

Cracks in the Pavement:

Case Study Analysis of Road Funding and Spending in Rural Utah

By Cameron Carter

Graduate Student, Master of Public Policy, University of Utah
Planning Intern, Utah Community Development Office

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Executive Summary

Roads are among the most important and most costly public goods provided by local governments. Across the US, municipalities are generally responsible for design, construction, repair, and maintenance of municipal roads within their network. State and federal funds are used to support these efforts but are often insufficient to meet local needs, leading to delayed road maintenance, poor road quality, and growing financial risk.

As policymakers consider solutions to this issue, research is needed to identify existing road funding needs and spending patterns, particularly in rural communities. This report utilizes an illustrative case study design to examine road funding and spending in six rural municipalities: Sigurd, Huntington, Naples, Mt. Pleasant, Roosevelt, and Price. In doing so, this report explores how these communities fund their road networks, the financial burden this creates, and policy recommendations to address this growing issue. Community data was obtained from financial reports submitted to the Utah Office of the State Auditor. Additional information was obtained from the Permanent Community Impact Fund Board (CIB) records on rural grants and loans.

On average, annual expenditures for road construction and maintenance totalled \$35,229 per mile, equal to 31.4% of the total municipal budget. External road funding was equal to \$19,015 per mile, of which 56.2% came from CIB funds, 41.3% from B&C funds, and 2.5% from UDOT funds. External funding is only able to cover 57.8% of construction and maintenance needs. Local governments must pay this residual cost equal to \$14,867 per mile.

These findings highlight the importance of careful planning and infrastructure management. Many rural municipalities are unable to fully fund their construction and maintenance needs even with external funding, leading to delayed maintenance, poor road quality, and growing financial risk. Local leaders can address these issues by consolidating services, reducing overall road costs, increasing road taxes and fees, and encouraging more active modes of transportation. Likewise, state and federal leaders should consider reforms that extend the longevity and sustainability of road funding sources. Proactive infrastructure management is needed to ensure rural communities have safe and reliable road networks for generations to come.

Introduction

Roads are fundamental to city development. They form the connective network between nearly all buildings and destinations, allowing people to commute short and far distances with ease. Despite this importance, improper road design often divides communities, compromises pedestrian safety, destabilizes the local environment, and consumes an enormous amount of money for construction and maintenance costs.

In 2022, there were 44,014 centerline road miles across Utah, 83% of which were municipality- or county-owned roads (“local roads”) while 17% were state-owned (UGRC, 2023). This report focuses on funding and spending related to these local roads. In 2022, local governments spent \$544.4 million on road construction and maintenance projects. \$310.6 million (57%) of this funding came from external funding sources while \$233.8 (43%) came from local general funds. Table 1 below summarizes this information.

Table 1: Utah Roads Summary FY2022		
Population Data (U.S. Census Bureau, 2022)	3.380M people → 1.034M households	
Vehicle Data (Utah Tax Commission, 2022)	3.105M vehicles → 33.8B Vehicle Miles Traveled	
	Local Roads	State Roads
Centerline Miles (UGRC, 2023)	36,467 centerline miles	7,547 centerline miles
Surface Type (UDOT Local Roads, 2023)	48% paved, 28% gravel, 24% dirt	100% paved
External Funding (UDOT Funding, 2022)	\$203.1M (B&C grants) \$78.6M (federal grants) \$28.9M (CIB grants)	\$413.7M (user fees) \$305.7M (federal grants) \$688.1M (sales tax)
Public Expenditures (MAG, 2022)	\$544.4M	\$1.468B
Local Cost	\$233.8M (43%)	\$768M (52%)

Local governments rely on external funding to support their road construction and maintenance needs. Although federal grants account for a sizable portion of aggregate external funding statewide, most of this funding has historically gone to urban and suburban communities as local and passthrough grants (CRS, 2021). Rural communities in Utah are left with two external funding sources: B&C funds and CIB funds. The sections below explore how these funds operate as well as recent trends in transportation revenue and road design.

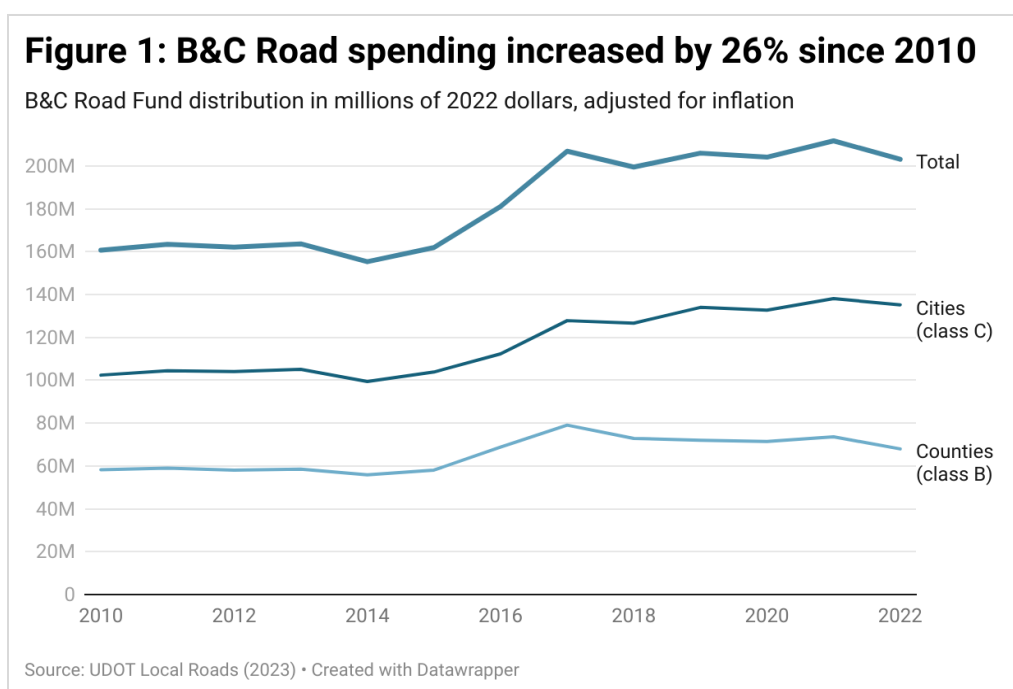
B&C Road Fund

The designated state funding source for local roads in Utah is the B&C Road Fund (UDOT Local Roads, 2023). This fund is named after the various road classifications within Utah where class B refers to county roads and class C refers to municipal roads. Local governments may use these funds for construction and maintenance needs or to pay financial costs related to bonds issued for local roads. Furthermore, 30% of these funds may be used to pay the costs of asserting, defending, and litigating local government rights on local roads.

Funds are allocated directly to cities and counties based on the distribution formula described in Utah Code 72-2-108 (2023). The distribution formula accounts equally for population and weighted road miles within the city or county, where paved roads are weighted by five and all other roads are weighted by two. Road miles measure the combined length of all roads within the local network regardless of road width or the number of lanes.

Under this distribution formula, more funding is given to jurisdictions with large populations or a greater number of weighted road miles. Cities or counties with paved road surfaces will receive more funding based on the weighted formula compared to gravel or dirt surfaces. A city or county with abnormally large roads is not given extra funding based on excessive road width.

The B&C Road Fund will distribute \$211.6 million to Utah cities and counties in 2023 (UDOT, 2023). This amount is \$40 million more than in 2010 after adjusting for inflation, a roughly 26% increase as shown in figure 1 despite the number of actual road miles in Utah increasing just 5% during the same time period. In other words, local governments are spending significantly more per mile now than they were in 2010, as shown in the table below.



Revenue for the B&C Road Fund is derived from gasoline taxes (85%), vehicle registration fees (10%), and other fees as shown in table 2 below (UDOT Funding, 2023). These revenue sources are collected in the Transportation Fund and managed by the Utah Department of Transportation (UDOT). After mandatory transfers are made, 30% of the remaining Transportation Fund is allocated by law to the B&C Road Fund (Utah Code 72-2-107, 2023).

Table 2: UDOT Transportation Fund Revenue 2023 (UDOT Funding, 2023)		
Revenue Source	Amount	Percent
Motor Fuel Fuel Tax	\$422,319,000	60%
Special Fuel Tax	\$177,971,000	25%
Motor Vehicle Registration	\$68,384,297	10%
Proportional Registration Fees	\$19,873,779	3%
Special Transportation Permits	\$12,300,014	2%
Highway Use Tax	\$10,067,607	1%
Vehicle Control Fees	\$7,210,169	1%
Temporary Permits	\$250,150	<0.1%
Transfer to Other Agencies	-\$11,920,900	-2%
Subtotal	\$706,455,166	
30% Transferred to B&C Road Fund	\$211,639,055	

Increases in Transportation Fund Revenue will automatically increase available B&C Funds, given the 30% allocation requirement. Since 2010, the Utah legislature has passed two bills that directly impact these revenue sources. In 2015, HB 362 replaced the per-gallon gasoline tax with a 12% sales tax based on state-wide average prices during the previous 3 years, excluding taxes, and subjected this minimum average price to annual increases based on inflation (HB 362, 2015). SB 276 in 2017 raised this new sales tax from 12% to 16.5% (SB 276, 2017).

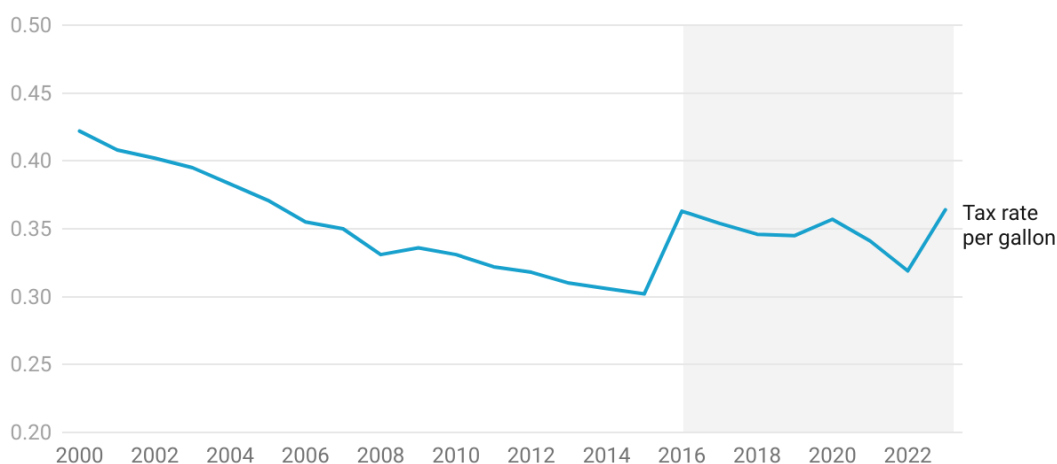
By tying gasoline taxes to inflation, lawmakers reversed a decade-long decline in gas tax revenue, as shown in figure 2 below (Utah Tax Commission, 2023). The 2023 rate of 36.4 cents per gallon is just slightly higher than the 2016 rate of 36.3 cents (Armstrong, 2022). Without this legislation, the 2023 rate would still be 24.5 cents per gallon, a difference equal to nearly \$200 million dollars less than the current revenue of \$422.3 million.

