

# Bunker Hill Mining and Metallurgical Complex Superfund Site

## Operable Unit 3 Paved Roadway Remediation Completion Report

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Final



Prepared for:  
United States Environmental Protection Agency (USEPA) Region 10  
Successor Coeur d'Alene Custodial and Work Trust (Trust)  
Idaho Department of Environmental Quality (IDEQ)

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## Acronyms and Abbreviations

Alta	Alta Science & Engineering, Inc.
BHSS	Bunker Hill Superfund Site
CQA/QC	Construction Quality Assurance and Quality Control
EPA	U.S. Environmental Protection Agency
ESHD	Eastside Highway District
ICP	Institutional Controls Program
IDAPA	Idaho Administrative Procedure Act
IDEQ	Idaho Department of Environmental Quality
LUR	Limited Use Repository
O&M	Operation and Maintenance
OU	Operable Unit
PHD	Panhandle Health District
PS&E	Planning, Specifications, & Estimates
QA/QC	Quality Assurance and Quality Control
ROW	Right-of-Way
RSL	Remaining Service Life
SVTP	Silver Valley Transportation Plan
Trust	Successor Coeur d'Alene Custodial and Work Trust
WMS	Waste Management Strategy

## Units

mi	miles
ccy	compacted cubic yards

# BHSS OU 3 Paved Roadway Remediation Completion Report



**Prepared by:**

Date: 9/23/2021

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Alta Science & Engineering, Inc.  
Derek Forseth, Chief Executive Officer

EPA and the Idaho Department of Environmental Quality have been rigorously engaged in the development of this report and are fully aware this report is assembled based on work and information provided to Alta Science and Engineering Inc. (Alta) to which Alta, and specifically the report authors (Derek Forseth, Clint Hartz), have no direct personal knowledge and do not attest to its accuracy or completeness or make any warranty or representation other than to state that the information was assembled to the best of our abilities.

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## Section 1 Introduction

This report documents the completion of the Paved Roadway Surface Remediation Program (Paved Roadway Program) in Operable Unit 3 (aka the “Basin”). Documentation of completion of Operable Units 1 and 2 (the “Box”) as part of the Paved Roads Program remedial action can be found in the *Bunker Hill Mining and Metallurgical Complex Superfund Site Operable Units 1 and 2 Paved Roadway Remediation Completion Report (Alta, 2021a)*.

### 1.1 Background

The U.S. Environmental Protection Agency (EPA) and the Idaho Department of Environmental Quality (IDEQ) developed a Roadway Surface Remediation Strategy (Strategy) in 2012 to define how to address public roads in the Bunker Hill Superfund Site (BHSS) as part of the site’s greater remediation approach. The Strategy was developed to protect human health by providing durable barriers to contamination underlying paved roads in the communities (IDEQ, 2012). The Strategy provided a mechanism to address, on a one-time basis, the deterioration of road surfaces damaged from heavy vehicle traffic during remediation activities. As a condition for this one-time repair, local jurisdictions agreed to continue to maintain roadway surfaces as part of providing basic services to the communities they serve with no ongoing commitment from EPA. (USEPA, 2017).

Paved roads provide barriers to underlying contamination and are therefore a component of the human health barriers cleanup. The Paved Roads program was established in response to the communities’ recognition that damage to roads in community areas had occurred over a number of years from cleanup activities, and the 2010 Five-Year Review recommendation to develop an approach for addressing roads as long-term barriers in collaboration with state, county, and local entities. (USEPA, 2015)

The Strategy applies to a specific list of existing public roads located within the administrative boundaries of the Institutional Control Program (ICP) in all three Operable Units (OU) of the BHSS. These OUs refer to two distinct cleanup areas; OU1 and OU2 comprise the 21-square-mile area known as the Box, where OU1 comprises the populated areas and OU2 contains the unpopulated areas. OU3 refers to the areas outside of the Box known as the Basin. The Basin is the focus of this report and the jurisdictions of this OU include Shoshone County, the Eastside Highway District (ESHD), and the Cities of Osburn, Wallace, and Mullan.

Prior to 2012, EPA and IDEQ’s cleanup work in communities had initially focused on remediating contaminated residential and commercial properties, common-use areas such as parks and playfields, and a limited number of right-of-ways (ROWs) including unpaved roads and road shoulders. These remedies were targeted based on the guidance provided from three Records of Decision (ROD) that the EPA published following the BHSS’s listing on the National Priorities List (NPL) in 1983. As property cleanups in the Basin neared completion, EPA and IDEQ began to address public roads in all three OUs to ensure the long-term effectiveness of roads and road shoulders that act as part of the remedies for the BHSS (USEPA, 2017). The inclusion of ROW remedial action in the RODs meant that the EPA recognized the need for clean roadway surfaces to serve as protective barriers between contaminated materials that lie under those surfaces and people living near and using those roadways (IDEQ, 2012). Through this declaration, the EPA and IDEQ were able to pursue public roadway cleanup and develop the Paved Roads Program within the Strategy.

