

U.P. Energy Forum Transmission Developments

Brett French


Senior Region Manager – External Relations

September 17, 2009



Overview

- Northern Umbrella Plan Update
- U.P. Energy Collaborative Update



Northern Umbrella Plan Update



Northern Umbrella Plan Update

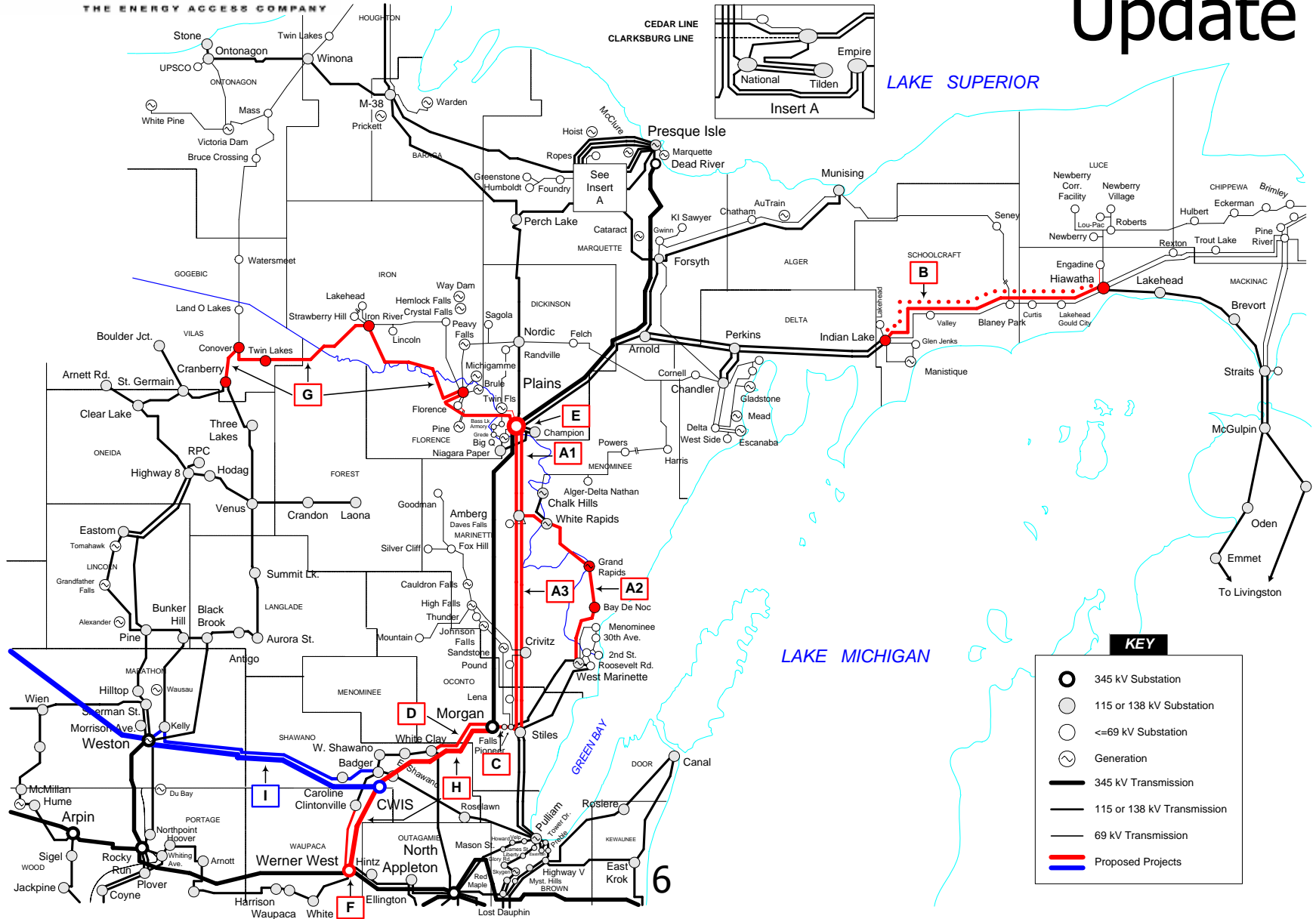
- A portfolio of 9 projects
- Developed in 2003 to address specific reliability and transmission capacity issues between U.P. and WI
- Represented major commitment by ATC to support Michigan's U.P.



Northern Umbrella Plan Update

- Completed 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 (cancelled in Feb. 2008)
 - F: New Werner West 345/138 kV Substation
 - I: Gardner Park – Central Wisconsin 345 kV Line
- In-progress projects:
 - G: Cranberry – Conover – Plains Project
 - H: Morgan – Werner West 345 kV Line

Northern Umbrella Plan Update





Northern Umbrella Plan Update

G. Cranberry-Conover-Plains

- **Phase 1:** Construction of new line between Eagle River, WI (Cranberry SS) and Conover, WI (Lakota Rd. SS) completed; assets placed in service 6/6/08
- **Phase 2:** Line rebuild/voltage conversion between Lakota Rd and Iron Grove Substations completed; assets placed in service 2/20/09
- **Phase 3:** Line rebuild/voltage conversion between Iron Grove and Aspen Substations completed; assets placed in service 8/24/09
- **Phase 4:** Schedule/Status (planned in service date is March 2010)
 - Line rebuild has begun and is presently at 10% complete
 - Plains and Twin Falls Substation modifications will start 10/12/09 and 10/19/09, respectively



Northern Umbrella Plan Update

H: New Morgan-Werner West 345kV Line (52.8 Mi)

ATC Executive approval	2/05
ATC Board approval	2/05
File CPCN application	3/05
CPCN issued	6/06
Werner West – Clintonville (17.5 miles) Clintonville – Highway 22 (7.7 miles) Werner West SS, 345/138 kV Morgan – White Clay (13.2 miles) Highway 22 – White Clay (15.4 miles)	Complete 5/09 Complete 5/09 Complete 5/09 Construction 10/07 – 9/30/09 Construction 4/09 – 9/30/09
Construction period ~99% Complete	1/07-09/09
Project in-service	9/30/09

Project Status Summary

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




Project Status Summary

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	Cancelled		Cancelled
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	\$105.4M	
• Phase 1: New 115 kV Cranberry – Conover		June 2008	-	In-service. Energized 6/6/08.
• Phase 2, 3 & 4: Rebuild 69 kV Conover – Plains to 138 kV		March 2010	-	Construction started July '08. Line rebuilt & energized from Lakota Rd. SS to Aspen SS.
H: New Morgan – Werner West 345 kV line & Clintonville – Werner West 138 kV line	Transfer capability, reliability, and network service.	2009	\$148.7M	15 miles remaining for the Hwy 22-White Clay Segment, expected to be placed in service 9/30/09
I: New Gardner Park – Central Wisconsin 345 kV line & Central Wisconsin 345 kV switching station	Required for new Weston 4 generation	2009	\$126.9M	Project Complete
		10		



Northern Umbrella Plan Update

- Northern Umbrella Plan project costs are currently estimated at ~\$550.2 million
- ~\$539.5 million spent through August 2009
- Of the 9 projects –
 - 6 are complete and in-service
 - 2 are in final stages of construction
 - 1 has been cancelled
- Completion of remaining Northern Umbrella Plan projects expected by Q1/Q2 2010



U.P. Energy Collaborative Update



U.P. Energy Collaborative Objective

- Evaluate the projected needs of the Upper Peninsula considering:
 - Plausible Futures
 - Reliability
 - Economics
 - Risks

U.P. Energy Collaborative Approach

- Work closely with stakeholders to:
 - Develop and model “Plausible Futures”
 - Loads (scalable and point)
 - Generation (existing and new)
 - Predict future transmission needs
 - Develop/evaluate potential solutions
 - Seek feedback on potential solutions
 - Offer recommendations to Management



U.P. Energy Collaborative Outcomes

- An understanding of the various “plausible futures”, projected needs and inherent risks
- A plan or portfolio of “solutions” that meet the intermediate (2018) and long-term (2024) needs of the U.P.