The per-gallon tax rate increase from HB 362 and SB 276 is coupled with increased gasoline sales. As Utah's population grows, more residents and visitors are likely to continue increasing

the total revenue produced by gasoline taxes and vehicle registration fees. One way to measure this growth is to examine vehicle miles traveled (VMT), as shown in figure 3 below. VMT is a measure of the total number of miles traveled per year by all vehicles in Utah. This number has been increasing steadily since 2000 and reached over 33.7 billion annual miles in 2021 (UDOT Traffic Statistics, 2023)

Figure 2: After decade of steady decline, Utah gas tax rate has remained relatively stable since 2016

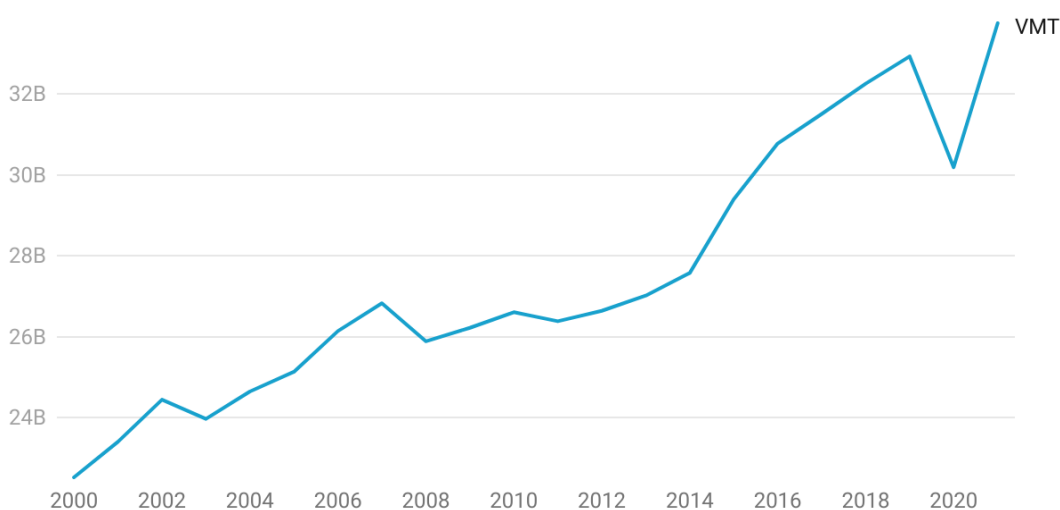
Tax rate per gallon in 2022 dollars, adjusted for inflation



Source: Utah Tax Commission (2023) • Created with Datawrapper

Figure 3: Number of miles driven on Utah roads has steadily increased since 2000

Vehicle Miles Traveled (VMT) in billions of miles



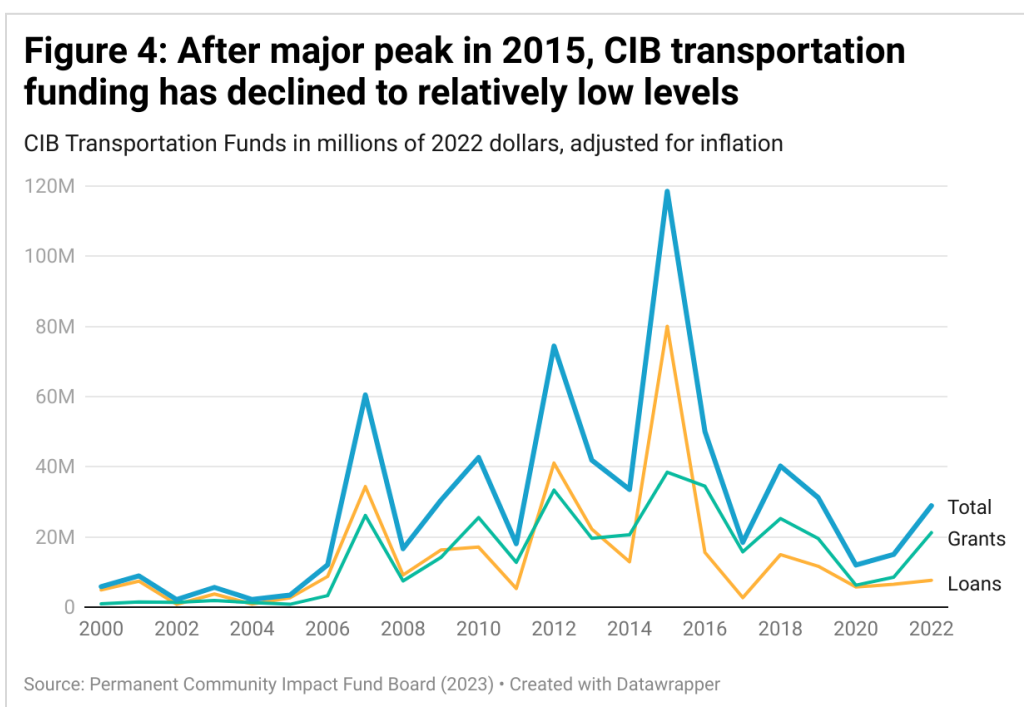
Source: UDOT Traffic Statistics (2023) • Created with Datawrapper

CIB Fund

The Permanent Community Impact Fund Board (CIB) provides loans and grants to rural communities that are impacted by mineral resource development on federal lands (CIB, 2023). These funds are meant to alleviate some of the burden on rural communities given that they are unable to collect taxes from federal lands. CIB funds are often used to support essential services such as roads, municipal buildings, and water and sewer facilities.

In 2022, the CIB fund dispersed \$115.8 million to rural communities, 43% of which were direct grants while 57% were low-interest loans. Transportation projects accounted for \$28.9 million (25%) of this total. Unlike other CIB-funded projects, transportation projects are mostly funded through grants rather than loans, at least in recent years as shown in figure 4 below.

Transportation funding follows a roughly cyclical pattern with peaks in 2007, 2012, and 2015. Since 2017, transportation funding has been significantly lower than historical levels.



This decline may be related to declines in oil and gas extraction on public lands in Utah in 2019 and 2020 (Maffly, 2020). Since the CIB fund relies on oil and gas extraction, these funds are highly susceptible to changes in drilling and energy permitting on federal lands. The boom and bust cycle common to the resource extraction industry presents a challenge for the many rural communities that depend on these funds for road maintenance needs.

Trends in Road Design

Table 3 below shows the cumulative length and surface type of roads in Utah in even years from 2010 to 2022, as reported by cities for B&C Fund distribution (UDOT Local Roads, 2023). As

mentioned previously, road miles account for half of the funding formula where paved roads are weighted by five and all other roads are weighted by two. Since 2010, the length of paved and gravel road miles has increased by 10.5% and 5.9%, respectively. Meanwhile, the length of dirt road miles has decreased by 5.7%. This has resulted in a significant increase in total weighted miles across the state, despite a minimal increase in actual miles constructed.

Cities and counties with high weighted road miles will receive more funding from the B&C Road Fund. For instance, replacing a one-mile dirt or gravel road with a one-mile paved road results in 2.5x larger weighted road miles and subsequently larger state funding. This extra funding makes sense given that paved roads cost more to build and maintain than gravel or dirt roads. However, if this trend towards move pavement continues, road construction and maintenance costs in rural Utah may eventually exceed available state revenue.

In addition to this incentive towards paved roads, the funding formula creates a disincentive for gravel roads. Gravel and dirt roads receive the same amount of B&C funding, but gravel roads may cost more to maintain depending on local conditions. Switching from dirt to gravel would increase municipal road costs without increasing funding for the higher maintenance.

Table 3: Local Roads by Length and Surface Type (UDOT Local Roads, 2023)					
Year	Paved Surfaces	Gravel Surfaces	Dirt Surfaces	Total Actual Miles	Total Weighted Miles
2022	17,461	10,388	8,618	36,467	125,318
2020	16,988	10,411	8,540	35,939	122,842
2018	16,809	10,408	8,840	36,057	122,540
2016	16,651	10,306	8,621	35,578	121,109
2014	16,328	10,332	8,706	35,366	111,010
2012	16,050	9,943	9,130	35,124	109,270
2010	15,806	9,808	9,141	34,755	107,787
% change:	+10.47%	+5.91%	-5.72%	+4.93%	+16.26%

Typical Road Costs

The move to more pavement in rural communities has significantly increased road construction costs, given that paved roads cost more to build than dirt or gravel (Zarrol, 2023). These costs will vary significantly depending on surface terrain, local climate and city needs (Strong Towns, 2020). Typical construction and maintenance costs in a steep, snowy area will be much higher than in a flat, temperate area.

Table 4 below details the rural pavement costs per lane mile according to a 2021 report by the Federal Highway Administration (FHWA Performance Report, 2021). City road networks (class C roads) can include local, minor collector, major collector, minor arterial, and principal arterial roads. Resurfacing costs range from \$190,000 to \$440,000 per lane mile while typical reconstruction costs range from \$688,000 to \$1.545 million. In general, rural roads require resurfacing every 10 to 15 years and major reconstruction every 25 to 30 years.

Table 4: Average Maintenance Costs (thousands of 2016 dollars per lane mile) (FHWA Performance Report, 2021)				
Road Type	Terrain Type	Resurfacing	Typical Reconstruction	Total Reconstruction
Other principal arterial	Flat	\$292	\$1,030	\$1,472
	Rolling	\$346	\$1,217	\$1,732
	Mountainous	\$440	\$1,545	\$2,190
Minor arterial	Flat	\$266	\$939	\$1,933
	Rolling	\$314	\$1,108	\$2,275
	Mountainous	\$399	\$1,405	\$2,871
Major collector	Flat	\$237	\$840	\$1,212
	Rolling	\$279	\$992	\$1,426
	Mountainous	\$355	\$1,256	\$1,800
Minor collector	Flat	\$209	\$752	\$1,102
	Rolling	\$248	\$887	\$1,296
	Mountainous	\$314	\$1,124	\$1,636
Local	Flat	\$190	\$688	\$1,029
	Rolling	\$223	\$810	\$1,211
	Mountainous	\$281	\$1,024	\$1,526

Beyond these direct costs, agency costs also include costs for the planning, design, operation, and administration. Other socio-economic costs may include road user costs, safety costs, work zone costs, and environmental costs (UDOT Research).

