Fiber to the Premise (FTTP):
Force Them To Pave?

APWA Congress Session
September 11, 2007

Presentation by:
Jay T. Spurgin, PE, MPA
Deputy Public Works Director/City Engineer
City of Thousand Oaks, California

Presentation Outline
• Balancing conflicting priorities
• FTTP design and construction
• Permit conditions and requirements
• Franchise agreement
• Successes and challenges
Balancing Conflicting Priorities

- 80% households with computers connected to internet
- Demand for high speed broadband service
- FTTP up to 30 mbps download vs 5 mbps cable modem, 1.5 mbps DSL
- Aesthetics of public infrastructure very important

FTTP = Force Them To Pave?

- City wanted FTTP network
- Verizon headquartered in Thousand Oaks
- Trenching of 55% of streets required
- Public outcry from previous cable TV project
- Street re-surfacing a major element of LFA negotiations
Project Setting
- Thousand Oaks 42 mi NW of Los Angeles
- City incorporated 1964
- 127,000 population
- 54 sq mi, 40% open space
- Center of "technology corridor"

City of Thousand Oaks

High Resident Expectations
- Median home price $780,000
- Average household income $107,000
- City pride in R/W aesthetics

City of Thousand Oaks

FTTP Comes to Town
- 2004 Verizon approached City with proposal to install FTTP system
- FTTP able to carry telephone, internet, and video (FiOS "triple play")
- Cable TV service required City franchise
- Telephone, internet service fall under state franchise

City of Thousand Oaks
Another Citywide Cable Network?

• 1996 to 1999 GTE Ameritech constructed a Citywide cable TV system
• 140 miles (40%) of City streets trenched
• Trenches patched but streets not resurfaced
• City received hundreds of resident complaints about street appearance

Lesson Learned?

• City undertook a 4-year street slurry sealing program to address majority of affected streets at about $1M cost
• GTE prepaid franchise fees
• Verizon took over GTE in 2000
• Verizon sold cable system to Adelphia (now Time Warner)

FTTP System Design

• Three wire centers in Thousand Oaks
• Five FO lines from CO to each FDH
• FDA for up to 400 customers (~100 AC)
• 150 FDAs in City
• FO line FDH to ONT
• 100 mbps capacity
FTTP Components

- Fiber Distribution Hub (FDH) 48x30x20

Right-of-Way Impacts

- Temporary construction impacts
- Permanent trench cuts/street restoration
- More infrastructure within right-of-way
- FDH size and location

Installation Scenarios

1. Existing conduit - room for FO lines
2. Overhead utility lines - overlash FO
3. New conduit required (200+ miles)

New Conduit, 55%
Existing Conduit, 25%
Overhead, 20%
Overhead Construction

HDD Construction

FTTP Project Control
- Encroachment permit for each FDA
- For HDD construction, standard trench repair acceptable
- For street trenching, curb to curb slurry seal required (cash out at $0.20/sf)
- All FDH locations approved by City
FDH Locations

City of Thousand Oaks

FDH Locations

City of Thousand Oaks

More Control

- Limit 10 open permits for new conduit
- Verizon inspectors
- Flowable fill for trench backfill
- Final paving within 30 days
- $200,000 bond
- NPDES stormwater compliance
FTTP Project Execution

- FTTP system installation began January 2006
- Specific Encroachment Permit conditions provided to Verizon (handout)
- Coordinate City pavement maintenance program with FTTP

FTTP Project Execution

- Rolled 2 inch PVC conduit installed
- “288” FO cable used (24 x 12 fiber ribbons)
- 24 inch cover allowed to avoid conflicts
- Pot holing at all utility crossings
- Rock wheel trenching in hard soil/rock
Franchise Agreement
Local or State?

- State legislation not yet introduced in 2004
- FiOS includes cable/video, no LFA required
- Negotiations over two years
- LFA approved Sept 12, 2006
- AB 2987 signed into law Sept 29, 2006

California Legislation
AB 2987

- State franchise instead of local
- Opt out for existing providers
- Franchise fees collected at State level
- Less support for PEG & I
- Local control/enforcement issues
LFA Provisions
- Initial cable service in 12 months
- Build-out within 36 to 60 months
- 5% franchise fee
- 15 year term (may opt-out after 3 years)
- PEG support equal to current cable operators

City of Thousand Oaks

LFA Provisions
- Free basic service to public buildings, fire stations and schools
- Commitment to honor local/state franchise
- Promotes competition

City of Thousand Oaks

Successes and Challenges
- Master Plan of system enables advanced planning for inspection/management
- Coordinate trenched streets with PMP
- Use of Verizon inspectors
- Typical underground construction challenges

City of Thousand Oaks
Successes and Challenges

- 35% take rate far exceeds expected
- 30 mbps download speed significantly faster than other technologies
- Triple play cost of $120/mo much less than separate phone/internet/cable services

Successes and Challenges

- Project about 20% complete
- Future public outcry?
- Slurry seal all trenched streets within 1 to 3 years
- Slurry seal patched streets?
FTTP = Force Them To Pave?