U.P. Energy Collaborative Futures

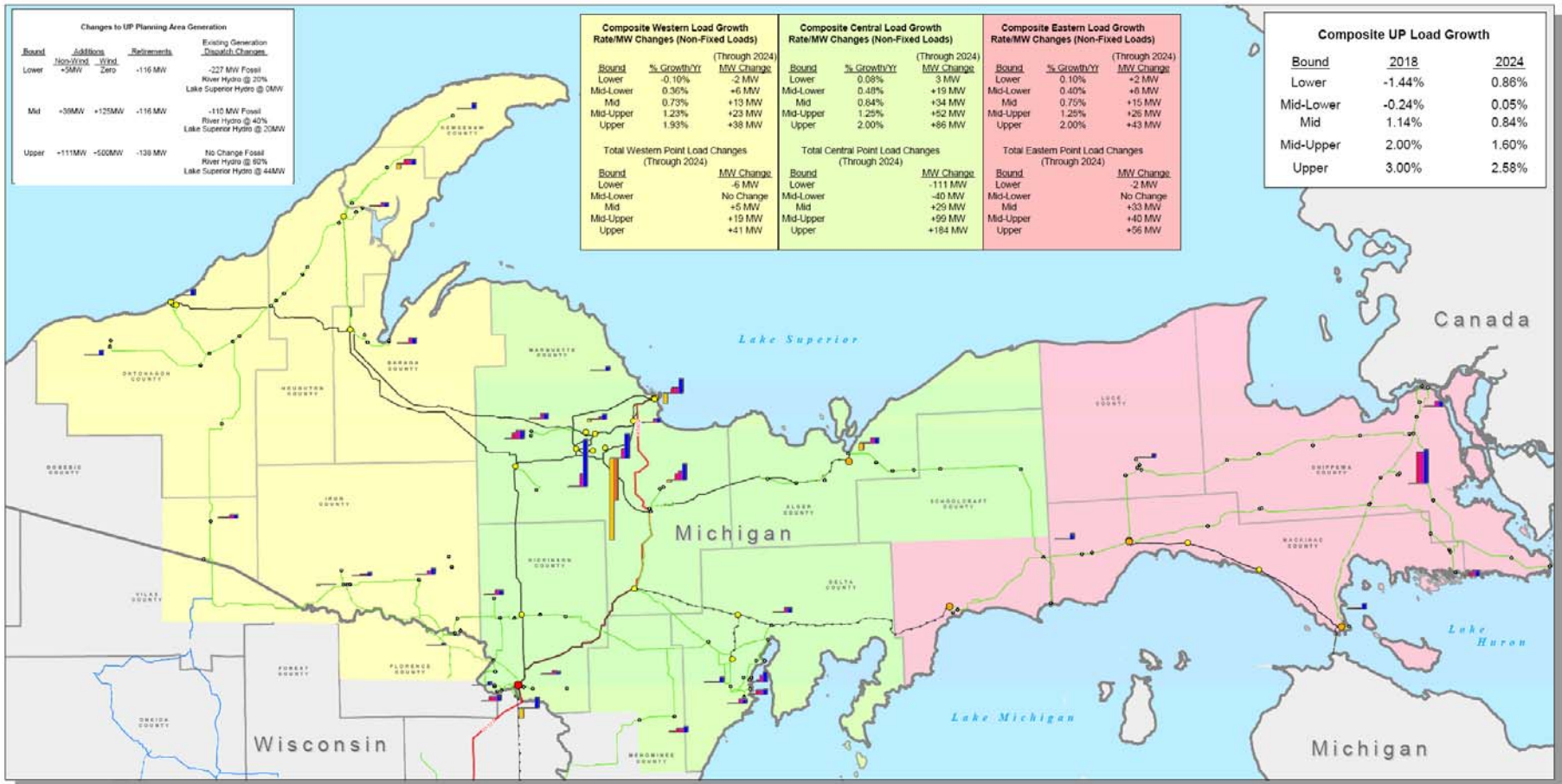
- **Robust Economy** — high economic and energy growth (2% scalable load, 3% total load, Includes Frontier), Existing UP Generation all available (20MW Eastern Hydro), Upper level of new Generation, (New bio mass generation masks new load). Assumes publicly announced generation retired. 125MW new UP wind. 600MW new Lower Peninsula generation.
- **High Retirements** — mid-level economy and energy growth (.75% scalable load, 1.14% total load, Includes Frontier), Existing UP fossil generation dispatched at low levels (32MW Eastern Hydro), New generation masks new load. Assumes publicly announced generation plus one CT retired. 125MW new UP wind and 600MW new Lower Peninsula generation.
- **High Environmental** — medium economic growth, low-mid energy growth (.45% scalable & declining point loads, (-.25% total load)), no Frontier) Existing UP fossil generation dispatched at mid-lower levels (20MW Eastern Hydro), Only 5MW new generation. Assumes publicly announced generation retired. 250MW new UP wind.



U.P. Energy Collaborative Futures

- **Slow Growth** – low economic and energy growth (0% scalable, declining point loads, (-1.5% total), no Frontier), Existing fossil generation dispatched at mid levels (20MW Eastern Hydro), 15MW new UP generation. Assumes publicly announced generation retired. 500MW new UP Wind. (Similar to 2008 MI Legislation. Renewable Energy Standard mandates MI native wind & Energy Efficiency Standard strives for negative energy growth.)
- **DOE 20% Wind** – Mid-Upper Economic and energy growth, (1.25% scalable, 2% total, includes Frontier load), existing fossil UP fossil generation at low dispatch availability, (20MW Eastern Hydro), new Frontier and Newberry generation masks Frontier load, Assumes publicly announced generation plus one CT retired. 500MW new UP Wind generation, 100MW Lower Peninsula wind.
- **Fuel Supply Disruption** – natural gas & Hydro supply disrupted, mid economic and energy growth (.75% scalable load, no point loads, .48% total, no Frontier), mid level of existing UP fossil dispatch, (0MW Eastern Hydro simulates Frontier load/generation balance), mid-lower new generation assumed (15MW), Assumes publicly announced generation retired, no UP wind.

