Rush Creek Task Force (CCPG)

March 29, 2017

Meeting Notes

1. **Introduction**
   - See Attendance list

2. **Anti-trust Reminder**
   - Patrick reviewed the anti-trust guidelines with the group. The guidelines are attached to the meeting agenda.
   - Sage Tauber (PSCo Regulatory) proposed that the RCTF adopt a more formal meeting process, leaning towards Robert's Rules of Order. The intent would be to make the meetings more efficient and capture key decisions of the group through motions and voting.
   - There was a question about voting, and PSCo indicated that the goal would be to reach majority agreement and noting any objections.
   - The OCC member expressed his concern with the formal meeting proposal, since he tends to offer objections. He referenced the anti-trust guidelines, section II, fifth bullet, which states a potential violation of anti-trust laws:
     - "Discussions concerning boycotting or group refusals to deal with competitors, vendors or suppliers."
     - The OCC member stated that the OCC could be included in the list in the bullet referenced.
   - Other than the OCC, the participants at the meeting were in favor of the proposal.

3. **Approve Meeting Notes**
   a. **January 24, 2017 Meeting**
      - The notes were reviewed at the February 22, 2017 meeting, and some corrections were made based on participant comments.
      - No further corrections were provided at this meeting.
      - Motion:
        - PSCo (Tom Green) moved to approve the January 24, 2017 meeting notes.
        - Tri-State (Chris Pink) seconded the motion.
      - Discussion:
        - None
      - Vote:
        - No objections were noted.
        - January 24, 2017 meeting notes were approved.

   b. **February 22, 2017 Meeting**
      - Notes were sent to RCTF on March 3, 2017
      - OCC (Chris Neil) replied with comments on March 6, 2017.
      - Revised notes were sent to RCTF on March 17, 2017.
      - OCC (Mr. Neil) replied with similar comments on March 20, 2017.
      - Motion:
        - PSCo (Tom Green) moved to approve the notes that were sent on March 17, 2017.
        - Tri-State (Ryan Hubbard) seconded the motion.
      - Discussion:

- None
- Vote:
  - No objections were noted.
  - February 22, 2017 meeting notes were approved.

4. Action Item Review

- Reviewed the action items from the February 22, 2017 meeting:

Item	Action	Status
1	Send January 24, 2017 meeting notes	Complete
2	Finalize Study Scope	Complete
3	Chris Pink to send document to PSCo showing SPP benefits	Complete. Action: PSCo to share the benefits document with all RCTF.
4	Provide OCC with Rocky Mountain Reserve Group (RMRG) contact to discuss OCC concern with loss of largest hazard.	Complete. PSCo, OCC, and PUC Staff held a conference call with Bob Johnson (RMRG Administrator) on March 9, 2017.
5	Review Preliminary Study Results	Addressed at this meeting
6	Draft Benefits Language	Ongoing

- Mr. Neil did not feel that his concern about loss of the largest hazard was fully addressed.
  - Tri-State (Chris Pink) mentioned that Tri-State had performed an Underfrequency Load Shedding Study that modeled very large generation lost that exhibited no transient instability.
  - Action: Chris Pink to provide the Underfrequency Load Sheeting Study to the RCTF.

5. Finalize and Approve Study Scope

- The latest draft of the scope was sent on March 17, 2017
- Tri-State provided a correction regarding generation at Carousel.
- OCC (Mr. Neil) provided comments to the RCTF by email on March 20, 2017, expanding the scope.
- Motion:
  - PSCo (Mr. Green) moved to approve the scope that was sent on March 17, 2017, with the correction provided by Tri-State.
  - Western Area Power Administration (Nathan Peters) seconded the motion.
- Discussion:
  - OCC indicated objection since the scope does not include an alternative that connects Rush Creek I to the Comanche – Daniels Park 345 kV lines.
    PSCo, PRPA, and others indicated that the alternative that models Rush Creek I to the Daniels Park Substation is electrically similar though there may be a difference in cost to connect to Daniels Park compared to connecting to a new station south of Daniels Park.
  - Action: PSCo agreed to evaluate the cost difference.
- Vote:
  - One objection to the motion was noted. The OCC objected to approving the scope since it did not include its proposed alternative.
  - Study Scope Approved by majority.

6. Review Preliminary Study Results

- PSCo reviewed preliminary study results for each of the alternatives in the Study Scope.
- Attachments A and B summarize the results.
- The preliminary results showed little, if any, injection capability benefit of the alternatives versus the benchmark case due to various weaknesses in the surrounding systems.

7. Stakeholder Comments

- OCC (Mr. Neil): PSCo has only been evaluating benefits from a PSCo perspective, and should think about benefits to Tri-State.
  - Tri-State and PSCo response: results show that PSCo evaluates benefits to all affected entities.
- Lisa Hickey: would like more discussion in the final study report regarding study results, including the ownership of each portion of the lines, and specific reason for transfer capacity limitations (e.g. the specific type of equipment which provides limitations) on each portion of the line so that readers of the report can better understand the results.

8. Action Items

Item	Action	Resp
1	Draft Benefits Language	PSCo
2	Continue studies with light load base case	PSCo
3	Transient stability analysis	PSCo
4	Modify results spreadsheet to include owner information	PSCo
5	Cost estimates	PSCo

9. Next Meeting

- April 27, 2017; 1:00 PM

10. Attendees List

Rush Creek Task Force				
LastName	FirstName	Company/Org	Email	3/29/2017
Arnold	Paul	Power Engineers	paul.arnold@powereng.com	
Audette Muniz	Jessie	Apex Clean Energy	jessie.audette@apexcleanenergy.com	
Brelhan	David	IREA	dbrelhan@irea.coop	
Brownrigg	Jeremy	PRPa	brownrigg@prpa.org	Phone
Caldara	Paul	Colorado PUC	paul.caldara@state.co.us	P.C.
Caldwell	Scott	Alterra Power USA Corp	scaldwell@alterrapower.ca	Phone
Carlson	Shawn	Basin	scarlson@bepc.com	Phone
Cichosz	Jon	Black Hills	jon.cichosz@blackhillscorp.com	Phone
Corrigan	Patrick	Xcel Energy	patrick.m.corrigan@xcelenergy.com	
Crawford	Rich	Midwest Wind Resources	midwestwind1@gmail.com	Phone
Dang	Dang	S-Power	ddang@spower.com	
Degutis	Erin	Xcel Energy	Erin.A.Degutis@xcelenergy.com	
Detsky	Mark	Dietze & Davis	mdetsky@dietzedavis.com	
Easton	Robert	Western	reaston@wapa.gov	
Feuerstein	Pam	IREA	PFeuerstein@irea.Coop	
Foltz	Adam	S-Power	afoltz@spower.com	
Gearhart	Roy	Western	rgearhar@wapa.gov	
Ghoshal	Orijit	Invenergy	OGhoshal@invenergyllc.com	Phone
Green	Tom	Xcel Energy	thomas.green@xcelenergy.com	
Greene	Lynn	Lucky Corridor	lynn@luckycorridor.com	
Hickey	Lisa	~~Western Resource Advocates~~ Interwest Energy Alliance	LisaHickey@newlewgroup.com	
Hirning	Jim	Western	Hirning@WAPA.GOV	Phone
Hubbard	Ryan	Tri-State	rhubbard@tristategt.org	Phone
Iammalamadaka	Swaraj	Apex Clean Energy	swaraj.iammalamadaka@apexcleanenergy.com	
Jurgemeyer	Mark	IREA	MJurgemeyer@irea.Coop	
Leuchtmann	Greg	Invenergy	GLeuchtmann@invenergyllc.com	
Mirzayi	Betty	Xcel Energy	betty.mirzayi@xcelenergy.com	
Neil	Chris	Office of Consumer Council	chris.neil@state.co.us	
Paoletti	Connie	Xcel Energy	connie.paoletti@xcelenergy.com	
Parisch	Puneet	Buckyball Systems	pparisch@buckyballsystems.com	
Peters	Nathan	Western	npeters@WAPA.GOV	Phone
Pink	Chris	Tri-State	cpink@tristategt.org	Phone
Rein	Mike	Xcel Energy	Michael.A.Rein@xcelenergy.com	
Singh	Hari	Xcel Energy	Hari.singh@xcelenergy.com	
Stegall	Lindsey	Colorado Energy Office	lindsey.stegall@state.co.us	
Sydnor	Marc	Apex Clean Energy	marc.sydnor@apexcleanenergy.com	
Tauber	Sage	Xcel Energy	Tauber, Sage (sage.tauber@xcelenergy.com)	Sage Tauber
Taylor	Joe	Xcel Energy	joseph.c.taylor@xcelenergy.com	
Taylor	Blane	Tri-State	btaylor@tristategt.org	
Wedewer	Lindsey	Colorado Energy Office	lindsey.wedewer@state.co.us	
Wendling	Warren	Wendling Consulting	w.l.wendling@q.com	
Worley	Chris	Colorado Energy Office	chris.worley@state.co.us	Phone

