BANNOCK Transportation Planning ORGANIZATION

Metropolitan Transportation Plan 2040 Air Quality Conformity Demonstration

The conformity demonstration for the Portneuf Valley Non-Attainment area outlines the transportation conformity process used to demonstrate that the 2021- 2027 Transportation Improvement Program and the 2040 Metropolitan Transportation Plan follows the State Implementation Plan and Idaho Administrative Rules on conformity.

Approved September 14, 2020

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Introduction

The Portneuf Valley Nonattainment Area (PVNAA) was shown to have met the PM_{10} National Ambient Air Quality Standards (NAAQS) with the approval of the redesignation request and associated State Implementation Plan (SIP)/Maintenance Plan by the Environmental Protect Agency (EPA) (71 FR 39574, July 13, 2006). Federal transportation rules require that "maintenance areas" demonstrate the attainment of the motor vehicle emissions budgets (MVEB) in the maintenance plan. The PVNAA is required to demonstrate that transportation activities will not cause an additional exceedance of the PM_{10} NAAQS.

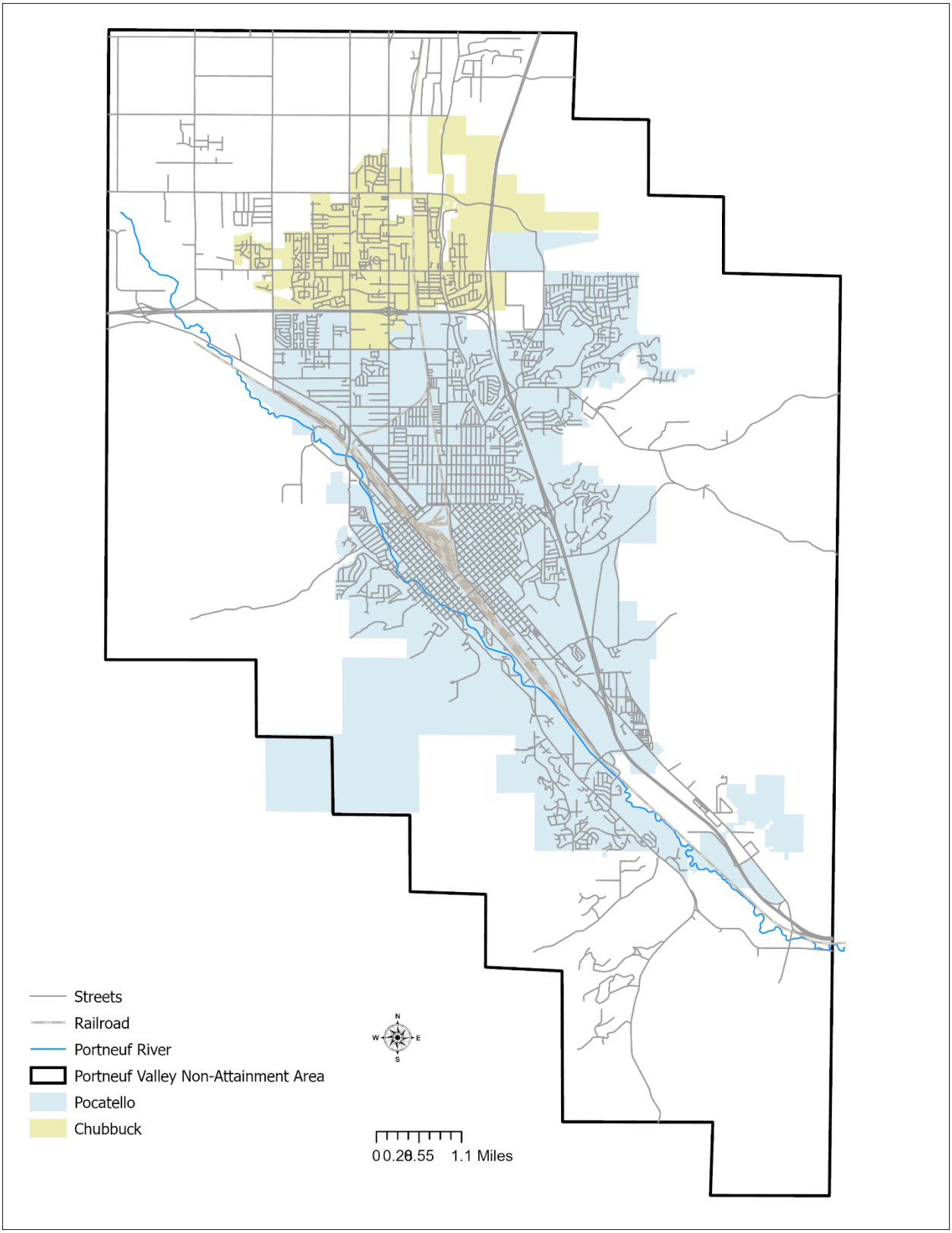
Bannock Transportation Planning Organization (BTPO) is the Metropolitan Planning Organization for the PVNAA. Metropolitan Planning Organizations are required to conduct a conformity determination on the Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP).

