

# Petersburg Indian Association 2024 Transit Study



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## List of Acronyms

- ADA - American with Disabilities Act
- ADOT&PF - Alaska Department of Transportation and Public Facilities
- ADT - Average Daily Traffic Count
- AMI - Area Median Income
- BIL - Bipartisan Infrastructure Law
- CE - Categorical Exclusions
- CM - Corrective Maintenance
- CMAQ - Congestion Mitigation and Air Quality
- CMMS - Computerized Maintenance Management System
- CRF - Code of Federal Regulations
- DOT - Department of Transportation
- EV - Electric Vehicle
- FAST Act - Fixing America's Surface Transportation Act
- FHWA - Federal Highway Administration
- FMCSA - Federal Motor Carrier Safety Administration
- FPL - Federal Poverty Level
- FTA - Federal Transit Administration
- GTFS - General Transit Feed Specification
- HUD - Department of Housing and Urban Development
- LRTP - Long Range Transportation Plan
- NEPA - National Environmental Policy Act
- NHTSA - National Highway Traffic Safety Administration
- NOFO - Notice of Funding Opportunity
- NOx - Nitrogen Oxide
- NTD - National Transit Database
- OST - Office of the Secretary of Transportation
- PIA - Petersburg Indian Association
- PM - Preventative Maintenance
- PMC - Petersburg Medical Center
- SEARHC - SouthEast Alaska Regional Health Consortium
- TAM - Transit Asset Management
- TERM - Transit Economic Requirements
- TIP - Transportation Improvement Program
- TTAM - Tribal Transportation Allocation Methodology formula
- ULB - Useful Life Benchmark
- US - United States
- USC - United States Code
- VRH - Vehicle Revenue Hours
- VRM - Vehicle Revenue Miles
- WAVE - Working Against Violence for Everyone

## Introduction

### Purpose of the Study

This study aims to better understand the best methods of delivering transit service to Petersburg Indian Association tribal members and non-tribal members (the general public) within the Petersburg Borough. This planning and feasibility study will explore the community conditions of the Petersburg Borough, including its geography, demographics, income, poverty, and existing transit resources.

Information will be gathered on existing transportation issues and proposed transit options. The goal is to assess the existing transit demand, identify transit funding, explore possibilities for a climate action plan, and suggest strategies to extend transportation services to all residents.

Petersburg Indian Association aims to provide reliable, safe, scheduled, efficient, and affordable transportation services to work, medical facilities, social activities, shopping, errands, social services, the airport, ferry, post office, library, municipal building, recreation, etc.

### Transit Stakeholders

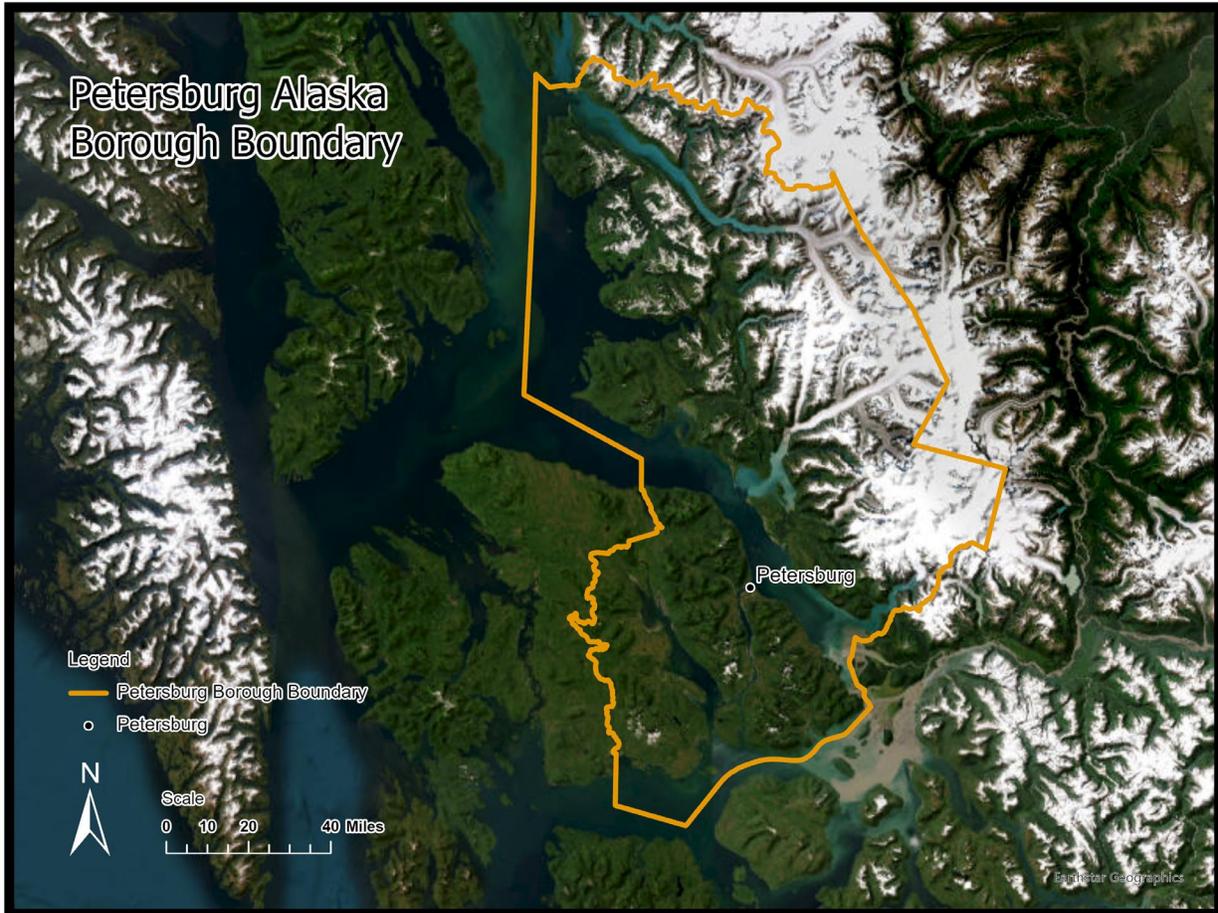
The key stakeholders involved in transportation services include the Petersburg Indian Association, Petersburg Borough, Petersburg Medical Center, Petersburg School District, Mountain View Manor Assisted Living and Elderly Housing, SouthEast Alaska Regional Health Consortium (SEARHC), and the Salvation Army.

# Community Conditions

## Study Area Location - Geography

The Petersburg Borough is located in southeast Alaska and is 3,829 square miles. To the southeast, it borders the City and Borough of Wrangell. On the east, it borders the Canadian province of British Columbia, and to the northwest, it borders the City and Borough of Juneau.

Figure 1 – Petersburg Borough Area Map



## Petersburg Borough Service Area 1

The Petersburg Borough provides essential services for residents in Service Area One, which encompasses forty-six square miles. The services provided to Service Area One are in the Borough Code of Ordinances Section 14.02.