11. Attachment A – Preliminary Alternative Analysis Summary

Rush Creek Task Force

Preliminary Alternative Analysis

March 29, 2017

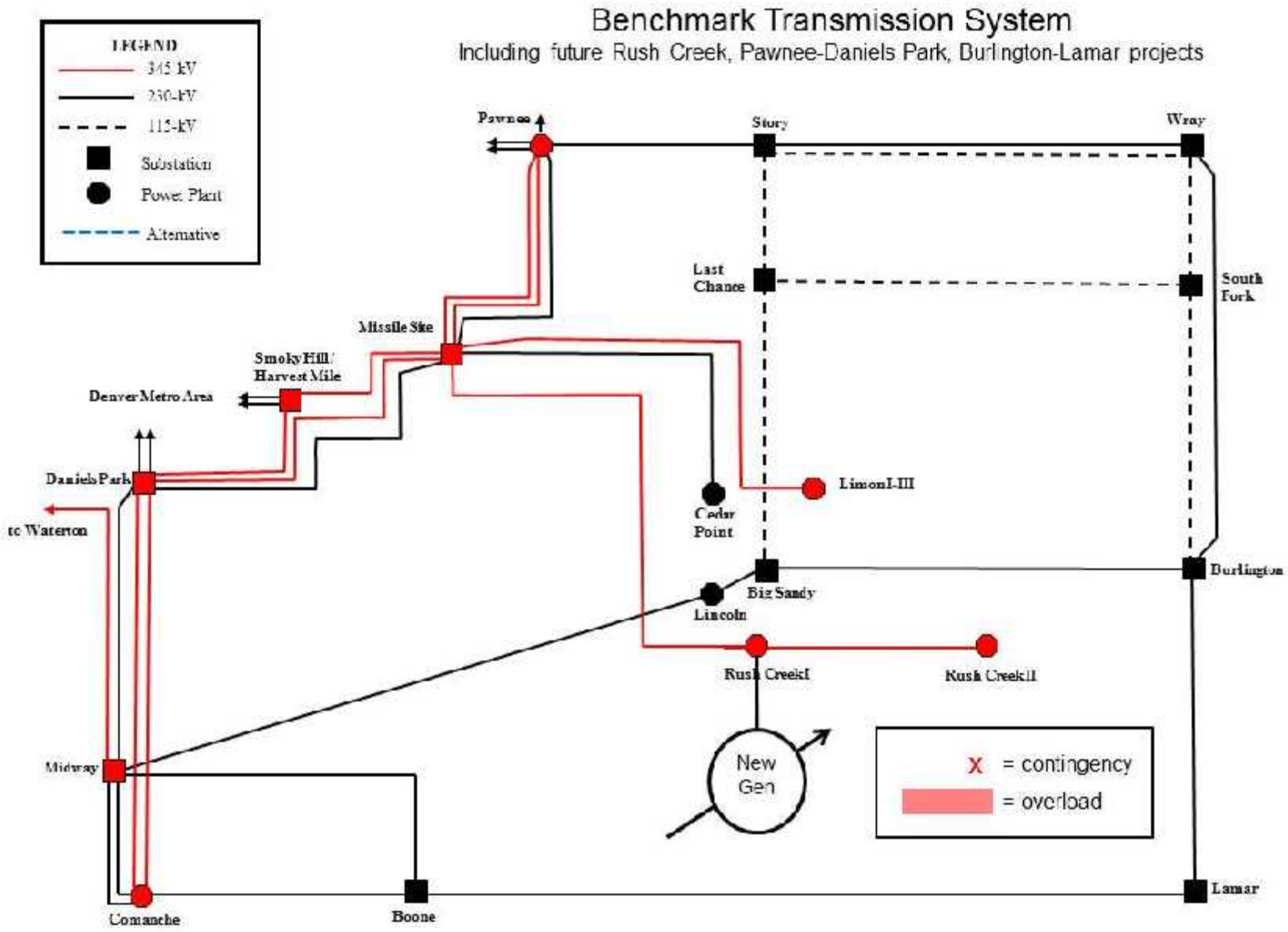
Power Flow Results - Heavy Summer 2026

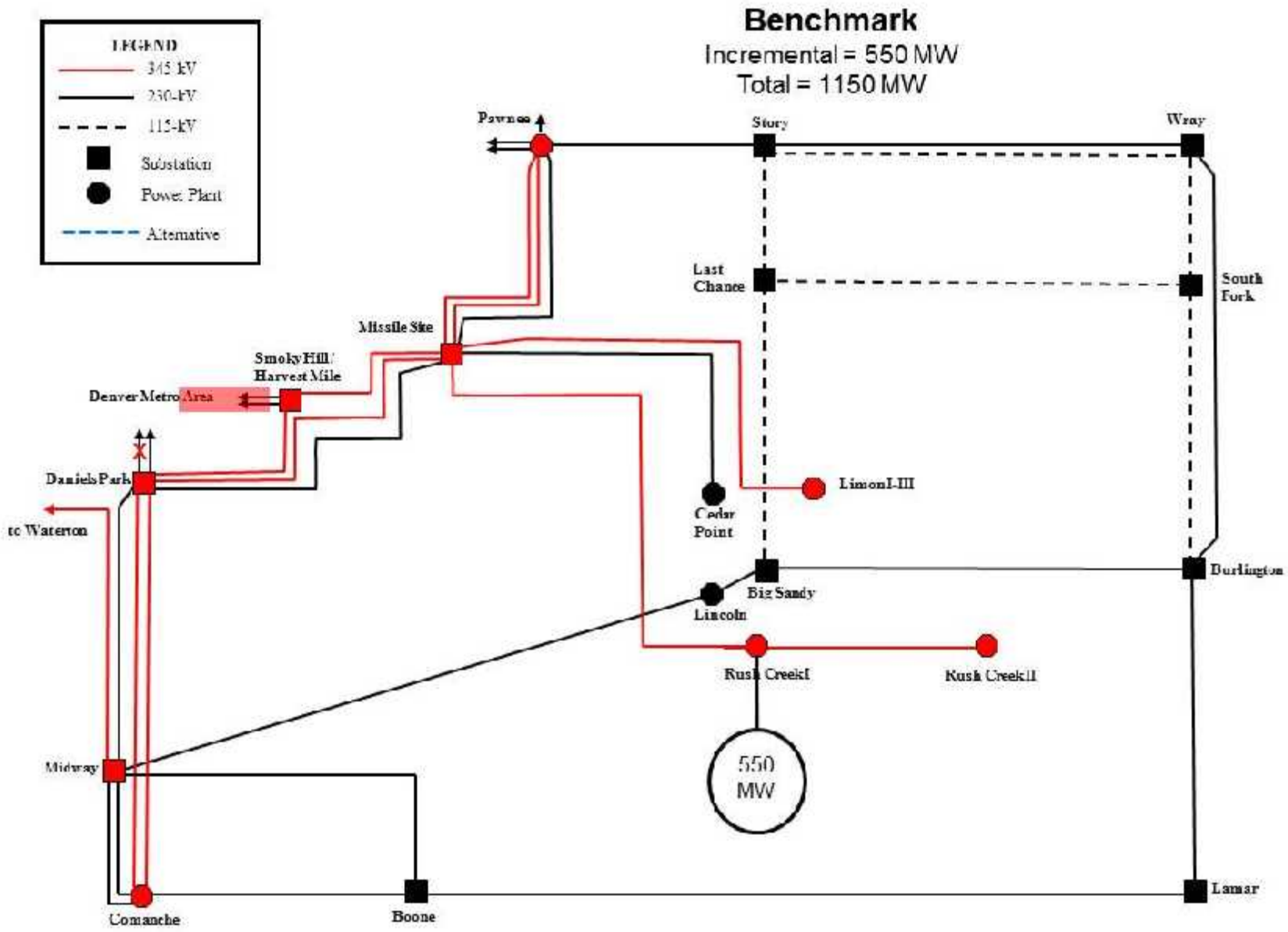
Alternative	Alternative Description	Incremental Injection Capability (MW)	Total Injection Capability (MW)	Limiting Element	Limiting Rating	Limiting Contingency
Alt 0	Benchmark	550	1150	Leetsdale-Monroe 230 kV UG	398 MVA	Daniels Park-Arapahoe 230 kV
Alt 1	RCII - Burlington	100	700	Burlington-Bonny Creek 115 kV	145 MVA	Missile Site-RCI 345 kV
		200	800	Burlington-Big Sandy 230 kV	274 MVA	
		250	850	Wray-N Yuma 230 kV	287 MVA	
Alt 2	RCI - Big Sandy	100	700	Big Sandy-Last Chance 115 kV	109 MVA	Missile Site-RCI 345 kV
		300	900	Burlington-Big Sandy 230 kV	274 MVA	
		300	900	Lincoln-Midway 230 kV	637 MVA	
Alt 3	RCII - Limon gen	-250	350	Missile Site-Limon I 345 kV	810 MVA	Missile Site-RCI 345 kV
