

Phase I Bond Release Application
J19, J19 West (J19W), and N9 Coal Resource Areas, Kayenta Mine

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PUBLIC NOTICE

Peabody Western Coal Company (PWCC) has filed an application with the Office of Surface Mining Reclamation and Enforcement (OSMRE) for bond release on a portion of the lands in the J19, J19W, and N9 Coal Resource Areas (CRAs) within the Kayenta Mine Permit AZ-0001F. PWCC is seeking a release of Phase I bond liability for a portion of the J19, J19W, and N9 areas currently under bond with Zurich American Insurance Company, Continental Casualty Company, National Fire Insurance Company of Hartford, Federal Insurance Company, Liberty Mutual Insurance Company, Indemnity National Insurance Company, and Travelers Casualty and Surety Company of America. PWCC is seeking a reduction in bond of \$20,299,758 under the Phase I application from the total J19, J19W, and N9 bond amount of \$79,830,381. The total combined bond for Kayenta Mine is \$178,569,992.

The Phase I bond release application consists of information currently contained in the AZ-0001F permit application package (PAP) approved October 3, 2017. The PAP outlines PWCC's reclamation operations on Permanent Program Lands. The total areas in J19, J19W, and N9 requested for Phase I release is 929 acres. Reclamation was completed between 1999 and 2019. Reclamation activities were completed in accordance with the approved PAP and included backfilling, grading, and replacement of suitable soil or plant growth media. Other reclamation activities included mitigation of unsuitable material and drainage control construction. The Kayenta Mine permit for the release areas is under Navajo Tribal Coal Lease 14-20-0603-9910, Navajo Tribal Coal Lease 14-20-0603-8580, and Hopi Tribal Coal Lease 14-20-0450-5743 and operates pursuant to Code of Federal Regulations (CFR), Title 30; Subchapter E, Part 750; Subchapter G, Parts 773 and 774; and Subchapter K, Parts 810 and 816. This notice is hereby given that:

1. The name and business address of the applicant is:

Peabody Western Coal Company
Kayenta Mine
P.O. Box 650
Kayenta, AZ 86033

2. The mine permit area is located approximately 18 miles south southwest of Kayenta, Arizona. The permit area for the Phase I bond release areas is located in USGS 7.5 minute quadrangle maps "Yucca Hill" and "Long House Valley" within the following lands of Navajo County, Arizona that are described relative to the Gila and Salt River Base Meridian as:

A total of 267 acres of land located within the J19 CRA. The computer-generated centroid location is Latitude 36° 26' 45.4" N and Longitude 110° 17'

54.9" W. A total of 251 acres of land located within the J19W CRA. The computer-generated centroid location is Latitude 36° 26' 57.0" N and Longitude 110° 19' 41.7" W. A total of 411 acres of land located within the N9 CRA. The computer-generated centroid location is Latitude 36° 33' 43.5" N and Longitude 110° 24' 59.2" W.

3. Locations of where copies of the application and permit are available for public review and/or inspection are:

Navajo Nation Minerals Department	Forest Lake Chapter House
Office of Surface Mining	Navajo Route 41
Window Rock Boulevard	20 Miles North of Pinon
Window Rock, AZ 86515	Pinon, AZ 86510
Office of Surface Mining	Hopi Tribe
Reclamation and Enforcement	Office of Mining and Mineral
Western Region Office	Resources, Highway 264
P. O. Box 25065	1 Mile East of Kykotsmovi
Denver, CO 80225-0065	Kykotsmovi, AZ 86039

4. The name and address of the OSMRE-WRO representative where written comments, objections, requests for a public hearing, or requests for an informal conference may be submitted on or before 5:00 p.m., (Date To Be Determined), thirty (30) days after the last publication date are:

Mr. Jeremy Spangler
Western Region Office
Office of Surface Mining Reclamation & Enforcement
P. O. Box 25065
Denver, CO 80225-0065
WR Permitting Information Line, 1-866-847-7362

5. Interested persons may obtain more information concerning the bond release by contacting Marie Shepherd, Senior Manager Environmental for PWCC at 928.677.5130.
6. The application has been filed with OSMRE and will be acted upon pursuant to the Permanent Regulatory Program (30 CFR Parts 750 and 774) approved by the Secretary of the Interior under Title V of the Surface mining Control and Reclamation Act of 1977.



PEABODY WESTERN

COAL COMPANY

Kayenta Mine
Highway 160, Navajo Route 41
P.O. Box 650
Kayenta, Arizona 86033
928.677.5177

June 17, 2020

Bureau of Indian Affairs
Navajo Area Office
Ms. Sharon A. Pinto, Area Director
P.O. Box 1060
301 West Hill Street
Gallup, New Mexico 87305-1060

RE: Notice of Application for Phase I Bond Release; J19, J19W, and N9 Coal Resource Areas; Kayenta Mine

Dear Ms. Pinto:

Peabody Western Coal Company (PWCC) has filed an application with the Office of Surface Mining Reclamation and Enforcement (OSMRE) for Phase I bond release on portions of the J19, J19W, and N9 Coal Resource Areas. The release areas are in the northwestern and southeastern portion of the PWCC lease area. PWCC is seeking release from Phase I bond liability for those surety bonds currently held with Zurich American Insurance Company, Continental Casualty Company, National Fire Insurance Company of Hartford, Liberty Mutual Insurance Company, Federal Insurance Company, Indemnity National Insurance Company, and Travelers Casualty and Surety Company of America. The total combined bond for Kayenta Mine is \$178,569,992.

The Phase I bond release areas are located within the Kayenta Mine Permanent Program permit area (AZ-0001F PAP) in the northwestern and southeastern portions of the PWCC lease area. PWCC is seeking a reduction of the total J19, J19W, and N9 bond amount of \$20,299,758 at this time by gaining regulatory approval for release of lands described in the application from Phase I bond liability. The total area sought for release includes 929 acres of disturbed land. Approval of Phase I will allow for Phase II and III bond release to proceed on these areas once all requirements for this phase are met. Phase III is the final bond release step and once approved will allow for the planned return of these lands to the Navajo Nation in the future. Until that time, PWCC will continue to control and manage reclaimed lands in the release areas described.

Reclamation of the Phase I release areas which includes; backfilling and grading, drainage control, mitigation of unsuitable material, and topsoil replacement was completed between 1999 and 2019. All reclamation activities were conducted in accordance with the Surface Mining Control and Reclamation Act (SMCRA) and the requirements of the OSMRE Permit AZ-0001F PAP approved October 3, 2017. Reclamation activities are documented in annual reports submitted previously to OSMRE.

The application and permit are available for public review and/or inspection at:

Navajo Nation Minerals Dept.
Office of Surface Mining
Window Rock Boulevard
Window Rock, AZ 86515

Forest Lake Chapter House
Navajo Route 41
14 miles North of Pinon
Pinon, AZ 86510

Ms. Sharon A. Pinto
June 17, 2020
Page 2 of 2

Office of Surface Mining
Reclamation and Enforcement
Western Region Office
1999 Broadway, Suite 3320
Denver, CO 80202-3050

Hopi Tribe
Office of Mining and Mineral
Resources, Highway 264
1 Mile East of Kykotsmovi
Kykotsmovi, AZ 86039

If you have questions, comments, or wish to request a hearing or informal conference regarding this bond release application, please contact:

Mr. Jeremy Spangler
Western Region Office
Office of Surface Mining Reclamation & Enforcement
1999 Broadway, Suite 3320
Denver, CO 80202-3050
303.293.5022

Please direct your questions about this application to me at 928.677.5130 or email them to me at mshepherd2@peabodyenergy.com.

Respectfully,

Marie Shepherd
Senior Manager Environmental
Kayenta Mine

C: Jeremy Spangler (OSMRE-WRO)



PEABODY WESTERN

COAL COMPANY

Kayenta Mine
Highway 160, Navajo Route 41
P.O. Box 650
Kayenta, Arizona 86033
928.677.5177

June 17, 2020

Bureau of Land Management
Arizona State Office
Mr. Stewart Boyd
Native American Minerals Lead
One North Central Ave., Suite 800
Phoenix, Arizona 85004

RE: Notice of Application for Phase I Bond Release; J19, J19W, and N9 Coal Resource Areas; Kayenta Mine

Dear Mr. Boyd:

Peabody Western Coal Company (PWCC) has filed an application with the Office of Surface Mining Reclamation and Enforcement (OSMRE) for Phase I bond release on portions of the J19, J19W, and N9 Coal Resource Areas. The release areas are in the northwestern and southeastern portion of the PWCC lease area. PWCC is seeking release from Phase I bond liability for those surety bonds currently held with Zurich American Insurance Company, Continental Casualty Company, National Fire Insurance Company of Hartford, Liberty Mutual Insurance Company, Federal Insurance Company, Indemnity National Insurance Company, and Travelers Casualty and Surety Company of America. The total combined bond for Kayenta Mine is \$178,569,992.

