

## **Appendix C**

### **Site-Based and Reach-Wide Cost Effectiveness and Incremental Cost Analysis**

#### **Shorty's Island / Meander Reach Ecosystem Restoration**

#### **Kootenai River, Idaho**

### **Draft Continuing Authorities Program Section 1135 Detailed Project Report and Integrated Environmental Assessment**

**June 2012**

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**SHORTY'S NORTH (SN)**

Code	Measure	Begin Station*	End Station*	Length (ft)	Effective Area (Sqft)	Material Volume (CY)	\$/SF EA Cstr Fixed Cost	\$/CY Placement of Materials	\$/SF EA Cost of Materials	Materials Cost \$	Fixed Cost \$	Placement Cost \$ **	Total Cost PV\$	Total Annualized Cost \$	Existing HSI	Existing HSI Var.	With Project HSI	With Proj. HSI Var.	Net HSI	Net Output	AAHUs	\$/sqft Tot Cost
SN-SPC(0)-A	Sub on Clay (0% slope) - 1	7514+50	7519+50	500	18,000	9,057	\$4.39	\$18.17	\$9.64	\$173,597	\$78,935	\$164,557	\$417,089	\$19,833	0.00	substrate	0.87	velocity	0.87	781,463	15,629	\$23.17
SN-SPC(0)-B	Sub on Clay (0% slope) - 2	7519+50	7523+50	400	23,000	10,074	\$4.39	\$18.17	\$8.48	\$194,944	\$100,861	\$183,049	\$478,854	\$22,770	0.00	substrate	0.92	velocity	0.92	1,057,439	21,149	\$20.82
SN-SPC(0)-C	Sub on Clay (0% slope) - 3	7523+50	7527+50	400	25,000	10,777	\$4.39	\$18.17	\$8.35	\$208,790	\$109,631	\$195,820	\$514,241	\$24,453	0.00	substrate	0.72	velocity	0.72	904,540	18,091	\$20.57
SN-SPC(10)-D	Sub on Clay (10% slope) - 1	7514+50	7519+50	500	27,364	14,540	\$4.39	\$18.17	\$10.15	\$277,758	\$119,996	\$264,194	\$661,948	\$31,476	0.00	substrate	0.87	velocity	0.87	1,187,977	23,760	\$24.19
SN-SPC(10)-E	Sub on Clay (10% slope) - 2	7519+50	7523+50	400	30,846	15,437	\$4.39	\$18.17	\$9.60	\$295,999	\$135,268	\$280,488	\$711,755	\$33,845	0.00	substrate	0.92	velocity	0.92	1,418,171	28,363	\$23.07
SN-SPC(10)-F	Sub on Clay (10% slope) - 3	7523+50	7527+50	400	33,334	15,576	\$4.39	\$18.17	\$9.00	\$300,038	\$146,177	\$283,022	\$729,237	\$34,676	0.00	substrate	0.72	velocity	0.72	1,206,069	24,121	\$21.88
<b>Relationships</b>								36														
A	not combinable	D					57.5															
B	not combinable	E					62.5															
C	not combinable	F																				

**SHORTY'S SOUTH (SS)**

Code	Measure	Begin Station*	End Station*	Length (ft)	Effective Area (Sqft)	Material Volume (CY)	\$/SF EA Cstr Fixed Cost	\$/CY Placement of Materials	\$/SF EA Cost of Materials	Materials Cost \$	Fixed Cost \$	Placement Cost \$ **	Total Cost PV\$	Total Annualized Cost \$	Existing HSI	Existing HSI Var.	With Project HSI	With Proj. HSI Var.	Net HSI	Net Output	AAHUs	\$/sqft Tot Cost
SS-SPC(0)-A	Sub on Clay (0% slope) - 1	7549+50	7554+50	500	13,000	6,490	\$4.39	\$18.17	\$9.57	\$124,462	\$57,008	\$117,921	\$299,392	\$14,236	0.00	substrate	0.65	velocity	0.65	420,743	8,415	\$23.03
SS-SPC(0)-B	Sub on Clay (0% slope) - 2	7554+50	7559+50	500	18,500	8,660	\$4.39	\$18.17	\$9.02	\$166,787	\$81,127	\$157,347	\$405,261	\$19,271	0.00	substrate	0.73	velocity	0.73	674,573	13,491	\$21.91
SS-SPC(0)-C	Sub on Clay (0% slope) - 3	7559+50	7563+50	400	22,500	9,635	\$4.39	\$18.17	\$8.30	\$186,754	\$98,668	\$175,067	\$460,490	\$21,897	0.00	substrate	0.87	velocity	0.87	976,829	19,537	\$20.47
SS-SPC(0)-D	Sub on Clay (0% slope) - 4	7570+50	7574+50	400	33,000	12,579	\$4.39	\$18.17	\$7.46	\$246,052	\$144,713	\$228,554	\$619,320	\$29,449	0.00	substrate	0.83	velocity	0.83	1,372,317	27,446	\$18.77
SS-SPC(0)-E	Sub on Clay (0% slope) - 5	7574+50	7578+50	400	17,500	7,814	\$4.39	\$18.17	\$8.63	\$151,002	\$76,742	\$141,986	\$369,730	\$17,581	0.00	substrate	0.73	velocity	0.73	638,110	12,762	\$21.13
SS-SPC(10)-F	Sub on Clay (10% slope) - 1	7549+50	7554+50	500	27,861	10,726	\$4.39	\$18.17	\$7.52	\$209,633	\$122,178	\$194,884	\$526,694	\$25,045	0.00	substrate	0.65	velocity	0.65	901,719	18,034	\$18.90
SS-SPC(10)-G	Sub on Clay (10% slope) - 2	7554+50	7559+50	500	39,304	13,988	\$4.39	\$18.17	\$7.00	\$275,221	\$172,358	\$254,151	\$701,730	\$33,368	0.00	substrate	0.73	velocity	0.73	1,433,157	28,663	\$17.85
SS-SPC(10)-H	Sub on Clay (10% slope) - 3	7559+50	7563+50	400	38,309	16,092	\$4.39	\$18.17	\$8.15	\$312,365	\$167,994	\$292,394	\$772,754	\$36,745	0.00	substrate	0.87	velocity	0.87	1,663,168	33,263	\$20.17
SS-SPC(10)-I	Sub on Clay (10% slope) - 4	7570+50	7574+50	400	39,801	16,972	\$4.39	\$18.17	\$8.27	\$329,079	\$174,540	\$308,388	\$812,006	\$38,612	0.00	substrate	0.83	velocity	0.83	1,655,159	33,103	\$20.40
SS-SPC(10)-J	Sub on Clay (10% slope) - 5	7574+50	7578+50	400	29,354	10,892	\$4.39	\$18.17	\$7.27	\$213,542	\$128,723	\$197,909	\$540,175	\$25,686	0.00	substrate	0.73	velocity	0.73	1,070,332	21,407	\$18.40
SS-SPS-L	Sub on Clay Shelves - 1	7566+50	7570+50	400	37,493	4,896	\$4.39	\$18.17	\$3.71	\$139,017	\$164,414	\$88,951	\$392,382	\$18,658	0.00	substrate	0.69	velocity	0.69	1,297,038	25,941	\$10.47
<b>Relationships</b>																						
A	not combinable	F																				
B	not combinable	G																				
C	not combinable	H																				
D	not combinable	I																				
E	not combinable	J																				

**MYRTLE CREEK (MC)**

Code	Measure	Begin Station*	End Station*	Length (ft)	Effective Area (Sqft)	Material Volume (CY)	\$/SF EA Cstr Fixed Cost	\$/CY Placement of Materials	\$/SF EA Cost of Materials	Materials Cost \$	Fixed Cost \$	Placement Cost \$ **	Total Cost PV\$	Total Annualized Cost \$	Existing HSI	Existing HSI Var.	With Project HSI	With Proj. HSI Var.	Net HSI	Net Output	AAHUs	\$/sqft Tot Cost
MC-SPS-K	Sub on Clay Shelves - 1	7672+50	7678+50	600	18,500	2,665	\$4.39	\$18.17	\$3.95	\$73,075	\$81,127	\$48,428	\$202,630	\$9,635	0.00	substrate	0.50	velocity	0.50	462,130	9,243	\$10.95
MC-SPS-L	Sub on Clay Shelves - 2	7678+50	7685+50	700	43,500	6,477	\$4.39	\$18.17	\$4.04	\$175,597	\$190,759	\$117,692	\$484,048	\$23,017	0.00	substrate	0.63	velocity	0.63	1,370,250	27,405	\$11.13
<b>Relationships</b>								none														

Downstream of REFUGE (DR)																						\$/sqft Tot Cost
Code	Measure	Begin Station*	End Station*	Length (ft)	Effective Area (Sqft)	Material Volume (CY)	\$/SF EA Cstr Fixed Cost	\$/CY Placement of Materials	\$/SF EA Cost of Materials	Materials Cost \$	Fixed Cost \$	Placement Cost \$ **	Total Cost PV\$	Total Annualized Cost \$	Existing HSI	Existing HSI Var.	With Project HSI	With Proj. HSI Var.	Net HSI	Net Output	AAHUs	
DR-SPC(0)-A	Sub on Clay (0% slope) - 1	7725+50	7730+50	500	18,000	8,679	\$4.39	\$18.17	\$9.27	\$166,824	\$78,935	\$157,697	\$403,455	\$19,185	0.00	substrate	0.77	velocity	0.77	689,268	13,785	\$22.41
DR-SPC(0)-B	Sub on Clay (0% slope) - 2	7741+50	7746+50	500	16,500	7,092	\$4.39	\$18.17	\$8.33	\$137,428	\$72,357	\$128,863	\$338,648	\$16,103	0.00	substrate	0.71	velocity	0.71	589,573	11,791	\$20.52
DR-SPC(0)-C	Sub on Clay (0% slope) - 3	7767+50	7771+50	400	21,000	8,122	\$4.39	\$18.17	\$7.56	\$158,683	\$92,090	\$147,575	\$398,348	\$18,942	0.00	substrate	0.65	velocity	0.65	683,919	13,678	\$18.97
DR-SPC(0)-D	Sub on Clay (0% slope) - 4	7771+50	7776+50	500	35,000	13,942	\$4.39	\$18.17	\$7.76	\$271,746	\$153,484	\$253,326	\$678,556	\$32,266	0.00	substrate	0.61	velocity	0.61	1,061,824	21,236	\$19.39
DR-SPC(10)-E	Sub on Clay (10% slope) - 1	7725+50	7730+50	500	28,359	14,429	\$4.39	\$18.17	\$9.75	\$276,377	\$124,359	\$262,172	\$662,909	\$31,522	0.00	substrate	0.77	velocity	0.77	1,085,925	21,719	\$23.38
DR-SPC(10)-F	Sub on Clay (10% slope) - 2	7741+50	7746+50	500	22,388	12,004	\$4.39	\$18.17	\$10.24	\$229,188	\$98,179	\$218,114	\$545,481	\$25,938	0.00	substrate	0.71	velocity	0.71	799,973	15,999	\$24.36
DR-SPC(10)-G	Sub on Clay (10% slope) - 3	7767+50	7771+50	400	30,349	14,723	\$4.39	\$18.17	\$9.32	\$282,874	\$133,086	\$267,506	\$683,467	\$32,500	0.00	substrate	0.65	velocity	0.65	988,381	19,768	\$22.52
DR-SPC(10)-H	Sub on Clay (10% slope) - 4	7771+50	7776+50	500	45,772	21,501	\$4.39	\$18.17	\$9.05	\$414,012	\$200,721	\$390,673	\$1,005,406	\$47,808	0.00	substrate	0.61	velocity	0.61	1,388,615	27,772	\$21.97
DR-SPS-K	Sub on Clay Shelves - 1	7733+50	7736+50	300	19,320	2,006	\$4.39	\$18.17	\$4.54	\$87,673	\$84,723	\$36,448	\$208,844	\$9,931	0.00	substrate	0.41	velocity	0.41	394,192	7,884	\$10.81
DR-SPS-L	Sub on Clay Shelves - 2	7737+50	7738+50	100	3,360	349	\$4.39	\$18.17	\$4.54	\$15,266	\$14,734	\$6,336	\$36,336	\$1,728	0.00	substrate	0.42	velocity	0.42	69,924	1,398	\$10.81

**Relationships**

A	not combinable	E
B	not combinable	F
C	not combinable	G
D	not combinable	H

REFUGE (RF)																						\$/sqft Tot Cost
Code	Measure	Begin Station*	End Station*	Length (ft)	Effective Area (Sqft)	Material Volume (CY)	\$/SF EA Cstr Fixed Cost	\$/CY Placement of Materials	\$/SF EA Cost of Materials	Materials Cost \$	Fixed Cost \$	Placement Cost \$ **	Total Cost PV\$	Total Annualized Cost \$	Existing HSI	Existing HSI Var.	With Project HSI	With Proj. HSI Var.	Net HSI	Net Output	AAHUs	
RF-SPC(0)-A	Sub on Clay (0% slope) - 1	7847+50	7854+50	700	26,000	12,016	\$4.39	\$18.17	\$8.91	\$231,625	\$114,017	\$218,322	\$563,964	\$26,817	0.00	substrate	0.62	velocity	0.62	804,595	16,092	\$21.69
RF-SPE-B	Sub on Existing Gravel - 1	7859+50	7862+50	300	8,500	1,047	\$4.39	\$18.17	\$3.57	\$30,385	\$37,275	\$19,019	\$86,679	\$4,122	0.15	substrate	0.54	velocity	0.39	198,429	3,969	\$10.20
RF-SPE-C	Sub on Existing Gravel - 2	7862+50	7867+50	500	37,000	4,556	\$4.39	\$18.17	\$3.57	\$132,262	\$162,254	\$82,791	\$377,307	\$17,941	0.15	substrate	0.68	velocity	0.53	1,111,250	22,225	\$10.20
RF-SPE-D	Sub on Existing Gravel - 3	7867+50	7869+50	200	8,000	985	\$4.39	\$18.17	\$3.57	\$28,597	\$35,082	\$17,901	\$81,580	\$3,879	0.15	substrate	0.57	velocity	0.42	199,730	3,995	\$10.20
RF-EES-E	Sub Enhancement - 1	7859+50	7862+50	300	8,500	354	\$4.39	\$18.17	\$1.37	\$11,606	\$37,275	\$6,435	\$55,316	\$2,630	0.15	substrate	0.15	substrate	0.00	33,292	666	\$6.51
RF-EES-F	Sub Enhancement - 2	7862+50	7867+50	500	37,000	1,542	\$4.39	\$18.17	\$1.37	\$50,519	\$162,254	\$28,012	\$240,785	\$11,450	0.15	substrate	0.15	substrate	0.00	144,917	2,898	\$6.51
RF-EES-G	Sub Enhancement - 3	7867+50	7869+50	200	8,000	333	\$4.39	\$18.17	\$1.37	\$10,923	\$35,082	\$6,057	\$52,062	\$2,476	0.15	substrate	0.15	substrate	0.00	31,333	627	\$6.51

**Relationships**

none

**Notes**  
 \* This represents river stationing in hundred-foot units (7515+00)  
 \*\* This cost includes placement costs, site preparation, staging, and mob/de-mob

**Measure Codes**  
 SPC = Substrate Placement on Clay Bed  
 SPS = Substrate Placement on Clay Shelf  
 EES = Enhancement of Existing Coarse Substrate  
 SPE = Substrate Placement on Existing Coarse Substrate

## Shortys North

## Basic

50 Period of Analysis (years)  
0.04125 FY 2011 Discount Rate

Note that this analysis is based on draft Costs and  
Habitat Outputs and should be considered  
preliminary.