Alt 4	Missile - RCI - RCII #2	550	1150	Leetsdale-Monroe 230 kV UG	398 MVA	Daniels Park-Arapahoe 230 kV
Alt 5	RCII - Burlington, RCI-Big Sandy	350	950	Big Sandy-Last Chance 115 kV	109 MVA	Missile Site-RCI 345 kV
		500	1100	Burlington-Bonny Creek 115 kV	145 MVA	
		550	1150	Lincoln-Midway 230 kV	637 MVA	
Alt 6	RCII - Burlington, RCI-Limon gen	-100	500	Missile Site-Limon I 345 kV	810 MVA	Missile Site-RCI 345 kV
Alt 7	RCII - Burlington, RCII-Limon gen	-100	500	Missile Site-Limon I 345 kV	810 MVA	Missile Site-RCI 345 kV
Alt 8	RCI - Daniels Park, RCII-Burlington	550	1150	Leetsdale-Monroe 230 kV UG	398 MVA	Daniels Park-Arapahoe 230 kV
Alt 9	RCI - Daniels Park, RCI-RCII	550	1150	Leetsdale-Monroe 230 kV UG	398 MVA	Daniels Park-Arapahoe 230 kV
Alt 9a	RCI - Daniels Park, RCI-RCII, Waterton Loop	600	1200	Leetsdale-Monroe 230 kV UG	398 MVA	Daniels Park-Arapahoe 230 kV

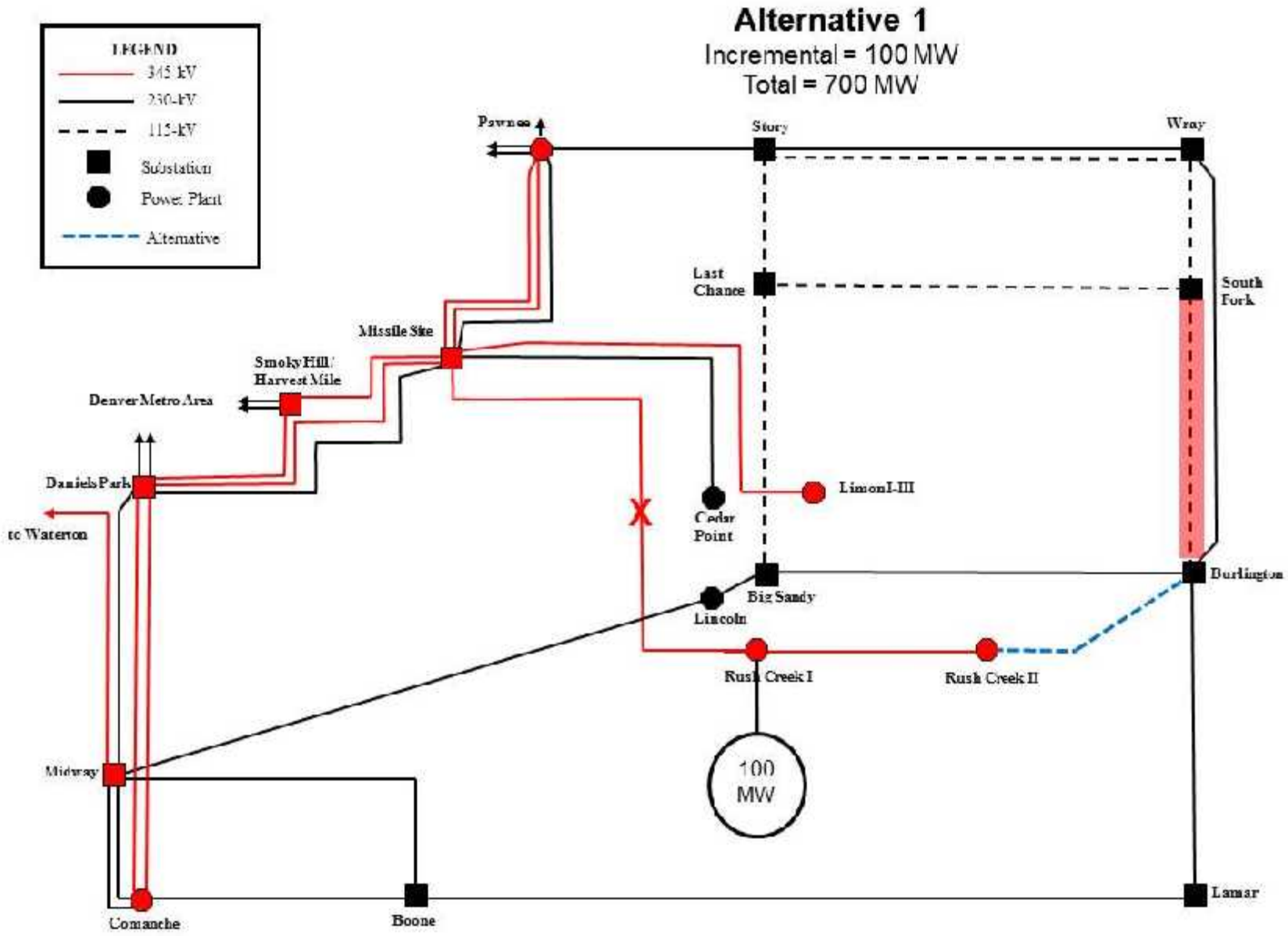
12. Attachment B – Preliminary Results Presentation

