



projects WIND ENERGY SERVICES

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Schumann Wind Project Review

8/23/2017



There is much more to just hauling freight. It's securing the route, removing the obstacles and, literally, stopping traffic. We make it happen with in-house permitting, our very own escorts, and expert project managers who make it seem like no big deal.



Table of Contents

Purpose..... 3

Project Description..... 3

Review Starting Point 3

Project Overview 4

Review Summary..... 4

Map 1: Route of Travel from Exit 216 I84 West near Pendleton, Oregon to site near Athena, Oregon. 5

Primary Route of Travel for WECs from Exit 216 I84 West to Schumann Wind Site 6

Map 2: Schumann Site Location..... 7

Map 3: Schumann Project Site Plan..... 8

Primary/Preferred Route for WECs from Exit 216 I84 West to Site 9

Transport Schedule 17

Comments 17

Appendix 18

 80 m Base Section 19

 80 m Mid Section 20

 80 m Top Section 21

 Nacelle – 13 Axle..... 22

 Hub..... 23

 GE 50.2 m Blade 24



Purpose

The Purpose of the report is to perform a detailed transportation study for the movement of wind turbine components to a location near Pendleton, OR.

Goal: To assess and determine that the routes leading to site are adequate to support cargo of determined sizes.

1. **Route Survey** – Checks for 3 key areas of road transport including: cornering, grade, and visual limitations on roads (i.e. bridges, wires, trees, and other obstructions, etc.) Confirmation of a clear route (dimensionally) will be completed by an ATS representative. A visual inspection of bridges and culverts will be completed but will not be an engineered assessment. Permit applications have not been submitted to the State of Oregon.
2. **Equipment Study** – At certain sites, the equipment to transport large equipment over the road is not acceptable to get to the unloading point. If this is determined to be the case, an alternate plan to utilize proper equipment will be presented. If certain routes to the site need specific equipment due to certain obstructions, it will be identified in this survey.
3. **Site Study** – The scope of this survey will end at the county roads leading to the site entrance.

Project Description

| | |
|-------------------------------|---|
| Customer | GE |
| Project Name | Schumann Wind Project |
| Project Location | Athena, Oregon |
| Contractor Name | TBD |
| Type of Turbine | GE 1.79-100 and GE 1.7-103 on 80 m towers |
| Quantity of Turbines | 1 – GE 1.79-100 and 4 – GE 1.7-103 |
| Receiving Hours | TBD |
| Project Deliveries Start Date | TBD |

Review Starting Point

The starting point is I84W MM 216 exit near Pendleton, OR.



Project Overview

ATS has reviewed first hand each segment of the primary routing within this document. ATS has not applied for permits from the State of Oregon.

From February 9 through February 10 Stephen Jones from ATS physically reviewed the proposed transport route and collaborated on the route improvements outlined in this document.

The route review beginning on page 9 shows the entire route detail along with noted areas of improvement. These improvements are based upon ATS equipment and transportation methods.

| Attendees | Company | Contact Information |
|---------------|---------|---------------------|
| Stephen Jones | ATS | stephenj@atsinc.com |

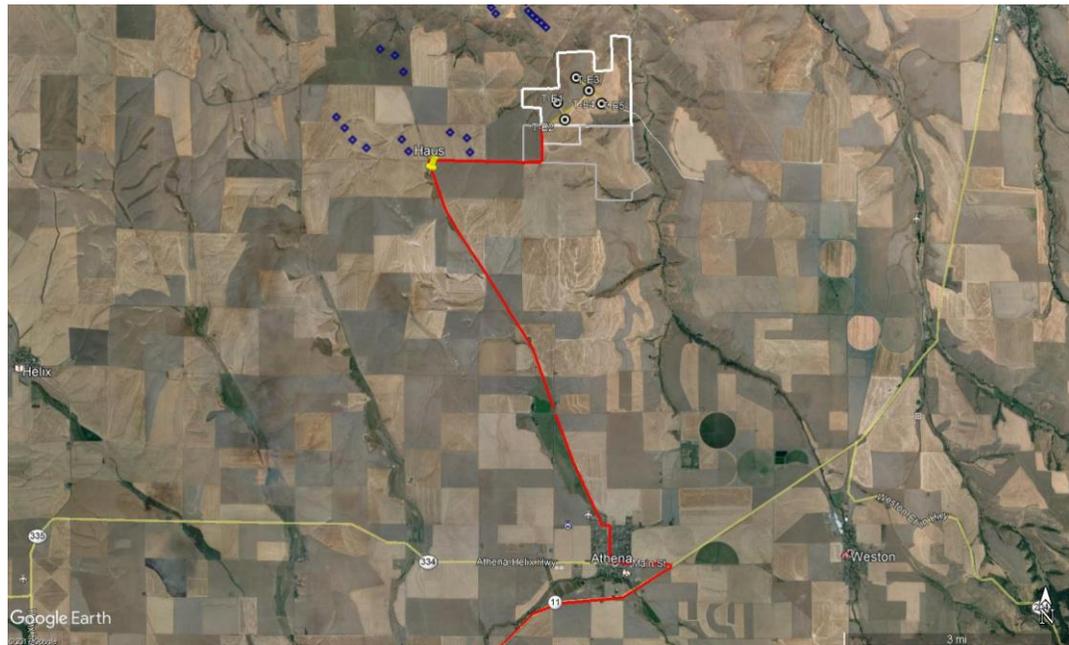
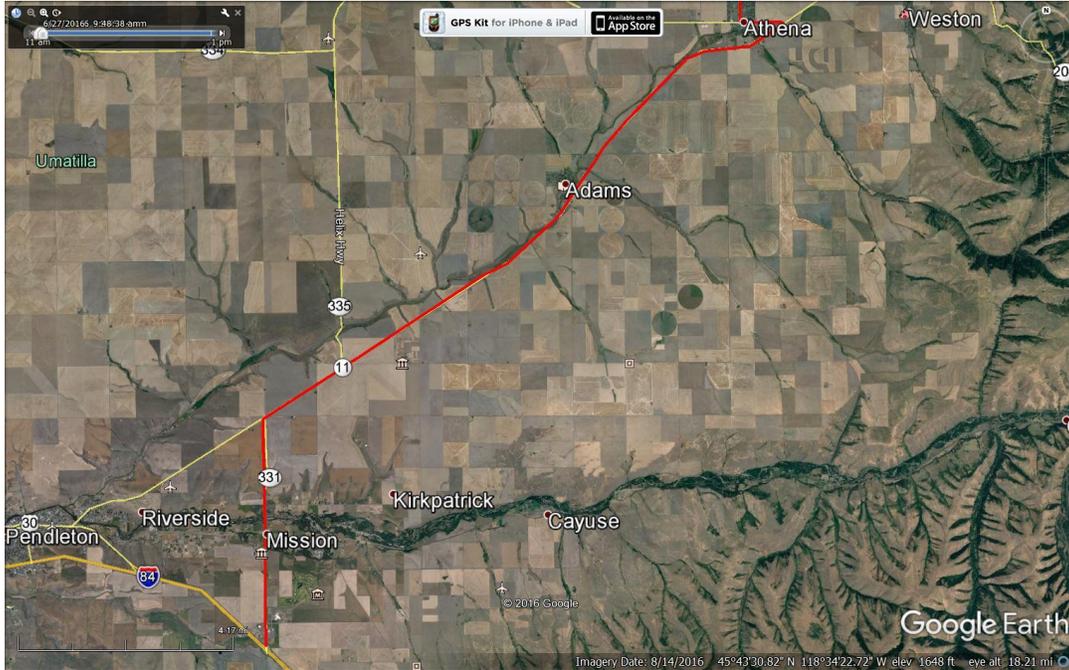
Review Summary

