

## Computation of Sounder North (Seattle-Everett) Cost per Boarding

**Calculating Annualized Cost** (per Table 3-7, FTA New Starts manual; <http://www.fta.dot.gov/library/policy/ns/2001/34.html>)

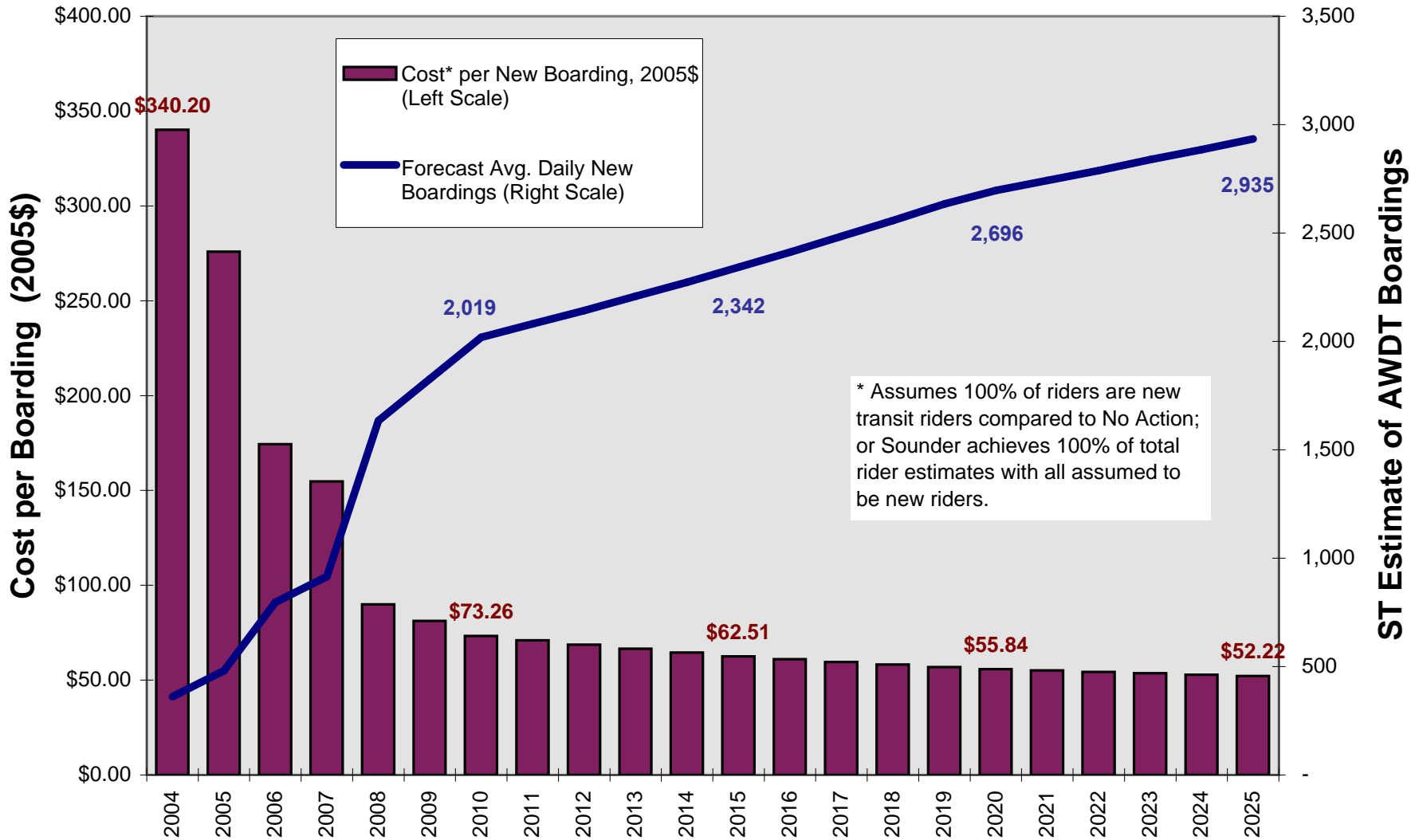
Source of cost data:

Sound Transit *Proposed 2005 Budget*, November 2004.