Ultimately, these costs are often many times larger than rural communities can afford. For example, the six rural communities analyzed in this study have an average of 30.4 centerline miles, equal to more than 60 lane miles of road (lane miles are equal to centerline miles multiplied by the number of lanes). Average resurfacing for 60 lane miles would cost \$11.4-26.4 million for resurfacing every 10 to 15 years and \$41.3-92.7 million for typical reconstruction every 25 to 30 years. For comparison, the average total municipal budget for these six communities is \$4.8 million annually.

Literature Review

Road funding is a growing budget issue for many states across the country. As road construction and maintenance costs continue to outpace traditional funding streams, local and national leaders have begun to take action. At the federal level, political leaders responded by passing the Bipartisan Infrastructure Law of 2022, which provides a \$15.4 billion increase to federal funding for roads, bridges and tunnels, and other critical infrastructure projects (FHWA Press, 2022).

Some states have responded to this funding need by raising motor fuel excise tax rates, enacting or increasing registration fees, diverting general funds to transportation, piloting mileage-based charge programs (road user charge), and charging taxes on electricity consumed at charging stations. This section explores recent studies on transportation costs in Utah, Nevada, and Ohio, as well as policy reform efforts from Ohio, Colorado, and Illinois.

Utah Road and Transit Cost Study

In 2022, the Mountainland Association of Governments, Utah Department of Transportation (UDOT), Utah Transit Authority (UTA), and Wasatch Front Regional Council (WFRC) conducted a Road and Transit Cost Study with the intent of providing agencies and policymakers with better information when discussing transportation options and tradeoffs (MAG, 2022). These agencies recognized the enormous costs of transportation across the State of Utah. By averaging costs between 2015 and 2019, they calculated the average annual road costs to be \$20.141 billion, including both public expenditures and private vehicle costs.

This amounts to \$2.012 billion in public expenditures and \$18.139 billion in private vehicle costs. Although private costs are significantly higher than public costs, private costs are not managed by the state and are indirectly related to public policy. Given those restraints, this report focuses only on public expenditures. Table 5 below shows how the \$2.012 billion in public costs are divided amongst state and local governments as well as urban and rural roads.

Table 5: Public Road Costs by Type (MAG, 2022)			
Road Type	Public Expenditures	Percent of costs	Total Public Expenditures
State roads	\$1.468 billion	73%	\$2.012 billion
Local roads	\$544 million	17%	
Urban roads	\$1.547 billion	77%	\$2.012 billion
Rural roads	\$465 million	13%	

This study discusses funding sources in Utah. Public funding for roads is derived from three sources: 49% from users fees, 15% from auto-related sales tax, and 36% from general funds.

This is consistent with other sources as discussed previously. It also highlights the need for future policy changes as funding from user fees and auto-related sales tax—64% of all public funding—is likely to decrease substantially in the coming decades. As agencies consider public road investments, they must be wary of the future costs these investments create. This study identified seven factors to consider when weighing different road investments:

1. Cost efficiency - cost of a project in actual dollars
2. Space efficiency - amount of space a project will consume
3. Marginal capacity potential - increase in road usage from the investment
4. Safety - level of safety for future road users
5. Equity - level of access for different income, age, and mobility groups
6. Environment - short- and long-term impacts on air and water quality
7. Freight - large trucks requiring larger and more durable roadways

Nevada Sustainable Transportation Advisory Working Group

In 2021, the Nevada legislature passed Assembly Bill 413, creating the Nevada Sustainable Transportation Advisory Working Group (Nevada Study). This group was tasked with examining statewide transportation funding challenges, particularly related to the long-term financial viability of state road funding mechanisms. They conducted public meetings, stakeholder outreach, and policy research throughout 2021 and 2022, culminating in a final report with both short- and long-term policy recommendations to improve financial sustainability.

Over the next 10 years, statewide transportation projects, programs, and operations in Nevada will require \$16.9 billion. Funding from state and federal sources are expected to cover only \$10.7 billion of that need, resulting in a \$6.2 billion funding gap over this 10-year period. Local governments have a similar funding gap of \$5.3 billion over the next 10 years.

This gap was calculated by an outside consulting firm using estimates for operation and maintenance, capacity growth, administrative needs, projected service expansion, and currently unfunded capital projects. Detailed methodology is unavailable in this report but likely relies on many assumptions, including a continued reliance on car-centric infrastructure and suburban planning patterns.

The working group identified two related factors contributing to this massive funding shortfall, both of which also apply to Utah's transportation system. First, Nevada has experienced major population growth over the past few decades and is expected to continue growing at historic levels. This growth has increased road usage throughout the state. Second, improving fuel economy and adoption of electric vehicles has reduced fuel tax revenue. These trends will likely accelerate in the decades to come, leading to an even wider gap between available funding and transportation system needs.

Four policy recommendations are provided to address this funding gap:

1. Zero-emissions vehicles should be subject to a per-mile road user charges (RUC)
2. Fuel taxes should be replaced with a per-mile RUC for all new vehicles by 2035
3. Current revenue sources should be increased while the transition to an RUC unfolds:
 - a. Increases to fuel tax rates and registration fees
 - b. Index state and federal fuel taxes to inflation
 - c. Increases to registration fees
4. Local governments should assess their current infrastructure needs and funding streams

Ohio Advisory Committee on Transportation Infrastructure

In 2019, Ohio Governor Mike DeWine formed an advisory committee to study the fiscal challenges facing the Ohio Department of Transportation (Ohio Report, 2019). Similar to the Nevada Working Group, this committee conducted public meetings, stakeholder outreach, and policy research throughout 2019 and eventually released a report with their transportation funding recommendations.

According to their report, Ohio had a budget shortfall equal to \$1 billion annually from 2020 to 2030—\$500 million for maintenance projects, \$250 million for safety projects, and \$250 million for new projects. Even with adequate funding, the Ohio Department of Transportation reports it would take five to seven years to catch up on deferred maintenance projects. This budget shortfall doesn't include local unfunded needs which likely exceed \$1.5 billion annually.

Ultimately the problem in Ohio was simple to assess: auto and gas user fee revenue was not sufficient to support road infrastructure needs. Many state and local communities were forced to acquire long-term debt to pay for short-term projects. This unsustainable funding mechanism resulted in deferred maintenance, poor road conditions, and unsafe roads throughout the state.

Although the committee was split on some policy solutions, they offered five broad recommendations to stabilize transportation funding:

1. Increase, index, and cap motor fuel user fees
2. Allow counties and municipalities to adopt option fees for road maintenance
3. Seek additional revenue from EVs and hybrid vehicles
4. Increase funding for public transit
5. Explore other alternative funding sources

Following this report, lawmakers quickly heeded the advice of the panel and adopted some policies to increase and stabilize transportation revenue (Warner, 2019):

- ★ Increased gasoline tax by 10.5 cents up to 38.5 cents per gallon
- ★ Increased diesel fuel tax by 19 cents up to 47 cents per gallon
- ★ New \$200 registration fee on EVs and \$100 fee on plug-in hybrids
- ★ \$70 million investment in public transit from the general fund

Colorado SB 21-260: Sustainability of the Transportation System

In 2021, Colorado passed SB 260, one of the most innovative transportation funding packages in the country. (SB 21-260, 2021) This legislation sought to stabilize the state transportation fund by raising \$5.4 billion over the next 10 years through increased user fees and general fund transfers. About 10% of new revenue is earmarked for public transit and pedestrian infrastructure, 14% for several EV programs, and 72% for maintenance and construction of state and local roads.

New revenue sources from SB 260:

- ★ Increased fuel taxes by 8 cents
- ★ Indexed fuel taxes to inflation
- ★ Increased registration fees for electric and hybrid vehicles
- ★ New 27-cent fee on retail deliveries, such as from Amazon, FedEx, and DoorDash
- ★ New 30-cent fee on Uber and Lyft rides (50% discount to EVs and for carpooling)

Rebuild Illinois Capital Plan

In 2019, the Illinois legislature passed a comprehensive, six-year funding package for various transportation projects across the state (Illinois Plan). This plan raised \$33.2 billion in new revenue for maintenance and construction of roads and bridges, mass transit, rail, aeronautics, and ports.

New revenue sources for Rebuild Illinois:

- ★ Increased fuel taxes by 19 cents for gasoline and 24 cents for diesel/special fuels
- ★ Indexed fuel taxes to inflation
- ★ Increased registration fees by \$50 for all cars, plus an extra \$50 to \$100 for trucks (depending on weight) and \$100 for EVs
- ★ Shifted 5% of the sales tax on motor fuels from the general fund to the road fund

Research Methods & Design

The following section presents the research methods and design used in this study. The purpose of this research is to investigate how rural communities in Utah fund their road construction and maintenance needs. An illustrative case study design was chosen to explore this phenomenon with a focus on six rural communities: Sigurd, Huntington, Naples, Mt. Pleasant, Roosevelt, and Price. These communities were selected from a list of cities and towns that received road funding from the Community Impact Fund Board (CIB) between 2010 and 2020. Communities were selected to ensure a variety of population sizes and number of CIB road grants or loans.

Table 6: Research Design - Illustrative Case Study				
Municipality	2020 Population (DWS Estimates, 2021)	CIB road grants/loans (2010-2020)		
		#	Total amount	Grant:Loan ratio
Sigurd	405	3	\$1,341,200	100:0
Huntington	1,914	2	\$853,934	62:38
Naples	2,280	4	\$4,137,839	63:37
Mt. Pleasant	3,655	1	\$1,300,000	62:38
Roosevelt	6,747	2	\$4,681,480	75:25
Price	8,216	5	\$4,444,000	64:36

This study utilizes an illustrative case study design, which is ideal for exploring a particular phenomenon in its real-world context. This design allows for an in-depth exploration of the context, stakeholders, and processes involved in road funding and spending in rural Utah. This research approach enables us to gain a comprehensive understanding of the challenges and opportunities related to rural roads, as well as the factors that contribute to effective or ineffective use of road funds in these communities.

The primary limitation of an illustrative case study design is that it may not be generalizable to other contexts or populations. While this case study approach provides detailed insights into the road funding and spending practices in the six specific communities identified above, the findings should be interpreted with caution when considering other cities or towns. Furthermore, as an in-depth exploration of a particular context, this study may not provide a comprehensive view of all factors that contribute to road funding and spending in rural communities. Therefore, the findings and conclusions of this study should be considered within the specific context of these communities and should not be overgeneralized to other settings.

Data was sourced from municipal financial reports and budgets submitted to the Utah Office of the State Auditor. These records contain comprehensive data on all financial transactions and accounts within municipal control. Financial data used in this study covers a period of 12 years, from 2010 to 2021, and is used to analyze trends and patterns in road funding and spending. Additionally, these records were corroborated with CIB funding records to validate road funding information reported by the selected municipalities, thus ensuring data reliability and accuracy.

