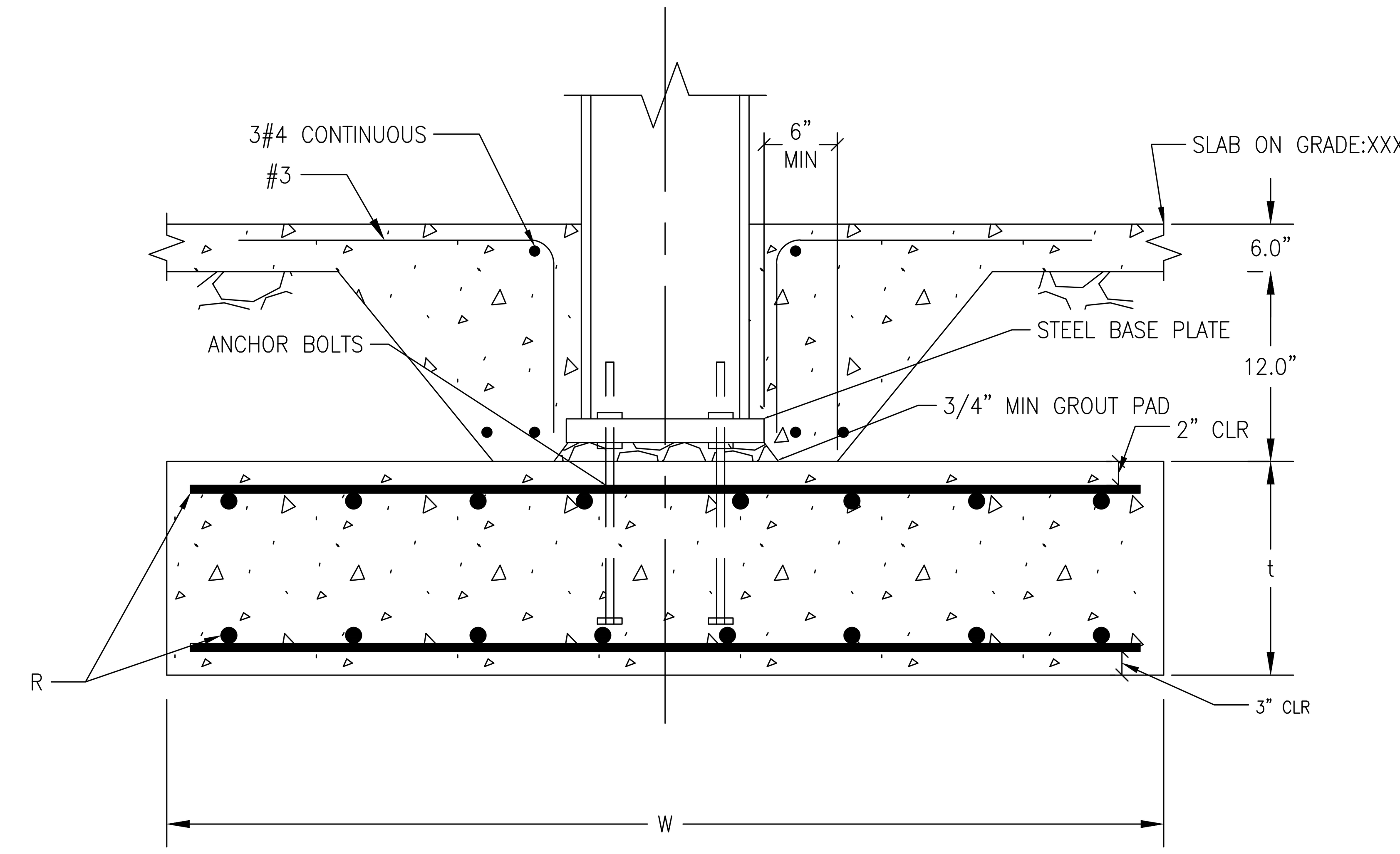
S102

MANUFACTURING FOOTING SCHEDULE

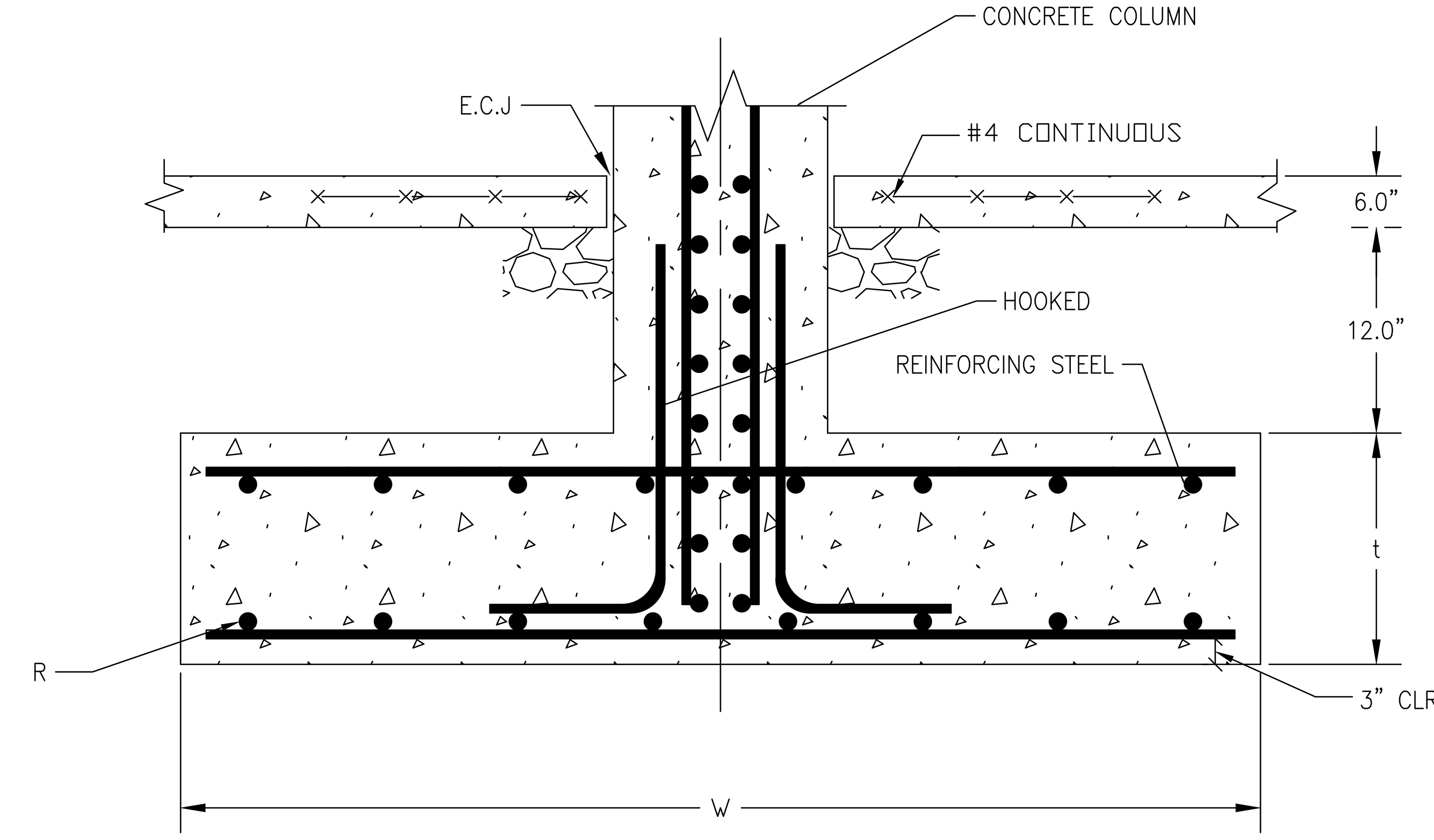
MARK	PLAN SIZE (W)	THICKNESS(t)	REINFORCEMENT(R)
F1	4'-0" SQ.	1'-6"	8-#5 EW- BOTTOM
F2	7'-0" SQ.	1'-6"	9-#5 EW- BOTTOM
F3	5'-0" SQ.	1'-6"	7-#5 EW- BOTTOM
F4	9'-0" SQ.	2'-0"	8-#7 EW- BOTTOM
F5	20'-0" SQ.	2'-6"	14-#5 EW- TOP 33-#7 EW- BOTTOM
F6	20'-0" SQ.	3'-0"	14-#5 EW- TOP 23-#7 EW- BOTTOM
F7	20'-0" SQ.	2'-6"	14-#5 EW- TOP 28-#7 EW- BOTTOM
F8	20'-0" SQ.	2'-6"	14-#5 EW- TOP 32-#7 EW- BOTTOM
F9	11'-0" SQ.	1'-6"	8-#5 EW- TOP 17-#5 EW- BOTTOM
F10	20'-0" SQ.	2'-6"	14-#5 EW- TOP 20-#7 EW- BOTTOM
F11	6'-0" SQ.	1'-6"	8-#5 EW- BOTTOM
F12	4'-0" SQ.	1'-6"	9-#5 EW- BOTTOM

OFFICE FOOTING SCHEDULE

MARK	PLAN SIZE	THICKNESS	REINFORCEMENT
O1	7'-0" SQ.	1'-6"	11-#5 EW- BOTTOM
O2	10'-0" SQ.	1'-6"	8-#5 EW- TOP 9-#6 EW- BOTTOM
O3	9'-0" SQ.	1'-6"	8-#6 EW- BOTTOM
O4	12'-0" SQ.	2'-0"	11-#7 EW- BOTTOM
O5	11'-0" SQ.	1'-6"	8-#5 EW- TOP 11-#7 EW- BOTTOM
O6	11'-0" SQ.	1'-6"	11-#7 EW- BOTTOM
O7	9'-0" SQ.	1'-6"	7-#5 EW- TOP 8-#6 EW- BOTTOM



1 S103 TYPICAL STEEL COLUMN FOOTING
NTS



2 S103 TYPICAL CONCRETE COLUMN FOOTING
NTS

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SHEET CONTENTS

FOUNDATION DETAILS FOR OFFICE AND MANUFACTURING BUILDINGS

FOUNDATION SCHEDULE

Revisions

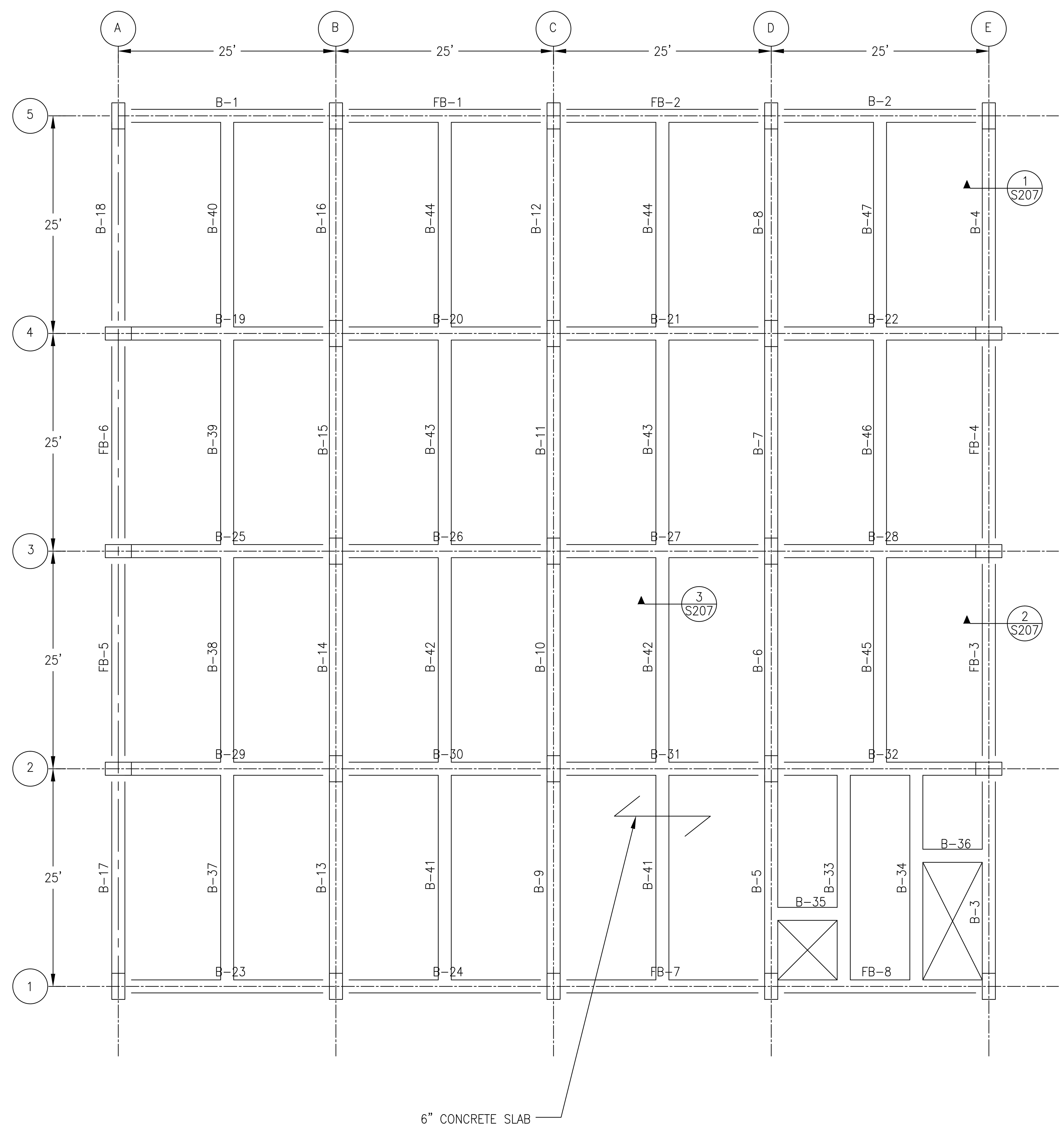
No.	Date	Comments

SCALE
NTS

DATE PREPARED
3/25/16

DRAWN BY
J. JOHNSON

SHEET #
S103



1
S201
FLOOR 1 CEILING
EL. 16'-0"

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SHEET CONTENTS

FLOOR ONE CEILING PLAN FOR OFFICE BUILDING

Revisions

No.	Date	Comments
1	2/21/16	SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/14/16	100% DD UPDATE
4	4/26/16	100% CD UPDATE

SCALE

$\frac{1}{8}$" = 1'

