



PSCOOTF Status Update

October 20, 2015

PSFA Presenters:

Kendra Karp, Chief Information Officer

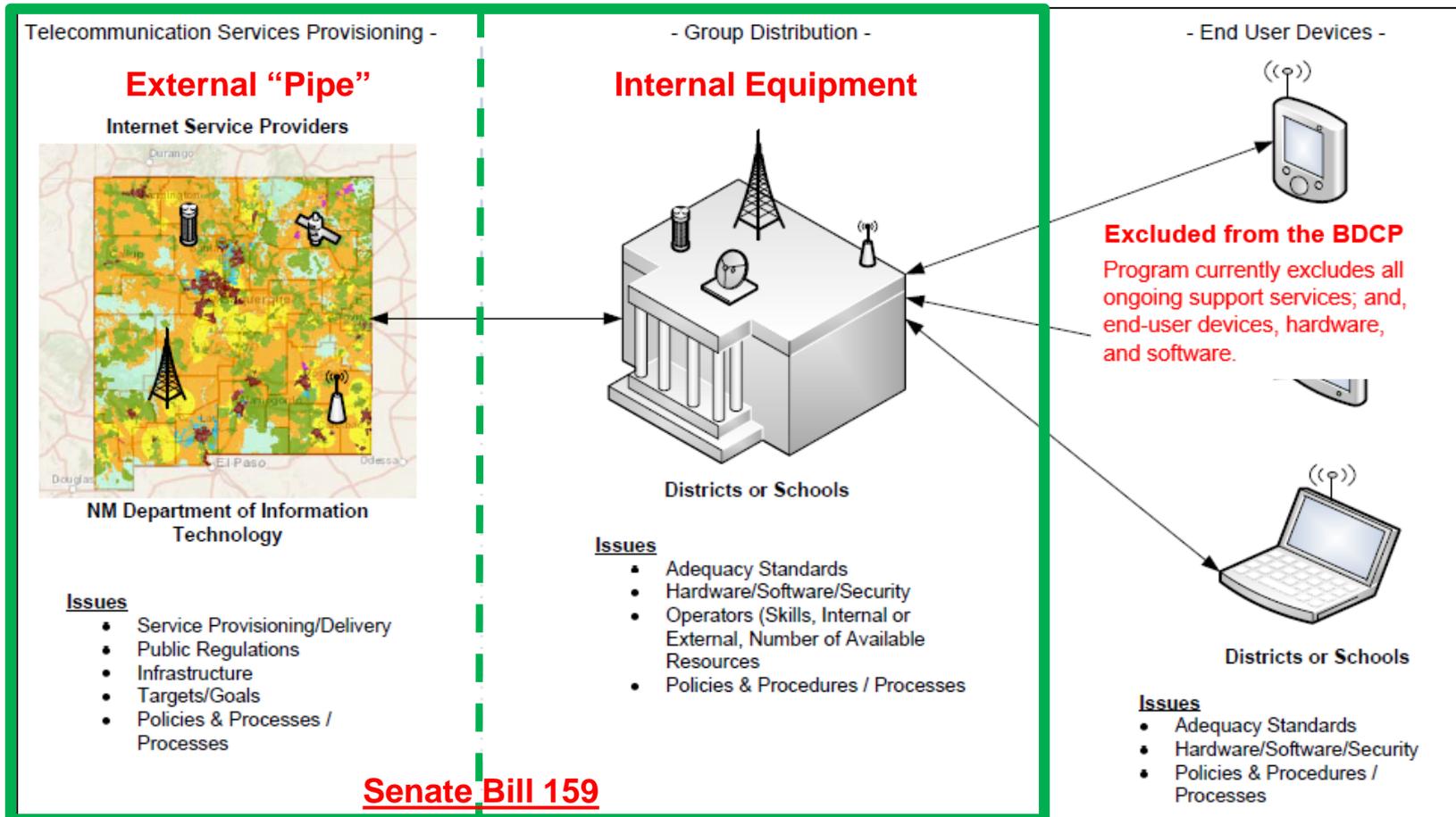
Ovidiu Viorica, Broadband Program Manager

Partnering with New Mexico's communities to provide quality, sustainable school facilities for our students and educators.

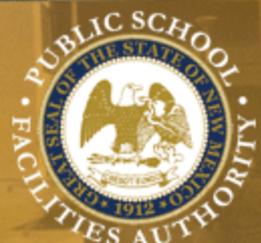


High-Level View

As displayed below, broadband originates from Internet Service Providers (ISP), is distributed to districts/schools and then reaches students via end-user devices. The green area is covered by the BDCP.



Partnering with New Mexico's communities to provide quality, sustainable school facilities for our students and educators.