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Reclamation of the Phase I release areas which includes; backfilling and grading, drainage control, mitigation of unsuitable material, and topsoil replacement was completed between 1999 and 2019. All reclamation activities were conducted in accordance with the Surface Mining Control and Reclamation Act (SMCRA) and the requirements of the OSMRE Permit AZ-0001F PAP approved October 3, 2017. Reclamation activities are documented in annual reports submitted previously to OSMRE.

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Mr. Stewart Boyd
June 17, 2020
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Office of Surface Mining
Reclamation and Enforcement
Western Region Office
1999 Broadway, Suite 3320
Denver, CO 80202-3050

Hopi Tribe
Office of Mining and Mineral
Resources, Highway 264
1 Mile East of Kykotsmovi
Kykotsmovi, AZ 86039

If you have questions, comments, or wish to request a hearing or informal conference regarding this bond release application, please contact:

Mr. Jeremy Spangler
Western Region Office
Office of Surface Mining Reclamation & Enforcement
1999 Broadway, Suite 3320
Denver, CO 80202-3050
303.293.5022

Please direct your questions about this application to me at 928.677.5130 or email them to me at mshepherd2@peabodyenergy.com.

Respectfully,

Marie Shepherd
Senior Manager Environmental
Kayenta Mine

C: Jeremy Spangler (OSMRE-WRO)



PEABODY WESTERN

COAL COMPANY

Kayenta Mine
Highway 160, Navajo Route 41
P.O. Box 650
Kayenta, Arizona 86033
928.677.5177

June 17, 2020

Chilchinbeto Chapter
Mr. Thomas Bradley, President
P.O. Box 1681
Kayenta, Arizona 86033

RE: Notice of Application for Phase I Bond Release; J19, J19W, and N9 Coal Resource Areas; Kayenta Mine

Dear Mr. Bradley:

Peabody Western Coal Company (PWCC) has filed an application with the Office of Surface Mining Reclamation and Enforcement (OSMRE) for Phase I bond release on portions of the J19, J19W, and N9 Coal Resource Areas. The release areas are in the northwestern and southeastern portion of the PWCC lease area. PWCC is seeking release from Phase I bond liability for those surety bonds currently held with Zurich American Insurance Company, Continental Casualty Company, National Fire Insurance Company of Hartford, Liberty Mutual Insurance Company, Federal Insurance Company, Indemnity National Insurance Company, and Travelers Casualty and Surety Company of America. The total combined bond for Kayenta Mine is \$178,569,992.

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Window Rock Boulevard
Window Rock, AZ 86515

Forest Lake Chapter House
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Pinon, AZ 86510

Mr. Thomas Bradley
June 17, 2020
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Office of Surface Mining
Reclamation and Enforcement
Western Region Office
1999 Broadway, Suite 3320
Denver, CO 80202-3050

Hopi Tribe
Office of Mining and Mineral
Resources, Highway 264
1 Mile East of Kykotsmovi
Kykotsmovi, AZ 86039

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Mr. Jeremy Spangler
Western Region Office
Office of Surface Mining Reclamation & Enforcement
1999 Broadway, Suite 3320
Denver, CO 80202-3050
303.293.5022

Please direct your questions about this application to me at 928.677.5130 or email them to me at mshepherd2@peabodyenergy.com.

Respectfully,

Marie Shepherd
Senior Manager Environmental
Kayenta Mine

C: Jeremy Spangler (OSMRE-WRO)



PEABODY WESTERN

COAL COMPANY

Kayenta Mine
Highway 160, Navajo Route 41
P.O. Box 650
Kayenta, Arizona 86033
928.677.5177

June 17, 2020

Forest Lake Chapter
Ms. Fern Benally, President
P.O. Box 441
Pinon, Arizona 86510

RE: Notice of Application for Phase I Bond Release; J19, J19W, and N9 Coal Resource Areas; Kayenta Mine

Dear Ms. Benally:

Peabody Western Coal Company (PWCC) has filed an application with the Office of Surface Mining Reclamation and Enforcement (OSMRE) for Phase I bond release on portions of the J19, J19W, and N9 Coal Resource Areas. The release areas are in the northwestern and southeastern portion of the PWCC lease area. PWCC is seeking release from Phase I bond liability for those surety bonds currently held with Zurich American Insurance Company, Continental Casualty Company, National Fire Insurance Company of Hartford, Liberty Mutual Insurance Company, Federal Insurance Company, Indemnity National Insurance Company, and Travelers Casualty and Surety Company of America. The total combined bond for Kayenta Mine is \$178,569,992.

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Pinon, AZ 86510

Ms. Fern Benally
June 17, 2020
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1999 Broadway, Suite 3320
Denver, CO 80202-3050

Hopi Tribe
Office of Mining and Mineral
Resources, Highway 264
1 Mile East of Kykotsmovi
Kykotsmovi, AZ 86039

If you have questions, comments, or wish to request a hearing or informal conference regarding this bond release application, please contact:

Mr. Jeremy Spangler
Western Region Office
Office of Surface Mining Reclamation & Enforcement
1999 Broadway, Suite 3320
Denver, CO 80202-3050
303.293.5022

Please direct your questions about this application to me at 928.677.5130 or email them to me at mshepherd2@peabodyenergy.com.

Respectfully,

Marie Shepherd
Senior Manager Environmental
Kayenta Mine

C: Jeremy Spangler (OSMRE-WRO)



PEABODY WESTERN

COAL COMPANY

Kayenta Mine
Highway 160, Navajo Route 41
P.O. Box 650
Kayenta, Arizona 86033
928.677.5177

June 17, 2020

Navajo Nation
Minerals Department
Mr. Akhtar Zaman
P.O. Box 1910
Window Rock, AZ 86515

RE: Notice of Application for Phase I Bond Release; J19, J19W, and N9 Coal Resource Areas; Kayenta Mine

Dear Mr. Zaman:

Peabody Western Coal Company (PWCC) has filed an application with the Office of Surface Mining Reclamation and Enforcement (OSMRE) for Phase I bond release on portions of the J19, J19W, and N9 Coal Resource Areas. The release areas are in the northwestern and southeastern portion of the PWCC lease area. PWCC is seeking release from Phase I bond liability for those surety bonds currently held with Zurich American Insurance Company, Continental Casualty Company, National Fire Insurance Company of Hartford, Liberty Mutual Insurance Company, Federal Insurance Company, Indemnity National Insurance Company, and Travelers Casualty and Surety Company of America. The total combined bond for Kayenta Mine is \$178,569,992.

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Window Rock Boulevard
Window Rock, AZ 86515

Forest Lake Chapter House
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14 miles North of Pinon
Pinon, AZ 86510

Mr. Akhtar Zaman
June 17, 2020
Page 2 of 2

Office of Surface Mining
Reclamation and Enforcement
Western Region Office
1999 Broadway, Suite 3320
Denver, CO 80202-3050

Hopi Tribe
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Resources, Highway 264
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If you have questions, comments, or wish to request a hearing or informal conference regarding this bond release application, please contact:

Mr. Jeremy Spangler
Western Region Office
Office of Surface Mining Reclamation & Enforcement
1999 Broadway, Suite 3320
Denver, CO 80202-3050
303.293.5022

Please direct your questions about this application to me at 928.677.5130 or email them to me at mshepherd2@peabodyenergy.com.

Respectfully,

Marie Shepherd
Senior Manager Environmental
Kayenta Mine

C: Jeremy Spangler (OSMRE-WRO)



PEABODY WESTERN

COAL COMPANY

Kayenta Mine
Highway 160, Navajo Route 41
P.O. Box 650
Kayenta, Arizona 86033
928.677.5177

June 17, 2020

The Hopi Tribe
Office of Mining and Minerals
Attn: Norman Honie Jr.
P.O. Box 123
Kykotsmovi, AZ 86039

RE: Notice of Application for Phase I Bond Release; J19, J19W, and N9 Coal Resource Areas; Kayenta Mine

Dear Mr. Honie:

Peabody Western Coal Company (PWCC) has filed an application with the Office of Surface Mining Reclamation and Enforcement (OSMRE) for Phase I bond release on portions of the J19, J19W, and N9 Coal Resource Areas. The release areas are in the northwestern and southeastern portion of the PWCC lease area. PWCC is seeking release from Phase I bond liability for those surety bonds currently held with Zurich American Insurance Company, Continental Casualty Company, National Fire Insurance Company of Hartford, Liberty Mutual Insurance Company, Federal Insurance Company, Indemnity National Insurance Company, and Travelers Casualty and Surety Company of America. The total combined bond for Kayenta Mine is \$178,569,992.