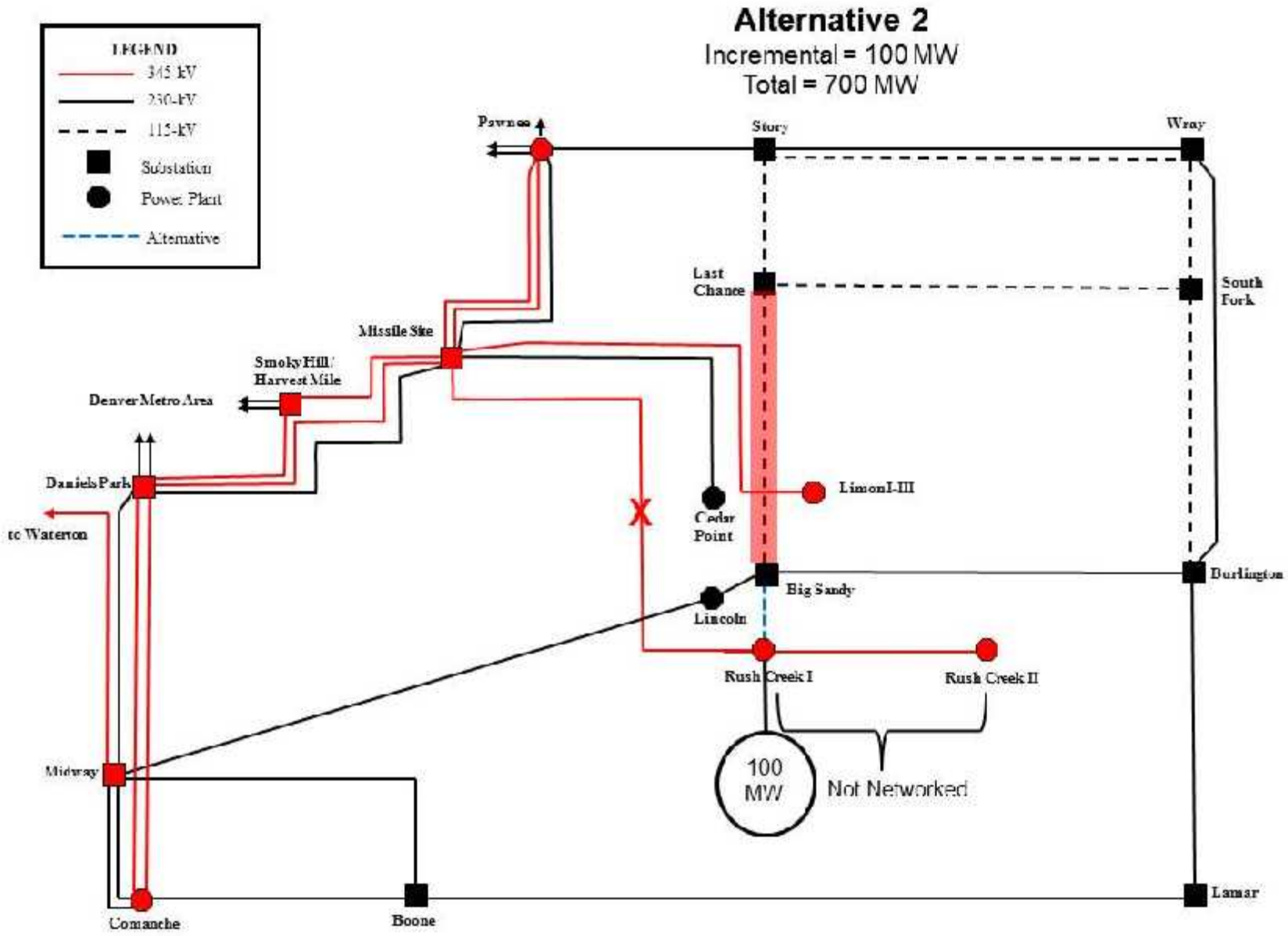
Rush Creek Task Force

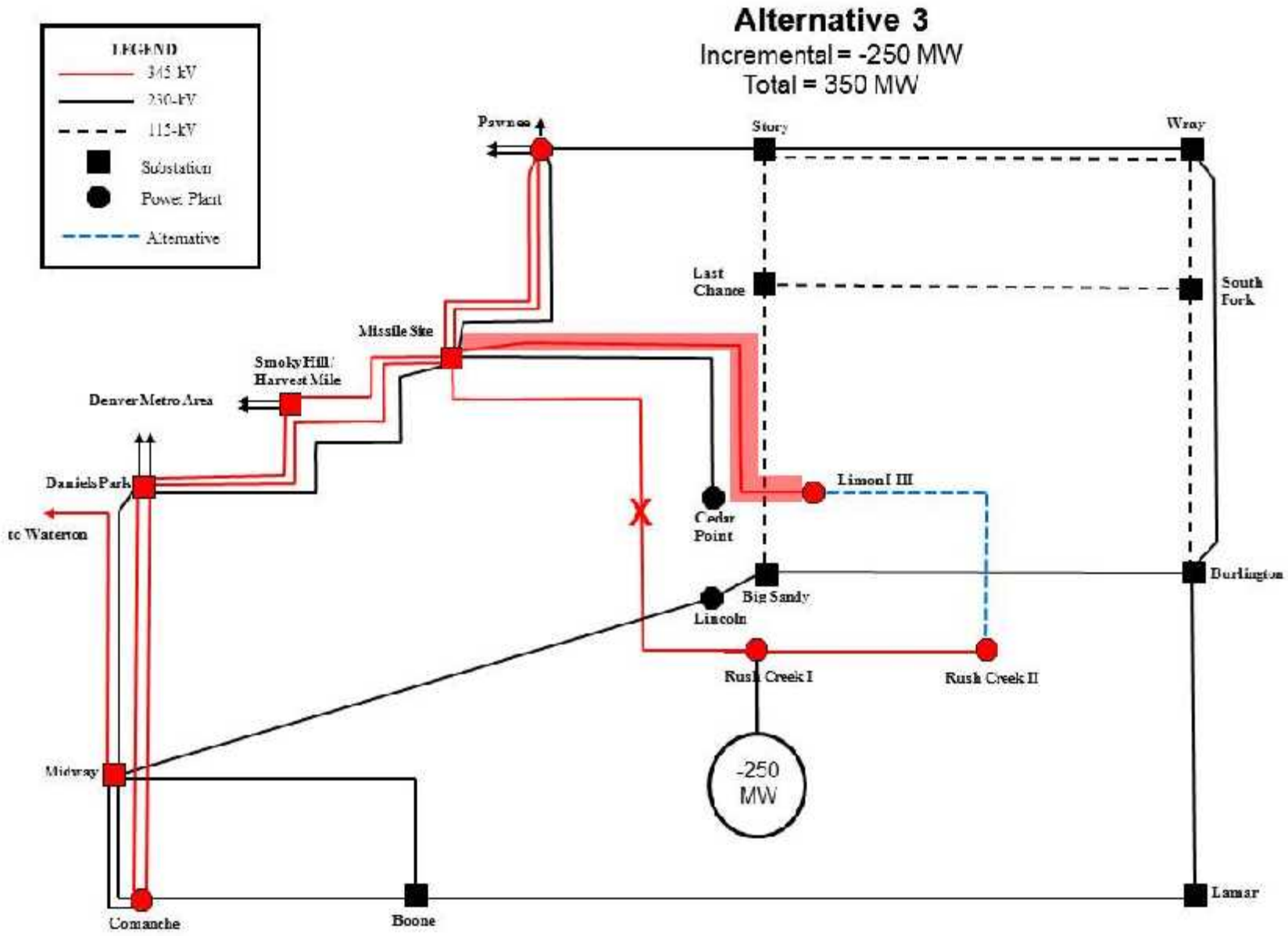
Preliminary Power Flow Analysis
Heavy Summer 2026 case
March 29, 2017