Figure 2 – Petersburg Borough Service Area 1



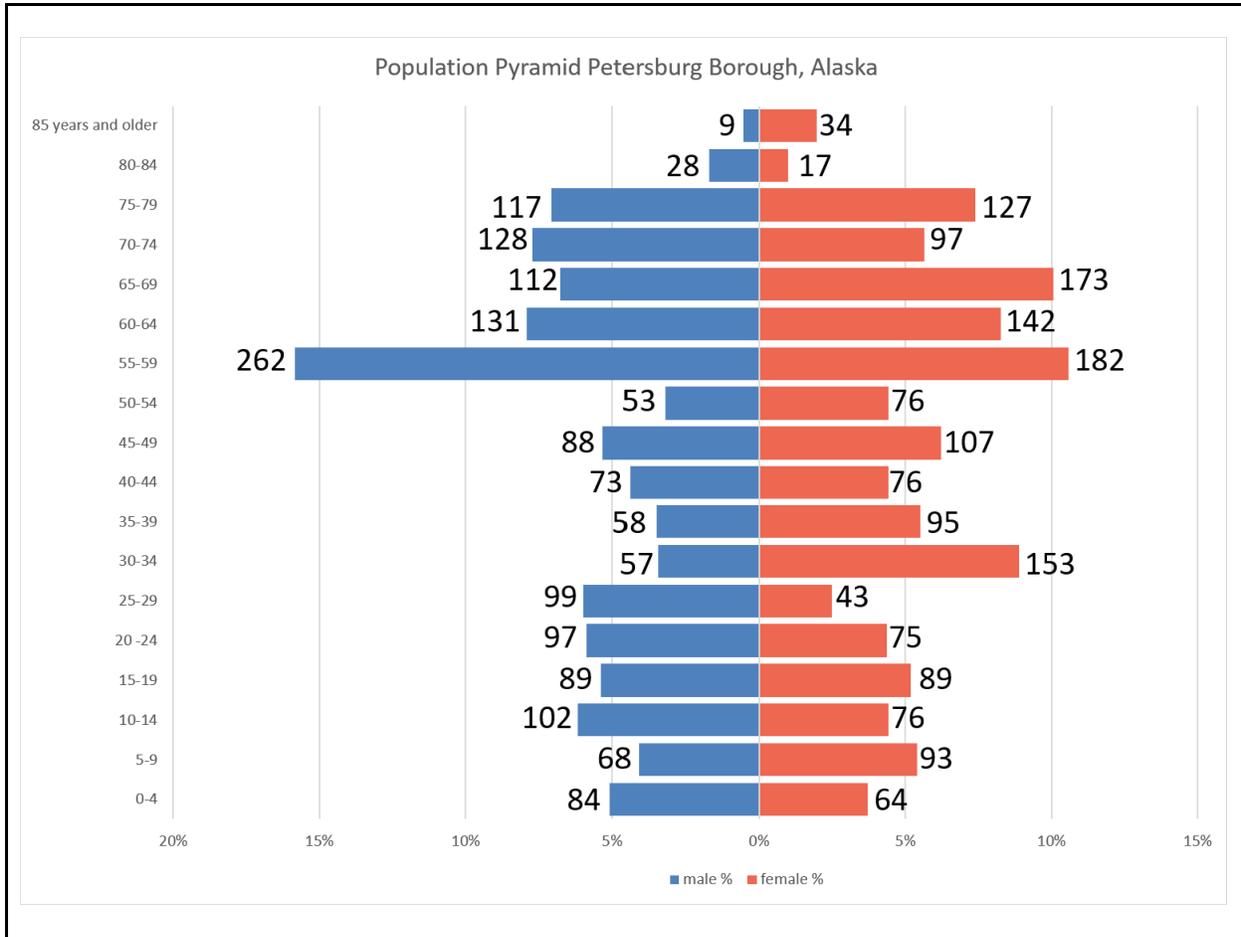
## Demographics

According to the 2020 United States Census, the 2022 estimated population of Petersburg is 3,398 (United States Census Bureau Populations and People 2024). Petersburg has a significant senior population compared to the State of Alaska and the United States. There are 1,718 households in the Petersburg Borough. (United States Census Bureau Housing 2024)

- The median age in the Petersburg Borough is 50.1 years old
- The median age in Alaska is 35.9 years old
- The median age in the United States is 38.8 years
- In the Petersburg Borough, Alaska, 25% of the population is 65 years of age or older

- In Alaska, 13.8% of the population is 65 or older.
- In the United States, 16.8% of the population is 65 years of age or older
- In the Petersburg Borough, Alaska, 13% of the population is school age, 5-17 years of age
- In the Petersburg Borough, Alaska, 47% of the population is between 18-55 years of age
- In the Petersburg Borough, Alaska, 5% are under 5 years of age

**Figure 3 – Petersburg Borough Population Pyramid**



## Disability

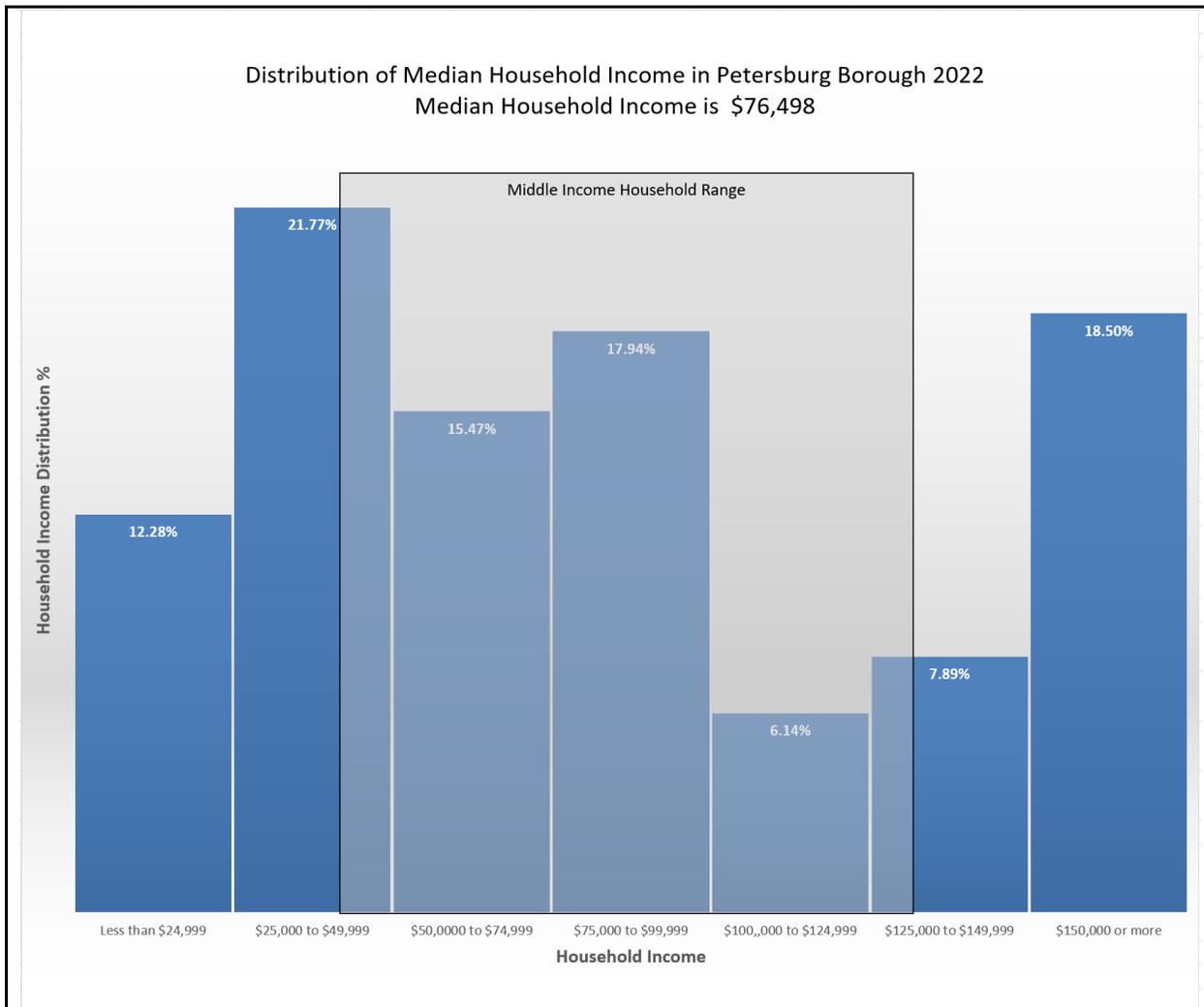
According to the 2020 Census of the United States for the Petersburg Borough, in 2022, according to health data, 19% of persons living in Petersburg have a disability (630 persons). 46% of the people over 65 have a disability (387 persons), and 24% of people ages 65 to 74 (122 persons) have a disability. The most common types of disability involve walking, independent living, or cognitive difficulties. (United States Census Bureau Health 2024)

