STATE OF WASHINGTON
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION
1300 S. Evergreen Park Dr. S.W., P.O. Box 47250 • Olympia, Washington 98504-7250
(360) 664-1160 • TTY (360) 586-8203

November 28, 2012

Richard Wagner
BNSF Railway Co.
2454 Occidental Avenue South , Suite 2-D
Seattle, WA 98134

Sent via Email and First Class Mail

RE: TR-121467 – REVISED Petition on Behalf of the City of Pasco to Construct a Highway-Rail Grade Crossing at Road 40 E in Pasco, Washington

Dear Mr. Wagner:

On September 10, 2012, the City of Pasco filed a petition with the Washington Utilities and Transportation Commission (Commission), seeking approval to construct a highway-rail grade crossing at Road 40 E in Pasco. The Commission has assigned Docket TR-121467 to this petition. On November 28, 2012, the City of Pasco filed a revised petition with the Commission.

Please review the enclosed revised petition and respond by December 18, 2012. Your response options include:

- Support the revised petition – Complete the Respondent's Waiver of Hearing form, which serves as your consent for the Commission to issue an order without further notice or hearing.
- Do not support the revised petition – Reply with your position and include whether you feel a hearing is necessary to resolve the issues or suggest other courses of action, such as further discussion prior to going to hearing.

You must respond with your position within 20 days of the date of this letter. If you have any questions, please contact Kathy Hunter at (360) 664-1257 or khunter@utc.wa.gov.

Sincerely,

Kathy Hunt for

David Pratt
Assistant Director Transportation Safety

Enclosure

cc: Ahmad Quayoumi, City of Pasco

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

City of Pasco Petitioner, vs. BNSF Railroad Respondent	)	DOCKET NO. Revised TR-121467 PETITION TO CONSTRUCT A HIGHWAY-RAIL GRADE CROSSING

The Petitioner asks the Washington Utilities and Transportation Commission to approve construction of a highway-rail grade crossing.

Section 1 – Petitioner's Information

City of Pasco
Petitioner

525 N. 3rd Ave
Street Address

Pasco, WA 99301
City, State and Zip Code

Mailing Address, if different than the street address

Ahmad Qayoumi
Contact Person Name

509-543-5738 qayoumia@pasco-wa.gov
Contact Phone Number and E-mail Address

Section 2 – Respondent's Information

BNSF Railway Company
Respondent

2454 Occidental Ave S. - Suite 2D
Street Address

Seattle, WA 98134-1439
City, State and Zip Code

Mailing Address, if different than the street address

Richard W Wagner – Manager Public Projects
Contact Person Name

206-625-6152 - Richard.Wagner@BNSF.com
Contact Phone Number and E-mail Address

Section 3 – Proposed Crossing Location

1. Existing highway/roadway Road 40 E

2. Existing railroad BNSF

3. Location of proposed crossing:
   Located in the SE1/4 of the NW 1/4 of Sec. 34 , Twp. 9N , Range 30E W.M.

4. GPS location, if known Latitude: 46°13'09"N Longitude: 119°02'41"W

5. Railroad mile post (nearest tenth) ≈ 1.62 on proposed spur track

6. City: Pasco County: Franklin

Section 4 – Proposed Crossing Information

1. Railroad company BNSF

2. Type of railroad at crossing ☒ Common Carrier ☐ Logging ☐ Industrial

   ☐ Passenger ☐ Excursion

3. Type of tracks at crossing ☐ Main Line ☒ Siding or Spur

4. Number of tracks at crossing 1

5. Average daily train traffic, freight 2

   Authorized freight train speed 10 Operated freight train speed 10

6. Average daily train traffic, passenger 0

   Authorized passenger train speed NA Operated passenger train speed NA

7. Will the proposed crossing eliminate the need for one or more existing crossings?
   Yes ____ No X

8. If so, state the distance and direction from the proposed crossing.

   _____

   _____

   _____

9. Does the petitioner propose to close any existing crossings?
   Yes ____ No X

Section 5 – Temporary Crossing

1. Is the crossing proposed to be temporary? Yes ____ No X

2. If so, describe the purpose of the crossing and the estimated time it will be needed

_____

_____

_____

3. Will the petitioner remove the crossing at completion of the activity requiring the temporary crossing? Yes ____ No NA

Approximate date of removal _____

Section 6 – Current Highway Traffic Information

1. Name of roadway/highway Rd 40 E

2. Roadway classification Urban Unclassified

3. Road authority City of Pasco

4. Average annual daily traffic (AADT) 1557

5. Number of lanes 2

6. Roadway speed 40

7. Is the crossing part of an established truck route? Yes X No ____

8. If so, trucks are what percent of total daily traffic? 62

9. Is the crossing part of an established school bus route? Yes X No ____

10. If so, how many school buses travel over the crossing each day? 26

11. Describe any changes to the information in 1 through 7, above, expected within ten years:
Roadway may be widened to 4 lanes.

_____

Section 7 – Alternatives to the Proposal

1. Does a safer location for a crossing exist within a reasonable distance of the proposed location?
   Yes ____ No X

2. If a safer location exists, explain why the crossing should not be located at that site.

3. Are there any hillsides, embankments, buildings, trees, railroad loading platforms or other barriers in the vicinity which may obstruct a motorist's view of the crossing?
   Yes ____ No X

4. If a barrier exists, describe:
   - ♦ Whether petitioner can relocate the crossing to avoid the obstruction and if not, why not.
   - ♦ How the barrier can be removed.
   - ♦ How the petitioner or another party can mitigate the hazard caused by the barrier.

5. Is it feasible to construct an over-crossing or under-crossing at the proposed location as an alternative to an at-grade crossing?
   Yes ____ No X

6. If an over-crossing or under-crossing is not feasible, explain why.

Not economically feasible to construct grade crossing for the proposed low rail traffic volume and low track speed. It will greatly impact the access to the properties to the west and east of Road 40 East.

7. Does the railway line, at any point in the vicinity of the proposed crossing, pass over a fill area or trestle or through a cut where it is feasible to construct an over-crossing or an under-crossing, even though it may be necessary to relocate a portion of the roadway to reach that point?

Yes ____ No X

8. If such a location exists, state:

- ♦ The distance and direction from the proposed crossing.
- ♦ The approximate cost of construction.
- ♦ Any reasons that exist to prevent locating the crossing at this site.

9. Is there an existing public or private crossing in the vicinity of the proposed crossing?

Yes ____ No X

10. If a crossing exists, state:

- ♦ The distance and direction from the proposed crossing.
- ♦ Whether it is feasible to divert traffic from the proposed to the existing crossing.

Section 8 – Sight Distance

1. Complete the following table, describing the sight distance for motorists when approaching the tracks from either direction.

a. Approaching the crossing from North , the current approach provides an unobstructed view as follows: (North, South, East, West)

Direction of sight (left or right)	Number of feet from proposed crossing	Provides an unobstructed view for how many feet
Right	300	750
Right	200	750
Right	100	1000 minimum
Right	50	1000 minimum
Right	25	1000 minimum
Left	300	1000 minimum
Left	200	1000 minimum
Left	100	1000 minimum
Left	50	1000 minimum
Left	25	1000 minimum

b. Approaching the crossing from South , the current approach provides an unobstructed view as follows: (Opposite direction-North, South, East, West)

Direction of sight (left or right)	Number of feet from proposed crossing	Provides an unobstructed view for how many feet
Right	300	1000 minimum
Right	200	1000 minimum
Right	100	1000 minimum
Right	50	1000 minimum
Right	25	1000 minimum
Left	300	900
Left	200	1000 minimum
Left	100	1000 minimum
Left	50	1000 minimum
Left	25	1000 minimum

2. Will the new crossing provide a level approach measuring 25 feet from the center of the railway on both approaches to the crossing?

