



Dig Once

Model Legislation

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Executive Summary

This white paper addresses the concept of Dig Once and policy implementations. It is intended to give insight to state and city officials, as well as field engineers in the telecommunications industry, who are interested in learning more about Dig Once policies and the advantages associated. It was written to acknowledge concerns and questions individuals and organizations may have about implementing a Dig Once policy. As data capacity demands grow and technology continues to advance, there is a need to preserve the land and maximize the space available in highway right-of-ways. There is also a push to close the digital divide by deploying fiber to more rural areas who are behind the times of technology.

This white paper lays out various legislations and current policies that have been enacted in favor of Digging Once. These serve to build the foundation of importance this topic has on a national scale. Additionally, it allows interested prospects to gain ideas of different implementation options and be aware of the process of getting a policy approved. By informing the audience of the various benefits of Digging Once, such as immense cost savings and economic development, this paper aims to encourage states and local municipalities to execute a similar policy.

Introduction

The purpose of this paper is to discuss the benefits and advantages to implementing a Dig Once policy. The definition of Dig Once being used is “policies and practices that minimize the number and scale of excavations when installing telecommunication infrastructure in a highway right-of-way.”¹ When referring to a Dig Once policy, the definition is “a policy that mandates inclusion of broadband conduit--plastic pipes which house fiber-optic communication cables--during the construction of any road receiving federal funding.”² There are various types and ways to enact a Dig Once policy, whether it be on a city, county or state level. These will be discussed throughout the paper.

Why Dig Once Policies Are Needed

Dig Once policies have several added benefits to states and communities, which will be discussed further in this paper. However, establishing some advantages up front allows for a better focus and application of the information. Some reasons to implement a Dig Once policy include a reduction in deployment costs, encouraging competition among internet service providers, and working to close the digital divide. Current policies in place focus less on direct deployment of fiber to communities, but by increasing the conduit that is available, telecommunications providers can more easily move into a town that was previously at a disadvantage.

Further, the implementation of Dig Once policies can advance government interests by:

1. Ensuring fast and efficient deployment of telecommunication networks.
2. Reducing costs by coordinating among departments and decreasing disruptions to the community and roads.
3. Improving aesthetic beauty of neighborhood by undergrounding lines.

Dig Once policies can be used in a variety of ways, such as aiming to connect residents, businesses, and mobile cell sites. It can also save taxpayer dollars and maximize the space available in the right-of-way.

Right-of-Way

In this paper, right-of-way is defined as “any highway agency-owned or leased land that is most often used to create a clear zone or travel lane within a roadway.”³ It is important to note the right-of-way because any Dig Once policy must accommodate the overcrowded right-of-ways and be able to support changes to the infrastructure design.

¹ FHWA, Office of Transportation Policy Studies. *Policy Brief: Minimizing Excavation Through Coordination*. (2013, October). Retrieved from https://www.fhwa.dot.gov/policy/otps/policy_brief_dig_once.pdf

² Brodtkin, J. “*Dig Once*” rule requiring fiber deployment is finally set to become US law. (2018, March 7). Retrieved from <https://arstechnica.com/tech-policy/2018/03/dig-once-rule-requiring-fiber-deployment-is-finally-set-to-become-us-law/>

³ US DOT, FHWA, & Office of Policy and Governmental Affairs. *Executive Order: Accelerating Broadband Infrastructure Deployment*. (2012, Dec.). Retrieved from <https://www.fhwa.dot.gov/policy/otps/workplan.pdf>

The Digital Divide

An additional purpose of this paper is to highlight secondary benefits of a Dig Once policy. One of these includes working to close the digital divide. The digital divide is defined as “the gap between demographics and regions that have access to modern technology and communications and those that don’t.”⁴ Ideally, by Digging Once, conduit is being installed in more and more locations in the public right-of-way, encouraging competition, thus lowering the cost of broadband internet.⁵ Currently, the FCC estimates that 75 percent of households have only one option for providers offering average speed.⁶ Additionally, many state policies have declared that conduit needs to be buried to accommodate “reasonable anticipated” future demand, which will also work to close the digital divide as more and more people gain access to high-speed broadband internet.⁷ A more robust network also increases economic development and encourages community growth and creates a more qualified and connected workforce.⁸ While other initiatives are in place to close the digital divide, Dig Once policies work to deploy more conduit and fiber at a lower cost in more locations, thus getting the United States closer to allowing everyone to have access to reliable internet networks.

About Dura-Line

Dura-Line, a leading global manufacturer and distributor, is transforming the structure of communication. Technology, data, and constant communication are more intertwined with our daily lives than ever before in human history. Dura-Line provides the essential infrastructure – conduit, FuturePath, cable-in-conduit, and accessories – to make this possible. Through our innovative product solutions and unparalleled customer insight, Dura-Line creates what connects us, serving a wide variety of markets including telecommunications, enterprise networking, energy, and transportation.

⁴ Coleman, A. *Dig Once: Using Public Rights-of-Way to Bridge the Digital Divide*. (2017, July). Retrieved from https://www.csg.org/pubs/capitolideas/enews/cs41_1.aspx

⁵ Fiber to the Home Council, *DIG SMART: Best Practices for Cities and States Adopting Dig Once Policies*. (2018). Retrieved from <https://www.ncbroadband.gov/wp-content/uploads/2018/01/FTTHCouncil-DigOnceDigSmart11.pdf>

⁶ *Ibid.*

⁷ Dura-Line. *Dig Once, Dig Smart*. (2018, April 1). Retrieved from <https://www.duraline.com/about-us/news/dig-once/>

⁸ FHWA, *Policy Brief*, (2013).

Conduit

This section will establish some background on conduit and why its deployment is beneficial. It will cover a history of it, how it is used in the industry, and some products and installation methods that are common in Digging Once.

History of Conduit and Conduit Network Systems

Conduit has been around for several decades, gaining popularity particularly in the mid-19080s when fiber optic cable deployment was growing. These cables transmits signals for voice, video and data, making them a popular choice. They could be installed in lengths up to 30,000 feet with few splice points interfering with signal attenuation. However, these cables are much thinner than traditional cables and required more protection; thus, the conduit network system was born.

The conduit network systems available in that time were typically 3.5” to 6” in diameter, as they previous copper cables were much thicker and took up more space. Since the fiber optic cables were much smaller in diameter, the new conduit could be as small as 1” to 1.25”. These were installed in the larger ducts, creating a new method of deployment called MicroDucts. This is becoming common place of today. The method requires no additional methods or tools and maximizes the space that was already existing.

Industry and Uses of Conduit

Conduit is used to protect fiber cables that are installed underground, namely cables that are used in the telecommunications industry. Protection is essential during both installation and throughout the life of the cable. Fiber optic cables are used to provide data transmission at very quick speeds.⁹ The technology of the cable allows it to convert electronic signals carrying data to light, sending that through glass or plastic fibers, then converting the light back to an electronic form.¹⁰ There are multiple sizes of fiber available, affecting what size conduit can be used. By using conduit to protect the fiber cables, the cable stays protected from environmental elements, natural disasters, and from being crushed. There have been noted problems of conduit availability, adoption and utilization, as broadband access has historically been driven by private investors.¹¹ However, with market innovations, access has improved considerably in the last decade. Fiber cables typically have a useful life of 20 to 25 years, while the conduit can last for 25 to 50 years.¹²

There are many reasons conduit is the preferred protector of fiber cables. During installation, there are several reasons it is advantageous to be used:¹³

⁹ Waxman, Eshoo, Markey & Matsui, *Planning and Flexibility*, (2012).

¹⁰ *Ibid.*

¹¹ *Ibid.*

¹² *Ibid.*

¹³ Dickinson, P., Hayward, P. & Hines, M. *Breakthrough Research on DAS for TPI Monitoring* [Webinar]. (2020, Feb. 2). Retrieved from <https://www.fiberopticsensing.org/p/cm/ld/fid=932&tid=393&sid=3074>

1. Easier installation, as it can be put in section by section between access points.
2. Greater ability to accommodate the unexpected changes of a route.
3. Helps reduce the cost of splice points and improve the fiber loss budget for the total system.
4. Locatable conduit available, allowing the fiber cable to be constructed with only non-conductive dielectric materials. This creates easier access to the fibers.

The permanency of the pathway is also a big advantage of conduit. It allows for easy removal of damaged or outdated cable, the ability to increase capacity of traditionally tight spaces and can be re-routed easily.¹⁴

MicroTechnology

MicroTechnology is a term that discusses new technologies like MicroDucts and MicroTrenching that take advantage of smaller spaces. As technology has advanced, both conduits and fibers have become smaller in size, leading to micro versions of existing technologies. By utilizing this technology when Digging Once, it is preventing future excavations, saving labor costs and increasing deployment speeds.

MicroDucts

MicroDucts are a new evolution of conduits that are smaller in diameter, from 5mm to 27mm. Just like standard High Density Polyethylene (HDPE) conduit, they house fiber cables with no additional tools or methodologies necessary. The benefit to using MicroDucts is that they can maximize space without comprising the fiber cables. In some cases, they are placed into existing empty conduits, which is a method called overriding. An added benefit is MicroDucts are future-friendly and can be installed empty to be filled with fiber cables at a later point in time, taking up less space than the standard conduit in the meantime. They also reduce construction costs and deployment time, as there is no future excavations necessary. Dura-Line's MicroDucts are co-extruded with SuperSilicore™ that reduces friction during cable installations and hold up to 432 count fiber MicroCables. Typical Dig Once policies include the burial of empty conduit, and MicroDucts are the perfect option to bury to accommodate future demands.

MicroTrenching

MicroTrenching is the placement of reduced diameter MicroDuct pathways into the utility space with reduced impact on the existing infrastructure.¹⁵ The traditional method of trenching was proving to be too expensive for rapid deployment of broadband infrastructure; however, with MicroTrenching, a cut in the ground is just large enough to hold conduit, making for cheaper installation costs.¹⁶ Other benefits of MicroTrenching include fewer road closures, completion taking one fifth of the time, one third of the cost, and far less manpower.

¹⁴ Dickinson, P., Hayward, P. & Hines, M., *Breakthrough Research* [Webinar], (2020).

¹⁵ Dura-Line. (2019). *MicroTrenching*. Knoxville, TN.

¹⁶ *Ibid.*

This method is used in a variety of applications, such as Fiber to the Home, long hauls, smart cities, and more. Common products used during installation include FuturePath Flex, FuturePath, locatable MicroDuct, or custom FuturePath.¹⁷ Due to the non-evasive nature of this trenching methodology, it is ideal when Digging Once and should be considered when creating a Dig Once policy.

Right-of-Ways

Right-of-ways, as defined in the introduction, are “any highway agency-owned or leased land that is most often used to create a clear zone or travel lane within a roadway.”¹⁸ Because of different service providers needing their own conduit pathways to place fiber, the right-of-ways have become overcrowded. As cities and infrastructure needs continue to grow, the conduit network systems need to, too. By maximizing the space available in existing conduits in the right-of-way with MicroDucts and MicroTrenching, these pathways are able to evolve as technology does. The right-of-way network systems must be flexible and easily upgradable; i.e. it must have enough pathways to accommodate growing needs in technology. This ultimately saves construction costs and allows cities and states to better serve the population.

FuturePath

FuturePath is a Dura-Line product that consists of two or more MicroDucts bundled in a single oversheath. With multiple configurations and customization options available, FuturePath is a great way to maximize space and install future-ready conduit network systems. It is installed just like a standard duct with no special equipment or tools required. When Digging Once, it is ideal for utilizing some of the pathways and leaving others empty for future upgrades needed. FuturePath is also accommodates moves, adds and changes with more ease than typical conduit, particularly because of the empty pathways that are left in the initial burial. Dura-Line carries many variations of FuturePath that have been optimized for different cables, such as gas distribution, and installation methods, like FuturePath Aerial.

FuturePath is a very advantageous product when combined with Digging Once. Some of the key advantages are highlighted below:

- Can hold smaller, higher fiber density MicroCables.
- Saves space in overcrowded right-of-ways.
- Requires fewer and smaller handholes.
- Reduces manpower and machine power needed for installation.
- Reduces fuel consumption and gas emissions.
- Lowers material handling requirements.
- Lessens soil displacement.
- More efficient than traditional 2 inch, 1.5 inch, 1.25 inch standard conduits that were ideal for larger cables.

¹⁷ Dura-Line, *MicroTrenching*. (2019).

¹⁸ US DOT, *Executive Order*, (2012).

Installations

There are multiple ways conduit can be installed that is typically dependent on the type of project being completed. Installations highlighted here are often associated with Dig Once techniques or have found added benefits by making use of them.

Plow

Plow installations are a common method of conduit deployment. It can be used for single or multiple ducts and with products like FuturePath. It requires less handling of the duct and can be accessed in the future with handholes. It is often in long hauls, smart cities, fiber to the home and cellular applications.

Directional Boring

Directional boring is one of the most common and efficient ways of placing MicroDucts in residential and commercial areas. By Digging Once to create predetermined spacing intervals, this installation method is minimally disrupting. It is also useful when expanding or upgrading previously installed infrastructure. This quick deployment and less evading installation is great when setting up conduit network systems in residential areas.

Trenching

Trenching is another installation method that can be used in conjunction with Dig Once. This is because by digging a trench once and burying spare conduit, the trench will never have to be re-excavated to upgrade or change the conduit network system. Additionally, more than one conduit can be installed in a trench, maximizing the space available.

Override

The process of installing smaller conduit within an old, existing conduit is called overriding. This is because the space that used to exist is being overridden in order to maximize it and allow more pathways to be placed. MicroDucts are the product used when applying this concept without having existing conduit in place. It is popular in Dig Once policies because it is saving the labor of extracting the existing conduit while also allowing for additional pathways to be placed to accommodate future growth and demand.

