

Northern Umbrella Plan & Projects- Update

November 29, 2007

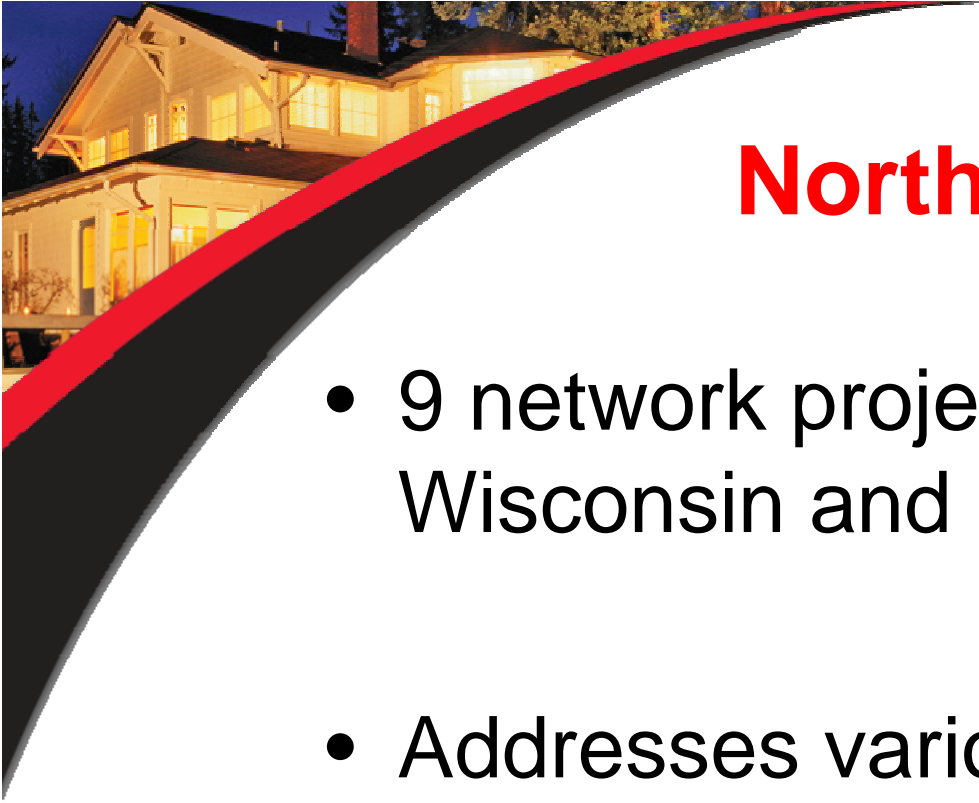
Jane Petras, ATC General Manager





Agenda

- Overall Northern Umbrella Plan Update
- Cranberry-Conover-Plains Project: Underground Transmission Line Construction
- Aspen Substation Project: Demolition of Brule Substation Equipment (as time permits)



Northern Umbrella Plan

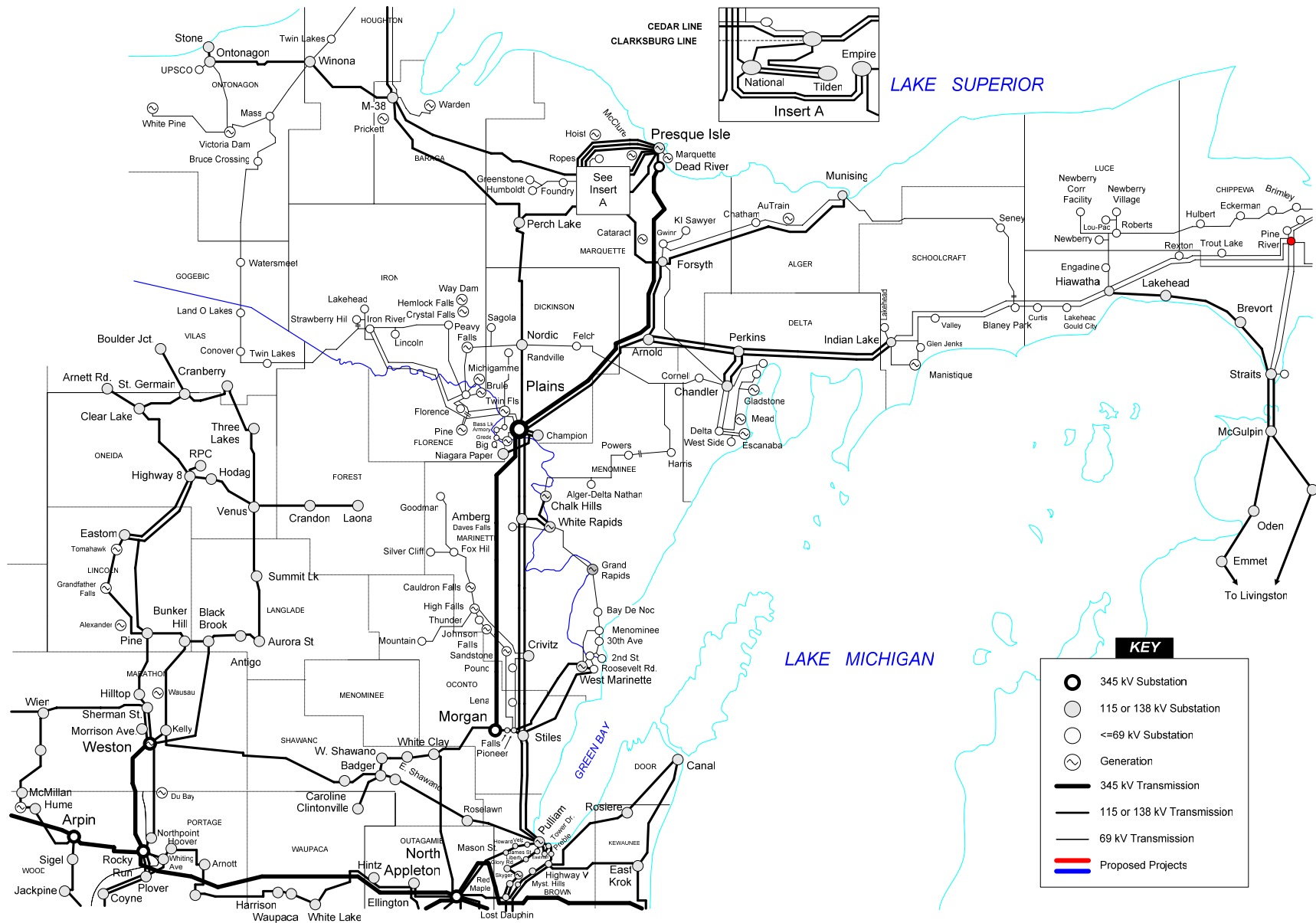
- 9 network projects in Northern Wisconsin and Upper Michigan
- Addresses various system issues and needs