At the time of this review, test transport permits have not been applied for from the State of Oregon. A compilation of worst case dimensions and weights will be used to ensure the proposed route will be suitable for transport.

1. Transport equipment listed in this document is a typical representation of the equipment that will be used. The exact equipment has not been selected.
2. The review was conducted assuming transports will utilize the I84W MM 216 exit near Pendleton, OR.
3. Roads were surveyed at 16' 1" vertical clearance. Road width requirements will also need to be met; a minimum of 16' usable road width is required for straight-line travel.
4. There are bridges that will be crossed in or near the project site. ATS will need confirmation the structures are approved and will support loaded transports. ATS did not order any permits within the project boundary or off of the main delivery route and assumes that these will be covered in local road use agreements.
5. Detailed improvement drawings were created using scaled Google Earth images. Shown improvements will be a good representation of what is needed however all improvement areas should be surveyed and exact dimensions of improvements to be confirmed prior to any construction.
6. The vertical clearances of all overpasses were checked along the proposed route; however the entire route will need to be checked for utility and tree clearances prior to deliveries. It is recommended that a "high pole" run the entire route approximately 6 months prior to the start of deliveries to ensure adequate time for any tree trimming or to raise any utilities that will interfere with the safe transport of components.
 - a. ATS will be able to schedule a "high pole" as needed.
7. This review was conducted using all information available at the time.



Map 1: Route of Travel from Exit 216 I84 West near Pendleton, Oregon to site near Athena, Oregon.





Primary Route of Travel for WECs from Exit 216 I84 West to Schumann Wind Site

| WEC Transport Route | Direction of Travel | Improvements Needed | | Miles |
|------------------------|---------------------|---|--|-------|
| Exit 216 I84W | West | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 0.3 |
| OR331 | North | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 4.4 |
| OR11 | North/East | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 13 |
| Main | West | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 0.9 |
| 2 nd Street | North | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 0.5 |
| Sherman | West | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 0.1 |
| Waterman | North | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No | 5.5 |
| Sanders ¹ | East - dirt | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 1.5 |
| Harris ² | North - dirt | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No | 0.5 |

26.7 miles to site entrance

Improvements Needed:

