CALIFORNIA DEPARTMENT OF TECHNOLOGY
707 3rd Street
West Sacramento, CA 95605
(916) 319-9223

Liana Bailey-Crimmins, Director
Jared Johnson, Chief Deputy Director

April 30, 2025

Honorable Scott Wiener, Chair
Joint Legislative Budget Committee
Senate Budget & Fiscal Review Committee
1021 O Street, Suite 8620
Sacramento, CA 95814

Honorable Josh Becker, Chair
Senate Energy, Utilities & Communications Committee
1021 O Street, Suite 6520
Sacramento, CA 95814

Honorable Jesse Gabriel, Chair
Assembly Budget Committee
1021 O Street, Room 8230
Sacramento, CA 95814

Honorable Tasha Boerner, Chair
Assembly Communications & Conveyance Committee
1021 O Street, Suite 4150
Sacramento, CA 95814

SUBJECT: REPORT TO THE JOINT LEGISLATIVE BUDGET COMMITTEE ON THE MIDDLE-MILE BROADBAND INITIATIVE PURSUANT TO PROVISION 7 OF ITEM 7502-001-0001 OF CHAPTER 35, STATUTES OF 2024 (SENATE BILL 108)

Dear Senator Wiener, Senator Becker, Assemblymember Gabriel, and Assemblymember Boerner,

In accordance with Provision 7 of Item 7502-001-0001 of Chapter 35, Statutes of 2024 (Senate Bill 108), the California Department of Technology (CDT) submits this report on the Middle-Mile Broadband Initiative (MMBI).

This report presents a business plan focused on the anticipated expenditures estimated for the operation of the MMBI's middle-mile broadband network over the next five fiscal years, including:

1. Estimated network expenditures by fiscal year and expenditure category;

2. Estimated average expenditures per user by expenditure category and type of user;

3. Assumptions used to inform estimated network expenditures such as network infrastructure repair and replacement timelines, number of positions for ongoing business operations, and utility usage; and,

4. Assumptions or estimates on network revenues based on available information.

As specified in SB 108, this report also presents an evaluation of alternate funding sources for future development of any additional middle-mile network miles not currently funded, including:

1. Estimated savings from design changes and efficiencies in current middle-mile network projects;

2. Estimated last-mile project funding for middle-mile infrastructure deemed essential for connection; and,

3. Lease revenue, bond financing and/or other financing options.

If you have questions or would like to discuss this report, please contact me at liana.bailey-crimmins@state.ca.gov.

Respectfully,

Liana Bailey-Crimmins
Director
California Department of Technology

cc: Brian Metzker, Principal Fiscal & Policy Analyst, Legislative Analyst's Office
Hans Hemann, Consultant, Joint Legislative Budget Committee
Elisa Wynne, Staff Director, Senate Budget & Fiscal Review Committee
Christian Griffiths, Chief Consultant, Assembly Budget Committee
Sarah Smith, Consultant, Senate Energy, Utilities & Communications Committee
Emilio Perez, Chief Consultant, Assembly Communications & Conveyance Committee
Nick Maduros, Secretary, Government Operations Agency
Erica Contreras, Secretary of the Senate, California State Senate
Sue Parker, Chief Clerk, California State Assembly
Cara L. Jenkins, Legislative Counsel, Office of Legislative Counsel

California Department of Technology

Middle-Mile Broadband Initiative Legislative Report – Business Plan

Published April 30, 2025

Gavin Newsom, Governor
State of California

Nick Maduros, Secretary
California Government Operations Agency

Liana Bailey-Crimmins, State CIO and Director
California Department of Technology

Contents

Introduction 1
A brief history of the MMBI 3
The MMBI's mission, vision and values 5
The MMBI's funding history 6
MMBI business plan 8
Estimated capital network expenditures by fiscal year and expenditure category 8
Estimated average expenditures per user, by expenditure category and type of user 10
Unserved users 11
Users within a 1-mile proximity of the MMBN 11
Assumptions used to inform estimated network expenditures such as network infrastructure repair and replacement timelines, number of positions for ongoing business operations, and utility usage 12
Fiber maintenance and operations 12
Network electronics maintenance and refresh 13
Network operations center (NOC) operations and components 13
Business support staffing 14
Hut maintenance and operations 15
Administrative and other non-operational costs 15
CDT administrative costs 15
Assumptions or estimates on network revenues based on available information 16
Customer assumptions 17
Service assumptions 17
Evaluation of alternate funding sources 18
Estimated savings from design changes and efficiencies in current middle-mile network projects 18
Cost savings by deploying fiber routes without new construction 18
Cost savings through design choices 19
Cost savings through advanced planning and procurement 19
Estimated last-mile project funding for middle-mile infrastructure deemed essential for connection 20
Lease revenue, bond financing and/or other financing options 21
Conclusion 21
Appendix A: Alignment of business plan with statutory requirements 22

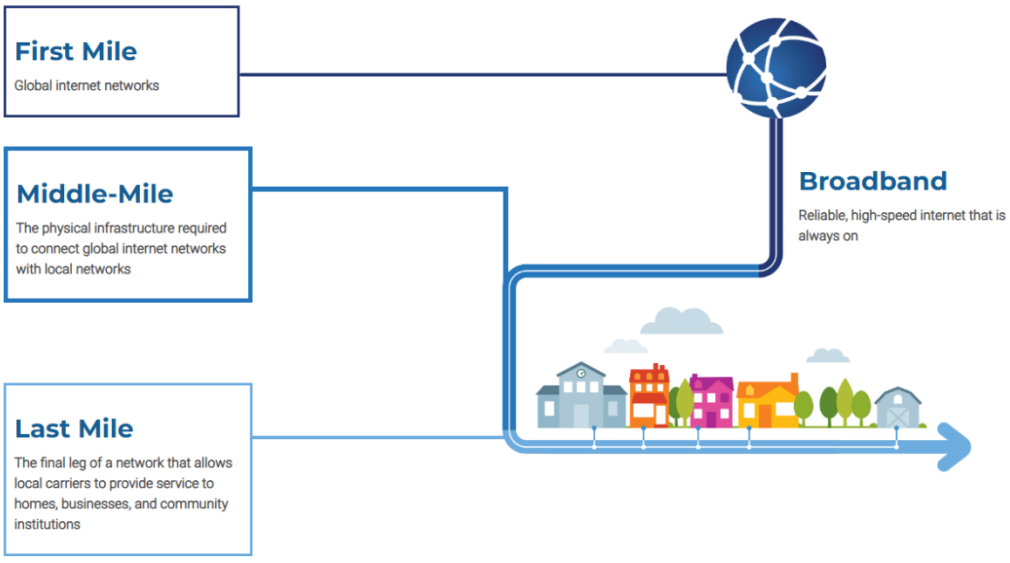
Tables

Table 1: Summary of MMBI Budgetary Activity (Fiscal Years 2021 – 2024) 7
Table 2: MMBI Expenditures (Actual and Projected, 7/1/2021 – 12/31/2026) 8
Table 3: MMBI Encumbrances and Expenditures – ARPA/SFRF (Actual and Projected) 8
Table 4: MMBI Encumbrances and Expenditures – General Funds (Actual and Projected) 9
Table 5: Estimated Annual MMBI Costs (2024 Dollars) 10