Yes ____ No X

3. If not, state in feet the length of level grade from the center of the railway on both approaches to the crossing. 5 feet, both sides of railroad crossing.

4. Will the new crossing provide an approach grade of not more than five percent prior to the level grade?

Yes X No ____

5. If not, state the percentage of grade prior to the level grade and explain why the grade exceeds five percent.

Section 9 – Illustration of Proposed Crossing Configuration

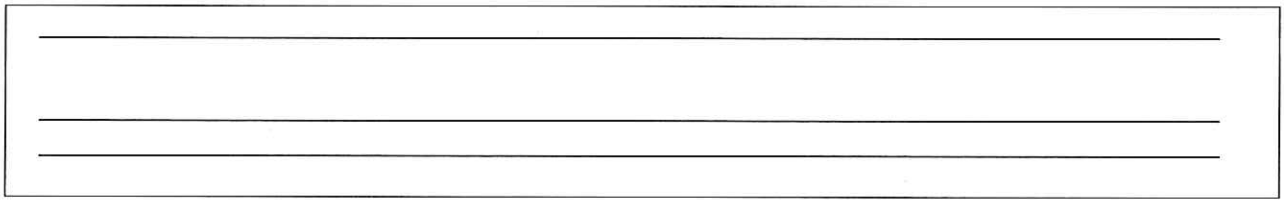
Attach a detailed diagram, drawing, map or other illustration showing the following:

- ♦ The vicinity of the proposed crossing.
- ♦ Layout of the railway and highway 500 feet adjacent to the crossing in all directions.
- ♦ Percent of grade.
- ♦ Obstructions of view as described in Section 7 or identified in Section 8.
- ♦ Traffic control layout showing the location of the existing and proposed signage.

Section 10 – Proposed Warning Signals or Devices

1. Explain in detail the number and type of automatic signals or other warning devices planned at the proposed crossing, including a cost estimate for each.

As part of the Heritage Park project, the City proposes to initially furnish and install concrete crossing surface, pavement markings, and "out of service" and advanced warning signs as shown on the illustration. These improvements are identified as Phase 1. The track through the crossing will not be placed in service and will be made inaccessible to railroad operations due to placement of an earthen bumper as shown on the illustrations. Within two years from order date, or sooner if railroad infrastructure is installed east of the crossing, and before railroad operations commence, the Out of Service signs will be removed and be replaced with an active warning system that would include shoulder light and automatic gates. These improvements would include 2 each 90' median barrier (1 each north and south of the crossing). The proposed warning system would be set up for 10 mph operations and would include approximately 500' approach track circuits, a 12' island circuit, and a PMD3R motion detector controller. These improvements are identified as Phase 2. All elements will be installed per current MUTCD and railroad standards. Estimated cost to the project for Phase 1 work directly related to the crossing is $100,000. The estimated cost for the Phase 2 portion of the project is an additional $230,000.



2. Provide an estimate for maintaining the signals for 12 months. $12,000.

3. Is the petitioner prepared to pay to the respondent railroad company its share of installing the warning devices as provided by law?

Yes NA No ____

Section 11 – Additional Information

Provide any additional information supporting the proposal, including information such as the public benefits that would be derived from constructing a new crossing as proposed.

The City wants to be competitive when there are industrial development prospects. The City regularly submits proposals to potential interested developers that will create jobs and additional tax base for the City. One of the key factors for site selection for potential users is rail access to their site. They would like a site that has existing rail access or a site which can have rail access implemented within 6 months or less.

Section 12 – Waiver of Hearing by Respondent

Waiver of Hearing

The undersigned represents the Respondent in the petition to construct or reconstruct a highway-railroad grade crossing.

We have investigated the conditions at the proposed or existing crossing site. We are satisfied the conditions are the same as described by the Petitioner in this docket. We agree that a crossing be installed or reconstructed and consent to a decision by the commission without a hearing.

Dated at _____ , Washington, on the _____ day of

_____, 20 ____.

BNSF Railway Company
Printed name of Respondent

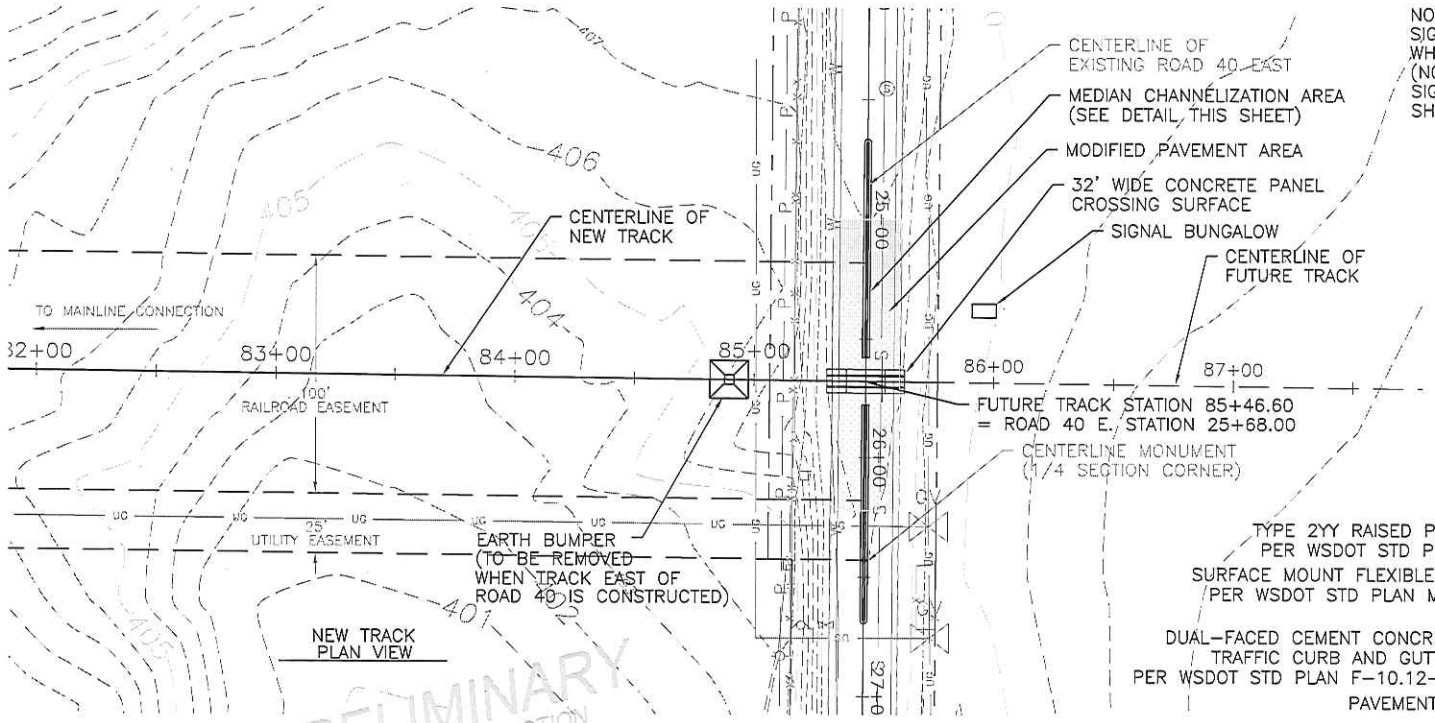
_____
Signature of Respondent's Representative