Fill and compact as needed; pages 13, 14 and 16

Sleeve and remove signs; pages 13 and 14

Remove unused utility pole; page 14

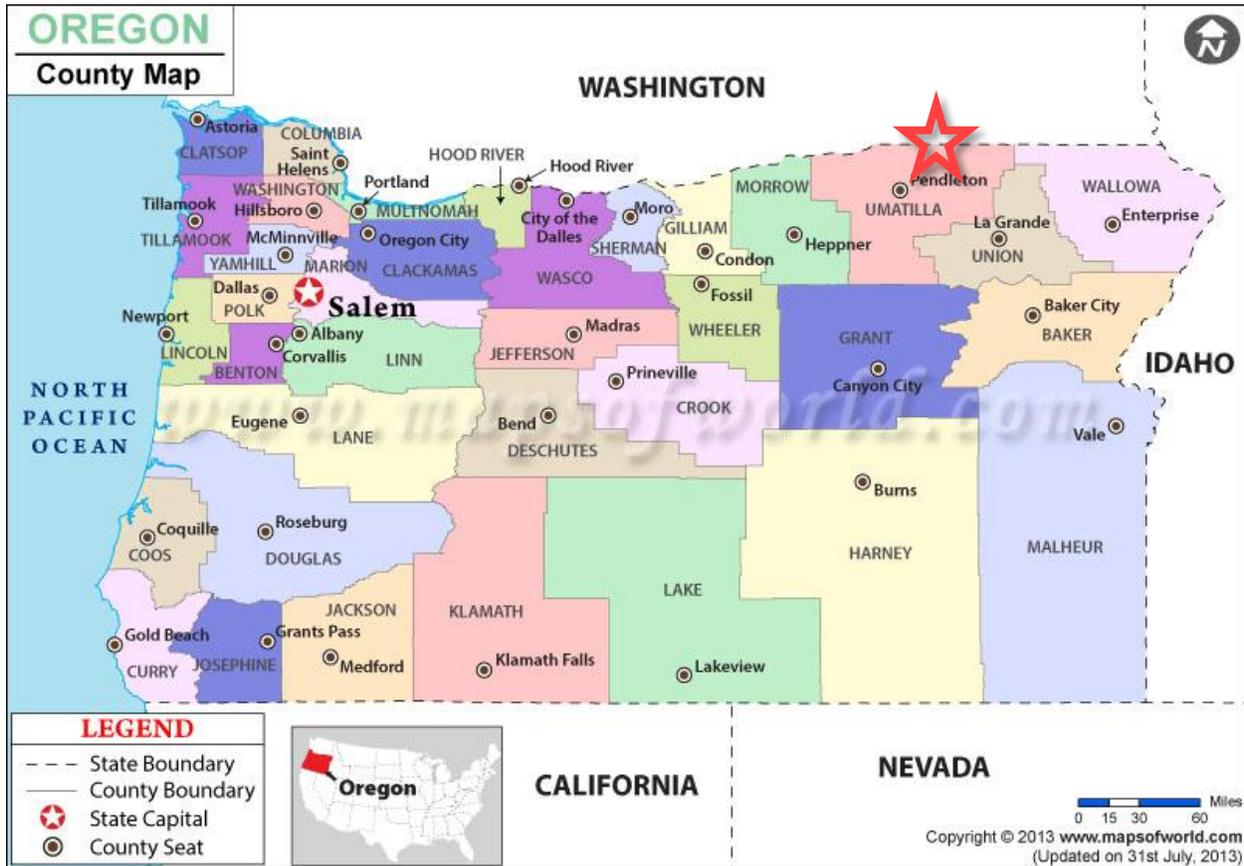
Watch guy wire; page 14

¹ Not Reviewed due to snow on route

² Not Reviewed due to snow on route

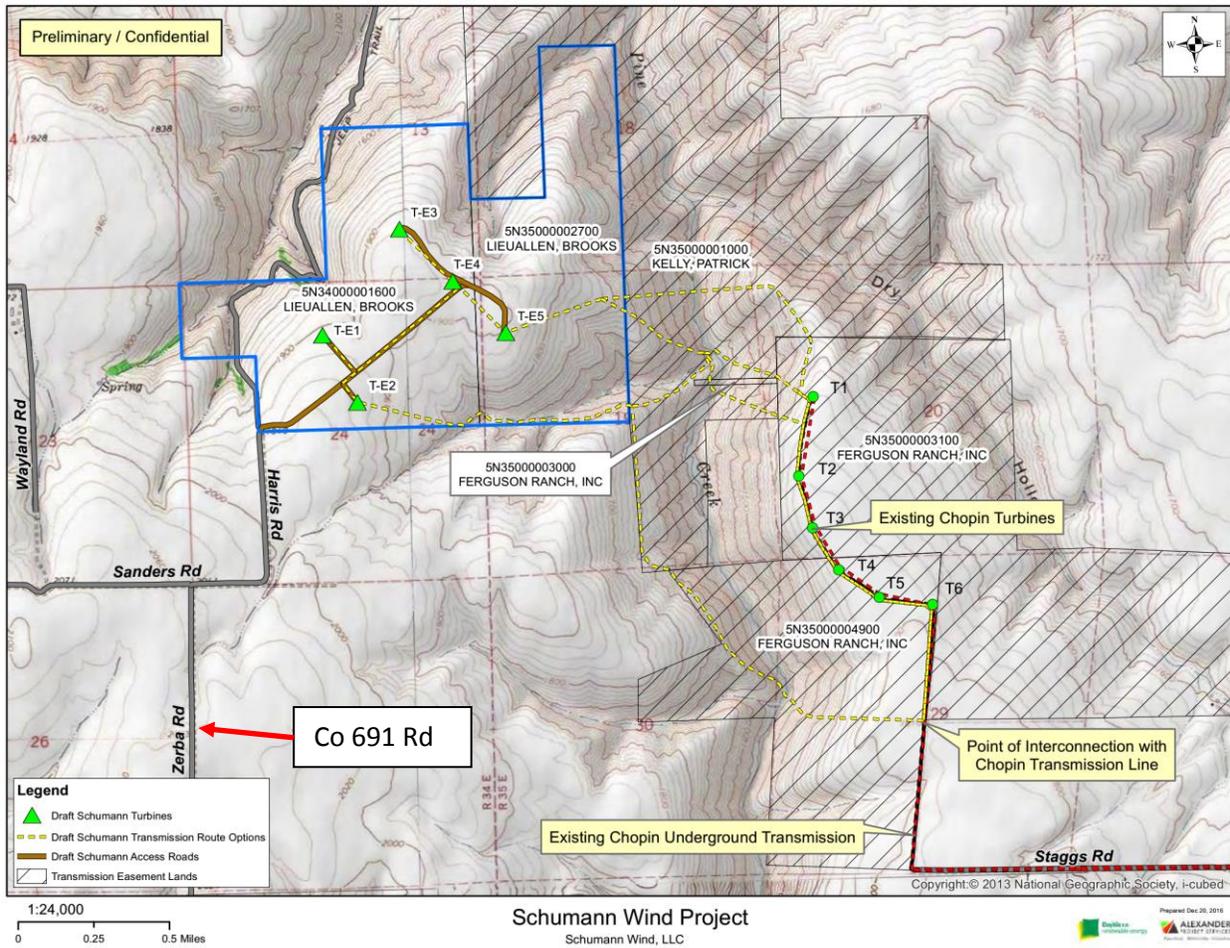


Map 2: Schumann Site Location





Map 3: Schumann Project Site Plan





Primary/Preferred Route for WECs from Exit 216 I84 West to Site

Exit 216 I84 W

No Improvements Needed.



Exit Ramp to OR331

No Improvements Needed.

Manual Steer Blades





Exit Ramp to OR331
continued

RR #809036X
10 Trains per day
5 to 10 mph
Track Rating Good





OR331 to OR11