Introduction

The California Department of Technology's (CDT) Middle-Mile Broadband Initiative (MMBI) will deploy a middle-mile network to serve as a backbone connecting communities throughout the State, including unserved and underserved communities with existing service that does not meet their needs.[1] This open-access Middle-Mile Broadband Network (MMBN) will span more than 8,000 miles through all 58 counties and will connect communities that have historically been left out of the digital economy. This network will create new opportunities for last-mile internet service providers (ISP), fostering competition and new markets for middle-mile broadband services where little or none currently exists.

The term "middle-mile" refers to the portion of broadband infrastructure that connects local ISPs' "last-mile" networks back to the global internet.[2] In this way, the MMBI facilitates those ISPs' cost-effective provisioning of high-speed internet services to households and businesses in communities throughout California. In other words, the MMBN's "users" will include the ISPs that deliver broadband service to California's homes; residents will buy service from those ISPs, and those ISPs will then connect to the MMBN.

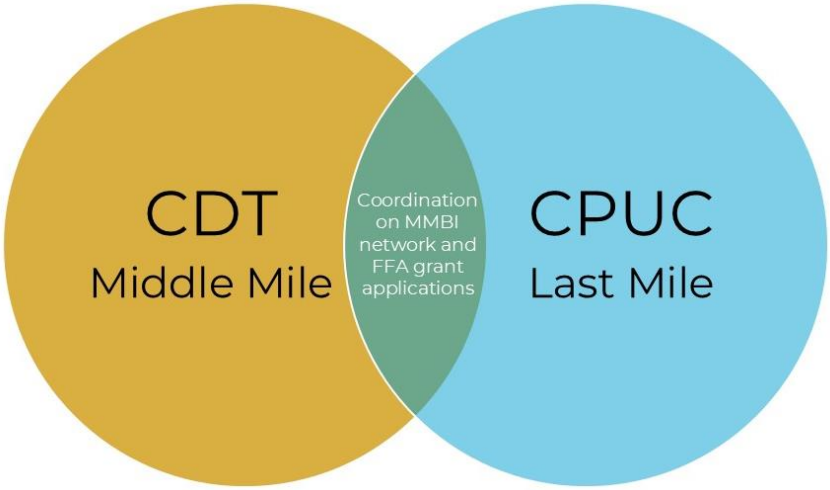


In addition to connecting unserved communities, the MMBI provides a host of benefits: bringing pricing in remote and high-cost areas into greater parity with other parts of the State; increasing capacity, resilience, redundancy and improved affordability; reducing barriers to market entry; reducing the cost of last-mile projects reaching unserved communities;

[1] Internet connection must be strong and reliable enough to handle the typical requirements of modern life. Some regions of California are unserved and have no internet connection. Others are underserved and have inadequate internet connection with download speeds less than 25 Mbps and upload speeds less than 3 Mbps. The MMBI prioritizes these unserved and underserved communities.

[2] "What is the middle-mile?" California Broadband for All: Middle-Mile Broadband Initiative, https://site-cammbi.hub.arcgis.com/pages/what-is-the-middle-mile.

supporting regional economic growth; and providing new connectivity reliant technologies. This pricing approach will enable MMBI customers, such as last-mile grant applicants and other ISPs, to pay the same middle-mile costs in rural areas as they would in parts of the State where such services are more cost-effective due to a denser population and proximity to major interconnection points. Those savings will be built into the ISPs' business models for investing in and delivering last-mile services, which will benefit end users throughout the State through lower operating costs.



By lowering costs and removing the barriers to parity of service in rural and low-income areas relative to the areas where the middle-mile market currently functions better, the MMBI will dovetail with the direct efforts the California Public Utilities Commission (CPUC) is making in reducing last-mile costs. For example, the CPUC's Last-Mile Federal Funding Account (FFA) provides grant funding to ISPs that deploy last-mile broadband infrastructure.[3] And when the CPUC distributes the funds it is receiving from the federal Broadband Equity, Access, and Deployment (BEAD) Program, the CPUC is required by the National Telecommunications and Information Administration (NTIA) to ensure that last-mile subgrantees offer a low-cost service option to low-income residents.

The State Legislature's $3.873 billion in appropriations for the MMBI to date have provided the funding necessary to address the projected capital costs for deploying the MMBN. To enable sustainable network operations that require no further State subsidy, the MMBI will sell services to a range of public and private entities that will benefit from the State's investment, while helping to fund the cost of providing and supporting statewide middle mile broadband service.

This business plan presents an overview of the MMBI's estimated costs, its expected customer segments, and a path toward sustainable network operations by a competitively selected Operations Third-Party Administrator (Operations TPA) that will be expected to take responsibility for network operations and maintenance costs. It also describes the extensive steps CDT has taken to reduce network deployment costs, including design decisions and innovative use of lease, joint build and purchase opportunities.