- Cooperation and compromise
- Mitigate infrastructure aesthetic concerns with reasonable permit conditions
- Your residents will demand this technology…be prepared
NOTES:

1. All trenches shall be backfilled with 100-E-100 cement/sand slurry mix. Asphalt shall be 1" thicker than existing.

2. These conditions shall be in addition to Plate No. 8-13.

3. Jagged and/or rough edges shall be kept at a minimum. Inspector will determine any additional saw cutting. Extreme care must be exercised on older roads where A/C has broken up or become brittle. Existing AC sections adjacent to concrete gutters, etc., less than 18" wide shall be removed and replaced with full depth AC section and as directed by the Public Works Inspector.

4. Trench width plus 18" on each side (min. 4' total width) shall be ground to a depth of 2".
   Place full width reinforcing fabric, followed by 2" AC overlay. Care shall be taken to prevent slurry mix from interfering with tack coat application. Reinforcing fabric shall comply with SSPWC 213 and 302-7.

5. All work must be completed within 30 days of starting date unless otherwise authorized by the City Engineer.
These specifications are for construction of the proposed Verizon Fiber to the Premise (FTTP) project, and, along with construction drawings and details, will accompany each individual Encroachment Permit. All activities shall comply with applicable State, Federal and Local regulations, including but not limited to the Thousand Oaks Municipal Code and Road Design and Construction Standards.

A. Construction Method
   1. Substructure construction shall be accomplished utilizing the following methods, in order of priority:
      A. Boring in parkways
      B. Trenching in parkways
      C. Boring in street
      D. Trenching in street
      E. Trenching in sidewalk

   2. Longitudinal trenching in the street shall require prior written approval from the City. Additional specifications and conditions may be imposed at that time.

B. Excavation in Parkways and Sidewalks
   1. No new excavations in the right of way shall be made on Fridays. Fridays are generally reserved for paving, cleanup and finishing the week’s work.

   2. Excavations in the parkway may be covered with plywood and barricaded for 48 hours, except on weekends. All other excavations must be backfilled and plated or temporarily paved. No excavations shall remain open over weekends.

   3. Backfill in parkways shall conform to Road Standards Plate 8-13.

   4. Compaction of backfill in parkways shall be 90% minimum. City will not require compaction testing unless there is evidence of inadequate compaction. City may conduct random compaction testing.

   5. All improvements and landscaping in parkways shall be restored in-kind. The contractor shall take photographs of each work area prior to beginning and retain in files for reference and examination.

   6. Sidewalk areas shall be backfilled with cement and sand slurry and replaced in accordance with Plate 8-3.

C. Excavation in Streets
   1. No new excavations in the right of way shall be made on Fridays. Fridays are generally reserved for paving, cleanup and finishing the week’s work.

   2. Backfill shall occur on same day as excavation. No excavations may remain open over night.

   3. All backfill shall conform to Road Standards Plate 8-14. Slurry backfill shall be SSPWC 100-E-100 with a maximum slump of 5 inches, without admixtures. Admixtures shall not be used without first providing product submittals and obtaining City’s approval. Care shall be taken to keep the edges of the asphalt free from slurry.
4. Steel plates shall conform to Road Standards Plate 1-8 and shall have a traction surface. No steel plates may be left in place over weekends or holidays without the written permission of the Inspector.

5. Slurry backfill shall remain a minimum of 3 inches below the finished surface. If the slurry has attained sufficient hardness for traffic, the excavation shall be covered with temporary paving. Where the slurry has not attained sufficient hardness, the excavation must be covered with steel plates until the next day.

6. Temporary paving and trench plates shall be maintained in good condition at all times, and shall be inspected by the permittee on a weekly basis. Temporary paving materials shall be added as needed to maintain a smooth riding surface within 24 hours of any complaint received or from direction given by the City.

D. Traffic Control
1. Traffic control shall conform to the most recent edition of Work Area Protection and Traffic Control Manual.

2. For minor residential streets, at least one 11-foot wide travel lane shall be provided at all times. At least one full-time dedicated flagger shall be utilized at each lane restriction to control traffic. Flaggers shall be equipped with Slow-Stop signs, a flag, a reflective vest and white hardhat. Adequate advance warning shall be provided at each entrance to the street(s) where work is occurring. Depending on visibility between flaggers, and/or distance that could make communication between flaggers difficult, flaggers may be required to use two-way radios.

3. No road may be fully closed at any time.

4. Work on any arterial road shall require a minimum of 48 hours notice and is subject to a separate traffic control plan being submitted and approved.

5. “No Parking” signs shall be posted a minimum of 48 hours prior to work beginning in that area, and shall clearly state the date(s) that it is in effect.

6. Access to all driveways shall be provided at all times. If sidewalks are blocked, advisory signs shall be placed at each of the nearest intersections.