_____
Title

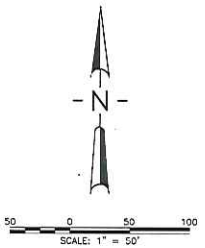
_____
Phone number and e-mail address

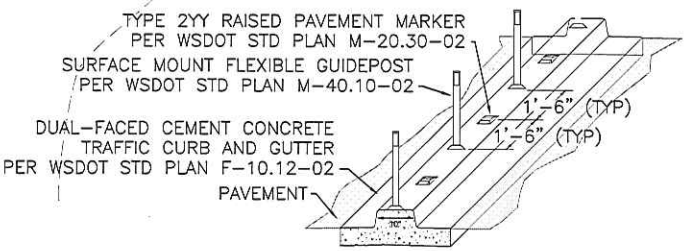
_____

_____
Mailing address

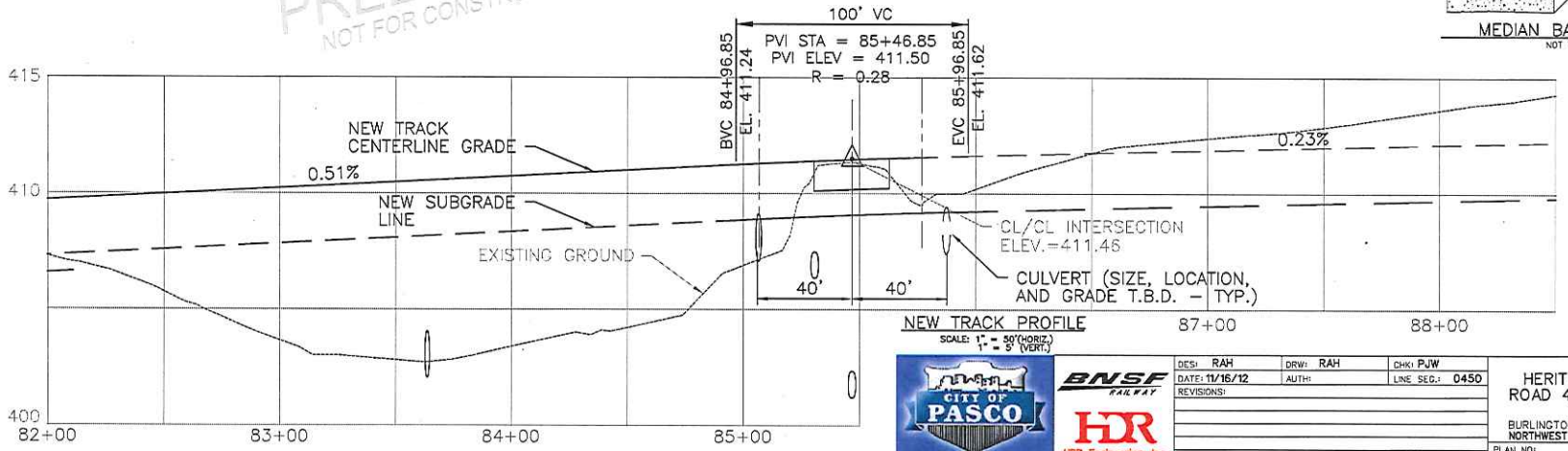


NOTE:
SIGNALS WILL BE INSTALLED WHEN TRACK BECOMES ACTIVE (NOT TO EXCEED 2 YEARS). SIGNALS ARE SHOWN ON SHEETS 2 AND 3.





MEDIAN BARRIER DETAIL
NOT TO SCALE



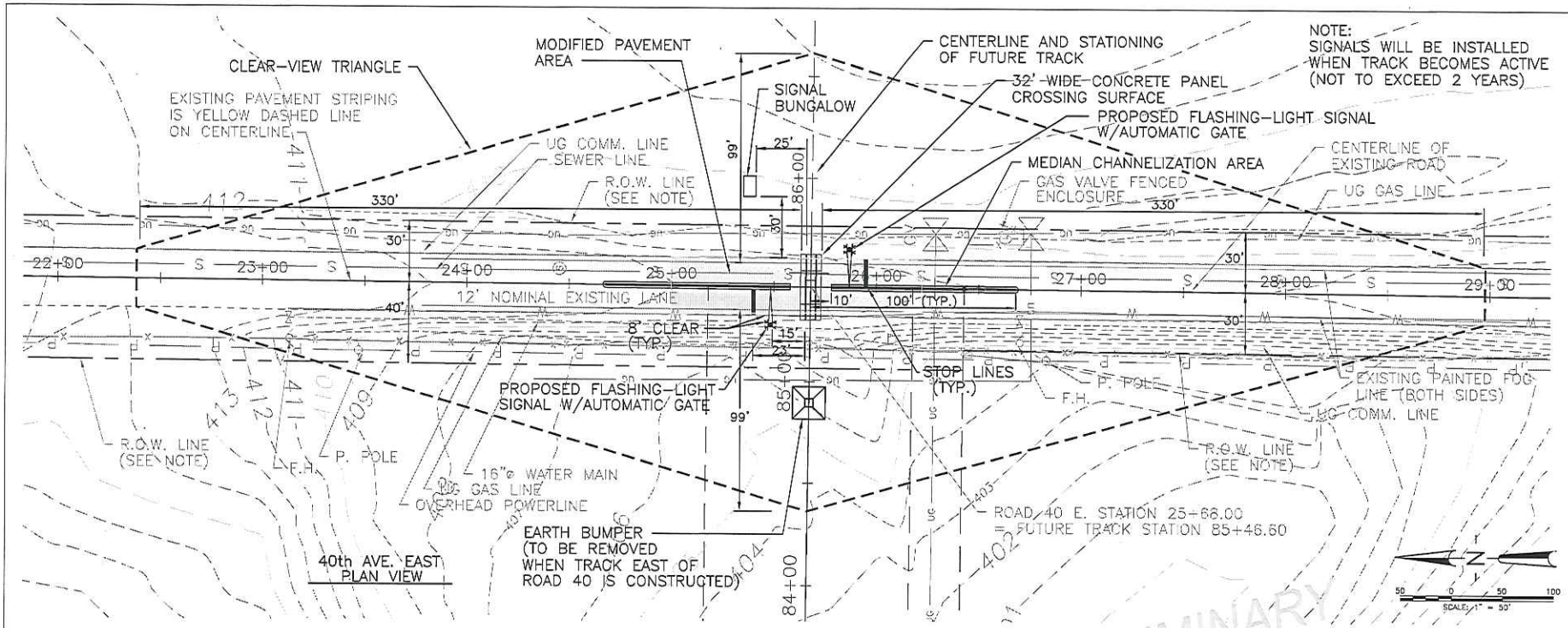
NEW TRACK PROFILE
SCALE: 1" = 50'(HORIZ.) 1" = 5' (VERT.)