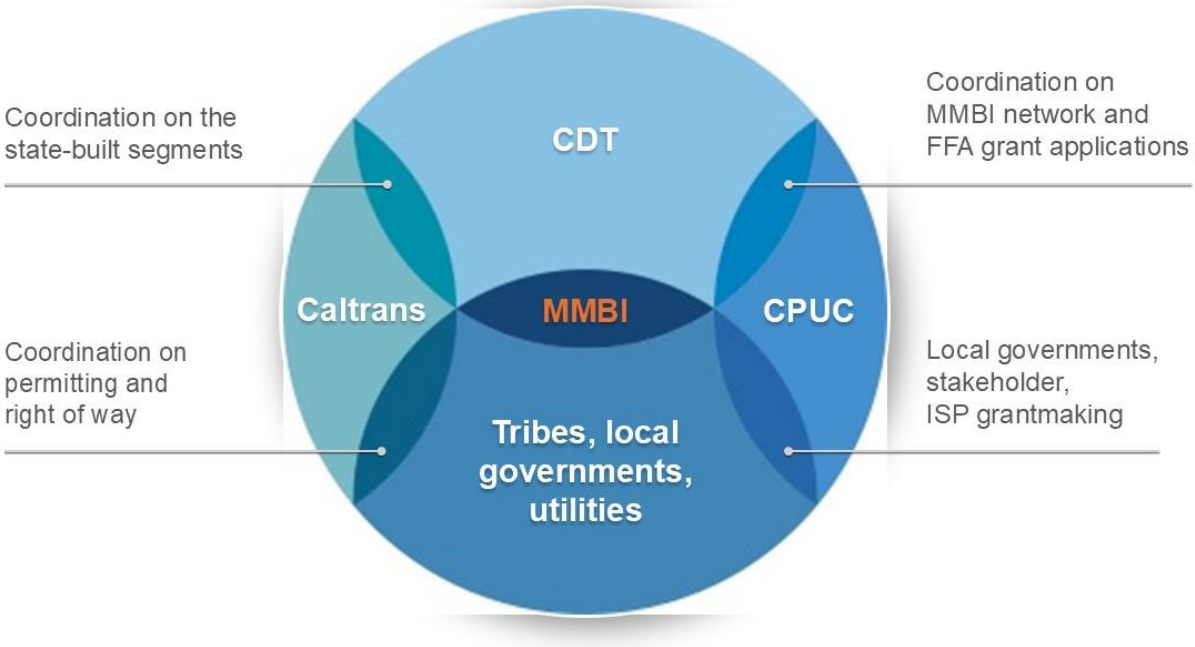
[3] "Last-Mile Federal Funding Account," CPUC, https://www.cpuc.ca.gov/industries-and-topics/internet-and-phone/broadband-implementation-for-california/last-mile-federal-funding-account.

A brief history of the MMBI

The MMBI was created by Senate Bill (SB) 156—the enabling legislation that was enacted in 2021. This legislation was a pivotal response to the growing recognition of the digital divide, particularly highlighted during the COVID-19 pandemic. As more residents relied on online services for education, work and healthcare, the need for robust and equitable internet access throughout California became even more apparent.

The 2021 Budget Act appropriated the MMBI's initial capital funding from federal funds made available through the American Rescue Plan Act (ARPA). The 2021 Budget Act, together with the implementing legislation, directed CDT to plan and implement a middle-mile broadband network to enable universal internet access, ensuring that even California's most remote communities can participate in the digital economy. The MMBI will achieve this goal by deploying a resilient, open-access network that enhances connectivity and offers affordable pricing that supports last-mile providers in delivering affordable services to Californians—particularly to unserved and underserved areas.

A highlight of the MMBI's development is CDT's cross-departmental coordination with the CPUC, the California Department of Transportation (Caltrans), and California's tribes, local governments, and utilities.



SB 156 specified that the CPUC assist CDT on implementing the MMBI and provide a report on potential locations the MMBI could serve. To that end, in 2021 a public CPUC proceeding gathered stakeholder input from diverse entities including local governments, community

organizations and private sector stakeholders to understand the unique needs and challenges faced in different regions by a variety of populations and potential end users and customers. This collaborative approach aimed to ensure that the middle-mile network would effectively address local needs while promoting equity in broadband access.

The CPUC's proceeding, as well as the regular Middle-Mile Advisory Committee (MMAC) and California Broadband Council (CBC) meetings and continued stakeholder outreach, have created public forums that serve as key channels for gathering feedback and building consensus around the MMBI's execution.

As planning progressed, CDT identified and refined the fiber routes across California that would deliver the most benefit from enhanced middle-mile infrastructure. The initiative focused on underserved rural areas, tribal lands and low-income urban communities, where lack of access to high-speed internet had created significant barriers of access to the digital economy. By prioritizing these areas, the MMBI seeks to lower barriers to last-mile service—which will foster economic development, improve educational and healthcare opportunities, and enhance residents' overall quality of life.

In 2022, the MMBI moved from planning to implementation, with the pre-construction phase commencing statewide and with the purchasing of materials and the soliciting of contracts for construction and lease partnerships.[4]

In 2023, the MMBI moved forward with signing contracts for construction and leases, meeting the federal requirements for encumbrance more than 15 months ahead of schedule. The MMBN is designed to be scalable and adaptable, allowing for future upgrades as technology evolves and demand increases. The goal is to ensure that the State's middle-mile infrastructure will support current needs and anticipated future growth—delivering services to a range of customers and deriving revenue that sustains the enterprise.

[4] The MMBI's current status is reported on the Broadband for All website: https://mmbi-files.cdt.ca.gov/mmbifiles/MMBIFactSheet.pdf.

The MMBI's mission, vision and values

In line with California's Broadband for All Action Plan,[5] the MMBI aims to enhance broadband connectivity across California, including in underserved urban areas and in rural areas. The mission of the MMBI is to deploy a robust middle-mile broadband network that facilitates high-speed internet access in communities and acts as a necessary backbone for last-mile connections to homes and businesses. By focusing on the middle-mile, the initiative seeks to bridge one key component of the digital divide.

The statewide, resilient, high-capacity broadband infrastructure will be open-access, allowing last-mile service providers and enterprise customers (including local and State government entities) to benefit from competitive pricing that is at or below market rates. The goal is to stimulate last-mile infrastructure deployment and competition by reducing middle mile access costs for ISPs and providing service in areas where existing service providers will not connect or provide extremely high pricing.

The underlying principles of the MMBI emphasize inclusivity, collaboration and transparency. The initiative prioritizes outreach and planning with local governments, tribal communities and private sector stakeholders. Transparency in MMBN operations and funding is also a key principle, aimed at building and maintaining public trust and ensuring accountability. As this business plan demonstrates, the State Legislature's budgetary allocations provide the capital investments enabling CDT to deploy the network.

CDT has maximized the impact of its capital funding in two primary ways—first, by refining the network design for efficiency and cost-effectiveness, and second, by executing the pioneering Request for Innovative Ideas (RFI^2) procurement process to secure Indefeasible Rights of Use (IRU)/lease agreements, joint build agreements and purchase agreements for deployment of more than 7,200 route miles of the approximately 8,000-mile MMBN fiber network. The remaining miles will be constructed by Caltrans via Job Order Contracts (JOC) signed in 2023.

The MMBI's implementation strategies involve leveraging State resources, federal funding and potential investment by an Operations TPA to create a sustainable business model. The Operations TPA will be expected to take responsibility for network operations and maintenance costs. The initiative is designed to adapt to technological advancements and changing community needs, with a framework that supports ongoing upgrades and expansions. By aligning with broader State and federal broadband goals, the MMBI positions California as a leader in bridging this important component of the digital divide, ultimately fostering greater economic growth and social equity across the State.