Collaborative Data Summary



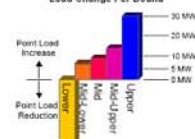
Currently, ATC owns or operates transmission facilities in 30 Wisconsin counties and in 15 Michigan counties. Facilities include:
 • Approximately 3,000 miles of transmission lines
 • 95 wholly owned substations
 • 415 leased owned substations
 • ATC offices in Madison, Cottage Grove, Pewaukee, De Pere, Wausau and Appleton, WI

The information presented in this map document represents the most current and accurate generalized compilation of ATC owned and operated transmission facilities available - some facility locations may be approximate. This map is advisory and intended for reference purposes only. Please direct any revisions or corrections to ATC Asset Applications and GIS Group.

Base Map Information: ATC, PSDW, MDNR, WDNR

Upper Michigan Energy Collaborative Futures

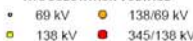
Load Change Per Bound



ATC LINE VOLTAGE & TYPE



ATC SUBSTATION VOLTAGE



- Eastern UP Planning Area
- Central UP Planning Area
- Western UP Planning Area





U.P. Energy Collaborative Status

- “Peak” case analyses completed
 - Overloaded transmission elements
 - Adequate voltage profiles
- Considered System Operation needs
 - Coordination of outages
 - Reliance on “Standing Op. Guides”
 - Management of Market Flows
- Incorporated Asset Management needs
 - Physical condition
 - Asset performance

Western U.P. Loading, Voltage, and Asset Renewal Needs

L a k e S u p e r i o r

**Core Low Voltage Need -
Found in 5 of 6 Futures**

Asset Renewal Needs - Atlantic69 69 kV Line

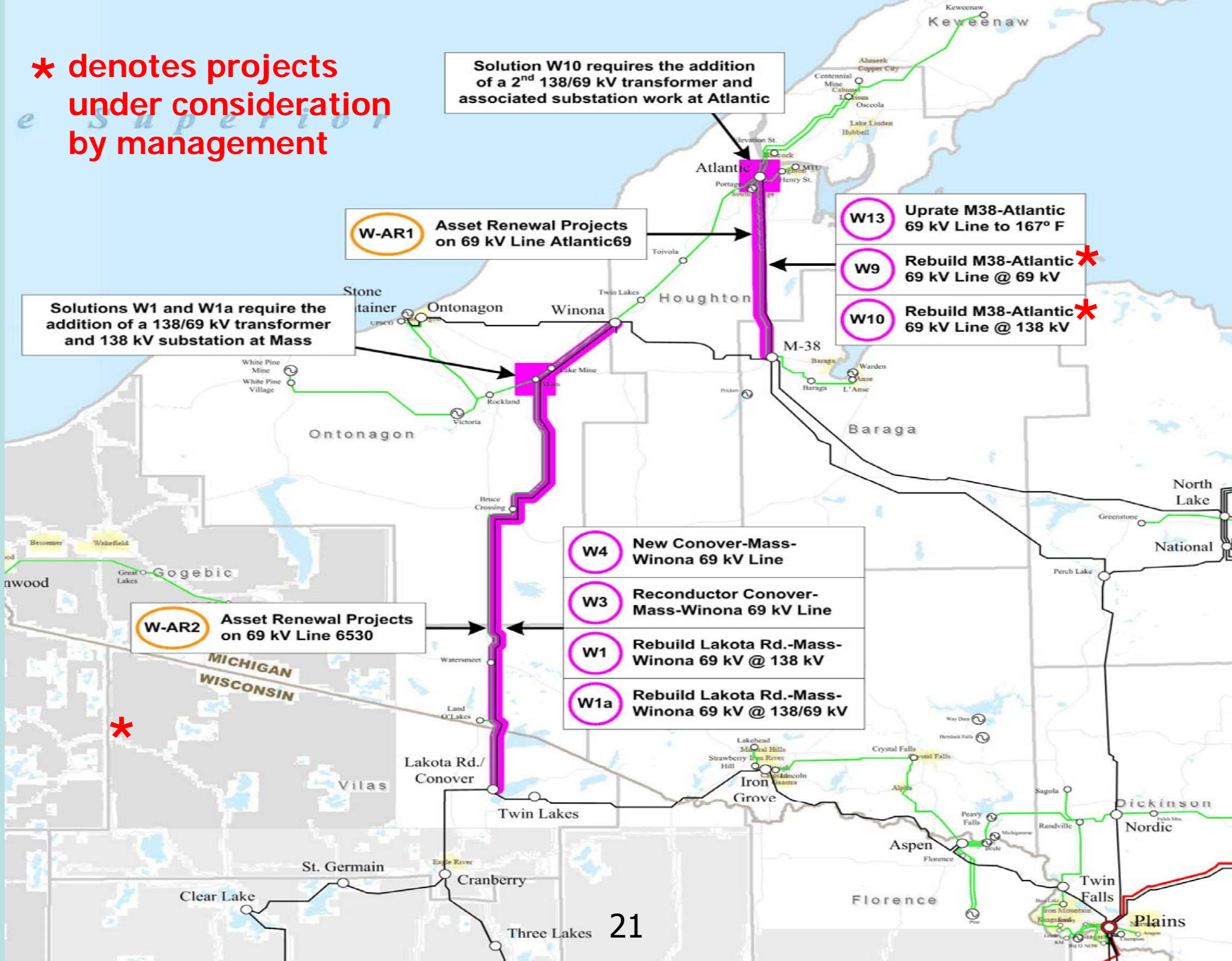
Core Line Overload Need - Found in 5 of 6 Futures