For the Basin, the Strategy included identifying and approving proposed projects, dispersing funds from the Successor Coeur d’Alene Custodial and Work Trust (Trust) to local jurisdictions

to design and construct the projects, constructing the projects, and documenting the completed work. The local jurisdictions had responsibility of planning and constructing the projects and documenting completed work. (USEPA, 2017).

## 1.2 Related Programs

The Paved Roads Program was developed along with two other programs to protect clean or remediated residential, commercial, and public properties from contamination or recontamination. These programs included the Basin Unpaved Roads (or Gravel Roads) and the Basin and Box Remedy Protection Programs. Gravel road remediation in the Box had been previously completed by the EPA and the Upstream Mining Group. Remedy Protection Projects were addressed in the Upper Basin Record of Decision (ROD) Amendment (USEPA, 2012) and the Basin gravel roads were addressed under the Basin Property Remediation Program (BPRP). The Remedy Protection Program is noted because some of the Paved Roads Program remediation work was completed during installation of storm drainage infrastructure as part of the Remedy Protection Program as noted in the Final Paved Roads List found in Appendix A.

## 1.3 Report Organization

This report is organized into sections conforming with EPA guidance on Remedial Action Completion Reports as modified at the request of EPA and IDEQ to align with the unique aspects of the paved roads program.

- **Program Implementation** describes the process of putting the Paved Roads Program into effect. The elements of this process include roadway eligibility criteria, program administrative authority, and jurisdictional timelines.
- **Program Funding and Costs** details the allocation of Paved Roads Program funding to the individual jurisdictions and a breakdown of how much of the funding was spent on the most common expenditures observed during the projects.
- **Remedial Action Activities** describes the specific steps that were taken to remediate the selected eligible roadways. This includes types of remediation treatments, waste disposal, and deviations from the Strategy.
- **Construction Quality Assurance** describes the process of implementing the performance-based standards by which the remediation projects were held to, to ensure that the level of quality of the completed work met the expectations originally outlined in the Strategy. This process included Quality Assurance and Quality Control (QA/QC) record keeping, material verification sampling, and construction oversight monitoring.
- The **Documentation** section describes the types of implementation documents that were collected throughout the duration of the Paved Roads Program. These records ranged from project applications, documentation audits, and certifications of project completions.

## Section 2 Program Implementation

The Strategy applied to existing public roads located within the administrative boundaries of the ICP. This meant that the program was intended to remediate roads meeting the following criteria (IDEQ, 2012):

1. Immediately adjacent to remediated residential and commercial properties;

2. May have been impacted by heavy truck and equipment traffic used in the cleanup; and
3. Have a remaining service life (RSL) of 10 years or less.

## 2.1 Administrative Authority

The administrative authority of the program was organized as follows (IDEQ, 2012):

### EPA

1. Provided funding for paved road surface remediation projects in the Box
2. Provided oversight and direction to IDEQ and the Trust
3. Reviewed and approved proposed paved road remediation projects in the Box and Basin for funding
4. Reviewed and approved post-construction documentation of work completed in the Box and Basin

### IDEQ

1. Administered/distributed funds to local jurisdictions for paved road surface remediation projects in the Box
2. Reviewed and approved, with EPA, proposed paved road surface remediation projects in the Box for funding
3. Reviewed and provided advice to EPA with regard to proposed paved road surface remediation projects in the Basin for funding
4. Reviewed and approved, with EPA, post-construction documentation of work completed in the Box
5. Reviewed and provided advice to EPA with regard to approval of post-construction documentation in the Basin

### Trust

1. Administered/distributed funds to local jurisdictions for approved paved road surface remediation projects in the Basin
2. Reviewed proposed paved road surface remediation projects in the Basin for funding and provided input to Roads Board
3. Reviewed post-construction documentation of work completed in the Basin and provided input to Roads Board

### Panhandle Health District (PHD)

1. Permitted paved road surface remediation projects in the Box and Basin
2. Administered the ICP to ensure roads continue to serve as effective barriers to underlying contamination

### Roadway Surface Remediation Board (Roads Board)

The Roads Board was created to oversee the program and ensure that the basic elements of the program were implemented during the approved projects. The Roads Board was comprised of a project manager from EPA, a manager from IDEQ, and a roads technical expert. The Roads Board also possessed the ability to make decisions throughout the program that were consistent with the ROD(s) and policies established by EPA and IDEQ. The Roads Board's specific roles and responsibilities were as follows:

1. Provided assistance to aid local jurisdictions in preparing roadway surface remediation project proposals
2. Reviewed and provided recommendation for approval from EPA for funding proposed paved road surface remediation projects
3. Reviewed and approved post-construction documentation of work completed

4. Reviewed and approved invoices for payment
5. Developed guidelines and policies to ensure local road jurisdictions are compliant with the basic elements of this strategy, ROD, and state and federal procurement requirements.

### Local Jurisdictions

The local jurisdictions were responsible for the project planning, project construction, and documentation of the completed work (IDEQ, 2012). Specifically, this meant these duties were broken down as follows:

1. Conducted planning for paved road surface remediation projects within their jurisdiction
2. Developed and submitted proposals for paved road surface remediation projects
3. Constructed paved road surface remediation projects
4. Developed and submitted post-construction documentation of paved road surface remediation projects
5. Perform Operation and Maintenance (O&M) activities on completed road surface remediation projects
6. Performed any necessary surveying and ROW clearance, public outreach, or public noticing of planned paved road remediation projects

The program was implemented over a multi-year period as shown in Table 1.

