

APPENDIX C – POST-FIELD DOCUMENTS AND FORMS

This appendix contains supporting documents for post-field data management and reporting activities:

- Park Summary Letter
- FMSS Specification Data Template
- FMSS Data Input Procedures and Test Guide

Park Summary Letter



U.S. Department
of Transportation

**Federal Highway
Administration**

<Office> Federal Lands Highway Division
Street Address
City, State, Zip

Superintendent
XYZ National Park
Road/Hwy/Street Address
City, State, Zip

<Date>

Subject: NPS Retaining Wall Inventory Program (WIP)

Dear <Superintendent Name>,

In support of the NPS Facility Management Software System (FMSS) asset management program, FHWA and NPS engineering staff have recently completed retaining wall inspection work within the Park under the newly developed NPS Retaining Wall Inventory Program (WIP). As you may recall, this inventory provides information to FMSS regarding such things as type, size and location of retaining structures, as well as the assessed condition of these facilities. In addition, when wall and/or adjacent element deficiencies are identified, repair recommendations and estimated costs are also provided, suitable for use as FMSS work orders.

Retaining wall inspections were conducted at <Park Name> during the week of <Dates Here>, and encompassed all known retaining wall structures associated with Park roadways – including structures retaining cuts and fills, as well as headwalls at culverts. Walls at bridge abutments, currently evaluated as part of the Bridge Inspection Program, are not included in the WIP assessment. For the purposes of this assessment, walls must be a minimum of 4 feet in maximum height of retained earth. This does not include the height of parapet or guardwall above a retaining wall. In general, guardwall or parapets are not included in this assessment; however, when required, guardwall treatments are included in the work order.

Using the tabled summary inventory information provided by the WIP database following completion of the Park data upload, describe such things as the routes inspected, the approximate number, types, and sizes of walls inspected per route, specific walls requiring immediate action, etc. Include any other pertinent findings from the field inspections, including overall impressions of the condition of retaining structures throughout the Park. The following is an example of the brief summary provided to Mesa Verde NP following completion of the WIP inventory:

The following tables and attachment provide an overview of the general findings of this inspection effort. All roadways and parking areas listed in the Road Inventory Program (RIP) Route Identification Report were inspected. In all, 37 walls of various type, function, and size were inventoried per the routes listed. None of the walls inventoried required significant repair – generally only minor maintenance. Of the twelve walls noted for maintenance, only six required work totaling more than \$500/wall, with the remaining six walls generally requiring little more than vegetation clearing. Although it was thought, prior to the site inspection, that the anchor tieback walls along Chapin Mesa Road may require substantial lagging repair, this was not the case. However, several of these walls would benefit from cleaning and repainting piles, walers, and anchor caps as minor corrosion was routinely evident on these structures.

Overall, the retaining walls inspected during this inventory appear to be functioning as intended, with only minor signs of distress evident. Routine inspection and performing the noted maintenance will greatly aid in the continued performance of all walls at Mesa Verde.

Rte No.	No. of Walls
0010, Chapin Mesa Road	19
0100, Balcony House Road	3
0101, Sun Point Road	4
0200, Wetherill Mesa Road	4
0209, HQ Loop Road	2
0211, Sun Temple Road	1
0415, HQ Residence Road	1
0918, Farview Parking Lot	1
0925, Side HQ & Post Office	2
Total	37

Wall Function	No. of Walls
FW - Fill Wall	35
HW – Culvert Head Wall	2

Primary Wall Type	No. of Walls
Anchor, Tieback H-Pile	9
Bin, Metal	2
Cantilever, Concrete	4
Crib, Metal	1
Gravity, Dry Stone, Rockery	11
Gravity, Mortared Stone	3
MSE, Welded Wire	7

Action Required	No. of Walls
Monitor / No Action	25
Minor Maintenance	12

Rte. – RIP Milepoint	Repair Cost
0010 – 2.599	\$1,500.00
0010 – 2.678	\$5,175.00
0010 – 3.057	\$4,065.00
0010 – 3.281	\$6,275.00
0010 – 6.847	\$2,140.00
0010 – 7.707	\$1,642.00