[5] "California State Broadband Action Plan," California Broadband Council, December 2020, https://broadbandcouncil.ca.gov/wp-content/uploads/sites/68/2020/12/BB4All-Action-Plan-Final-Draft-v26.pdf.

The MMBI's funding history

The MMBI's business plan relies on multiple funding sources to cover the capital costs of building the network. These sources include appropriations from the California Legislature as well as a competitively sought and awarded federal grant.

The MMBI is now funded almost entirely with General Fund. No funding is now coming from the American Rescue Plan Act/State Fiscal Recovery Funds (ARPA/SFRF), and the only federal funding remaining for the $3.873 billion project is a $73 million grant from the National Telecommunications and Information Administration (NTIA) awarded in 2023.

The MMBI was originally created by SB 156 [2021] and funded through a $3.25 billion appropriation of ARPA/SFRF in the 2021 Budget Act. Per authority in the 2022 Budget Act, $887 million of ARPA/SFRF was swapped out and replaced with General Fund. The remaining $2.363 billion in ARPA/SFRF funding had been encumbered before the end of calendar year 2024 and was scheduled to be liquidated as components of the project were completed, before the end of calendar year 2026, per federal requirements.

Additional General Fund resources were appropriated through SB 189 [2022] ($300 million in the 2023–2024 California Spending Plan and $250 million in the 2024–2025 plan).

Finally, in 2023, CDT was awarded $73 million in NTIA Enabling Middle Mile grant funding, which brought the total budget to $3.873 billion.

In 2024, per authority in the 2024 Budget Act, the remaining $2.363 billion in budget authority was swapped from ARPA/SFRF to General Fund. This ARPA/SFRF authority was moved to other projects that were previously General Funded, but which are also qualified uses of the federal ARPA/SFRF funding, consistent with U.S. Treasury guidelines.

CDT is working with the State Controller's Office to convert all previous expenditures from ARPA/SFRF to General Fund.

The following table provides a year-by-year summary of the MMBI's budgetary activities as described above. These activities have provided the necessary resources for the development and deployment of the MMBN, supporting the State's goal to build an affordable, open-access, statewide digital infrastructure. Additional details are presented in a separate report to the California Legislature.[6]

[6] "Middle-Mile Broadband Initiative Annual Legislative Report: Program Year 2023, Published March 2024," CDT, https://cdt.ca.gov/wp-content/uploads/2024/04/2024-Middle-Mile-Broadband-Network-Annual-Report.pdf.

Table 1: Summary of MMBI Budgetary Activity (Fiscal Years 2021 – 2024)

Source	2021	2022[7]	2023[8]	2024[9]	Total
ARPA/SFRF	$3.250 B	($0.887 B)	$-	($2.363 B)	$-
General Fund	$-	$0.887 B	$0.300 B	$2.613 B	$3.800 B
NTIA	$-	$-	$0.073 B	$-	$0.073 B
Total	**$3.250 B**	**$-**	**$0.373 B**	**$0.250 B**	**$3.873 B**

[7] The 2022 Budget Act provided authority to swap approximately $887 million of ARPA/SFRF funding for General Funds and created budgetary authority to use any federal funds received.
[8] The 2023 Budget Act allocated $300 million General Fund to MMBI. Additionally, the NTIA Enabling Middle-Mile Broadband Infrastructure grant program awarded CDT $73 million in funding.
[9] The 2024 Budget Act allocated $250 million General Fund to MMBI and provided authority to swap approximately $2.363 billion of ARPA/SFRF funding for General Funds.

MMBI business plan

This business plan presents estimated MMBI expenditures based on available information as of December 2024.

Estimated capital network expenditures by fiscal year and expenditure category

The following table summarizes actual and projected capital expenditures from the MMBI's initiation in July 2021 through planned completion in December 2026; it lists the MMBI's capital expenditures by funding source and by the entity using the funds to deploy segments of the MMBN (i.e., CDT, Caltrans and RFI[2] partners).

Table 2: MMBI Expenditures (Actual and Projected, 7/1/2021 – 12/31/2026)

	ARPA/SFRP[10]	General Fund	NTIA	Total GF & NTIA
RFI[2] partnerships	($0.671 B)	$2.400 B	$0.030 B	$2.430 B
Caltrans	($0.283 B)	$0.680 B	$0.042 B	$0.722 B
CDT (administration)	($0.078 B)	$0.308 B	$-	$0.308 B
CDT (materials)	($0.072 B)	$0.412 B	$0.001 B	$0.413 B
Total expenditures	**($1.104 B)**	**$3.800 B**	**$0.073 B**	**$3.873 B**

Table 3: MMBI Encumbrances and Expenditures – ARPA/SFRF (Actual and Projected)

ARPA/SFRF						
	FY2021/22 – Actuals		FY2022/23 – Actuals		FY2023/24 – Actuals	
	Encumbrance	Expended	Encumbrance	Expended	Encumbrance	Expended
RFI[2] partnerships	$-	$-	$0.042 B	$0.042 B	$1.289 B	$0.629 B
Caltrans	$0.009 B	$0.009 B	$0.138 B	$0.138 B	$0.457 B	$0.136 B
CDT (administration)	$0.015 B	$0.015 B	$0.030 B	$0.030 B	$0.191 B	$0.033 B
CDT (materials)	$-	$-	$0.035 B	$0.035 B	$0.157 B	$0.037 B
ARPA/SFRF total	**$0.024 B**	**$0.024 B**	**$0.245 B**	**$0.245 B**	**$2.094 B**	**$0.835 B**
ARPA/SFRF						
	FY2024/25 – Projection		FY2025/26 – Projection		7/1/26 – 12/31/26 – Projection	
	Encumbrance	Expended	Encumbrance	Expended	Encumbrance	Expended
RFI[2] partnerships	($1.331 B)	($.671 B)	$-	$-	$-	$-
Caltrans	($0.604 B)	($.283 B)	$-	$-	$-	$-
CDT (administration)	($0.236 B)	($.078 B)	$-	$-	$-	$-
CDT (materials)	($0.192 B)	($.072 B)	$-	$-	$-	$-
ARPA/SFRF total	**($2.363 B)**	**($1.104 B)**	**$-**	**$-**	**$-**	**$-**

[10]Expenditures reflected as ARPA/SFRF occurred between FY 2021 and FY 2023, prior to the 2024 Budget Act which swapped ARPA/SFRF funding for General Funds.

