Northstar Commuter Rail Extension Feasibility Assessment

Appendix G – Technical Memorandum on Conceptual Engineering

July 31, 2020

Prepared for

DEPARTMENT OF TRANSPORTATION

By

QUANDEL CONSULTANTS

Table of Contents

1. Introduction

This Technical Memorandum provides design documentation for the engineering plans prepared to support the Northstar Commuter Rail Extension Feasibility Assessment. Engineering plans were produced for each proposed capital improvement and are included as Attachment 1 to this Technical Memorandum.

2. Level of Design

Engineering plans were developed at a conceptual level of design. Concept engineering plans are completed at the initial phase of a project to evaluate the feasibility of the project and develop the preliminary costs related to its proposed capital improvements. Concept engineering plans were prepared on scaled orthophoto imagery and show the horizontal alignment and location of design elements including:

- Track
- Turnouts
- Crossovers
- Station Platforms
- Signals
- Highway Rail Grade Crossings
- Fencing

Plans produced for this Feasibility Assessment are for planning purposes only and are not to be used for construction.

3. Base Mapping and Existing Elements

Basemapping and survey are the foundations of civil engineering design. Aerial images were used as basemapping for the Conceptual Level Design Plans. Aerial images were used because they provide enough detail for concept level design. The aerial images were obtained from the National Agriculture Imagery Program and contain geospatial data formatted in the UTM coordinate system using the North American Datum of 1983 (NAD83). The images were used to extract the existing conditions of the railroad. During future project phases, a full ground or LiDAR survey would be needed to create basemapping acceptable for use in final design plans used for construction. Although the locations of features extracted from the aerial images are not exact, they are appropriate for use in assessing the feasibility of the capital improvements and estimating capital costs.

4. Design Standards

Concept Level Design Plans must follow a design standard to ensure their designs are practical and conform with the surrounding rail network. Each railroad has its own design standards that are followed for any construction on their property (right-of-way). BNSF Railway's (BNSF's) standards were used for development of concept level plans.

Concept Level Design Plans present a plan view of the proposed capital improvements. Design standards used for horizontal alignment, horizontal clearances, and turnout sizes are as follows:

- **Horizontal Alignment:** "BNSF Design Criteria for Speed and Curvature – BNSF Engineering Instructions 5 Track Geometry", Appendix A (12/2008) and Appendix B (10/2007)
- **Clearance:** "BNSF Standard Plans – Clearance Requirements by State" (10/1997) & "BNSF Standard Plans – Minimum Clearance Diagram" (10/1997)
- **Turnouts:** "BNSF Standard Plan for No. 11, 15, 20 and 24 Turnouts" (09/2009 & 05/2008)

These standards are included as Attachments 2, 3, and 4.

5. Signal Design

The concept engineering plans show existing and proposed signal locations. Existing signals were located using track charts provided by BNSF, aerial imagery, and information gathered during field visits. The proposed signal design includes removal, relocation, and modification to existing signals and installation of new signals. The final location of signals and signal equipment will be determined by BNSF's signal engineers during PE or final design.

6. Station Design

One station was proposed to be constructed and one station was proposed to be expanded to support implementation of expanded Northstar service. Detailed station designs were not prepared. The concept engineering plans include a general footprint of the proposed St. Cloud Station, Big Lake Station center platform, and associated track and signal work. Site, structural, and architectural elements were not designed. The station designs contain enough to assess their feasibility and complete a high-level cost estimate.

7. Presentation of Concept Engineering Plans

Concept engineering plans are presented in Attachment 1 for the following capital improvements:

- St. Cloud Improvements
- CP MP 66 Upgrade
- New Control Point at Becker
- Big Lake West Siding
- Big Lake Station Track Connection
- Big Lake Station Expansion
- Big Lake Maintenance Facility Expansion
- Third Main Track CP Coon Creek to CP Interstate
- Third Main Track CP Interstate to CP Van Buren
- Two Main Tracks CP Van Buren to CP Stadium

Attachment 1

Conceptual Engineering Plans

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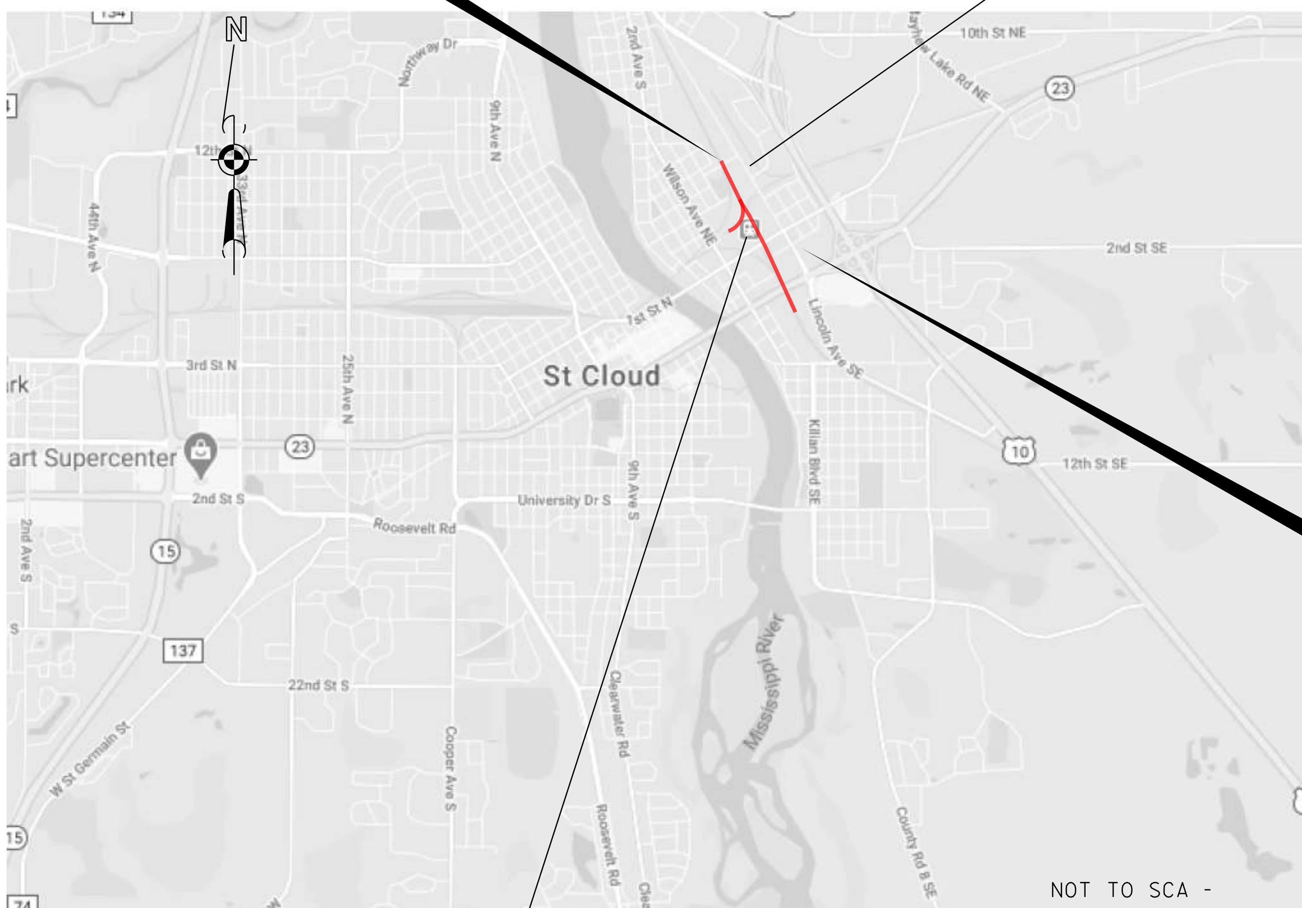

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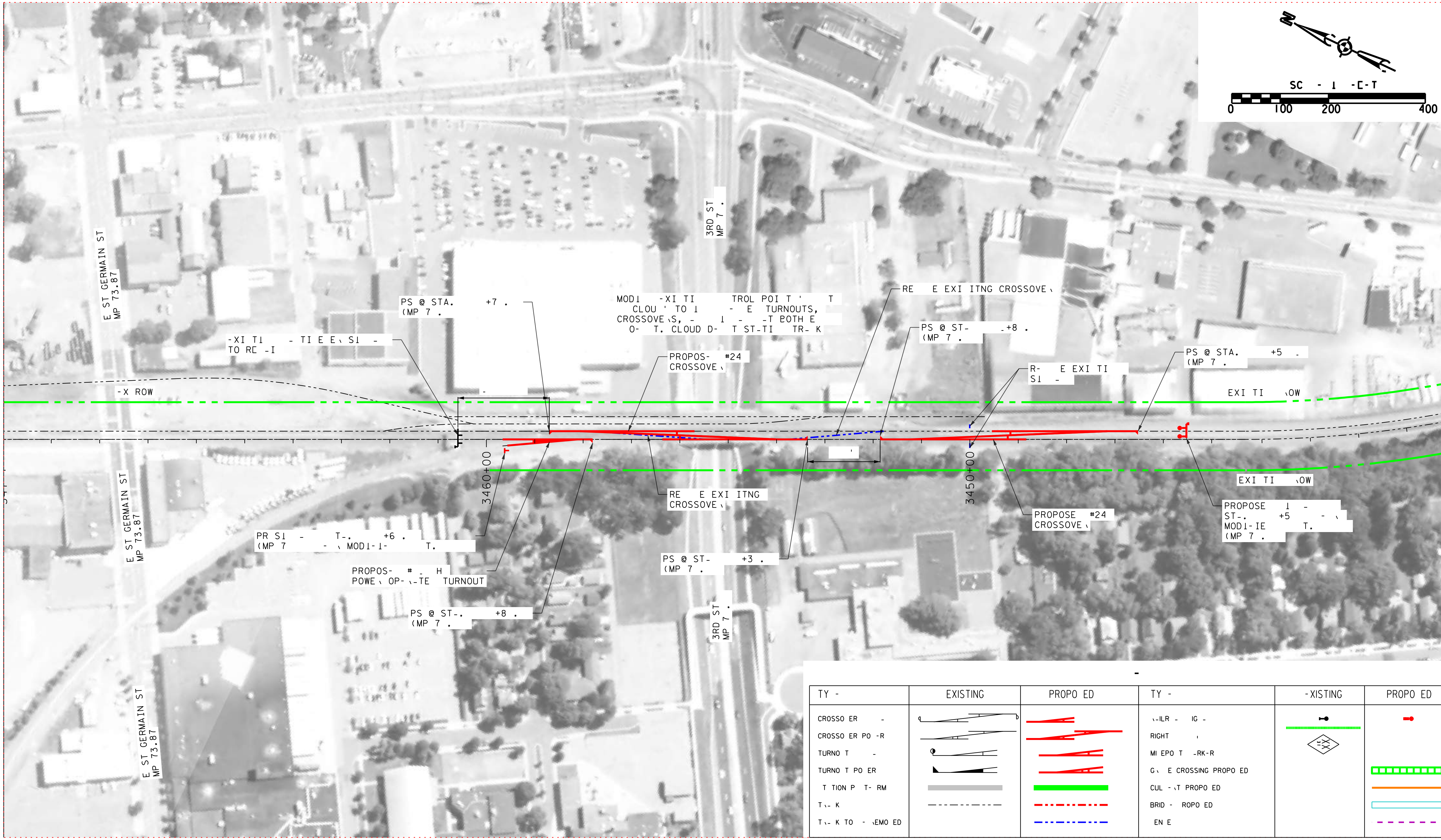

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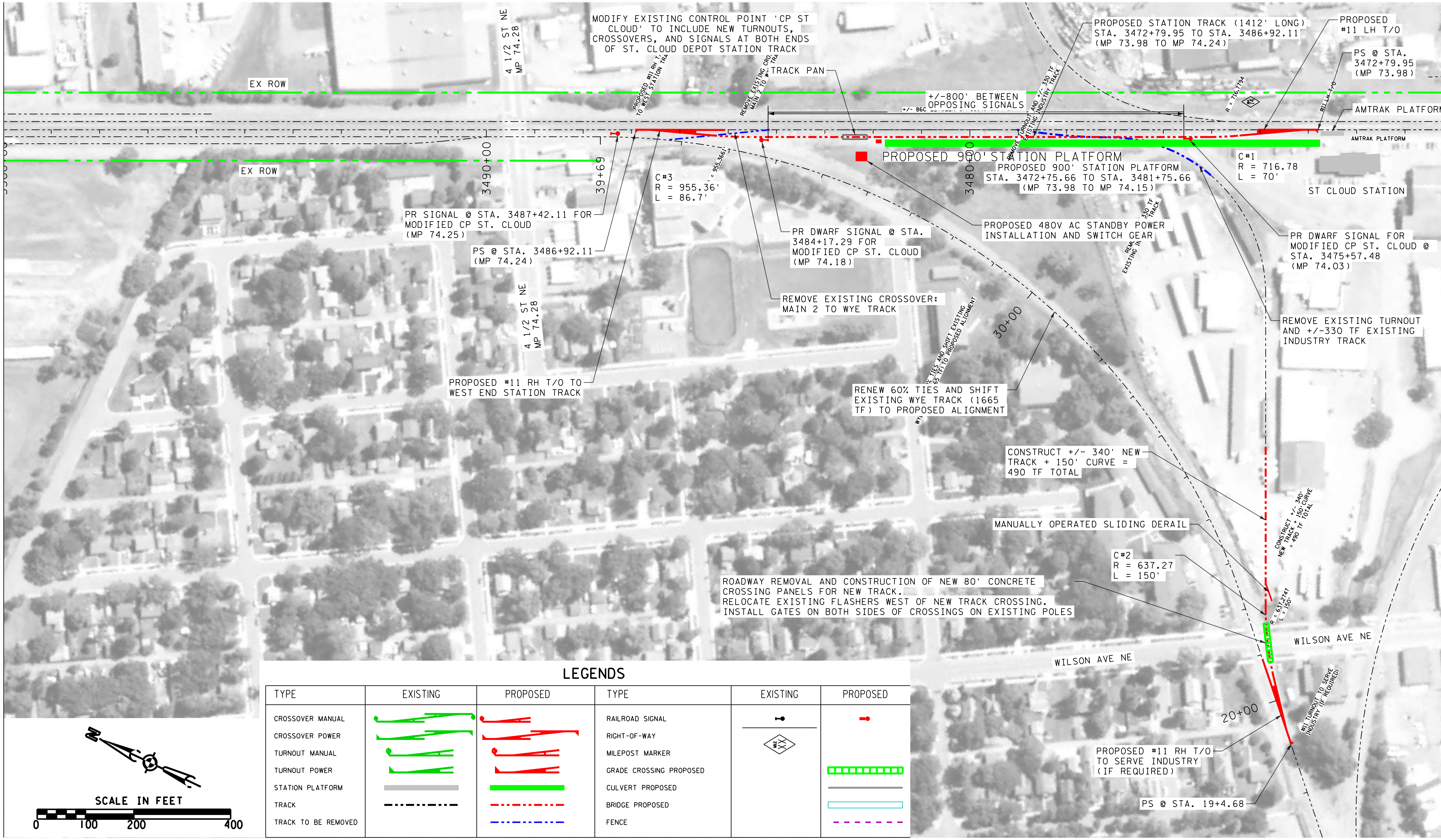

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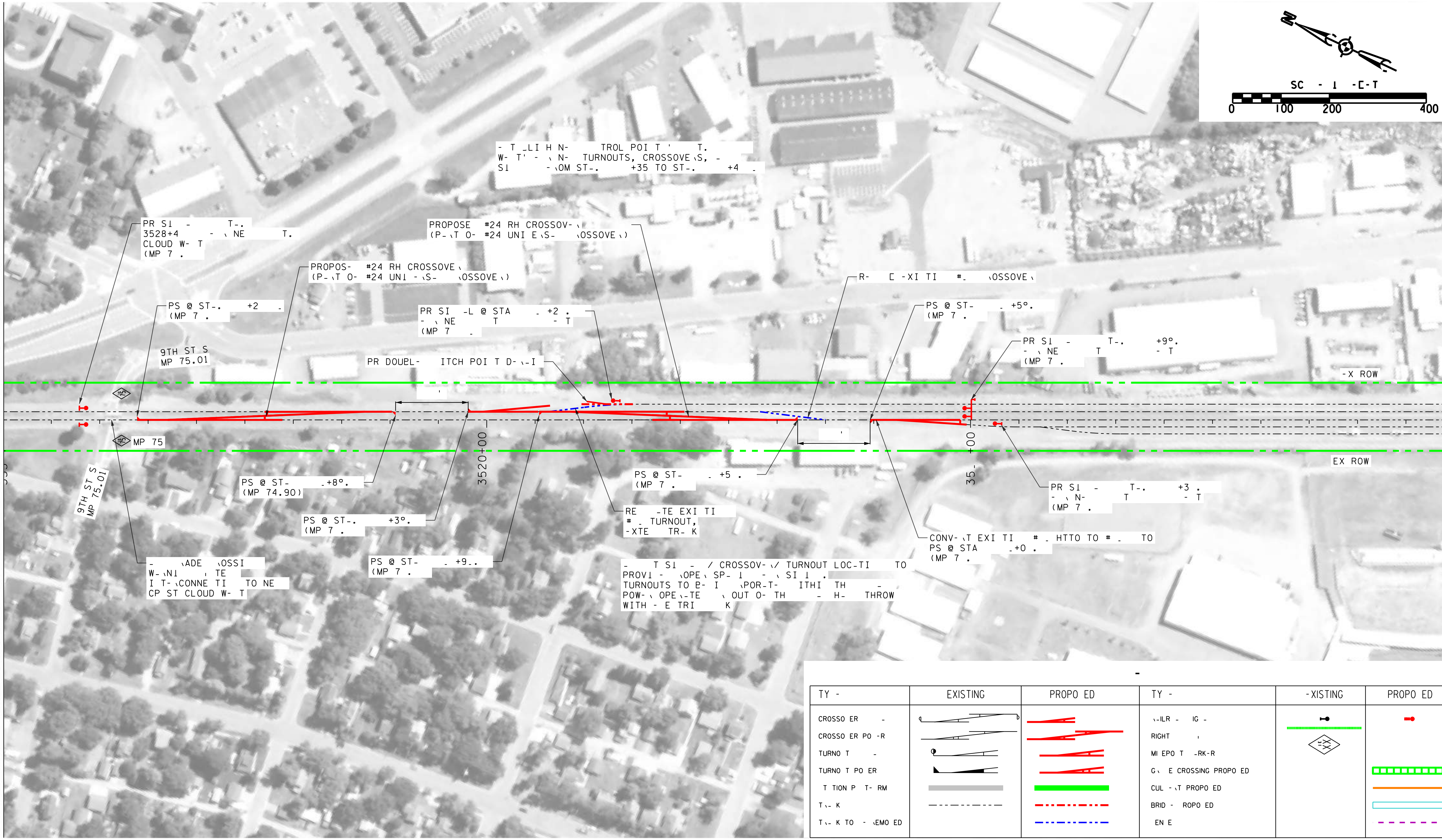

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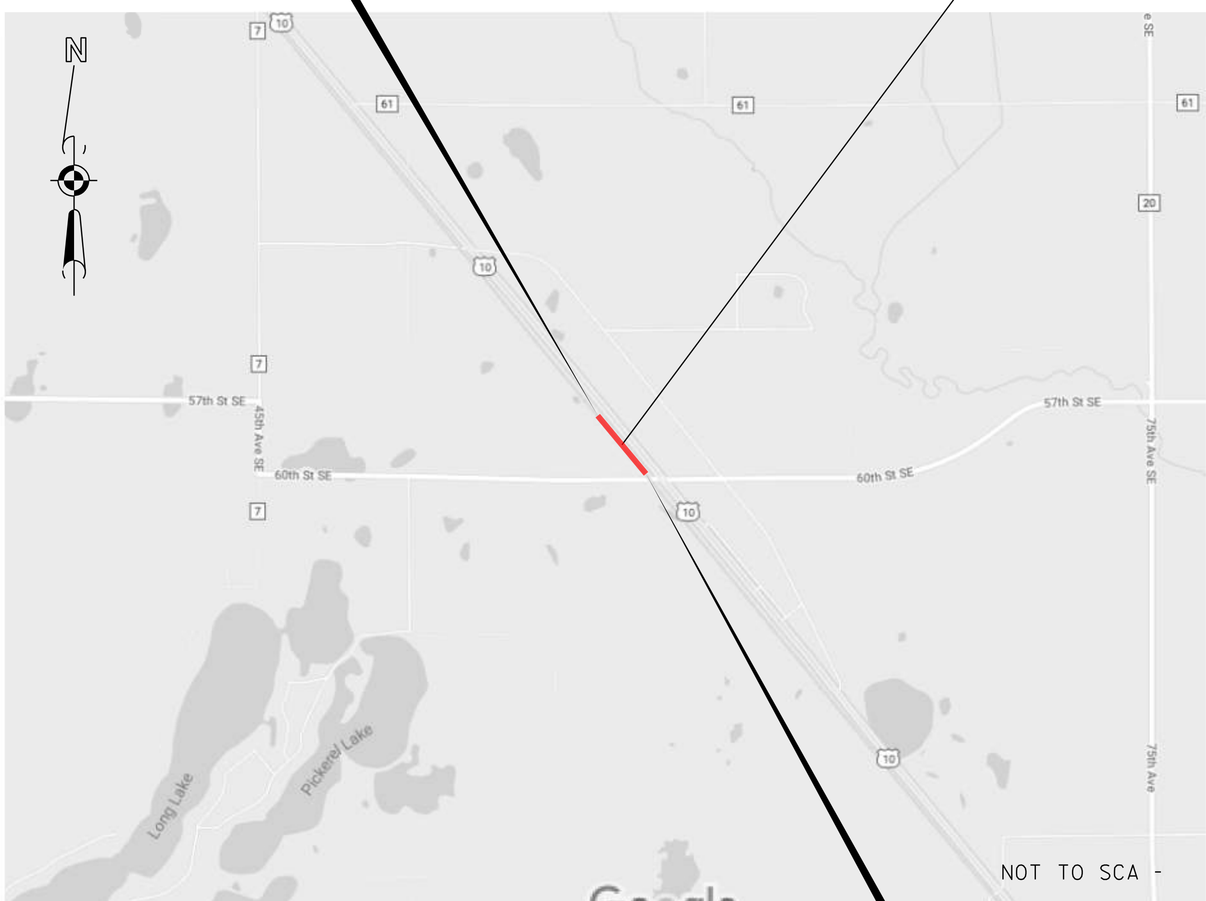

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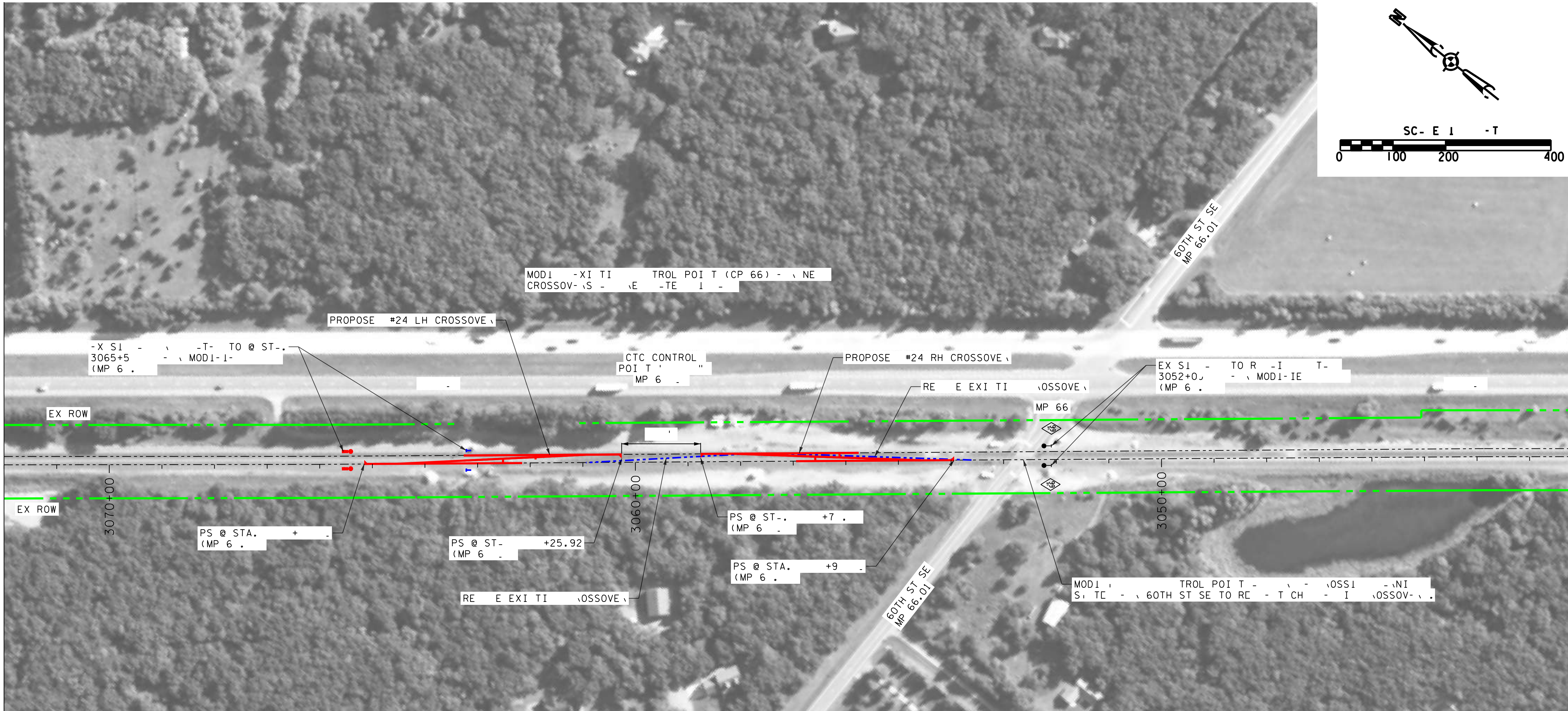

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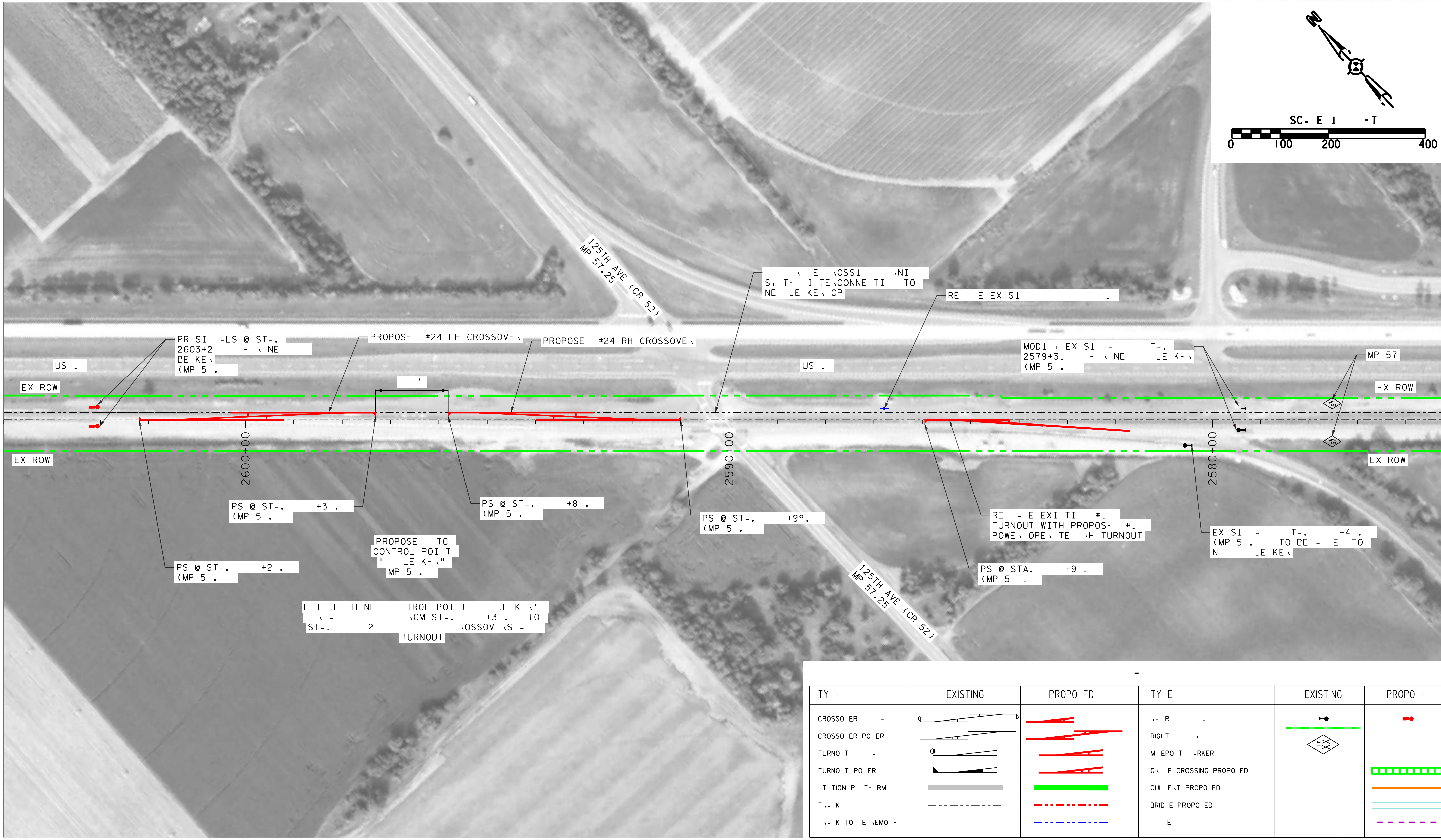

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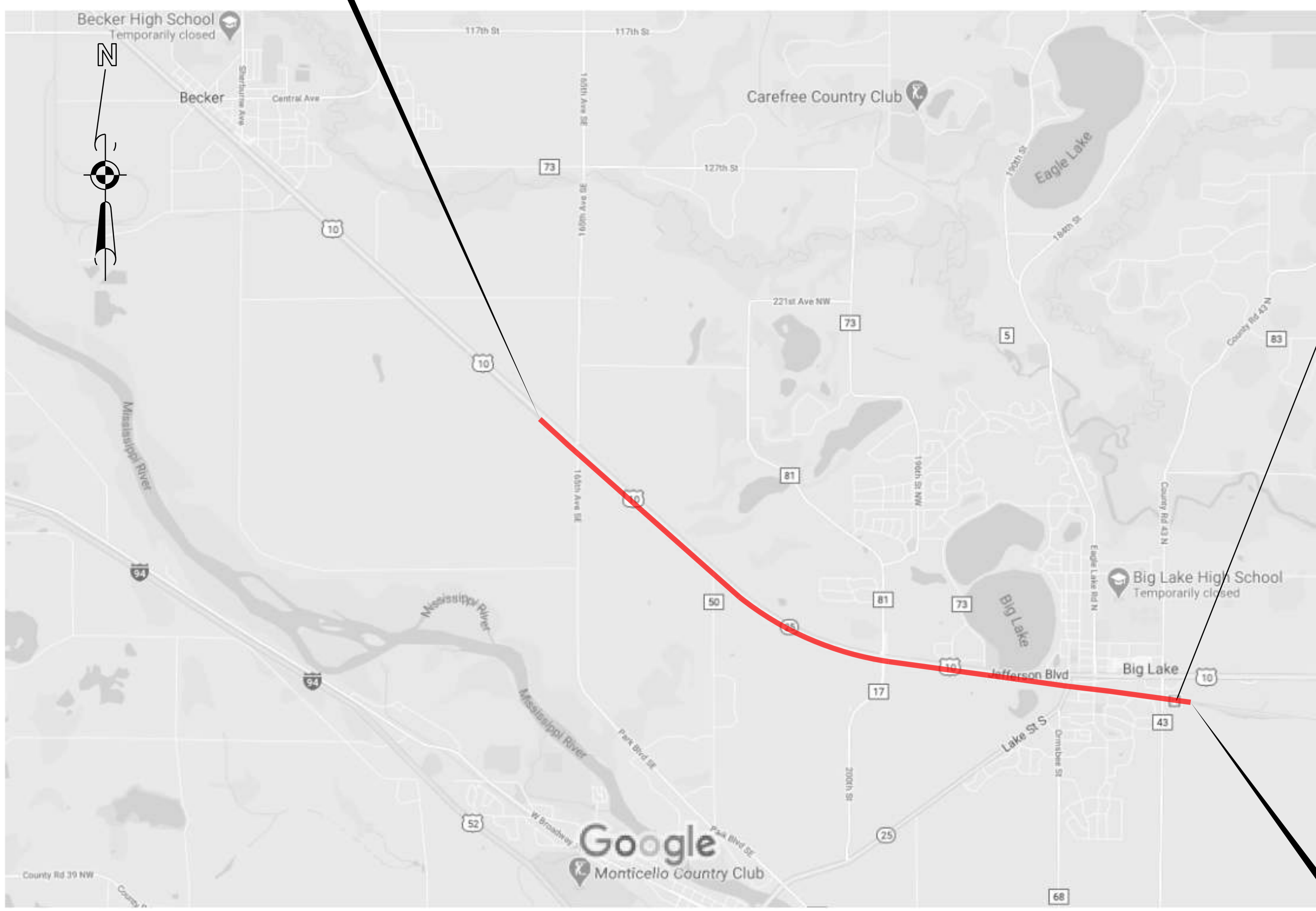

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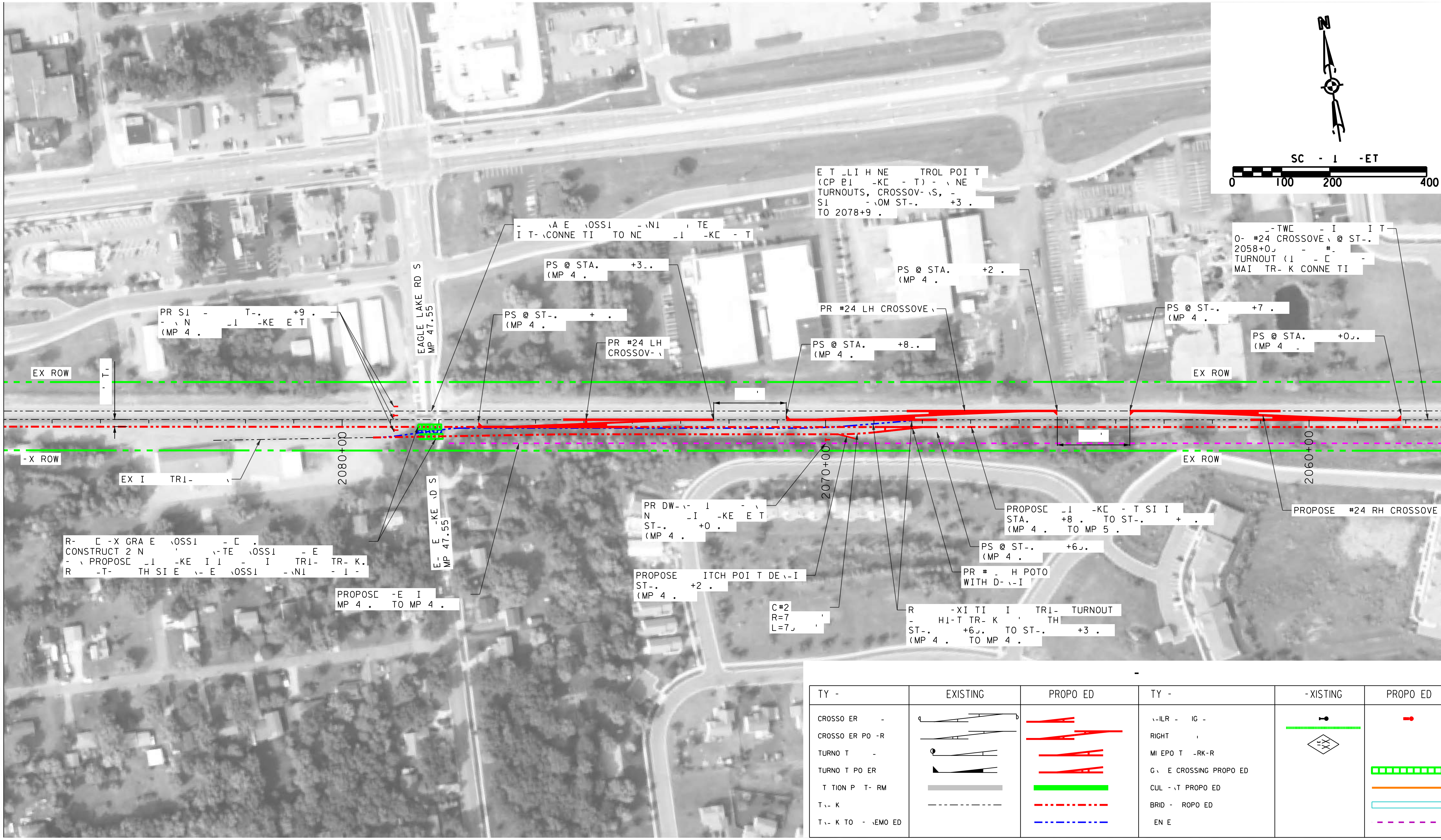

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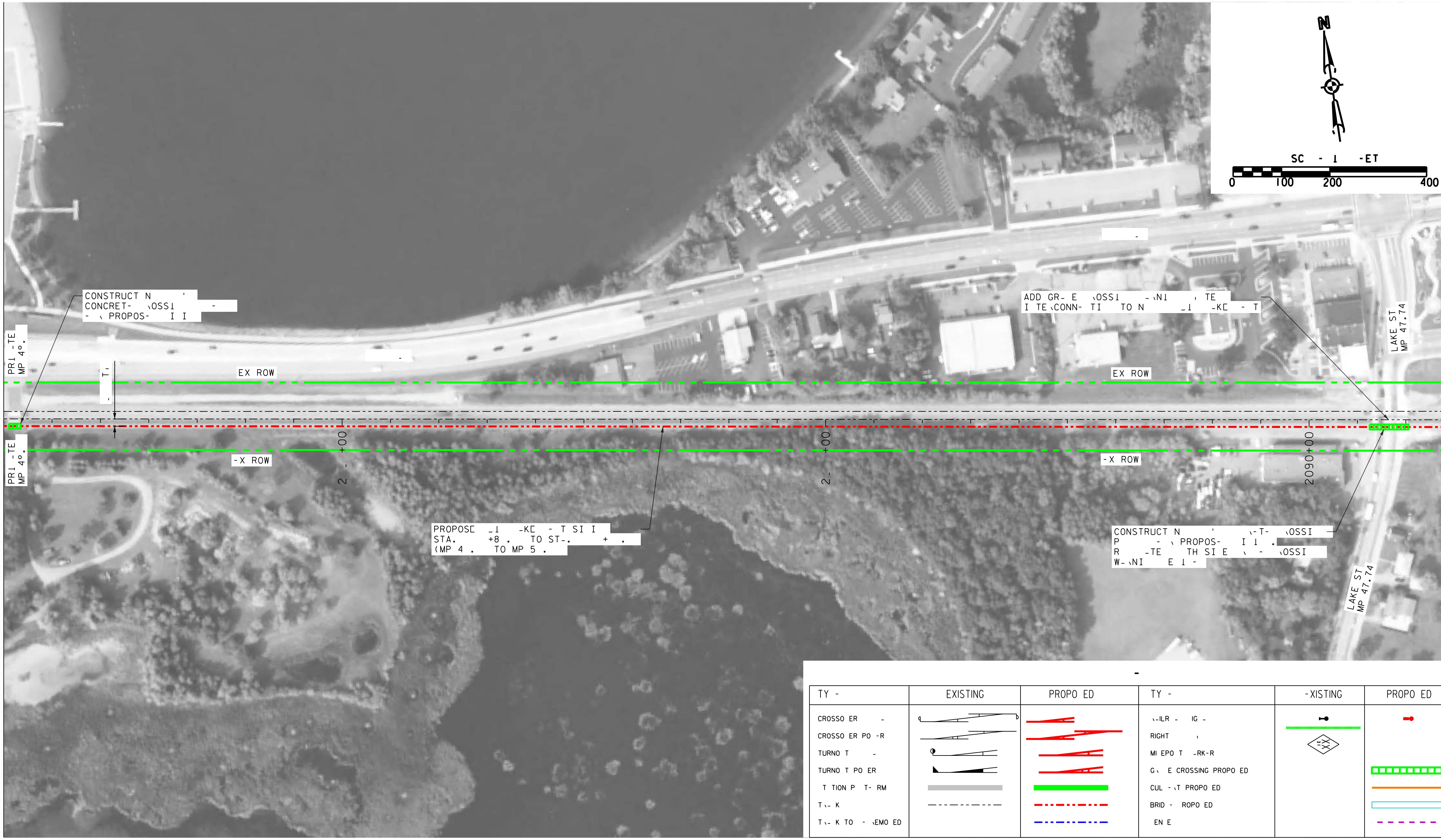

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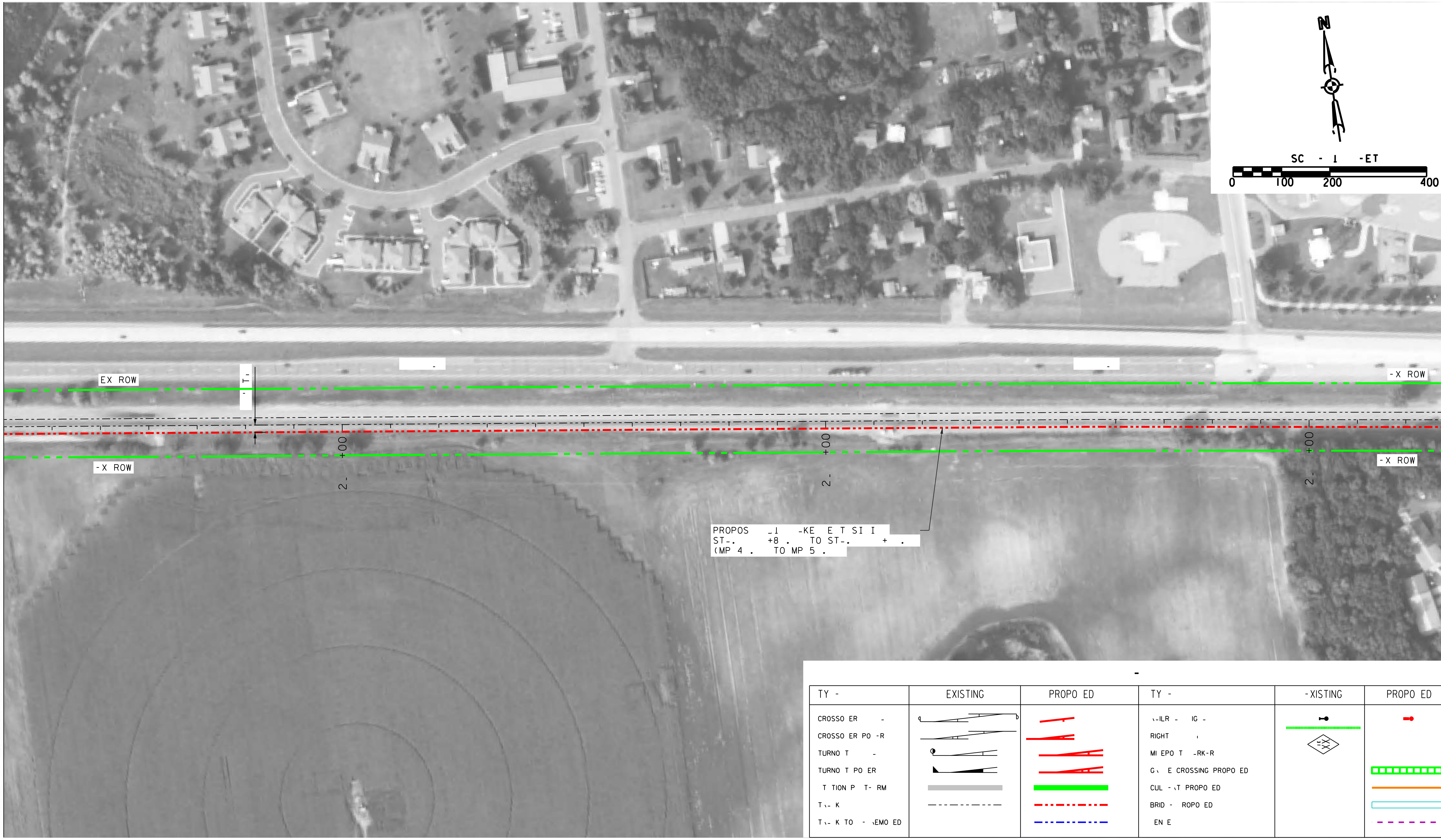

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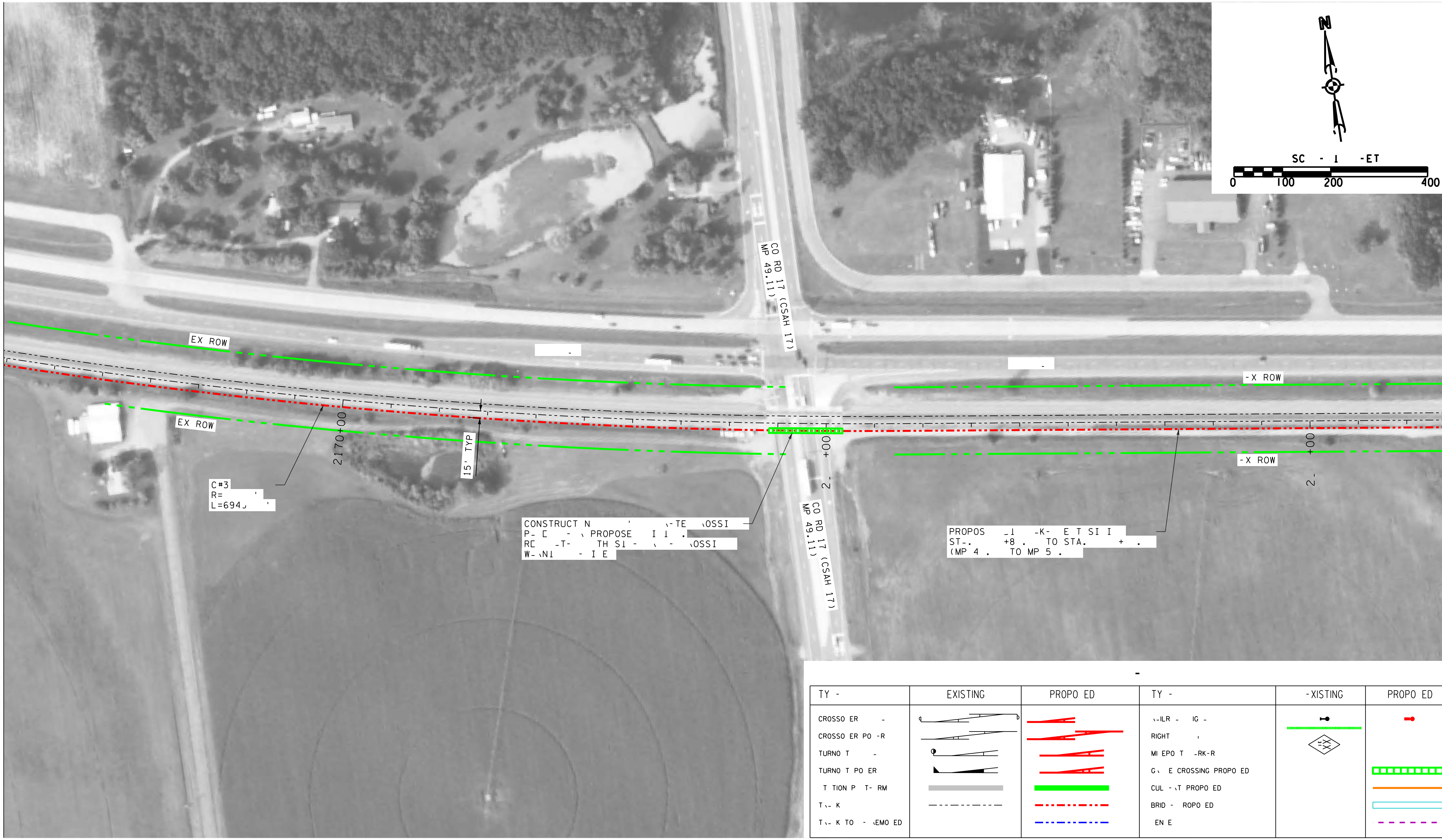

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DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS
BIG LAKE WEST SIDING
ST .

SHEET N . 6 OF 13

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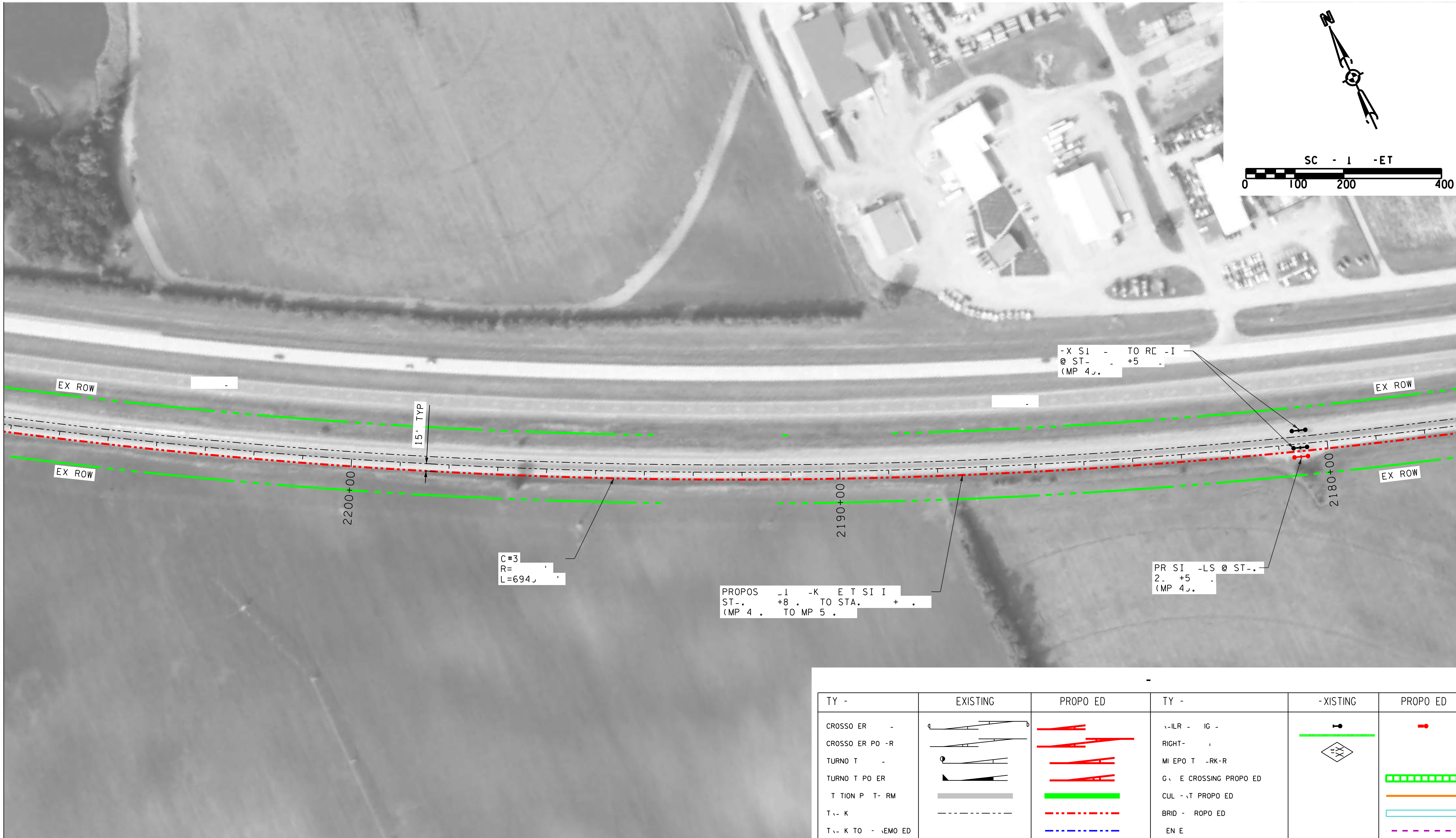

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QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS
BIG LAKE WEST SIDING
ST .