## Costs

Code	Measure	Length (ft)	Effctv Area (sqft)	Ann Cost \$
SN-SPC(0)-A	Sub on Clay (0% slope) - 1	500	18,000	\$19,833
SN-SPC(0)-B	Sub on Clay (0% slope) - 2	400	23,000	\$22,770
SN-SPC(0)-C	Sub on Clay (0% slope) - 3	400	25,000	\$24,453
SN-SPC(10)-D	Sub on Clay (10% slope) - 1	500	27,364	\$31,476
SN-SPC(10)-E	Sub on Clay (10% slope) - 2	400	30,846	\$33,845
SN-SPC(10)-F	Sub on Clay (10% slope) - 3	400	33,334	\$34,676

## Benefits

Code	Measure	Net HS I	Tot Net HU s	AAHUs
SN-SPC(0)-A	Sub on Clay (0% slope) - 1	0.87	781,463	15,629
SN-SPC(0)-B	Sub on Clay (0% slope) - 2	0.92	1,057,439	21,149
SN-SPC(0)-C	Sub on Clay (0% slope) - 3	0.72	904,540	18,091
SN-SPC(10)-D	Sub on Clay (10% slope) - 1	0.87	1,187,977	23,760
SN-SPC(10)-E	Sub on Clay (10% slope) - 2	0.92	1,418,171	28,363
SN-SPC(10)-F	Sub on Clay (10% slope) - 3	0.72	1,206,069	24,121

## IWR Planning Suite Data

Code	Measure	Ann Cost (\$)	Output (HUs)	\$/HU
SN-SPC(0)-A	Sub on Clay (0% slope) - 1	\$19,833	15,629	\$1.27
SN-SPC(0)-B	Sub on Clay (0% slope) - 2	\$22,770	21,149	\$1.08
SN-SPC(0)-C	Sub on Clay (0% slope) - 3	\$24,453	18,091	\$1.35
SN-SPC(10)-D	Sub on Clay (10% slope) - 1	\$31,476	23,760	\$1.32
SN-SPC(10)-E	Sub on Clay (10% slope) - 2	\$33,845	28,363	\$1.19
SN-SPC(10)-F	Sub on Clay (10% slope) - 3	\$34,676	24,121	\$1.44

## Relationships

Measure	Link	Measure
A	not combinable	D
B	not combinable	E
C	not combinable	F

## Cost Effective Plans

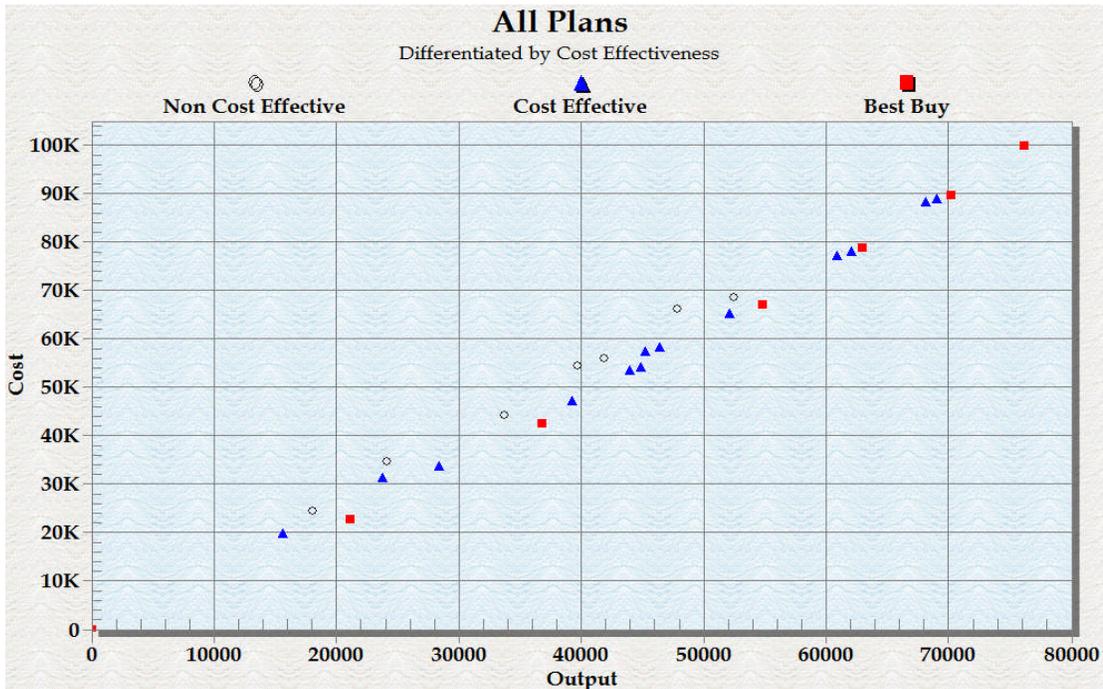
#	Plan	Tot. Cost (\$)	Ann. Cost (\$)	Output (HUs)	Cost Effective	\$/HU
1	No Action Plan	\$0	\$0	0	Best Buy	\$0
2	A	\$417,089	\$19,833	15,629	Cost Effective	\$1.27
3	B	\$478,854	\$22,770	21,149	Best Buy	\$1.08
4	D	\$661,948	\$31,476	23,760	Cost Effective	\$1.32
5	E	\$711,755	\$33,845	28,363	Cost Effective	\$1.19
6	A-B	\$895,943	\$42,603	36,778	Best Buy	\$1.16
7	B-C	\$993,095	\$47,223	39,240	Cost Effective	\$1.20
8	A-E	\$1,128,845	\$53,678	43,993	Cost Effective	\$1.22
9	B-D	\$1,140,802	\$54,246	44,908	Cost Effective	\$1.21
10	B-F	\$1,208,090	\$57,446	45,270	Cost Effective	\$1.27
11	C-E	\$1,225,996	\$58,297	46,454	Cost Effective	\$1.25
12	D-E	\$1,373,703	\$65,321	52,123	Cost Effective	\$1.25
13	A-B-C	\$1,410,184	\$67,056	54,869	Best Buy	\$1.22
14	A-B-F	\$1,625,180	\$77,279	60,899	Cost Effective	\$1.27
15	A-C-E	\$1,643,086	\$78,130	62,083	Cost Effective	\$1.26
16	B-C-D	\$1,655,043	\$78,699	62,999	Best Buy	\$1.25
17	A-E-F	\$1,858,081	\$88,354	68,114	Cost Effective	\$1.30
18	B-D-F	\$1,870,038	\$88,922	69,030	Cost Effective	\$1.29
19	C-D-E	\$1,887,944	\$89,774	70,214	Best Buy	\$1.28
20	D-E-F	\$2,102,940	\$99,997	76,244	Best Buy	\$1.31

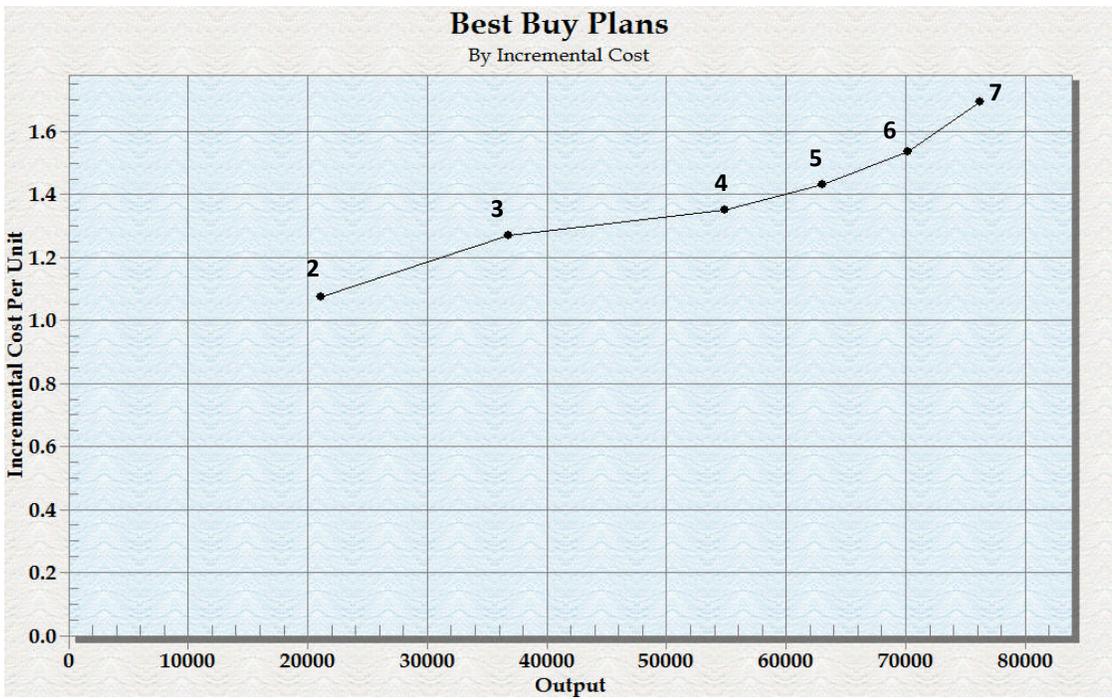
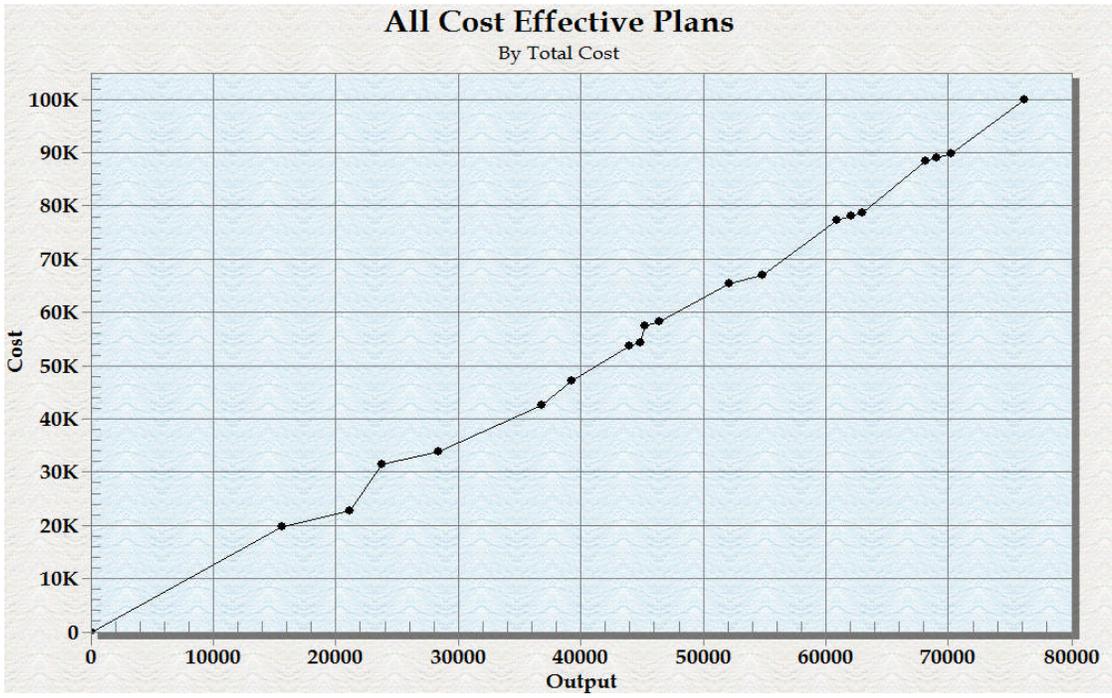
**Best Buy Plans**

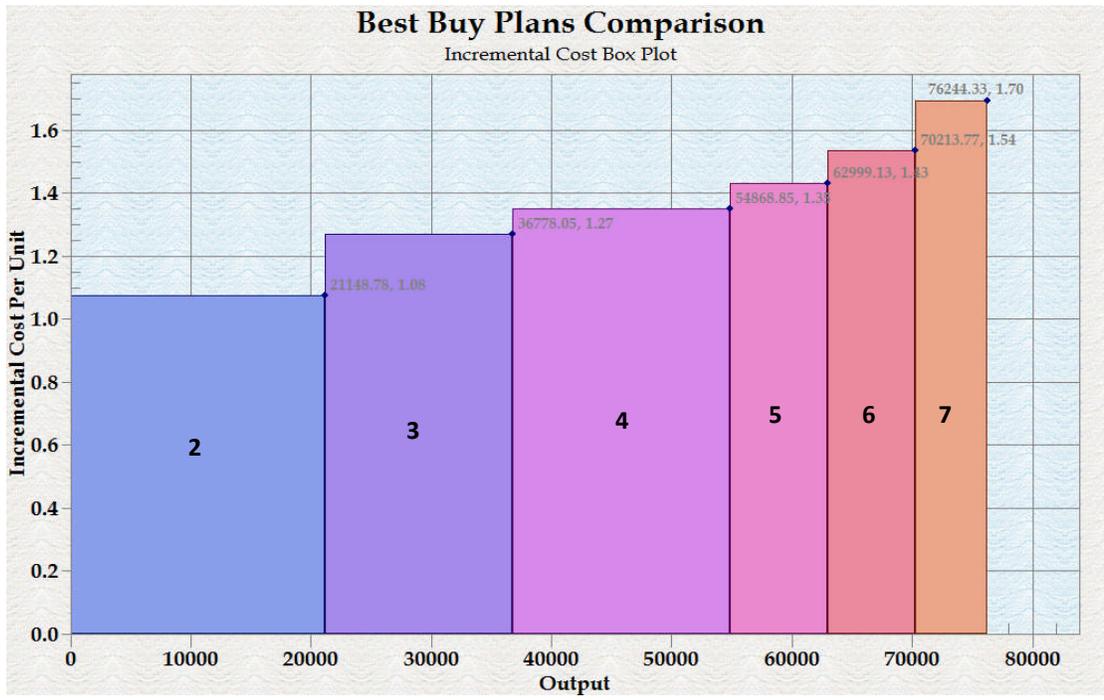
#	Plan	Tot. Cost (\$)	Ann. Cost (\$)	Output (HUs)	\$/HU	Inc. Cost (\$)	Inc. HUs	Inc. Cost per Inc. HU (\$)
1	No Action Plan	\$0	\$0	0	0	\$0	0	\$0.00
2	SN-SPC(0)-B	\$478,854	\$22,770	21,149	\$1.08	\$22,770	21,149	\$1.08
3	SN-SPC(0)-A SN-SPC(0)-B	\$895,943	\$42,603	36,778	\$1.16	\$19,833	15,629	\$1.27
4	SN-SPC(0)-A SN-SPC(0)-B SN-SPC(0)-C	\$1,410,184	\$67,056	54,869	\$1.22	\$24,453	18,091	\$1.35
5	SN-SPC(0)-B SN-SPC(0)-C SN-SPC(10)-D	\$1,655,043	\$78,699	62,999	\$1.25	\$11,643	8,130	\$1.43
6	SN-SPC(0)-C SN-SPC(10)-D SN-SPC(10)-E	\$1,887,944	\$89,774	70,214	\$1.28	\$11,075	7,215	\$1.54
7	SN-SPC(10)-D SN-SPC(10)-E SN-SPC(10)-F	\$2,102,940	\$99,997	76,244	\$1.31	\$10,223	6,031	\$1.70

**Measure Info**

Code	Measure	Begin Station	End Station	Length (ft)	Effective Area (Sq ft)
SN-SPC(0)-A	Sub on Clay (0% slope) - 1	7514+50	7519+50	500	18,000
SN-SPC(0)-B	Sub on Clay (0% slope) - 2	7519+50	7523+50	400	23,000
SN-SPC(0)-C	Sub on Clay (0% slope) - 3	7523+50	7527+50	400	25,000
SN-SPC(10)-D	Sub on Clay (10% slope) - 1	7514+50	7519+50	500	27,364
SN-SPC(10)-E	Sub on Clay (10% slope) - 2	7519+50	7523+50	400	30,846
SN-SPC(10)-F	Sub on Clay (10% slope) - 3	7523+50	7527+50	400	33,334







## Shortys South

## Basic

50 Period of Analysis (years)  
0.04125 FY 2011 Discount Rate

Note that this analysis is based on draft Costs and Habitat  
Outputs and should be considered preliminary.

