

Public Money for I&I Reduction on Private Property

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RH2 Engineering, Inc.

2010 PNCWA Annual Conference

Bend, Oregon





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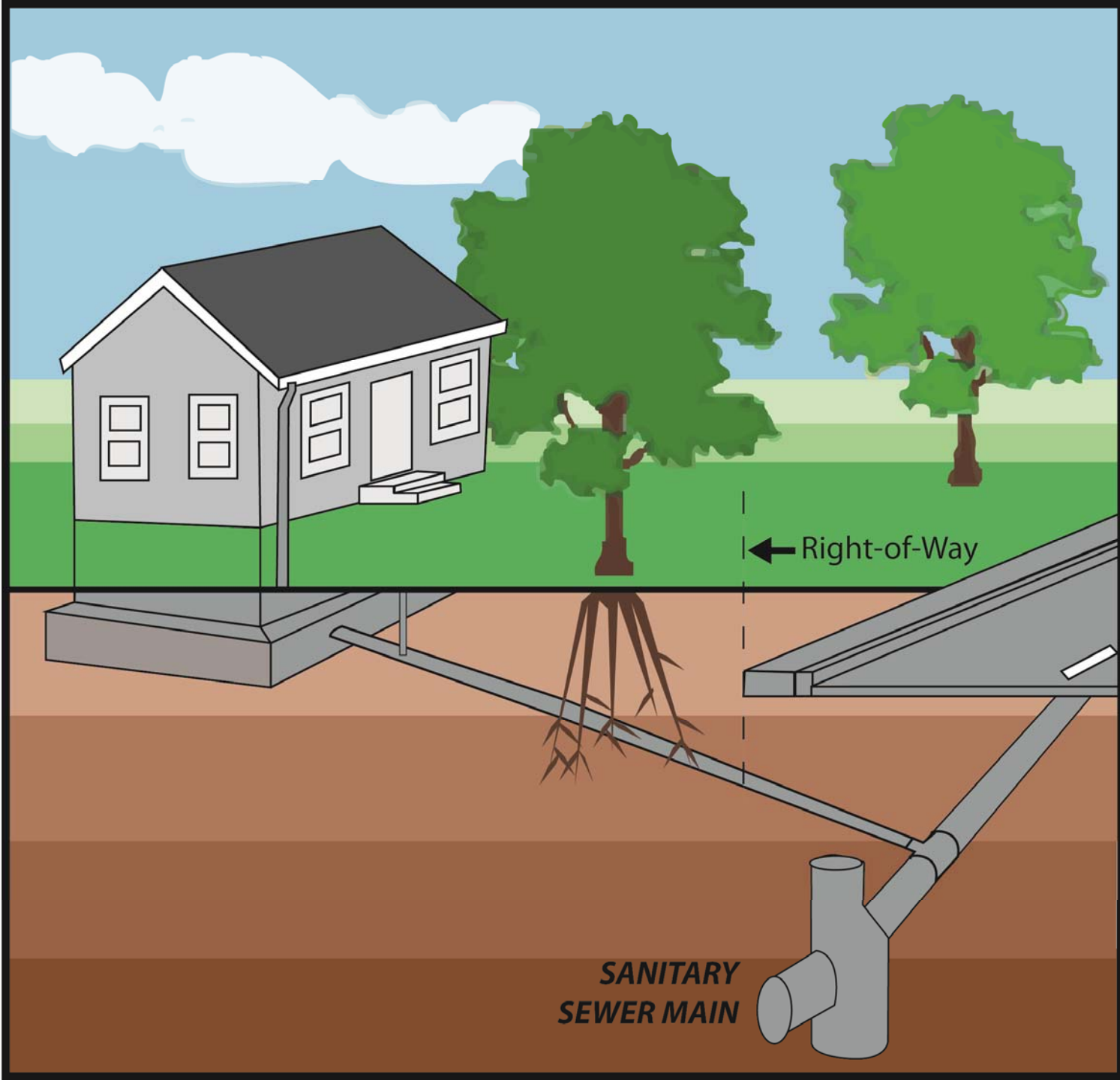


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Effectively Targetting I&I Reduction

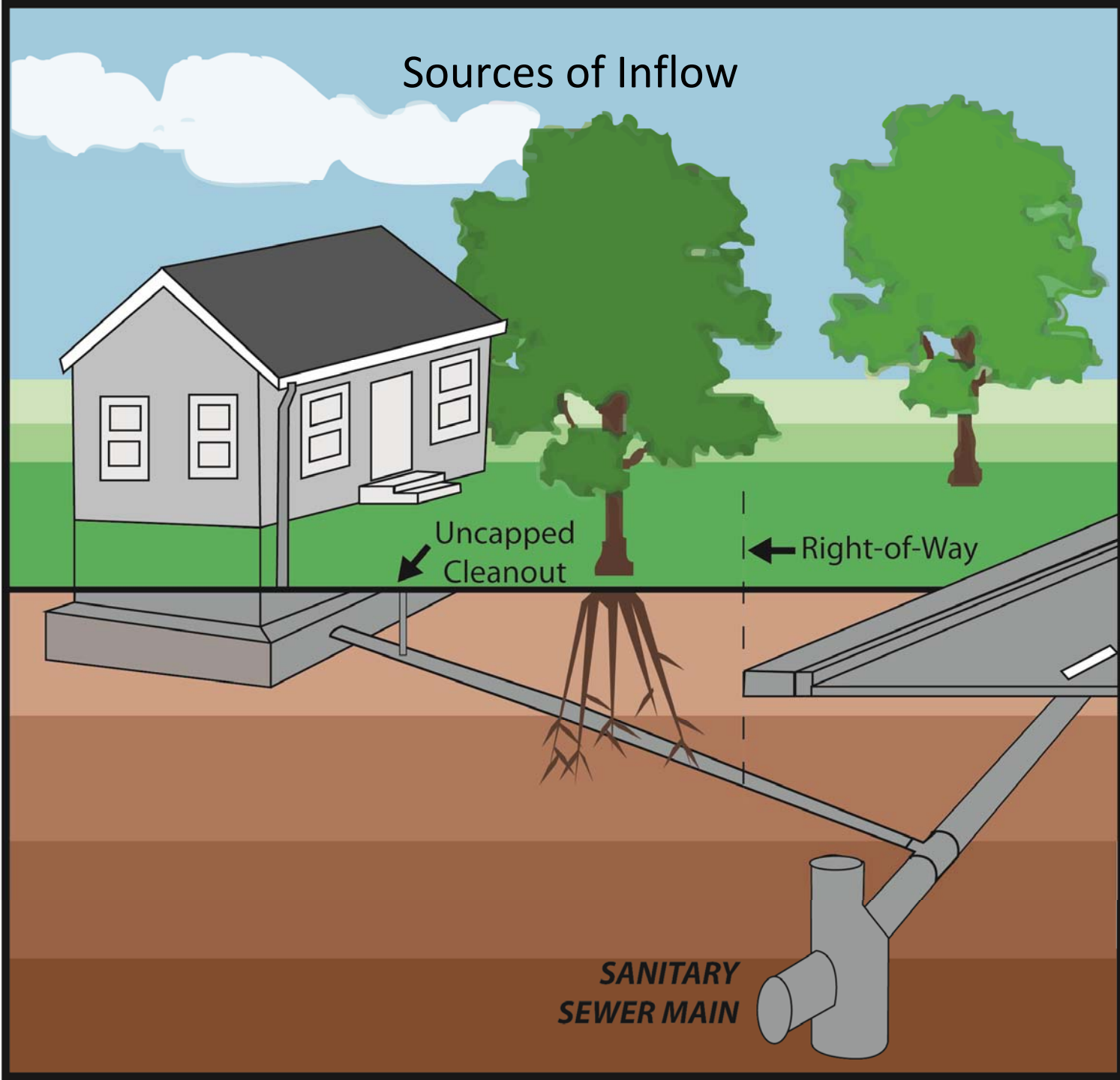
- Fact: Most I&I comes from side sewers.
- Problem: There are obstacles to reducing this I&I source.
- Today's talk:
 - Define terms & Public/Private boundary
 - Contracting methods to avoid obstacles
 - Alternatives to spending public money to replace sidesewers