SHEET N . 7 OF 13

PRO - T: NORTHSTAR COMMUT-R RAI - XPANSION STUDY
PLOT NA - Big Lake We t Siding Plans t
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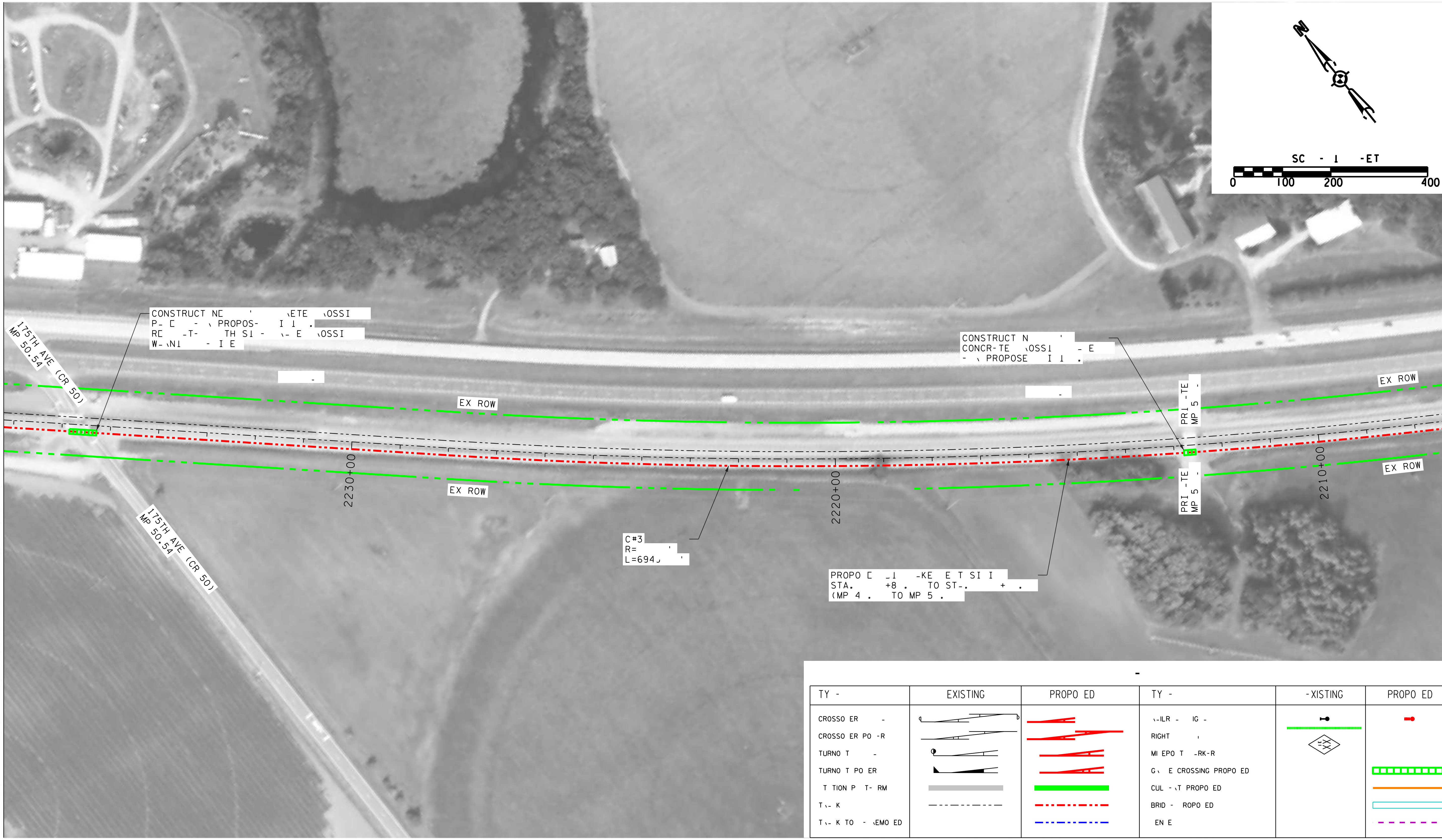

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STATE PRO .

QUA I CONSULTANTS
DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS BIG LAKE WEST SIDING

ST .

SHEET N . 8 OF 13

PRO - T: NORTHSTAR COMMUT-R RAI - XPANSION STUDY
PLOT NA - Big Lake We t Siding Plans t
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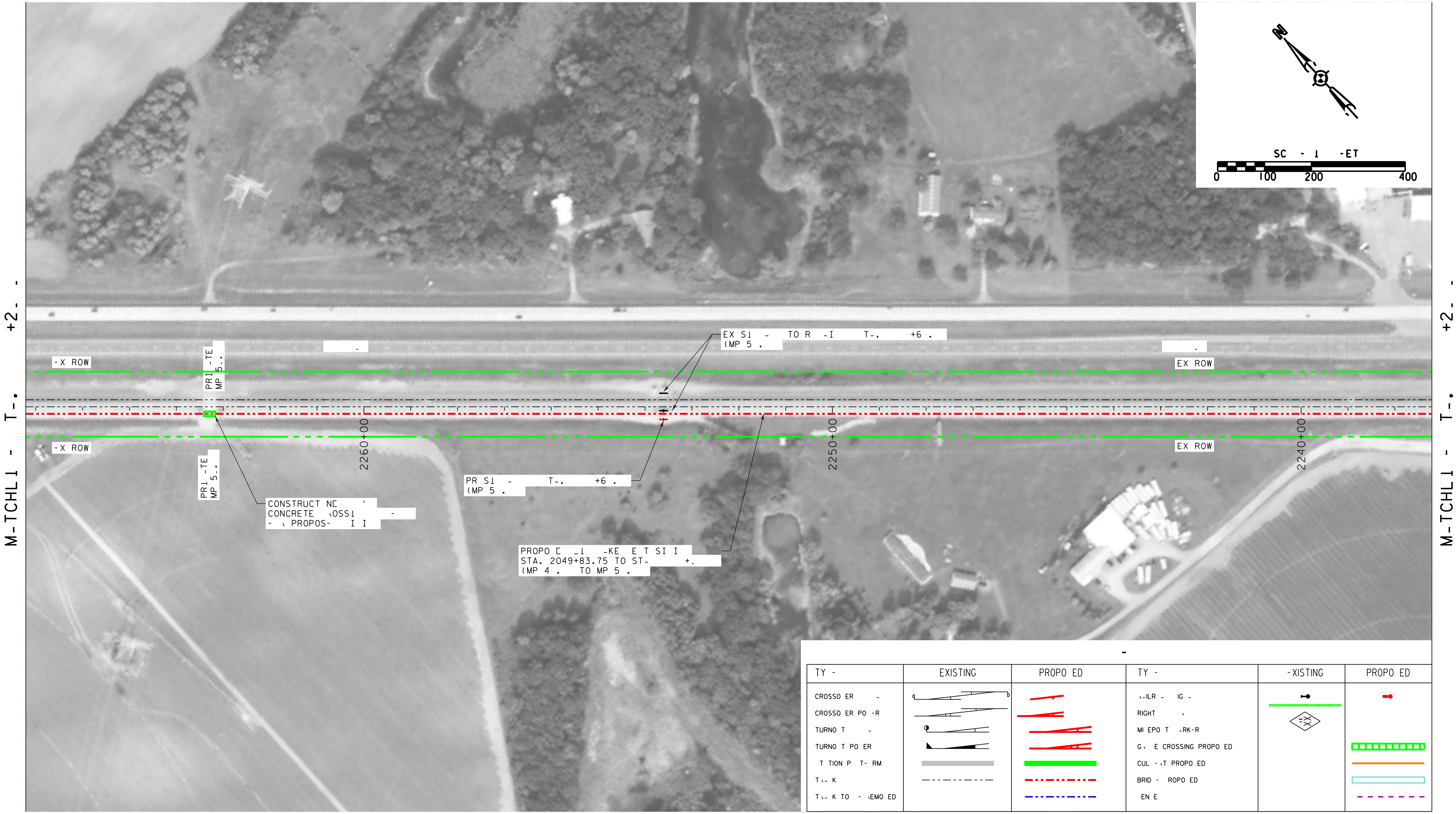

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QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS
BIG LAKE WEST SIDING
ST .

SHEET N . 9 OF 13

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QUA I CONSULTANTS
DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS
BIG LAKE WEST SIDING
ST .

SHEET N .
10
OF
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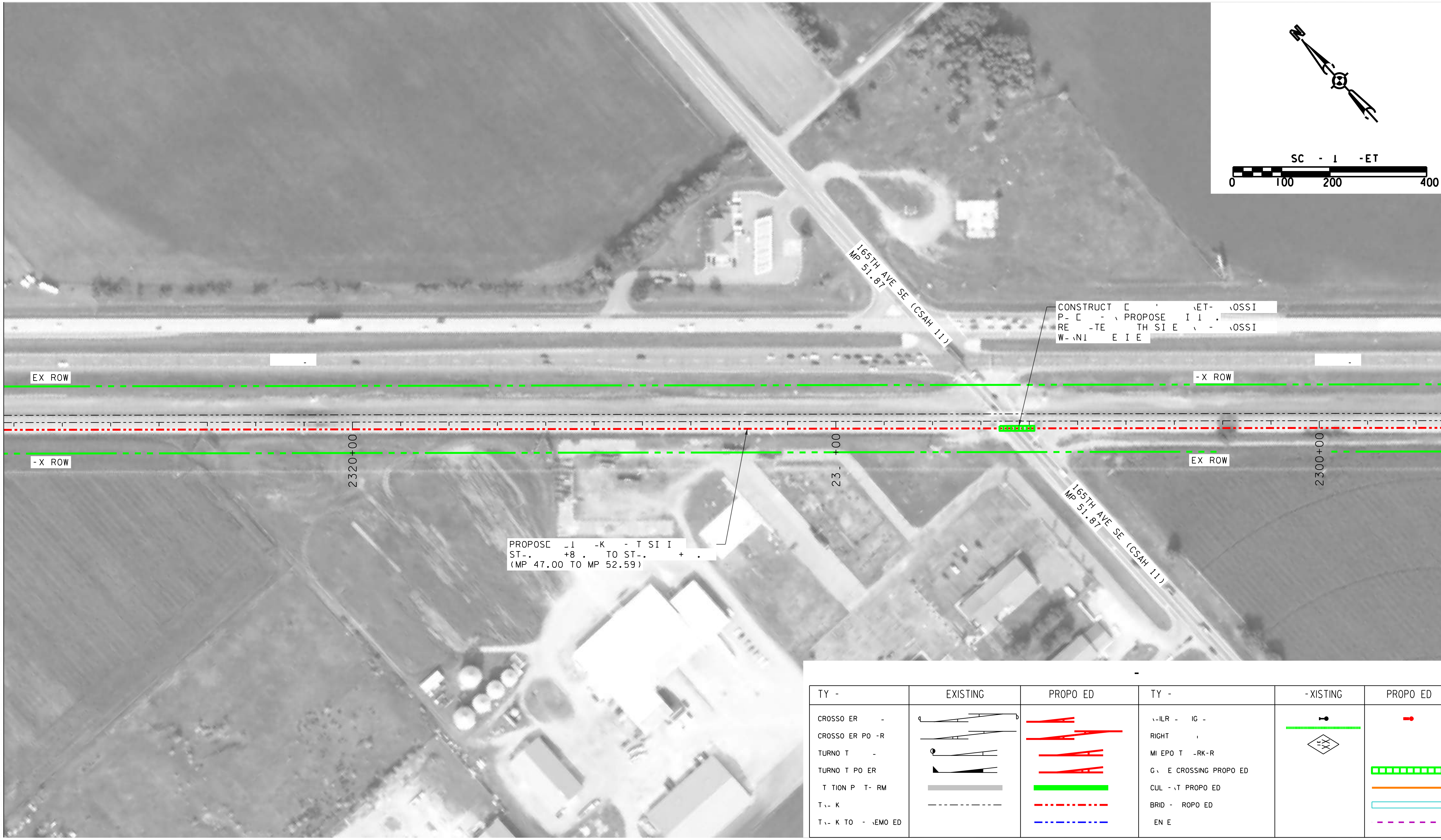

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QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS
BIG LAKE WEST SIDING
ST .

SHEET N . 11 OF 13

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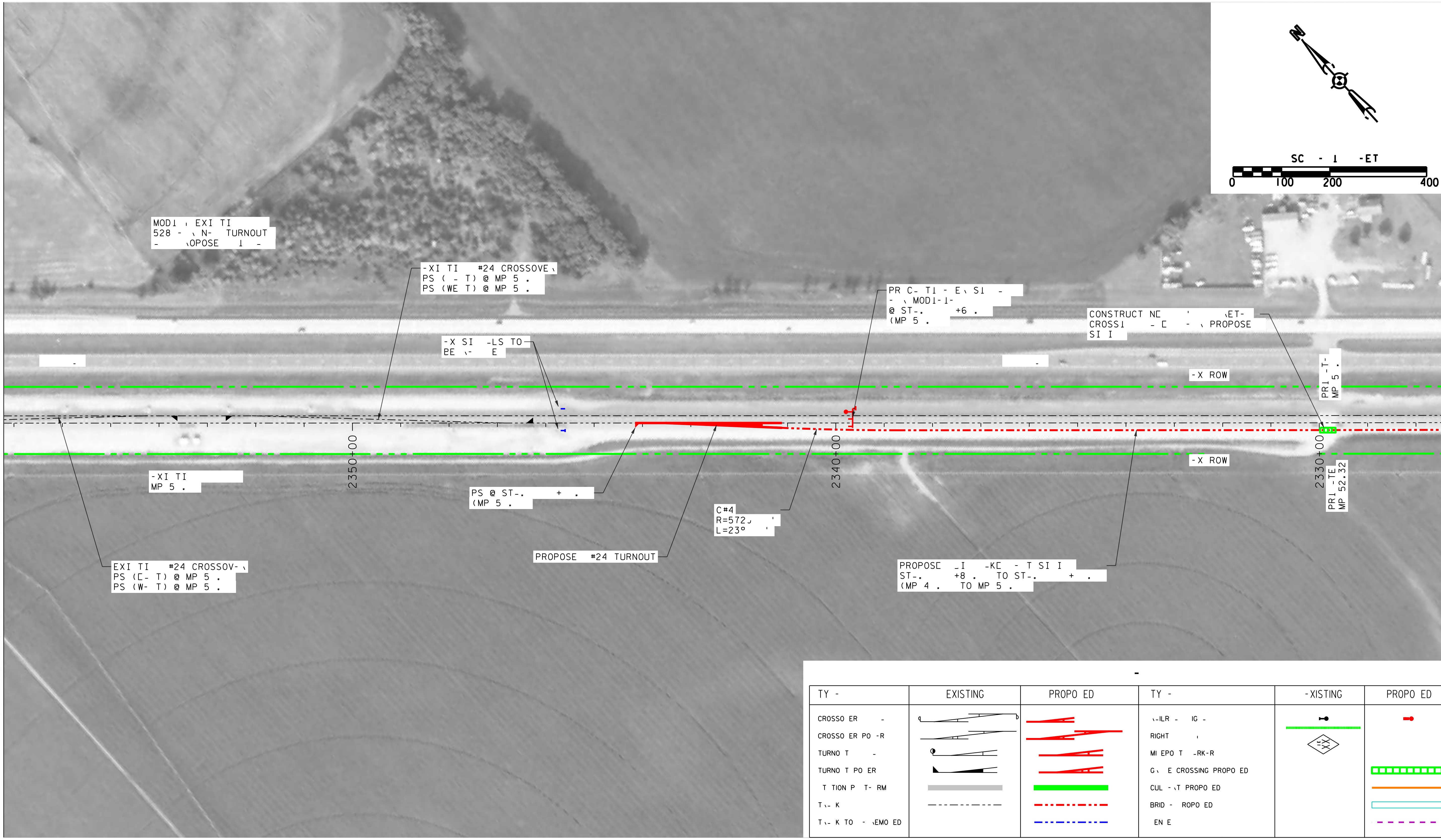

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QUA I CONSULTANTS

mn DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS BIG LAKE WEST SIDING

ST .

SHEET N . 12 OF 13

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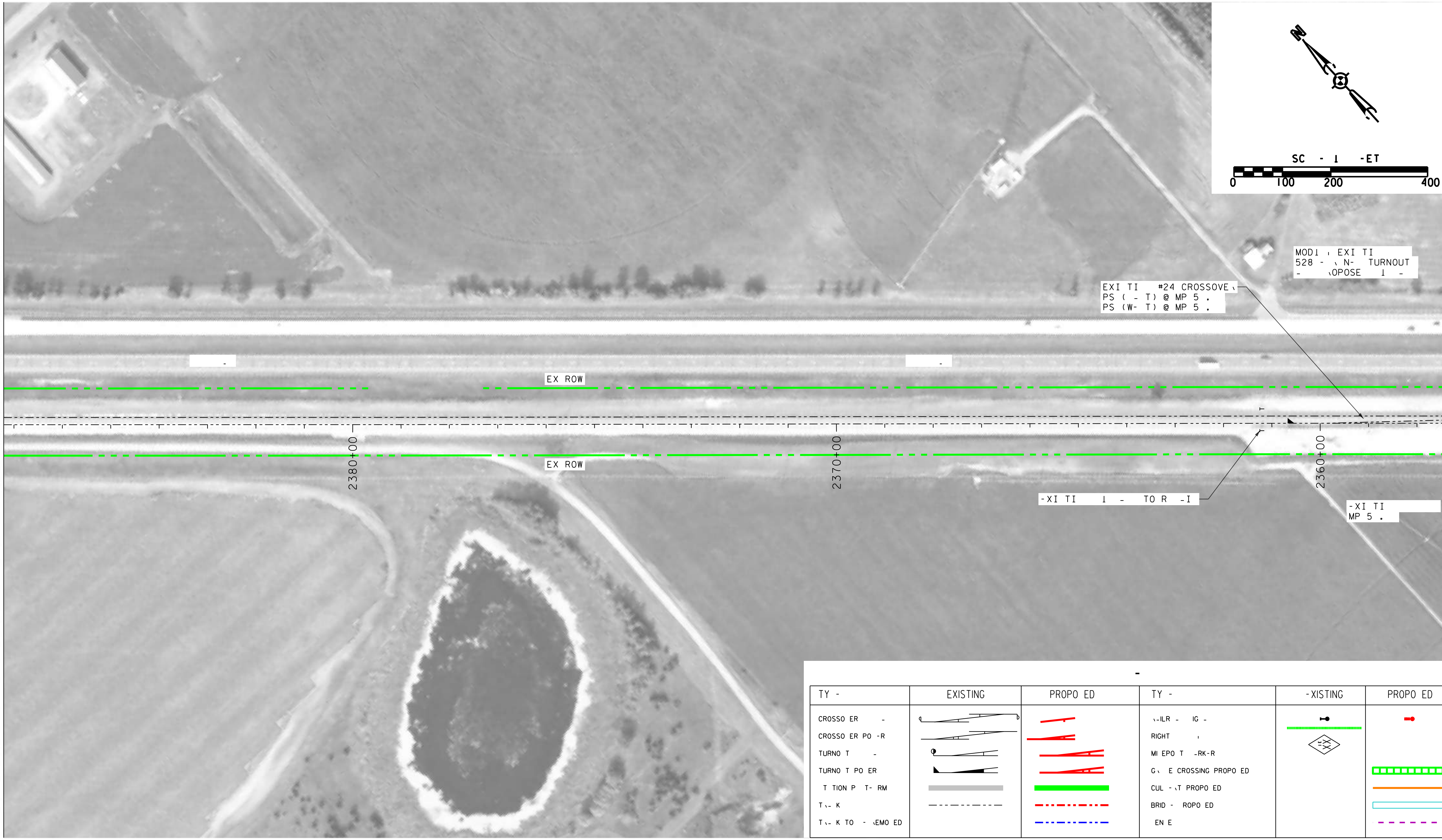

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QUA I CONSULTANTS

mn DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS
BIG LAKE WEST SIDING
ST .

SHEET N . 13 OF 13

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BIG LAKE STATION TRACK CONNECTION

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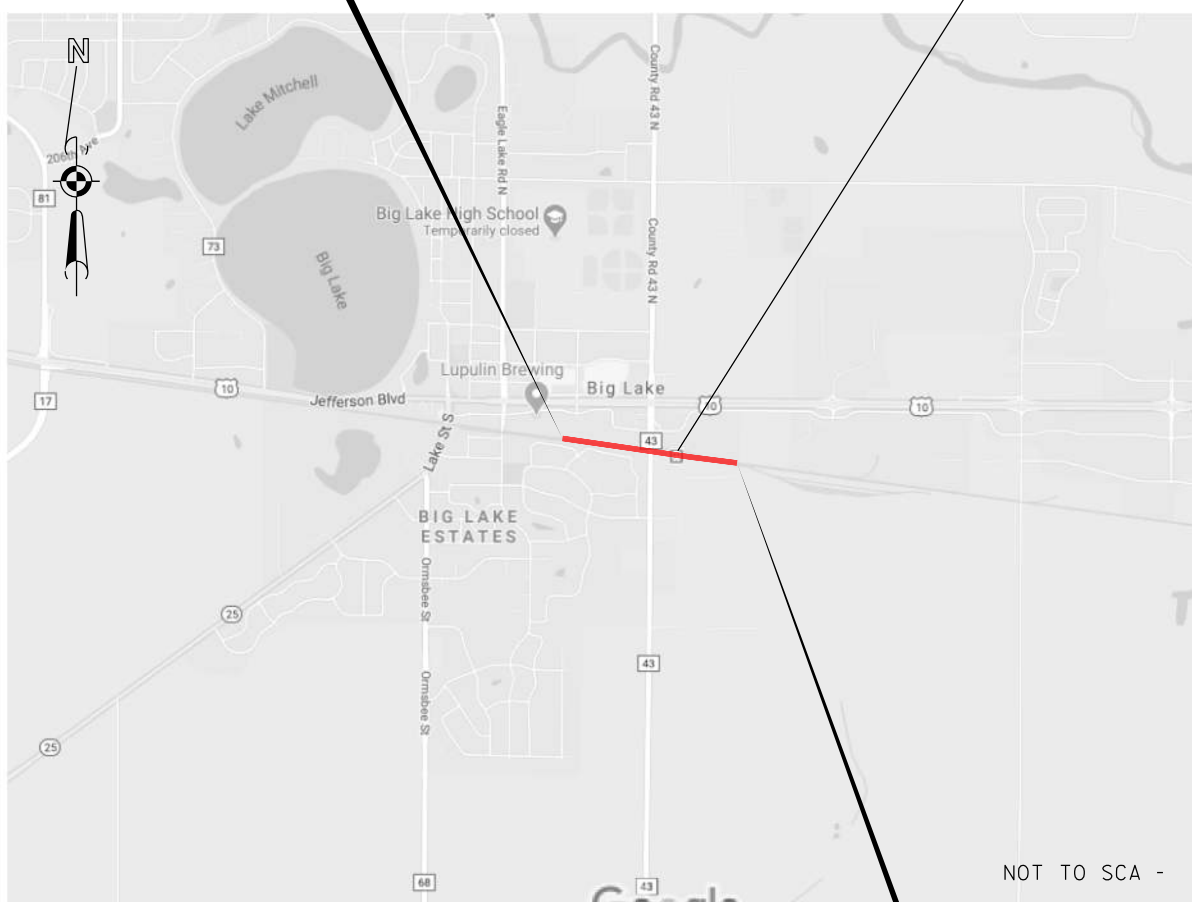

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SHERBURNE COUNTY
BIG LAKE TOWNSHIP

DEPARTMENT OF TRANSPORTATION

STATE FUNDS

GOVERNING SPECIFICATIONS

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INDEX

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1	TIT E SH ET
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STATE PRO . SHEET N . 1 F 3 SHEETS

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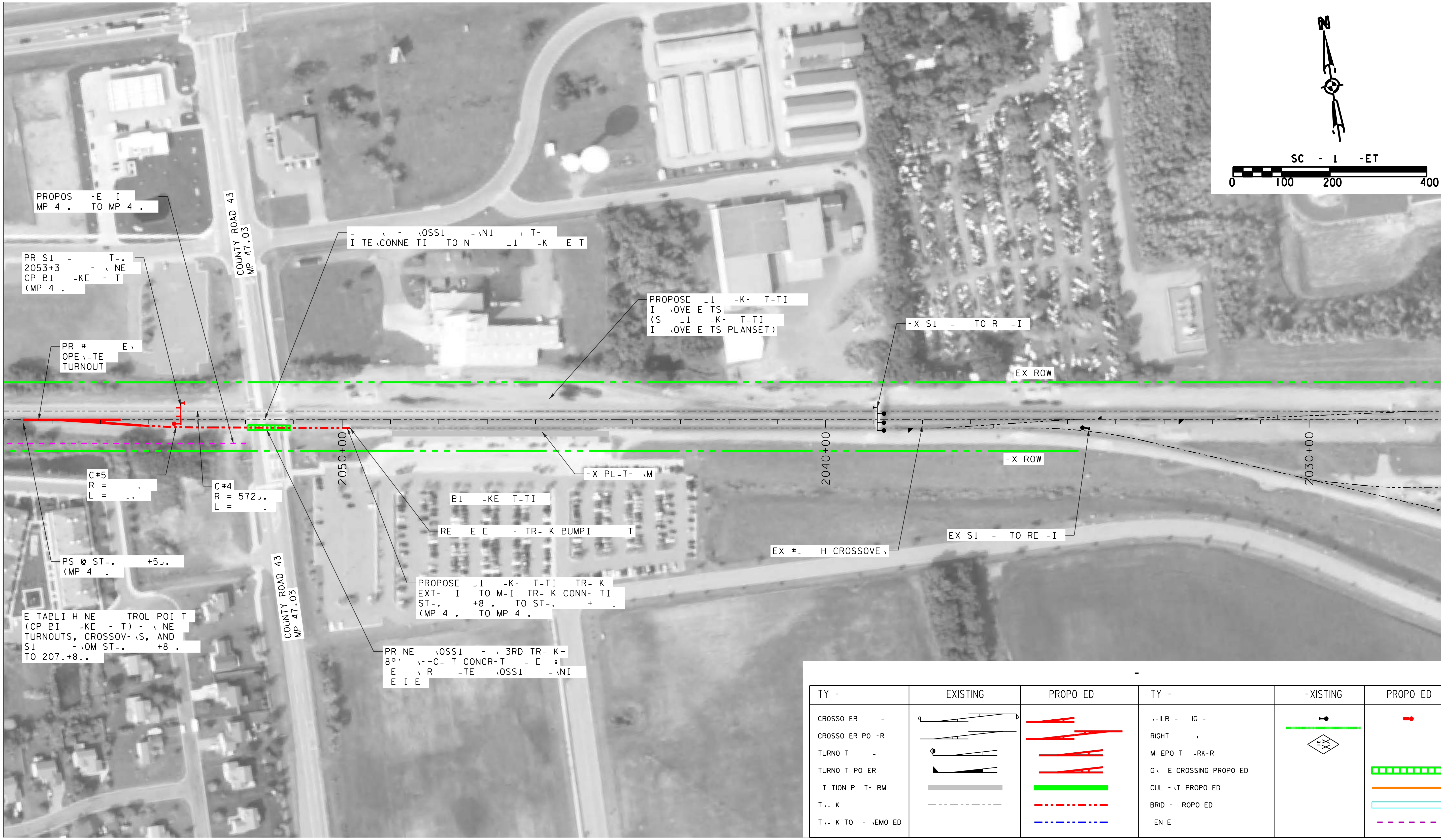

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STATE PRO .

QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS BIG LAKE STATION TRACK CONNECTION ST .

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PLOT NA - Big Lake Conne tion Plans t
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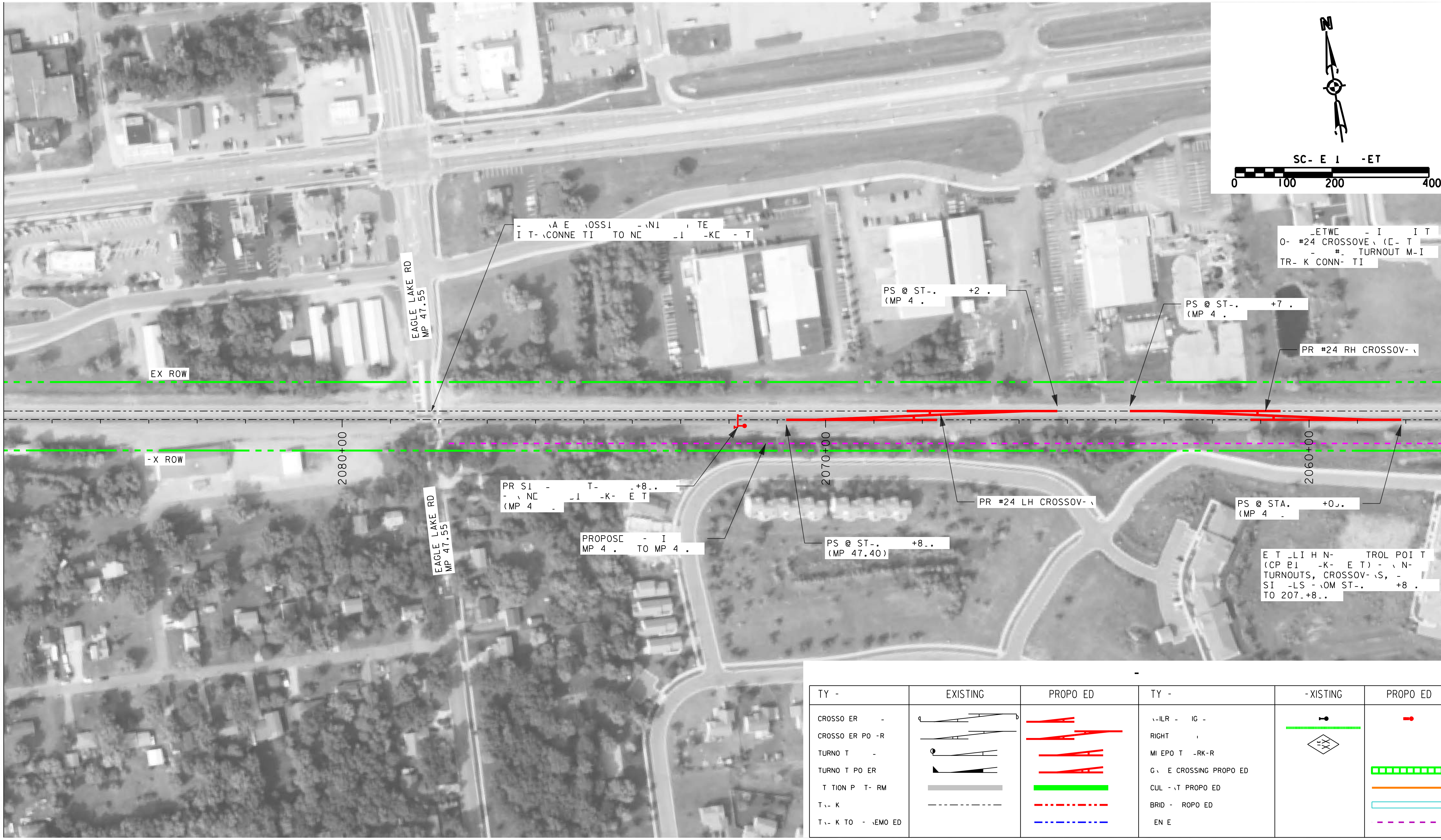

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STATE PRO .

QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS BIG LAKE STATION TRACK CONNECTION ST .

SHEET N .
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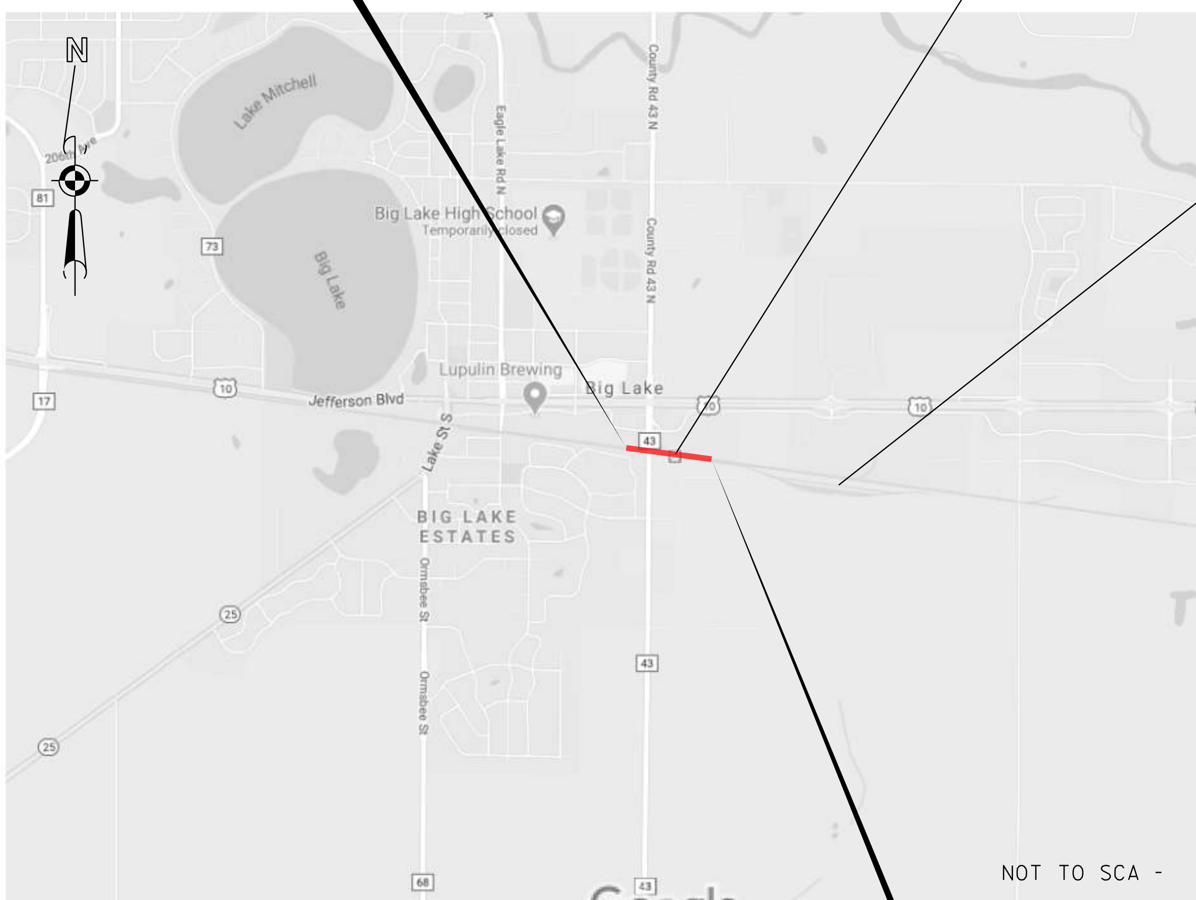
BIG LAKE STATION
MP 4 .

BIG LAKE MAINTENANCE FACILITY
MP 4 .



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SHERBURNE COUNTY
BIG LAKE TOWNSHIP

DEPARTMENT OF TRANSPORTATION

STATE FUNDS

GOVERNING SPECIFICATIONS

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INDEX

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QUA I CONSULTANTS

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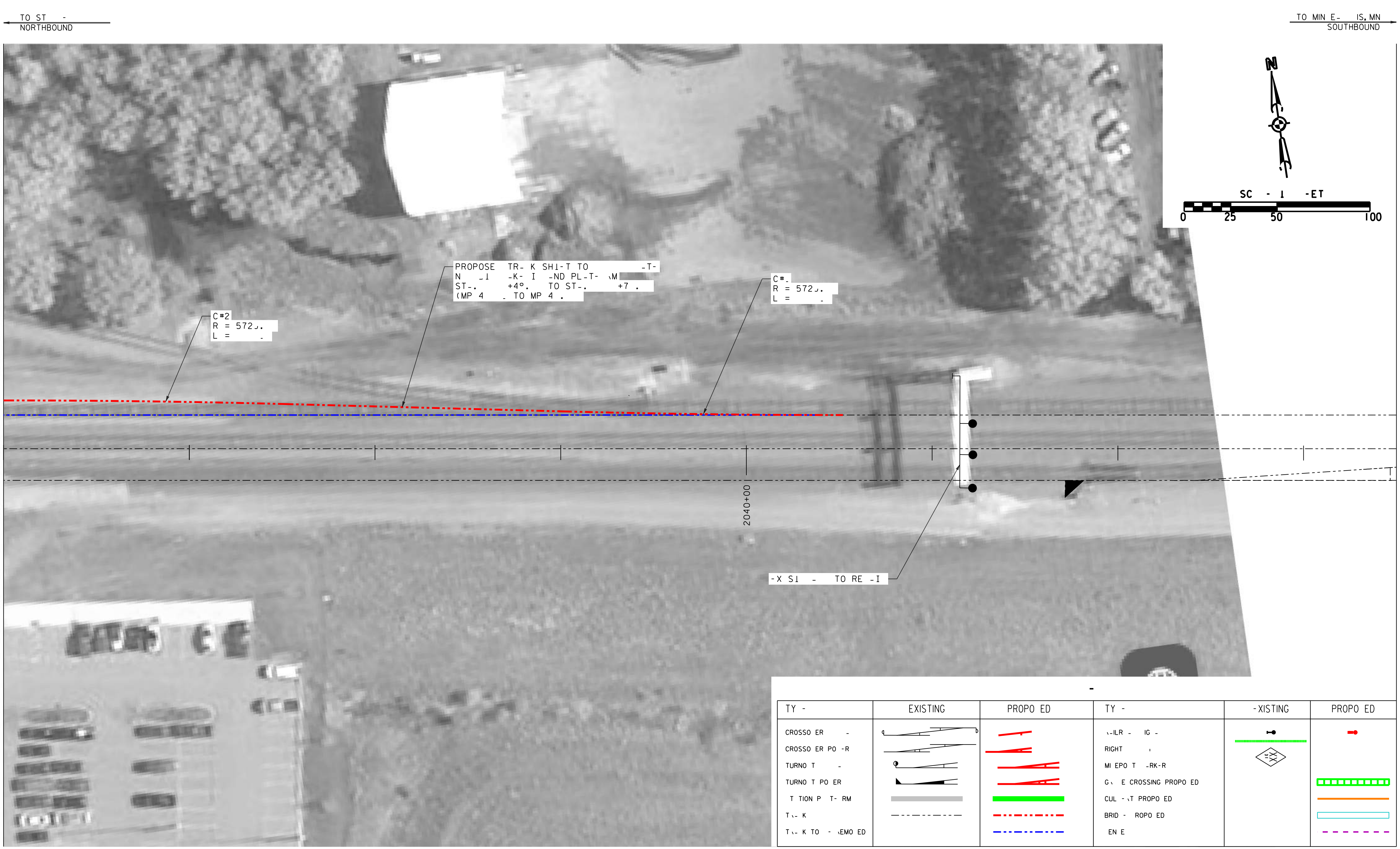

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STATE PRO .

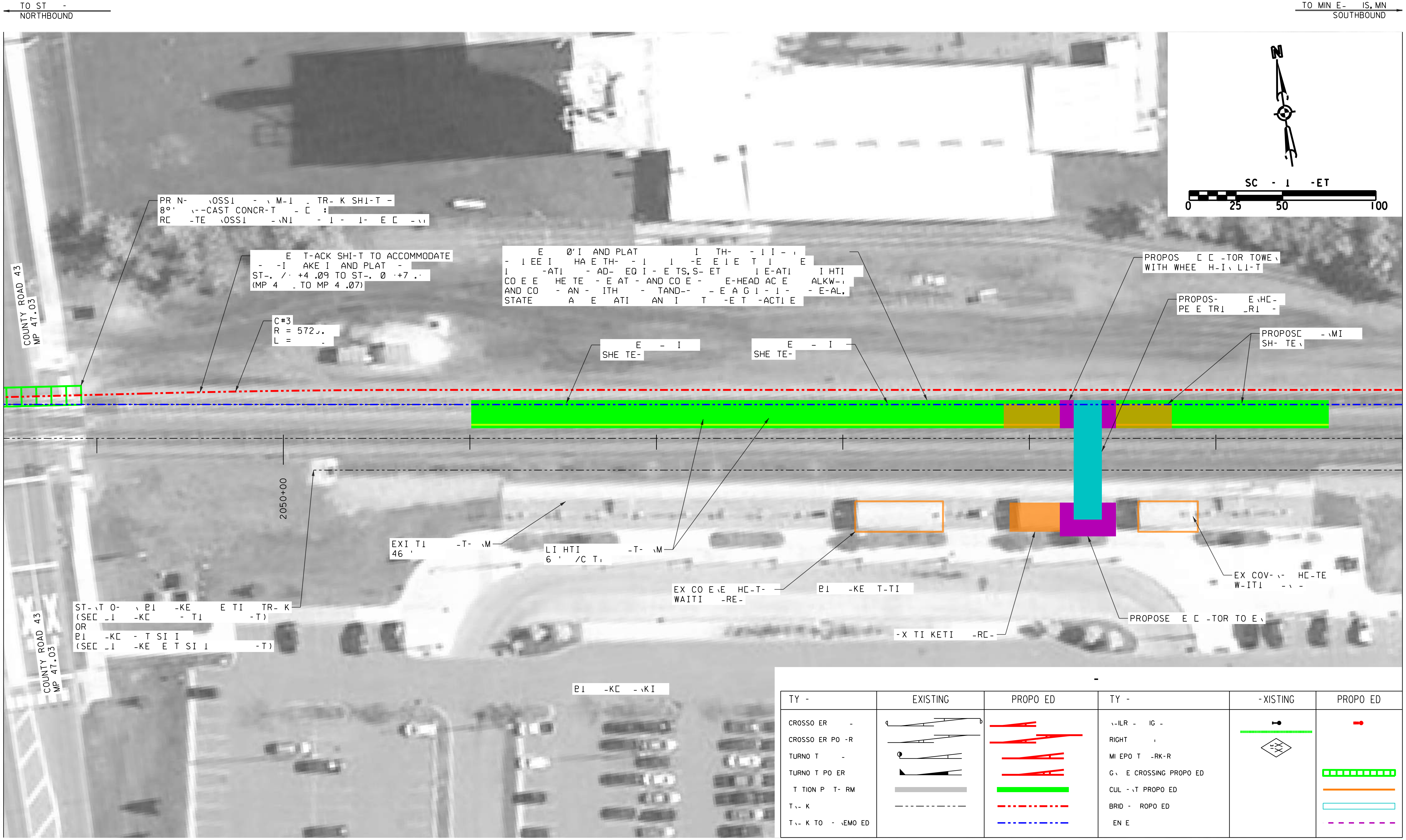
QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS BIG LAKE STATION EXPANSION ST .

SHEET N . 2 OF 4



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QUANTI CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS BIG LAKE STATION EXPANSION

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SHEET N. 3 OF 4

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PLOT NA - Big Lake t tion Plans t
- IG - I -

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2	DR--T 2	SP	SP	4/14/2020

ESI E : RWN
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STATE PRO .

QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL
EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS
BIG LAKE STATION EXPANSION
ST .

SHEET N . 4 OF 4

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END TRACK WORK
MP 4 .

SHERBURNE COUNTY
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BEGIN TRACK WORK
MP 4 .

STATE FUNDS

GOVERNING SPECIFICATIONS

THE 201 EDITI THE MI T T T RT TI
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INDEX

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1	TIT E SH ET
2 - 3	P ET

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QUA I
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DEPARTMENT OF
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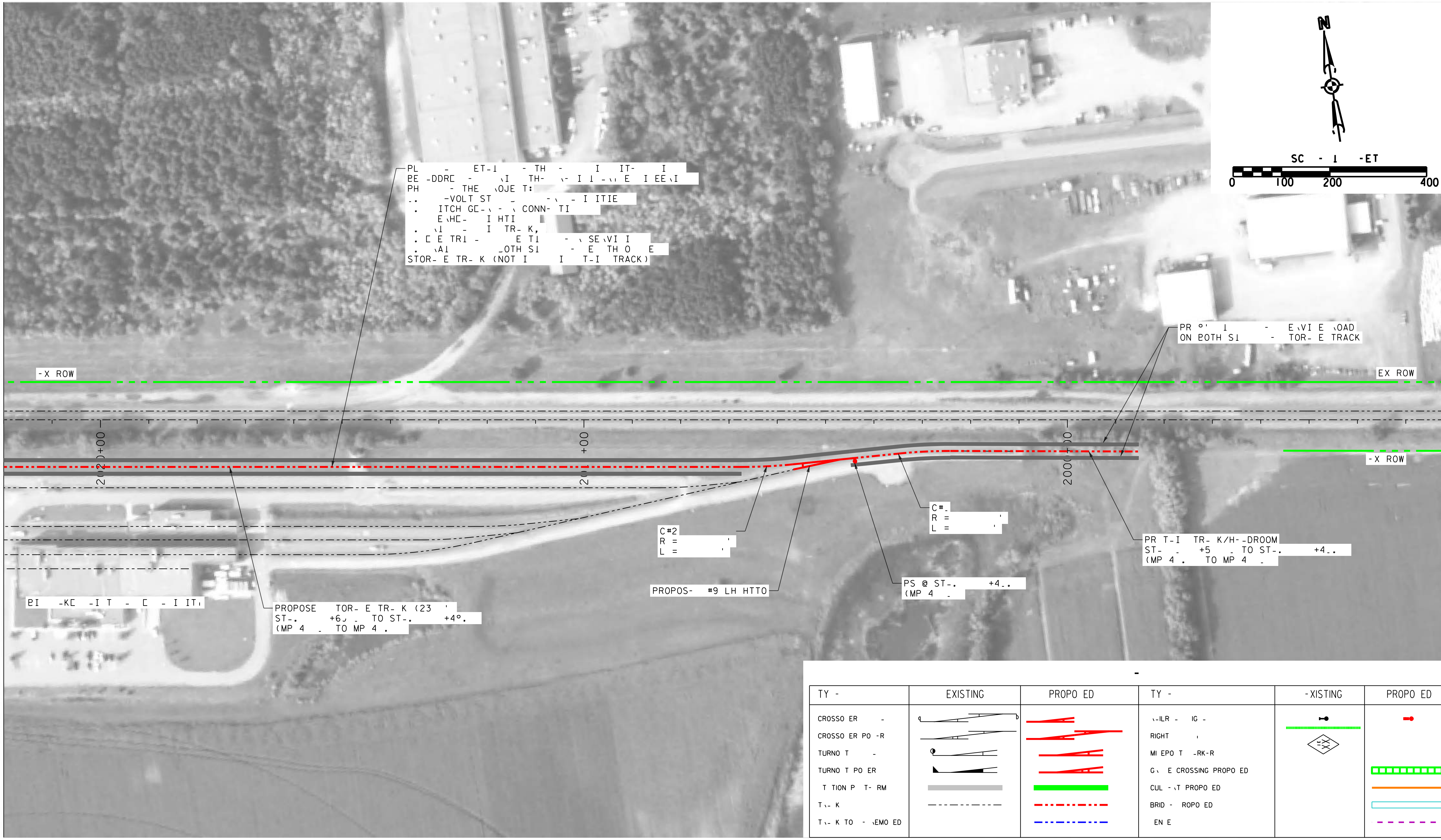

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DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS BIG LAKE MAINTENANCE FACILITY EXPANSION ST .

SHEET N . 2 OF 3

PRO - T: NORTHSTAR COMMUT-R RAI - XPANSION STUDY
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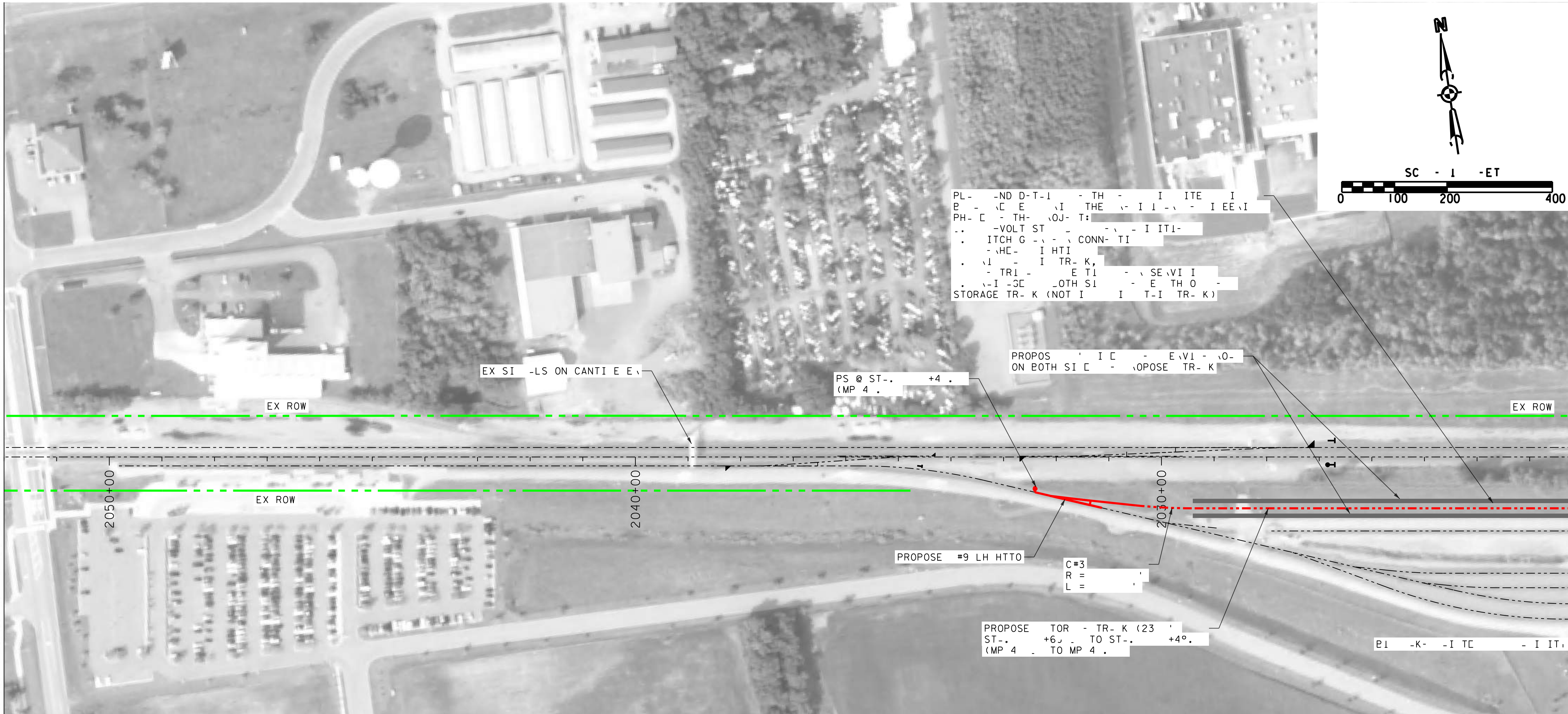

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STATE PRO .