Item	Useful Life (Years)	Annualization Factor	Total Cost (millions 2005\$)	Annualized Cost (millions 2005\$)	Notes
Agency Administration	100	0.070	\$ 15.26	\$ 1.07	All elements; 100 years is a very generous assumption; 30 years a more likely coverage.
Pre-Engineering & Env Review	100	0.070	\$ 7.98	\$ 0.56	All elements; 100 years is a very generous assumption; 30 years a more likely coverage.
Final Design & Specification	100	0.070	\$ 5.62	\$ 0.39	All elements; 100 years is a very generous assumption; 30 years a more likely coverage.
ROW Acquisition & Permits	100	0.070	\$ 278.02	\$ 19.46	Per FTA guidelines and standard practice, BNSG Agreements permitting.
Construction	30	0.081	\$ 45.31	\$ 3.67	Per FTA guidelines.
Rail Vehicles	25	0.086	\$ 36.30	\$ 3.12	Per FTA guidelines.
Contingency	30	0.081	\$ 4.06	\$ 0.33	Per FTA guidelines.
<b>TOTAL CAPITAL COSTS (millions, stated in 2004\$)</b>			<b>\$ 392.54</b>	<b>\$ 28.60</b>	<b>Annualized Capital Costs (millions, 2005\$)</b>
<b>With NO cost transferred to BNSF benefit</b>			<b>\$28,602</b>	<b>\$28,602,000</b>	<b>Annualized Capital Costs (2005\$) per above FTA formulae</b>
			5,886	<b>\$9,490,000</b>	<b>O&amp;M Costs (2005\$) - 22-year Average: 2004-2025</b>
			\$34,488	<b>\$38,092,000</b>	<b>Annualized Total Cost (2005\$) - 22-year Average: 2004-2025</b>
assuming 0% of O&M cost is offset 1000s			\$0	<b>\$0</b>	<b>O&amp;M cost savings (2005\$) for Sound Transit REX Bus services.</b>
			\$34,488	<b>\$38,092,000</b>	<b>Incremental Annualized Cost (2005\$)</b>
and assuming 100% of riders are new * * (or, alternatively, assuming 100% of ridership forecast is achieved)			125	<b>544,273</b>	<b>22-year Average Incremental Annual Boardings (forecast year ridership)</b>
			\$275.90	<b>\$69.99</b>	<b>COST-EFFECTIVENESS (2005\$ Cost per Boarding)</b>
			\$2.46	<b>\$2.46</b>	<b>Avg. farebox revenue per rider (2005\$) per 2005 long-range financial plan</b>
<b>Year 2005</b>			\$273.44	<b>\$67.53</b>	<b>Net cost (in 2005\$) to taxpayers per boarding - 22-year average</b>
			\$47.09	<b>\$17.44</b>	<b>22-year Average Cost per New Boarding - O&amp;M Costs Only (Excl fare reduction)</b>
			<b>2005</b>	<b>22-year Averages</b>	