DATE PREPARED

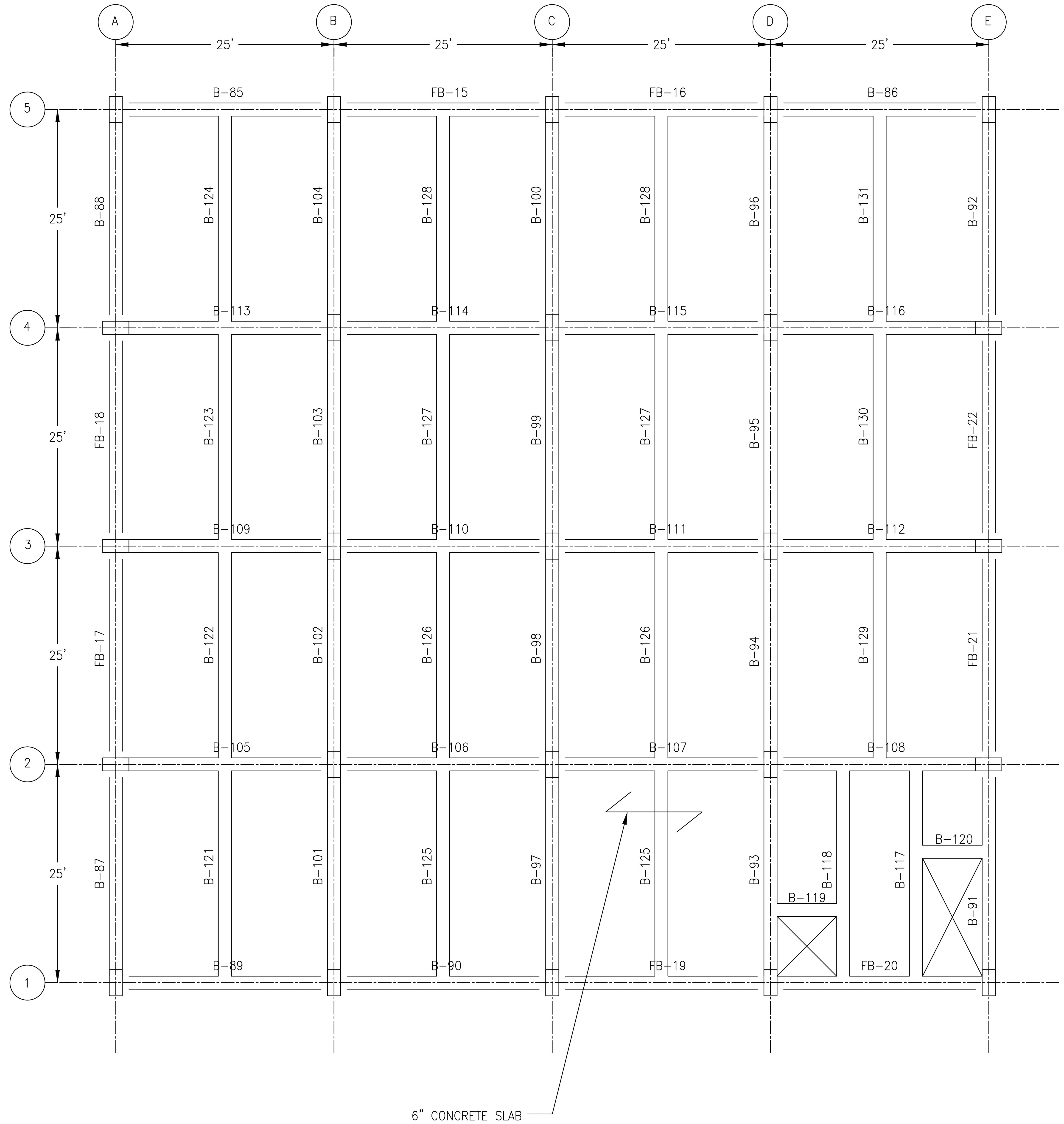
4/24/16

DRAWN BY

C. LOWE

SHEET #

S201



1 S202 FLOOR 2 CEILING
ELEV. 28'-0"

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SHEET CONTENTS

FLOOR 2 CEILING PLAN FOR OFFICE BUILGING

Revisions

No.	Date	Comments
1	2/21/16	SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/14/16	100% DD UPDATE
4	4/26/16	100% CD UPDATE

SCALE

$\frac{1}{8}" = 1'$

DATE PREPARED

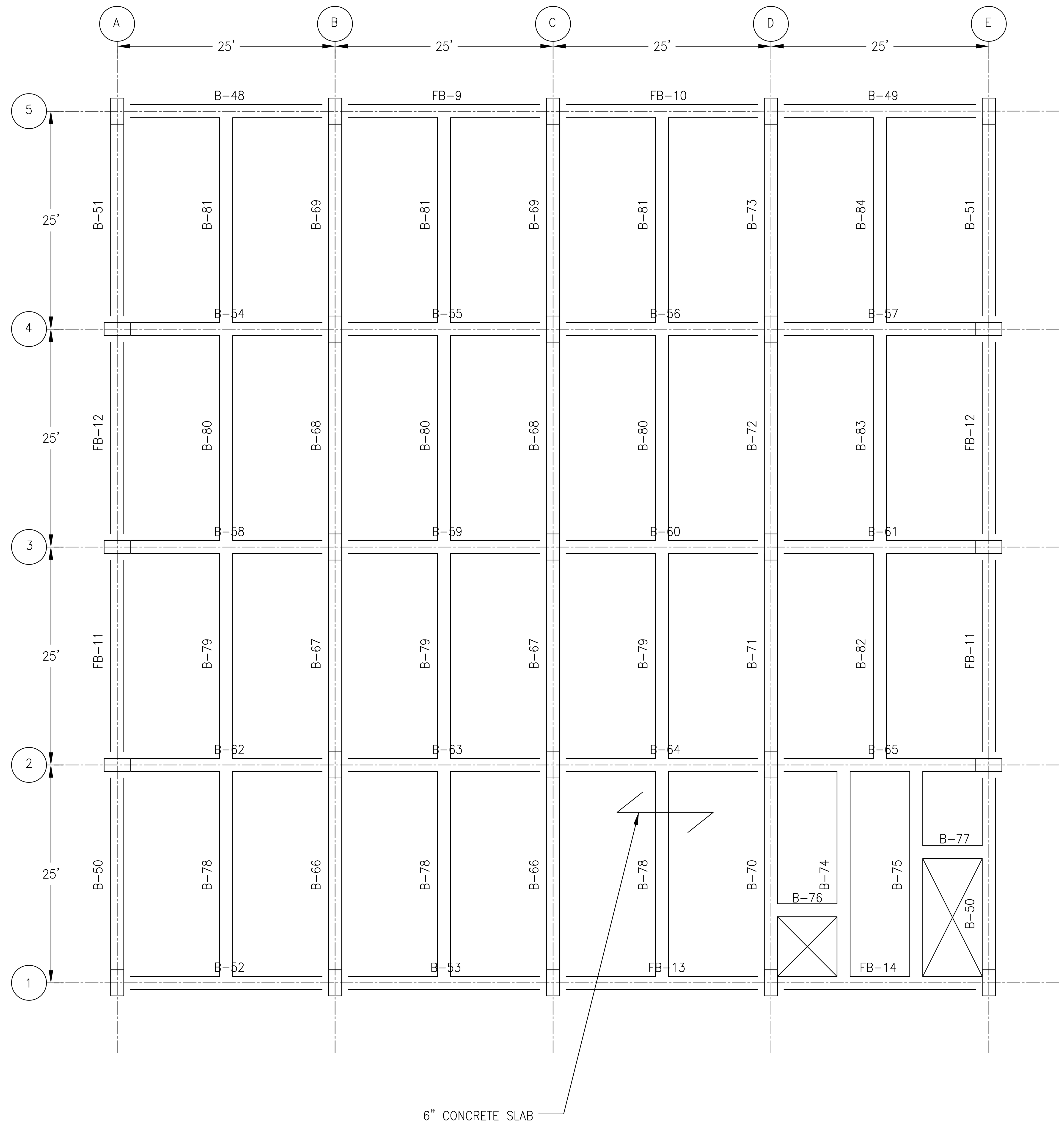
4/24/16

DRAWN BY

C. LOWE

SHEET #

S202



1 S203 FLOOR 3 CEILING (ROOF)
EL. 40'-0"

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SHEET CONTENTS

FLOOR 3 (ROOF)

Revisions

No.	Date	Comments
1	2/21/16	SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/14/16	100% DD UPDATE
4	4/26/16	100% CD UPDATE

SCALE

$\frac{1}{8}$" = 1'

DATE PREPARED

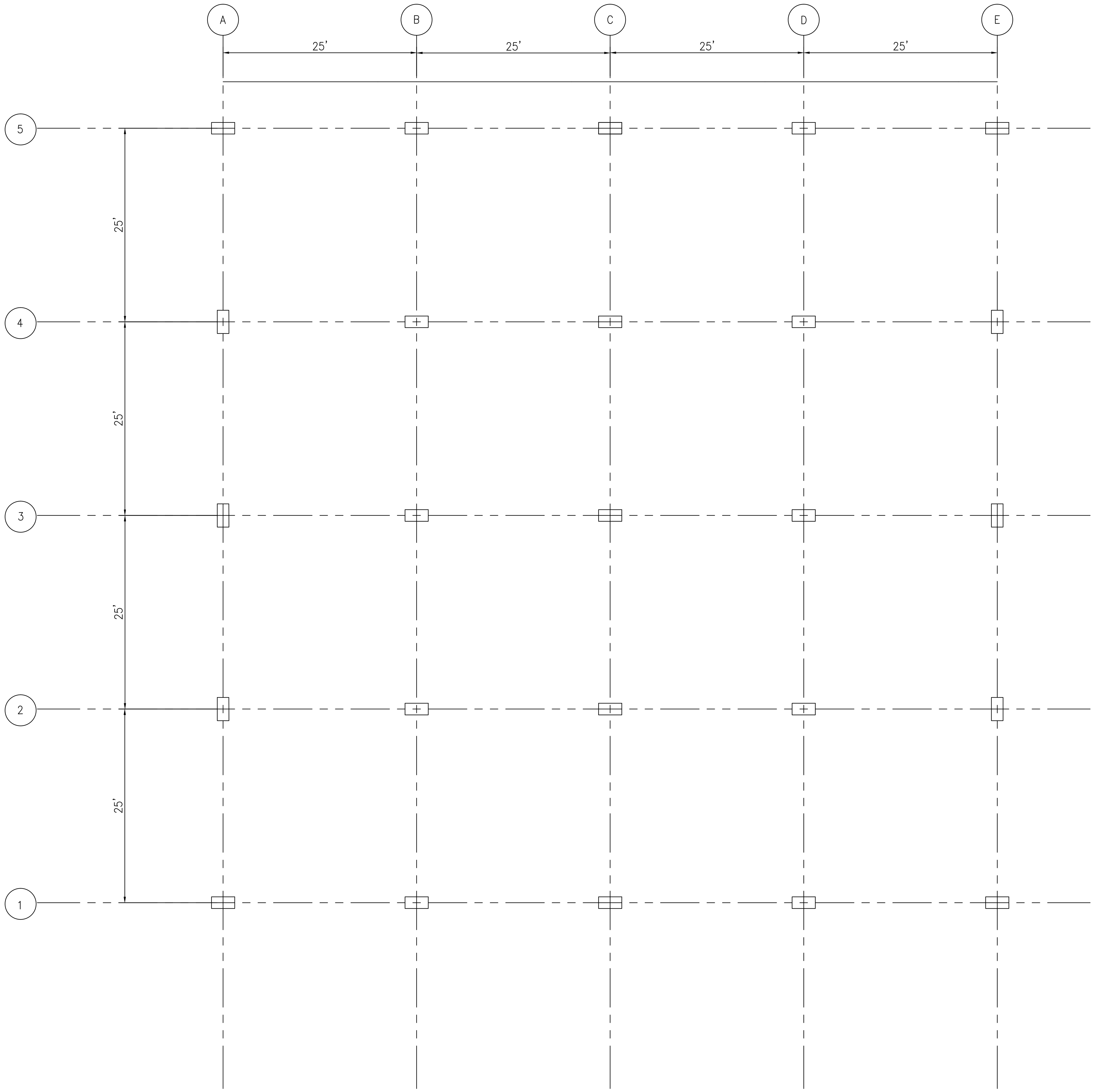
4/24/16

DRAWN BY

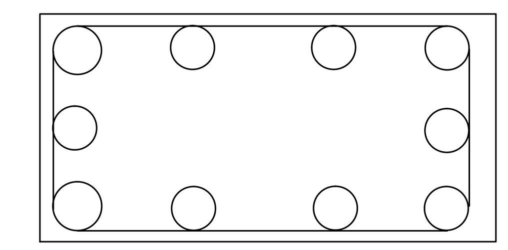
C. LOWE

SHEET #

S203



1 S204 COLUMN PLAN 1/8" = 1'



2 S204 COLUMN DETAIL NTS

CONCRETE COLUMN SCHEDULE

COLUMNS	A-1, A-2, A-3, A-4, A-5, B-1, B-2, B-3, B-4, B-5, C-1, C-2, C-3, C-4, C-5, D-1, D-2, D-3, D-4, D-5, E-1, E-2, E-3, E-4, E-5
VERTICAL REINF. TIES f'c (psi) ROOF	(12) #7 #4@12" 4000
COLUMN: SIZE VERTICAL REINF. TIES f'c (psi) THIRD FLOOR	18"x36" (12) #7 #4@12" 4000
COLUMN: SIZE VERTICAL REINF. TIES f'c (psi) SECOND FLOOR	18"x36" (12) #7 #4@12" 4000
COLUMN: SIZE VERTICAL REINF. TIES f'c (psi) FIRST FLOOR	18"x36" (12) #7 #4@12" 4000
FTG. / GRADE BEAM / PIER CAP	

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SHEET CONTENTS

DRAWING DETAILS THE COLUMN PLAN AND SCHEDULE FOR THE OFFICE BUILDING

Revisions

No.	Date	Comments
1	4/14/16	100% DD UPDATE
2	4/27/16	100% CD UPDATE

SCALE

$\frac{1}{8}$" = 1'