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DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS BIG LAKE MAINTENANCE FACILITY EXPANSION ST .

SHEET N . 3 OF 3

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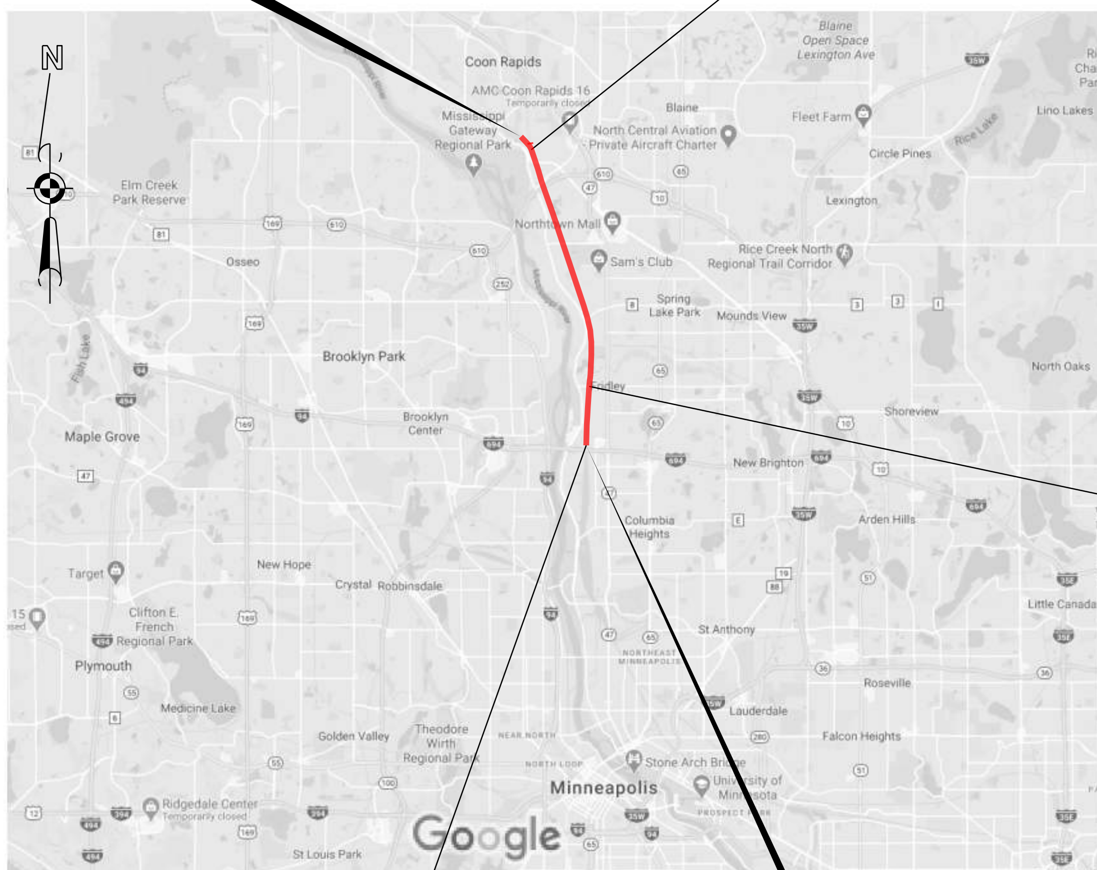
END TRACK WORK
MP 21.

CP COON CREEK
MP 21.10



FRIDLEY STATION
MP 1 .10

CP INTERSTATE
MP 1 .

BEGIN TRACK WORK
MP 1 .

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CITY OF COON RAPIDS

STATE FUNDS

GOVERNING SPECIFICATIONS

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INDEX

H T	- \I TI
1	TIT E SH ET
2 - 12	P ET

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QUA I CONSULTANTS

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DEPARTMENT OF TRANSPORTATION

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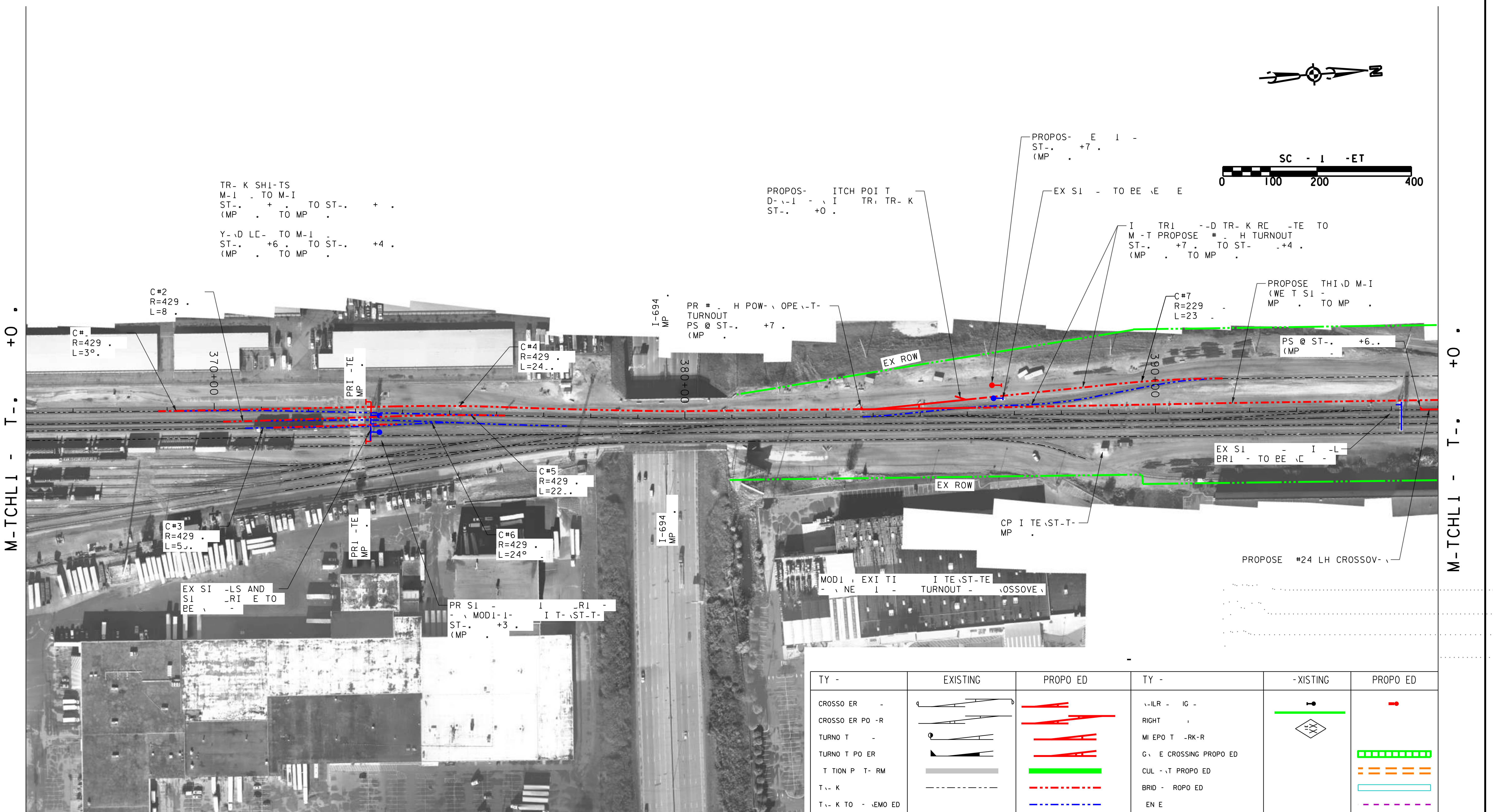

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STATE PRO .

QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN TRACK CP COON CREEK TO CP INTERSTATE ST

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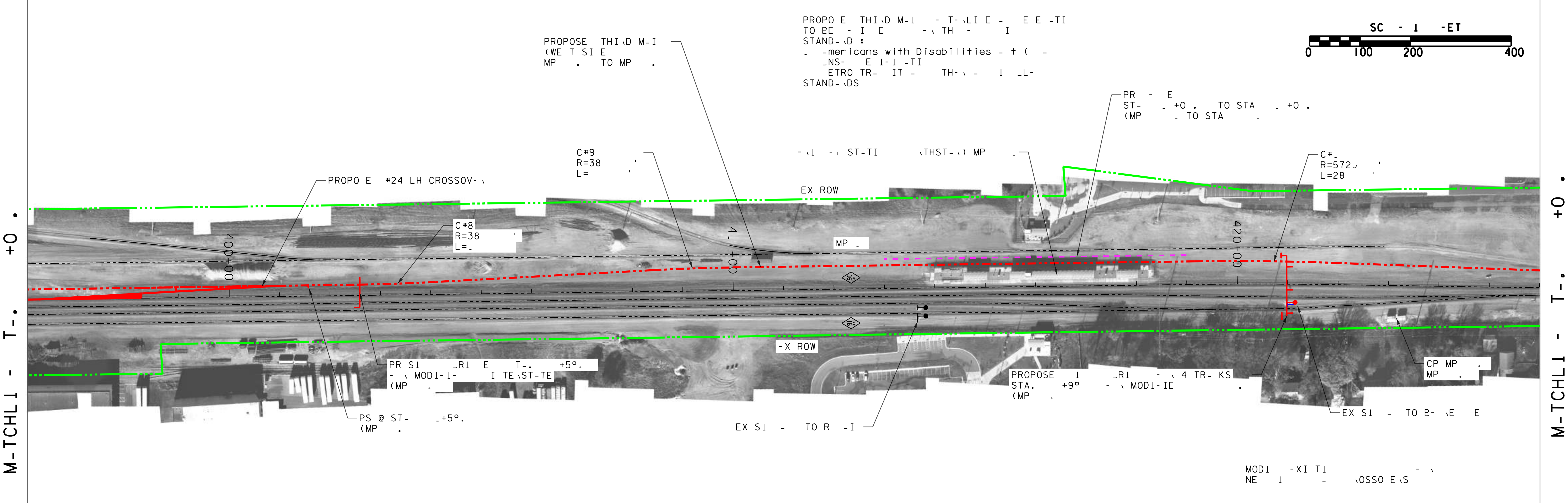

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QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN TRACK CP COON CREEK TO CP INTERSTATE ST .

SHEET N . 3 OF 12

PRO - T: NORTHSTAR COMMUT-R RAI -XPANSION STUDY
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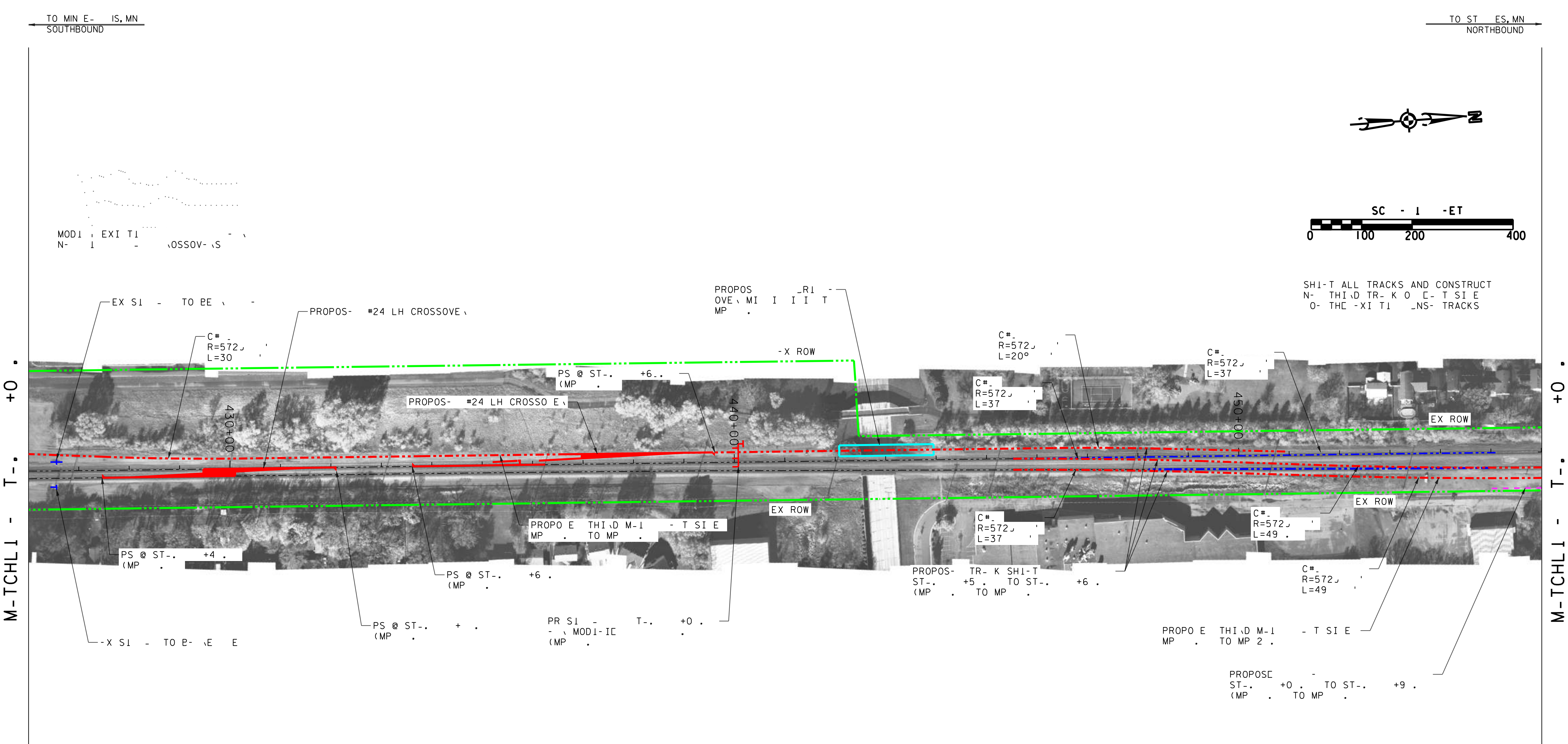

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QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN TRACK CP COON CREEK TO CP INTERSTATE ST .

SHEET N . 4 OF 12

PRO - T: NORTHSTAR COMMUT-R RAI - XPANSION STUDY
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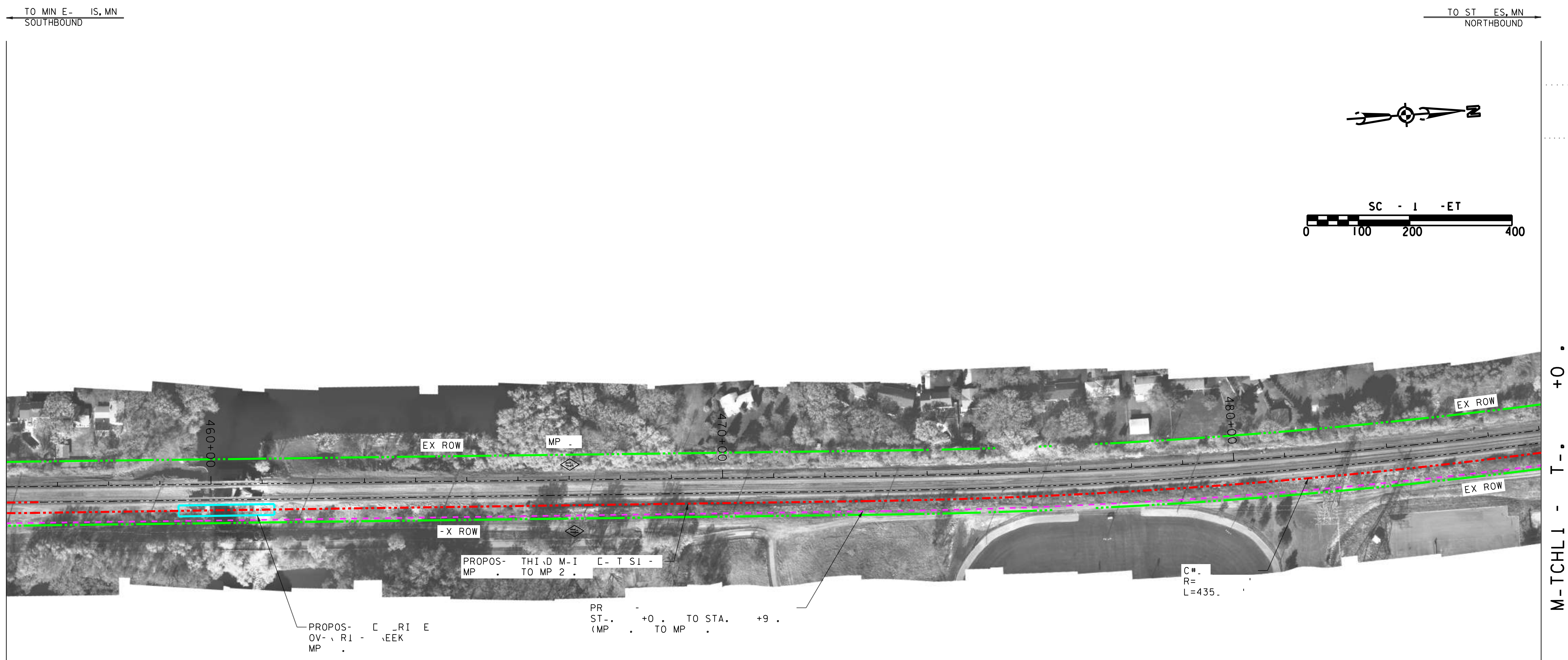

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QUA I CONSULTANTS
DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS
THIRD MAIN TRACK CP COON CREEK TO CP INTERSTATE ST .

SHEET N . 5 OF 12

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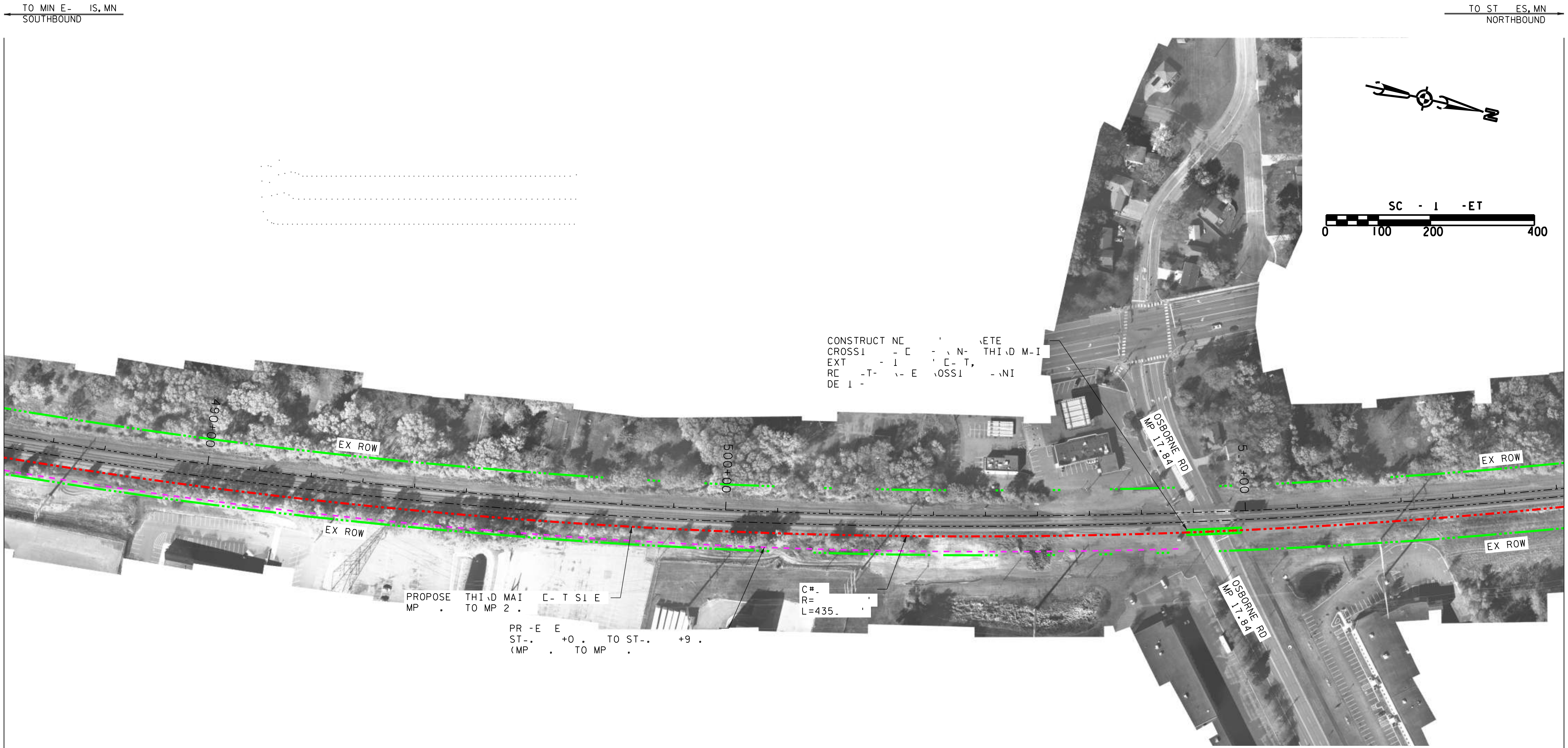

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QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN TRACK CP COON CREEK TO CP INTERSTATE ST .

SHEET N . 6 OF 12

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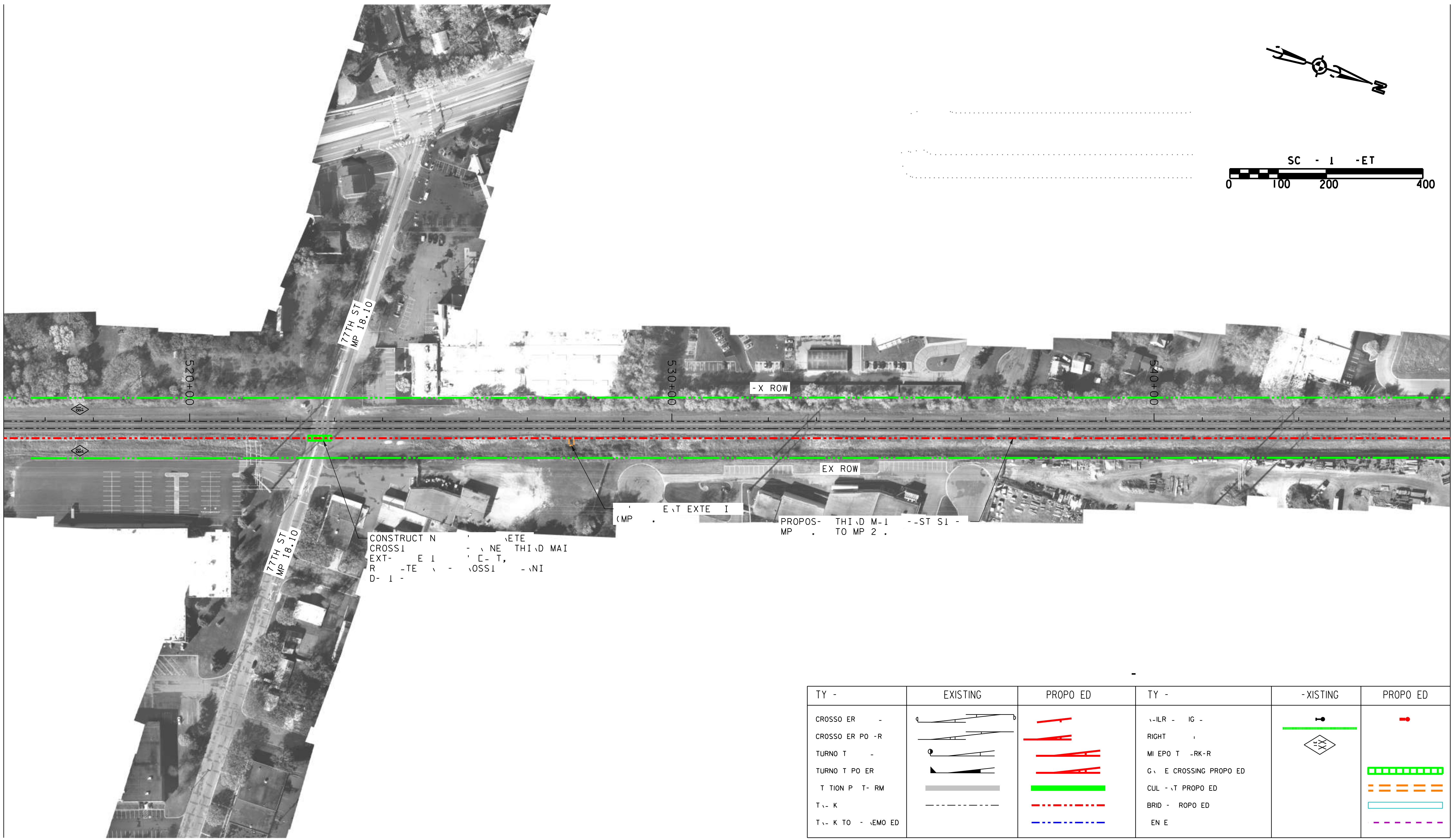

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QUA I CONSULTANTS

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NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS
THIRD MAIN TRACK CP COON CREEK TO CP INTERSTATE
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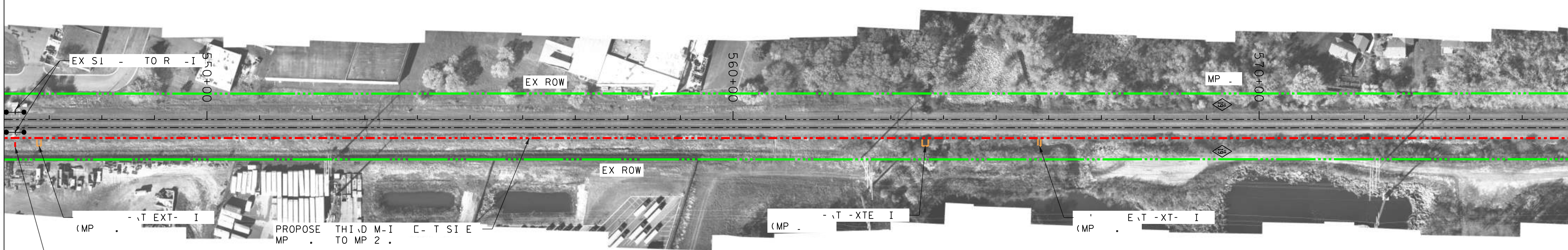

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DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS
THIRD MAIN TRACK CP COON CREEK TO CP INTERSTATE
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SHEET N . 8 OF 12

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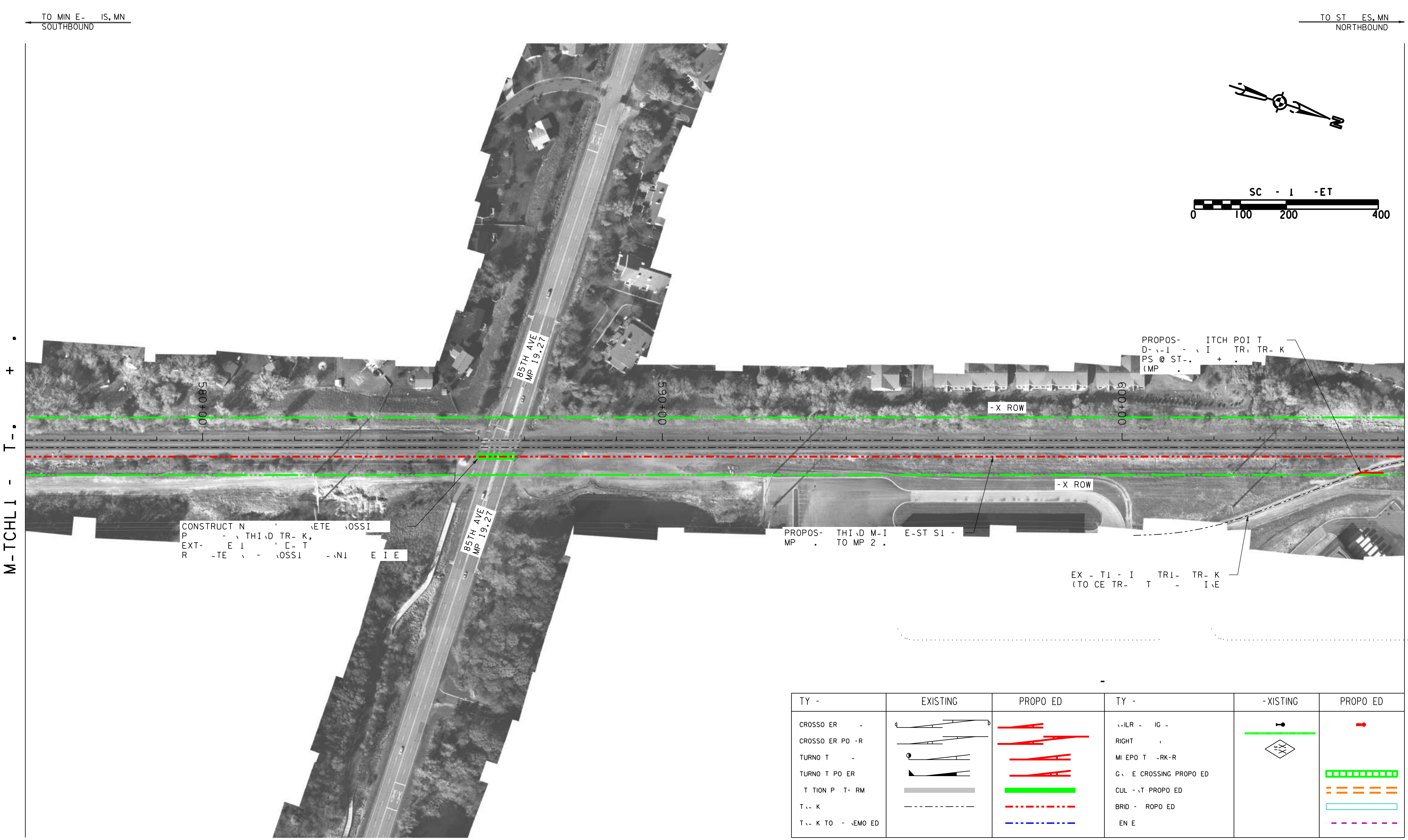

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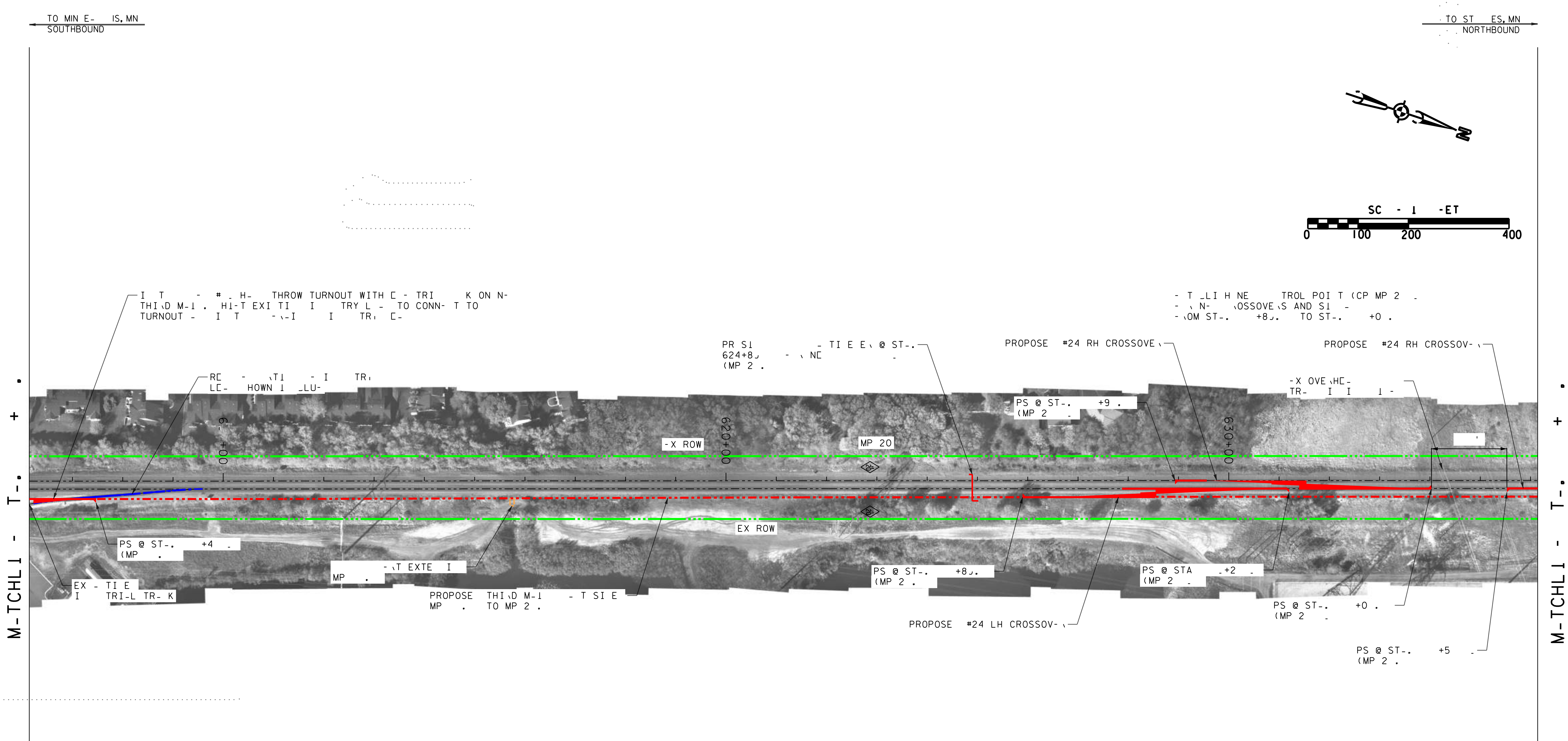
QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN TRACK CP COON CREEK TO CP INTERSTATE ST .

SHEET NO. 9 OF 12



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DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN TRACK CP COON CREEK TO CP INTERSTATE ST

SHEET N . 10 OF 12

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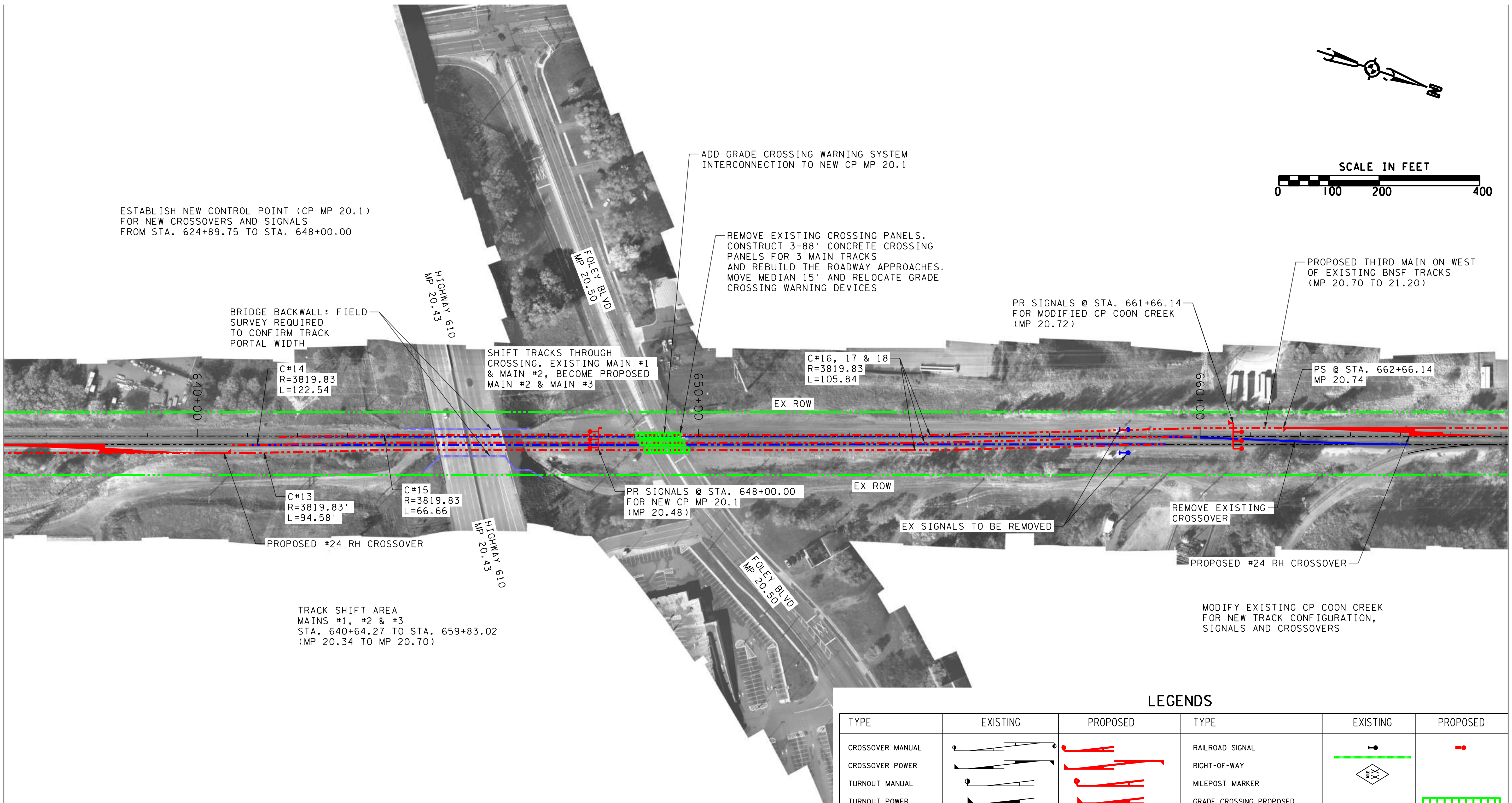

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TURNOUT POWER			GRADE CROSSING PROPOSED		
STATION PLATFORM			CULVERT PROPOSED		
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NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS
THIRD MAIN TRACK CP COON CREEK TO CP INTERSTATE
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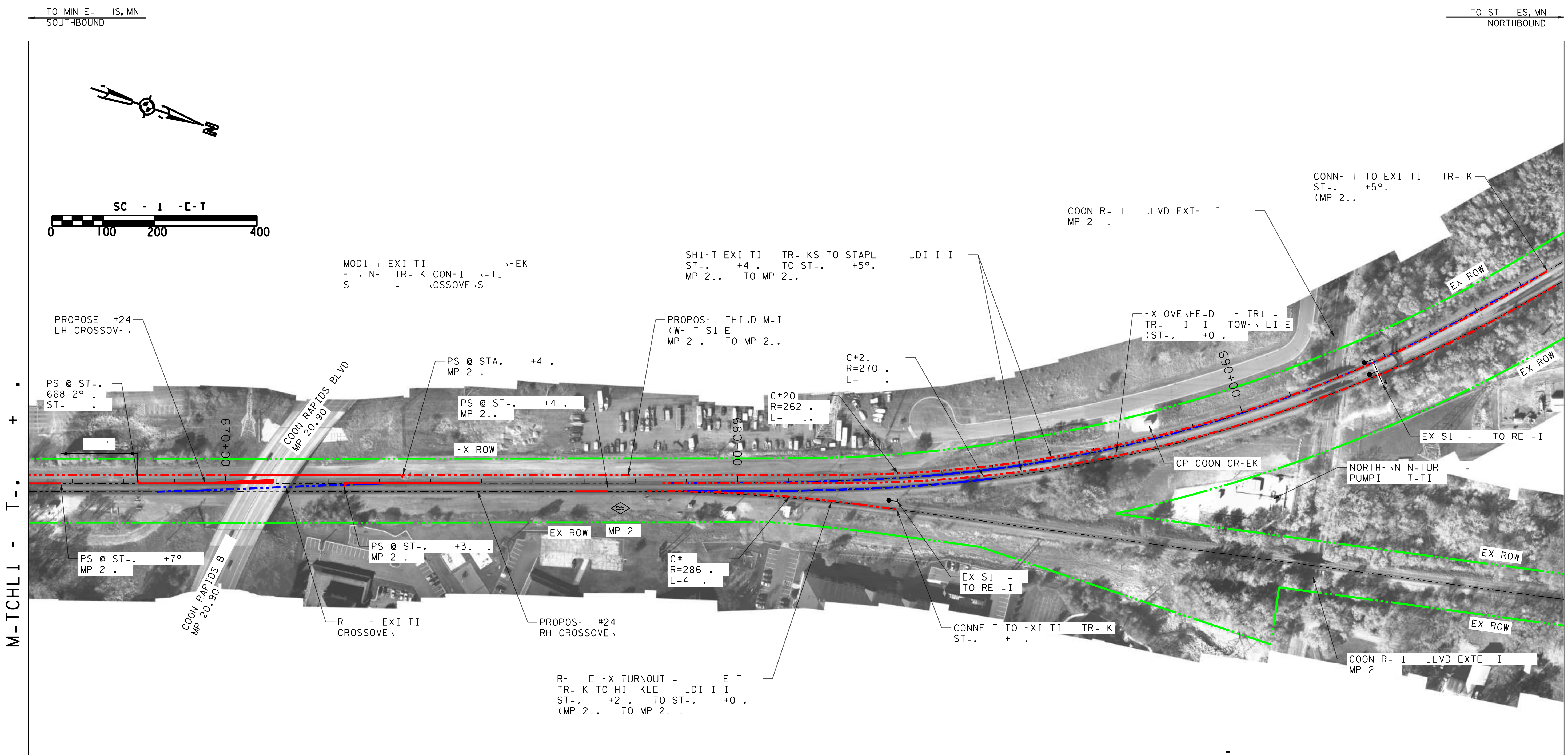
SHEET NO. 11 OF 12



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DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN TRACK CP COON CREEK TO CP INTERSTATE ST .

SHEET N . 12 OF 12

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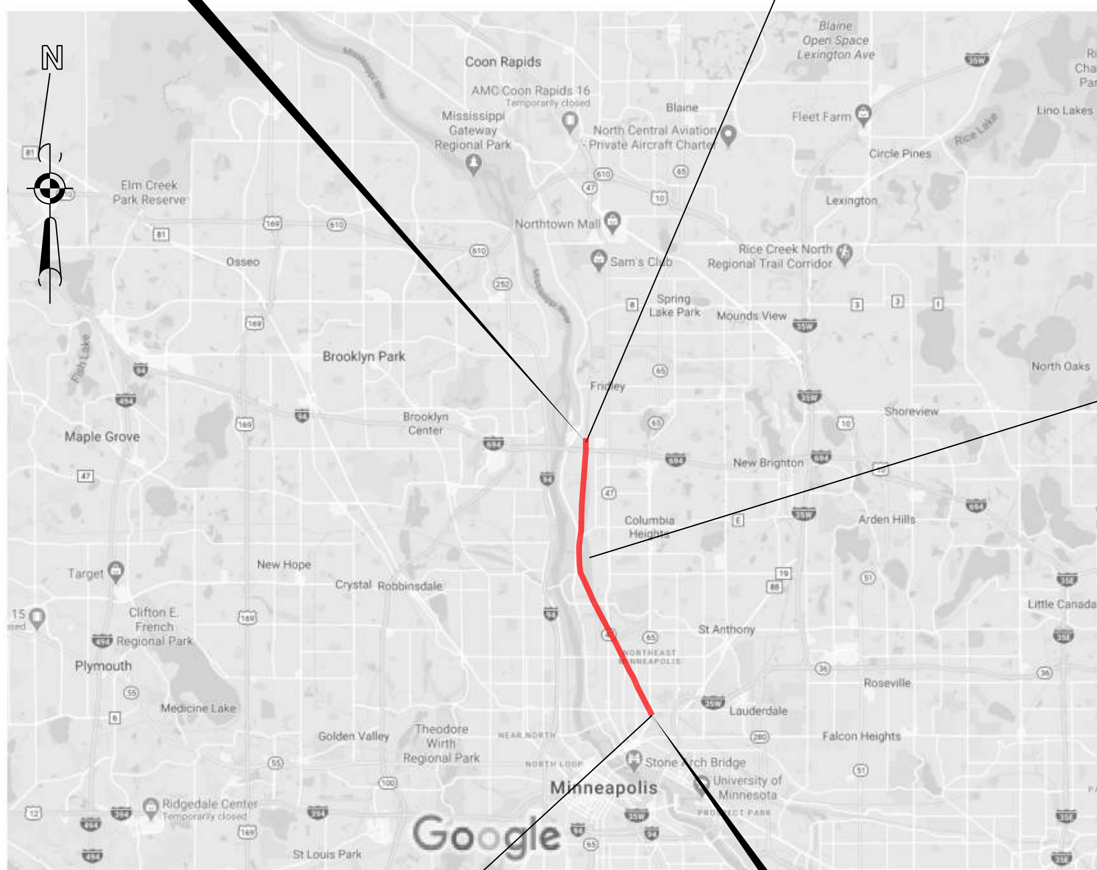

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CITY OF FRIDLEY

STATE FUNDS

GOVERNING SPECIFICATIONS

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INDEX

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2 - 10	P ET

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QUA I CONSULTANTS

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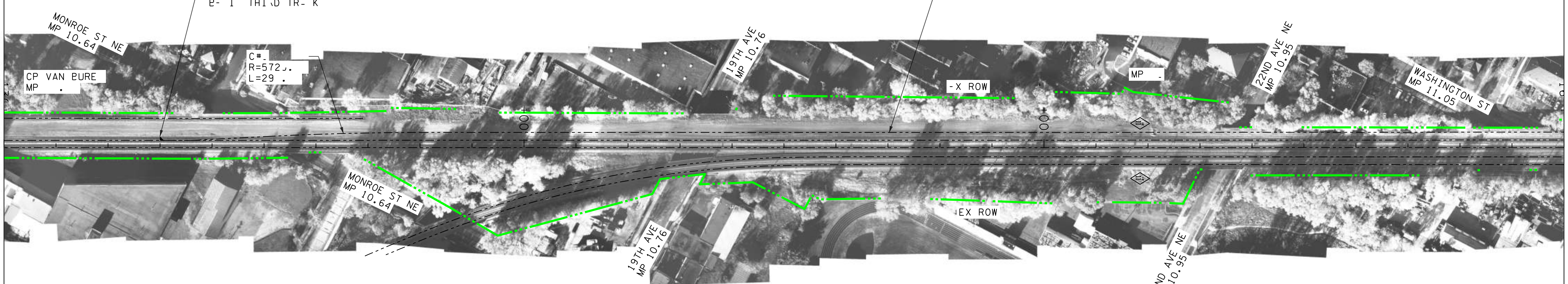

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DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN CP INTERSTATE TO CP VAN BUREN ST

SHEET N . 2 OF 10

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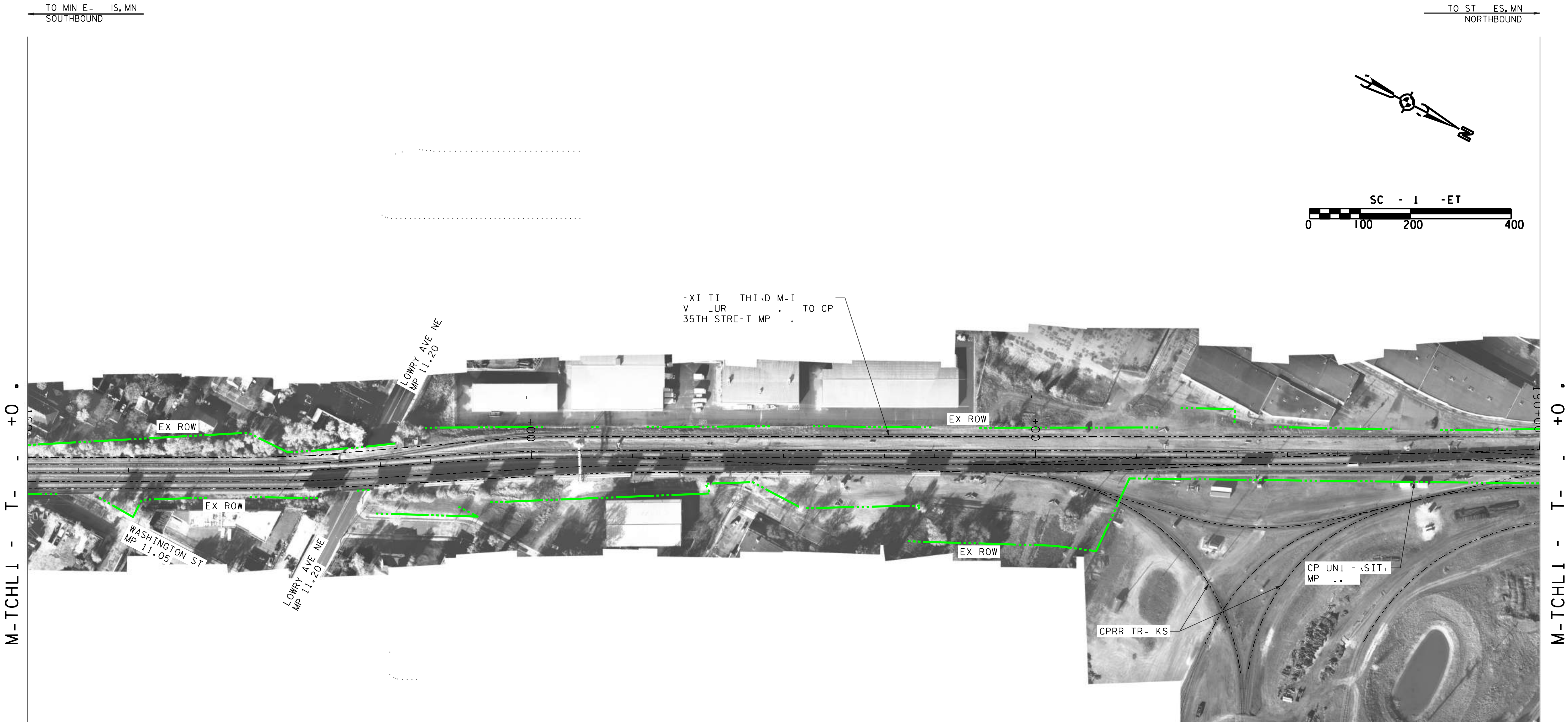

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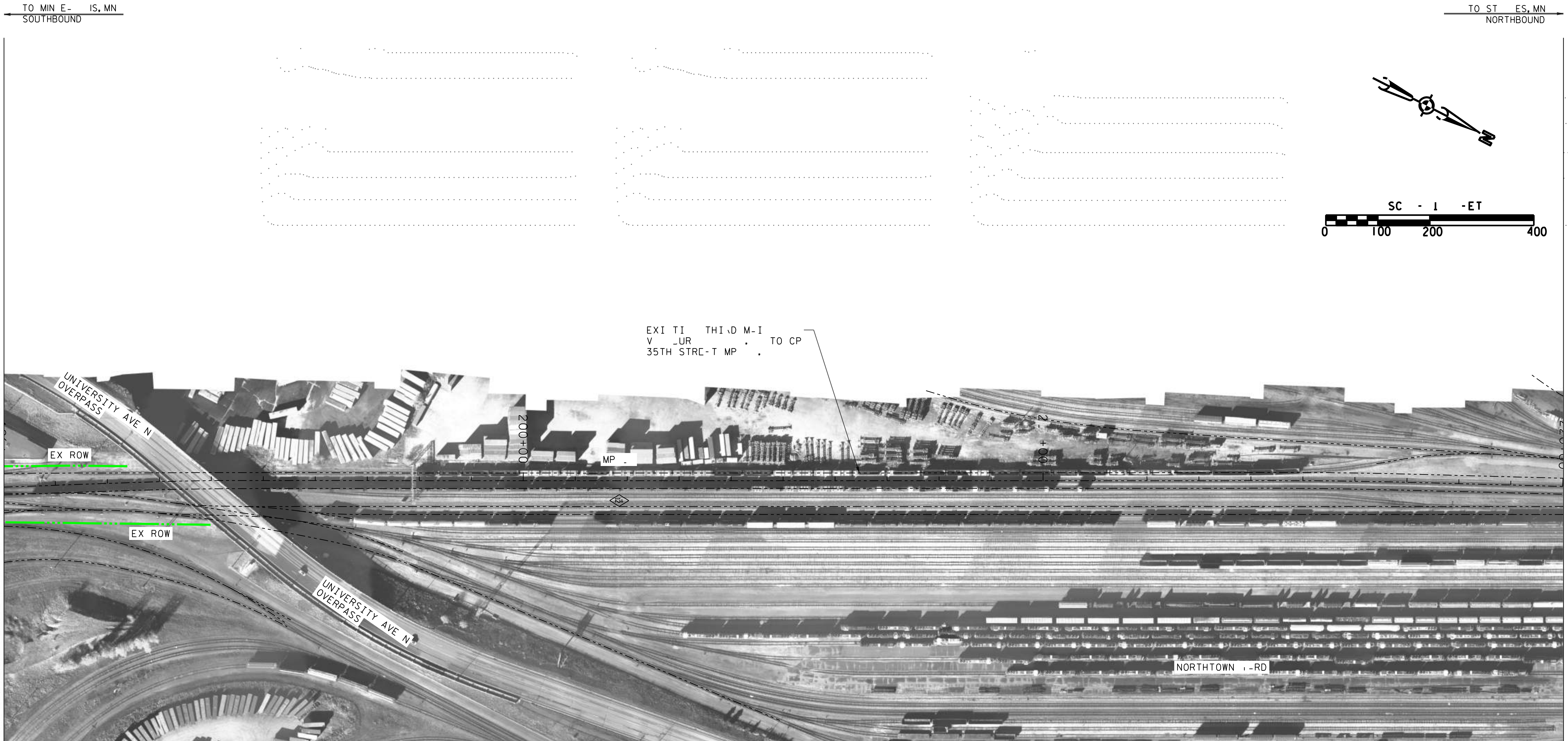
QUA I CONSULTANTS

DEPARTMENT OF TRANSPORTATION

NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN CP INTERSTATE TO CP VAN BUREN ST .