NUP: Goals & Objectives

- Increase reliability throughout the U.P.
- Provide adequate voltage support to portions of Michigan and Wisconsin.
- Increase transfer capacity across the MI/WI border from 220 MVA to 525 MVA.
- Reduce or eliminate certain “Binding Constraints” under MISO Day 2.
- Provide for additional redundant service paths.
- Serve existing Transmission Service Requests.
- Create a more robust transmission grid.

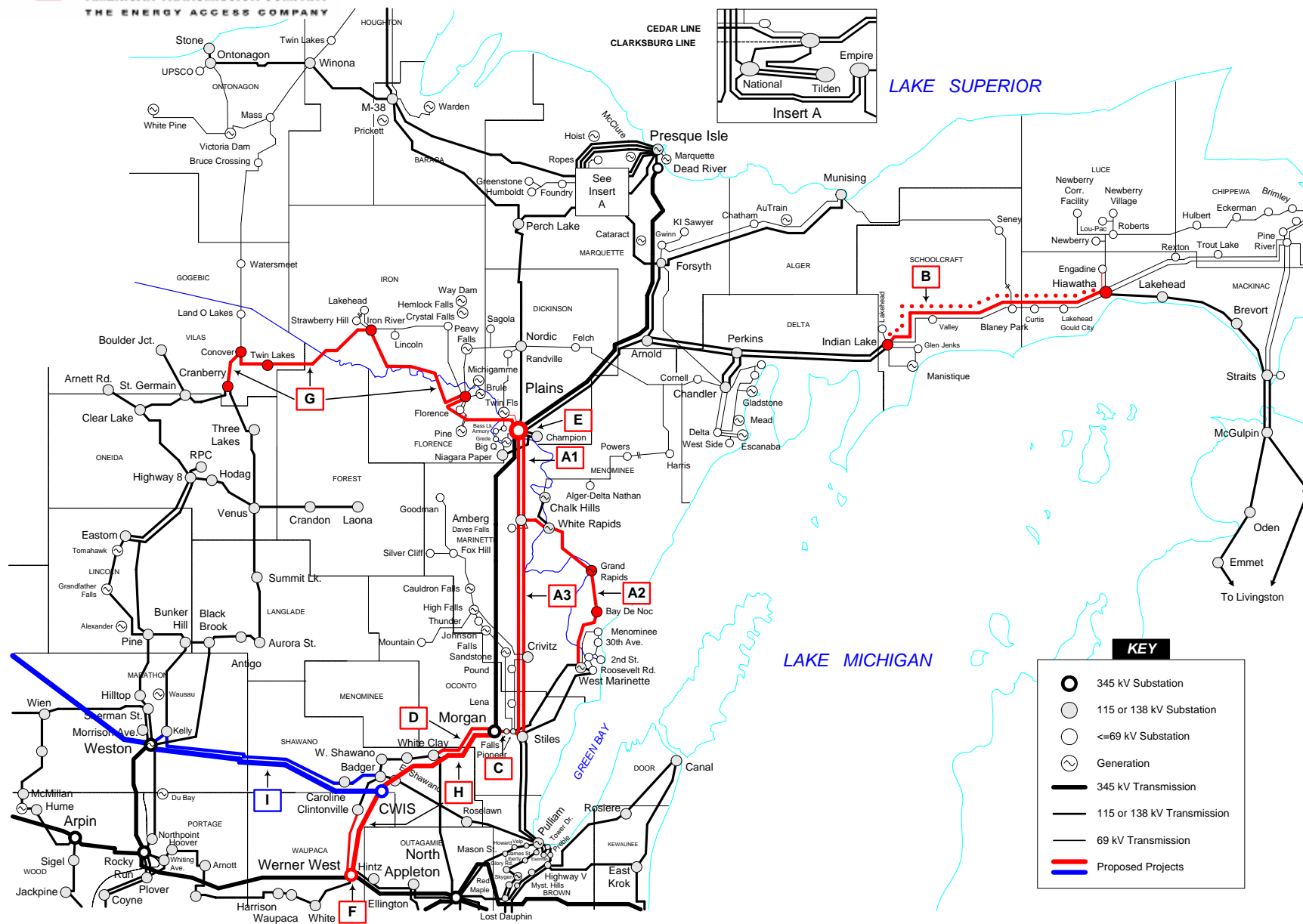
System Prior to NUP Projects





Northern Umbrella Plan Projects

- A:** Plains – Stiles 138 kV Rebuild
- B:** Indian Lake – Hiawatha 69 kV to 138 kV Rebuild
- C:** Morgan – Stiles 138 kV Rebuild
- D:** Morgan – White Clay 138 kV Up-rate
- E:** Add 2nd Plains Transformer
- F:** New Werner West 345/138 kV Substation
- G:** Cranberry – Conover – Plains Project
- H:** Morgan – Werner West 345 kV Line (including Clintonville – Werner West 138 kV)
- I:** New Weston – Central Wisconsin 345 kV Line (for generator interconnection)