## Costs

Code	Measure	Length (ft)	Effctv Area (sqft)	Ann Cost \$
SS-SPC(0)-A	Sub on Clay (0% slope) - 1	500	13,000	\$14,236
SS-SPC(0)-B	Sub on Clay (0% slope) - 2	500	18,500	\$19,271
SS-SPC(0)-C	Sub on Clay (0% slope) - 3	400	22,500	\$21,897
SS-SPC(0)-D	Sub on Clay (0% slope) - 4	400	33,000	\$29,449
SS-SPC(0)-E	Sub on Clay (0% slope) - 5	400	17,500	\$17,581
SS-SPC(10)-F	Sub on Clay (10% slope) - 1	500	27,861	\$25,045
SS-SPC(10)-G	Sub on Clay (10% slope) - 2	500	39,304	\$33,368
SS-SPC(10)-H	Sub on Clay (10% slope) - 3	400	38,309	\$36,745
SS-SPC(10)-I	Sub on Clay (10% slope) - 4	400	39,801	\$38,612
SS-SPC(10)-J	Sub on Clay (10% slope) - 5	400	29,354	\$25,686
SS-SPS-L	Sub on Clay Shelves - 1	400	37,493	\$18,658

## Benefits

Code	Measure	Net HS I	Tot Net HU s	AAHUs
SS-SPC(0)-A	Sub on Clay (0% slope) - 1	0.65	420,743	8,415
SS-SPC(0)-B	Sub on Clay (0% slope) - 2	0.73	674,573	13,491
SS-SPC(0)-C	Sub on Clay (0% slope) - 3	0.87	976,829	19,537
SS-SPC(0)-D	Sub on Clay (0% slope) - 4	0.83	1,372,317	27,446
SS-SPC(0)-E	Sub on Clay (0% slope) - 5	0.73	638,110	12,762
SS-SPC(10)-F	Sub on Clay (10% slope) - 1	0.65	901,719	18,034
SS-SPC(10)-G	Sub on Clay (10% slope) - 2	0.73	1,433,157	28,663
SS-SPC(10)-H	Sub on Clay (10% slope) - 3	0.87	1,663,168	33,263
SS-SPC(10)-I	Sub on Clay (10% slope) - 4	0.83	1,655,159	33,103
SS-SPC(10)-J	Sub on Clay (10% slope) - 5	0.73	1,070,332	21,407
SS-SPS-L	Sub on Clay Shelves - 1	0.69	1,297,038	25,941

## IWR Planning Suite Data

Code	Measure	Ann Cost (\$)	Output (HUs)	\$/HU
SS-SPC(0)-A	Sub on Clay (0% slope) - 1	\$14,236	8415	\$1.69
SS-SPC(0)-B	Sub on Clay (0% slope) - 2	\$19,271	13491	\$1.43
SS-SPC(0)-C	Sub on Clay (0% slope) - 3	\$21,897	19537	\$1.12
SS-SPC(0)-D	Sub on Clay (0% slope) - 4	\$29,449	27446	\$1.07
SS-SPC(0)-E	Sub on Clay (0% slope) - 5	\$17,581	12762	\$1.38
SS-SPC(10)-F	Sub on Clay (10% slope) - 1	\$25,045	18034	\$1.39
SS-SPC(10)-G	Sub on Clay (10% slope) - 2	\$33,368	28663	\$1.16
SS-SPC(10)-H	Sub on Clay (10% slope) - 3	\$36,745	33263	\$1.10
SS-SPC(10)-I	Sub on Clay (10% slope) - 4	\$38,612	33103	\$1.17
SS-SPC(10)-J	Sub on Clay (10% slope) - 5	\$25,686	21407	\$1.20
SS-SPS-L	Sub on Clay Shelves - 1	\$18,658	25941	\$0.72

## Relationships

Measure	Link	Measure
A	not combinable	F
B	not combinable	G
C	not combinable	H
D	not combinable	I
E	not combinable	J

## Shortys South Draft CEICA Results

## Cost Effective Plans

#	Plan	Tot. Cost (\$)	Ann. Cost (\$)	Output (HUs)	Cost Effective	\$/HU
1	No Action Plan	\$0	\$0	-	Best Buy	
2	A	\$299,392	\$14,236	8,415	Cost Effective	\$1.69
3	E	\$369,730	\$17,581	12,762	Cost Effective	\$1.38
4	L	\$392,382	\$18,658	25,941	Best Buy	\$0.72
5	D	\$619,320	\$29,449	27,446	Cost Effective	\$1.07
6	A-L	\$691,774	\$32,895	34,356	Cost Effective	\$0.96
7	E-L	\$762,112	\$36,239	38,703	Cost Effective	\$0.94
8	B-L	\$797,644	\$37,929	39,432	Cost Effective	\$0.96
9	C-L	\$852,872	\$40,555	45,477	Cost Effective	\$0.89
10	J-L	\$932,557	\$44,344	47,347	Cost Effective	\$0.94
11	D-L	\$1,011,702	\$48,107	53,387	Best Buy	\$0.90
12	G-L	\$1,094,112	\$52,026	54,604	Cost Effective	\$0.95
13	H-L	\$1,165,136	\$55,403	59,204	Cost Effective	\$0.94
14	A-D-L	\$1,311,094	\$62,344	61,802	Cost Effective	\$1.01
15	C-F-L	\$1,379,566	\$65,600	63,512	Cost Effective	\$1.03
16	D-E-L	\$1,381,432	\$65,688	66,149	Cost Effective	\$0.99
17	C-J-L	\$1,393,046	\$66,241	66,884	Cost Effective	\$0.99
18	E-G-L	\$1,463,842	\$69,607	67,366	Cost Effective	\$1.03
19	A-H-L	\$1,464,528	\$69,640	67,619	Cost Effective	\$1.03
20	C-D-L	\$1,472,192	\$70,004	72,924	Cost Effective	\$0.96
21	D-J-L	\$1,551,877	\$73,793	74,794	Cost Effective	\$0.99
22	G-J-L	\$1,634,287	\$77,712	76,011	Cost Effective	\$1.02
23	C-I-L	\$1,664,878	\$79,167	78,581	Cost Effective	\$1.01
24	H-J-L	\$1,705,310	\$81,089	80,611	Cost Effective	\$1.01
25	D-G-L	\$1,713,432	\$81,475	82,050	Cost Effective	\$0.99
26	D-H-L	\$1,784,455	\$84,853	86,650	Best Buy	\$0.98
27	G-H-L	\$1,866,866	\$88,771	87,867	Cost Effective	\$1.01
28	B-D-J-L	\$1,957,138	\$93,064	88,285	Cost Effective	\$1.05
29	H-I-L	\$1,977,142	\$94,015	92,307	Cost Effective	\$1.02
30	C-D-J-L	\$2,012,366	\$95,690	94,330	Cost Effective	\$1.01
31	D-E-G-L	\$2,083,162	\$99,056	94,812	Cost Effective	\$1.04
32	A-D-H-L	\$2,083,847	\$99,089	95,065	Cost Effective	\$1.04
33	C-G-J-L	\$2,094,777	\$99,609	95,547	Cost Effective	\$1.04
34	D-E-H-L	\$2,154,185	\$102,434	99,413	Cost Effective	\$1.03
35	C-D-G-L	\$2,173,922	\$103,372	101,587	Cost Effective	\$1.02
36	D-G-J-L	\$2,253,607	\$107,161	103,457	Cost Effective	\$1.04
37	D-F-H-L	\$2,311,149	\$109,897	104,685	Cost Effective	\$1.05
38	D-H-J-L	\$2,324,630	\$110,538	108,057	Cost Effective	\$1.02
39	G-H-J-L	\$2,407,040	\$114,457	109,274	Cost Effective	\$1.05
40	A-C-D-G-L	\$2,473,313	\$117,609	110,002	Cost Effective	\$1.07
41	D-G-H-L	\$2,486,186	\$118,221	115,314	Best Buy	\$1.03
42	A-D-H-J-L	\$2,624,022	\$124,775	116,472	Cost Effective	\$1.07
43	G-H-I-L	\$2,678,872	\$127,383	120,970	Cost Effective	\$1.05
44	C-D-G-J-L	\$2,714,096	\$129,058	122,993	Cost Effective	\$1.05
45	A-D-G-H-L	\$2,785,577	\$132,457	123,728	Cost Effective	\$1.07
46	D-F-H-J-L	\$2,851,324	\$135,583	126,091	Cost Effective	\$1.08
47	D-E-G-H-L	\$2,855,915	\$135,802	128,076	Cost Effective	\$1.06
48	C-G-I-J-L	\$2,906,783	\$138,220	128,650	Cost Effective	\$1.07
49	A-G-H-I-L	\$2,978,264	\$141,619	129,385	Cost Effective	\$1.09
50	D-F-G-H-L	\$3,012,880	\$143,265	133,348	Cost Effective	\$1.07
51	D-G-H-J-L	\$3,026,360	\$143,906	136,720	Best Buy	\$1.05
52	F-G-H-I-L	\$3,205,566	\$152,428	139,005	Cost Effective	\$1.10
53	G-H-I-J-L	\$3,219,047	\$153,069	142,377	Cost Effective	\$1.08
54	A-D-G-H-J-L	\$3,325,752	\$158,143	145,135	Cost Effective	\$1.09
55	D-E-F-G-H-L	\$3,382,609	\$160,846	146,110	Cost Effective	\$1.10
56	C-F-G-I-J-L	\$3,433,477	\$163,265	146,685	Cost Effective	\$1.11
57	A-G-H-I-J-L	\$3,518,439	\$167,305	150,792	Cost Effective	\$1.11
58	D-F-G-H-J-L	\$3,553,054	\$168,951	154,755	Best Buy	\$1.09
59	F-G-H-I-J-L	\$3,745,741	\$178,114	160,411	Best Buy	\$1.11

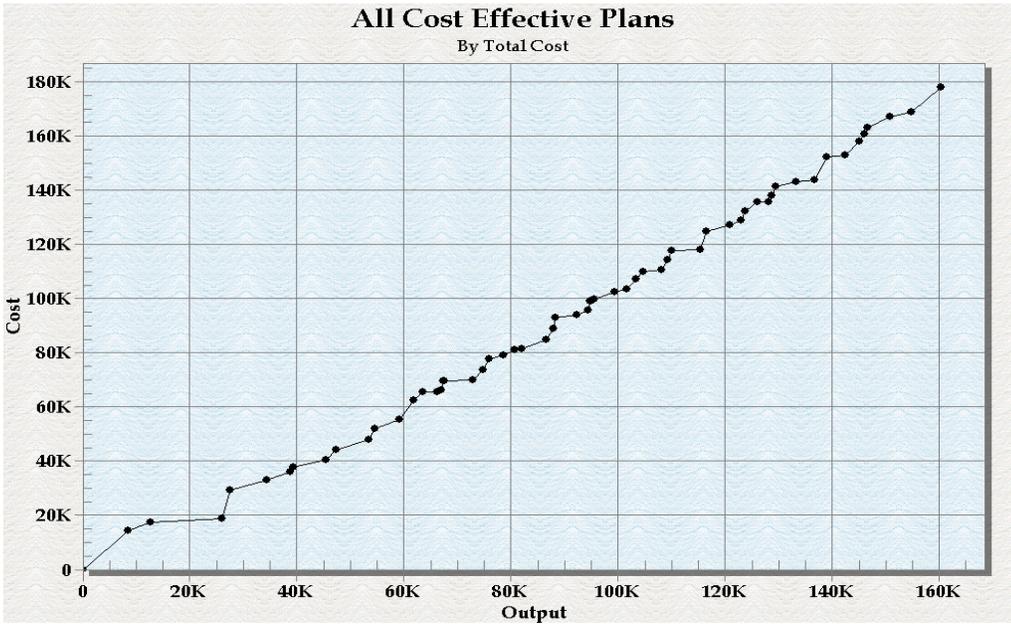
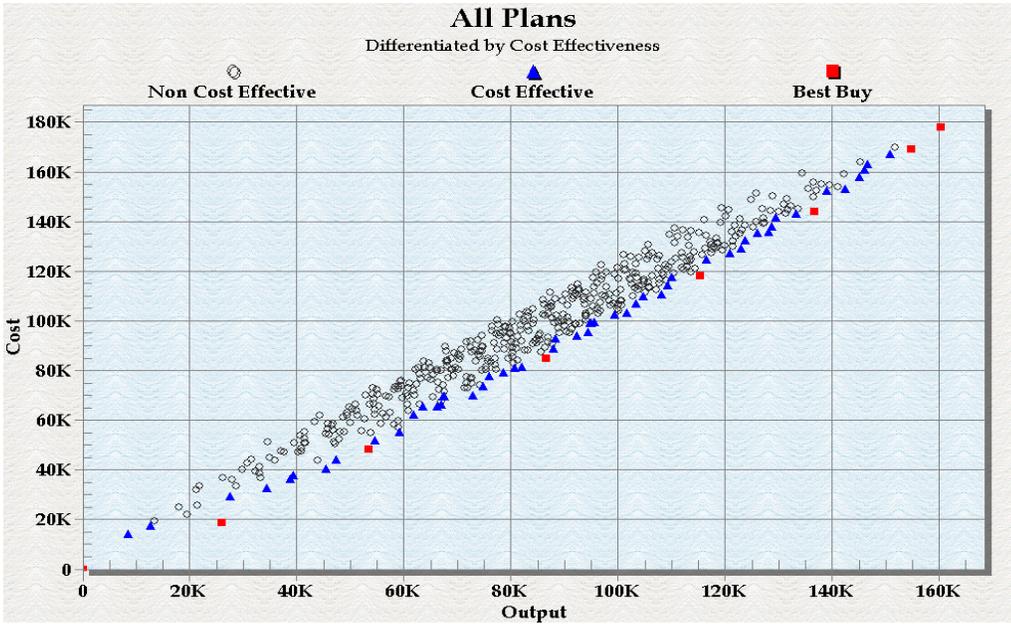
Shortys South Draft CEICA Results

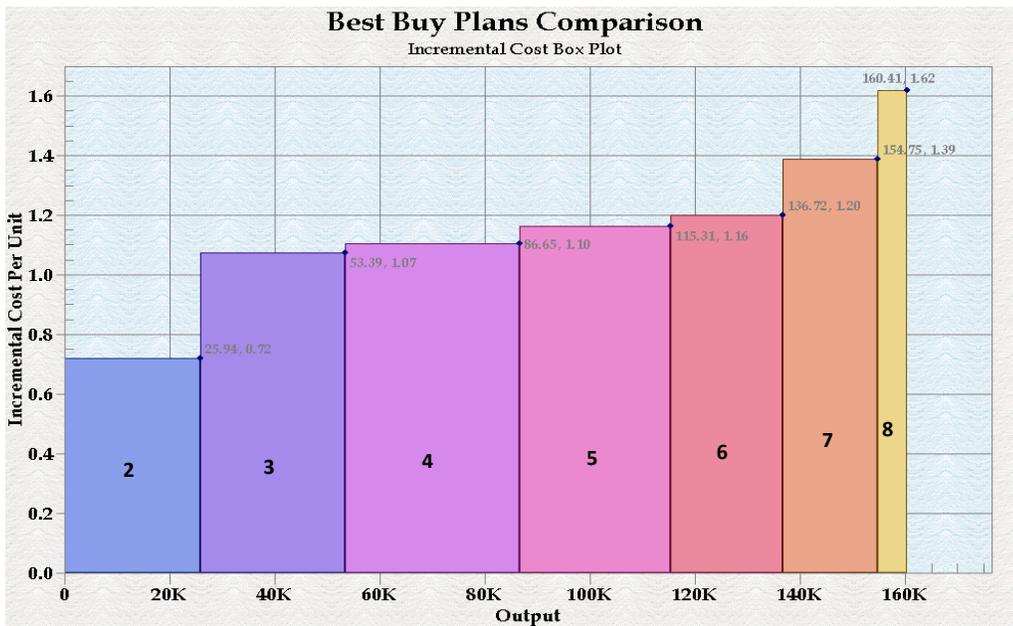
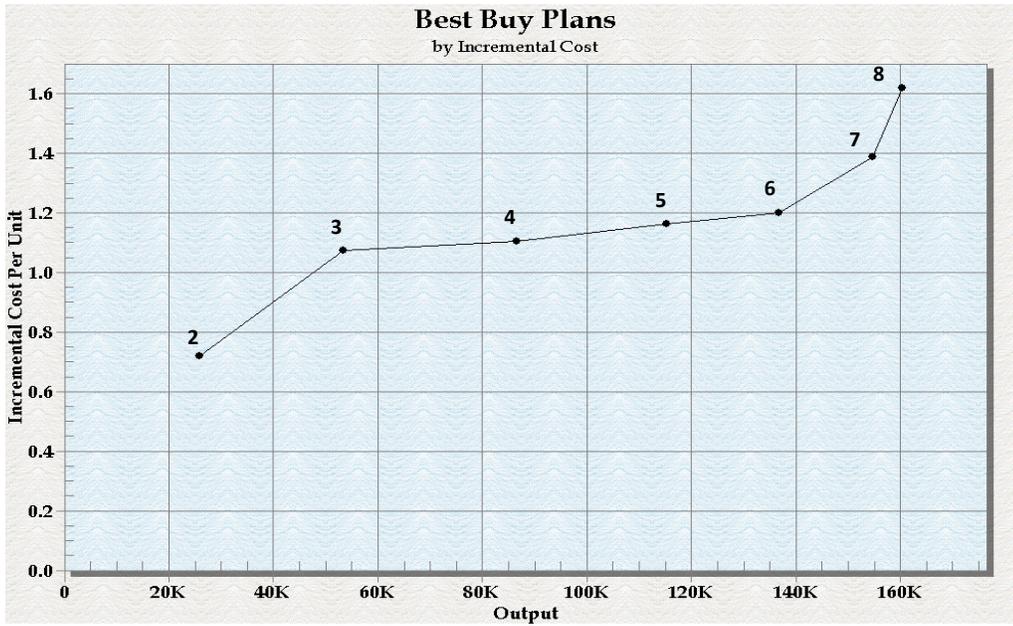
Best Buy Plans