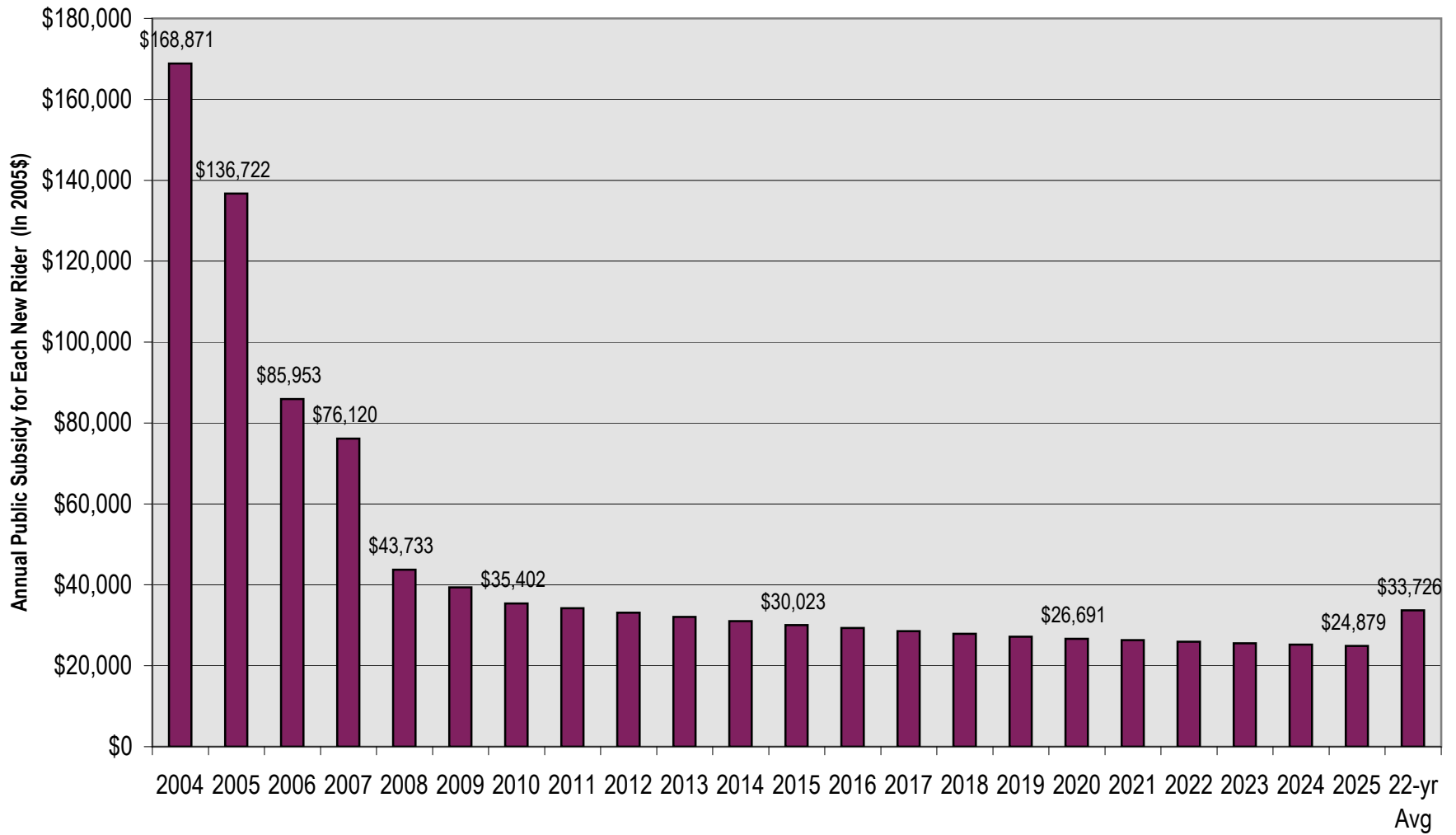
# Sounder North Cost-Effectiveness\*

Cost per New Boarding vs. Forecast Daily New Boardings - Before Fare Payment



# Sounder North - Annual Public Subsidy per Rider

Cost per Ride\* less Fares x 2 x 250



Cost per Boarding

Year-by-year calculation of Sounder North COST-EFFECTIVENESS (Incremental Cost per New Rider), using above assumptions re: savings on replaced transit service and % of									
	1997	1998	1999	2000	2001	2002	2003	2004	2005
Annualized Capital Cost (\$M)								\$ 28.60	\$ 28.60
O&M Cost (\$M in 2005\$), <i>net after any offset from reduced bus service</i>								3.38	5.89
<b>Total Annualized Cost (\$M), <i>net after any offset from reduced bus service</i></b>								<b>\$ 31.98</b>	<b>\$ 34.49</b>
Forecast Total Ridership, Boardings (000)								94	125
<i>Incremental (new) or achieved transit boardings (000)</i>								<i>94</i>	<i>125</i>
<b>COST-EFFECTIVENESS (Incremental Cost per New Boarding)</b>								<b>\$ 340.20</b>	<b>\$ 275.90</b>
less: Average farebox revenue per boarding (2005\$)								2.46	2.46
<b>Equals: Net cost to taxpayers <i>per incremental (new) or achieved boarding</i></b>								<b>\$ 337.74</b>	<b>\$ 273.44</b>