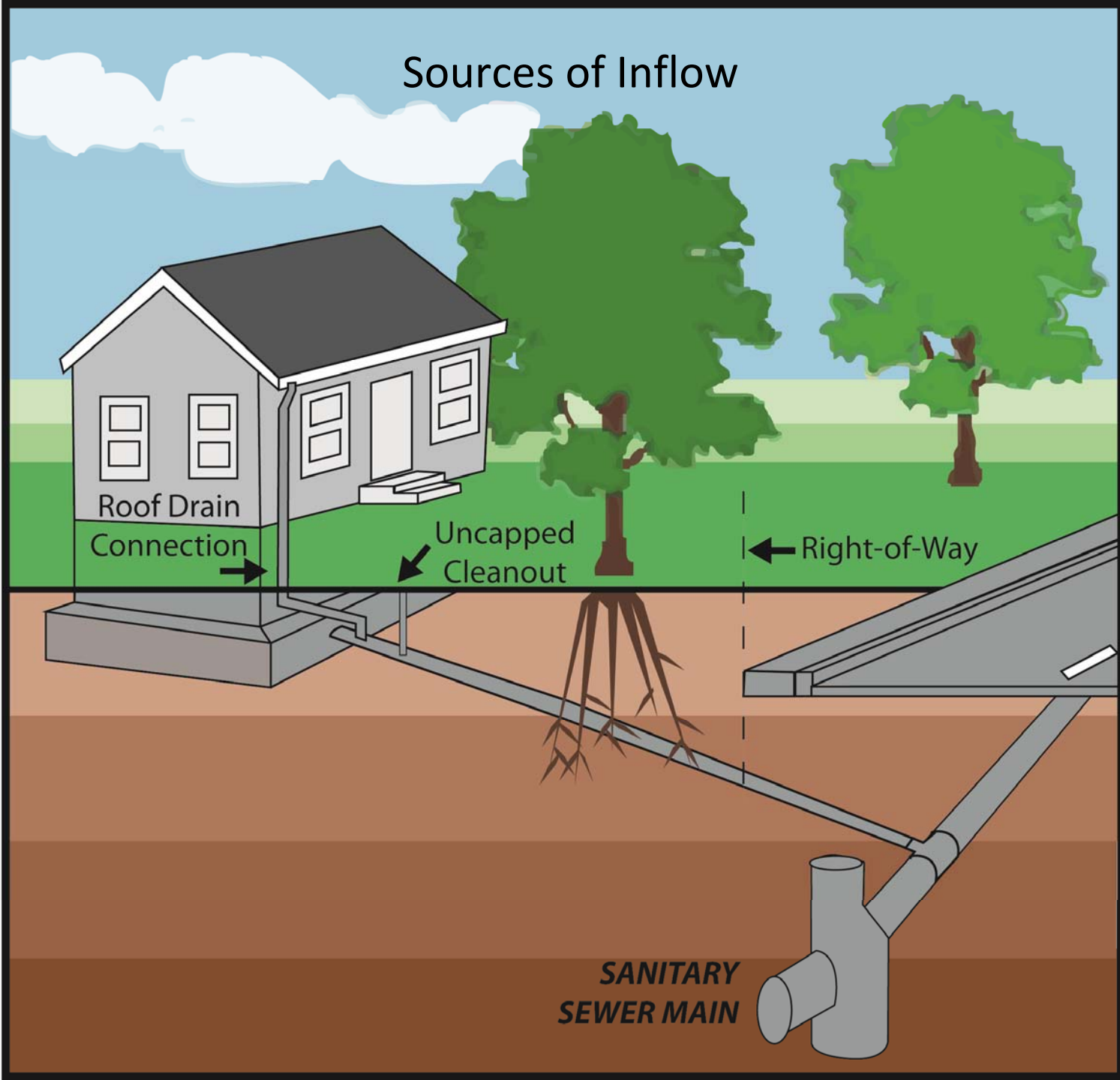
← Right-of-Way

**SANITARY
SEWER MAIN**

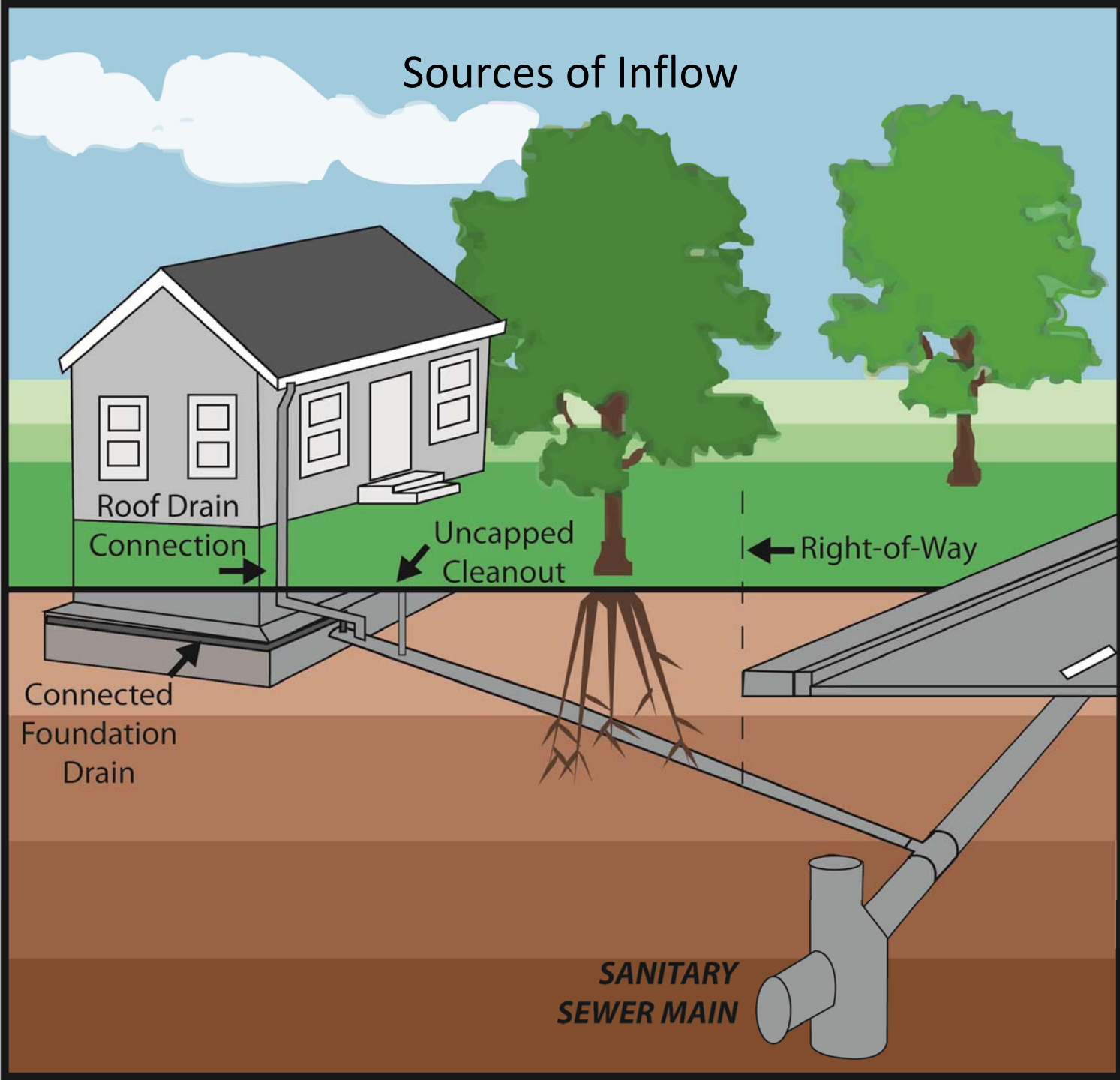
Sources of Inflow



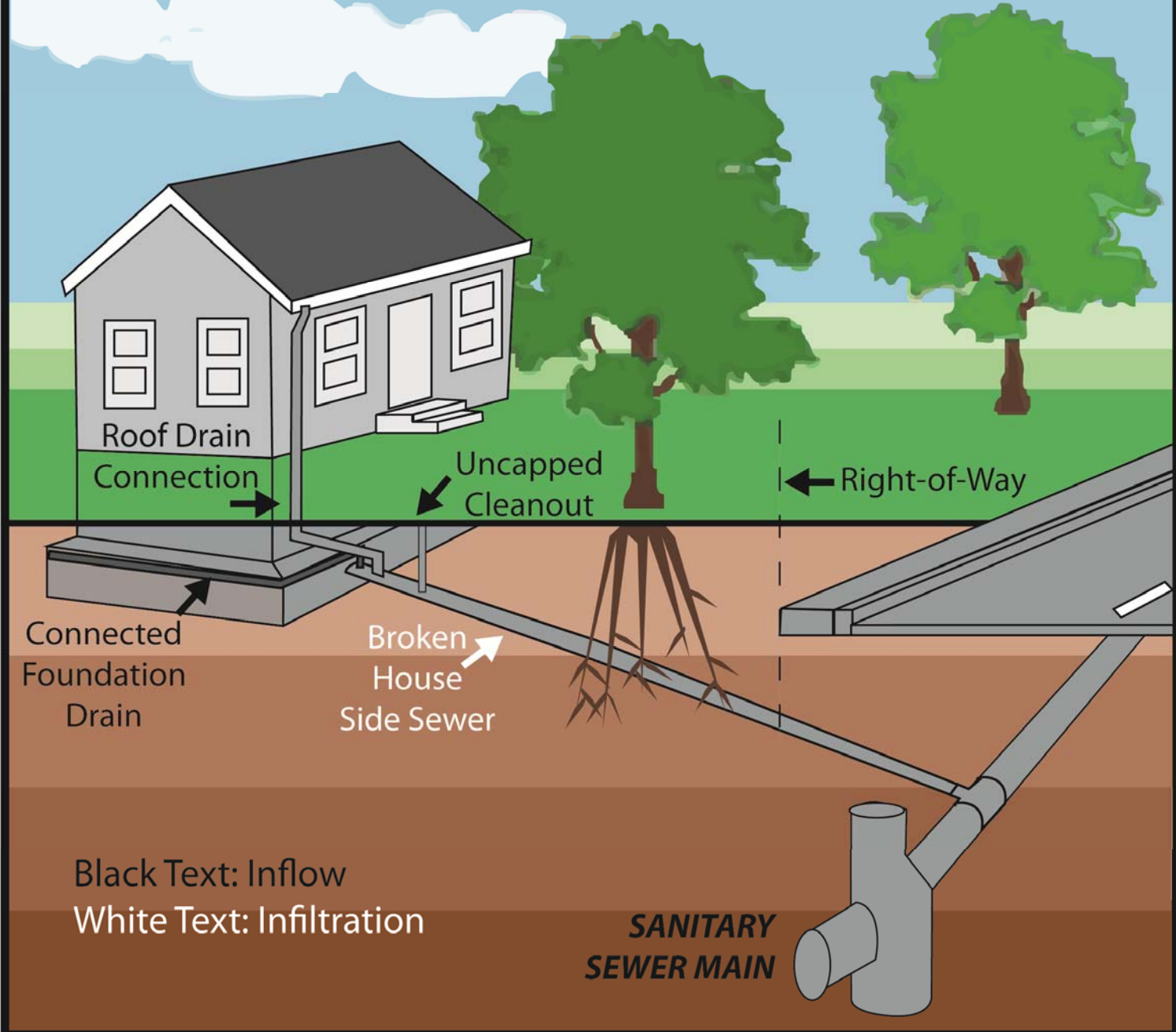
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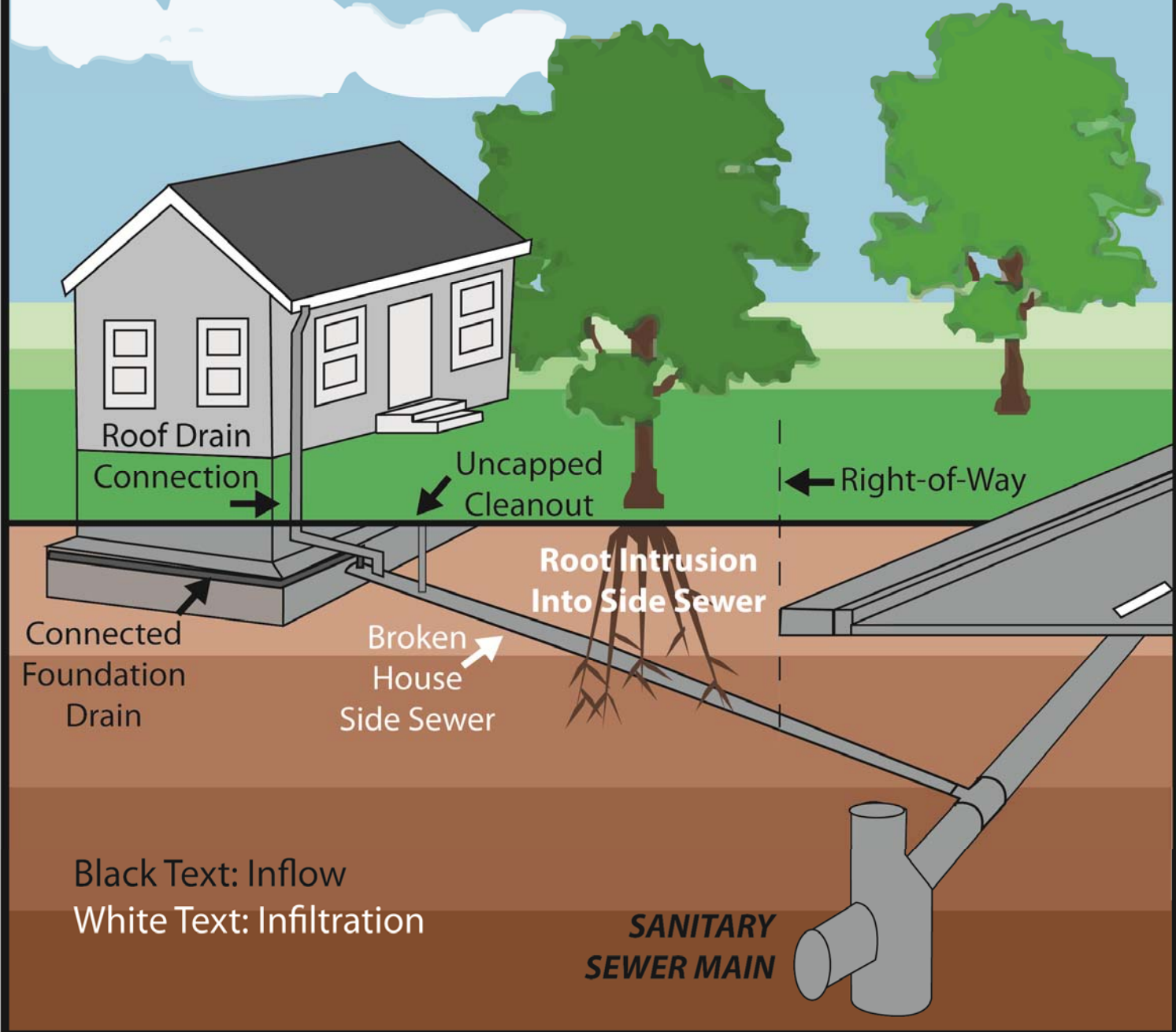
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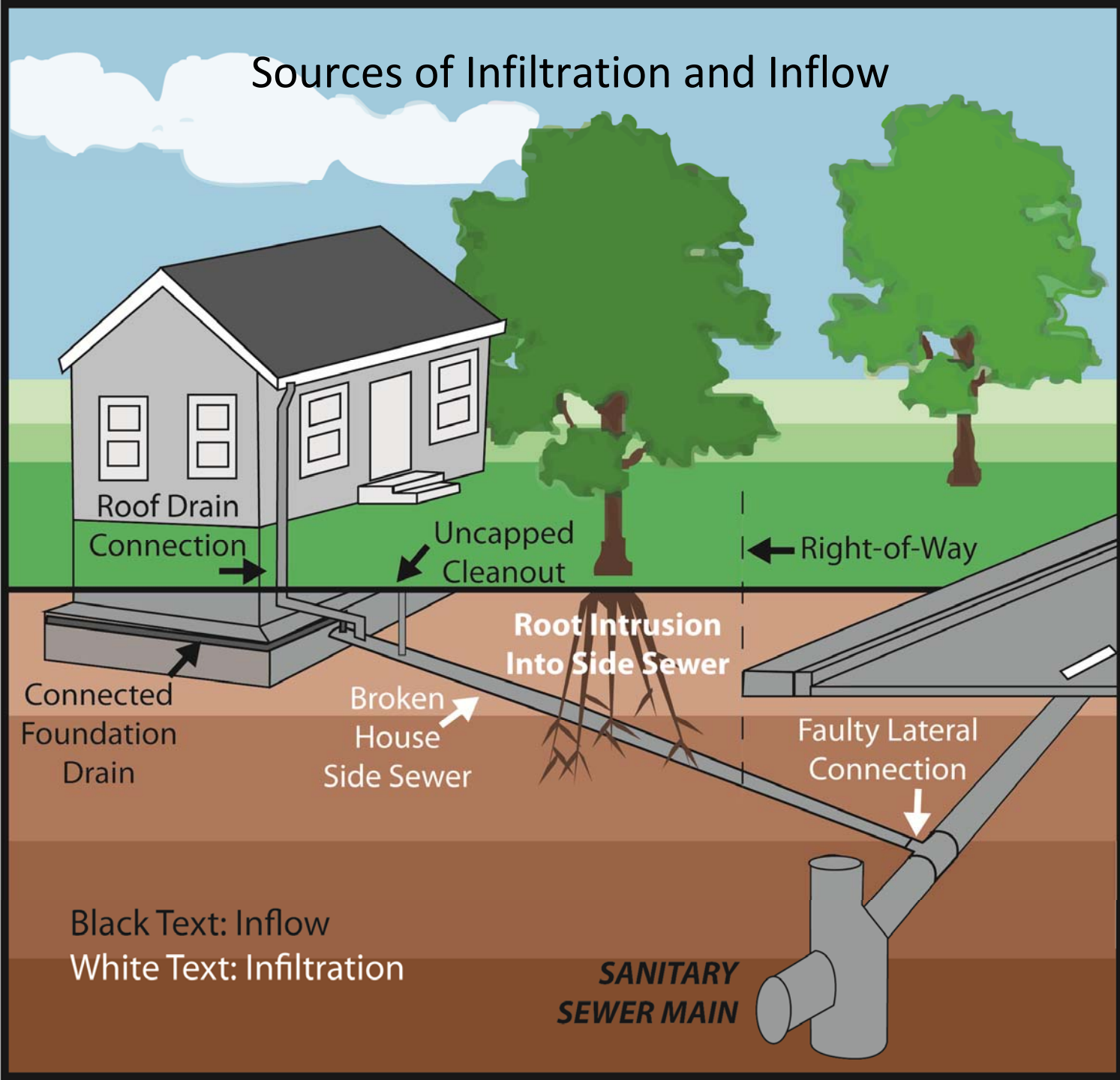
Sources of Infiltration and Inflow