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Office of Surface Mining
Window Rock Boulevard
Window Rock, AZ 86515

Forest Lake Chapter House
Navajo Route 41
14 miles North of Pinon
Pinon, AZ 86510

Mr. Norman Honie, Jr.
June 17, 2020
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Office of Surface Mining
Reclamation and Enforcement
Western Region Office
1999 Broadway, Suite 3320
Denver, CO 80202-3050

Hopi Tribe
Office of Mining and Mineral
Resources, Highway 264
1 Mile East of Kykotsmovi
Kykotsmovi, AZ 86039

If you have questions, comments, or wish to request a hearing or informal conference regarding this bond release application, please contact:

Mr. Jeremy Spangler
Western Region Office
Office of Surface Mining Reclamation & Enforcement
1999 Broadway, Suite 3320
Denver, CO 80202-3050
303.293.5022

Please direct your questions about this application to me at 928.677.5130 or email them to me at mshepherd2@peabodyenergy.com.

Respectfully,

Marie Shepherd
Senior Manager Environmental
Kayenta Mine

C: Jeremy Spangler (OSMRE-WRO)



PEABODY WESTERN

COAL COMPANY

Kayenta Mine
Highway 160, Navajo Route 41
P.O. Box 650
Kayenta, Arizona 86033
928.677.5177

June 17, 2020

Navajo Tribal Utility Authority
Mr. Walter W. Haase, P.E., General Manager
P.O. Box 170
Fort Defiance, Arizona 86504-0170

RE: Notice of Application for Phase I Bond Release; J19, J19W, and N9 Coal Resource Areas; Kayenta Mine

Dear Mr. Haase:

Peabody Western Coal Company (PWCC) has filed an application with the Office of Surface Mining Reclamation and Enforcement (OSMRE) for Phase I bond release on portions of the J19, J19W, and N9 Coal Resource Areas. The release areas are in the northwestern and southeastern portion of the PWCC lease area. PWCC is seeking release from Phase I bond liability for those surety bonds currently held with Zurich American Insurance Company, Continental Casualty Company, National Fire Insurance Company of Hartford, Liberty Mutual Insurance Company, Federal Insurance Company, Indemnity National Insurance Company, and Travelers Casualty and Surety Company of America. The total combined bond for Kayenta Mine is \$178,569,992.

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Mr. Walter W. Haase
June 17, 2020
Page 2 of 2

Office of Surface Mining
Reclamation and Enforcement
Western Region Office
1999 Broadway, Suite 3320
Denver, CO 80202-3050

Hopi Tribe
Office of Mining and Mineral
Resources, Highway 264
1 Mile East of Kykotsmovi
Kykotsmovi, AZ 86039

If you have questions, comments, or wish to request a hearing or informal conference regarding this bond release application, please contact:

Mr. Jeremy Spangler
Western Region Office
Office of Surface Mining Reclamation & Enforcement
1999 Broadway, Suite 3320
Denver, CO 80202-3050
303.293.5022

Please direct your questions about this application to me at 928.677.5130 or email them to me at mshepherd2@peabodyenergy.com.

Respectfully,

Marie Shepherd
Senior Manager Environmental
Kayenta Mine

C: Jeremy Spangler (OSMRE-WRO)



**PEABODY WESTERN
COAL COMPANY**
Kayenta Mine
Highway 160, Navajo Route 41
P.O. Box 650
Kayenta, Arizona 86033
928.677.5177

June 17, 2020

Shonto Chapter
Ms. Elizabeth Whitethorne-Benally
P. O. Box 7800
Shonto, AZ 86054

RE: Notice of Application for Phase I Bond Release; J19, J19W, and N9 Coal Resource Areas; Kayenta Mine

Dear Ms. Whitethorne-Benally:

Peabody Western Coal Company (PWCC) has filed an application with the Office of Surface Mining Reclamation and Enforcement (OSMRE) for Phase I bond release on portions of the J19, J19W, and N9 Coal Resource Areas. The release areas are in the northwestern and southeastern portion of the PWCC lease area. PWCC is seeking release from Phase I bond liability for those surety bonds currently held with Zurich American Insurance Company, Continental Casualty Company, National Fire Insurance Company of Hartford, Liberty Mutual Insurance Company, Federal Insurance Company, Indemnity National Insurance Company, and Travelers Casualty and Surety Company of America. The total combined bond for Kayenta Mine is \$178,569,992.

The Phase I bond release areas are located within the Kayenta Mine Permanent Program permit area (AZ-0001F PAP) in the northwestern and southeastern portions of the PWCC lease area. PWCC is seeking a reduction of the total J19, J19W, and N9 bond amount of \$20,299,758 at this time by gaining regulatory approval for release of lands described in the application from Phase I bond liability. The total area sought for release includes 929 acres of disturbed land. Approval of Phase I will allow for Phase II and III bond release to proceed on these areas once all requirements for this phase are met. Phase III is the final bond release step and once approved will allow for the planned return of these lands to the Navajo Nation in the future. Until that time, PWCC will continue to control and manage reclaimed lands in the release areas described.

Reclamation of the Phase I release areas which includes; backfilling and grading, drainage control, mitigation of unsuitable material, and topsoil replacement was completed between 1999 and 2019. All reclamation activities were conducted in accordance with the Surface Mining Control and Reclamation Act (SMCRA) and the requirements of the OSMRE Permit AZ-0001F PAP approved October 3, 2017. Reclamation activities are documented in annual reports submitted previously to OSMRE.

The application and permit are available for public review and/or inspection at:

Navajo Nation Minerals Dept.
Office of Surface Mining
Window Rock Boulevard
Window Rock, AZ 86515

Forest Lake Chapter House
Navajo Route 41
14 miles North of Pinon
Pinon, AZ 86510

Ms. Elizabeth Whitethorne-Benally
June 17, 2020
Page 2 of 2

Office of Surface Mining
Reclamation and Enforcement
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1999 Broadway, Suite 3320
Denver, CO 80202-3050

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Kykotsmovi, AZ 86039

If you have questions, comments, or wish to request a hearing or informal conference regarding this bond release application, please contact:

Mr. Jeremy Spangler
Western Region Office
Office of Surface Mining Reclamation & Enforcement
1999 Broadway, Suite 3320
Denver, CO 80202-3050
303.293.5022

Please direct your questions about this application to me at 928.677.5130 or email them to me at mshepherd2@peabodyenergy.com.

Respectfully,

Marie Shepherd
Senior Manager Environmental
Kayenta Mine

C: Jeremy Spangler (OSMRE-WRO)

PUBLIC NOTICE

Peabody Western Coal Company (PWCC) has filed an application with the Office of Surface Mining Reclamation and Enforcement (OSMRE) for bond release on a portion of the lands in the J19, J19W, and N9 Coal Resource Areas (CRAs) within the Kayenta Mine Permit AZ-0001F. PWCC is seeking a release of Phase I bond liability for a portion of the J19, J19W, and N9 areas currently under bond with Zurich American Insurance Company, Continental Casualty Company, National Fire Insurance Company of Hartford, Federal Insurance Company, Liberty Mutual Insurance Company, Indemnity National Insurance Company, and Travelers Casualty and Surety Company of America. PWCC is seeking a reduction in bond of \$20,299,758 under the Phase I application from the total J19, J19W, and N9 bond amount of \$79,830,381. The total combined bond for Kayenta Mine is \$178,569,992.