Aerial

While aerial installations are not typical in Dig Once policies, it can be an alternative if the right-of-way is lacking space or the terrain makes it difficult to lay conduit underground. In these instances, Figure-8 Aerial FuturePath is used and attached directly to the poles.

Fiber to the Home

Currently, there is a push for more direct deployment to the home, known as fiber to the home, as technology continues to evolve and increase in demand. By building multipath conduit network systems, different internet service providers (ISP) can come into the community. This encourages competition and leads to lower prices. It is also attractive for business in the area, as they have more freedom in choice, as well. This also prevents monopolization of larger companies and allows smaller, local telecommunication companies to afford the fiber. Additionally, the closer the fiber is to the residence, the better connectivity and speed the home has. This better quality internet appeals to residents moving into the area and keeps current residents happy at a low cost. Wireless technology may be used to connect to residences and businesses, as there can be cost savings associated.¹⁹

Some Dig Once policies, such as in Loma Linda, California (highlighted later in the paper), have made a deal with developers that requires greenfield development to connect back to the city center. This allows for any future businesses that come along to have enough pathways to connect to whichever provider they prefer and guarantees faster speeds and higher data capacity. This technology meets the increasing demand of more data capacity and can easily be upgraded in the future.

Fiber Optic Sensing

Fiber optic sensing relies upon measurement of a small amount of light returned from pulses of laser light that traveled down the fiber cable in the opposite direction. This technology essentially converts the optical fiber into an infinite, or distributed, series of sensors. The distributed sensing along the length can monitor vibration, temperature, or strain. Fiber optic sensing is growing in global importance relative to monitoring applications in many vertical markets, including railways, roadways, power cables, oil and gas wells, pipeline conditions, just to name a few. In addition, the technology provides both asset and perimeter security across multiple markets. Adoption and popularity is increasing with growing awareness as the benefits of fiber optic sensing are becoming realized. Given its monitoring abilities, it can provide significant added benefit to the already existing utility of fiber cable and accelerate market growth.

A fiber optic sensing system is comprised of the fiber cable in the conduit, an interrogator that reads real time signals off the cable, and intelligent monitoring software. This software presents a network operator with its analysis of what it is detecting and what it considers to be normal baseline background information. The intelligent software can distinguish between background noise and anticipated or recognized occurrences, and only triggers an alarm during abnormal events.

¹⁹ Waxman, Eshoo, Markey & Matsui, *Planning and Flexibility*, (2012).

Distributed Acoustic Sensing

Distributed acoustic sensing (DAS) is one type of fiber optic sensing that provides intelligence for a range of markets and applications.²⁰ It monitors, detects, and classifies acoustic vibration patterns.²¹ Small changes are identified from pulse to pulse and by changes in the interferometric signal.²² Conduit pathways for optical fiber cables offer advantages that include added protection, easier installations, flexibility, technology upgrades and added capacity for additional use and monetization. The combination of sensing technology with conduit pathway technology is increasing in vertical markets like security and asset integrity, pipelines and smart city applications. In consort with Dig Once policies, installing sensor technology gives more peace of mind regarding the integrity of the cable and can save thousands of dollars from early detections of potential issues.

A research experiment conducted by Dura-Line and part evaluated the reliability of the sensing capabilities with “event stimuli” such as footsteps, nearby excavation, and leak simulation in conduit.²³ One of the main conclusions is that distributed acoustic sensing, a technology used for fiber sensing applications, works extremely well in commercial applications when a conduit system is deployed to protect the fiber optic cable. The webinar presenting the results can be found at <https://www.fiberopticsensing.org/p/cm/ld/fid=734&tid=310&sid=3074> and <https://www.youtube.com/watch?v=BKhZbpwUofc>

²⁰ FoTech. *What is DAS?* (n.d.) Retrieved from <https://www.fotech.com/about/what-is-distributed-acoustic-sensing/>

²¹ *Ibid.*

²² *Ibid.*

²³ Dickinson, P., Hayward, P. & Hines, M., *Breakthrough Research* [Webinar], (2020).

Background

There have been numerous attempts at passing legislations requiring Dig Once policies; however, none have become mandated bills. Rather, they serve as inspiration that, when paired with the Federal Mandate, allow cities, counties, and states to better execute their own policies. This section will review the governing bodies, the goals of the legislation, and the various acts and legislations that have attempted to pass in the United States.

Federal Communications Commission

The Federal Communications Commission (FCC) is a regulatory agency that monitors and regulates interstate and international communications by radio, television, wire, satellite, and cable throughout the United States, its territories, and the District of Columbia.²⁴ Since conduit installments carry fibers that transmit internet signals, it fosters its own opinions and recommendations on Dig Once policies. Broadly speaking, it believes that state policies need to require contractors to install spare fiber and empty conduits as is necessary for a reasonably anticipated future demand. However, officials have also stated that they would support a policy that required the feasibility and need for broadband conduit to first be evaluated as a part of the construction process.²⁵ Doing so would limit the potential of unused conduit, but not support future growth needs.

The FCC's National Broadband Plan works to encourage broadband deployment and suggests that Congress enacts a federal Dig Once policy for all federally funded highway projects in the public right-of-way.²⁶ Additionally, this plan recommends that federal financing of highway, road, and bridge projects from the USDOT be reliant on states and localities allowing joint deployment of conduits.²⁷

U.S. Department of Transportation

The U.S. Department of Transportation (DOT) works to provide the safest, most efficient modern transportation system that improves the quality of life while increasing the productivity and competitiveness of American workers and businesses.²⁸ Since it determines public right-of-ways and approves construction, it is a key player in the discussion of Dig Once policies.

The DOT has expressed support for a Dig Once policy, though worry that any formal declaration of a policy dictating broadband deployment would be outside its scope of expertise.²⁹ However, current regulations do allow for fiber optic cables to be run along right-of-ways.³⁰ Additionally,

²⁴ FCC. *About the FCC*. (n.d.). Retrieved from <https://www.fcc.gov/about/overview>

²⁵ Waxman, H. A., Eshoo, A. G., Markey, E. J., & Matsui, D. O., *Planning and Flexibility Are Key to Effectively Deploying Broadband Conduit through Federal Highway Projects*. (2012, June 27). Retrieved from <https://www.gao.gov/assets/600/591928.pdf>

²⁶ Waxman, Eshoo, Markey & Matsui, *Planning and Flexibility*, (2012).

²⁷ *Ibid.*

²⁸ USDOT. *About DOT*. (2020, Jan. 29). Retrieved from <https://www.transportation.gov/about>

²⁹ Waxman, Eshoo, Markey & Matsui, *Planning and Flexibility*, (2012).

³⁰ *Ibid.*

it is the DOT's belief that any federal policy for federally-funded projects would affect only a small percentage of the nation's roadways, as many are state owned.³¹ Due to these concerns, the DOT believes that rather than a formal policy, the DOT and FCC should act as facilitators to help states create broadband deployment policies.³²

Federal Highway Administration

A part of the DOT, the Federal Highway Administration (FHWA) controls the construction, maintenance and preservation of highways, bridges, and tunnels, while also conducting research to improve the safety, mobility, and innovation of the roads.³³

When a state does decide to enforce a Dig Once policy, it must be approved by the FHWA. Once it is, any utility installation for federal highway that follow do not require FHWA approval, so long as it maintains the agreed upon state policy.³⁴ In terms of funding, federal funding is provided to the states by the Federal Aid Highway Program (FAHP).³⁵ The FAHP receives the money through the Highway Trust Fund and funds 43 percent of total highway spending and 50 percent of highway projects with some kind of utility work.³⁶

National Highway System

The National Highway System comprises the Interstate System and other systems to support the economy, mobility and defense of the nation.³⁷ It comprises of 40.5 million miles of road, 75 percent which are locally owned, 20 percent state owned, and three percent federally owned.³⁸ The Interstate System is made of 46,720 miles of highways, which only accounts for one percent of total roadways, yet carries 25 percent of all highway traffic.³⁹

Goals of the Legislation

There are a few goals of the attempted legislation that highlight why Dig Once policies are needed and efficient. The first is to eliminate duplicative expenses. By Digging Once, you are saving the cost of retrenching every time new conduit or fibers are needed, as well as coordinating with others to disturb the roadways only once. The next is to create funding allocation opportunities. As cost savings are realized by Digging Once, more funds become available to allocate to other jobs and projects that can work to benefit state and local economies.

³¹ Waxman, Eshoo, Markey & Matsui, *Planning and Flexibility*, (2012).

³² *Ibid.*

³³ USDOT. *Federal Highway Administration*. (n.d.). Retrieved from <https://highways.dot.gov>

³⁴ Policy: Federal Highway Administration. (2012, December). Retrieved from <https://www.fhwa.dot.gov/policy/otps/workplan.cfm#dig>

³⁵ Waxman, Eshoo, Markey & Matsui, *Planning and Flexibility*, (2012).

³⁶ US DOT, FHWA, & Office of Policy and Governmental Affairs, *Executive Order*, (2012).

³⁷ FHWA, National Highway System. *What is the National Highway System?* (2020, March). Retrieved from https://www.fhwa.dot.gov/planning/national_highway_system/

³⁸ US DOT, FHWA, & Office of Policy and Governmental Affairs, *Executive Order*, (2012).

³⁹ *Ibid.*

Another goal of Dig Once legislation is to save taxpayer's money. While the cost savings take some time to be fully realized, the future benefits of not having to excavate the roadways again, which cost an average of \$27,000 per mile, ultimately saves taxpayers money.⁴⁰ If less excavation is required to install or change fibers in conduit, the average cost of deployment decreases, allowing for taxpayers to pay less in public service costs. Finally, planning for a more connected future is another goal of legislation. As technology evolves and people become increasingly tech savvy, the need for higher broadband speeds increases, thus needing fibers that can maintain the demand. By Digging Once, the conduit is already laid and the fiber can easily be switched in or out through air-jetting.

Telecommunications Act of 1996

The first overhaul of deregulating telecommunications, the Telecommunications Act of 1996 covered a wide variety of topics. In reference to Dig Once, it required that telecommunications providers allow other vendors to have access to the facilities (trenches) for broadband deployment.⁴¹ It also required states and local providers to remove any barriers preventing competition.⁴² Other providers were to be notified by the state and given adequate time to respond to the notice about install their own facilities concurrently.⁴³ The full act is quite extensive, covering a range of topics from video programming to violence and obscenity, and can be viewed at <https://transition.fcc.gov/Reports/tcom1996.pdf>.

Rep. Anna Eshoo Acts

Rep. Anna Eshoo (D-Calif.) has been an advocate of Dig Once policies for many years. She has sent five acts through the House of Representatives; however, they have failed to pass and not made it to the Senate floor. The five Acts all have the same goal of requiring conduit installation during highway construction projects, with few amendments as the years pass. There were various supporters on each Act, with bipartisan representation. Below are the main goals of each Act. The full texts of each Act, with supporters listed, can be found in Appendix B.

2009

“H. R. 2428: To amend title 23, United States Code, to direct the Secretary of Transportation to require that broadband conduit be installed as part of certain highway construction projects, and for other purposes.”⁴⁴

2011

“H. R. 1695: To amend title 23, United States Code, to direct the Secretary of Transportation to require that broadband conduit be installed as part of certain highway construction projects, and for other purposes.”⁴⁵

⁴⁰ Dura-Line, *Dig Once, Dig Smart*, (2018).

⁴¹ US DOT, FHWA, & Office of Policy and Governmental Affairs, *Executive Order*, (2012).

⁴² *Ibid.*

⁴³ *Ibid.*

⁴⁴ <https://www.congress.gov/bill/111th-congress/house-bill/2428/text>

⁴⁵ <https://www.govtrack.us/congress/bills/112/hr1695/text>

2015

“**H. R. 3805:** United States Code, to provide for the inclusion of broadband conduit installation in certain highway construction projects, and for other purposes.”⁴⁶

2018

“**H. R. 4800:** To amend title 23, United States Code, to provide for the inclusion of broadband conduit installation in certain highway construction projects, and for other purposes.”⁴⁷

2019

“**H. R. 2692:** To amend title 23, United States Code, to provide for the inclusion of broadband conduit installation in certain highway construction projects, and for other purposes.”⁴⁸

Klobuchar and Warner Bill

Sens. Amy Klobuchar (D-Minn.) and Mark Warner (D-Va.) pushed a Bill through the Senate in 2011 with a very similar goal to Rep. Eshoo (D-Calif.). However, much like Eshoo’s attempts, this Bill also failed to pass and died on the Senate floor. The goal of the Bill is below. The full text of the Bill can be found in Appendix C.

“**S. 1939:** To amend title 23, United States Code, to direct the Secretary of Transportation to require that broadband conduits be installed as part of certain highway construction projects, and for other purposes.”

2012 Government Accountability Office

In 2012, Reps. Henry Waxman (D-Calif.), Anna Eshoo (D-Calif.), Edward Markey (D-Mass.) and Doris Matsui (D-Calif.) wrote a report to the Government Accountability Office. The report came after being asked that they “examine federal “Dig Once” policies that would require the deployment of broadband conduit in conjunction with federally funded highway construction projects as a way to decrease the costs of deploying fiber and eliminate the need for multiple excavations.”⁴⁹ The report presented information on advantages, disadvantages, and how policies of states and cities can inform a federal policy.⁵⁰ This document adequately explains the benefits of Dig Once policies and is referenced numerous times throughout this paper. The informants the authors used for the scope and methodology are listed in Appendix D. The full report can be found <https://www.gao.gov/assets/600/591928.pdf>.