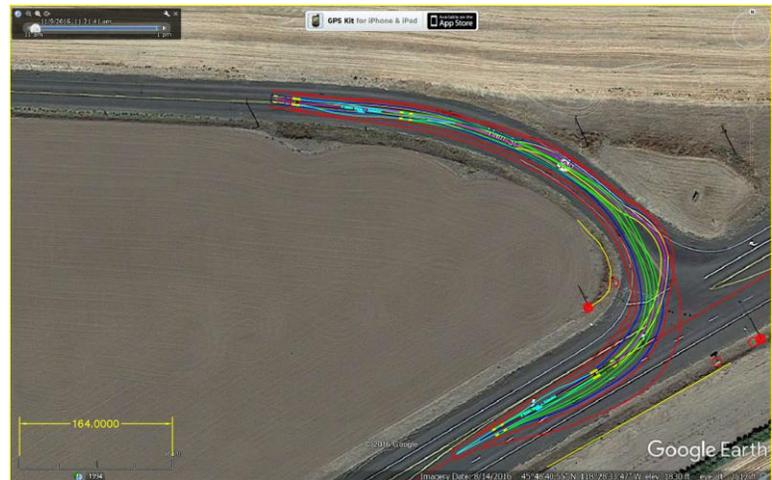
No Improvements Needed.





OR11 to Main

No Improvements Needed.





Main to 2nd St



IMPROVEMENT NEEDED

Verify impacted area is adequate when snow is melted. Fill and compact as needed. Sleeve and remove sign if it is reinstalled.

Manual steer blades and towers.



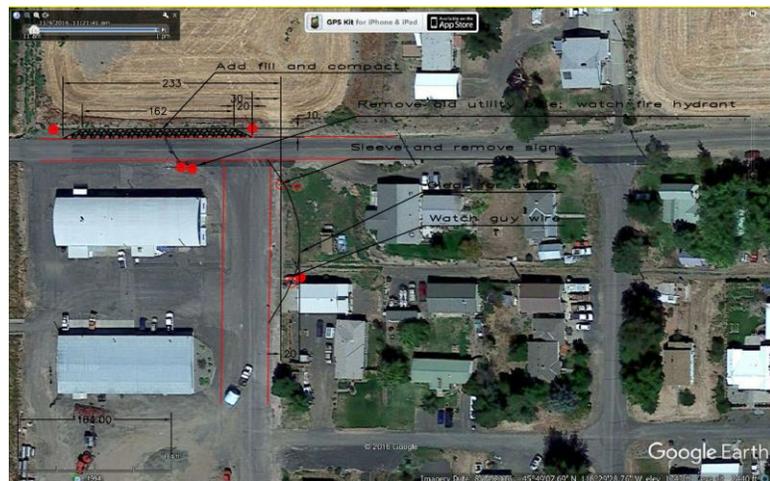


2nd St to Sherman



IMPROVEMENT NEEDED

- Add fill and compact.
- Remove unused utility pole by fire hydrant.
- Sleeve and remove sign.
- Watch guy wire and area of blade swing.
- Manual Steer blades and towers.

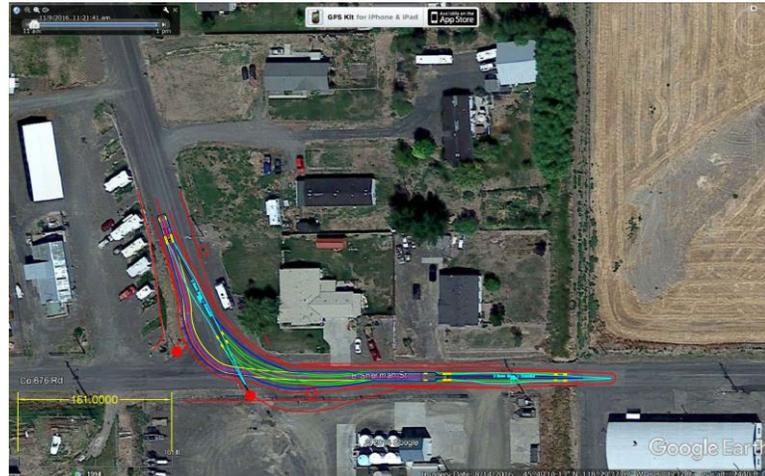




Sherman to Waterman

No Improvements Needed.