Table 4: MMBI Encumbrances and Expenditures – General Funds (Actual and Projected)

General Funds						
	FY2021/22 – Actuals		**FY2022/23 – Actuals**		**FY2023/24 – Actuals**	
	Encumbrance	**Expended**	**Encumbrance**	**Expended**	**Encumbrance**	**Expended**
RFI[2] partnerships	$-	$-	$-	$-	$0.533 B	$0.175 B
Caltrans	$-	$-	$-	$-	$0.118 B	$-
CDT (administration)	$-	$-	$-	$-	$0.009 B	$0.004 B
CDT (materials)	$-	$-	$-	$-	$0.220 B	$0.025 B
General Funds total	**$-**	**$-**	**$-**	**$-**	**$0.880 B**	**$0.204 B**
General Funds						
	FY2024/25 – Projection		**FY2025/26 – Projection**		**7/1/26 – 12/31/26 – Projection**	
	Encumbrance	**Expended**	**Encumbrance**	**Expended**	**Encumbrance**	**Expended**
RFI[2] partnerships	$1.867B	$1.292 B	$-	$0.587 B	$-	$0.346 B
Caltrans	$.562 B	$0.623 B	$-	$0.057 B	$-	$-
CDT (administration)	$0.299 B	$0.153 B	$-	$0.076 B	$-	$0.075 B
CDT (materials)	$0.192 B	$0.188 B	$-	$0.116 B	$-	$0.083 B
General Funds total	**$2.920 B**	**$2.256 B**	**$-**	**$0.836 B**	**$-**	**$0.504 B**

Table 5: MMBI Encumbrances and Expenditures – NTIA (Actual and Projected)

NTIA						
	FY2021/22 – Actuals		**FY2022/23 – Actuals**		**FY2023/24 – Actuals**	
	Encumbrance	**Expended**	**Encumbrance**	**Expended**	**Encumbrance**	**Expended**
RFI[2] partnerships	$-	$-	$-	$-	$-	$-
Caltrans	$-	$-	$-	$-	$-	$-
CDT (administration)	$-	$-	$-	$-	$-	$-
CDT (materials)	$-	$-	$-	$-	$-	$-
General Funds total	**$-**	**$-**	**$-**	**$-**	**$-**	**$-**
NTIA						
	FY2024/25 – Projection		**FY2025/26 – Projection**		**7/1/26 – 12/31/26 – Projection**	
	Encumbrance	**Expended**	**Encumbrance**	**Expended**	**Encumbrance**	**Expended**
RFI[2] partnerships	$0.030B	$0.030 B	$-	$-	$-	$-
Caltrans	$0.042 B	$0.042 B	$-	$-	$-	$-
CDT (administration)	$-	$-	$-	$-	$-	$-
CDT (materials)	$0.001 B	$0.001 B	$-	$-	$-	$-
General Funds total	**$0.073 B**	**$0.073 B**	**$-**	**$-**	**$-**	**$-**

As of the date of this business plan, CDT is conducting a competitive procurement to select an Operations TPA for the MMBN. One of many areas of competition among bidders responding to that solicitation is the responsibility for operations and maintenance costs over the course of the Operations TPA contract.

Because that procurement is currently in progress, CDT does not yet have a final determination of the assumption of responsibility for the MMBN's costs. With that caveat, the following table provides a breakdown of CDT's current general estimates of expected MMBN operations and maintenance costs, with estimated total annual expenditures ranging from approximately $75 million to $95 million per year (in 2024 dollars) with a short ramp-up period. Except for the estimated "CDT administrative costs" identified in the final row, many of these costs are expected to be borne by the Operations TPA and to be funded with revenues from operation of the network.

Table 5: Estimated Annual MMBI Costs (2024 Dollars)

Cost Category	Estimated Annual Cost
Fiber maintenance and operations	$20 million to $22 million
Network electronics maintenance	$18 million to $21 million
Network electronics refresh (amortization)	$10 million to $14 million
Network operations center (NOC) components	$7 million to $9 million
NOC operations	$4 million to $6 million
Business support staffing	$6 million to $8 million
Hut maintenance and operations	$4 million to $6 million
Operations TPA administrative and other nonoperational costs	$2 million to $4 million
CDT administrative costs	$4 million to $5 million
Total	**$75 million to $95 million**

Estimated average expenditures per user, by expenditure category and type of user

The MMBI's expenditure types are:

- Capital expenditures: The preliminary estimates presented here are based on the initial, one-time appropriations for capital costs to develop, build and otherwise deploy the 8,000 miles of MMBN fiber routes, huts, and related infrastructure, which currently totals $3.873 billion.
- Operations and maintenance expenditures: As noted, CDT estimates the total annual operations and maintenance costs to be approximately $85 million, which is the midpoint in the estimated range of costs. For this report, the estimated operating cost is assumed to be static regardless of the number of users.

CDT anticipates a broad range of MMBN users, including not only communities that are currently unserved, but also communities which have slower broadband in the 25 Mbps download/3 Mbps upload range (i.e., 25/3), rather than the 100/20 range preferred by the NTIA. Additionally, CDT anticipates there will be communities that currently have access to broadband but will benefit from the MMBN due to its competitive pricing and the other providers it could catalyze.

CDT also anticipates having sufficient capacity to provide commercial services to wireless providers and hyperscalers (e.g., large data centers and cloud services providers) to broaden the revenue base to help fund the overall operations and maintenance of the MMBN.

However, CDT has limited data about potential users. CDT has access to two data sets related to potential MMBN users: Estimates of the State's unserved population and locations, and the total population and number of locations located within 1 mile of the MMBN. Based on this, CDT provides the following conservative estimates of expenditures per user based on these two data sets.

Unserved users

Based on federal guidance, the CPUC estimates there are approximately 4.93 million unserved individuals and approximately 996,000 unserved locations in California. (A location may be a home or an apartment complex in which there may be hundreds of unserved individuals—but locations also include vacation rentals, in which there are no unserved individuals.) The following tables list the estimated capital and operating costs (expenditures) per unserved user, assuming $3.873 billion in total capital costs and $85 million in annual operating costs.

User category	Total	Capital cost per individual/location
Unserved population statewide	4,930,000	$786
Unserved locations statewide	996,000	$3,889

User category	Total	Operating cost per individual/location
Unserved population statewide	4,930,000	$17
Unserved locations statewide	996,000	$85

Users within a 1-mile proximity of the MMBN

As noted, besides the unserved locations and populations in the communities the MMBN is intending to serve, CDT anticipates that many other communities will choose to use the MMBN, given that it will not only be more affordable, but will provide an 8,000-mile backbone that reaches every county in the State. The CPUC estimates that the currently planned, 8,000-mile

MMBN will reach within 1 mile of 18.1 million individuals and 3.83 million locations statewide. The following tables list the estimated capital and operating costs (expenditures) per user within 1 mile of the MMBN, assuming $3.873 billion in total capital costs and $85 million in annual operating costs.