Completed Projects

A: Plains – Stiles 138 kV Rebuild

- Placed in-service October 2006
- Cost = \$94.3 million

B: Indian Lake – Hiawatha 69 kV to 138 kV Rebuild

- Placed in-service March 2006
- Cost = \$52.3 million

C: Morgan – Stiles 138 kV Rebuild

- Placed in-service May 2006
- Cost = \$8.0 million

D: Morgan – White Clay 138 kV Up-rate

- Placed in-service March 2005
- Cost = \$0.4 million

F: New Werner West 345/138 kV Substation

- Placed In-service December 2006
- Cost = \$12.4 million





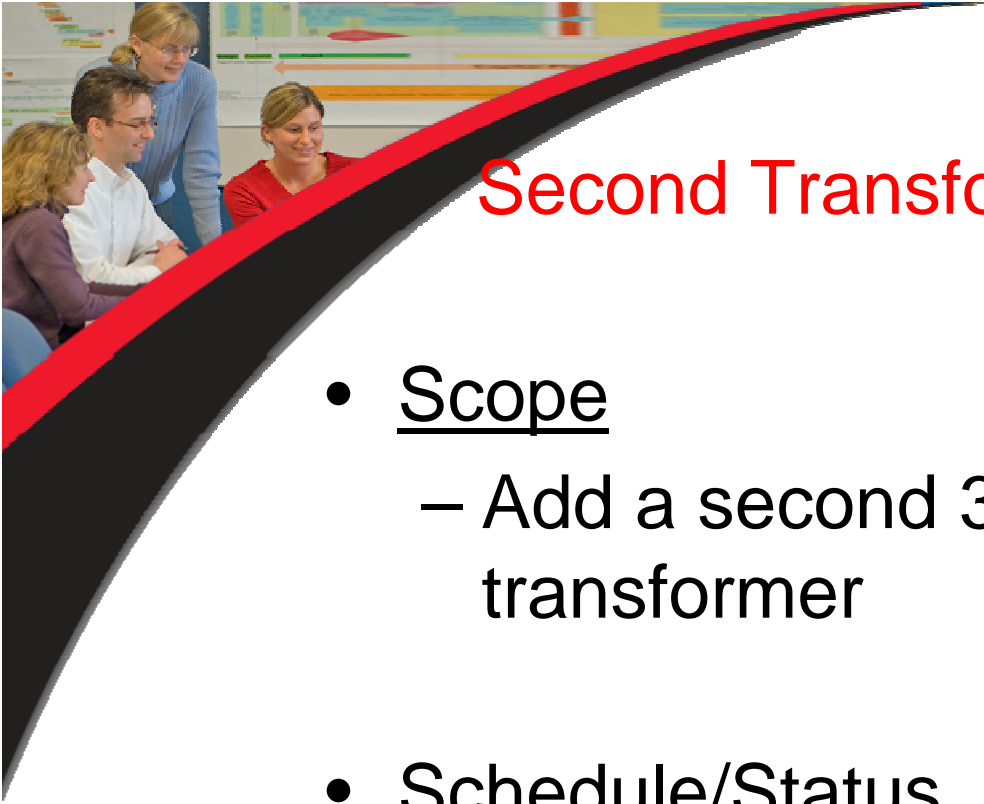
In-progress Projects

E: Add 2nd Plains Transformer

G: Cranberry – Conover – Plains Project

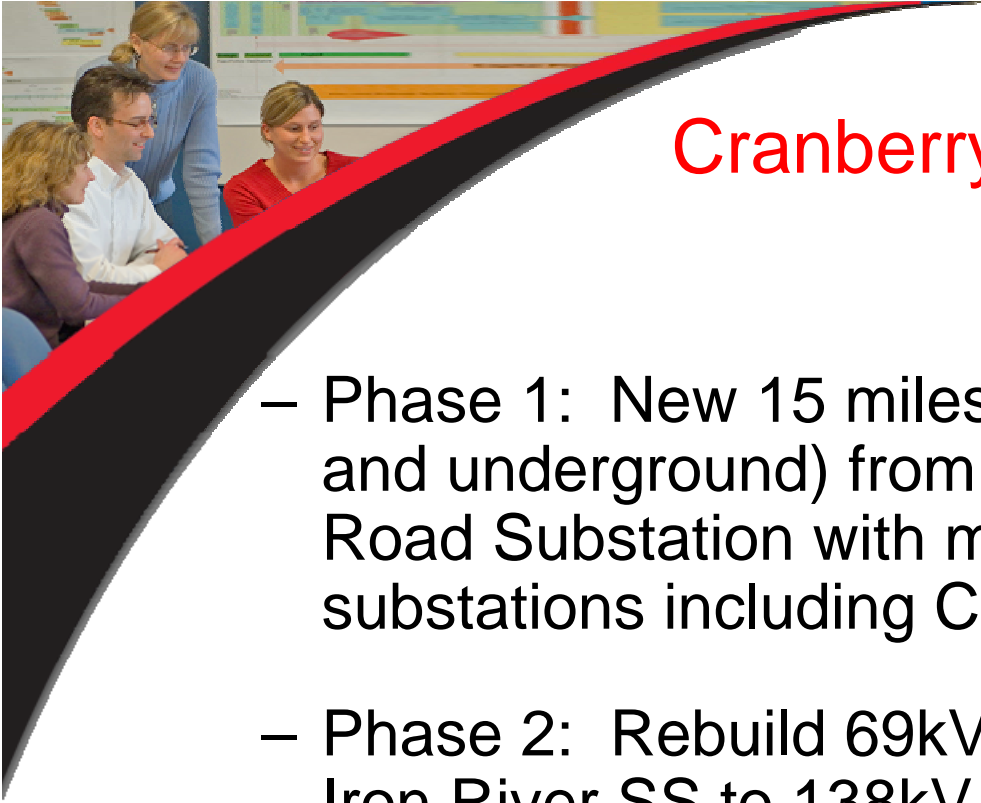
H: Morgan – Werner West 345 kV Line (including
Clintonville – Werner West 138 kV)