Transportation conformity is the process of evaluating the planned transportation activities emissions against the Motor Vehicle Emissions Budget (MVEB) established by the SIP. The latest SIP for the Portneuf Valley Non-Attainment Area was approved by the Environmental Protection Agency (EPA) on July 13, 2006, and effective on August 14, 2006. Due to changes in the requirements for air quality modeling, an amendment to that SIP and MVEB was submitted in April 2014 and was approved by EPA with an effective date of September 15, 2014 (79 FR 41647, July 17, 2014). The Code of Federal Regulation Title 40 CFR §93.100 – §93.129 and 40 CFR §51.390 provides the requirements and specifications for determining transportation conformity.

The State of Idaho Rules for the Control of Air Pollution in Idaho IDAPA 58.01.01.563 through 58.01.01.574 describes the rules and procedures for determining transportation conformity.

The procedure to determine if the MTP or TIP conforms to the SIP is the budget test. The budget test compares emissions from a specific action such as an update of the MTP or TIP to the emissions limitation established in the budget referred to as the Motor Vehicle Emissions Budget (MVEB).

Figure 1 Portneuf Valley Non-Attainment Area



Transportation Plans

This conformity determination is specifically for the 2040 Metropolitan Transportation Plan (MTP)[1] and the 2021-2027 TIP[2]. Only the first four years of the TIP are subject to the conformity rule. The remaining three years are included in the conformity determination for 2040 MTP. Both the MTP and TIP meet the requirements of the 2014 State Implementation Plan(SIP). The PVNAA does not court orders related to air quality conformity. The TIP is the short-range implementation document of the MTP. The TIP lists all federally funded project and those projects which are considered regionally significant. The MTP is the twenty-year vision of the regional transportation system. Both documents list projects that achieve goals and performance measures. The TIP and MTP are fiscally constraint which means that the amount of funds anticipated over the next seven years (TIP) and twenty years (MTP) match the anticipated cost of the projects identified,

The SIP does not identify any Transportation control measures for the PVNAA.

Interagency Consultation

The State of Idaho Rules for the Control of Air Pollution in Idaho IDAPA 58.01.01.567 requires an Interagency Consultation Committee (ICC) with representatives from local, state, and federal agencies with interest in transportation air quality. The development of conformity determination for the 2040 Metropolitan Transportation Plan and the 2021 – 2027 Transportation Improvement Program included consultation from the ICC. The ICC reviewed the horizon years at their April 2, 2020, meeting. Appendix A provides a summary of the ICC meetings.

Time Horizons

40 CFR §93.106(d)(1) and 40 CFR§93.106(d)(2) allow the modification of the time horizon if the Policy Board, in conjunction with IDEQ and other stakeholders agree. In the past conformity determinations, BTPO has elected to modify the time frame of the conformity determination and has used a shortened time frame. BTPO has chosen not to the shortened time frame since there was no saving in time or effort.

In analyzing the time frame requirements in 40 CFR §93.106(a)(1), 40 CFR §93.106(d)(1) and 40 CFR §93.118(b)(2) the following horizon or analysis year have been identified:

- Horizon Year 2025 – Within ten years of the validation of the 2015 travel demand model per 40 CFR §93.106(d)(2)(i)(B)
- Horizon Year 2035 – The horizon years must be with ten years. per 40 CFR §93.106(a)(1)(ii)

[1] https://www.bannockplanning.org/wp-content/uploads/2019/10/BTPO-Metropolitan-Transportation-Plan-2040.pdf
[2] https://www.bannockplanning.org/wp-content/uploads/2020/07/BTPO-Transportation-Improvement-Program-FY2021_Draft.pdf

- Horizon Year 2040 - 40 CFR §93.106(a)(1)(i) requires the last year of the 2040 MTP to be a horizon year.

Portneuf Valley Non-Attainment Area Transportation Conformity Assumptions

The TDM[3] and Portneuf Valley PM_{10} Maintenance Plan Amendment[4] documents provide a detailed description of inputs used in the development of conformity models. Both the TDM and the MOVES model are complicated software packages that used local data to reproduce or simulate either travel or emissions for existing and future conditions. This section discusses the key assumptions or inputs for the TDM and MOVES models.