SHEET N . 3 OF 10



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NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN CP INTERSTATE TO CP VAN BUREN ST

SHEET N . 4 OF 10

PRO - T: NORTHSTAR COMMUT-R RAI -XPANSION STUDY
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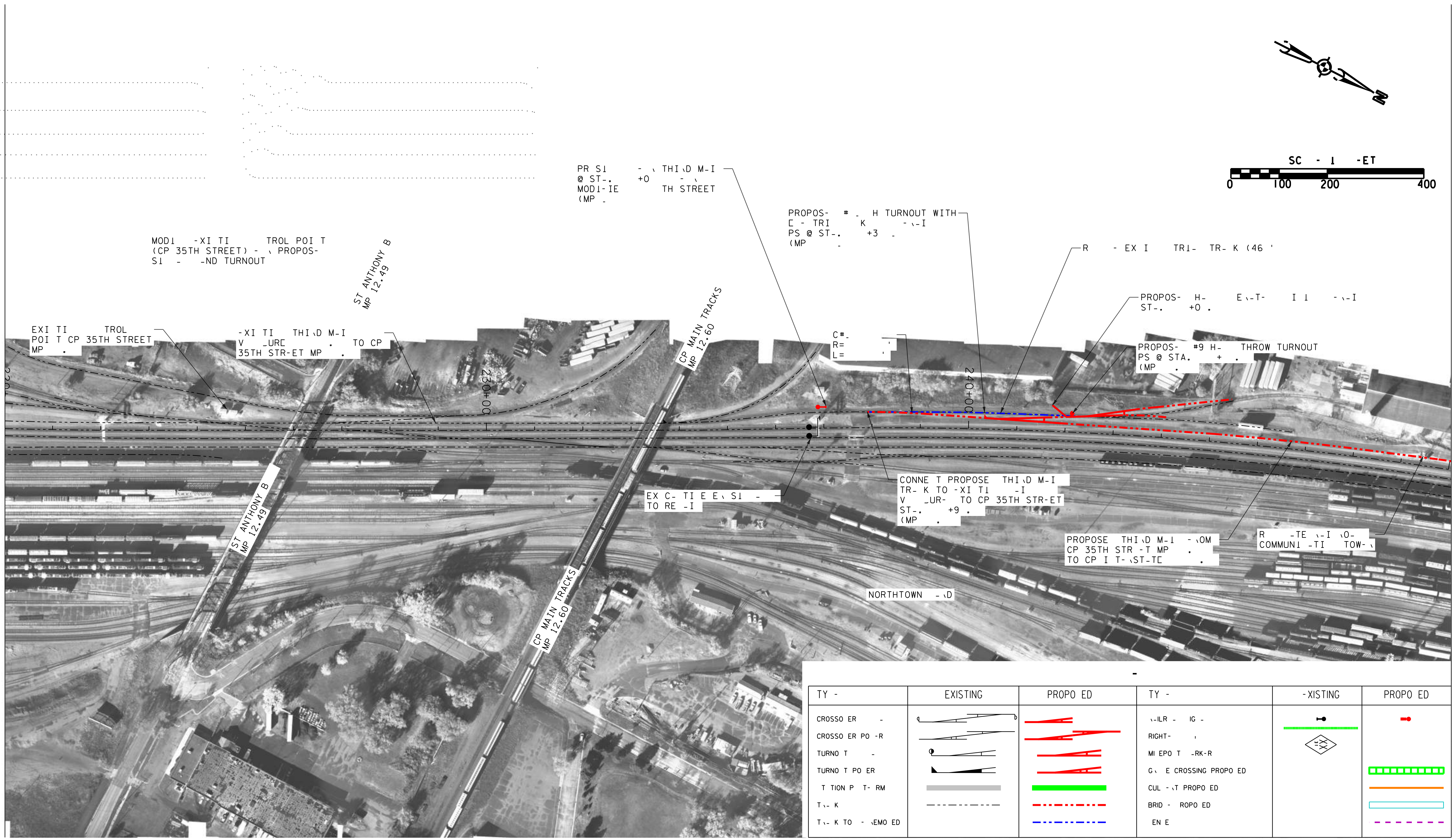
NORTHBOUND



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PROPOSED INFRASTRUCTURE IMPROVEMENTS
THIRD MAIN CP INTERSTATE TO CP VAN BUREN ST
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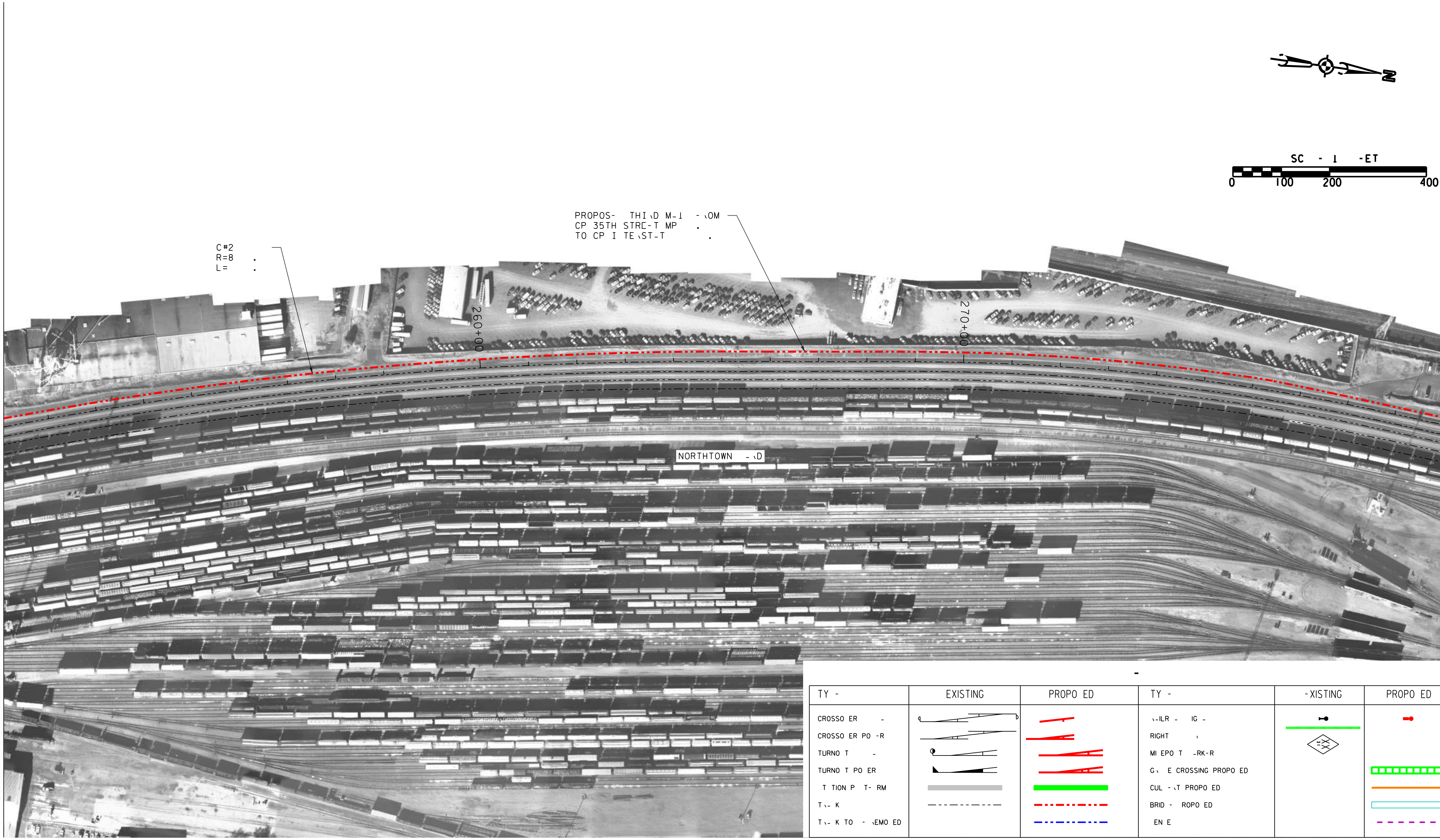

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NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN CP INTERSTATE TO CP VAN BUREN ST .

SHEET N . 6 OF 10

TO MIN E- IS, MN
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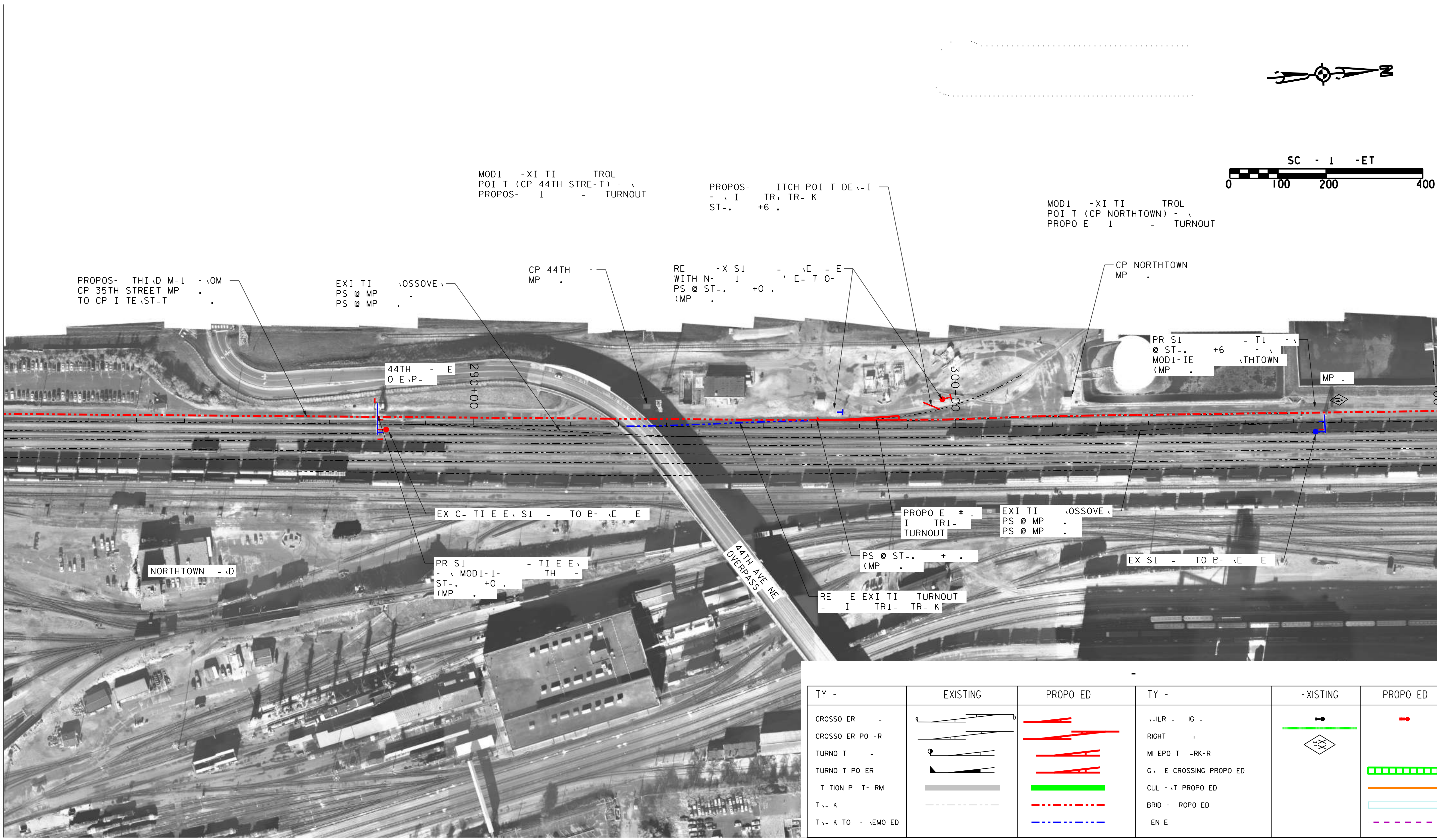
NORTHBOUND



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PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN CP INTERSTATE TO CP VAN BUREN ST

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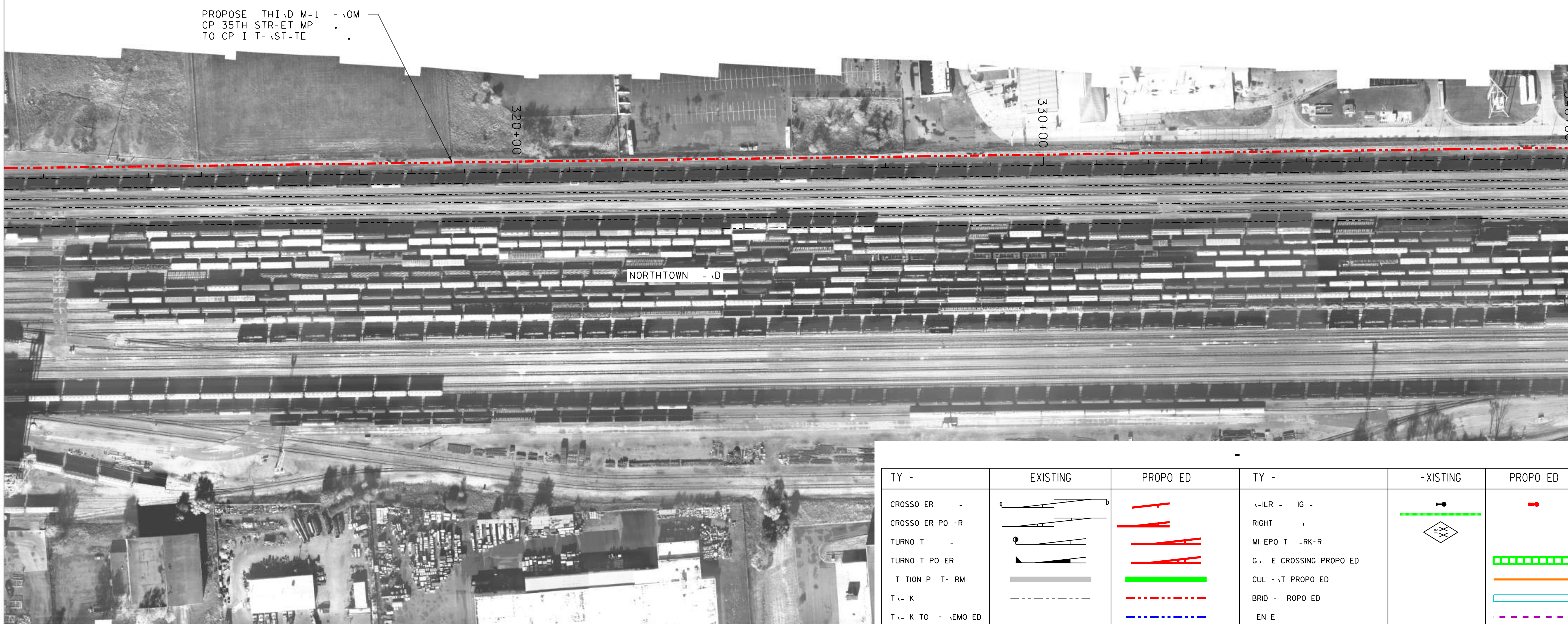

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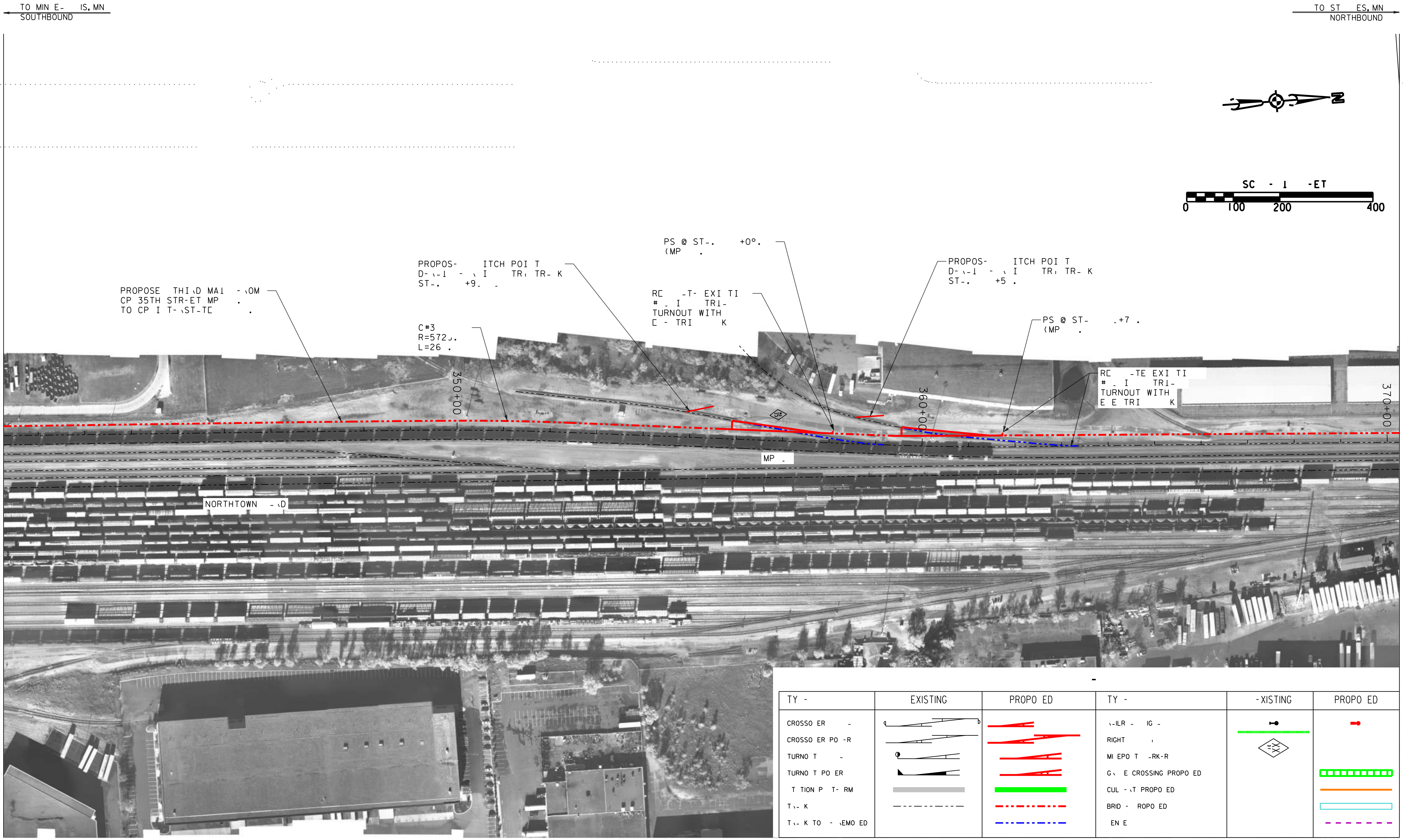
PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN CP INTERSTATE TO CP VAN BUREN ST .

SHEET N . 8 OF 10



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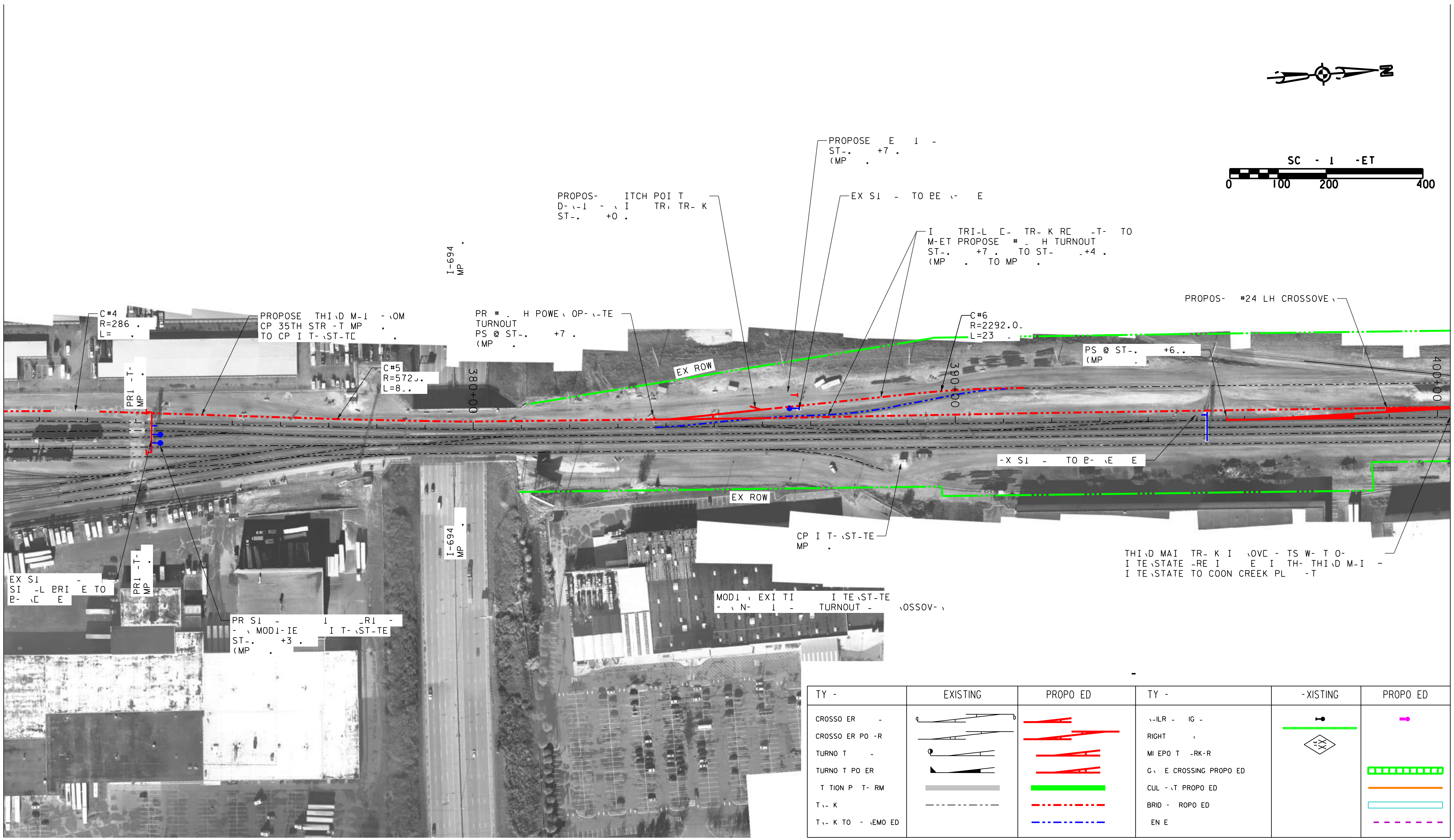
NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN CP INTERSTATE TO CP VAN BUREN ST

SHEET N . 9 OF 10



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PROPOSED INFRASTRUCTURE IMPROVEMENTS THIRD MAIN CP INTERSTATE TO CP VAN BUREN ST

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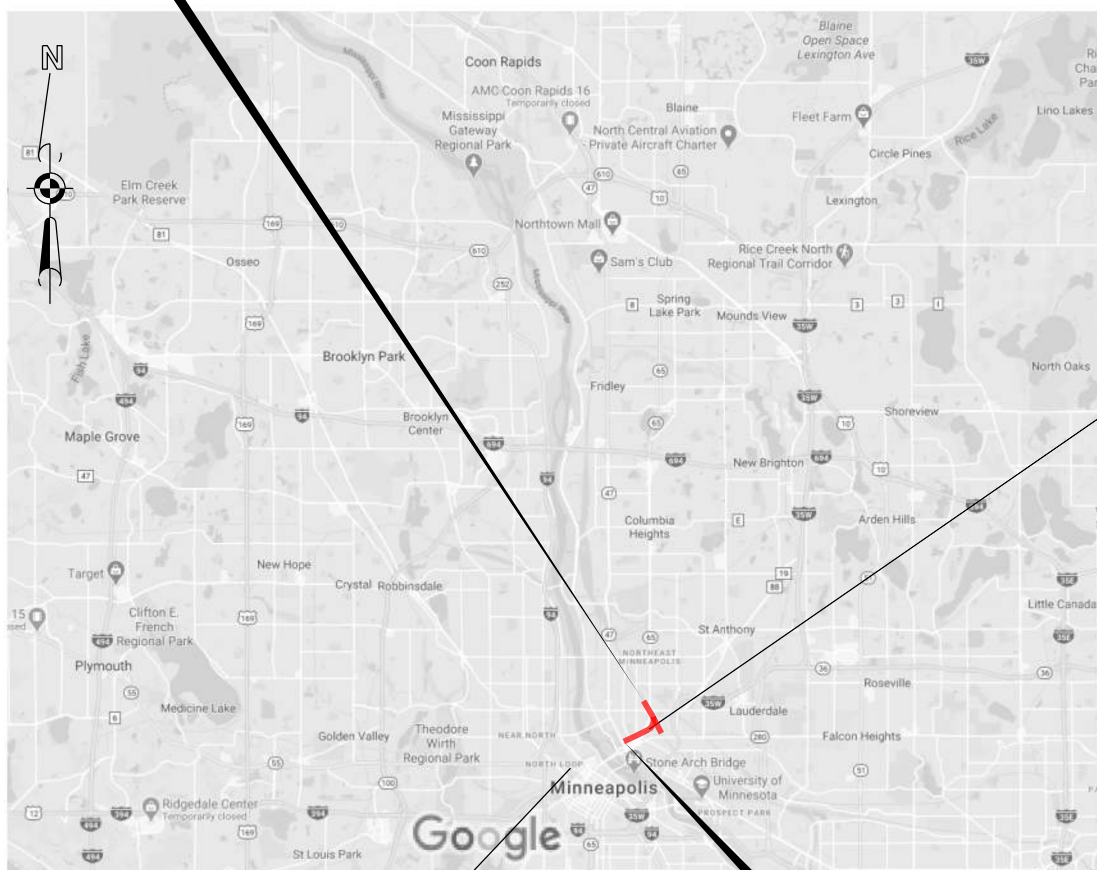

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MP . AYZATA SUB)

TARGET FIELD STATION
MP 1 . AYZATA SUB)

BEGIN TRACK WORK
MP 1 .10 (WAYZATA SUB)

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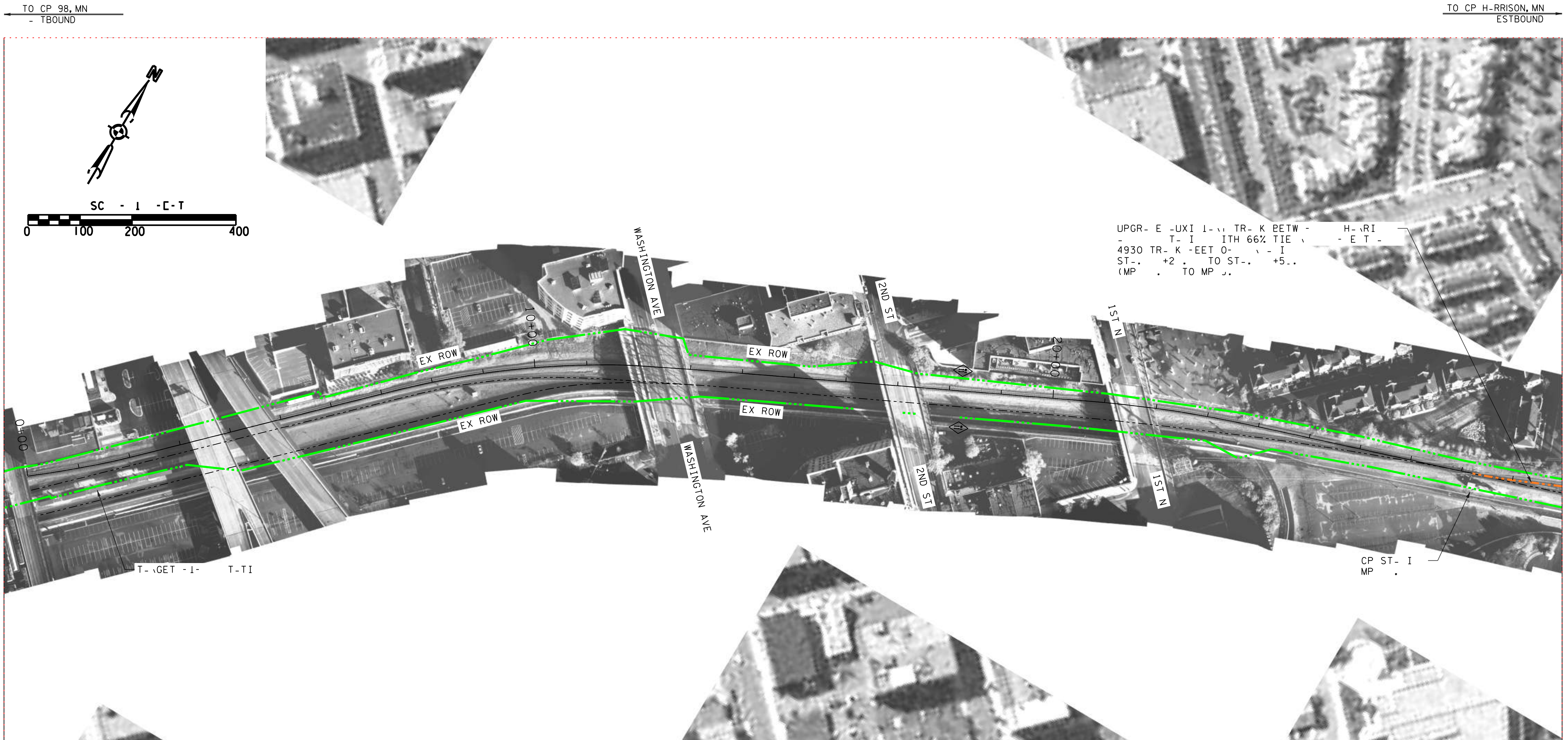

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NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS TWO MAIN TRACKS CP VAN BUREN TO CP STADIUM ST .

SHEET NO. 2 OF 6

TO MIN E- IS, MN
SOUTHBOUND

TO ST ES, MN
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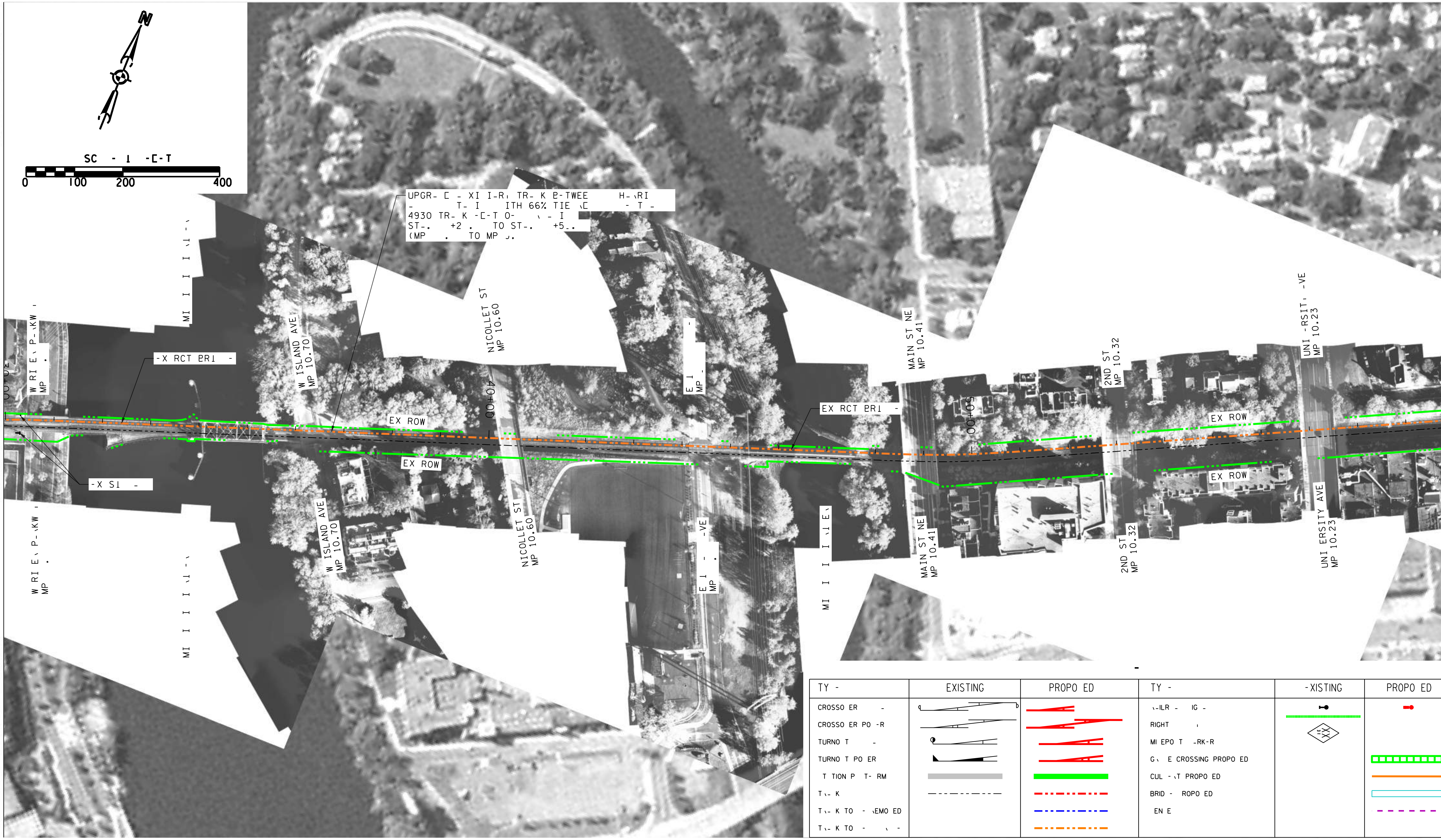

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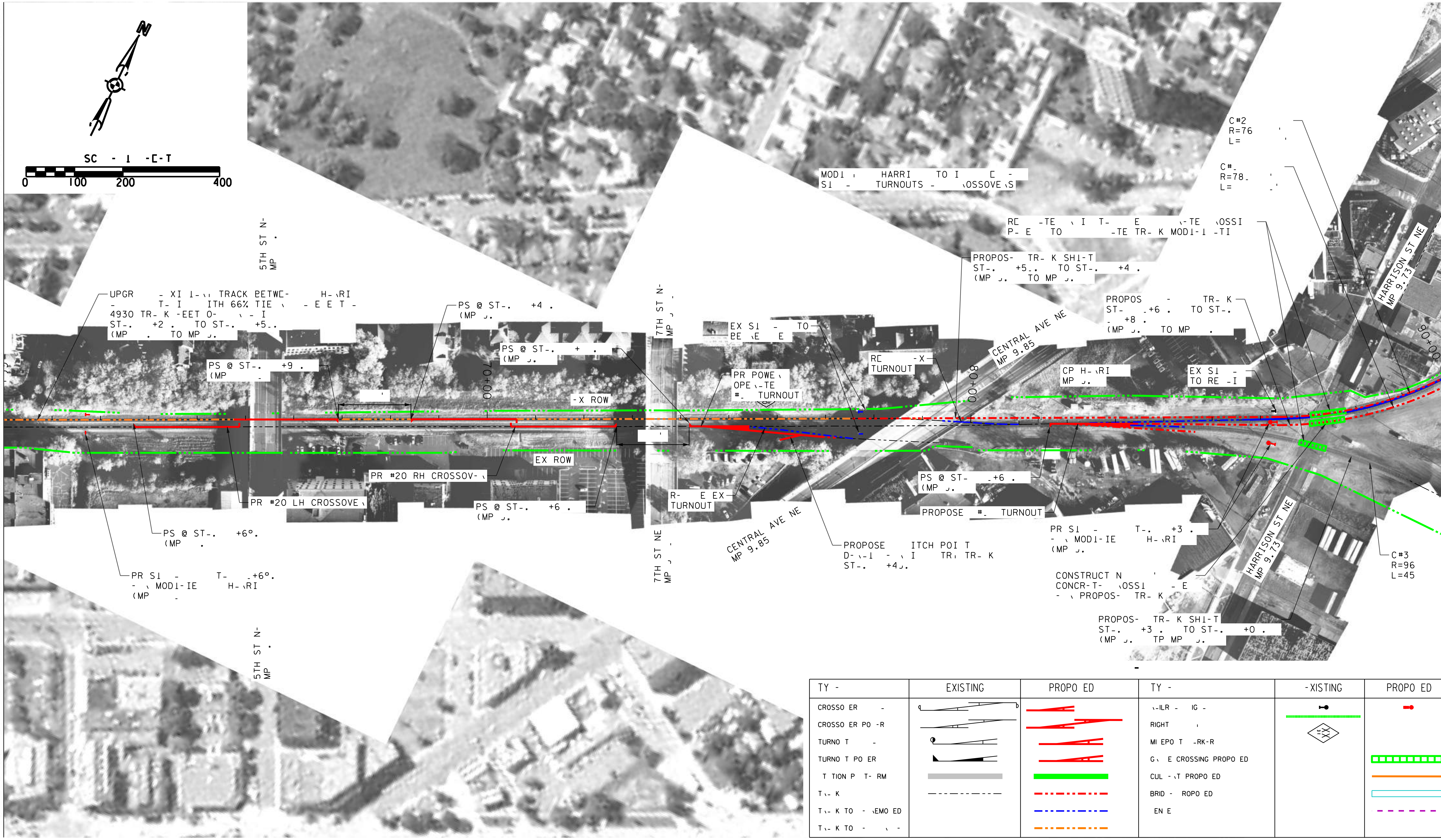
NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS TWO MAIN TRACKS CP VAN BUREN TO CP STADIUM ST

SHEET N . 3 OF 6

TO CP 98, MN
- TBOUND

TO ST ES, MN
NORTHBOUND



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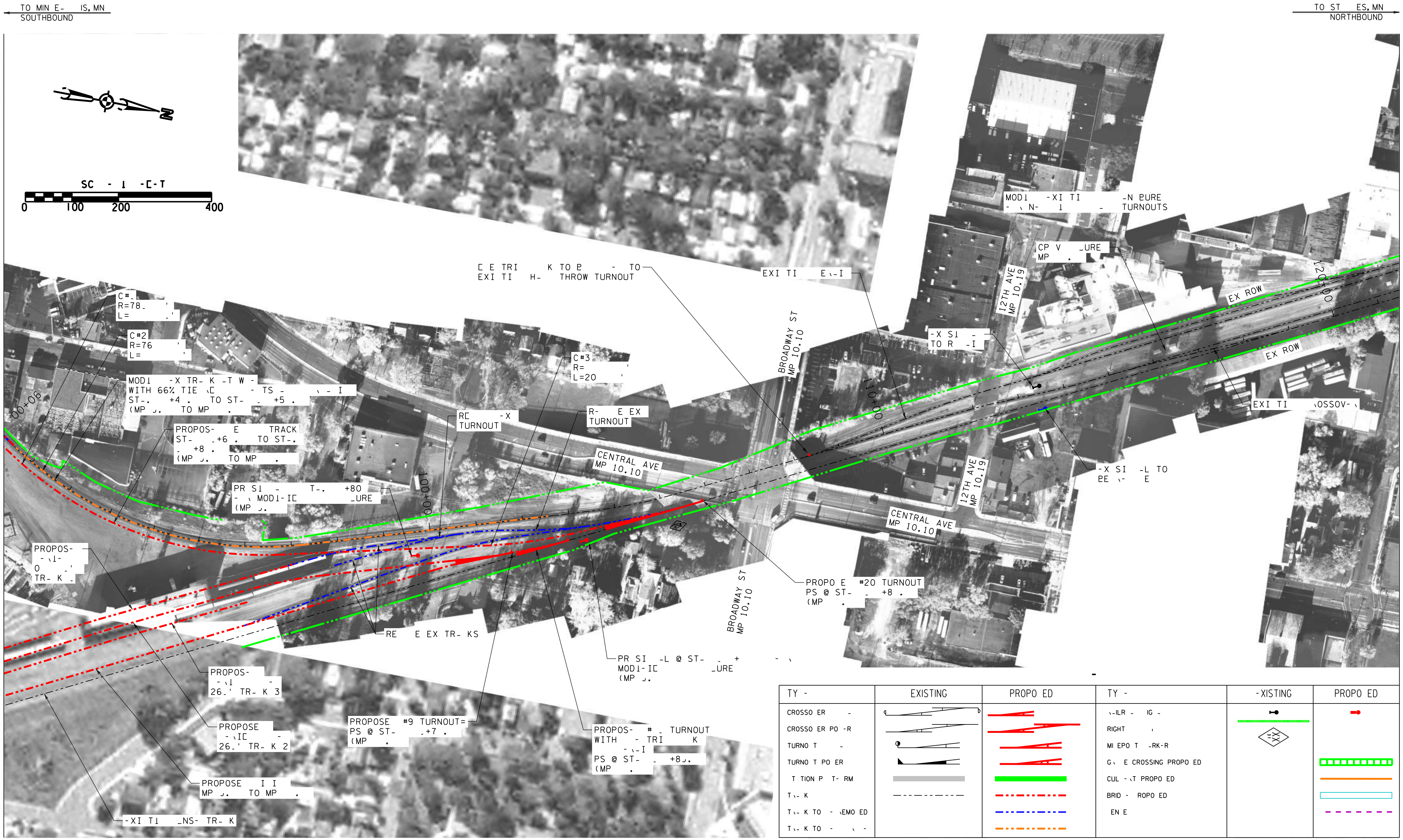
NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS TWO MAIN TRACKS CP VAN BUREN TO CP STADIUM ST

SHEET N . 4 OF 6



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NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS TWO MAIN TRACKS CP VAN BUREN TO CP STADIUM ST .