I: Gardner Park – Central Wisconsin 345 kV Line
(for generator interconnection)



Second Transformer at Plains Substation

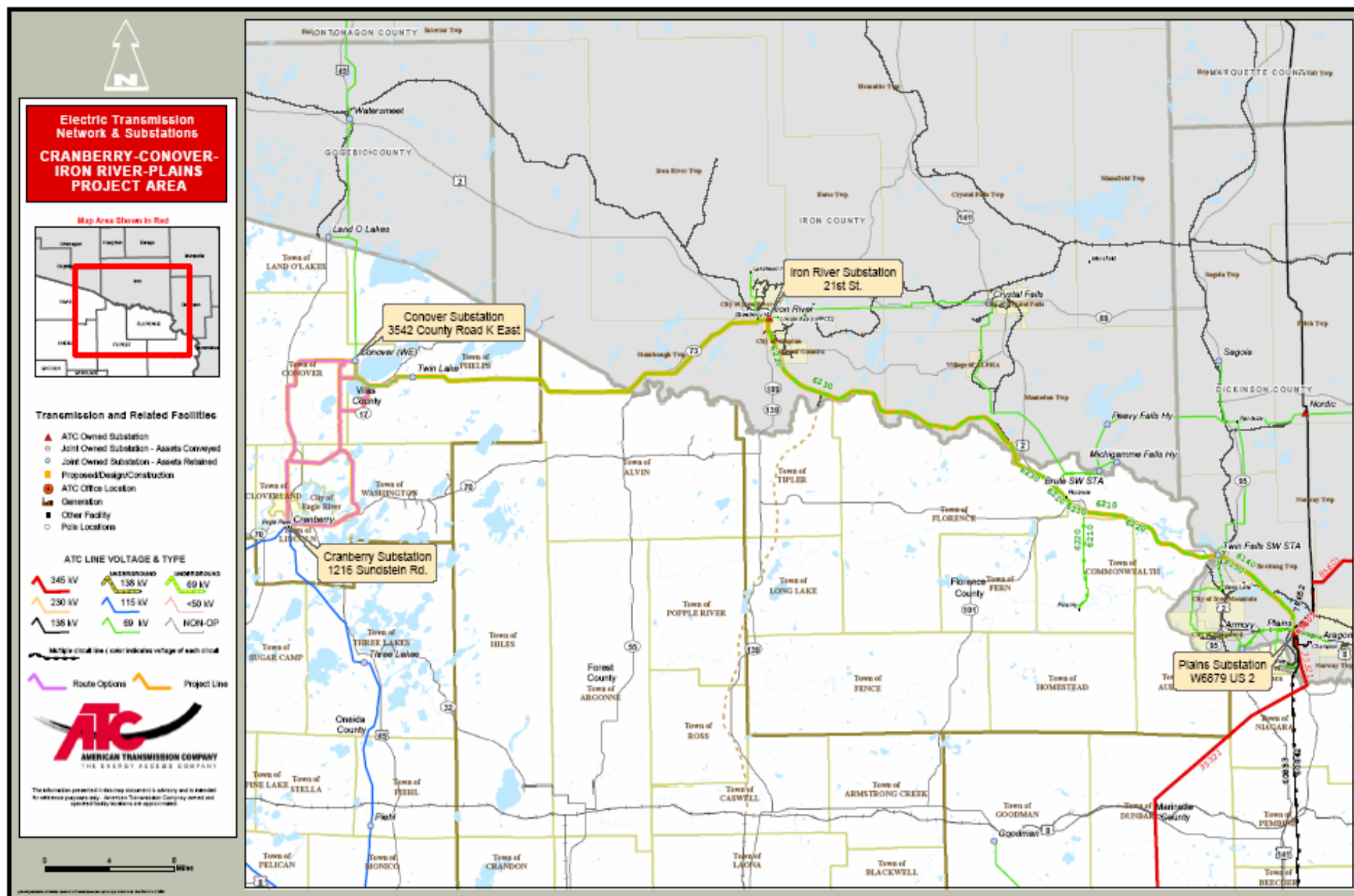
- Scope
 - Add a second 345/138 kV, 250MVA transformer
- Schedule/Status
 - Project planning in progress (scoping, estimating, etc.)
 - New transformer has been ordered
 - Planned in-service December 2009