Emissions Model

The EPA approved Motor Vehicle Emissions Simulator Model (MOVES2014) on October 7, 2014, as the official model for conducting transportation conformity. EPA also provided a two-year grace period beginning October 7, 2014, and ending October 7, 2016, to implement the MOVES2014 for transportation conformity (79 FR 60343 October 7, 2014). MOVES2014b was used to complete this conformity analysis. The MOVES model provides vehicle emissions for Nitrogen Oxides (NOx) and Volatile Organic Compounds (VOCs) and a portion of Particulate Matter less than ten microns (PM_{10}). BTPO calculated the paved road dust portion of PM_{10} using the 2011 AP-42 Compilation of Air Pollutant Emission Factors – Chapter 13.

MOVES2014b Input Assumptions

National emissions data is the basis of the MOVES model. Local data replaces some of the national data set to improve the accuracy of the MOVES model.

Vehicle Fleet Key Assumptions

Vehicle population and age distribution came from the following four sources:

- Cars, motorcycles, trucks and light commercial trucks – Idaho DMV
- Intercity and transit buses – Phone interview with providers
- School buses – Idaho Department of Education
- Commercial trucks – Short and long haul – National defaults

The vehicle population data was for Bannock County. The Idaho Department of Environmental Quality developed Vehicle Age Distribution data for Bannock County using a VIN –decoded vehicle registration data. The emissions inventory and all the conformity runs use the same age distribution.

[3] http://bannockplanning.org/wp-content/uploads/2015-Travel-Demand-Model-Documentation-Approved.pdf
[4] https://www.deq.idaho.gov/media/1117336/portneuf-valley-pm10-maintenance-plan-amendment-0414.pdf

Fuel-Related Key Assumptions

All analysis years use the national default fuel supply. National defaults account for alternative-fueled vehicles, which is the setting used in the Portneuf Valley PM_{10} Maintenance Plan Amendment.

Meteorology Key Assumptions

Meteorology inputs, including average hourly temperature, relative humidly, and precipitation, came from observed data for 2011 at the Pocatello Regional Airport. All conformity runs use the 2011 meteorological data used in the development of the 2014 Maintenance plan.

Paved Road Dust Key Assumptions

BTPO used the January 2011 AP-42 Compilation of Air Pollutant Emission Factors Section 13.2.1 Paved Roads Equation 2[5] to determine the daily paved road dust emissions. The emissions for each roadway type are the product of the emission factors and the VMT each day. Components of the road dust equation are VMT, road surface silt loading, average vehicle weight, and precipitation. Differences in silt loading during winter and summer season requires defining the seasons. The period November 1 – February 29 is the winter season, and the period from March 1 – October 31 is the summer season. The method used is the same method used in the Portneuf Valley PM_{10} Maintenance Plan Amendment.

$$E_{ext} = [K\ (sL)^{0.91}\ X\ (W)^{1.02}]\ X\ (1 - P/4N)$$

Were

E_{ext} = PM_{10} or $PM_{2.5}$ emission factor in the same units as k

K = particle size multiplier (1.0 for PM_{10}) (grams/VMT)

sL = road surface silt loading (grams per square meter)

W = average weight of the vehicles traveling the road (tons)

(E*quation 2 from January 2011 AP-42 Compilation of Air Pollutant Emission Factors Section 13.2.1 Paved Roads)*

Vehicle Miles Traveled: VMT is generated from the TDM outputs along with Highway Performance Monitoring Data to get hourly distribution by roadway type.

Silt Loading: Silt loading is the average amount of material on the road. PVNAA uses national defaults. Silt loading for paved road emission calculations is available in Table 8 of the Portneuf Valley PM_{10} Maintenance Plan Amendment.

Average Vehicle Weight: All horizon years use the national default average vehicle for each vehicle type.

[5] https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0201.pdf

Precipitation Data: If there is a day with more than a trace of precipitation (≥0.01 inches), that day is considered not to have measurable road dust. Data came from the MESOWEST and Western Regional Climate Center and was for 2011. 2020, 2030, and 2040 horizon year use the 2011 data.