DATE PREPARED

4/14/16

DRAWN BY

C. LOWE

SHEET #

S204

BEAM NO.	BEAM SIZE	BOTTOM REINFORCING				TOP REINFORCING									STIRRUPS					
						TOP LEFT				TOP CONT.	TOP RIGHT				LEFT SIZE	SPACING				RIGHT SIZE
	B x D	BARS	LAYERS	BL	BR	BARS	LAYERS	LA	LB		BARS	LAYERS	RA	RB		TYPE		TYPE		
B-1	18 x 18	(3) #5	1			(3) #5	1	7'-0"			(4) #5	1	8'-9"		#4	B2	(21)@6"	B2	(21)@6"	#4
B-2	18 x 18	(3) #5	1			(4) #5	1	8'-3"			(3) #5	1	7'-0"		#4	B1	(1)@6"	B1	(24)@6"	#4
B-3	18 x 18	(3) #5	1			(3) #5	1	8'-0"			(4) #4	1	9'-0"							
B-4	18 x 18	(3) #5	1			(5) #5	1	9'-0"			(3) #5	1	7'-0"		#4	B1	(1)@6"	B1	(25)@6"	#4
B-5	18 x 18	(4) #5	1			(3) #7	1	6'-11"			(4) #7	1	8'-6"		#4	B3	(17)@6"	B4	(13)@6"	#4
B-6	18 x 18	(3) #5	1			(4) #7	1	8'-6"			(3) #7	1	8'-6"		#4	B5	(13)@6"	B2	(13)@6"	#4
B-7	18 x 18	(3) #5	1			(3) #7	1	8'-6"			(3) #7	1	8'-6"		#4	B2	(13)@6"	B2	(13)@6"	#4
B-8	18 x 18	(4) #5	1			(3) #7	1	8'-6"			(3) #7	1	6'-7"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-9	18 x 18	(4) #5	1			(3) #7	1	6'-7"			(3) #7	1	8'-6"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-10	18 x 18	(3) #5	1			(3) #7	1	8'-6"			(3) #7	1	8'-6"		#4	B2	(13)@6"	B2	(11)@6"	#4
B-11	18 x 18	(3) #5	1			(3) #7	1	8'-6"			(3) #7	1	8'-6"		#4	B2	(11)@6"	B2	(13)@6"	#4
B-12	18 x 18	(4) #5	1			(3) #7	1	8'-6"			(3) #7	1	6'-7"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-13	18 x 18	(4) #5	1			(3) #7	1	6'-7"			(3) #7	1	8'-6"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-14	18 x 18	(3) #5	1			(3) #7	1	8'-6"			(3) #7	1	8'-6"		#4	B2	(13)@6"	B2	(13)@6"	#4
B-15	18 x 18	(3) #5	1			(3) #7	1	8'-6"			(3) #7	1	8'-6"		#4	B2	(13)@6"	B2	(13)@6"	#4
B-16	18 x 18	(4) #5	1			(3) #7	1	8'-6"			(3) #7	1	6'-7"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-17	18 x 18	(3) #5	1			(3) #5	1	7'-0"			(4) #5	1	9'-0"		#4	B2	(21)@6"			
B-18	18 x 18	(3) #5	1			(4) #5	1	9'-0"			(3) #5	1	7'-0"		#4	B1	(1)@6"	B1	(25)@6"	#4
B-19	18 x 18	(5) #5	1			(4) #7	1	6'-5"			(3) #7	1	9'-0"		#4	B6	(13)@6"	B7	(23)@6"	#4
B-20	18 x 18	(4) #5	1			(3) #7	1	9'-0"			(3) #7	1	8'-9"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-21	18 x 18	(4) #5	1			(3) #7	1	8'-9"			(3) #7	1	9'-0"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-22	18 x 18	(5) #5	1			(3) #7	1	9'-0"			(4) #7	1	6'-5"		#4	B7	(17)@6"	B6	(13)@6"	#4
B-23	18 x 18	(3) #5	1			(3) #5	1	7'-0"			(3) #5	1	8'-9"		#4	B2	(21)@6"			
B-24	18 x 18	(3) #5	1			(3) #5	1	8'-9"			(4) #5	1	8'-9"							
B-25	18 x 18	(3) #6	1			(5) #6	1	6'-5"			(4) #6	1	9'-0"		#4	B8	(13)@6"	B5	(15)@6"	#4
B-26	18 x 18	(3) #6	1			(4) #6	1	9'-0"			(3) #6	1	8'-9"		#4	B5	(13)@6"	B2	(13)@6"	#4
B-27	18 x 18	(3) #6	1			(3) #6	1	8'-9"			(4) #6	1	9'-0"		#4	B2	(13)@6"	B5	(13)@6"	#4
B-28	18 x 18	(3) #6	1			(4) #6	1	9'-0"			(5) #6	1	6'-5"		#4	B5	(15)@6"	B8	(13)@6"	#4
B-29	18 x 18	(4) #6	1			(4) #7	1	6'-5"			(3) #7	1	9'-0"		#4	B4	(13)@6"	B3	(17)@6"	#4
B-30	18 x 18	(3) #6	1			(3) #7	1	9'-0"			(3) #7	1	8'-9"		#4	B2	(13)@6"	B2	(13)@6"	#4
B-31	18 x 18	(3) #6	1			(3) #7	1	8'-9"			(3) #7	1	9'-0"		#4	B2	(13)@6"	B2	(13)@6"	#4
B-32	18 x 18	(3) #6	1			(3) #7	1	9'-0"			(4) #7	1	6'-5"		#4	B2	(17)@6"	B5	(15)@6"	#4
B-33	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-10"							
B-34	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-11"							
B-35	18 x 18	(3) #5	1			(3) #5	1			(3) #5	(3) #5	1								
B-36	18 x 18	(3) #5	1			(3) #5	1	3'-0"			(3) #5	1	2'-10"							
B-37	18 x 18	(3) #5	1			(3) #5	1	6'-7"			(3) #5	1	8'-6"							
B-38	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	8'-6"							
B-39	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	8'-6"							
B-40	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-7"							
B-41	18 x 18	(3) #5	1			(3) #5	1	6'-7"			(3) #5	1	8'-6"							
B-42	18 x 18	(3) #5	1			(3) #5	1	8'-11"			(3) #5	1	8'-6"							
B-43	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	8'-11"							
B-44	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-7"							
B-45	18 x 18	(3) #5	1			(3) #5	1	7'-6"			(3) #5	1	8'-6"							
B-46	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	8'-6"							
B-47	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-7"							
B-48	18 x 18	(3) #5	1			(3) #5	1	7'-0"			(4) #5	1	8'-9"		#4	B2	(21)@6"			
B-49	18 x 18	(3) #5	1			(4) #5	1	8'-9"			(3) #5	1	7'-0"		#4	B1	(1)@6"	B1	(24)@6"	#4
B-50	18 x 18	(3) #5	1			(3) #5	1	6'-5"			(3) #5	1	9'-0"							
B-52	18 x 18	(3) #5	1			(3) #5	1	7'-0"			(3) #5	1	8'-9"		#4	B2	(21)@6"			
B-53	18 x 18	(3) #5	1			(3) #5	1	8'-9"			(4) #5	1	8'-9"							
B-54	18 x 18	(3) #5	1			(4) #5	1	6'-5"			(4) #5	1	9'-0"		#4	B5	(9)@6"	B5	(13)@6"	#4
B-55	18 x 18	(3) #5	1			(4) #5	1	9'-0"			(3) #5	1	8'-9"		#4	B5	(5)@6"	B2	(5)@6"	#4
B-56	18 x 18	(3) #5	1			(3) #5	1	8'-9"			(4) #5	1	9'-0"		#4	B2	(5)@6"	B5	(5)@6"	#4
B-57	18 x 18	(3) #5	1			(4) #5	1	9'-0"			(4) #5	1	6'-5"		#4	B5	(13)@6"	B5	(9)@6"	#4
B-58	18 x 18	(3) #5	1			(4) #5	1	6'-5"			(4) #5	1	9'-0"		#4	B5	(7)@6"	B5	(11)@6"	#4
B-59	18 x 18	(3) #5	1			(4) #5	1	9'-0"			(3) #5	1	8'-9"		#4	B5	(5)@6"	B2	(5)@6"	#4
B-60	18 x 18	(3) #5	1			(3) #5	1	8'-9"			(4) #5	1	9'-0"		#4	B2	(5)@6"	B5	(5)@6"	#4

BEAM NO.	BEAM SIZE	BOTTOM REINFORCING				TOP REINFORCING									STIRRUPS					
						TOP LEFT				TOP CONT.	TOP RIGHT				LEFT SIZE	SPACING				RIGHT SIZE
	B x D	BARS	LAYERS	BL	BR	BARS	LAYERS	LA	LB		BARS	LAYERS	RA	RB		TYPE		TYPE		
B-61	18 x 18	(3) #5	1			(4) #5	1	9'-0"			(4) #5	1	6'-5"		#4	B5	(11)@6"	B5	(7)@6"	#4
B-62	18 x 18	(3) #5	1			(4) #5	1	6'-5"			(4) #5	1	9'-0"		#4	B5	(9)@6"	B5	(13)@6"	#4
B-63	18 x 18	(3) #5	1			(4) #5	1	9'-0"			(3) #5	1	8'-9"		#4	B5	(5)@6"	B2	(5)@6"	#4
B-64	18 x 18	(3) #5	1			(3) #5	1	8'-9"			(4) #5	1	9'-0"		#4	B2	(5)@6"	B5	(5)@6"	#4
B-65	18 x 18	(3) #5	1			(4) #5	1	9'-0"			(5) #5	1	6'-5"		#4	B5	(13)@6"	B8	(9)@6"	#4
B-66	18 x 18	(3) #5	1			(3) #6	1	6'-7"			(3) #6	1	8'-6"		#4	B2	(7)@6"	B2	(7)@6"	#4
B-67	18 x 18	(3) #5	1			(3) #6	1	8'-6"			(3) #6	1	8'-6"		#4	B2	(7)@6"	B2	(7)@6"	#4
B-68	18 x 18	(3) #5	1			(3) #6	1	8'-6"			(3) #6	1	8'-6"		#4	B2	(7)@6"	B2	(7)@6"	#4
B-69	18 x 18	(3) #5	1			(3) #6	1	8'-6"			(3) #6	1	6'-7"		#4	B2	(7)@6"	B2	(7)@6"	#4
B-70	18 x 18	(3) #5	1			(3) #6	1	6'-7"			(3) #6	1	8'-6"		#4	B2	(9)@6"	B2	(13)@6"	#4
B-71	18 x 18	(3) #5	1			(3) #6	1	8'-6"			(3) #6	1	8'-6"		#4	B2	(7)@6"	B2	(7)@6"	#4
B-72	18 x 18	(3) #5	1			(3) #6	1	8'-6"			(3) #6	1	8'-6"		#4	B2	(7)@6"	B2	(7)@6"	#4
B-73	18 x 18	(3) #5	1			(3) #6	1	8'-6"			(3) #6	1	6'-7"		#4	B2	(7)@6"	B2	(7)@6"	#4
B-74	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-10"							
B-75	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-7"							
B-76	18 x 18	(3) #5	1			(3) #5	1			(3) #5	(3) #5	1								
B-77	18 x 18	(3) #5	1			(3) #5	1	3'-0"			(3) #5	1	2'-5"							
B-78	18 x 18	(3) #5	1			(3) #5	1	6'-7"			(3) #5	1	8'-6"							
B-79	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	8'-6"							
B-80	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	8'-6"							
B-81	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-7"							
B-82	18 x 18	(3) #5	1			(3) #5	1	7-11"			(3) #5	1	8'-6"							
B-83	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	8'-6"							
B-84	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-7"							
B-85	18 x 18	(3) #5	1			(3) #5	1	7'-0"			(4) #5	1	8'-9"		#4	B2	(21)@6"			
B-86	18 x 18	(3) #5	1			(4) #5	1	8'-9"			(3) #5	1	7'-0"		#4	B1	(1)@6"	B1	(24)@6"	#4
B-87	18 x 18	(3) #5	1			(3) #5	1	7'-0"			(4) #5	1	9'-0"		#4	B2	(21)@6"			
B-88	18 x 18	(3) #5	1			(4) #5	1	9'-0"			(3) #5	1	7'-0"		#4	B1	(1)@6"	B1	(25)@6"	#4
B-89	18 x 18	(3) #5	1			(3) #5	1	7'-0"			(3) #5	1	8'-9"		#4	B2	(21)@6"			
B-90	18 x 18	(3) #5	1			(3) #5	1	8'-9"			(4) #5	1	8'-9"							
B-91	18 x 18	(3) #5	1			(3) #5	1	8'-0"			(4) #5	1	9'-0"							
B-92	18 x 18	(3) #5	1			(4) #5	1	9'-0"			(3) #5	1	7'-0"		#4	B1	(1)@6"	B1	(25)@6"	#4
B-93	18 x 18	(4) #5	1			(3) #7	1	6'-11"			(4) #7	1	8'-6"		#4	B3	(17)@6"	B4	(13)@6"	#4
B-94	18 x 18	(3) #5	1			(4) #7	1	8'-6"			(3) #7	1	8'-6"		#4	B5	(13)@6"	B2	(13)@6"	#4
B-95	18 x 18	(3) #5	1			(3) #7	1	8'-6"			(3) #7	1	8'-6"		#4	B2	(13)@6"	B2	(13)@6"	#4
B-96	18 x 18	(4) #5	1			(3) #7	1	8'-6"			(3) #7	1	6'-7"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-97	18 x 18	(4) #5	1			(3) #7	1	6'-7"			(3) #7	1	8'-6"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-98	18 x 18	(3) #5	1			(3) #7	1	8'-6"			(3) #7	1	8'-6"		#4	B2	(13)@6"	B2	(11)@6"	#4
B-99	18 x 18	(3) #5	1			(3) #7	1	8'-6"			(3) #7	1	8'-6"		#4	B2	(11)@6"	B2	(13)@6"	#4
B-100	18 x 18	(4) #5	1			(3) #7	1	8'-6"			(3) #7	1	6'-7"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-101	18 x 18	(4) #5	1			(3) #7	1	6'-7"			(3) #7	1	8'-6"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-103	18 x 18	(3) #5	1			(3) #7	1	8'-6"			(3) #7	1	8'-6"		#4	B2	(13)@6"	B2	(13)@6"	#4
B-104	18 x 18	(4) #5	1			(3) #7	1	8'-6"			(3) #7	1	6'-7"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-105	18 x 18	(4) #6	1			(4) #7	1	6'-5"			(3) #7	1	9'-0"		#4	B4	(13)@6"	B3	(17)@6"	#4
B-106	18 x 18	(3) #6	1			(3) #7	1	9'-0"			(3) #7	1	8'-9"		#4	B2	(13)@6"	B2	(13)@6"	#4
B-107	18 x 18	(3) #6	1			(3) #7	1	8'-9"			(3) #7	1	9'-0"		#4	B2	(13)@6"	B2	(13)@6"	#4
B-108	18 x 18	(3) #6	1			(3) #7	1	9'-0"			(4) #7	1	6'-5"		#4	B2	(17)@6"	B5	(15)@6"	#4
B-109	18 x 18	(3) #6	1			(5) #6	1	6'-5"			(4) #6	1	9'-0"		#4	B8	(13)@6"	B5	(15)@6"	#4
B-110	18 x 18	(3) #6	1			(4) #6	1	9'-0"			(3) #6	1	8'-9"		#4	B5	(13)@6"	B2	(13)@6"	#4
B-111	18 x 18	(3) #6	1			(3) #6	1	8'-9"			(4) #6	1	9'-0"		#4	B2	(13)@6"	B5	(13)@6"	#4
B-112	18 x 18	(3) #6	1			(4) #6	1	9'-0"			(5) #6	1	6'-5"		#4	B5	(15)@6"	B8	(13)@6"	#4
B-113	18 x 18	(3) #5	1			(4) #7	1	6'-5"			(3) #7	1	9'-0"		#4	B6	(13)@6"	B7	(17)@6"	#4
B-114	18 x 18	(4) #5	1			(3) #7	1	9'-0"			(3) #7	1	8'-9"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-115	18 x 18	(4) #5	1			(3) #7	1	8'-9"			(3) #7	1	9'-0"		#4	B3	(13)@6"	B3	(13)@6"	#4
B-116	18 x 18	(3) #5	1			(3) #7	1	9'-0"			(4) #7	1	6'-5"		#4	B7	(17)@6"	B6	(13)@6"	#4
B-117	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-11"							
B-118	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-10"							
B-119	18 x 18	(3) #5	1			(3) #5	1			(3) #5	(3) #5	1								
B-120	18 x 18	(3) #5	1			(3) #5	1	3'-0"			(3) #5	1	2'-10"							
B-121	18 x 18	(3) #5	1			(3) #5	1	6'-10"			(3) #5	1	8'-6"							
B-122	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	8'-6"							
B-123	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	8'-6"							
B-124	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-7"							
B-125	18 x 18	(3) #5	1			(3) #5	1	6'-7"			(3) #5	1	8'-6"							
B-126	18 x 18	(3) #5	1			(3) #5	1	8'-11"			(3) #5	1	8'-6"							
B-127	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	8'-11"							
B-128	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-7"							
B-129	18 x 18	(3) #5	1			(3) #5	1	7'-6"			(3) #5	1	8'-6"							
B-130	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	8'-6"							
B-131	18 x 18	(3) #5	1			(3) #5	1	8'-6"			(3) #5	1	6'-7"							