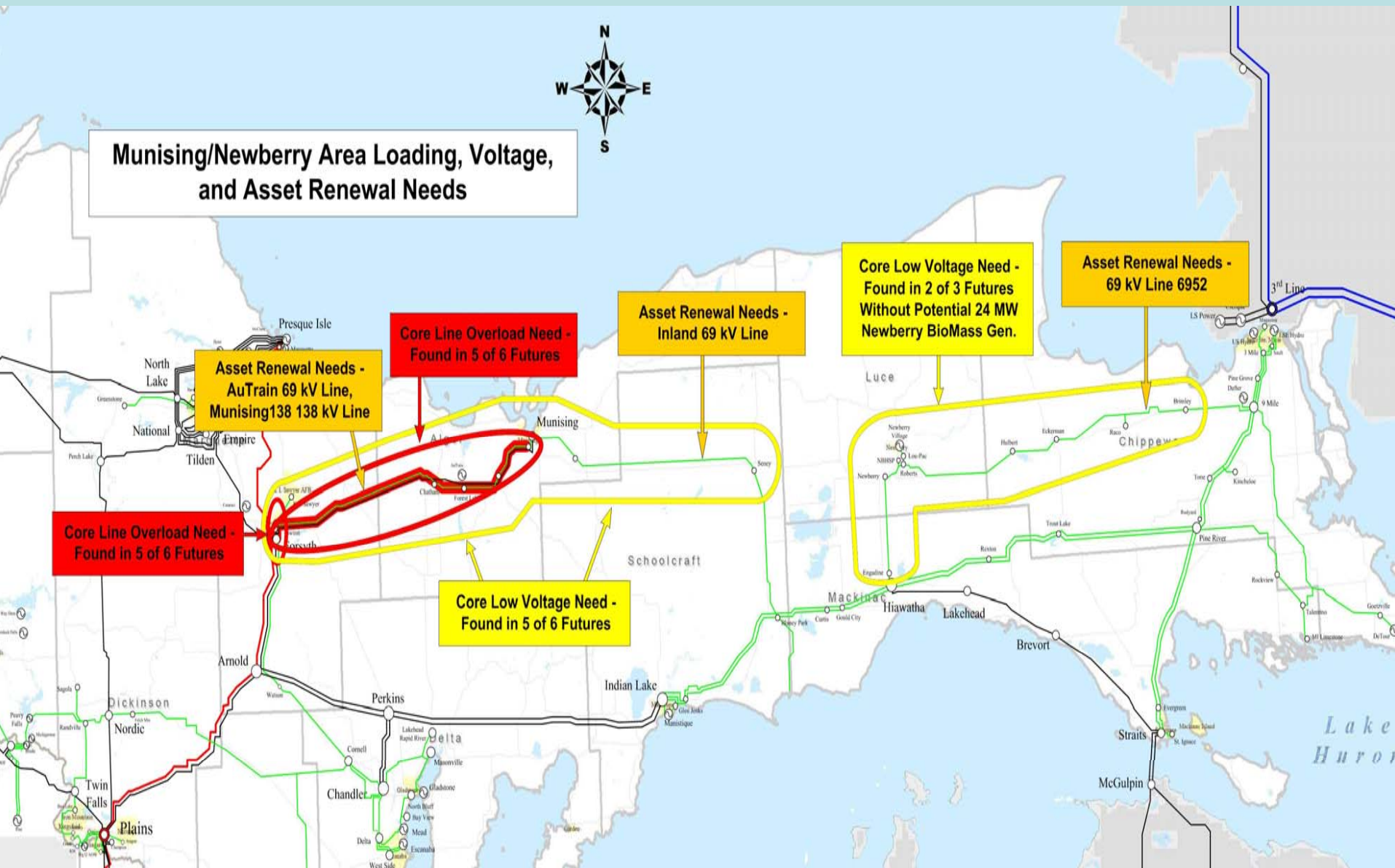
**Contingent Low Voltage Need -
Found in 3 of 6 Futures**