Manual Steer blades.

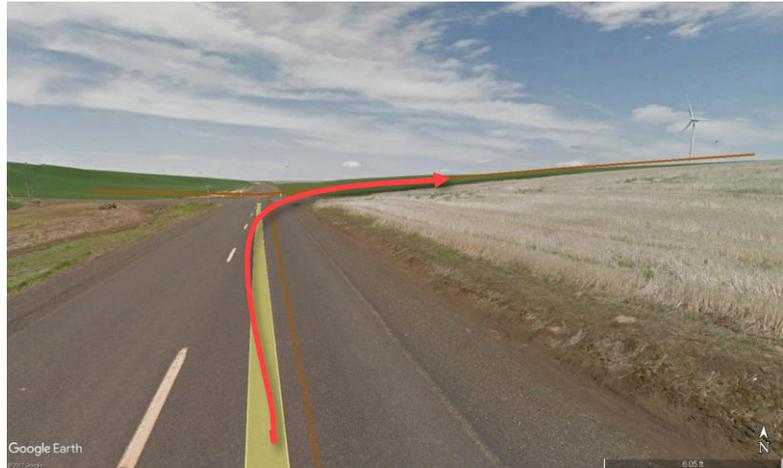




Waterman to Sanders

IMPROVEMENT NEEDED

Build turn to GE specifications.
Snow covered at time of survey.
Unable to proceed after this intersection.
Image from Google Earth.



End of Route



Transport Schedule

TBD

Comments

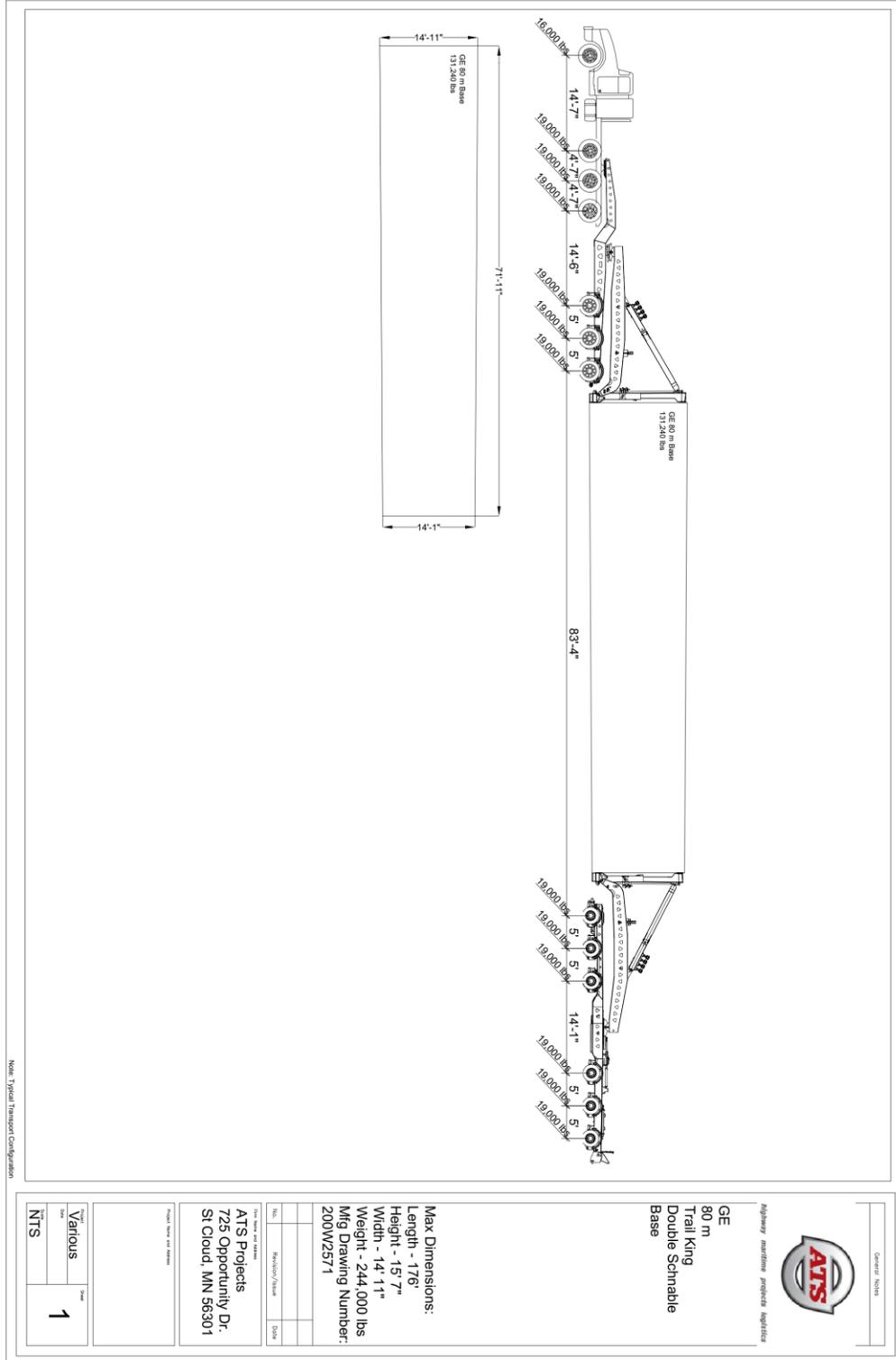
1. The trailers listed are examples and are subject to change at the time of transport.