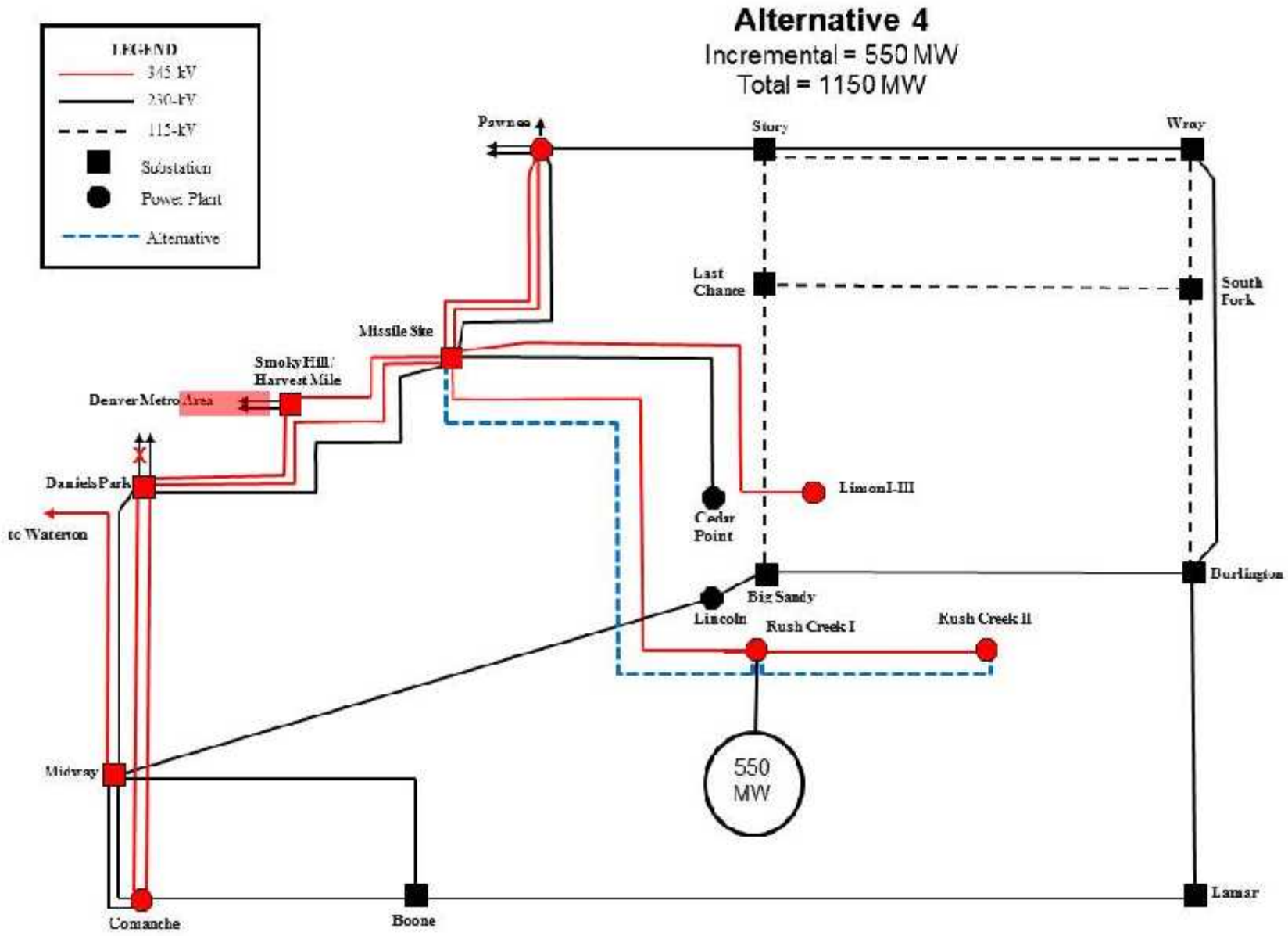

Benchmark Transmission System
Including future Rush Creek, Pawnee-Daniels Park, Burlington-Lamar projects
LEGEND
345 kV
230-kV
115-kV
Substation
Power Plant
Alternative
Pawnee
Story
Wray
Last Chance
South Fork
Missile Site
Smoky Hill/ Harvest Mile
Denver Metro Area
Daniels Park
to Waterton
Limon I-III
Cedar Point
Burlington
Big Sandy
Lincoln
Rush Creek I
Rush Creek II
New Gen
X = contingency
= overload
Midway
Comanche
Boone
Lamar

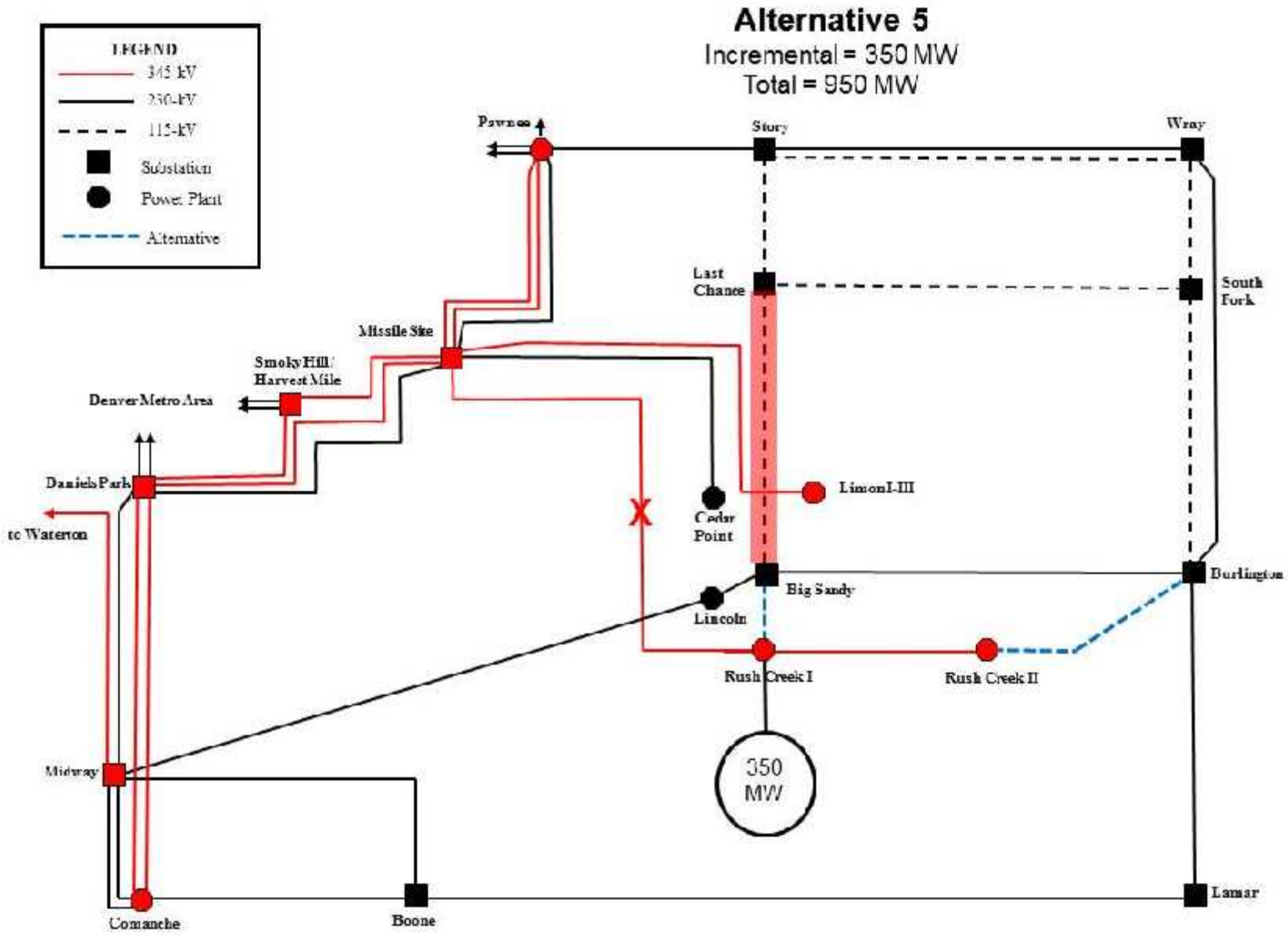

Benchmark
Incremental = 550 MW
Total = 1150 MW
LEGEND
345 kV
230-kV
115-kV
Substation
Power Plant
Alternative
Pawnee
Story
Wray
Last Chance
South Fork
Missile Site
Smoky Hill/ Harvest Mile
Denver Metro Area
Daniels Park
to Waterton
Limon I-III
Cedar Point
Big Sandy
Lincoln
Burlington
Rush Creek I
Rush Creek II
550 MW
Midway
Comanche
Boone
Lamar