## Income and Poverty

From the 2020 United States (US) Census data, the median household income for the Petersburg Borough in 2022 was \$77,826. 4.6% of the population is in poverty—the 2022 Census Reporter. Data shows the distribution of household income in the Petersburg Borough in Figure 4. (United States Census Bureau Income and Poverty 2024)

The US government established the Federal Poverty Level (FPL) to define low income. In 2023, the federal poverty level definition of low income for a single-person household is \$14,580 annually. Each additional person in the household adds \$5,140 to the total. For a household of four, the guideline would be \$30,000. (Bundrick, What is Considered Low Income 2023) Figure 4 shows the income distribution from the United States Census Bureau's tabular data for the Petersburg Borough. (United States Census Bureau Income and Poverty 2024)

**Figure 4 – Petersburg Borough Income Distribution Graph**



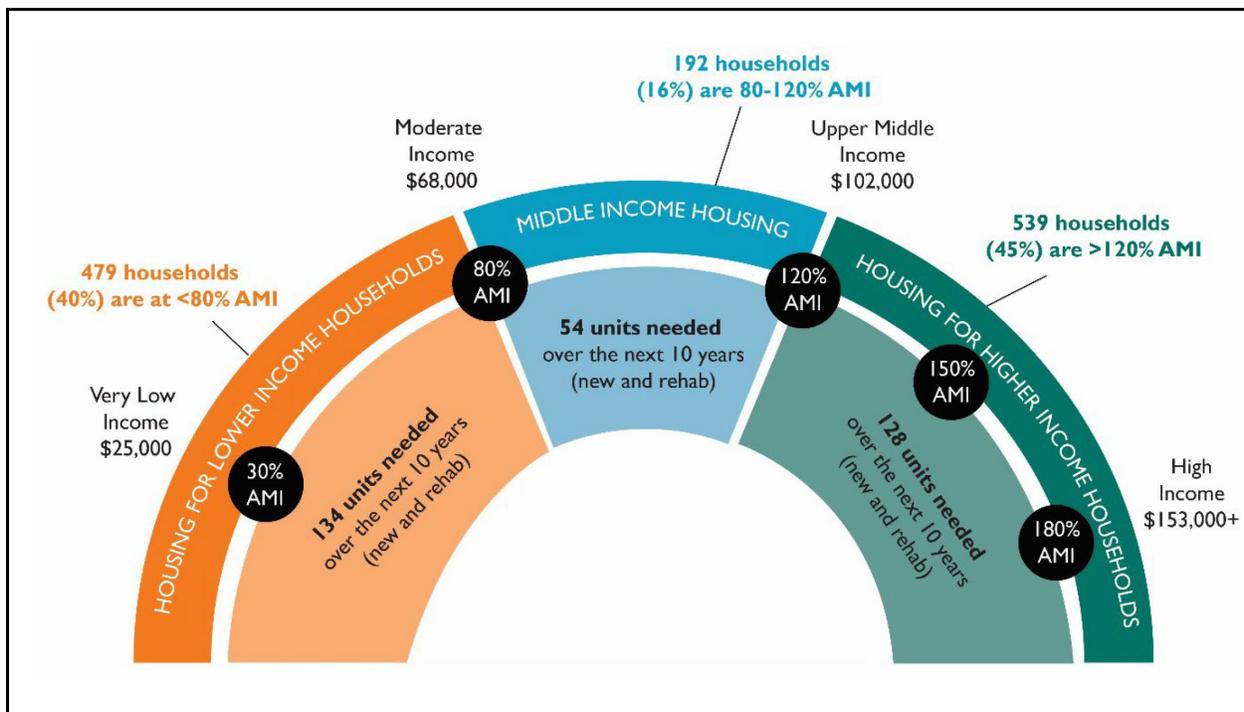
## Zero-Vehicle Population

The word vehicle refers to privately owned motor vehicles such as cars and trucks. (Enviro Atlas 2015) 16% of the Petersburg Borough is zero-vehicle population, according to a US News and World Report. (US News and World Report n.d.) The community transit survey also found that 16% of people did not own vehicles.

## Area Median Income

The determination of housing needs by income for lower-income households was done in the 2023 Petersburg Borough Housing Needs Assessment. The results show that 40% of households are lower-income households. This is determined by calculating the Area Median Income (AMI). The AMI is determined by the Department of Housing and Urban Development (HUD) (Hamann 2023) Figure 5 is the chart from the Petersburg Borough's Housing Needs Study showing the percentage of households' Area Median Income distribution.

**Figure 5 – Housing Needs by Income 2023 from the Petersburg Borough's Housing Needs Assessment**



## Community Input

Petersburg Indian Association conducted a public survey on transit in Petersburg.

## Summary of survey results

Results from the transit survey showed that many people were unsure or dissatisfied with existing transit options in Petersburg. Public transit is not available to all Petersburg residents. The study reported a 16% zero-vehicle population. 61% of respondents expressed that they would use a public transit system if it were available to them.

## Survey results

- Question 1 – How do Primary travel within Petersburg (% is for the usage of all transit modes)
  - 72% drive a personal vehicle
  - 38% walk
  - 17% bike
  - 17% PIA transit (Seniors/physically disabled)
  - 6% for-hire taxi
  
- Question 2 – Think about your most recent trip (work, school, grocery store, or other regular destination). How did you get to your destination?
  - 59% drove alone
  - 18% walked
  - 13% PIA transit for Seniors
  - 5% carpool
  - 5% biked
  
- Q3 – Would you use public transportation if it was available in Petersburg for all ages?
  - 32% Likely
  - 29% Extremely likely
  - 18% Unsure
  - 15% Unlikely
  - 6% Extremely Unlikely
  
- Q4 – How satisfied are you with the existing public transportation options in Petersburg?
  - 31% Unsure
  - 26% Dissatisfied
  - 19% Very Dissatisfied
  - 14% Satisfied
  - 10% Very Satisfied
  
- Q5 – If you do not currently use public transportation in Petersburg, what are some reasons why? (Check all that apply)
  - 92% The PIA Bus is not available to me
  - 8% The PIA Bus is not convenient for me
  - 8% The PIA Bus wait times are too long
  - 5% I do not feel comfortable because of Covid-19