ATS Specialized, Inc. (ATS) has exercised due and customary care in conducting this project route review and has not, save as specifically stated, independently verified information provided by others. No other warranty, express or implied is made in relation to the conduct of the review or the contents of this report. Therefore, ATS assumes no liability for any loss resulting from errors, omissions, or misrepresentations made by others. This review has been prepared at the request of GE. The use of this report is unauthorized by third parties without written authorization of ATS and shall be at their own risk, and ATS accepts no duty of care to any such third party.

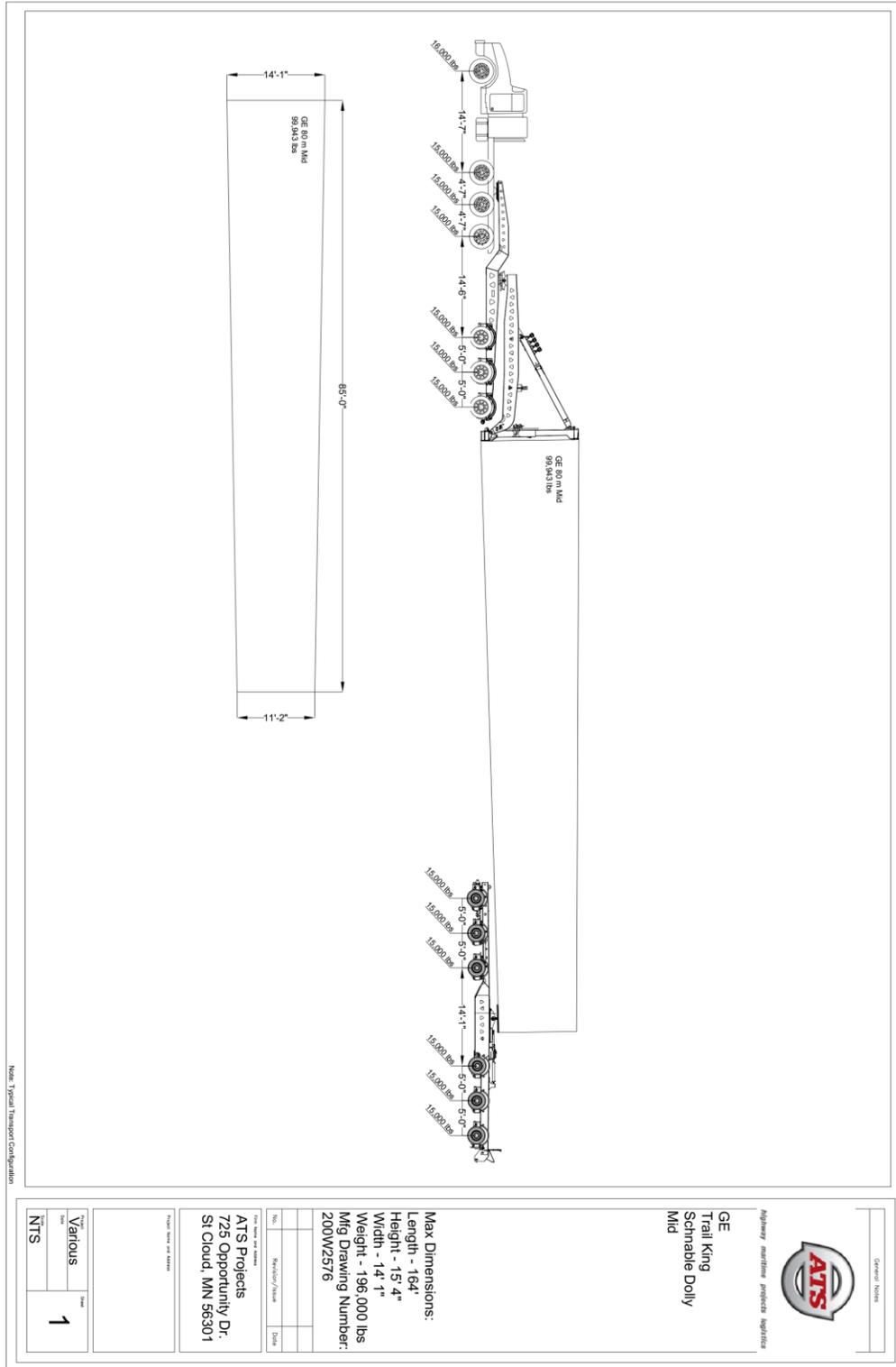
Any recommendations, opinions or findings stated in the review are based on circumstances and facts as they existed at the time ATS performed the work. Any changes in circumstances and facts upon which this review was conducted may adversely affect any recommendations, opinions or findings contained in this report.



