

Appendix A: Calculation of Initial LTIC Rate

This technical memo was prepared by Kittelson & Associates, Inc. and is an appendix to the Local Transportation Infrastructure Charge Administrative Rules.



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MEMORANDUM

Date: February 2, 2016

Project #: 18221

To: Nick Popenuk
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From: Tony Roos, PE
Wade Scarbrough, PE

Project: PBOT Local Transportation Infrastructure Charge
Subject: Engineering Review of Historical LID Construction Costs

As requested, Kittelson & Associates, Inc. (KAI) has reviewed the available construction cost data on recent historical local residential street projects in the City of Portland. The analysis focused on publicly-built, Local Improvement District (LID)-funded projects, but also included a comparison to privately-built projects. The purpose of this analysis is to assist with determining the initial rate for the Local Transportation Infrastructure Charge (LTIC) that will be charged to single-family development on unimproved streets, instead of requiring site-specific frontage improvements.

The available data set included 19 publicly-constructed LID projects and 5 privately-constructed roadway segments. The projects ranged in scope and size from curb/sidewalk improvements, to partial street improvements, to full street improvements. The locations of the projects were spread throughout Portland, with all quadrants of the City represented.

In addition to the financial information, we also reviewed supplementary information (where available), including construction drawings, aerial images of the finished products, and the Council Ordinance and LID Administrator's Final Estimates. The remainder of this memorandum summarizes the methodology and conclusions of our analysis.

Analysis

Our methodology consisted of breaking down the total construction funding source of each project, isolating the roadway construction funding that would be associated with a typical residential in-fill development, and converting these costs to an equivalent half-street improvement cost.

Breakdown of Costs:

In reviewing the Public LID information, we noted that many of the projects included extra costs and construction elements that would not typically be associated with roadway improvements completed by developers. These items included the following:

- Water/Storm/Sewer Capacity Upgrades: Waterline, sewer, and storm line capacity projects were included in some of the LID projects; these facility upgrades were paid for by the Bureau of Environmental Services (BES) or Portland Water Bureau (PWB). These improvements are not typically associated with minor road construction required for developments and therefore were removed from the project costs.
- Extra Work: Several projects had a variety of funding sources for extra work that is not typically associated with roadway frontage improvements required of developers. These funding sources included the Environmental Protection Agency, Oregon Department of Transportation (for a multi-use path), or Pacific Power (for placing power underground). These extra-work items were removed from the project costs for this analysis.

Equivalent Half Street Adjustment Factor:

The LID projects varied in terms of scope of improvements. Some built the entire roadway, some just a portion of the roadway and sidewalk, and some just a sidewalk. The widths of the roadways also varied from 20 feet to 42 feet. Given that developers would be conditioned to build only the half-street improvement along their property frontage, we applied an adjustment factor to convert each of the projects to an equivalent half-street construction cost. For instance, if the LID built the entire roadway including the full pavement width and curb/sidewalks on both sides, we divided the roadway cost by 2. Some projects included the full pavement width but sidewalks on only one side. For these projects, we developed an equivalent half-street factor of 1.62 based on an analysis of typical roadway paving and curb/sidewalk construction costs.

Of the 19 publicly-constructed LID projects provided by the City, we used 17 to formulate our cost analysis. Two projects were removed from the analysis because they included only minor sidewalk improvements, and therefore did not sufficiently represent the nature of a half-street construction project.

Inflation Adjustment

The LID projects were constructed over a 9-year period beginning in 2004. Therefore, an inflation factor was applied to each project to compare the projects at 2015 costs. The Engineering News Record (ENR) City Cost Index for Seattle, Washington (the closest index available) was utilized for this calculation. ENR has been collecting, compiling and publishing price data on 67 different building materials in the Seattle area on a monthly basis for over 50 years.

Limitations of this Analysis

Given the limitations of the available LID data, our analysis was not able to determine distinctions in costs between project scopes and/or locations. These limitations are further discussed, as follows:

- Cost Variability: Detailed design information was not available for review on the reviewed projects, thus the itemized cost for construction could not be normalized. Each project varied in scope and location, resulting in (among other construction items) different amounts of excavation, varying pavement and aggregate thicknesses, as well as construction sequencing issues that all affect the overall cost of a project.
- Location of Projects: The projects reviewed in this analysis represent a broad cross-section of Portland. With only 17 projects included in the analysis, however, there were insufficient project examples to isolate differences in costs that may exist for different subareas within the City.

Analysis Results

The analysis found that the average cost of publicly-built street improvements was \$618 per linear foot of frontage, and that the median cost was \$583 per linear foot. There was, however, significant variation in the cost per linear foot for the 17 projects included in the analysis, including a range from \$279 to \$902 per linear foot. Details of the cost analysis calculations are provided in Attachment A. For the sake of comparison, a similar evaluation was conducted for privately-built frontage improvements, which is described in Attachment B.