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Marion County
Nickajack Industrial Site
Port Road
New Hope, TN 37380

SHEET CONTENTS

BEAM SCHEDULE

Revisions

No.	Date	Comments
1	2/21/16	SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/14/16	100% DD UPDATE
4	4/26/16	100% CD UPDATE

SCALE

–

DATE PREPARED

4/24/16

DRAWN BY

C. LOWE

SHEET #

S205

BEAM NO.	BEAM SIZE	BOTTOM REINFORCING				TOP REINFORCING							STIRRUPS					
						TOP LEFT			TOP CONT.	TOP RIGHT			LEFT SIZE	SPACING				RIGHT SIZE
	B x D	BARS	LAYERS	BL	BR	BARS	LAYERS	LA		BARS	LAYERS	RA		TYPE		TYPE		
FB-1	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"	#4	F1	(5)@6"	F1	(5)@6"	#4
FB-2	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"	#4	F1	(5)@6"	F1	(5)@6"	#4
FB-3	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"						
FB-4	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"						
FB-5	18 x 18	(3) #5	1			(4) #5	1	10'-7"		(4) #5	1	9'-9"				F1	(5)@6"	#4
FB-6	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"	#4	F1	(5)@6"			
FB-7	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(5) #5	1	9'-9"	#4	F1	(5)@6"	F2	(5)@6"	#4
FB-8	18 x 18	(3) #5	1			(5) #5	1	8'-9"		(4) #5	1	8'-9"	#4	F2	(17)@6"	F1	(17)@6"	#4
FB-9	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"				F1	(5)@6"	#4
FB-10	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"		F1	(5)@6"			
FB-11	18 x 18	(3) #5	1			(3) #5	1	9'-9"		(3) #5	1	9'-9"						
FB-12	18 x 18	(3) #5	1			(3) #5	1	9'-9"		(3) #5	1	9'-9"						
FB-13	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"	#4	F1	(21)@6"			
FB-14	18 x 18	(3) #5	1			(4) #5	1	8'-9"		(4) #5	1	8'-9"	#4	F1	(7)@6"	F1	(7)@6"	#4
FB-15	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"	#4	F1	(5)@6"	F1	(5)@6"	#4
FB-16	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"	#4	F1	(5)@6"	F1	(5)@6"	#4
FB-17	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"				F1	(5)@6"	#4
FB-18	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"						
FB-19	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(5) #5	1	9'-9"	#4	F1	(5)@6"	F2	(5)@6"	#4
FB-20	18 x 18	(3) #5	1			(5) #5	1	8'-9"		(4) #5	1	8'-9"	#4	F2	(17)@6"	F1	(17)@6"	#4
FB-21	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"						
FB-22	18 x 18	(3) #5	1			(4) #5	1	9'-9"		(4) #5	1	9'-9"						

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SHEET CONTENTS

FRAME BEAM SCHEDULE

Revisions

No.	Date	Comments
1	2/21/16	SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/14/16	100% DD UPDATE
4	4/26/16	100% CD UPDATE

SCALE

–

DATE PREPARED

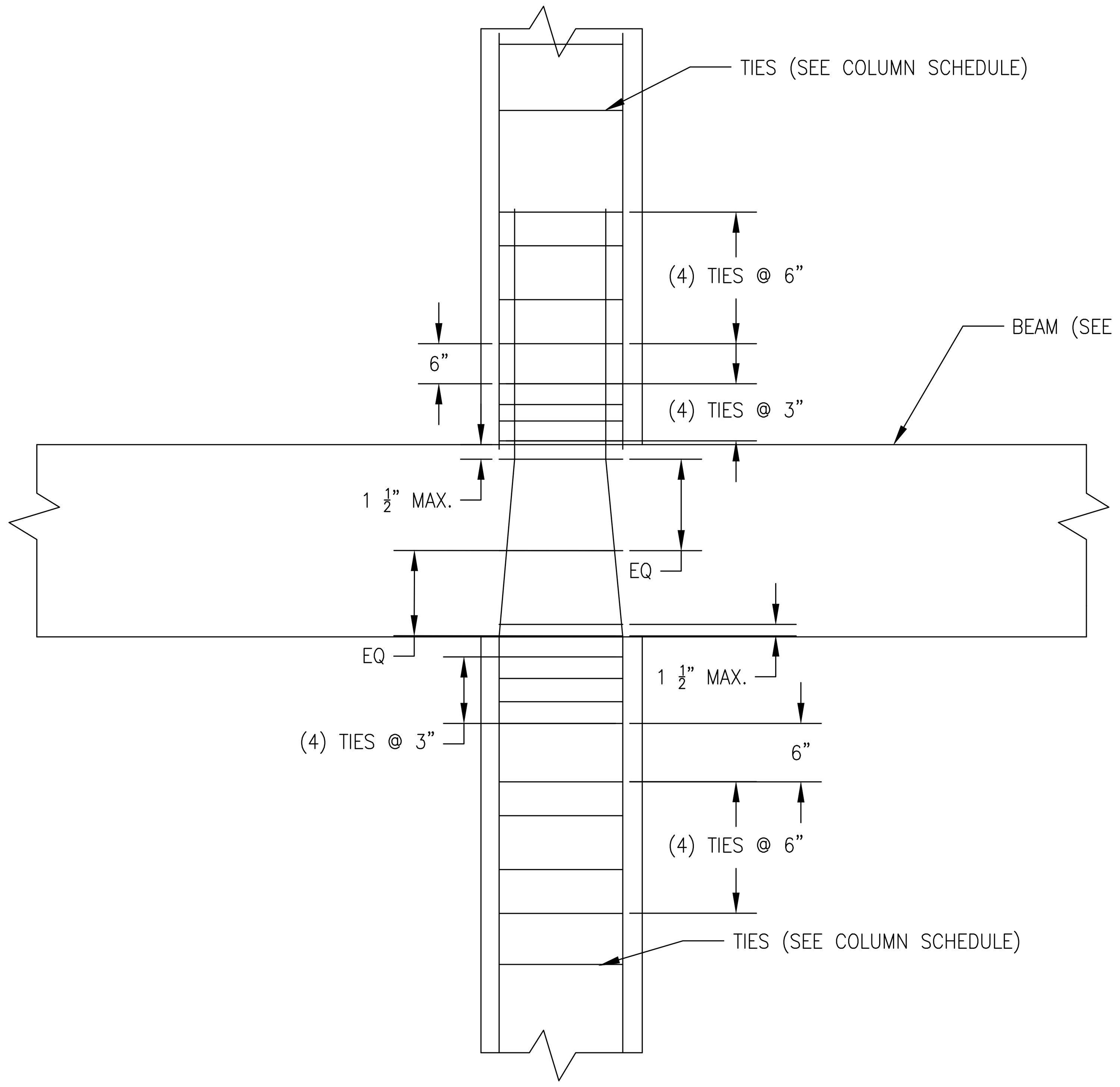
4/24/16

DRAWN BY

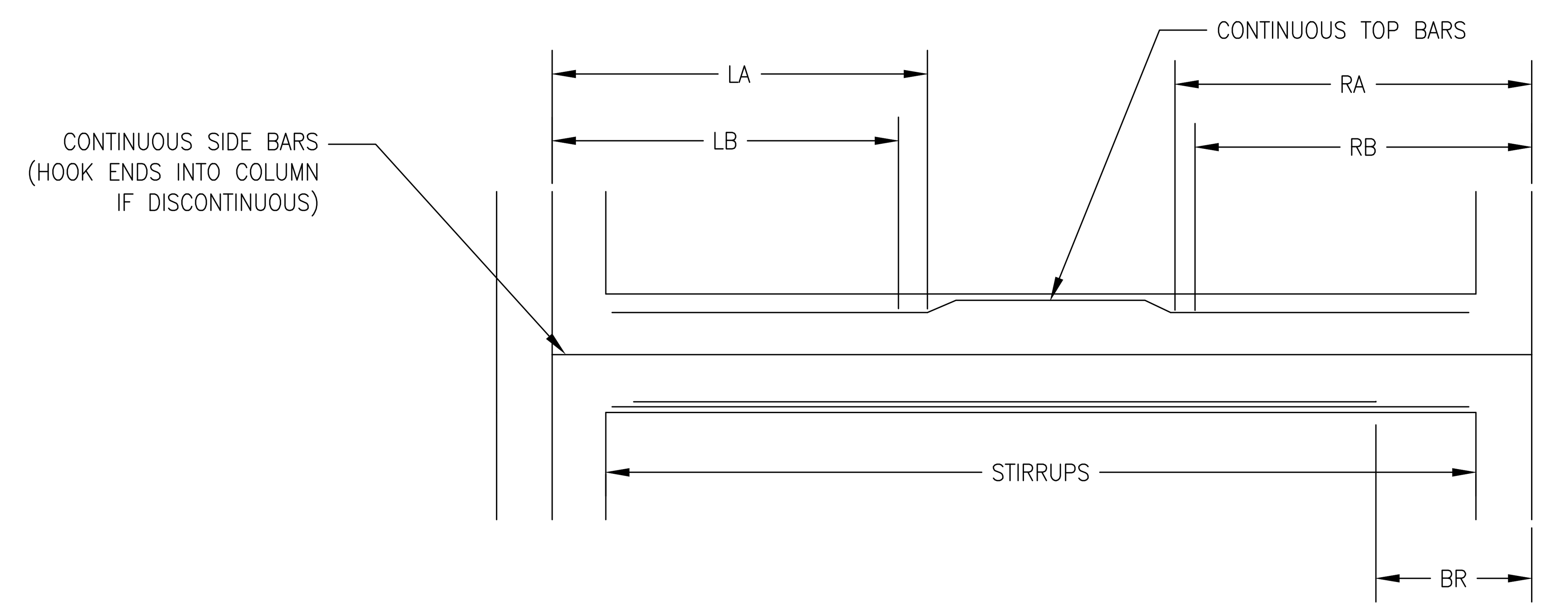
C. LOWE

SHEET #

S206



1 S207 TYPICAL COLUMN TO BEAM DETAIL
NTS



2 S207 TYPICAL FRAME BEAM/BEAM DETAIL
NTS

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SHEET CONTENTS

OFFICE BUILDING DETAILS

Revisions

No.	Date	Comments
1	2/21/16	SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/14/16	100% DD UPDATE
4	4/26/16	100% CD UPDATE

SCALE

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DATE PREPARED

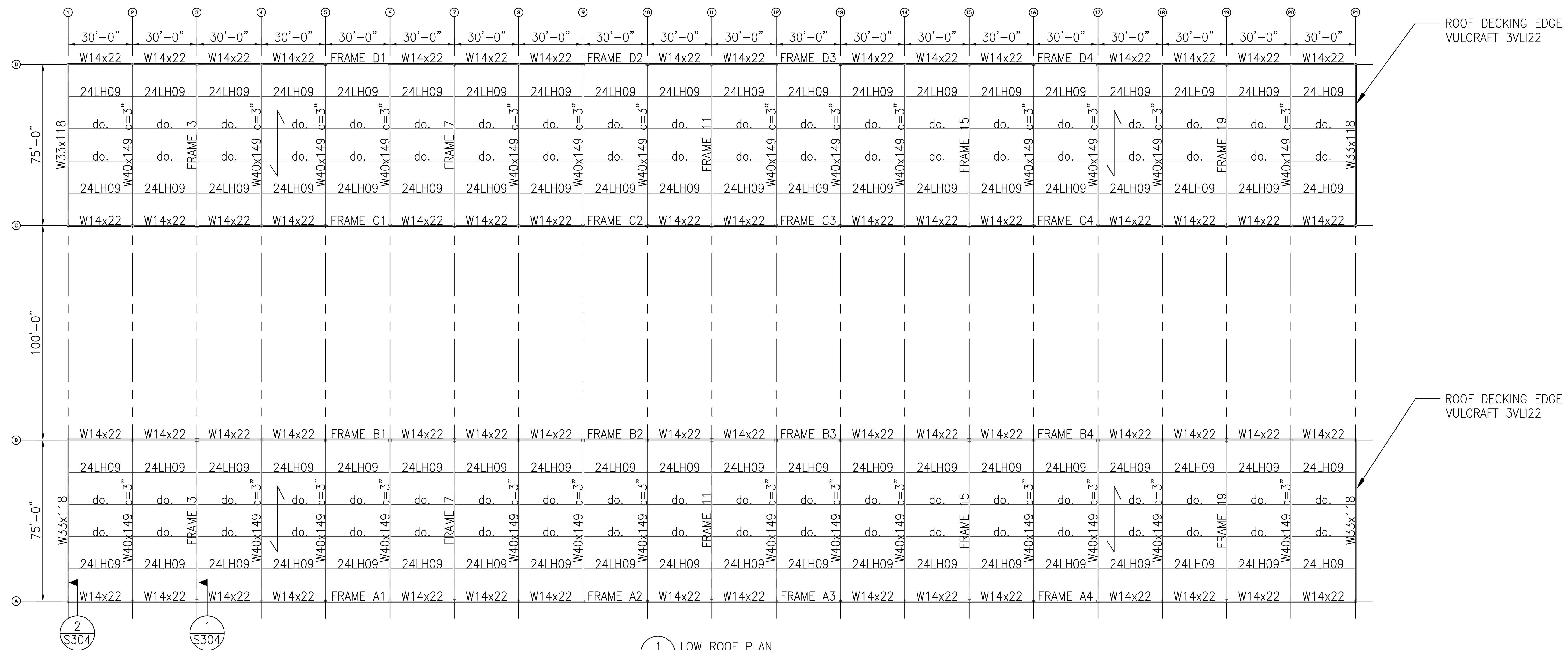
4/24/16

DRAWN BY

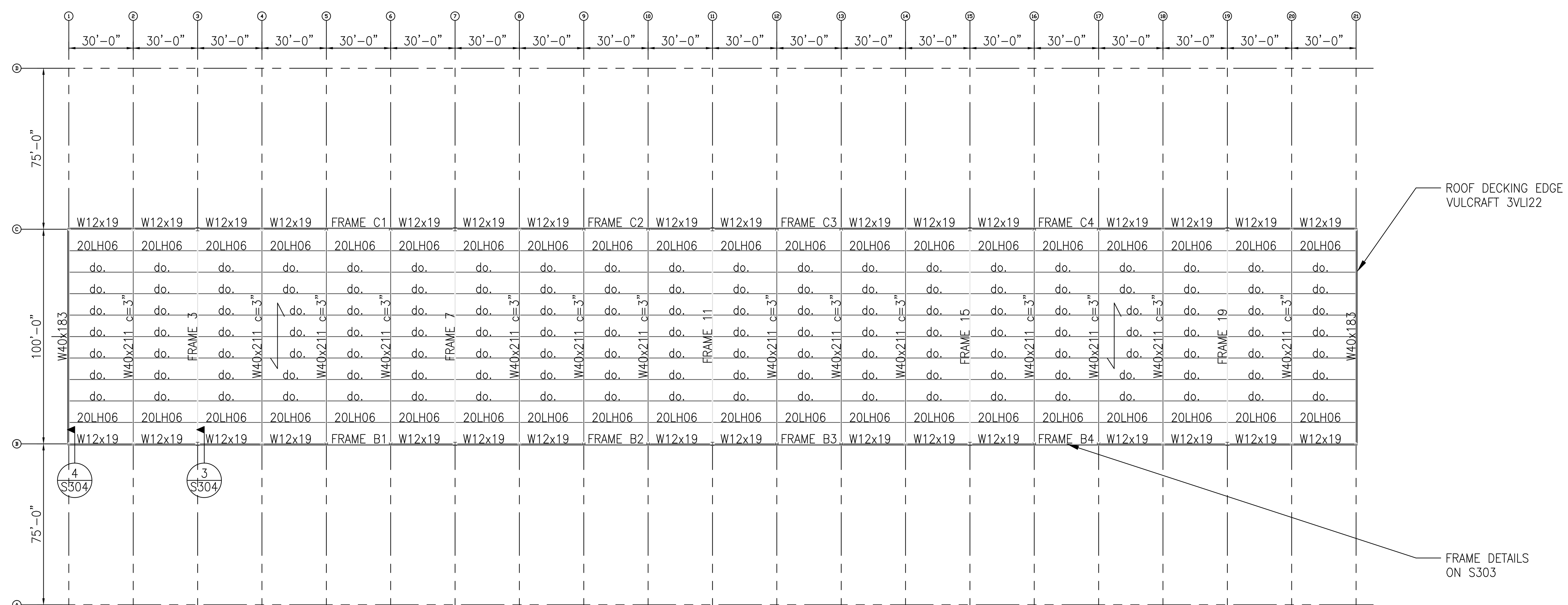
C. LOWE

SHEET #

S207



1 LOW ROOF PLAN
S301 ELEV. 20'-0"



2 HIGH ROOF PLAN
S301 ELEV. 40'-0"

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Port Road
New Hope, TN 37380