#	Plan	Tot Cost (\$)	Ann. Cost (\$)	Output (HUs)	\$/HU	Inc. Cost (\$)	Inc. HUs	Inc. Cost per Inc. HU (\$)
1	No Action Plan	\$0	\$0	0	\$0	\$0	0	\$0.00
2	SS-SPS-L	\$392,382	\$18,658	25,941	\$0.72	\$18,658	25,941	\$0.72
3	SS-SPC(0)-D SS-SPS-L	\$1,011,702	\$48,107	53,387	\$0.90	\$29,449	27,446	\$1.07
4	SS-SPC(0)-D SS-SPC(10)-H SS-SPS-L	\$1,784,455	\$84,853	86,650	\$0.98	\$36,745	33,263	\$1.10
5	SS-SPC(0)-D SS-SPC(10)-G SS-SPC(10)-H SS-SPS-L	\$2,486,186	\$118,221	115,314	\$1.03	\$33,368	28,663	\$1.16
6	SS-SPC(0)-D SS-SPC(10)-G SS-SPC(10)-H SS-SPC(10)-J SS-SPS-L	\$3,026,360	\$143,906	136,720	\$1.05	\$25,686	21,407	\$1.20
7	SS-SPC(0)-D SS-SPC(10)-F SS-SPC(10)-G SS-SPC(10)-H SS-SPC(10)-J SS-SPS-L	\$3,553,054	\$168,951	154,755	\$1.09	\$25,045	18,034	\$1.39
8	SS-SPC(10)-F SS-SPC(10)-G SS-SPC(10)-H SS-SPC(10)-I SS-SPC(10)-J SS-SPS-L	\$3,745,741	\$178,114	160,411	\$1.11	\$9,162	5,657	\$1.62

Measure Info

Code	Measure	Begin Station	End Station	Length (ft)	Effective Area (Sq ft)
SS-SPC(0)-A	Sub on Clay (0% slope) - 1	7549+50	7554+50	500	13,000
SS-SPC(0)-B	Sub on Clay (0% slope) - 2	7554+50	7559+50	500	18,500
SS-SPC(0)-C	Sub on Clay (0% slope) - 3	7559+50	7563+50	400	22,500
SS-SPC(0)-D	Sub on Clay (0% slope) - 4	7570+50	7574+50	400	33,000
SS-SPC(0)-E	Sub on Clay (0% slope) - 5	7574+50	7578+50	400	17,500
SS-SPC(10)-F	Sub on Clay (10% slope) - 1	7549+50	7554+50	500	27,861
SS-SPC(10)-G	Sub on Clay (10% slope) - 2	7554+50	7559+50	500	39,304
SS-SPC(10)-H	Sub on Clay (10% slope) - 3	7559+50	7563+50	400	38,309
SS-SPC(10)-I	Sub on Clay (10% slope) - 4	7570+50	7574+50	400	39,801
SS-SPC(10)-J	Sub on Clay (10% slope) - 5	7574+50	7578+50	400	29,354
SS-SPS-L	Sub on Clay Shelves - 1	7566+50	7570+50	400	37,493







# Myrtle

**Basic**

50 Period of Analysis (years)
0.04125 FY 2011 Discount Rate

Note that this analysis is based on draft Costs and Habitat Outputs and should be considered preliminary.

**Costs**

Code	Measure	Length (ft)	Effctv Area (sqft)	Ann Cost \$
MC-SPS-K	Sub on Clay Shelves - 1	600	18,500	\$9,635
MC-SPS-L	Sub on Clay Shelves - 2	700	43,500	\$23,017

**Benefits**

Code	Measure	Net HSI	Tot Net HU s	AAHUs
MC-SPS-K	Sub on Clay Shelves - 1	0.50	462,130	9,243
MC-SPS-L	Sub on Clay Shelves - 2	0.63	1,370,250	27,405

**IWR Planning Suite Data**

Code	Measure	Ann Cost (\$)	Output (HUs)	\$/HU
MC-SPS-K	Sub on Clay Shelves - 1	\$9,635	9,243	\$1.04
MC-SPS-L	Sub on Clay Shelves - 2	\$23,017	27,405	\$0.84

**Relationships**

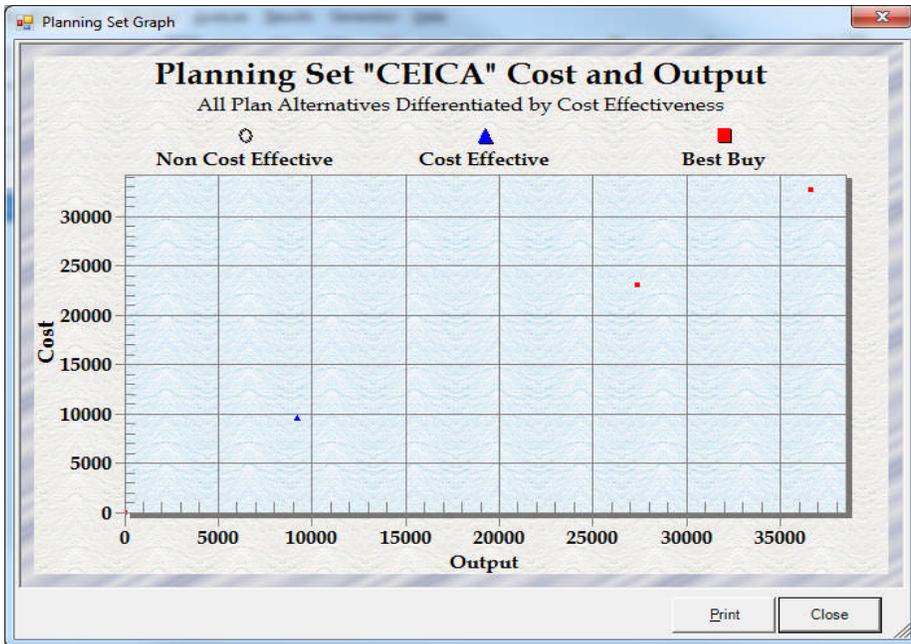
Measure	Link	Measure
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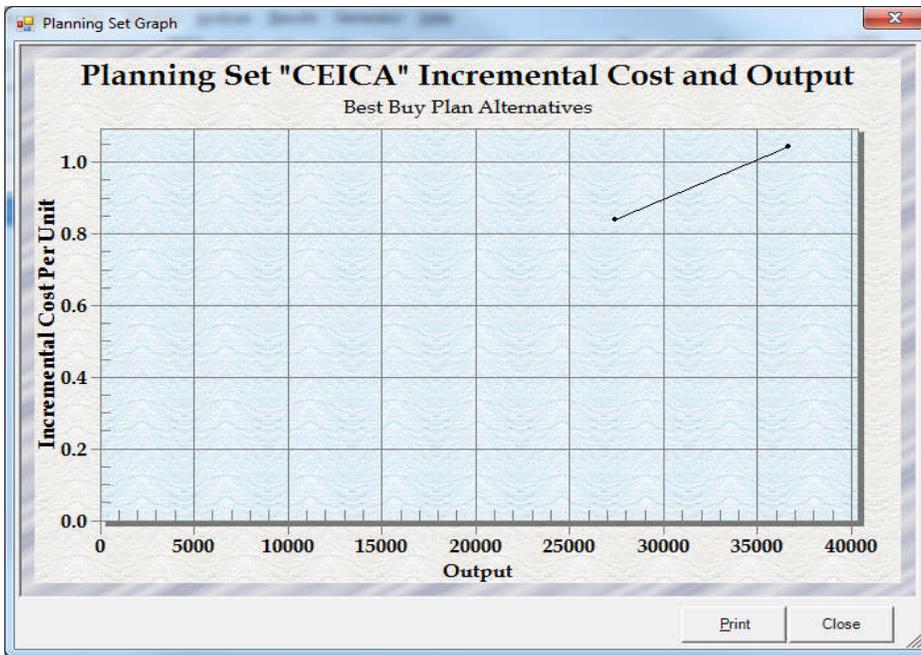
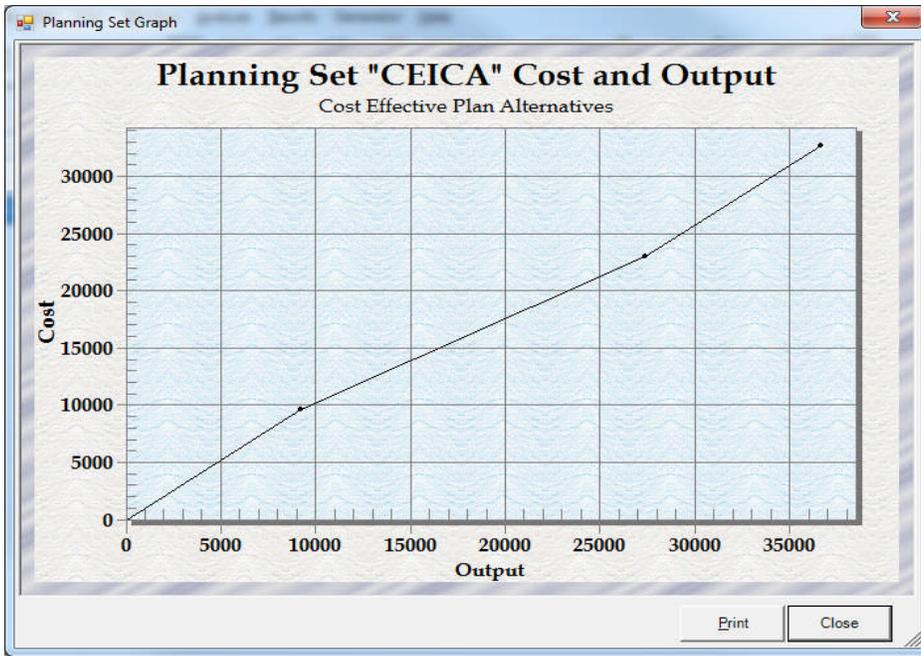
**Cost Effective Plans**

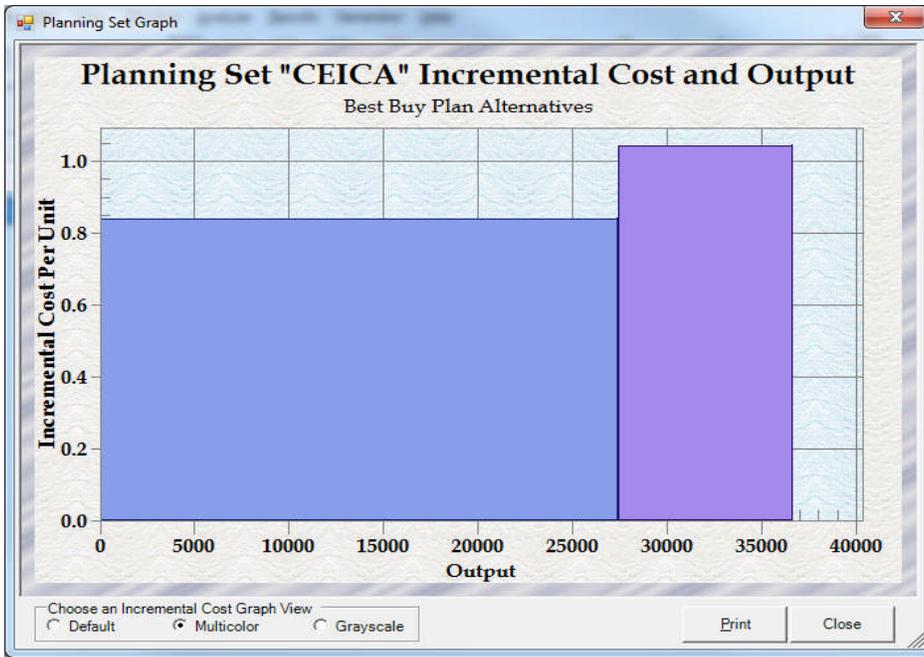
#	Plan	Tot Cost (\$)	Ann. Cost (\$)	Output (HUs)	Cost Effective	\$/HU
1	No Action Plan	\$0	\$0	-	Best Buy	
2	K	\$202,630	\$9,635	9,243	Cost Effective	\$1.04
3	L	\$484,048	\$23,017	27,405	Best Buy	\$0.84
4	K+L	\$686,677	\$32,652	36,648	Best Buy	\$0.89

**Best Buy Plans**

#	Plan	Tot. Cost (\$)	Ann. Cost (\$)	Output (HUs)	\$/HU	Inc. Cost (\$)	Inc. HUs	Inc. Cost per Inc. HU (\$)
1	No Action Plan	\$0	\$0	0	\$0	\$0	0	\$0.00
2	MC-SPS-L	\$484,048	\$23,017	27,405	\$0.84	\$23,017	27,405	\$0.84
3	MC-SPS-L MC-SPS-K	\$686,677	\$32,652	36,648	\$0.89	\$9,635	9,243	\$1.04









## DS of Refuge

## Basic

50 Period of Analysis (years)  
0.04125 FY 2011 Discount Rate

Note that this analysis is based on draft Costs and Habitat Outputs and should be considered preliminary.

## Costs

Code	Measure	Length (ft)	Effctv Area (sqft)	Ann Cost \$
DR-SPC(0)-A	Sub on Clay (0% slope) - 1	500	18,000	\$19,185
DR-SPC(0)-B	Sub on Clay (0% slope) - 2	500	16,500	\$16,103
DR-SPC(0)-C	Sub on Clay (0% slope) - 3	400	21,000	\$18,942
DR-SPC(0)-D	Sub on Clay (0% slope) - 4	500	35,000	\$32,266
DR-SPC(10)-E	Sub on Clay (10% slope) - 1	500	28,359	\$31,522
DR-SPC(10)-F	Sub on Clay (10% slope) - 2	500	22,388	\$25,938
DR-SPC(10)-G	Sub on Clay (10% slope) - 3	400	30,349	\$32,500
DR-SPC(10)-H	Sub on Clay (10% slope) - 4	500	45,772	\$47,808
DR-SPS-K	Sub on Clay Shelves - 1	300	19,320	\$9,931
DR-SPS-L	Sub on Clay Shelves - 2	100	3,360	\$1,728

## Benefits

Code	Measure	Net HS I	Tot Net HU s	AAHUs
DR-SPC(0)-A	Sub on Clay (0% slope) - 1	0.77	689,268	13,785
DR-SPC(0)-B	Sub on Clay (0% slope) - 2	0.71	589,573	11,791
DR-SPC(0)-C	Sub on Clay (0% slope) - 3	0.65	683,919	13,678
DR-SPC(0)-D	Sub on Clay (0% slope) - 4	0.61	1,061,824	21,236
DR-SPC(10)-E	Sub on Clay (10% slope) - 1	0.77	1,085,925	21,719
DR-SPC(10)-F	Sub on Clay (10% slope) - 2	0.71	799,973	15,999
DR-SPC(10)-G	Sub on Clay (10% slope) - 3	0.65	988,381	19,768
DR-SPC(10)-H	Sub on Clay (10% slope) - 4	0.61	1,388,615	27,772
DR-SPS-K	Sub on Clay Shelves - 1	0.41	394,192	7,884
DR-SPS-L	Sub on Clay Shelves - 2	0.42	69,924	1,398

## IWR Planning Suite Data

Code	Measure	Ann Cost (\$)	Output (HUs)	\$/HU
DR-SPC(0)-A	Sub on Clay (0% slope) - 1	\$19,185	13,785	\$1.39
DR-SPC(0)-B	Sub on Clay (0% slope) - 2	\$16,103	11,791	\$1.37
DR-SPC(0)-C	Sub on Clay (0% slope) - 3	\$18,942	13,678	\$1.38
DR-SPC(0)-D	Sub on Clay (0% slope) - 4	\$32,266	21,236	\$1.52
DR-SPC(10)-E	Sub on Clay (10% slope) - 1	\$31,522	21,719	\$1.45
DR-SPC(10)-F	Sub on Clay (10% slope) - 2	\$25,938	15,999	\$1.62
DR-SPC(10)-G	Sub on Clay (10% slope) - 3	\$32,500	19,768	\$1.64
DR-SPC(10)-H	Sub on Clay (10% slope) - 4	\$47,808	27,772	\$1.72
DR-SPS-K	Sub on Clay Shelves - 1	\$9,931	7,884	\$1.26
DR-SPS-L	Sub on Clay Shelves - 2	\$1,728	1,398	\$1.24

## Relationships

Measure	Link	Measure
A	not combinable	E
B	not combinable	F
C	not combinable	G
D	not combinable	H