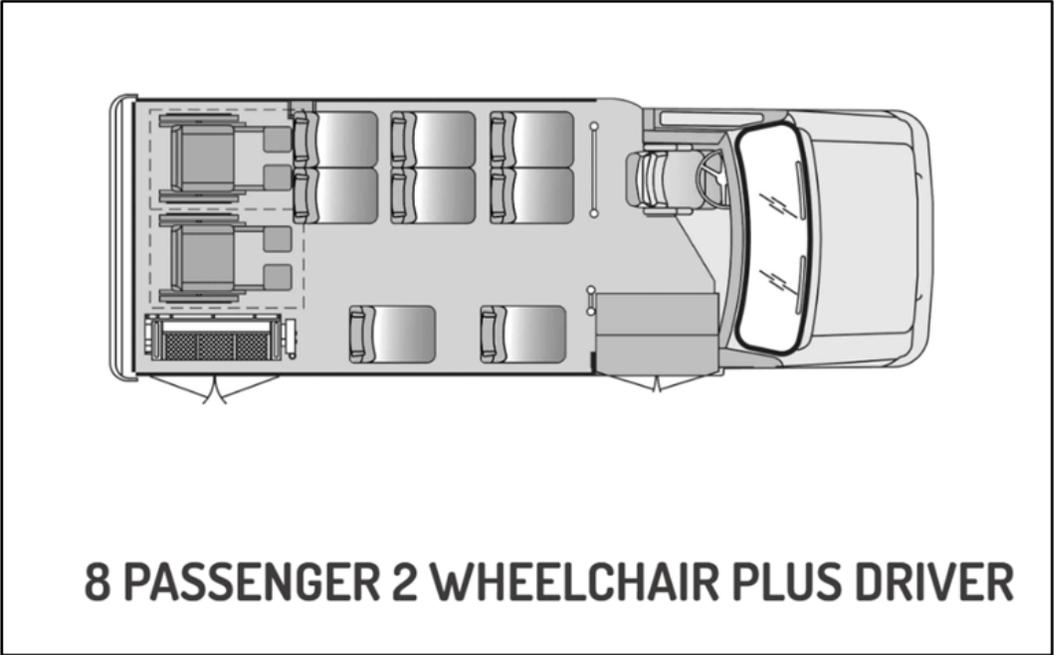
- Q6 – How likely would you use public transit for your next trip if you were to walk less than 10 minutes and wait less than 20 minutes for the transit bus?
  - 35% Likely
  - 24% Unsure
  - 15% Extremely Likely
  - 15% Unlikely
  - 11% Extremely Unlikely
  
- Q7 – How often would you take public transportation instead of private transportation if the Petersburg Indian Association offered a fixed-route transit bus?
  - 49% Sometimes
  - 16% Rarely
  - 13% Always
  - 11% Usually
  - 11% Never
  
- Q8 – What is your age?
  - 31% 45-54
  - 20% 55-64
  - 20% 65+
  - 15% 35-44
  - 11% 25-34
  - 3% 18-24
  
- Q9 – Are you a Petersburg Indian Association member?
  - 25% Yes
  - 75% No
  
- Q10 – Do you have a personal vehicle that you can use to commute or run errands?
  - 84% Yes
  - 16% No
  
- Q11 – Which of the following best describes your employment?
  - 53% Worked full-time
  - 13% Worked part-time
  - 13% Retired
  - 8% Looking for work
  - 7% Not employed or looking for work
  - 6% Disabled

- Q12 – What is your approximate average household income?
  - 20% \$0-\$24,999
  - 20% \$25,000-\$49,999
  - 16% 75,000-\$99,999
  - 15% \$50,000-\$74,999
  - 11% \$100,000-\$124,999
  - 6% \$125,000-\$149,999
  - 6% \$150,000-\$174,999
  - 4% \$175,000-\$199,999
  - 2% \$200,000+
  
- Q13 – Do you have any long-term physical or mental disabilities that affect your use of a transit service?
  - 6% Yes
  - 94% No

## Existing Transit Resources

The Petersburg Indian Association operates free transit services for seniors and individuals with physical disabilities. However, Petersburg has no other public transit system, requiring residents to rely on private vehicles, friends, family, or for-hire transit services. The Petersburg Medical Center (PMC) operates a van service for Petersburg General Hospital's Long Term Care Facility residents, and Mountain View Manor Assisted Living operates a van service for its assisted living residents. The Petersburg Borough Parks and Recreation does not offer services for Petersburg residents. Petersburg Public Schools contracts bus services for students to and from school. Figure 6 shows the configuration of the PIA transit bus, two wheelchairs, and eight passengers. Figure 7 is a photo of the PIA transit bus for seniors and the physically disabled.

**Figure 6 – Petersburg Indian Association 11-person bus**



**Figure 7 – Petersburg Indian Association Transit Bus for Seniors and the Physically Disabled**



## Petersburg Indian Association Transit Service Area

The service operates in a twenty-five-square-mile service area. Its hours of operation are Monday through Friday, 9:00 a.m. to 4:00 p.m., and Sundays, 9:00 a.m. to 1:00 p.m. Figure 8 shows PIA's routes of operation.

Figure 8 – Petersburg Indian Association Transit Bus Area



## Petersburg Indian Association Transit Bus Operating Statistics

Federally recognized Indian tribes can receive funding in rural areas with populations of less than 50,000 under the Federal Transit Administration (FTA) Tribal Transit Program. Transit data from tribes is a requirement of the funding. Petersburg Indian Association has collected the following operating statistics from the beginning of the service in 2020. PIA's transit program has been growing in ridership, vehicle revenue miles, and vehicle revenue hours. PIA's operating statistics are in Table 1. Ridership increased 43.4% from 2021 to 2022 and 21.5% from 2022 to 2023.

**Table 1 – PIA Transit Operating Statistics**

<b>Transit Operating Statistics for PIA Demand-Response Service</b>					
	<b>2021</b>	<b>2022</b>	<b>% Change 2021-2022</b>	<b>2023</b>	<b>% Change 2022-2023</b>
<b>Ridership</b>	4101	5882	43.4%	7146	21.5%
<b>VRM</b>	6015	8702	44.7%	9700	11.5%
<b>VRH</b>	387	694	79.3%	812	17.0%
<b>Service Days</b>	256	281	9.8%	287	2.1%

Ridership is when the passenger boards the bus from origin to destination. A passenger may have several errands; each time the passenger steps on the bus, it is counted as a ridership.

Vehicle Revenue Miles (VRM) is the running time transporting passengers from one destination to another and, after dropping off a passenger, driving to pick up the next passenger.

Vehicle Revenue Hours (VRH) are the running time spent transporting passengers from one destination to another, waiting at the pick-up point for the passenger, and, after dropping off a passenger, driving to pick up another passenger.

Service Days are the days the bus is operating.

### **Petersburg Indian Association Transit Maintenance**

Petersburg Indian Association uses a cloud-based computerized maintenance management system called *HIPPO CMMS* to track maintenance for the transit bus. The online program manages assets, schedules, tracks, and reports work orders for preventative and corrective maintenance.

### **Petersburg Indian Association Transit Asset Management (TAM)**

Transit Asset Management (TAM) is a business model that uses the condition of transit assets to guide the optimal prioritization of transit funding. Its goal is to keep the transit network in good repair and operating at full performance. TAM is a requirement for all recipients of transit funds from the FTA. The TAM Rule is found in 49 Code of Federal Regulations (CFR) 625.

Good repair of assets comprises the life cycle that has been met or recovered, does not pose a safety risk, and can perform its design function. An accountable executive leads the compliance with the rule and carries out the TAM. The TAM needs to be updated every 4 years or if there are significant changes to the transit assets. PIA's TAM plan is in Table 2. Transit Asset Management elements are the inventory of capital assets, condition assessment, decision support tools, and investment prioritization.