**Table 1. Program Timeline**

Activity	Approximate Date
<b>Record of Decision</b>	September 12, 2002
<b>Interim Record of Decision Amendment</b>	August 2012
<b>Remedial Design Start</b>	April 16, 2013
<b>Remedial Action Start</b>	August 5, 2013
<b>Remedial Design Completion</b>	June 30, 2020
<b>Construction Complete</b>	October 2020
<b>Remedial Action Completion</b>	September 30, 2021

## 2.2 Paved Road Remediation Eligibility

The Strategy relied on roadway inventories and transportation planning information developed by the local jurisdictions. See the Strategy (IDEQ, 2012), the Strategy Revision 1 dated May 5, 2016 (Harwood, 2016), and Coeur d’Alene Basin Paved Roads Inventory and Remaining Service Life Maps, TerraGraphics, 2012 and Updated Maps, TerraGraphics, 2014.

When developing the Strategy, a critical component of assessing a roadway’s eligibility for remediation was the pavement RSL rating system. The RSL rating system refers to the anticipated number of years that a road surface would be functionally and structurally acceptable with only routine maintenance. A roadway’s rating was based on pavement condition

survey results, where a RSL value of 0 indicated the poorest possible condition and a RSL value of 20 indicated the best condition. The Strategy used this RSL system as a general indicator of what effect BHSS remediation activities had on the roadways. The RSLs developed in the Strategy were based on the Silver Valley Transportation Plan (SVTP).

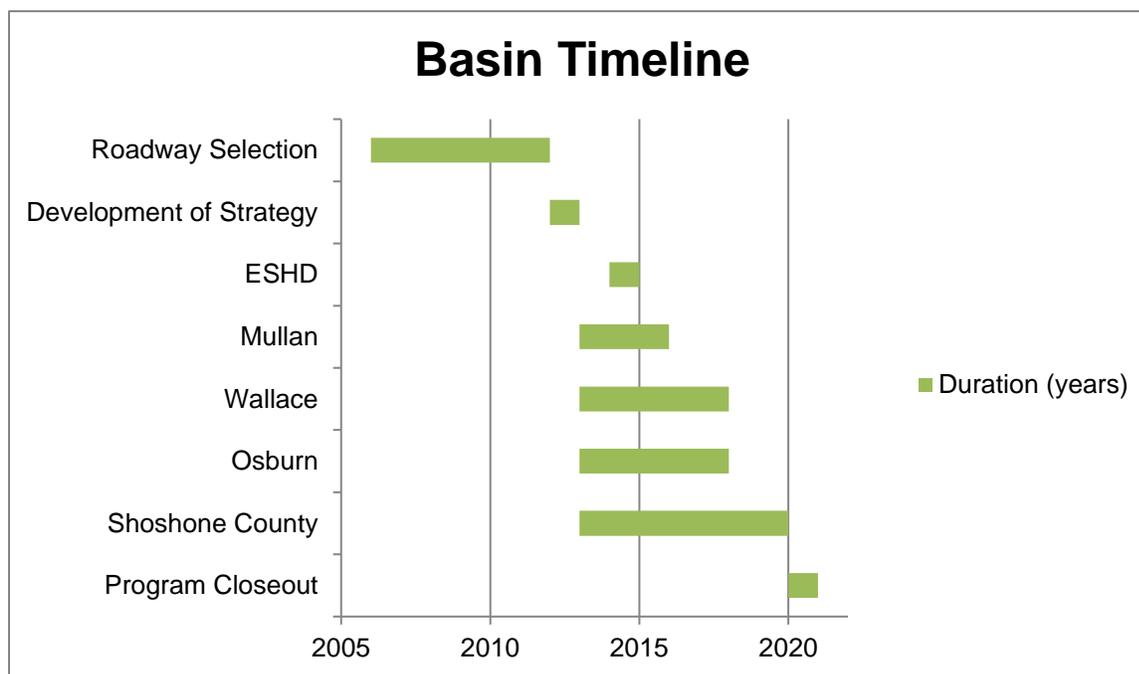
The rationale for selecting roads to be addressed in the Paved Roads Program is noted in Section 5 of the Strategy (IDEQ, 2012). In order for the EPA to approve the Basin Paved Roads Program for funding by the Trust, a determination needed to be made that heavy truck traffic from property remediation contributed to wear and tear of the roads near those properties (Harwood, 2016). As a result, to be included in the program, road segments needed to have an RSL value of less than 10 years when the compilation of road segments was developed in 2011, and they needed to be along areas where properties were remediated. This 10-year service life cutoff was chosen by EPA and IDEQ after reviewing the type and extent of defects that correlated to particular RSL values. This analysis determined that RSLs of 10 or less corresponded to roadway surfaces that were no longer functioning as acceptable contamination barriers, due in part to prior remediation activities. Roadways with RSLs above 10 were deemed to be functioning.