Vehicle Miles Traveled Conversion

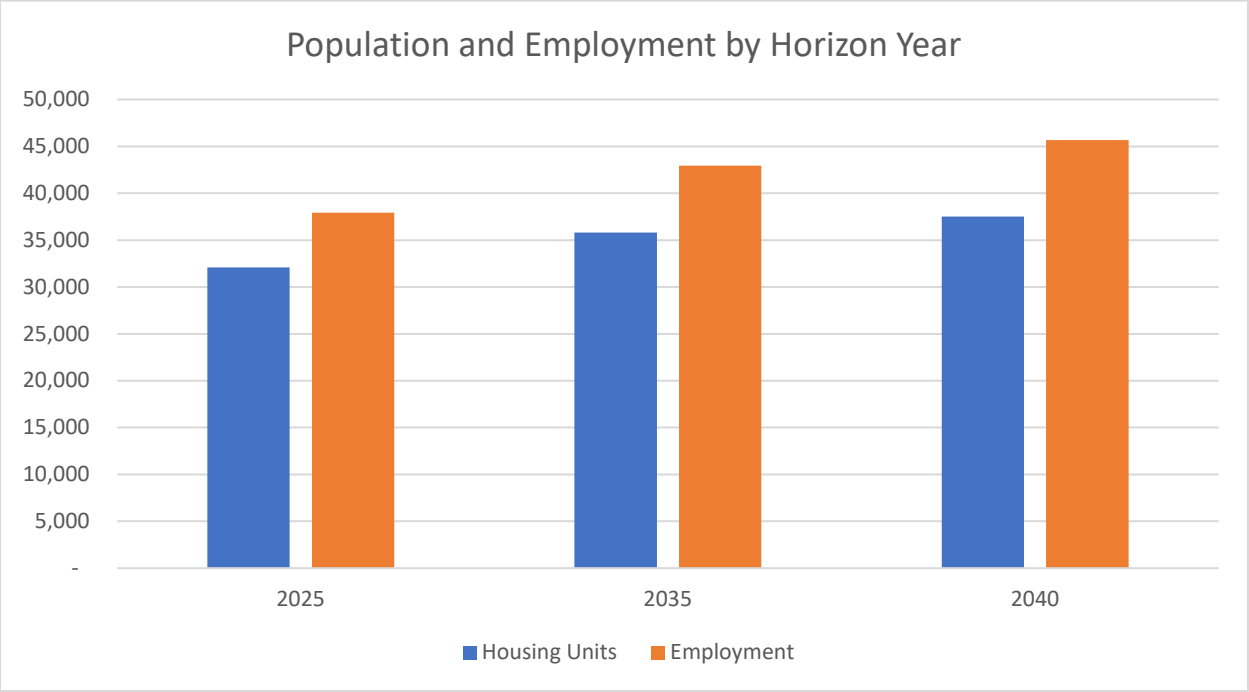
The BTPO Travel Demand Model (TDM) provides the average annual weekday traffic (AAWDT) for the PVNAA area for each time horizon. Automatic Traffic Recorder (ATR) data is used to convert the AAWDT into hourly, daily, and monthly traffic volume. The ATR data set used here is from ITD covering 2016-2017. The data set includes a total of one hundred and six (106) ATR sites with complete data in southern Idaho counties. Combined with the vehicle mix datasheet updated on May 2018 by ITD, from this data, the VMT and VHT related MOVES input files are produced.

Travel Demand Model

The BTPO travel demand model provides an average annual daily traffic estimate for the PVNAA area. BTPO's travel demand model software is TransCAD, and the current version is TransCAD 8.0. The TDM was validated and calibrated with a 2015 base year. The TDM models all roads in the PVNAA. The 2019 road network is the initial transportation network. The horizon year network includes changes identified in the projects listed in section 3. The 2015 travel model documentation is available on BTPO's website (https://www.bannockplanning.org/travel-demand-model/).

In 2019, BTPO updated demographic projections. The construction of the Northgate interchange required an evaluation of the demographic projections. Figure 2 provides the housing unit and employment projections for each horizon year.

Figure 2 Demographic Projections by Horizon Years



Mode Split Assumptions

Built into the TDM is a method to account for non-vehicle travel. The method is not an official mode split model. Based on the household survey, the percentage of non-vehicle trips from one district to another is known. For each trip purpose, based on the survey, the model allocates the percentage of vehicle trips to the trip assignment step of the mode. The percentage of non-vehicle trips is constant over the twenty years of the TDM.

Travel Demand Model Assumptions

Vehicle Miles Traveled Inputs

Household Disaggregation: A conversion table, based on the 2012 household survey, converted households into a household size and the number of workers per household.

Trip Generation: The TDM uses six trip purposes to calculate the average weekday person trips. The trip purposes are:

- HBW – Home Base Work
- HBC – Home Base College
- SCH – Home Based School
- HBS – Home Based Shopping
- HBO – Home Based Other
- NHB – Not Home Based

Trip Distribution: The 2012 household survey is the basis of the destination choice model. The Destination choice models help reproduce the vehicle travel patterns in the PVNAA.