**Table 2 – PIA Transit Inventory of Assets and Capital Investment Prioritization**

PIA Transit Inventory of Capital Assets				Transit Asset Management 2020-2024						
Asset No.	Year	Make		License	Vin# or other	Item Description ( <i>model &amp; serial number</i> )	DATE	Original Acquisition Cost	Listed with Psg Ins.	Deposition
1	2019	FORD Transit	Startrans Candidate II Transit	YZF368	1FDES6PM3KKA41043	Paratransit 11 person bus	9/10/2019	\$73,504.74	Yes	

Investment Prioritization (fiscally constrained list)				
No.	Year	Proposed Project	Standard of Good Repair Rating $\leq$ 2.5	Cost
2020-2024		None	None	\$0
1	2027	New purchase of 11 passenger cutaway bus		\$100,000

Projects are prioritized by their Standard of Good Repair Rating. This rating takes into account the percent of useful life remaining, the condition of the asset, the asset's performance with regard to reliability, ambience, safety, and meeting industry standards, and lastly the level of corrective and preventative maintenance that is required. If the State of Good Repair Score is Poor in the Asset Criteria's that asset should be prioritized for replacement.

Performance Measures reported to NTD

Equipment Age: The percentage of vehicles that have met or exceeded their Useful Life Benchmark (ULB) equals 0% for PIA  
 Rolling Stock Age: The percentage of revenue vehicle with a particular asset class that have met or exceeded their ULB equals 0% for PIA  
 Facilities Condition: the percentage of facilities with a condition rating below 3.0 on the FTA Transit Economic Requirements (TERM) scale

**Table 3 – PIA Transit Asset Management Plan Condition of Assets**

RATING OF ASSETS - CONDITION ASSESSMENT							TTP TRANSIT ASSET MANAGEMENT PLAN	
ASSET CRITERIA AND SCORING SYSTEM					CONDITION RATING			
Asset Rating Score	Asset Age	Asset Condition	Asset Performance	Level of Maintenance	Asset Condition Rating			
	ULB (Percent of Useful Life Remaining)	(Quality, Level of Required Maintenance)	(Reliability, Ambience, Safety, Meets Industry Standards)	(Level of Preventative and Corrective Maintenance)	Rating Description	Scoring Range		
5	Asset new or nearly new 75% - 100%	Asset new or like new; no visible defects	Asset meets or exceeds all performance and reliability metrics, industry standards	No unfunded or deferred maintenance activities	Excellent	4.8-5.0	In SGR greater than 2.5	
4	Asset nearing or at its midlife point 50% - 75%	Asset showing minimal signs of wear; some slight defects or deterioration	Asset generally meets performance and reliability metrics, industry standards	Some temporary deferrals of PM and CM; but no activities skipped completely	Good	4.7- 4.0		
3	Asset has passed its midlife point 25% - 50%	Some moderately defective or deteriorated components; expected maintenance needs	Occasional performance and reliability issues; may be substandard in some areas	More frequent and extended deferrals of PM and CM; some activities skipped altogether	Adequate	3.0-3.9		
2	Asset nearing or at end of its useful life 0% - 25%	Increasing number of defects, deteriorating components, growing maintenance needs	Performance and reliability problems becoming more serious; sub-standard elements	PM and CM activities frequently delayed or skipped until major problems surface	Marginal	2.0-2.9	SGR=2.5	
1	Asset is past its useful life	Asset in need of replacement or restoration, may have critically damaged components	Frequent performance and reliability problems; does not meet industry standards	Significant backlog of PM and CM work due to history of derred and skipped activities	Poor	1.0-1.9	Not SGR less than 2.5	
Performance Measure is 1=Poor to 5 = Excellent								
0	Asset non-operable	Asset non-operable	Asset non-operable	Asset non-operable	Non-Operable	0		
PIA SCORING BASED ON PREDETERMINED WEIGHTINGS					Asset Condition Rating			
	Asset Age	Asset Condition	Asset Performance	Level of Maintenance				
	20%	30%	30%	20%				
PIA cutaway 1	3	4	4	4	3.75		SGR is Standard of Good Repair	
the purpose is to plan the maintenance and replacement of the asset(s), the target for the asset( $\geq$ Replacements begin at year 9 and run for a 2 year period ending at year 11 (Average Service Life = 10 years								

## Transit Demand Assessment

### Greatest Transit Need

The elderly, disabled, zero-vehicle households, and low-income populations have the greatest need for public transit. The US Census data yields information for these populations in Petersburg. Additionally, the Petersburg Borough commissioned a Housing Needs Assessment, which reported the total percentage of low-income households.

Results from the census data yield an elderly population in Petersburg, with an average age of 50.1, and 25% of the population over 65. According to the census data, low-income households comprise approximately 30% of the population in Petersburg. From the Petersburg Borough's Housing Needs Assessment 2023, 40% of households are lower-income, with an Area Mean Income AMI under \$68,000. The data from the transit survey taken in the Petersburg Borough found that 16% of the population are zero-vehicle residents.

## Transit Demand Determined by Vehicle Availability

Passenger Trips per year are determined by a method in the Demand Estimating Model for Transit Route and System Planning in Small Urban Areas (1979), Transportation Research Record #730. The trip rate analysis indicated a distinct difference between households with no automobiles and households with one or more cars. The resulting basic trip generation rates were (S. P. Marvin Golenberg n.d.):

**Figure 9 – Basic Trip Rate**

Number of Automobiles per Household	Daily trip rate per household
0	0.21
≥1	0.04

The number of households in the Petersburg Borough equals 1,753 (Alaska Department of Transportation and Public Facilities n.d.). According to the transit survey, the number of Zero-Vehicle households is 16%. US News and World report on the Petersburg Borough's community health for Zero-Vehicle households was 16.9%. (US News and World Report 2024) Using the above rates, the potential transit demand can be estimated as follows:

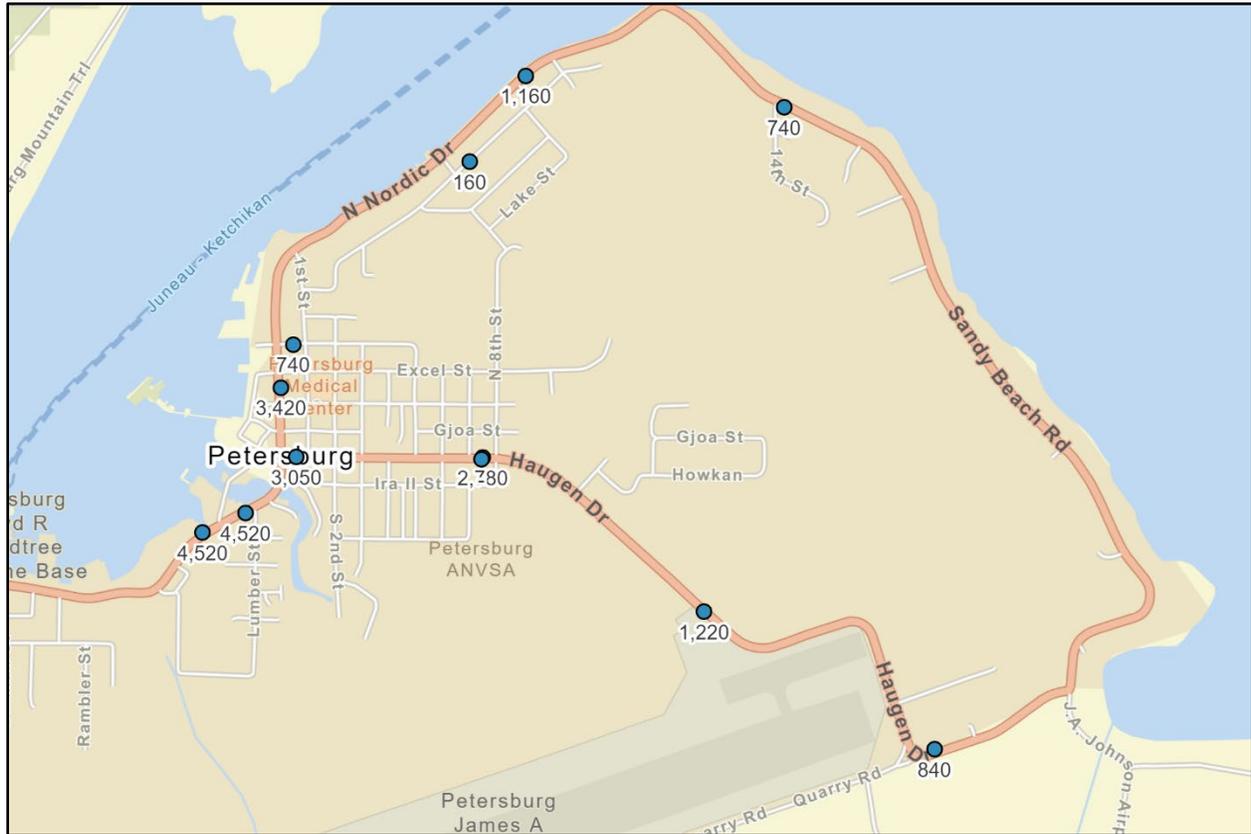
$$(0.21 * \text{Zero Vehicle Households} + 0.04 * \text{Residents of Multi-Vehicle Households}) * 287 \text{ service days per year} = 33,785 \text{ one-way trips per year}$$