Cranberry-Conover-Plains: Scope

- Phase 1: New 15 miles of 115kV line (overhead and underground) from Cranberry to new Lakota Road Substation with modifications at various substations including Conover SS
- Phase 2: Rebuild 69kV line from Conover SS to Iron River SS to 138kV including new Iron Grove SS
- Phases 3 and 4: Rebuild 69kV line from Iron River SS to Plains SS to 138kV (single, double and triple circuit configurations) with modifications at various substations including Aspen SS

Cranberry – Conover – Plains Project





Cranberry-Conover-Plains: Schedule/Status

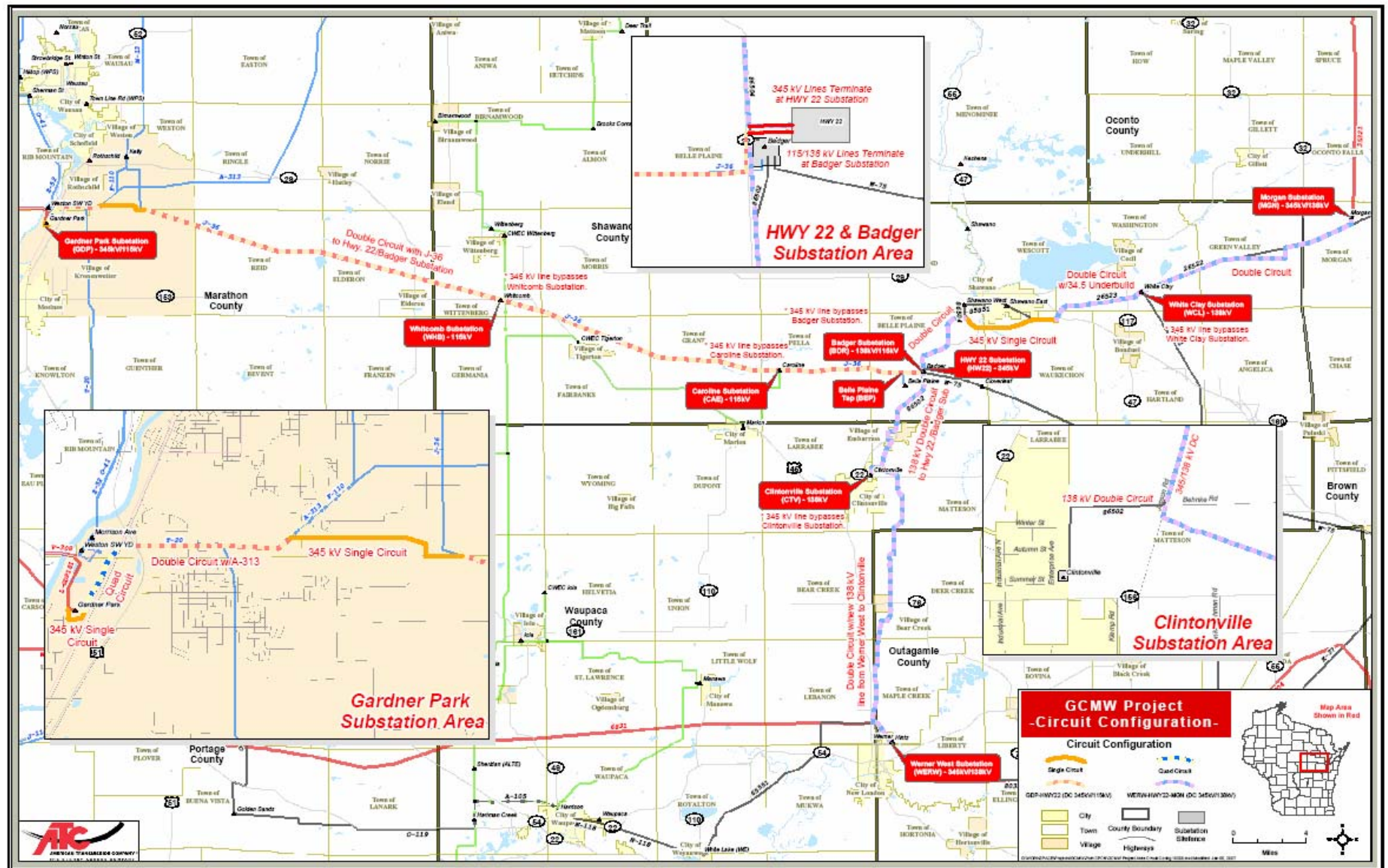
- PSCW approval received November 2006, design/construction in phases
- Phase 1
 - OH line, UG line and substation design/procurement activities essential complete
 - New easement acquisition complete except for 3 parcels
 - Construction started Aug. '07 on UG line and in Oct. '07 on SS and OH line
 - Planned in-service June 2008
- Phase 2
 - OH and SS design and procurement activities underway
 - Partial construction (Twin Lakes crossing) 1Q08
 - Remainder of construction 3Q08 to 1Q09 (with construction complete to Twin Lakes SS in 3Q08)
- Phase 3 & 4
 - OH line and substation design/procurement activities will start 1Q08
 - Construction start 2Q09
 - Planned in-service June 2010



Gardner Park-Central Wisconsin & Morgan- Werner West (GCMW): Scope

- Gardner Park – Central Wisconsin: New approximately 50 miles 345 kV line, new Central Wisconsin 345kV switching station, expansion of Gardner Park substation
- Morgan – Werner West: New 345 kV line approximately 51 miles of 345kV line, expansion work at Morgan, Werner West and Clintonville Substations