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TO ST ES, MN
NORTHBOUND

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NORTHSTAR COMMUTER RAIL EXTENSION FEASIBILITY STUDY

PROPOSED INFRASTRUCTURE IMPROVEMENTS TWO MAIN TRACKS CP VAN BUREN TO CP STADIUM MATCHLINE A–A TO MATCHLINE B–B

SHEET N . 6 OF 6

Attachment 2

BNSF Design Criteria for Speed and Curvature – BNSF Engineering Instructions 5 Track Geometry, Appendix A and Appendix B

Appendix A

Two-Inch Unbalanced Design Superelevation for Freight Trains

Curvature		Speed														
degrees	Minutes	20 mph	25 mph	30 mph	35 mph	40 mph	45 Mph	50 mph	55 mph	60 mph	65 mph	70 mph	75 mph	80 mph	85 mph	90 mph
0	30	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 7/8
0	40	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	1 0	1 3/8	1 7/8
0	50	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 7/8	1 3/8	1 3/4	2 1/4	2 3/4
1	0	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	1 0	1 1/2	2 0	2 1/2	3 1/8	3 3/4
1	10	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	1 0	1 1/2	2 1/8	2 5/8	3 1/4	4 0	4 5/8
1	20	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 7/8	1 3/8	2 0	2 5/8	3 1/4	4 0	4 3/4	
1	30	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	1 1/4	1 7/8	2 1/2	3 1/4	4 0	4 3/4		
1	40	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	1 0	1 5/8	2 1/4	3 0	3 3/4	4 5/8			
1	50	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	1 1/4	2 0	2 5/8	3 1/2	4 3/8				
2	0	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	0 7/8	1 1/2	2 1/4	3 1/8	4 0	4 7/8				
2	10	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	1 1/8	1 7/8	2 5/8	3 1/2	4 1/2					
2	20	0 3/4	0 3/4	0 3/4	0 3/4	0 3/4	1 3/8	2 1/8	3 0	4 0	5 0					
2	30	0 3/4	0 3/4	0 3/4	0 3/4	0 7/8	1 5/8	2 3/8	3 3/8	4 3/8						
2	40	0 3/4	0 3/4	0 3/4	0 3/4	1 0	1 7/8	2 3/4	3 3/4	4 3/4						
2	50	0 3/4	0 3/4	0 3/4	0 3/4	1 1/4	2 1/8	3 0	4 0							
3	0	0 3/4	0 3/4	0 3/4	0 3/4	1 3/8	2 3/8	3 1/4	4 3/8							
3	10	0 3/4	0 3/4	0 3/4	0 3/4	1 5/8	2 1/2	3 5/8	4 3/4							
3	20	0 3/4	0 3/4	0 3/4	0 7/8	1 3/4	2 3/4	3 7/8								
3	30	0 3/4	0 3/4	0 3/4	1 1/8	2 0	3 0	4 1/8								
3	40	0 3/4	0 3/4	0 3/4	1 1/4	2 1/8	3 1/4	4 1/2								
3	50	0 3/4	0 3/4	0 3/4	1 3/8	2 3/8	3 1/2	4 3/4								
4	0	0 3/4	0 3/4	0 3/4	1 1/2	2 1/2	3 3/4	5 0								
4	10	0 3/4	0 3/4	0 3/4	1 5/8	2 3/4	4 0									
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7	40	0 3/4	1 3/8	2 7/8	4 5/8											
7	50	0 3/4	1 1/2	3 0	4 3/4											
8	0	0 3/4	1 1/2	3 1/8	4 7/8											
8	10	0 3/4	1 5/8	3 1/4												
8	20	0 3/4	1 3/4	3 1/4												
8	30	0 3/4	1 3/4	3 3/8												
8	40	0 3/4	1 7/8	3 1/2												
8	50	0 3/4	1 7/8	3 5/8												
9	0	0 3/4	2 0	3 3/4												
9	10	0 3/4	2 1/8	3 7/8												
9	20	0 3/4	2 1/8	4 0												
9	30	0 3/4	2 1/4	4 0												
9	40	0 3/4	2 1/4	4 1/8												
9	50	0 7/8	2 3/8	4 1/4												
10	0	0 7/8	2 3/8	4 3/8												
10	10	0 7/8	2 1/2	4 1/2												
10	20	1 0	2 5/8	4 5/8												
10	30	1 0	2 5/8	4 5/8												
10	40	1 0	2 3/4	4 3/4												
10	50	1 1/8	2 3/4	4 7/8												
11	0	1 1/8	2 7/8	5 0												
11	10	1 1/4	3 0													
11	20	1 1/4	3 0													
11	30	1 1/4	3 1/8													
11	40	1 3/8	3 1/8													
11	50	1 3/8	3 1/4													
12	0	1 3/8	3 1/4													

Elevation in Inches

v=square root of ((e+u)/.0007*d)

e=.0007*d*v^2-u

where:

v=velocity in mph

d=degree of curve in decimals

u=unbalanced elevation in inches

Appendix B

Spiral Lengths

Curvature

degrees	0	0	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5
minutes	20	40	0	20	40	0	20	40	0	20	40	0	20	40	0	20	40

Elevation inches

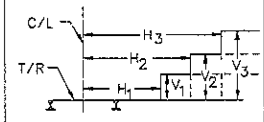
0 0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0 1/8	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0 1/4	20	10	10	10	10	10	10	0	0	0	0	0	0	0	0	0	0
0 3/8	40	30	20	20	20	10	10	10	10	10	10	10	10	10	10	10	0
0 1/2	50	40	30	30	20	20	20	20	10	10	10	10	10	10	10	10	10
0 5/8	60	50	40	30	30	30	30	20	20	20	20	20	10	10	10	10	10
0 3/4	80	60	50	40	40	40	40	40	40	40	40	40	40	40	40	40	40
0 7/8	90	70	60	50	40	40	40	40	40	40	40	40	40	40	40	40	40
1 0	100	90	70	60	60	50	50	50	50	50	50	50	50	50	50	50	50
1 1/8	120	100	80	70	60	60	50	50	50	50	50	50	50	50	50	50	50
1 1/4	130	120	90	80	70	60	60	60	60	60	60	60	60	60	60	60	60
1 3/8	140	140	100	90	80	70	70	60	60	60	60	60	60	60	60	60	60
1 1/2	160	150	120	100	90	90	80	70	70	70	70	70	70	70	70	70	70
1 5/8	170	160	130	110	100	90	80	70	70	70	70	70	70	70	70	70	70
1 3/4	180	170	140	120	110	100	90	80	80	80	80	80	80	80	80	80	80
1 7/8	200	200	150	130	120	110	100	100	90	90	80	80	80	80	80	80	80
2 0	210	210	180	150	130	120	100	100	90	90	90	90	90	90	90	90	90
2 1/8	220	220	190	160	140	120	120	110	100	100	100	90	90	90	90	90	90
2 1/4	240	240	200	170	160	140	130	120	100	100	100	100	100	100	100	100	100
2 3/8	250	250	210	180	170	150	140	120	120	110	110	100	100	100	100	100	100
2 1/2	270	270	240	190	180	160	150	130	130	120	120	120	110	110	110	110	110
2 5/8	280	280	250	220	180	170	150	140	140	120	120	120	110	110	110	110	110
2 3/4	290	290	260	230	190	180	160	160	140	140	130	130	120	120	120	120	120
2 7/8	310	310	270	240	200	180	170	170	150	150	130	130	130	120	120	120	120
3 0	320	320	280	250	230	190	190	180	160	160	140	140	140	130	130	130	130
3 1/8	330	330	310	260	240	220	200	180	160	160	150	150	150	140	140	140	140
3 1/4	350	350	330	290	250	230	210	190	190	170	170	150	150	150	140	140	140
3 3/8	360	360	340	300	260	240	220	200	200	180	180	160	160	160	150	150	150
3 1/2	370	370	350	310	270	250	230	210	210	180	180	160	160	160	150	150	150
3 5/8	390	390	360	320	280	260	230	210	210	190	190	170	170	170	170	160	160
3 3/4	400	400	400	330	310	270	240	240	220	200	200	200	180	180	180	160	160
3 7/8	410	410	410	340	320	270	250	250	230	230	200	200	180	180	180	170	170
4 0	430	430	430	380	330	310	280	260	240	240	210	210	190	190	190	190	170
4 1/8	440	440	440	390	340	320	290	270	240	240	220	220	190	190	190	190	180
4 1/4	450	450	450	400	350	330	300	280	250	250	220	220	220	200	200	200	180
4 3/8	470	470	470	420	360	340	310	280	280	260	230	230	230	210	210	210	210
4 1/2	480	480	480	430	370	350	320	290	290	270	270	240	240	210	210	210	210
4 5/8	490	490	490	440	410	360	330	300	300	270	270	240	240	240	220	220	220
4 3/4	510	510	510	480	420	370	340	340	310	280	280	250	250	250	220	220	220
4 7/8	520	520	520	490	430	400	350	350	320	290	290	260	260	260	230	230	230
5 0	540	540	540	510	450	420	390	360	330	300	300	300	270	270	240	240	240

Attachment 3

BNSF Standard Plans – Clearance Requirements by State and

BNSF Standard Plans – Minimum Clearance Diagram

STATE	REGULATION REFERENCE	YEAR OF LATEST AMENDMENT	TRACK CENTERS								VERTICAL						HORIZONTAL																			
																							PLATFORMS (H-HORIZONTAL CLEARANCE (MIN) V-VERTICAL CLEARANCE (MAX))						SIGNALS							
																														LOW BETWEEN TRACKS		SWITCH BOXES, ETC.				
			MAIN TRACKS	ANY TWO SUBSIDIARY TRACKS	ADJACENT SUBSIDIARY TRACK TO ANY MAIN TRACKS	LADDER TRACK ADJACENT TO ANY PARALLEL TRACK	TWO ADJACENT PARALLEL LADDER TRACKS	LEAD, REPAIR AND CABOOSE TRACKS	TEAM TRACKS IN PAIRS	UNLOADING TRACKS AT PLATFORMS	GENERAL	THRU BRIDGES	HIGHWAY BRIDGES	TUNNELS	BUILDING DOORS	IN BUILDINGS	GENERAL	THRU BRIDGES	HIGHWAY BRIDGES	TUNNELS	BUILDING DOORS	IN BUILDINGS	V_1	H_1	V_2	H_2	V_3	H_3	HIGH	HEIGHT (MAX)	CLEARANCE	HEIGHT (MAX)	CLEARANCE	POLES	ORE AND COAL DOCKS	CATTLE CHUTES
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
ALABAMA	NR	NR ·	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
ARIZONA	CHPTR. 5, ART. 1	1987	14-0	14-0	15-0	20-0	20-0	NR	13-0	13-6	22-0	22-0	23-0	22-0	18-0[2]	18-0[3]	8-6	8-0	8-6	8-0	7-8[2]	8-6	0-8	4-8			4-6	8-0	8-6	3-0	6-0	0-5	3-0	8-6	8-6	8-6
ARKANSAS	CASE R-1012	1956	14-0	14-0	14-0	17-0	20-0	14-0	13-0	13-0	22-0	22-0	22-0	23-0	17-0[2]	18-0[3]	8-6	8-0	8-6	8-0	7-0[4] [2]	7-0[5]	0-8	5-0	4-0	5-9[6]	4-0	8-0	8-6	3-0	6-0	0-4	3-0	8-6	8-6	8-6
CALIFORNIA	G.O. 26-D	1988	14-0	14-0	15-0	20-0	20-0	14-0	13-0	13-0	22-6	22-6	22-6	22-6	18-0	18-0[3]	8-6	8-0	8-6	8-0	8-6	8-6	0-8	4-8	NR	NR	4-0	7-6[8]	8-6	3-0	6-0	0-4	3-0	8-6	8-6	8-6
CANADA	CHPTR. 1189	1983	13-0	13-6	14-0	15-0	18-0	13-6	12-0	12-0	22-6	22-6	22-6	22-6	22-6	22-6	8-4 1/4	8-0	8-4 1/4	8-0	8-4 1/4	8-4 1/4	[12]	[12]	[12]	[12]	4-0	[12]	8-4 1/4	3-0	8-4 1/4	NR	NR	8-4 1/4	8-4 1/4	8-4 1/4
COLORADO	DEC. 55621	1987	14-0	14-0	15-0	17-0	20-0	14-0	13-0	13-6	22-6	22-0	22-6	23-0	17-0[2]	18-0[3]	8-6	8-0	8-6	8-0	7-0	8-0[5]	0-8	5-0	4-0	5-9[6]	4-0	8-6	8-6	3-0	6-0	0-4	3-0	8-6	8-6	8-6
IDAHO	G.O. NO. 158	1980	14-0	14-0	15-0	20-0	20-0	14-0	13-0	13-0	23-6	22-6	22-6	22-6	18-0[2]	18-0[3]	8-6	8-0	8-6	8-0	8-6[2]	8-6[2]	0-8	4-8	4-0	7-3	4-0	8-6[8]	8-0	3-0	6-0	0-4	3-0	8-6	8-6	8-6
ILLINOIS	TITLE 92 I.A.C.	1986	13-6[11]	13-6	15-0	17-0[15]	19-0[16]	NR	13-6	13-6	21-6	21-3	21-6	21-6[1]	H	21-6	8-0	8-0	8-0	8-0[1]	7-0[2]	8-0	0-4	4-6	0-8	5-1[7]	CFH	6-2	8-6	NR	NR	NR	NR	9-0	8-0	8-0
IOWA	NR	1982	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
KANSAS	ART. 5 -RSR	1987	14-0	14-0	14-0	17-0	20-0	14-0	13-0	13-6	22-6	22-6	22-6	23-0	17-0	18-0	8-6	8-6	8-6	8-0	7-0[13]	7-0[14]	0-8	5-0	4-0	6-2[6]	4-0	8-6	8-6	3-0	6-0	0-4	3-0	8-6	8-6	8-6
KENTUCKY	277.240	1942	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	22-0	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MINNESOTA	219.47	1980	14-0	14-0	14-0	17-0	19-0	14-0	14-0	14-0	22-0	22-0	22-0	22-0	22-0[2]	22-0	8-6	8-6	8-6	8-6	8-6[2]	8-6	NR	NR	NR	NR	NR	NR	8-6	NR	NR	NR	NR	8-6	8-6	8-6
MISSISSIPPI	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
MISSOURI	TTL 4 CSR 265-8.060	1987	14-0	14-0	14-0	17-0	19-0	14-0	13-6	14-0	22-0	22-0	22-0	22-0	22-0	22-0	8-6	8-0	8-0	8-6	8-6[2]	8-6	0-4	4-6	0-8	5-1[7]	CFH	8-6	8-6	4-0	5-0 8-0 [10]	0-3	4-2	8-6	8-6	8-6
MONTANA	ADM. RULES	1980	14-0	14-0	15-0	20-0	20-0	14-0	13-0	13-0	22-6	22-6	22-6	22-6	18-0[2]	18-0[3]	8-6	8-0	8-6	8-0	8-6[2]	8-6	0-8	4-8	4-0	5-9[6]	4-0	8-6[8]	8-0	3-0	6-0	0-4	3-0	8-6	8-6	8-6
NEBRASKA	ORD 16, CHPT 5, ART 4	1987	14-0	14-0	15-0	17-0	20-0	14-0	13-0	13-6	22-6	22-0	23-0	23-0	17-0[2]	18-0[3]	8-6	8-0	8-6	8-0	7-0[2]	8-6[5]	0-8	5-0	4-0	5-9[5]	4-0	8-6	8-6	3-0	6-0	0-4	3-0	8-6	8-6	8-6
NEW MEXICO	ORDER 2202	1987	14-0	14-0	15-0	17-0	20-0	14-0	13-0	13-6	22-6	22-0	22-6	23-0	17-0[2]	18-0[3]	8-6	8-0	8-6	8-0	7-0[4]	7-0[6]	0-8	4-8	4-0	5-9[5]	4-0	8-6	8-6	3-0	6-0	0-4	3-0	8-6	8-6	8-6
NORTH DAKOTA	SEC.49.10.1-13	1981	NR	NR	NR	NR	NR	NR	NR	NR	21-0	21-0[1]	21-0	21-0[1]	21-0	21-0	8-0[1]	8-0[1]	8-0	8-0[1]	8-0	8-0	NR	NR	NR	NR	4-0	8-0	8-0	NR	NR	NR	NR	8-0	8-0	8-0
OKLAHOMA	ORDER 33847	1987	14-0	14-0	14-0	17-0	20-0	14-0	13-0	13-6	22-0	22-0	22-0	23-0	17-0[2]	18-0[3]	8-6	8-0	8-6	8-0	7-0[2] [4]	7-0[5]	0-8	4-8	4-0	5-9[5]	4-0	8-6	8-6	3-0	6-0	0-4	3-0	8-6	8-6	8-6
OREGON	ORDER 83-313	1983	15-0	14-0	15-0	20-0	20-0	14-0	14-0	13-0	20-9	20-9	20-9	20-9	18-0[2]	18-0[3]	8-6	8-0	8-6	8-0	8-6	8-6	0-8	4-8	NR	NR	4-0	7-3[8]	8-6	3-0	6-0	0-4	3-0	8-6	8-6	8-6
SOUTH DAKOTA	ORDER F2465	1957	NR	NR	NR	NR	NR	NR	NR	NR	22-6	22-6	22-6[1]	22-6	17-0	22-6	8-6	8-0	8-0[1]	8-6	7-0	8-6	0-8	4-8	CFH	5-9[6]	NR	NR	8-0	NR	NR	0-4	3-0	8-6	8-6	8-6
TENNESSEE	RULE 1220-3-1-.12	1970	14-0	13-0	14-0	18-0	18-0	14-0	13-0	13-0	22-0	22-0	22-0	22-0	17-0	17-0[3]	8-0	8-0	8-0	8-0	8-0	8-0	0-8	4-8	4-0	5-9	4-0	7-6	8-0	NR	6-6	0-4	3-0	8-0	8-0	8-0
TEXAS	SEC. 5, CHPT 11	1988	NR	NR	NR	NR	NR	NR	NR	NR	22-0	22-0	22-0	NR	22-0[2]	22-0	8-6	7-6	8-6	NR	8-6[2]	8-6	1-0	4-6	NR	NR	4-0	8-6	8-6	2-6	5-6	0-6	4-0	8-6	8-6	8-6
WASHINGTON	CHPTR. 480-60	1969	14-0	14-0	15-0	20-0	20-0	14-0	13-0	13-0	22-6	22-6	22-6	22-6	18-0[2]	18-0[3]	8-6	8-0	8-6	8-0	8-6[2]	8-6	0-8	4-8	4-0	7-3[6]	4-0	8-6[8]	8-0	3-0	6-0	0-4	3-0	8-6	8-6	8-6
WISCONSIN	CHPTR. TC-3	1982	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0	22-0	22-0[1]	22-0	22-0[1]	22-0	22-0	8-6	E	8-6	8-6[1]	8-6	8-6	0-4 0-8	4-6 5-1	1-9	6-0[7]	5-0	6-4	8-6	E	E	E	E	12-0	8-6	8-6
WYOMING	CHPTR. XIII	1979	14-0	14-0	15-0	17-0	20-0	14-0	13-0	13-0	22-6	22-0	23-6	23-0	17-0[2]	18-0[3]	8-6	8-0	8-6	8-0	7-0[2] [4]	7-0[5]	0-8	5-0	4-0	5-9[6]	4-0	8-6	8-6	3-0	6-0	0-4	3-0	8-6	8-6	8-6
BNSF RY. CO.	[18]	1997	25-0[19]	14-0	25-0	20-0	20-0	14-0	14-0	[20]	23-0	23-0	[21]	23-0	[20]	[20]	8-6[17]	8-6	[21]	8-6	[20]	[20]	[20]	[20]	[20]	[20]	[20]	[20]	8-6	[20]	6-0[12]	[20]	[20]	8-6	8-6	8-6



THIS CHART FOR INFORMATION ONLY - NO LIABILITY CAN BE ASSUMED
ARCHITECTS, CONTRACTORS, ETC., SHOULD CHECK WITH STATE INVOLVED.

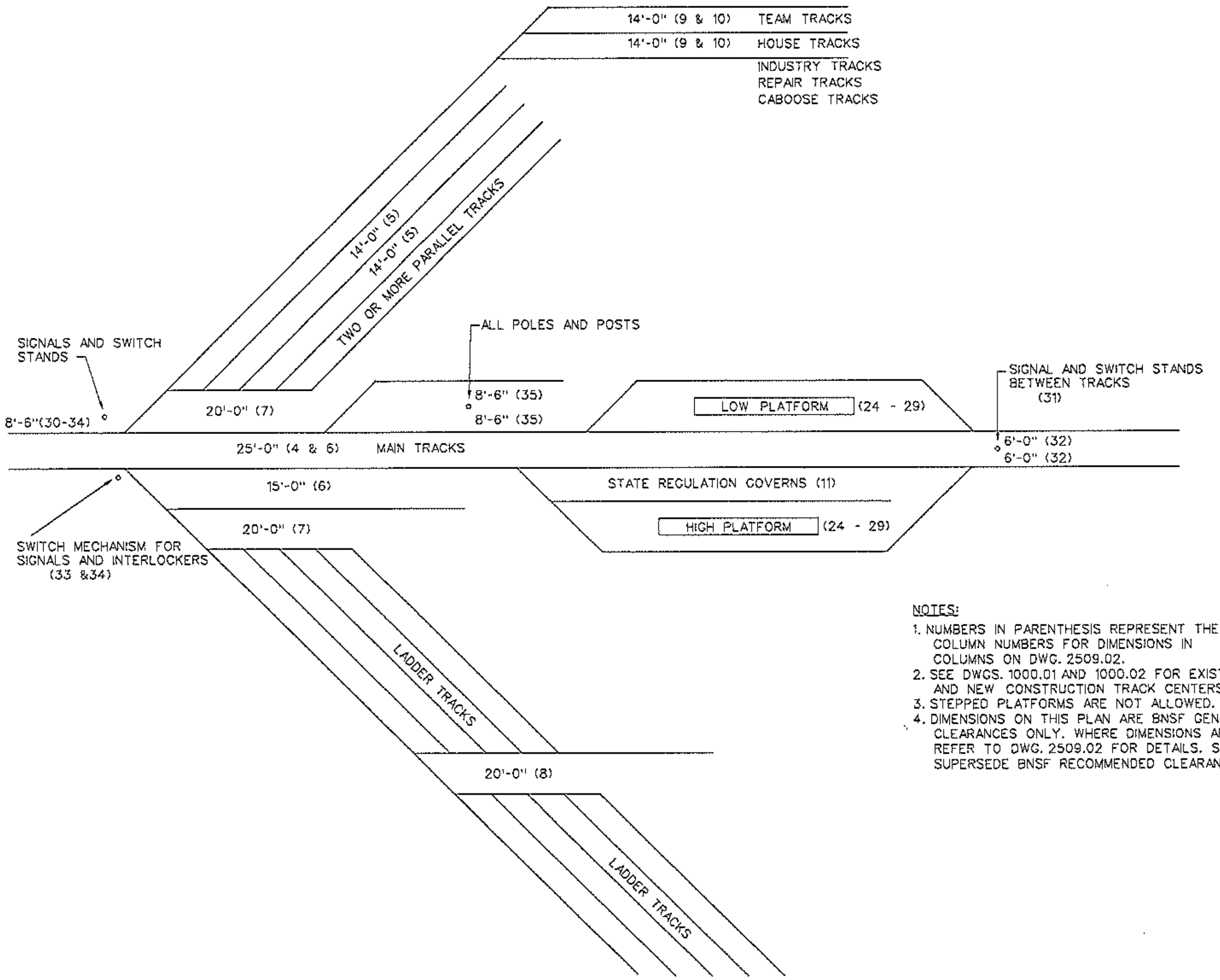
DIMENSIONS:
SHOWN IN FEET AND INCHES.
ARE FOR TANGENT TRACK - MOST LAWS SPECIFY INCREASES FOR CURVED AND SUPERELEVATED TRACK.
VERTICAL - MEASURED FROM TOP OF RAIL. EXCEPT CANADA BASE OF RAIL FOR OTHER THAN PLATFORMS.
HORIZONTAL - MEASURED FROM CENTER LINE OF TRACK.
APPLY TO NEW CONSTRUCTION, SOME RECONSTRUCTION AND SOME EXTENSIONS
SOME CAN BE VARIED UPON APPROVAL OF APPLICATION BY GOVERNING BODY.
ARE BASED ON MAXIMUM CAR SIZE FOR CALIFORNIA, IDAHO, MINNESOTA, MONTANA, NORTH DAKOTA, OREGON AND WASHINGTON.
ALL ARE MINIMUM EXCEPT COLUMNS 24, 26, 28, 31 AND 33 WHICH ARE MAXIMUM.

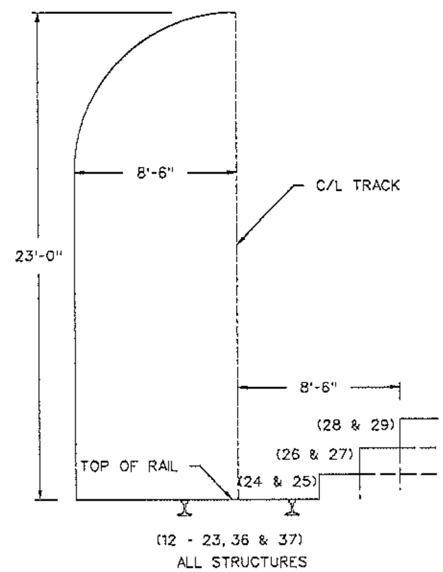
ABBREVIATIONS
CFH - CAR FLOOR HEIGHT
E - EXEMPT
H - HEIGHT OF CAR GOVERNS
NR - NO CURRENT REGULATION TO COVER

COLUMN HEADINGS
2 SHOWS BASIC REGULATION
3 SHOWS EFFECTIVE YEAR OR YEAR OF LATEST AMENDMENT
7 & 8 APPLY TO HAND AND MECHANICALLY OPERATED SWITCHES EXCEPT AS NOTED
12 & 18 PREVALS FOR ALL ITEMS NOT OTHERWISE PROVIDED FOR
13 & 19 BRIDGES SUPPORTING TRACKS
14 & 20 BRIDGES SPANNING TRACKS
24 & 25 PASSENGER PLATFORMS
26 & 27 PASSENGER/FREIGHT PLATFORMS ON SIDE TRACKS EXCEPT AS NOTED.
28 & 29 FREIGHT PLATFORMS ON SIDE TRACKS
STEPPED PLATFORMS ARE NOT ALLOWED.
35 OTHER THAN TROLLEY CONTACT POLES.
36 TO CENTER OF STAND EXCEPT AS NOTED.
37 APPLIES TO BOTH SUPPORTS AND PLATFORMS EXCEPT AS NOTED.

FOOTNOTES:
1 LESSER CLEARANCES NOT PERMITTED IN QUADRANTS
2 ENGINE HOUSES AND SHOP BUILDINGS EXEMPT OR PERMITTED LESSER DIMENSIONS
3 ONLY IF TRACKS END WITHIN BUILDINGS.
4 MAY BE REDUCED TO 5-9 IF 8-3 (8-6 FOR WY) PROVIDED ON OPPOSITE SIDE
5 MAY BE REDUCED TO 5-9 IF 8-0 (8-6 FOR NE, MO & WY) PROVIDED ON OPPOSITE SIDE
6 ONLY IF 8-0 (7-3 FOR MT & WY; 8-6 FOR WA & SD) PROVIDED ON OPP. SIDE
7 PASSENGER PLATFORMS ONLY.
8 MAY BE 8-0 AT 4-6 FOR REFRIGERATOR CAR PLATFORMS ONLY.
9 TO ENDS OF ARMS IN OPERATING POSITION.
10 FOR PLATFORMS AT CAR EAVE HEIGHT - SUPPORTS TO BE 8-0 (8-6 FOR TEXAS).
11 FOR FREIGHT TRACKS - CAN BE 13-0 FOR PASSENGER TRACKS.
12 REGARDING CANADA - CHECK STANDARD CLEARANCE DIAGRAM APPROVED BY BOARD OF TRANSPORT COMMISSIONERS FOR CANADA FOR RAILWAY INVOLVED.
13 MAY BE REDUCED TO 6-2 IF 8-3 PROVIDED ON OPPOSITE SIDE.
14 MAY BE REDUCED TO 6-2 IF 8-0 PROVIDED ON OPPOSITE SIDE.
15 FOR HAND OPERATED SWITCHES - MAY BE 15-0 FOR MECHNICALLY OPERATED SWITCHES.
16 FOR HAND OPERATED SWITCHES - MAY BE 17-0 FOR MECHANICALLY OPERATED SWITCHES.
17 MUST HAVE ADDITIONAL SIDE CLEARANCE OF 1 1/2 INCH PER DEGREE OF CURVATURE.
18 IF NO FIGURE IS GIVEN USE STATUORY CLEARANCE.
19 NEW CONSTRUCTION 25-0 CENTER TO CENTER MAIN TRACK/CONTROL SIDING.
20 STATE REGULATION GOVERNS.
21 CENTER LINE OF TRACK TO CLOSEST EDGE OF PIER: MAIN LINE-25'0", OTHERS-18'-0".

BURLINGTON NORTHERN SANTA FE STANDARD PLAN ENGINEERING DEPT., FORT WORTH, TEXAS	CLEARANCE REQUIREMENTS BY STATE AND RECOMMENDED BNSF CLEARANCE	DATE: 10/29/97	DWG. NO. 2509	SHEET NO. 02	REV. NO. 01





NOTES:

1. NUMBERS IN PARENTHESIS REPRESENT THE COLUMN NUMBERS FOR DIMENSIONS IN COLUMNS ON DWG. 2509.02.
2. SEE DWGS. 1000.01 AND 1000.02 FOR EXISTING AND NEW CONSTRUCTION TRACK CENTERS.
3. STEPPED PLATFORMS ARE NOT ALLOWED.
4. DIMENSIONS ON THIS PLAN ARE BNSF GENERAL CLEARANCES ONLY. WHERE DIMENSIONS ARE NOT SHOWN, REFER TO DWG. 2509.02 FOR DETAILS. STATE REGULATIONS SUPERSEDE BNSF RECOMMENDED CLEARANCES.

BURLINGTON NORTHERN
SANTA FE
STANDARD PLAN
ENGINEERING DEPT., FORT WORTH, TEXAS

BNSF
MINIMUM CLEARANCES
DIAGRAM

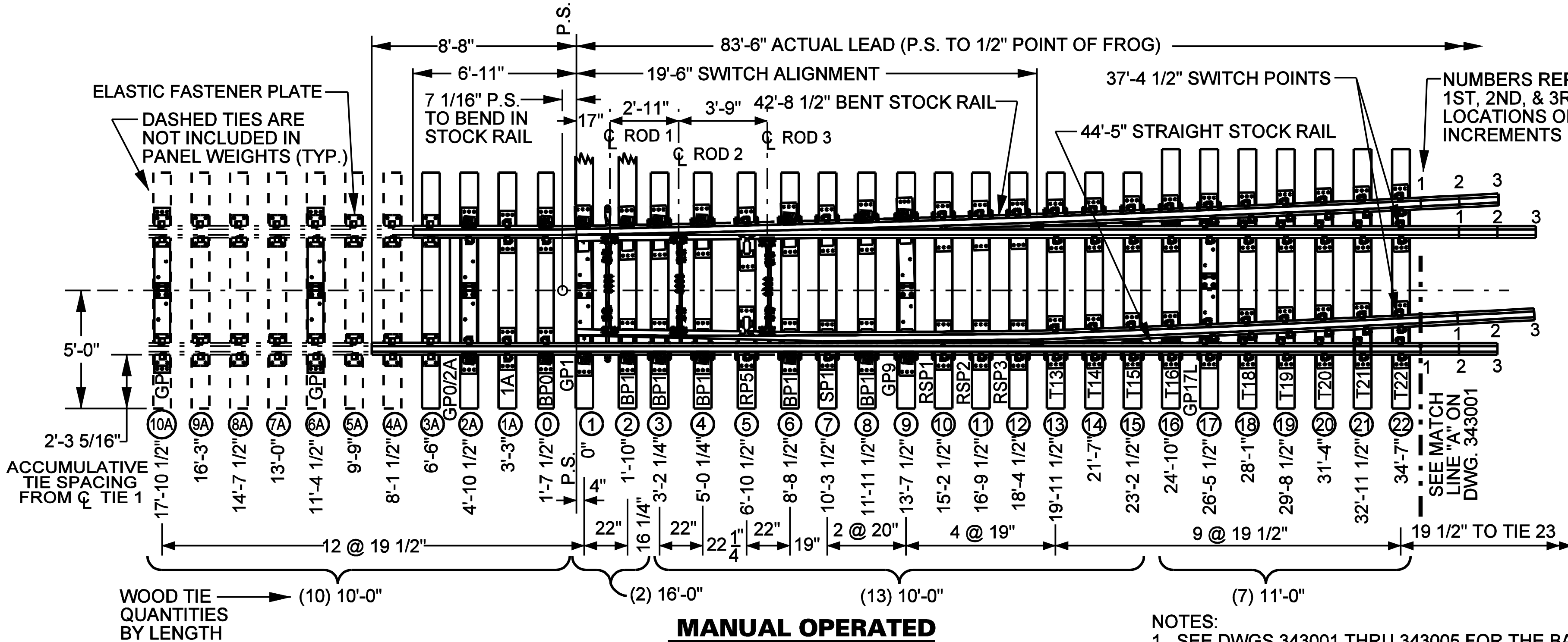
RAIL: NONE

DATE: 10/29/97 SCALE: NONE

DWG. NO. 2509 SHEET NO. 01 REV. NO. 09

Attachment 4

BNSF Standard Plan for No. 11, 15, 20, and 24 Turnouts

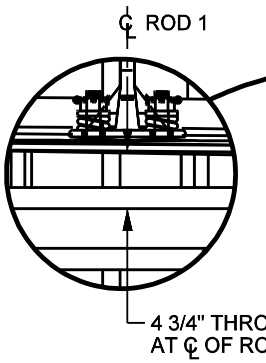


MANUAL OPERATED

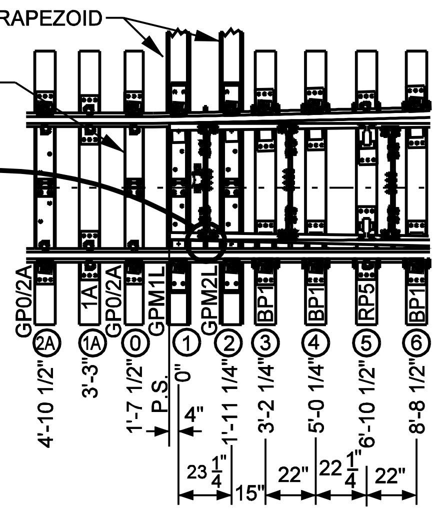
PANEL WEIGHT: 20,000 LBS.

NOTES:

1. SEE DWGS 343001 THRU 343005 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 343100 FOR TURNOUT GEOMETRY.
4. SEE DWG 343200 FOR TURNOUT BILL OF MATERIAL.
5. FULLY BOX ANCHOR STOCK RAILS, TIES 3-15 FOR SHIPPING OF PANELS ONLY.
6. APPLY 5" SAFE BOND WIRES ONE CRIB AHEAD OF HEEL OF SWITCH ON STOCK AND SWITCH POINT RAILS.
7. ALL SWITCH POINT AND STOCKRAIL DIMENSIONS ARE TO FIRST INSTALL, SEE PLAN 241500 FOR FULL LENGTH.



THROW DETAIL



POWER OPERATED

PANEL WEIGHT: 20,000 LBS.

	UPRR	BNSF RH	BNSF LH
136LB. POWER	N/A	004734653	004734810
136LB. MANUAL	N/A	004734828	004734836
136LB. MAN. SPR. SW.	N/A	004734869	004734877
141LB. POWER	N/A	005253505	005253497
141LB. MANUAL	N/A	005253521	005253513
141LB. MAN. SPR. SW.	N/A	005253547	005253539

BNSF RAILWAY

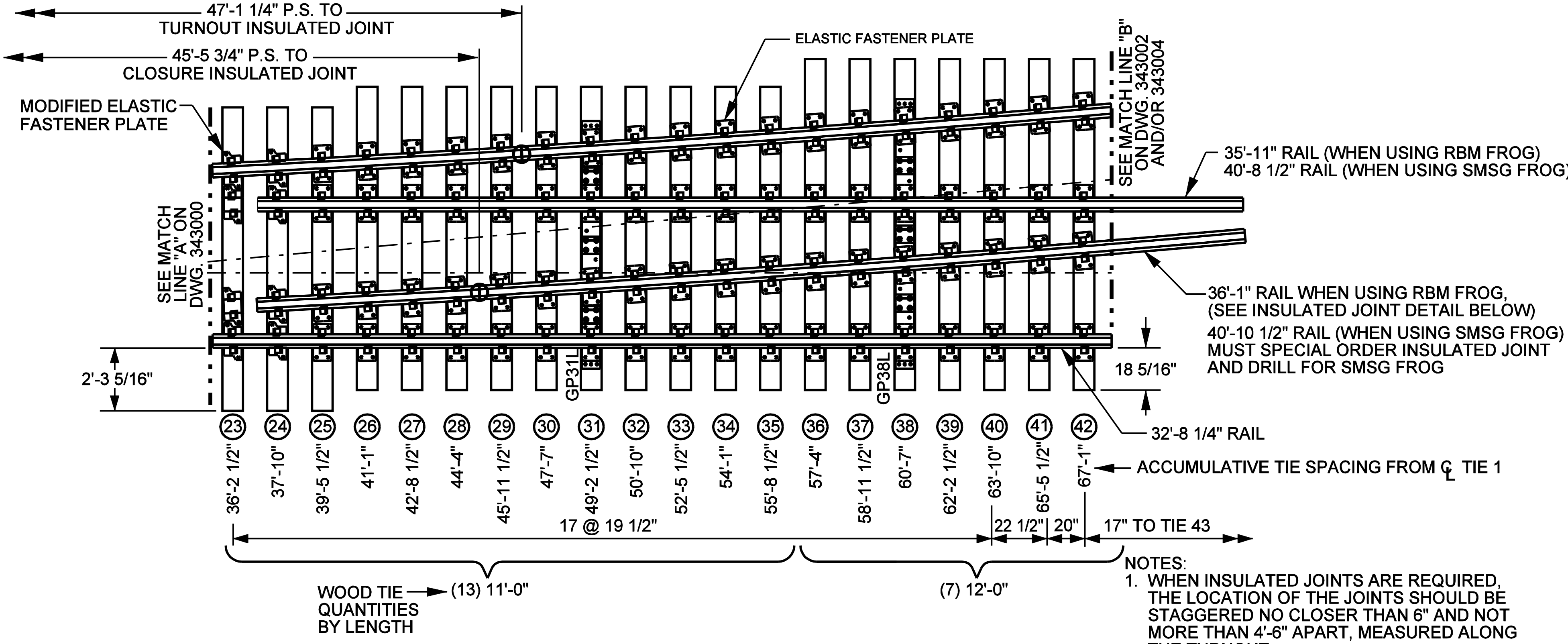
UNION PACIFIC

COMMON STANDARDS

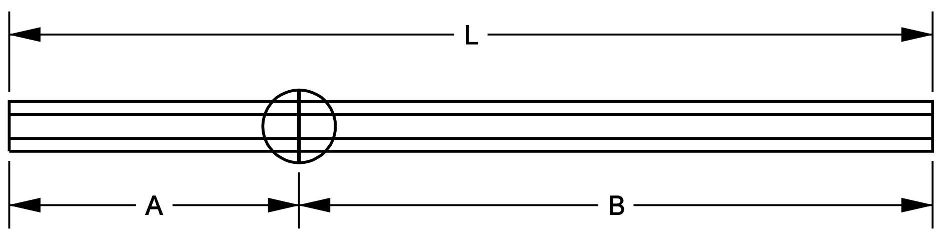
NO. 11 TURNOUT136/141 LB.
PANEL NO. 1

FILE OWNER: BNSF | DATE: AUG. 26, 2009

REV. NO.: 5 | DWG NO: 343000



NOTES:
1. WHEN INSULATED JOINTS ARE REQUIRED, THE LOCATION OF THE JOINTS SHOULD BE STAGGERED NO CLOSER THAN 6" AND NOT MORE THAN 4'-6" APART, MEASURED ALONG THE TURNOUT.
2. SEE DWGS 343000, 343002, 343003, 343004, AND 343005 FOR THE BALANCE OF LAYOUT PLANS.
3. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
4. SEE DWG 343100 FOR TURNOUT GEOMETRY.
5. SEE DWG 343200 FOR TURNOUT BILL OF MATERIAL.
6. PANEL WEIGHT = 17,000 LBS.



INSULATED JOINT DETAIL
(FOR USE WITH RBM FROG ONLY)

	A	B	L
TURNOUT INSULATED JOINT RAIL	11'-4"	21'-5"	32'-9"
CLOSURE INSULATED JOINT RAIL	8'-2"	27'-11"	36'-1"

	BNSF STOCK CODE	
	136LB.	141LB.
LH TURNOUT INSULATED JOINT RAIL	005253760	005253554
LH CLOSURE INSULATED JOINT RAIL	005253778	005253562
RH TURNOUT INSULATED JOINT RAIL	005253786	005253570
RH CLOSURE INSULATED JOINT RAIL	005253794	005253588

BNSF RAILWAY

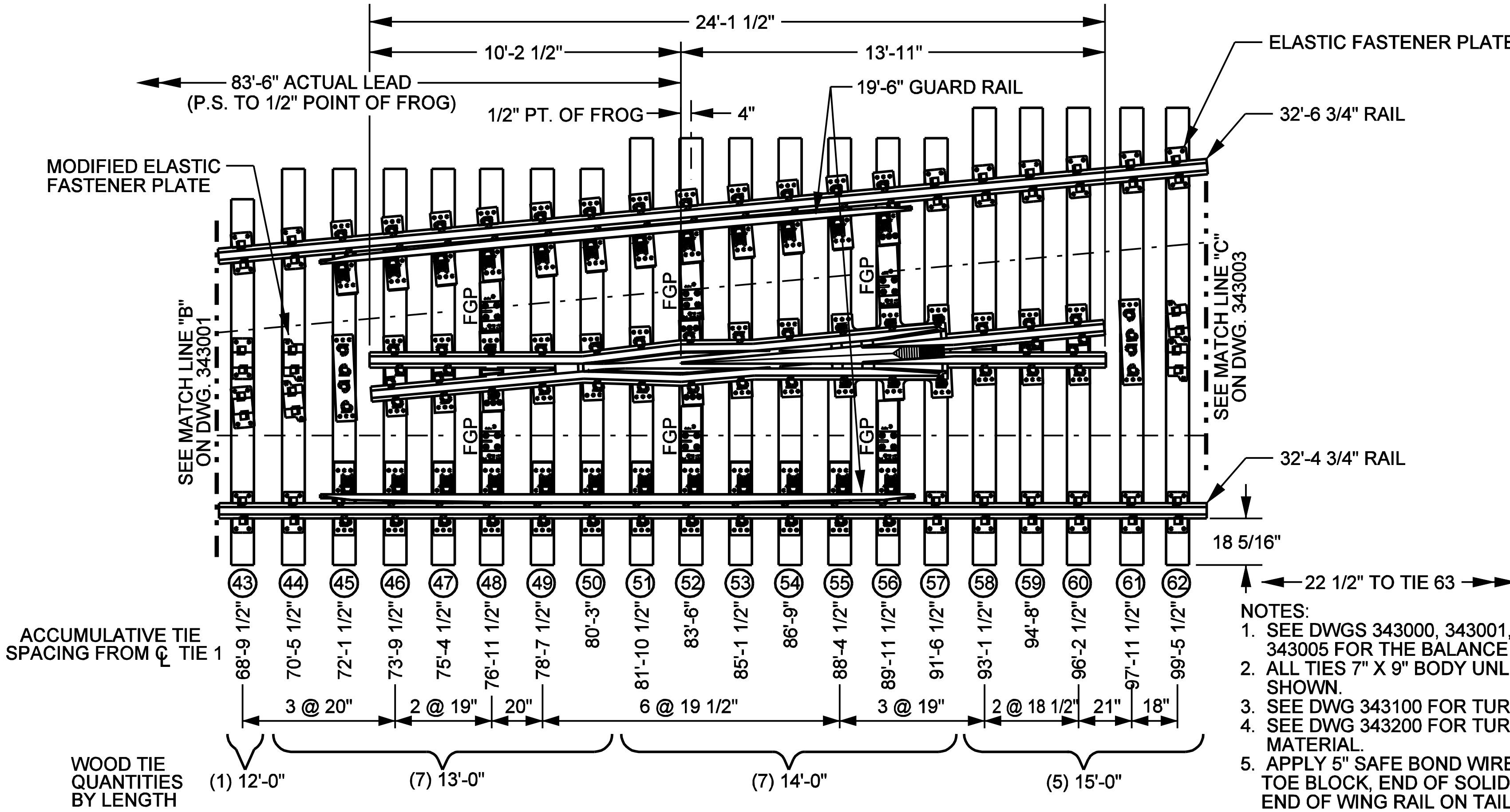
UNION PACIFIC

COMMON STANDARDS

NO. 11 TURNOUT 136/141 LB.
PANEL NO. 2

FILE OWNER: BNSF | DATE: AUG. 26, 2009

REV. NO.: 5 | DWG NO: 343001



NOTES:

1. SEE DWGS 343000, 343001, 343003, 343004, AND 343005 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 343100 FOR TURNOUT GEOMETRY.
4. SEE DWG 343200 FOR TURNOUT BILL OF MATERIAL.
5. APPLY 5" SAFE BOND WIRES ONE CRIB AHEAD OF TOE BLOCK, END OF SOLID WING RAIL, BEHIND END OF WING RAIL ON TAIL RAIL AND ONE CRIB BEHIND HEEL BLOCK OF FROG.
6. PANEL WEIGHT = 22,000 LBS.
7. SEE DWGS 343004 AND 343005 FOR SMSG AND LIFT FROG PANELS.

	UPRR	BNSF RH	BNSF LH
136LB. RBM	N/A	004710299	004710307
136LB. SPR	N/A	004710315	004710323
136LB. SOLID	N/A	004710331	004710349
141LB. RBM	N/A	005252739	005252721
141LB. SPR	N/A	005252754	005252747
141LB. SOLID	N/A	N/A	N/A

BNSF RAILWAY

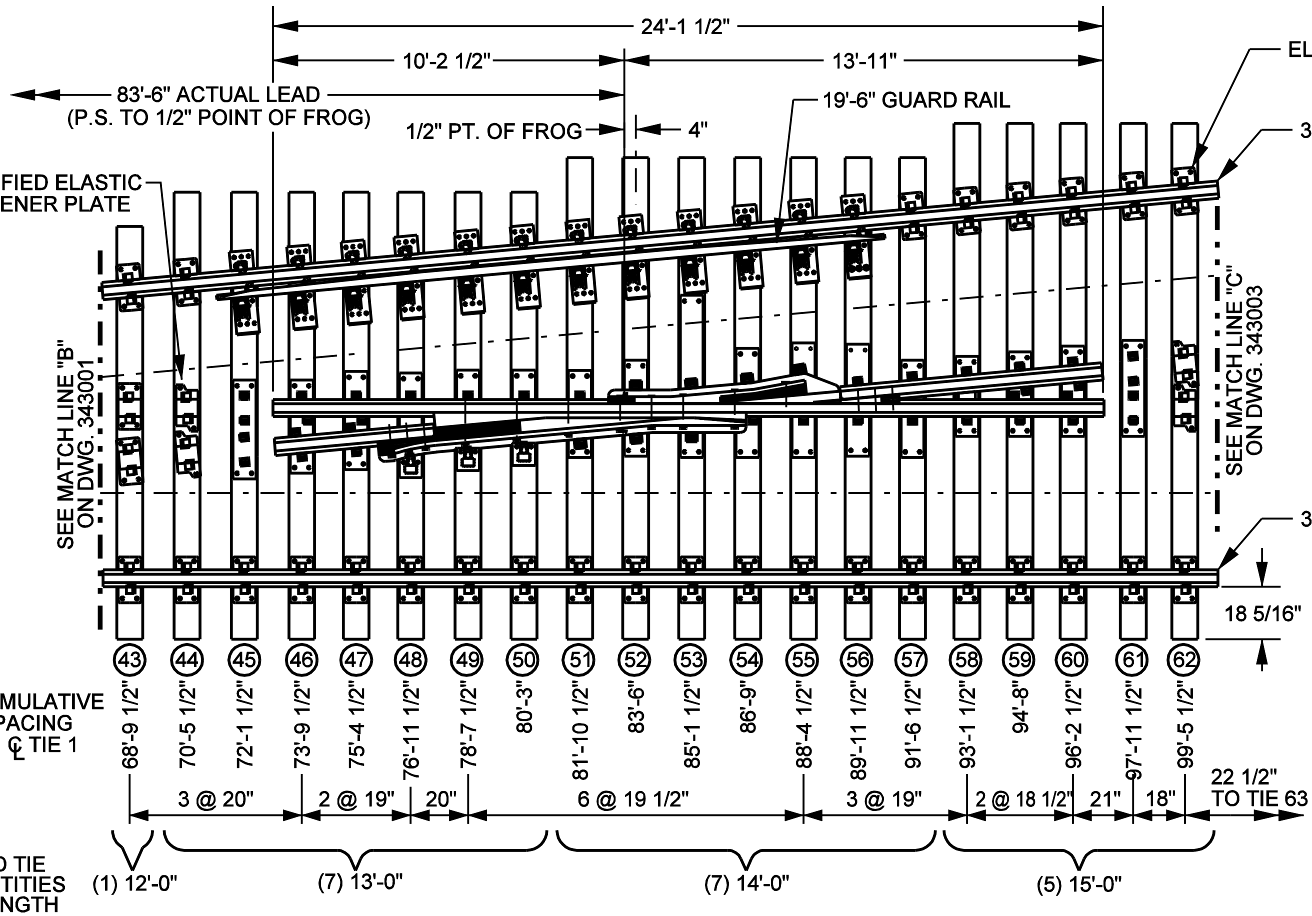
UNION PACIFIC

COMMON STANDARDS

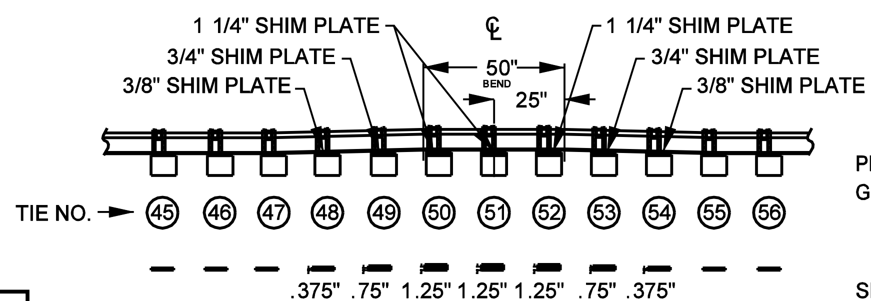
NO. 11 TURNOUT 136/141 LB. PANEL NO. 3 WITH OPTIONAL RBM FROG

FILE OWNER: BNSF | DATE: AUG. 26, 2009

REV. NO.: 5 | DWG NO: 343002



NOTES:
1. SEE DWGS 343000, 343001, 343002, 343003, AND 343004 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 343100 FOR TURNOUT GEOMETRY.
4. SEE DWG 343200 FOR TURNOUT BILL OF MATERIAL.
5. APPLY 5" SAFE BOND WIRES ONE CRIB AHEAD OF TOE BLOCK, END OF SOLID WING RAIL, BEHIND END OF WING RAIL ON TAIL RAIL AND ONE CRIB BEHIND HEEL BLOCK OF FROG.
6. PANEL WEIGHT = 22,000 LBS.
7. SEE DWG 343002 AND 343004 FOR SMSG AND RBM FROG PANELS.
8. HY-RAIL VEHICLES MUST USE CAUTION MOVING OVER LIFT FROG.



PLACE SHIM PLATES UNDER TURNOUT SIDE GUARD RAIL PLATES ON TIES AS SHOWN.

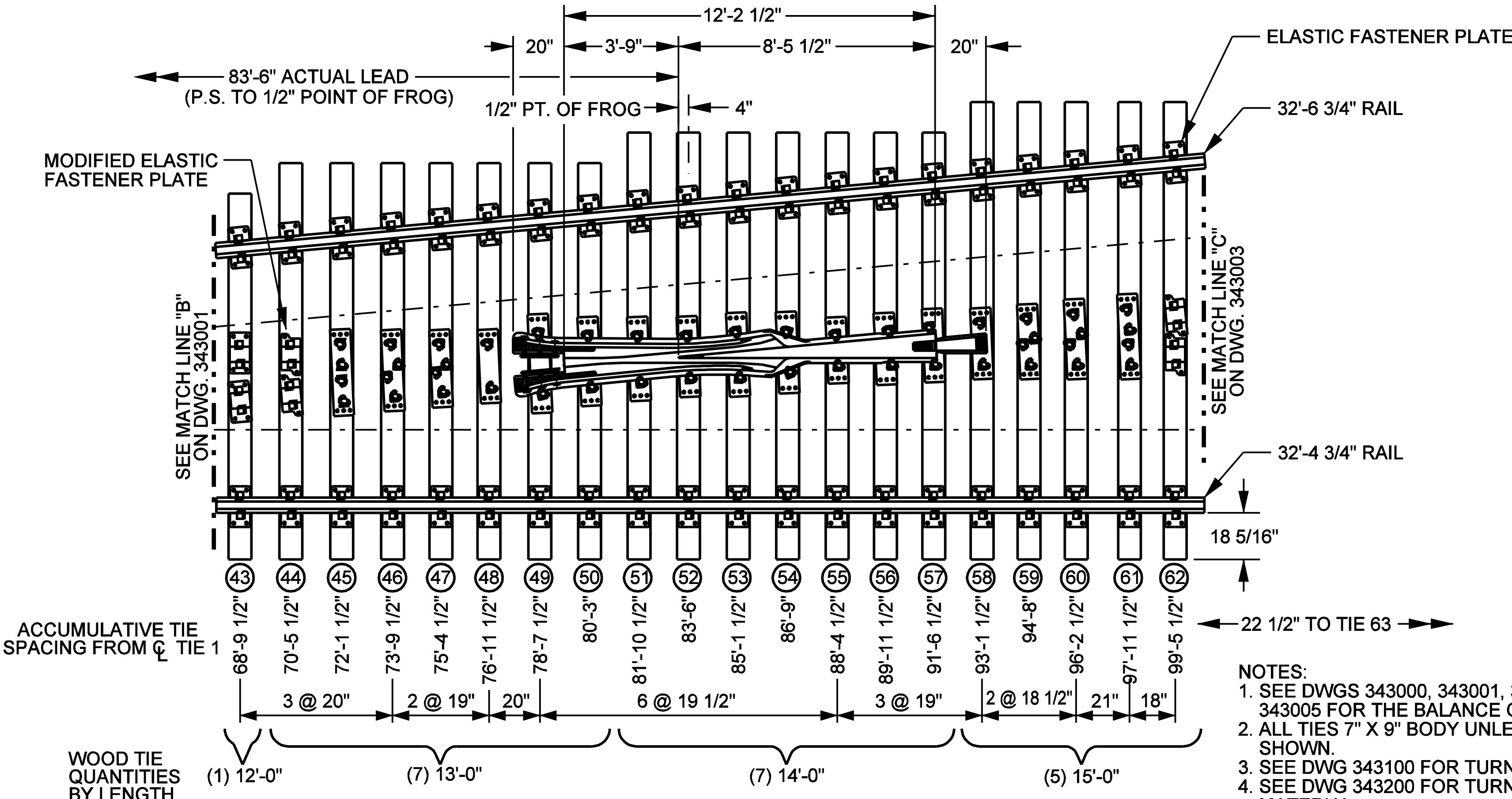
SHIM LOCATION (SIDE VIEW)

BNSF RAILWAY

COMMON STANDARDS

NO. 11 TURNOUT 136/141 LB. PANEL NO. 3 WITH OPTIONAL LIFT FROG

FILE OWNER: BNSF	DATE: AUG. 26, 2009
REV. NO.: 0	DWG NO: 343005



NOTES:

1. SEE DWGS 343000, 343001, 343002, 343003, AND 343005 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 343100 FOR TURNOUT GEOMETRY.
4. SEE DWG 343200 FOR TURNOUT BILL OF MATERIAL.
5. PANEL WEIGHT = 22,000 LBS.
6. SEE DWGS 343002 AND 343005 FOR RBM AND LIFT FROG PANELS.