Mode Split: The model split model uses a simple lookup table of auto share by district production-attraction pairs as calculated from the household survey by trip purpose.

TDM Vehicle Miles Traveled (VMT): The TDM provides output in the form of Average Annual Weekday Traffic. Vehicle Miles Traveled is calculated by multiplying the length of each road segment by the ADT of that segment.

Road Types: The TDM and MOVES use different roadway types. A crosswalk table converts the TDM road types into the four road types used by MOVES.

Vehicle Hours Traveled (VHT) Key Assumptions

VHT characterize the time spent traveling and the average speed of a vehicle traveling on specific road type. The BTPO TDM used the Akcelik volume-delay function used to adjust the average speed to account for congestion. The MOVES and TDM models use the same Akcelik volume-delay function (Equation 1).

Equation 1 Akcelik Volume Delay Function

$$R = R_0 + D_0 + 0.25T\left[(x-1)+\sqrt{\left((x-1)^2+\frac{16J\cdot X\cdot L^2}{T^2}\right)}\right]$$

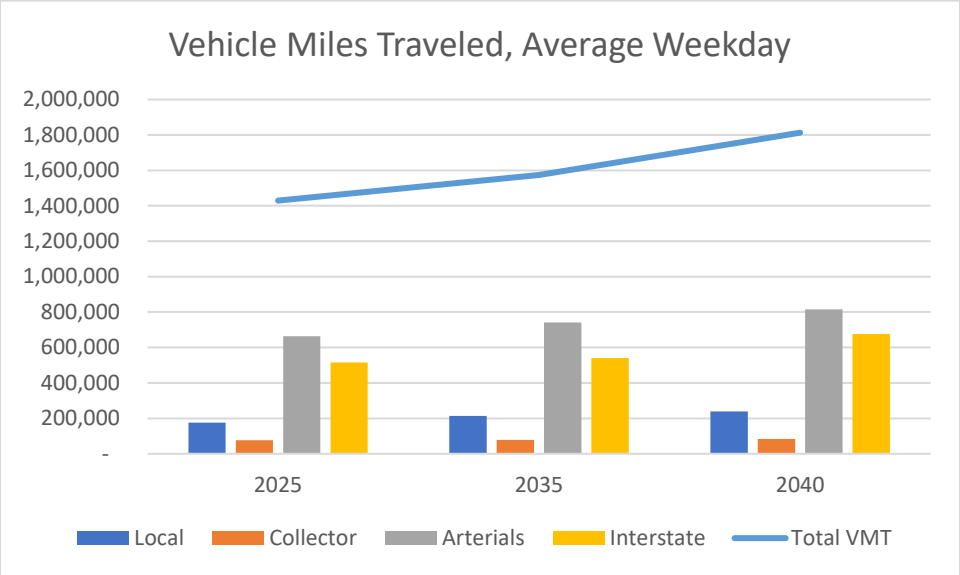
Where:

R	= Link traversal time
R_0	= Free flow link traversal time
D_0	= zero flow control delay
T	= expected duration of demand
X	= flow to capacity ratio
J	= calibration parameter
L	= Link length

Travel Demand Model Output

Figure 3 provides the results for 2025, 2035, and 2040, the three horizon years.

Figure 3 Vehicle Miles Traveled Estimated for Horizon Years



Projects Included in the Transportation Emissions Analysis

Ensuring that emissions from the transportation activities within the area will not exceed the MVEB for that area is the purpose of transportation conformity. Transportation conformity at a program level pertains to the Metropolitan Transportation Plan and the Transportation Improvement Program (TIP). The Metropolitan Transportation Plan includes all the TIP projects.

Table 1 lists the 2025 horizon year projects modeled in the travel demand model. Table 2 includes projects with anticipated construction starting in 2026. No additional projects are planned between 2035 and 2040. Projects from Tables 1 and 2 were included in the 2040 horizon year demonstration. Projects listed in 40 CFR § 93.126 Table 2 are exempt from emission analysis (Table 3). BTPO and the Interagency Consultation Committee has determined that projects in Table 4 are exempt from emission analysis since they do not have potential regional impacts.

Table 1 - 2025 Horizon Year Projects

Key Number	Project Name	Activity	Year of Activity	Sponsor
B1001	New Day Parkway Road- Whitaker Road to Hiline Rd	The project will widen New Day Parkway from 2 to five lanes, including bicycle facilities	2021	Chubbuck
21860	Yellowstone - Park Lawn and Siphon	The project will widen the Yellowstone Avenue from two to five lanes	2024	ITD
Sponsor Codes: BPO = Bannock Transportation Planning Organization; Chubbuck = City of Chubbuck; Pocatello = City of Pocatello PRT = Pocatello Regional Transit; ITD = Idaho Transportation Department.				