Adhering to these eligibility criteria, the program developed a list of 592 eligible road segments with 337 eligible roads in the Basin. When the program ended in 2020, 319 of the originally identified eligible Basin road segments were remediated.

### 2.3 Implementation by Local Jurisdictions

The Paved Roads Program was implemented in 2013 and ended in 2020. Some of the remediated road segments were completed in conjunction with other public infrastructure projects that the local jurisdictions were working on. These other projects in the Basin were part of the Remedy Protection Program, which is discussed in further detail in Section 4.5. Figure 1 shows the timeline of the Paved Roads Program implementation in the Basin.

**Figure 1. Paved Roads Program Timeline in the Basin**



### Section 3 Program Funding and Costs

A total of \$24 million was allocated for the Basin roads jurisdictions (IDEQ, 2012). At the conclusion of the Paved Roads Program, a total of \$23,784,810.95 was spent in the Basin. Funding of paved road surface remediation work within the Basin was provided by the Trust.

The Strategy was revised (Revision 1; Harwood, 2016) in 2016 in part to allow unused funding allotments from jurisdictions that completed their segments to be utilized by other jurisdictions to remediate as many segments in the program as possible.

Table 2 presents the total project cost by Basin jurisdiction as provided by the Trust.

**Table 2. Total Project Costs in the Basin**

Basin Jurisdictions	Preliminary Maximum Allotted Funding	Final Project Expenditures
<b>Osburn</b>	\$ 4,891,000	\$ 4,324,699.48
<b>Wallace</b>	\$ 4,485,000	\$ 3,630,054.62
<b>Mullan</b>	\$ 4,661,000	\$ 2,780,472.01
<b>Shoshone County</b>	\$ 9,020,000	\$ 12,203,904.69
<b>Eastside Highway District</b>	\$ 943,000	\$ 845,680.15
<b><u>TOTAL</u></b>	<b><u>\$ 24,000,000</u></b>	<b><u>\$ 23,784,810.95</u></b>

The Strategy established caps on planning, engineering, and contract administration costs. Jurisdictions were authorized by the Roads Board to spend 1% of their total allocation on Planning. Up to 9% of the remaining allocation was authorized for engineering. Another 5% of the construction contract price was authorized within the allocation for contract administration and construction oversight.

#### 3.1 Program Implementation

Implementation of the Paved Roads Program was managed by the Roads Board as described in Section 7 of the Strategy (IDEQ, 2012). The jurisdictions were responsible for all other aspects of implementing the program.

As noted in Revision 1 of the Strategy in 2016 and the Final Paved Roads List Appendix A, much of the road work treatments such as chip-sealing proposed in the SVTP was considered insufficient to ensure that a sustainable barrier to contaminated road base materials would be provided. Therefore, 1% of the allocation was allowed for planning to determine ways to optimize the allocated funding while improving the roads as barriers.

The Paved Roads Program was implemented in 2013 with 337 eligible road segments in the Basin based on the original roadway inventory and subsequent reviews by the jurisdictions and the Roads Board. The program ended in 2020 with 18 road segments remaining unaddressed in the Basin. This limitation was explained to the jurisdictions in the roll out of the program. However, actual planning, engineering, and road construction costs came in much lower and almost all of the eligible road segments were remediated. This included some that were added

during the program because they were inadvertently left off the original inventory list due to limited data and discrepancies in the Geographics Information System inventory.

In the Basin, the Cities of Osburn and Mullan remediated all of their eligible roadways. Shoshone County ended the program with 17 incomplete road segments and the City of Wallace ended with 1 incomplete road segment. Each jurisdiction signed forms agreeing to accept the O&M responsibilities for their own road segments as a condition of being part of the program and receiving funding.

Engineer's Certificate of Completion and Project Record Drawings are included in Appendix B and Appendix C, respectively.

## **Section 4 Remedial Action Activities**

This section describes the types of remedial actions implemented. The jurisdictions were responsible for determining which surface treatments were needed for their eligible roads segments and then submitting these treatment plans to the Roads Board for approval. These treatments were developed through visual inspection and from the consultation of a selected and qualified engineer. Project experience also helped guide the treatment selection process, as the jurisdictions, engineers, and contractors gained more insight into the most effective methods for remediating the road segments during the program. The Roads Board did not determine or prescribe roads treatments.

### **4.1 Remediated Roadways**

In the Basin, 319 road segments were remediated. The treatment types used for the remediation of these roads in the Basin were completed using four primary methods; 1 - Rebuild, 2 - Mill/Overlay, 3 - Seal Coat, and 4 - Fog Seal. The rebuild treatment was the most commonly used method among the Basin jurisdictions and was also the most involved treatment type. Rebuilt roadways underwent excavation and removal of existing surface material and the existing roadway fill material. Once the existing material was removed, the road was then rebuilt with a cross section designed by the jurisdiction. Generally, roadway rebuilds involved geotextile fabric overlain with clean, imported fill material and 3 inches of an approved asphalt mix. All work fell under ICP jurisdiction and permits were required.