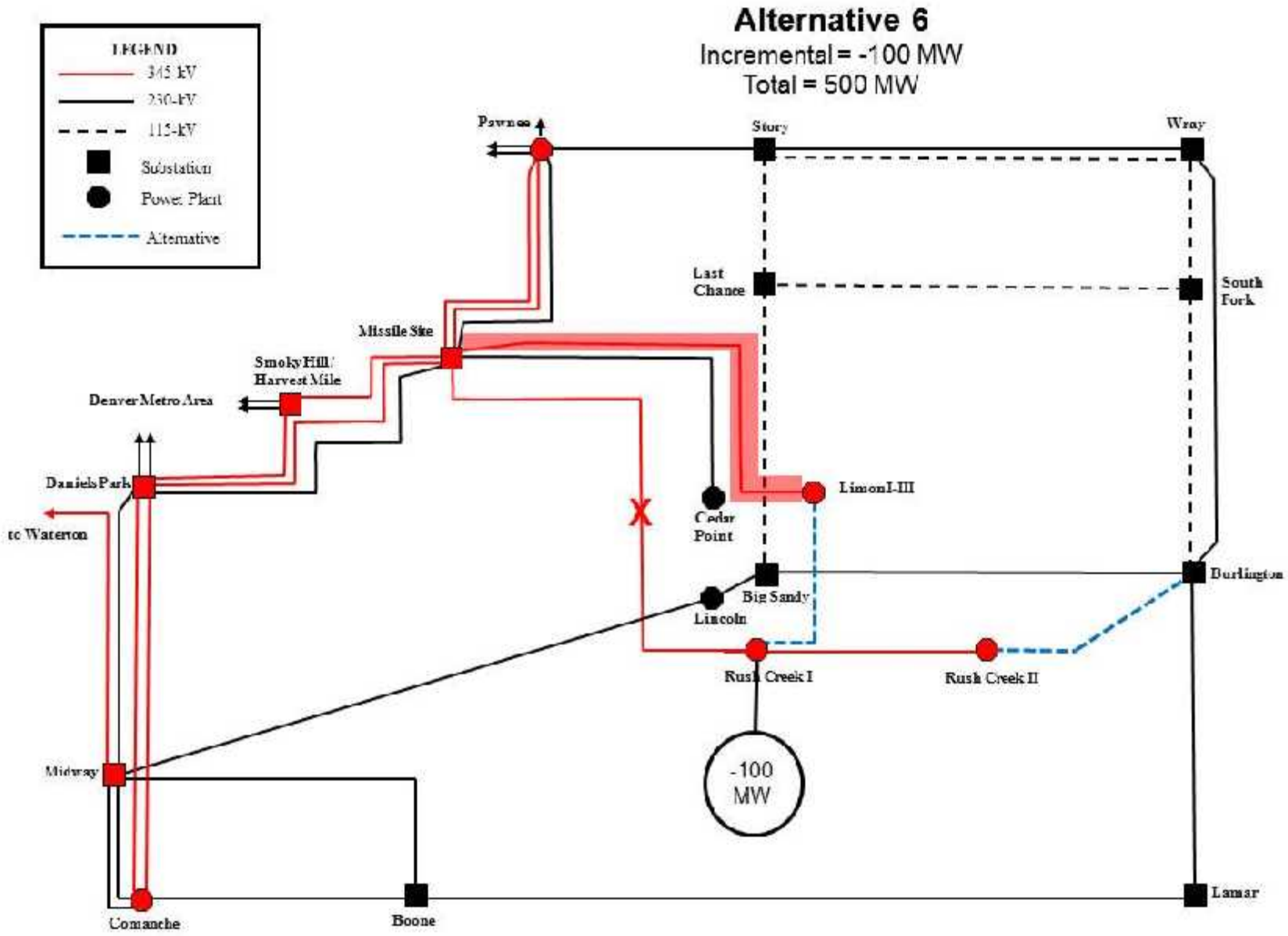

Alternative 1
Incremental = 100 MW
Total = 700 MW
LEGEND
345 kV
230-kV
115-kV
Substation
Power Plant
Alternative
Pawnee
Story
Wray
Last Chance
South Fork
Missile Site
Smoky Hill/ Harvest Mile
Denver Metro Area
Daniels Park
to Waterton
Limon I-III
Cedar Point
Big Sandy
Lincoln
Burlington
Rush Creek I
Rush Creek II
100 MW
Midway
Comanche
Boone
Lamar

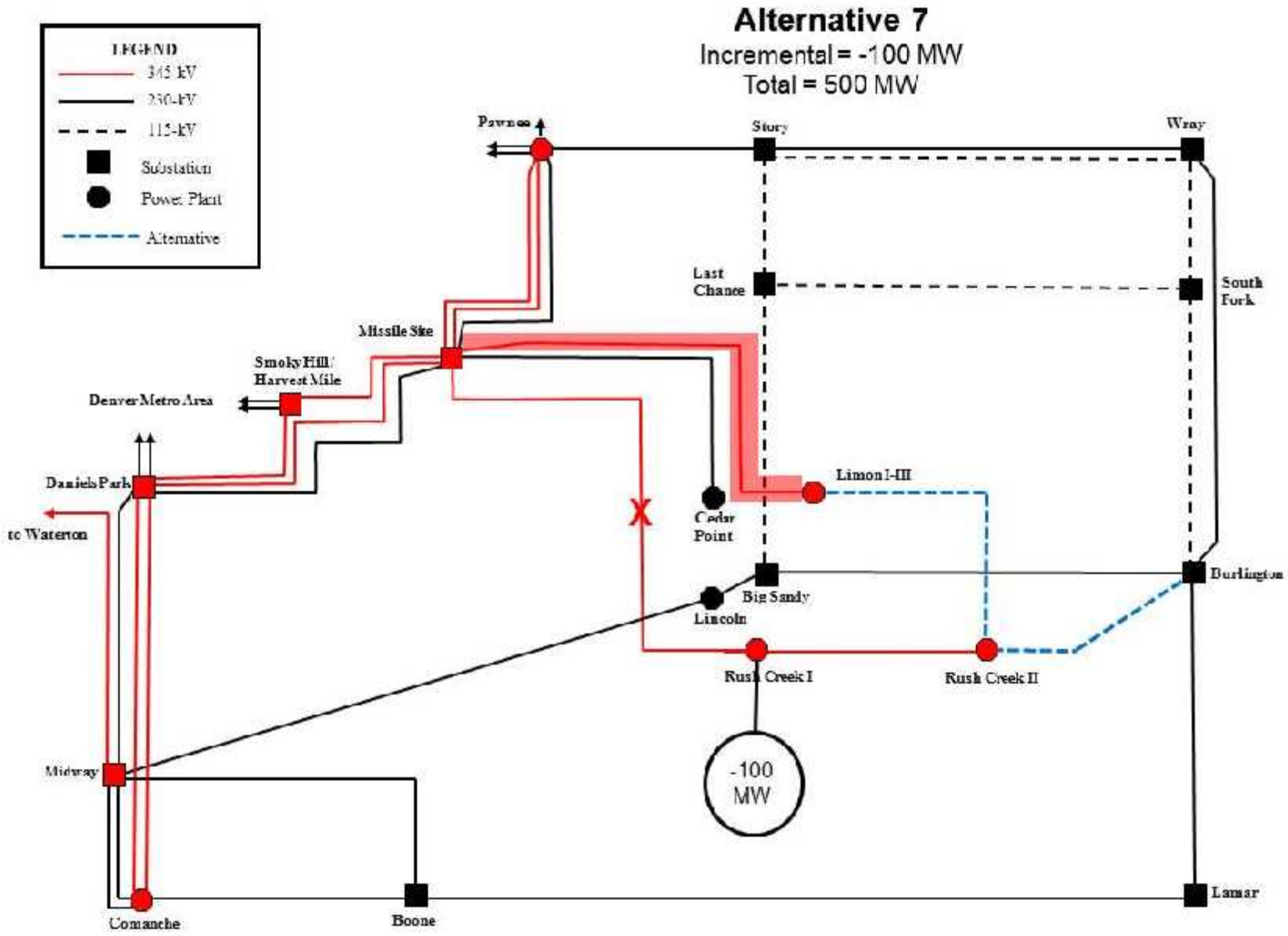

Alternative 2
Incremental = 100 MW
Total = 700 MW
LEGEND
345 kV
230-kV
115-kV
Substation
Power Plant
Alternative
Pawnee
Story
Wray
Last Chance
South Fork
Missile Site
Smoky Hill/ Harvest Mile
Denver Metro Area
Daniels Park
to Waterton
Cedar Point
Limon I-III
Big Sandy
Lincoln
Burlington
Rush Creek I
Rush Creek II
100 MW
Not Networked
Midway
Comanche
Boone
Lamar