As an integral part of the inventory process, we will soon be sending <Facility Manager> a compilation of pertinent field inspection data required to update the status of retaining wall facilities within FMSS. The data will be provided in an Excel spreadsheet in a file format compatible with the FMSS equipment specification template. Included in this data file will be specifics regarding wall type, function, location, dimensions, work orders, etc. Once this data has been uploaded by Park staff to FMSS, we request that FMSS wall equipment numbers be sent back to our database management team so that we might complete the Central WIP database for your Park. To further assist your staff in updating FMSS with WIP spec template info, I have included a brief instruction guide regarding WIP/FMSS data transfer procedures developed by David Keough, NPS WASO. Any questions on the spec template information and/or data transfer procedures may be forwarded directly to <WIP Database Administrator>, WIP Database Administrator, CFLHD, at <Phone Number> or by e-mail at <WIP Database Administrator e-mail address>.

On behalf of the FHWA inventory team, I would like to thank you and your staff for the outstanding assistance we received prior to and during the site inspections. If I can be of any assistance or answer any questions regarding the Park inventory, please feel free to contact me at <Phone Number>. For additional Wall Inventory Program (WIP) information, please contact <NPS WASO Program Coordinator >, NPS WASO Program Coordinator, at <Phone Number>, or <FLH WIP Coordinator>, FLH WIP Coordinator, at <Phone Number>.

We look forward to working with you and your staff again as we move forward in supporting NPS asset management efforts.

Sincerely,

Team Lead
Title

cc: <Facility Manager, XYZ National Park>
<NPS WASO Program Coordinator>, NPS WASO
<FLH WIP Database Administrator>, FHWA-CFLHD