The next most used treatment method in the Basin was the mill/overlay option. This treatment process involves the milling, or removal, of a portion of the existing asphalt and then overlaying the milled road section with a new layer of asphalt. Milling and overlaying involves the use of heavy, specialized equipment and is typically more cost effective than a full rebuild, but more costly than a seal coat.

Next was seal coating, which was used just a little less than the mill/overlay option. Seal coating isn't as involved as a rebuild, but still provides an important level of treatment. A seal coat is an asphalt bitumen, or other synthetic mixture, that has been heated in order to render the substance viscous and then able to be sprayed on a roadway. The asphalt bitumen is a binding substance made from the by-products of refined crude oil and is used in asphalt road construction. This sprayed coating acts as a wearing layer on the surface of the asphalt that helps to preserve the longevity of the road by protecting it from water infiltration and excessive wear from vehicle traffic.

The fog seal was the most sparingly used treatment in the Basin. A fog seal is the light application of a diluted, slow-setting asphalt emulsion to a pavement surface. This treatment is

very cost effective and best served on low traffic volume roads where a light surface restoration or rejuvenation is needed.

Table 3 shows a breakout of the roadway treatments by jurisdiction as provided by IDEQ.

**Table 3. Project Treatment Types**

Jurisdiction	Rebuild (mi)	Mill/Overlay (mi)	Seal Coat (mi)	Fog Seal (mi)	Number of Road Segments
<b>Osburn</b>	10.77	0.96	0	0	98
<b>Wallace</b>	4.88	0.07	0	0	46
<b>Mullan</b>	6.14	0	0	0	63
<b>Shoshone County</b>	28.17	0	1.41	1.27	103
<b>Eastside Highway District</b>	0	5.64	1.65	0	9
<b><u>TOTAL</u></b>	<b><u>49.96</u></b>	<b><u>6.67</u></b>	<b><u>3.06</u></b>	<b><u>1.27</u></b>	<b><u>319</u></b>

mi = miles

## 4.2 Deviations from Paved Roads Strategy

An important part of the Paved Roads Program was that the Strategy allowed for adjustments to the implementation methodology to occur. The initial drafting of the Strategy by the EPA and IDEQ was intended to address the roadway remediation needs within the affected communities. It was based on the best available information and data at the time the Strategy was initially drafted in 2012 and when it was revised in 2016. As program implementation moved forward, it was found that some of the source data was either inadequate or inaccurate.

Some road segments initially identified for the program were later found to be inaccurate due to incorrect names, misidentified end points, and incorrect locations of the road segments.

Funding levels listed in the original Strategy were imprecise due to initial cost information being based on preliminary estimates and not actual construction bids. This discrepancy meant that some jurisdictions were either overfunded or underfunded. The original Strategy did not specify how excess remedial funds could be shifted amongst jurisdictions in order to complete as much work as possible. As work proceeded, project costs were changing and mostly coming in lower than initial estimates. The Roads Board reallocated funds amongst the jurisdictions as entire communities were completed.

## 4.3 Roadways Not Remediated

The remaining 18 untreated roadways in the Basin were not completed due to a determination that other roads had greater needs and would be prioritized. By the time that the higher priority

roads were completed, the Paved Roads Program had exhausted all remaining funds and was therefore unable to finish the remaining roads. These roads are listed in Table 4 below and in Appendix A.

**Table 4. Remaining Incomplete Basin Roads**

Reference #	Road Name	From Street	To Street	Length (mi)	Jurisdiction
14	Coeur d'Alene Mine	Silver Valley	E. Mullan (gravel road)	0.06	Shoshone County
33	Friday	City Limits (Mullan)	Atlas	0.07	Shoshone County
37	Green	Green (terminus)	Buds	0.14	Shoshone County
44	Hunt Gulch	Silver Valley	Gravel Road (private)	0.12	Shoshone County
45	Isabelle	Silver Valley	Isabelle (terminus)	0.16	Shoshone County
57	Mullan (alley)	Mullan/Silver Valley	Mullan	0.09	Shoshone County
81	Placer Creek	King	874 ft South of King	0.21	Shoshone County
89	Reinoehl	Birch	End of Pavement	0.35	Shoshone County
99	Riverview	Gravel Road (private)	Shiplett	0.34	Shoshone County
100	Riverview	Box/Basin Limit	Tom Sawyer	0.50	Shoshone County
138	W. Fork French Gulch	French Gulch	End of Pavement	0.74	Shoshone County
139	W. Fork Pine	Trusty	Barker	0.04	Shoshone County
140	W. Fork Pine Creek	Barker	Village	0.38	Shoshone County
145	Wind River	Wind River (terminus)	Yellowstone	0.13	Shoshone County

Reference #	Road Name	From Street	To Street	Length (mi)	Jurisdiction
147	Wright	Silver Valley	Shiplett/Silver Valley	0.15	Shoshone County
157	Fifth	Western	Markwell	0.20	Shoshone County
42	Sixth	I90/Nine Mile	Pine	0.04	Wallace

#### 4.4 Remedial Action Waste Disposal

Waste generated during the implementation of the Paved Roads Program was sent to specifically engineered and constructed disposal sites that are designed to reliably contain materials and prevent contaminants from being released to surface water, groundwater, or air in concentrations that will cause state and/or federal standards to be exceeded (BEIPC 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021). Paved Roads Program waste was sent to the Limited Use Repositories (LURs) located throughout the BHSS and other repositories that were in close proximity to the work, in order to minimize transportation distances and costs.