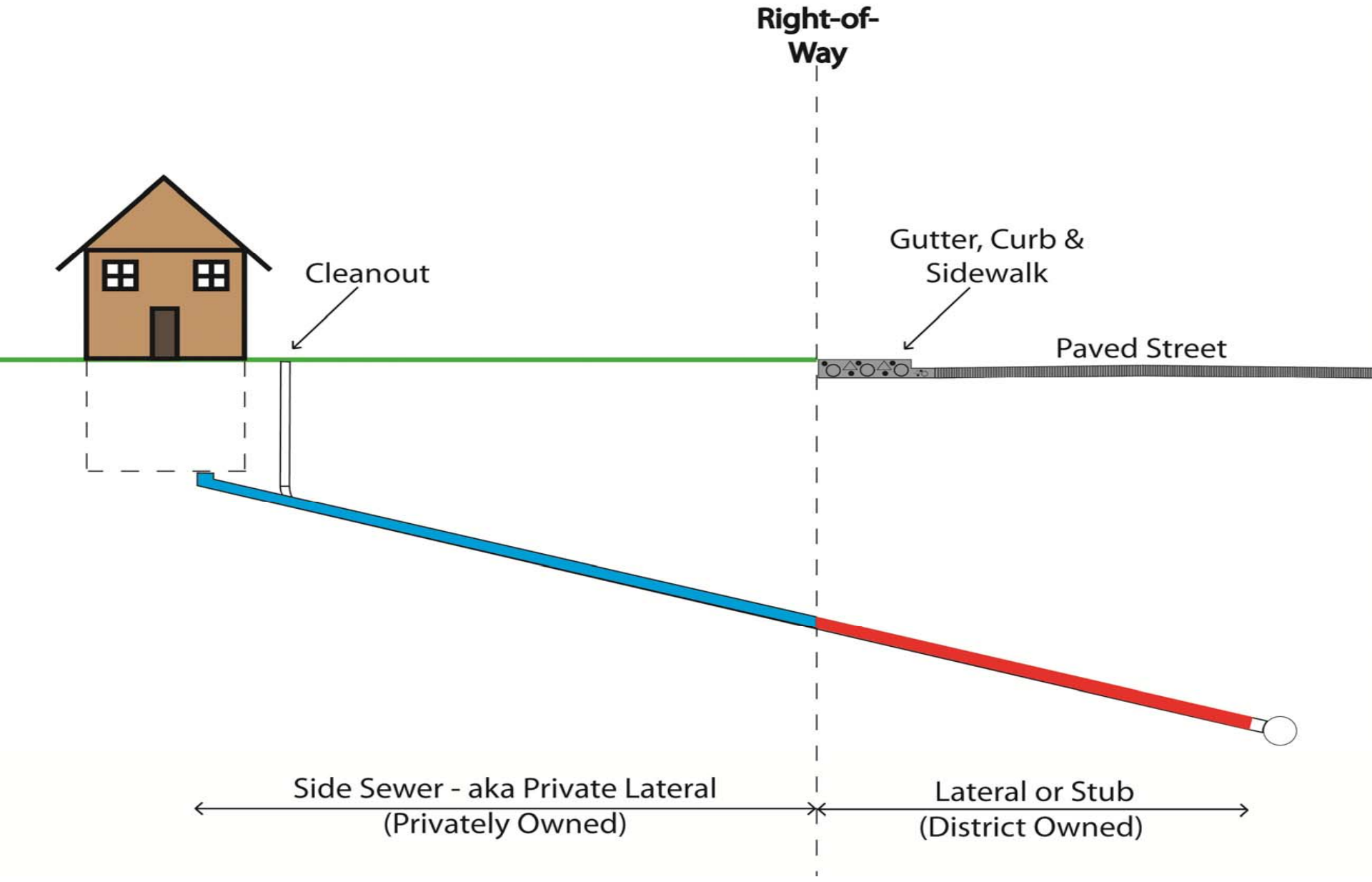
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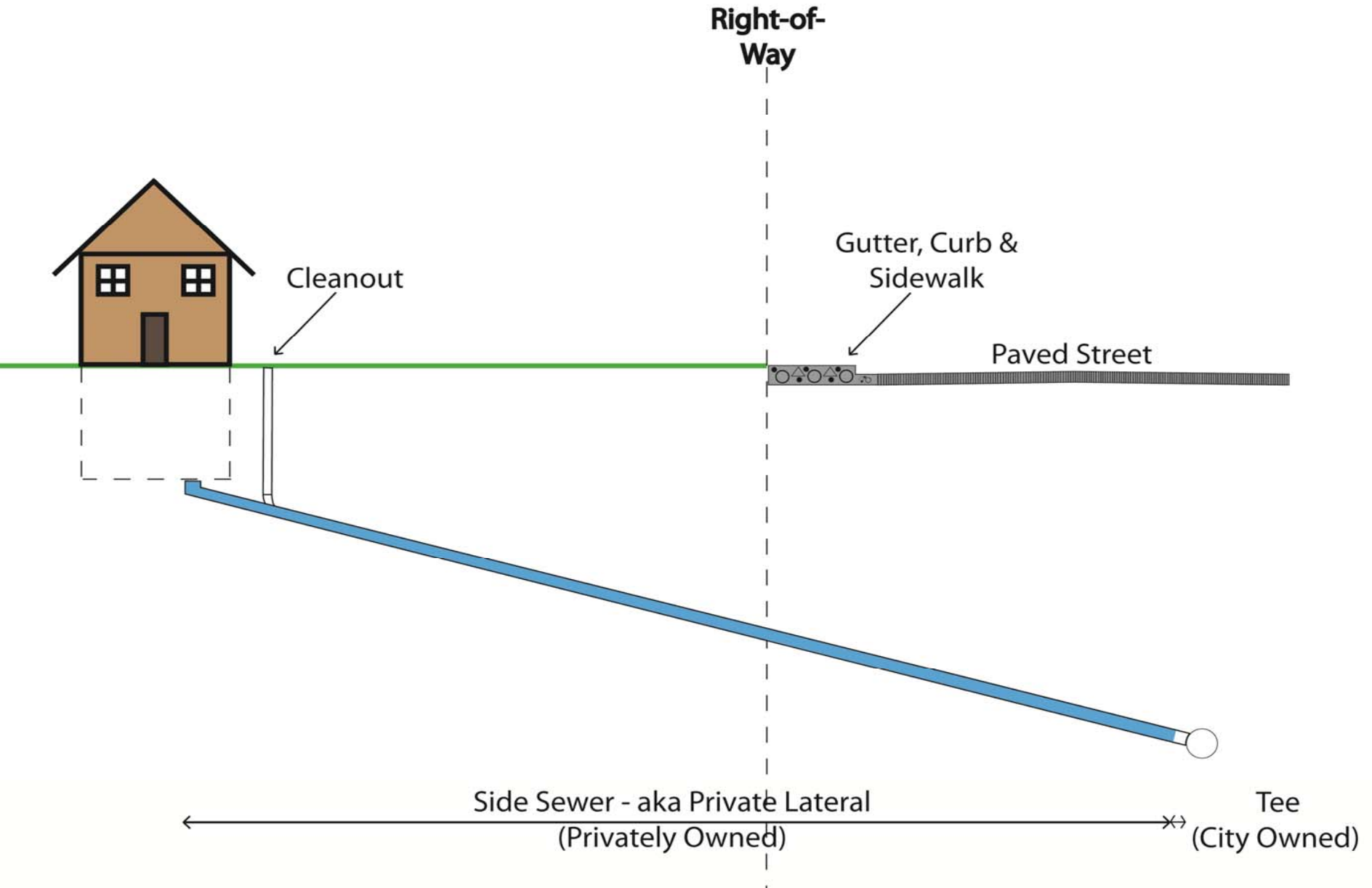
Sources of Infiltration and Inflow



Typical Public/Private Boundary for Sewer District



Typical Public/Private Boundary for Municipality



Most I&I Enters at Sidesewers

- Regional Infiltration and Inflow Control Program Pilot Project Report, King County 2004
 - 6 year, \$41 million study to:
 - Identify sources of I&I
 - Identify methods to reduce I&I
 - Identify the most cost effective I&I reduction strategies
 - Program started in 1999 and concluded in 2005.
 - Included pre and post in-stream flow monitoring to determine effectiveness of I&I control measures.

Findings of King County Study

Table A2-1. Components and Origin of Modeled I/I Flows

| Component | Origin | Ownership |
|--------------------|---|----------------|
| Fast response | Direct connection of stormwater sources | Private/Public |
| Rapid infiltration | Leaking side sewers, leaking shallow sewer mains, sump pumps, foundation drains, manhole chimneys, and connected storm drains | Private/Public |
| Slow infiltration | Leaking deeper sewer mains, manholes, and deep laterals | Public |
| Base infiltration | Deep sewer mains and manhole bases | Public |

A2.4 Modeled Private Property I/I Component Flows

Modeling was completed in 2003 and 2004 for approximately 800 mini-basins in the service area. Based on modeling results, approximately 85 percent of the total 20-year peak I/I flow for the region is either fast response (52 percent) or rapid infiltration (33 percent). This finding is a strong indication that a significant portion of the regional 20-year peak I/I flow originates from private property sources.

In 97 percent of the mini-basins, the majority of the 20-year peak I/I flow was a combination of fast response and rapid infiltration components. This finding suggests that there is a strong potential for the presence of private property I/I in most of the mini-basins throughout the region.

Source: <http://www.kingcounty.gov/environment/wastewater/II/Resources/Reports/AlternativeOptions.aspx>



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A2.6 Private Property I/I Reduction Effectiveness

A 78-percent reduction in total 20-year peak I/I flow was achieved in the Kent pilot basin through rehabilitation of nearly 100 percent of the private property services. The total construction cost for this pilot project without tax was \$993,000. This represents a cost per rehabilitated service of approximately \$6,500.

A 74-percent reduction in total 20-year peak I/I flow was achieved in the Ronald pilot basin through rehabilitation of approximately 72 percent of the private property services. The total construction cost for this pilot project without tax was \$990,000. This represents an estimated cost per rehabilitated service of approximately \$4,800.

Findings of Greencastle, Indiana WERF Study

After just a few years in effect, wastewater treatment plant (WWTP) operators noted lower average daily flows and lower peak flow rates. Manholes that frequently surcharged to the surface prior to implementing the policy now do not surcharge. The City views the policy as an unqualified success at reducing I/I in the collection system.

The analysis of the five minute data recorded at the four monitoring locations did uncover a statistically significant decrease in response to wet weather flow for three of four sewer basins. For one sewer basin, the results were mixed. Observed decreases in daily average flow rates ranged from 55-67% on wet weather days for the three sewer basins where decreases were observed.

Delaying and reducing the rapid response to rainfall has several significant benefits. With the policy, energy costs related to pumping should decrease and the collection system is less likely to become overloaded. Consequently, sewer system surcharging resulting in basement back-ups and sanitary sewer overflows is less likely with the policy. It is likely expensive collection system improvements such as sewer relays, relief sewers and pump station upgrades can be scaled back or avoided altogether if an effective I/I reduction program is implemented. Also, peak hour flows to the wastewater treatment plant are reduced. This results in less need for influent pumping capacity, wet weather treatment capacity and peak flow equalization.

Obstacles to Replacing Sidesewers

1. Gifting of public funds
2. Permission to inspect sidesewer
3. Permission to work on private property (easements)
4. Elimination of Illegal inflow connections
5. Cost to restore private surface improvements (driveways, patios, decks, rockeries, etc.)

Funding Restrictions

- If using Washington State Revolving Fund (SRF) money to replace sidesewers, the agency must own them and have easement.
 - Ditto in Oregon and Idaho for loans administered by DEQs.
- CDBG – Can use for new sidesewers, but not for rehabilitation.

Funding Restrictions (cont.)

- If Replacing sewers using Washington's Public Works Trust Fund (PWTF) loans:
 - Must delineate basin with I&I problem
 - Agency must pass resolution targeting I&I reduction in identified basin
 - Resolution must be passed stating how money will be recovered for the replacement of sewers in basin



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Opinion from Washington Attorney General's Office, August 2009

**SEWER DISTRICTS — PUBLIC FUNDS — GIFT OF PUBLIC FUNDS — GIFTS —
LOANS — Use of public funds to repair or replace side sewers.**

Municipal sewer districts have statutory authority to use public funds to repair or replace side sewers located on private property if doing so will increase sewer capacity by reducing infiltration and inflow. Use of public funds to do so does not constitute an unconstitutional gift or loan of public funds if the district acts without donative intent and can demonstrate that the action will result in significant benefit to the public.