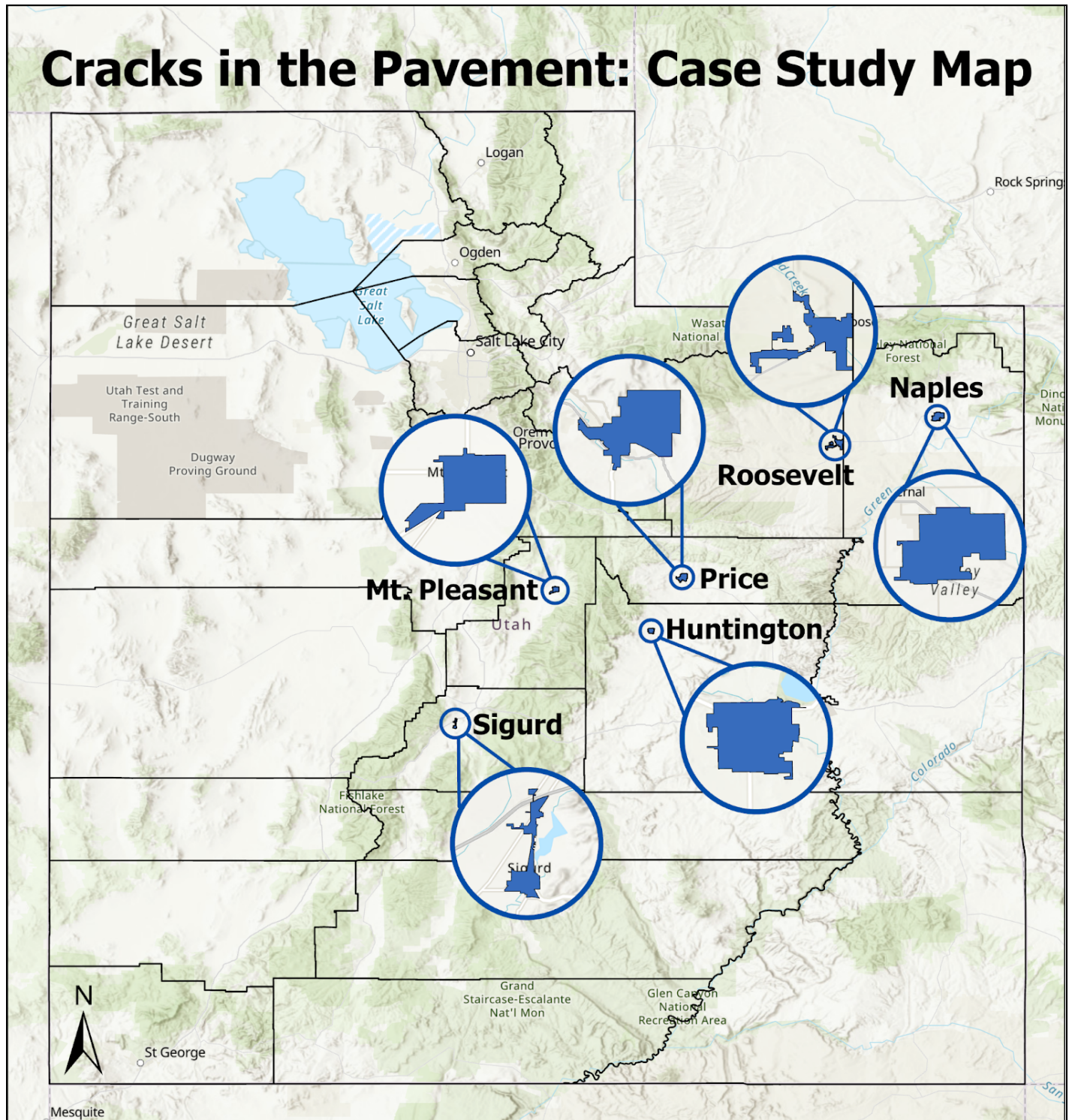
During data collection, it was found that many municipalities reported unspecific funding sources. For instance, many reported receiving “state grants” or “CIB grants” but did not specify if these funds were related to roads. Likewise, some municipalities misreported CIB funding compared to state CIB records. Interviews with local officials were conducted to resolve these discrepancies and ensure data reliability and accuracy.

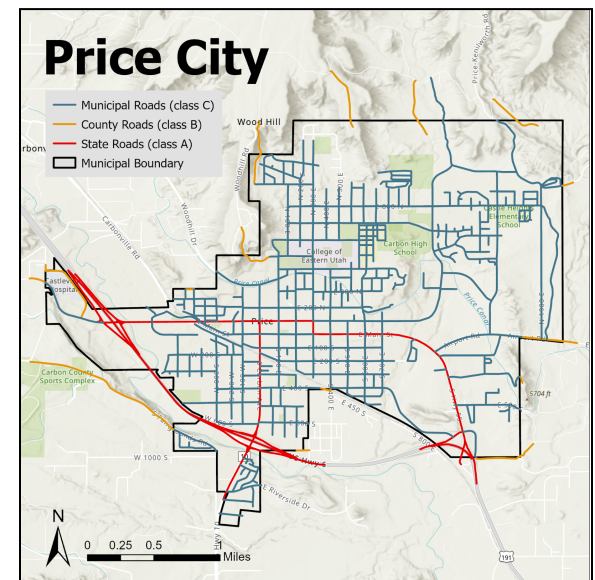
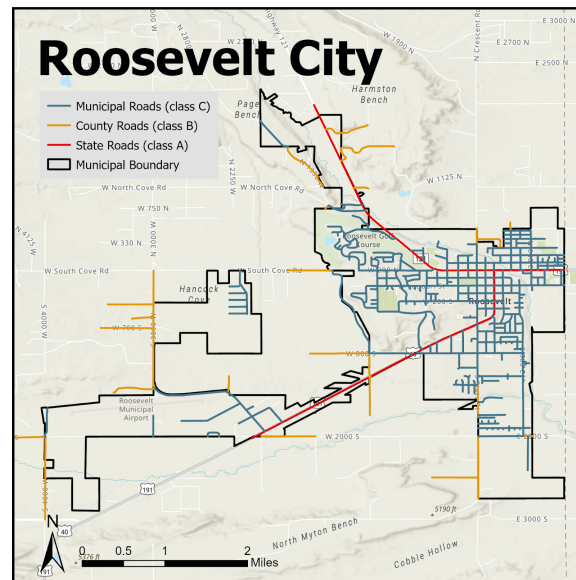
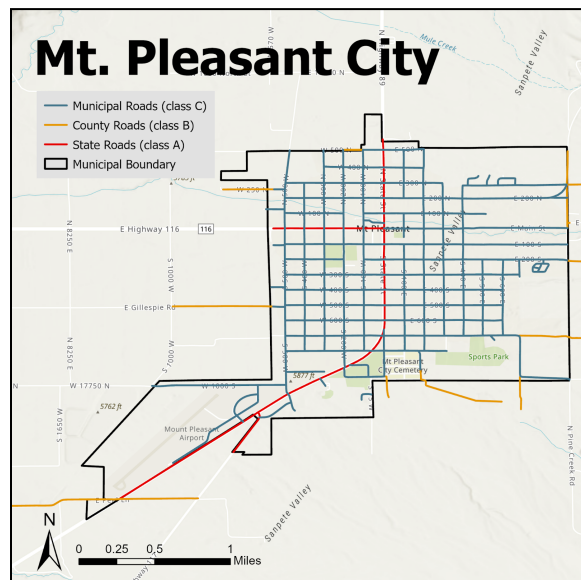
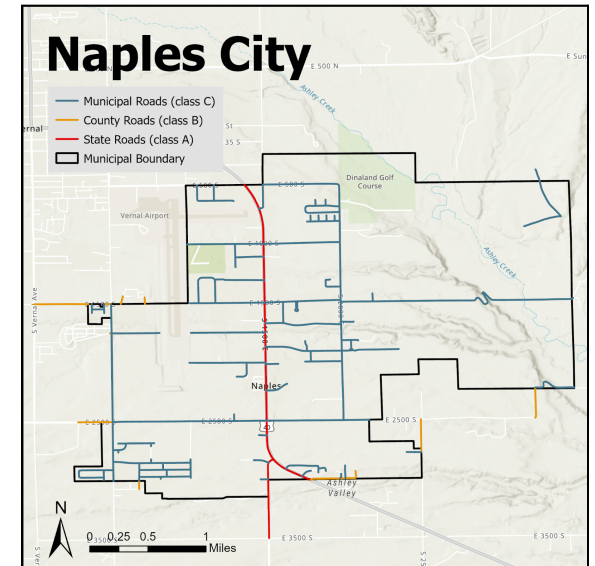
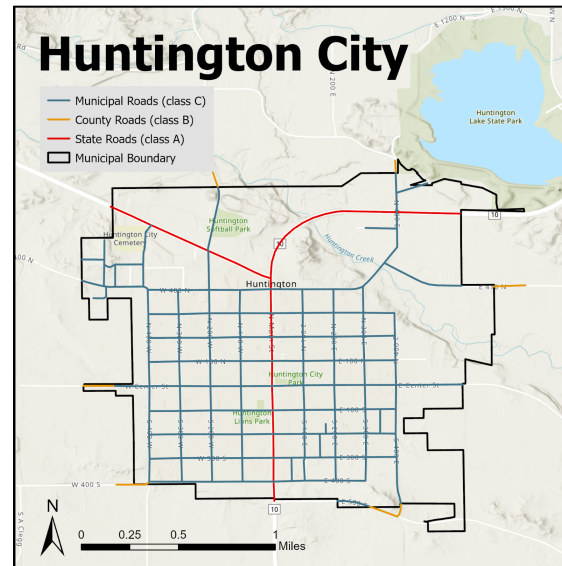
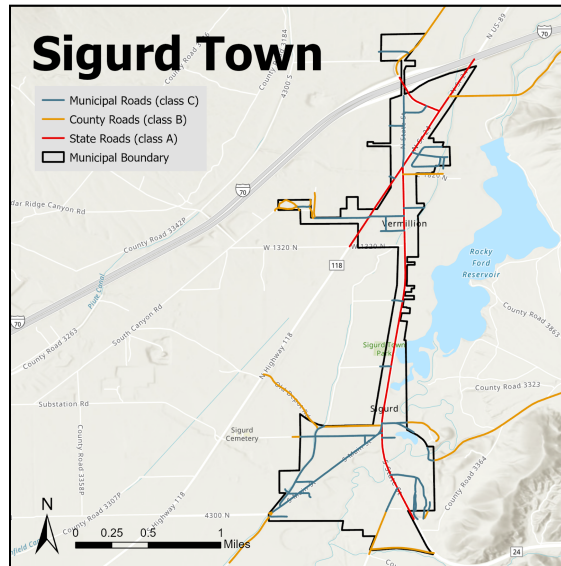
In many cases, city officials were unable to provide specific information about various state or federal grants received during this study period. These unspecified grants were assumed to be unrelated to roads and subsequently removed from this analysis. This assumption is based on two factors. First, the vast majority of rural road grants come from the B&C Fund, CIB fund, or UDOT transportation fund. These grants are well documented and unlikely to be misreported. Second, the unspecified grant amounts were comparatively small in all cases. Subsequently, even if these funds were related to roads, which is unlikely, their removal has little effect on the analysis as a whole.