The Phase I bond release application consists of information currently contained in the AZ-0001F permit application package (PAP) approved October 3, 2017. The PAP outlines PWCC's reclamation operations on Permanent Program Lands. The total areas in J19, J19W, and N9 requested for Phase I release is 929 acres. Reclamation was completed between 1999 and 2019. Reclamation activities were completed in accordance with the approved PAP and included backfilling, grading, and replacement of suitable soil or plant growth media. Other reclamation activities included mitigation of unsuitable material and drainage control construction. The Kayenta Mine permit for the release areas is under Navajo Tribal Coal Lease 14-20-0603-9910, Navajo Tribal Coal Lease 14-20-0603-8580, and Hopi Tribal Coal Lease 14-20-0450-5743 and operates pursuant to Code of Federal Regulations (CFR), Title 30; Subchapter E, Part 750; Subchapter G, Parts 773 and 774; and Subchapter K, Parts 810 and 816. This notice is hereby given that:

1. The name and business address of the applicant is:

Peabody Western Coal Company
Kayenta Mine
P.O. Box 650
Kayenta, AZ 86033

2. The mine permit area is located approximately 18 miles south southwest of Kayenta, Arizona. The permit area for the Phase I bond release areas is located in USGS 7.5 minute quadrangle maps "Yucca Hill" and "Long House Valley" within the following lands of Navajo County, Arizona that are described relative to the Gila and Salt River Base Meridian as:

A total of 267 acres of land located within the J19 CRA. The computer-generated centroid location is Latitude 36° 26' 45.4" N and Longitude 110° 17'

54.9" W. A total of 251 acres of land located within the J19W CRA. The computer-generated centroid location is Latitude 36° 26' 57.0" N and Longitude 110° 19' 41.7" W. A total of 411 acres of land located within the N9 CRA. The computer-generated centroid location is Latitude 36° 33' 43.5" N and Longitude 110° 24' 59.2" W.

3. Locations of where copies of the application and permit are available for public review and/or inspection are:

Navajo Nation Minerals Department	Forest Lake Chapter House
Office of Surface Mining	Navajo Route 41
Window Rock Boulevard	20 Miles North of Pinon
Window Rock, AZ 86515	Pinon, AZ 86510
Office of Surface Mining	Hopi Tribe
Reclamation and Enforcement	Office of Mining and Mineral
Western Region Office	Resources, Highway 264
1999 Broadway, Suite 3320	1 Mile East of Kykotsmovi
Denver, CO 80202-3050	Kykotsmovi, AZ 86039

4. The name and address of the OSMRE-WRO representative where written comments, objections, requests for a public hearing, or requests for an informal conference may be submitted on or before 5:00 p.m., (Date To Be Determined), thirty (30) days after the last publication date are:

Mr. Jeremy Spangler
Western Region Office
Office of Surface Mining Reclamation & Enforcement
1999 Broadway, Suite 3320
Denver, CO 80202-3050
303.293.5022

5. Interested persons may obtain more information concerning the bond release by contacting Marie Shepherd, Senior Manager Environmental for PWCC at 928.677.5130.
6. The application has been filed with OSMRE and will be acted upon pursuant to the Permanent Regulatory Program (30 CFR Parts 750 and 774) approved by the Secretary of the Interior under Title V of the Surface mining Control and Reclamation Act of 1977.

SECTION 1

Phase I Bond Release Supporting Documentation

Introduction

Peabody Western Coal Company (PWCC) is requesting Phase I bond release on portions of lands within the J19, J19-West (J19W), and N9 areas of Kayenta Mine. The bond release application included in this submittal contains required documentation and information to support Phase I bond release for 929 acres of mined and reclaimed lands in the permanent program areas within the J19 (267 acres) Coal Resource Area (CRA), J19W (251 acres) CRA, and N9 (411 acres) CRA as shown on Maps 1.1.1 and 1.1.2. None of the proposed permanent ponds or a request for permanent roads is included in this release application. These features will be further evaluated in relation to the final land use and customary use areas over the entire release application areas. Information for the Phase I technical portions of the application are contained in Section 2 of this document. Information such as the public notice, affidavit of publication, and copies of letters to the Tribes, government agencies, and utilities are included in this section of the application.

Permit and Bond Release Summary Information

The J19 and J19W CRAs are located within the southeastern portion of PWCC's Kayenta Mine. The N9 CRA is located within the northwestern portion of PWCC's Kayenta Mine. The Kayenta Mine operates under Permit AZ-0001F issued by the Office of Surface Mining Reclamation and Enforcement (OSMRE) to PWCC Kayenta Mine on October 3, 2017. Permit AZ-0001F authorized continuation of ongoing Kayenta Mine surface coal mining and reclamation activities in CRAs N9, J19, J19W, and J21, as well as to perform reclamation activities in CRAs previously mined (i.e. N11) for the 5-year period July 2015 through July 2020. The 5-year renewal application for Permit AZ-0001F was submitted to OSMRE on February 27, 2020.

The Kayenta mine permit area is located approximately 18 miles south southwest of Kayenta, Arizona (USGS 7.5 minute quadrangle maps Longhouse Valley, Marsh Pass S.E., Owl Spring, Great Spring, Yucca Hill, and Cliff Rose Hill). The permit areas for the J19, J19W, and N9 Phase I bond release are located within the following lands of Navajo County, Arizona that are described relative to the Gila and Salt River Base Meridian as:

A total of 267 acres of mined and reclaimed land located within the J19 CRA. The computer-generated centroid location of this area is approximately Latitude 36° 26' 45.4" N and Longitude 110° 17' 54.9" W. A total of 251 acres of mined and reclaimed land located within the J19W CRA. The computer-generated centroid

location of this area is approximately Latitude 36° 26' 57.0" N and Longitude 110° 19' 41.7" W. A total of 411 acres of mined and reclaimed land located within the N9 CRA. The computer-generated centroid location of this area is approximately Latitude 36° 33' 43.5" N and Longitude 110° 24' 59.2" W.

The type of bond and the amount of bond filed for Kayenta Mine Permit AZ-0001F are described in Table 1.1. The portion requested for release in the J19, J19W, and N9 CRAs includes \$20,299,758 for Phase I. Justification for the release dollars are explained in the following section.

Table 1.1. Bond Information for Kayenta Mine.		
Bond Surety	Bond Number	Bond Amount
Continental Casualty Company & National Fire Insurance Company of Hartford	9264222	\$28,304,188
Continental Casualty Company of Chicago & National Fire Insurance Company of Hartford	9264224	\$8,167,651
Indemnity National Insurance Company	N-7003484	\$7,250,000
Federal Insurance Company	82154865	\$10,797,629
Liberty Mutual Insurance Company	60S003887	\$29,012,760
Travelers Casualty and Surety Company of America	105243347	\$23,847,246
Travelers Casualty and Surety Company of America	105191031	\$28,000,000
Zurich American Insurance Company	8940860	\$43,190,518
TOTAL		\$178,569,992

Phase I Bond Reduction Cost

PWCC is seeking a reduction in bond for Phase I in the amount of \$20,299,758. This amount was determined using direct and indirect unit costs calculated for 267 acres in J19, 251 acres in J19W, and 411 acres in N9 as documented in Permit AZ-0001F, Chapter 24, Table 24-1-4. Reclamation cost estimates as of July 2017 ("worst case" or "highest liability" as approved in Permit AZ-0001F by OSMRE on October 3, 2017) were used and these rates were adjusted for inflation through June 2020. Reduction in bond at the J19W CRA was based upon 19,500 feet of the final pit being 100% backfilled (total bonded pit length is 32,100 feet - Table 24-2-1) and completion of Phase I reclamation activities including general grading on 251 acres and replacing four feet of suitable plant growth material including one foot of soil material on the surface of 247 acres of final graded lands per Chapter 22, Minesoil Reconstruction, Volume 11, Permit AZ-0001F. OSMRE released 2,400 feet of reduced highwall and backfilled pit from Phase I bond on January 4, 2017. OSMRE

released 6,500 feet of highwall and backfilled pit from Phase I bond on July 25, 2018. Reduction in bond at J19 was based upon completion of Phase I reclamation activities including general grading on 267 acres and replacing four feet of suitable plant growth material including one foot of soil material on the surface of 163 acres of final graded lands per Chapter 22, Minesoil Reconstruction, Volume 11, Permit AZ-0001F. Reduction in bond at N9 was based upon completion of Phase I reclamation activities including general grading on 411 acres and replacing four feet of suitable plant growth material including one foot of soil material on the surface of 286 acres of final graded lands per Chapter 22, Minesoil Reconstruction, Volume 11, Permit AZ-0001F. Suitable plant growth material replacement areas are documented for the J19W, J19, and N9 CRAs on Maps 2.1.1, 2.1.2, 2.2.1, and 2.2.2 in Section 2 of this document.