SHEET CONTENTS

DRAWING DETAILS THE MANUFACTURING FACILITY (1) FRAMING PLAN FOR THE LOWER ROOF AND (2) FRAMING PLAN FOR THE UPPER ROOF

Revisions

No.	Date	Comments
1	4/10/16	100% DD UPDATE
2	4/17/16	100% CD UPDATE
3	4/29/16	100% CD UPDATE

SCALE

$\frac{1}{32}$" = 1'

DATE PREPARED

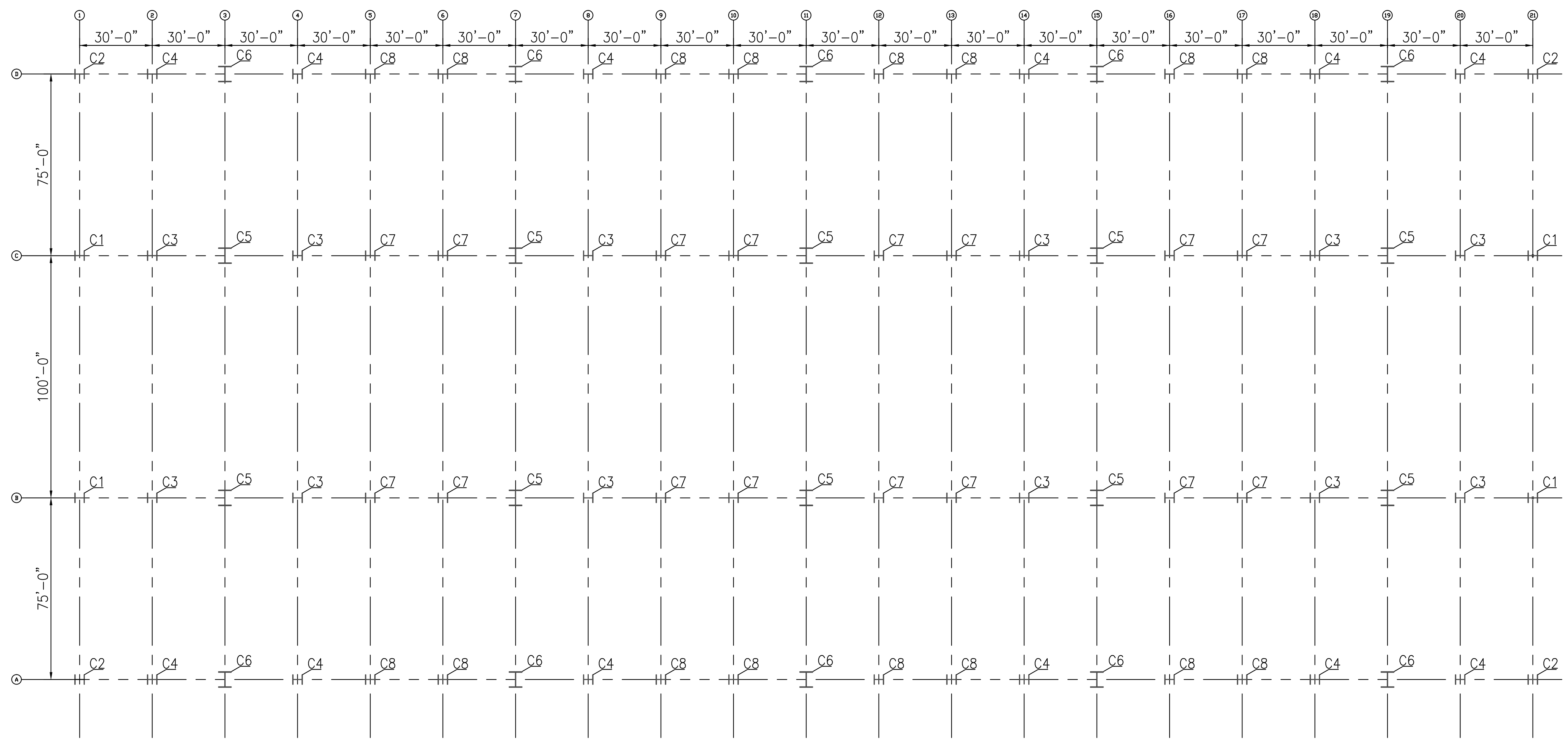
3/25/16

DRAWN BY

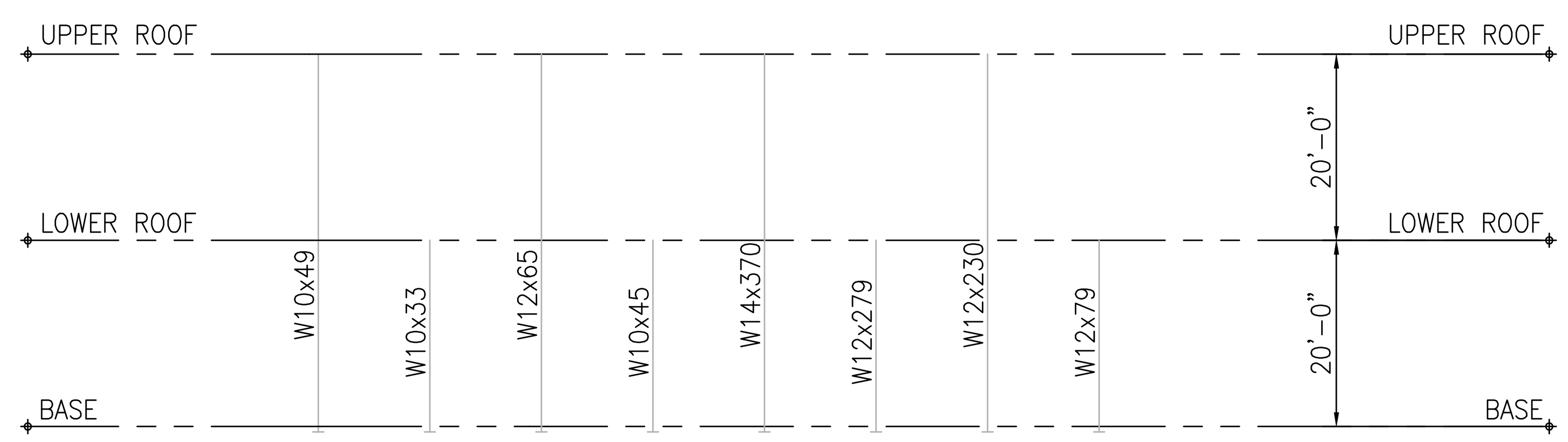
C. ROYER

SHEET #

S301



1 S302 COLUMN PLAN $\frac{1}{32}$"=1'



COLUMN MARK	C1	C2	C3	C4	C5	C6	C7	C8

1 S302 COLUMN SCHEDULE NTS

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SHEET CONTENTS

DRAWING DETAILS THE COLUMN LAYOUT AND SCHEDULE FOR THE MANUFACTURING BUILDING

Revisions

No.	Date	Comments
1	4/10/16	100% DD UPDATE
2	4/17/16	100% CD UPDATE
3	4/29/16	100% CD UPDATE

SCALE

$\frac{1}{32}$"=1'

DATE PREPARED

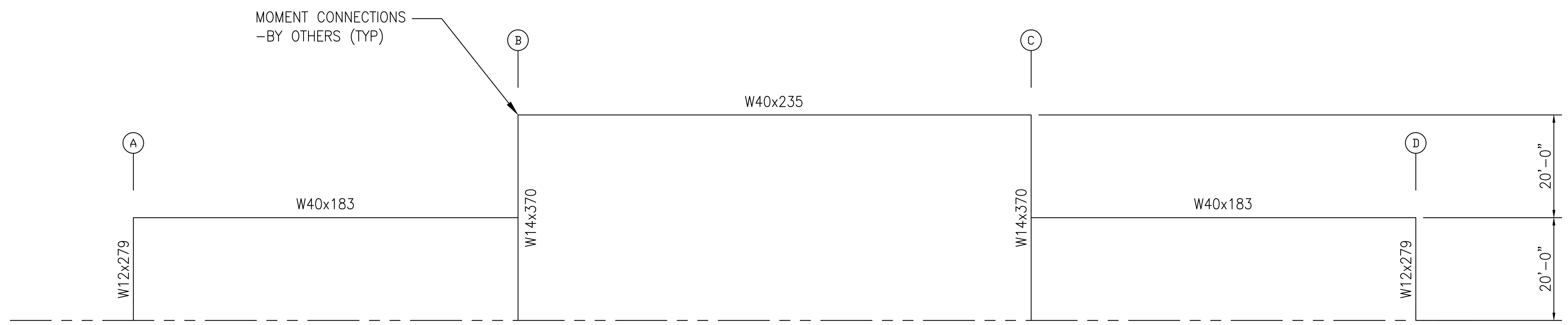
3/25/16

DRAWN BY

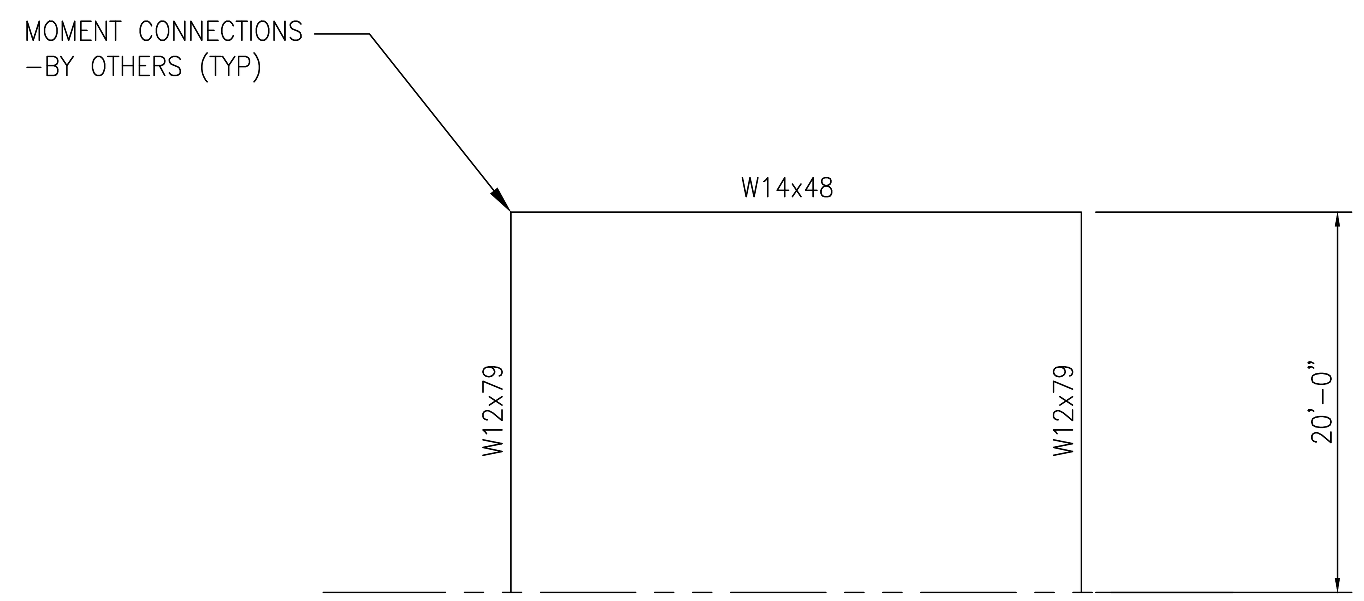
C. ROYER

SHEET #

S302



1/S303 FRAME 3,7,11,15,19 ELEV.
$\frac{1}{16}$"=1'



2/S303 FRAME A1-4, D1-4 ELEV.
$\frac{1}{8}$"=1'

3/S303 FRAME B1-4, C1-4 ELEV.
$\frac{1}{8}$"=1'

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SHEET CONTENTS

MOMENT FRAMES FOR THE MANUFACTURING FACILITY (SEE LOCATION OF FRAMES ON S301)

Revisions

No.	Date	Comments
1	4/10/16	100% DD UPDATE
2	4/17/16	100% CD UPDATE
3	4/29/16	100% CD UPDATE