DES: RAH	DRW: RAH	CHK: PJW	
DATE: 11/16/12	AUTH:	LINE SEG.: 0450	
REVISIONS:			

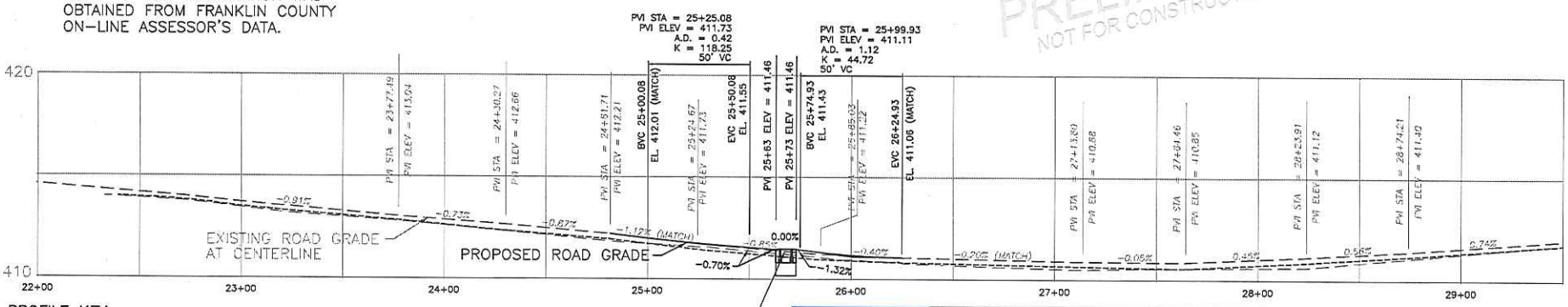
CITY OF PASCO
HERITAGE INDUSTRIAL CENTER
ROAD 40 EAST GRADE CROSSING
STAGE 2
BURLINGTON NORTHERN AND SANTA FE RAILWAY
NORTHWEST DIVISION, BURBANK SUBDIVISION M.P. 0.87

PLAN NO:

SHEET: 1 OF 3



NOTE:
RIGHT OF WAY INFORMATION WAS OBTAINED FROM FRANKLIN COUNTY ON-LINE ASSESSOR'S DATA.



PROFILE KEY
—— —— EXISTING GRADE LINE
-------- LEFT (EAST) PAVEMENT EDGE
– – – – RIGHT (WEST) PAVEMENT EDGE

PROPOSED TRACK PROFILE
SCALE: 1" = 50'(HORIZ.) 1" = 5' (VERT.)

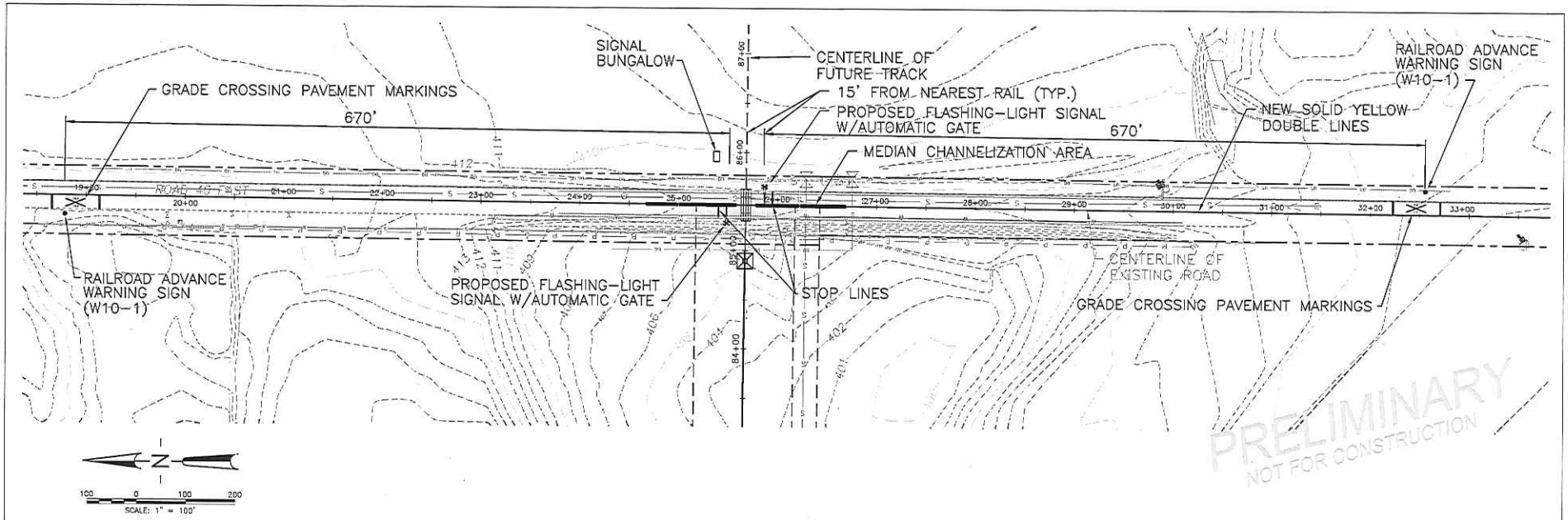
CL/CL INTERSECTION ELEV.=411.46

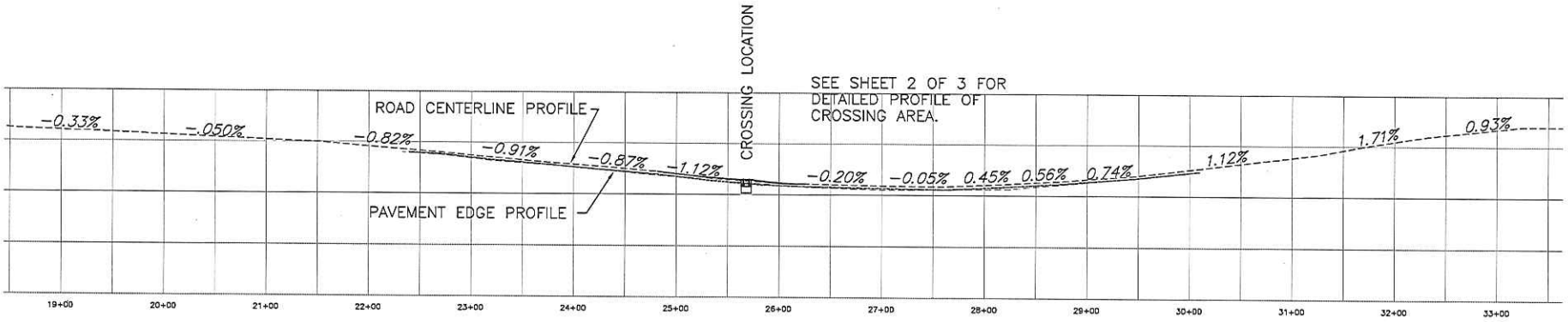
CITY OF PASCO
BNSF RAILWAY
HDR Engineering, Inc.