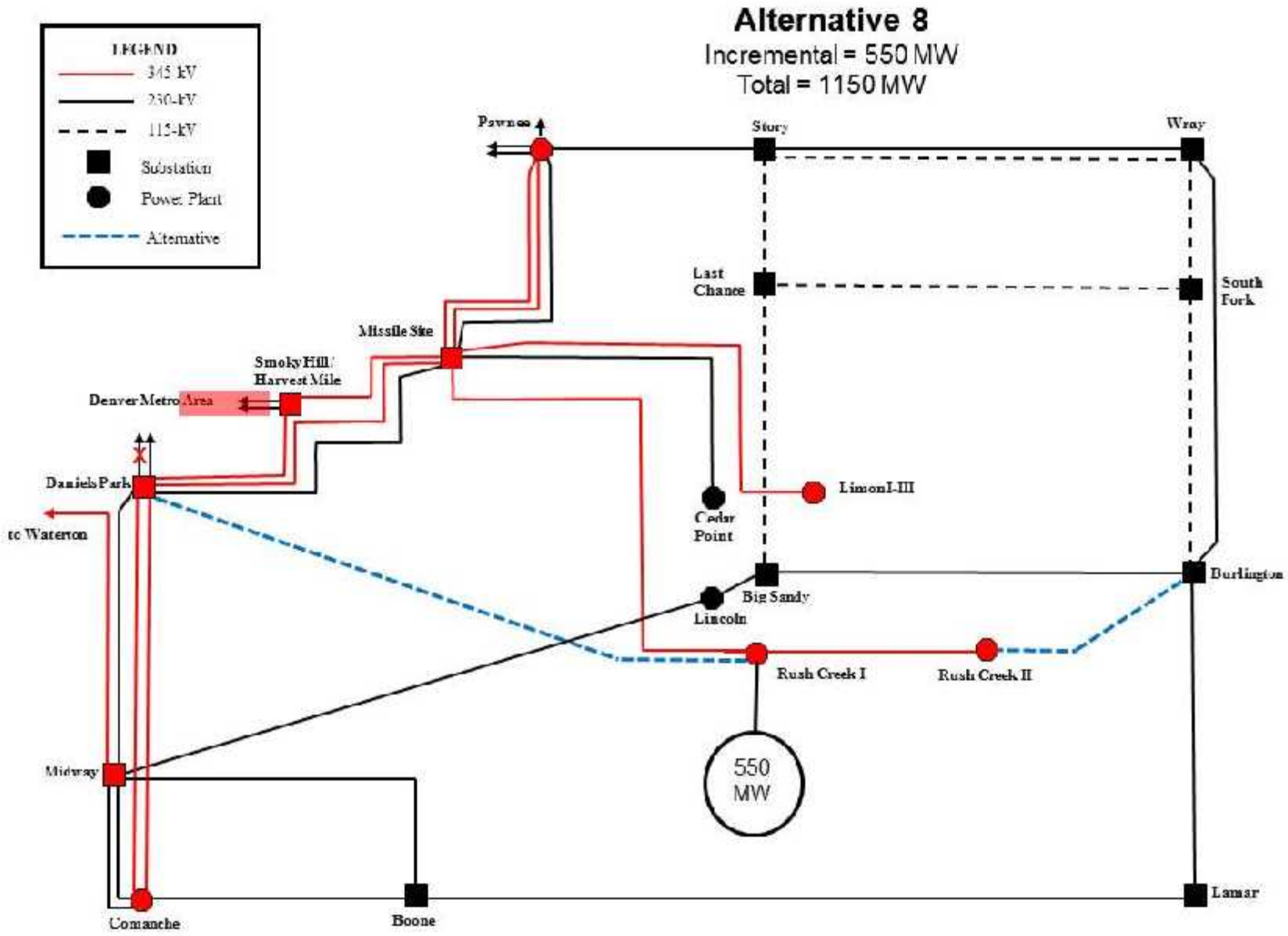

Alternative 3
Incremental = -250 MW
Total = 350 MW
LEGEND
345 kV
230-kV
115-kV
Substation
Power Plant
Alternative
Pawnee
Story
Wray
Last Chance
South Fork
Missile Site
Smoky Hill/ Harvest Mile
Denver Metro Area
Daniels Park
to Waterton
Limon I III
Cedar Point
Big Sandy
Lincoln
Burlington
Rush Creek I
Rush Creek II
-250 MW
Midway
Comanche
Boone
Lamar

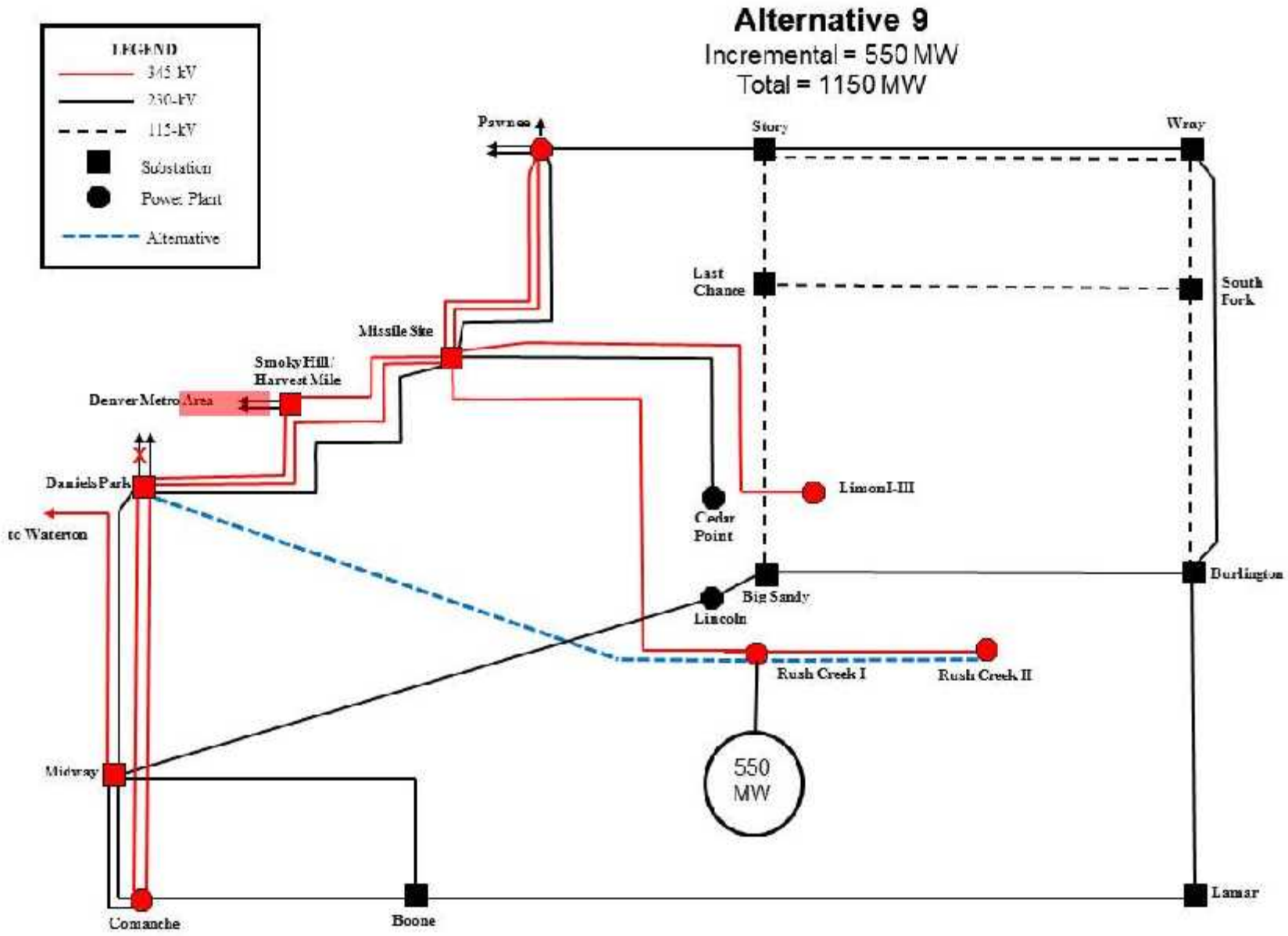

Alternative 4
Incremental = 550 MW
Total = 1150 MW
LEGEND
345 kV
230-kV
115-kV
Substation
Power Plant
Alternative
Pawnee
Story
Wray
Last Chance
South Fork
Missile Site
Smoky Hill/ Harvest Mile
Denver Metro Area
Daniels Park
to Waterton
Limon I-III
Cedar Point
Big Sandy
Lincoln
Rush Creek I
Rush Creek II
Burlington
550 MW
Midway
Comanche
Boone
Lamar