E. Paving
1. Prior to paving with hot asphalt, the edges of the asphalt shall be cleaned as necessary before the application of the tack coat.

2. Tack coat used in conjunction with paving fabric shall be PG 64-10 and shall conform to SSPWC 302-5.4.

3. Temporary paving may be cold-mix asphalt, flush with the finished surface. Cold-mix shall be replaced with hot-mix within 14 working days. Hot-mix base paving shall be SSPWC Type III-C2, PG 64-10.

4. Floating pieces of asphalt less than 18” in width measured to the edge of pavement or another excavation or joint shall be removed and replaced. In streets that are cracked, damaged or “alligatored,” the extent of removal and replacement of asphalt shall be per the Inspector’s direction.

5. Final paving shall be in accordance with Road Standards Plate 8-14, modified such that the cold-milling shall extend a minimum of 1 foot beyond the edge of the excavation (instead of 18”). Final paving shall be Type III C2, PG 64-10.
6. Final paving shall occur within 30 calendar days of the completion of the underground construction.

F. Cleanup
1. Cleanup shall occur at the end of each day, including mechanical sweeping if necessary. All construction tools, equipment, trash, debris, spoils and materials shall be removed from the area or otherwise secured. Materials left in the right of way shall be neatly stockpiled and delineated in a safe manner, and in no case shall materials remain stockpiled over weekends/holidays, or for more than 72 hours.

2. Boring operations will require vacuum equipment to clean up mud and/or slurry. Sandbags or other containment devices shall be utilized to prevent mud from entering the storm drains per the approved Storm Water Pollution Control Plan (SWPCP).

G. Supervision
1. Each crew shall have a responsible and competent, English-speaking foreman present during construction who shall exercise strict supervision over the crew.

2. Workers shall not use private property for any reason. Adequate water and toilet facilities shall be provided. Workers shall be courteous, considerate and conduct themselves professionally.

3. Workers shall wear shirts or tags that clearly identify their company’s name.

H. Inspection Hours
1. Regular inspection hours are Monday through Friday, 7:00 am to 4:00 pm. Work occurring after 4:00 pm is subject to overtime inspection charges. No work may occur in the street on Saturday, Sunday or holidays without written permission from the City, except that minor work in parkways and sidewalks that does not require inspection may occur on Saturdays only with advance notice to the City.

I. General Conditions
1. Colors and styles of Hub cabinets shall be approved by the City of Thousand Oaks prior to issuance of Encroachment Permits. The Construction Inspection Supervisor shall approve all locations and colors of Hub cabinets in advance of installation. Location of Hub cabinets shall be determined based on being minimally obtrusive, aesthetics, public safety and public right of way accessibility.

2. One Encroachment Permit shall be obtained for each service area.

3. There will be a maximum of three (3) Encroachment Permits outstanding at any one time, consisting of one in each of the currently designated inspection areas. Generally, a permitted area will be final paved and cleaned up before the next permit is issued. The City at its discretion may increase the number encroachment permits outstanding at any one time contingent upon the work preceding satisfactorily, the City’s ability to provide inspection services and associated administrative support.

4. If the disturbed area is to be over one (1) acre, a Stormwater Pollution Prevention Plan (SWPPP) shall be prepared and a WDID obtained from the State Water Quality Control Board. A Stormwater Pollution Control Plan (SWPCP) shall be submitted to the City for review and approval prior to construction.

5. A performance bond in the amount of $200,000 shall be provided to the City prior to construction beginning.

6. Verizon shall conduct a continuing public outreach program, informing residents of construction impacts and the approximate schedule. The program would consist of:
• City Council presentations, prior to issuance of Encroachment Permits, describing overall impacts to the City, a comprehensive plan, and describing services, benefits, costs, and schedules. Periodically provide status updates to City Council during progress of the work.
• Written communications, fliers and door hangers to residences and businesses describing the overall project, construction impacts, and schedules well in advance of work and specifically shortly prior to starting work in permitted areas.
• During construction provide and publish a hotline number answered by a full time Verizon representative with up to the date knowledge of the project and activities to respond to questions and concerns.
• Develop and implement a process to resolve concerns and damage claims to private property during or resulting from construction activities.
• Details shall be provided to the City prior to the implementation of the above.

7. Electronic copies of the detailed construction drawings shall be submitted to the City in “PDF” or other common format.

8. Where typical excavation occurs in the street, the street shall be coated to its full width with a SSPWC Type I slurry, in accordance with 302-4. The City may waive or modify this requirement at its discretion depending upon the existing condition of the street, the intensity of the excavations, and whether the location is scheduled to receive City maintenance within two years of the installation. As currently anticipated, typical excavation would include potholes and bore pits every 100 feet apart or less. In general, an entire tract, neighborhood or service area will treated equally.

DPW:821-90 \common\verizon ftp specifications for encroachment permits