For work done in the Basin, the roads waste generated was sent to the Osburn LUR, Transfer Station LUR, East Zanetti LUR, Big Creek Repository, Big Creek Repository Annex, and the Lower Burke Canyon Repository. Table 5 below shows the estimated total volume of roads waste delivered to the aforementioned Basin disposal sites throughout the duration of the Paved Roads Program as determined from the Waste Management Strategy (WMS) reports, its subsequent updates (Alta, 2019c, 2020, 2021b and TerraGraphics 2015, 2016a), and the Basin Environmental Improvement Project Commission (BEIPC) Annual Reports (BEIPC 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021). Most of the waste volume estimations presented below in Table 5 were partially determined using truck counts with the assumption that one truck load is equivalent to 9 compacted cubic yards (CCY) of waste. Refer to the construction completion reports of the completed repositories for more information of the waste disposal at those sites. The completed sites include the Osburn LUR (TerraGraphics, 2016b), Transfer Station LUR (Alta, 2019b), and the East Zanetti LUR (Alta, 2019a).

**Table 5. Approximate Volume of Remedial Action Waste Generated by the Paved Roads Program in the Basin**

<b>Disposal Site</b>	<b>Waste Volume Placed (CCY)</b>
<b>Osburn LUR</b>	28,548
<b>Transfer Station LUR</b>	19,200
<b>East Zanetti LUR</b>	28,500
<b>Big Creek Repository</b>	55,530
<b>Big Creek Repository Annex</b>	6,417
<b>Lower Burke Canyon Repository</b>	13,257
<b><u>TOTAL</u></b>	<b><u>151,452</u></b>

ccy = compacted cubic yards

#### **4.5 Work Completed Under Other Concurrent Programs**

There were 32 total roadways completed concurrently with Basin Remedy Protection projects. The remedy protection projects included:

- Osburn (5 roads)
  - Meyer Creek (2013)
    - Road Reference #'s: 36, 60, 61, 62, and 79
- Mullan (21 roads)
  - Copper Street/Boulder Creek (2016-2017)
    - Road Reference #'s: 3, 4, 10, 11, 28, 29, 35, and 37
  - Third Street (2013)
    - Road Reference #'s: 2, 34, 36, 52, 53, and 54
  - Dewey Street (2013)
    - Road Reference #'s: 7, 24, 62, and 63
  - Tiger Creek (2018-2019)
    - Road Reference #'s: 12
  - Mill Road (2015)
    - Road Reference #'s: 30, and 31
- Shoshone County (6 roads)
  - Revenue Gulch, Silverton (2016-2020)
    - Reference #'s: 21, 54, 91, 104, and 130

- Mill Road, Mullan (2015)
  - Road Reference #'s: 11

Further discussion about these Remedy Protection projects is outside the scope of this report, but if more information is desired then refer to the as-built documentation completed for each project.

## **Section 5 Construction Quality Assurance**

### **5.1 CQA/QC Roles and Responsibilities**

Construction Quality Assurance/Quality Control (CQA/QC) refers to the execution of tasks that ensure construction is safely completed on time and within budget according to project plans and specifications.

In regard to the implementation of the Paved Roads Program, the local jurisdictions were given sole responsibility for CQA/QC. The Paved Roads Program did not establish specific design standards, tolerances, specifications, or other design-based elements for which the jurisdictions were obligated to adhere to. Instead, the jurisdictions were responsible for developing their own design standards given their allocation of resources that complied with the objectives described in the Strategy and the established regulations set forth by local, state, and federal regulatory agencies. Once these design standards were developed, it was then incumbent on the jurisdictions to establish and maintain safe work zone conditions that protected workers and the communities alike, while allowing for timely completion of the projects. The jurisdictions were also responsible for ensuring that the quality of the completed work satisfied expectations laid out in the approved design plans and in the objectives described in the Strategy.

The Roads Board, while not having a role in CQA/QC, was involved with reviewing Plans, Specifications, and Estimates (PS&E) and reviewing change order submissions. The Roads Board performed periodic site visits to observe construction progress and the conclusion of project construction. At the post-construction walk-through, the Roads Board would review the work for compliance with the approved design and bid package.

The Trust did not have direct CQA/QC duties. The Trust acted solely as the funding entity for Basin Paved Roads Program projects. Additionally, under the Remedy Protection program where a number of road segments were completed, the Trust assumed the role of financial administrator and the design and construction manager. With these designations the Trust managed the planning of the technical and administrative components of the Remedy Protection projects in the Basin.

PHD was also not responsible for any workmanship CQA/QC but they were in charge of running the ICP program and ensuring that all Paved Roads Program work was in compliance with their regulations and guidelines. Since the ICP was created to locally enforce rules that maintain the integrity of clean soil and other protective barriers, the program focused on monitoring the clean material imported for projects and the safety measures taken by contractors and jurisdictions to ensure that contaminated soil didn't become mobilized into the communities during construction. To exercise this authority, PHD set standards to which clean imported construction material was held in addition to regular site visits to monitor construction methods. The ICP standard for acceptable heavy metal concentration levels in clean import earthen material in the Basin can be seen in Table 6 below.