User category	Total	Capital cost per individual/location
Population living within 1 mile of the MMBN	18,100,000	$214
Potential service locations within 1 mile of the MMBN	3,830,000	$1,011

User category	Total	Operating cost per individual/location
Population living within 1 mile of the MMBN	18,100,000	$5
Potential service locations within 1 mile of the MMBN	3,830,000	$22

Assumptions used to inform estimated network expenditures such as network infrastructure repair and replacement timelines, number of positions for ongoing business operations, and utility usage

While CDT will maintain a base level of staff for the purpose of monitoring the Operations TPA once the MMBN is operational, the infrastructure repair and replacement and business operations will be done by the Operations TPA. Therefore, most positions associated with the operations and maintenance of the MMBN will be determined by the Operations TPA once it is selected and on board.

The MMBI's preliminary financial model includes assumptions related to core aspects of network deployment and operations, including operations staffing, equipment maintenance, NOC services and systems, repairs, utility usage, legal services, warehousing and administrative functions.

The model assumes a standalone operation that is purpose-built for the MMBN, representing a conservative set of assumptions around estimating annual maintenance and operations costs in the range of $85 million. CDT expects an experienced Operations TPA will be able to efficiently develop an operating plan that accounts for these functions within the MMBN's operating revenues.

Fiber maintenance and operations

At an estimated $20 million to $22 million per year, maintenance of the fiber optic infrastructure is anticipated to be one of the more significant cost components of the MMBN's operations. Fiber maintenance entails performing repairs, relocating fiber as may be required by right-of-way permits, maintaining accurate fiber documentation and performing underground locates in response to tickets initiated through the State's 811 system.

Many of these costs are relatively fixed as established in the lease, joint build and purchase agreements that CDT had already executed as components of the RFI[2] contracts. In total, costs associated with routine maintenance for all segments are estimated at approximately $2,500 per mile per year, not including additional estimated costs for emergency repairs, relocations and utility locates of approximately $1 million to $2 million for segments constructed by Caltrans and certain segments for which those costs are not otherwise covered under the partner agreements for leases and joint builds.

While these costs will be somewhat variable from year to year—and are contingent on outside, often localized factors (e.g., damage caused by storms, natural disasters or construction activities)—projected costs are anticipated to be relatively consistent on an average per-route-mile basis across a network of this extensive scale.

Network electronics maintenance and refresh

The network electronics supporting MMBN services require manufacturer support contracts to provide access to software updates, licensing associated with specific feature sets and timely replacement of failed components. Based on the bill of materials for network electronics obtained by CDT through its competitive procurement process and currently being staged for deployment, the estimated cost of this maintenance is approximately $18 million to $21 million per year.

Additionally, network electronics must be replaced as equipment reaches the end of its useful life, both in terms of technology obsolescence and the equipment's operational lifespan. Unlike user devices, which tend to have a relatively short lifespan of only three to four years, the carrier-grade components upon which MMBN services rely are expected to have a useful lifespan of seven to 10 years, equating to an annual, amortized cost of replacement of approximately $10 million to $14 million.

Network operations center (NOC) operations and components

The NOC and NOC operations comprise the services, facilities, systems and staffing required for continuous monitoring of the network, maintaining system documentation, managing network security, provisioning and optimizing customer services, collecting statistics related to service delivery, and responding to network service problems.

CDT estimates total NOC systems and facilities costs will range from $7 million to $9 million per year, encompassing pricing obtained through a competitive bid process for a network management system (implementation, ongoing services and licensing) and estimated pricing for a NOC facility and equipment.

Additionally, CDT estimates NOC operations costs (consisting primarily of staffing costs for a NOC manager, NOC support engineers and NOC technicians) to be $4 million to $6 million per

year, varying in part due to the range of anticipated take-rates among customers in the serviceable market.

Business support staffing

Business support costs encompass Operations TPA staffing across the full range of sales and marketing functions, as well as executive roles, at an estimated annual cost of $6 million to $8 million (inclusive of business support systems such as billing, order management and marketing leads tracking software). These costs, encompass both fixed positions and those that vary with customer take-rate within the serviceable market.

Fixed costs for staffing include the following roles:

- Senior management: This team is responsible for making high-level decisions and setting the overall direction of the organization.
- Technology team: This group of technical experts is responsible for maintaining, operating, and repairing the organization's systems and products.
- Financial team: This team is responsible for all of the organization's financial matters, including budgets, billing, tracking and reporting on revenues and expenditures, and ensuring the financial viability of the network.
- Sales and marketing: This team is responsible for promoting the MMBN's products and services and attracting customers. The marketing side creates campaigns to engage and attract potential customers, while the sales side signs service contracts and maintains client relationships.

The staffing requirements for certain roles are anticipated to be variable with respect to the number of customers acquired, with the Operations TPA ramping up over the first 10 years of operations and varying based on the take-rate achieved within the total serviceable market. Variable staffing roles include:

- Account managers: This team maintains relationships with existing clients to ensure satisfaction with the products or services received and to address any issues, while also working to renew or expand service contracts.
- Sales representatives: This team will serve as the Operations TPA's frontline salesforce, reaching out to potential customers, presenting products or services, and signing up new customers. Their goal is to generate new business and drive the sales and revenue growth needed to continue serving the state's unserved and underserved communities.
- Sales engineers: This team will be composed of technical experts who support the sales team. They understand the technical aspects of the products or services and work with

customers to identify technical solutions. They often assist in demonstrations and answer technical questions.

Hut maintenance and operations

Operations and maintenance costs related to the MMBN huts are relatively predictable fixed costs. These huts are spaced along the MMBN routes at intervals of approximately 50 miles. They provide secure environments for housing network electronics; provide resilient climate control and electrical power with backup power generation; and serve as points for customer connections and colocation of customer equipment. Operating costs, estimated at approximately $4 million to $6 million per year for the roughly 140 planned huts, include:

- Physical security monitoring.
- Electrical generator maintenance and fuel supply.
- Facilities maintenance, including cleaning and groundskeeping.
- Heating, ventilation and air conditioning (HVAC) system maintenance.
- Fire suppression system maintenance.
- Electrical power consumption.