Issued August 27, 2009

<http://www.atg.wa.gov/AGOOpinions/Opinion.aspx?section=archive&id=23724>



Valley View Sewer District's (VVSD) Stub Replacement Program

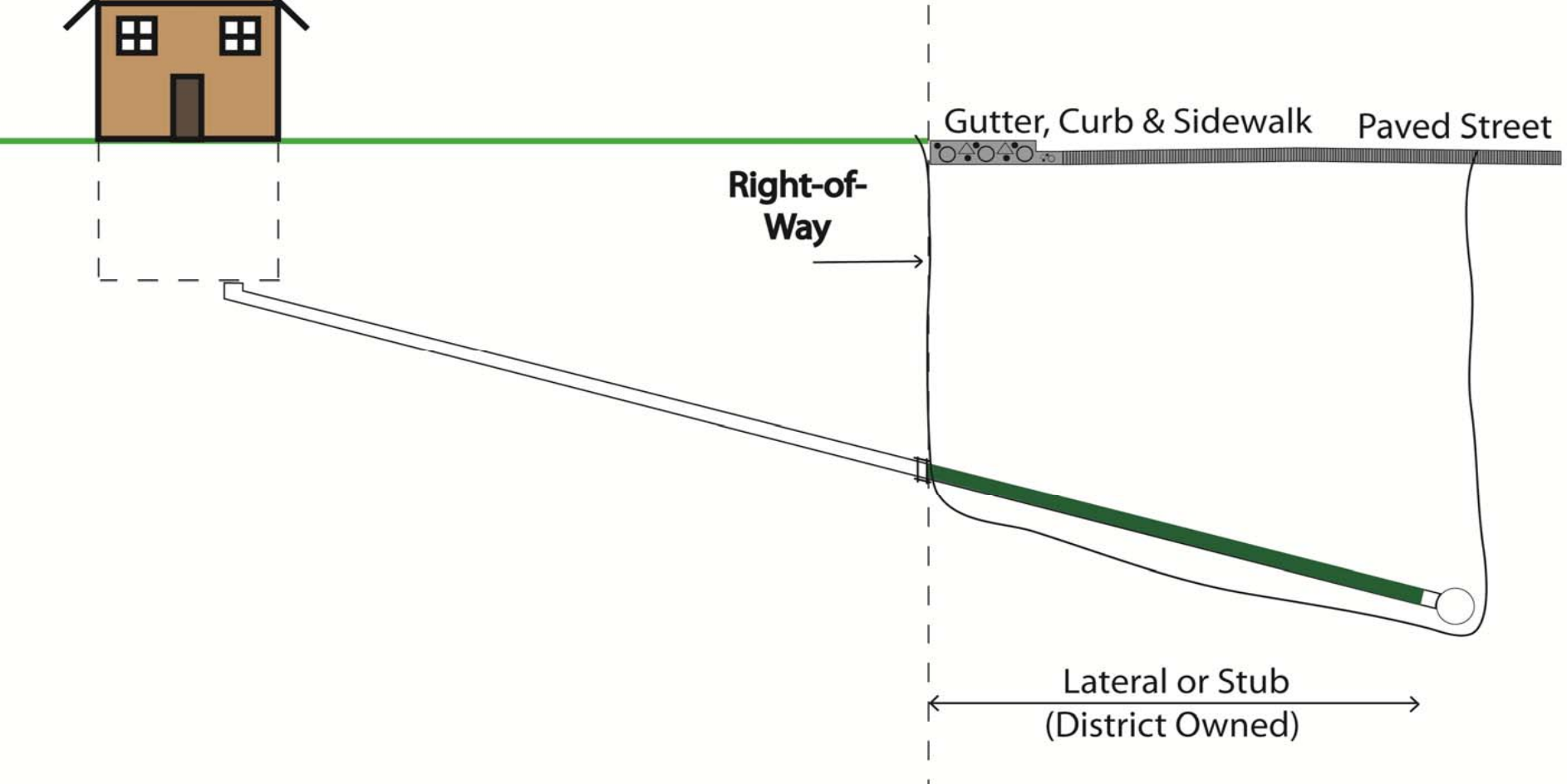
- Stubs (Laterals) were identified as the leading cause of I&I in King County's 2005 report
- The District embarked on a stub replacement program using Public Works Trust Fund loans
- Various methods of stub replacement were tried
- Most effective contract format called for pipe bursting

More Lateral Replacement is Less Cost

- It can be less expensive to replace a lateral and sidesewer to the house than to the R/W
 - True if lateral is more than 30-ft
 - True if lateral has extensive surface improvements
- Cost is reduced by shallower pipe “launch pit” in yard, rather than in improved R/W
- HDPE material cost per foot: 4-inch ~\$2.00, 6-inch HDPE ~\$4.00

Estimated Cost to Replace Lateral Only by Open-Cut

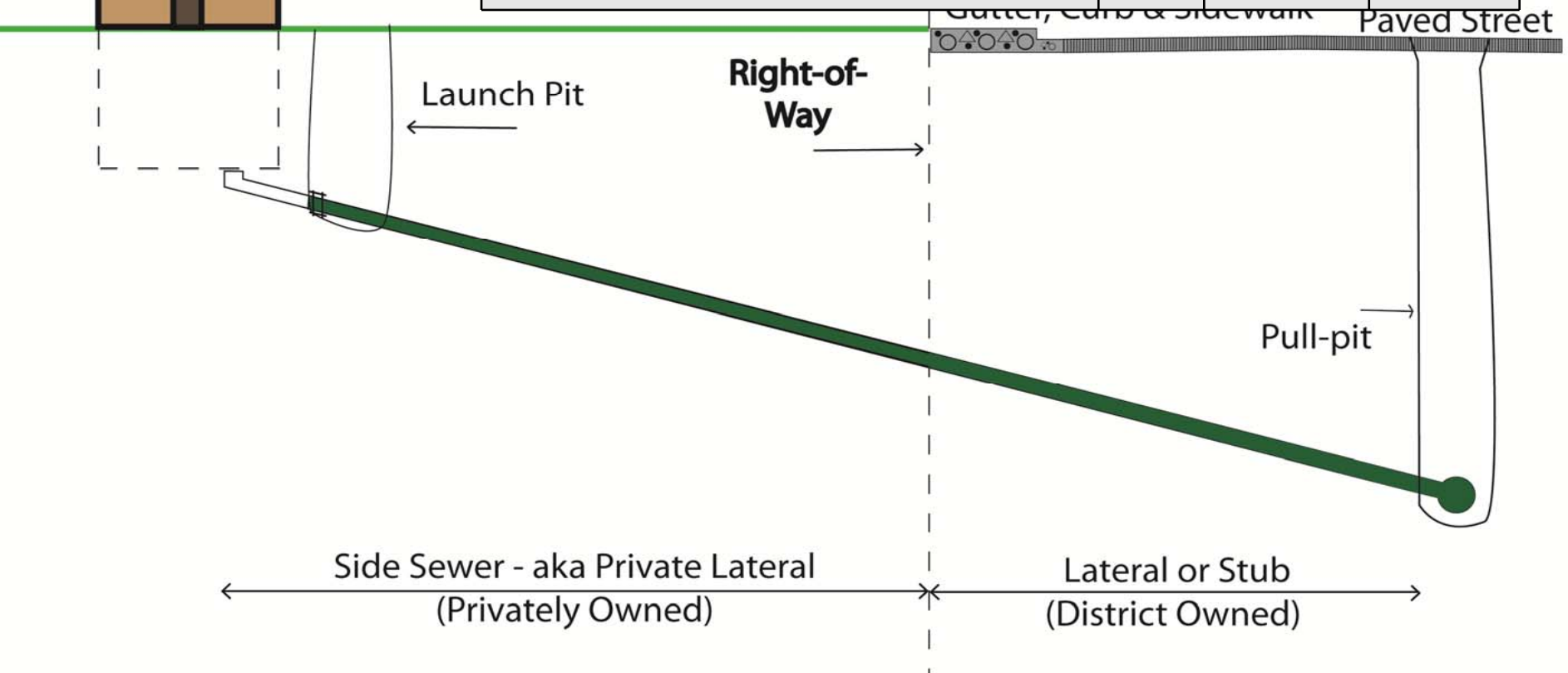
| | Qty | Unit Price | Total |
|---------------------------------|--------|------------|---------------|
| Excavate and Replace Lateral | 38 ft | \$125 | \$4,750 |
| Restore Asphalt | 11 SY | \$70 | \$770 |
| Restore Sidewalk, Curb & Gutter | 1.2 CY | \$800 | \$960 |
| Traffic Control | LS | \$950 | \$950 |
| TOTAL | | | \$7430 |



Estimated Cost to Burst Lateral to House



| | Qty | Unit Price | Total |
|--|-------|------------|----------------|
| Excavate Pull-pit over Main & Replace Tee and 6-ft of Main | 8 ft | \$125 | \$1,000 |
| Restore Asphalt | 11 SY | \$70 | \$770 |
| Excavate Launch-pit in Yard Near House & Restore Lawn | 1 EA | \$550 | \$550 |
| Install 70-ft Lateral of 4-in HDPE by Pipe-bursting | 70 CY | \$50 | \$3,500 |
| Traffic Control | LS | \$550 | \$550 |
| TOTAL | | | \$5,820 |



Sequence of Events for VVSD's Stub Replacement Program

1. Faulty laterals were identified through routine District video inspection
2. Mailers were sent to homeowners with faulty stubs including Right of Entry (ROE) and sidesewer replacement agreements
3. Open house was held for homeowners
4. Agreements were executed and construction began
5. Sidesewer inspected during construction & replacements made as needed.

VVSD Stub Replacement Construction Plans – Cover Sheet

"WORKING TOWARD A BETTER ENVIRONMENT"

Valley View
SEWER DISTRICT

VALLEY VIEW SEWER DISTRICT

PHASES 2 & 3 STUB REPLACEMENTS

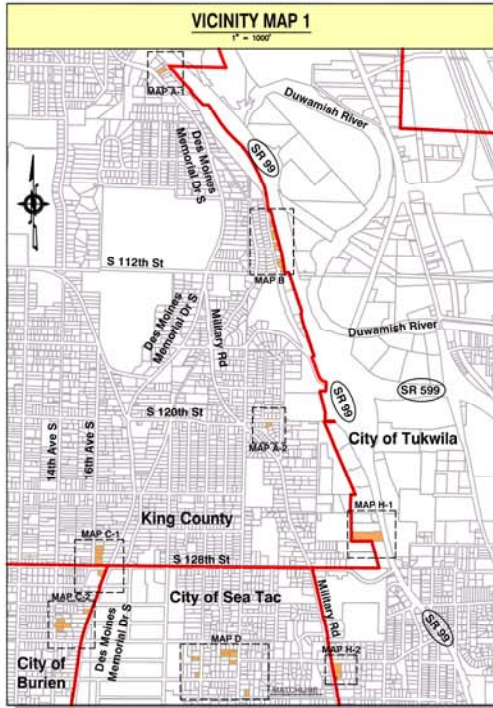
CONTACTS

| | | |
|--|--------------------|--------------|
| Valley View Sewer District General Manager | Dana Dick | 206-242-3236 |
| RH2 Engineering Project Manager | John Hendron, P.E. | 425-951-5326 |
| RH2 Engineering Project Engineer | Sean Kanda | 425-951-5460 |

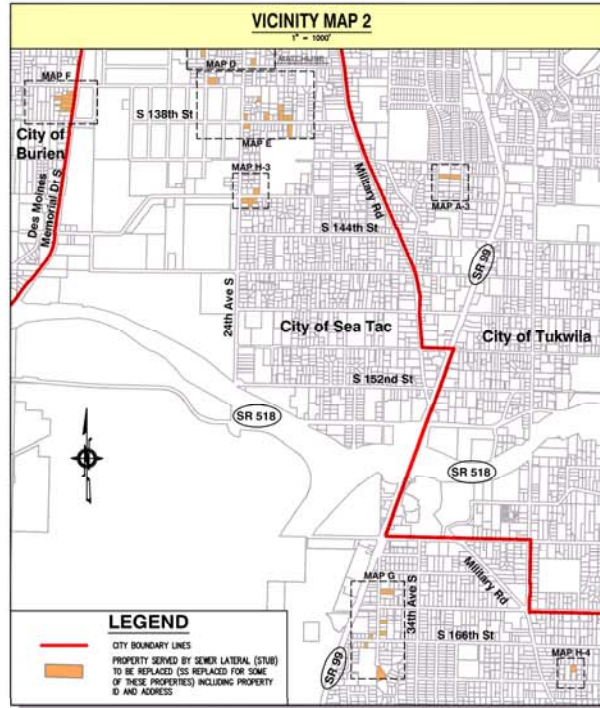
GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE RULES AND REGULATIONS OF VALLEY VIEW SEWER DISTRICT.
2. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF VALLEY VIEW SEWER DISTRICT AND OTHER PROJECT REQUIREMENTS AS APPLICABLE.
3. THE TRAFFIC CONTROL PLANS INCLUDED IN THE CONTRACT DOCUMENTS AND SPECIFICATIONS SHALL BE IMPLEMENTED BY THE CONTRACTOR IN ACCORDANCE WITH THE REQUIREMENTS OF APPROVED KING COUNTY, CITY OF BURIEIN, CITY OF TUKWILA AND CITY OF SEACTac RIGHT-OF-WAY PERMITS.
4. KING COUNTY, THE CITY OF BURIEIN, THE CITY OF TUKWILA AND THE CITY OF SEACTac SHALL ALL BE NOTIFIED PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL TESTING AND CONSTRUCTION SHALL BE INSPECTED BY VALLEY VIEW SEWER DISTRICT.
5. LOCATIONS SHOWN ON EXISTING UTILITIES ARE APPROXIMATE. IDENTIFICATION, LOCATION MARKING AND RESPONSIBILITY FOR UNDERGROUND FACILITIES OR UTILITIES IS GOVERNED BY PROVISIONS OF CHAPTER 19.122 REVISED CODE OF WASHINGTON.
6. THE CONTRACTOR SHALL PROVIDE EROSION AND SEDIMENTATION CONTROL FACILITIES AS REQUIRED IN ACCORDANCE WITH THE REQUIREMENTS OF PROJECT PERMITS. SUCH FACILITIES SHALL INCLUDE SILT FENCING, FILTER FABRIC PROTECTION OF CATCH BASINS, PROTECTION OF DRAINAGE DITCHES, AND OTHER MEASURES AS MAY BE REQUIRED.
7. THE EXISTING TOPOGRAPHIC AND PHYSICAL FEATURES SHOWN ON THESE PLANS ARE BASED ON A COMBINATION OF RECORD DRAWINGS AND GIS DATA FROM VALLEY VIEW SEWER DISTRICT. THE CONTRACTOR MAY DISCOVER VARIATIONS BETWEEN ACTUAL CONDITIONS AND THOSE SHOWN IN THE PLANS. THESE VARIATIONS WILL NOT BE THE BASIS FOR A CLAIM FOR EXTRA COMPENSATION.
8. MINIMUM SEPARATION OF POTABLE WATER MAINS AND SANITARY SEWER LINES SHALL BE TEN (10) FEET HORIZONTALLY FOR PARALLEL PIPE, AND EIGHTEEN (18) INCHES VERTICALLY FOR PERPENDICULAR OR OBLIQUE CROSSINGS, MEASURED FROM OUTSIDE EDGE TO OUTSIDE EDGE. SITUATIONS OCCURRING WITH LESS THAN MINIMUM SEPARATION WILL REQUIRE CONSTRUCTION IN ACCORDANCE WITH SECTION C1-8 OF THE "CRITERIA FOR SEWAGE WORKS DESIGN" PUBLISHED BY THE WASHINGTON STATE DEPARTMENT OF ECOLOGY AS REVISED OCTOBER 2008.
9. CAUTION—EXTREME HAZARD—OVERHEAD ELECTRICAL SERVICE LINES ARE NOT SHOWN ON THE DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXTENT OF ANY HAZARD CREATED BY OVERHEAD ELECTRICAL POWER IN ALL AREAS AND SHALL FOLLOW PROCEDURES DURING CONSTRUCTION AS REQUIRED BY LAW AND REGULATION. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL MEET WITH UTILITY OWNERS AND DETERMINE THE EXTENT OF HAZARD AND REMEDIAL MEASURES AND SHALL TAKE WHATEVER PRECAUTIONS (INCLUDING FLAGGING AND/OR NEWSPAPER NOTICES) WITHIN THE LIMITS OF THIS PROJECT. THE CONTRACTOR SHALL INSTALL THE BOXES TEMPORARILY IN SUCH POSITION THAT THEIR COVERS/LIDS WILL NOT BE IMPAIRED. AFTER CONSTRUCTION WORK HAS BEEN COMPLETED, RELOCATED MAIN AND NEWSPAPER BOXES SHALL BE REINSTALLED AT THEIR ORIGINAL LOCATION OR RELOCATED BEHIND WALKWAY SO THAT THE FRONT OF THE MAILBOX IS 12" TO 18" FROM EDGE OF WALKWAY AND 30" TO 42" ABOVE GRADE AT EDGE OF WALKWAY.