	UPRR	BNSF RH	BNSF LH
136LB. RBM	N/A	004710299	004710307
136LB. SPR	N/A	004710315	004710323
136LB. SOLID	N/A	004710331	004710349
141LB. RBM	N/A	005252739	005252721
141LB. SPR	N/A	005252754	005252747
141LB. SOLID	N/A	N/A	N/A

BNSF RAILWAY

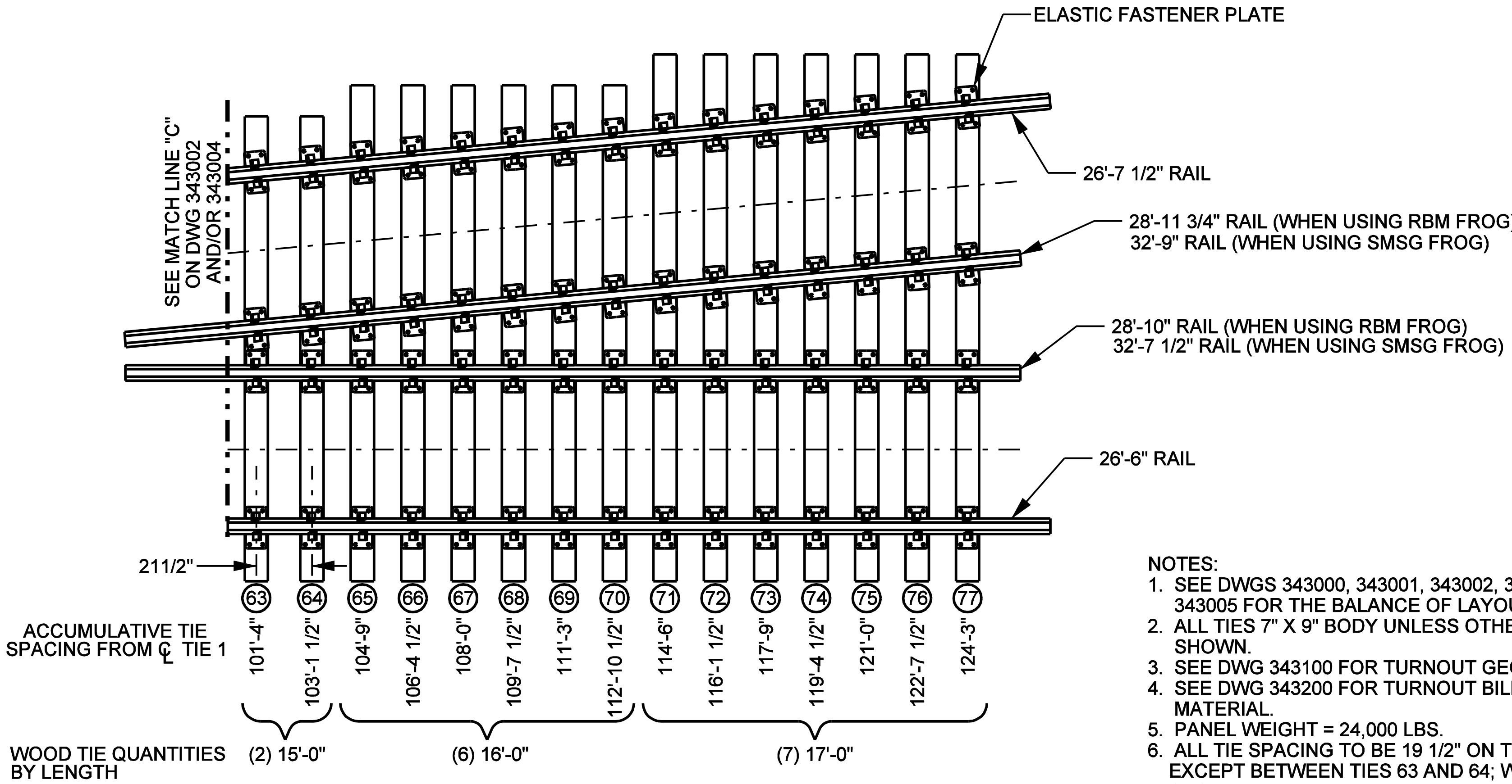
COMMON STANDARDS

NO. 11 TURNOUT 136/141 LB. PANEL NO. 3 WITH OPTIONAL SMSG FROG

FILE OWNER: BNSF | DATE: AUG. 26, 2009

REV. NO.: 2 | DWG NO: 343004

22-9B



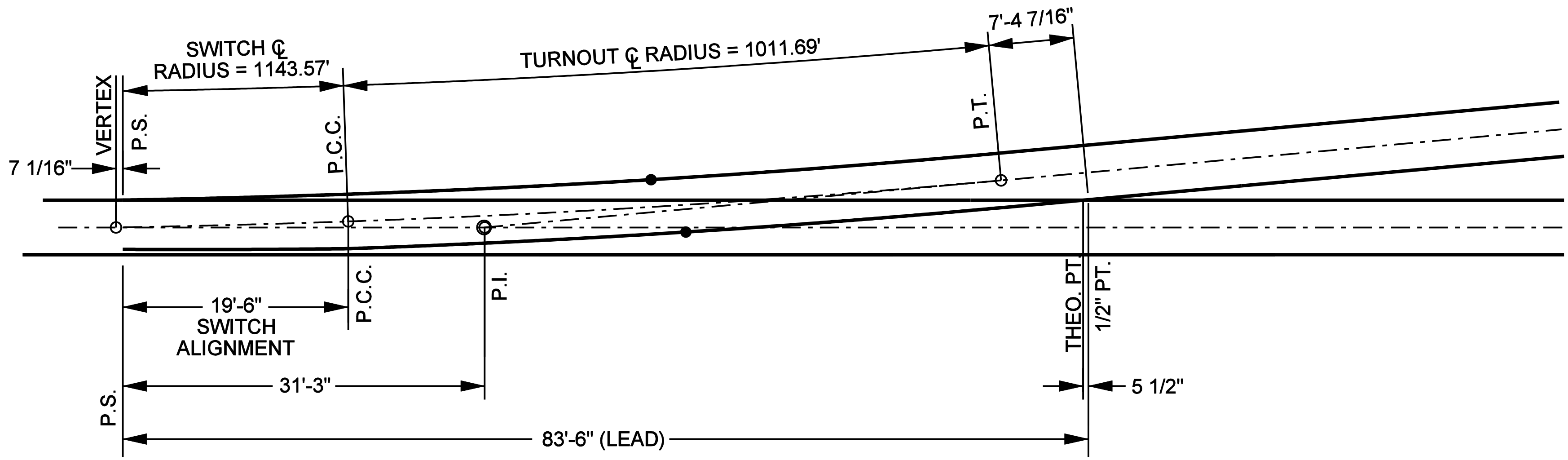
NOTES:
1. SEE DWGS 343000, 343001, 343002, 343004, AND 343005 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 343100 FOR TURNOUT GEOMETRY.
4. SEE DWG 343200 FOR TURNOUT BILL OF MATERIAL.
5. PANEL WEIGHT = 24,000 LBS.
6. ALL TIE SPACING TO BE 19 1/2" ON THIS DWG. EXCEPT BETWEEN TIES 63 AND 64; WHICH ARE SHOWN AT 21 1/2".

BNSF RAILWAY | UNION PACIFIC

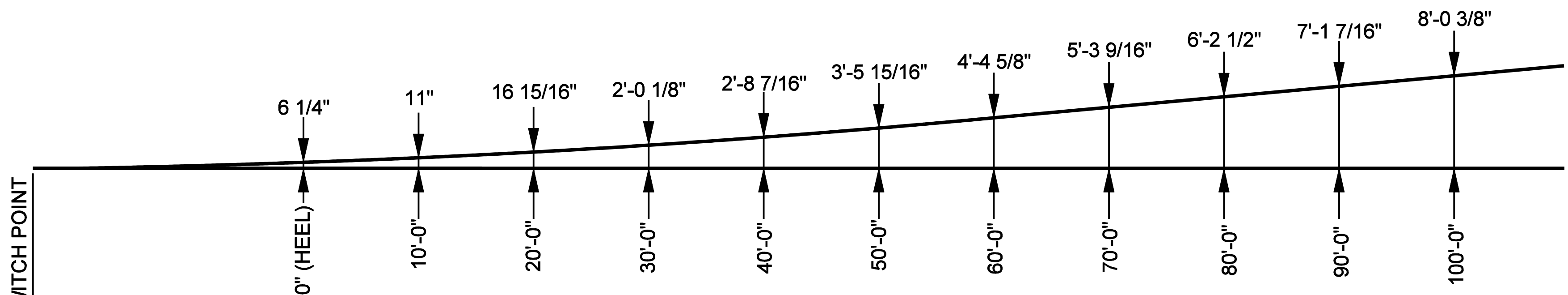
COMMON STANDARDS

NO. 11 TURNOUT 136/141 LB.
PANEL NO. 4

FILE OWNER: BNSF	DATE: AUG. 26, 2009
REV. NO.: 3	DWG NO: 343003



GENERAL LAYOUT



SPREAD LAYOUT

	SWITCH DATA	
	SWITCH LENGTH	19'-6"
	HEEL SPREAD	6 1/4"
	HEEL ANGLE	1°-59'-16"
	SWITCH ANGLE	1°-00'-40"
	THROW AT ROD #1	4 3/4"
	RADIUS (CENTER LINE)	1143.57'
	T =	9.69'
	CENTRAL ANGLE - CLOSURE CURVE	0°58'16"
	DEGREE OF CURVE	5°00'06"
TURNOUT POINT	THICKNESS AT POINT	1/8"
TURNOUT POINT	RADIUS (CLOSURE CURVE)	1145.92'
TURNOUT POINT	VERTEX DISTANCE	7 1/16"

FROG DATA	
ANGLE	5°-12'-18"
LENGTH	VARIES

TURNOUT DATA	
RADIUS OF CENTER LINE	1011.69'
T =	28.35'
CENTRAL ANGLE - CLOSURE CURVE	3°13'02"
DEGREE OF CURVE	5°40'44"

NOTES:

COMMON STANDARDS

NO. 11 TURNOUT 19'-6" CURVED SWITCH TURNOUT GEOMETRY

FILE OWNER: BNSF	DATE: JAN. 9, 2003
REV. NO.: 0	DWG NO: 343100

ITEMS SPECIAL TO MANUAL OR POWER AND A CHOICE OF FROGS

QTY.	REQUIRED FOR MANUAL	DRW #	BNSF STOCK CODE	UPRR ITEM #
2	"BP0" PLATE FOR TIE 0	241306	004721361	N/A
1	"GP1" ADJUSTABLE BRACE GAGE PLATE FOR TIE 1	241300	SEE DRG	SEE DRG
2	"BP1" ADJUSTABLE BRACE SLIDE PLATE FOR TIE 2	241306	004721338	557-2638
1	7' X 9" X 10' - 0" TIE (TIE 0)	N/A	004929436	502-1000
2	7' X 9" X 16' - 0" TIE (TIES 1 AND 2)	N/A	004929550	502-1600
1	SWITCH ROD NO. 1	241600	SEE DRG	557-5587
QTY.	REQUIRED FOR POWER	DRW #	BNSF ITEM #	UPRR ITEM #
1	"GP0/2A" ADJUSTABLE BRACE GAGE PLATE FOR TIE 0	241301	004721056	N/A
1	"GPM1L/R" ADJUSTABLE BRACE MACHINE GAGE PLATE FOR TIE 1	241302	SEE DRG	SEE DRG
1	"GPM2L/R" ADJUSTABLE BRACE MACHINE GAGE PLATE FOR TIE 2	241303	SEE DRG	SEE DRG
1	8" (TOP) X 10" X 10'-0" TIE (TIE 0)	250000	004930145	502-4300
2	7" X 10' X 14'-0" TRAPEZOID TIE (TIES # 1 AND # 2)	250000	004930186	502-4899
1	SWITCH ROD NO. 1 WITH BASKET (ADJUSTER)	241601	SEE DRG	557-5585
QTY.	FROGS	DRW #	BNSF ITEM #	UPRR ITEM #
1	RBM WITH PLATES	153100	SEE DRG	SEE DRG
1	SOLID SELF GUARDED FROG WITH PLATES	153200	SEE DRG	SEE DRG
1	SPRING FROG WITH PLATES	153300	SEE DRG	SEE DRG
6	"FGP" FROG GAGE PLATE	156000	004720983	555-6806
QTY.	GUARD RAIL (REQUIRED FOR RBM, SPRING AND JUMP FROGS)	DRW #	BNSF ITEM #	UPRR ITEM #
2	19' - 6" BOLTLESS ADJUSTABLE GUARD BAR	160100	004729257	556-5260

MANUAL OPERATED ITEM NUMBERS	BNSF L.H.		BNSF R.H.		BNSF L.H.	BNSF R.H.	UPRR L.H.		UPRR R.H.		UPRR L.H.	UPRR R.H.
USE OF SPRING SWITCH 1 1/4" REINF. IN TURNOUTS					WITH	WITH					WITH	WITH
USE OF BONDED JOINT IN TURNOUS	WITHOUT	WITH	WITHOUT	WITH	WITH	WITH	WITHOUT	WITH	WITHOUT	WITH	WITH	WITH
136 LB - #11 TURNOUT W/ RBM FROG, PANEL (COMPLETE)	004737243	004737235	004737227	004737219	004737573	004737581	N/A	N/A	N/A	N/A	N/A	N/A
136 LB - #11 TURNOUT W/ SPRING FROG, PANEL	004737326	004737318	004737300	004737292	004737607	004737615	N/A	N/A	N/A	N/A	N/A	N/A
136 LB - #11 TURNOUT W/ SMSG FROG, PANEL (COMPLETE)	004737284	004737276	004737268	004737250	004737623	004737631	N/A	N/A	N/A	N/A	N/A	N/A
136 LB - #11 TURNOUT W/ RBM FROG, PPTO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	557-8058	N/A	557-8059	557-8034	557-8082
136 LB - #11 TURNOUT W/ SPRING FROG, PPTO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	557-8083	N/A	557-8084	557-8079	557-8080
136 LB - #11 TURNOUT W/ SMSG FROG, PPTO	N/A	N/A	N/A	N/A	N/A	N/A	557-8089	N/A	557-8090	N/A	N/A	N/A
136 LB - #11 TURNOUT W/ JUMP FROG, PPTO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	557-8098	N/A	557-8099	N/A	N/A

POWER OPERATED ITEM NUMBERS	BNSF L.H.		BNSF R.H.		UPRR L.H.		UPRR R.H.	
UES OF BONDED JOINT IN TURNOUTS	WITHOUT	WITH	WITHOUT	WITH	WITHOUT	WITH	WITHOUT	WITH
136 LB #11 W/ RBM FROG, PANEL	004737367	004737359	004737342	004737334	N/A	N/A	N/A	N/A
136 LB #11 TURNOUT W/ SPRING FROG, PANEL	004737441	004737433	004737425	004737417	N/A	N/A	N/A	N/A
136 LB #11 TURNOUT W/ SMSG FROG, PANEL	004737409	004737391	004737383	004737375	N/A	N/A	N/A	N/A
136 LB #11 TURNOUT W/ RBM FROG, PPTO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
136 LB #11 TURNOUT W/ SPRING FROG, PPTO	N/A	N/A	N/A	N/A	N/A	557-8077	N/A	557-8078
136 LB #11 TURNOUT W/ SMSG FROG, PPTO	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

141 LB ITEM NUMBERS

DESCRIPTION	BNSF STOCK CODE
141 LB RH SPRING MANUAL W O/ INSULATED JOINTS	BNSF PART # 004738274
141 LB LH SPRING MANUAL W O/ INSULATED JOINTS	BNSF PART # 004738290
141 LB RH SPRING POWER W O/ INSULATED JOINTS	BNSF PART # 004738316
141 LB LH SPRING POWER W O/ INSULATED JOINTS	BNSF PART # 004738332
141 LB RH SPRING MANUAL TURNOUT W/ INSULATED JOINTS	BNSF PART # 004738266
141 LB LH SPRING MANUAL TURNOUT W/ INSULATED JOINTS	BNSF PART # 004738282
141 LB RH SPRING POWER TURNOUT W/ INSULATED JOINTS	BNSF PART # 004738308
141 LB LH SPRING POWER TURNOUT W/ INSULATED JOINTS	BNSF PART # 004738324
DESCRIPTION	UPRR ITEM #
141 LB LH TURNOUT W/ RBM FROG, SS, PPTO	UPRR PART # 557-8521
141 LB RH TURNOUT W/ RBM FROG, SS, PPTO	UPRR PART # 557-8522
141 LB LH TURNOUT W/ SPRING FROG, HT, PPTO	UPRR PART # 557-8523
141 LB RH TURNOUT W/ SPRING FROG, HT, PPTO	UPRR PART # 557-8524
141 LB LH TURNOUT W/ RBM FROG, HT, PPTO	UPRR PART # 557-8527
141 LB RH TURNOUT W/ RBM FROG, HT, PPTO	UPRR PART # 557-8528
141 LB LH TURNOUT W/ SPRING FROG, PO, PPTO	UPRR PART # 557-8529
141 LB RH TURNOUT W/ SPRING FROG, PO, PPTO	UPRR PART # 557-8530
141 LB LH TURNOUT W/ SPRING FROG, SS, PPTO	UPRR PART # 557-8531
141 LB RH TURNOUT W/ SPRING FROG, SS, PPTO	UPRR PART # 557-8532
141 LB LH TURNOUT W/ JUMP FROG, HT, PPTO	UPRR PART # 557-8441
141 LB RH TURNOUT W/ JUMP FROG, HT, PPTO	UPRR PART # 557-8442

TIES USED IN ALL # 11 TURNOUTS

QTY	SIZE	TIE NUMBER
10	7" X 9" X 10'-0"	TIES 1A THRU 10A
13	7" X 9" X 10'-0"	TIES 3 THRU 15
20	7" X 9" X 11'-0"	TIES 16 THRU 35
8	7" X 9" X 12'-0"	TIES 36 THRU 43
7	7" X 9" X 13'-0"	TIES 44 THRU 50
7	7" X 9" X 14'-0"	TIES 51 THRU 57
7	7" X 9" X 15'-0"	TIES 58 THRU 64
6	7" X 9" X 16'-0"	TIES 65 THRU 70
7	7" X 9" X 17'-0"	TIES 71 THRU 77

ITEMS USED IN ALL # 11 TURNOUTS

QTY.	COMPONENT DESCRIPTION	DWG #	BNSF STOCK CODE	UPRR ITEM #
1	19'-6" (EXT. 35'-9") STRT SAMSON SWITCH POINT (NO TIP)	243100	SEE DWG	SEE DWG
1	19'-6" (EXT. 35'-9") CURVED SAMSON SWITCH POINT (W/TIP)	243100	SEE DWG	SEE DWG
1	37'-11" STRAIGHT SAMSON STOCK RAIL	241500	SEE DWG	SEE DWG
1	36'-2" BENT / CURVED SAMSON STOCK RAIL	241500	SEE DWG	SEE DWG
1	EA. SWITCH RODS NO. 2, AND 3	241600	SEE DWG	SEE DWG
2	"GP" GAGE PLATE FOR TIES 6A & 10A AHEAD OF POINT	241304	004721270	N/A
1	"GP0/2A" ADJUSTABLE BRACE GAGE PLATE FOR TIE 2A	241301	004721031	N/A
2	"1A" PLATE FOR TIE 1A	241307	004721403	N/A
1	"GP9" ADJUSTABLE BRACE GAGE PLATE FOR TIE 9	241305	004721312	N/A
2	"RP5" ROLLER RISER PLATE	241309	004721551	N/A
2	ROLLER BEARING ASSEMBLY FOR "PR5" PLATE	241309	516650007	N/A
8	"BP1" ADJUSTABLE BRACE SLIDE PLATE	241306	004721338	557-2960
4	"SP1" SIDE PLATE	241306	004721346	557-2961
2	EA. "RSP1", "RSP2", AND "RSP3" RISER SLIDE PLATES FOR TIP 10-12	243309	SEE DWG	N/A
2	TURNOUT PLATES T13 THUR T22	243307	SEE DWG	SEE DWG
1	"GP17" GAGE PLATE FOR TIE 17	243311	SEE DWG	SEE DWG
1	"GP31" GAGE PLATE FOR TIE 31	243312	SEE DWG	SEE DWG
1	"GP38" GAGE PLATE FOR TIE 38	243313	SEE DWG	SEE DWG
1	36'-1" CLOSURE INSULATED JOINT RAIL	343001	004741385	N/A
1	32'-9" INSULATED JOINT TURNOUT RAIL	343001	004741377	N/A
1	36'-1" CLOUSRE RAIL (ONLY IN NON-INSULATED TU)	343001	N/A	N/A
1	32'-9" JOINT TURNOUT RAIL (ONLY IN NON-INSULATED TURNOUT)	343001	N/A	N/A
253	136 OR 141 LB. RAIL (IN LINEAR FEET)	N/A	N/A	N/A
152	PANDROL TIE PLATE	263000	004743175	503-9020
12	MODIFIED PANDROL TIE PLATE	263001	N/A	N/A
518	PANDROL ECLIP E-2055 (SUBTRACT 8 FOR INSULATED TURNOUT)	132500	004740866	503-6100
8	INSULATED JOINT CLIP ASSEMBLY (ONLY IN INSULATED TURNOUT)	132800	SEE DWG	SEE DWG
1254	15/16" DIA. 6 1/2' LG. "RAILROAD APPROVED" SCREW SPIKES	130800	004744066	503-8620
2208	RAIL ANCHORS FOR BNSF	135010	004738647	N/A
520	RAIL ANCHORS FOR UPRR	135010	N/A	550-1650

NOTES FOR MANUFACTURERS

1. ALL MATERIAL TO MEET OR EXCEED RAILROADS RELATED SPECIFICATIONS.
2. SIGNAL DEPARTMENT TO FURNISH DAP PLATING FOR MACHINE MOUNTING.
3. TRAPEZOID HEAD BLOCK TIES ARE DAPPED PER DWG DB0046.00.

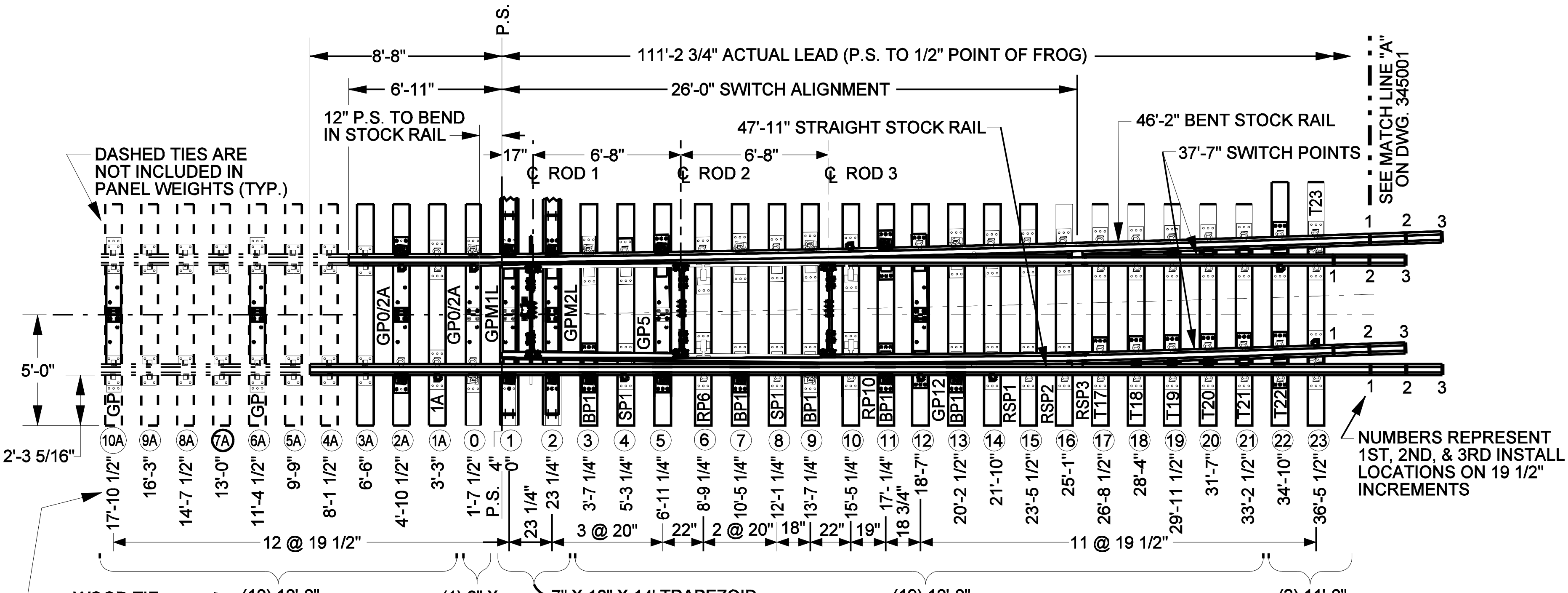
BNSF RAILWAY

UNION PACIFIC

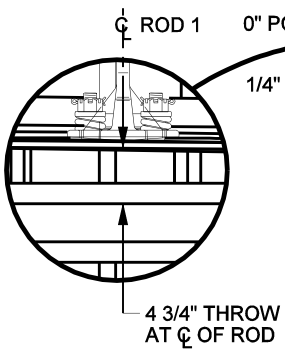
COMMON STANDARDS

NO. 11 TURNOUT WITH RBM, SMSG, LIFT AND SPRING FROGS BILL OF MATERIALS

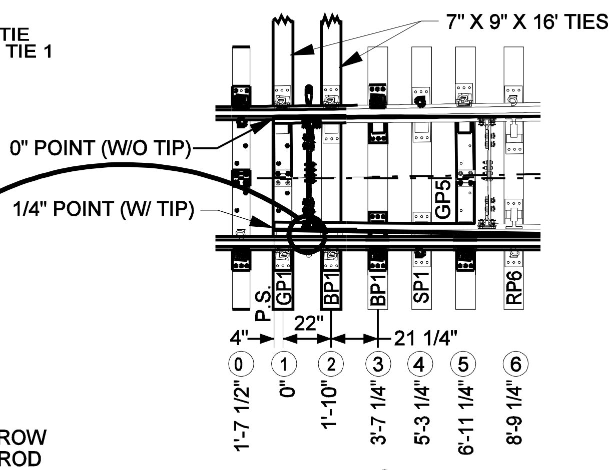
FILE OWNER: BNSF	DATE: AUG. 26, 2009
REV. NO.: 8	DWG NO: 343200



POWER OPERATED



THROW DETAIL



MANUAL OPERATED

NOTES:
1. SEE DWGS 345001, 345002, AND 345003 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIE SPACING 19 1/2" EXCEPT WHERE NOTED.
3. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
4. SEE DWG 345100 FOR TURNOUT GEOMETRY.
5. SEE DWG 345200 FOR TURNOUT BILL OF MATERIAL.
6. APPLY 5" SAFE BOND WIRES ONE CRIB AHEAD OF HEEL OF SWITCH ON STOCK AND SWITCH POINT RAILS.
7. BNSF MANUAL AND MANUAL SPRING SWITCHES WILL BE SUPPLIED WITH UHMWPE PADS ON TIES 1 THROUGH 14.
8. PANEL WEIGHT = APPROXIMATELY 20,900 LBS.

	UPRR	BNSF LH	BNSF RH
136LB. POWER	N/A	518030091	518030065
136LB. MANUAL	N/A	518030093	518030092
136LB. MAN. SPRG.	N/A	518030095	518030094
141LB. POWER	N/A	518030134	518030135
141LB. MANUAL	N/A	518030136	518030137
141LB. MAN. SPRG.	N/A	518030138	518030139

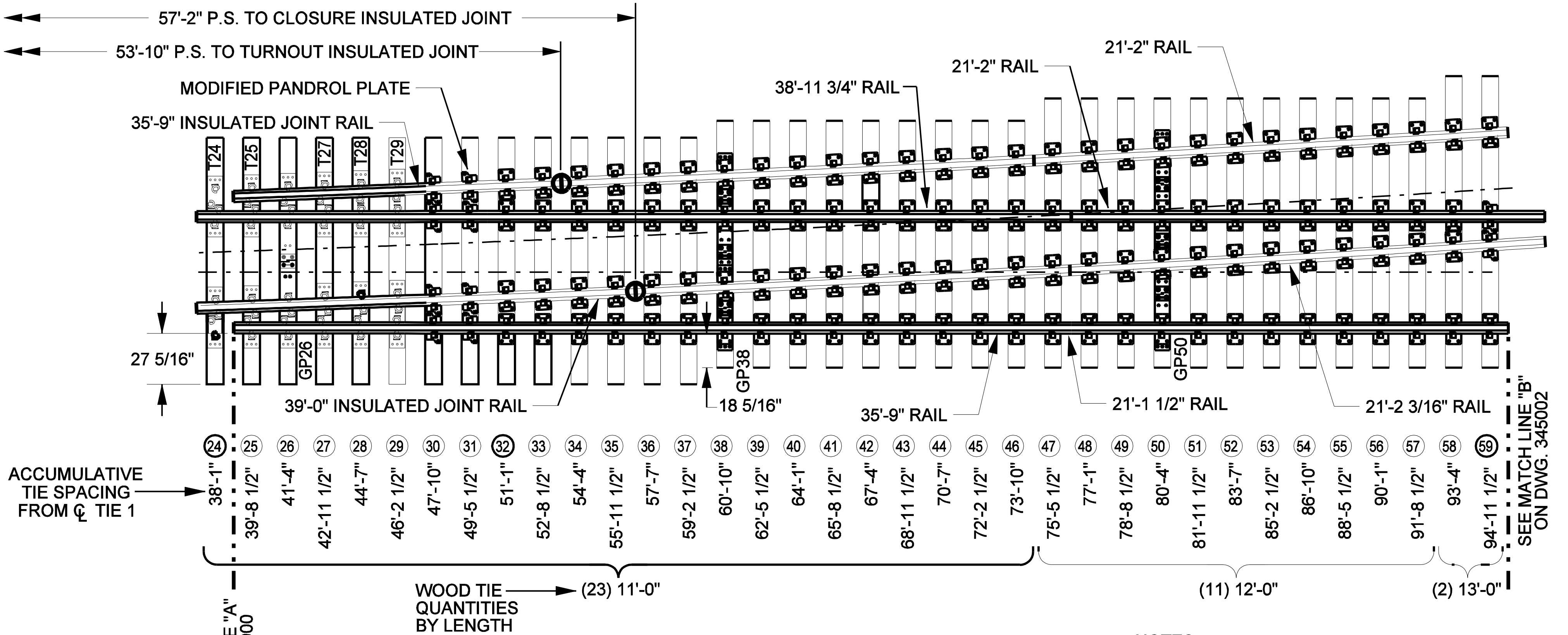
BNSF RAILWAY

UNION PACIFIC

COMMON STANDARDS

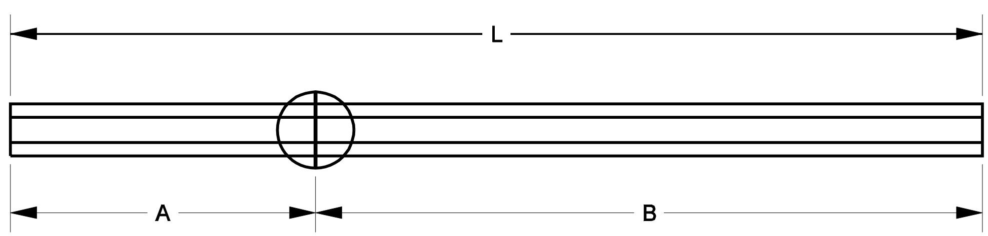
NO. 15 TURNOUT 136/141 LB. PANEL NO. 1

FILE OWNER: UPRR | DATE: MAY 16, 2008
REV. NO.: 4 | DWG NO: 345000



NOTES:

1. SEE DWGS 345000, 345002, AND 345003 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIE SPACING IS 19 1/2" ON THIS PANEL.
3. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
4. SEE DWG 345100 FOR TURNOUT GEOMETRY.
5. SEE DWG 345200 FOR TURNOUT BILL OF MATERIAL.
6. PANEL WEIGHTS = APPROXIMATELY 19,500 LBS. AND 11,800 LBS.



	A	B	L
TURNOUT INSULATED JOINT RAIL	14'-8"	21'-1"	35'-9"
CLOSURE INSULATED JOINT RAIL	19'-7"	19'-5"	39'-0"

	BNSF ITEM NUMBER	
	136LB.	141LB.
LH TURNOUT INSULATED JOINT RAIL	518030155	518030140
LH CLOSURE INSULATED JOINT RAIL	518030156	518030141
RH TURNOUT INSULATED JOINT RAIL	518030157	518030142
RH CLOSURE INSULATED JOINT RAIL	518030158	518030143

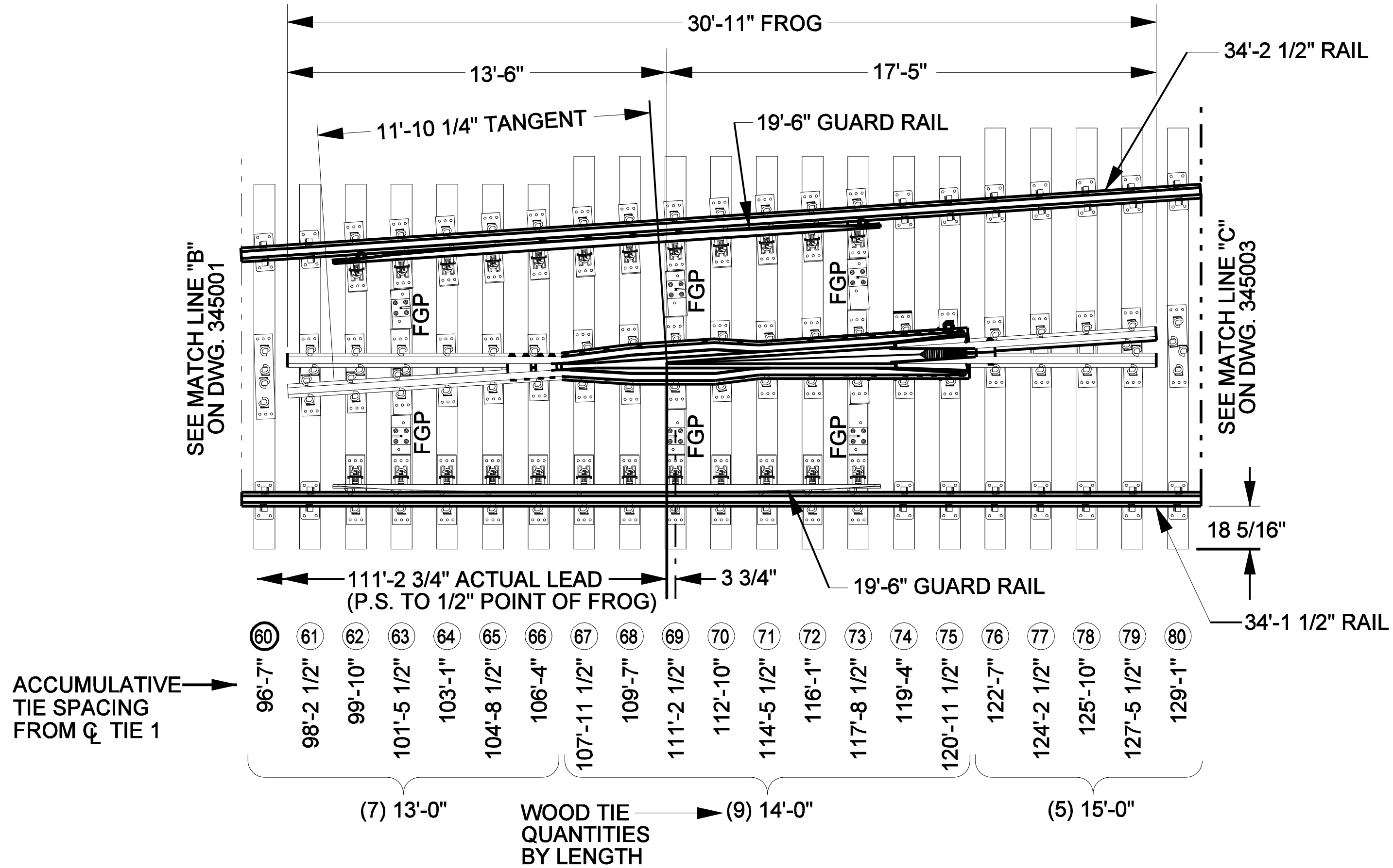
BNSF RAILWAY

UNION PACIFIC

COMMON STANDARDS

NO. 15 TURNOUT 136/141 LB. PANELS NO. 2 AND NO. 3

FILE OWNER: UPRR	DATE: MAY 19, 2008
REV. NO.: 3	DWG NO: 345001



NOTES:
1. SEE DWGS 345000, 345001, AND 345003 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIE SPACING IS 19 1/2" ON THIS PANEL.
3. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
4. SEE DWG 345100 FOR TURNOUT GEOMETRY.
5. SEE DWG 345200 FOR TURNOUT BILL OF MATERIAL.
6. PANEL WEIGHT = APPROXIMATELY 28,800 LBS.

BNSF RAILWAY

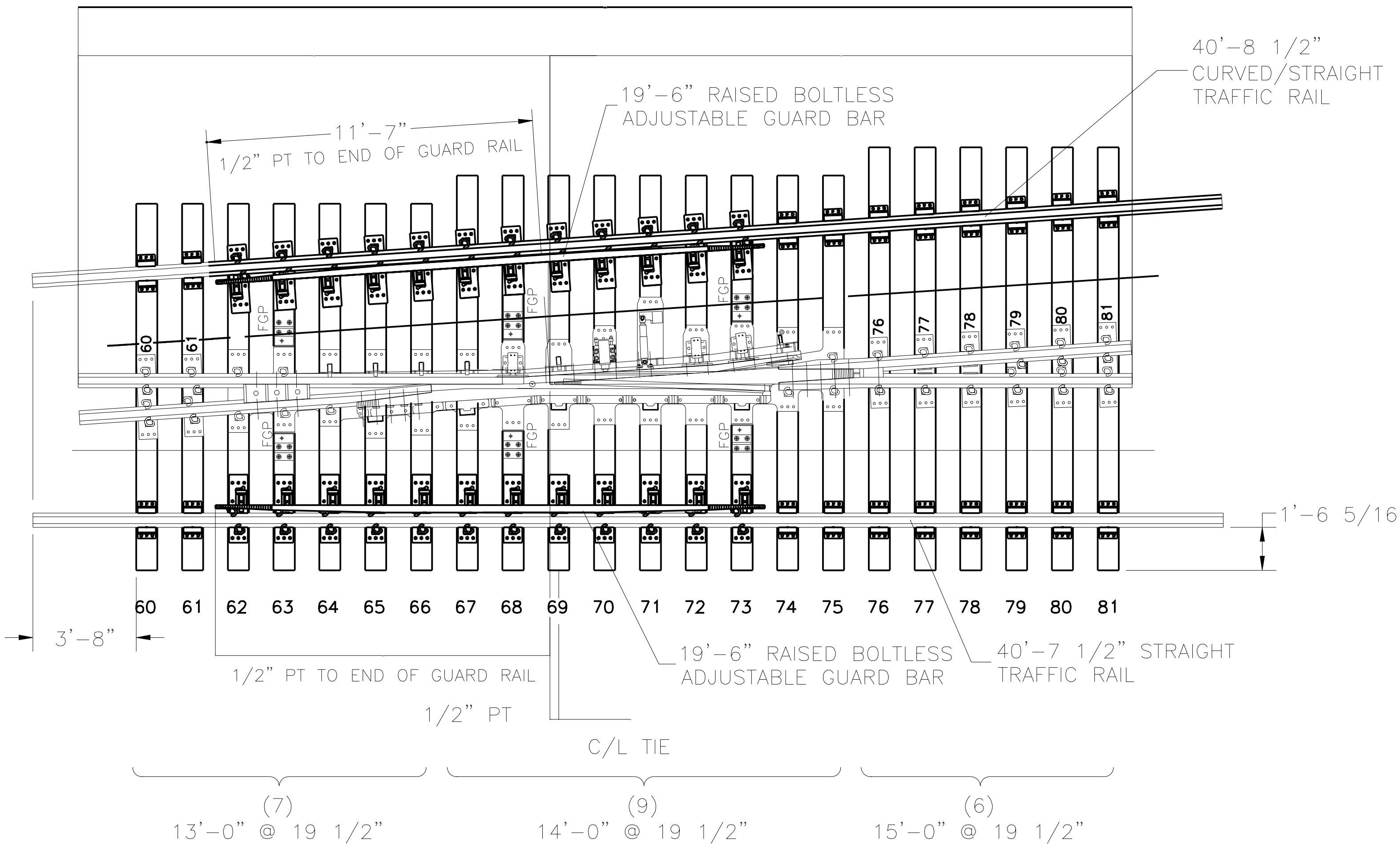
UNION PACIFIC

COMMON STANDARDS

	UPRR	BNSF LH	BNSF RH
136LB. RBM	N/A	513450060	513450059
136 LB. SPRING	N/A	513450063	513450061
141 LB. RBM	N/A	513450232	513450233
141 LB. SPRING	N/A	513450234	513450235

NO. 15 TURNOUT 136/141 LB.
PANEL NO. 4

FILE OWNER: UPRR	DATE: MAY 16, 2008
REV. NO.: 3	DWG NO: 345002



LEFT HAND FROG PANEL (SHOWN)
RIGHT HAND FROG PANEL (OPPOSITE)

MAINTENANCE LENGTH SHOWN

#15 SPRING FROG PANEL	BNSF PART NUMBER
LEFT HAND	513450063
RIGHT HAND	513450061

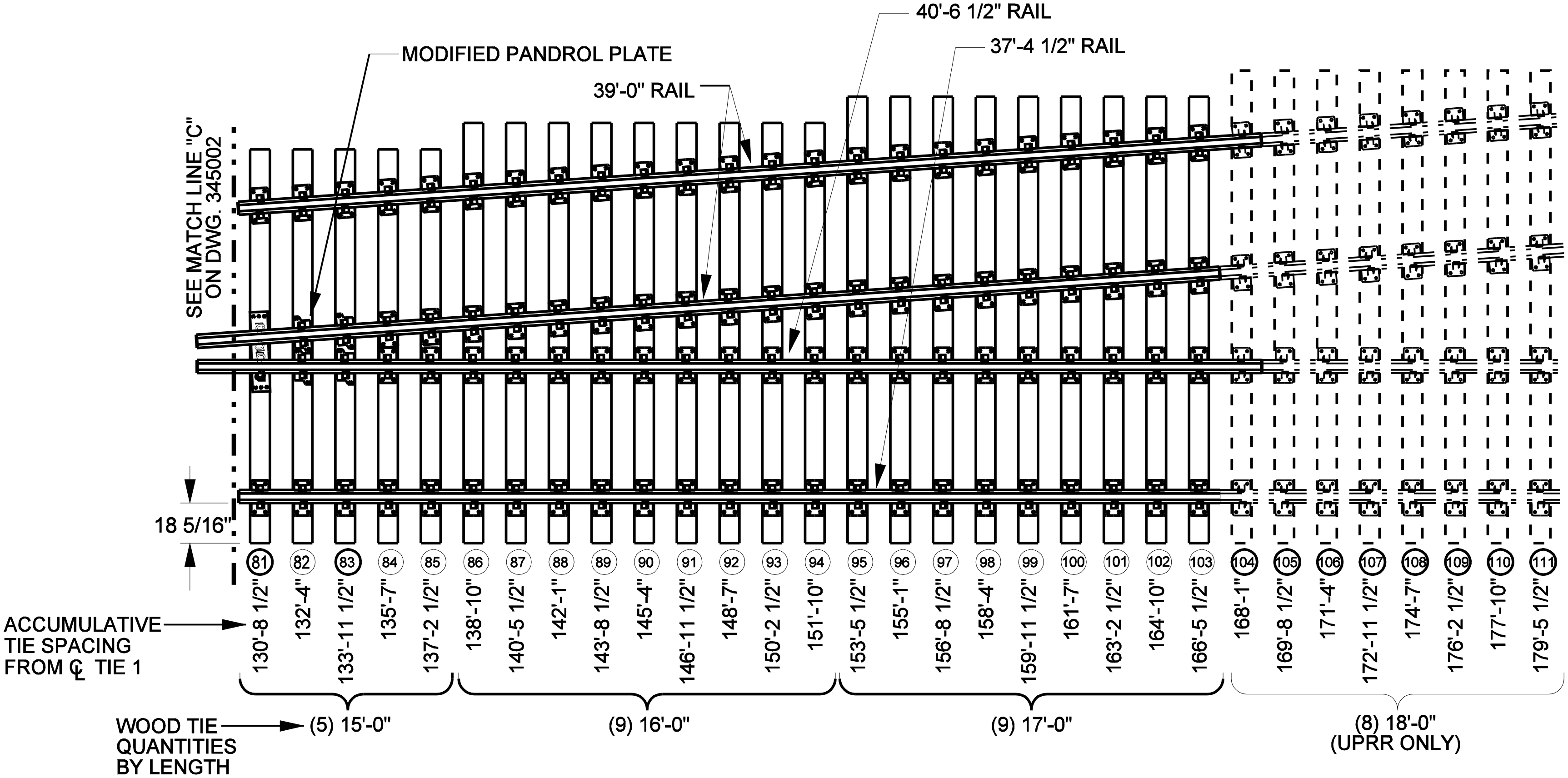
BNSF RAILWAY

STANDARD PLAN

#15 SPRING FROG 136 LB. PANEL NO. 4

SCALE: NONE | FILE OWNER BNSF | DATE: JUNE 8, 2007 | REV. NO.: 00 | DWG. 345010

22-15A



NOTES:
1. SEE DWGS 345000, 345001, AND 345002 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIE SPACING IS 19 1/2" ON THIS PANEL.
3. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
4. SEE DWG 345100 FOR TURNOUT GEOMETRY.
5. SEE DWG 345200 FOR TURNOUT BILL OF MATERIAL.
6. PANEL WEIGHT = APPROXIMATELY 23,650 LBS.