⁴⁶ <https://www.congress.gov/bill/114th-congress/house-bill/3805?s=1&r=8>

⁴⁷ <https://www.congress.gov/115/bills/hr4800/BILLS-115hr4800ih.pdf>

⁴⁸ <https://www.congress.gov/bill/116th-congress/house-bill/2692/text>

⁴⁹ Waxman, Eshoo, Markey & Matsui, *Planning and Flexibility*, (2012).

⁵⁰ *Ibid.*

Executive Order 13616, 2012

On June 14, 2012, President Barack Obama passed Executive Order 13616: Accelerating Broadband Infrastructure Deployment. It outlined many new criteria for the Department of Transportation to meet. While it did not mandate a federal Dig Once policy, it directed the DOT to review the current Dig Once requirements while working with state and local governments to create best practices and effectively use investment in transportation infrastructure.^{51,52}

Additionally, the DOT must have a set of best practices that can accommodate future technologies with fewer excavations.⁵³ Further, policies, procedures and requirements were to be revised with regard to Dig Once, an online platform was to be made to identify ROW laws, and review the state DOT's policies to ensure private companies and other entities can construct and maintain broadband facilities.⁵⁴ The full text of Executive Order 13616 can be found in Appendix E.

Consolidated Appropriations Act, 2018

In 2018, President Donald Trump signed a Federal Mandate that covered a variety of topics but included a section about broadband infrastructure. The relevant section, presented to 115th Congress, is in full below. The full text of the Consolidated Appropriations Act can be found at <https://www.congress.gov/bill/115th-congress/house-bill/1625>.

H.R.1625 - Consolidated Appropriations Act, 2018⁵⁵

“(Sec. 607) To facilitate installation of broadband infrastructure, the DOT must promulgate regulations to ensure that states receiving federal-aid highway funds: (1) identify a broadband utility coordinator to facilitate the broadband infrastructure right-of-way efforts within the state; (2) register broadband infrastructure entities that seek to be included in those facilitation efforts; (3) establish a process to electronically notify such entities of the state transportation improvement program on an annual basis; (4) coordinate statewide telecommunication and broadband plans and state and local transportation and land use plans, including strategies to minimize repeated excavations that involve the installation of broadband infrastructure in a right-of-way; and (5) ensure that any existing broadband infrastructure entities are not disadvantaged.”

⁵¹ Coleman, *Dig Once*, (2017).

⁵² Waxman, Eshoo, Markey & Matsui, *Planning and Flexibility*, (2012).

⁵³ *Ibid*.

⁵⁴ US DOT, FHWA, & Office of Policy and Governmental Affairs, *Executive Order*, (2012).

⁵⁵ H.R.1625 - 115th Congress (2017-2018): Consolidated Appropriations Act, 2018. (2018, March 23). Retrieved from <https://www.congress.gov/bill/115th-congress/house-bill/1625>

Best Practices

When looking at Dig Once policies, there are a number of ways to define best practices. Dig Once can have more than one application, leading to different types of implementation, each with its own best practices. Additionally, there are components of the policies that have separate guidelines for fulfilling a best practice. Finally, best practices for determining right-of-way are laid out. Outlined will be some states and cities who have successfully implemented Dig Once policies (see Appendix E). Other state legislatures are outlined in Appendix F, with city and county legislatures outlined in Appendix G.

Types

There are four main types of Dig Once policies:

- Dig Once, Dig Smart
- Dig Once, Permitting Process
- Dig Once, Coordination
- Dig Once, Joint Trenching

“Dig Once, Dig Smart” refers to when the local government installs publicly owned conduit whenever possible. This is sometimes referred to as “One Touch,” but most commonly referred to as “Dig Smart.” From there, telecommunication companies can lease the conduit for its fiber cables.

“Dig Once, Permitting Process” is when the local government streamlines the permit procedures. “Dig Once, Coordination” involves coordinating plans and activities in the right-of-way. This can come in the form of shared leasing, where multiple Internet Service Providers (ISP)s share the cost of leasing infrastructure or in a utilities partnership, when conduit is installed at the same time as sewer and water projects.⁵⁶

The final type, “Dig Once, Joint Trenching,” is when utilities are installed at the same time as the conduit in the same trench. This is meant to improve coordination with telecommunication providers when plans are made to open the ground for any reason, sharing the cost of excavation.⁵⁷ There are two types of joint trenching, mandatory and voluntary. Mandatory joint trenching is like what is described above, with the requirement that all potential excavators use the same trench to install their infrastructure at the same time.⁵⁸ Voluntary joint trenching, however, is when approval is required when those excavating in public right-of-ways to formulate construction plans and schedule construction with other service providers that are interested in installing or maintaining equipment in the public right-of-way.⁵⁹ The disadvantage

⁵⁶ Cooper, T. (2019, August 7). Dig Once: The Digital Divide Solution Congress Squandered And Policy That Could Save \$126 Billion On Broadband Deployment. Retrieved from <https://broadbandnow.com/report/dig-once-digital-divide/>

⁵⁷ Cooper, *Dig Once*, (2019).

⁵⁸ Fiber to the Home Council, *Dig Smart*, (2018).

⁵⁹ *Ibid.*

here is that if no one agrees to installing at the same time in the same right-of-way, no conduit is installed at all.

Regardless of which Dig Once policy a city, county or state decides to implement, the premise of not having to re-excavate any time a move, add, change, or upgrade of fiber needs to occur still exists. However, this paper primarily focuses on the benefits of “Dig Once, Dig Smart,” as it ensures that conduit installation is part of all projects in a city with coordination and advanced planning.⁶⁰

Cost Considerations

Regardless of which Dig Once policy is enacted, there are significant cost savings to be realized. The Federal Highway Administration estimates that 90 percent of conduit deployment costs is due to the excavation of the roadways.⁶¹ The average cost per mile is estimated to be \$27,000.⁶² In a total excavation, the deployment of conduit network systems is only approximated to be upwards of 4 percent of the total cost.⁶³ These costs often leave smaller, more rural communities to be left out of the deployment of conduit, thus impacting their choices in internet service providers.

It has been estimated that overall savings of installing conduit with utilities or other road excavations can be between 25 and 33 percent, as shown by San Francisco after implementing a Dig Once policy.⁶⁴ Additionally, the Utah Department of Transportation found that it saved an average of 15.5 percent per mile when installing conduit in conjunction with other road projects rather than independently.⁶⁵ Finally, the FHWA appraises that it is up to 10 times more expensive to install fiber independently than in coordination with other roadwork.⁶⁶

These figures represent only the initial cost savings. By Digging Once, there will not be a necessity to have a total excavation again, ultimately saving these costs repeatedly. With multiple pathways installed, the conduit will be prepared for new pathways or a change in fiber easily and without disruption to the roadways.

Components for Successful Implementation

There are multiple components for successful implementation of a Dig Once policy:

1. Education
2. Ordinance
3. Coordination
4. Conduit Network System

⁶⁰ Fiber to the Home Council, *Dig Smart*, (2018).

⁶¹ Dura-Line. *Dig Once, Dig Smart*. (2018).

⁶² *Ibid.*

⁶³ Fiber to the Home Council, *Dig Smart*, (2018).

⁶⁴ Waxman, Eshoo, Markey & Matsui, *Planning and Flexibility*, (2012).

⁶⁵ *Ibid.*

⁶⁶ Fiber to the Home Council, *Dig Smart*, (2018).

These elements will help guide the creation of an effective and comprehensive Dig Once policy.

Education

Educating the state and city on the benefits of a Dig Once policy is the first and foremost most important component. If the benefits are not realized, it will be difficult to obtain buy-in and funding and potentially stall or stop the project before it starts. Educating interested parties and stakeholders up front will result in on-going cooperation. It will also lay out the cost-benefit savings, making them more likely to want to implement such a policy. By demonstrating the economic impact and the need for high-speed broadband connectivity, the use of such a policy will continue to become more prevalent. Finally, describe the anticipated future demands of fiber as technologies continue to grow and more people require access to high-speed broadband. Detail the future-ready nature of the conduit network systems to meet such demands. Be sure to address any concerns and emphasize the highlights to create a well-rounded education of the stakeholders.

Ordinance

By practicing ordinance, various public goods can be established when coupled with Dig Once policies. It is important to establish the link to public goods and other benefits that will come of such a policy. Some of these goods include the prevention of road excavation repeatedly, ensure the right-of-way is being used efficiently, and perform deployment quicker. With Dig Once policies creating public goods, they then lead to other developments to help the community. Some examples are saving tax money, managing public resources, and encouraging economic development. These events all stem from the initial Dig Once policy.

With that being said, there are some best practices that should be observed when planning ordinance into a Dig Once policy.

Ordinance best practices:

- Use existing laws and practices and integrate ideas into statutes and processes.
- Explain expectations for compliance and how to cope with expectations.
- Underscore who is responsible in the text of ordinance.
- Encourage or require companies to use your conduit.
- Maintain public ownership of conduit as much as possible.

These best practices are just some of the ideas to better maintain ordinance. The other thing to establish in the ordinance is who has the responsibility for the cost of conduit deployment. It might differ depending on if the landscape is a greenfield or brownfield. A greenfield is operating on new territory that has not been previously trenched or had infrastructure installed before. In these cases, the developer might be responsible for the cost. Brownfield development refers to where infrastructure already exists. Cities are typically responsible for costs in developing this area.

Coordination

The second component for successful implementation of a Dig Once policy is coordination. This ensures that departments, developers and private companies are coordinating the best ways to limit street disruptions. This helps inform potential excavators, like providers of broadband, when underground or road construction will take place so they can be prepared to install equipment alongside scheduled excavations.⁶⁷ Facilitation often happens through a database, where underground facility owners are required to update and maintain scheduled excavations.⁶⁸

Coordination between communities at the state and local levels is important when planning for broadband deployment. This is because the local communities have a better understanding of its needs, but coordinating with the state government will help to ensure state requirements are met.⁶⁹ Additionally, it eliminates the need for duplicative federal reviews and permits years later when trying to work at the same location.⁷⁰ Deployment can be accomplished more quickly due to this.

When practicing coordination for a Dig Once policy, there are some best practices to keep in mind.

Coordination best practices:

- Establish relationships and expectations by keeping track of private projects and streamlining bureaucratic systems.
- Create effective coordination committees.
- Clearly define an explanation of costs.
- Line up departments' budgets for potential large projects.

These practices will allow the Dig Once policy to be more encompassing and create clear expectations.

Conduit Network Systems

Conduit network systems look at the type, placement and design of the network. For instance, they might decide to utilize MicroTrenching or MicroDucts. MicroTrenching is placing reduced diameter MicroDuct pathways into the utility space to reduce the impact on the existing infrastructure.⁷¹ By using this technology, costs can be lowered and deployment can be sped up. MicroDucts, on the other hand, better allow for Dig Once policies to anticipate a scalable, future-ready for internal use and potential leasing monetization.

It is important to standardize, document, and manage the assets of the network system to make certain that initial and future deployment of telecommunication networks go quickly. Further, preplanning and creating a master conduit plans verifies that the conduit is being installed in

⁶⁷ Fiber to the Home Council, *Dig Smart*, (2018).

⁶⁸ *Ibid.*

⁶⁹ Waxman, Eshoo, Markey & Matsui, *Planning and Flexibility*, (2012).

⁷⁰ FHWA, *Policy Brief*, (2013).

⁷¹ Dura-Line, *MicroTrenching*. (2019).

essential places that make sense. Doing so will provide long term benefits and create maximization of the conduit network system benefits. Some things to consider in a master plan include the goal of the conduit system, standards, and layout, as well as locations for vaults and handholes. Failure to create a master plan leads to conduit being placed in wrong locations without added value, which is an overall costly waste of time.

Once a master plan is developed, the next decision is determining who will build a foundational network system. There are a few options to consider. First, there might be dark fiber that can be leased; in essence, borrow the fiber. Another option is buying it if a local telecommunication company partner were to build a system. Finally, building the network from scratch and maintaining it will result in a city-owned conduit network system.

As with ordinance and coordination, there are best practices that are advised for conduit network systems.

Best practices of conduit network systems:

- Create a master plan.
- Publish clear and consistent guidelines (with engineering standards).
- Choose the type of conduit that makes sense for your community—plan for the future.
- Do not underestimate MicroTechnology
 - MicroTrenching is not NanoTrenching
 - NanoTrenching puts conduit a few inches below the surface and is unproven technology.
- Document and verify your conduit.

These practices will ensure an effective, valuable conduit network systems that is future-ready.

State Examples

Currently, 11 states have implemented official Dig Once policies of varying degrees. Other states do not have a formal policy, but rather the expectation that communities will work to Dig Once without official policies. West Virginia, in [HB 4447, creating new codes §17 – 2 E- 1-E-9](#) passed in 2018, states that telecommunication companies must partner with the Division of Highways when installing infrastructure. Additionally, they must advertise for two week in relevant media to inform other telecommunication companies that a trench is being built if they wish to share.⁷² Maine also enacted a Dig Once policy in 2018 under [Chapter 344, Sec. 1. 35-A MRSA §2503, sub-§2](#), stating that any public entity doing construction must install broadband conduit and allow for the leasing of the conduit to telecommunication companies. Additionally, all telecommunication companies in the area must be notified when one company decides to deploy conduit.⁷³ Illinois was one of the first states to have a Dig Once policy ([605 ILCS 5/9-131](#)) [Sec. 9-131.](#)). The law declares that the DOT and Department of Central Management Services must collaborate when installing fiber networks in state-funded projects in new locations.⁷⁴ The

⁷² Cooper, *Dig Once*, (2019).