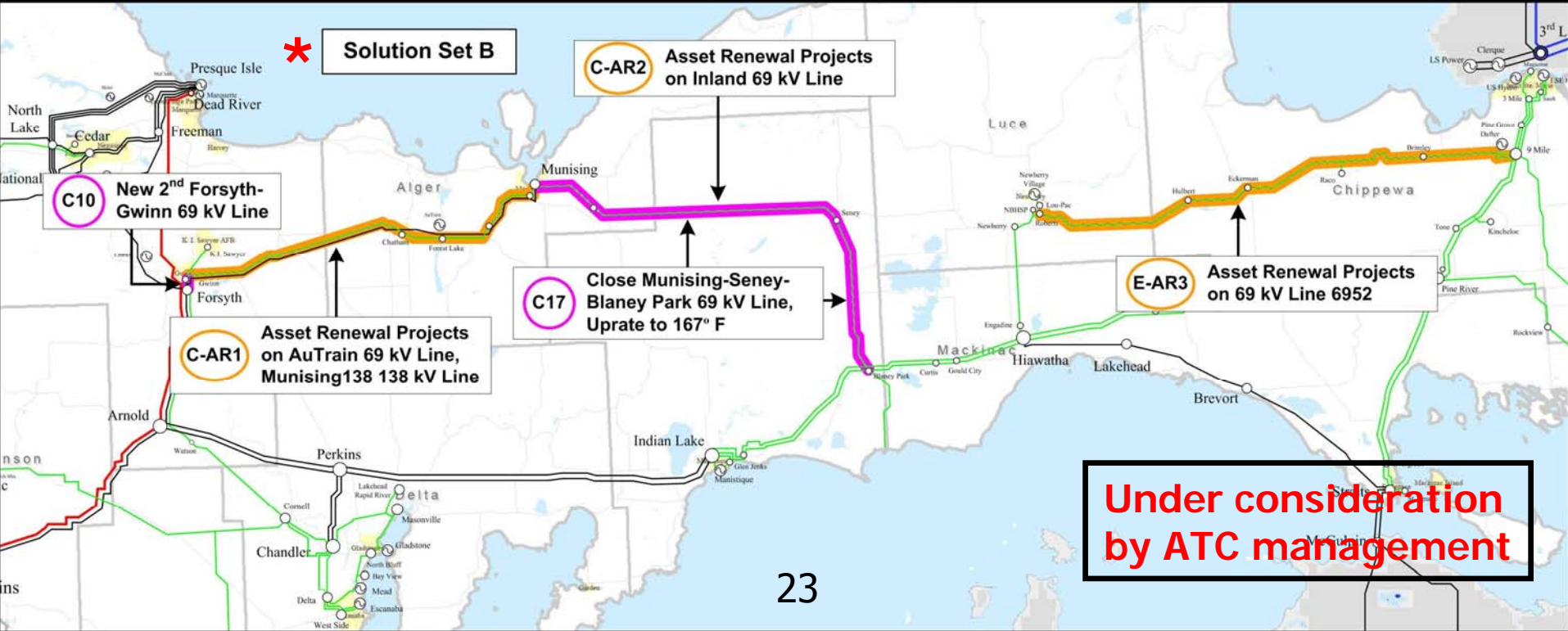
Asset Renewal Needs - 69 kV Line 6530

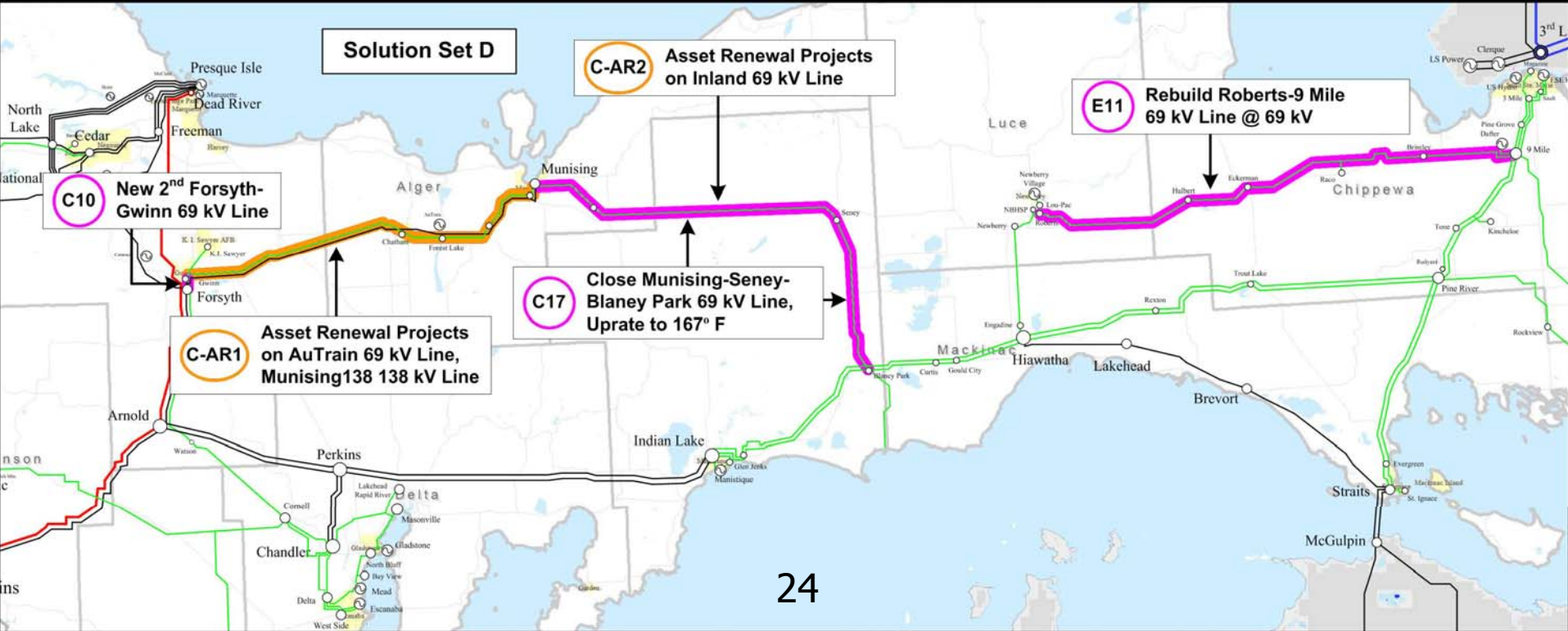
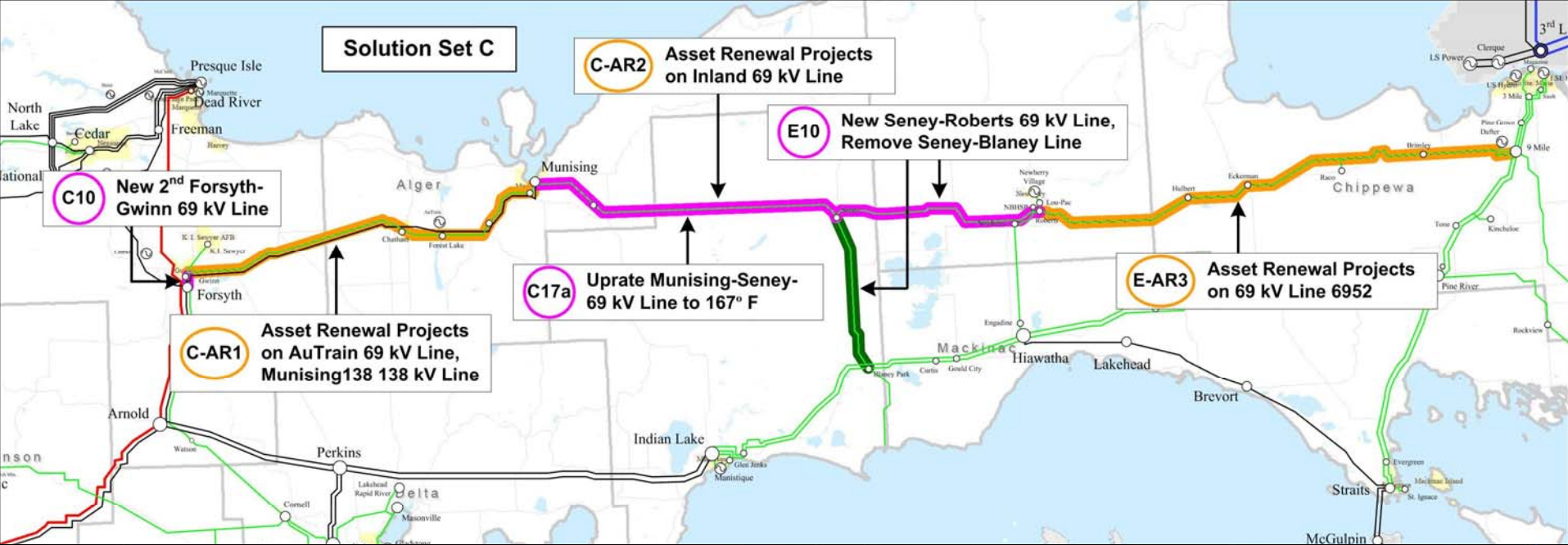