Based on this analysis, we conclude that the historical cost of publicly-built street improvements was about \$600 per linear foot of frontage (halfway between the average and median costs).

ATTACHMENT A

COST ANALYSIS CALCULATIONS

Project	Name	Year Built	C/L Length	Improvements			Private Funding			City Funding							Total Funding	Outlying costs		Analysis			Inflation Rate to 2015	2015 Costs
				Full or partial	AC	S/W	Shared	Owner	Pacific Power	BES	Multi-lane path	PBOT	PWB	General Fund	EPA	PDC		Right-of-Way	Roadway Costs*	Adjustment Factor**	cost/lf of 1/2 Street			
C-10038	SW Water & Yamhill	2011	400	Curb & S/W	5	15	\$ 142,405										\$ 142,405	\$ 41	\$ 142,365	1.00	\$ 356	117%	\$ 418	
C-10039	SE 82nd	2013	534	Curb & S/W	5	6	\$ 266,222						\$ 22,870				\$ 289,092	\$ 1,715	\$ 266,222	1.00	\$ 499	106%	\$ 528	
C-10014	SW Texas Green St:	2008	2075	partial	20	6	\$ 903,153				\$ 1,244,686		\$ 556,813			\$ 77,000	\$ 2,781,652	\$ 227,029	\$1,459,966	1.62	\$ 434	119%	\$ 519	
C-10004	SW 19th: Barbur to Evans	2004	230	partial	20	6	\$ 122,574				\$ 49,211		\$ 26,266				\$ 198,051	\$ -	\$ 148,840	1.62	\$ 399	127%	\$ 509	
C-10019	N Winchell St	2008	195	partial	24	6	\$ 147,560						\$ 39,973	\$ 11,763			\$ 199,296		\$ 187,533	1.62	\$ 594	119%	\$ 709	
C-10010	SE Ellis St:	2007	170	full	26	5	\$ 68,777						\$ 9,824	\$ 7,590			\$ 86,190	\$ 50	\$ 78,601	2.00	\$ 231	121%	\$ 279	
C-10006	SE Lents III Extension	2007	470	Full	26	6	\$ 51,121						\$ 27,160	\$ 20,983		\$ 140,133	\$ 239,397	\$ 139	\$ 218,414	2.00	\$ 232	121%	\$ 280	
C-10017	SE 152nd	2009	1431	full	26	5	\$ 1,029,036				\$ 440,375		\$ 257,642		\$ 22,000		\$ 1,749,053	\$ 277,939	\$1,308,679	2.00	\$ 457	120%	\$ 548	
C-10037	NE Alberta	2013	1000	full	26	5	\$ 879,932						\$ 122,454				\$ 1,002,385	\$ 150,188	\$1,002,385	2.00	\$ 501	106%	\$ 531	
C-10021	SW Nevada St	2008	210	partial	26	8	\$ 143,204	\$ 23,703			\$ 1,066		\$ 35,125				\$ 203,097	\$ -	\$ 202,031	1.62	\$ 594	119%	\$ 709	
C-10040	SE Lents Phase IV/SE 118th	2012	600	full	26	6	\$ 259,688						\$ 3,597			\$ 678,535	\$ 941,820	\$ 151,668	\$ 941,820	2.00	\$ 785	114%	\$ 892	
C-10026	SE 31st	2011	199	full	28	6	\$ 149,012						\$ 28,535				\$ 177,547	\$ -	\$ 177,547	2.00	\$ 446	117%	\$ 524	
C-10015	NE 135th & Prescott Ct	2007	817	partial	30	8	\$ 548,053				\$ 7,000		\$ 91,786				\$ 646,839	\$ 1,689	\$ 639,839	1.62	\$ 483	121%	\$ 583	
C-10035	NE 97th & NE Everett	2013	1129	full	30	6	\$ 526,020	\$ 140,500	\$ 34,314	\$ 417,000	\$ 50,000		\$ 261,618			\$ 315,506	\$ 1,744,958	\$ 186,002	\$1,243,644	2.00	\$ 551	106%	\$ 583	
C-10007	SE 128th: Foster to Lydia	2004	433	full	32	6	\$ 59,188						\$ 35,528	\$ 40,000			\$ 364,925	\$ 26,189	\$ 324,925	2.00	\$ 375	127%	\$ 478	
C-10024	NE Winchell St	2008	250	partial	32	7	\$ 231,996						\$ 53,026				\$ 285,022	\$ 11,593	\$ 285,022	1.62	\$ 704	119%	\$ 840	
C-10030	NE 109th	2011	1002	full	38	5	\$ 1,137,472						\$ 143,916				\$ 1,281,388	\$ 69,832	\$1,281,388	2.00	\$ 639	117%	\$ 751	
C-10036	NE 136th	2012	480	full	40	5	\$ 613,053						\$ 122,661	\$ 10,000			\$ 745,715	\$ -	\$ 735,715	2.00	\$ 766	114%	\$ 871	
C-10008	NE 148th:	2006	1020	full	42	8	\$ 950,697	\$ 351,326					\$ 59,142			\$ 147,000	\$ 1,508,166	\$ 17,395	\$1,508,166	2.00	\$ 739	122%	\$ 902	