FCC goals



GOALS

The FCC has adopted goals for K-12 connectivity. In this report we used the goals as a benchmark for where students are today

Purpose	2014	2018
Internet access	100 kbps per student/staff	1 Mbps per student/staff
District transport (WAN)	*1 Gbps per school	Scalable to 10 Gbps per school

More information: <https://www.fcc.gov/page/summary-e-rate-modernization-order>

*2014 WAN targets were recommended by SETDA, but the FCC did not adopt any short term WAN goals

Highlight Added by PSFA

Strength of broadband infrastructure



GOALS

Operational

External “Pipe”

Internal Equipment

INTERNET ACCESS
1 Mbps per student*

WAN
1 Gbps per school

Wi-Fi / LAN
1:1 in every classroom

Do districts buy enough Internet access to support their students?

Do schools have fast enough connections to their district hub?

Do schools have infrastructure for Wi-Fi?

31% of districts < 100 Kbps
100% of districts < 1 Mbps

72% of schools < 1 Gbps

92% of schools need upgrades (per HP report)



Sources: 2015 FCC Form 471 E-rate applications

Titles Added by PSFA

Internet access costs are variable across the state



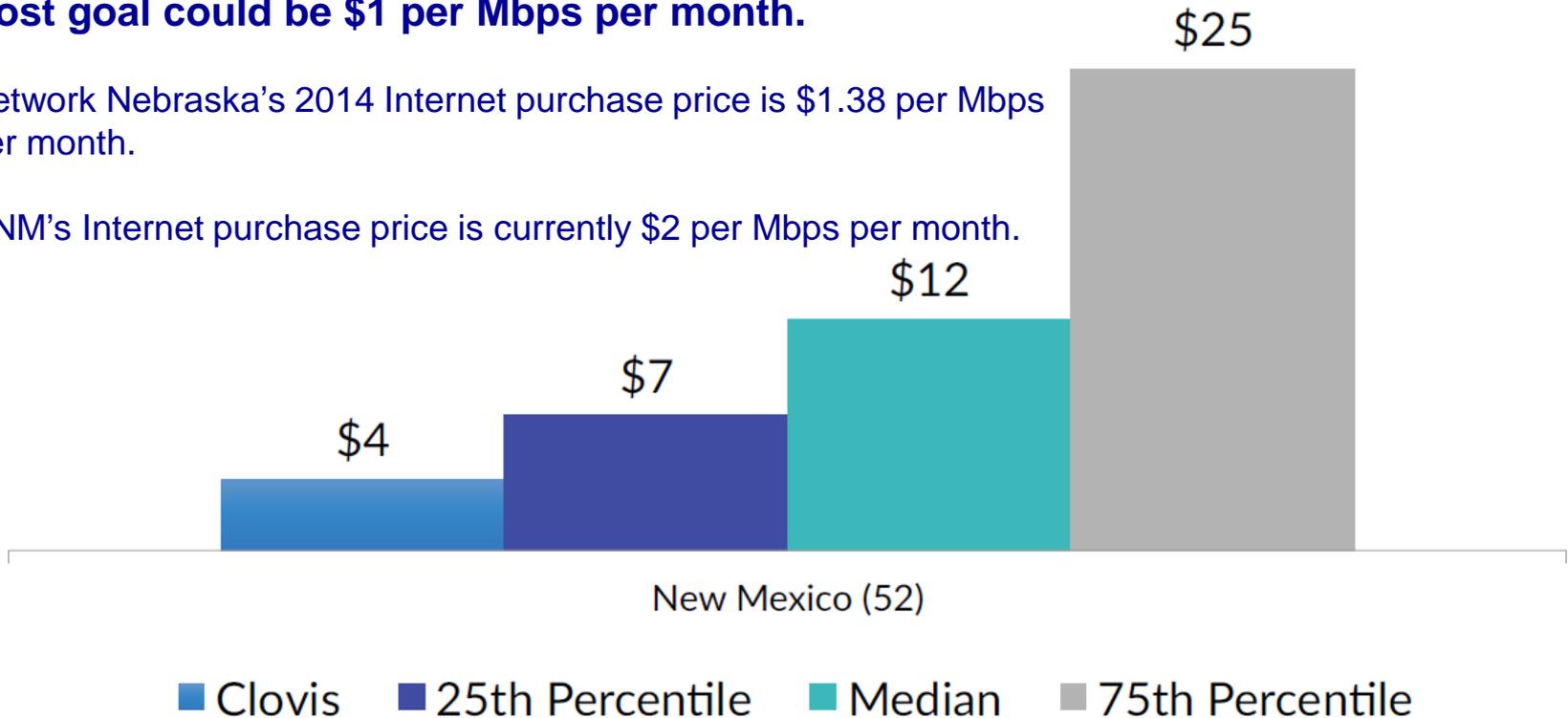
AFFORDABILITY

District Internet Access Cost per mbps

In an aggregated model, the State of New Mexico's Internet cost goal could be \$1 per Mbps per month.