**Contingent Line Overload Need -
Found in 3 of 6 Futures**

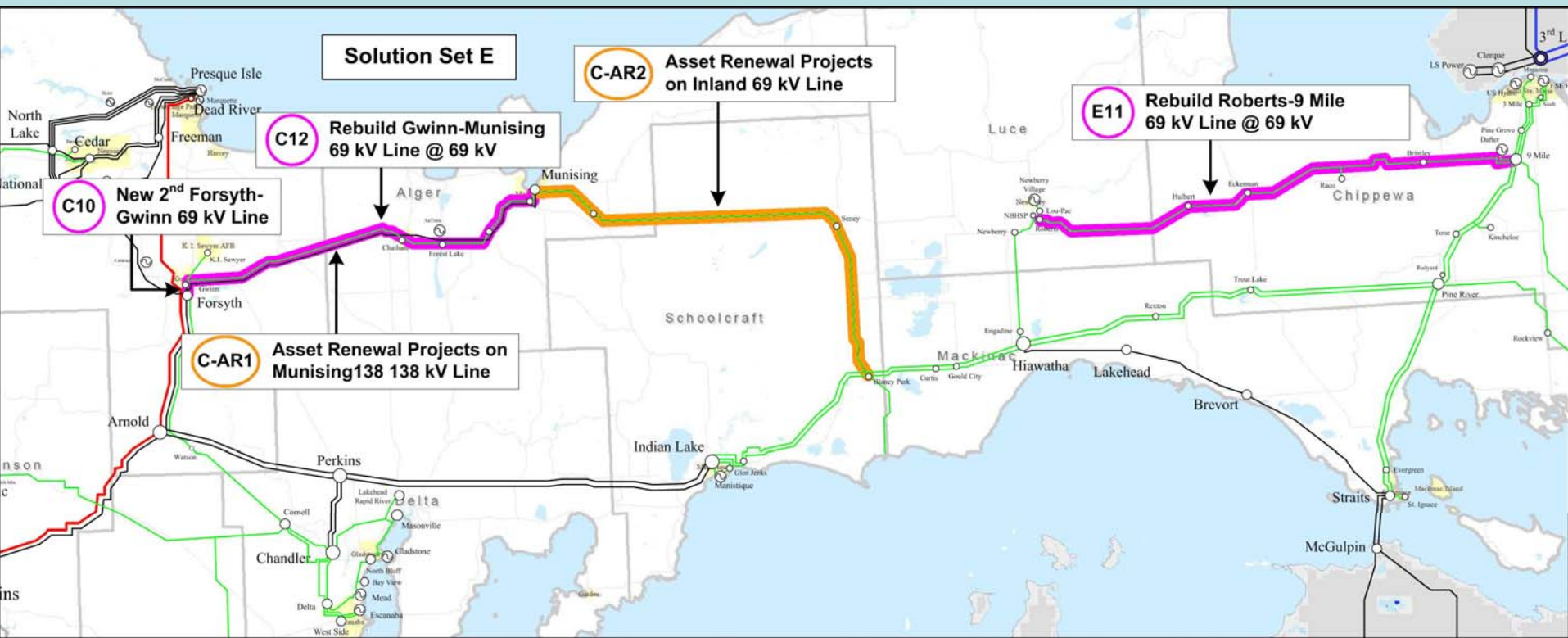
✱ denotes projects under consideration by management