DS of Refuge Draft CEICA Results

Cost Effective Plans

#	Plan	Tot. Cost (\$)	Ann. Cost (\$)	Output (HUs)	Cost Effective	\$/HU
1	No Action Plan	\$0	\$0	0	Best Buy	\$0.00
2	L	\$36,336	\$1,728	1,398	Best Buy	\$1.24
3	K	\$208,844	\$9,931	7,884	Cost Effective	\$1.26
4	K-L	\$245,180	\$11,659	9,282	Best Buy	\$1.26
5	B	\$338,648	\$16,103	11,791	Cost Effective	\$1.37
6	B-L	\$374,983	\$17,831	13,190	Cost Effective	\$1.35
7	C	\$398,348	\$18,942	13,678	Cost Effective	\$1.38
8	A	\$403,455	\$19,185	13,785	Cost Effective	\$1.39
9	C-L	\$434,683	\$20,670	15,077	Cost Effective	\$1.37
10	A-L	\$439,791	\$20,912	15,184	Cost Effective	\$1.38
11	F	\$545,481	\$25,938	15,999	Cost Effective	\$1.62
12	B-K	\$547,492	\$26,034	19,675	Cost Effective	\$1.32
13	B-K-L	\$583,828	\$27,762	21,074	Best Buy	\$1.32
14	C-K	\$607,192	\$28,873	21,562	Cost Effective	\$1.34
15	A-K	\$612,300	\$29,115	21,669	Cost Effective	\$1.34
16	C-K-L	\$643,528	\$30,600	22,961	Cost Effective	\$1.33
17	A-K-L	\$648,635	\$30,843	23,068	Cost Effective	\$1.34
18	E-L	\$699,244	\$33,250	23,117	Cost Effective	\$1.44
19	B-C	\$736,996	\$35,045	25,470	Cost Effective	\$1.38
20	A-B	\$742,103	\$35,288	25,577	Cost Effective	\$1.38
21	B-C-L	\$773,331	\$36,773	26,868	Cost Effective	\$1.37
22	A-B-L	\$778,439	\$37,016	26,975	Cost Effective	\$1.37
23	A-C	\$801,803	\$38,127	27,464	Cost Effective	\$1.39
24	A-C-L	\$838,139	\$39,854	28,862	Cost Effective	\$1.38
25	E-K	\$871,753	\$41,453	29,602	Cost Effective	\$1.40
26	E-K-L	\$908,088	\$43,181	31,001	Cost Effective	\$1.39
27	B-C-K	\$945,840	\$44,976	33,354	Cost Effective	\$1.35
28	A-B-K	\$950,947	\$45,218	33,461	Cost Effective	\$1.35
29	B-C-K-L	\$982,175	\$46,703	34,752	Best Buy	\$1.34
30	A-B-K-L	\$987,283	\$46,946	34,859	Cost Effective	\$1.35
31	A-C-K	\$1,010,647	\$48,057	35,348	Cost Effective	\$1.36
32	A-C-K-L	\$1,046,983	\$49,785	36,746	Cost Effective	\$1.35
33	C-E-L	\$1,097,592	\$52,192	36,795	Cost Effective	\$1.42
34	A-B-C	\$1,140,451	\$54,230	39,255	Cost Effective	\$1.38
35	A-B-C-L	\$1,176,787	\$55,957	40,654	Cost Effective	\$1.38
36	B-E-K	\$1,210,401	\$57,556	41,394	Cost Effective	\$1.39
37	B-E-K-L	\$1,246,736	\$59,284	42,792	Cost Effective	\$1.39
38	C-E-K	\$1,270,101	\$60,395	43,281	Cost Effective	\$1.40
39	C-E-K-L	\$1,306,436	\$62,122	44,679	Cost Effective	\$1.39
40	A-B-C-K	\$1,349,295	\$64,160	47,139	Cost Effective	\$1.36
41	A-B-C-K-L	\$1,385,631	\$65,888	48,538	Best Buy	\$1.36
42	B-C-E-L	\$1,436,240	\$68,295	48,587	Cost Effective	\$1.41
43	A-C-D	\$1,480,359	\$70,393	48,700	Cost Effective	\$1.45
44	A-C-D-L	\$1,516,694	\$72,120	50,099	Cost Effective	\$1.44
45	D-E-K	\$1,550,309	\$73,719	50,839	Cost Effective	\$1.45
46	A-C-F-K	\$1,556,129	\$73,995	51,347	Cost Effective	\$1.44
47	D-E-K-L	\$1,586,644	\$75,447	52,237	Cost Effective	\$1.44
48	A-C-F-K-L	\$1,592,464	\$75,723	52,746	Cost Effective	\$1.44

DS of Refuge Draft CEICA Results

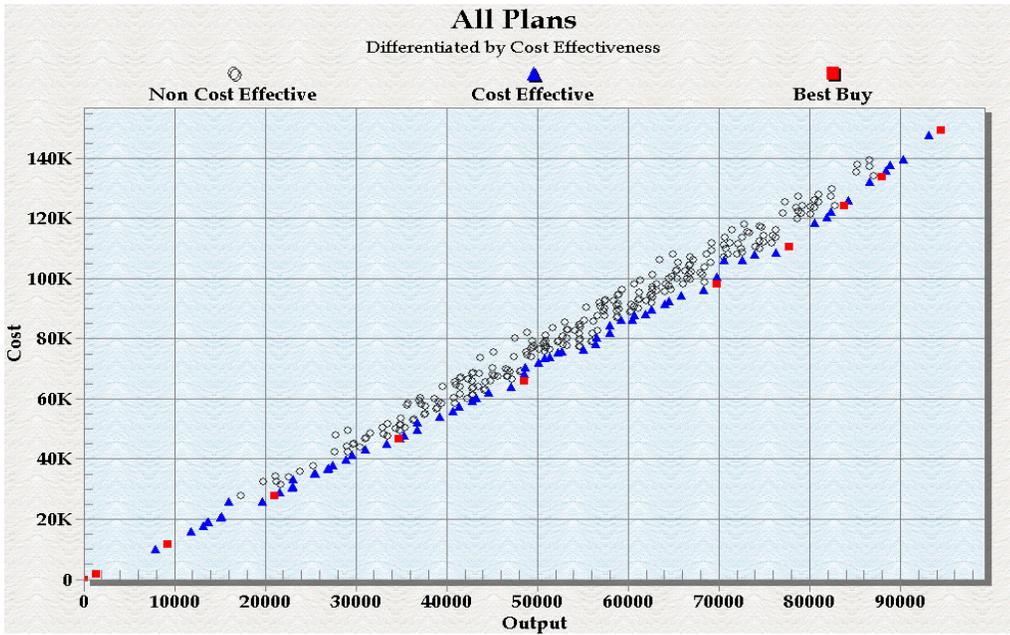
49	B-C-E-K	\$1,608,749	\$76,498	55,072	Cost Effective	\$1.39
50	B-C-E-K-L	\$1,645,084	\$78,225	56,471	Cost Effective	\$1.39
51	A-C-D-K	\$1,689,203	\$80,323	56,584	Cost Effective	\$1.42
52	A-C-D-K-L	\$1,725,539	\$82,051	57,983	Cost Effective	\$1.42
53	C-D-E-L	\$1,776,148	\$84,458	58,032	Cost Effective	\$1.46
54	C-E-F-K	\$1,815,582	\$86,333	59,280	Cost Effective	\$1.46
55	A-B-C-D	\$1,819,007	\$86,496	60,492	Cost Effective	\$1.43
56	C-E-F-K-L	\$1,851,917	\$88,061	60,679	Cost Effective	\$1.45
57	A-B-C-D-L	\$1,855,342	\$88,223	61,890	Cost Effective	\$1.43
58	B-D-E-K	\$1,888,957	\$89,822	62,630	Cost Effective	\$1.43
59	B-D-E-K-L	\$1,925,292	\$91,550	64,029	Cost Effective	\$1.43
60	C-D-E-K	\$1,948,657	\$92,661	64,517	Cost Effective	\$1.44
61	C-D-E-K-L	\$1,984,992	\$94,388	65,916	Cost Effective	\$1.43
62	A-B-C-D-K	\$2,027,851	\$96,426	68,376	Cost Effective	\$1.41
63	A-B-C-D-K-L	\$2,064,187	\$98,154	69,774	Best Buy	\$1.41
64	B-C-D-E-L	\$2,114,796	\$100,561	69,823	Cost Effective	\$1.44
65	D-E-G-K	\$2,233,775	\$106,218	70,606	Cost Effective	\$1.50
66	A-C-D-F-K	\$2,234,684	\$106,261	72,584	Cost Effective	\$1.46
67	A-C-D-F-K-L	\$2,271,020	\$107,989	73,982	Cost Effective	\$1.46
68	B-C-D-E-K	\$2,287,304	\$108,764	76,309	Cost Effective	\$1.43
69	B-C-D-E-K-L	\$2,323,640	\$110,491	77,707	Best Buy	\$1.42
70	C-D-E-F-K	\$2,494,138	\$118,599	80,517	Cost Effective	\$1.47
71	C-D-E-F-K-L	\$2,530,473	\$120,327	81,915	Cost Effective	\$1.47
72	B-D-E-G-K	\$2,572,423	\$122,321	82,398	Cost Effective	\$1.48
73	B-D-E-G-K-L	\$2,608,759	\$124,049	83,796	Best Buy	\$1.48
74	B-C-E-H-K-L	\$2,650,490	\$126,033	84,243	Cost Effective	\$1.50
75	D-E-F-G-K	\$2,779,256	\$132,156	86,606	Cost Effective	\$1.53
76	D-E-F-G-K-L	\$2,815,592	\$133,884	88,004	Best Buy	\$1.52
77	C-E-F-H-K-L	\$2,857,323	\$135,869	88,451	Cost Effective	\$1.54
78	B-E-G-H-K	\$2,899,273	\$137,863	88,934	Cost Effective	\$1.55
79	B-E-G-H-K-L	\$2,935,609	\$139,591	90,332	Cost Effective	\$1.55
80	E-F-G-H-K	\$3,106,106	\$147,698	93,142	Cost Effective	\$1.59
81	E-F-G-H-K-L	\$3,142,442	\$149,426	94,540	Best Buy	\$1.58

Best Buy Plans

#	Plan	Tot Cost (\$)	Ann. Cost (\$)	Output (HUs)	\$/HU	Inc. Cost (\$)	Inc. HUs	Inc. Cost per
1	No Action Plan	\$0	\$0	0	\$0.00	\$0	0	\$0.00
2	DR-SPS-L	\$36,336	\$1,728	1,398	\$1.24	\$1,728	1,398	\$1.24
3	DR-SPS-K	\$245,180	\$11,659	9,282	\$1.26	\$9,931	7,884	\$1.26
	DR-SPS-L							
4	DR-SPC(0)-B	\$583,828	\$27,762	21,074	\$1.32	\$16,103	11,791	\$1.37
	DR-SPS-K							
	DR-SPS-L							
5	DR-SPC(0)-B	\$982,175	\$46,703	34,752	\$1.34	\$18,942	13,678	\$1.38
	DR-SPC(0)-C							
	DR-SPS-K							
	DR-SPS-L							
6	DR-SPC(0)-A	\$1,385,631	\$65,888	48,538	\$1.36	\$19,185	13,785	\$1.39
	DR-SPC(0)-B							
	DR-SPC(0)-C							
	DR-SPS-K							
	DR-SPS-L							
7	DR-SPC(0)-A	\$2,064,187	\$98,154	69,774	\$1.41	\$32,266	21,236	\$1.52
	DR-SPC(0)-B							
	DR-SPC(0)-C							
	DR-SPC(0)-D							
	DR-SPS-K							
	DR-SPS-L							
8	DR-SPC(0)-B	\$2,323,640	\$110,491	77,707	\$1.42	\$12,337	7,933	\$1.56
	DR-SPC(0)-C							
	DR-SPC(0)-D							
	DR-SPC(10)-E							
	DR-SPS-K							
	DR-SPS-L							
	9							
DR-SPC(0)-D								
DR-SPC(10)-E								
DR-SPC(10)-G								
DR-SPS-K								
DR-SPS-L								
10	DR-SPC(0)-D	\$2,815,592	\$133,884	88,004	\$1.52	\$9,835	4,208	\$2.34
	DR-SPC(10)-E							
	DR-SPC(10)-F							
	DR-SPC(10)-G							
	DR-SPS-K							
	DR-SPS-L							
11	DR-SPC(10)-E	\$3,142,442	\$149,426	94,540	\$1.58	\$15,542	6,536	\$2.38
	DR-SPC(10)-F							
	DR-SPC(10)-G							
	DR-SPC(10)-H							
	DR-SPS-K							
	DR-SPS-L							

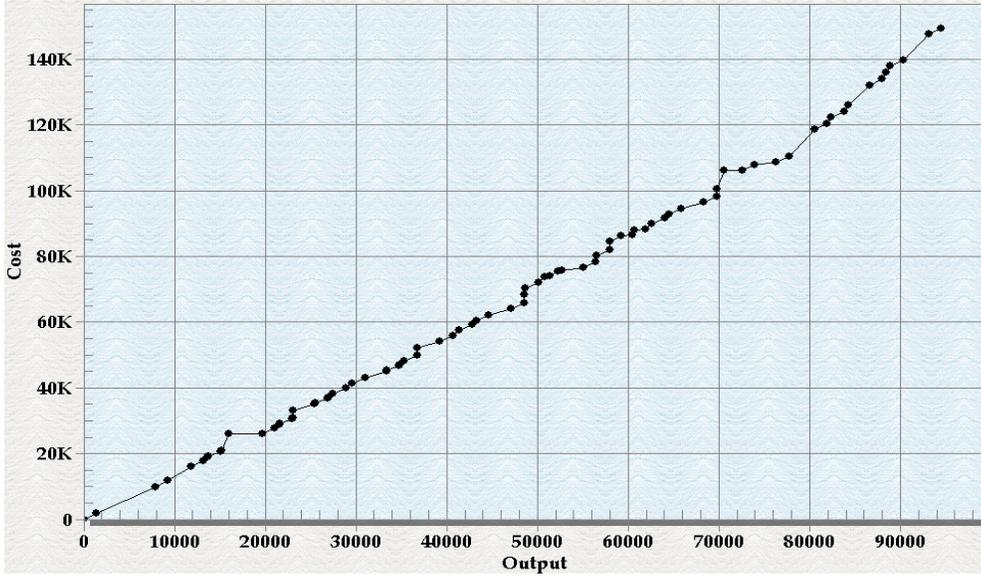
Measure Info

Code	Measure	Begin Station	End Station	Length (ft)	Effective Area (Sq ft)
DR-SPC(0)-A	Sub on Clay (0% slope) - 1	7725+50	7730+50	500	18,000
DR-SPC(0)-B	Sub on Clay (0% slope) - 2	7741+50	7746+50	500	16,500
DR-SPC(0)-C	Sub on Clay (0% slope) - 3	7767+50	7771+50	400	21,000
DR-SPC(0)-D	Sub on Clay (0% slope) - 4	7771+50	7776+50	500	35,000
DR-SPC(10)-E	Sub on Clay (10% slope) - 1	7725+50	7730+50	500	28,359
DR-SPC(10)-F	Sub on Clay (10% slope) - 2	7741+50	7746+50	500	22,388
DR-SPC(10)-G	Sub on Clay (10% slope) - 3	7767+50	7771+50	400	30,349
DR-SPC(10)-H	Sub on Clay (10% slope) - 4	7771+50	7776+50	500	45,772
DR-SPS-K	Sub on Clay Shelves - 1	7733+50	7736+50	300	19,320
DR-SPS-L	Sub on Clay Shelves - 2	7737+50	7738+50	100	3,360