GCMW Area Map





GCMW: Schedule/Status

- PSCW approval received June 2006
- Project being designed/constructed in phases
- Construction started January 2007
- Actual physical work complete = 32%
- Overall planned in-service date is December 2009

NUP: Project Status Summary (Slide 1/2)

Project Name	Key Need Drivers	Projected In-Service Date	Projected Cost	Status
A: Plains – Stiles 138 kV Rebuild	Physical condition; transfer capability; solution also results in a more robust parallel path for 2/3 of P-S corridor		\$94.3M	Complete
•A1: Plains – Amberg		October 2005	-	Complete
•A2: Amberg – West Marinette		November 2005	-	Complete
•A3: Amberg – Stiles		October 2006	-	Complete
B: Indian Lake – Hiawatha 69 kV to 138 kV Rebuild	TLR mitigation; voltage support; physical condition; local load-serving in Manistique area; required operating guide that splits the U.P. system			Complete
•Phase 1 – Rebuild Indian Lake – Glen Jenks		August 2004	\$6.1M	Complete
•Phase 2 – Rebuild as double circuit 138 kV, operate at 69 kV		March 2006	\$46.2M	Complete
•Phase 3 – Convert to 138 kV operation		N/A	N/A	Not part of the Northern Umbrella Plan
C: Morgan – Stiles 138 kV Rebuild as double circuit	Transfer capability	May 2006	\$8.0M	Complete

NUP: Project Status Summary (Slide 2/2)

Project Name	Key Need Drivers	Projected In-Service Date	Projected Cost	Status
D: Morgan – White Clay 138 kV uprate (eventual rebuild as part of Element H)	Transfer capability	March 2005	\$0.4M	Project Complete.
E: Add 2 nd Plains transformer (250 MVA 345/138 kV)	Transfer capability	4Q09	\$7.3M	Transformer ordered, project scope, schedule and cost being defined and planned.
F: New Werner West Substation with 345/138 kV transformer	TLR mitigation, system security	December 2006	\$14.2M	Project Complete.
G: Cranberry – Conover – Plains Project	Transfer capability; Transmission service; Reliability, physical condition	See below	\$134.6M	
• Phase 1: New 115 kV Cranberry – Conover		June 2008	-	Construction started in August 2007.
• Phase 2, 3 & 4: Rebuild 69 kV Conover – Plains to 138 kV		June 2010	-	Design/procurement activities started. Will design/construct from west to east.
H: New Morgan – Werner West 345 kV line & Clintonville – Werner West 138 kV line	Transfer capability, reliability, and network service.	2009	\$132.3M	Engineering and ROW activities continuing on Werner West – Hwy 22 and Hwy 22 – White Clay. Construction has begun on White Clay – Morgan with the temporary line complete..
I: New Gardner Park – Central Wisconsin 345 kV line & Central Wisconsin 345 kV switching station	Required for new Weston 4 generation	2009	\$131.5M	Engineering and ROW activities continuing on Gardner Park – Whitcomb. Construction complete on Belle Plain Tap – Hwy 22. and complete on Caroline – BPT.



Northern Umbrella Plan Summary

- Current estimated cost for all projects is \$575 million
- Total project spending to date is approximately \$294 million (through October 2007)
- Of the 9 projects –
 - 5 are complete and in-service
 - 4 are in various stages of design and construction
- Construction and completion of all projects is expected in mid-2010



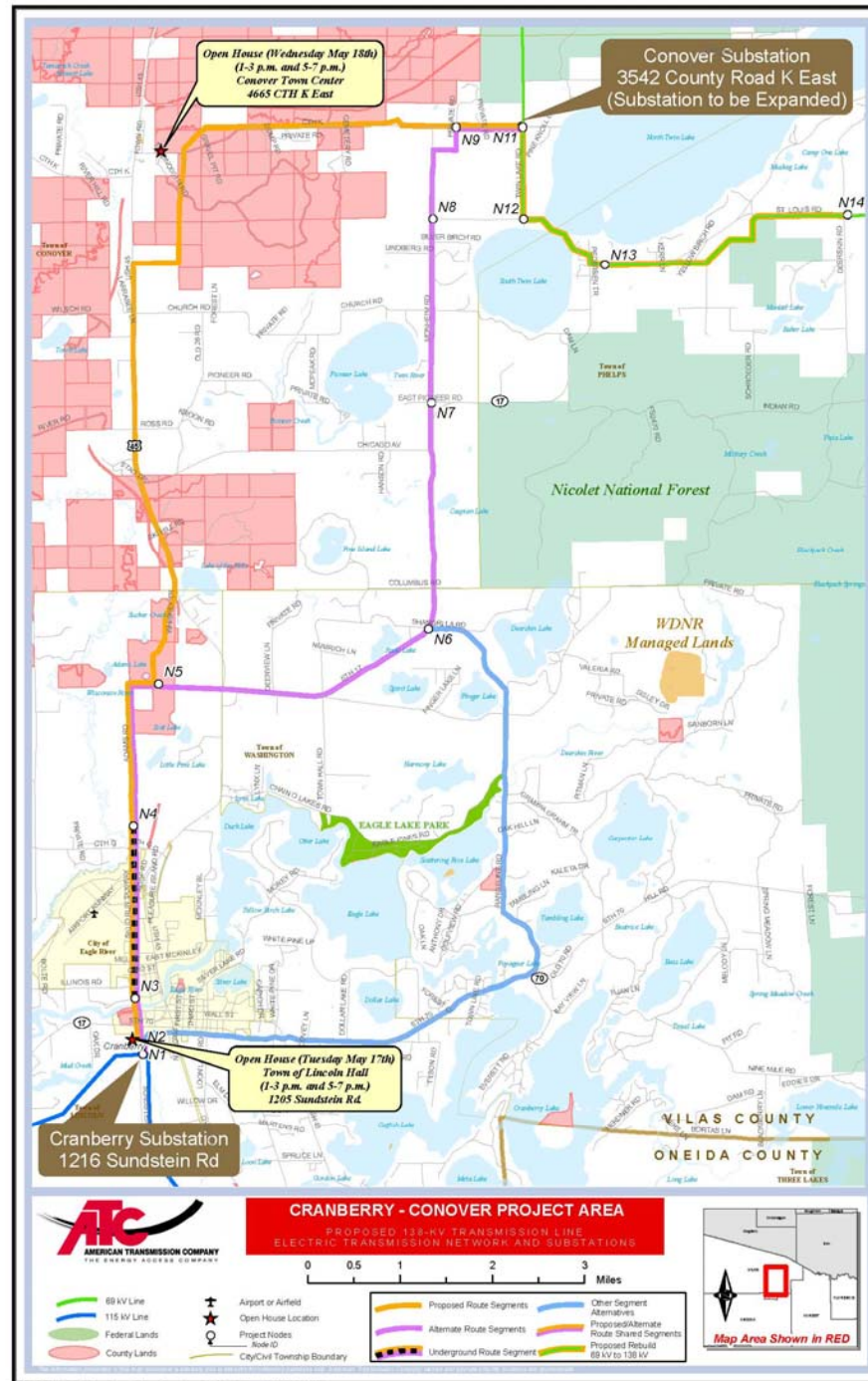
QUESTIONS ON NORTHERN UMBRELLA PLAN ???