Network Nebraska's 2014 Internet purchase price is \$1.38 per Mbps per month.

UNM's Internet purchase price is currently \$2 per Mbps per month.



Sources: 2015-16 E-rate data

Notes Added by PSFA

Alternative Service Models

For K-12 Schools, 1 Mbps per Student and Staff

No.	Model	Current Annual Cost (Millions)	Estimated 10 Year Cost (Millions)	Estimated 20 Year Cost (Millions)
0.	Current NM Model (Avg. 75 Kbps/user for public schools Avg. 183 Kbps/user for public charter schools)	\$10.5	\$400 M - \$1.1 B	\$800 M - \$2.2 B
1.	State built and operated network	N/A	\$567.9	\$777.9
2.	State built and operated open access aggregation network (Private sector service providers connect districts to aggregation network)	N/A	\$620.5	\$1,044.5
3.	Leased open access private sector aggregation network (Private sector service providers connect district to aggregation network)	N/A	\$314	\$628
4.	Managed service network for all participating schools and districts (Likely leveraging existing networks)	N/A	Unknown without Procurement (RFI/RFP)	



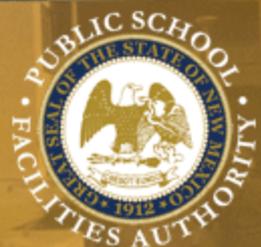
Estimated Capital Costs

For K-12 Schools, 1 Mbps per Student and Staff

No.	Model	Capital Construction & Electronics (Millions)
1.	State built and operated network	\$357.9
2.	State built and operated open access aggregation network (Private sector service providers connect district to aggregation network)	\$196.5
3.	Leased open access private sector aggregation network (Private sector service providers connect district to aggregation network)	\$40.0
4.	Managed service network for all participating schools and districts (Likely leveraging existing networks)	\$40.0

ctc technology & energy

engineering & business consulting



BDCP Bandwidth Standard Analysis

(100 kbps per student/staff vs. 1000 Kbps (1 Mbps) per student/staff)

Table 8: Estimated Capital and Operational Costs for Statewide Fiber Network

1)

Capital (Const. and Electronics)	Annual Operating				Total 10-Year (Capital and Operating)
	Internet (100 Gig)	Transport	Other	Total	
\$357.9 mil.	\$1.2 mil.	-	\$19.8 mil.	\$21.0 mil.	\$567.9 mil.

Same for 100 Kbps - 1 Mbps / user

There is no difference in capital cost with service levels of 100 Kbps per user to 1 Mbps per user.

Table 9: Estimated Capital and Annual Cost for Statewide Aggregation Network

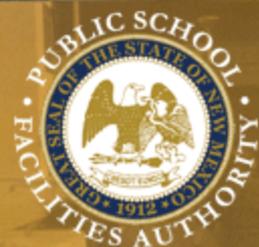
2)

Capital (Const. and Electronics)	Annual Operating				Total 10-Year (Capital and Operating)
	Internet	Transport	Other	Total	
100 Kbps per user					
\$196.5 mil.	\$0.12 mil.	\$8.3 mil.	\$13.2 mil.	\$21.6 mil.	\$412.5 mil.
1,000 Kbps per user					
\$196.5 mil.	\$1.2 mil.	\$28 mil.	\$13.2 mil.	\$42.4 mil.	\$620.5 mil.

Table 10: Estimated Capital and Annual Cost for Outsourced Statewide Aggregation Network

3)