DES: RAH	DRW: RAH	CHK: PJW
DATE: 11/16/12	AUTH:	LINE SEG.: 0450
REVISIONS:		

CITY OF PASCO
HERITAGE INDUSTRIAL CENTER
ROAD 40 EAST GRADE CROSSING
STAGE 2
BURLINGTON NORTHERN AND SANTA FE RAILWAY
NORTHWEST DIVISION, BURBANK SUBDIVISION M.P. 0.87

PLAN NO:





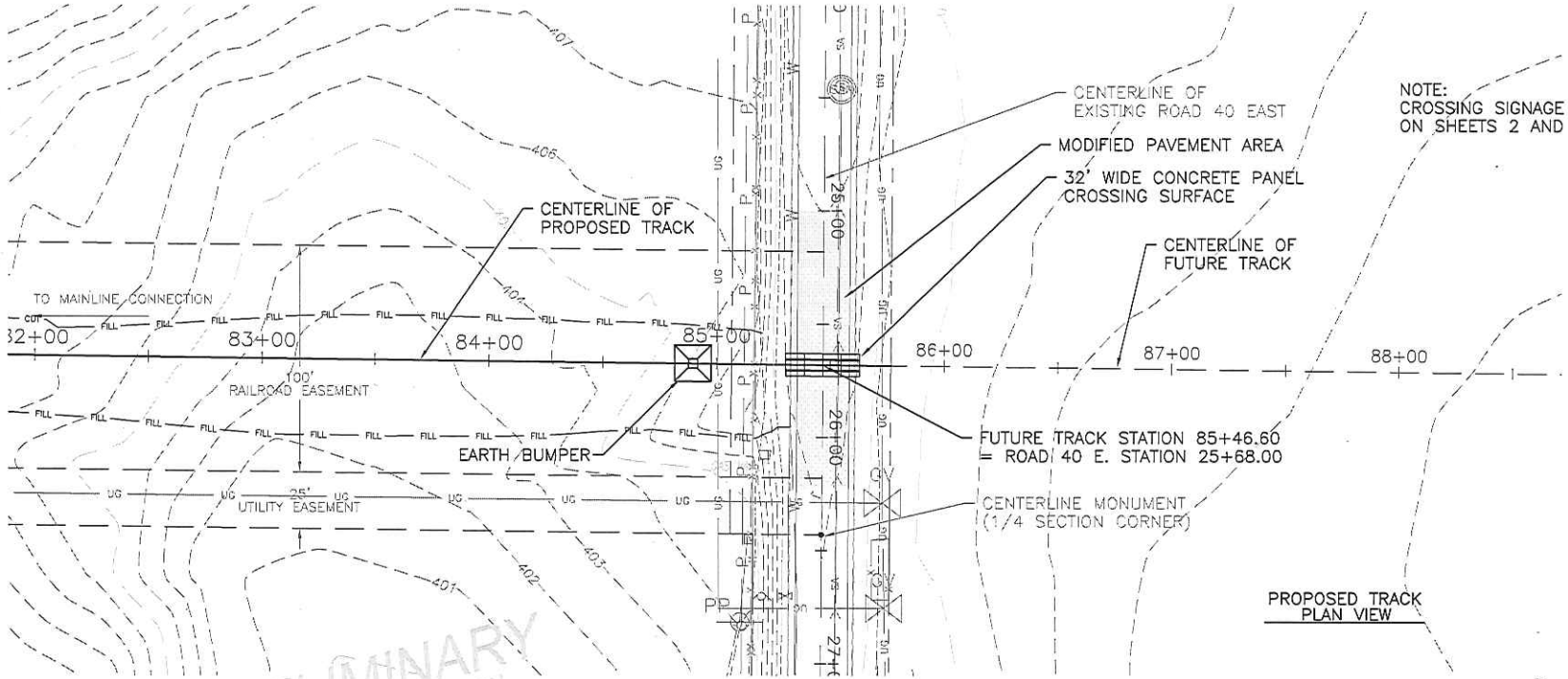
DES: RAH	DRW: RAH	CHK: PJW	
DATE: 11/16/12	AUTH:	LINE SEG.: 0450	
REVISIONS:			

CITY OF PASCO
HERITAGE INDUSTRIAL CENTER
ROAD 40 EAST GRADE CROSSING
STAGE 2
BURLINGTON NORTHERN AND SANTA FE RAILWAY
NORTHWEST DIVISION, BURBANK SUBDIVISION M.P. 0.87

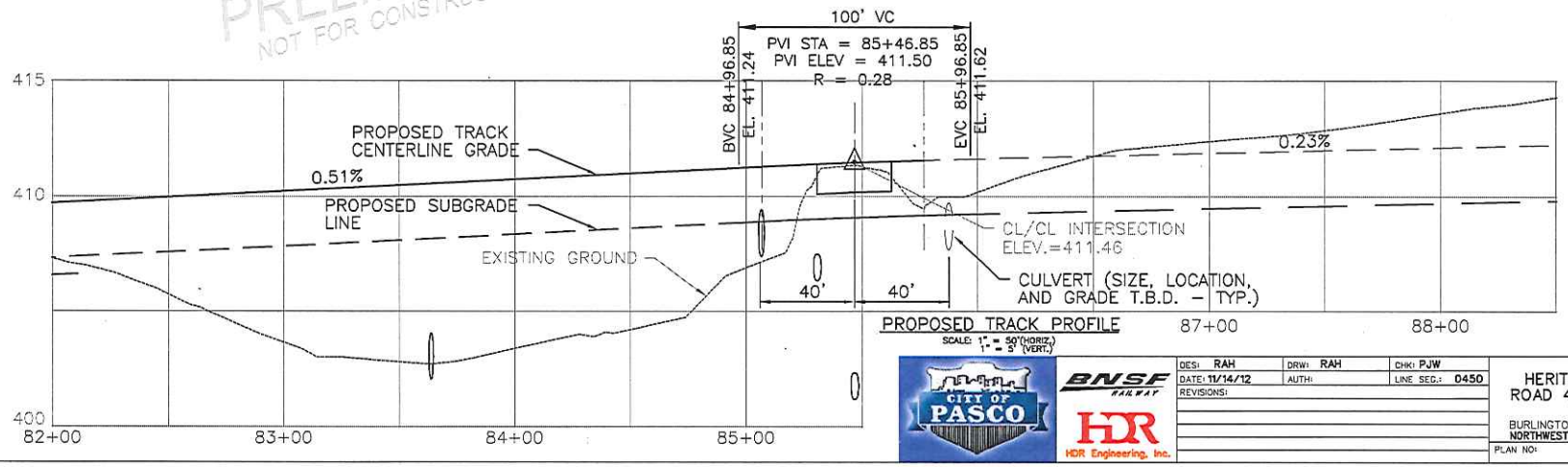
PLAN NO:

SHEET: 3 OF 3

HDR Engineering, Inc.



NOTE:
CROSSING SIGNAGE IS SHOWN ON SHEETS 2 AND 3.



PROPOSED TRACK PROFILE
SCALE: 1" = 50'(HORIZ.) 1" = 5' (VERT.)