Administrative and other non-operational costs

Miscellaneous operating costs are anticipated to total approximately $2 million to $4 million per year. These costs include:

- Insurance.
- Legal and regulatory fees.
- Office space and supplies.
- Secure warehousing space.
- Business collaboration tools.
- Billing and support system software.
- Fiber management system software.
- Colocation at internet peering points.

CDT administrative costs

CDT will require ongoing staffing for contract administration purposes, such as conducting the oversight required by the anticipated Network Stewardship Agreement. CDT estimates these costs at a range of $4 million to $5 million per year, comprised of internal staff and consulting support including:

- Contract acquisition, oversight and contract management.
- Deliverable management.
- Project Management.
- Financial oversight and management.

- Quality assurance.
- Stakeholder coordination.
- Reporting and documentation.
- Risk management – including legal oversight and review.
- Technical and architectural oversight and management.
- Network upgrades and improvements.

Assumptions or estimates on network revenues based on available information

As of the date of this business plan, CDT is conducting a competitive procurement for an MMBI Operations TPA, consistent with SB 156. The procurement, which was informed by CDT's MMBI market sounding,[11] is structured to ensure that an able and experienced operator becomes the service provider over the MMBN and effectively and efficiently delivers best-in-class services consistent with the MMBI's mission.

Projections as to MMBI revenues and the business terms for how revenues may be shared between the State of California and the selected Operations TPA are negotiable terms of the ongoing procurement. Given procurement requirements and state law, these terms will not be publicly disclosed until the procurement is concluded, which is estimated to be late summer or early fall, 2025.

While CDT will not have sufficient information to estimate revenues until the Operations TPA is selected, CDT expects the Operations TPA to provide competitively (i.e. at or below market) priced lit service and dark fiber IRUs to a range of customers (e.g., ISPs, communities, government entities and enterprise customers such as hyperscalers and wireless companies) to make the network financially sustainable and avoid the need for an operating subsidy.

This is because revenues from serving only ISPs that provide last-mile service to unserved or underserved locations are not necessarily expected to be sufficient to cover the total cost of operating the network. The experience of public and non-profit middle-mile networks in other states indicates that the economics of open-access middle-mile networks are significantly improved when operators sell services to government and enterprise customers—and that the revenues generated by those sales make it possible to serve small ISPs and ISPs in remote and low-income areas, consistent with the MMBI's plans. MMBN infrastructure will be sufficient to meet these needs.

[11] "Middle-Mile Broadband Initiative market sounding: Results and recommendations for network operations and maintenance," CDT, April 22, 2024, https://cdt.ca.gov/wp-content/uploads/2024/04/MMBI-Market-Sounding-Report-042224_Final.pdf.

Customer assumptions

CDT's MMBI market sounding (April 2024) and ongoing outreach by CDT have identified a range of potential customer types—each of which may contribute to the MMBI's revenue and, importantly, the MMBI's goal of enabling Broadband for All. Primarily, the MMBN will play an essential role in connecting last-mile ISPs to the global internet backbone.

As noted in the introduction to this business plan, the MMBI's customers or "users" will include these ISPs that deliver broadband service to homes and businesses. California's residents will buy service from the ISPs but will not directly connect to the MMBN. In other words, the MMBI will build the MMBN infrastructure to connect California's unserved and underserved communities—and within those communities, ISPs will build and operate infrastructure that connects from the MMBN to individual households and businesses.

The MMBI's target customer segments include:

Primary (mission-focused – reaching the unserved/underserved through the state):

- Last-mile grant recipients that are building last-mile infrastructure to connect households and businesses.
- ISPs that will make primary and redundant connections between the global internet and their last-mile residential/business customers.
- Other last-mile providers.

Secondary (revenue-focused):

- Commercial customers.
  - Enterprise customers (large businesses, typically with multiple locations to connect).
  - Hyperscalers
  - Wireless carriers (cellular service providers).
- Government entities (both for internal networks and for public-facing broadband services).
- Institutional customers and Community Anchor Institutions.

By strategically targeting diverse customer segments and offering scalable, high-quality services, the Operations TPA will be expected to establish a sustainable revenue model that adapts to evolving market demands.

Service assumptions

The diverse services delivered over middle-mile networks encompass applications tailored to the needs of different customer types. Basic services include ISP transport, commodity internet and interconnection to data centers. High-value services include dedicated bandwidth for high-capacity data transfer, cloud connectivity for seamless access to cloud-based applications and enhanced network redundancy for disaster recovery. The Operations TPA might also offer

network management and security solutions, helping customers monitor, manage and secure their connectivity.

These services will help ISPs expand their reach and quality of service without the challenging costs of building or maintaining middle-mile infrastructure—enabling them to better serve end-users, particularly in underserved or remote areas.

MMBN service types are expected to include the following:

- One-time services:
    - Activation and capital costs for connecting service.
    - Capital costs for constructing fiber laterals to new locations.
- Ongoing services:
    - *Lit services*: CDT expects the MMBN to provide affordable, open-access, lit service at the same cost to providers statewide (i.e., at or below current market prices).
    - *Dark fiber IRUs*: CDT expects the Operations TPA to offer open-access dark fiber leases through IRUs at a negotiated rate to a range of public and private customers; CDT is installing 288-count fiber, which will be sufficient to provide both lit and dark fiber services. Prior to selection of the Operations TPA, the MMBI may begin efforts related to dark fiber sales to generate revenue that will cover early network operating costs.

Evaluation of alternate funding sources

Estimated savings from design changes and efficiencies in current middle-mile network projects

CDT has leveraged a multifaceted approach to ensuring efficiency and cost savings in the deployment of the MMBN—both because CDT is committed to being a good steward of public funds and because inflationary pressures and supply chain challenges drove up construction costs by more than 40% between the initial appropriation in 2021 and the execution of five regional JOCs in early 2023.

Through these cost-saving efforts, CDT estimates it will deploy approximately 8,000 miles of MMBN fiber, as compared to less than 4,000 miles that otherwise might have been deployed through standalone construction with the same amount of funding.

Cost savings by deploying fiber routes without new construction

One of the MMBI's key strategies is the use of IRUs, joint build agreements and purchase agreements where feasible rather than planning new, standalone construction.

- IRUs are long-term, capitalized leases of infrastructure that allow CDT to acquire long-term access to existing fiber optic infrastructure without incurring major construction costs, significantly lowering upfront costs. By securing these rights, the initiative will leverage existing networks, which will both reduce overall expenditures and expedite deployment.
- Joint build agreements enable collaboration with other entities, such as local governments and private providers, to share construction costs and resources. This collaborative approach significantly reduces the construction costs for the partner and CDT.
- Purchase agreements have further complemented these strategies by ensuring favorable terms for acquiring portions of the planned MMBN that have already been constructed.