Escanaba Area Loading, Voltage, and Asset Renewal Needs

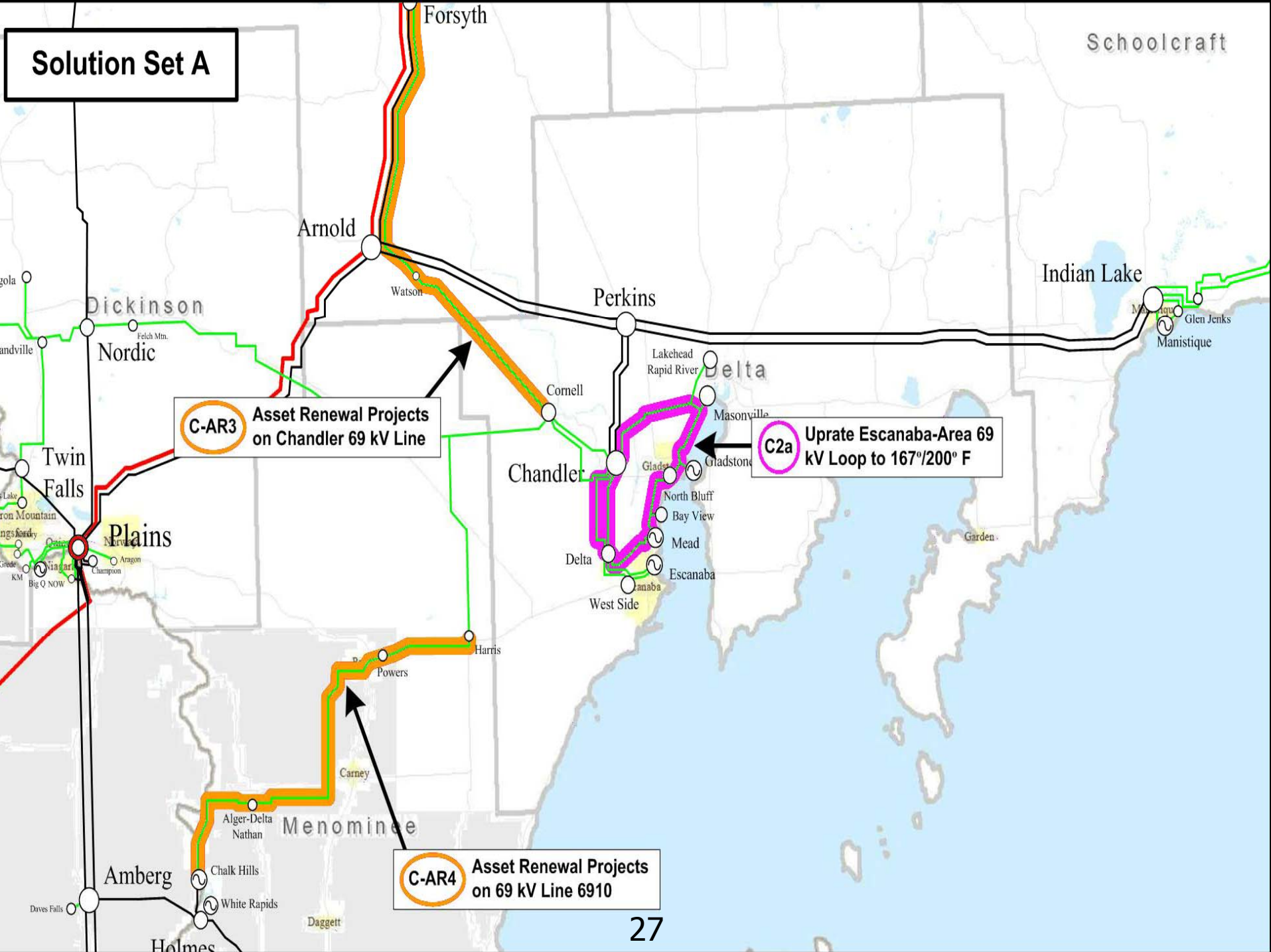
Asset Renewal Needs - CHANDLER 69 kV Line

**Core Transformer/Line Overload
Need - Found in 4 of 6 Futures**

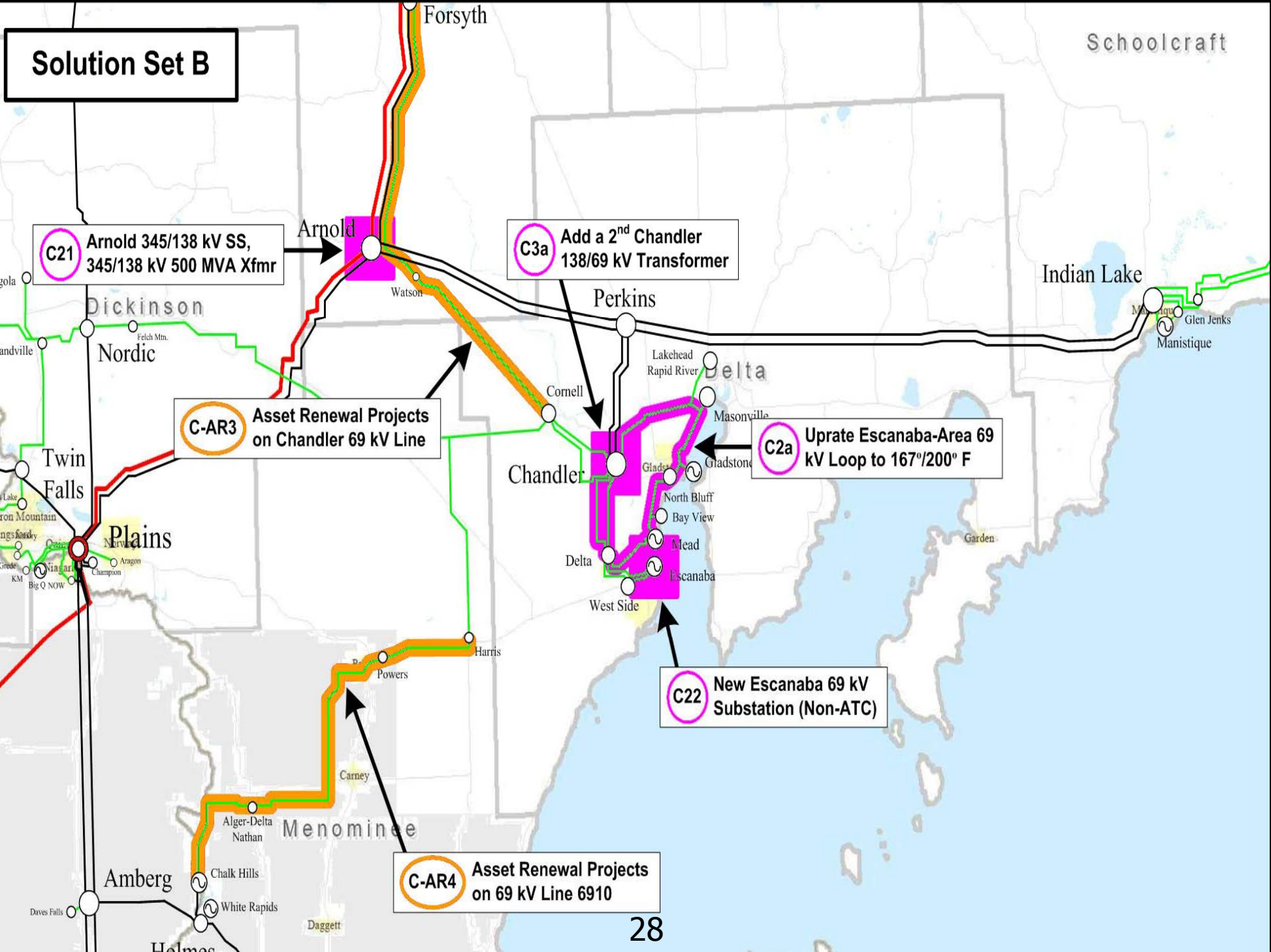
**Core Low Voltage Need -
Found in 4 of 6 Futures**