CITY OF PASCO

BNSF RAILWAY

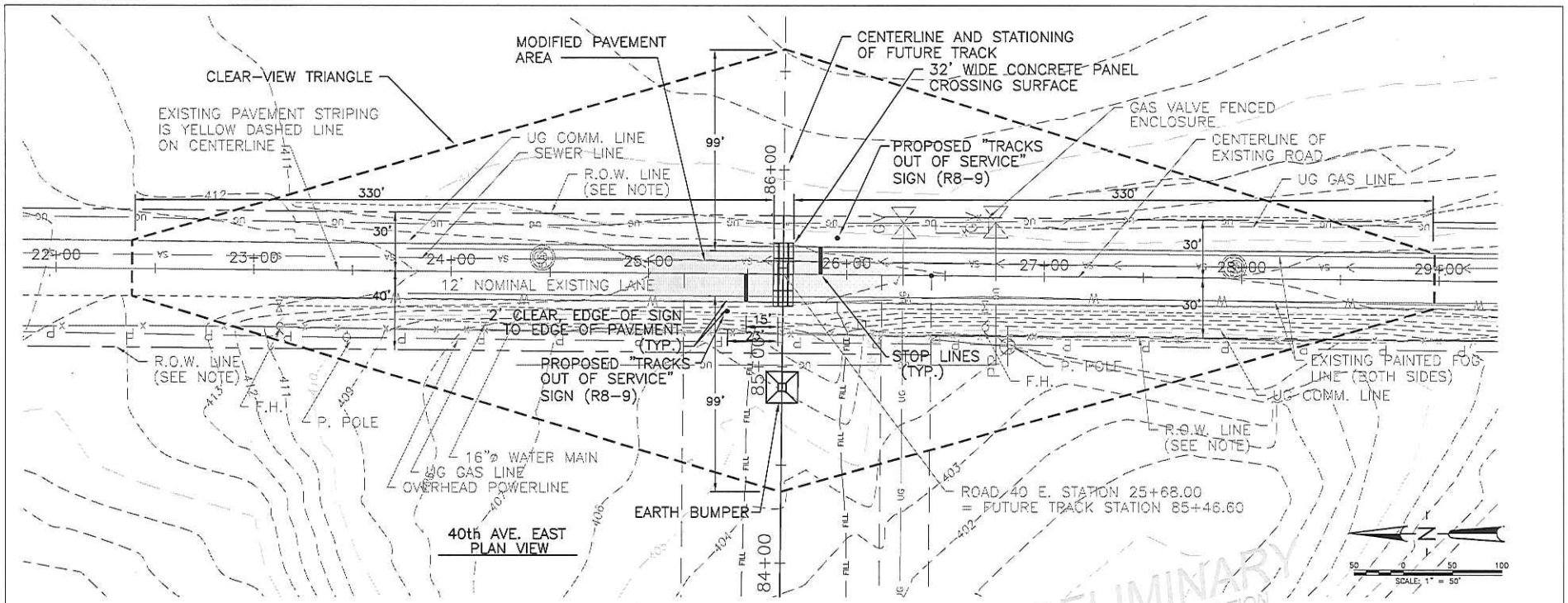
HDR Engineering, Inc.

DES: RAH	DRW: RAH	CHK: PJW	
DATE: 11/14/12	AUTH:	LINE SEG.: 0450	
REVISIONS:			

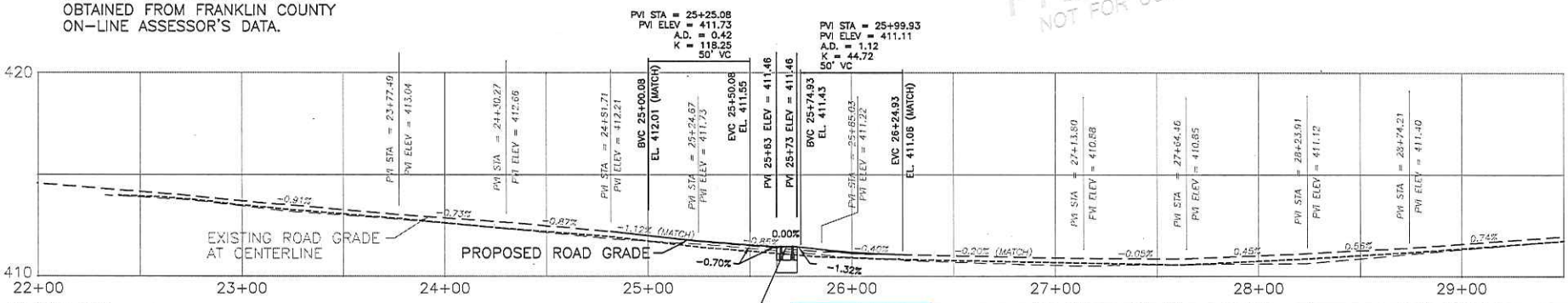
CITY OF PASCO
HERITAGE INDUSTRIAL CENTER
ROAD 40 EAST GRADE CROSSING
STAGE 1
BURLINGTON NORTHERN AND SANTA FE RAILWAY
NORTHWEST DIVISION, BURBANK SUBDIVISION M.P. 0.87

PLAN NO:

SHEET: 1 of 3



NOTE:
RIGHT OF WAY INFORMATION WAS OBTAINED FROM FRANKLIN COUNTY ON-LINE ASSESSOR'S DATA.



PROFILE KEY
—— —— EXISTING GRADE LINE
-------- LEFT (EAST) PAVEMENT EDGE
– – – – RIGHT (WEST) PAVEMENT EDGE

PROPOSED TRACK PROFILE
SCALE: 1" = 50'(HORIZ.) 1" = 5' (VERT.)

CL/CL INTERSECTION ELEV.=411.46

CITY OF PASCO

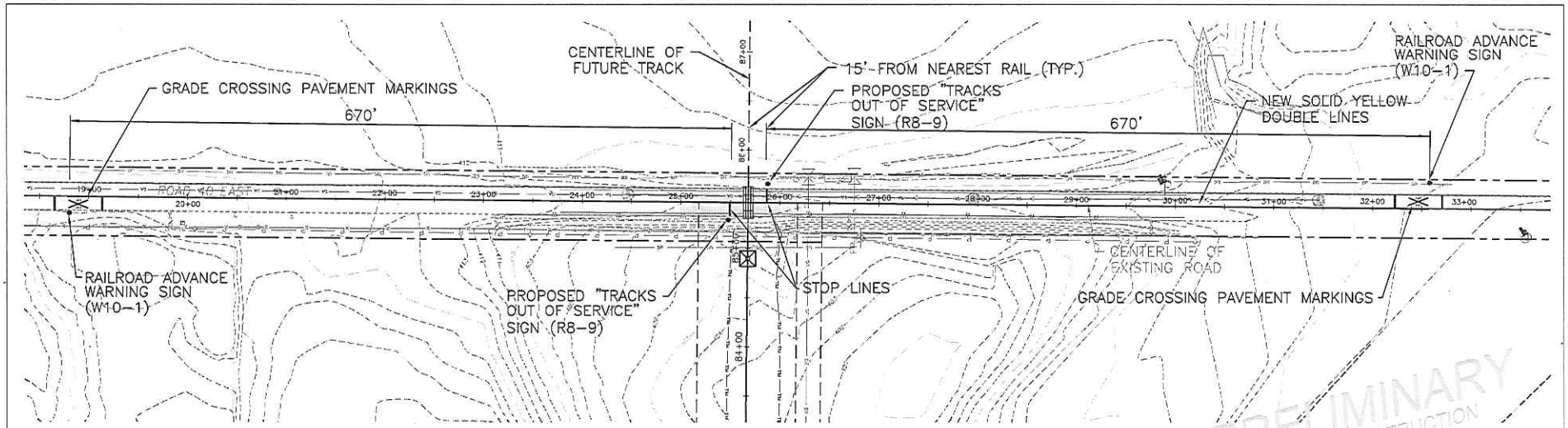
BNSF RAILWAY

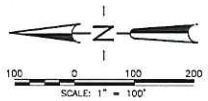
HDR Engineering, Inc.