## Transit Demand Determined by Traffic Counts

Only 0.5% of rural residents use public transportation to travel to work (US News and World Report 2024). The Alaska Department of Transportation and Public Facilities, ADOT&PF, gathers the Average Daily Traffic, ADT count for the Petersburg Borough Area. The potential traffic demand can be calculated as follows:

$$.005 * 4,520 \text{ ADT} * 287 \text{ Service Days per year} = 6,100 \text{ one-way trips per year}$$

Figure 10 – ADOT & PF Petersburg Average Daily Traffic Counts 2022



### Transit Demand Summary

The total estimated demand for one-way trips in public transit services ranges from 6,100 to 33,785. Petersburg Indian Association had 7,146 unlinked passenger trips for its on-demand elderly and physically disabled transit services in 2023.

### Transit Funding

PIA has access to transit funds from the Federal Highway Administration FHWA Tribal Transportation Program (TTP) and the Federal Transit Administration FTA Tribal Transportation Program. These programs support public transit projects' capital, operating, planning, and administrative expenses.

### FHWA Tribal Transportation Program

Petersburg Indian Association has transit funds from the FHWA Tribal Transportation Program, funded by the Highway Trust Fund contract authority, and is subject to the overall federal aid obligation limitation. Funds are allocated among Tribes using a statutory formula based on tribal population, road mileage, and average tribal shares of the former Tribal Transportation Allocation Methodology, TTAM formula (US Department of Transportation Federal Highway Administration n.d.) The amount of the Tribal

Transportation TTP funds that Tribes can spend on transit is 100% of their TTP allocation minus any amounts from other areas. PIA annually budgets \$120,000 of its \$700,000 FHWA funding for its On-Demand transit operations.

## **FTA Tribal Transportation Program**

FTA's Tribal Transit Program offers formula and competitive funding grants under FTA's 5311 program 49 USC Section 5311 / Fixing America's Surface Transportation Act (FAST Act) Section 3007 (US Department of Transportation Federal Transit Administration n.d.).

FTA's formula grants are for rural areas with populations under 50,000. The grant directly funds the federally recognized Indian tribal government for capital, operating, planning, and administrative expenses to support public transit projects that meet the growing needs of rural tribal communities. To access Tribal Transit Program formula program funds, prospective recipients must have reported to the National Transit Database (NTD) in the most recent NTD report year at the time of apportionment to be allocated funds under the Tribal Transit Program formula program. This typically means prospective recipients must have reported to the NTD for two consecutive years before their first TTP formula allocation. (Federal Transit Administration 2024). PIA currently receives \$8.875 from FTA's formula grant.

FTA's competitive grants are for prospective recipients who respond to a published Notice of Funding Opportunity (NOFO). The grants are for planning, capital, or operating funds for transit projects. Tribal governments that do not operate public transportation services may apply to the Tribal Transit competitive program for a planning project or start-up costs.

## **National Environmental Policy Act Funding Requirements**

Federal funds require that you meet the requirements of the National Environmental Policy Act (NEPA). An environmental assessment or impact statement is unnecessary if actions do not significantly affect the human environment. NEPA designates specific actions under Categorical Exclusions that do not induce significant environmental impacts. The purchase of transit vehicles is defined as a categorical exclusion.

## **General Transit Feed Specification Funding Requirements**

A fixed route transit service requires General Transit Feed Specification (GTFS). The FTA needs the GTFS planning tool to inform the public of fixed transit services. Trip planners will have the transit information for using the transit, where it goes, and the service schedules. The information will be on apps like Google Transit, Apple Maps, Bing, and Transit App. This map information integrates a combination of geographic data and the scheduling of the transit route. (Federal Transit Administration 2024)

## **Transit Climate Action Information**

### **Laws**

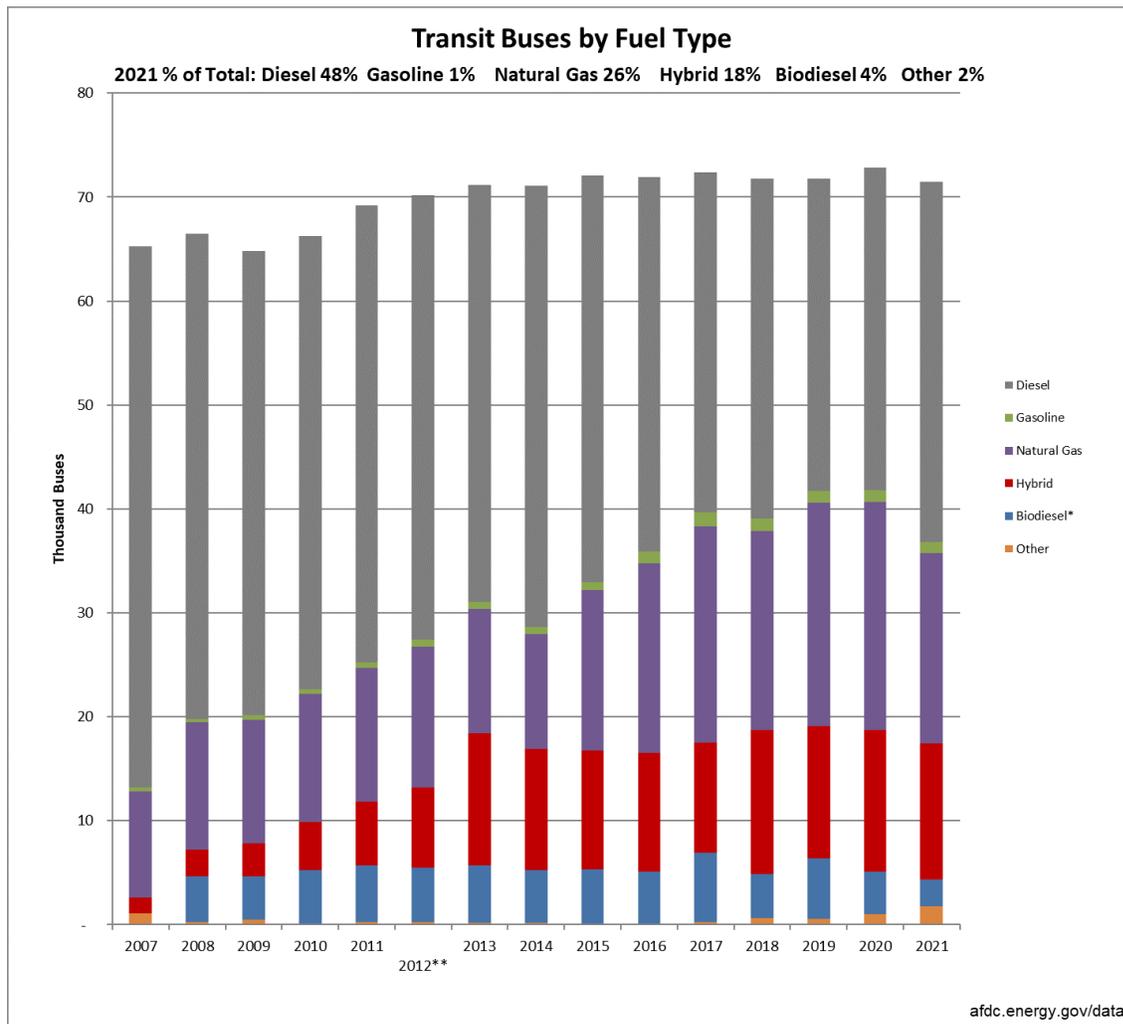
Political commitments steer activities toward the goal of the adoption of electric and hybrid buses.