⁷³ *Ibid.*

⁷⁴ *Ibid.*

Broadband Deployment Council continues to compile Dig Once best practices to execute policies in counties and cities. The full descriptions of these policies can be found in Appendix F, with other state legislations outlined in Appendix G.

City Examples

Counties and cities can also utilize Dig Once policies, regardless of whether or not the state has a formal policy. Currently, there are 18 cities who have enacted formal policies, with many dating back several years. One of the earliest policies on place, if not the earliest, was in Boston. In 1988, it was required that public right-of-ways being built had conduits installed.⁷⁵ There was an expansion in 1994 that further required telecommunication companies to lease out existing conduit before being able to install new conduits.⁷⁶ In Ord. 629 §1, passed by Loma Linda, California, in 2004, requires that new construction connects to existing fiber networks and include broadband-capable wiring.⁷⁷ The city of Brentwood, California, established in Ordinance No. 609 in 1999 that was similar to Boston's policy. It also required that any new construction in public right-of-ways had conduit installed, however it required twin conduits.⁷⁸ Additionally, developers are required to install a fiber optic system in one of the conduits and leave the other empty.⁷⁹ A more detailed description about these city examples can be found in Appendix F, with other county and city ordinances outlined in Appendix H.

⁷⁵ Cooper, *Dig Once*, (2019).

⁷⁶ *Ibid.*

⁷⁷ *Ibid.*

⁷⁸ *Ibid.*

⁷⁹ *Ibid.*

Considerations

When creating a Dig Once policy, there are several considerations to address. Some of them are outlined below.⁸⁰

Considerations with implementations of dig once:

- Conduit access
- Installation
- Management
- Maintenance
- Cost issues
- Location of access points along the conduit
- Number and size of conduits
- Security of conduit and access points
- Conduit allocation process
- Conduit map
- Management of right of way access
- Designation of conduit maintenance responsibilities
- Setting conduit access rates

While an extensive list, following these considerations will enable the best Dig Once policy that is roadblock-free and can be implemented accordingly.

⁸⁰ Waxman, Eshoo, Markey & Matsui, *Planning and Flexibility*, (2012).

Advantages

There are many advantages to implementing a Dig Once policy. The biggest is the cost savings associated with the policy. Digging Once can save up to 90 percent of deployment costs due to reducing excavations and re-trenching needed.⁸¹ Additionally, the benefits continue to accrue as more projects are done and less digging is required.⁸² Placing conduit in useful locations will provide long term benefits, as well as maximizing the value of both the conduit and fiber.

There are a number of ways that a Dig Once policy furthers local communities. For instance, despite not having a formal Dig Once policy, Lincoln, Nebraska, was able to utilize the concept and successfully build out a fiber network. Prior to having an extensive network, businesses were leaving or not coming to Lincoln due to the lack of broadband options. In 2011 during a downtown rebuild, it was decided that 5 miles of conduit would be installed since the excavations were already happening.⁸³ In 2012, a new manager began having ISP's sign on to supply in the town and in 2015, the city of Lincoln reached a deal with Allo Communications that allowed Allo to lease the existing space and build conduit network systems throughout the rest of the city.⁸⁴ Though it took a few years to have conduit installed citywide, it ultimately brought in more businesses and made residents happy, fueling economic growth.

The case of Lincoln, Nebraska, was just one example of how having a robust broadband network can benefit a city. A few of the extensive benefits Dig Once policies provide include⁸⁵:

- Encouraging broadband competition by promoting the deployment of advanced fiber networks.
- Lowering the costs for providing broadband service by mandating the installation of conduit throughout the public right-of-way.
- Making communities more attractive to broadband providers wishing to break into new markets or expand existing operations, ultimately leading to more choices and lower prices for the consumer.
- Decreasing the need and frequency of construction along public right-of-ways, where the construction can be inconvenient and dangerous.
- Incentivizing broadband providers to lay fiber underground, protecting the reliability of these networks.
- Hiding unsightly equipment, thus beautifying the community.

Other advantages that have been laid out by House representatives⁸⁶ include decreasing construction frequency along major highways, lowering the cost of installation, accelerating access and reliability of broadband networks, providing public and economic benefits (as outlined above), and decreasing the project time of the deployment of fiber.

⁸¹ Cooper, *Dig Once*, (2019).

⁸² Fiber to the Home Council, *Dig Smart* (2018).

⁸³ Zager, M. (2018, March). Lincoln Steps Into the Future. Retrieved from <https://www.bbcmag.com/community-broadband/lincoln-steps-into-the-future>

⁸⁴ *Ibid.*

⁸⁵ Fiber to the Home Council, *Dig Smart* (2018).

⁸⁶ Waxman, Eshoo, Markey, & Matsui, *Planning and Flexibility* (2012).

Disadvantages

Overall, the fulfillment of Dig Once policies are more advantageous than not. However, that is not to say there are not some disadvantages that arise. The largest disadvantage is that some empty conduit remains unused. This was the case in 1998 when Virginia's DOT installed spare conduit with the intent of leasing it to local telecommunication providers. However, the clients of these providers required that they own the conduit rather than leased it out.⁸⁷ It took until 2008 when the DOT was finally able to sell the unused portions. A similar case happened in California where conduit installed in the 1990s still remains unused.⁸⁸ It had the additional problem of having portions of conduit that did not connect back to other infrastructure.⁸⁹ Due to this and the fact that were not active fibers installed, it proved difficult for California's DOT to have the conduit used. However, these isolated instances are becoming less of a problem as the need for high-speed broadband connectivity continues to grow and new technologies are implemented.

Another concern and disadvantage that has been expressed with Dig Once policies is that in the time it takes to find someone to lease or buy the empty conduit, its life expectancy dwindles, lessening the value.⁹⁰ Additionally, another concern is the potential for additional administration costs for the state DOT's and other local governments to maintain the duct and lease out the infrastructure.⁹¹ This could like hiring additional personnel to keep up with inventory and administering the network.⁹²

Waxman, Eshoo and Markey (2012) outlined other potential disadvantages of Dig Once policies, including the potential to divert highway funding away from highway construction projects.⁹³ Despite the low cost of installing conduit, the added engineering it would take to install conduit can be a hinderance and thus costly for highway construction. There is also the possibility of a conflict with state and local policies when leasing at a cost-based rate can cause a loss of revenue and trade opportunities, such as the case in Massachusetts and Utah.⁹⁴

⁸⁷ Waxman, Eshoo, Markey, & Matsui, *Planning and Flexibility* (2012).

⁸⁸ *Ibid.*

⁸⁹ *Ibid.*

⁹⁰ Policy: Federal Highway Administration. (2012, December). Retrieved from <https://www.fhwa.dot.gov/policy/otps/workplan.cfm#dig>

⁹¹ *Ibid.*

⁹² Waxman, Eshoo, Markey, & Matsui, *Planning and Flexibility* (2012).

⁹³ *Ibid.*

⁹⁴ *Ibid.*

Future Implementation

States, counties or cities that are interested in creating a Dig Once policy should coordinate with their Departments of Transportation. Additionally, they should coordinate with other telecommunications companies to show the extensive benefits associated with these policies. The Fiber to the Home Council has suggested language for crafting a Dig Once policy that can be found in Appendix I.

Conclusion

This white paper has established why Dig Once policies are beneficial and should be implemented. By analyzing the history of conduit deployment, the legislations and current policies in place, and the benefits and disadvantages, this paper is a well-rounded resource to refer to when needing information on Digging Once. As technology advances and high-speed broadband becomes more of a necessity in the American population, Digging Once provides a cost saving and efficient way to keep up with demand while still being future-ready. With execution of a Dig Once policy, communities and states are able to more quickly deploy conduit for broadband use and grow the economy by attracting residents and businesses to move to the area. Through extensive cost savings, Dig Once policies open the door for public works funding to reallocate funds to other projects. Dig Once should be seriously considered by those communities and states wanting to make a lasting impact on data capacity and preparing for the increased demands of the future.

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Appendices

Appendix A

Definitions

Dig Once- Policies and practices that minimize the number and scale of excavations when installing telecommunication infrastructure in highway right-of-way

Digital Divide- Gap between demographics and regions that have access to modern technology and communications and those that don't

Joint-Trench Agreement- Meant to improve coordination with telecommunication providers when plans are made to open the ground for any reason

- All providers and utilities install at the same time and share the cost
- Voluntary Joint Trenching- Requires entities that have received approval to excavate in public right-of-way to formulate construction plans and schedule construction with other service providers that are interested in installing or maintaining equipment in public right-of-way
 - Relies on other excavators volunteering to jointly trench for benefits to be realized
 - Disadvantage- if no one agrees, there is no conduit installed at all
- Mandatory Joint Trenching- Requires all potential excavators to install their infrastructure in the same trench at the same time, then split the cost

One Touch- Conduit is installed during any relevant government-funded construction project

Shared Leasing- Multiple internet service providers (ISPs) share the cost of leasing infrastructure

Utilities Partnerships- Conduit installed at the same time as sewer and water projects

Highway Right-of-Way- Highway agency-owned or leased land that is most often used to create a clear zone or travel lane within the roadway

- Clear zone- A region around a roadway of sufficient width to allow 80% of vehicles that inadvertently leave the roadway to safely recover to the roadway

Shared-Resource Arrangement- Public agency charges the utility for the use of the right-of-way and allows access as needed

Greenfield Development- Operating on new territory that has not been previously trenched or had infrastructure installed before

Brownfield Development- Infrastructure already exists or has existed in the past; previously developed land

Fiber Optic Sensing- Monitors a fiber optic cable from a single location via pulses of light traveling down the fiber.

Appendix B

Rep. Anna Eshoo's (D-Calif.) Broadband Conduit Deployment Acts

2009

111TH CONGRESS 1ST SESSION

H. R. 2428

To amend title 23, United States Code, to direct the Secretary of Transportation to require that broadband conduit be installed as part of certain highway construction projects, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

MAY 14, 2009

Ms. ESHOO (for herself, Mr. WAXMAN, Mr. BOUCHER, and Mr. MARKEY of Massachusetts) introduced the following bill; which was referred to the Committee on Transportation and Infrastructure

A BILL

To amend title 23, United States Code, to direct the Secretary of Transportation to require that broadband conduit be installed as part of certain highway construction projects, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the “Broadband Conduit Deployment Act of 2009”.

SEC. 2. INCLUSION OF BROADBAND CONDUIT INSTALLATION IN CERTAIN HIGHWAY CONSTRUCTION PROJECTS.

Chapter 3 of title 23, United States Code, is amended by adding at the end the following:

“§330. Inclusion of broadband conduit installation in certain highway construction projects

“(a) IN GENERAL.—The Secretary shall require States to install broadband conduit in accordance with this section as part of any covered highway construction project.

“(b) INSTALLATION REQUIREMENTS.—In carrying out subsection (a), the Secretary shall ensure with respect to a covered highway construction project that—

“(1) an appropriate number of broadband conduits, as determined by the Secretary, are installed along such highway to accommodate multiple broadband providers, with consideration given to the availability of existing conduits;

“(2) the size of each such conduit is consistent with industry best practices and is sufficient to accommodate potential demand, as determined by the Secretary; and

“(3) hand holes and manholes for fiber access and pulling with respect to each such conduit are placed at intervals consistent with industry best practices, as determined by the Secretary.

“(c) STANDARDS.—The Secretary shall establish standards to carry out subsection (b) that consider population density in the area of a covered highway construction project, the type of highway involved in such project, and existing broadband access in the area of such project.

“(d) PULL TAPE.—The Secretary shall ensure that each broadband conduit installed pursuant to this section includes a pull tape and is capable of supporting fiber optic cable placement techniques consistent with industry best practices, as determined by the Secretary.

“(e) DEPTH OF INSTALLATION.—The Secretary shall ensure that each broadband conduit installed pursuant to this section is placed at a depth consistent with industry best practices, as determined by the Secretary, and that, in determining the depth of placement, consideration is given to the location of existing utilities and the cable separation requirements of State and local electrical codes.

“(f) DEFINITIONS.—In this section, the following definitions apply:

“(1) BROADBAND.—The term ‘broadband’ means an Internet Protocol-based transmission service that enables users to send and receive voice, video, data, graphics, or a combination thereof.

“(2) BROADBAND CONDUIT.—The term ‘broadband conduit’ means a conduit for fiber optic cables that support broadband or, where appropriate, wireless facilities for broadband service.

“(3) COVERED HIGHWAY CONSTRUCTION PROJECT.—The term ‘covered highway construction project’ means a project to construct a new highway or to construct an additional lane or shoulder for an existing highway that is commenced after the date of enactment of this section and that receives funding under this title.

“(g) WAIVER AUTHORITY.—The Secretary may waive the application of this section or any provision therein if the Secretary determines such waiver appropriate with respect to a covered highway construction project.

“(h) COORDINATION WITH FCC.—In carrying out this section, the Secretary shall coordinate with the Federal Communications Commission as the Secretary determines appropriate, including in making determinations with respect to potential demand under subsection (b)(2) and existing broadband access under subsection (c).”.

SEC. 3. CLERICAL AMENDMENT.

The analysis for chapter 3 of title 23, United States Code, is amended by adding at the end the following:

“330. Inclusion of broadband conduit installation in certain highway construction projects. ”.

2011

112TH CONGRESS 1ST SESSION

H. R. 1695

To amend title 23, United States Code, to direct the Secretary of Transportation to require that broadband conduit be installed as part of certain highway construction projects, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES
MAY 3, 2011

Ms. ESHOO (for herself, Mr. WAXMAN, Mr. MARKEY, Ms. MATSUI, and Ms. WOOLSEY) introduced the following bill; which was referred to the Committee on Transportation and Infrastructure

A BILL

To amend title 23, United States Code, to direct the Secretary of Transportation to require that broadband conduit be installed as part of certain highway construction projects, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the “Broadband Conduit 5 Deployment Act of 2011”.