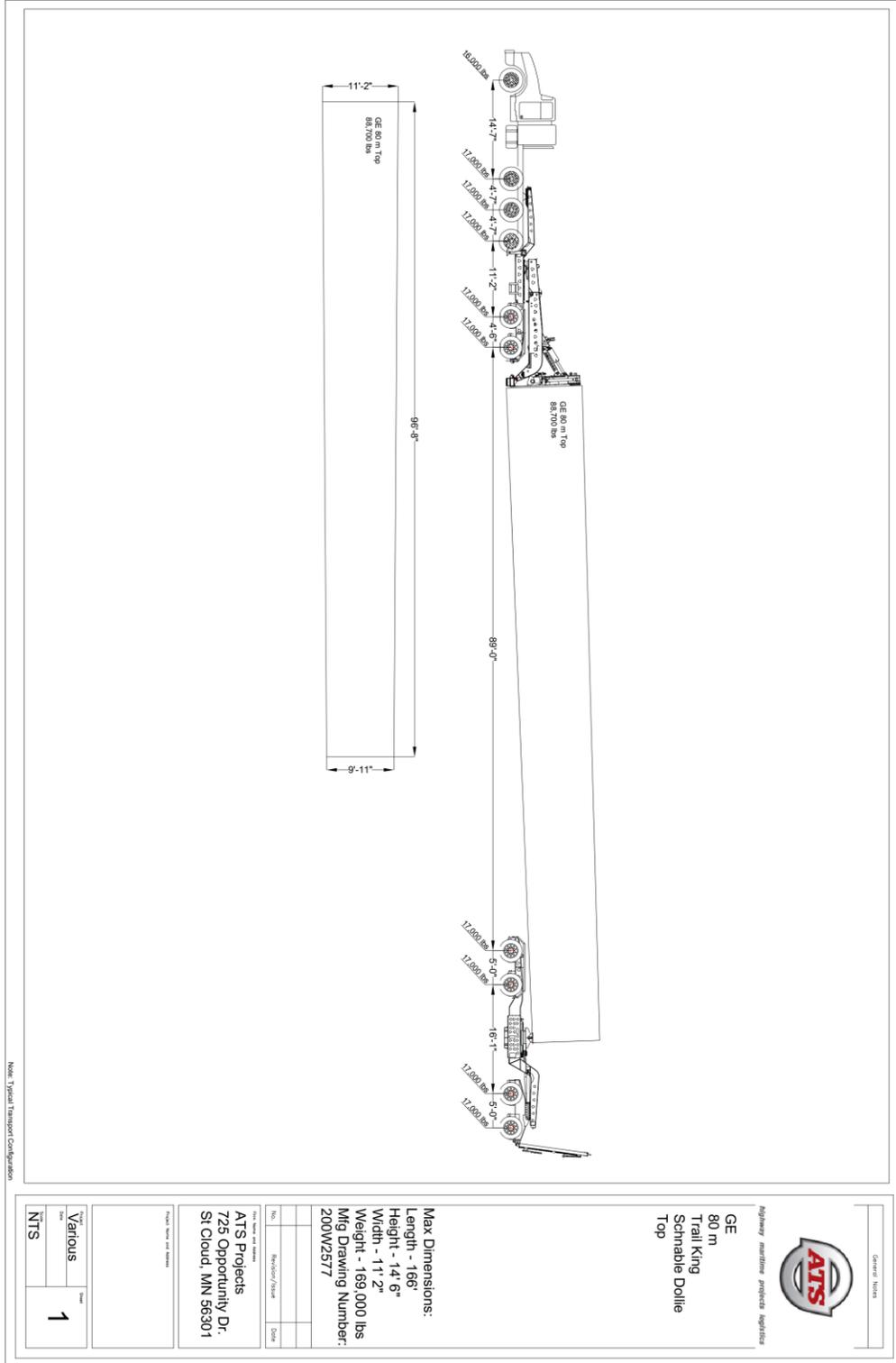
Appendix



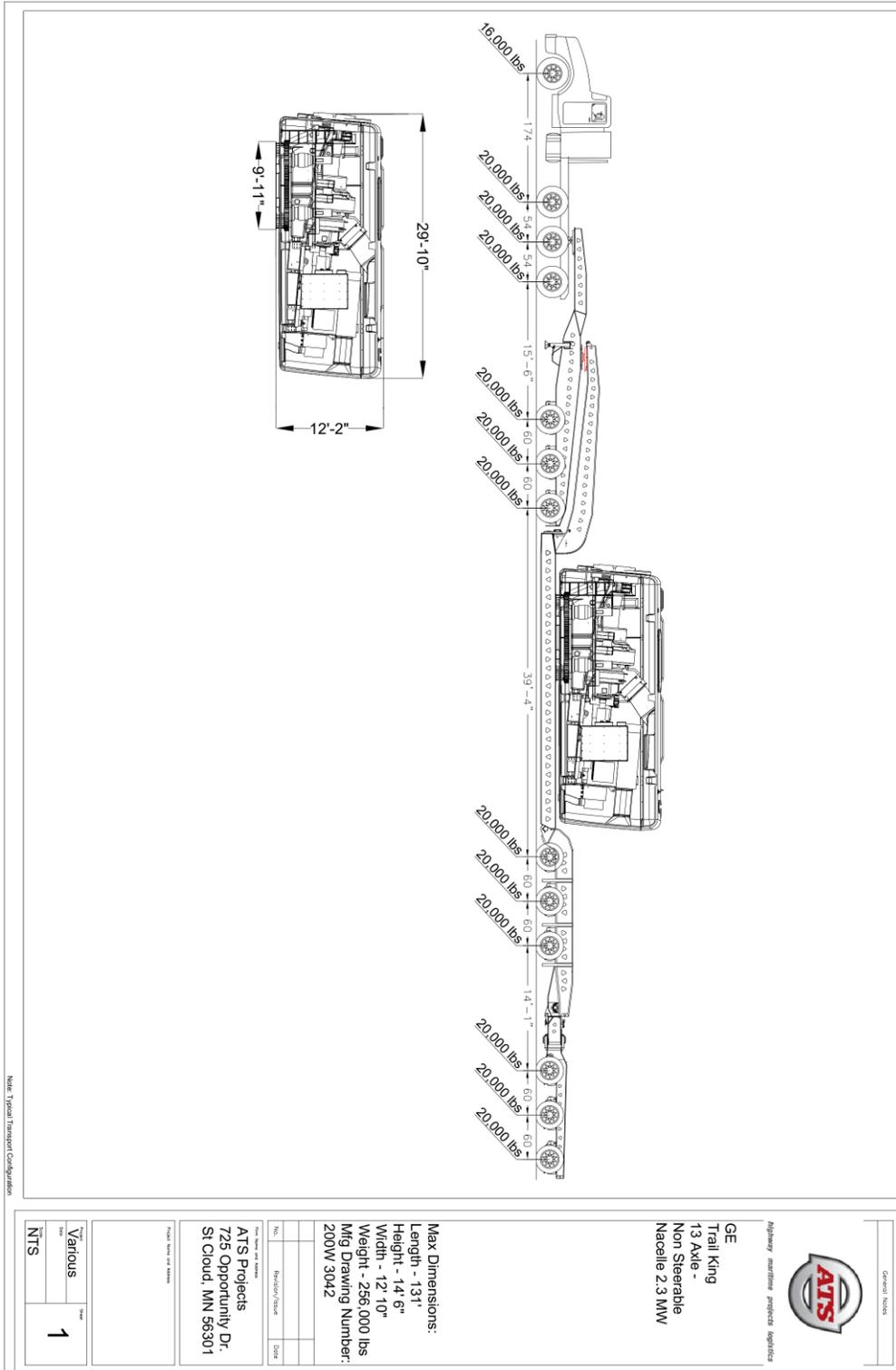
80 m Base Section