The Bipartisan Infrastructure Law (BIL), enacted as the Infrastructure Investment and Jobs Act in 2021, contains the Surface Transportation Reauthorization Act of 2021 and the Surface Transportation Investment Act of 2021. BIL continues authorization for national surface transportation legislation, such as the Congestion Mitigation and Air Quality (CMAQ) Improvement Program, and includes provisions to increase investment in electric vehicle supply equipment, alternative fuel infrastructure, electric vehicle batteries, electricity grid upgrades, and light-medium and heavy-duty zero-emission vehicles. (US Department of Energy n.d.)

### Transit Vehicle Fuel Choices

Conventional fuels that power transit vehicles are derived from petroleum: gasoline and diesel. Alternative fuel choices include natural gas, biodiesel, and electricity. Some hybrid vehicles use a combination of conventional and alternative fuel. (US Department of Energy n.d.)

**Figure 11 – Transit Buses by Fuel Type chart (American Public Transportation Association 2024)**



**Diesel** – Diesel fuel is derived from petroleum. Unlike the emission control systems on gasoline vehicles, many diesel vehicles have additional after-treatment components that reduce particulate matter and break down dangerous nitrogen oxide (NOx) emissions into harmless nitrogen and water. Diesel buses make up 48% of transit buses. (US Department of Energy n.d.)

**Natural Gas** – Natural gas is clear, odorless, and non-corrosive. It can run combustion engines in liquid and gas states. It has fewer carbon emissions than gasoline, making it more eco-friendly. Gasoline and diesel-powered engines can be modified to handle natural gas fuel. (US Department of Energy 2024) Natural gas vehicles make up 26% of transit buses.

**Hybrid–Electric** – Hybrid electric vehicles are powered by an internal combustion engine of petroleum fuels in combination with one or more electric motors that use energy stored in batteries. The electric motor's extra power may allow for a smaller combustion engine. The battery can also power auxiliary loads and reduce engine idling when the vehicle is stopped. The electric battery charges using regenerative braking and the internal combustion engine. The vehicle captures energy usually lost during braking by using the electric motor as a generator and storing the captured energy in the battery. (Department of Energy n.d.) Hybrid-electric vehicles make up 18.8% of transit buses.

**Mild Hybrids** – Mild hybrids cannot power vehicles using electricity alone. They use a battery and electric motor to help power the vehicle, and can allow the engine to shut off when the vehicle stops (such as at traffic lights or in stop-and-go traffic). (Department of Energy n.d.)

**Full Hybrids** – Full hybrids have larger batteries and electric motors that can power vehicles for short distances and at low speeds. (Department of Energy n.d.)

**Biodiesel** – Biodiesel is a renewable, biodegradable fuel manufactured domestically from vegetable oils, animal fats, or recycled restaurant grease. It is a liquid fuel often called B100, pure, or neat biodiesel in its unblended form. Like petroleum diesel, biodiesel is used to fuel compression-ignition engines. (US Department of Energy n.d.) Biodiesel fuel transit vehicles make up 4% of transit vehicles.

**Gasoline** – Gasoline is derived from petroleum. It is easily attainable and quick to burn. Gasoline is the most common transportation fuel, but it is not the most common bus transit fuel. (Department of Energy n.d.) Gasoline-fueled transit bus vehicles make up 1% of transit vehicles.

**All Electric Vehicles** – All-electric vehicles are also called battery electric vehicles. A battery pack stores the electrical energy that powers the motor. The batteries are charged by plugging the vehicle into an electric power source. (US Department of Energy n.d.) All electric vehicles are part of 2% of transit vehicles in "Other" types of transit fuel.

## **Financial Challenges for Alternative Fuel Vehicles**

Capital costs are higher for alternative fuel vehicles than for petroleum-based fuel vehicles. The useful life of a Cutaway bus (10 passengers plus a driver) is seven years. Batteries for electric and hybrid-electric buses may need to be replaced after six to eight years. (World Resources Institute 2019) Physical assets for alternative fuel vehicles, such as charging stations for electric and electric-hybrid vehicles, may need to be developed, along with other supporting infrastructure. Automotive services for alternative vehicles must be

available in Petersburg, or additional costs must be considered when shipping out the vehicles to be serviced. Recycling the electric vehicle batteries may have associated costs.

The 2019 capital cost of PIA's gas-powered 8-passenger bus with two wheelchairs was \$72,779.74. The 2023 estimated cost for a 12-passenger bus with two wheelchairs was \$314,356 (Appendix).

## **Benefits of Alternative Fuel Vehicles**

Electric and hybrid-electric buses deliver local and global emission reductions with higher fuel efficiency, 24-40 Percent lower carbon dioxide emissions, 18-90 percent lower nitrogen oxide emissions, 37-90 percent lower carbon monoxide emissions, and 17-78 percent lower hydrocarbon emissions. (Shauna L. Hallmark 2013)

## **Technology Development for Alternative Fuel Vehicles**

The PIA employees must be educated in alternative fuel vehicles' technical operation, maintenance, and disposal challenges. Technical expertise is required to install and maintain charging technology. Automotive services need to be educated about alternative fuel vehicles to be kept locally in Petersburg.

## **Options for alternative fuel vehicles**

The Department of Energy and the Federal Transit Administration have both cited the lack of data and analysis results in real-world service as a challenge for moving forward with different fuel cell technologies for transit. (US Department of Energy National Renewable Energy Laboratory 2010) The education and development of the requirements for alternative fuel technology include understanding the fuel supply, fueling infrastructure, preventative and operational maintenance, insurance, performance, and safety requirements of the alternative fuel technology vehicle.

Electric and hybrid-electric buses offer lower emissions, which promotes air quality benefits. The benefits and challenges of adopting electric and hybrid-electric buses for public transport require an understanding of the following:

- Capital cost of diesel, gasoline, natural gas, electric, or hybrid-electric buses.
  - Useful life of the vehicle
    - Smaller bus 7 years (light truck chassis E-350 or E-450)
    - Larger bus 12 years
- Operational expenditures
  - Fuel, electricity, employee wages/benefits, and administrative costs
- Maintenance cost
  - Mechanics, vehicle expenses (oil/filter replacement)
- Physical assets needed for buses
- Technical challenges
- Service quality of buses

## Transit Safety Information

FTA administers a national transit safety program authorized by 49 United States Code (USC) § 5329 to improve the safety of all public transportation systems. The program has oversight to advance safe, reliable, and equitable transit service throughout the United States. FTA's Office of Transit and Safety & Oversight helps make transit safer through policy development, hazard investigation, data collection, risk analysis, oversight programs, and information sharing. (Federal Transit Administration n.d.)