FMSS Specification Data Template

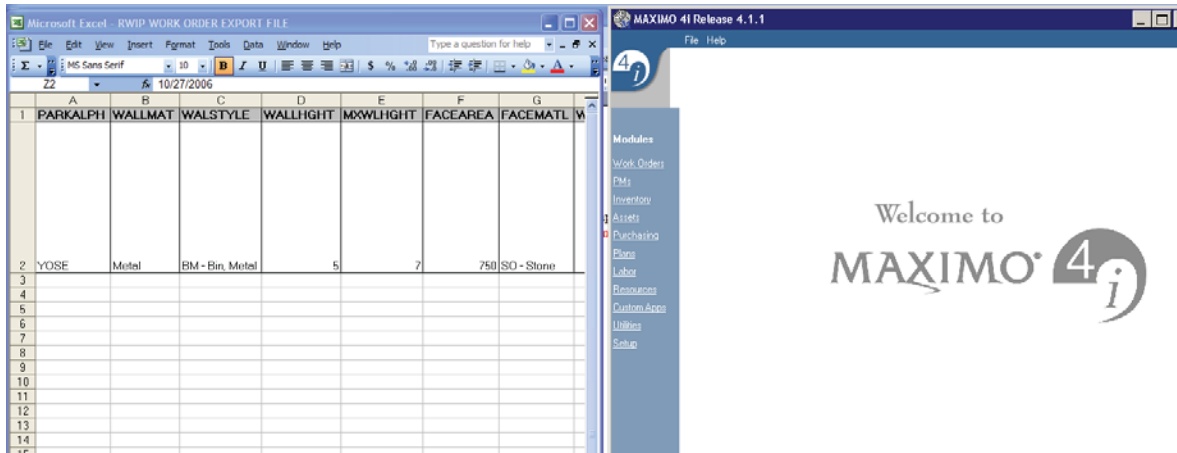
FMSS DATA FIELD NAME	DESCRIPTION	TYPE
ACTREPCOST	Actual repair costs. The Park provides this information only after a wall is repaired.	Numeric
ASSETNO	Asset Number: assigned by the FMSS system for each retaining wall.	Numeric
COSTSRCE	Cost Source: A constant value of "FHWA" which used historical cost data to estimate repairs.	Character
DATESENT	Date the Wall Inventory export file was sent to a Park's Superintendent.	Date
ESTREPCOST	Total estimated repair or replacement costs based on itemized repair elements identified in the work order using the FHWA cost guide.	Numeric
EVENT	Event = RETAINING WALL.	Character
FACE_ANGLE	Wall face batter angle in degrees measured from the horizontal. No decimals.	Numeric
FACEAREA	Field-calculated exposed area of the wall face. Measured in square feet.	Numeric
FACEMATL	The face material, or surface treatment, if any, that has been applied to the retaining wall. Paint; Sealant; Stain; etc.	Character
GPSTALAT	Latitude Start: Interpolation in the field of the GPS Latitude Coordinate for the Wall starting point.	Numeric
GPSTALNG	Longitude Start: Interpolation in the field of the GPS Longitude Coordinate for the Wall starting point.	Numeric
MLPNTST	Calculated wall start milepoint based on measurement from a Visidata event milepoint, or on odometer mileage.	Numeric
MLPNTND	Calculated wall end milepoint based on adding the measured length of the wall along the roadway to the wall start milepoint.	Numeric
MXWLHGT	Maximum exposed height of the wall. Measured in feet.	Numeric
OFFSETND	Horizontal distance in feet from pavement edge to the wall face at the end of the wall.	Numeric
OFFSETST	Horizontal distance in feet from pavement edge to the wall face at the start of the wall.	Numeric
PARENTEQN	Parent Equipment Number. A field assigned by the FMSS system for each retaining wall.	Numeric
PARKALPH	NPS alpha codes for Park names (YOSE, ZION, MEVE, etc.)	Character
REPORTBY	The system that reported data to NPS. Default value is value "WIP". This is a required field for the export file to the FMSS system.	Character
REPRECS	Repair / Replace Recommendations: Itemized description of recommended wall repairs: elements, methods, estimated quantities, including costs per repair item. Constructability issues are included: (access, staging, traffic control, safety hazards, etc.)	Character
RTENO	Route Number for a Park road. Provided in the RIP Route Identification Report.	Character
SIDE	Side of the centerline where the wall is located; in the direction of increasing mileposts (R, L, N/A).	Character
WALLHGT	Average exposed height of the wall (generally based on multiple measurements along the wall). Measured in feet.	Numeric