VICINITY MAP 1



VICINITY MAP 2



LEGEND

- CITY BOUNDARY LINES
- PROPERTY SERVED BY SEWER LATERAL (STUB) TO BE REPLACED (SS REPLACED FOR SOME OF THESE PROPERTIES) INCLUDING PROPERTY ID AND ADDRESS

DRAWING LIST

| NO. | COVER SHEET | CDW |
|-----|--|-----|
| 1 | PROJECT PROPERTY LOCATIONS MAP A | C01 |
| 2 | PROJECT PROPERTY LOCATIONS MAP B | C02 |
| 3 | PROJECT PROPERTY LOCATIONS MAP C | C03 |
| 4 | PROJECT PROPERTY LOCATIONS MAP D | C04 |
| 5 | PROJECT PROPERTY LOCATIONS MAP E | C05 |
| 6 | PROJECT PROPERTY LOCATIONS MAP F | C06 |
| 7 | PROJECT PROPERTY LOCATIONS MAP G | C07 |
| 8 | PROJECT PROPERTY LOCATIONS MAP H | C08 |
| 9 | SEWER LATERAL (STUB) AND SS REHABILITATION DETAILS TABLE | C09 |
| 10 | DETAILS I | D01 |
| 11 | DETAILS II | D02 |



VVSD Stub Replacement Construction Plans – Information Sheet

| PROPERTY ID | ADDRESS | UPPER MHCO | LOWER MH | EX. SS DEPTH AT HOUSE (FT.) | EX. SS/STUB DEPTH AT PL. (FT.) | EX. STUB DEPTH AT MAIN (FT.) | SINGLE OR DOUBLE SS | EX. STUB LENGTH (FT.) | EX. 4" SS LENGTH (FT.) | EX. 6" SS LENGTH (FT.) | EX. 8" SS LENGTH (FT.) | REFERENCE MHCO | STUB STATION FROM REFERENCE MHCO | PIT DIG LOCATION (PL. OR YARD) | REHABILITATION METHOD | PROPOSED PIPE DIAMETER (IN.) | ROE | AGREEMENT | EX. SEWER MAIN DIAMETER | EX. SEWER MAIN MATERIAL | TRAFFIC CONTROL PLAN | TRAFFIC CONTROL POLICE OFFICERS | NOTES |
|-------------|---------------------|------------|----------|-----------------------------|--------------------------------|------------------------------|---------------------|-----------------------|------------------------|------------------------|------------------------|----------------|----------------------------------|--------------------------------|---|------------------------------|--------|-----------|-------------------------|-------------------------|---|---|--|
| 1 | 5930 DMND | G423 | C422 | 2 | 2 | 6 | SINGLE | 72 (FT) | - | 66 | - | LOWER | 2+0.5 | YARD | PIPE BURST STUB & SS | 4 | X | - | 21" | CONCRETE | N/A | N/A | |
| 2 | 5930 26 AVE S | D614 | D613 | 1.5 | 4 | 5 | SINGLE | 5 | - | 12 | - | UPPER | 0+8 | YARD | PIPE BURST STUB & SS | 6 | X | 0" | CLAY | N/A | N/A | | |
| 3 | 5940 26 AVE S | D614 | D613 | 2 | 4 | 5 | SINGLE | 5 | - | 41 | - | UPPER | 0+1 | YARD | PIPE BURST STUB & SS | 6 | X | 0" | CLAY | N/A | N/A | | |
| 4 | 5950 26 AVE S | D614 | D613 | 2 | 4 | 5 | SINGLE | 5 | - | 27 | - | UPPER | 2+1.5 | YARD | PIPE BURST STUB & SS | 6 | X | 0" | CLAY | N/A | N/A | | |
| 5 | 5954 26 AVE S | D614 | D613 | 2 | 4 | 5 | SINGLE | 5 | - | 25 | - | UPPER | 2+6 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 6 | 5956 26 AVE S | D614 | D613 | 2 | 4 | 5 | SINGLE | 5 | - | 33 | - | UPPER | 2+4 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 7 | 5979 26 AVE S | D613 | D612 | 2 | 4 | 5 | SINGLE | 5 | - | 32 | - | UPPER | 0+1 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 8 | 5939 S 119 ST | D613 | D612 | 2 | 4 | 5 | SINGLE | 5 | - | 35 | - | UPPER | 0+1 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 9 | 11014 AVE S | D612 | D610 | 2 | 4 | 5 | SINGLE | 5 | - | 57 | - | UPPER | 0+9 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 10 | 11022 26 AVE S | D612 | D610 | 7 | 4 | 5 | SINGLE | 5 | - | 55 | - | UPPER | 1+0.5 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 11 | 11032 26 AVE S | D612 | D610 | 3 | 4 | 5 | SINGLE | 5 | - | 40 | - | UPPER | - | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 12 | 13024 14 AVE S | CO811-12 | B11-11 | 2 | 2 | 6 | SINGLE | 5 | - | 35 | - | LOWER | 1+4 | YARD | PIPE BURST MAINLINE, STUB & SS | 6 | X | 0" | CLAY | N/A | N/A | PROJECT WORK FOR THIS PROPERTY INCLUDES REHABILITATION OF SEWER MAIN BETWEEN CO811-12 AND MH B11-11 | |
| 13 | 13102 14 AVE S | CO811-12 | B11-11 | 4 | 2 | 6 | SINGLE | 5 | - | 46 | - | LOWER | 0+4 | YARD | MAINLINE SEE 12, PIPE BURST STUB & SS | 6 | X | 0" | CLAY | N/A | N/A | | |
| 14 | 13114 14 AVE S | CO811-12 | B11-11 | 4 | 5 | 6 | SINGLE | 5 | - | 129 | - | LOWER | 1+9 | YARD | MAINLINE SEE 12, PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 15 | 13104 14 AVE S | CO811-12 | B11-11 | 1.5 | 4 | 5.5 | SINGLE | 5 | - | 48 | - | LOWER | 1+3 | YARD | MAINLINE SEE 12, PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 16 | 13015 DMND | B11-10 | C13-3 | 7 | 5 | 10 | SINGLE | 21 | - | 80 | - | UPPER | 0+1 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | K.20.40.00 | 1 | | |
| 17 | 13021 14 AVE S | B10-1 | B13-2 | 2 | 4 | 10 | SINGLE | 20 | - | 25 | - | UPPER | 0+3 | YARD | PIPE BURST STUB & SS | 6 | X | 0" | CONCRETE | N/A | N/A | | |
| 18 | 13105 14 AVE S | B10-1 | B13-2 | N/A | 3 | 10 | SINGLE | 13 | - | - | - | UPPER | 2+23 | PL | PIPE BURST STUB ONLY | 4 | X | N/A | 0" | CONCRETE | N/A | N/A | |
| 19 | 13015 DMND | B13-5 | B13-5 | 2 | 5 | 6 | SINGLE | 16 | - | 32 | - | UPPER | 1+6 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CONCRETE | K.20.40.00 | 1 | | |
| 20 | 13019 DMND | B13-5 | B13-5 | 2 | 5 | 6 | DOUBLE | 16 | 81 | 16 | - | UPPER | 0+75 | PL & YARD | PIPE BURST STUB & SS | 6 | X | 0" | CONCRETE | K.20.40.00 | 1 | | |
| 21 | 13025 DMND | B13-5 | B13-5 | 2 | SEE 20 | SEE 20 | DOUBLE | SEE 20 | - | 69 | - | SEE 20 | SEE 20 | PL & YARD | STUB SEE 20, PIPE BURST SS | 6 | X | 0" | CONCRETE | SEE 20 | SEE 20 | | |
| 22 | 13025 DMND | B13-4 | B13-4 | 3 | 5 | 6 | SINGLE | 16 | - | 100 | - | UPPER | 3+11 | YARD | PIPE BURST STUB & SS | 6 | X | 0" | CONCRETE | K.20.40.00 | 1 | | |
| 23 | 13043 DMND | B13-4 | B13-5 | N/A | 4 | 6 | DOUBLE | 16 | N/A | N/A | - | UPPER | 2+20 | N/A | OPEN CUT STUB, TV SS | 6 | N/A | N/A | 0" | CONCRETE | K.20.40.00 | 1 | |
| 24 | 2434 S 120 ST | D6-1 | D6-7 | 2 | 4 | 5 | SINGLE | 5 | - | 54 | - | LOWER | 0+9 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 25 | 12824 18 AVE S | B10-4 | B10-5 | 2 | 4 | 10 | DOUBLE | 45 | - | 55 | - | UPPER | 0+47 | PL & YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | K.20.40.00 | N/A | | |
| 27 | 12834 18 AVE S | B10-4 | B10-5 | 1.5 | SEE 26 | SEE 26 | DOUBLE | SEE 26 | - | 84 | - | SEE 26 | SEE 26 | PL | STUB SEE 26, PIPE BURST SS | 4 | X | 0" | CLAY | SEE 26 | SEE 26 | | |
| 28 | 12840 18 AVE S | B10-4 | B10-5 | N/A | 6 | 10 | DOUBLE | 45 | N/A | N/A | - | UPPER | 1+9 | PL | PIPE BURST STUB ONLY | 6 | N/A | N/A | 0" | CLAY | K.20.40.00 | N/A | |
| 29 | 1866 S 120 ST | B10-4 | B10-5 | 1.5 | SEE 28 | SEE 28 | DOUBLE | SEE 28 | - | 28 | - | SEE 28 | SEE 28 | PL | SEE 28 | SEE 28 | N/A | N/A | 0" | CLAY | SEE 28 | SEE 28 | PIPE STATION LOCATED AT THIS ADDRESS |
| 31 | 12027 22 AVE S | C10-16 | C10-15 | 2 | 4 | 8 | SINGLE | 10 | - | 31 | - | UPPER | 1+21 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | K.20.40.00 | N/A | | |
| 32 | 12015 23 PL S | C10-19 | C10-18 | 2 | 8 | 8 | DOUBLE | 5 | - | 111 | - | UPPER | 0+23 | PL & YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 33 | 12023 23 PL S | C10-19 | C10-18 | 5 | SEE 32 | SEE 32 | DOUBLE | SEE 32 | - | 32 | - | SEE 32 | SEE 32 | PL & YARD | STUB SEE 32, PIPE BURST SS | 4 | X | 0" | CLAY | SEE 32 | SEE 32 | | |
| 34 | 12029 24 AVE S | C10-19 | C10-18 | UNKNOWN | 4 | 10 | SINGLE | 5 | - | 80 | - | UPPER | 0+1 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | NO SS PERMIT ON FILE | |
| 35 | 12029 24 AVE S | C10-19 | C10-18 | 3 | 5 | 10 | SINGLE | 5 | - | 88 | - | UPPER | 1+38 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 36 | 2556 S 134 ST | C10-12 | C10-11 | 1 | 3 | 5 | SINGLE | 18 | - | 35 | - | UPPER | 0+75 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | K.20.40.00 | N/A | PROVIDE AN EXTRA FLAGGER AND SIGNS TO ACCOUNT FOR 4-WAY INTERSECTION | |
| 38 | 13040 22 AVE S | C10-23 | C10-22 | 2 | 10 | 12 | SINGLE | 10 | - | 67 | - | UPPER | 3+20 | YARD | PIPE BURST STUB & SS | 6 | X | 0" | CLAY | K.40.40.00 | N/A | | |
| 40 | 2412 S 130B ST | D10-10 | D10-9 | 2 | 5 | 11 | SINGLE | 15 | - | 27 | - | UPPER | 2+00 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | K.20.40.00 | N/A | | |
| 41 | 2420 S 137 ST | CO D10-6 | D10-5 | 2.5 | 6 | 7 | SINGLE | 10 | - | 15 | - | N/A | C+013+6 | YARD | PIPE BURST MAINLINE (PARTIAL) STUB & SS | 8 MAIN, 4 SS | 0" | CLAY | N/A | N/A | MAIN GOING NORTH FROM CONNECTION TO CO D10-6 IS CONSIDERED PART OF STUB | | |
| 43 | 2434 S 138 ST | D10-6 | D10-7 | 1.5 | 5 | 8 | SINGLE | 40 | - | 30 | - | UPPER | 3+75 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | K.20.40.00 | N/A | PROVIDE AN EXTRA FLAGGER AND SIGNS TO ACCOUNT FOR 4-WAY INTERSECTION | |
| 44 | 13804 24 AVE S | D10-6 | D10-7 | N/A | 4 | 4 | SINGLE | 10 | N/A | N/A | - | LOWER | 1+60 | N/A | OPEN CUT STUB | 6 | X | N/A | 0" | CLAY | K.40.40.00 | N/A | |
| 45 | 2438 S 138 ST | D10-6 | D10-7 | 4 | 6 | 9.5 | SINGLE | 40 | - | 36 | - | UPPER | 0+42 | YARD | PIPE BURST STUB & SS | 6 | X | 0" | CLAY | K.20.40.00 | N/A | | |
| 46 | 2434 S 138 ST | D10-10 | D10-9 | 3 | 5 | 10 | SINGLE | 8 | - | 30 | - | UPPER | 2+46 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | N/A | N/A | | |
| 47 | 2618 S 138 ST | D10-10 | D10-9 | 1.5 | 5 | 10 | SINGLE | 10 | - | 36 | - | UPPER | 2+61 | YARD | PIPE BURST STUB & SS | 6 | X | 0" | CLAY | N/A | N/A | | |
| 48 | 2621 S 138 ST | D10-12 | D10-9 | 3 | 8 | 11 | SINGLE | 20 | 126 | - | - | UPPER | 0+63 | YARD | PIPE BURST STUB & SS | 6 | X | 0" | CLAY | K.20.40.00 | N/A | | |
| 49 | 2623 S 138 ST | D10-12 | D10-9 | 2 | 7 | 11 | DOUBLE | 40 | 62 | 32 | - | UPPER | 0+66 | YARD & YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | K.20.40.00 | N/A | 62" - 4" SS IS SHARED | |
| 50 | 2618 S 138 ST | D10-12 | D10-9 | 2 | SEE 49 | SEE 49 | DOUBLE | SEE 49 | - | 40 | - | SEE 49 | SEE 49 | YARD & YARD | STUB SEE 49, PIPE BURST SS | 4 | X | 0" | CLAY | SEE 49 | SEE 49 | 62" - 4" SS IS SHARED | |
| 55 | 2417 S 142 ST | D14-3 | D14-4 | 2 | 6 | 8 | SINGLE | 15 | - | 82 | - | UPPER | 2+61 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | K.20.40.00 | N/A | | |
| 56 | 2423 S 142 ST | D14-3 | D14-4 | 2 | 3 | 8 | SINGLE | 15 | - | 66 | - | UPPER | 2+67.5 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CLAY | K.20.40.00 | N/A | | |
| 57 | 2428 S 142 ST | D14-4 | D14-2 | 1.5 | 4 | 13 | SINGLE | 23 | - | 34 | - | UPPER | 1+23 | YARD | PIPE BURST STUB & SS | 6 | X | 0" | CLAY | N/A | N/A | | |
| 58 | 1429 24 AVE S | D14-3 | D14-4 | 1.5 | 7 | 8 | SINGLE | 8 | - | 56 | - | UPPER | 1+17 | YARD | PIPE BURST STUB & SS | 6 | X | 0" | CLAY | K.20.40.00 | N/A | | |
| 59 | 13010 MILITARY RD S | D10-16 | D10-20 | N/A | 4 | 10 | SINGLE | 40 | N/A | N/A | - | LOWER | 1+08 | PL | PIPE BURST STUB ONLY | 6 | X | N/A | 0" | CONCRETE | K.20.40.00 | 1 | PROVIDE AN EXTRA FLAGGER AND SIGNS TO ACCOUNT FOR 4-WAY INTERSECTION |
| 63 | 13202 MILITARY RD S | D10-22 | D10-20 | N/A | 7 | 8 | SINGLE (7) | 5 | - | - | - | LOWER | 1+08 | N/A | OPEN CUT STUB & TV SS CONNECTIONS TO STUB | 6 | N/A | N/A | 0" | CONCRETE | N/A | N/A | TV SS CONNECTIONS TO STUB TO DETERMINE WHO IS CONNECTED TO THE STUB |
| 65 | 14102 37 AVE S | E14-26 | E14-27 | 2.5 | 4 | 11.5 | DOUBLE | 370 | N/A | N/A | - | LOWER | NEAR S PENETRATION | PL | PIPE BURST STUB ONLY | 6 | X | N/A | 0" | CONCRETE | K.20.40.00 | N/A | |
| 65A | 14016 35 AVE S | E14-26 | E14-27 | N/A | SEE 65 | SEE 65 | DOUBLE | SEE 65 | N/A | N/A | - | SEE 65 | SEE 65 | PL | SEE 65 | SEE 65 | SEE 65 | SEE 65 | SEE 65 | SEE 65 | SEE 65 | SEE 65 | |
| 69 | 16230 32 AVE S | E19-32 | E19-31 | 1.5 | 6 | 13 | SINGLE | 25 | - | 100 | - | LOWER | 1+00 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CONCRETE | K.20.40.00 | N/A | | |
| 70 | 16424 32 AVE S | E20-11 | E19-32 | 3 | 5 | 11 | SINGLE | 25 | - | 28 | - | UPPER | 1+49 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CONCRETE | K.20.40.00 | N/A | | |
| 71 | 3126 S 168 ST | D20-12 | D20-12 | 2 | 5 | 8 | SINGLE | 40 | - | 20 | - | UPPER | 1+05 | YARD | PIPE BURST STUB & SS | 4 | X | 0" | CONCRETE | K.20.40.00 | N/A | | |
| 72 | 3121 S 168 ST | D20-11 | D20-11 | 2 | 5 | 8 | SINGLE | 40 | N/A | N/A | - | LOWER | 1+05 | PL | PIPE BURST STUB ONLY | 6 | X | N/A | 0" | CONCRETE | K.20.40.00 | N/A | |
| 73 | 18802 32 AVE S | N/A | N/A | UNKNOWN | 12 | 14 | SINGLE | 40 | N/A | N/A | - | LOWER | E20-4 | PL | PIPE BURST STUB ONLY | 6 | X | N/A | 0" | CONCRETE | SEE NOTES | SEE NOTES | WORK IN R.O.W. AT END OF O.C.D.E. SAC - PLAN FOR NO REQUIRED TRAFFIC CONTROL |