SCALE

VARIES

DATE PREPARED

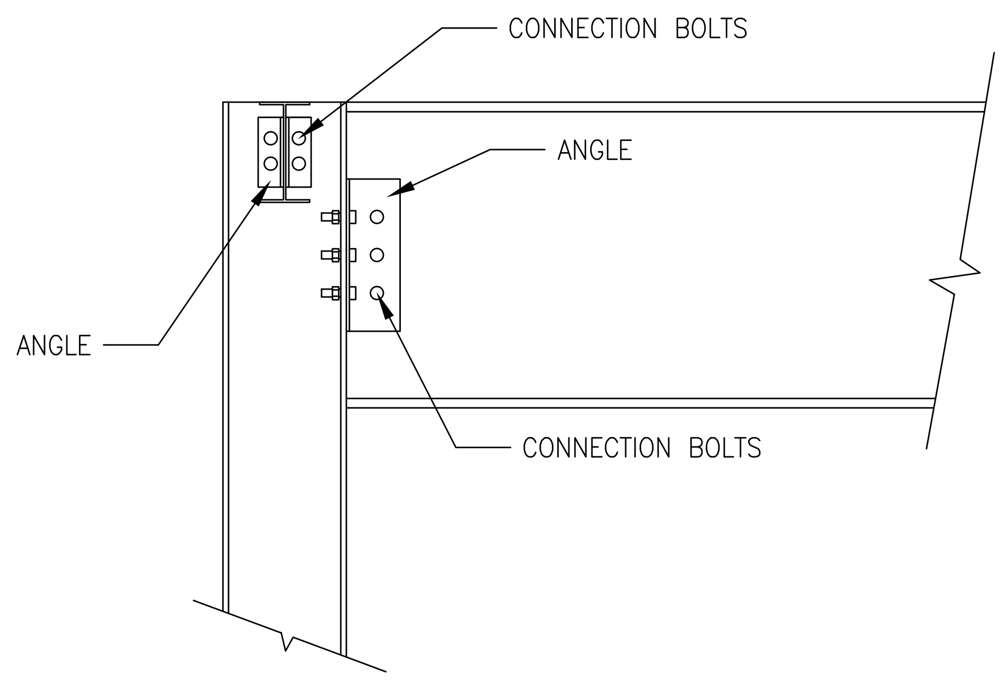
3/25/16

DRAWN BY

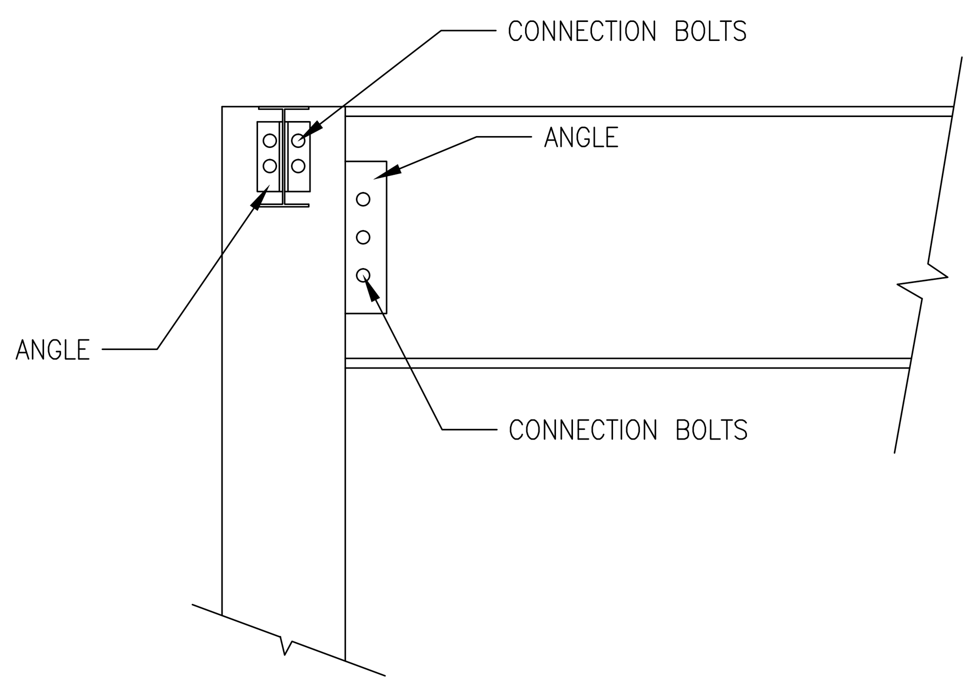
C. ROYER

SHEET #

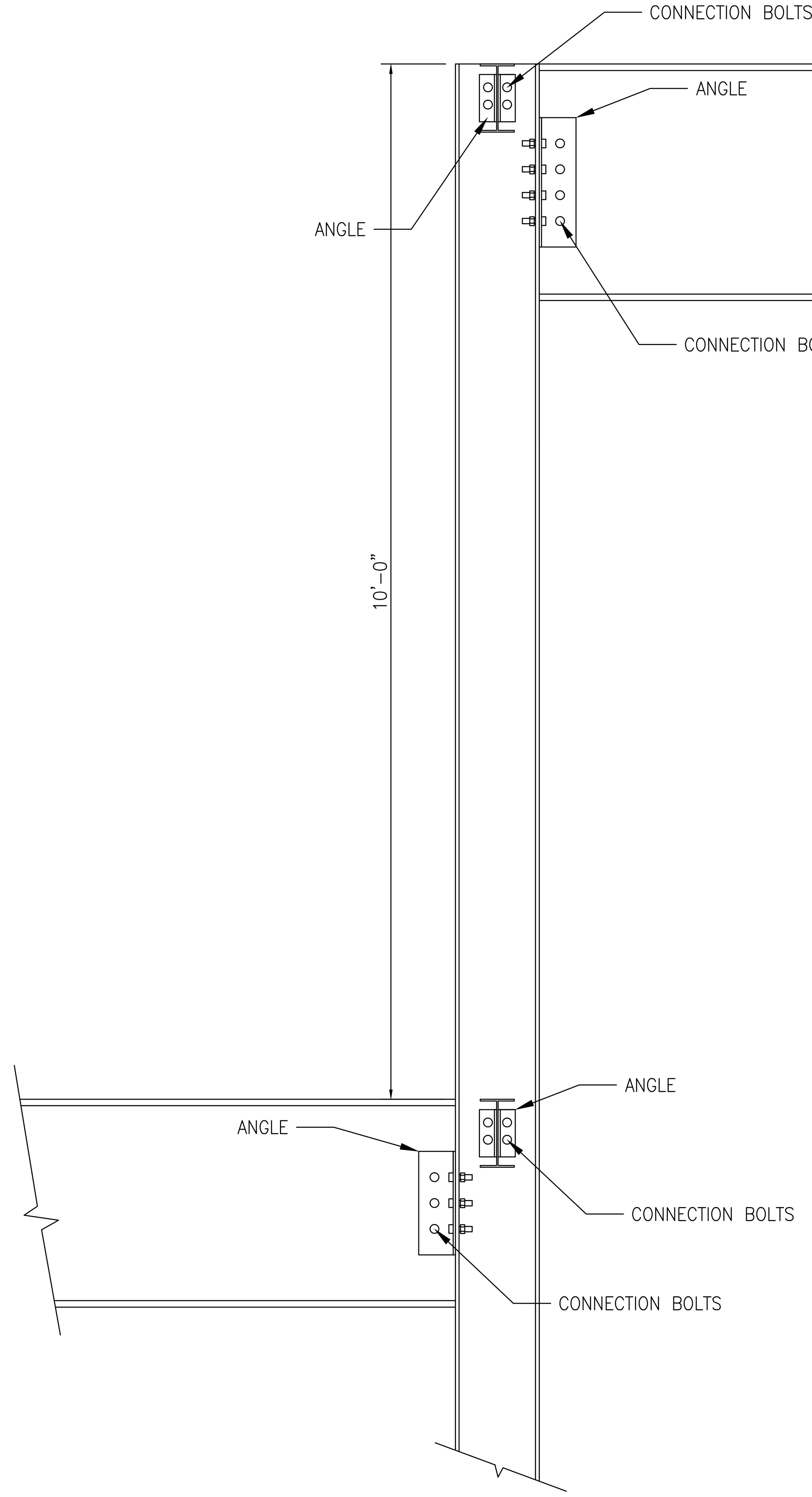
S303



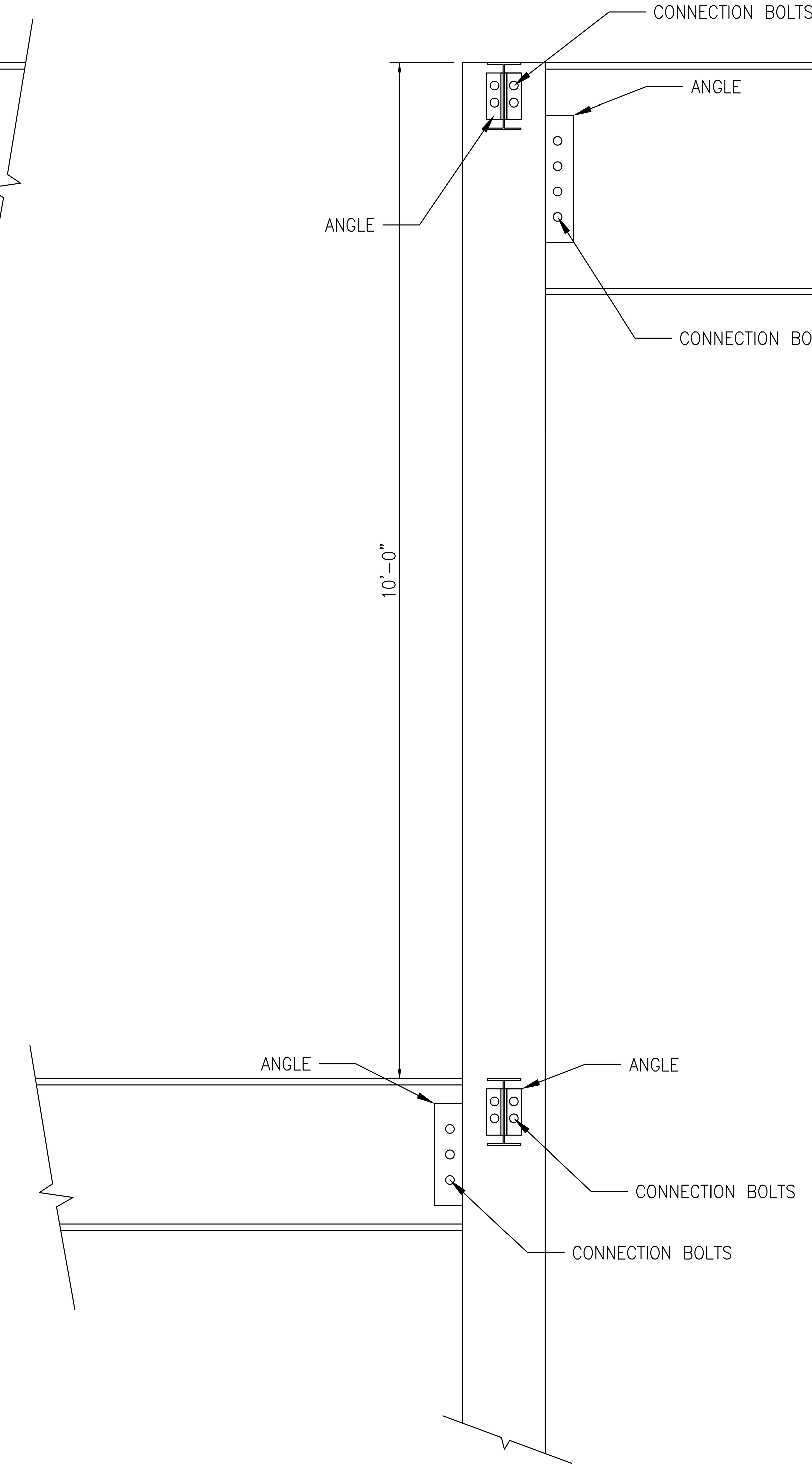
1 S304 LOW ROOF BEAM-COLUM DETAIL 1"=1'



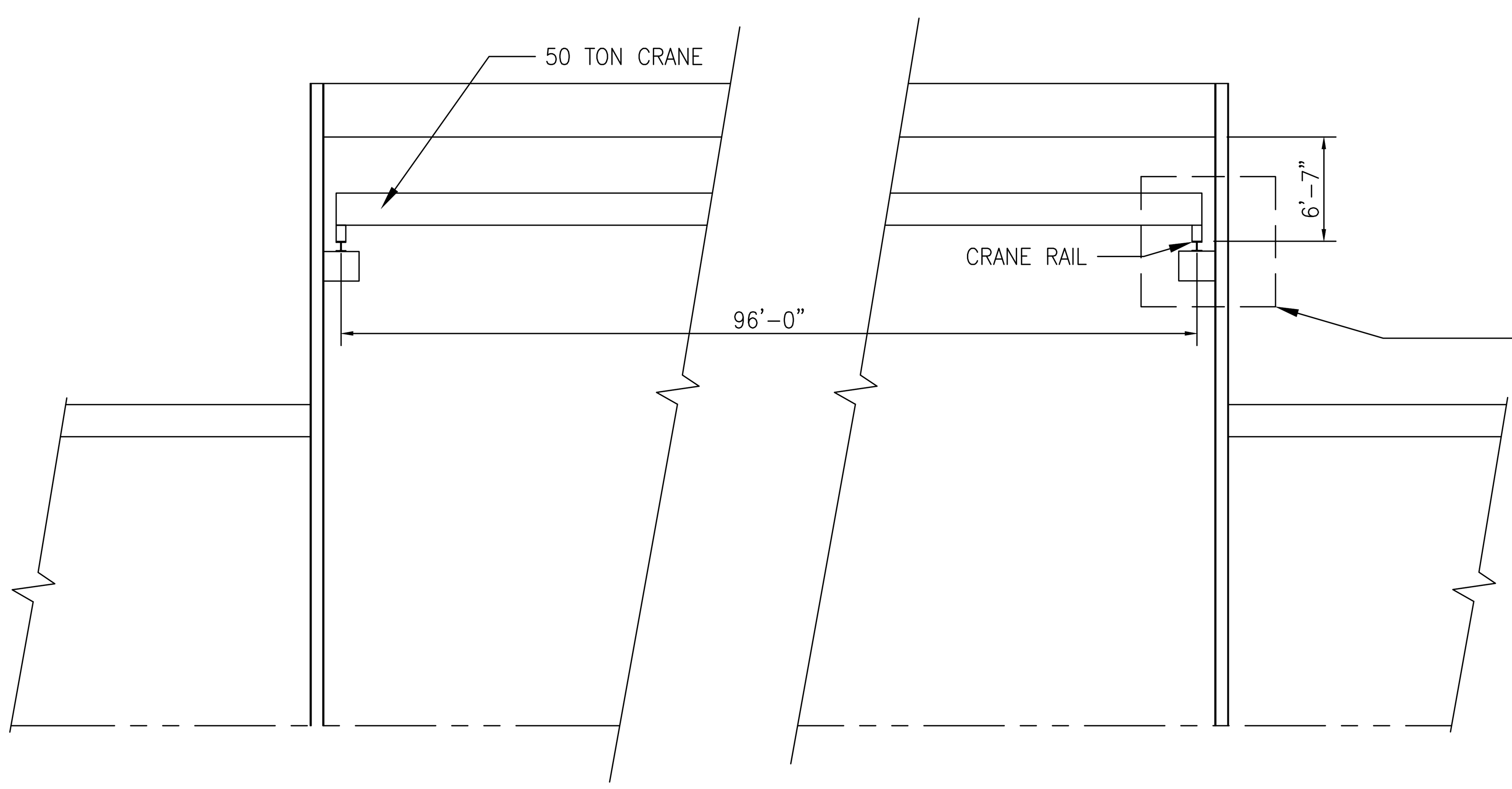
2 S304 LOW ROOF BEAM-COLUM DETAIL 1"=1'