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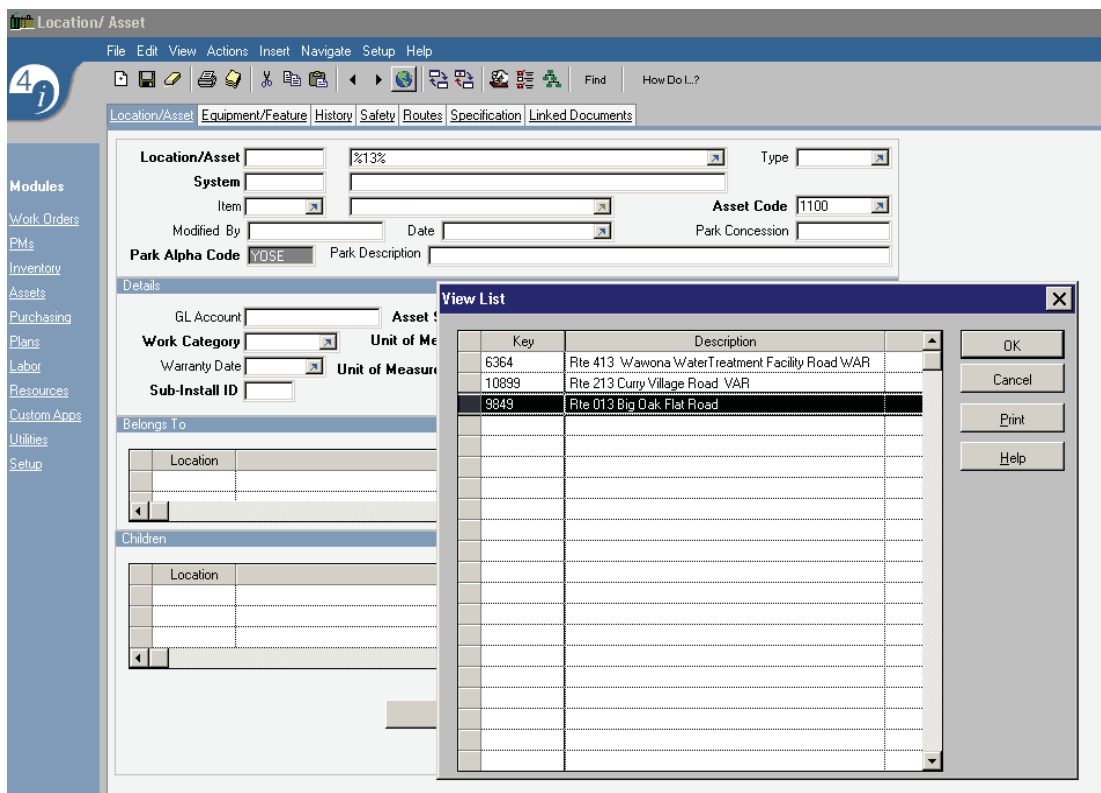
FMSS DATA FIELD NAME	DESCRIPTION	TYPE
WALLMAT	Primary construction material of the retaining wall. (Concrete, Metal, Timber, etc.)	Character
WALLNGTH	Total constructed wall length at the top of wall ground line. Measured in feet; no decimals.	Numeric
WALLSTAT	Wall Status: the recommended action for the retaining wall - No Action, Monitor, Maintenance, Repair Elements, Replace Elements, Replace Wall.	Character
WALLSTYLE	A description of the predominant style or type of the retaining wall based on support mechanism and construction material. (Anchor, Tieback H-Pile; Gravity Mortared Stone; etc.)	Character
WIPWLID	Wall ID: Unique identifier for retaining walls based on combining: PARK_ALPHA + RTE_NO + WALL_BEG_MP + SIDE. (e.g., YOSE-0013-12.240-R)	Character
WORKORDR	Work Order Description: Brief narrative about the type of repair, what is to be repaired, etc.	Character
WORKORDER NO	Number assigned to the work order by the FMSS system.	Numeric

FMSS Data Input Procedures and Test Guide

Begin with loading the WIP output data file as well as FMSS.



In FMSS, find the Asset to which this retaining wall resides. A query could be done on the route number, park alpha code and asset code. Load appropriate asset into the location/asset module.



Go to the Equipment/Feature tab and scan through the list to see if the retaining wall has already been created.

- If it has been created, indicate the Equipment/Feature number in the EQNO field on the WIP spreadsheet.
- If there is no Equipment/Feature, determine where in the equipment/feature hierarchy this new E/F belongs.
 - Note: In most cases, a RETAINING WALL parent E/F will be created for an asset and all retaining walls for that asset will belong to this parent E/F as child E/F's.
 - In this example, YOSE manages the road in sections as determined by E/F. In this case, the retaining wall will become a child of the particular section parent E/F and therefore the data person inputting the data will need to indicate the parent E/F number in order to create the child retaining wall.

The screenshot shows a software application window titled 'Location/ Asset'. The interface includes a menu bar (File, Edit, View, Actions, Insert, Navigate, Setup, Help), a toolbar with various icons, and a navigation pane on the left with modules like Work Orders, PMs, Inventory, Assets, Purchasing, Plans, Labor, Resources, Custom Apps, Utilities, and Setup. The main area displays a table of Equipment/Feature data for the selected location/asset 'Rte 013 Big Oak Flat Road'.