VVSD Stub Replacement Construction Plans – Information Sheet, Blowup No. 1

| PROPERTY ID | ADDRESS | UPPER MH/CO | LOWER MH | EX. SS DEPTH AT HOUSE (FT.) | EX. SS/STUB DEPTH AT PL (FT.) | EX. STUB DEPTH AT MAIN (FT.) | SINGLE OR DOUBLE SS | EX. STUB LENGTH (FT.) | EX. 6" SS LENGTH (FT.) | EX. 4" SS LENGTH (FT.) | REFERENCE MH/CO | STUB STATION FROM REFERENCE MH/CO | PIT DIG LOCATION (PL OR YARD) |
|-------------|----------------|-------------|----------|-----------------------------|-------------------------------|------------------------------|---------------------|-----------------------|------------------------|------------------------|-----------------|-----------------------------------|-------------------------------|
| 1 | 10082 DMMD | C4-23 | C4-22 | 2 | 2 | 6 | SINGLE | 72 (4") | - | 66 | LOWER | 2+63.5 | YARD |
| 2 | 10830 26 AVE S | D6-14 | D6-13 | 1.5 | 4 | 5 | SINGLE | 5 | - | 12 | UPPER | 0+18 | YARD |
| 3 | 10840 26 AVE S | D6-14 | D6-13 | 2 | 4 | 5 | SINGLE | 5 | - | 41 | UPPER | 0+61 | YARD |
| 4 | 10850 26 AVE S | D6-14 | D6-13 | 2 | 4 | 5 | SINGLE | 5 | - | 27 | UPPER | 2+21.5 | YARD |
| 5 | 10854 26 AVE S | D6-14 | D6-13 | 2 | 4 | 5 | SINGLE | 5 | - | 25 | UPPER | 2+45 | YARD |
| 6 | 10860 26 AVE S | D6-14 | D6-13 | 2 | 4 | 5 | SINGLE | 5 | - | 33 | UPPER | 2+94 | YARD |
| 7 | 10878 26 AVE S | D6-13 | D6-12 | 2 | 4 | 5 | SINGLE | 5 | - | 32 | UPPER | 0+61 | YARD |
| 8 | 2608 S 110 ST | D6-13 | D6-12 | 2 | 4 | 5 | SINGLE | 5 | - | 35 | UPPER | 0+81 | YARD |
| 9 | 11014 26 AVE S | D6-12 | D6-10 | 2 | 4 | 5 | SINGLE | 5 | - | 51 | UPPER | 0+99 | YARD |
| 10 | 11022 26 AVE S | D6-12 | D6-10 | 7 | 4 | 5 | SINGLE | 5 | - | 55 | UPPER | 1+70.5 | YARD |
| 11 | 11032 26 AVE S | D6-12 | D6-10 | 3 | 4 | 5 | SINGLE | 5 | - | 40 | UPPER | 2+80 | YARD |
| 12 | 13024 14 AVE S | CO B11-12 | B11-11 | 2 | 2 | 6 | SINGLE | 5 (STUB) + 157 (MAIN) | - | 35 | LOWER | 1+54 | YARD |
| 13 | 13102 14 AVE S | CO B11-12 | B11-11 | 4 | 2 | 6 | SINGLE | 5 | - | 45 | LOWER | 0+44 | YARD |
| 14 | 13114 14 AVE S | CO B11-12 | B11-11 | 4 | 5 | 6 | SINGLE | 5 | - | 129 | LOWER | 1+49 | YARD |

VVSD Stub Replacement Construction Plans – Information Sheet, Blowup No. 2

| PIT DIG LOCATION (PL OR YARD) | REHABILITATION METHOD | PROPOSED PIPE DIAMETER (IN.) | ROE | AGREEMENT | EX. SEWER MAIN DIAMETER | EX. SEWER MAIN MATERIAL | TRAFFIC CONTROL PLAN | TRAFFIC CONTROL POLICE OFFICERS | NOTES |
|-------------------------------|--------------------------------|------------------------------|-----|-----------|-------------------------|-------------------------|----------------------|---------------------------------|--|
| YARD | PIPE BURST STUB & SS | 4 | X | | 21" | CONCRETE | N/A | N/A | |
| YARD | PIPE BURST STUB & SS | 6 | | | 8" | CLAY | N/A | N/A | |
| YARD | PIPE BURST STUB & SS | 6 | X | | 8" | CLAY | N/A | N/A | |
| YARD | PIPE BURST STUB & SS | 6 | X | | 8" | CLAY | N/A | N/A | |
| YARD | PIPE BURST STUB & SS | 4 | X | | 8" | CLAY | N/A | N/A | |
| YARD | PIPE BURST STUB & SS | 4 | X | X | 8" | CLAY | N/A | N/A | |
| YARD | PIPE BURST STUB & SS | 4 | X | X | 8" | CLAY | N/A | N/A | |
| YARD | PIPE BURST STUB & SS | 4 | X | X | 8" | CLAY | N/A | N/A | |
| YARD | PIPE BURST STUB & SS | 4 | X | X | 8" | CLAY | N/A | N/A | |
| YARD | PIPE BURST STUB & SS | 4 | X | X | 8" | CLAY | N/A | N/A | |
| YARD | PIPE BURST STUB & SS | 4 | X | X | 8" | CLAY | N/A | N/A | |
| YARD | PIPE BURST MAINLINE, STUB & SS | 6 | X | X | 6" | CLAY | N/A | N/A | PROJECT WORK FOR THIS PROPERTY INCLUDES REHABILITATION OF SEWER MAIN BETWEEN C0 B11-12 AND MH B11-11 |
| YARD | MAINLINE STUB & SS | 6 | X | X | 6" | CLAY | N/A | N/A | |

VVSD Stub Replacement

VALLEY VIEW SEWER DISTRICT
Phases 2 & 3 Stub Replacements
Bid Tabulation

Bid Opening Date: June 26, 2009, 10 AM

Engineer: RH2 Engineering, Inc.