GIS data from the Utah Geospatial Resource Center was used to identify municipality-owned, county-owned, and state-owned roads within each municipality. Maps were created to display this information. GIS data was also used to calculate the centerline length of municipal roads for each municipality. In all cases, these centerline lengths were found to be slightly smaller or larger than centerline lengths reported to UDOT. Given that UDOT data is outdated for these six municipalities, this study uses the calculated centerline lengths for municipal roads.

The data analysis techniques used in this study are primarily descriptive. The study analyzed the annual municipal road expenses and any external road funding from state or federal sources. Comparing these two figures allows us to determine how reliant these communities are on external funding to pay for general road construction and maintenance needs, as well as their respective reliance on average local and state subsidies used for local roads.

Case Study Maps

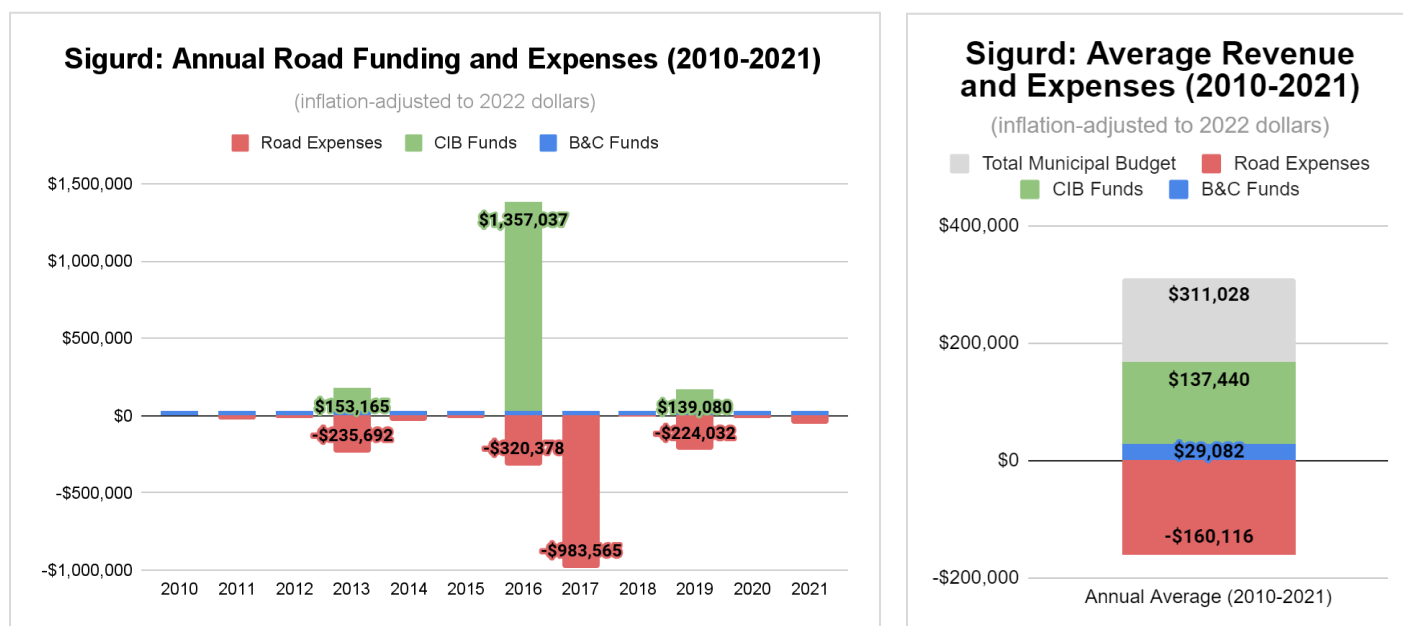




Case Study Analysis

Sigurd Town

Sigurd is a small town in Sevier County located in central Utah. According to population data from the Utah Department of Workforce Services, the Sigurd population declined from 429 to 405 (-5.6%) between 2010 and 2020. The total length of municipal roads in Sigurd is 6.41 centerline miles, 100% of which are paved surfaces. The following charts show yearly and average funding and expenses related to roads from 2010 to 2021.



Sigurd's total municipal budget is \$311,028 on average. This includes all revenue from all governmental accounts, excluding enterprise accounts, and shows the total amount of money the town is able to spend per year on average. State road funds are a significant portion of this revenue: B&C grants account for 9.3% (\$29,082) while CIB grants are 44.2% (\$137,440) of the total municipal budget. Road revenue and expenses are roughly equal, with only a slight surplus of \$6,406 per year on average.

The longitudinal data reveals a more interesting picture of road funding and expenses in Sigurd. For eight of the eleven years analyzed, revenue and expenses are relatively small and balanced around \$30,000—equal to Sigurd's yearly B&C Fund allotment. In contrast, both road revenue and expenses dramatically increased in 2013, 2016, 2017, and 2019. These years correspond with major road maintenance projects funded entirely by CIB grants (not loans):

- 2013 - hard surface chip seal on Main St, 1520 N, Vermillion Dr, and Canal Rd
- 2016 - storm drainage on Center St; ditch bank repair on 1520 N; hard surface chip seal on Main St, 300 S, 400 S, Canal Rd, and Center St; roto-milling on 100 W, Black Knolls

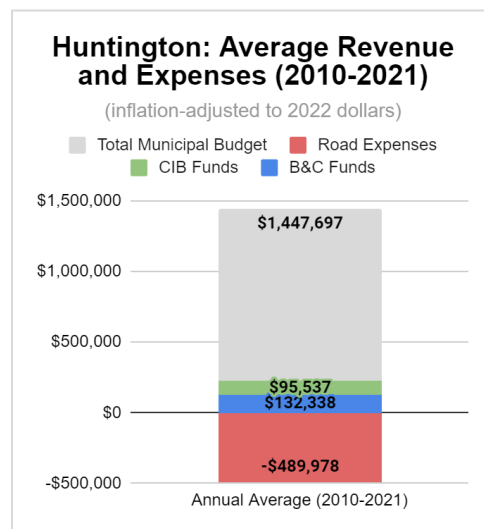
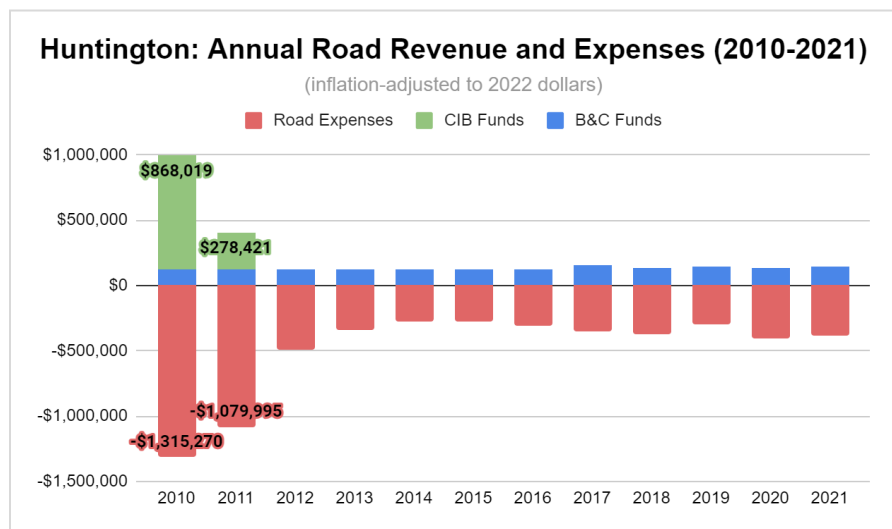
Rd, 45 W, 1420 N, and 1520 N; overlay hot mix plus concrete approach on 1520 N and State St; double chip seal on 1320 N

- 2019 - chip seal and crack seal on Main St, Vermillion Dr, 300 S, 45 W, Center St, 100 W, 400 S, 1580 N, State St, Rocky Ford Dr, 1520 N, South Canal Rd, 1420 N, Black Knoll Rd, Lariat Dr, 1320 N, Firehouse Ln, and North Canal Rd

Three municipal roads—Main St, Canal Rd, and 1520 N—received CIB-funded maintenance in each of the three major years listed above. Other roads, like Center St and Vermillion Dr, were funded in two of the three major years. This suggests that Sigurd may struggle to fund annual basic maintenance costs. Each year, allotted B&C road funds cover the cheapest or most essential road projects but aren't enough to cover all maintenance needs in the municipality. As a result, road maintenance is delayed until CIB funding is available to cover the cost. Unlike the other cities in this study, Sigurd seems to spend very little from its general fund on roads and instead relies heavily on CIB funding for road expenses.

Huntington City

Huntington is a small city located in Emery County. The Huntington population declined from 2,219 to 1,914 (-10.1%) between 2010 to 2020. The city has a total of 20.45 centerline miles of municipal roads, 90% of which are paved surfaces. Further data on the yearly and average funding and expenses related to roads for Huntington are shown below.



Huntington's average total municipal budget is \$1,447,697, excluding enterprise accounts. B&C Roads funds account for 9.1% (\$132,338) of this total while CIB funds account for 6.6% (\$95,537). Road expenses, on the other hand, far outweigh revenue. Huntington spends \$489,978 on average for road-related expenses each year, roughly a third of its entire city budget and \$262,103 more than average annual road revenues. This funding shortfall comes out of the general fund, resulting in fewer dollars for other government services.