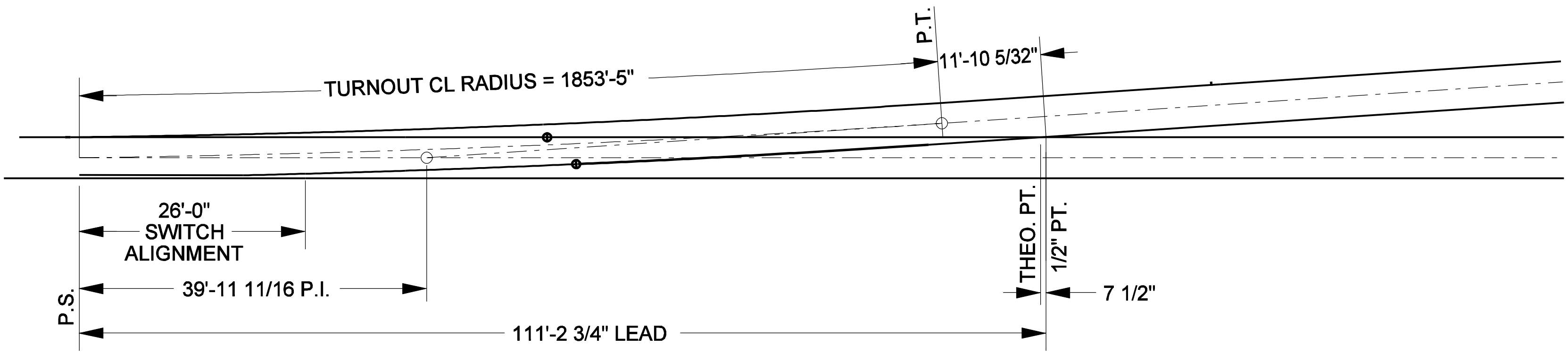
BNSF RAILWAY

UNION PACIFIC

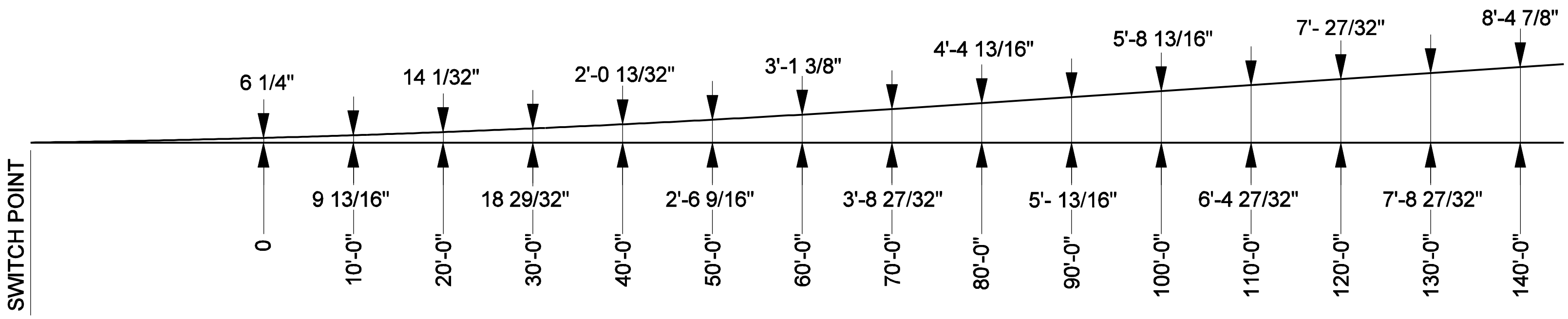
COMMON STANDARDS

NO. 15 TURNOUT 136/141 LB.
PANEL NO. 5

FILE OWNER: UPRR	DATE: MAY 2, 2008
REV. NO.: 1	DWG NO: 345003



GENERAL LAYOUT



SPREAD LAYOUT

	SWITCH DATA	
	SWITCH LENGTH	26'-0"
	HEEL SPREAD	6 1/4"
	HEEL ANGLE	1°-33'-2"
	SWITCH ANGLE	0°-44'-47"
	THROW AT ROD #1	4 3/4"
	RADIUS (CENTER LINE)	1853.42'
	T =	49.68'
	CENTRAL ANGLE - CLOSURE CURVE	3°-04'-16"
	DEGREE OF CURVE	3°-05'-30"
TURNOUT POINT	THICKNESS AT POINT	1/4"
TURNOUT POINT	RADIUS (CLOSURE CURVE)	1855.77'
TURNOUT POINT	VERTEX DISTANCE	0"

FROG DATA	
ANGLE	3°-49'-06"
LENGTH	VARIES

TURNOUT DATA	
RADIUS OF CENTER LINE	1853.42'
T =	49.68'
CENTRAL ANGLE - CLOSURE CURVE	3°-04'-16"
DEGREE OF CURVE	3°-05'-30"

NOTES:

COMMON STANDARDS

NO. 15 TURNOUT 26'-0"
CURVED SWITCH,
TURNOUT GEOMETRY

FILE OWNER: UPRR	DATE: JAN. 14, 2003
REV. NO.: 0	DWG NO: 345100

345100

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ITEMS USED IN ALL NO. 15 TURNOUTS

QTY.	COMPONENT DESCRIPTION	DWG NO.	BNSF ITEM NO.	UPRR ITEM NO.
1	26-0" (EXT. 37'-7") STRT SAMSON SWITCH POINT (NO TIP)	245100	SEE DWG	SEE DWG
1	26-0" (EXT. 37'-7") CURVED SAMSON SWITCH POINT (W/TIP)	245100	SEE DWG	SEE DWG
1	47'-11" STRAIGHT SAMSON STOCK RAIL	241500	SEE DWG	SEE DWG
1	46'-2" BENT/CURVED SAMSON STOCK RAIL	241500	SEE DWG	SEE DWG
1 EA.	SWITCH RODS NO. 2 AND 3	241600	516620171	557-5586
2	"GP" GAGE PLATE FOR TIES 6A & 10A AHEAD OF POINT	241304	515821526	N/A
2	"1A" PLATE FOR TIE 1A AHEAD OF POINT	241306	515821540	N/A
2	"GP0/2A" ADJUSTABLE BRACE GAGE PLATE FOR TIES 0 & 2A	241301	515821003	N/A
1	"GP5" ADJUSTABLE BRACE GAGE PLATE FOR TIE 5	245305	515910639	N/A
1	"GP12" GAGE PLATE FOR TIE 12	245300	515910640	N/A
2	"RP6" ROLLER RISER PLATE	241309	515821555	SEE DWG
2	"RP10" ROLLER RISER PLATE	241309	515821556	SEE DWG
4	ROLLER ASSEMBLY	241309	516650007	SEE DWG
10	"BP1" ADJUSTABLE BRACE SLIDE PLATE	241306	515821014	557-2638
4	"SP1" SLIDE PLATE	241306	515821069	557-2849
2	RISER SLIDE PLATES - RSP1, RSP2, AND RSP3	243309	SEE DWG	SEE DWG
2	TURNOUT PLATES T17 THRU T29	245307	SEE DWG	557-8991
1	"GP26" GAGE PLATE FOR TIE 26	245310	SEE DWG	SEE DWG
1	"GP38" GAGE PLATE FOR TIE 38	245311	SEE DWG	SEE DWG
1	"GP50" GAGE PLATE FOR TIE 50	245312	SEE DWG	SEE DWG
2	19'-6" BOLTLESS ADJUSTABLE GUARD RAIL	160100	516240059	556-5260
6	"FGP" FROG GAGE PLATE	156000	515821497	555-6806
1	39'-0" CLOSURE INSULATED JOINT RAIL	345001	524400035	N/A
1	35'-9" INSULATED JOINT TURNOUT RAIL	345001	524400034	N/A
384	136 OR 141 LB. RAIL (IN LINEAR FEET)	176000	SEE DWG	SEE DWG
218	PANDROL TIE PLATE	263000	525820956	503-9020
14	MODIFIED PANDROL TIE PLATE	263001	N/A	N/A
720	PANDROL CLIP E-2055	132500	521710020	503-6100
8	PANDROL INSULATED JOINT CLIP ASSEMBLY	132800	521710020	503-5580
1424	15/16" DIA. x 6 1/2" LG. "RAILROAD APPROVED" SCREW SPIKES	130800	527570012	503-8620
2208	RAIL ANCHORS FOR BNSF	135010	520130012	N/A
610	RAIL ANCHORS FOR UPRR	135010	N/A	550-1650

ITEMS SPECIAL TO MANUAL OR POWER AND A CHOICE OF FROGS

QTY.	REQUIRED FOR MANUAL	DWG #	BNSF ITEM #	UPRR ITEM #
1	"GP1" ADJUSTABLE BRACE GAGE PLATE FOR TIE 1	241300	SEE DWG	SEE DWG
2	"BP1" ADJUSTABLE BRACE SLIDE PLATE FOR TIE 2	245306	515821014	557-2638
1	7" X 9" X 10'-0" TIE (TIE 0)	N/A	N/A	502-1000
2	7" X 9" X 16'-0" TIE (TIES 1 AND 2)	N/A	N/A	502-1600
1	SWITCH ROD NO. 1	241600	SEE DWG	557-5587
QTY.	**REQUIRED FOR POWER**	**DWG #**	**BNSF ITEM #**	**UPRR ITEM #**
1	SWITCH ROD NO. 1 WITH BASKET (ADJUSTER)	241601	SEE DWG	557-5585
1	"GPM1L/R" ADJUSTABLE BRACE MACHINE GAGE PLATE FOR TIE 1	241302	SEE DWG	SEE DWG
1	"GPM2L/R" ADJUSTABLE BRACE MACHINE GAGE PLATE FOR TIE 2	241303	SEE DWG	SEE DWG
1	8" (TOP) X 10" X 10'-0" TIE (TIE 0)	N/A	SEE DWG	502-4300
2	7" X 10" X 14'-0" TRAPEZOID TIE (TIES 1 AND 2)	250000	SEE DWG	502-4899
QTY.	**REQUIRED FOR POWER**	**DWG #**	**BNSF ITEM #**	**UPRR ITEM #**
1	30'-11" RBM WITH PLATES	157100	SEE DWG	SEE DWG
1	30'-11" SOLID MANGANESE SPRING FROG WITH PLATES	157200	SEE DWG	SEE DWG

TIES USED IN ALL #15 TURNOUTS

QTY.	SIZE	TIE NUMBER
10	7" X 9" X 10'-0"	TIES 1A THRU 10A
19	7" X 9" X 10'-0"	TIES 3 THRU 21
25	7" X 9" X 11'-0"	TIES 22 THRU 46
11	7" X 9" X 12'-0"	TIES 47 THRU 57
9	7" X 9" X 13'-0"	TIES 58 THRU 66
9	7" X 9" X 14'-0"	TIES 67 THRU 75
10	7" X 9" X 15'-0"	TIES 76 THRU 85
9	7" X 9" X 16'-0"	TIES 86 THRU 94
9	7" X 9" X 17'-0"	TIES 95 THRU 103

MANUAL OPERATED ITEM NUMBERS	BNSF L.H.	BNSF R.H.	UPRR L.H.	UPRR R.H.
136 LB - #15 TURNOUT W/ SPRING SWITCH AND RBM FROG, PANEL (COMPLETE)	518789148	518789149	N/A	N/A
136 LB - #15 TURNOUT W/ SPRING SWITCH AND SPRING FROG, PANEL (COMPLETE)	518789150	518789151	N/A	N/A
136 LB - #15 TURNOUT W/ RBM FROG, PREPLATED TIES	N/A	N/A	557-8289	557-8290
136 LB - #15 TURNOUT W/ SPRING FROG, PREPLATED TIES	N/A	N/A	557-8295	557-8296
136 LB - #15 TURNOUT W/ SPRING SWITCH AND RBM FROG, PREPLATED TIES	N/A	N/A	557-8287	557-8288
136 LB - #15 TURNOUT W/ SPRING SWITCH AND SPRING FROG, PREPLATED TIES	N/A	N/A	557-8293	557-8294
141 LB - #15 TURNOUT W/ SPRING SWITCH AND RBM FROG, PANEL (COMPLETE)	XXXXXXXXX	XXXXXXXXX	N/A	N/A
141 LB - #15 TURNOUT W/ SPRING SWITCH AND SPRING FROG, PANEL (COMPLETE)	XXXXXXXXX	XXXXXXXXX	N/A	N/A
141 LB - #15 TURNOUT W/ RBM FROG, PREPLATED TIES	N/A	N/A	557-8545	557-8546
141 LB - #15 TURNOUT W/ SPRING FROG, PREPLATED TIES	N/A	N/A	557-8541	557-8542
141 LB - #15 TURNOUT W/ SPRING SWITCH AND RBM FROG, PREPLATED TIES	N/A	N/A	557-8543	557-8544
141 LB - #15 TURNOUT W/ SPRING SWITCH AND SPRING FROG, PREPLATED TIES	N/A	N/A	557-8547	557-8548

POWER OPERATED ITEM NUMBERS	BNSF L.H.	BNSF R.H.	UPRR L.H.	UPRR R.H.
136 LB - #15 TURNOUT W/ RBM FROG, PANEL (COMPLETE)	518789130	518789129	N/A	N/A
136 LB - #15 TURNOUT W/ SPRING FROG, PANEL (COMPLETE)	5187889132	518789131	N/A	N/A
136 LB - #15 TURNOUT W/ RBM FROG, PREPLATED TIES	N/A	N/A	557-8245	557-8246
136 LB - #15 TURNOUT W/ SPRING FROG, PREPLATED TIES	N/A	N/A	557-8240	557-8241
141 LB - #15 TURNOUT W/ RBM FROG, PANEL (COMPLETE)	518789226	518789227	N/A	N/A
141 LB - #15 TURNOUT W/ SPRING FROG, PANEL (COMPLETE)	518789232	518789233	N/A	N/A
141 LB - #15 TURNOUT W/ RBM FROG, PREPLATED TIES	N/A	N/A	557-8553	557-8554
141 LB - #15 TURNOUT W/ SPRING FROG, PREPLATED TIES	N/A	N/A	557-8551	557-8552

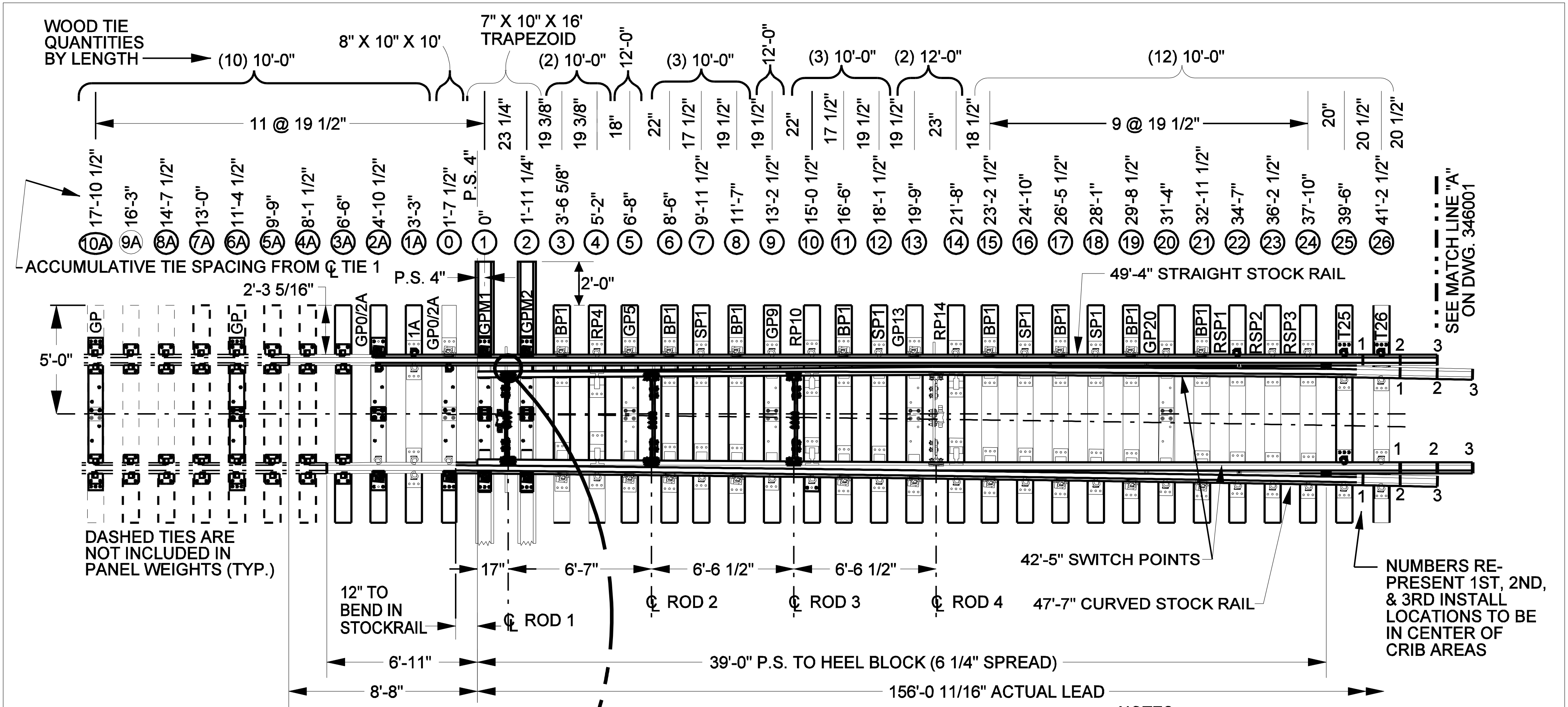
NOTES FOR MANUFACTURERS

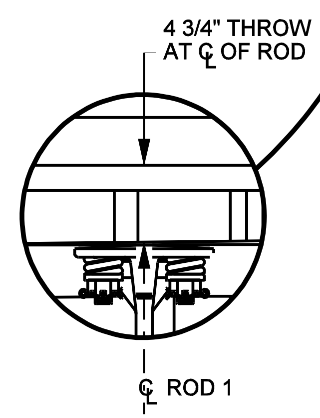
1. ALL MATERIAL TO MEET OR EXCEED RAILROADS RELATED SPECIFICATIONS.
2. SIGNAL DEPARTMENT TO FURNISH #1 ROD BASKET ADJUSTER AND DAP PLATING FOR MACHINE MOUNTING.
3. TRAPEZOID HEAD BLOCK TIES ARE DAPPED PER DWG 250000.

COMMON STANDARDS

NO. 15 TURNOUT 136/141 LB. WITH RBM AND SPRING FROGS, BILL OF MATERIALS

FILE OWNER: UPRR	DATE: MAY 2, 2008
REV. NO.: 5	DWG NO: 345200





THROW DETAIL

NOTES:
1. SEE DWGS 346001, 346002, 346003, AND 346004 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 346100 FOR TURNOUT GEOMETRY.
4. SEE DWG 346200 FOR TURNOUT BILL OF MATERIAL.
5. APPLY 5" SAFE BOND WIRES ONE CRIB AHEAD OF HEEL OF SWITCH ON STOCK AND SWITCH POINT RAILS.
6. PANEL WEIGHT = APPROXIMATELY 24,500 LBS.

	UPRR	BNSF LH	BNSF RH
136LB. POWER	N/A	518030099	518030067
136LB. MAN. SPRG.	N/A	518030101	518030100
141LB. POWER	N/A	518030144	518030145
141LB. MAN. SPRG.	N/A	518030146	518030147

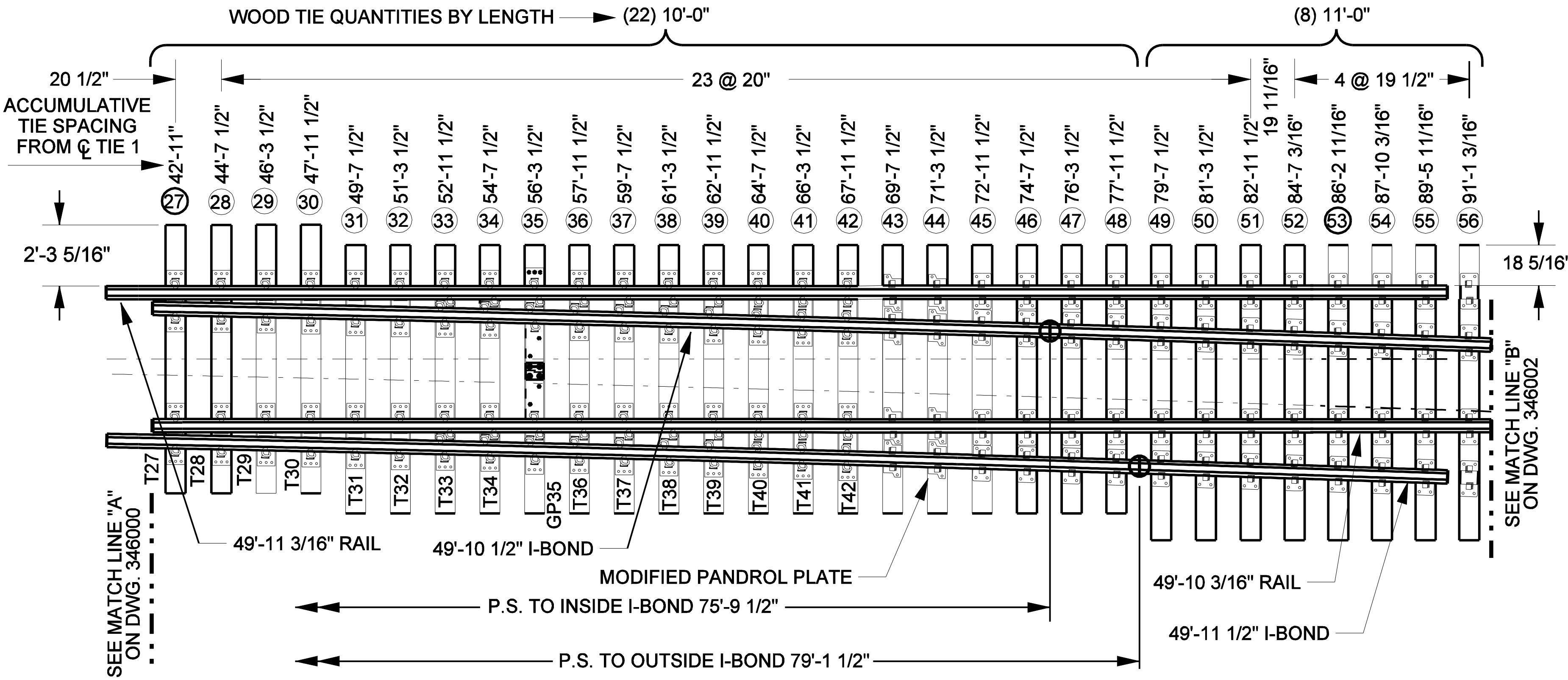
BNSF RAILWAY

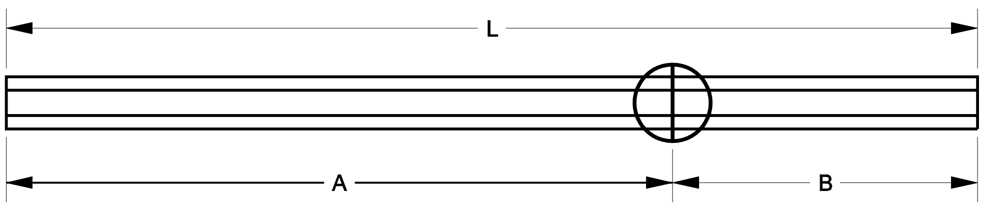
UNION PACIFIC

NO. 20 TURNOUT 136/141 LB. PANEL NO. 1

FILE OWNER: UPRR | DATE: MAY 16, 2008

REV. NO.: 2 | DWG NO: 346000





NOTES:
1. SEE DWGS 346000, 346002, 346003, AND 346004 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY ON THIS DWG.
3. SEE DWG 346100 FOR TURNOUT GEOMETRY.
4. SEE DWG 346200 FOR TURNOUT BILL OF MATERIAL.
5. PANEL WEIGHT = APPROXIMATELY 24,000 LBS.

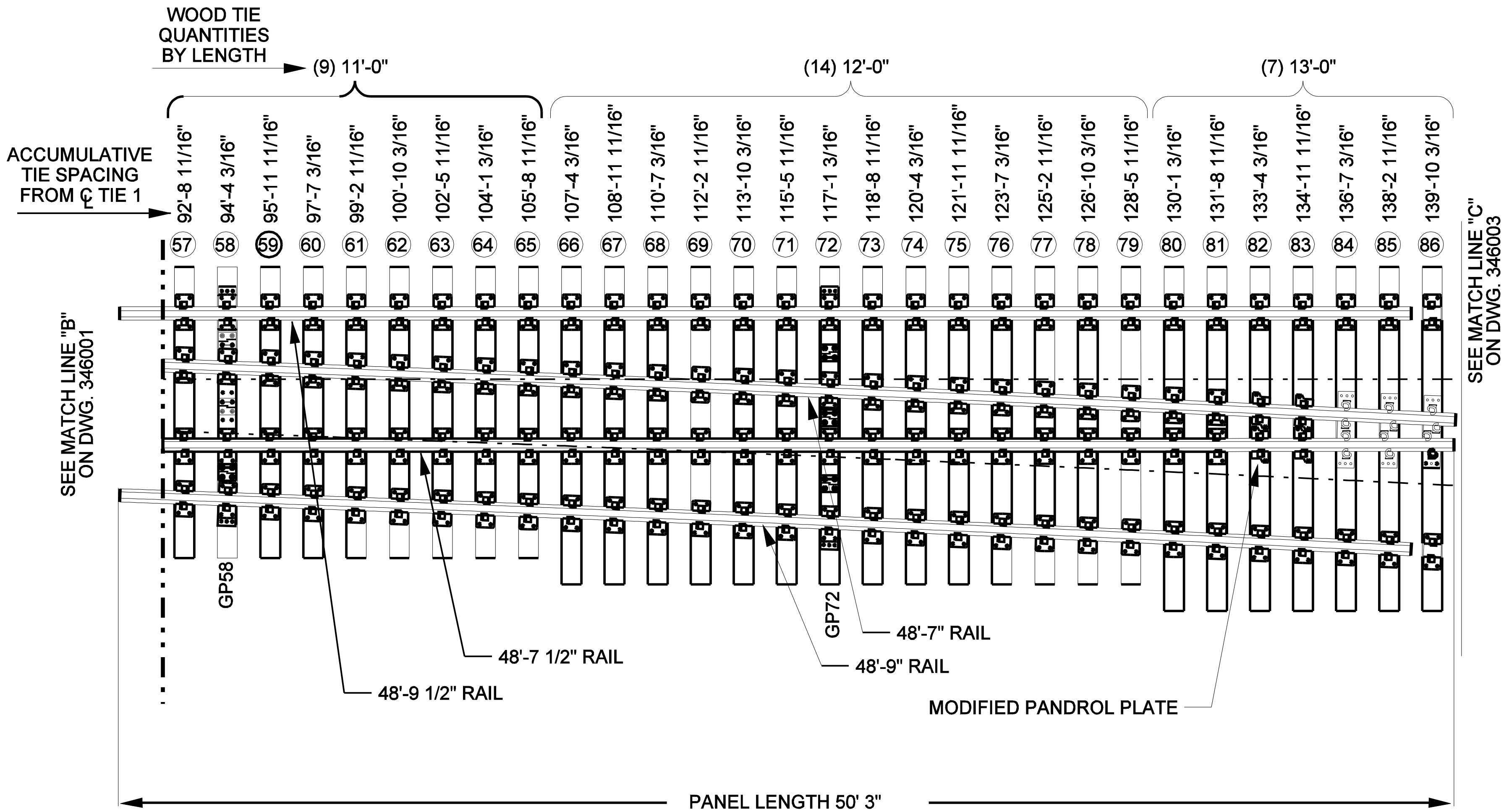
	A	B	L	136 LB. BNSF ITEM NO.	141 LB. BNSF ITEM NO.
CLOSURE INSULATED JOINT RAIL	33'-5"	16'-5 1/2"	49'-10 1/2"	524400038	524400074
TURNOUT INSULATED JOINT RAIL	38'-5 1/2"	11'-6"	49'-11 1/2"	524400036	524400075

BNSF RAILWAY

UNION PACIFIC

NO. 20 TURNOUT 136/141 LB. PANEL NO. 2

FILE OWNER: UPRR	DATE: MAY 7, 2008
REV. NO.: 3	DWG NO: 346001

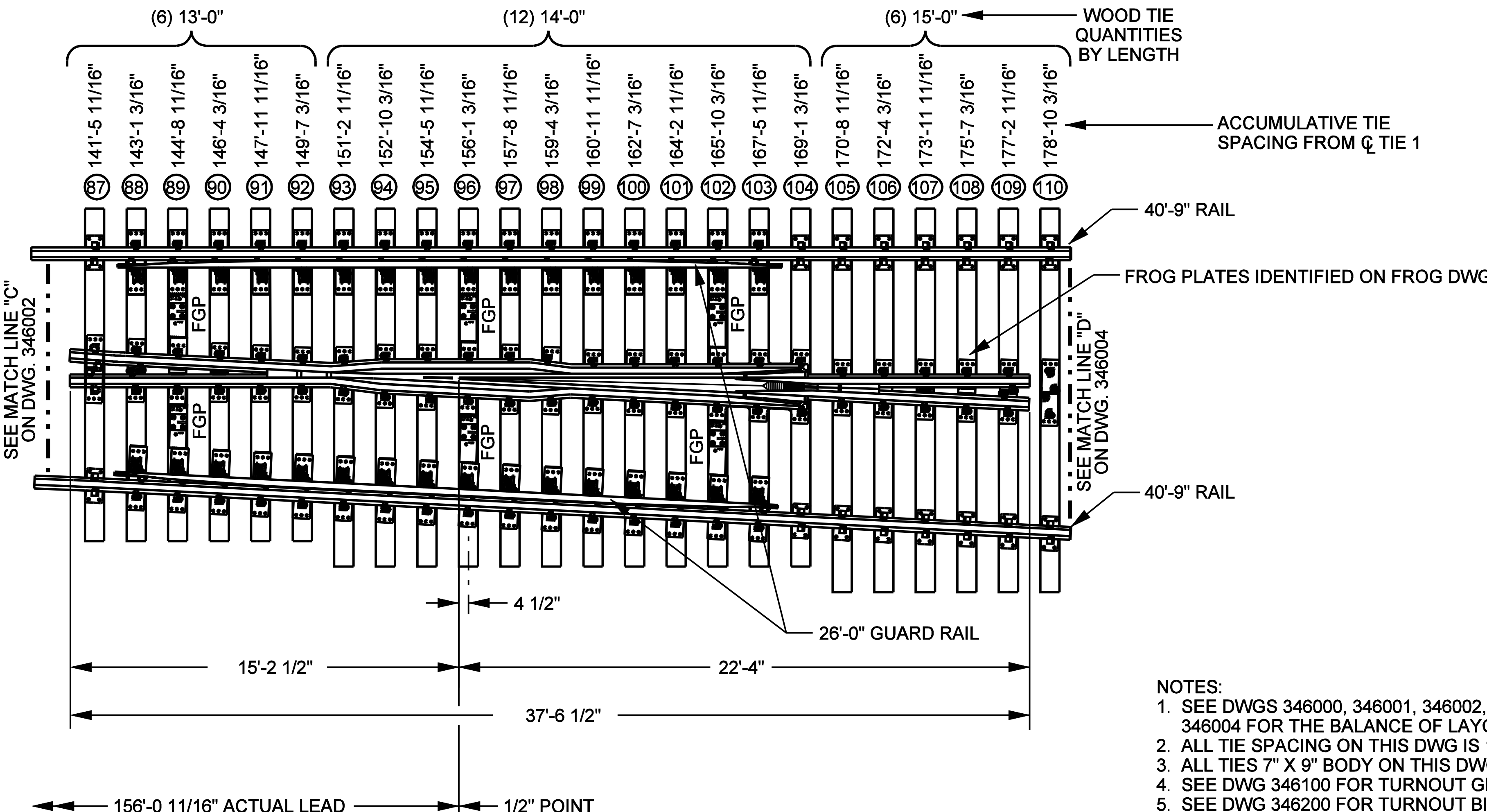


NOTES:
1. SEE DWGS 346000, 346001, 346003, AND 346004 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIE SPACING ON THIS DWG IS 19 1/2".
3. ALL TIES 7" X 9" BODY ON THIS DWG.
4. SEE DWG 346100 FOR TURNOUT GEOMETRY.
5. SEE DWG 346200 FOR TURNOUT BILL OF MATERIAL.
6. PANEL WEIGHT = APPROXIMATELY 26,500 LBS.

BNSF RAILWAY

NO. 20 TURNOUT 136/141 LB. PANEL NO. 3

FILE OWNER: UPRR	DATE: MAY 7, 2008
REV. NO.: 4	DWG NO: 346102



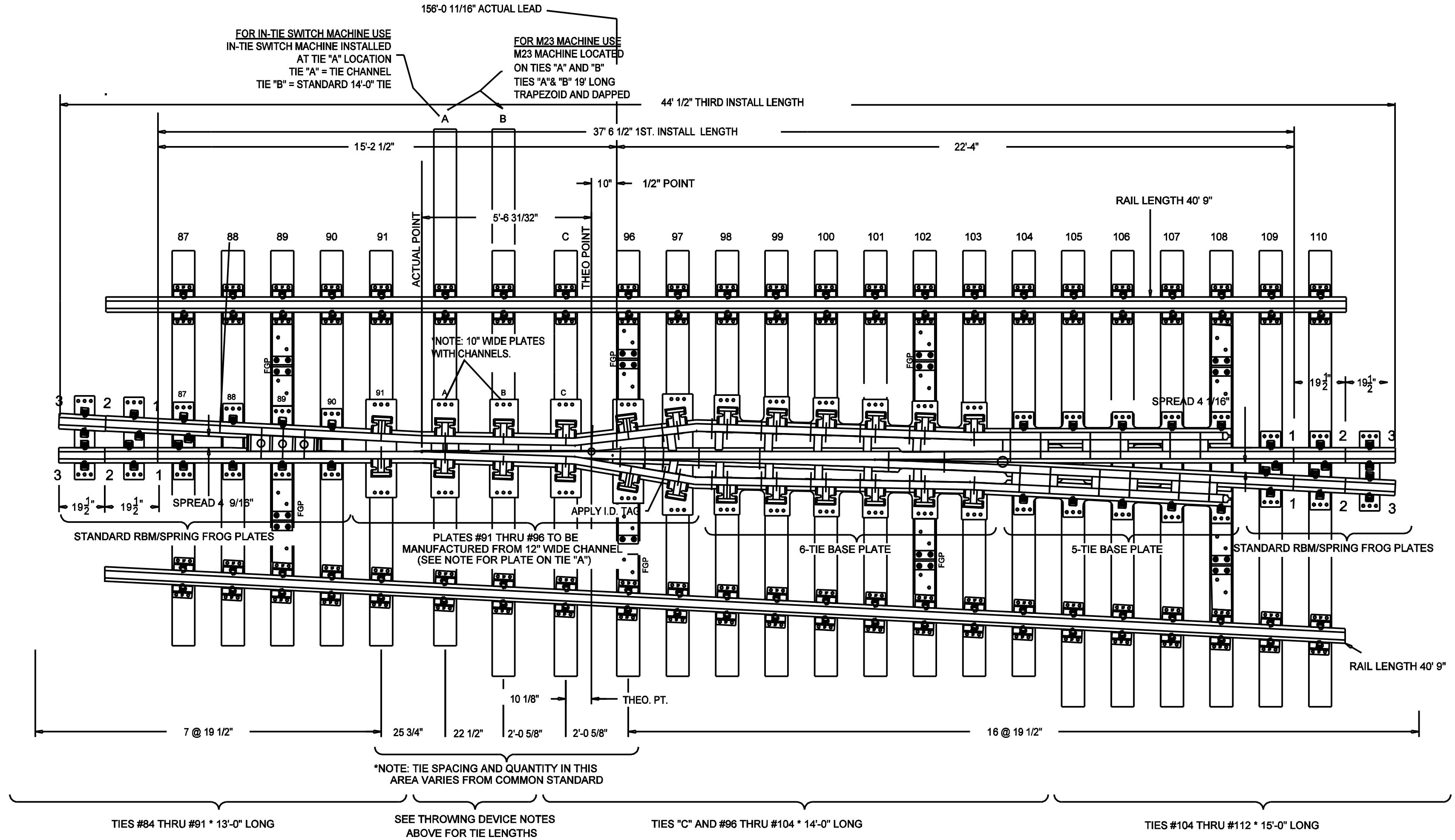
NOTES:
1. SEE DWGS 346000, 346001, 346002, AND 346004 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIE SPACING ON THIS DWG IS 19 1/2".
3. ALL TIES 7" X 9" BODY ON THIS DWG.
4. SEE DWG 346100 FOR TURNOUT GEOMETRY.
5. SEE DWG 346200 FOR TURNOUT BILL OF MATERIAL.
6. PANEL WEIGHT = APPROXIMATELY 31,000 LBS.

	136 LB.		141 LB.	
	BNSF RH	BNSF LH	BNSF RH	BNSF LH
RBM	004710422	004710414	005252853	005252846
SPRING	004710422	004710430	005252879	005252861

BNSF RAILWAY

NO. 20 TURNOUT 136/141 LB. PANEL NO. 4

FILE OWNER: BNSF	DATE: MAY 7, 2008
REV. NO.: 5	DWG NO: 346103



NOTES:

1) BODY BOLTS TO BE GRADE 8, 1 3/8" DIAMETER, HEX HEAD W/ FLAT WASHER AND LOCK NUT. FINAL BOLT TORQUE TO BE 2200 FT./LBS. LUBRICATED USING "NEVER SEIZE" ON THE BOLT THREADS, WASHER AND NUT FACE. TORQUE DEVICE MAY BE MANUAL, PNEUMATIC OR HYDRAULIC.
2) PANEL SHIPPING WEIGHT TO BE STENCILED ON RAIL HEAD WITH WHITE PAINT.
3) ID TAGS TO BE ATTACHED AS NEAR THE POINT AS POSSIBLE WHERE THEY CAN BE CLEARLY READ.
4) RAIL ENDS BLANK.
5) TIES FOR SWITCH MACHINE WILL BE DAPPED AND TRAPEZOID. REMAINING SWITCH TIES ARE 10" WIDE.
6) PROVIDE A SLOT WITH EASEMENT THAT ALLOWS FOR A 5/8"x 1 1/4" OPENING FOR A CALROD HEATER IN WING/ FROG AREA.
7) FOR NEW APPLICATION, CUT TO 1st. LENGTH, MAINTENANCE LENGTH IS 3rd INSTALL.
8) LOCATION OF 1/2" POINT OF FROG WILL BE MARKED ON BOTH WING RAILS.
9) 1ST INSTALL LENGHT IS LONGER COMPARED TO RBM/SPRING FROG PANEL DUE TO SHORTER BASE TO BASE CLEARANCE ON THE TOE AND HEEL END.

RH FROG SHOWN

PANEL WEIGHT 31,294 LBS

	STOCK CODE
# 20 MPF 141LB RH POWER TURNOUT W/ INSULATED JOINTS	004738340
# 20 MPF 141LB LH POWER TURNOUT W/ INSULATED JOINTS	004738357

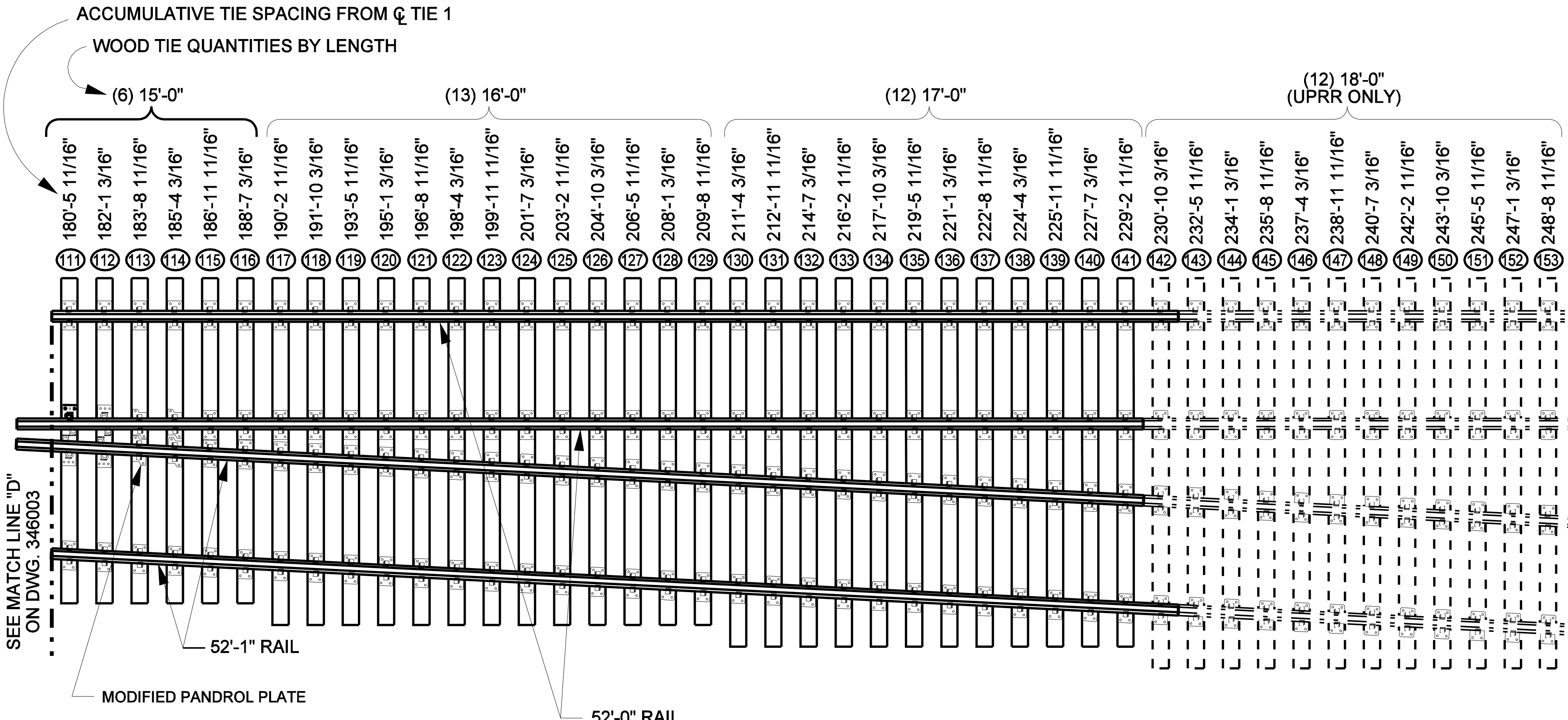
BNSF RAILWAY

BNSF STANDARD PLAN

NO. 20 MOVABLE POINT FROG
141 & 136 LB. PANEL NO. 4

FILE OWNER: BNSF | DATE: MAY 7, 2009
REV. NO. 07 | DWG NO: 346210

22-22A



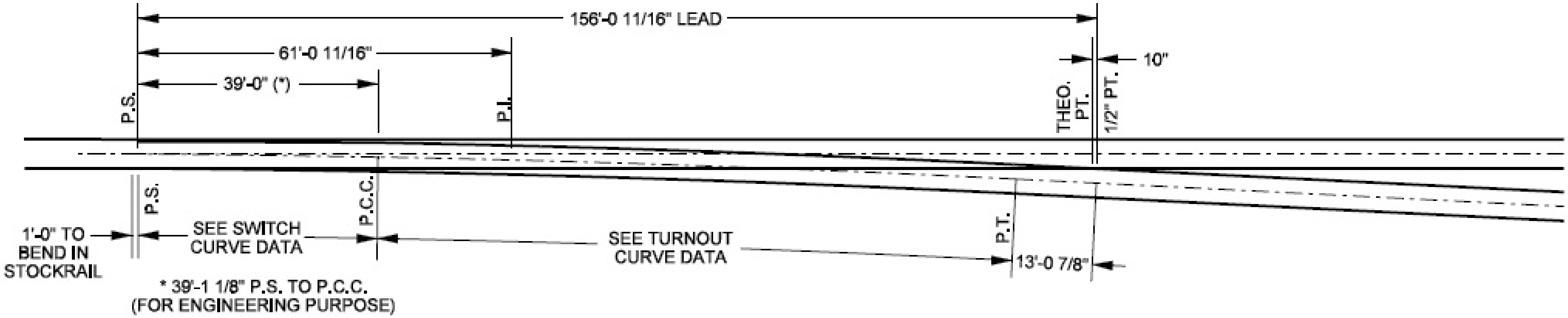
NOTES:
1. SEE DWGS 346000, 346001, 346002, AND 346003 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIE SPACING ON THIS DWG IS 19 1/2".
3. ALL TIES 7" X 9" BODY ON THIS DWG.
4. SEE DWG 346100 FOR TURNOUT GEOMETRY.
5. SEE DWG 346200 FOR TURNOUT BILL OF MATERIAL.
6. PANEL WEIGHT = APPROXIMATELY 31,750 LBS.

BNSF RAILWAY

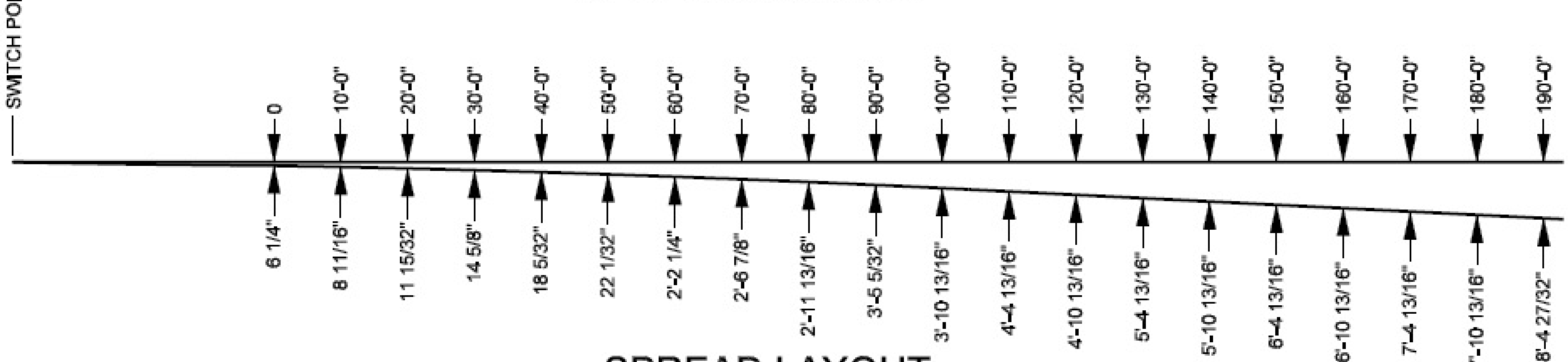
UNION PACIFIC

NO. 20 TURNOUT 136/141 LB.
PANEL NO. 5

FILE OWNER: UPRR	DATE: MAY 7, 2008
REV. NO.: 1	DWG NO: 346004



GENERAL LAYOUT



SPREAD LAYOUT

SWITCH DATA		
	SWITCH LENGTH	39'-0"
	HEEL SPREAD	6 1/4"
	HEEL ANGLE	0°-59'-02"
	SWITCH ANGLE	0°-32'-45"
	THROW AT ROD #1	4 3/4"
	RADIUS (CENTER LINE)	5103.26'
	T =	19.5'
	CENTRAL ANGLE - CLOSURE CURVE	0°-26'-16"
	DEGREE OF CURVE	1°-07'-22"
TURNOUT POINT	THICKNESS AT POINT	1/4"
	RADIUS (CLOSURE CURVE)	5105.62'
	VERTEX DISTANCE	12"

FROG DATA	
ANGLE	2°-51'-51"
LENGTH	VARIES

TURNOUT DATA	
RADIUS OF CENTER LINE	3329.66'
T =	51.99'
CENTRAL ANGLE - CLOSURE CURVE	1°-47'-21"
DEGREE OF CURVE	1°-43'-15"

NOTES:

COMMON STANDARDS

NO. 20 TURNOUT WITH 39'-0" CURVED SWITCH, TURNOUT GEOMETRY

FILE OWNER: UPRR	DATE: JAN. 14, 2003
REV. NO.: 0	DWG NO: 346100

QTY.	COMPONENT DESCRIPTION	DWG. NO.	BNSF ITEM NO.	UPRR ITEM NO.
1	39'-0" (EXT. 42'-5") STRT SAMSON SWITCH POINT (NO TIP)	246100	SEE DWG	SEE DWG
1	39'-0" (EXT. 42'-5") CURVED SAMSON SWITCH POINT (W/TIP)	246100	SEE DWG	SEE DWG
1 EA.	49'-4" STRAIGHT & 47'-7" BENT/CURVED SAMSON STOCK RAIL	241500	SEE DWG	SEE DWG
1	SWITCH ROD NO. 1 W/ BASKET	241601	516620011	557-5585
1 EA.	SWITCH RODS NO. 2 AND 3	241600	SEE DWG	557-5586
1	SWITCH ROD NO. 4 W/ BASKET	241601	516620013	557-5588
2	"GP" GAGE PLATE FOR TIES 6A & 10A AHEAD OF POINT	241304	515821526	N/A
2	"1A" PLATE FOR TIE #1A AHEAD OF POINT	241307	515821539	N/A
2	"GP0/2A" ADJUSTABLE BRACE GAGE PLATE FOR TIES #0 & 2A	241301	515821504	N/A
1	"GPM1L/R" ADJUSTABLE BRACE MACHINE GAGE PLATE FOR TIE #1	241302	SEE DWG	SEE DWG
1	"GPM2L/R" ADJUSTABLE BRACE MACHINE GAGE PLATE FOR TIE #2	241303	SEE DWG	SEE DWG
16	"BP1" ADJUSTABLE BRACE SLIDE PLATE	241306	515821532	557-2960
8	"SP1" SLIDE PLATE	241306	515821533	557-2961
2	"RP4" ROLLER RISER PLATE	241309	515821557	SEE DWG
2	"RP10" ROLLER RISER PLATE	241309	515821558	SEE DWG
2	"RP14" ROLLER RISER PLATE	241309	515821559	SEE DWG
6	ROLLER ASSEMBLY	241309	516650007	SEE DWG
1	"GP5" & "GP13" GAGE PLATES FOR TIES #5 & #13	246300	SEE DWG	N/A
1	"GP9" & "GP20" GAGE PLATE FOR TIES #9 & #20	246301	SEE DWG	N/A
2	"RSP1", "RSP2", AND "RSP3" RISER SLIDE PLATES	243309	SEE DWG	N/A
2	TURNOUT PLATES T25 THRU T42	246307	515861711	557-8995
1	"GP35" GAGE PLATE FOR TIE 35	246311	SEE DWG	SEE DWG
1	"GP58" GAGE PLATE FOR TIE 58	246312	SEE DWG	SEE DWG
1	"GP72" GAGE PLATE FOR TIE 72	246313	SEE DWG	SEE DWG
*1	35'-11" RBM FROG WITH PLATES (*RBM OR SPRING PER OPTION)	158100/200	SEE DWG	SEE DWG
6	"FGP" FROG GAGE PLATE	156000	515821497	555-6806
2	26'-0" BOLTLESS ADJUSTABLE GUARD RAIL	160100	516240058	556-6021
242	STANDARD ROLLED STEEL PANDROL PLATES	263000	525820956	503-9020
16	MODIFIED PANDROL TIE PLATE	263001	N/A	N/A
902	PANDROL CLIP E-2055	132500	521710020	503-6100
8	PANDROL INSULATED JOINT CLIP ASSEMBLY	132800	SEE DWG	SEE DWG
1	CLOSURE INSULATED JOINT RAIL 49'-10 1/2"	346001	524400038	N/A
1	TURNOUT INSULATED JOINT RAIL 49'-11 1/2"	346001	524400036	N/A
1804	15/16" DIA. x 6 1/2" LG. "RAILROAD APPROVED" SCREW SPIKES	130800	527570012	503-8620
2208	RAIL ANCHORS FOR BNSF	135010	520130012	N/A
616	RAIL ANCHORS FOR UPRR	135010	N/A	550-1650
587	136 OR 141 LB. RAIL (IN LINEAR FT.)	176000	N/A	N/A

BILL OF TIES

QTY.	SIZE	TIE NUMBER
10	7" X 9" X 10'-0"	1A THRU 10A
1	8" X 10" X 10'-0"	0
2	7" X 10" X 16'-0" TRAPEZOID TIES	1 & 2
46	7" X 9" X 10'-0"	3 THRU 48
17	7" X 9" X 11'-0"	49 THRU 65
14	7" X 9" X 12'-0"	66 THRU 79
13	7" X 9" X 13'-0"	80 THRU 92
12	7" X 9" X 14'-0"	93 THRU 104
12	7" X 9" X 15'-0"	105 THRU 116
13	7" X 9" X 16'-0"	117 THRU 129
12	7" X 9" X 17'-0"	130 THRU 141
152 TOTAL		

ITEM NUMBERS	BNSF LH	BNSF RH	UPRR LH	UPRR RH
136 LB - #20TURNOUT W/ RBM FROG, PANEL (COMPLETE)	518789134	518789133	N/A	N/A
136 LB - #20 TURNOUT W/ SPRING FROG, PANEL (COMPLETE)	518789136	518789135	N/A	N/A
136 LB - #20TURNOUT W/ RBM FROG, PANEL (COMPLETE) WITH MANUAL THROW SPRING SWITCHES	518789152	518789153	N/A	N/A
136 LB - #20 TURNOUT W/ SPRING FROG, PANEL (COMPLETE) WITH MANUAL THROW SPRING SWITCHES	518789154	518789155	N/A	N/A
136 LB - #20 TURNOUT W/ RBM FROG, PO, PPTO	N/A	N/A	557-8407	557-8408
136 LB - #20 TURNOUT W/ SPRING FROG, PO, PPTO	N/A	N/A	557-8409	557-8410
141 LB - #20 TURNOUT W/ RBM FROG, PO, PPTO	N/A	N/A	557-8563	557-8564
141 LB - #20 TURNOUT W/ SPRING FROG, PO, PPTO	N/A	N/A	557-8565	557-8566

NOTES FOR MANUFACTURERS

1. ALL MATERIAL TO MEET OR EXCEED RAILROADS RELATED SPECIFICATIONS.
2. SIGNAL DEPARTMENT TO FURNISH ROD BASKETS, ADJUSTER, AUXILARY THROWING DEVICE, AND DAP PLATING FOR MACHINE MOUNTING WHEN REQUIRED.
3. TRAPEZOID HEAD BLOCK TIES ARE DAPPED PER STD DWG 250000.