Cost per Boarding

Sounder North riders new to transit																
2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60	\$ 28.60
7.49	8.22	9.62	9.98	9.86	9.78	9.70	9.62	9.54	9.46	9.69	9.91	10.13	10.35	10.54	10.68	10.80
\$ 36.09	\$ 36.82	\$ 38.22	\$ 38.58	\$ 38.46	\$ 38.38	\$ 38.30	\$ 38.22	\$ 38.15	\$ 38.07	\$ 38.29	\$ 38.51	\$ 38.74	\$ 38.95	\$ 39.14	\$ 39.28	\$ 39.41
207	238	425	475	525	541	557	574	591	609	627	646	665	685	701	713	725
207	238	425	475	525	541	557	574	591	609	627	646	665	685	701	713	725
\$ 174.37	\$ 154.70	\$ 89.93	\$ 81.22	\$ 73.26	\$ 70.95	\$ 68.76	\$ 66.58	\$ 64.54	\$ 62.51	\$ 61.07	\$ 59.61	\$ 58.25	\$ 56.86	\$ 55.84	\$ 55.10	\$ 54.35
2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46	2.46
\$ 171.91	\$ 152.24	\$ 87.47	\$ 78.76	\$ 70.80	\$ 68.49	\$ 66.30	\$ 64.12	\$ 62.08	\$ 60.05	\$ 58.61	\$ 57.15	\$ 55.79	\$ 54.40	\$ 53.38	\$ 52.64	\$ 51.89

Cost per Boarding

2023	2024	2025 total thru 2025	
\$ 28.60	\$ 28.60	\$ 28.60	\$ 629.24
10.94	11.07	11.24	\$ 207.89
<b>\$ 39.54</b>	<b>\$ 39.67</b>	<b>\$ 39.84</b>	<b>\$ 837.13</b>
738	750	763	11,974
738	750	763	11,974
<b>\$ 53.58</b>	<b>\$ 52.90</b>	<b>\$ 52.22</b>	<b>\$ 69.91</b>
2.46	2.46	2.46	2.46
\$ 51.12	\$ 50.44	\$ 49.76	\$ 67.45

Source: "Fare Revenue Forecast" tab of ST's 2005 Base financial plan spreadsheet model (2005 Baseline v1.)

**SOUND TRANSIT**  
**Ridership Forecast**

Scenario:

2005 Baseline v.1

Total Cos Annualized Cost (millions 200 94

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>Ridership (# of boardings, 000s)</b>															
<b>Souder North (Seattle-Everett)</b>															
All Subareas		0	0	0	0	0	0	94	125	207	238	425	475	525	541
Snohomish subarea		0	0	0	0	0	0	94	125	207	238	425	475	525	541
		0													

Source: "Program Costs" tab of ST's 2005 Base financial plan spreadsheet model (2005 Baseline v1.)

**SOUND TRANSIT**  
**Program Costs**

Scenario:

2005 Baseline v.1

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
<b>NOMINAL \$000s</b>															
<b>OPERATING COSTS</b>															
<b>Souder North (Seattle-Everett)</b>															
All Subareas	-	-	2	71	325	88	342	3,274	<b>5,886</b>	7,724	8,746	10,572	11,354	11,613	11,925
Snohomish Subarea	-	-	2	71	325	88	342	3,274	<b>5,886</b>	7,724	8,746	10,572	11,354	11,613	11,925
Seattle CPI-U	163.0	167.8	172.8	179.2	185.7	189.4	192.5	197.1	<b>203.3</b>	209.6	216.4	223.5	231.3	239.4	247.9

**CONSTANT \$000s (2005\$)**

**OPERATING COSTS**

**Souder North (Seattle-Everett)**

All Subareas	-	-	2	81	356	94	361	3,377	5,886	7,492	8,217	9,616	9,980	9,862	9,780
Snohomish Subarea	-	-	2	81	356	94	361	3,377	5,886	7,492	8,217	9,616	9,980	9,862	9,780





Source: Resolution No. R2004-02, Amending the Adopted 2004 Budget for Sounder Commuter Rail Capital Projects and Transit Operations

**REGIONAL EXPRESS BUS - All Subareas**  
**Capital Program Costs**

Total Cost Annualized Cost (millions 2005\$)