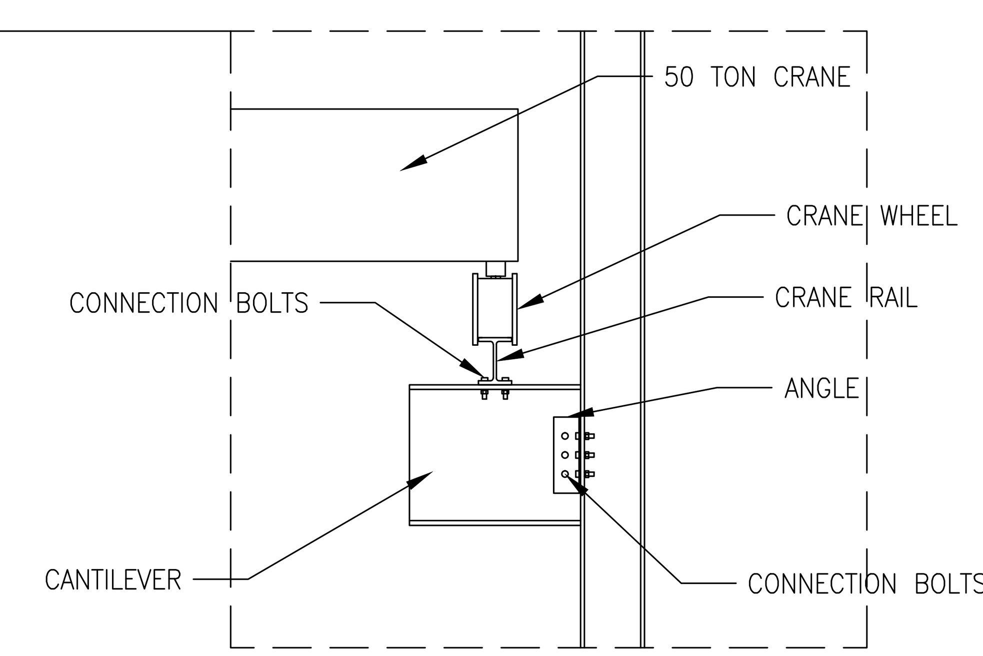
3 S304 LOW & HIGH ROOF BEAM-COLUM DETAIL 1"=1'



4 S304 LOW & HIGH ROOF BEAM-COLUM DETAIL 1"=1'



5 S304 CRANE DETAIL $\frac{1}{8}$"=1'



6 S304 CRANE SUPPORT DETAIL $\frac{1}{2}$"=1'

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DETAIL SHEET FOR THE MANUFACTURING FACILITY

Revisions

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1	4/10/16	100% CD UPDATE
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SCALE

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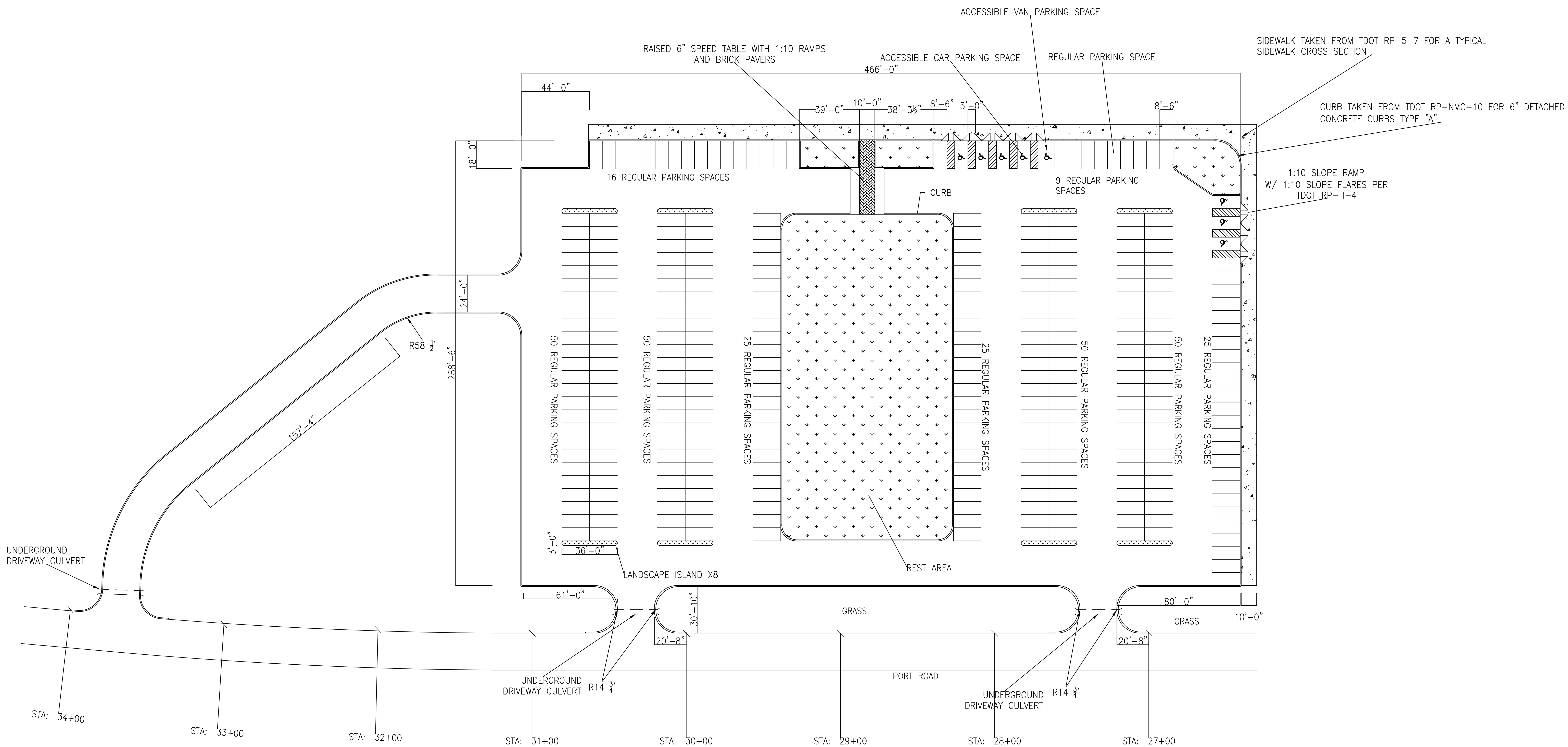
SHEET #

S304



1 T101 PARKING LOT DIMENSIONS
1:400

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SHEET CONTENTS

PARKING LOT DIMENSIONS

Revisions

No.	Date	Comments
1	2/21/16	SCHEMATIC DESIGN
2	3/25/16	50% DD UPDATE
3	4/13/16	100% DD UPDATE
4	4/26/16	100% CD UPDATE

SCALE
1:400

DATE PREPARED
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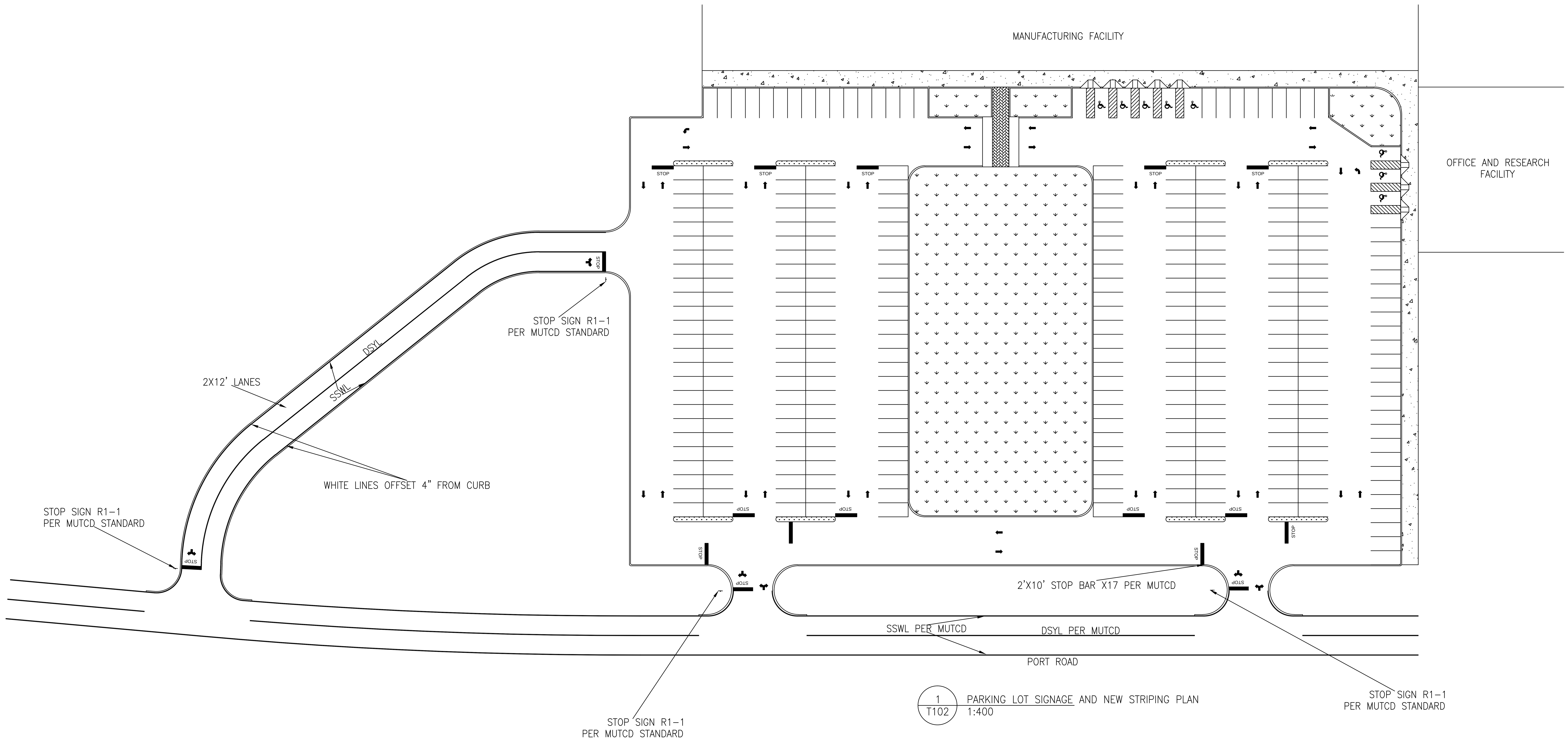
DRAWN BY
S. GILLILAND

SHEET #
T101



1 / T102 PARKING LOT SIGNAGE AND NEW STRIPING PLAN
1:400

NOTES:
-ALL STRIPING AND SIGNAGE CONSTITUTES NEW DEVELOPMENT; NONE OF IT PRE-EXISTING

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PARKING LOT STRIPING AND SIGNING PLAN

Revisions

No.	Date	Comments
1	2/21/16	SCHEMATIC DESIGN UPDATE
2	3/25/16	50% DD UPDATE
3	4/13/16	100% DD UPDATE
4	4/26/16	100% CD UPDATE