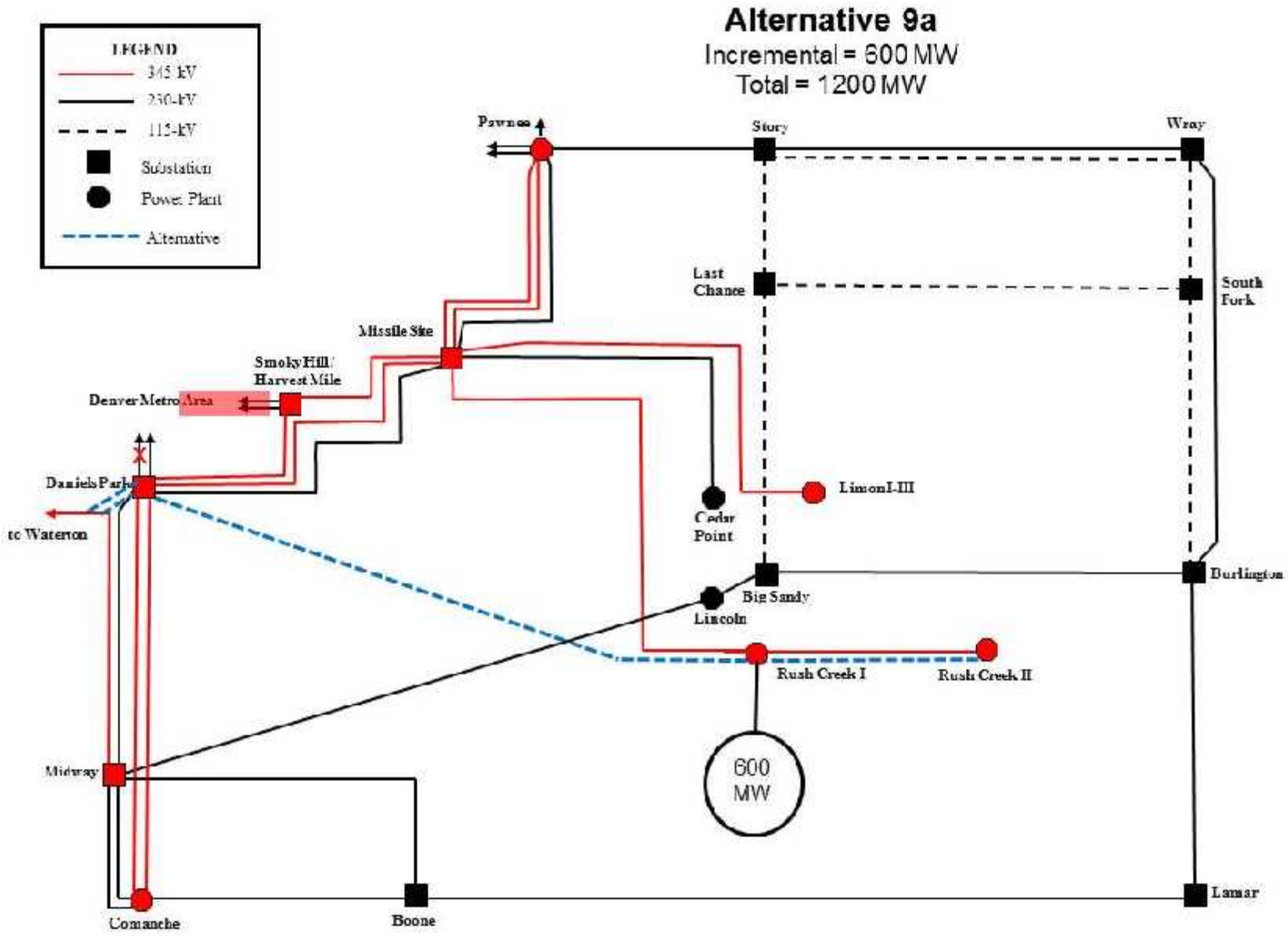

Alternative 5
Incremental = 350 MW
Total = 950 MW
LEGEND
345 kV
230-kV
115-kV
Substation
Power Plant
Alternative
Pawnee
Story
Wray
Last Chance
South Fork
Missile Site
Smoky Hill/ Harvest Mile
Denver Metro Area
Daniels Park
to Waterton
Limon I-III
Cedar Point
Big Sandy
Lincoln
Burlington
Rush Creek I
Rush Creek II
350 MW
Midway
Comanche
Boone
Lamar


Alternative 6
Incremental = -100 MW
Total = 500 MW
LEGEND
345 kV
230-kV
115-kV
Substation
Power Plant
Alternative
Pawnee
Story
Wray
Last Chance
South Fork
Missile Site
Smoky Hill/ Harvest Mile
Denver Metro Area
Daniels Park
to Waterton
Cedar Point
Limon I-III
Big Sandy
Lincoln
Burlington
Rush Creek I
Rush Creek II
-100 MW
Midway
Comanche
Boone
Lamar


Alternative 7
Incremental = -100 MW
Total = 500 MW
LEGEND
345 kV
230-kV
115-kV
Substation
Power Plant
Alternative
Pawnee
Story
Wray
Last Chance
South Fork
Missile Site
Smoky Hill/ Harvest Mile
Denver Metro Area
Daniels Park
to Waterton
Limon I-III
Cedar Point
Big Sandy
Lincoln
Burlington
Rush Creek I
Rush Creek II
-100 MW
Midway
Comanche
Boone
Lamar


Alternative 8
Incremental = 550 MW
Total = 1150 MW
LEGEND
345 kV
230-kV
115-kV
Substation
Power Plant
Alternative
Pawnee
Story
Wray
Last Chance
South Fork
Missile Site
Smoky Hill/ Harvest Mile
Denver Metro Area
Daniels Park
to Waterton
Limon I-III
Cedar Point
Big Sandy
Lincoln
Burlington
Rush Creek I
Rush Creek II
550 MW
Midway
Comanche
Boone
Lamar


Alternative 9
Incremental = 550 MW
Total = 1150 MW
LEGEND
345 kV
230-kV
115-kV
Substation
Power Plant
Alternative
Pawnee
Story
Wray
Last Chance
South Fork
Missile Site
Smoky Hill/ Harvest Mile
Denver Metro Area
Daniels Park
to Waterton
Limon I-III
Cedar Point
Big Sandy
Lincoln
Burlington
Rush Creek I
Rush Creek II
550 MW
Midway
Comanche
Boone
Lamar


Alternative 9a
Incremental = 600 MW
Total = 1200 MW
LEGEND
345 kV
230-kV
115-kV
Substation
Power Plant
Alternative
Pawnee
Story
Wray
Last Chance
South Fork
Missile Site
Smoky Hill/ Harvest Mile
Denver Metro Area
Daniels Park
to Waterton
Limon I-III
Cedar Point
Big Sandy
Lincoln
Burlington
Rush Creek I
Rush Creek II
600 MW
Midway
Comanche
Boone
Lamar