FTA conducts inspections, investigations, audits, examinations, and testing of equipment, facilities, rolling stock, and operations. It issues safety advisories and directives and requires, if necessary, corrective action plans and operation prohibitions.

The National Transit Database requires annual reporting of all safety issues involving transit buses, passengers, and operators. The goal is to keep transit passengers and bus drivers safe.

Recipients of funding from FTA 5311 grants may draft and certify their safety plans.

Petersburg Indian Association's twelve-page informational Passenger Booklet is available on its website. Riders can also access the four-page Transit Passenger Code of Conduct.

Figure 12 – Petersburg Indian Association's Passenger Booklet (appendix)



**PETERSBURG INDIAN ASSOCIATION**

# PIA TRANSIT

ORIGIN TO DESTINATION  
PARATRANSIT BUS SERVICE

FOR SENIOR CITIZENS (60 YRS OR OLDER)  
AND PERSONS WITH PHYSICAL DISABILITIES

RESERVATIONS REQUIRED

**Service**

Available Daily  
9:00 a.m. to 4:00 p.m.

**Service Area**

Between Sandy Beach Park and  
the Beachcomber

**Free** to the eligible passenger and caregiver!

**907-650-7788**

Figure 13 – Petersburg Indian Association's Transit Passenger Code of Conduct (appendix)



## Transit Passenger Code of Conduct

**These rules are in place for the safety and awareness of all passengers that use the PIA transit bus to create a fair and safe environment for all passengers.**

1. The transportation of animals is prohibited, except in a secure container or carrier, or a service animal on a short, secure leash. If an animal is disruptive, the animal will not be allowed back.
2. Wearing roller skates, in-line skates, or using skateboards is prohibited. Carrying sporting equipment aboard is allowed.
3. Eating is prohibited. Drinking from a container with a secured lid designed to prevent spillage is allowed.
4. Alcoholic beverages are not to be consumed or transported on the transit bus.
5. The use of marijuana, having a marijuana dispensary as your point of origin or departure, or the marijuana odor on your person is prohibited.
6. Objects that block the aisle or stairway or that occupy a seat are prohibited, except at driver's discretion. Strollers must be folded prior to boarding.
7. Storing personal property on the transit bus is prohibited. PIA is not responsible for stolen or damaged items.
8. Extending anything out windows or doors of moving bus is strictly prohibited.
9. Hanging and swinging off bars or stanchions is prohibited.
10. Attaching oneself to the exterior of the bus is prohibited and may be cause to initiate legal action.
11. Smoking is strictly prohibited on the transit vehicle and within 20' of the bus when parked.

## Transit Issues

Seniors, disabled, and low-income individuals have the most significant transportation needs. (D. M. Jeremy Mattson 2022) In their 2013 Community Coordinated Transportation Plan—Public Transit, the Petersburg Borough stated that Petersburg has service gaps and unmet transportation needs for accessible transit for seniors, the physically disabled, and low-income individuals. The Rural Transit Fact Book 2022 states that rural populations tend to be older, that the population aged over 65 has the highest percentages of disabilities, and that the population lives below the poverty line. (D. M. Jeremy Mattson 2022). Petersburg's median age is 50.1 years compared to Alaska's median of 35.9 years and the United States' median of 38.8 years. (United States Census Bureau Populations and People 2024). Petersburg has a significant senior community.

Petersburg Indian Association is the lead agency in providing transit services in Petersburg. PIA provides a safe, reliable, and free on-demand transit service to riders 60 years of age and older and the physically handicapped. PIA trains its drivers, recruits fill-in drivers, and maintains its transport fleet. PIA has communicated with care providers of the transit service and advertises its service via flyers, on the piatribal.org website, and in the local newspaper.

Petersburg's remote location presents challenges for environmentally friendly and affordable transportation options.

Population characteristics contribute to transit service demand. Dependent Population Characteristics that need transit services are:

- Elderly population
  - As seen on the US census data, Petersburg has an elderly population with a median age of 50.1 years. The state of Alaska's median age is 35 years. The median age of the United States is 38.8 years.
  - The age of 65 is the age at which US citizens are legally considered seniors, as defined by the Social Security Administration. (Beabout, What Age is Considered Elderly, Experts Way In 2023)
  - Mobility-Limited Population. As people age, they may experience a change in their ability to move around physically. (National Insitute on Aging 2020)
  
- Low-Income Population
  - Federal guidelines define low income as \$14,580 annually for one person and \$30,000 for a family of four. (Wallet 2023)
  - According to the US Census, the number of low-income households in Petersburg is approximately 30%.
  - According to the 2023 Petersburg Borough Housing Needs Assessment, 40% of households are lower-income housing.

## Prioritize solutions with transit funding

### On-Demand Senior and Physically Handicapped Transit Service

There appears to be a need and desire for public transit in Petersburg. Low-income households have the greatest need for public transit. The transit survey results yielded 16% of residents not owning a personal vehicle. The census reporter showed that almost 30% of people in Petersburg are in the lower income range. The 2023 Petersburg Borough Housing Needs Assessment also reported that 40% of households are lower-income.

With transit being a priority for seniors, the physically disabled, and low-income residents, the Petersburg Indian Association's continuance of their on-demand transit senior and physically handicapped service is recommended as the priority service.

### Fixed Route Transit Service

As the transit survey and interviews with the stakeholders concluded, additional transit service for Petersburg residents of all ages is the next priority. The recommended service would be for one vehicle on a fixed route, which is the primary service area of Petersburg. Procurement and operating costs are estimated for the service, which would be offered Monday through Friday.

- Number of buses: 1
- Source of vehicles: FTA and FHWA TTP, FTA TTP Competitive Grant Program
- Operated by: Petersburg Indian Association
- Capital Purchase Cost Electric 15 Passenger Bus: \$314,400
- Capital Purchase Cost Petroleum 15 Passenger Bus: \$120,000
- Annual operation and maintenance cost: \$100,000
- Annual hours of service: 1,694

A fixed transit service operating five days a week from 9 am to 4 pm in a 12.3-mile route with stops at grocery stores, post office, airport, recreation areas, harbors, ferry terminal, library, and medical services would cost approximately \$100,000 a year with a capital investment between \$100,000 and \$340,000, depending on the type of transit vehicle purchased. An option for a transit service route is in Figure 14.

Figure 14 – Proposed Fixed Transit Route



## Conclusion for public transit in Petersburg

This study aimed to learn about the community conditions determining the best-fit transit options for the Petersburg Area. Petersburg needs a transit service that matches the community conditions. Transit information was researched and gathered, the capital, maintenance, and operating costs of bus service were examined, a community survey was conducted, and interviews with community members helped model and shape the type of transit services for the Petersburg community. Transit buses need to be adaptable to the community's transit needs. The choices in Petersburg are petroleum-run buses or electric buses. The petroleum-run buses were the best option for Petersburg because of their affordability and maintenance. Even though the climate action plan aims to reduce the carbon footprint of Petersburg residents, the capital and maintenance costs of the electric bus are deterrents for electric vehicles in Petersburg. The transit study concluded that Petersburg Residents favor a public transit on-demand service for the senior and the physically handicapped population segment. Petersburg residents also favor a fixed-route public service, but a fixed-route service would be problematic and should be entered into slowly with much planning and research. The findings are discussed in detail in previous pages.

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