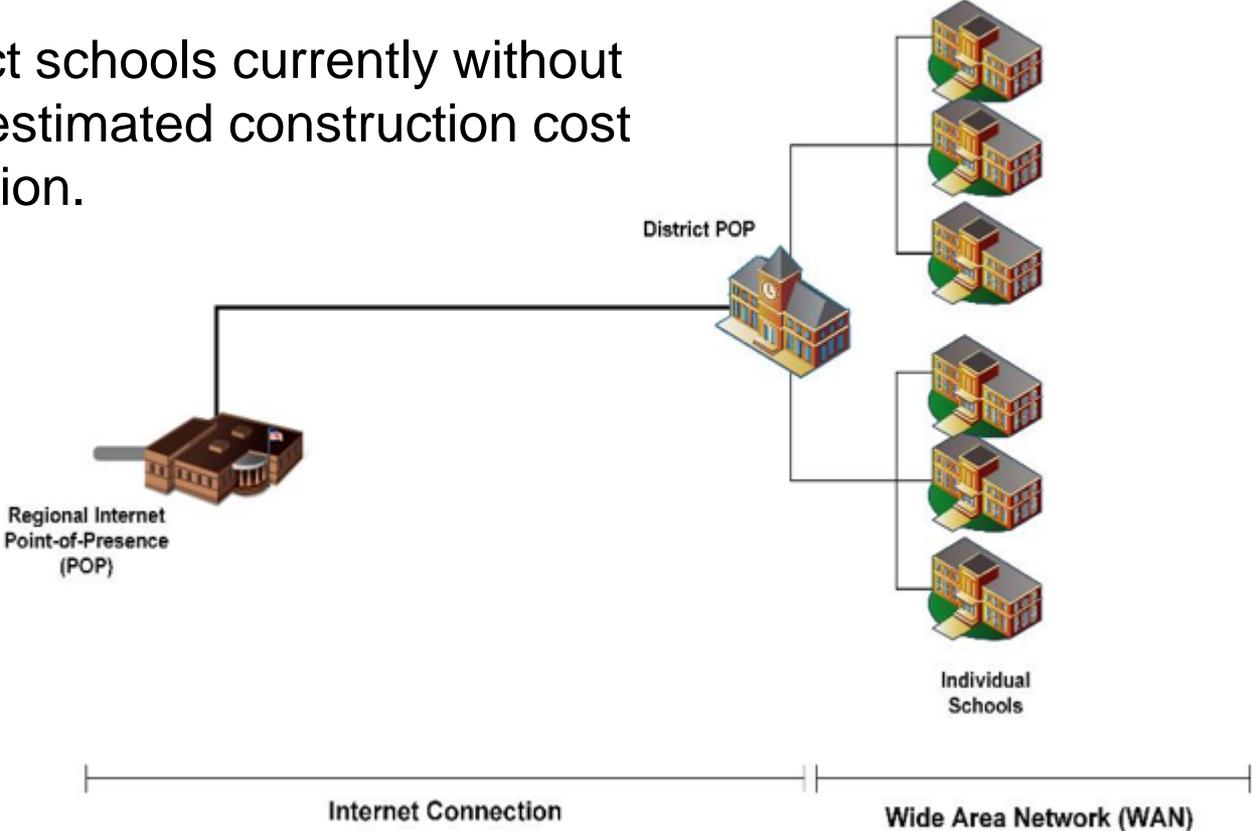
Capital (Const. and Electronics)	Annual Operating				Total 10-Year (Capital and Operating)
	Internet	Transport	Other	Total	
100 Kbps per user					
\$40.0 mil.	\$0.12 mil.	\$8.3 mil.	-	\$10.6 mil.	\$106 mil.
1,000 Kbps per user					
\$40.0 mil.	\$1.2 mil.	\$28 mil.	-	\$31.4 mil.	\$314 mil.



School Wide Area Network (WAN) Architecture

Figure 1: Distributing Internet Service from a District POP to Individual Schools

To connect schools currently without fiber, the estimated construction cost is \$40 Million.



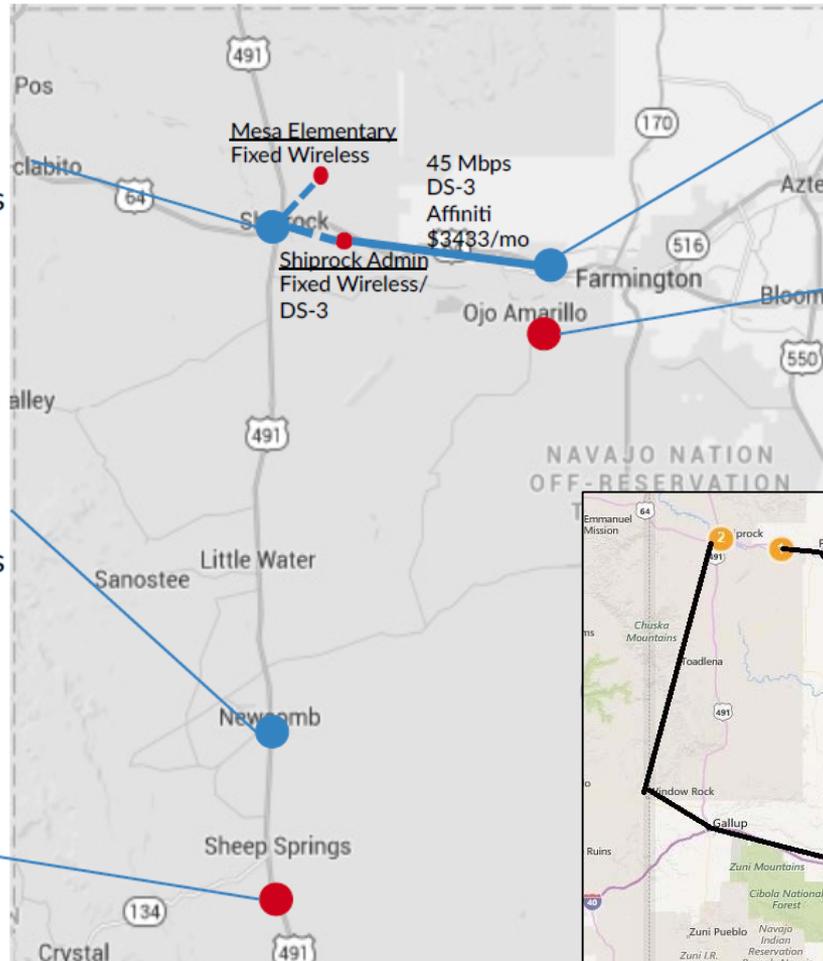
Case Study: Central Consolidated School District