LOW BID

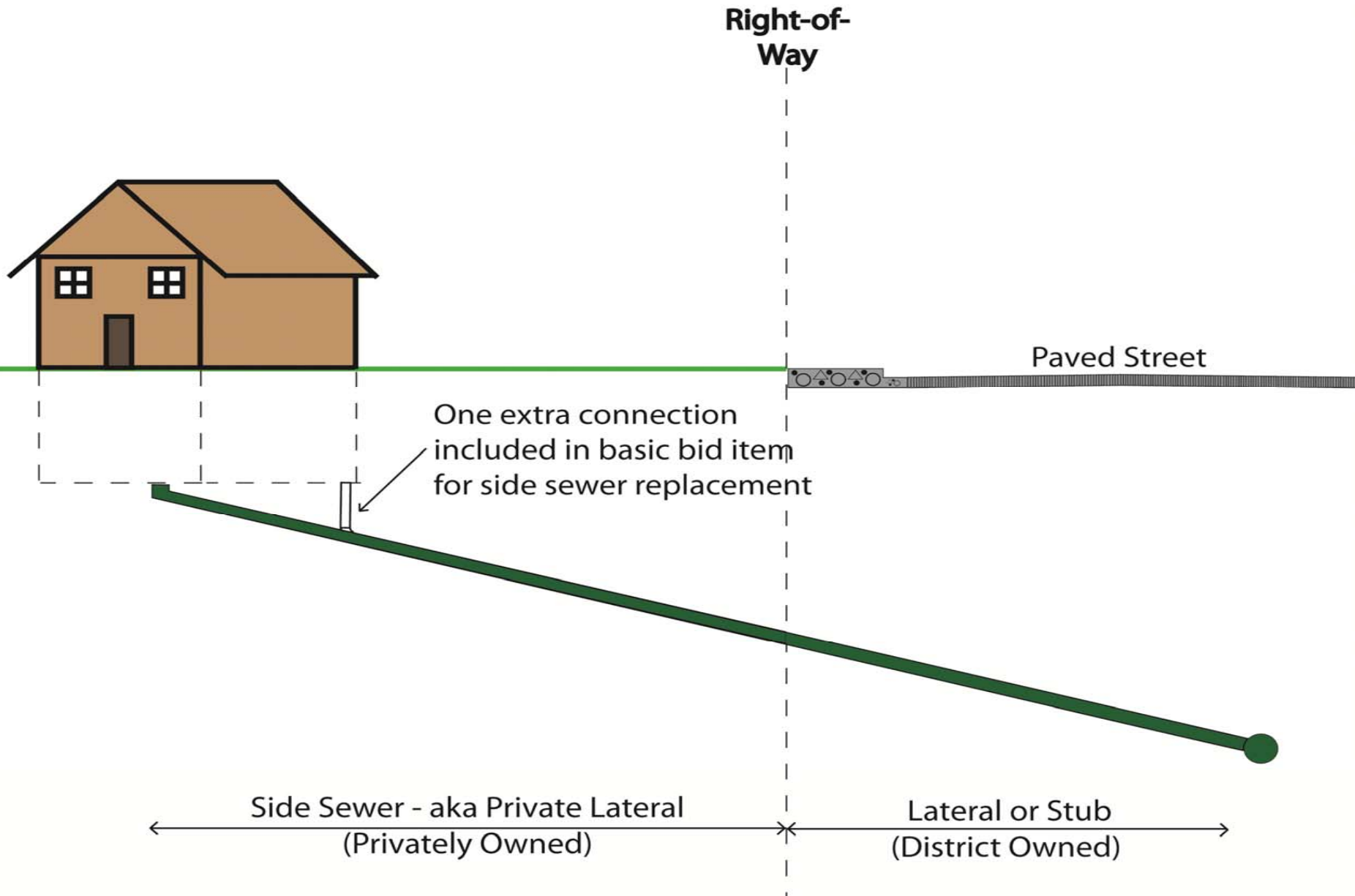
**Landis & Landis
Construction**

| Bid Item | Description | Unit | Quantity | Unit Price | Total |
|----------|---|------|----------|--------------|---------------|
| 1 | Mob/Demob (8% Maximum) | LS | 1 | \$ 21,000.00 | \$ 21,000.00 |
| 2 | Traffic Control | LS | 1 | \$ 17,000.00 | \$ 17,000.00 |
| 3 | Shoring and Trench Safety Systems (min. \$200 each) | EA | 59 | \$ 350.00 | \$ 20,650.00 |
| 4 | Temporary Erosion Control | LS | 1 | \$ 5,000.00 | \$ 5,000.00 |
| 5 | Open-cut Replacement of Sewer Lateral (Stub) | EA | 6 | \$ 3,000.00 | \$ 18,000.00 |
| 6 | Pipe Bursting Replacement of Sewer Lateral (Stub) | EA | 50 | \$ 3,000.00 | \$ 150,000.00 |
| 7 | Pipe Bursting Replacement or Open-cut Replacement of House Side Sewer (Not to Exceed \$500) | EA | 50 | \$ 500.00 | \$ 25,000.00 |
| 8 | Additional Cleanout | EA | 10 | \$ 125.00 | \$ 1,250.00 |
| 9 | Additional Pit Private Property Up to 3-feet Deep | EA | 10 | \$ 275.00 | \$ 2,750.00 |
| 10 | Additional Pit Private Property Over to 3-feet Deep | EA | 10 | \$ 500.00 | \$ 5,000.00 |
| 11 | Restoration | LS | 1 | \$ 25,000.00 | \$ 25,000.00 |

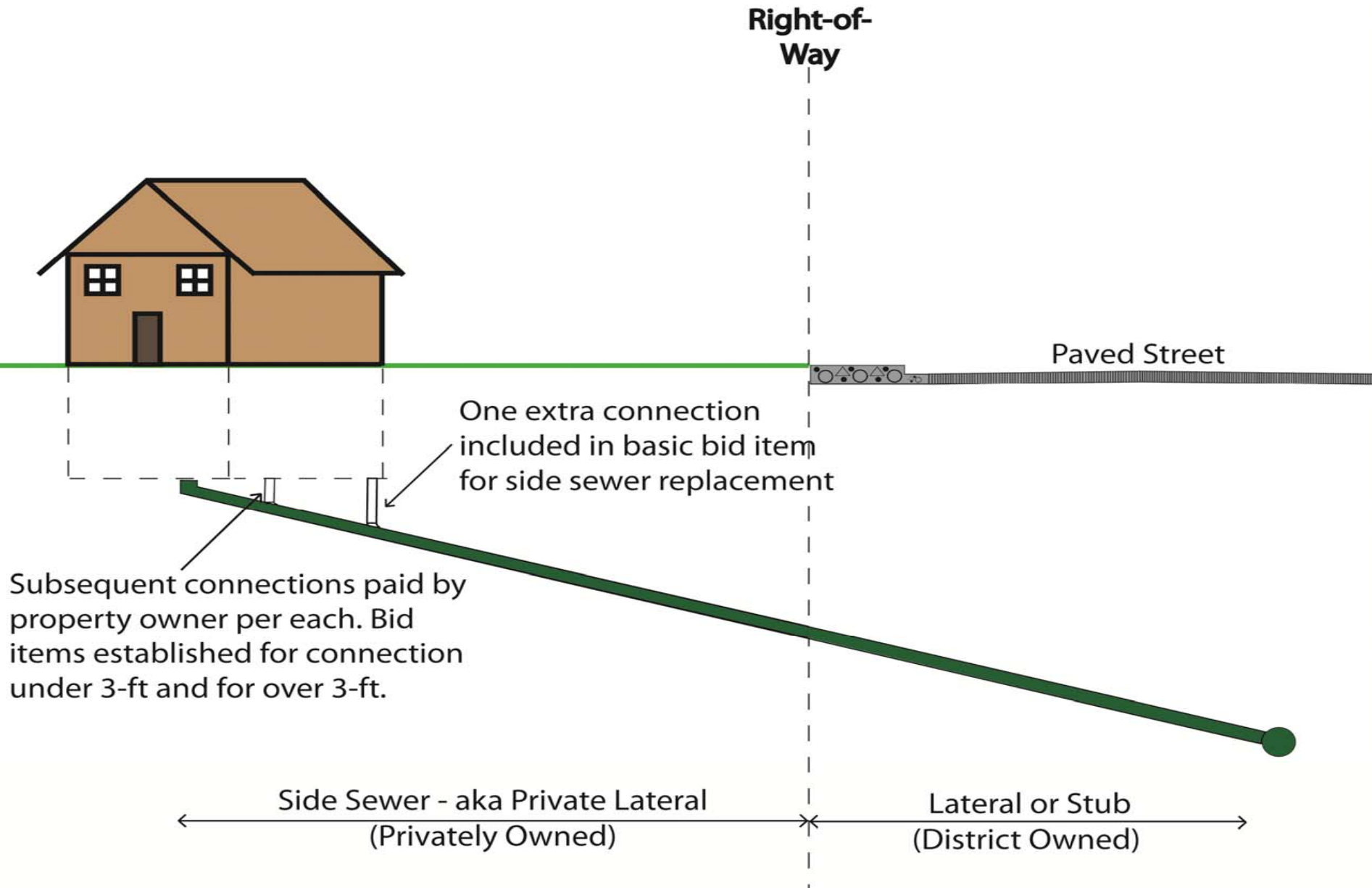
| | |
|--|---------------------|
| Subtotal (Construction Costs) | \$290,650.00 |
| WSST (9.5%) | \$27,611.75 |
| Total (Construction Costs w/ SST) | \$318,261.75 |

| | |
|---------------------------------|------|
| % of Low Bid | 100% |
| % of Engineer's Estimate | 73% |

Properties with Multiple Connections to Side Sewer



Properties with Multiple Connections to Side Sewer



Properties with Multiple Connections to Side Sewer

Property owner asked if they want side sewer replaced beyond second connection if condition of the service is poor. Property owner pays for each connection after first one.



Right-of-Way

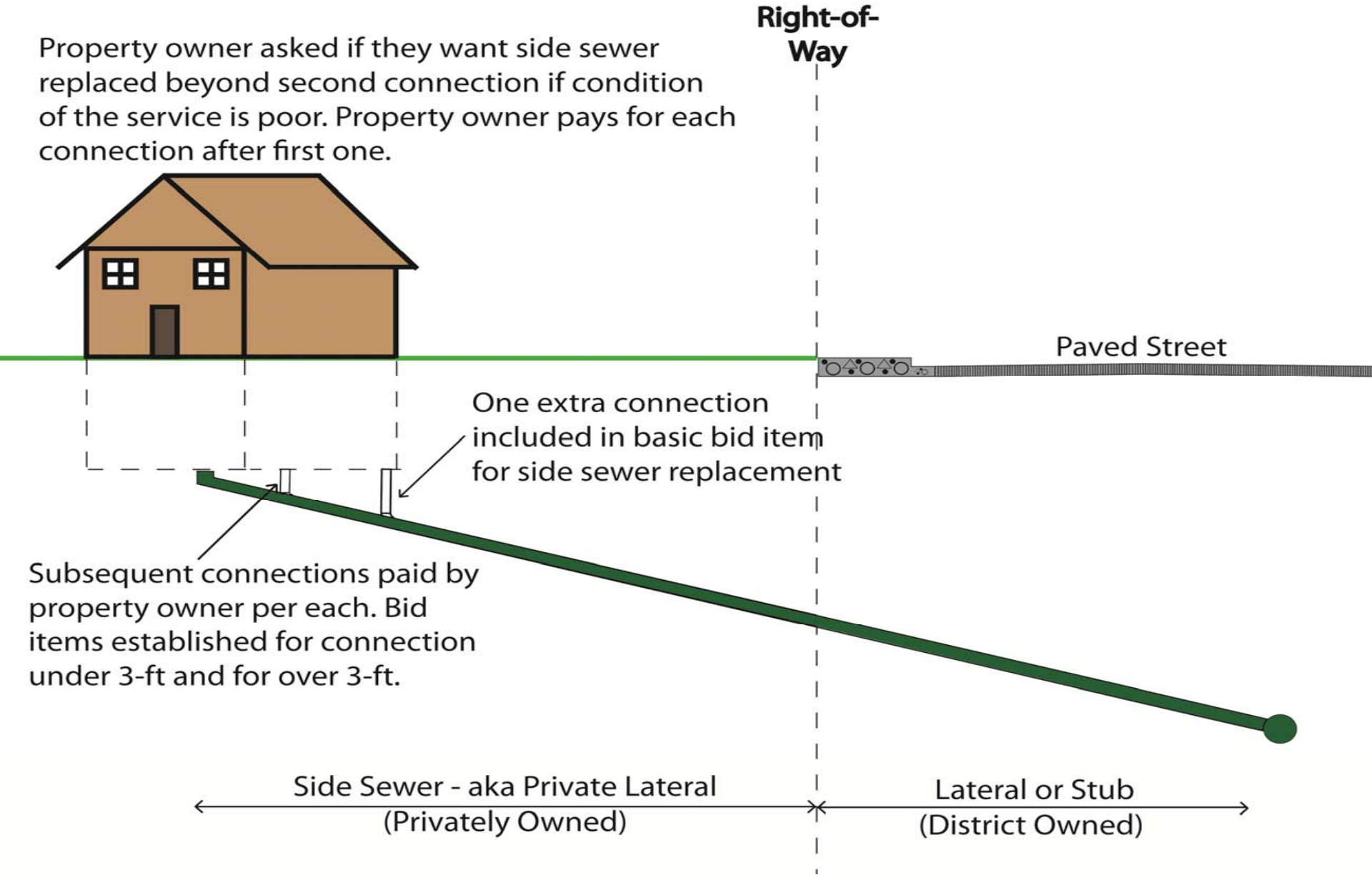
Paved Street

One extra connection included in basic bid item for side sewer replacement

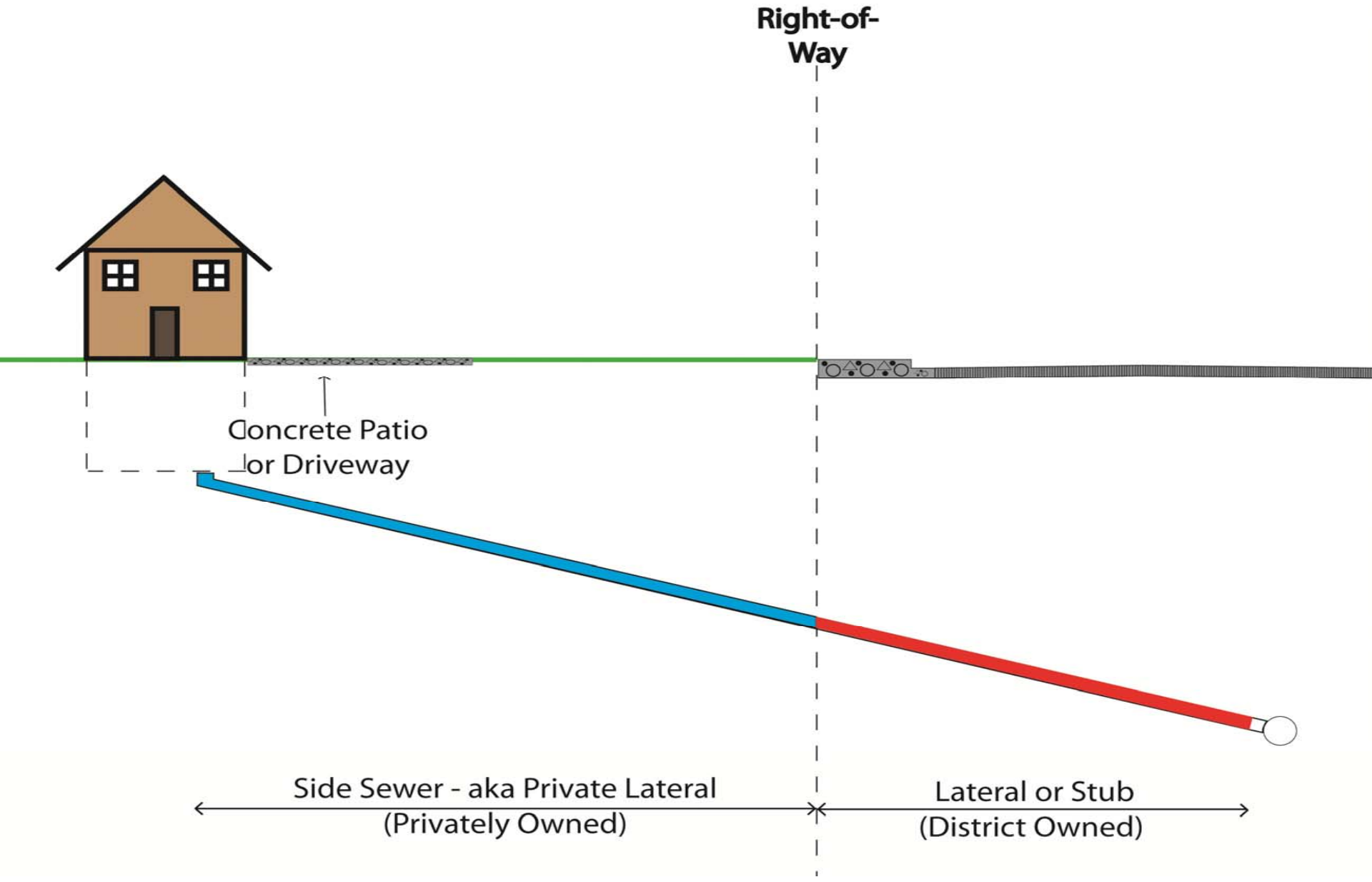
Subsequent connections paid by property owner per each. Bid items established for connection under 3-ft and for over 3-ft.