SCALE
1:400

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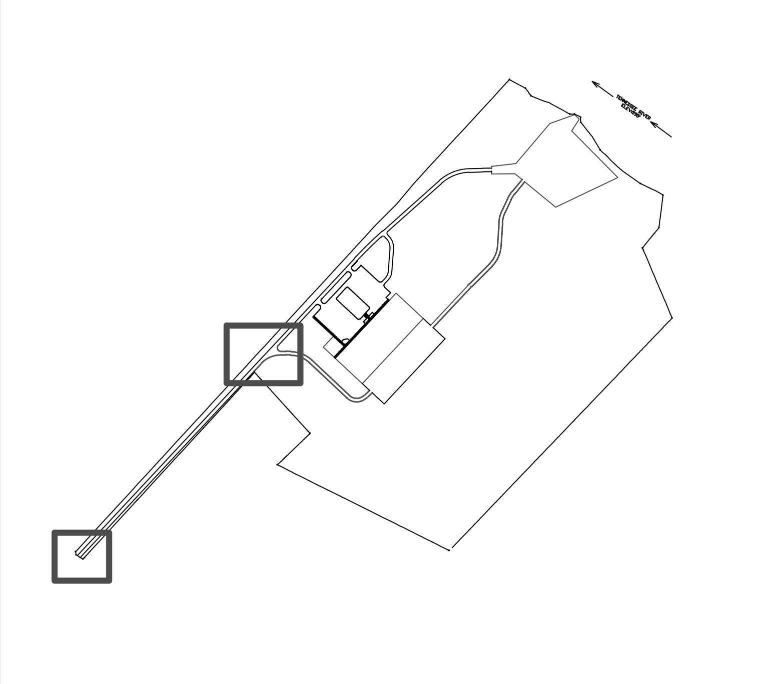
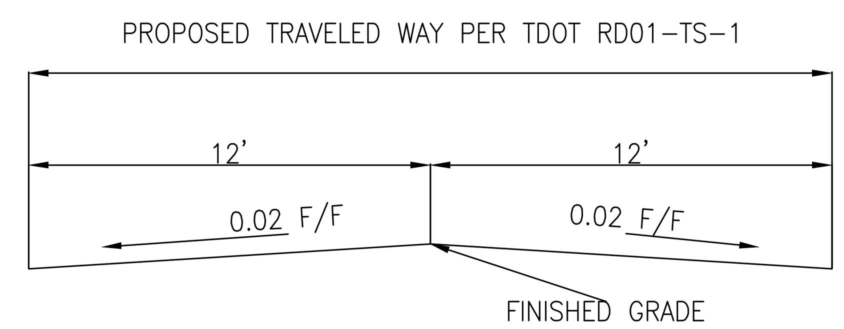
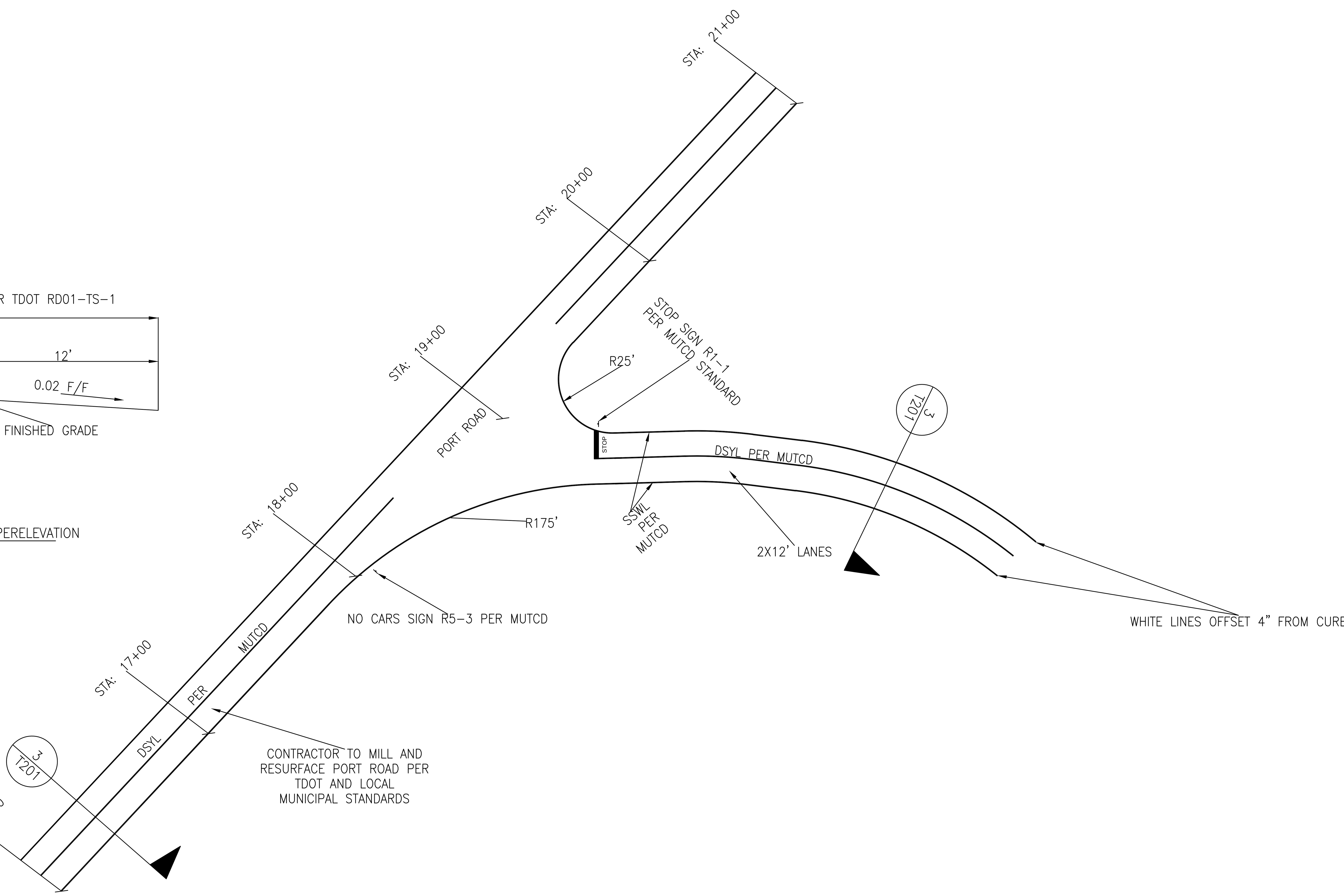
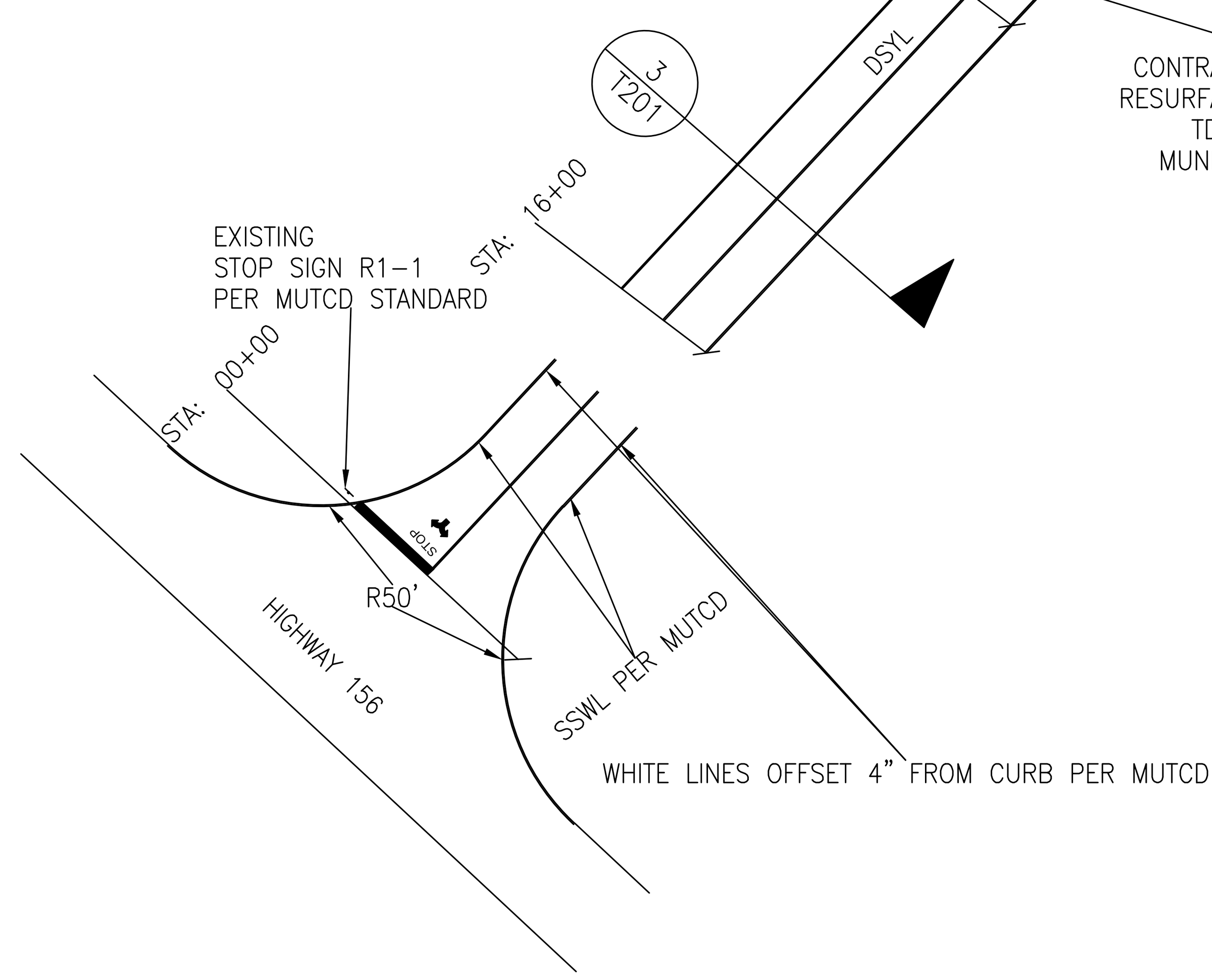
SHEET #
T102





3 T201 ROADWAY SUPERELEVATION
NTS





2 T201 TRUCK ACCESS INTERSECTION
1:400

1 T201 HWY 156 INTERSECTION
1:400

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SR 156/PORT ROAD INTERSECTION MODIFICATIONS

TRUCK ACCESS/PORT ROAD INTERSECTION

Revisions

No.	Date	Comments
1	4/13/16	100% DD UPDATE
2	4/26/16	100% CD UPDATE

SCALE
1:400

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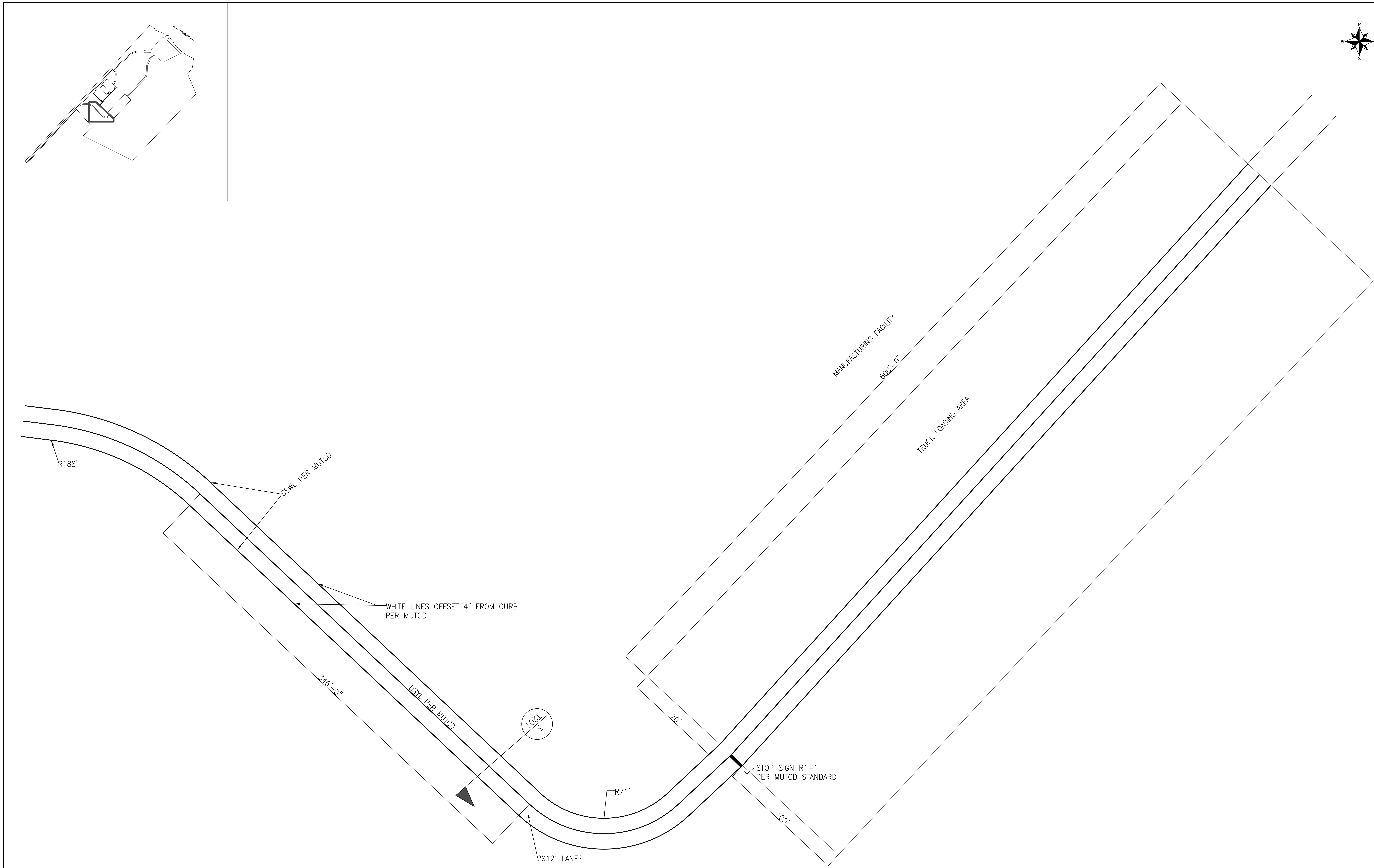
T201



1
T301
TRUCK ACCESS ROADWAY PLAN
1:400

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TRUCK ACCESS LAYOUT

Revisions

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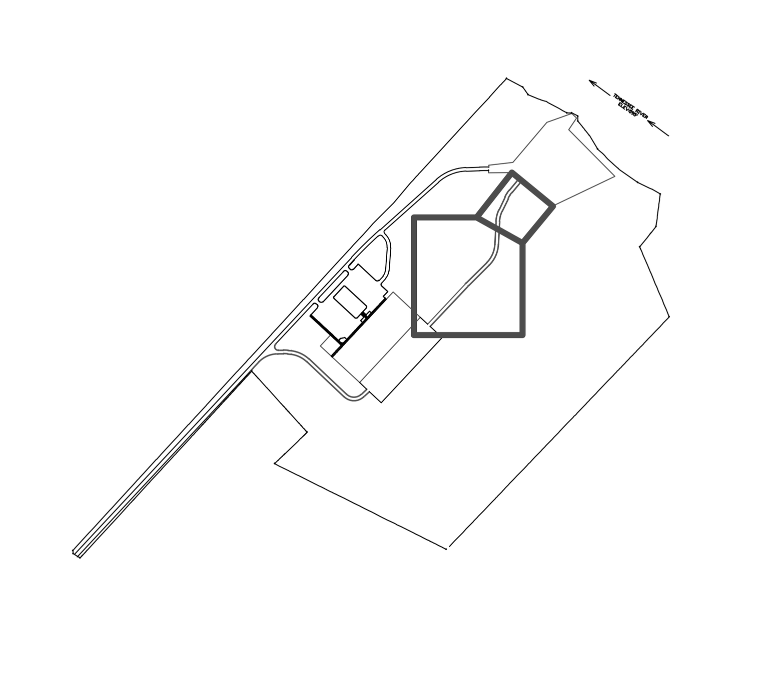
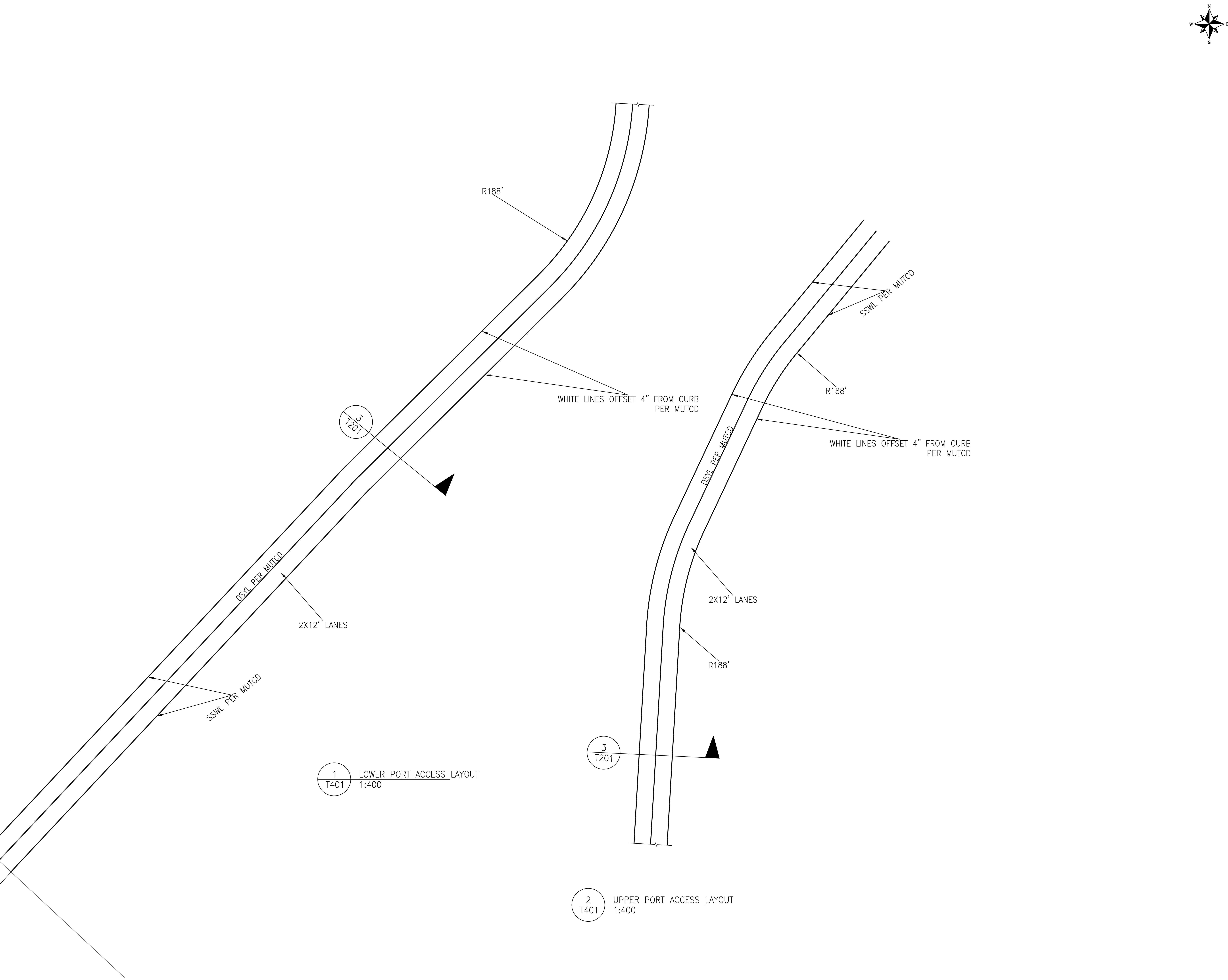
T301





1
T401
LOWER PORT ACCESS LAYOUT
1:400

2
T401
UPPER PORT ACCESS LAYOUT
1:400

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UPPER AND LOWER PORT ACCESSES LAYOUT

Revisions

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2	4/26/16	100% CD UPDATE

SCALE

1:400

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SHEET #

T401