**NOMINAL (YOES) \$000s**  
**CAPITAL COSTS (TOTAL)**

**Regional Express Bus**

			1997	1998	1999	2000	1997-02	2002	2003	2004	2005	2006	2007	2008	2009	2010	
<b>All Subareas</b>			-	-	-	20,776	28,667	-	83,605	88,464	11,952	70,224	69,773	3,877	7,213	-	
1997-03			-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<u>Project</u>																	
<b>Where in FTA calc:</b>	110-255	Sounder South (Seattle-Lakewood)	133,048	-	-	-	20,776	28,667	-	83,605	88,464	11,952	70,224	69,773	3,877	7,213	-
see below 2004\$ figures	<i>Elements:</i> Agency Administration		5,809				3,294		2,515	1,505	2,319	2,941	2,094	335			
see below 2004\$ figures	Pre-Engineering/Env Review		6,115				4,538		1,577	1,170	134	1	-	-	-	-	-
see below 2004\$ figures	Final Design & Specification		985				886		99	864	1,884	1,827	-	-	-	-	-
see below 2004\$ figures	ROW Acquisition and Permits		86,307				7,093		79,214	81,533	907	54,115	50,034	-	-	-	-
see below 2004\$ figures	Construction		6,005				5,805		200	1,155	6,529	9,876	16,251	3,459	3,139		
see below 2004\$ figures	Vehicles		27,827			20,776	7,051		-	2,236	176	402	-	-	2,249		
see below 2004\$ figures	Contingency		-				-		-	1	3	1,062	1,394	83	1,825		

-----YOE \$ Costs inflate to 2005\$ --> **Base Year** <-- YOE \$ Costs deflate to 2005\$ -----

BCI - Seattle	3325.2	3431.3	3474.6	3611.6	3669.8	3739.1	3838.4	3990	<b>4095.4</b>	4218.7	4338	4460.5	4588.4	4725.6
CPI - Seattle	163	167.8	172.8	179.2	185.7	189.4	192.5	197.1	<b>203.3</b>	209.6	216.4	223.5	231.3	239.4
ROWI - ST	86	100	108.8	114.2	115.3	112	114.3	119.4	<b>124.3</b>	129.1	134.2	139.5	144.2	148

**CONSTANT (2004\$) \$000s**  
**CAPITAL COSTS (TOTAL)**

**Regional Express Bus**

			1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
<b>All Subareas</b>			-	-	-	23,559	31,538	-	90,784	92,011	11,952	67,737	64,968	3,557	6,438	-	
1997-02			-	-	-	-	-	-	-	-	-	-	-	-	-	-	
<u>Project</u>																	
<b>Where in FTA calc:</b>	110-255	Sounder South (Seattle-Lakewood)	55,097	-	-	-	23,559	31,538	-	90,784	92,011	11,952	67,737	64,968	3,557	6,438	-
ROW	<i>Elements:</i> Agency Administration		3,606	0	0	0	3,606	0	2,656	1,552	2,319	2,853	1,967	305	0	0	
ROW	CPI	Pre-Engineering/Env Review	4,968	0	0	0	4,968	0	1,665	1,207	134	1	0	0	0	0	
ROW	CPI	Final Design & Specification	970	0	0	0	970	0	105	891	1,884	1,772	0	0	0	0	
ROW	ROW	ROW Acquisition and Permits	7,647	0	0	0	7,647	0	86,144	84,879	907	52,103	46,343	0	0	0	
ROW	BCI	Construction	6,478	0	0	0	6,478	0	213	1,186	6,529	9,587	15,342	3,176	2,802	0	
Rail vehicles	BCI	Vehicles	31,428	0	0	0	23,559	7,869	0	0	2,295	176	390	0	0	2,007	
ROW	BCI	Contingency	-	0	0	0	0	0	0	1	3	1,031	1,316	76	1,629	0	

ROW Preparation

Structures

Structures

Structures

ROW

ROW

2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025 total thru 2025	Totals thru 2009
-	-	-	-	-	-	-	-	-	-	-	-	-	-	384,551	384,551
-	-	-	-	-	-	-	-	-	-	-	-	-	-	384,551	384,551
														15,003	
														7,420	
														5,560	
														272,896	272,896
														46,414	46,414
														32,890	32,890
														4,368	
														-	-
														-	-
4881.3	5040.6	5203.3	5375.3	5551.2	5737.5	5930	6128.5	6333.6	6553.2	6780.9	7023.9	7280.1	7541.1	7809.8	
247.9	256.6	265.5	274.6	284.2	294.3	304.9	316.2	328.3	341.2	354.6	368.8	383.7	399.1	415.5	
151.2	154.3	157.5	161	164.7	168.4	172.1	175.9	179.8	183.7	187.7	191.7	195.7	199.9	204.1	
2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025 total thru 2025	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	392,544	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	-	-	-	-	-	392,544	
														15,258	
														7,975	
														5,622	
														278,023	
														45,313	
														36,296	
														4,056	
														-	
														-	
														-	
														-	