By embracing joint builds and leases/purchases where feasible, the State can share construction costs and therefore expects to deploy that portion of the MMBN at approximately half the cost of standalone construction. Through these joint builds and leases/purchases, CDT is also leveraging existing projects in construction, reducing time-to-market by as much as 14 months.

As of December 2024, CDT expects to secure IRUs, joint build agreements and purchase agreements for deployment of more than 7,200 miles of the approximately 8,000-mile fiber network—representing significant savings as compared to the costs of deploying a comparable network using only new construction.

Cost savings through design choices

In designing the MMBN, CDT also made deliberate choices to streamline infrastructure and reduce costs while maintaining the functionality and scalability needed to meet current and future network needs.

One cost-saving decision was to limit the number of conduits utilized in the network. By adopting a design that minimizes conduit redundancy, CDT was able to substantially reduce both construction costs and long-term maintenance costs. Fewer conduits translate into reduced excavation and installation expenses, making the deployment process more efficient. This approach aligns with the MMBI's goal of maximizing resources while still delivering a high-quality network that meets the needs of diverse users.

Cost savings through advanced planning and procurement

The MMBI's combination of innovative financial strategies and thoughtful design choices position it to deliver a cost-effective solution. CDT has also closely monitored—and taken steps to counteract—the inflation and other cost pressures in the broadband sector throughout the MMBN design process.

For example, the JOC mechanism enabled CDT to establish accurate unit pricing for MMBN labor and materials early on, well ahead of final design. This, in turn, enabled CDT to estimate MMBN route segment costs and to compare potential segments. Those comparisons were a key project planning tool that allowed CDT to fine-tune the overall MMBN routes—balancing cost with potential outcomes for each segment and for the MMBN as a whole.

The JOCs also secured contractor resources for planned MMBN deployment of certain segments. CDT's deployment partners have allocated crews and resources at established rates, which guarantees work to those entities while reducing CDT's risk with regard to labor availability, supply chain disruption and inflationary pressure on labor costs. This approach will reduce the MMBI's costs as compared to a traditional design-bid-build contracting model.

The State also used five regional JOC contractors which helped the State achieve significant economies of scale.

In another example, CDT recognized early the potential impact of inflation on the cost of network materials and took steps, through competitive procurement, to secure vendor commitments to deliver products at locked-in prices.

CDT will continue to identify approaches to reduce the MMBI's costs, even as broadband material and labor demand increases with the release of BEAD Program grant funds in California and the other states.

Estimated last-mile project funding for middle-mile infrastructure deemed essential for connection

The MMBN is designed to enable last-mile ISPs and other users to connect with minimal additional construction. Huts and other interconnection points have been planned at regular intervals throughout the MMBN to enable frequent and cost-effective interconnection—and the MMBN's routes have been carefully designed in proximity to California's unserved and underserved locations. As noted, however, connections to the MMBN in some locations will require construction of laterals or additional middle-mile infrastructure.

Funding for that additional infrastructure will largely be the responsibility of last-mile ISPs or other MMBI customers. If an ISP wants to connect to the MMBN, for example, it will reach out to the Operations TPA (or potentially another middle-mile provider that is providing services over the MMBN) to identify its options and costs, including costs to construct any infrastructure required to connect its facilities.

CDT assumes the Operations TPA may choose to invest its own capital to connect some users as part of its business strategy (i.e., to secure long-term contracts). In other situations, the Operations TPA may provide a price quote—as is standard industry practice for such non-

recurring costs—for connecting a new customer; that cost would be paid by the customer and may be payable upfront or may be amortized over five or more years.

Last mile ISPs that receive grants for deployment of last-mile service from programs such as the California Advanced Services Fund, FFA or BEAD, may include some costs for connecting the last-mile network to middle-mile infrastructure.

Lease revenue, bond financing and/or other financing options

CDT looked at the possibility of funding construction of additional segments of the middle-mile above the current 8,000-mile network. However, it is not clear that revenues would be sufficient in the early years to be able to secure a revenue bond. Through the IRU, joint build and purchase agreements described above, as well as the routing and design decisions made over the course of planning the network, the MMBI has aligned the MMBN's statutory goals, available funding and expected performance characteristics.

Further, CDT anticipates the Operations TPA it selects will assume the risk that revenue may not cover expenses in the early years of network operations—and that the Operations TPA will invest its own capital in the MMBI; this arrangement will offset some of the MMBI's potential financial risk. The Operations TPA's responsibilities and capital requirements (if any) will be determined through the competitive selection process; as of the writing of this business plan, that process is not yet complete.

Conclusion

The MMBI's deployment of the MMBN will connect underserved communities throughout California, fostering competition and new markets for broadband services. By providing affordable, high-speed internet access, the initiative supports regional economic growth and reduces barriers to digital equity. The sustainable business model ensures long-term benefits for both ISPs and end users across the State.

Appendix A: Alignment of business plan with statutory requirements

Provision 7 of Item 7502-001-0001 of Chapter 35, Statutes of 2024 (Senate Bill 108):

Statutory requirement	Addressed in this report	Page#
(a) A detailed business plan for [MMBI's] middle-mile network over the next five fiscal years, including:	MMBI business plan	8
1. Estimated network expenditures by fiscal year and expenditure category.	Estimated network expenditures by fiscal year and expenditure category	8
2. Estimated average expenditures per user, by expenditure category and type of user.	Estimated average expenditures per user, by expenditure category and type of user	11
3. Assumptions used to inform estimated network expenditures such as network infrastructure repair and replacement timelines, number of positions for ongoing business operations, and utility usage.	Assumptions used to inform estimated network expenditures such as network infrastructure repair and replacement timelines, number of positions for ongoing business operations, and utility usage	12
4. Assumptions or estimates on network revenues based on available information.	Assumptions or estimates on network revenues based on available information	16
(b) An evaluation of alternate funding sources for any additional middle-mile network miles not currently funded, including:	Evaluation of alternate funding sources	18
1. Estimated savings from design changes and efficiencies in current middle-mile network projects.	Estimated savings from design changes and efficiencies in current middle-mile network projects	18
2. Estimated last-mile project funding for middle-mile infrastructure deemed essential for connection.	Estimated last-mile project funding for middle-mile infrastructure deemed essential for connection	20
3. Lease revenue, bond financing and/or other financing options.	Lease revenue, bond financing and/or other financing options	21