The project categories and direct costs applicable to this Phase I bond release are listed in Table 1.2.1 for the J19W CRA, Table 1.2.2 for the J19 CRA, and Table 1.2.3 for the N9 CRA. PWCC is not requesting full release of the grading and ripping maintenance costs for the disturbed lands because these are considered by OSMRE to be Phase II reclamation activities. Similarly, no costs have been requested on the disturbed lands for the Phase III reclamation activities including surface stabilization, revegetation, and vegetation maintenance. The combined total bond reduction direct costs shown in Tables 1.2.1, 1.2.2, and 1.2.3 is \$16,571,234.

Table 1.2.1 Bond Reduction of Direct Costs for Backfilling, Grading, Suitable Material Replacement, and Soil Material Replacement in the J19W CRA.	
Project Category	Bond Reduction Amount
Cast/blast high wall (10,600 feet)	\$2,478,741
Doze high wall (10,600 feet)	\$1,505,783
Doze first two spoils (10,600 feet)	\$1,407,633
Doze back two spoils (10,600 feet)	\$ 331,968
Backfill and grade ramps (10,600 feet)	\$ 674,372
General grading (251 ac @ \$4,127.70/ac)	\$1,036,053
Suitable material replacement (247 ac @ \$0.98/yd)	\$ 937,256
Soil material replacement (247 ac @ \$1.32/yd)	\$ 841,618
Total Direct Cost Category I	\$9,213,424
Inflation July 2017 thru June 2020 (5.85%)	\$ 538,985
Total Direct Cost Category I (Inflated to 6-2020)	\$9,752,409

<p align="center">Table 1.2.2</p> <p align="center">Bond Reduction of Direct Costs for Grading, Suitable Material Replacement, and Soil Material Replacement in the J19 CRA.</p>	
Project Category	Bond Reduction Amount
General grading (267 ac @ 4,127.70/ac)	\$1,102,096
Suitable material replacement (163 ac @ \$0.98/yd)	\$ 618,513
Soil material replacement (163 ac @ \$1.32/yd)	\$ 555,400
Total Direct Cost Category I	\$2,276,009
Inflation July 2017 thru June 2020 (5.85%)	\$ 133,147
Total Direct Cost Category I	\$2,409,156

<p align="center">Table 1.2.3</p> <p align="center">Bond Reduction of Direct Costs for Grading, Suitable Material Replacement, and Soil Material Replacement in the N9 CRA.</p>	
Project Category	Bond Reduction Amount
General grading (411 ac @\$4,127.68/ ac)	\$1,696,476
Suitable material replacement (286 ac @ \$1.11/yd)	\$1,229,205
Soil material replacement (286 ac @ \$1.68/yd)	\$1,240,279
Total Direct Cost Category I	\$4,165,960
Inflation July 2017 thru June 2020 (5.85%)	\$ 243,709
Total Direct Cost Category I (Inflated to 6-2020)	\$4,409,669

Tables 1.3.1, 1.3.2, and 1.3.3 show the indirect costs obtained from Permit AZ-0001F, Chapter 24 that are associated with the J19W, J19, and N9 Phase I direct cost, respectively as determined in July 2017. The total indirect cost reflects inflation through June 2020 (5.85%). The combined total bond reduction indirect costs shown in Tables 1.3.1, 1.3.2, and 1.3.3 is \$3,728,524.

<p align="center">Table 1.3.1</p> <p align="center">Bond Reduction of Indirect Costs for Backfilling, Grading, Suitable Material Replacement, and Soil Material Replacement in the J19W CRA.</p>	
Project Category	Bond Reduction Amount
Mobilization/demobilization (1.5%)	\$ 146,286
Contingencies (2.0%)	\$ 195,048
Engineering redesign fee (2.0%)	\$ 195,048
Contractor profit and overhead (15.0%)	\$1,462,861

Reclamation management fee (2.0%)	\$ 195,048
Total Indirect Cost	\$2,194,291

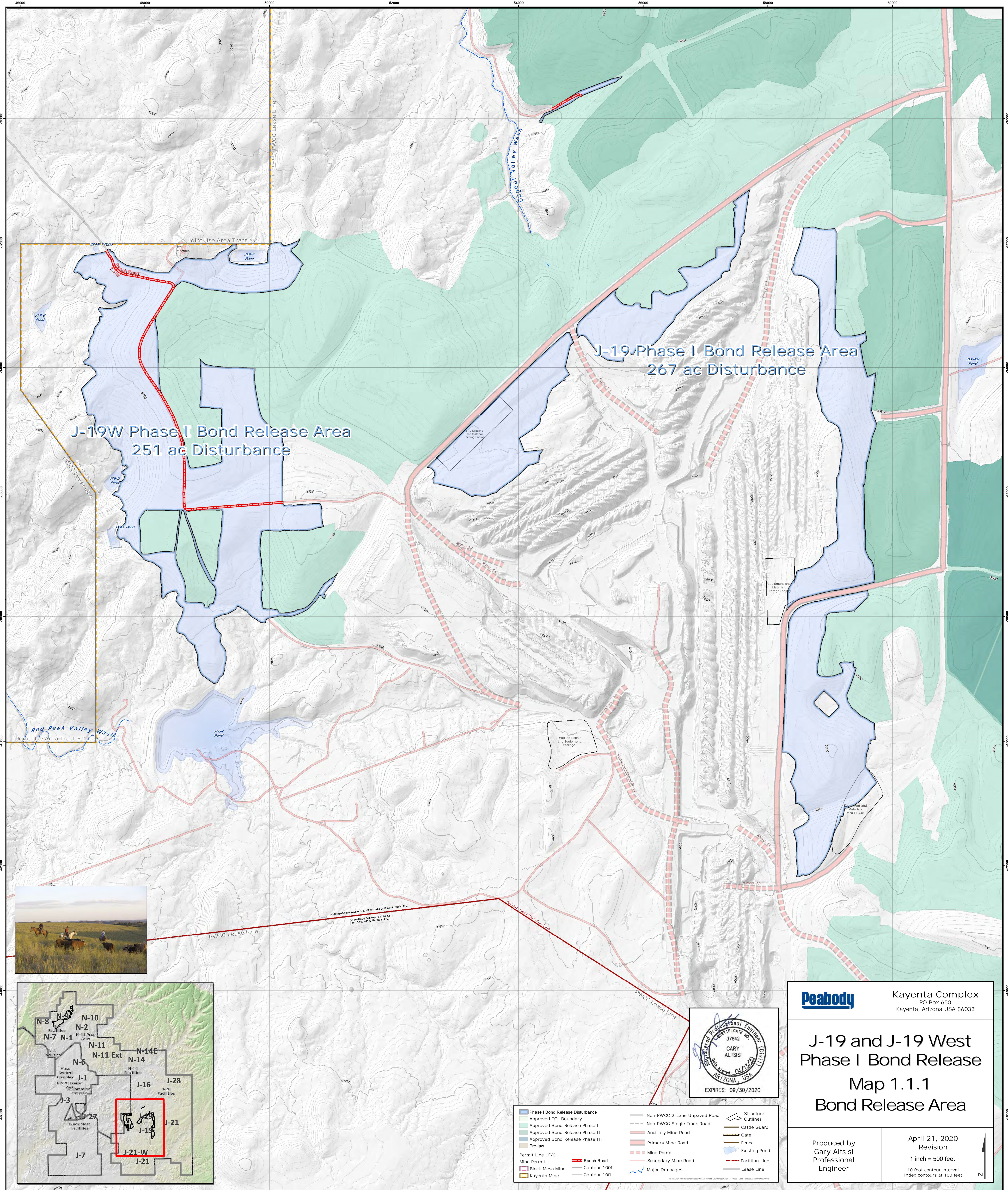
Table 1.3.2 Bond Reduction of Indirect Costs for Grading, Suitable Material Replacement, and Soil Material Replacement in the J19 CRA.	
Project Category	Bond Reduction Amount
Mobilization/demobilization (1.5%)	\$ 36,137
Contingencies (2.0%)	\$ 48,183
Engineering redesign fee (2.0%)	\$ 48,183
Contractor profit and overhead (15.0%)	\$361,373
Reclamation management fee (2.0%)	\$ 48,183
Total Indirect Cost	\$542,059


Table 1.3.3 Bond Reduction of Indirect Costs for Grading, Suitable Material Replacement, and Soil Material Replacement in the N9 CRA.	
Project Category	Bond Reduction Amount
Mobilization/demobilization (1.5%)	\$ 66,145
Contingencies (2.0%)	\$ 88,193
Engineering redesign fee (2.0%)	\$ 88,193
Contractor profit and overhead (15.0%)	\$661,450
Reclamation management fee (2.0%)	\$ 88,193
Total Indirect Cost	\$992,174

The total direct, indirect, tax, and 2017 - 2020 inflation costs for Phase I bond categories in the J19W, J19, and N9 CRAs are \$20,299,758.