**Table 6. Basin Imported Barrier Contaminant Acceptance Levels**

Contaminant	Sample Concentration Level
Lead	< 100 ppm
Arsenic	< 35 ppm
Cadmium	< 5 ppm

## 5.2 Methods Used for QA/QC within the Jurisdictional Contract Documents

The QA/QC outlined within the jurisdictional contract documents was facilitated through project submittal approval. Submittals were informational documents that provided data on the materials that the contractor intended to use for a project. The project contracts specified that the engineer had the responsibility of determining which submittals would be required, and the contractor was responsible for sourcing the needed construction materials and submitting the required data to the engineer for approval.

For the Paved Roads Program, submittals were typically organized into the following four categories:

1. **Pre-Construction:** These submittals pertained to scheduling, Best Management Practices (BMP) plans, proof of regulatory certifications, and required permitting. Examples included:
  - a. Contractor’s Schedule
  - b. Stormwater Pollution Prevention (SWPP) Plan
  - c. Traffic Control Plan
  - d. Site Control Plan
  - e. Health and Safety Plan
  - f. ICP Permit
  - g. Dust Control and Decontamination Plans
2. **Product Data:** Refers to submittals that showed the specifications of selected construction material that the contractor intended to use on the project. Examples included:
  - a. Asphalt Mix Design
  - b. Concrete Mix
  - c. Aggregate Material Composition and Gradation
  - d. Geotextile Fabric
  - e. Pavement Line Paint
3. **Test Reports:** Refers to submittals that provided the results from analytical tests that were performed on project materials to ensure that the materials intended for use met the required design criteria. Examples included:

- a. Asphalt and Road Base Compaction
  - b. Aggregate Material Analysis
  - c. Imported Backfill Analysis
4. **Post-Construction:** These submittals pertained to the closeout documentation that was necessary to certify the project as complete. The primary example of this was the as-built drawings that the contractor was required to submit following construction completion.

These submittals did vary from project to project, depending on what the design called for. The required submittals were organized and tracked typically in a Submittal Register that was updated throughout the projects.

### 5.3 Project Analytical Sampling

Analytical sampling was performed regularly throughout each of the projects to ensure that construction quality was in compliance with the Paved Roads Program's objectives. At a minimum, all sampling and materials analysis done during the program adhered to the requirements set forth by the ICP, the American Association of State Highway and Transportation Officials (AASHTO), the American Society for Testing and Materials (ASTM), and the Idaho Standards for Public Works Construction (ISPWC).

To achieve ICP compliance, the jurisdiction's construction contractor was required to be approved for an ICP contractor's permit. This permit demonstrated that the contractor's Site personnel had successfully completed the requisite ICP training course testing and that the contractor acknowledged the job responsibilities that were required for any work done within the BHSS. An important component of this permit required that all imported earthen material, like that used for new road base, must be tested and found to meet ICP import requirements. These requirements can be found in greater detail in Section 41.01.01 of the Idaho Administrative Procedure Act (IDAPA).

Additional testing was needed for all aggregate and asphalt mix material used. This testing included material source analysis such as gradations, sand equivalent, hardness, heavy metal levels, maximum dry density, and optimum moisture content. In-place testing was also done on compacted road sub-grades and any asphalt that was placed. These tests included moisture and compaction density testing using portable nuclear gauge testing procedures.

The contractor was obligated to use a certified lab and construction materials testing firm to produce the analytical testing results. All of the corresponding test results were submitted to the engineer, who was given the authority by the jurisdictions to reject materials or workmanship that were found to not be in compliance.

### 5.4 Performance Standards Monitoring

Performance standards monitoring is the sole responsibility of the jurisdictions. If workmanship or natural deterioration issues do arise following construction, it is the responsibility of the jurisdictions to rectify the issues at no additional cost to the Paved Roads Program.

Each project contract customarily included a warranty period provision agreed upon between the jurisdiction and the contractor. This period went into effect for a predetermined amount of time after the work was deemed to have achieved substantial completion. It required that the contractor fix any issues with the project that arose due to defective workmanship at their own

expense. This warranty provision was usually active for one year for Paved Roads Program projects.

Construction quality requirements for the Paved Roads Program are defined in the contract documents and typically cover all of the materials and labor required for rebuilding street sections, paving, stormwater, and other related items. Signs of defects to this work that jurisdictions look for include road sagging, poor surface drainage, and premature pavement deterioration. These issues, among others, can arise from a variety of workmanship problems such as poor sub-grade compaction, water leakage from underground piping installed, thin layers of asphalt, and inadequate surface grading. After the expiration of the warranty period, all subsequent corrective work must be completed by and at the expense of the jurisdiction.

The completion of Paved Roads Program projects and the results of monitoring efforts will be documented in future Five-Year Reviews for the BHSS. The most recent updates can be found in the 2020 Five-Year Review (USEPA, 2021).