Equipment/Feature	Description	Belongs To	Item	Priority	Up?	Calendar
18867	Rte 013 Big Oak Flat Road				Y	
59451	Surface, Bituminous , Class I , 1 MI	59615			Y	
59452	Surface, Bituminous , Class I , 1 MI	59617			Y	
59453	Surface, Bituminous , Class I , 1 MI	59619			Y	
59454	Surface, Bituminous , Class I , 1 MI	59620			Y	
59455	Surface, Bituminous , Class I , 1 MI	59621			Y	
59456	Surface, Bituminous , Class I , 1 MI	59622			Y	
59457	Surface, Bituminous , Class I , 1 MI	59623			Y	
59458	Surface, Bituminous , Class I , 1 MI	59626			Y	
59459	Surface, Bituminous , Class I , 1 MI	59627			Y	
59460	Surface, Bituminous , Class I , 1 MI	59629			Y	
59461	Surface, Bituminous , Class I , 1 MI	59630			Y	
59462	Surface, Bituminous , Class I , 1 MI	59631			Y	
59463	Surface, Bituminous , Class I , 1 MI	59632			Y	
59464	Surface, Bituminous , Class I , 1 MI	59633			Y	
59465	Surface, Bituminous , Class I , 1 MI	59634			Y	
59466	Surface, Bituminous , Class I , 1 MI	59635			Y	
59467	Surface, Bituminous , Class I , 1 MI	59636			Y	
59468	Surface, Bituminous , Class I , 1 MI	59638			Y	
59469	Surface, Bituminous , Class I , .96 MI	59639			Y	
59615	Rte 013 Big Oak Flat Road Section 1	18867			Y	
59617	Rte 013 Big Oak Flat Road Section 2	18867			Y	
59619	Rte 013 Big Oak Flat Road Section 3	18867			Y	
59620	Rte 013 Big Oak Flat Road Section 4	18867			Y	
59621	Rte 013 Big Oak Flat Road Section 5	18867			Y	
59622	Rte 013 Big Oak Flat Road Section 6	18867			Y	
59623	Rte 013 Big Oak Flat Road Section 7	18867			Y	
59626	Rte 013 Big Oak Flat Road Section 8	18867			Y	
59627	Rte 013 Big Oak Flat Road Section 9	18867			Y	
59629	Rte 013 Big Oak Flat Road Section 10	18867			Y	
59630	Rte 013 Big Oak Flat Road Section 11	18867			Y	
59631	Rte 013 Big Oak Flat Road Section 12	18867			Y	

Creating the Retaining Wall Equipment/Feature: Go to the Equipment/Feature module.

- Select Insert, new equipment/feature by auto-number. Indicate this number on the WIP spreadsheet.
- In the “belongs to” field, type the parent equipment/feature number and tab. This will automatically populate the location/asset.
- Type in the park alpha code, the work category (1000) and the asset code (1100).
- From the drop list, select the WBS component (G2010 – Roads) and WBS sub-component (G204002 - Retaining Walls).
- Select the U/M of S.F. and input the quantity as indicated in the FACEAREA field on the RWIP spreadsheet and Save.

The screenshot shows the 'Equipment/ Feature' window with the following data:

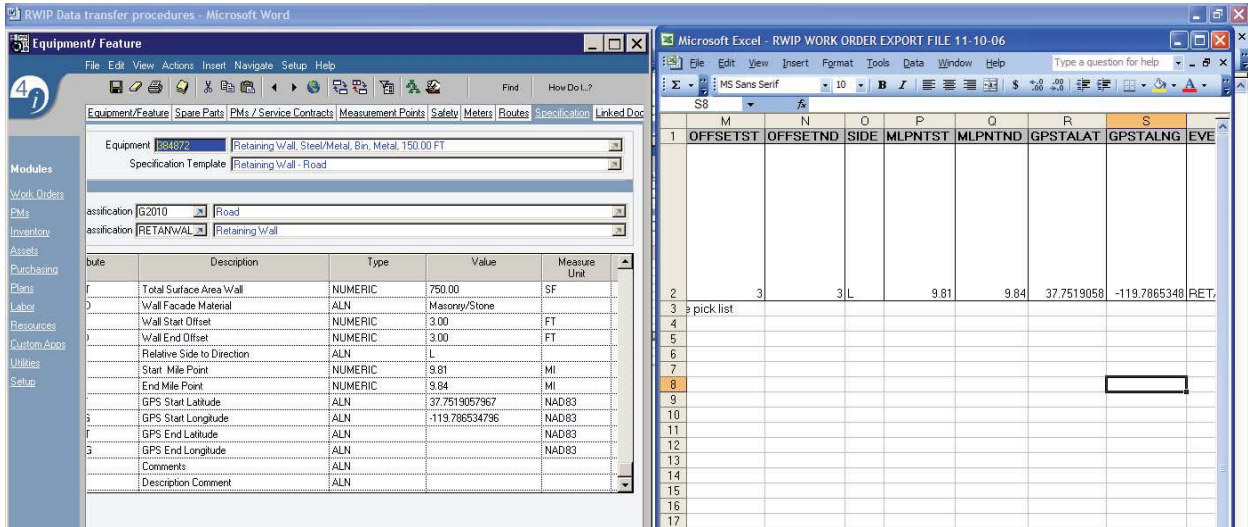
- Equipment/ Feature:** 384872
- Belongs To:** 59627 (Rte 013 Big Oak Flat Road Section 9)
- Location/ Asset:** 9849 (Rte 013 Big Oak Flat Road)
- Park Alpha Code:** YOSE
- Work Category:** 1000
- Asset Code:** 1100
- WBS Component:** G2010
- WBS SUB Component:** G204002
- Quantity:** 750
- Unit of Measure:** SF
- Total:** \$0.00
- YTD:** \$0.00
- Budgeted:** \$0.00
- Inventory:** \$0.00
- Installation Date:** [Empty]
- Warranty Date:** [Empty]
- Purchase Price:** \$0.00
- Total Downtime:** 0:00
- Up?:** [Y]
- Date:** 11/10/2006
- Modified By:** RRENAUD
- Modified:** 11/10/2006 9:01 AM

Filling out the Specification Template: Go to the Specification Tab.

Parent	E	C	D	E	F	G	H	I
1								
2	59627	384872	YOSE-0013-9-81	Metal	BM+ Bin Metal	150		5
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								

- In the classification field, select roads. In the sub-classification field, select retaining wall. This will attach the appropriate specification template to the E/F. [Note that the template shown here has not been loaded into FMSS Production as of 2-23-07.]
- Using the WIP spreadsheet, begin populating the value column for each matching field.
- Continue filling out the specification template. Save when complete.

Note that the Equipment description is auto-populated with values fields from the specification. For example: Retaining Wall, Steel/Metal, Bin, Metal, 150.00 FT.



Creating the Work Order(s): Go to the work order tracking module.

- To be considered part of the condition assessment process, the repair work order should be created as a follow-up work order to an INCAC inspection work order. Create an INCAC work order from the PM module and then find the open INCAC work order in work order tracking (Query on Location/asset number and sub work type of IN%). Change the status of the INCAC work order to INPRG. Select the “generate follow-up work” icon, auto-number and OK.
- Change work order Description as stated in the work order field on the WIP spreadsheet.
- Cut and past the repair/replace recommendations from the WIP spreadsheet into the long description of the work order.
- Select the E/F pick button to find the Retaining wall E/F or type in the retaining wall E/F number. Tab to fill in E/F description, WBS Component and Sub Component.
- In the reported by field, type WIP.
- Change status to WACOST.
- Change to Sub Work Type to reflect the type of work described in the long description.
- Delete CA from the plan type.
- Select FHWA as the cost source.
- Save the work order.