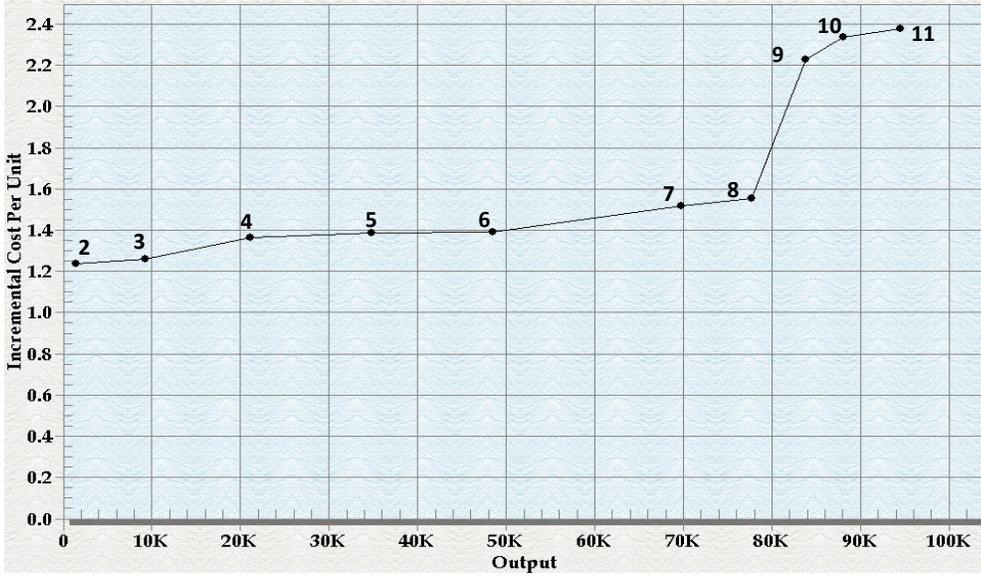
### All Cost Effective Plans

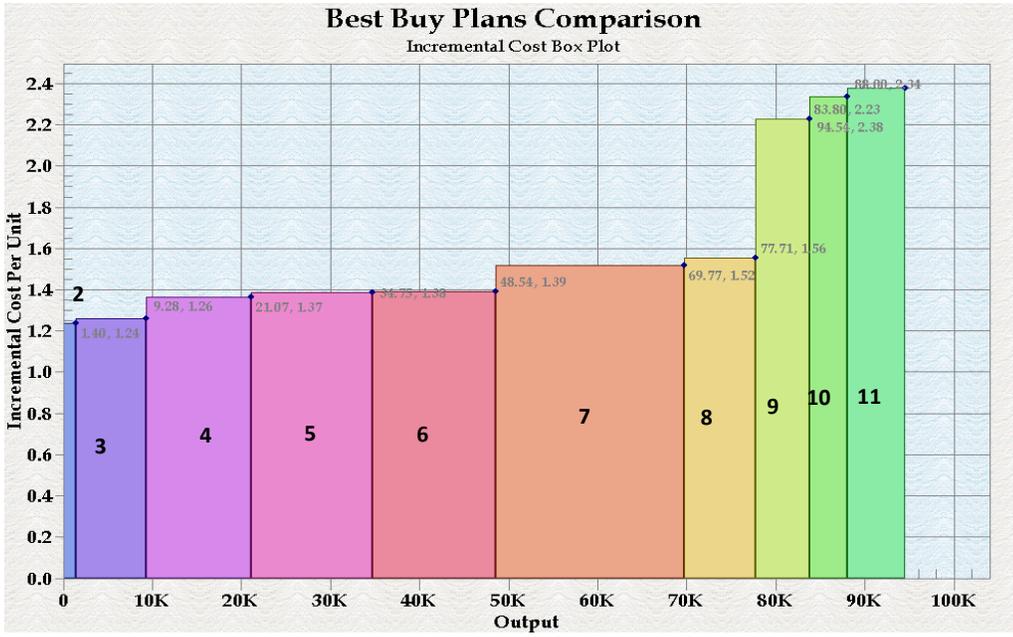
by Total Cost



### Best Buy Plans

by Incremental Cost







**Refuge**

**Basic**

50 Period of Analysis (years)
0.04125 FY 2011 Discount Rate

**Note that this analysis is based on draft Costs and Habitat Outputs and should be considered preliminary.**

**Costs**

Code	Measure	Length (ft)	Effctv Area (sqft)	Ann Cost \$
RF-SPC(0)-A	Sub on Clay (0% slope) - 1	700	26000	\$26,817
RF-SPE-B	Sub on Existing Gravel - 1	300	8500	\$4,122
RF-SPE-C	Sub on Existing Gravel - 2	500	37000	\$17,941
RF-SPE-D	Sub on Existing Gravel - 3	200	8000	\$3,879
RF-EES-E	Sub Enhancement - 1	300	8500	\$2,630
RF-EES-F	Sub Enhancement - 2	500	37000	\$11,450
RF-EES-G	Sub Enhancement - 3	200	8000	\$2,476

**Benefits**

Code	Measure	Net HS I	Tot Net HU s	AAHUs
RF-SPC(0)-A	Sub on Clay (0% slope) - 1	0.62	804,595	16,092
RF-SPE-B	Sub on Existing Gravel - 1	0.39	198,429	3,969
RF-SPE-C	Sub on Existing Gravel - 2	0.53	1,111,250	22,225
RF-SPE-D	Sub on Existing Gravel - 3	0.42	199,730	3,995
RF-EES-E	Sub Enhancement - 1	0.00	33,292	666
RF-EES-F	Sub Enhancement - 2	0.00	144,917	2,898
RF-EES-G	Sub Enhancement - 3	0.00	31,333	627

**IWR Planning Suite Data**

Code	Measure	Ann Cost (\$)	Output (HUs)	\$/HU
RF-SPC(0)-A	Sub on Clay (0% slope) - 1	\$26,817	16,092	\$1.67
RF-SPE-B	Sub on Existing Gravel - 1	\$4,122	3,969	\$1.04
RF-SPE-C	Sub on Existing Gravel - 2	\$17,941	22,225	\$0.81
RF-SPE-D	Sub on Existing Gravel - 3	\$3,879	3,995	\$0.97
RF-EES-E	Sub Enhancement - 1	\$2,630	666	\$3.95
RF-EES-F	Sub Enhancement - 2	\$11,450	2,898	\$3.95
RF-EES-G	Sub Enhancement - 3	\$2,476	627	\$3.95

**Relationships**

none

Refuge Draft CEICA Results

Cost Effective Plans

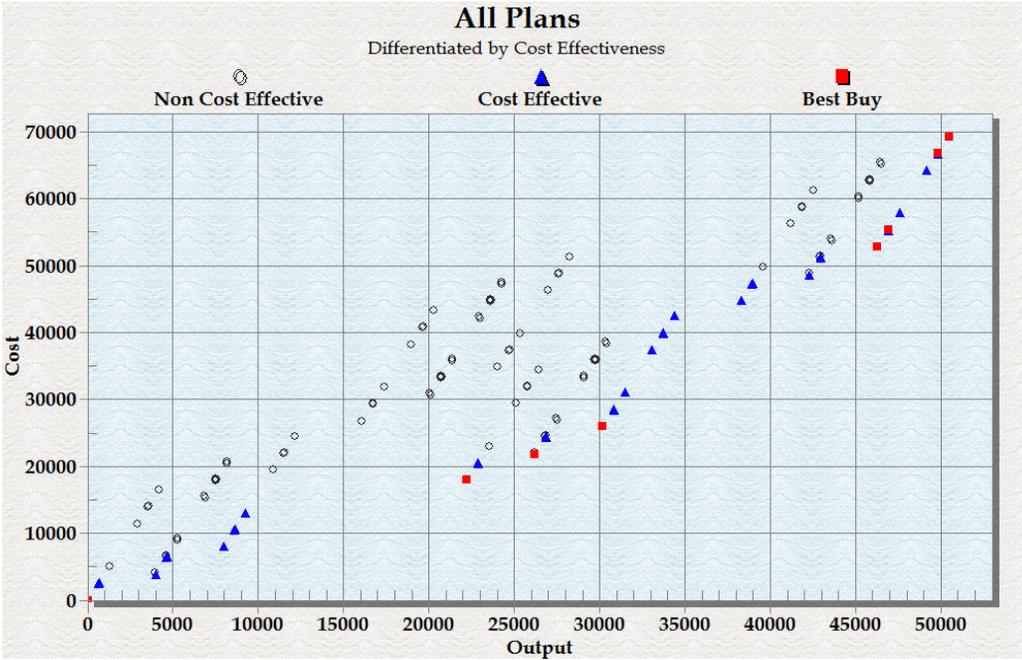
#	Plan	Tot Cost (\$)	Ann. Cost (\$)	Output (HUs)	Cost Effective	\$/HU
1	No Action Plan	\$0	\$0	0	Best Buy	
2	G	\$52,062	\$2,476	627	Cost Effective	\$3.95
3	E	\$55,316	\$2,630	666	Cost Effective	\$3.95
4	D	\$81,580	\$3,879	3,995	Cost Effective	\$0.97
5	D-G	\$133,642	\$6,355	4,621	Cost Effective	\$1.38
6	D-E	\$136,896	\$6,510	4,660	Cost Effective	\$1.40
7	B-D	\$168,259	\$8,001	7,963	Cost Effective	\$1.00
8	B-D-G	\$220,320	\$10,476	8,590	Cost Effective	\$1.22
9	B-D-E	\$223,574	\$10,631	8,629	Cost Effective	\$1.23
10	B-D-E-G	\$275,636	\$13,107	9,256	Cost Effective	\$1.42
11	C	\$377,307	\$17,941	22,225	Best Buy	\$0.81
12	C-G	\$429,369	\$20,417	22,852	Cost Effective	\$0.89
13	C-E	\$432,623	\$20,572	22,891	Cost Effective	\$0.90
14	C-D	\$458,887	\$21,821	26,220	Best Buy	\$0.83
15	C-D-G	\$510,949	\$24,296	26,846	Cost Effective	\$0.91
16	C-D-E	\$514,203	\$24,451	26,885	Cost Effective	\$0.91
17	B-C-D	\$545,566	\$25,942	30,188	Best Buy	\$0.86
18	B-C-D-G	\$597,628	\$28,418	30,815	Cost Effective	\$0.92
19	B-C-D-E	\$600,882	\$28,573	30,854	Cost Effective	\$0.93
20	B-C-D-E-G	\$652,943	\$31,048	31,481	Cost Effective	\$0.99
21	B-C-D-F	\$786,351	\$37,392	33,087	Cost Effective	\$1.13
22	B-C-D-F-G	\$838,413	\$39,867	33,713	Cost Effective	\$1.18
23	B-C-D-E-F	\$841,667	\$40,022	33,752	Cost Effective	\$1.19
24	B-C-D-E-F-G	\$893,729	\$42,498	34,379	Cost Effective	\$1.24
25	A-C	\$941,271	\$44,758	38,317	Cost Effective	\$1.17
26	A-C-G	\$993,333	\$47,234	38,944	Cost Effective	\$1.21
27	A-C-E	\$996,587	\$47,389	38,983	Cost Effective	\$1.22
28	A-C-D	\$1,022,851	\$48,638	42,311	Cost Effective	\$1.15
29	A-C-D-G	\$1,074,913	\$51,113	42,938	Cost Effective	\$1.19
30	A-C-D-E	\$1,078,167	\$51,268	42,977	Cost Effective	\$1.19
31	A-B-C-D	\$1,109,530	\$52,759	46,280	Best Buy	\$1.14
32	A-B-C-D-G	\$1,161,592	\$55,235	46,907	Cost Effective	\$1.18
33	A-B-C-D-E	\$1,164,846	\$55,390	46,946	Best Buy	\$1.18
34	A-B-C-D-E-G	\$1,216,907	\$57,865	47,573	Cost Effective	\$1.22
35	A-B-C-D-F	\$1,350,315	\$64,209	49,178	Cost Effective	\$1.31
36	A-B-C-D-F-G	\$1,402,377	\$66,684	49,805	Cost Effective	\$1.34
37	A-B-C-D-E-F	\$1,405,631	\$66,839	49,844	Best Buy	\$1.34
38	A-B-C-D-E-F-G	\$1,457,692	\$69,315	50,471	Best Buy	\$1.37

Best Buy Plans

#	Plan	Tot Cost (\$)	Ann. Cost (\$)	Output (HUs)	\$/HU	Inc. Cost (\$)	Inc. HUs	Inc. Cost per Inc. HU (\$)
1	No Action Plan	\$0	\$0	0	\$0.00	\$0	0	\$0.00
2	RF-SPE-C	\$377,307	\$17,941	22,225	\$0.81	\$17,941	22,225	\$0.81
3	RF-SPE-C RF-SPE-D	\$458,887	\$21,821	26,220	\$0.83	\$3,879	3,995	\$0.97
4	RF-SPE-B RF-SPE-C RF-SPE-D	\$545,566	\$25,942	30,188	\$0.86	\$4,122	3,969	\$1.04
5	RF-SPC(0)-A RF-SPE-B RF-SPE-C RF-SPE-D	\$1,109,530	\$52,759	46,280	\$1.14	\$26,817	16,092	\$1.67
6	RF-SPC(0)-A RF-SPE-B RF-SPE-C RF-SPE-D RF-EES-E	\$1,164,846	\$55,390	46,946	\$1.18	\$2,630	666	\$3.95
7	RF-SPC(0)-A RF-SPE-B RF-SPE-C RF-SPE-D RF-EES-E RF-EES-F	\$1,405,631	\$66,839	49,844	\$1.34	\$11,450	2,898	\$3.95
8	RF-SPC(0)-A RF-SPE-B RF-SPE-C RF-SPE-D RF-EES-E RF-EES-F RF-EES-G	\$1,457,692	\$69,315	50,471	\$1.37	\$2,476	627	\$3.95

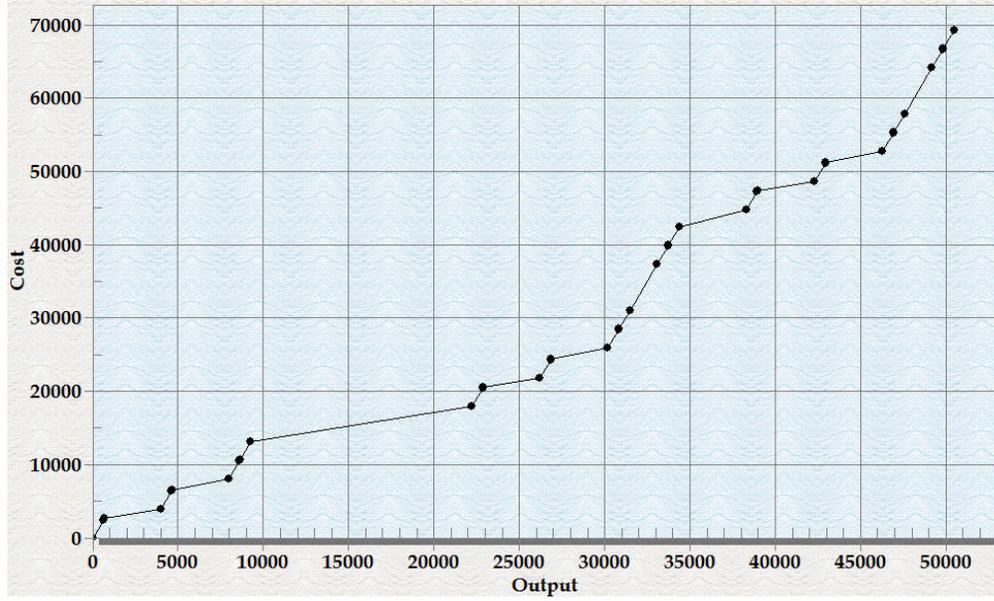
Measure Info

Code	Measure	Begin Station	End Station	Length (ft)	Effective Area (Sq ft)
RF-SPC(0)-A	Sub on Clay (0% slope) - 1	7847+50	7854+50	700	26,000
RF-SPE-B	Sub on Existing Gravel - 1	7859+50	7862+50	300	8,500
RF-SPE-C	Sub on Existing Gravel - 2	7862+50	7867+50	500	37,000
RF-SPE-D	Sub on Existing Gravel - 3	7867+50	7869+50	200	8,000
RF-EES-E	Sub Enhancement - 1	7859+50	7862+50	300	8,500
RF-EES-F	Sub Enhancement - 2	7862+50	7867+50	500	37,000
RF-EES-G	Sub Enhancement - 3	7867+50	7869+50	200	8,000



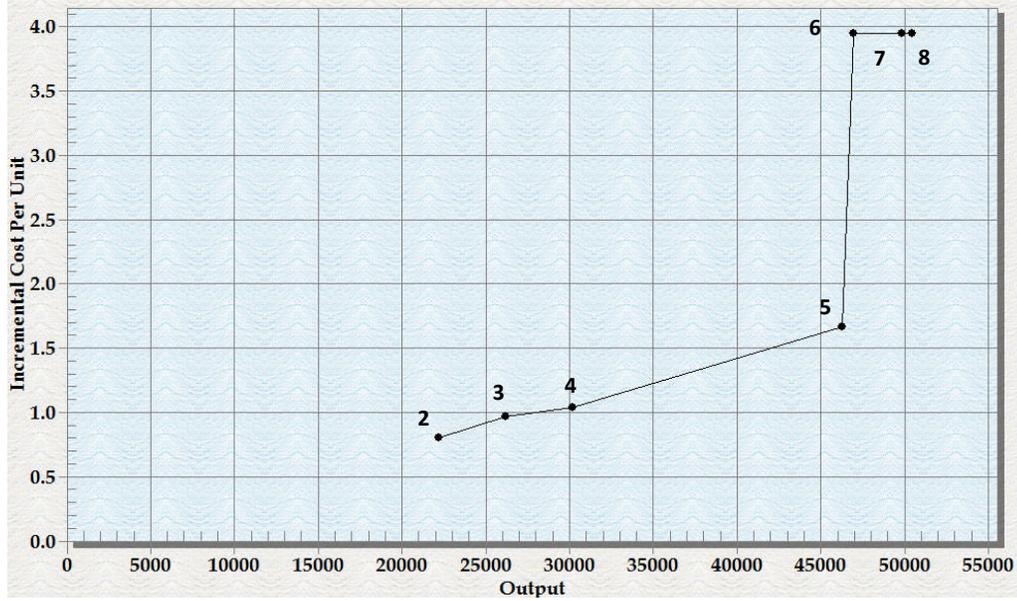
### All Cost Effective Plans

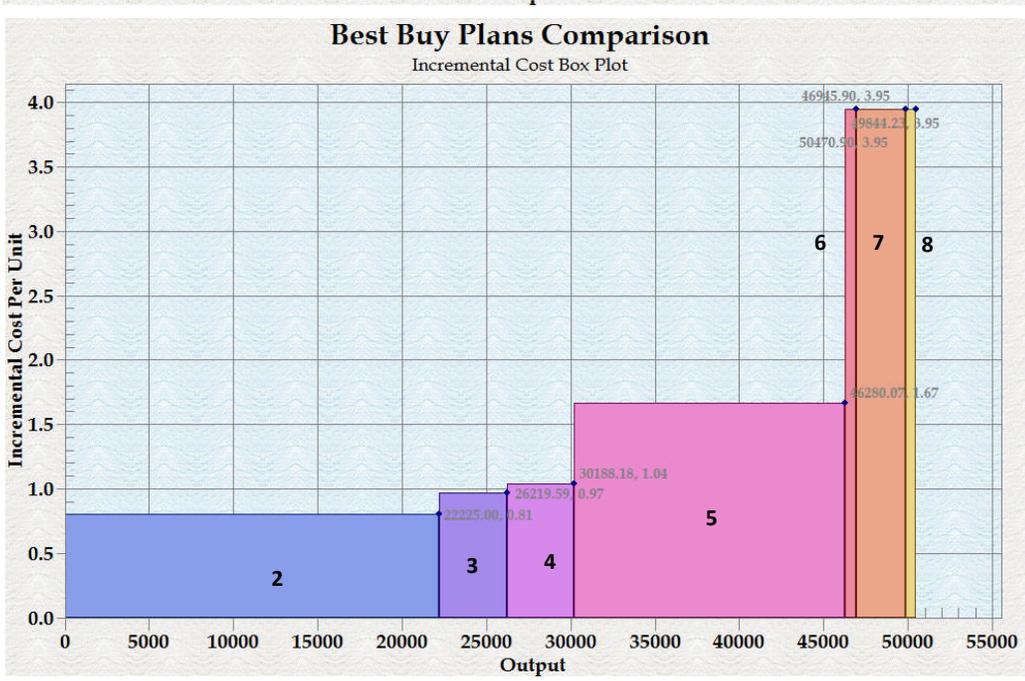
by Total Cost



### Best Buy Plans

by Incremental Cost







**COMBINED**

**Basic**

50 Period of Analysis (years) 0.04125 FY 2011 Discount Rate
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**Note that this analysis is based on draft Costs and Habitat Outputs and should be considered preliminary.**

In order to combine plans across all sites, the Best Buy plans from each site were included as scales of a single measure for each site. In other words, each combined alternative will include one Best Buy plan from each site.