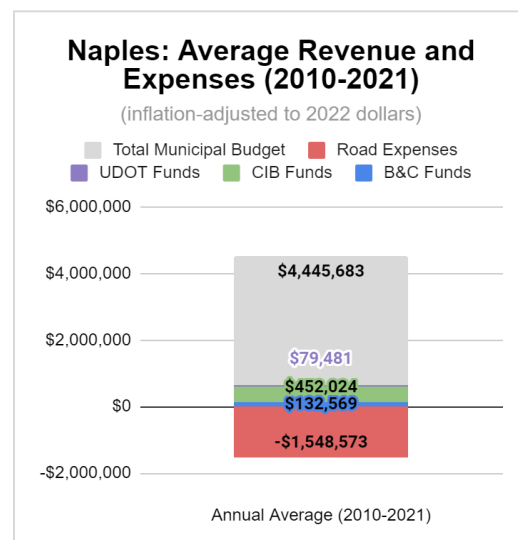
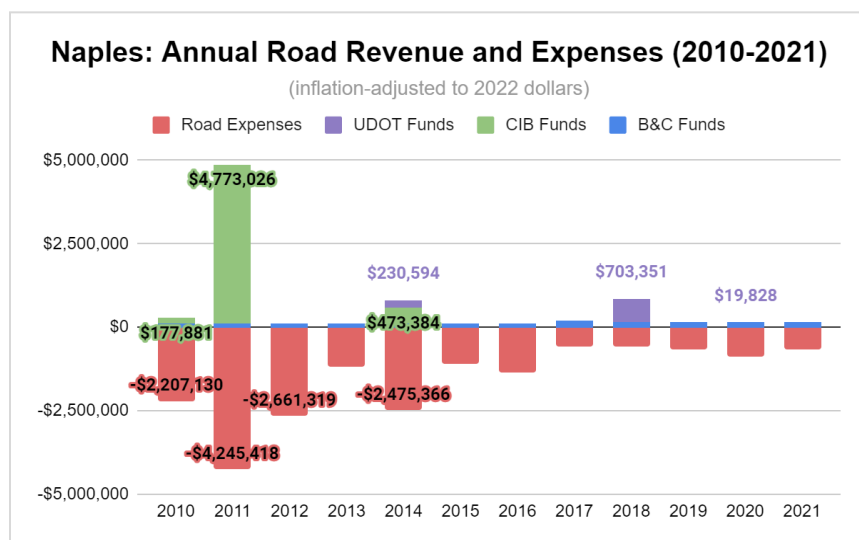
In a typical year, Huntington receives roughly \$130,000 from the B&C fund but spends \$300,000-350,000 on general maintenance. The two atypical years, 2010 and 2011, involved major storm drain and sidewalk construction projects, funded by CIB grants and loans:

- 2010 - sidewalk improvements near Huntington Elementary School (100 N, Main St, and Center St) and other locations
- 2011 - Gutter, curb, and sidewalk projects on 300 E, 400 N, 400 W, and 550 W

This seems to suggest Huntington primarily uses CIB funds for new construction projects while self-funding a large portion of its maintenance costs on existing roads (although the 12-year study period analyzed here may be underrepresenting large maintenance-related CIB funding requests). On one hand, this effort to fund road maintenance without significant external funding indicated a level of financial sustainability and self-reliance. But, on the other hand, Huntington may be underutilizing CIB resources that could likely cover some of these maintenance costs, thus freeing up general fund money to be used for other government services.

Naples City

Naples is a small city located in Uintah County, Utah. The city's population increased from 1,755 in 2010 to 2,280 in 2020, representing a growth of 29.9%. Naples has a total of 21.63 centerline miles of municipal roads, with 99% of them being paved surfaces. The charts below describe annual and average road revenue and expenses from 2010 to 2021.



Naples' average municipal budget is \$4,445,683, significantly higher than Huntington's annual revenue despite having a similar population size. External road funds include \$132,569 (3%) from the B&C Roads fund, \$452,024 (10%) from the CIB fund, and \$79,481 (3%) from UDOT funds. Naples spends \$1,548,573 on road expenses each year, roughly one-third of the total annual budget. The difference between average road revenue and expenses is \$884,449, all of which must be funded by local revenue through the general fund.

Similar to Huntington, road expenses were primarily concentrated between 2010-2014, followed by relatively low amounts of revenue and spending. These early years are punctuated by major construction projects funded by CIB grants and loans:

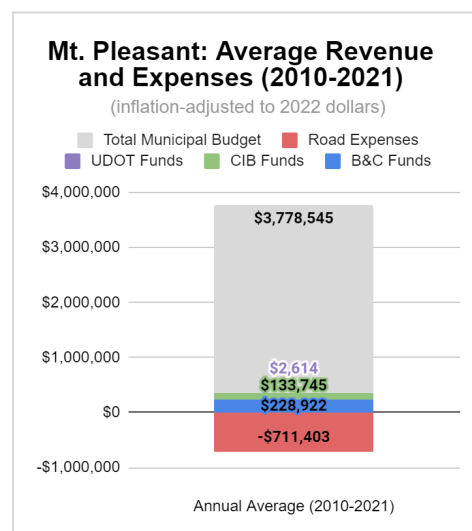
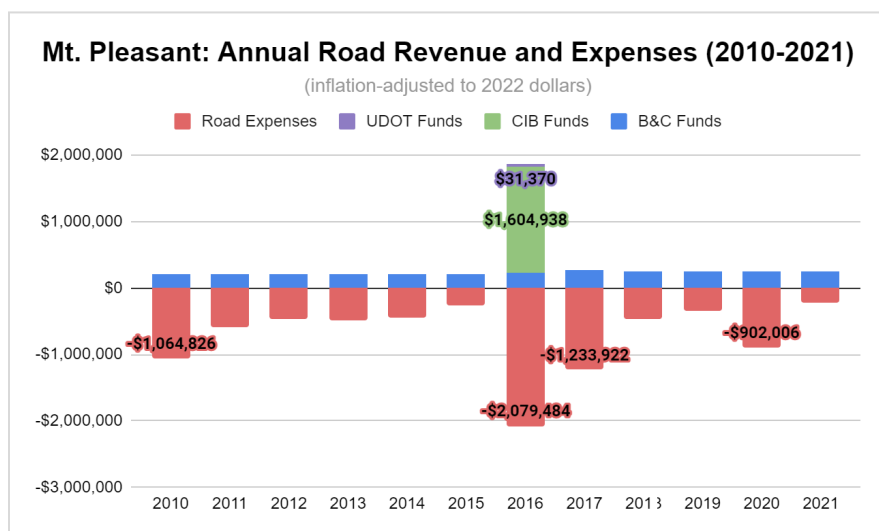
- 2010 (supplemental to 2009 project) - reconstruction and repaving of 1000 S with curb, gutter, and drainage improvements
- 2011 - widening and reconstruction of 2500 S; upgrades to sewer, water, gas, electrical, and drainage systems
- 2014 - drainage reconstruction on 1300 E and 1000 S; street light installation on 1500 E

UDOT funding was used for street light installation in 2014 and sidewalk improvements in 2020. Information for the larger UDOT grant from 2018 was unavailable.

Overall, external road funding seems to cover both maintenance costs on existing roads, such as the reconstruction and repaving projects listed above, as well as new construction projects like road widening and installation of street lights. Naples is spending by far the most money per road mile (more on this later), although this may be skewed given that they pursued significant and expensive construction projects from 2009 to 2014. Whether this massive road spending continues is an open question. In a typical maintenance year, Naples spends around \$600,000 while only receiving \$130,000 from the B&C Fund, meaning the city must self-fund or delay most of their road maintenance needs.

Mt. Pleasant City

Mt. Pleasant is a small city located in Sanpete County. Mt. Pleasant's population grew from 3,260 to 3,655 (12.1%) from 2010 to 2020. The city's total length of municipal roads is 32.15 miles, 96% of which are paved.



Mt. Pleasant has an average annual municipal budget of \$3,778,545. Less than 10% of this revenue comes from external road funds. The B&C fund accounts for \$228,922 (6%), CIB funds account for \$133,745 (3.5%), and UDOT funds account for just \$2,614 (<0.1%). Mt. Pleasant spends \$711,403, or 19% of all revenue, on road expenses.

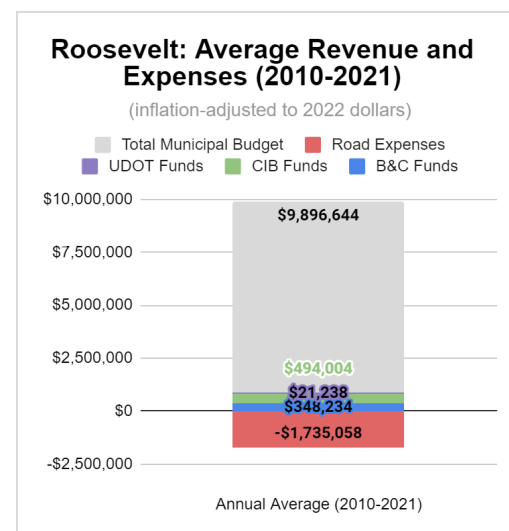
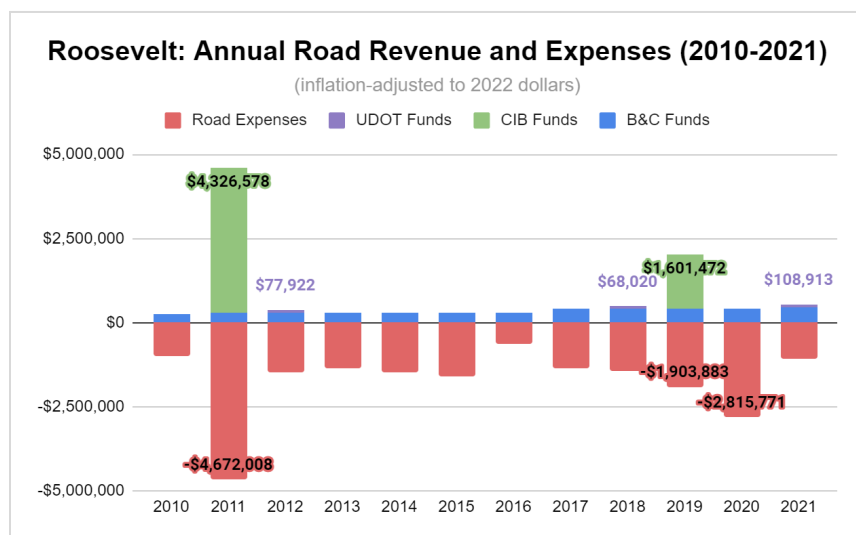
During this study period, Mt. Pleasant received CIB funds in only one year: 2016. Beyond this, the city also received CIB funding in 2009, half of which was spent in 2010. Both amounts were used for major road construction projects throughout the city, as shown below. Information for the UDOT grant is unavailable, but given that it was also in 2016, it is likely this funding was used for the same project.

- 2009-10 - street reconstruction; drainage improvements; and bridge construction
- 2016 - Roto-milling, grading, and placing of double-chip surface on 50 blocks of city road (equal to roughly half of all city roads).

Other than the bridge construction, external road funding seems to be used primarily for maintenance projects on existing roads. But, unlike the other five municipalities in this case study, Mt. Pleasant also had significant road expenses in 2020 that were not financed with external road funding. Beyond these abnormal years, the typical maintenance year includes roughly \$230,000 of B&C funding and \$300,000 of road expenses.