External Infrastructure

Shiprock High School
 150 Mbps
 Lit Fiber
 Frontier Communications
 \$5497/mo

Newcomb High School
 150 Mbps
 Lit Fiber
 Frontier Communications
 \$5497/mo

Naschitti Elementary
 10 Mbps
 Microwave
 NTUA
 \$1365/mo



Kirtland Business Office
 200 Mbps
 Lit Fiber
 CenturyLink
 \$3404/mo

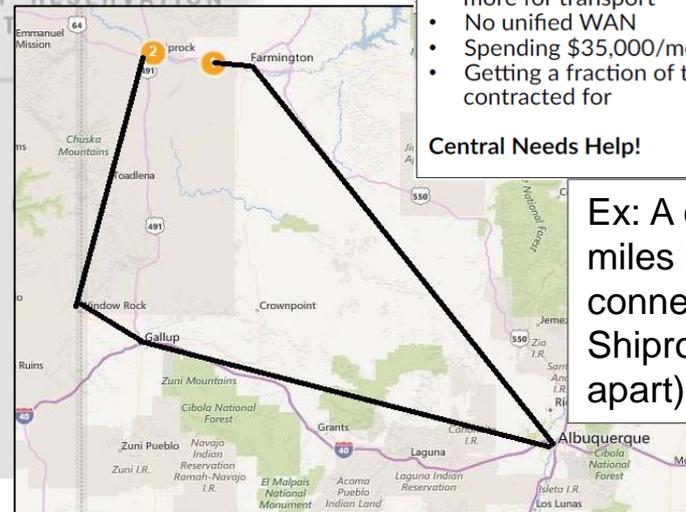
Ojo Amarillo Elementary
 100 Mbps
 Sacred Winds
 Fiber/Microwave
 \$5200/mo

In Summary:

- 4 different service providers for IA, plus 2 more for transport
- No unified WAN
- Spending \$35,000/mo on broadband
- Getting a fraction of the bandwidth they're contracted for