Table 2 2035 Horizon Year Projects

Key Number	Project Name	Activity	Year of Activity	Sponsor
22867	Gould Street - Yellowstone Ave to Garrett Way	Widen the westbound lanes from two to three and add additional right-turn lanes to the intersection of Garrett Way and Gould St.	2027	ITD
Sponsor Codes: BPO = Bannock Transportation Planning Organization; Chubbuck = City of Chubbuck; Pocatello = City of Pocatello PRT = Pocatello Regional Transit; ITD = Idaho Transportation Department.				

Table 3 lists the projects exempt from regional air quality conformity as defined in CFR 40 §93.126 Table 2. Table 4 lists the projects exempt from regional air quality conformity as defined in CFR 40 §93.127 Table 3. Projects listed in Table 4 are exempt from regional emissions analysis unless they are determined to have potential regional impacts.

Table 3 Projects exempt from regional emissions analysis (40 CFR § 93.126)

Key Number	Project Name	Activity	Year of Activity	Exempt Project Type
13800	Pocatello UZA Operations	Operations provide funds for the day to day operations of the PRT fixed-route system.	2021-2024	Operation Assistance
13801	Pocatello UZA Capital Lease	Capital Facility Lease provides funds to lease a transfer station for the fixed transit route system	2021-2024	Purchase of Office
13802	Pocatello UZA Capital	Demand Response Operations provides door to door transit service for elderly and disabled persons in the Pocatello urban area.	2021-2024	Operation Assistance
13803	Pocatello UZA Preventive Maintenance	Provide all maintenance costs related to vehicles including supplies, materials, labor, services, and associated costs required to preserve or extend	2021-2024	Purchase of operating equipment
19755	Pocatello UZA Capital	Capital Vehicle Replacement project will purchase new or buses to replace those busses which are beyond their useful life. An estimated	2021-2024	Purchase of new buses
19720	Pocatello USZ Planning	Mobility management provides planning services to assist in coordinating transit services between transit providers and human service agencies.	2021-2024	Planning
23042	Pocatello UZA Capital	E Clark Street install or repair sidewalk and curb ramp from 18th Ave to 1st Ave	2021	Bicycle and Pedestrian Facilities
23043	Pocatello UZA Capital	E Carter Street install sidewalk and curb ramps from 5th Ave to 8th Ave	2022	Bicycle and Pedestrian Facilities
21827	I-15B, Cedar to Flandro	Mill and inlay	2021	Pavement Resurfacing
19952	FY 2021 BTPO Metropolitan Planning	Planning	2021	Planning
20432	FY 2022 BTPO Metropolitan Planning	Planning	2022	Planning
20432	FY 2023 BTPO Metropolitan Planning	Planning	2023	Planning

Key Number	Project Name	Activity	Year of Activity	Exempt Project Type
22495	FY 2024 BTPO Metropolitan Planning	Planning	2024	Planning
22999	FY 2025 BTPO Metropolitan Planning	Planning	2025	Planning
22883	Pedestrian Crossing Safety Improvements	The project will add 12 bulb outs and curb ramps within downtown Pocatello. The project will also add two Rectangular Rapid Flash Beacons Near Pocatello High School.	2023	Bicycle and Pedestrian Facilities
21911	Yellowstone Ave; Breneman to Knudsen	Safety improvement to add median to the center	2025	Guardrails, median barriers,
22450	State, FY 21 Pocatello 15 ADA Ramps	Construct 15 ADA Ramps on in Pocatello	2021	Bicycle and Pedestrain Facilities
12098	Center Street Underpass	Bridge Rehabilitation	2026	Widening narrow pavements or reconstructing bridges
5002	S. 5th Avenue Safety Improvement	Sidewalks and crosswalks	2022	Bicycle and Pedestrian Facilities
23024	Pole Line Road - W Alameda Road to W Quinn Road	Add a two-way center turn lane and sidewalk to Pole Line Road from W Alameda Road to W	2025	Adding medians.

Idaho Transportation Department.

Projects types included in this list are listed in 40 CFR §93.126 to 40 CFR §93.127 and are exempt for the conformity requirements.