**Best Buy Plans to be Combined**

Combined Measure	Scale	Site Code	Area Restored (sqft)	Tot Cost (\$)	Ann. Cost (\$)	Output (HUs)
SN	2	SN-SPC(0)-B	23,000	\$478,854	\$22,770	21,149
SN	3	SN-SPC(0)-A SN-SPC(0)-B	41,000	\$895,943	\$42,603	36,778
SN	4	SN-SPC(0)-A SN-SPC(0)-B SN-SPC(0)-C	66,000	\$1,410,184	\$67,056	54,869
SN	5	SN-SPC(0)-B SN-SPC(0)-C SN-SPC(10)-D	75,364	\$1,655,043	\$78,699	62,999
SN	6	SN-SPC(0)-C SN-SPC(10)-D SN-SPC(10)-E	83,210	\$1,887,944	\$89,774	70,214
SN	7	SN-SPC(10)-D SN-SPC(10)-E SN-SPC(10)-F	91,543	\$2,102,940	\$99,997	76,244
SS	2	SS-SPS-L	37,493	\$392,382	\$18,658	\$25,941
SS	3	SS-SPC(0)-D SS-SPS-L	70,493	\$1,011,702	\$48,107	53,387
SS	4	SS-SPC(0)-D SS-SPC(10)-H SS-SPS-L	108,801	\$1,784,455	\$84,853	86,650
SS	5	SS-SPC(0)-D SS-SPC(10)-G SS-SPC(10)-H SS-SPS-L	148,105	\$2,486,186	\$118,221	115,314
SS	6	SS-SPC(0)-D SS-SPC(10)-G SS-SPC(10)-H SS-SPC(10)-J SS-SPS-L	177,459	\$3,026,360	\$143,906	136,720
SS	7	SS-SPC(0)-D SS-SPC(10)-F SS-SPC(10)-G SS-SPC(10)-H SS-SPC(10)-J SS-SPS-L	205,320	\$3,553,054	\$168,951	154,755
SS	8	SS-SPC(10)-F SS-SPC(10)-G SS-SPC(10)-H SS-SPC(10)-I SS-SPC(10)-J SS-SPS-L	212,122	\$3,745,741	\$178,114	160,411
MC	2	MC-SPS-L	47,000	\$484,048	\$23,017	27,405
MC	3	MC-SPS-L MC-SPS-K	77,500	\$686,677	\$32,652	36,648

COMBINED Draft CEICA Results

DR	2	DR-SPS-L	3,360	\$36,336	\$1,728	1,398
DR	3	DR-SPS-K DR-SPS-L	22,680	\$245,180	\$11,659	9,282
DR	4	DR-SPC(0)-B DR-SPS-K DR-SPS-L	39,180	\$583,828	\$27,762	21,074
DR	5	DR-SPC(0)-B DR-SPC(0)-C DR-SPS-K DR-SPS-L	60,180	\$982,175	\$46,703	34,752
DR	6	DR-SPC(0)-A DR-SPC(0)-B DR-SPC(0)-C DR-SPS-K DR-SPS-L	78,180	\$1,385,631	\$65,888	48,538
DR	7	DR-SPC(0)-A DR-SPC(0)-B DR-SPC(0)-C DR-SPC(0)-D DR-SPS-K DR-SPS-L	113,180	\$2,064,187	\$98,154	69,774
DR	8	DR-SPC(0)-B DR-SPC(0)-C DR-SPC(0)-D DR-SPC(10)-E DR-SPS-K DR-SPS-L	123,539	\$2,323,640	\$110,491	77,707
DR	9	DR-SPC(0)-B DR-SPC(0)-D DR-SPC(10)-E DR-SPC(10)-G DR-SPS-K DR-SPS-L	132,887	\$2,608,759	\$124,049	83,796
DR	10	DR-SPC(0)-D DR-SPC(10)-E DR-SPC(10)-F DR-SPC(10)-G DR-SPS-K DR-SPS-L	138,776	\$2,815,592	\$133,884	88,004
DR	11	DR-SPC(10)-E DR-SPC(10)-F DR-SPC(10)-G DR-SPC(10)-H DR-SPS-K DR-SPS-L	149,547	\$3,142,442	\$149,426	94,540
RF	2	RF-SPE-C	37,000	\$377,307	\$17,941	22,225
RF	3	RF-SPE-C RF-SPE-D	45,000	\$458,887	\$21,821	26,220
RF	4	RF-SPE-B RF-SPE-C RF-SPE-D	53,500	\$545,566	\$25,942	30,188
RF	5	RF-SPC(0)-A RF-SPE-B RF-SPE-C RF-SPE-D	79,500	\$1,109,530	\$52,759	46,280
RF	6	RF-SPC(0)-A RF-SPE-B RF-SPE-C RF-SPE-D RF-EES-E	88,000	\$1,164,846	\$55,390	46,946
RF	7	RF-SPC(0)-A RF-SPE-B RF-SPE-C RF-SPE-D RF-EES-E RF-EES-F	125,000	\$1,405,631	\$66,839	49,844
RF	8	RF-SPC(0)-A RF-SPE-B RF-SPE-C RF-SPE-D RF-EES-E RF-EES-F RF-EES-G	133,000	\$1,457,692	\$69,315	50,471

IWR Planning Suite Data

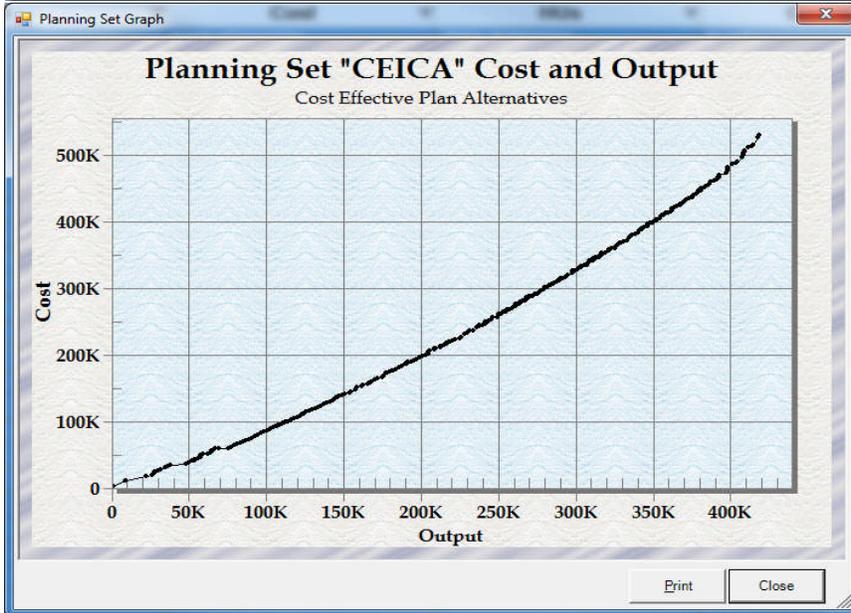
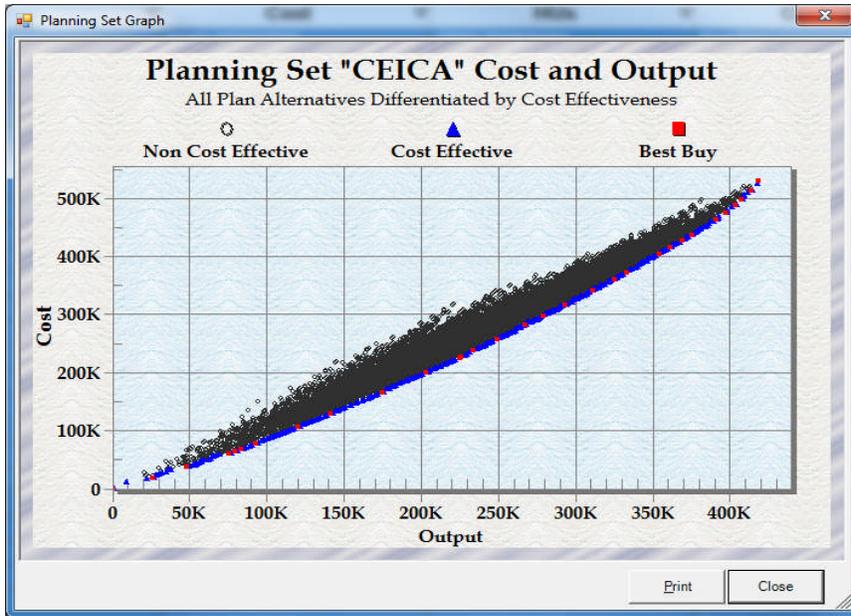
Code	Total Cost (\$)	Ann Cost (\$)	Output (HUs)	\$/HU
SN2	\$478,854	\$22,770	21,149	\$1.08
SN3	\$895,943	\$42,603	36,778	\$1.16
SN4	\$1,410,184	\$67,056	54,869	\$1.22
SN5	\$1,655,043	\$78,699	62,999	\$1.25
SN6	\$1,887,944	\$89,774	70,214	\$1.28
SN7	\$2,102,940	\$99,997	76,244	\$1.31
SS2	\$392,382	\$18,658	25,941	\$0.72
SS3	\$1,011,702	\$48,107	53,387	\$0.90
SS4	\$1,784,455	\$84,853	86,650	\$0.98
SS5	\$2,486,186	\$118,221	115,314	\$1.03
SS6	\$3,026,360	\$143,906	136,720	\$1.05
SS7	\$3,553,054	\$168,951	154,755	\$1.09
SS8	\$3,745,741	\$178,114	160,411	\$1.11
MC2	\$484,048	\$23,017	27,405	\$0.84
MC3	\$686,677	\$32,652	36,648	\$0.89
DR2	\$36,336	\$1,728	1,398	\$1.24
DR3	\$245,180	\$11,659	9,282	\$1.26
DR4	\$583,828	\$27,762	21,074	\$1.32
DR5	\$982,175	\$46,703	34,752	\$1.34
DR6	\$1,385,631	\$65,888	48,538	\$1.36
DR7	\$2,064,187	\$98,154	69,774	\$1.41
DR8	\$2,323,640	\$110,491	77,707	\$1.42
DR9	\$2,608,759	\$124,049	83,796	\$1.48
DR10	\$2,815,592	\$133,884	88,004	\$1.52
DR11	\$3,142,442	\$149,426	94,540	\$1.58
RF2	\$377,307	\$17,941	22,225	\$0.81
RF3	\$458,887	\$21,821	26,220	\$0.83
RF4	\$545,566	\$25,942	30,188	\$0.86
RF5	\$1,109,530	\$52,759	46,280	\$1.14
RF6	\$1,164,846	\$55,390	46,946	\$1.18
RF7	\$1,405,631	\$66,839	49,844	\$1.34
RF8	\$1,457,692	\$69,315	50,471	\$1.37

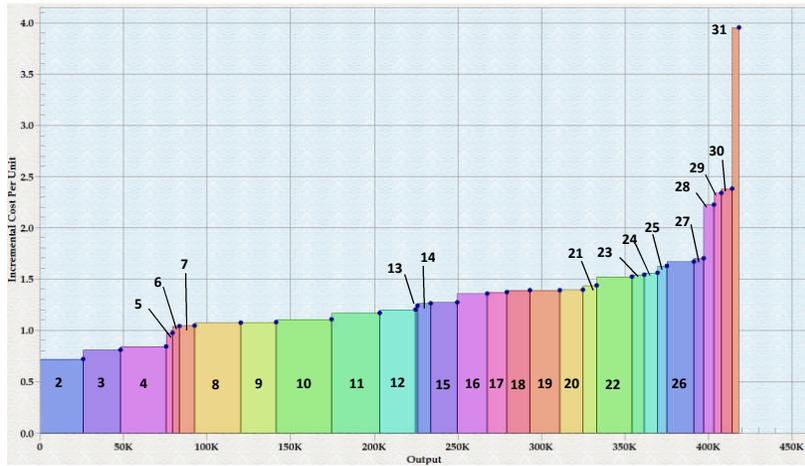
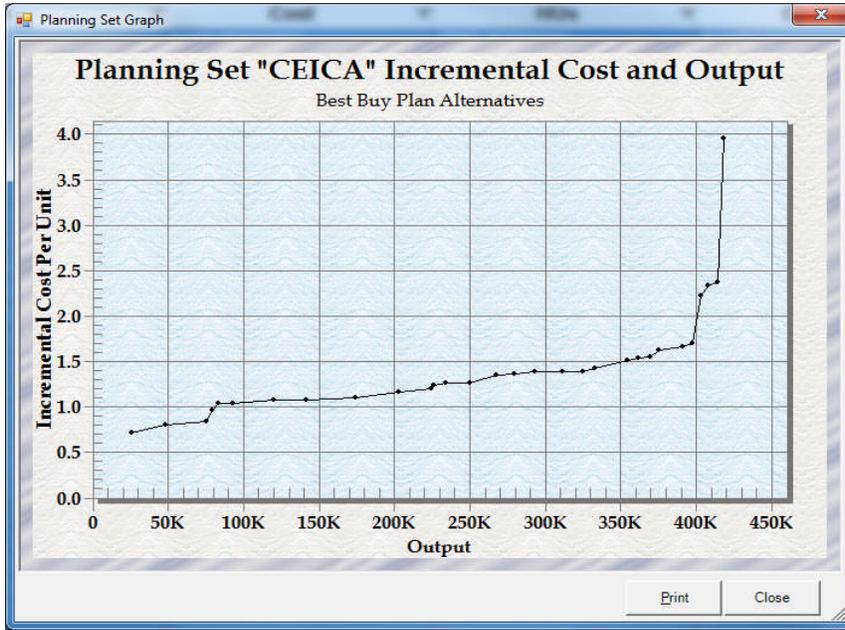
Relationships  
none