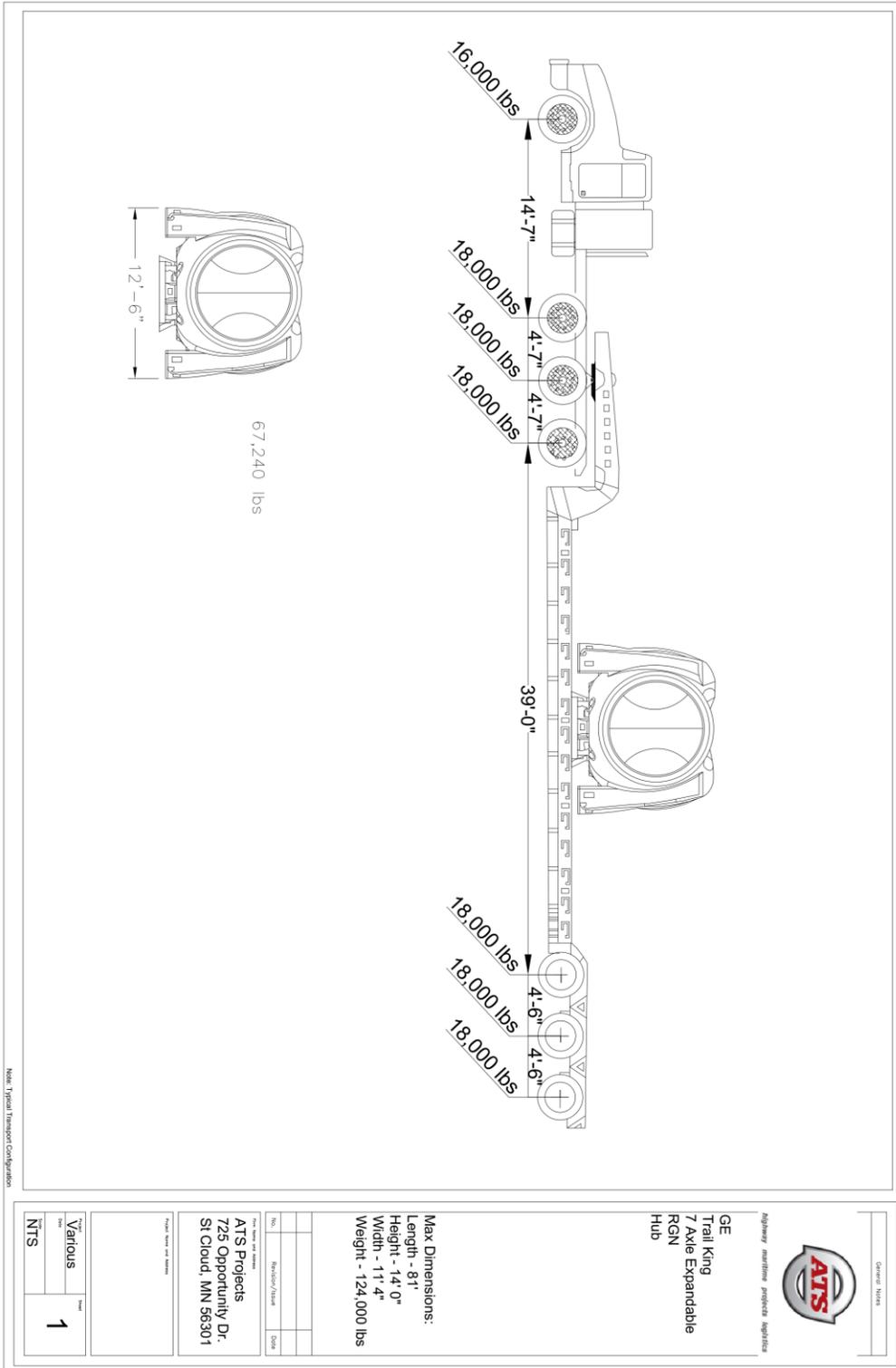
80 m Mid Section



80 m Top Section



Nacelle – 13 Axle



Hub