Table 4 Projects exempt from regional emissions analysis (40 CFR § 93.127)

Key Number	Project Name	Activity	Year of Activity	Exempt Project Type
12099	Intersection of Hawthorne and Quinn	Improve capacity by installing a signal or other traffic control device. The project includes additional turn lanes, but no additional through lanes.	2025	Intersection signalization projects at individual intersections
20589	I-86/I-15 Interchange Complex	The project reconfigures the interchange complex. Activities include repair or replacement of bridges and ramps.	2023	Interchange reconfiguration projects.

Motor Vehicle Emissions Budget

Secondary formation of PM_{10} can occur in the atmosphere through a series of complex photochemical reactions involving certain precursor pollutants. Studies indicate that secondary aerosols are significant contributors to PM_{10} concentrations in the Portneuf Valley. The conformity rule requires an MVEB for precursors to PM_{10} when they are significant contributors (40 CFR 93.109(b)(2)(iii)). Accordingly, an MVEB was established for N_{OX} and VOC. SO2 and NH3 are also considered precursors to PM_{10}. SO2 was not included as onroad vehicles are not a significant source of SO2 emissions (less than 1% of the total Portneuf Valley inventory in 2004). NH3 is not included in the MVEB because vehicles exhaust extremely small amounts, and the atmosphere in the Western US is generally considered to be ammonia-rich.

The PVNAA Motor Vehicle Emission Budget has been updated to reflect emission modeling with the MOVES model and the revised State Implementation Plan

Table 5: PVNAA Revised Motor Vehicle Emission Budget

Year	PM_{10} (TPY)	NO_x (TPY)	VOC (TPY)
2020	498	856	651

Results

Tables 6, 7, and 8 demonstrate that the transportation emission outputs of the MOVES2014b model and Road Dust calculations from AP 42 13.2.1 are less than the MVB for horizon years 2025, 2035, and 2040. Therefore, the proposed 2021 to 2027 TIP and 2040 MTP passes the budget test for all three pollutants and conforms to the State Implementation Plan.