## Measures included in the above plans

Code	Measure	Begin Station*	End Station*	Length (ft)	Effective Area (Sqft)
SN-SPC(0)-A	Sub on Clay (0% slope) - 1	7514+50	7519+50	500	18,000
SN-SPC(0)-B	Sub on Clay (0% slope) - 2	7519+50	7523+50	400	23,000
SN-SPC(0)-C	Sub on Clay (0% slope) - 3	7523+50	7527+50	400	25,000
SN-SPC(10)-D	Sub on Clay (10% slope) - 1	7514+50	7519+50	500	27,364
SN-SPC(10)-E	Sub on Clay (10% slope) - 2	7519+50	7523+50	400	30,846
SN-SPC(10)-F	Sub on Clay (10% slope) - 3	7523+50	7527+50	400	33,334
SS-SPC(0)-A	Sub on Clay (0% slope) - 1	7549+50	7554+50	500	13,000
SS-SPC(0)-B	Sub on Clay (0% slope) - 2	7554+50	7559+50	500	18,500
SS-SPC(0)-C	Sub on Clay (0% slope) - 3	7559+50	7563+50	400	22,500
SS-SPC(0)-D	Sub on Clay (0% slope) - 4	7570+50	7574+50	400	33,000
SS-SPC(0)-E	Sub on Clay (0% slope) - 5	7574+50	7578+50	400	17,500
SS-SPC(10)-F	Sub on Clay (10% slope) - 1	7549+50	7554+50	500	27,861
SS-SPC(10)-G	Sub on Clay (10% slope) - 2	7554+50	7559+50	500	39,304
SS-SPC(10)-H	Sub on Clay (10% slope) - 3	7559+50	7563+50	400	38,309
SS-SPC(10)-I	Sub on Clay (10% slope) - 4	7570+50	7574+50	400	39,801
SS-SPC(10)-J	Sub on Clay (10% slope) - 5	7574+50	7578+50	400	29,354
SS-SPS-L	Sub on Clay Shelves - 1	7566+50	7570+50	400	37,493
MC-SPS-K	Sub on Clay Shelves - 1	7672+50	7678+50	600	18,500
MC-SPS-L	Sub on Clay Shelves - 2	7678+50	7685+50	700	43,500
DR-SPC(0)-A	Sub on Clay (0% slope) - 1	7725+50	7730+50	500	18,000
DR-SPC(0)-B	Sub on Clay (0% slope) - 2	7741+50	7746+50	500	16,500
DR-SPC(0)-C	Sub on Clay (0% slope) - 3	7767+50	7771+50	400	21,000
DR-SPC(0)-D	Sub on Clay (0% slope) - 4	7771+50	7776+50	500	35,000
DR-SPC(10)-E	Sub on Clay (10% slope) - 1	7725+50	7730+50	500	28,359
DR-SPC(10)-F	Sub on Clay (10% slope) - 2	7741+50	7746+50	500	22,388
DR-SPC(10)-G	Sub on Clay (10% slope) - 3	7767+50	7771+50	400	30,349
DR-SPC(10)-H	Sub on Clay (10% slope) - 4	7771+50	7776+50	500	45,772
DR-SPS-K	Sub on Clay Shelves - 1	7733+50	7736+50	300	19,320
DR-SPS-L	Sub on Clay Shelves - 2	7737+50	7738+50	100	3,360
RF-SPC(0)-A	Sub on Clay (0% slope) - 1	7847+50	7854+50	700	26,000
RF-SPE-B	Sub on Existing Gravel - 1	7859+50	7862+50	300	8,500
RF-SPE-C	Sub on Existing Gravel - 2	7862+50	7867+50	500	37,000
RF-SPE-D	Sub on Existing Gravel - 3	7867+50	7869+50	200	8,000
RF-EES-E	Sub Enhancement - 1	7859+50	7862+50	300	8,500
RF-EES-F	Sub Enhancement - 2	7862+50	7867+50	500	37,000
RF-EES-G	Sub Enhancement - 3	7867+50	7869+50	200	8,000







Plans of Interest from Combined CEICA

Plan #	Code	Total Restored Area (sqft)	Tot Cost (\$)	Output (HUs)	Inc. Cost per Inc. HU (\$)
11	SN2SS5MC3RF4	302,105	\$4,197,284	203,298	\$1.16
12	SN2SS6MC3RF4	331,459	\$4,737,462	224,705	\$1.20
13	SN2SS6MC3DR2RF4	334,819	\$4,773,802	226,103	\$1.24
14	SN2SS6MC3DR3RF4	354,139	\$4,982,630	233,987	\$1.26
15	SN3SS6MC3DR3RF4	372,139	\$5,399,719	249,616	\$1.27
16	SN4SS6MC3DR3RF4	397,139	\$5,913,967	267,707	\$1.35
17	SN4SS6MC3DR4RF4	413,639	\$6,252,614	279,499	\$1.37
18	SN4SS6MC3DR5RF4	434,639	\$6,650,966	293,177	\$1.38
19	SN4SS7MC3DR5RF4	462,500	\$7,177,663	311,211	\$1.39

CODE
SN2SS5MC3RF4

Plan #	Description	Stationing	Length (ft)	Restored Area (sqft)	Total Cost (\$)	
11	SN-SPC(0)-B	Sub on Clay (0% slope) - 2	7519+50 to 7523+50	400	23,000	\$478,854
	SS-SPC(0)-D	Sub on Clay (0% slope) - 4	7570+50 to 7574+50	400	33,000	\$619,320
	SS-SPC(10)-G	Sub on Clay (10% slope) - 2	7554+50 to 7559+50	500	39,304	\$701,730
	SS-SPC(10)-H	Sub on Clay (10% slope) - 3	7559+50 to 7563+50	400	38,309	\$772,754
	SS-SPS-L	Sub on Clay Shelves - 1	7566+50 to 7570+50	400	37,493	\$392,382
	MC-SPS-K	Sub on Clay Shelves - 1	7672+50 to 7678+50	600	18,500	\$202,630
	MC-SPS-L	Sub on Clay Shelves - 2	7678+50 to 7685+50	700	43,500	\$484,048
	RF-SPE-B	Sub on Existing Gravel - 1	7859+50 to 7862+50	300	8,500	\$86,679
	RF-SPE-C	Sub on Existing Gravel - 2	7862+50 to 7867+50	500	37,000	\$377,307
	RF-SPE-D	Sub on Existing Gravel - 3	7867+50 to 7869+50	200	8,000	\$81,580
				4400	286,605	\$4,197,282

CODE
SN2SS6MC3RF4

Plan #	Description	Stationing	Length (ft)	Restored Area (sqft)	Total Cost (\$)	
12	SN-SPC(0)-B	Sub on Clay (0% slope) - 2	7519+50 to 7523+50	400	23,000	\$478,854
	SS-SPC(0)-D	Sub on Clay (0% slope) - 4	7570+50 to 7574+50	400	33,000	\$619,320
	SS-SPC(10)-G	Sub on Clay (10% slope) - 2	7554+50 to 7559+50	500	39,304	\$701,730
	SS-SPC(10)-H	Sub on Clay (10% slope) - 3	7559+50 to 7563+50	400	38,309	\$772,754
	SS-SPC(10)-J	Sub on Clay (10% slope) - 5	7574+50 to 7578+50	400	29,354	\$540,175
	SS-SPS-L	Sub on Clay Shelves - 1	7566+50 to 7570+50	400	37,493	\$392,382
	MC-SPS-K	Sub on Clay Shelves - 1	7672+50 to 7678+50	600	18,500	\$202,630
	MC-SPS-L	Sub on Clay Shelves - 2	7678+50 to 7685+50	700	43,500	\$484,048
	RF-SPE-B	Sub on Existing Gravel - 1	7859+50 to 7862+50	300	8,500	\$86,679
	RF-SPE-C	Sub on Existing Gravel - 2	7862+50 to 7867+50	500	37,000	\$377,307
	RF-SPE-D	Sub on Existing Gravel - 3	7867+50 to 7869+50	200	8,000	\$81,580
			4800	315,959	\$4,737,457	

Plans of Interest

CODE
SN2SS6MC3DR2RF4

Plan #	Description	Stationing	Length (ft)	Restored Area (sqft)	Total Cost (\$)	
13	SN-SPC(0)-B	Sub on Clay (0% slope) - 2	7519+50 to 7523+50	400	23,000	\$478,854
	SS-SPC(0)-D	Sub on Clay (0% slope) - 4	7570+50 to 7574+50	400	33,000	\$619,320
	SS-SPC(10)-G	Sub on Clay (10% slope) - 2	7554+50 to 7559+50	500	39,304	\$701,730
	SS-SPC(10)-H	Sub on Clay (10% slope) - 3	7559+50 to 7563+50	400	38,309	\$772,754
	SS-SPC(10)-J	Sub on Clay (10% slope) - 5	7574+50 to 7578+50	400	29,354	\$540,175
	SS-SPS-L	Sub on Clay Shelves - 1	7566+50 to 7570+50	400	37,493	\$392,382
	MC-SPS-K	Sub on Clay Shelves - 1	7672+50 to 7678+50	600	18,500	\$202,630
	MC-SPS-L	Sub on Clay Shelves - 2	7678+50 to 7685+50	700	43,500	\$484,048
	DR-SPS-L	Sub on Clay Shelves - 2	7737+50 to 7738+50	100	3,360	\$36,336
	RF-SPE-B	Sub on Existing Gravel - 1	7859+50 to 7862+50	300	8,500	\$86,679
	RF-SPE-C	Sub on Existing Gravel - 2	7862+50 to 7867+50	500	37,000	\$377,307
	RF-SPE-D	Sub on Existing Gravel - 3	7867+50 to 7869+50	200	8,000	\$81,580
					4900	319,319

CODE
SN2SS6MC3DR3RF4

Plan #	Description	Stationing	Length (ft)	Restored Area (sqft)	Total Cost (\$)	
14	SN-SPC(0)-B	Sub on Clay (0% slope) - 2	7519+50 to 7523+50	400	23,000	\$478,854
	SS-SPC(0)-D	Sub on Clay (0% slope) - 4	7570+50 to 7574+50	400	33,000	\$619,320
	SS-SPC(10)-G	Sub on Clay (10% slope) - 2	7554+50 to 7559+50	500	39,304	\$701,730
	SS-SPC(10)-H	Sub on Clay (10% slope) - 3	7559+50 to 7563+50	400	38,309	\$772,754
	SS-SPC(10)-J	Sub on Clay (10% slope) - 5	7574+50 to 7578+50	400	29,354	\$540,175
	SS-SPS-L	Sub on Clay Shelves - 1	7566+50 to 7570+50	400	37,493	\$392,382
	MC-SPS-K	Sub on Clay Shelves - 1	7672+50 to 7678+50	600	18,500	\$202,630
	MC-SPS-L	Sub on Clay Shelves - 2	7678+50 to 7685+50	700	43,500	\$484,048
	DR-SPS-K	Sub on Clay Shelves - 1	7733+50 to 7736+50	300	19,320	\$208,844
	DR-SPS-L	Sub on Clay Shelves - 2	7737+50 to 7738+50	100	3,360	\$36,336
	RF-SPE-B	Sub on Existing Gravel - 1	7859+50 to 7862+50	300	8,500	\$86,679
	RF-SPE-C	Sub on Existing Gravel - 2	7862+50 to 7867+50	500	37,000	\$377,307
	RF-SPE-D	Sub on Existing Gravel - 3	7867+50 to 7869+50	200	8,000	\$81,580
				5200	338,639	\$4,982,637

CODE
SN3SS6MC3DR3RF4

Plan #	Description	Stationing	Length (ft)	Restored Area (sqft)	Total Cost (\$)	
15	SN-SPC(0)-A	Sub on Clay (0% slope) - 1	7514+50 to 7519+50	500	18,000	\$417,089
	SN-SPC(0)-B	Sub on Clay (0% slope) - 2	7519+50 to 7523+50	400	23,000	\$478,854
	SS-SPC(0)-D	Sub on Clay (0% slope) - 4	7570+50 to 7574+50	400	33,000	\$619,320
	SS-SPC(10)-G	Sub on Clay (10% slope) - 2	7554+50 to 7559+50	500	39,304	\$701,730
	SS-SPC(10)-H	Sub on Clay (10% slope) - 3	7559+50 to 7563+50	400	38,309	\$772,754
	SS-SPC(10)-J	Sub on Clay (10% slope) - 5	7574+50 to 7578+50	400	29,354	\$540,175
	SS-SPS-L	Sub on Clay Shelves - 1	7566+50 to 7570+50	400	37,493	\$392,382
	MC-SPS-K	Sub on Clay Shelves - 1	7672+50 to 7678+50	600	18,500	\$202,630
	MC-SPS-L	Sub on Clay Shelves - 2	7678+50 to 7685+50	700	43,500	\$484,048
	DR-SPS-K	Sub on Clay Shelves - 1	7733+50 to 7736+50	300	19,320	\$208,844
	DR-SPS-L	Sub on Clay Shelves - 2	7737+50 to 7738+50	100	3,360	\$36,336
	RF-SPE-B	Sub on Existing Gravel - 1	7859+50 to 7862+50	300	8,500	\$86,679
	RF-SPE-C	Sub on Existing Gravel - 2	7862+50 to 7867+50	500	37,000	\$377,307
	RF-SPE-D	Sub on Existing Gravel - 3	7867+50 to 7869+50	200	8,000	\$81,580
				5700	356,639	\$5,399,726

Plans of Interest

CODE
SN4SS6MC3DR3RF4

Plan #	Description	Stationing	Length (ft)	Restored Area (sqft)	Total Cost (\$)	
16	SN-SPC(0)-A	Sub on Clay (0% slope) - 1	7514+50 to 7519+50	500	18,000	\$417,089
	SN-SPC(0)-B	Sub on Clay (0% slope) - 2	7519+50 to 7523+50	400	23,000	\$478,854
	SN-SPC(0)-C	Sub on Clay (0% slope) - 3	7523+50 to 7527+50	400	25,000	\$514,241
	SS-SPC(0)-D	Sub on Clay (0% slope) - 4	7570+50 to 7574+50	400	33,000	\$619,320
	SS-SPC(10)-G	Sub on Clay (10% slope) - 2	7554+50 to 7559+50	500	39,304	\$701,730
	SS-SPC(10)-H	Sub on Clay (10% slope) - 3	7559+50 to 7563+50	400	38,309	\$772,754
	SS-SPC(10)-J	Sub on Clay (10% slope) - 5	7574+50 to 7578+50	400	29,354	\$540,175
	SS-SPS-L	Sub on Clay Shelves - 1	7566+50 to 7570+50	400	37,493	\$392,382
	MC-SPS-K	Sub on Clay Shelves - 1	7672+50 to 7678+50	600	18,500	\$202,630
	MC-SPS-L	Sub on Clay Shelves - 2	7678+50 to 7685+50	700	43,500	\$484,048
	DR-SPS-K	Sub on Clay Shelves - 1	7733+50 to 7736+50	300	19,320	\$208,844
	DR-SPS-L	Sub on Clay Shelves - 2	7737+50 to 7738+50	100	3,360	\$36,336
	RF-SPE-B	Sub on Existing Gravel - 1	7859+50 to 7862+50	300	8,500	\$86,679
	RF-SPE-C	Sub on Existing Gravel - 2	7862+50 to 7867+50	500	37,000	\$377,307
	RF-SPE-D	Sub on Existing Gravel - 3	7867+50 to 7869+50	200	8,000	\$81,580
				6100	381,639	\$5,913,967

CODE
SN4SS6MC3DR4RF4

Plan #	Description	Stationing	Length (ft)	Restored Area (sqft)	Total Cost (\$)	
17	SN-SPC(0)-A	Sub on Clay (0% slope) - 1	7514+50 to 7519+50	500	18,000	\$417,089
	SN-SPC(0)-B	Sub on Clay (0% slope) - 2	7519+50 to 7523+50	400	23,000	\$478,854
	SN-SPC(0)-C	Sub on Clay (0% slope) - 3	7523+50 to 7527+50	400	25,000	\$514,241
	SS-SPC(0)-D	Sub on Clay (0% slope) - 4	7570+50 to 7574+50	400	33,000	\$619,320
	SS-SPC(10)-G	Sub on Clay (10% slope) - 2	7554+50 to 7559+50	500	39,304	\$701,730
	SS-SPC(10)-H	Sub on Clay (10% slope) - 3	7559+50 to 7563+50	400	38,309	\$772,754
	SS-SPC(10)-J	Sub on Clay (10% slope) - 5	7574+50 to 7578+50	400	29,354	\$540,175
	SS-SPS-L	Sub on Clay Shelves - 1	7566+50 to 7570+50	400	37,493	\$392,382
	MC-SPS-K	Sub on Clay Shelves - 1	7672+50 to 7678+50	600	18,500	\$202,630
	MC-SPS-L	Sub on Clay Shelves - 2	7678+50 to 7685+50	700	43,500	\$484,048
	DR-SPS-K	Sub on Clay Shelves - 1	7733+50 to 7736+50	300	19,320	\$208,844
	DR-SPS-L	Sub on Clay Shelves - 2	7737+50 to 7738+50	100	3,360	\$36,336
	DR-SPC(0)-B	Sub on Clay (0% slope) - 2	7741+50 to 7746+50	500	16,500	\$338,648
	RF-SPE-B	Sub on Existing Gravel - 1	7859+50 to 7862+50	300	8,500	\$86,679
	RF-SPE-C	Sub on Existing Gravel - 2	7862+50 to 7867+50	500	37,000	\$377,307
	RF-SPE-D	Sub on Existing Gravel - 3	7867+50 to 7869+50	200	8,000	\$81,580
			6600	398,139	\$6,252,615	