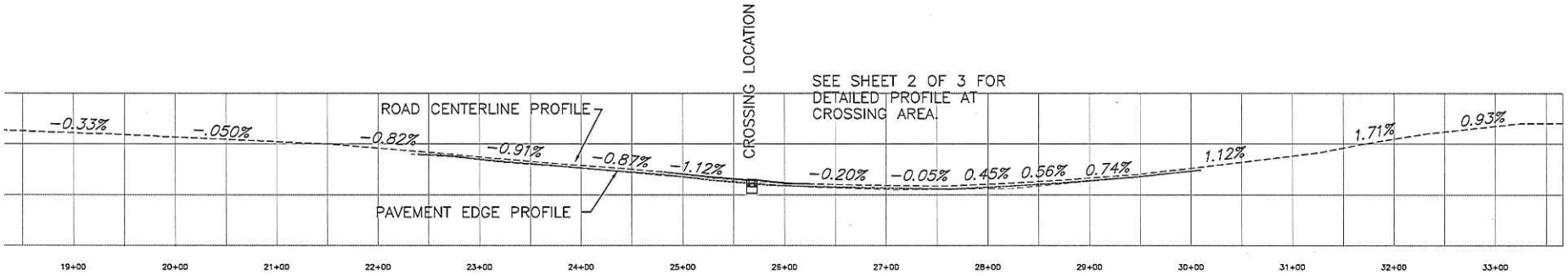
DES: RAH	DRW: RAH	CHK: PJW
DATE: 11/14/12	AUTH:	LINE SEG.: 0450
REVISIONS:		

CITY OF PASCO
HERITAGE INDUSTRIAL CENTER
ROAD 40 EAST GRADE CROSSING
STAGE 1
BURLINGTON NORTHERN AND SANTA FE RAILWAY
NORTHWEST DIVISION, BURBANK SUBDIVISION M.P. 0.87

PLAN NO: SHEET: 2 of 3







DES: RAH	DRW: RAH	CHK: PJW	
DATE: 11/14/12	AUTH:	LINE SEG.: 0450	
REVISIONS:			

CITY OF PASCO
HERITAGE INDUSTRIAL CENTER
ROAD 40 EAST GRADE CROSSING
STAGE 1
BURLINGTON NORTHERN AND SANTA FE RAILWAY
NORTHWEST DIVISION, BURBANK SUBDIVISION M.P. 0.87

PLAN NO: | SHEET: 3 OF 3

DOCKET NO. TR- 121467
PETITION TO CONSTRUCT A HIGHWAY-RAIL GRADE CROSSING
Appendix - Supplemental information

Project: Proposed at-grade crossing for the Heritage Spur Industry track across Road 40 East.

Background

Roadways

Road 40 East is a two-lane roadway that runs north/south north of the Port of Pasco. Land use along the corridor is agricultural, light industrial and residential. The speed limit is 40 mph. The proposed track will cross Road 40 East at-grade between A Street and East B Street, south of State Route 12.

Why is a Grade Separation Not Warranted?

1.) Does not meet minimum threshold for FHWA Grade Separation Guidelines warranting a Grade Separation
   a. Roadway characteristics
   b. Average Daily Vehicle Delay
   c. Crossing Exposure Value
   d. Accident Prediction

FHWA – Crossing Handbook

State Route-rail grade crossings should be considered for grade separation or otherwise eliminated across the railroad right-of-way whenever one or more of the following conditions exist:

Item	Yes/No
The State Route highway is a part of the designated Interstate State Route System;	No
The State Route highway is otherwise designed to have full controlled access;	No
The posted State Route highway speed equals or exceeds 70 mph;	No
AADT exceeds 100,000 in urban areas or 50,000 in rural areas;	No
Maximum authorized train speed exceeds 110 mph;	No
An average of 150 or more trains per day or 300 Million Gross Tons (MGT) per year;	No
An average of 75 or more passenger trains per day in urban areas or 30 or more passenger trains per day in rural areas;	No
Crossing exposure (the product of the number of trains per day and AADT) exceeds 1,000,000 in urban areas or 250,000 in rural areas;	No
Passenger train crossing exposure (the product of the number of passenger trains per day and AADT) exceeds 800,000 in urban areas or 200,000 in rural areas.	No
The expected accident frequency (EAF) for active devices with gates, as calculated by the USDOT Accident Prediction Formula including 5-year accident history, exceeds 0.5; or	No
Vehicle delay exceeds 40 vehicle hours per day	No

Summary of Results

1.) Does not meet minimum threshold for FHWA Grade Separation Guidelines warranting a Grade Separation
   a. Average Daily Vehicle Delay
      10.5 hours < 40 hours
   b. Crossing Exposure Value
      136,160 < 250,000
   c. Accident Prediction
      0.033 < 0.5

1. FHWA Grade Separation Guidelines warranting a Grade Separation

FHWA Grade Separation Guidelines Rough Screening

The FHWA Grade Separation Guidelines identifies the preliminary project analysis phase (Level 1) to include factors that, if sufficiently negative, will eliminate the project from further consideration. These include physical feasibility, surrounding land development, and cost. Additionally, Level 1 Analysis includes:

- State Route and Rail Traffic: State Route and rail traffic are:
  - Current
    - AADT – 1,557(2012)
    - Trains Average
      - Freight – 2
      - Passenger – 0
  - 2030
    - AADT – 2,835 (2030)
    - Trains Average
      - Freight – 3 (assumed 1.5% growth in number of trains, train lengths assumed to increase up to 7,500 feet)
      - Passenger – 0
- The expected vehicle delay is summarized in Table 1. The USDOT Railroad-State Route Grade Crossing Handbook, Revised Second Edition August 2007 identified several conditions which, if exceeded would cause a grade separation project to be considered. The Vehicle Delay threshold is a minimum of 40 vehicle hours per day. The estimate daily Vehicle Delay in 2030 is 4.1hours.

Table 1. Expected Vehicle Delay

Expected Daily Vehicle Delay (Hours)
1.2

ESTIMATED DELAY COST, ESTIMATED ANNUAL COST OF VEHICULAR DELAY, AND COST OF CRASHES

Tables 2 and 3 contains a summary of estimated delay cost, estimated annual cost of vehicular delay and cost of crashes, as well as an exposure value.