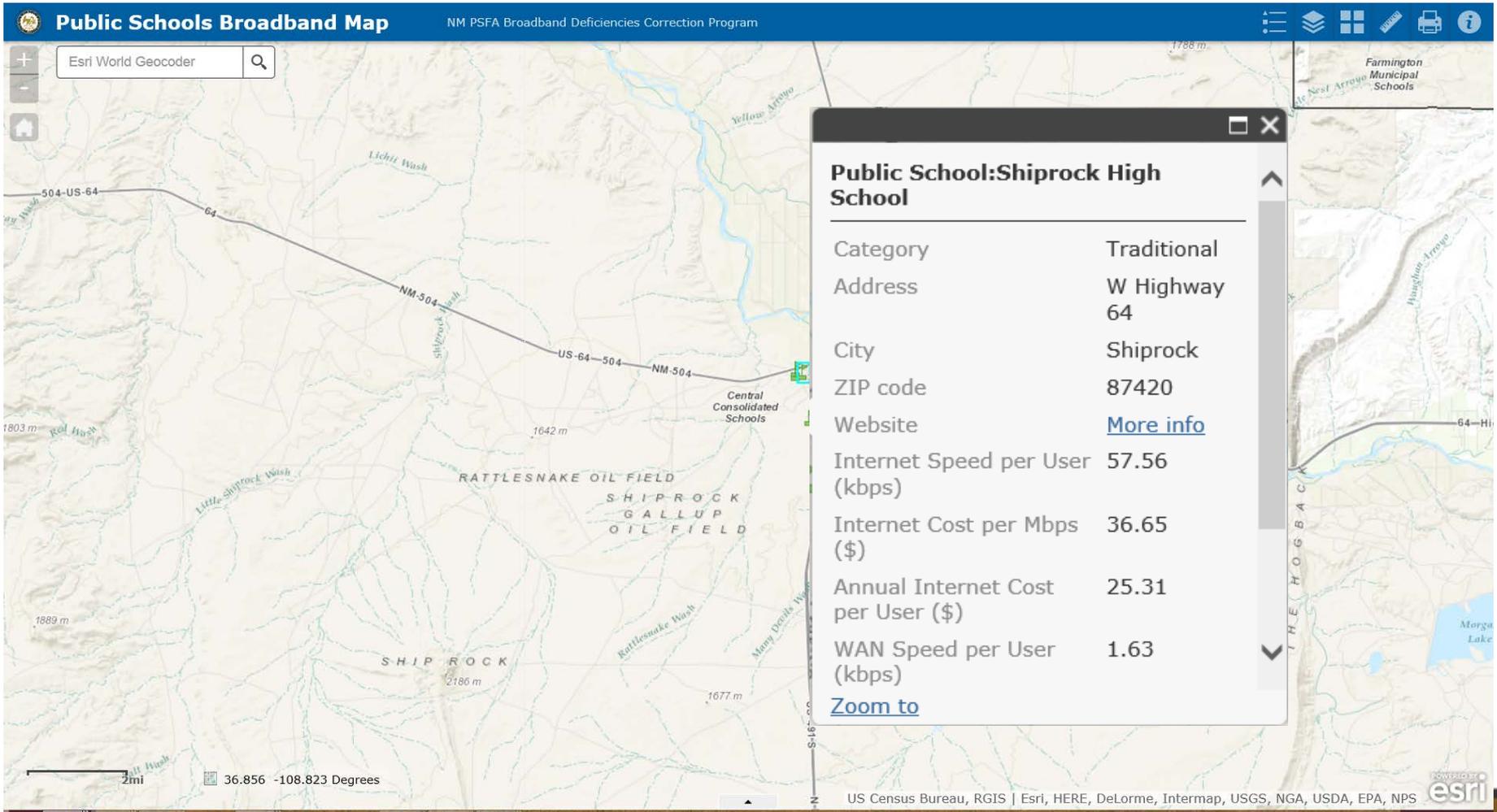
Central Needs Help!

Ex: A circuit ~400 miles long is used to connect Kirtland to Shiprock (16 miles apart)

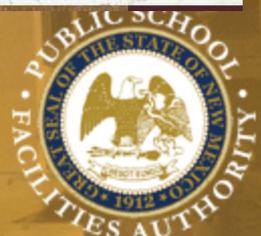


Title, lower graph and example added by PSFA

Public Schools Broadband Map



Partnering with New Mexico's communities to provide quality, sustainable school facilities for our students and educators.



State matching can reduce costs even further



FIBER

If the state funds up to 10% of the cost for a school's fiber build, then the FCC will match. This opportunity is guaranteed for the next three years

Cost to connect a school in district ABC to fiber:	\$100,000
- E-rate discount for ABC (80%):	- \$80,000
- New Mexico funds 10% of the build:	- \$10,000
- FCC matches New Mexico's 10%:	- \$10,000
<hr/>	
Remaining costs to district ABC:	\$0

Preliminary Findings – School Networks

Broadband Deficiencies Correction Program (BDCP)

Internal Equipment

- Based on the HP field assessment with support from schools, most networks require upgrades (**841 locations**):
 - 96% require switches replacement, power back-up etc...
 - **92% require wireless network upgrades**
 - 54% require upgrades to primary distribution equipment (routers, filters...)
 - 37% require a way to monitor their network
 - 35% require facilities upgrades (cooling, equipment protection against dust, water, physical damage...)
 - 30% require wiring upgrades

Partnering with New Mexico's communities to provide quality, sustainable school facilities for our students and educators.



\$39 million in E-rate eligible funding is available



WI-FI

As a result of E-rate modernization, the FCC adopted a budget of \$150/student, pre-discount, for category 2 services over the next 5 years.

What this means for New Mexico:

\$39 million

of the state's five year E-rate budget for wired and wireless networks in the building is still available