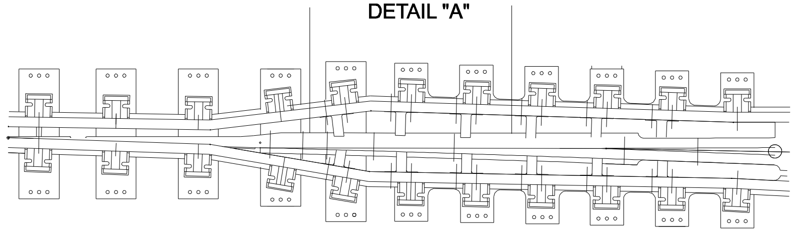
BNSF RAILWAY

UNION PACIFIC

NO. 20 TURNOUT WITH RBM AND SPRING FROGS 136/141 LB. BILL OF MATERIALS

FILE OWNER: UPRR | DATE: JUNE 25, 2008

REV. NO.: 4 | DWG NO: 346200



PROGRESS RAIL FROGS

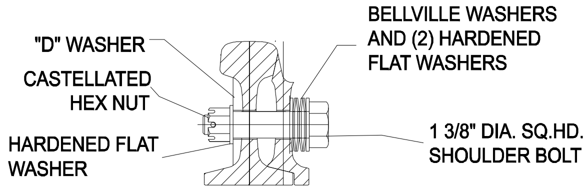
NORTRAK FROGS

POINT ASSEMBLY BOLT SCHEDULE

BOLT TO BE 1" SQ.HD x DRILLED @ "L"
* COMPLETE W/ BELLVILLE WASHERS,
4 HARDENED FLAT WASHERS, AND
CASTELLATED HEX NUT & COTTER PIN

BOLT#	"L"	BNSF PART NUM.
#1	4 1/8"	510282029
#2	4 1/4"	510282030
#3	4 3/8"	510282031
#4	4 3/8"	510282031
#5	4 3/4"	510282032
#6	4 3/4"	510282032
#7	5"	510282033
#8	5 1/4"	510282034
#9	5 3/4"	510282035
#10	6 3/4"	510282036

FOR OLD STYLE FROGS ON ORIN
SUB FROM MP 39
TO MP 56 AND MARIETTA, SD



POINT ASSEMBLY BOLT SCHEDULE

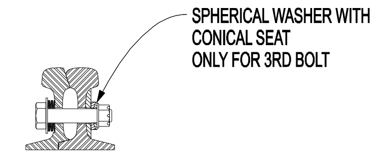
SHOULDER BOLTS TO BE 1 3/8" SQ.HD
* COMPLETE W/ BELLVILLE WASHERS,
(3) HARDENED FLAT WASHERS, AND
CASTELLATED HEX NUT & COTTER PIN

BOLT#	"A"	"B"	PART No.
#1	3 3/4"	4 5/8"	
#2	4"	4 7/8"	
#3	4 3/4"	5 5/8	

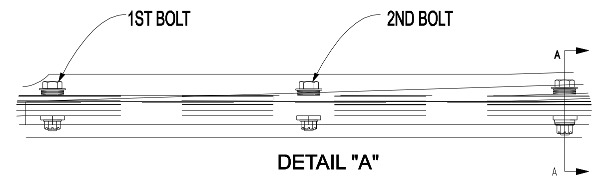
BOLT#	"L"
#4	5 3/4"
#5	6 3/4"

BOLT TO BE 1" SQ.HD x DRILLED @ "L"
* COMPLETE W/ BELLVILLE WASHERS,
4 HARDENED FLAT WASHERS, AND
CASTELLATED HEX NUT & COTTER PIN

FOR FROGS MADE AFTER JULY 2006



SECTION A-A



DETAIL "A"

BOLT LOCATION	SPACER BOLT SIZE	BNSF PART NUM.
BOLT #1 & #2	1 3/8"X 5 9/16"	510282027
BOLT #3	1 3/8" X 6"	510282028

BNSF RAILWAY

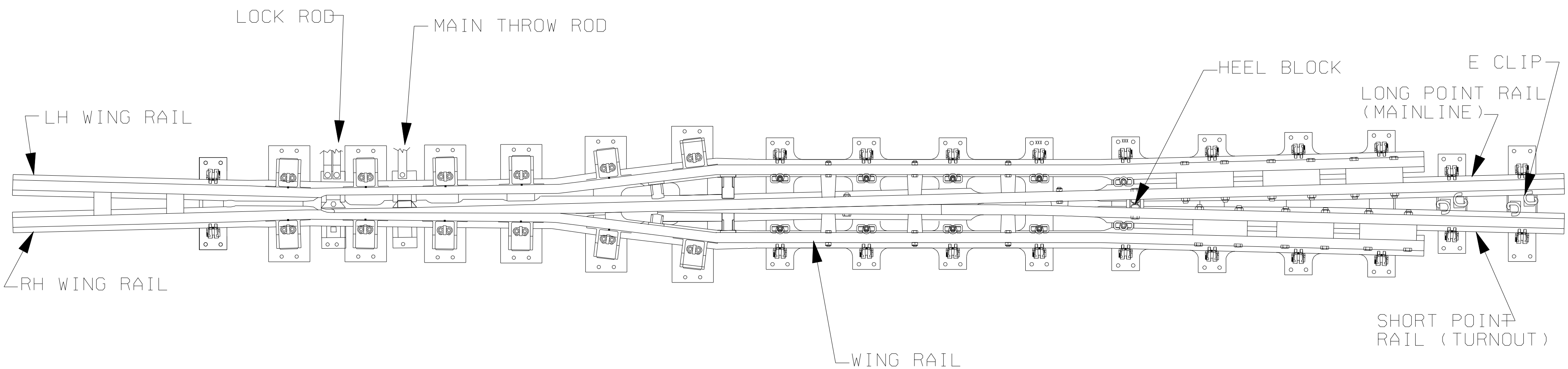
STANDARD PLAN

SHORT AND LONG POINT
ASSEMBLEY #20
SWING NOSE FROG

FILE OWNER: BNSF | DATE: JULY 17, 2006
REV. NO. 1 | DWG NO: 346215

NOTES
FROG INSPECTION MUST INCLUDE BOLTS AS SHOWN ON DRAWING.
BROKEN OR BENT BOLTS MUST BE REPLACED IMMEDIATLELY.

22-25B



ITEM DESCRIPTION	MAINTENANCE LENGTH	BNSF PART NUMBER
LONG POINT RAIL LH	25'-7" HEEL	516241007
LONG POINT RAIL RH	25'-7" HEEL	516241008
SHORT POINT RAIL LH	25'-7" HEEL	516241009
SHORT POINT RAIL RH	25'-7" HEEL	516241010
WING RAIL LH	16' 10" TOE	516241011
WING RAIL RH	16' 10" TOE	516241012

WEIGHTS

LONG POINT	1418 LBS
SHORT POINT	1058 LBS
WING RAIL	1632 LBS

BNSF RAILWAY

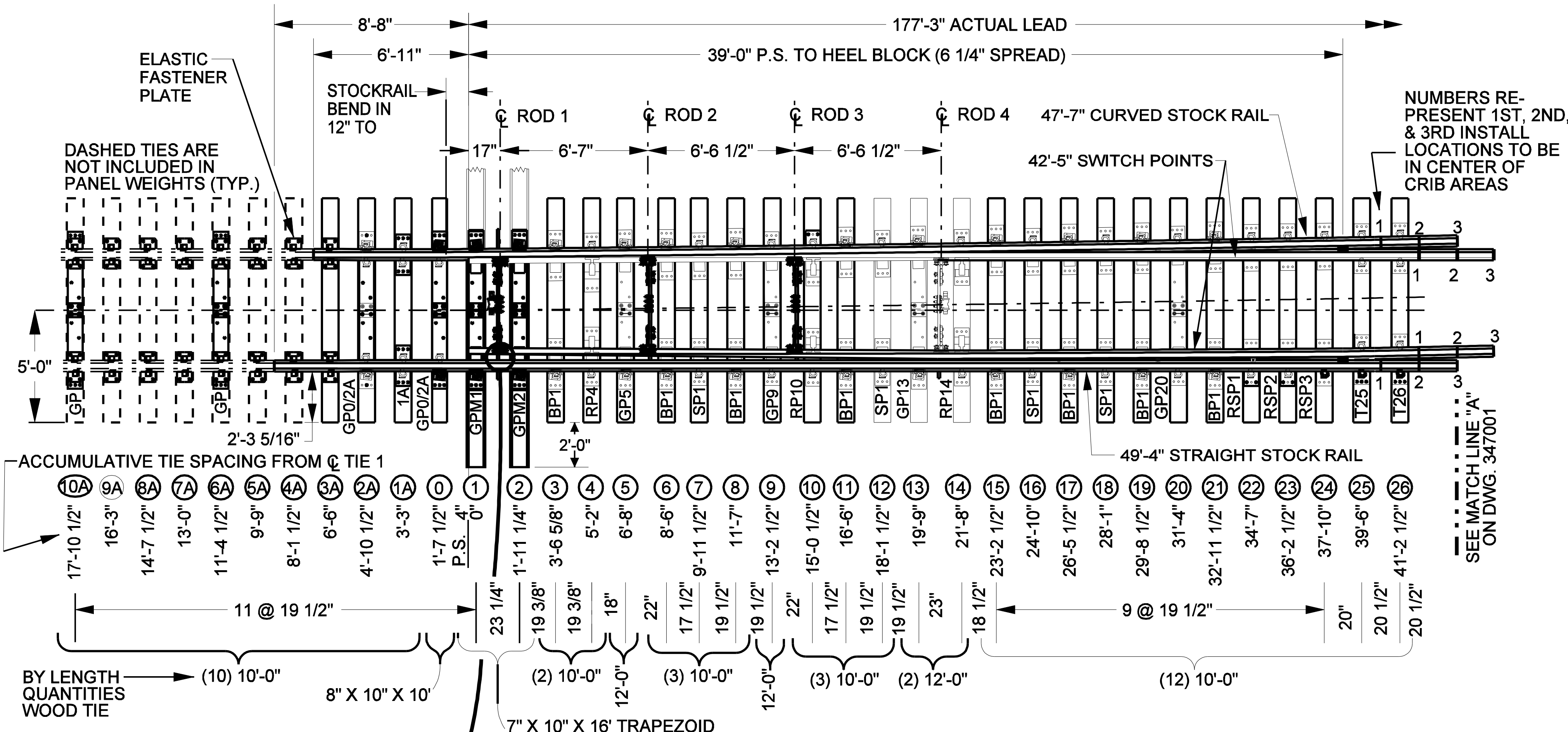
STANDARD PLAN

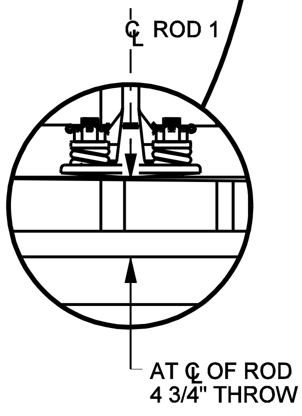
POINT AND WING RAILS
FOR #20 SWING NOSE FROG
NORTRAK DESIGN 141LB

REV. NO.: 0 | SHEET NO. 0 | DATE: 11/13/ 06

DWG NO: 346216

22-25C





THROW DETAIL

NOTES:

1. SEE DWGS 347001 THROUGH 347006 FOR THE BALANCE OF LAYOUT PLANS. 347006 IS ONLY USED BY UPRR.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 347100 FOR TURNOUT GEOMETRY.
4. SEE DWG 347200 FOR TURNOUT BILL OF MATERIAL.
5. APPLY 5" SAFE BOND WIRES ONE CRIB AHEAD OF HEEL OF SWITCH ON STOCK AND SWITCH POINT RAILS.
6. PANEL WEIGHT = APPROXIMATELY 24,500 LBS.

	UPRR	BNSF LH	BNSF RH
136LB. POWER	N/A	518030070	518030148
141LB. POWER	N/A	518030149	518030150

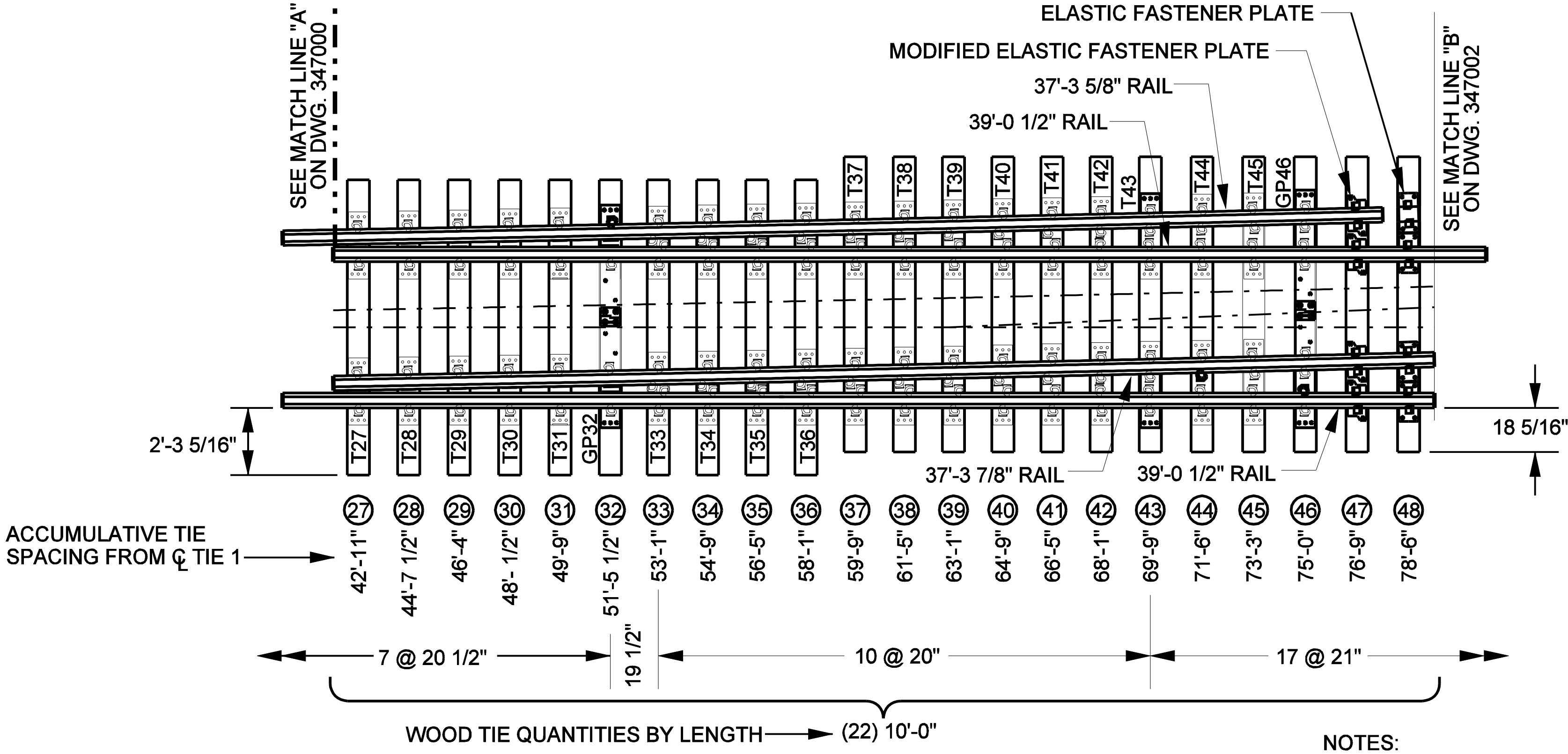
BNSF RAILWAY

UNION PACIFIC

COMMON STANDARDS

NO. 24 TURNOUT 136/141 LB.
PANEL NO. 1

FILE OWNER: UPRR	DATE: MAY 16, 2008
REV. NO.: 2	DWG NO: 347000



NOTES:

1. SEE DWGS 347000 AND 347002 THROUGH 347006 FOR THE BALANCE OF LAYOUT PLANS. 347006 IS ONLY USED BY UPRR.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 347100 FOR TURNOUT GEOMETRY.
4. SEE DWG 347200 FOR TURNOUT BILL OF MATERIAL.
5. PANEL WEIGHT = APPROXIMATELY 16,600 LBS.

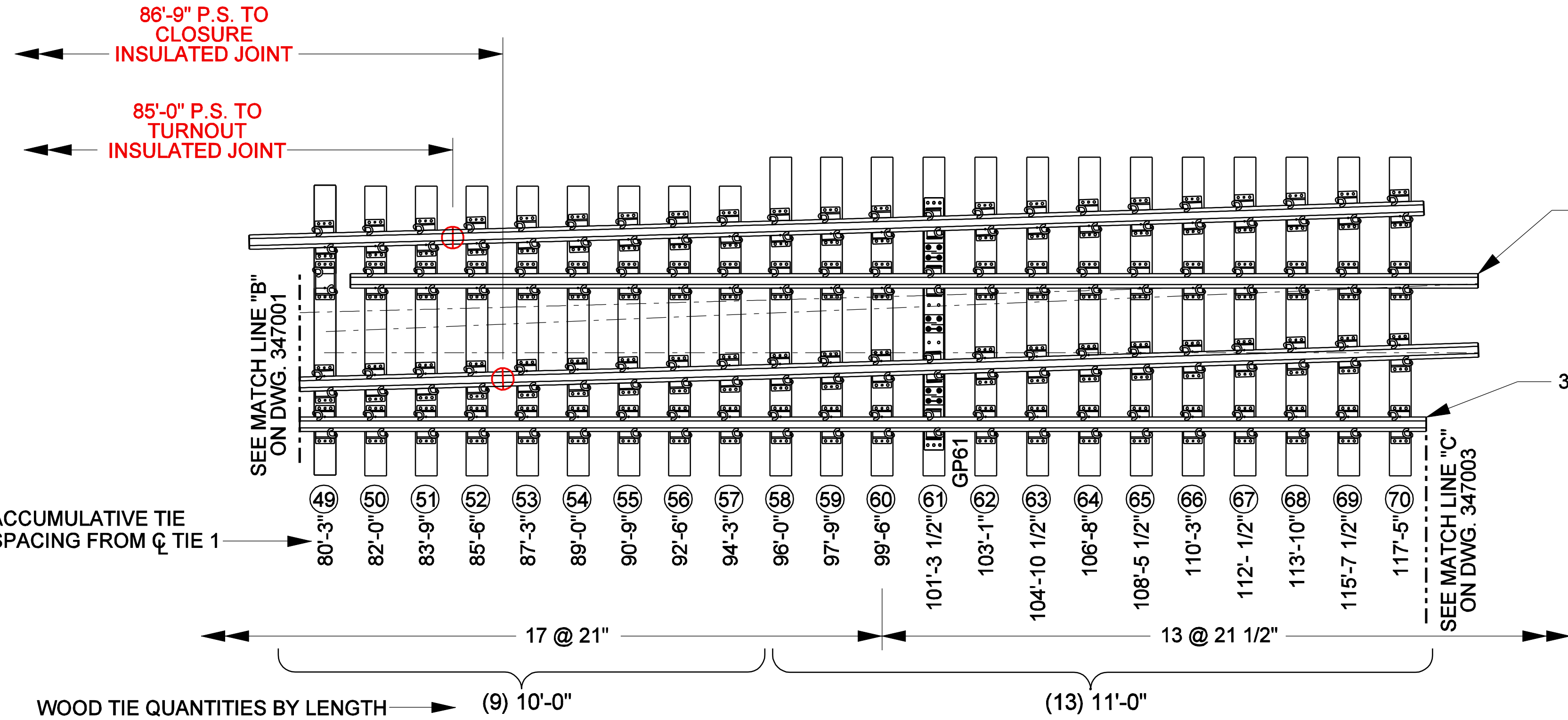
BNSF RAILWAY

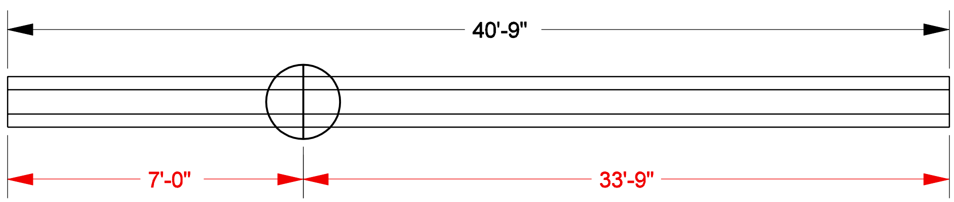
UNION PACIFIC

COMMON STANDARDS

NO. 24 TURNOUT 136/141 LB.
PANEL NO. 2

FILE OWNER: UPRR	DATE: MAY 8, 2008
REV. NO.: 1	DWG NO: 347001





TURNOUT AND CLOSURE INSULATED JOINT RAIL

(BNSF ITEM NO. 524400040)

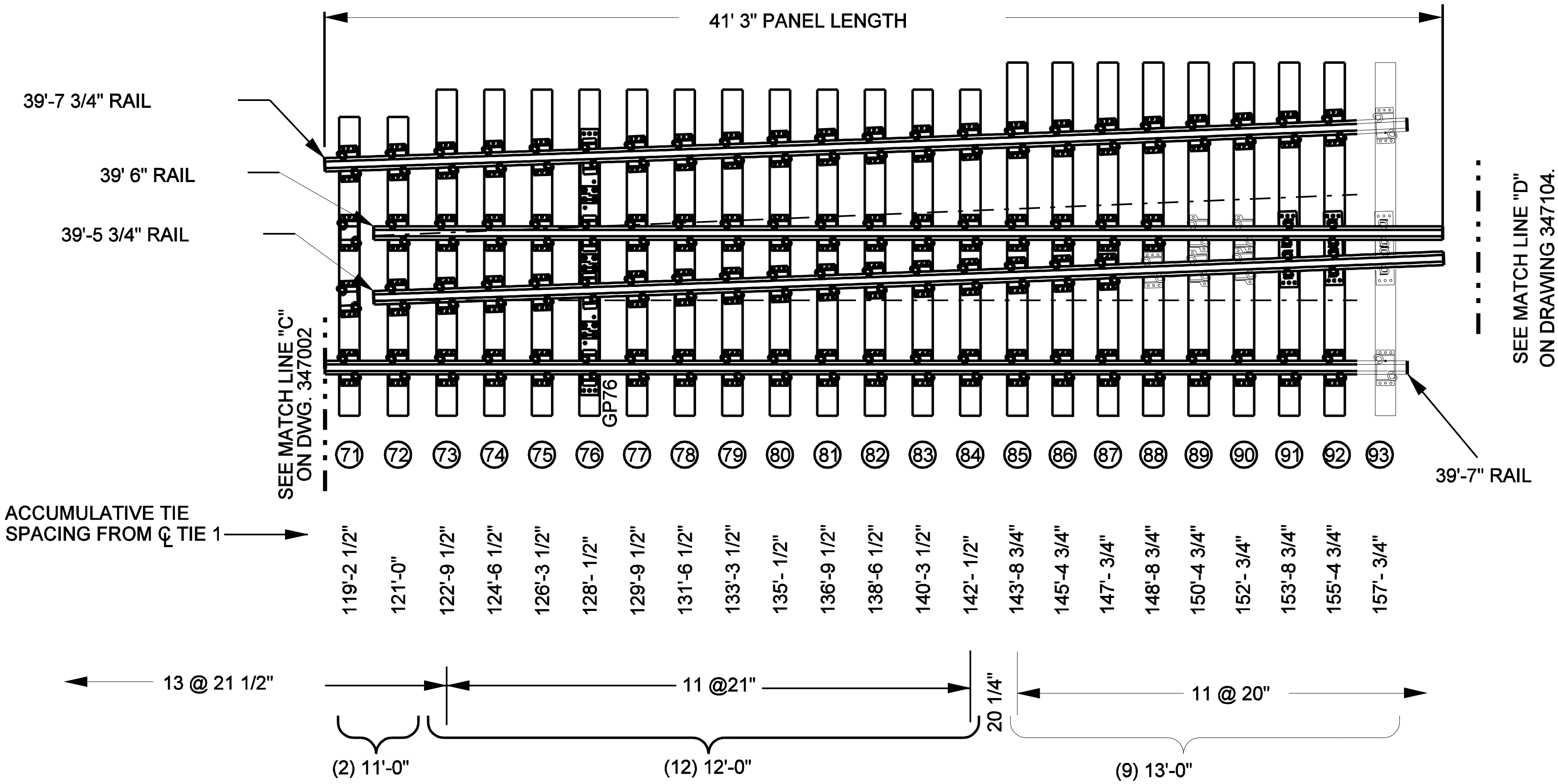
NOTES:
1. SEE DWGS 347000, 347001, 347003, 347004, 347005, AND 347006 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 347100 FOR TURNOUT GEOMETRY.
4. SEE DWG 347200 FOR TURNOUT BILL OF MATERIAL.
5. PANEL WEIGHT = APPROXIMATELY 18,450 LBS.

COMMON STANDARDS

NO. 24 TURNOUT 136 LB. PANEL NO. 3

FILE OWNER: UPRR	DATE: FEB. 11, 2004
REV. NO.: 2	DWG NO: 347002

347002



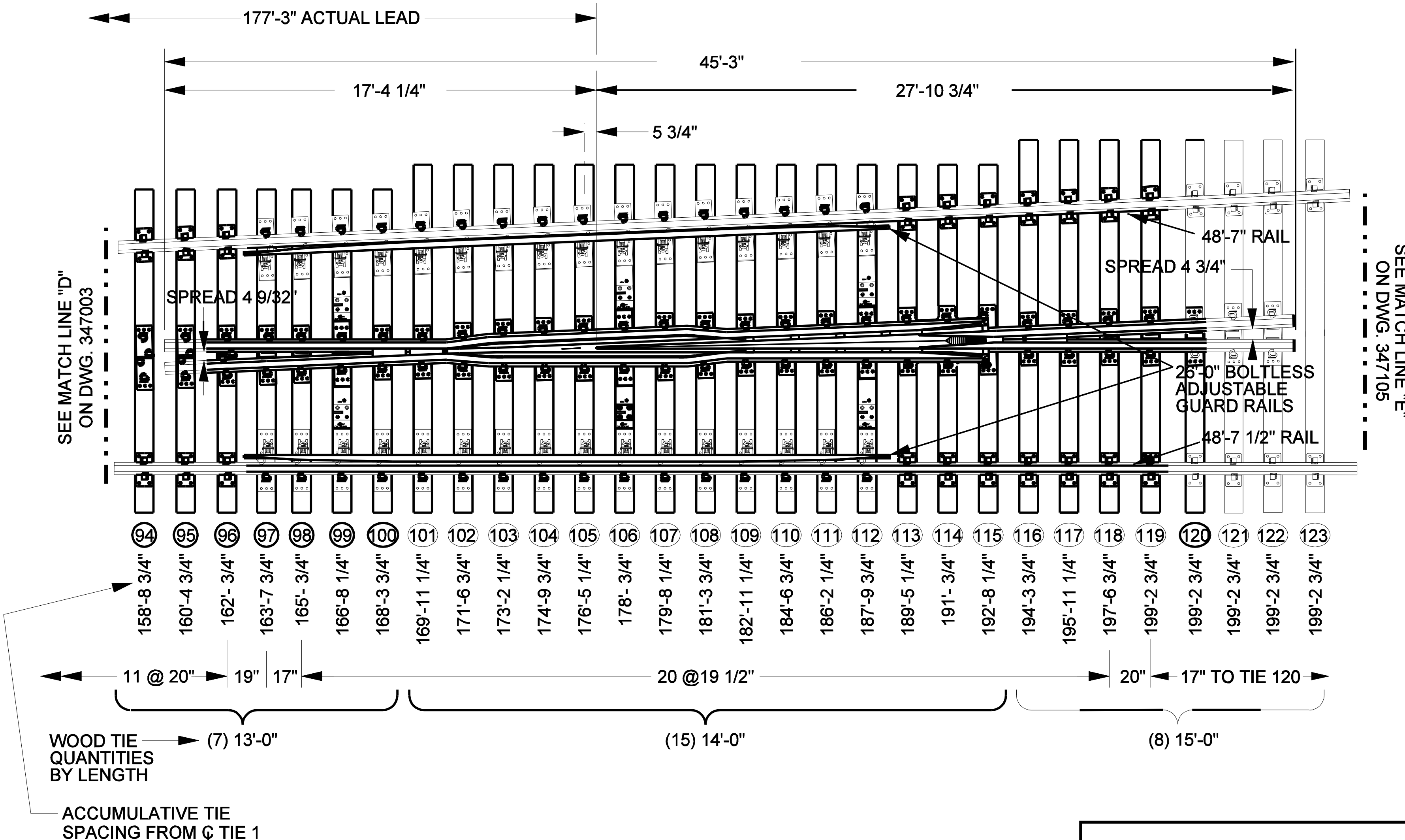
NOTES:
1. SEE DWGS 347000, 347001, 347002, 347104, 347105, AND 347006 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 347100 FOR TURNOUT GEOMETRY.
4. SEE DWG 347200 FOR TURNOUT BILL OF MATERIAL.
5. PANEL WEIGHT = APPROXIMATELY 18,750 LBS.

BNSF RAILWAY

STANDARD PLAN

NO. 24 TURNOUT 136/141 LB.
PANEL NO. 4

SCALE: NONE	FILE OWNER BNSF	DATE: MAR 8, 2007
	REV. NO.: 04	DWG NO: 347103



NOTES:
1. SEE DWGS 347000 THROUGH 347003, 347005, AND 347006 FOR THE BALANCE OF LAYOUT PLANS. 347006 IS ONLY USED BY UPRR.
2. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
3. SEE DWG 347100 FOR TURNOUT GEOMETRY.
4. SEE DWG 347200 FOR TURNOUT BILL OF MATERIAL.
5. PANEL WEIGHT = APPROXIMATELY 24,650 LBS.

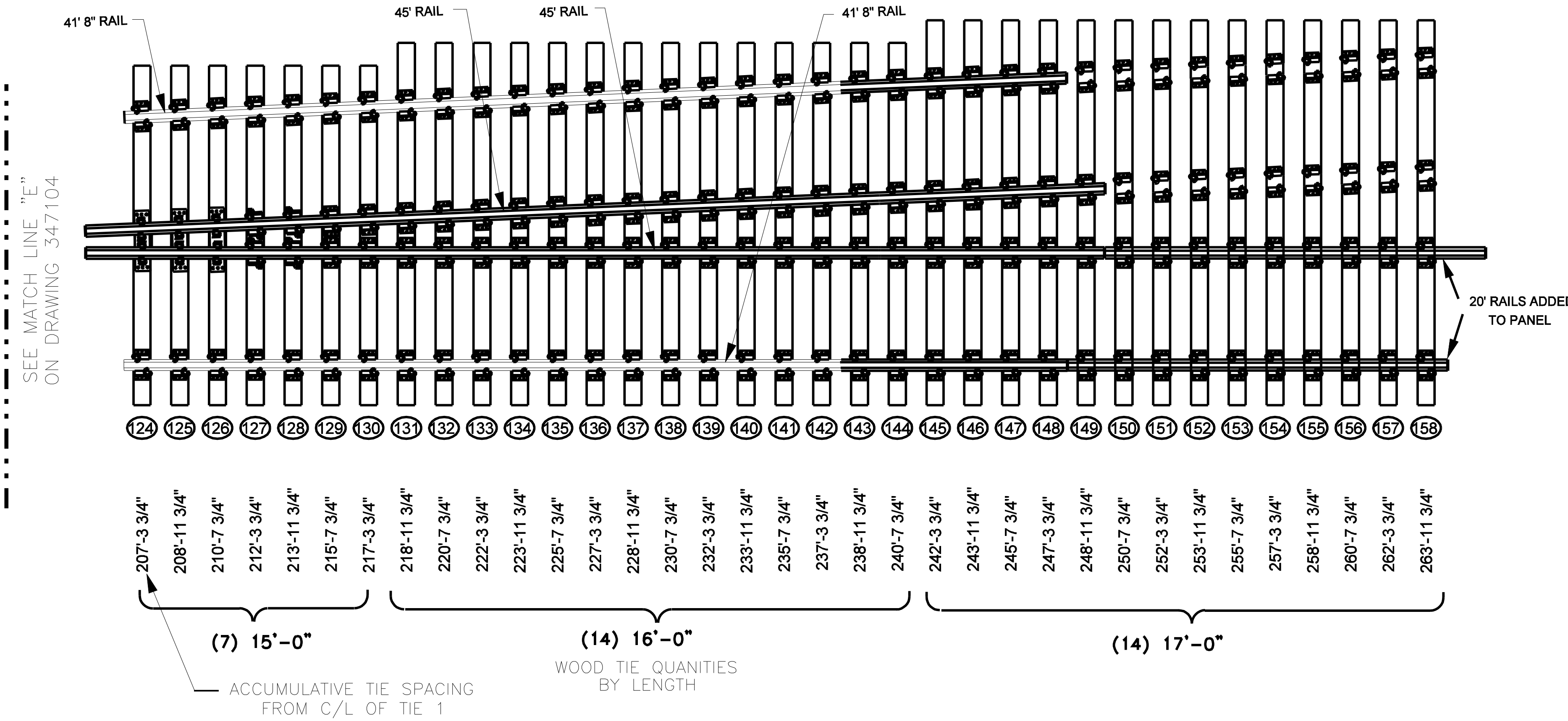
	136 LB.	141 LB.
	BNSF ITEM NO.	BNSF ITEM NO.
RH	513450068	513450241
LH	513450069	513450240

BNSF RAILWAY

STANDARD PLAN

NO. 24 TURNOUT 136/141 LB.
PANEL NO. 5

FILE OWNER: BNSF	DATE: JULY 10, 2008
REV. NO.: 1	DWG NO: 347104



NOTES:
1. SEE DWGS 347000, 347001, 347002, 347103, 347104, AND 347006 FOR THE BALANCE OF LAYOUT PLANS.
2. ALL TIE SPACING 20" UNLESS OTHERWISE SHOWN.
3. ALL TIES 7" X 9" BODY UNLESS OTHERWISE SHOWN.
4. SEE DWG 347100 FOR TURNOUT GEOMETRY.
5. SEE DWG 347200 FOR TURNOUT BILL OF MATERIAL.
6. PANEL SHIPPED PREPLATED.

PANEL WEIGHT 32,500 LBS

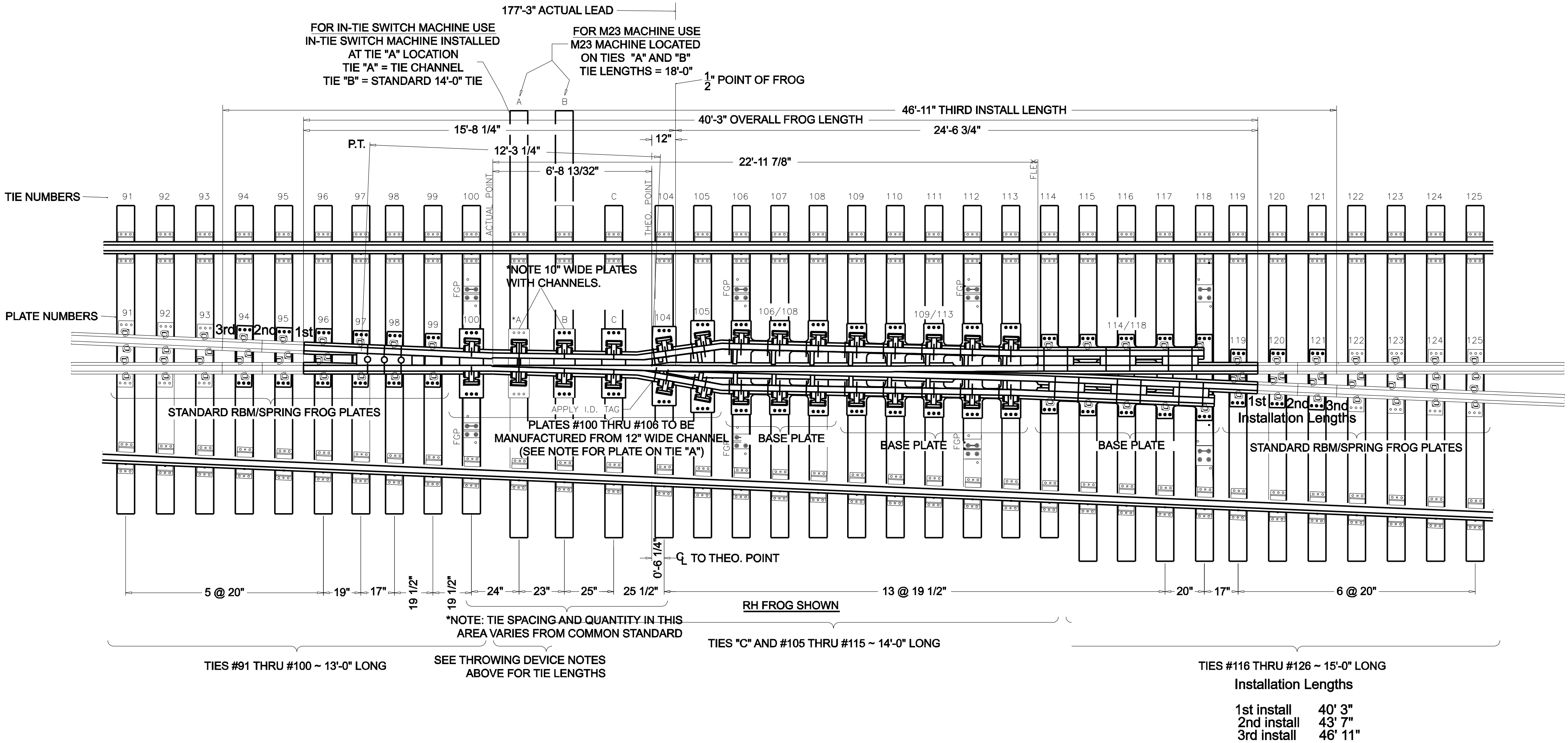
22-31

BNSF RAILWAY

STANDARD PLAN

NO. 24 TURNOUT 136/141 LB.
PANEL NO. 6

SCALE: NONE	FILE OWNER BNSF	DATE: JUNE 19, 2008
	REV. NO.: 04	DWG NO: 347105



NOTES:

1) BODY BOLTS TO BE GRADE 8, 1 3/8" DIAMETER, HEX HEAD W/ FLAT WASHER AND LOCK NUT. FINAL BOLT TORQUE TO BE 2200 FT./LBS. LUBRICATED USING "NEVER SEIZE" ON THE BOLT THREADS, WASHER AND NUT FACE. TORQUE DEVICE MAY BE MANUAL, PNEUMATIC OR HYDRAULIC.
2) PANEL SHIPPING WEIGHT TO BE STENCILED ON RAIL HEAD WITH WHITE PAINT.
3) ID TAGS TO BE ATTACHED AS NEAR THE POINT AS POSSIBLE WHERE THEY CAN BE CLEARLY READ.
4) RAIL ENDS BLANK.
5) TIES FOR SWITCH MACHINE WILL BE DAPPED AND TRAPIZOID.
6) PROVIDE A SLOT WITH EASEMENT THAT ALLOWS FOR A 5/8"x 1 1/4" OPENING FOR A CALROD HEATER IN WING/ FROG AREA.
7) FOR NEW APPLICATION, CUT TO 1st. LENGTH, MAINTANENCE LENGTH IS 3rd INSTALL.
8) LOCATION OF 1/2" POINT OF FROG WILL BE MARKED ON BOTH WING RAILS.

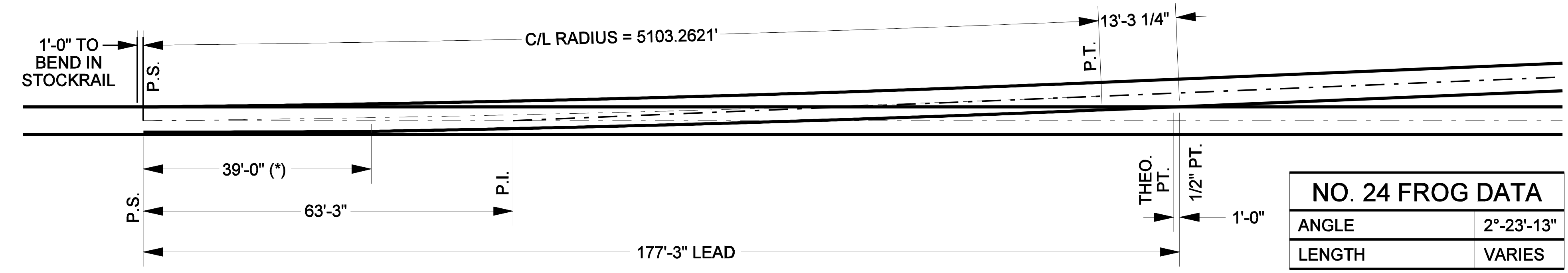
22-32A

BNSF RAILWAY

BNSF STANDARD PLAN

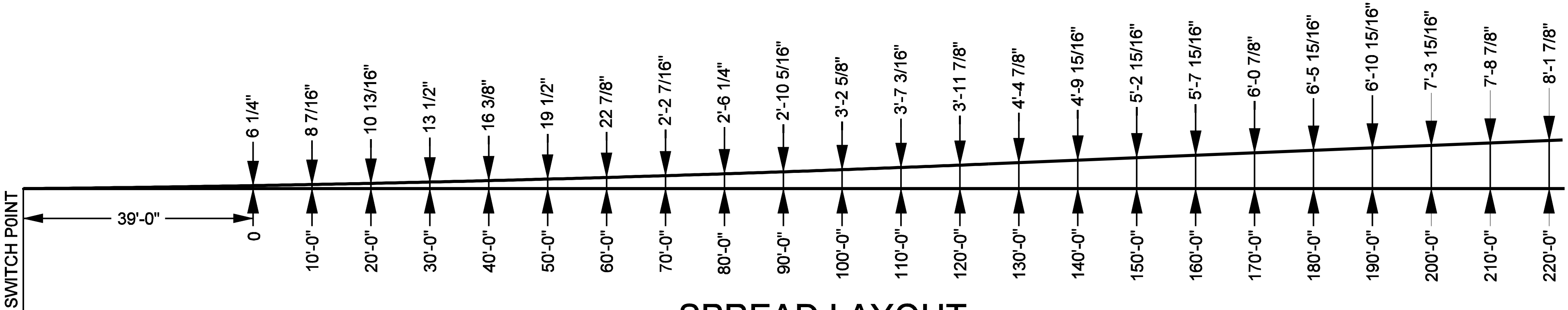
NO. 24 MOVABLE POINT FROG
141 & 136 LB. PANEL NO. 5

FILE OWNER: BNSF	DATE: DEC. 6, 2006
REV. NO. 07	DWG NO: 347010



NO. 24 FROG DATA	
ANGLE	2°-23'-13"
LENGTH	VARIES

GENERAL LAYOUT



SPREAD LAYOUT

	SWITCH DATA	
	SWITCH LENGTH	39'-0"
	HEEL SPREAD	6 1/4"
	HEEL ANGLE	0°-59'-02"
	SWITCH ANGLE	0°-32'-45"
	THROW AT ROD #1	4 3/4"
	RADIUS (CENTER LINE)	5103.26'
	T =	81.99'
	CENTRAL ANGLE - CLOSURE CURVE	1°-50'-27"
	DEGREE OF CURVE	1°-07'-22"
TURNOUT POINT	THICKNESS AT POINT	1/4"
TURNOUT POINT	RADIUS (CLOSURE CURVE)	5105.62'
TURNOUT POINT	VERTEX DISTANCE	12"

FROG DATA	
ANGLE	2°-23'-13"
LENGTH	VARIES

TURNOUT DATA	
RADIUS OF CENTER LINE	5103.26'
T =	81.99'
CENTRAL ANGLE - CLOSURE CURVE	1°-50'-27"
DEGREE OF CURVE	1°-07'-22"

BNSF RAILWAY
UNION PACIFIC

COMMON STANDARDS

NO. 24 TURNOUT 39'-0" CURVED SWITCH, TURNOUT GEOMETRY

FILE OWNER: UPRR	DATE: OCT. 12, 2005
REV. NO.: 1	DWG NO: 347100

QTY.	COMPONENT DESCRIPTION	DWG. NO.	BNSF ITEM NO.	UPRR ITEM NO.
1	39'-0" (EXT. 42'-5") STRT SAMSON SWITCH POINT (NO TIP)	246100	SEE DWG	SEE DWG
1	39'-0" (EXT. 42'-5") CURVED SAMSON SWITCH POINT (W/TIP)	246100	SEE DWG	SEE DWG
1 EA.	49'-4" STRAIGHT & 47'-7" BENT/CURVED SAMSON STOCK RAIL	241500	SEE DWG	SEE DWG
1	SWITCH ROD NO. 1 W/ BASKET	241601	516620011	557-5585
1 EA.	SWITCH RODS NO. 2 AND 3	241600	SEE DWG	557-5586
1	SWITCH ROD NO. 4 W/ BASKET	241601	516620013	557-5588
2	"GP" GAGE PLATE FOR TIES 6A & 10A AHEAD OF POINT	241304	515821526	N/A
2	"1A" PLATE FOR TIE #1A AHEAD OF POINT	241307	515821539	N/A
2	"GP0/2A" ADJUSTABLE BRACE GAGE PLATE FOR TIES #0 & 2A	241301	515821504	N/A
1	"GPM1L/R" ADJUSTABLE BRACE MACHINE GAGE PLATE FOR TIE #1	241302	SEE DWG	SEE DWG
1	"GPM2L/R" ADJUSTABLE BRACE MACHINE GAGE PLATE FOR TIE #2	241303	SEE DWG	SEE DWG
16	"BP1" ADJUSTABLE BRACE SLIDE PLATE	241306	515821532	557-2960
8	"SP1" SLIDE PLATE	241306	515821533	557-2961
2	"RP4" ROLLER RISER PLATE	241309	515821557	SEE DWG
2	"RP10" ROLLER RISER PLATE	241309	515821558	SEE DWG
2	"RP14" ROLLER RISER PLATE	241309	515821559	SEE DWG
6	ROLLER ASSEMBLY	241309	516650007	SEE DWG
1	"GP5" & "GP13" GAGE PLATES FOR TIES #5 & #13	246300	SEE DWG	N/A
1	"GP9" & "GP20" GAGE PLATE FOR TIES #9 & #20	246301	SEE DWG	N/A
2	"RSP1", "RSP2", AND "RSP3" RISER SLIDE PLATES	243309	SEE DWG	N/A
2	TURNOUT PLATES T25 THRU T45	247307	SEE DWG	557-8999
1	"GP32" GAGE PLATE FOR TIE 32	247310	SEE DWG	SEE DWG
1	"GP46" GAGE PLATE FOR TIE 46	247311	SEE DWG	SEE DWG
1	"GP61" GAGE PLATE FOR TIE 61	247312	SEE DWG	SEE DWG
1	"GP76" GAGE PLATE FOR TIE 76	247313	SEE DWG	SEE DWG
*1	46'-11" RBM FROG WITH PLATES (*RBM OR SPRING PER OPTION)	159100/200	SEE DWG	SEE DWG
6	"FGP" FROG GAGE PLATE	156000	515821497	555-6806
2	26'-0" BOLTLESS ADJUSTABLE GUARD RAIL	160101	516240058	556-6021
328	STANDARD ROLLED STEEL PANDROL PLATES	263000	525820956	503-9020
12	MODIFIED PANDROL TIE PLATE	263001	N/A	N/A
1040	PANDROL CLIP E-2055	132500	521710020	503-6100
8	PANDROL INSULATED JOINT CLIP ASSEMBLY	132800	SEE DWG	SEE DWG
2	40'-9" CLOSURE AND TURNOUT INSULATED JOINT RAIL	347002	524400040	SEE DWG
2092	15/16" DIA. x 6 1/2" LG. "RAILROAD APPROVED" SCREW SPIKES	130800	527570012	503-8620
2208	RAIL ANCHORS FOR BNSF	135010	520130012	N/A
944	RAIL ANCHORS FOR UPRR	135010	N/A	550-1650
636	136 OR 141 LB. RAIL (IN LINEAR FT.)	176000	N/A	N/A

BILL OF TIES		
QTY.	SIZE	TIE NUMBER
10	7" X 9" X 10'-0"	1A THRU 10A
1	8" X 10" X 10'-0"	0
2	7" X 10" X 16'-0" TRAPEZOID TIES	1 & 2
55	7" X 9" X 10'-0"	3 THRU 57
15	7" X 9" X 11'-0"	58 THRU 72
12	7" X 9" X 12'-0"	73 THRU 84
16	7" X 9" X 13'-0"	85 THRU 100
15	7" X 9" X 14'-0"	101 THRU 115
15	7" X 9" X 15'-0"	116 THRU 130
14	7" X 9" X 16'-0"	131 THRU 144
14	7" X 9" X 17'-0"	145 THRU 158
169 TOTAL		

NOTES FOR MANUFACTURERS

1. ALL MATERIAL TO MEET OR EXCEED RAILROADS RELATED SPECIFICATIONS.
2. SIGNAL DEPARTMENT TO FURNISH ROD BASKETS, ADJUSTER, AUXILARY THROWING DEVICE, AND DAP PLATING FOR MACHINE MOUNTING WHEN REQUIRED.
3. TRAPEZOID HEAD BLOCK TIES ARE DAPPED PER STD DWG 250000.

ITEM NUMBERS	BNSF LH	BNSF RH	UPRR LH	UPRR RH
136 LB - #24TURNOUT W/ RBM FROG, PANEL (COMPLETE)	004737540	004737532	N/A	N/A
136 LB - #24 TURNOUT W/ SPRING FROG, PANEL (COMPLETE)	004737565	004737557	N/A	N/A
136 LB - #24 TURNOUT W/ RBM FROG, PREPLATED TIES	N/A	N/A	557-8449	557-8450
136 LB - #24 TURNOUT W/ SPRING FROG, PREPLATED TIES	N/A	N/A	557-8451	557-8452
141 LB - #24TURNOUT W/ RBM FROG, PANEL (COMPLETE)	005254057	005254065	N/A	N/A
141 LB - #24 TURNOUT W/ SPRING FROG, PANEL (COMPLETE)	005254115	005254123	N/A	N/A
141 LB - #24 TURNOUT W/ RBM FROG, PREPLATED TIES			557-8596	557-8597
141 LB - #24 TURNOUT W/ SPRING FROG, PREPLATED TIES			557-8598	557-8599

BNSF RAILWAY

UNION PACIFIC

NO. 24 TURNOUT WITH RBM AND SPRING FROGS 136/141 LB., BILL OF MATERIALS

FILE OWNER: UPRR | DATE: APRIL 16, 2010

REV. NO.: 5 | DWG NO: 347200