Roosevelt City

Roosevelt is a rural city located in Duchesne County (Uintah Basin AOG). The city population increased from 6,046 to 6,747 (11.6%) between 2010 and 2020. Roosevelt has 45.8 centerline miles of municipal roads, of which 92% are paved.



Roosevelt's average annual budget is \$9,896,644. External road revenue comes from three sources. The B&C Fund accounts for \$348,234 (3.5%), CIB funds account for \$494,044 (5%),

and UDOT funds account for 21,238 (0.2%). Average annual road expenses total \$1,735,058, or roughly 17.5% of the total budget.

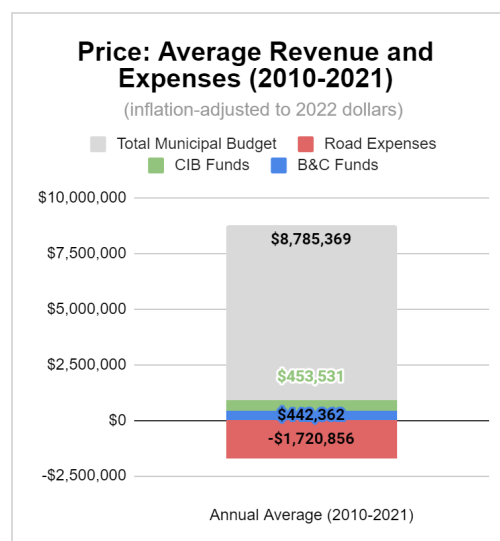
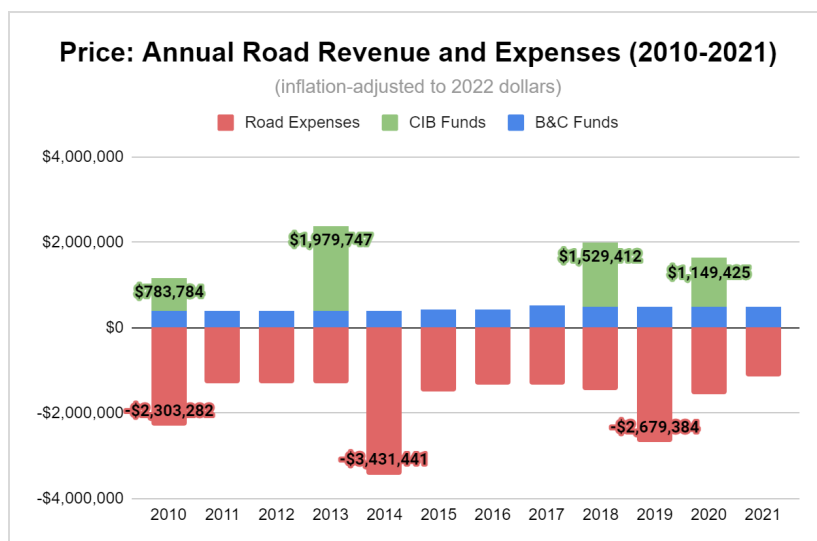
Roosevelt had two major road projects during this study period, both of which were primarily funded by CIB grants and loans, shown below. The three UDOT grants from 2012, 2018, and 2021 were used to construct or improve sidewalks around neighborhood schools.

- 2011 - road repair including new curb and gutter, roto-milling, grading, and repaving on 200 S, Areva Rd, Clubhouse Dr, 750 N, Canyon View Dr, Mason Cir, Alexia Ln, Joyce Ave, Carma Ave, and 300 E (all damaged during secondary water line installation)
- 2019 - complete reconstruction and widening of State St and 800 S

These projects indicate that most external road funding is used for new road construction or widening (the 2011 project wasn't strictly maintenance related, given that the roads were damaged from water line installation). Typically maintenance costs are around \$1-1.2 million, which is paid for by the \$400,000 B&C fund allotment (recently higher than average) and other revenues from the general fund.

Price City

Price City is a rural city located in Carbon County. The city population declined from 8,715 to 8,216 (-5.7%) between 2010 and 2020. Price has 55.82 centerline miles of municipal roads, 96% of which are paved.



Price has an annual average budget of \$8,785,369. External road funding came from only two sources during this study period: the B&C fund with \$442,362 (5%) and the CIB fund with \$453,531 (5%). Average annual road expenses totalled \$1,720,856, roughly 20% of the entire city budget and twice as much as average road revenues.

Price had four significant road projects during this study period, each of which received substantial funding from CIB grants and loans:

- 2010 - total reconstruction of 100 E
- 2013-14 - construction of new roads, sidewalks, curbs, and gutter around Utah State University Research Park
- 2018-19 - improvements to storm drain, water system, and gas system on 800 N
- 2020 - total reconstruction of 700 E

These projects indicate that Price uses CIB funds for both new construction projects, as seen in the USU Research Park project, as well as reconstruction and maintenance of existing city roads. Beyond these projects, Price typically spends close to \$1.2 million dollars per year on maintenance while only receiving \$400,000-500,000 from the B&C Fund.

Comparative Analysis

This section aims to provide a cross-case comparison of the six rural municipalities described above. To do so, this study first uses averages from the 11-year study period to compare road funding and expenses within each municipal context. After these averages are discussed, a snapshot comparison is used to compare typical maintenance costs across our six municipalities. This snapshot comparison provides a more nuanced view of typical road revenue and expenses, given the cyclical nature of major road projects, by only examining specific years that exclude major construction projects.

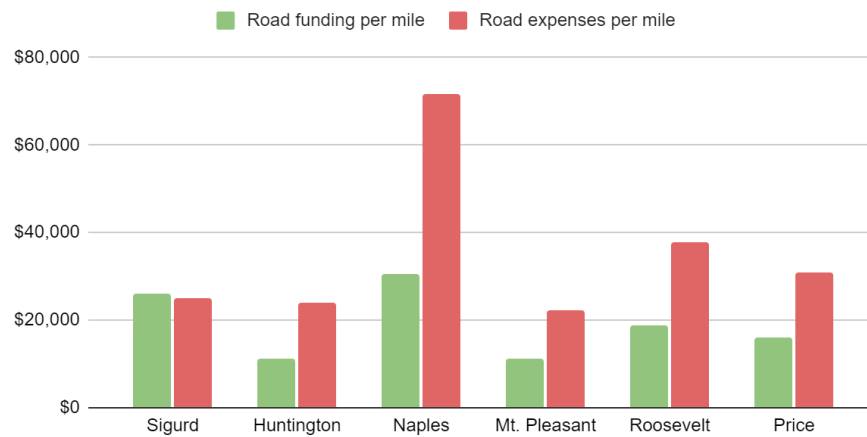
Table 7 summarizes relevant data from each municipality, including population size, population growth, road centerline length in miles, and the percent of paved road surfaces.

Table 7: Municipal Data Summary						
	Sigurd	Huntington	Naples	Mt. Pleasant	Roosevelt	Price
2020 population	405	1,914	2,280	3,655	6,747	8,216
Change since 2010	-5.6%	-10.1%	+29.9%	+12.1%	+11.6%	-5.7%
Road miles	6.41	20.45	21.63	32.15	45.8	55.82
Percent paved	100%	90%	99%	96%	92%	96%

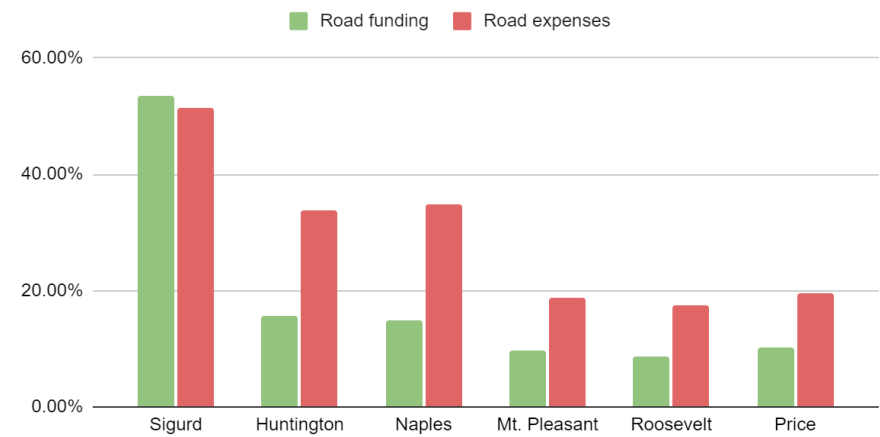
Charts for both the average comparison and the snapshot comparison are provided below, followed by a discussion of major findings. The scale of the y-axis is the same across the relevant charts to allow easy comparison between analysis types.

Average: Road Funding and Expenses per Mile (2010-2021)

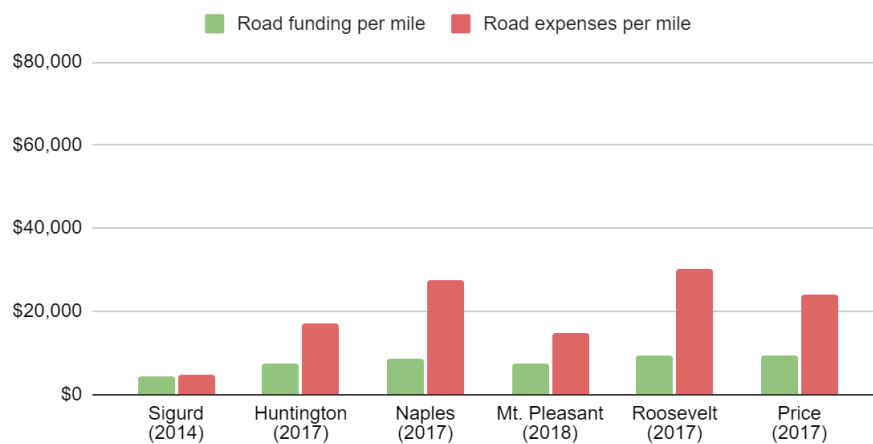
Includes all study years. (inflation-adjusted to 2022 dollars)

**Average: Percent of Total Municipal Budget**

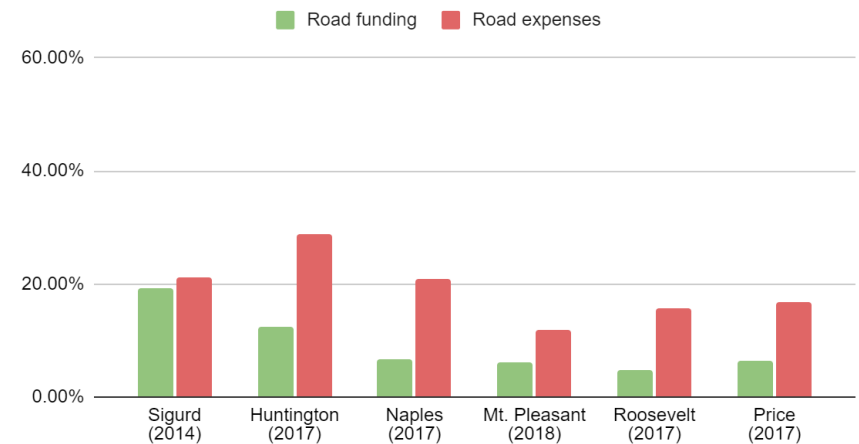
Includes all study years. (Inflation-adjusted to 2022 dollars)

**Snapshot: Road Funding and Expenses per Mile**

Includes only one year, without major projects. (inflation-adjusted to 2022 dollars)

**Snapshot: Percent of Total Municipal Budget**

Includes only one year, without major projects. (inflation-adjusted to 2022 dollars)



Average Funding and Expenses

These charts show average road funding and expenses from all 11 years within this study period. As shown above, road funding per mile varies significantly across the six municipalities, ranging from \$11,143 in Huntington to \$30,702 in Naples. Given that B&C funds are mostly equal across municipalities, this funding discrepancy is largely due to some municipalities receiving significantly more CIB funds than others.