Work Order Tracking

Work Order: 143552 CAC INSPECT Rte 013 W/D Priority: 0

Location/ Asset: 9849 Rte 013 Big Oak Flat Road Loc/Eq Priority:

Equipment/ Feature: Reported By: CMILLER Reported By Date: 9/23/2002 11:48 Work Phone:

WD Status: INPRG WD Status Date: 11/10/2006 12:1 Charge to Store? N Work Type: FM

GL Account: Warranty Date: Sub Type: INCAC

WBS Component: Quantity: Park Alpha Code: YOSE

Sub Component: Measurement Unit:

Job Details | **Park Planning** | **Problems/ Follow-up Work**

Plan Type: CA Job Plan: 1321 PMIS #: Component: Work Category: 1000

Safety Plan: PM: 34599 Work Prg/Budget: Work Activity:

Service Contract: Park GPRA Goal #: Incident Name:

GPRA Goal #: Problem Code:

GPRA Goal IV:

Scheduling Information

Start Completion

Target: 9/23/2002 12:00 AM 9/23/2002 12:00 AM

Scheduled: Actual: 11/10/2006 12:19 PM

Estimated Duration: 0:00 Crew: Interruptible? N

Remaining Duration: Modify By: RRENAUD Date: 11/10/2006 12:19 PM

Generate Follow-up Work

Originating Work Order: 143552

Follow-up Work Order:

Copy Work Plan

Buttons: OK, Cancel, AutoNumber, Help

RWIP Data transfer procedures - Microsoft Word

Work Order Tracking

Work Order: 896171 Remove Trees and Repair Stone Masonry Wall W/D Priority: 0

Location/ Asset: 9849 Rte 013 Big Oak Flat Road Loc/Eq Priority:

Equipment/ Feature: 384872 Retaining Wall, Steel/Metal, Bin, Metal, 150.00 FT, 7.00 FT Equipment Up? Y

Reported By: RWIP Reported By Date: 11/10/2006 12:2 Work Phone:

WD Status: WACOST WD Status Date: 11/10/2006 12:5 Charge to Store? N Work Type: FM

GL Account: Warranty Date: Sub Type: DM

WBS Component: G2010 Quantity: Park Alpha Code: YOSE

Sub Component: G204002 Measurement Unit:

Job Details | **Park Planning** | **Problems/ Follow-up Work**

Plan Type: PMIS #: Component: Work Category: 1000

Job Plan: Cost Source: FHWA

Safety Plan: Work Prg/Budget: Long Description:

PM: Park GPRA Goal #: Repair Recommendations

Service Contract: GPRA Goal #: Remove trees growing from wall face. Remove damaged/broken masonry rock blocks, cleaning useable blocks and wasting unusable blocks. Replace damaged and missing interior wall and facing stones and mortar in place. Repair/replace damaged and missing mortar around adjacent intact blocks. Reestablish curb drainage, cleaning debris accumulated along the top of wall and adding new cubing. Cost Items

GPRA Goal IV: Labor: 4 man-days @ \$350/day = \$1,400

Scheduling Information: Dimensioned masonry, rock face finish, 4 m3 @ \$1,000/ m3 = \$4,000

Target: 9/23/2002 12:00 AM 9/23/2002 12:00 AM 8" asphalt cubing - 10 m @ \$10/ft = \$400

Scheduled: Actual: Tree removal: 2 trees @ \$100/tree = \$200

Actual: Total = \$6,000

Estimated Duration: 0:00 Crew: Interruptible? N

Remaining Duration: Buttons: OK, Cancel, Spell Check...

- Go to the Costs tab.
- In the Current Estimate Column, Service Cost field, type in the repair cost from the WIP spreadsheet.
- Change the status of the work order to COSTED and Save. For those who are proficient in FMSS, input the cost elements as shown in the long description for labor, materials and tools, on the Plans tab.

	Current Estimate	Estimate at Approval	Actual
Labor Hours	0:00	0:00	0:00
Labor Cost	\$0.00	\$0.00	\$0.00
Material Cost	\$0.00	\$0.00	\$0.00
Tool Cost	\$0.00	\$0.00	\$0.00
Service Cost	\$6,000.00	\$0.00	\$0.00
Total Cost	\$6,000.00	\$0.00	\$0.00

Continue/repeat in the same manner for other retaining walls or repair recommendations as indicated on the WIP spreadsheet. Return marked up spreadsheet to your FLHP coordinator after data input in complete. Note: If the Park determined that the work order should be a DM work order, verify that the cost was reflected in the deferred costs on the location/asset.