SEC. 2. INCLUSION OF BROADBAND CONDUIT INSTALLATION IN CERTAIN HIGHWAY CONSTRUCTION PROJECTS.

Chapter 3 of title 23, United States Code, is amended by adding at the end the following:

“§ 330. Inclusion of broadband conduit installation in certain highway construction projects

“(a) IN GENERAL.—The Secretary shall require States to install broadband conduit in accordance with this section as part of any covered highway construction project.

“(b) INSTALLATION REQUIREMENTS.—In carrying out subsection (a), the Secretary shall ensure with respect to a covered highway construction project that—

“(1) an appropriate number of broadband conduits, as determined by the Secretary, are installed along such highway to accommodate multiple broadband providers, with consideration given to the availability of existing conduits;

“(2) the size of each such conduit is consistent with industry best practices and is sufficient to accommodate potential demand, as determined by the Secretary; and

“(3) hand holes and manholes for fiber access and pulling with respect to each such conduit are placed at intervals consistent with industry best practices, as determined by the Secretary.

“(c) STANDARDS.—The Secretary shall establish standards to carry out subsection (b) that consider population density in the area of a covered highway construction project, the type of highway involved in such project, and existing broadband access in the area of such project.

“(d) PULL TAPE.—The Secretary shall ensure that each broadband conduit installed pursuant to this section includes a pull tape and is capable of supporting fiber optic cable placement techniques consistent with industry best practices, as determined by the Secretary.

“(e) DEPTH OF INSTALLATION.—The Secretary shall ensure that each broadband conduit installed pursuant to this section is placed at a depth consistent with industry best practices, as determined by the Secretary, and that, in determining the depth of placement, consideration is given to the location of existing utilities and the cable separation requirements of State and local electrical codes.

“(f) ACCESS.—The Secretary shall ensure that any requesting broadband provider has access to each broadband conduit installed pursuant to this section, on a competitively neutral and nondiscriminatory basis, for a charge not to exceed a cost-based rate.

“(g) WAIVER AUTHORITY.—The Secretary may waive the application of this section or any provision there-in if the Secretary determines such waiver appropriate with respect to a covered highway construction project.

“(h) COORDINATION WITH FCC.—In carrying out this section, the Secretary shall coordinate with the Federal Communications Commission as the Secretary determines appropriate, including in making determinations with respect to potential demand under subsection (b)(2) and existing broadband access under subsection (c).

“(i) DEFINITIONS.—In this section, the following definitions apply:

“(1) BROADBAND.—The term ‘broadband’ means an Internet Protocol-based transmission service that enables users to send and receive voice, video, data, graphics, or a combination thereof.

“(2) BROADBAND CONDUIT.—The term ‘broadband conduit’ means a conduit for fiber optic cables that support broadband or, where appropriate, wireless facilities for broadband service.

“(3) COVERED HIGHWAY CONSTRUCTION PROJECT.—The term ‘covered highway construction project’ means a project to construct a new highway or to construct an additional lane or shoulder for an existing highway that is commenced after the date of enactment of this section and that receives funding under this title.”.

SEC. 3. CLERICAL AMENDMENT.

The analysis for chapter 3 of title 23, United States Code, is amended by adding at the end the following:

“330. Inclusion of broadband conduit installation in certain highway construction projects.”

2015

114TH CONGRESS 1ST SESSION

H. R. 3805

United States Code, to provide for the inclusion of broadband conduit installation in certain highway construction projects, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

OCTOBER 22, 2015

Ms. ESHOO (for herself, Mr. WALDEN, Mr. BILIRAKIS, Mrs. BLACKBURN, Mr. BUTTERFIELD, Ms. CLARKE of New York, Mr. COLLINS of New York, Mr. CRAMER, Ms. DELBENE, Mr. MICHAEL F. DOYLE of Pennsylvania, Mrs. ELLMERS of North Carolina, Mr. EMMER of Minnesota, Mr. GARAMENDI, Mr. GUTHRIE, Mr. HUFFMAN, Mr. JOHNSON of Ohio, Mr. KINZINGER of Illinois, Mr. LANCE, Mr. LOEBSACK, Ms. LOFGREN, Mr. LONG, Mr. BEN RAY LUJÁN of New Mexico, Ms. MATSUI, Mr. MCNERNEY, Mr. OLSON, Mr. RUSH, Mr. SHIMKUS, and Mr. YARMUTH) introduced the following bill; which was referred to the Committee on Transportation and Infrastructure

A BILL

To amend title 23, United States Code, to provide for the inclusion of broadband conduit installation in certain highway construction projects, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the “Broadband Conduit Deployment Act of 2015”.

SEC. 2. INCLUSION OF BROADBAND CONDUIT INSTALLATION IN CERTAIN HIGHWAY CONSTRUCTION PROJECTS.

(a) IN GENERAL.—Chapter 3 of title 23, United States Code, is amended by adding at the end the following:

“§330. Inclusion of broadband conduit installation in certain highway construction projects

“(a) REQUIREMENT.—

“(1) IN GENERAL.—The Secretary shall require States to evaluate the need for broadband conduit in accordance with this section as part of any covered highway construction project.

“(2) CONSULTATION.—This evaluation shall be done in consultation with local and national telecommunications providers, including telecommunications service and equipment providers.

“(3) RESULTS OF EVALUATION.—If the evaluation reveals an anticipated need in the next 15 years for broadband conduit beneath hard surfaces to be constructed by the project, the conduit shall be installed under the hard surfaces as part of the covered highway construction project.

“(b) INSTALLATION REQUIREMENTS.—In carrying out subsection (a), the Secretary shall ensure with respect to a covered highway construction project that —

“(1) an appropriate number of broadband conduits, as determined by the Administrator of the National Telecommunications and Information Administration, are installed along such highway to accommodate multiple broadband providers, with consideration given to the availability of existing conduits;

“(2) the size of each such conduit is consistent with industry best practices and is sufficient to accommodate potential demand, as determined by the Administrator; and
“(3) hand holes and manholes for fiber access and pulling with respect to each such conduit are placed at intervals consistent with industry best practices, as determined by the Administrator.

“(c) STANDARDS.—The Secretary, in consultation with the Administrator, shall establish standards, consistent with applicable requirements in section 156 of this title, section 1.23, part 645, and part 710 of title 23, Code of Federal Regulations, and the Approved Utility Accommodation Manual, to carry out subsection (b) that consider—

“(1) the ability to accommodate broadband installation without impacting the safety, operations, and maintenance of the highway facility, its users, or others;

“(2) population density in the area of a covered highway construction project;

“(3) the type of highway involved in such project; and

“(4) existing broadband access in the area of such project.

“(d) PULL TAPE.—The Secretary shall ensure that each broadband conduit installed pursuant to this section includes a pull tape and is capable of supporting fiber optic cable placement techniques consistent with industry best practices, as determined by the Secretary.

“(e) DEPTH OF INSTALLATION.—The Secretary shall ensure that each broadband conduit installed pursuant to this section is placed at a depth consistent with industry best practices, as determined by the Secretary, and that, in determining the depth of placement, consideration is given to the location of existing utilities and the cable separation requirements of State and local electrical codes.

“(f) ACCESS.—The Secretary shall ensure that any requesting broadband provider has access to each broadband conduit installed pursuant to this section, on a competitively neutral and nondiscriminatory basis, for a charge not to exceed a cost-based rate.

“(g) WAIVER AUTHORITY.—The Secretary may waive the application of this section if the Secretary determines that the waiver is appropriate with respect to a covered highway construction project based upon—

“(1) a showing of undue burden;

“(2) a determination that the installation of broadband conduit beneath hard surfaces to be constructed as part of a covered highway construction project is not necessary based on the availability of existing broadband infrastructure;

“(3) a cost-benefit analysis; or

“(4) the consideration of other relevant factors.

“(h) COORDINATION WITH FCC.—In carrying out this section, the Secretary and the Administrator shall coordinate with the Federal Communications Commission, including in making determinations with respect to an appropriate number of broadband conduits under subsection (b)(1), potential demand under subsection (b)(2), and existing broadband access under subsection (c).

“(i) PUBLICATION OF CONDUIT AVAILABILITY.—Not later than 1 year after the date of enactment of this section, the Secretary shall provide information to the Federal Communications Commission and the Administrator for inclusion within the National Broadband Map.

“(j) DEFINITIONS.—In this section, the following definitions apply:

“(1) ADMINISTRATOR.—The term ‘Administrator’ means the Administrator of the National Telecommunications and Information Administration.

“(2) BROADBAND.—The term ‘broadband’ means an Internet Protocol-based transmission service that enables users to send and receive voice, video, data, graphics, or a combination thereof.

“(3) BROADBAND CONDUIT.—The term ‘broadband conduit’ means a conduit for fiber optic cables that support broadband or, where appropriate, wireless facilities for broadband service.

“(4) COVERED HIGHWAY CONSTRUCTION PROJECT.—The term ‘covered highway construction project’ means a project to construct a new highway or to construct an additional lane or paved shoulder for an existing highway that is commenced after the date of enactment of this section and that receives funding under this title.

“(5) HARD SURFACES.—The term ‘hard surfaces’ means asphalt and concrete pavement, curb and gutter, and sidewalk.”.

(b) CLERICAL AMENDMENT.—The analysis for chapter 3 of title 23, United States Code, is amended by adding at the end the following:

“330. Inclusion of broadband conduit installation in certain highway construction projects. ”.

2018

115TH CONGRESS 2ND SESSION

H. R. 4800

To amend title 23, United States Code, to provide for the inclusion of broadband conduit installation in certain highway construction projects, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES
JANUARY 16, 2018

Ms. ESHOO (for herself and Mr. MCKINLEY) introduced the following bill; which was referred to the Committee on Transportation and Infrastructure

A BILL

To amend title 23, United States Code, to provide for the inclusion of broadband conduit installation in certain highway construction projects, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the “Broadband Conduit Deployment Act of 2018”.

SEC. 2. INCLUSION OF BROADBAND CONDUIT INSTALLATION IN CERTAIN HIGHWAY CONSTRUCTION PROJECTS.

(a) IN GENERAL.—Chapter 3 of title 23, United States Code, is amended by adding at the end the following:

“§ 331. Inclusion of broadband conduit installation in certain highway construction projects

“(a) REQUIREMENT.—

“(1) IN GENERAL.—The Secretary shall require States to evaluate the need for broadband conduit in accordance with this section as part of any covered highway construction project.

“(2) CONSULTATION.—The evaluation shall be done in consultation with local and national telecommunications providers, including telecommunications service and equipment providers.

“(3) RESULTS OF EVALUATION.—If the evaluation reveals an anticipated need in the next 15 years for broadband conduit beneath hard surfaces to be constructed by the project, the conduit shall be installed under the hard surfaces as part of the covered highway construction project.

“(b) INSTALLATION REQUIREMENTS.—In carrying out subsection (a), the Secretary shall ensure with respect to a covered highway construction project that—

“(1) an appropriate number of broadband conduits, as determined by the Assistant Secretary of Commerce for Communications and Information, are installed along such highway to accommodate multiple broadband providers, with consideration given to the availability of existing conduits;

“(2) the size of each such conduit is consistent with industry best practices and is sufficient to accommodate potential demand, as determined by the Assistant Secretary of Commerce for Communications and Information; and

“(3) hand holes and manholes for fiber access and pulling with respect to each such conduit are placed at intervals consistent with industry best practices, as determined by the Assistant Secretary of Commerce for Communications and Information.

“(c) STANDARDS.—The Secretary, in consultation with the Assistant Secretary of Commerce for Communications and Information, shall establish standards, consistent with applicable requirements in section 156 of this title, section 1.23, part 645, and part 710 of title 23, Code of Federal Regulations, and the Approved Utility Accommodation Manual, to carry out subsection (b) that consider—

“(1) the ability to accommodate broadband installation without impacting the safety, operations, and maintenance of the highway facility, its users, or others;

“(2) population density in the area of a covered highway construction project;

“(3) the type of highway involved in such project; and

“(4) existing broadband access in the area of such project.

“(d) PULL TAPE.—The Secretary shall ensure that each broadband conduit installed pursuant to this section includes a pull tape and is capable of supporting fiber optic cable placement techniques consistent with industry best practices, as determined by the Secretary.

“(e) DEPTH OF INSTALLATION.—The Secretary shall ensure that each broadband conduit installed pursuant to this section is placed at a depth consistent with industry best practices, as determined by the Secretary, and that, in determining the depth of placement, consideration is

given to the location of existing utilities and the cable separation requirements of State and local electrical codes.

“(f) ACCESS.—The Secretary shall ensure that any requesting broadband provider has access to each broadband conduit installed pursuant to this section, on a competitively neutral and nondiscriminatory basis, for a charge not to exceed a cost-based rate.

“(g) WAIVER AUTHORITY.—The Secretary may waive the application of this section if the Secretary determines that the waiver is appropriate with respect to a covered highway construction project based upon—

- “(1) a showing of undue burden;
- “(2) a determination that the installation of
- “(3) a cost-benefit analysis; or
- “(4) the consideration of other relevant factors.

“(h) COORDINATION WITH FCC.—In carrying out this section, the Secretary and the Assistant Secretary of Commerce for Communications and Information shall coordinate with the Federal Communications Commission, including in making determinations with respect to an appropriate number of broadband conduits under subsection (b)(1), potential demand under subsection (b)(2), and existing broadband access under subsection (c).