**Adjustment factor		Public LID	Private Development
Full Road w/ 2 sidewalks	2	Average \$ 618	\$ 505
Full Road w/ 1 sidewalk	1.62	Median \$ 583	\$ 434
1/2 street or less	1	High \$ 902	\$ 759
		Minimum \$ 279	\$ 383
		Std. Dev \$ 193	\$ 151

* discounted by Utility Undergrounding, EPA, BES, and PWB allocations

ATTACHMENT B

PRIVATELY CONSTRUCTED COMPARISON



MEMORANDUM

Date: January 31, 2016

Project #: 18221

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From: Tony Roos, PE
Wade Scarbrough, PE

Project: PBOT Local Transportation Infrastructure Charge

Subject: Privately-Constructed Cost Review

Comparison to Privately-Constructed Street Projects:

The available data for privately-constructed street improvements were comprised of five projects ranging in length from 40 to 185 centerline feet. Each consisted of reconstructing a portion of the pavement width and adding sidewalk on one side. The width of paving ranged from 5 feet to 22 feet. Based on this data, the cost per linear foot of constructed roadway centerline was calculated for each project and compared to the costs from the publicly-constructed projects. It should be noted, however, that directly comparing publicly-constructed project costs to privately-constructed projects is difficult. Public and private projects have inherently different requirements. Major differences include:

- Public projects:
 - Constructed under prevailing wage rules
 - Require Right-of-Way acquisition
 - Typically include larger scopes of work
- Private projects:
 - Constructed simultaneously with private development
 - Typically include smaller project scope
 - Higher permit costs

Table 1 (below) provides a comparison of half-street construction costs for the publicly-constructed LID projects and the privately-constructed projects.

Table 1: Comparison of Half-Street Construction Costs per Linear Foot

	Publicly-Constructed LID Projects (Cost per Linear Foot)	Privately-Constructed Projects (Cost per Linear Foot)
Average	\$ 618	\$ 505
Median	\$ 583	\$ 434
High	\$ 902	\$ 759
Minimum	\$ 279	\$ 383

As shown in the table, the half-street construction costs for both the publicly-constructed and privately-constructed projects were relatively consistent, with average costs per linear foot of \$505 for privately-built projects, compared to \$618 for publicly-built projects. This difference can be attributed to the factors described above, regarding the differences in publicly-built and privately-built transportation improvements. Additionally, the privately-built cost estimates included only five example projects that may not provide an accurate reflection of the average cost of privately built streets. Additionally, data for the privately-built projects did not include the year built, so they have not been adjusted for inflation, whereas the publicly-built projects were.

The evaluation of privately-built cost estimates helps to provide some context for the proposed rate of the LTIC versus the actual costs for developers to privately build frontage improvements. However, these private cost estimates are not intended to be included as part of the methodology for determining the rate of the LTIC, and the data limitations described previously in this memorandum explain why the costs shown in Table 1 are not a true apples-to-apples comparison.

Private Development Cost Analysis

Project Name		Improvements				Costs				Description
Project	Location	C/L Length	Full or partial	Paved	Sidewalk	Permits	Construction	Total	Cost/LF	
Pvt 1	8229 SW 7th	40	Partial	22	7	\$ 9,338	\$ 21,029	\$ 30,367	\$ 759	22' wide repave w/ 10' extra pave on both ends
Pvt 2	7337 N Mohawk	110	Partial	5	6	\$ 6,953	\$ 35,227	\$ 42,180	\$ 383	sawcut & widen 2 frontages.
Pvt 3	6206 SE 47th	185	Partial	20	6	\$ 19,525	\$ 60,746	\$ 80,271	\$ 434	sawcut & widen on 1 side, 20' paved w/ sidewalk on the 2nd
Pvt 4	6134 NE Vera	98	partial	8	6	\$ 17,137	\$ 34,016	\$ 51,153	\$ 522	sawcut & widen on 1 side, 8' paved w/ sidewalk on 2nd, large WQ Facility
Pvt 5	5307/5315 NE Multnomah	117	Partial	8	6	\$ 12,009	\$ 38,006	\$ 50,015	\$ 427	sawcut & widen, 8' paved

Average	\$ 505
Median	\$ 434
High	\$ 759
Low	\$ 383
Std Dev.	\$ 151