Side Sewer - aka Private Lateral
(Privately Owned)

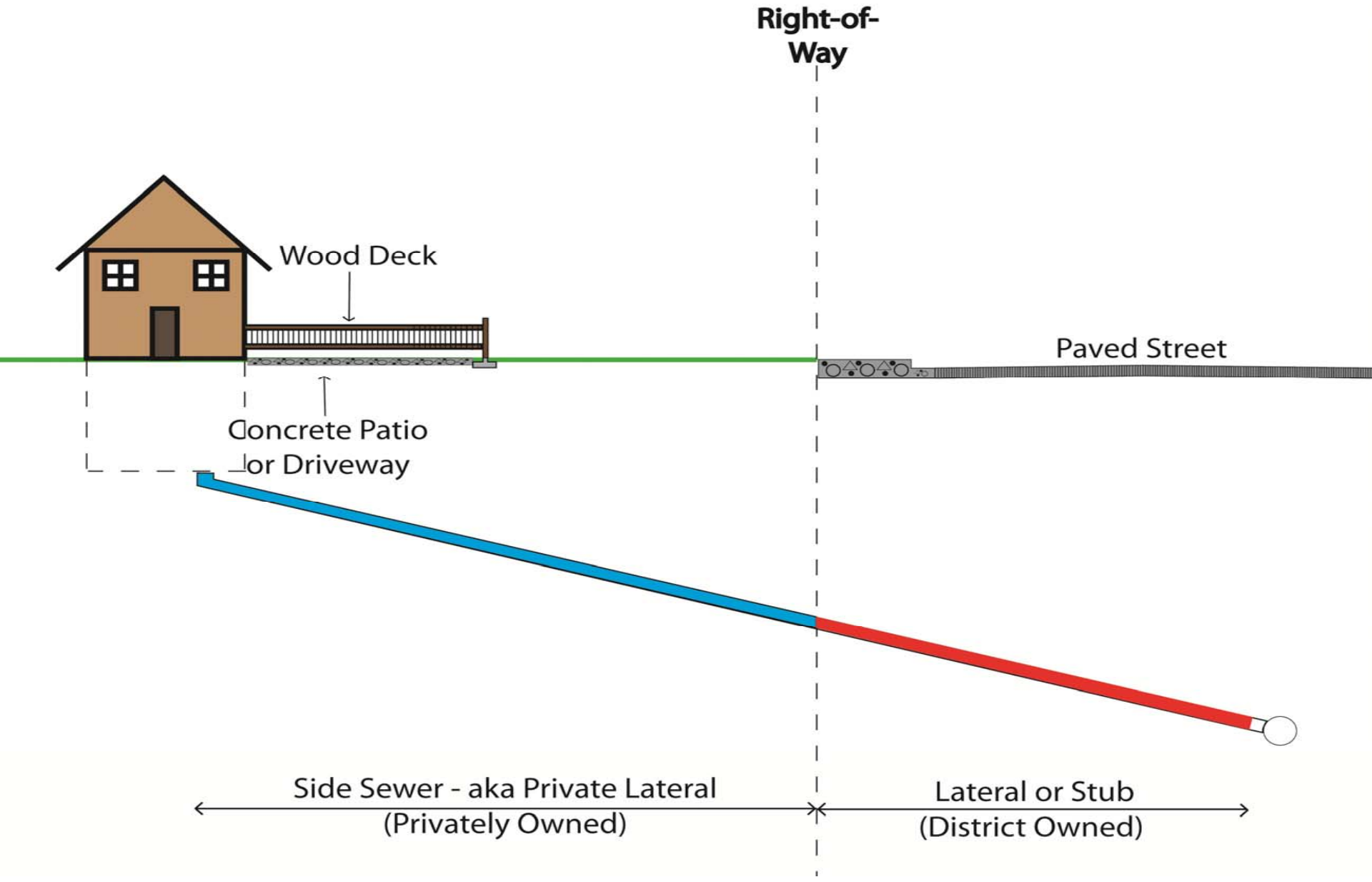
Lateral or Stub
(District Owned)



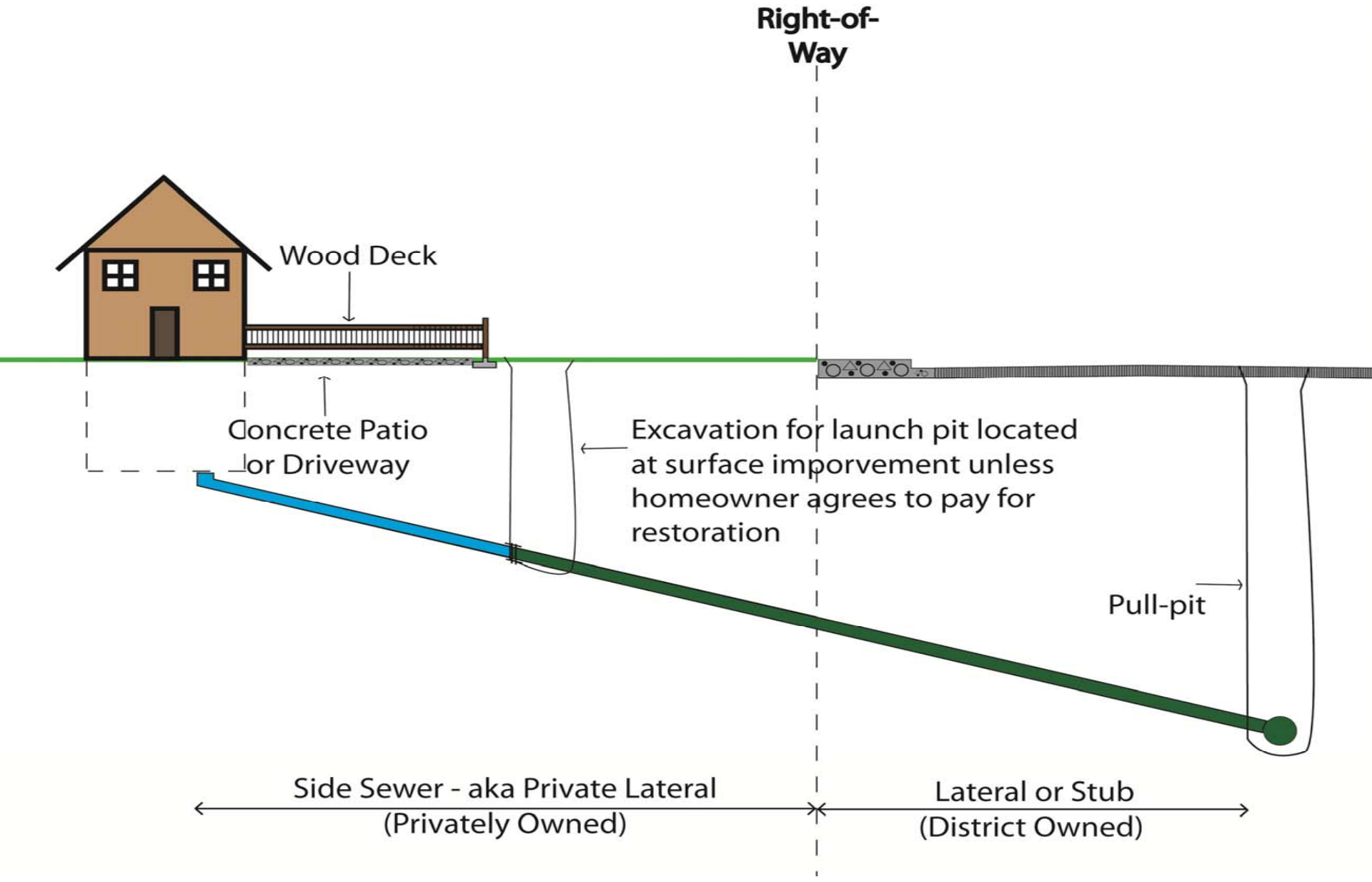
Properties with Surface Improvements



Properties with Surface Improvements

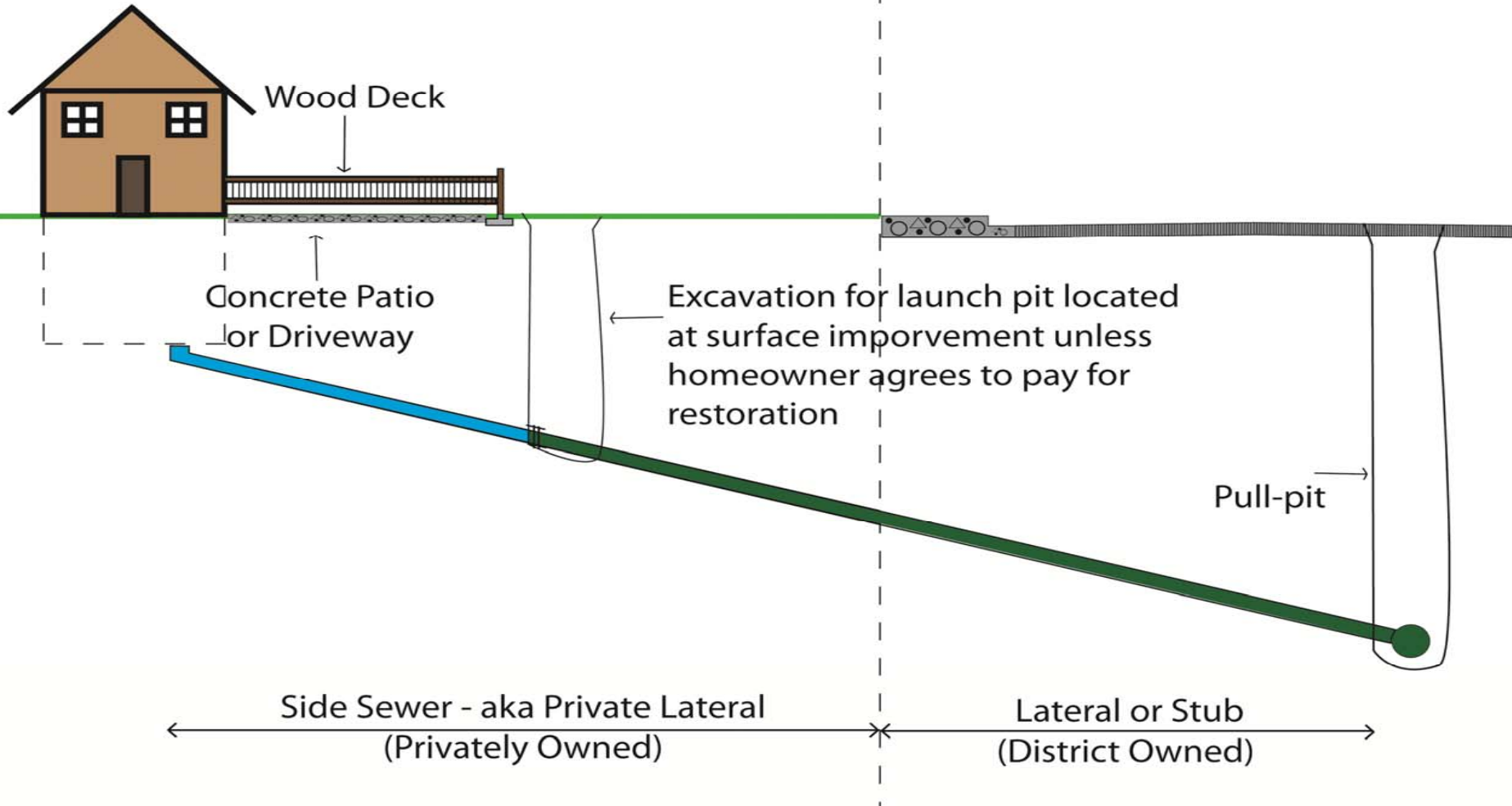


Properties with Surface Improvements



Properties with Surface Improvements

- Deck, rockery or other surface improvements are by change order



VVSD's Removal of Obstacles to Replacing Sidesewers

1. Gifting of public funds
2. Permission to inspect sidesewer
3. Elimination of inflow connections
4. Permission to work on private property (easements)
5. Cost to restore private surface improvements (driveways, patios, decks, rockeries, etc.)

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Alternative Methods for Sidesewer Replacement

- Time of Sale Inspections
 - City of Tacoma
 - Greencastle Indiana
- Funding program
 - Salem OR: Grant for sidesewer, 0% Loan for Inflow
- Punitive – Fines, Liens
- See WEF's Private Property Virtual Library
(http://www.wef.org/PrivateProperty/?ekmense=c57dfa7b_121_0_5825_1)

Acknowledgements

- Dana Dick, General Manager, Valley View Sewer District
- Bob Stanton, Vice President, PACE Engineers
- Dan Buno, President, Buno Construction
- Dennis Smith, President, Pipe Experts







Questions