96%

of districts have yet to exceed the new \$150/student budget

39%

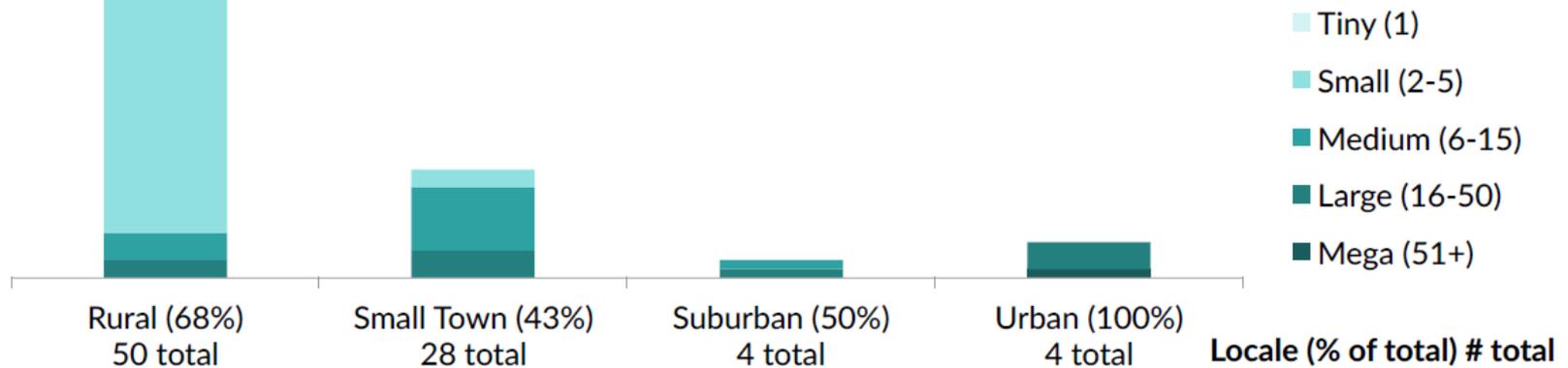
of districts have not requested any C2 funding

Sources: 2015-16 E-rate data

Methodology

- Our data is based on E-rate funding requests for 2015-2016
- Our data is a sample
 - 60% of NM school district were verified as clean in our sample
- Our data does not include charter schools or BIE schools
- We used current staff counts for the 2014 goals, and 5 year counts for the 2018 goal

Number of school districts by size and location



State Roll-up Report for 2018 Goal

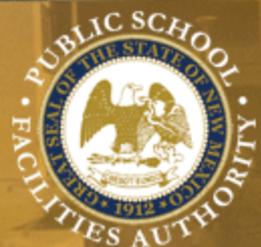


New Mexico Public School Facilities Authority
BROADBAND DEFICIENCIES CORRECTION PROGRAM (BDPCP)

10/2/2015

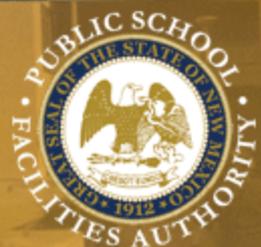
Statewide Schools Rollup Report for 1000 Kbps/headcount

Schools with Direct Broadband Connections - based on a rating of 1000 Kbps/Student & Staff	Number of Schools		ROM Internet Costs	Subtotals
Connected Schools who's Broadband MEETS the 1000 Kbps standard	2	NO ASSOCIATED COSTS TO IMPROVE BROADBAND		
Connected Schools who's Broadband does NOT meet the 1000 Kbps standard	191			
Low Cost to improve Broadband connection to 1000 Kbps	191		\$24,800,000.00	\$24,800,000.00
Median Cost to improve Broadband connection to 1000 Kbps	191		\$61,350,000.00	\$61,350,000.00
High Cost to improve Broadband connection to 1000 Kbps	191		\$97,900,000.00	\$97,900,000.00
Total Number of Direct Connected Schools	193			



State Roll-up Report for 2018 Goal (Continued...)

Schools with Dependent LAN/WAN Connections - based on a rating of 1000 Kbps/Student & Staff	Number of Schools		ROM Transport Costs	Subtotals
Dependent Schools who's infrastructure MEETS the 1000 Kbps standard	281	NO ASSOCIATED COSTS TO IMPROVE LAN/WAN		
Dependent Schools who's infrastructure does NOT meet the 1000 Kbps standard	366			
Cost to improve LAN/WAN connection to 1000 Kbps	366		\$16,200,000.00	\$16,200,000.00
Total Number of Dependent Schools	647			

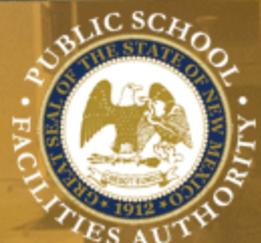


State Roll-up Report for 2018 Goal (Continued...)