Permanent Facilities

There are no requests included in this J19 and N9 Phase I bond release application for any facilities to be retained as permanent features. None of the sediment ponds (including those proposed as permanent), roads, or Kayenta Mine support facilities located within the J19 and N9 CRAs are included in this Phase I bond release application. The two-track ranch road shown within the J19W portion of the release area will continue to be used for access to monitor the J19-A, J19-D, and J19-E sediment ponds, for compliance-related inspections, for reclamation maintenance, other environmental monitoring, and local access by residents.






Kayenta Complex
PO Box 650
Kayenta, Arizona USA 86033

J-19 and J-19 West
Phase I Bond Release
Map 1.1.1
Bond Release Area

Produced by
Gary Altsisi
Professional
Engineer

April 21, 2020
Revision
1 inch = 500 feet
10 foot contour interval
Index contours at 100 feet



<div>Phase I Bond Release Disturbance</div> <div>Approved TOJ Boundary</div> <div>Approved Bond Release Phase I</div> <div>Approved Bond Release Phase II</div> <div>Approved Bond Release Phase III</div> <div>Pre-law</div> <div>Permit Line 1F/01</div> <div>Mine Permit</div> <div>Black Mesa Mine</div> <div>Kayenta Mine</div>	<div>Ranch Road</div> <div>Contour 100ft</div> <div>Contour 10ft</div> <div>Non-PWCC 2-Lane Unpaved Road</div> <div>Non-PWCC Single Track Road</div> <div>Ancillary Mine Road</div> <div>Primary Mine Road</div> <div>Mine Ramp</div> <div>Secondary Mine Road</div> <div>Major Drainages</div>	<div>Structure Outlines</div> <div>Cattle Guard</div> <div>Gate</div> <div>Fence</div> <div>Existing Pond</div> <div>Partition Line</div> <div>Lease Line</div>
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ACCUCLASS #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	TOT S %	SULFATE %	PYR S %	ORG %	ACID POT TH/100TN	NEUT POT TH/100TN	A-S POT TH/100TN	PYR A POT TH/100TN	PYR A-B TH/100TN	%CaCO3
PB-1861	58RG24	11/15/99	0-1	6.21	6.31	51.3	21.9	42.3	47.0	8.30	27.5	30.0	42.5	C	0.242				7.57	11.2	3.60		1.118	
PB-1862	58RG24	11/15/99	1-2	6.58	4.66	44.9	22.0	53.0	15.6	2.55	31.3	28.8	40.0	CL/C	0.142				4.45	14.4	9.99		1.443	
PB-1863	58RG24	11/15/99	2-3	6.68	5.04	43.8	24.9	66.6	15.4	2.28	37.5	22.5	40.0	CL/C	0.347				10.8	16.1	5.24		1.606	

1999-1

lab_id	qc	sample_id	uprdepth	lowrdepth	sampled	ph	ec	ca	mg	na	sar	sand	silt	clay	loexture	totals	ab_tot_s	neutpot	abp_tot_s
0302S04202	45	RG 26	0	1	27-Sep-02	7.4	5.63	22	22	38	27	4.9	42	29	29 CL	0.19	0.19	5.9	25
0302S04203	46	RG 26	1	3	27-Sep-02	7.8	4.24	8.3	8.3	14	34	10	40	33	27 CL	0.1	0.1	3.1	25
																			19.1
																			21.9

2002-1

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	TOT S %	SULFATE %	PYR S %	ORG S%	ACID POT TH/100TN	NEUT POT TH/100TN	A-B POT TH/100TN	PFR A POT TH/100TN	PFR A-B TH/100TN	%CAODS
S-3686	46RG33	5/15/2003	0-1'	6.22	10.6	42.5	22.2	39.5	88.3	15.9	36.8	37.5	23.8	L	0.942		0.458		29.4	4.95	-24.5	14.3	-9.36	0.495
S-3687	46RG33	5/15/2003	1-3'	6.66	9.71	42.7	22.7	29.4	91.8	18.0	41.3	33.8	25.0	L	1.036		0.438		32.4	13.9	-18.5	13.7	0.18	1.386
S-3690	46RG35	5/15/2003	0-1'	6.37	8.80	42.6	22.2	40.3	86.1	11.8	36.3	36.3	27.5	CL	0.955		0.454		29.8	6.44	-23.4	14.2	-7.75	0.644
S-3690R	46RG35	5/15/2003	0-1'	6.33	9.12	41.7	25.3	46.2	74.4	12.4	37.5	35.0	27.5	CL	0.953		0.434		29.8	5.94	-23.8	13.6	-7.62	0.594
S-3691	46RG35	5/15/2003	1-3'	5.34	11.6	41.8	24.7	75.6	93.1	13.1	37.5	36.3	26.3	L	1.194		0.529		37.3	2.48	-34.8	16.5	-14.1	0.248
QC-18																	0.006		3.71	12.9	9.16	0.19	12.7	
QC-23																								
SC1-001				7.00	4.53	52.8	18.6	11.1	30.6	7.94	33.8	31.3	35.0	CL	0.119									

2003-1

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	TOT S %	SULFATE %	PYR S %	ORG %	ACID POT TW/100TN	NEUT POT TW/100TN	A-B POT TW/100TN	PYR A POT TW/100TN	PYR A-B TW/100TN	% GAC03
S-4264	43RG13		0-1	8.09	5.81	41.6	5.04	3.75	53.5	25.5	35.00	28.75	36.25	CL	0.168				5.26	12.5	7.25			1.251
S-4265	43RG13		1-3	8.87	7.50	40.4	14.3	11.7	83.1	17.5	41.25	25.00	33.75	CL	0.262		0.053		8.19	7.41	-0.78	1.86	5.75	0.741
QC-18															0.110		0.000		3.43	12.5	9.08	0.00	12.5	1.251
QC-25				7.20	4.43	49.4	15.9	8.72	28.9	8.52	35.00	30.00	35.00	CL										
SOC-346																								

2004-1

QAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	TOT S %	SULFATE S %	PVR S %	ORG S %	ACID POT TN/1000TN	NEUT POT TN/1000TN	A-B POT TN/1000TN	PYR A POT TN/1000TN	PYR S A-B TN/1000TN	% CACCS
S-4332	41RG14		0-1	7.92	6.44	48.3	20.1	17.2	37.8	8.70	37.50	31.25	31.25	CL	0.240				7.49	10.4	2.95	2.06	6.35	1.044
S-4333	41RG14		1-3	7.75	6.91	49.0	19.2	18.6	41.8	9.62	35.00	31.25	33.75	CL	0.408		0.066		12.7	8.42	-4.33			0.841
S-4338	41RG17		0-1	6.88	9.09	47.6	17.0	15.5	63.1	15.7	23.75	40.00	36.25	CL	0.723		0.342		22.6	2.36	-20.2	10.7	-8.33	0.236
S-4339	41RG17		1-3	7.41	8.90	48.5	18.2	17.4	58.7	13.9	27.50	37.50	35.00	CL	0.599		0.193		18.7	4.38	-14.3	6.03	-1.65	0.438
S-4340	45RG32		0-1	7.65	5.72	50.3	12.9	9.13	38.4	11.6	35.00	31.25	33.75	CL	0.489		0.285		15.3	14.5	-0.80	8.90	5.57	1.448
S-4340R	45RG32		0-1	7.59	5.67	52.4	13.3	9.38	38.3	11.4	35.00	31.25	33.75	CL	0.507		0.262		15.9	16.5	0.64	8.18	8.31	1.850
S-4341	45RG32		1-3	8.04	5.03	38.9	18.7	27.0	17.8	3.72	50.00	23.75	26.25	SCL	0.134				4.18	33.0	28.8			3.299
S-4342	45RG33		0-1	7.99	4.91	44.1	17.1	12.3	26.9	7.00	58.75	22.50	18.75	SL	0.244				7.63	37.0	29.4			3.703
S-4343	45RG33		1-3	8.06	9.89	40.5	17.2	19.1	69.6	16.3	57.50	22.50	20.00	SCL/SL	0.324				10.1	35.0	24.9			3.501
S-4344	45RG34		0-1	7.57	7.58	43.2	18.1	22.1	40.4	9.00	38.75	30.00	31.25	CL	0.660		0.201		20.6	14.5	-6.13	6.28	8.20	1.448
S-4345	45RG34		1-3	7.32	9.21	40.5	21.2	20.2	54.8	12.0	50.00	23.75	26.25	SCL	0.691		0.291		21.6	15.5	-6.10	9.09	6.39	1.549
S-4346	45RG35		0-1	7.45	7.17	44.6	17.4	13.4	47.4	12.1	38.75	30.00	31.25	CL	0.476				14.9	20.5	5.66			2.054
S-4347	45RG35		1-3	7.52	9.51	46.6	17.4	23.1	62.2	13.8	41.25	27.50	31.25	CL	0.597		0.224		18.6	13.5	-5.18	7.00	6.47	1.347
S-4348	45RG36		0-1	7.49	8.20	47.3	18.1	11.5	57.4	14.9	42.50	27.50	30.00	CL	0.695				21.7	24.6	2.87			2.458
S-4348	45RG36		1-3	7.29	9.02	45.7	18.8	12.8	63.1	15.9	38.75	30.00	31.25	CL	0.796				24.9	25.6	0.71			2.559
QC-18																			3.76	9.42	5.67	0.56	8.86	0.942
QC-26				7.17	4.58	51.3	15.2	8.23	29.1	8.51	38.75	26.25	35.00	CL			0.018							
SQC-01																								