Table 2. Estimated Delay Cost - 2012

2012 ESTIMATION OF GRADE CROSING DELAY AND CRASH COSTS

Variables	Values
L = Avg. train length in miles[3]	1.25
S = Avg. train speed in MPH	10
T = Avg. number of trains per day	2
AADT = Avg. Annual Daily (highway) Traffic	1,557
T = Percentage of commercial trucks	62
CMC = Cost per hour of vehiclular delay, cars[1]	$24.00
CMT = Cost per hour of vehicular delay, commercial trucks[1]	$71.00
F = Cost of fuel, per gallon	$4.00
C1 = Estimated cost of fatality crashes, each, $ millions[2]	$6.2000
C2 = Estimated cost of injury only crashes, each, $ millions[2]	$0.1410
Calculations - Delay Costs[4]	
MT = Number of minutes crossing is blocked per train	8.15
M = Number of minutes per day the crossing is blocked	16.30
P = Probability that a vehicle will be delayed	0.0113
N = Number of vehicles delayed at the crossing, avg. day	17.62
D = Total minutes of daily vehicular delay	71.82
C = Cost of vehicular delay per day	$3,816.48
F = Cost of fuel consumed by waiting vehicles per day	$3.73
Estimated vehiclular delay and fuel costs, dollars per year	$1,394,378
Calculations - Crash Costs	
ECF= Estimated crash frequency per year[5]	0.000881
CC = Combined crash costs per crash, $ millions[6]	$0.8507
Estimated crash costs, dollars per year	$750
Summary (rounded)	
Estimated cost of vehicular delay, per year	**$1,394,000**
Estimated cost of crashes, per year	**$1,000**
Exposure value for this example (AADT x Number of trains)	**3,114**

Notes:
1. Estimated costs from reference (2).
2. Estimated costs from reference (1)
3. Train length represents longest conceivable train length.
4. Calculations per modified procedure from NCHRP 288.
5. Calculations per basic procedure from NCHRP 50.
6. Assumes 11.7 fatalities per total RHGC crashes (2007 FRA data)

Table 3. Estimated Delay Cost – 2030

2030 ESTIMATION OF GRADE CROSING DELAY AND CRASH COSTS	
Variables	**Values**
L = Avg. train length in miles[3]	1.42
S = Avg. train speed in MPH	10
T = Avg. number of trains per day	3
AADT = Avg. Annual Daily (highway) Traffic	2,680
T = Percentage of commercial trucks	62
CMC = Cost per hour of vehiclular delay, cars[1,7]	$31.44
CMT = Cost per hour of vehicular delay, commercial trucks[1,7]	$93.01
F = Cost of fuel, per gallon[7]	$5.24
C1 = Estimated cost of fatality crashes, each, $ millions[2,7]	$8.1220
C2 = Estimated cost of injury only crashes, each, $ millions[2,7]	$0.1847
Calculations - Delay Costs[4]	
MT = Number of minutes crossing is blocked per train	9.17
M = Number of minutes per day the crossing is blocked	27.51
P = Probability that a vehicle will be delayed	0.0191
N = Number of vehicles delayed at the crossing, avg. day	51.20
D = Total minutes of daily vehicular delay	234.75
C = Cost of vehicular delay per day	$16,341.62
F = Cost of fuel consumed by waiting vehicles per day	$15.99
Estimated vehiclular delay and fuel costs, dollars per year	$5,970,528
Calculations - Crash Costs	
ECF= Estimated crash frequency per year[5]	0.002522
CC = Combined crash costs per crash, $ millions[6]	$1.1145
Estimated crash costs, dollars per year	$2,811
Summary (rounded)	
Estimated cost of vehicular delay, per year	**$5,971,000**
Estimated cost of crashes, per year	**$3,000**
Exposure value for this example (AADT x Number of trains)	**8,040**

Notes:
1. Estimated costs from reference (2).
2. Estimated costs from reference (1)
3. Train length represents longest conceivable train length.
4. Calculations per modified procedure from NCHRP 288.
5. Calculations per basic procedure from NCHRP 50.
6. Assumes 11.7 fatalities per total RHGC crashes (2007 FRA data)
7. Costs adjusted by 1.5% annually from the 2012 costs.

Results

The current (2012) and future (2030) Crossing Exposure Value results for the proposed railway crossing are shown in Table 2 & 3. The model shows the Road 40 East Crossing Exposure Value of 3,114 and 8,040 respectively is below the FHWA Crossing exposure (the product of the number of trains per day and AADT) threshold of 1,000,000 in urban areas.

ACCIDENT PREDICTION MODEL

Methodology

The methodology used for the Road 40 East grade crossing Accident Prediction Model was developed using principles consistent with USDOT Accident Prediction Model[1]. In particular, the methodology involves two independent calculations to produce a collision prediction value:

- The basic formula provides an initial hazard ranking based on a crossing's characteristics. Road 40 East crossing characteristics were taken from the USDOT Crossing Inventory and FRA Accident/Incident Reports

Results

The Accident Prediction Model results are shown in Table 4. The model shows the Road 40 East crossing is below the FHWA expected accident frequency threshold of 0.5, where grade separation should be considered. Further, the results are below the FHWA expected accident frequency threshold of 0.2, where grade separation should be considered based on fully allocated life-cycle costs, for all scenarios.

Table 4. Road 40 East Accident Prediction Model Results

Scenario	Trains per Day	Vehicles per Day	Expected Number of Accidents per Year
2011 Current Trains, Current Vehicles	2	1,557	0.1460
2030 Future Trains, Future Vehicle	3	2,680	0.211

Results

The results from the Accident Prediction Model suggest that grade separation at the Road 40 East crossing may not be warranted from a public benefit perspective.

Existing Conditions

Traffic Volumes

Average Annual Daily Traffic Volumes

The existing AADT volumes are presented in Exhibit 1.

Exhibit 1
Existing (2012) AADT Traffic Volumes

Location	AADT
Road 40 East Study Area	1,557

[1] USDOT. Accident Prediction Model. http://safety.fhwa.dot.gov/xings/com_roaduser/07010/sec03.htm

As shown in Exhibit 1, existing AADT volumes are low. The capacity of a typical two-lane roadway is approximately 10,000 vpd.

Peak Hour Approach Volumes

Based on daily traffic counts and traffic diverted from the closure of Road 40 East railway crossing, intersections most likely impacted by the project were identified for evaluation. The intersections include:

- East A Street & State Route 12
- Sacajawea Road and State Route 12

Vehicular Delays and Queues

Exhibit 5 presents a summary of the average vehicular delay due to the train movements for each type of train including freight and passenger trains. Also calculated was the maximum possible queue, shown in Exhibit 6.

Exhibit 5
Existing Peak hour maximum delay

At-Grade Crossing	Maximum Time to Clear Crossing (seconds) Freight
Road 40 East	489

2030 Condition

Traffic volumes for the 2030 condition include the existing volumes plus the estimated 18-year growth in traffic. The 2030 traffic volume conditions were estimated by factoring existing traffic volumes by the estimated growth rate determined for the study area.

Traffic Volumes

The estimated growth rate for the Road 40 East area is provided in Exhibit 7.

Exhibit 7
Estimated Growth Rate

Study Area	Estimated Growth Rate (percent per year)	Growth Rate Factor[1]
Road 40 East	3.0	1.72

1 - growth rate compounded annually for the 2030 future year

Results

Existing Conditions

- The AADT volumes on the analyzed roadways are significantly less than the typical two-lane capacity of 10,000 vehicles per day.

2030 Conditions

- The 2030 AADT volumes on the analysis roadways are still below the typical two-lane roadway capacity of 10,000 vehicles per day.
- Since emergency vehicles will continue to use existing routes, which are not constrained by capacity limitations, the response time would be minimally affected.

References

1. Mid-America Transportation Center, Report # MATC-UNL:422, WBS: 25-1121-0001-4222
2. Denver Regional Council of Governments, 2011 Annual Report on Traffic Congestion in the Denver Region, July 30, 2011