CCP Project (Phase 1): Underground 138kV Line Construction

- Location: approximately 2 miles of the new 15 mile line from Cranberry to Conover adjacent to the Eagle River Union Airport
- Design: XLPE (cross-linked polyethylene) cable in a concrete duct bank with manholes approximately every 1/3 of a mile, backfilled with sand
- Route: Mainly within a local paved road with other underground utilities (sewer, water, telephone, natural gas)
- Cost: \$10.9 million
- Schedule:
 - Duct bank/manhole construction started August '07
 - Expected ductbank/manhole finish December '07 or spring of '08
 - Cable installation and testing planned March '08









Manholes

- Pre-cast concrete boxes constructed offsite
- Manhole inside dimensions are 24' x 8' x 8'
- Delivered in two sections on flatbed trucks
- Each section weighs approximately 71,000 pounds
- Manholes used for pulling and splicing cable





71,000 pound manhole top





Crane lifts vault bottom

Lowering manhole bottom into hole





Applying waterproof seal





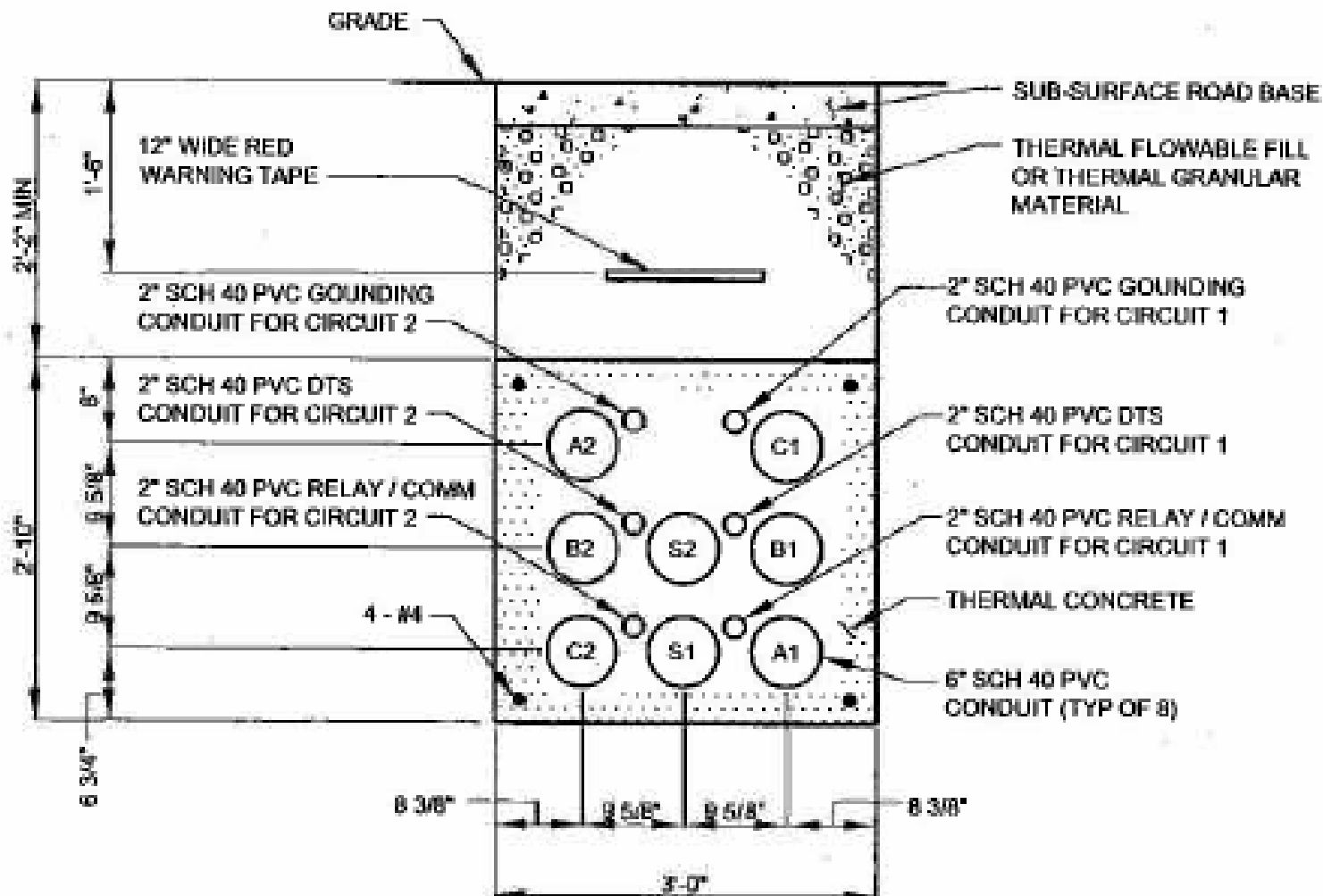


Lowering manhole top

Applying waterproof seal to manhole collar



Duct Bank







**Shoring required
due to depth and
sand**

**Steel plate required over trench
for road crossings**







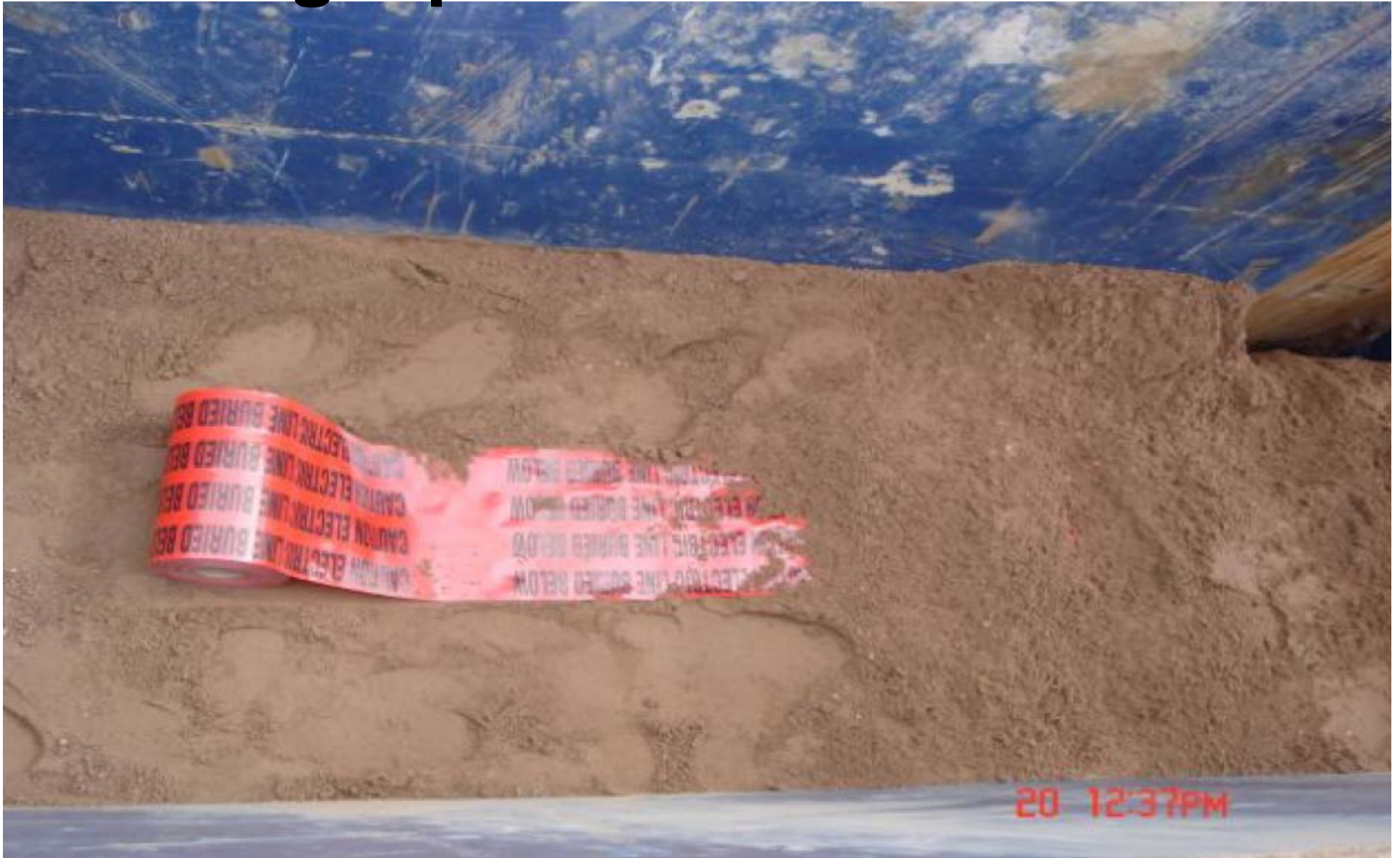
Concrete is poured to encase conduit





20 12 34 PM

Warning tape buried above concrete



Sand - granular material compacted over concrete for heat dissipation





09/25/2007

Shore box is removed for next location





QUESTIONS ON CCP UG CONSTRUCTION ???