2005-1

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	TOT S %	SULFATE %	PYR S %	ORG %	ACID POT TN/100TN	NEUT POT TN/100TN	A-B POT TN/100TN	PYR A POT TN/100TN	PYR A-B TN/100TN	%CACOD
S-4394	41RG18	07/15/05	0-12"	7.27	5.41	43.6	22.0	14.5	27.5	8.45	37.50	28.75	33.75	CL	0.226				7.08	9.42	2.37		0.942	
S-4395	41RG18	07/15/05	12-28"	7.09	6.85	40.4	22.7	19.8	38.4	8.33	47.50	21.25	31.25	SCL	0.259				8.09	9.42	1.33		0.942	
S-4396	41RG18	07/15/05	28-36"	7.59	1.71	40.5	7.68	3.92	5.8	2.40	40.00	28.75	31.25	CL	0.097				3.02	9.42	6.41		0.942	
QC-18															0.124				3.87	10.4	6.56		1.044	
QC-26				8.95	4.93	44.0	15.9	8.64	30.4	8.66	33.75	28.75	37.50	CL										
SQC-001																								

2005-2



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877-472-0711 • 406-442-0711 • 406-442-0712 fax • helena@energylab.com

LABORATORY ANALYTICAL REPORT

Client: PWCC-Kayenta Mine
Project: J-19 and J21 Area
Workorder: H06100053

Report Date: 10/13/06
Date Received: 10/05/06

Analysis		pH-SatPst		COND	SAR	Ca-SatPst		Mg-SatPst		Na-SatPst		Sand	Silt	Clay	Texture	Sulfur, Total
Units		Up	Low	s_u_m	minhos/cm	unitless	meq/L	meq/L	meq/L	%	%	%	%	%	unitless	%
Sample ID	Client Sample ID	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results	Results
H06100053-001	41RG19, 0-1'	0	1	6.7	4.70	4.3	26.4	13.8	19.3	32	33	35	33	CL	0.22	
H06100053-002	41RG19, 1-3'	1	3	6.5	4.69	4.9	25.2	16.3	22.5	35	33	32	33	CL	0.25	
H06100053-003	41RG20, 0-1'	0	1	6.1	6.08	5.8	30.3	20.6	29.3	34	30	36	30	CL	0.34	
H06100053-004	41RG20, 1-3'	1	3	6.3	3.85	2.1	29.6	11.8	9.35	43	26	31	26	L	0.15	
H06100053-005	41RG21, 0-1'	0	1	5.7	5.87	5.2	29.7	19.2	26.8	36	30	34	30	CL	0.25	
H06100053-006	41RG21, 1-3'	1	3	6.0	4.16	4.0	23.0	13.1	17.1	34	32	34	32	CL	0.34	



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LABORATORY ANALYTICAL REPORT

Client: PWCC-Kayenta Mine
Project: J-19 and J21 Area
Workorder: H06100053

Report Date: 10/13/06
Date Received: 10/05/06

Sample ID	Client Sample ID	Analysis		Sulfur, Sulfate	Sulfur, Pyritic	Sulfur, Organic	Neut. Potential		Acid Potential		Acid/Base Potential	
		Units	Up	Low	%	Results	t/kt	Results	t/kt	Results	t/kt	Results
H06100053-001	41RG19, 0-1'	0	1				8	7.0	1			
H06100053-002	41RG19, 1-3'	1	3		0.10	0.03	8	7.8	0			
H06100053-003	41RG20, 0-1'	0	1		0.14	0.02	6	5.4	0			
H06100053-004	41RG20, 1-3'	1	3				8	4.7	3			
H06100053-005	41RG21, 0-1'	0	1		0.10	0.02	6	4.2	2			
H06100053-006	41RG21, 1-3'	1	3		0.16	0.04	7	4.3	2			

2006-1

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQL	MAGNESIUM MEQL	SODIUM MEQL	SAR	% SAND	% SILT	% CLAY	CLASS	% CACCS	TOT S %	SULFATE S %	PYR S %	ORG S %	ACID POT TN/100TN	NEUT POT TN/100TN	A-B POT TN/100TN	PYR A-B POT TN/100TN	PYR B TN/100TN
S-5050	61RG9	8/30/10	0-1	6.34	5.26	36.8	18.2	33.6	19.3	3.80	47.50	27.50	25.00	SCL	0.256	0.688		0.125		18.4	2.56	-15.8	3.91	-1.34
S-5050R	61RG9	8/30/10	0-1	6.34	5.26	37.3	18.2	33.3	19.2	3.79	47.50	26.25	26.25	SCL	0.157	0.576		0.125		18.0	1.57	-16.4	3.91	-2.33
S-5051	61RG9	8/30/10	1-3	6.57	5.33	41.9	18.7	32.2	21.0	4.16	45.00	27.50	27.50	CL/SCL	0.454	0.492		0.121		15.4	4.54	-10.8	3.78	0.76
QC-29															0.949	0.183		0.034		5.73	9.49	3.76	1.06	8.42
QC-38				7.20	4.30	45.4	4.89	2.02	35.8	19.2	27.50	32.50	40.00	CL/C										

2010-1

SampleID	ClientSampleID	Depth	Matrix	CollectionDate	Sand, %	Silt, %	Clay, %	Texture, unitless	pH, Sal/Pot, s u	COND, mmhos/cm	Ca-Sal/Pot, meq/l	Mg-Sal/Pot, meq/l	Na-Sal/Pot, meq/l	SAR, unitless	Sulfur, Total, %	Sulfur, Sulfate, %	Sulfur, Pyritic, %	Sulfur, Organic, %	Neut Potential, dkt	Acid Potential, dkt	Acid/Basic Potential, (kt)
H11070042-008	6RG15, 0-1'	0-1'	Soil	06/29/2011 17:00	34	32	34	CL	6.4	43	23.7	20.2	6.45	1.38	<0.01				39	<0.3	39
H11070042-010	6RG15, 1-3'	1-3'	Soil	06/29/2011 17:00	22	34	44	C	6.9	33	23.3	13.2	3.57	0.84	<0.01				90	<0.3	90
H11070042-003	6RG22, 0-1'	0-1'	Soil	06/29/2011 17:00	46	32	22	L	3.4	14.3	17.7	150	42.7	4.66	0.86				2	6.0	4
H11070042-004	6RG22, 1-3'	1-3'	Soil	06/29/2011 17:00	35	35	30	L	3.3	13.5	19.0	127	40.1	4.62	0.82				2	5.9	4
H11070042-005	6RG23, 0-1'	0-1'	Soil	06/29/2011 17:00	38	38	26	L	3.3	13.3	19.3	127	40.7	4.62	0.82				0	5.7	5
H11070042-006	6RG23, 1-3'	1-3'	Soil	06/29/2011 17:00	38	35	27	CL	3.0	12.0	17.3	103	41.3	5.32	0.88	0.58	0.18	0.10	0	6.1	