“(i) PUBLICATION OF CONDUIT AVAILABILITY.—Not later than 1 year after the date of enactment of this section, the Secretary shall provide information to the Federal Communications Commission and the Assistant Secretary of Commerce for Communications and Information for inclusion within the National Broadband Map.

“(j) DEFINITIONS.—In this section, the following definitions apply:

- “(1) BROADBAND.—The term ‘broadband’ means an Internet Protocol-based transmission service that enables users to send and receive voice, video, data, graphics, or a combination thereof.
- “(2) BROADBAND CONDUIT.—The term ‘broadband conduit’ means a conduit for fiber optic cables that support broadband or, where appropriate, wireless facilities for broadband service.
- “(3) COVERED HIGHWAY CONSTRUCTION PROJECT.—The term ‘covered highway construction project’ means a project to construct a new highway or to construct an additional lane or paved shoulder for an existing highway that is commenced after the date of enactment of this section and that receives funding under this title.
- “(4) HARD SURFACES.—The term ‘hard surfaces’ means asphalt and concrete pavement, curb and gutter, and sidewalk.”.

(b) CLERICAL AMENDMENT.—The analysis for chapter 3 of title 23, United States Code, is amended by adding at the end the following:

“331. Inclusion of broadband conduit installation in certain highway construction projects.”.

2019

116TH CONGRESS 1ST SESSION

H. R. 2692

To amend title 23, United States Code, to provide for the inclusion of broadband conduit installation in certain highway construction projects, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES
MAY 14, 2019

Ms. ESHOO (for herself and Mr. MCKINLEY) introduced the following bill; which was referred to the Committee on Transportation and Infrastructure

A BILL

To amend title 23, United States Code, to provide for the inclusion of broadband conduit installation in certain highway construction projects, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the “Broadband Conduit Deployment Act of 2019”.

SEC. 2. INCLUSION OF BROADBAND CONDUIT INSTALLATION IN CERTAIN HIGHWAY CONSTRUCTION PROJECTS.

(a) IN GENERAL .—Chapter 3 of title 23, United States Code, is amended by adding at the end the following:

“§331. Inclusion of broadband conduit installation in certain highway construction projects

“(a) REQUIREMENT.—

“(1) IN GENERAL.—Not later than 90 days after the date of enactment of this section, the Secretary shall issue a notification and requirement to States that each State is required to evaluate the need for broadband conduit in accordance with this section as part of any covered highway construction project.

“(2) CONSULTATION.—The evaluation shall be done in consultation with local and national telecommunications providers, including telecommunications service and equipment providers.

“(3) RESULTS OF EVALUATION.—If the evaluation reveals an anticipated need in the next 15 years for broadband conduit beneath hard surfaces to be constructed by the project, the conduit shall be installed under the hard surfaces as part of the covered highway construction project.

“(4) DATE OF COMPLETION.—A State shall complete the evaluation described in paragraph (1) not later than 180 days after the date on which the Secretary issues the notification described in paragraph (1) to such State.

“(b) INSTALLATION REQUIREMENTS.—In carrying out subsection (a), the Secretary shall ensure with respect to a covered highway construction project that —

“(1) an appropriate number of broadband conduits, as determined by the Assistant Secretary of Commerce for Communications and Information, are installed along such

highway to accommodate multiple broadband providers, with consideration given to the availability of existing conduits;

“(2) the size of each such conduit is consistent with industry best practices and is sufficient to accommodate potential demand, as determined by the Assistant Secretary of Commerce for Communications and Information; and

“(3) hand holes and manholes for fiber access and pulling with respect to each such conduit are placed at intervals consistent with industry best practices, as determined by the Assistant Secretary of Commerce for Communications and Information.

“(c) STANDARDS.—Not later than 90 days after the date of enactment of this section, the Secretary, in consultation with the Assistant Secretary of Commerce for Communications and Information, shall establish standards, consistent with applicable requirements in section 156 of this title, section 1.23, part 645, and part 710 of title 23, Code of Federal Regulations, and the Approved Utility Accommodation Manual, to carry out subsection (b) that consider—

“(1) the ability to accommodate broadband installation without impacting the safety, operations, and maintenance of the highway facility, its users, or others;

“(2) population density in the area of a covered highway construction project;

“(3) the type of highway involved in such project; and

“(4) existing broadband access in the area of such project.

“(d) PULL TAPE.—Not later than 90 days after the date of enactment of this section, the Secretary shall ensure that each broadband conduit installed pursuant to this section includes a pull tape and is capable of supporting fiber optic cable placement techniques consistent with industry best practices, as determined by the Secretary.

“(e) DEPTH OF INSTALLATION.—The Secretary shall ensure that each broadband conduit installed pursuant to this section is placed at a depth consistent with industry best practices, as determined by the Secretary, and that, in determining the depth of placement, consideration is given to the location of existing utilities and the cable separation requirements of State and local electrical codes.

“(f) ACCESS.—The Secretary shall ensure that any requesting broadband provider has access to each broadband conduit installed pursuant to this section, on a competitively neutral and nondiscriminatory basis, for a charge not to exceed a cost-based rate.

“(g) WAIVER AUTHORITY.—The Secretary may waive the application of this section if the Secretary determines that the waiver is appropriate with respect to a covered highway construction project based upon—

“(1) a showing of undue burden;

“(2) a determination that the installation of broadband conduit beneath hard surfaces to be constructed as part of a covered highway construction project is not necessary based on the availability of existing broadband infrastructure;

“(3) a cost-benefit analysis; or

“(4) the consideration of other relevant factors.

“(h) COORDINATION WITH FCC.—In carrying out this section, the Secretary and the Assistant Secretary of Commerce for Communications and Information shall coordinate with the Federal Communications Commission, including in making determinations with respect to an appropriate number of broadband conduits under subsection (b)(1), potential demand under subsection (b)(2), and existing broadband access under subsection (c).

“(i) PUBLICATION OF CONDUIT AVAILABILITY.—Not later than 1 year after the date of enactment of this section, the Secretary shall provide information to the Federal Communications

Commission and the Assistant Secretary of Commerce for Communications and Information for inclusion within the National Broadband Map.

“(j) DEFINITIONS.—In this section, the following definitions apply:

“(1) BROADBAND.—The term ‘broadband’ means an Internet Protocol-based transmission service that enables users to send and receive voice, video, data, graphics, or a combination thereof.

“(2) BROADBAND CONDUIT.—The term ‘broadband conduit’ means a conduit for fiber optic cables that support broadband or, where appropriate, wireless facilities for broadband service.

“(3) COVERED HIGHWAY CONSTRUCTION PROJECT.—The term ‘covered highway construction project’ means a project to construct a new highway or to construct an additional lane or paved shoulder for an existing highway that is commenced after the date of enactment of this section and that receives funding under this title.

“(4) HARD SURFACES.—The term ‘hard surfaces’ means asphalt and concrete pavement, curb and gutter, and sidewalk.”.

(b) CLERICAL AMENDMENT.—The analysis for chapter 3 of title 23, United States Code, is amended by adding at the end the following:

“331. Inclusion of broadband conduit installation in certain highway construction projects. ”.

Appendix C

Sens. Amy Klobuchar (D-Minn.) and Mark Warner (D-Va.) Broadband Deployment Act

Source: <https://www.govtrack.us/congress/bills/112/s1939>

112TH CONGRESS 1ST SESSION

S. 1939

To amend title 23, United States Code, to direct the Secretary of Transportation to require that broadband conduits be installed as part of certain highway construction projects, and for other purposes.

IN THE SENATE OF THE UNITED STATES
DECEMBER 1, 2011

Ms. KLOBUCHAR (for herself and Mr. WARNER) introduced the following bill; which was read twice and referred to the Committee on Environment and Public Works

A BILL

To amend title 23, United States Code, to direct the Secretary of Transportation to require that broadband conduits be installed as part of certain highway construction projects, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the “Broadband Conduit Deployment Act of 2011”.

SEC. 2. INCLUSION OF BROADBAND CONDUIT INSTALLATION IN CERTAIN HIGHWAY CONSTRUCTION PROJECTS.

Chapter 3 of title 23, United States Code, is amended by adding at the end the following:

“§ 330. Inclusion of broadband conduit installation in certain highway construction projects

“(a) DEFINITIONS.—In this section:

“(1) BROADBAND.—The term ‘broadband’ means an Internet Protocol-based transmission service that enables users to send and receive voice, video, data, or graphics, or a combination of those items.

“(2) BROADBAND CONDUIT.—The term ‘broadband conduit’ means a conduit for fiber optic cables that support broadband or, where appropriate, wireless facilities for broadband service.

“(3) COVERED HIGHWAY CONSTRUCTION PROJECT.—The term ‘covered highway construction project’ means a project to construct a new highway or to construct an additional lane or shoulder for an existing highway that—

“(A) is commenced after the date of enactment of this section; and

“(B) receives funding under this title.

“(b) REQUIREMENT.—The Secretary shall require States to install 1 or more broadband conduits in accordance with this section as part of any covered highway construction project.

“(c) INSTALLATION REQUIREMENTS.—In carrying out subsection (b), the Secretary shall ensure, to the maximum extent practicable with respect to a covered highway construction project, that—

“(1) an appropriate number of broadband conduits, as determined by the Secretary, are installed along the highway to accommodate multiple broadband providers, with consideration given to the availability of existing conduits;

“(2) the size of each such conduit is consistent with industry best practices and is sufficient to accommodate potential demand, as determined by the Secretary; and

“(3) hand holes and manholes for fiber access and pulling with respect to each such conduit are placed at intervals consistent with industry best practices, as determined by the Secretary.

“(d) STANDARDS.—In establishing standards to carry out subsection (c), the Secretary shall take into consideration—

“(1) population density in the area of a covered highway construction project;

“(2) the type of highway involved in the project; and

“(3) existing broadband access in the area of the project.

“(e) PULL TAPE.—Each broadband conduit installed pursuant to this section shall include a pull tape and be capable of supporting fiber optic cable placement techniques consistent with industry best practices, as determined by the Secretary.

“(f) ACCESS.—The Secretary shall ensure that any requesting broadband provider has access to each broadband conduit installed pursuant to this section, on a competitively neutral and nondiscriminatory basis, for a charge not to exceed a cost-based rate.

“(g) DEPTH OF INSTALLATION.—Each broadband conduit installed pursuant to this section shall be placed at a depth consistent with industry best practices, as determined by the Secretary, after consideration is given to the location of existing utilities and the cable separation requirements of State and local electrical codes.

“(h) WAIVER AUTHORITY.—The Secretary may waive the application of this section or any provision of this section if the Secretary determines that, upon a showing of undue burden or that a covered highway construction project is not necessary based on the availability of existing broadband conduit infrastructure, cost-benefit analysis, or consideration of other relevant factors, the waiver is appropriate with respect to a covered highway construction project.

“(i) COORDINATION WITH FCC.—In carrying out this section, the Secretary shall coordinate with the Federal Communications Commission, including with respect to determinations regarding—

“(1) potential demand under subsection (c)(2);

“(2) existing broadband access under subsection (d)(3);

“(3) pull tape requirements under subsection (e); and

“(4) depth-of-installation standards under sub- section (g).”.

SEC. 3. CONFORMING AMENDMENT.

The analysis for chapter 3 of title 23, United States Code, is amended by adding at the end the following:

“330. Inclusion of broadband conduit installation in certain highway construction projects.”.

Appendix D

GAO Informants

- States: CA, MA, MI, OR, UT, VA
- FCC
- FHWA
- Telecommunications Industry Association
- National Association of Telecommunications Officers and Advisors
- National Association of Regulatory Utility Commissioners
- American Association of State Highway and Transportation Officials
- New America Foundation
- California Emerging Technology Fund
- Massachusetts Broadband Institute
- Google, Verizon, Inyo Networks, Sonic.net, Monkey Brains, Slic Network Solutions and Jaguar Communications
- Governments: San Francisco, Santa Monica, Burbank, Portland

Responses not generalizable

Appendix E

Executive Order- Accelerating Broadband Infrastructure Deployment

Source: The White House, President Barack Obama,

<https://obamawhitehouse.archives.gov/the-press-office/2012/06/14/executive-order-accelerating-broadband-infrastructure-deployment>

Executive Order -- Accelerating Broadband Infrastructure Deployment

June 14, 2012

EXECUTIVE ORDER

ACCELERATING BROADBAND INFRASTRUCTURE DEPLOYMENT

By the authority vested in me as President by the Constitution and the laws of the United States of America, including section 301 of title 3, United States Code, and in order to facilitate broadband deployment on Federal lands, buildings, and rights of way, federally assisted highways, and tribal and individual Indian trust lands (tribal lands), particularly in underserved communities, it is hereby ordered as follows:

Section 1. Policy. Broadband access is essential to the Nation's global competitiveness in the 21st century, driving job creation, promoting innovation, and expanding markets for American businesses. Broadband access also affords public safety agencies the opportunity for greater levels of effectiveness and interoperability. While broadband infrastructure has been deployed in a vast majority of communities across the country, today too many areas still lack adequate access to this crucial resource. For these areas, decisions on access to Federal property and rights of way can be essential to the deployment of both wired and wireless broadband infrastructure. The Federal Government controls nearly 30 percent of all land in the United States, owns thousands of buildings, and provides substantial funding for State and local transportation infrastructure, creating significant opportunities for executive departments and agencies (agencies) to help expand broadband infrastructure.

Sec. 2. Broadband Deployment on Federal Property Working Group. (a) In order to ensure a coordinated and consistent approach in implementing agency procedures, requirements, and policies related to access to Federal lands, buildings, and rights of way, federally assisted highways, and tribal lands to advance broadband deployment, there is established a Broadband Deployment on Federal Property Working Group (Working Group), to be co-chaired by representatives designated by the Administrator of General Services and the Secretary of Homeland Security (Co-Chairs) from their respective agencies, in consultation with the Director of the Office of Science and Technology Policy (Director) and in coordination with the Chief Performance Officer (CPO).