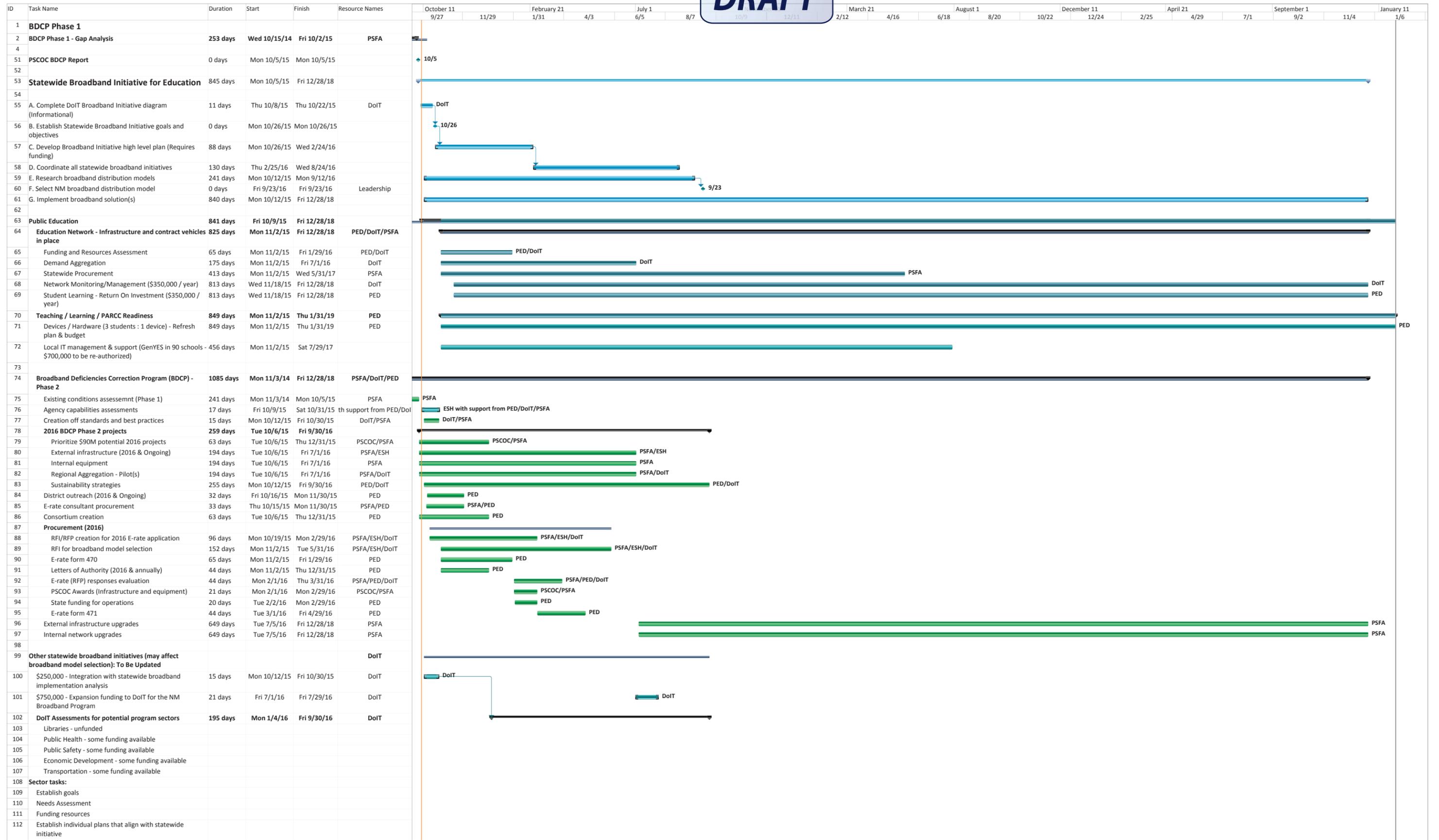
Other Improvements for all Schools noted to meet State of New Mexico and Industry IT standards:	Number of Schools	ROM Capital Costs	ROM Additional Annual Operational Costs	Subtotals
Total number of all NM public schools surveyed to date:	840			
# of Schools to improve Network Monitoring & Cost	308	\$2,801,090.60	\$771,518.44	\$3,572,609.04
# of Schools to improve Primary Distribution Equipment & Cost	490	\$12,771,892.00	\$3,918,440.40	\$16,690,332.40
# of Schools to improve Wired Networking & Cost	806	\$72,005,955.67	\$22,743,152.82	\$94,749,108.49
# of Schools to improve IT Facility & Cost	291	\$5,944,500.00		\$5,944,500.00
# of Schools to improve Data Cabling & Cost	250	\$44,126,658.24		\$44,126,658.24
# of Schools to improve Wireless Networking & Cost	766	\$29,080,175.77	\$8,201,438.00	\$37,281,613.77
Subtotals		\$166,730,272.28	\$35,634,549.66	\$202,364,821.94

The following handouts are available on the PSFA website.

1. CTC's Summary of Findings and Recommendations
2. Key to Interpreting Status Reports
3. Sample Reports
4. Survey Process Guide



DRAFT



Project: WorkPlan_BroadbandInit
 Date: Fri 10/9/15

Task Split

Milestone Summary

Project Summary External Tasks

External Milestone Inactive Task

Inactive Milestone Inactive Summary

Manual Task Duration-only

Manual Summary Rollup Manual Summary

Start-only Finish-only

Deadline Progress