Table 6: Volatile Organic Compounds (VOC) Budget Test, Tons per Year

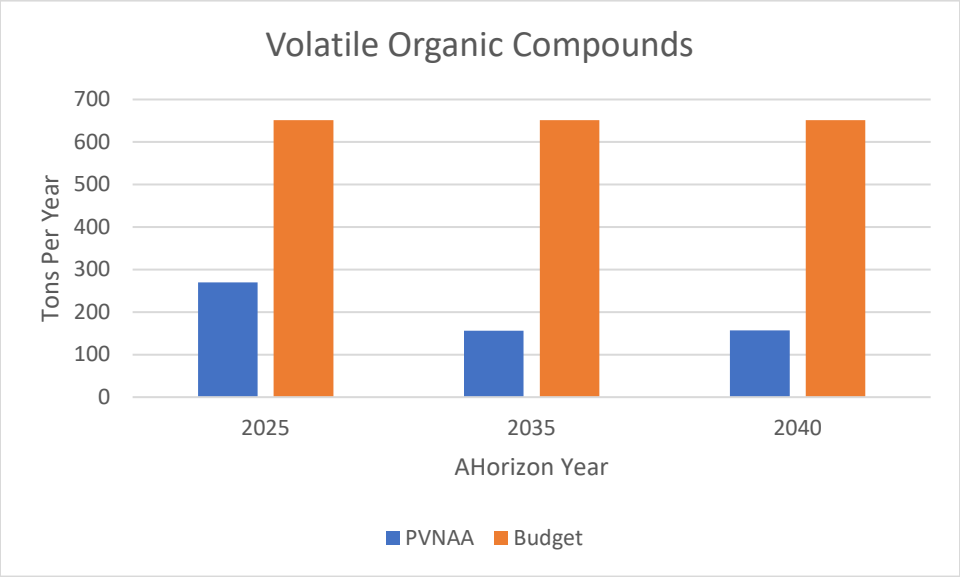


Table 7: Oxides of Nitrogen (NOx) Budget Test, Tons per Year

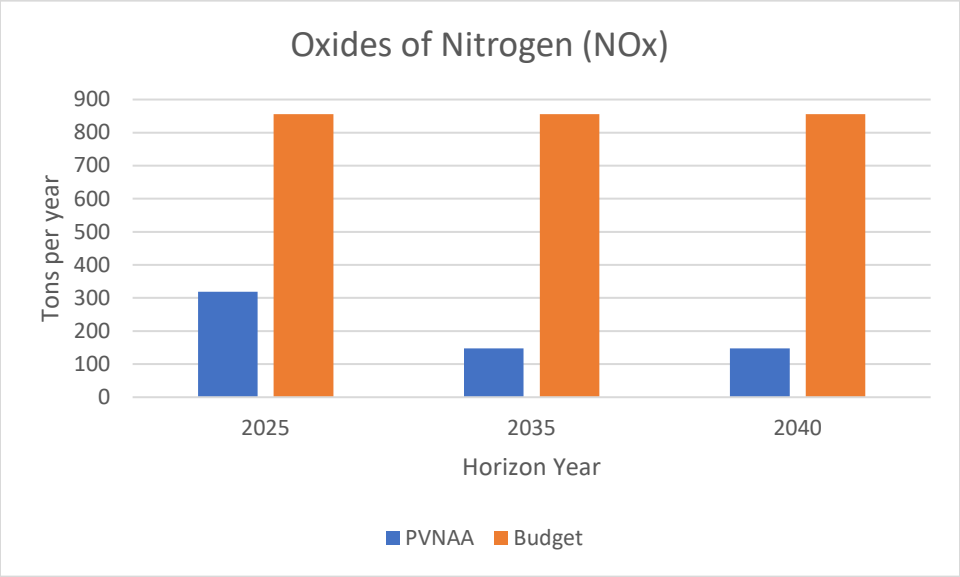
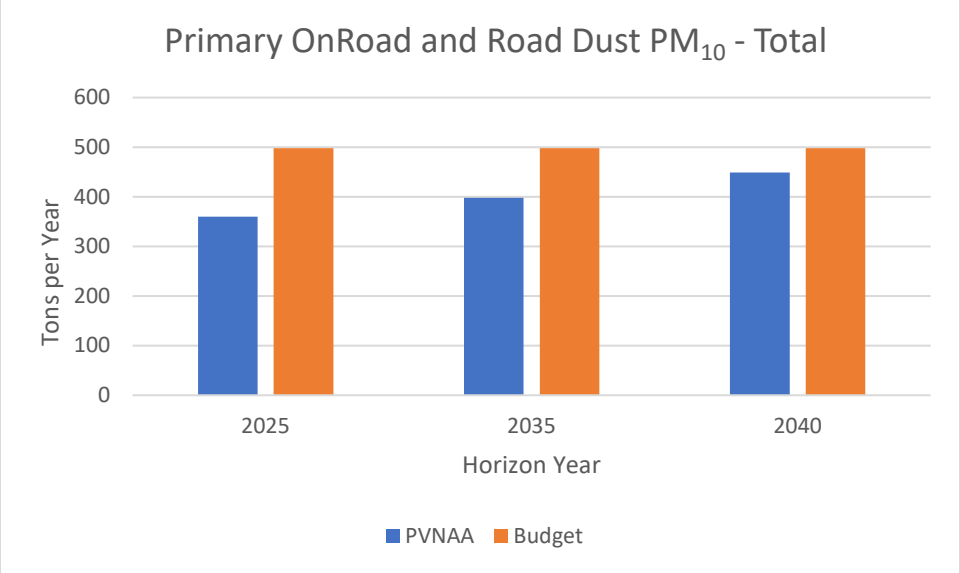


Table 8: PM_{10} Budget Test, Tons Per Year



Appendix A. ICC Meeting Summaries

Bannock Planning Organization
Interagency Consultation Committee Meeting
Monday, April 2, 2020
Meeting Summary

Members Attending:
Karl Pepple – Environmental Protection Agency
Kimi Smith - Idaho Department of Environmental Quality
Aislinn Johns - Idaho Department of Environmental Quality
Scott Frey – Federal Highway Administration
Clay Woods - Idaho Department of Environmental Quality
Mori Byington – Bannock Transportation Planning Organization
Carl Brown - Idaho Department of Environmental Quality
Ryan McDaniel – Idaho Transportation Department

Topics Discussed

Conformity Horizon Years

The upcoming conformity analysis for the Transportation Improvement Program includes 2021 to 2040. The analysis period is after the 2020 Motor Vehicle Emissions Budget and the 2020 horizon years used in the analysis of the Metropolitan Transportation Plan. BTPO is proposing using 2023, 2035, and 2040 has the horizon years. The BTPO calibrated the Travel Demand Model in 2015, which meets the ten-year requirement of §93.106(a)(1)(ii).

The group consensus was to use 2025, 2035, and 2040 as horizon years for the 2021 – 2040 conformity analysis.

Timeline for Conformity Determination

BTPO is proposing a timeline that allows the draft TIP to include the draft conformity determination.

Week of May 12 – BTPO submits the travel demand model runs

Week of June 15 – IDEQ provides MOVES model run results for 2025, 2035, and 2040 to BTPO

June 29 – BTPO sends ICC the draft conformity analysis for review.

July 27 – ICC meeting on draft conformity analysis