Asset Renewal Needs - 69 kV Line 6910

Solution Set A

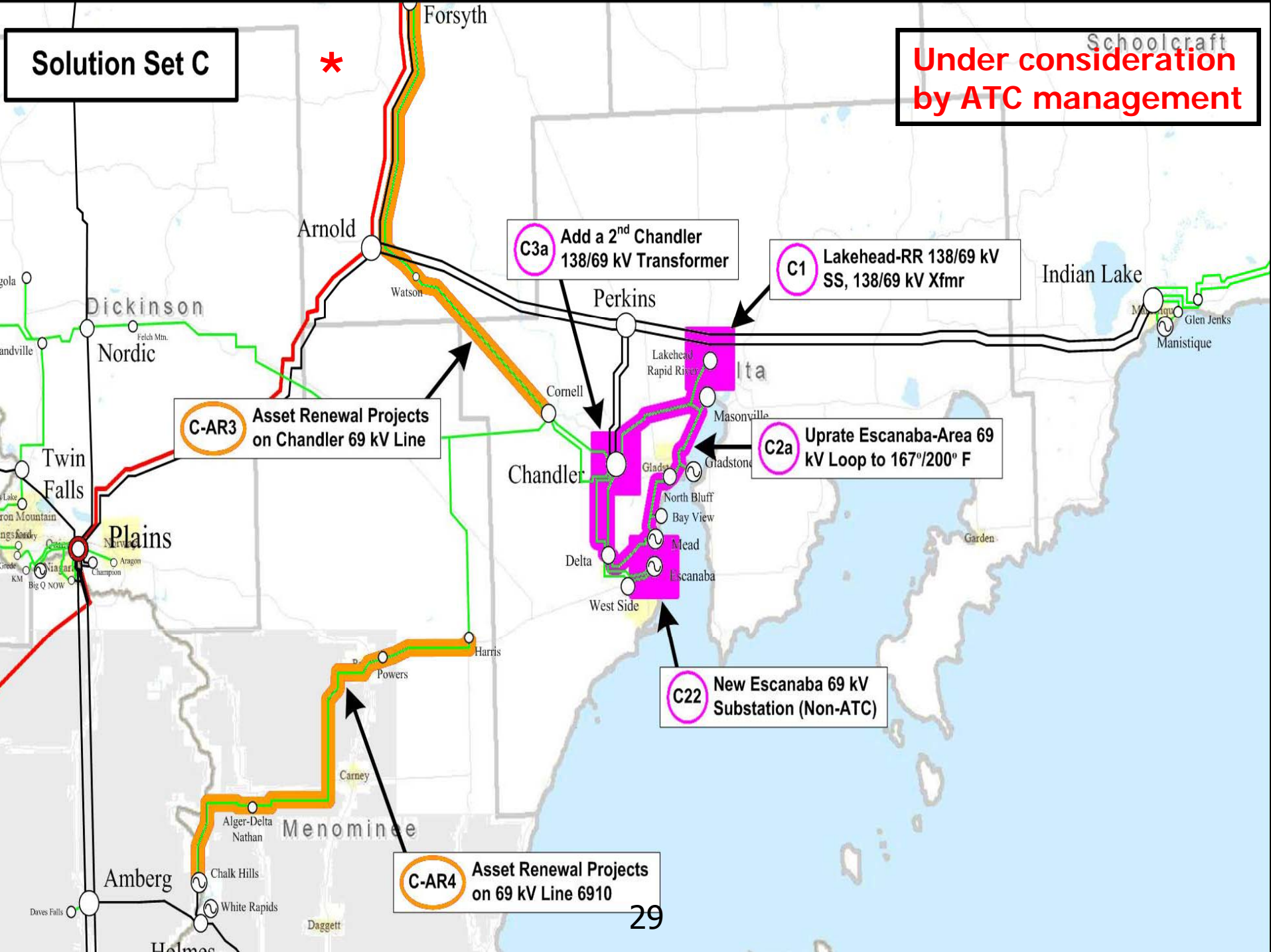


Solution Set B



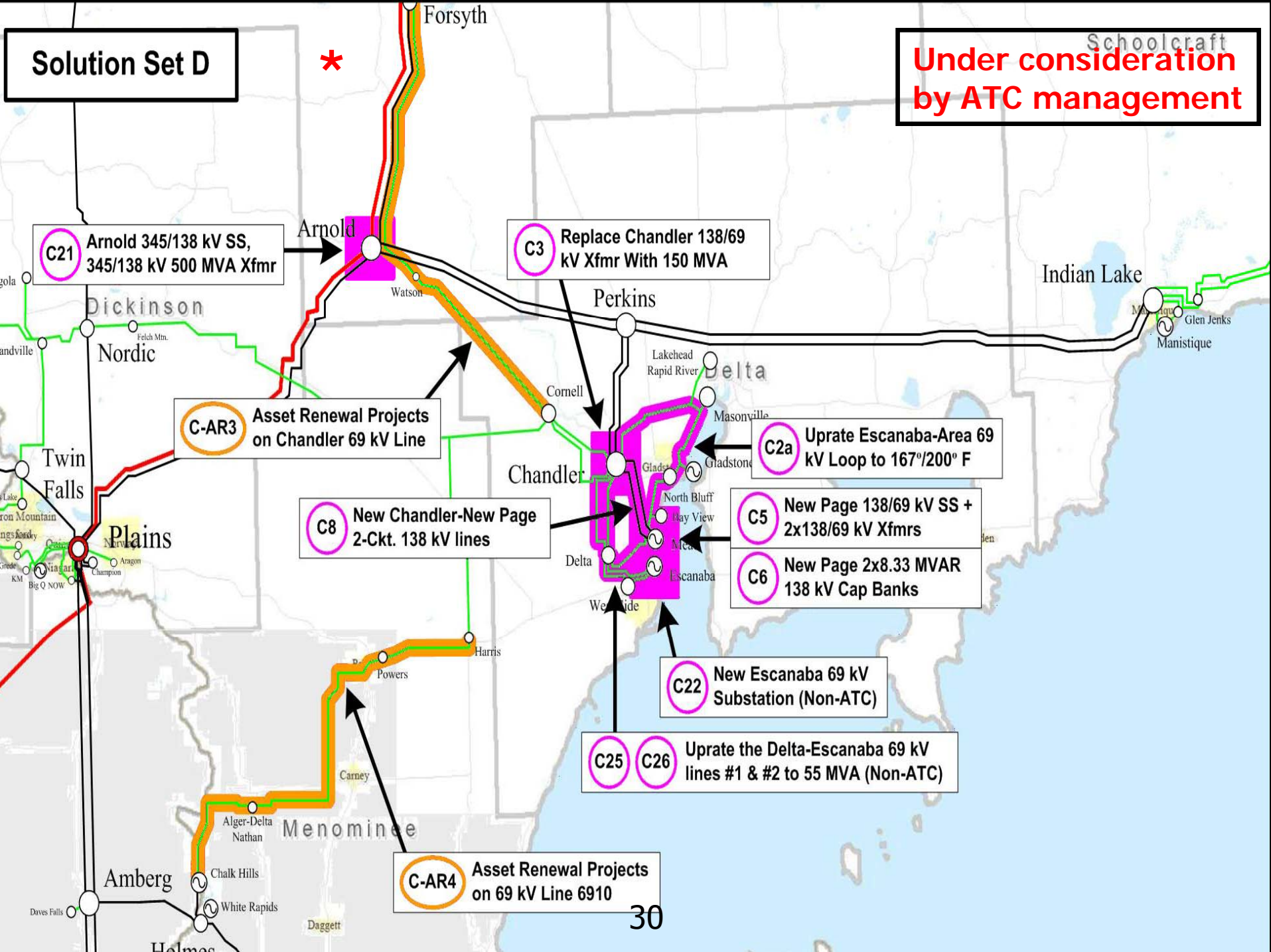
Solution Set C

**Under consideration
by ATC management**

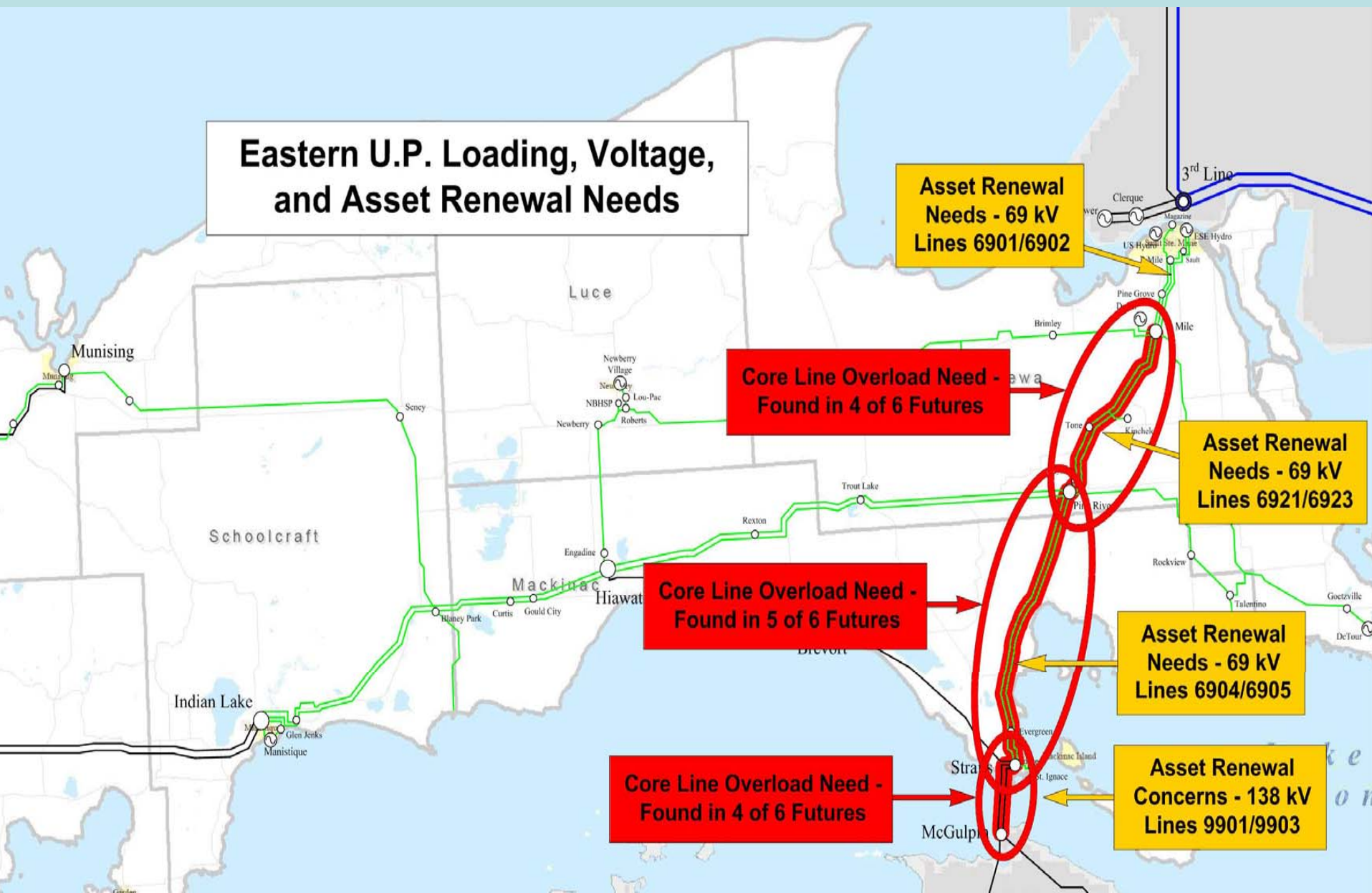


Solution Set D

Schoolcraft
**Under consideration
by ATC management**



Eastern U.P. Loading, Voltage, and Asset Renewal Needs



*** denotes projects under consideration by management**





U.P. Energy Collaborative Next Steps

- Solicit feedback from customers, stakeholders and regulators
- Evaluate non-transmission alternatives with customers/stakeholders
- Incorporate “off-peak” considerations
- Refine solution sets, as necessary to incorporate feedback
- Make final decision on “Core Projects”
- Implement Plan



Questions or Comments...