On one hand, the municipalities that receive the most CIB funding, Naples and Sigurd, may be overly reliant on CIB funding for their construction and maintenance needs. On the other hand, municipalities with low CIB funding may be missing out on grants or loans that they could otherwise use instead of self-funding their road network needs.

Similarly, road expenses per mile also vary significantly, ranging from \$22,128 in Mt. Pleasant to \$71,594 in Naples. This may be related to several factors, such as terrain, climate, and frequency of use in each municipality. Nevertheless, Naples stands out in that it spends significantly more per mile than the other municipalities. This suggests Naples may face challenges in optimizing its road expenses.

Among these six municipalities, Sigurd is the only one with a relatively balanced ratio of road funding and expenses per mile. The other five municipalities spend significantly more money than they receive from external funding sources, leading to larger costs for local taxpayers.

It is worth noting that the amount of funding or expenses per mile of road does not always correspond to the percent of the budget allocated to road funding and expenses when comparing across municipalities. For example, Sigurd spends relatively little per mile compared to other municipalities, despite allocating 51.5% of its total budget to road expenses, much higher than the percentage of the next highest municipality. As a small town, Sigurd's municipal budget is tiny compared even to small rural cities. Large road projects in Sigurd consume huge amounts of money that the city couldn't otherwise fund without external grants or loans, primarily from CIB.

Snapshot Funding and Expenses

The snapshot analysis is useful in that it compares road funding and expenses during a typical year without major road construction projects for each municipality. This provides a rough approximation for typical maintenance costs funded exclusively by B&C funds. Unlike CIB and UDOT funds, B&C funds are allocated annually and automatically, making it the only consistent source of external funding for rural municipalities. It's also the only source specifically dedicated to municipal road maintenance needs.

The most obvious difference between the average and snapshot comparisons is size: funding and expenses are much lower in a typical year compared to the 11-year average. This reflects the fact that road expenses are cyclical. Every few years, a major project pops up requiring two, three, or

four times as much money as a typical year. These major years are almost exclusively funded by CIB funds. Typical years, while not as intense, add significant costs to rural communities in the long run.

All six municipalities spend more on roads than they receive from external funding sources, although this varies greatly. For instance, Roosevelt spends \$20,710 more than it receives from external funds while the difference in Sigurd is only \$419. As mentioned previously, this may suggest that Sigurd spends very little on maintenance in a typical year and instead delays maintenance until more funding is available.

Unlike before, Naples spending per mile is much more in line with comparison cities. In fact, the overall range for road expenses is much smaller here, indicating that with the exception of Sigurd, maintenance costs are similar amongst these municipalities. Likewise, the range for both funding and expenses as a percent of total municipal budget is much smaller.

Overall, these findings highlight the importance of careful planning and management of road funding and spending in rural communities. Municipalities should take great care when spending road grants or loans. Road projects that expand or widen the municipal road network, even when funded by external grants, will ultimately lead to future maintenance expenses that may be burdensome and unmanageable.

Summary of Findings

Table 8 below summarizes the major findings from this study.

Table 8: Summary of Findings		
	Overall Construction & Maintenance (11-year averages)	Typical Maintenance (one-year snapshot, without major projects)
Annual road funding	\$19,015 per mile 14.3% of total budget	\$7,752 per mile 9.3% of total budget
External funding sources	56.2% CIB 41.3% B&C 2.5% UDOT	100% B&C*
Annual road expenses	\$35,229 per mile 31.4% of total budget	\$19,685 per mile 19.2% of total budget
Contribution to road expenses	34.7% CIB 22.0% B&C 1.12% UDOT 42.2% General funds	47.8% B&C* 52.2% General funds

*Snapshot analysis purposely excludes years with major projects funded by CIB or UDOT

Limitations

While this case study analysis provides insight into the road funding and spending patterns in rural Utah, there are some limitations to consider.

First, this study relies on public financial data reported by each municipality and obtained through the Utah Auditor's Office. It is possible that some information was not reported or may have been inaccurately recorded. In fact, in some cases, the reported amounts were inconsistent with CIB records. Furthermore, many of the recorded amounts were ambiguous, particularly for funding sources in small municipalities. Many reported receiving "state grants" or "CIB grants" but did not specify if these funds were related to roads.

To resolve these issues, this study assumes that CIB records and other state records are more accurate than municipal records, and that most road funding comes from B&C funds, CIB funds, and UDOT funds. Given these assumptions, inconsistent records and unreported funding sources were left out of the analysis and replaced with state records when applicable.

Second, this study is limited to a specific time frame from 2010 to 2021, due to limitations in publicly available data. As such, this study cannot provide a comprehensive picture of road funding and spending patterns over the full lifespan of rural roads. The average and snapshot analysis presented above are helpful in addressing this issue, but may not capture the full extent of the cyclical nature of road spending.

Third, this study focuses only on six rural communities and therefore may be limited in context. As an illustrative case study design, this study aims to provide in-depth analysis of road funding and spending in specific case study communities. Policymakers should use caution when applying these findings to other populations, particularly in regions or contexts that are significantly different from the rural context highlighted here.

Finally, while this study identifies patterns and trends in road funding and spending, it does not examine the effectiveness of road projects or their impact on local communities. Not all road projects are the same even if they have similar construction and maintenance costs. Some projects may have more positive effects, such as improving accessibility, promoting economic development, and enhancing public safety, while other projects may disrupt local ecosystems, increase traffic and noise pollution, and exacerbate existing social and economic inequalities.

Further research is needed to fully understand the implications of road funding and spending patterns in rural Utah and beyond. Future studies may consider evaluating specific road projects and their impacts on local communities, as well as identifying best practices for designing and implementing road projects that reduce long-term costs, maximize positive outcomes, and minimize negative impacts.

Conclusions

This report has explored the primary funding sources for municipal roads in rural Utah. Overall, 56% of external funding comes from CIB funds while 41% comes from the B&C fund. These funding sources are vital to many road construction and maintenance projects in rural municipalities. Without external support, many communities would be unable to maintain and expand their road networks.

However, these funds alone are unable to support existing needs. Typical road maintenance costs consume around 19.2% of the total municipal budget, or up to 31.4% when also accounting for major construction costs. These costs are far larger than the sum of all external funding sources. Local general funds pay for 52.2% of typical maintenance costs, or 42.2% when accounting for major construction costs (given that CIB funds are primarily for major construction projects). This can be a major financial burden on small municipalities, often leading to poor road conditions and delayed maintenance.

Furthermore, this funding disparity is likely to increase in the near future unless significant policy changes occur. CIB funds rely on mineral lease extraction while B&C funds are primarily supported by motor fuel taxes. Both of these sources may decrease as the economy transitions to more renewable sources of energy and transportation.

Roads should ideally generate enough revenue to pay for themselves, but they almost never do. According to a report by the Center for American Progress, four out of ten highways don't carry enough traffic to generate sufficient revenue to pay for their maintenance costs (Schmitt, 2015). This study only looked at national highways, which carry 55% of all vehicle traffic in the US. The financial returns are much worse for local roads, which generate fewer trips and less fuel use than highways. A similar study found that gas taxes and other fees paid by drivers cover less than half of road construction and maintenance costs nationally, down from more than 70% in the 1960s (PIRG, 2015).

In light of these findings, municipalities should be doing all they can to reduce road costs. Policymakers should also consider reforms that extend the longevity and sustainability of road funding sources. This report identifies four broad policy recommendations that may help to address these concerns in rural communities:

1. Consolidate road services to counties or special service districts.

Consolidating road services among municipalities could lead to cost savings, more efficient use of resources, and better quality road projects. Counties often have the expertise and equipment needed to manage road costs and transportation planning, which can result in economies of scale and better use of resources. By consolidating road services, municipalities can avoid duplicating services and can pool their resources, leading to reduced costs, better

service delivery, and more consistent and coordinated transportation planning across municipalities.

2. Restrict road widths and surface types.

In many cases, rural roads are built larger and stronger than they need to be. Large, paved roads are far more expensive to build and maintain than small streets or gravel roads. Municipalities can drastically reduce costs by reducing road sizes and switching to gravel or dirt in places that have lower traffic volumes. Smaller roads also allow for denser development throughout the city, which produces more revenue and can help offset road costs.

3. Increase road taxes and fees.

As discussed, road revenue sources are not generating enough revenue to pay for road construction and maintenance costs. Policymakers can rebalance these funds by increasing tax revenue. This could include increasing fuel taxes or vehicle fees, implementing a tax on electric and hybrid vehicles, indexing taxes and fees to inflation, applying higher taxes to heavier vehicles and trucks, adding special fees to Uber or Lyft rides, and exploring other revenue-generating measures.

4. Encourage active transportation.

Alternative modes of transit, such as public transit, biking, and walking, are often underdeveloped in rural communities. Encouraging more active transportation can reduce dependence on cars, thus reducing the need for expensive road projects throughout the community. In a rural context, these systems might focus on main streets, community centers, and recreational opportunities. Active transportation infrastructure improvements are complemented by land use changes such as smaller road widths, pedestrian streets, and dense development near downtown areas.

Each of these policy recommendations deserve further research and consideration. In addition, it is important to consider the unique challenges and opportunities present in each municipality. Policymakers should explore innovative solutions that are tailored to the specific context of rural communities. To achieve sustainable and long-lasting policy reforms, policymakers must work collaboratively across local, regional, and state governments.

The funding challenges facing rural communities require urgent attention and bold policy solutions. Policymakers and local leaders must act swiftly and decisively to implement policies that ensure the longevity and sustainability of municipal road networks. By doing so, rural communities can ensure that their road networks are safe, reliable, and sustainable, thereby enabling them to thrive and prosper in the years ahead.

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