(b) The Working Group shall be composed of:

(i) a representative from each of the following agencies, and the Co-Chairs, all of which have significant ownership of, or responsibility for managing, Federal lands, buildings, and rights of way, federally assisted highways, and tribal lands (Broadband Member Agencies):

- (1) the Department of Defense;
- (2) the Department of the Interior;
- (3) the Department of Agriculture;
- (4) the Department of Commerce;
- (5) the Department of Transportation;
- (6) the Department of Veterans Affairs; and
- (7) the United States Postal Service;

(ii) a representative from each of the following agencies or offices, to provide advice and assistance:

- (1) the Federal Communications Commission;
- (2) the Council on Environmental Quality;
- (3) the Advisory Council on Historic Preservation; and
- (4) the National Security Staff; and

(iii) representatives from such other agencies or offices as the Co-Chairs may invite to participate.

(c) Within 1 year of the date of this order, the Working Group shall report to the Steering Committee on Federal Infrastructure Permitting and Review Process Improvement, established pursuant to Executive Order 13604 of March 22, 2012 (Improving Performance of Federal Permitting and Review of Infrastructure Projects), on the progress that has been made in implementing the actions mandated by sections 3 through 5 of this order.

Sec. 3. Coordinating Consistent and Efficient Federal Broadband Procedures, Requirements, and Policies. (a) Each Broadband Member Agency, following coordination with other Broadband Member Agencies and interested non-member agencies, shall:

(i) develop and implement a strategy to facilitate the timely and efficient deployment of broadband facilities on Federal lands, buildings, and rights of way, federally assisted highways, and tribal lands, that:

(1) ensures a consistent approach across the Federal Government that facilitates broadband deployment processes and decisions, including by: avoiding duplicative reviews; coordinating review processes; providing clear notice of all application and other requirements; ensuring consistent interpretation and application of all procedures, requirements, and policies; supporting decisions on deployment of broadband service to those living on tribal lands consistent with existing statutes, treaties, and trust responsibilities; and ensuring the public availability of current information on these matters;

(2) where beneficial and appropriate, includes procedures for coordination with State, local, and tribal governments, and other appropriate entities;

(3) is coordinated with appropriate external stakeholders, as determined by each Broadband Member Agency, prior to implementation; and

(4) is provided to the Co-Chairs within 180 days of the date of this order; and

(ii) provide comprehensive and current information on accessing Federal lands, buildings, and rights of way, federally assisted highways, and tribal lands for the deployment of broadband facilities, and develop strategies to increase the usefulness and accessibility of this information, including ensuring such information is available online and in a format that is compatible with appropriate Government websites, such as the Federal Infrastructure Projects Dashboard created pursuant to my memorandum of August 31, 2011 (Speeding Infrastructure Development Through More Efficient and Effective Permitting and Environmental Review).

(b) The activities conducted pursuant to subsection (a) of this section, particularly with respect to the establishment of timelines for permitting and review processes, shall be consistent with Executive Order 13604 and with the Federal Plan and Agency Plans to be developed pursuant to that order.

(c) The Co-Chairs, in consultation with the Director and in coordination with the CPO, shall coordinate, review, and monitor the development and implementation of the strategies required by paragraph (a)(i) of this section.

(d) Broadband Member Agencies may limit the information made available pursuant to paragraph (a)(ii) of this section as appropriate to accommodate national security, public safety, and privacy concerns.

Sec. 4. Contracts, Applications, and Permits. (a) Section 6409 of the Middle Class Tax Relief and Job Creation Act of 2012 (Public Law 112-96) contains provisions addressing access to Federal property for the deployment of wireless broadband facilities, including requirements that the General Services Administration (GSA) develop application forms, master contracts, and

fees for such access. The GSA shall consult with the Working Group in developing these application forms, master contracts, and fees.

(b) To the extent not already addressed by section 6409, each Broadband Member Agency with responsibility for managing Federal lands, buildings, or rights of way (as determined by the Co-Chairs) shall, in coordination with the Working Group and within 1 year of the date of this order, develop and use one or more templates for uniform contract, application, and permit terms to facilitate nongovernment entities' use of Federal property for the deployment of broadband facilities. The templates shall, where appropriate, allow for access by multiple broadband service providers and public safety entities. To ensure a consistent approach across the Federal Government and different broadband technologies, the templates shall, to the extent practicable and efficient, provide equal access to Federal property for the deployment of wireline and wireless facilities.

Sec. 5. Deployment of Conduit for Broadband Facilities in Conjunction with Federal or Federally Assisted Highway Construction. (a) The installation of underground fiber conduit along highway and roadway rights of way can improve traffic flow and safety through implementation of intelligent transportation systems (ITS) and reduce the cost of future broadband deployment. Accordingly, within 1 year of the date of this order:

(i) the Department of Transportation, in consultation with the Working Group, shall review dig once requirements in its existing programs and implement a flexible set of best practices that can accommodate changes in broadband technology and minimize excavations consistent with competitive broadband deployment;

(ii) the Department of Transportation shall work with State and local governments to help them develop and implement best practices on such matters as establishing dig once requirements, effectively using private investment in State ITS infrastructure, determining fair market value for rights of way on federally assisted highways, and reestablishing any highway assets disturbed by installation;

(iii) the Department of the Interior and other Broadband Member Agencies with responsibility for federally owned highways and rights of way on tribal lands (as determined by the Co-Chairs) shall revise their procedures, requirements, and policies to include the use of dig once requirements and similar policies to encourage the deployment of broadband infrastructure in conjunction with Federal highway construction, as well as to provide for the reestablishment of any highway assets disturbed by installation;

(iv) the Department of Transportation, after outreach to relevant nonfederal stakeholders, shall review and, if necessary, revise its guidance to State departments of transportation on allowing for-profit or other entities to accommodate or construct, safely and securely maintain, and utilize broadband facilities on State and locally owned rights of way in order to reflect changes in broadband technologies and markets and to promote competitive broadband infrastructure deployment; and

(v) the Department of Transportation, in consultation with the Working Group and the American Association of State Highway and Transportation Officials, shall create an online platform that States and counties may use to aggregate and make publicly available their rights of way laws and joint occupancy guidelines and agreements.

(b) For the purposes of this section, the term "dig once requirements" means requirements designed to reduce the number and scale of repeated excavations for the installation and maintenance of broadband facilities in rights of way.

Sec. 6. General Provisions. (a) This order shall be implemented consistent with all applicable laws, treaties, and trust obligations, and subject to the availability of appropriations.

(b) Nothing in this order shall be construed to impair or otherwise affect:

(i) the authority granted by law to an executive department, agency, or the head thereof;
or

(ii) the functions of the Director of the Office of Management and Budget relating to budgetary, administrative, or legislative proposals.

(c) Independent agencies are strongly encouraged to comply with this order.

(d) This order is not intended to, and does not, create any right or benefit, substantive or procedural, enforceable at law or in equity by any party against the United States, its departments, agencies, or entities, its officers, employees, or agents, or any other person.

BARACK OBAMA

Appendix F

Outlined State and City Dig Once Legislatures

Source: <https://broadbandnow.com/report/dig-once-digital-divide/>

State Examples

WEST VIRGINIA

Law(s): HB 4447, creating new codes §17 – 2 E- 1-E-9

Date enacted: 2018

Description: West Virginia’s state government has developed a uniform system for conduit installation for telecom companies that are applying to install telecom infrastructure. Telecom companies must enter into an agreement with the state’s Division of Highways for installing conduit in public rights-of-way; companies must also notify the West Virginia Broadband Enhancement Council and all other carriers on record within the state of installation permit. Other telecom companies that are interested in installing their own fiber have 30 days to notify the applicant of interest in sharing the trench. The telecom company is also required to run an advertisement in the relevant media for two weeks advertising the project, to allow other carriers the opportunity to respond. The law also allows the Division of Highways to charge fees for access to public rights-of-way, or accept in-kind compensation from sources such as conduit, dark fiber, access points; other telecom equipment or services or even bandwidth.

MAINE

Law(s): Chapter 344, Sec. 1. 35-A MRSA §2503, sub-§2

Date enacted: 2018

Description: Maine’s law requires any public entity involved in a construction project to install broadband conduit, and authorizes that entity to lease the conduit to telecom companies for installing broadband and/or wireless facilities for the purpose of providing service. The law states that telecom companies proposing broadband deployments must notify the ConnectME Authority with the location and description of the proposed facility and that the Authority must then disseminate that information to all other telecom companies or other entities that may be interested in installing broadband at the same time. The Authority is also tasked with maintaining a map of broadband conduit installations through the state.

ILLINOIS

Law(s): 605 ILCS 5/9-131) Sec. 9-131.

Date enacted: 2009

Description: Illinois state law requires the state DOT and the Department of Central Management Services (DCMS) to collaborate in installing fiber network conduit where it does not already exist in every new state-funded construction project that opens trenches along state-owned roadways. Either department is authorized to allow a third-party company to manage the leasing of the conduit to telecom companies, so long as the state can receive market-based pricing for the lease. The state’s DOT also coordinates with the Illinois Broadband Deployment Council to compile Dig Once best practices and draft ordinances for county and city agencies within the state.

City Examples

LOMA LINDA, CA

Law: Ord. 629 §1

Date enacted: 2004

Description: The city of Loma Linda requires all new construction to connect to the city's existing fiber network, through ordinances laid out in their Loma Linda Connected Community Program. Residential and commercial builders in Loma Linda are required to include broadband-capable internal wiring and fiber-optic interfaces in new structures. Loma Linda was one of the first communities in the US to adopt a comprehensive future-facing dig once construction policy, and one of the only ones to extend the ordinance to building wiring specifications.

BRENTWOOD, CA

Law: Ordinance No. 609

Date enacted: 1999

Description: Brentwood California began implementing Dig Once policies 20 years ago. The city requires developers to design and install two advanced technology system conduits dedicated to the city within public rights-of-way during new construction and to each lot line within the development. It goes on to require developers to install a fiber optic system in one of the two conduits, designed to serve the development by either the city itself or a licensed franchisee. The second conduit must remain empty and is reserved for future use by other franchisees. Over the last 20 years, the city now has 150 miles of conduit passing over 8,000 homes. ISP Sonic.net has relied heavily on the conduit to provide broadband service to residents.

BOSTON, MA

Date enacted: 1998; expansion in 1994

Description: Boston is possibly the very first city to implement a Dig Once policy, back in 1988. Initially, the city required all construction projects that involved excavators in a public right-of-way to install conduit, and the city then leased that conduit to telecom companies through a one-time fee plus a \$5 per foot annual charge. However, the city found its offering wasn't attractive enough to telecom companies, who had begun building their own conduit along parallel streets. The city has since revised its laws to require telecom companies to lease space from the installed conduit before being allowed to install their own conduit, thereby encouraging companies to make use of what's already been installed. In 1994, Boston implemented a policy that required all telecom companies to install conduits in the same trench at the same time, on a shared-cost basis. This policy requires a lead company to coordinate with other telecom entities in drafting engineering plans and estimating costs for the trenching and conduit installation.

Appendix G

Other State Dig Once Legislature Examples

Source: <https://broadbandnow.com/report/dig-once-digital-divide/>

NORTH CAROLINA

Law(s): Executive Order 91 forming the Task Force on Connecting North Carolina

Date enacted: 2019

Description: The Governor of North Carolina formed the Task Force on Connecting North Carolina in March 2019, aimed at increasing Internet access to North Carolina residents and aligning state agencies policies in order to remove barriers to broadband deployment. It's comprised of officials representing an array of state departments, including the department of transportation (DOT) and the department of information technology (DIT).

The governor has asked representatives from the DOT and DIT to jointly develop and implement no later than July 1st, 2019 a statewide "Dig Once" policy promoting the installation of broadband conduit or cables during road construction projects.

UTAH

Law(s): R907-64. Longitudinal and Wireless Access to Interstate System Rights-of-Way for Installation of Telecommunication Facilities; Section 72-7-108

Date enacted: 1999

Description: Utah's state government began implementing Dig Once policies ahead of the 2002 Salt Lake City Olympics. The state's DOT has since expanded the policy, requiring the installation of oversized conduit for certain road construction projects, while interested telecom parties can then extend that infrastructure to neighboring communities.

The state's DOT owns the conduit and leases it to telecom companies that want to use it. The state's Telecommunications Advisory Council reviews and approves valuations and trades between the state's DOT and telecom companies for access to conduit, and maintains a map of fiber locations.

ARIZONA

Law(s): Arizona REV. STAT. ANN. § 28-7381

Date enacted: 2012

Description: Arizona's Dig Once policies are targeted specifically at expanding broadband access to rural communities. The policy states that during road construction projects along rural highways, the DOT can coordinate with telecom companies to install conduit, and enables the agency to lease the conduit to telecom providers at a cost-based rate.

MINNESOTA

Law(s): 116J.39-116J.40: Coordination of Broadband Infrastructure Development

Date enacted: 2013

Description: Minnesota's state laws encourage the state's Office of Broadband Development to coordinate with the state's DOT for "Dig Once" measures in planning, relocation, installation, or improving broadband conduit within a right-of-way. It enables the Office of Broadband Development to evaluate procedures and criteria for contracts or lease agreements with telecom

companies and as well as pricing requirements. It also allows for co-location of fiber and conduit with other utilities in the same trench.