## **Section 6 Documentation**

The following sections describe the documentation process of seeing a Paved Roads Program project through to completion. This includes project application, project approval, funding procurement, auditing, and close-out certification.

### **6.1 Project Application and Approval**

Each jurisdiction was responsible for setting its priorities for identifying prospective projects for their roadways that were listed on the Final Paved Roads List. The jurisdictional planning activities associated with organizing priorities were subject to evaluations by the Roads Board to ensure that they were consistent with the rationale and scope outlined in the Strategy.

When projects were identified and a jurisdiction was ready to move forward with design and implementation, the jurisdiction would submit proposals to the Roads Boards for review on an annual basis. The content requested as part of the proposals can be found in Section 7.1 of the Strategy (IDEQ, 2012).

Upon receiving the proposals, the Roads Board would evaluate them, at a minimum, based on the following criteria:

1. Inclusion and completeness of the information described in Section 7.1 of the Strategy.
2. Additional relevant information that demonstrates how the project intended to meet the objectives of the Site remediation and the Strategy.
3. For proposed projects ensure cost estimates reflected Davis-Bacon wages, where applicable.
4. The discussion of the need or desire to implement the proposed project with other community infrastructure work, if any. This was meant to address the implications of project coordination with the road surface remediation project implementation timeline.

Once a proposal review was complete, then the jurisdiction received written notification from the Roads Board for one of the following three outcomes (IDEQ, 2012):

1. Proposal approval and recommendation to EPA for funding.
2. Additional information required before an approval or disapproval decision can be reached.

3. The proposal is disapproved and does not qualify for funding.

If a proposal was approved then the jurisdiction would move forward with putting together the final proposal package that included final construction drawings, final engineer's estimate, description of potential project waste, and bid documents. This final package would go through another review process by the Roads Board. Upon approval of the final package, the Roads Board would notify EPA in writing and the jurisdiction would then be responsible for working with the designated funding entity, which in the Basin was the Trust, to make sure that adequate funding was available. If funding was available, then the jurisdiction would move forward with the contractor bidding process.

## **6.2 Project Records**

An important responsibility of the jurisdictions during the implementation of a Paved Roads Program project was to maintain adequate project records. These records were to be kept and made available by the jurisdictions for review by the regulatory agencies of the Paved Roads Program. An example of the project record checklist that the jurisdictions were obligated to adhere to can be found attached to this report as Appendix D.

## **6.3 Contract Administrative Record Verifications**

IDEQ performed periodic documentation reviews using the form provided in Appendix D on behalf of the Roads Board during the initial years of the Paved Roads Program. These reviews were meant to make sure that the jurisdictions were adhering to the minimum documentation requirements provided in the subgrant agreements with the local jurisdiction.

## **6.4 Closeout and Certification**

When a project was deemed to have fulfilled the objectives outlined in the final design package and was fit to be used for its intended purpose, a substantial completion inspection was performed by authorized representatives for the jurisdiction, the engineer, and the contractor. When the project passed inspection, the engineer issued a Certificate of Substantial Completion to the jurisdiction and the contractor. Attached to this would be a construction punch-list that listed remaining work requiring immediate attention in order for the contractor to receive final payment. The issuance of this letter marked the beginning of the contractual correction period where applicable warranties were required for the completed work. These letters are included in this report as Appendix B. The inspection prior to the completion of punch list items is considered the pre-final inspection for each road segment. Final inspection occurred after punch list items were addressed and was performed by the jurisdiction, these were conducted annually prior to the close of the construction season. The road technical support member of the Roads Board either joined in these inspections or performed separate inspections during and after construction completion of each road segment. This member of the Roads Board, or the Roads Board as a whole, communicated any issues or considerations to the jurisdiction to resolve prior to submitting as-built drawings.

Following completion of project construction, the jurisdictions would submit as-built or record drawings with the stamp of a certified engineer to the Roads Board for final review and approval. These drawings show the exact layout of the completed work which includes any approved deviations made from the final design plans during the construction process. Once approved, the as-built drawings were combined with the project proposal and final design

package to act as final documentation for the project. The as-built drawings were also sent to PHD for their records. These drawings are included in this report as Appendix C.

## **Section 7 Operations and Maintenance**

Once an approved project was certified as complete for a road segment, the Roads Board would officially indicate its completion on the Final Paved Roads List. After this designation, any subsequent work or maintenance on the road segment became the responsibility of the local jurisdiction, subject to the requirements of the ICP (Harwood, 2016). This work is expected to be routine in nature and is referred to as O&M. These O&M activities are necessary to ensure that the new protective barriers installed during the program are maintained and function as intended. An acknowledgement of the need for O&M and who bears the responsibility of it was found in the project application forms and on the formal project approval letters delivered to the jurisdictions from the Roads Board. The project approval letters are found in Appendix E.

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**Appendix A**  
**Final Basin Paved Roads List**

**Appendix B**  
**Certification Letters**

**Appendix C**  
**As-Built Drawings**

**Appendix D**  
**Example Records Review (Wallace)**

**Appendix E**  
**Roads Board Approval Letters to Jurisdictions**