NEVADA

Law(s): SB 53, creating the Nevada Telecommunications Advisory Council

Date enacted: 2017

Description: Nevada state legislature formed the Telecommunications Advisory Council within the state's DOT in 2017, outlining parameters and regulations for the DOT in coordinating with telecom companies for access to rights-of-way for installing telecommunications equipment. The law charges the council with seeking input from telecommunications providers and the public relating to broadband access, provide recommendations to the state DOT on offering access to rights-of-way to telecommunications providers, as well as approving or denying proposed fiber trade agreements between the DOT and a telecom provider. The DOT is also authorized to enter into agreements with telecom companies and charge fees to access to public rights-of-way, or receive in-kind compensation.

MARYLAND

Law(s): SB 717 –Connecting Rural Maryland Act of 2017, creating the Task Force on Rural Internet, Broadband, Wireless, and Cellular Service; HB 961-Rural Broadband Communication Services

Date enacted: 2017-present

Description: Maryland's DOT coordinates with telecom providers and local utilities for installing conduit. The Connecting Rural Maryland Act created the Task Force on Rural Internet, Broadband, Wireless and Cellular Service, which was charged with facilitating cooperation between telecom providers to reduce redundancy, save money, and ensure that the all fiber assets are being used efficiently. The task force focused on facilitating cooperation between electric cooperatives and telecom companies.

The task force's last report recommended the state include fiber optic cable as part of its definition of telecommunications equipment, and that it allow utilities to lease excess fiber and/or pole attachment rights for telecommunications, including broadband, without obtaining a separate easement, in order to promote broadband access in rural parts of the state. It has requested that the state's legislature draft authority for electric cooperatives to coordinate with telecom providers in laying fiber. That bill is expected to be introduced during the 2019 session. HB 961, meanwhile, specifies that nonprofit telecommunications services providers in rural and underserved areas of the State must be allowed to use the right-of-way or easement of specified State agencies for the installation of broadband communication infrastructure without being charged to do so.

GEORGIA

Law(s): SB 402 — Achieving Connectivity Everywhere (ACE) Act

Date enacted: 2018

Description: Georgia state legislature passed the ACE bill in 2018, which enables the state DOT to develop and implement a long-term policy allowing public rights-of-way to be used for the deployment of broadband services and other “emerging communication technologies” either by the state or private providers. It also requires local governments' comprehensive plans to include elements to facilitate the deployment of broadband services, and it amends the OneGeorgia

Authority Act to include broadband services. Finally, the bill authorizes the Georgia Technology Authority to establish policies and programs necessary to coordinate statewide efforts to promote broadband deployments between state agencies, local governments and industry representatives.

CALIFORNIA

Law(s): Section 14051 of the Government Code

Date enacted: 2016

Description: California requires the state DOT to notify telecom companies of state-led highway construction projects through its website to enable companies to collaborate with the state on installing conduit in public rights-of-way during each project.

Appendix H

Other City and County Dig Once Legislature Examples

Source: <https://broadbandnow.com/report/dig-once-digital-divide/>

SANDY, OR

Law: Development code 17.84.60

Description: The city of Sandy requires private developers to install conduit when disturbing existing roads or building new ones, and offers maps of existing installations so that developers can be strategic in how they install conduit. The city was added broadband fiber to the list of municipal infrastructures (such as water, sewer, power lines and mailboxes) that all new developments must include.

BERKELEY, CA

Law: Ord. 7083-NS § 4 (part) Excavations for video and telecommunications systems

Date enacted: 2009

Description: Berkeley has implemented a suite of policies and procedures outlining best practices for telecom companies in order to minimize the inconveniences of installation, maintenance and removal of telecom facilities in public rights-of-way. The city requires that existing facilities be moved underground alongside new facilities when feasible, and that telecom companies coordinate construction projects with utilities installing infrastructure in public rights-of-way. Telecom companies must also alert the city to any excess or surplus conduit to be installed, and that new facilities be installed within existing facilities where there is sufficient excess capacity.

BELLEVUE, WA

Description: The city of Bellevue doesn't have a formal Dig Once policy in place, but the city has set Dig Once conditions within some of its development projects in the past. The city asks excavator projects include installing conduit along roads when feasible, as well as during street lighting and traffic signal upgrades. It also requires transportation projects that interrupt public sidewalks include installed conduit.

GONZALES, CA

Law: "Dig Once" Policy for Public Works Projects in Gonzales

Date enacted: 2016

Description: Gonzales city government has implemented a Dig Once policy for public works projects that requires the city to install conduit during projects such as construction and maintenance of utility infrastructure, or public roadways, or during excavations for installing communications, in public rights-of-way. The conduit is owned by the city.

ARLINGTON COUNTY, VA

Description: Arlington County does not have a specific Dig Once policy, but the county has reached "Dig Once" agreements with utility providers in the past. The county entered into one such agreement with electric utility Dominion Virginia Power. The utility needed to install underground conduit along a congested urban public right-of-way. The county required the

utility to install fiber in parallel conduit for the county's use. The county is also in the midst of installing a fiber network and is building extra capacity for use at a later date.

SAN FRANCISCO, CA

Law: Ordinance 220-14

Date enacted: 2014

Description: San Francisco laws requires any government-led construction project involving a public right-of-way to include improvements to communications infrastructure when feasible. It also requires a telecom company applying to install communications infrastructure to notify the city's Department of Technology, in order for the department to participate in installing conduit at the same time, and encourages the department to consider doing so, in order to create a more efficient delivery of broadband services to the public and for the city's needs.

MONTEREY, CA

Law: MBEP/CCBC Shadow Conduit Specifications version 1.0

Date enacted: 2016

Description: The city of Monterey and the Central Coast Broadband Consortium (CCBC) have developed a set of conduit specifications and guidelines for reducing redundancy in installation. Its recommendations range from the conduit size and number of conduits to install; whether future conduit installation would be problematic or impossible; and whether any partners or customers will make immediate use of it. But the specifications leave out guidance on when to require conduit installation and who should be required to install it.

SANTA CRUZ, CA

Law: Telecommunications Improvement Ordinance

Date enacted: 2014

Description: The city of Santa Cruz, also part of the Central Coast Broadband Consortium (CCBC), adopted the Santa Cruz county's ordinance in 2014, which in turn was based on the city of San Francisco's Dig One policy. It requires that any entity proposing construction projects in public rights-of-way for utility improvements also install conduit or other telecommunications equipment when practical and feasible. City staff will work with contractors to identify the most cost-effective approach to installing conduit to meet the city requirements, and will notify and coordinate with other telecom companies to join the project.

SAN BENITO COUNTY, CA

Law: Multi-use streets policy

Date enacted: 2015

Description: San Benito County, part of the CCBC, and implemented a Dig Once practices as part of its multi-use streets policy. It requires county roadway construction projects to include install underground utility conduit. The county, which is part of a municipal broadband network, can then use the conduit to expand the network. The county may also utilize the CCBC's shadow conduit policy, which recommends trenching digging projects include a 60-day window in order to notify other telecom or utility providers who may be interested in installing conduit at the same time. The county encourages local jurisdictions to adopt similar policies.

CHICAGO, IL

Description: The City of Chicago has created a specific office that handles coordinating construction projects across agencies and companies to minimize disruptions to the public. The Project Coordination Office, within the city's DOT, was formed in 2012 at the direction of Mayor Rahm Emanuel to coordinate projects within public rights-of-way between different service providers and utilities. In 2013, the mayor expanded the scope of the office to include telecommunications. The office has helped the city save an estimated \$150 million in construction costs since 2012.

CELINA, TX

Law: Subdivision Ordinance; Division 4. Design Standards; Section 10.03.126: Improvements; Subsection 10.03.126(i)

Date enacted: 2017

Description: The city of Celina has adopted a conduit ordinance that requires any city-led or developer-led construction project that includes underground excavation to install conduit and fiber-optic cable at the same time, in order to accommodate future telecommunications uses. Private developers must pay for the conduit installation, which then becomes the property of the city. The city also requires that telecom companies looking to install fiber make use of the city's fiber assets when available, first, and pay fees to the city for access to the infrastructure.

MOUNT VERNON, WA

Law: Municipal code 12.20.015 Construction standards for the regulation of use of public rights-of-way and public property.

Date enacted: 1999

Description: Mount Vernon requires private developers to install conduit when engaging in construction projects that either disturb existing roads or create new roads. The city maintains maps of conduit installations so that developers can be strategic in where they place the conduit.

EL DORADO COUNTY, CA

Law: Broadband Infrastructure Installation Policy

Date enacted: 2018

Description: El Dorado County adopted a conduit installation requirement for capital improvement projects. The policy requires construction projects from the county's Department of Transportation, the Facilities Division and the Parks, Trails and Rivers Division to include installing conduit when digging trenches or excavating underground as part of the construction.

HUMBOLDT COUNTY, CA

Law: General Plan

Date enacted: 2017

Description: Humboldt county's 2017 updated general plan includes provisions to expand broadband access that include implementing Dig Once policies. The plan recommends that new residential and commercial development projects include requiring developers to install conduit within joint utility trenches for future telecommunications use. It also recommends flexibility in conduit placement requirements in order to allow for retrofitting of communications systems.

POULSBO, WA

Law: 12.02.010 Construction and development standards

Date enacted: 2003

Description: Poulsbo requires any new public street construction by either the city or a private developer include the installation of conduit that can accommodate two telecom companies' fiber infrastructures. The law requires that the conduit be dedicated to the city upon completion, and that any telecom company looking to deploy infrastructure must first lease conduit space from the city if available.

Appendix I

Model Legislation

Source: *Fiber to the Home Council*, <https://www.ncbroadband.gov/wp-content/uploads/2018/01/FTTHCouncil-DigOnceDigSmart11.pdf>

This appendix includes model legislation for (1) municipalities or states to implement Dig Smart policies and (2) states to facilitate Dig Smart policies at the municipal level. The model legislation here also includes definitions and sensible exceptions for Dig Smart requirements (*e.g.*, in cases of emergency repair).

These provisions may be adapted for municipal or state use. In place of “city” or “state” the model legislation uses Government Entity. These provisions are models to serve as a starting point for cities and states interested in obtaining the benefits of Dig Smart; the provisions may be altered as appropriate or necessary to conform to specific community preferences and existing laws.

Definitions

Section XX.XX

As used in this chapter creating “Dig Smart” requirements, the following definitions apply:

1. “Communications Infrastructure” means conduit installed in public rights of way that can accommodate at least two separate fiber optic cables.
2. “Developer” means any person or private entity that proposes to subdivide, divides or causes to be divided real property into a subdivision.
3. “Emergency” means an Unexpected Occurrence requiring prompt action to prevent or mitigate loss of, or damage to, life, health, property, or essential public services.
4. “Excavate” or “Excavation” means any work or action in which earth, rock, pavement, or other material in the ground or underwater in a public right-of-way is moved, removed, or otherwise displaced by means of tools, equipment, or explosives in any of the following ways: grading, trenching, digging, ditching, drilling, tunneling, scraping, cable or pipe plowing and driving, or any other means.
5. “Excavator” means any person, private entity, or Government Entity that engages in Excavation or has applied for a permit from Government Entity to Excavate.
6. “Operator” means any person, private entity, or Government Entity that owns, operates, or maintains Underground Facilities.
7. “Public Works Project” means any Excavation project undertaken by Government Entity.
8. “Underground Facilities” means underground or submerged conductor, pipe, structure, conduit, or equipment used or installed for use in providing electric or communications service or in carrying, providing, or gathering gas, oil or oil products, sewage, wastewater, storm drainage, or water or other liquids. All Underground Facilities shall be considered to extend up to the connection to the customer’s facilities.
9. “Unexpected Occurrence” is an unexpected event, including without limitation fires, floods, earthquakes, or other soil or geologic movements, riots, accidents, and damage to Underground Facilities requiring repair.

Exceptions to Dig Smart Requirements

Section XX.XX

- (a) Emergency. Operators, Excavators, and Developers are not required to comply with “Dig Smart” requirements in cases of Excavation because of an Emergency.
- (b) *De Minimis* Excavation. Notwithstanding anything else set forth in this chapter, “Dig Smart” requirements involving Excavation only apply when the contiguous length of the proposed Excavation will be at least 900 linear feet in the public right-of way.

Mandatory Installation of Conduit

Section XX.XX

- (a) Installation of Conduit in Public Rights-of-Way in Public Works Projects. Whenever an agency or department of the Government Entity undertakes a Public Works Project involving the planning, construction, reconstruction, or repaving of a public right-of-way, such project shall include, to the maximum extent practicable and feasible, installation of underground Communications Infrastructure by the Government Entity.
- (b) Installation of Conduit in Public Rights-of-Way in Other Excavations.
 - 1. To the maximum extent practicable and feasible, the Government Entity shall condition all Excavation permits on the installation of underground Communications Infrastructure on behalf of the Government Entity.
 - 2. The Government Entity shall provide at the Government Entity’s cost the necessary materials (but not any equipment used for installation) for the permittee to install underground Communications Infrastructure in the public right-of-way.
 - 3. The Government Entity shall bear all reasonable and documented design and construction costs associated solely with inclusion of the Government Entity’s Communications Infrastructure in the Excavation.
 - 4. Title to the installed Communications Infrastructure provided by the Government Entity shall vest in the Government Entity upon installation without any further action of the Excavator or the Government Entity.

State Facilitation of Local Dig Smart

Section XX.X

To the extent practicable, the Department of XX shall encourage and assist local units of government to adopt and implement “Dig Smart” policies for construction or other improvements to county state-aid highways, municipal state-aid roads, and any other rights-of-way under the local unit of government’s jurisdiction. “Dig Smart” refers to policies that require the government entity to install conduit in conjunction with excavation along public rights-of-way.