2011-1

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MMHOM	% SAT	CALCIUM MEDL	MONESUM MEDL	SODIUM MEDL	SAR	% SAND	% SILT	% CLAY	CLASS	% CACO3	TOI %	SULFATE %	PYR %	ORG %	ACID POT TWH00TN	NEUT POT TWH00TN	ALB POT TWH00TN	PVR POT TWH00TN	PVR LAB TWH00TN
1211-046-09	2183 61RG	11/9/12	0-1	3.73	9.45	38.1	19.4	94.1	60.8	8.04	41.25	30.00	28.75	CL	-0.41	1.16	0.89	0.01	0.26	36.1	-4.08	-40.2	0.37	-4.45
1211-046-10	2183 61RG	11/9/12	1-3	3.63	9.35	38.8	19.1	81.6	67.7	9.55	36.25	33.75	30.00	CL	-0.51	1.08	0.80	0.02	0.26	33.7	-5.10	-38.8	0.75	-5.85
1211-046-10R	2183 61RG	11/9/12	1-3	3.71	9.25	42.6	19.1	77.1	64.4	9.28	37.50	32.50	30.00	CL	-0.51	1.08	0.80	0.04	0.24	33.7	-5.10	-38.8	1.15	-6.25
1211-046-19	2181 61RG	11/9/12	0-1	4.94	8.55	42.3	18.9	79.7	50.0	7.06	35.00	33.75	31.25	CL	-0.20	0.88	0.53	0.04	0.31	27.5	-2.04	-29.5	1.25	-3.29
1211-046-20	2181 61RG	11/9/12	1-3	4.83	7.10	39.5	18.9	60.8	40.1	6.35	38.75	31.25	30.00	CL	-0.31	0.81	0.47	0.08	0.26	25.2	-3.06	-28.2	2.47	-5.53
1211-046-20R	2181 61RG	11/9/12	1-3	4.83	7.10	40.1	18.7	59.9	39.9	6.36	37.50	25.00	37.50	CL	-0.31	0.78	0.40	0.12	0.26	24.4	-3.06	-27.5	3.78	-6.84
1211-046-21	2186 60RG	11/9/12	0-1	5.58	9.56	37.3	20.5	27.6	97.9	20.0	32.50	22.50	45.00	C	-0.20	0.67	0.43	0.02	0.23	21.0	-2.04	-23.1	0.66	-2.89
1211-046-22	2166 60RG	11/9/12	1-3	5.78	10.8	49.7	18.6	16.0	118	27.8	30.00	25.00	45.00	C	0.20	0.79	0.46	0.04	0.29	24.7	2.04	-22.7	1.19	0.85
1211-046-47	2164 61RG	11/9/12	0-1	5.84	4.20	43.3	19.5	19.6	97.4	22.0	20.00	43.75	36.25	SCL/CL	0.00	0.61	0.28	0.11	0.22	18.9	0.00	-18.9	3.31	-3.31
1211-046-48	2164 61RG	11/9/12	1-3	6.04	8.80	42.0	17.1	15.6	95.8	23.7	22.50	41.25	36.25	CL	0.10	0.66	0.37	0.05	0.25	20.6	1.02	-19.6	1.47	-0.45
1211-046-51	2164 61RG	11/9/12	0-1	5.37	7.10	38.9	20.2	33.2	66.2	12.8	36.25	32.50	31.25	CL	-0.10	0.65	0.35	0.09	0.22	20.4	-1.02	-21.4	2.69	-3.70
1211-046-52	2164 61RG	11/9/12	1-3	5.65	6.90	42.7	18.6	27.5	64.8	13.5	35.00	32.50	32.50	CL	0.00	0.64	0.36	0.07	0.21	20.0	0.00	-20.0	2.03	-2.03
1211-046-57	2146 60RG	11/9/12	0-1	5.53	9.80	37.8	21.1	44.3	95.3	17.4	31.25	37.50	31.25	CL	-0.20	0.86	0.48	0.10	0.28	27.0	-2.04	-28.1	3.19	-5.22
1211-046-58	2146 60RG	11/9/12	1-3	5.63	8.90	39.9	20.4	32.4	93.7	16.2	28.75	37.50	33.75	CL	-0.20	0.79	0.44	0.10	0.25	24.8	-2.04	-26.8	3.22	-3.70
1211-046-61	2225 61RG	11/9/12	0-1	4.96	6.30	33.2	22.3	112	17.2	2.10	42.50	30.00	27.50	CL	-0.25	0.68	0.50	0.02	0.17	21.4	-2.50	-23.9	0.53	-3.03
1211-046-62	2225 61RG	11/9/12	1-3	4.24	5.30	35.0	20.4	95.4	12.3	1.61	50.00	26.25	23.75	SCL	-0.15	0.92	0.68	<0.01	0.26	28.7	-1.49	-30.2	<0.01	-1.49
1211-046-65	2180 60RG	11/9/12	0-1	2.34	9.40	40.7	21.1	211	122	0.11	37.50	28.75	33.75	CL	-0.85	1.67	1.15	<0.01	0.59	52.1	-8.55	-60.7	<0.01	-8.55
1211-046-68	2190 60RG	11/9/12	1-3	2.44	8.30	42.3	21.9	199	1.61	0.16	35.00	28.75	36.25	CL	-0.85	1.55	1.11	<0.01	0.46	48.4	-8.55	-56.9	<0.01	-8.55
1211-046-71	2147 60RG	11/9/12	0-1	3.51	4.90	33.8	20.0	90.6	17.4	2.33	45.00	27.50	27.50	CL/SCL	-0.25	1.24	0.61	0.20	0.43	38.8	-2.50	-41.3	6.37	-8.87
1211-046-72	2147 60RG	11/9/12	1-3	4.37	8.40	40.5	19.1	58.4	51.0	8.19	36.25	32.50	31.25	CL	-0.25	0.88	0.46	0.09	0.33	27.6	-2.50	-30.1	2.81	-5.31
1211-046-73	2162 61RG	11/9/12	0-1	5.32	8.35	38.5	21.1	87.9	74.8	11.2	27.50	41.25	31.25	CL	-0.25	1.19	0.60	0.21	0.37	37.0	-2.50	-39.5	6.56	-9.06
1211-046-74	2184 61RG	11/9/12	1-3	6.17	6.45	41.3	20.7	42.0	54.2	9.69	31.25	37.50	31.25	CL	0.25	0.85	0.41	0.18	0.25	26.5	2.55	-24.0	5.69	-3.14
1211-046-75	2184 61RG	11/9/12	0-1	5.82	8.30	47.7	19.4	43.3	80.4	14.4	40.00	28.75	31.25	CL	0.05	0.73	0.52	0.02	0.19	22.7	0.53	-22.2	0.56	-0.03
1211-046-76	2184 61RG	11/9/12	1-3	6.42	7.45	40.7	18.0	27.8	72.1	15.1	40.00	28.75	31.25	CL	0.46	0.55	0.23	0.14	0.17	17.1	4.56	-12.5	4.47	0.10
1211-046-87	2185 61RG	11/9/12	0-1	3.61	10.1	29.3	22.9	186	58.4	5.71	57.50	30.00	12.50	SL	-0.45	0.97	0.68	0.09	0.20	30.2	-4.51	-34.8	2.66	-7.03
1211-046-88	2185 61RG	11/9/12	1-3	3.23	14.4	30.0	28.3	339	66.5	4.90	63.75	28.75	7.50	SL	-0.65	1.14	0.95	0.02	0.18	35.6	-6.53	-42.1	0.50	-7.07
1211-046-91	2168 60RG	11/9/12	0-1	5.19	7.30	44.8	21.3	33.9	71.2	13.6	31.25	38.75	30.00	CL	-0.05	0.87	0.41	0.19	0.26	27.0	-0.48	-27.5	6.00	-6.48
1211-046-92	2168 60RG	11/9/12	1-3	5.40	8.05	41.4	22.5	37.8	83.9	15.3	33.75	38.75	27.50	CL	-0.05	0.90	0.45	0.17	0.28	28.1	-0.48	-28.5	5.34	-5.82

2012-1

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO ₃	TOT %	SULFATE %	PYR %	ORG %	ACID POT TH/100TH	NEUT POT TH/100TH	AB POT TH/100TH	PYR A POT TH/100TH	PYR AB TH/100TH
1212-078-01	3123-N9	12/12/12	0-1	3.73	4.20	53.0	25.3	18.3	12.0	2.56	55.00	25.00	20.00	SL/SCL	-2.37	0.38	0.14	0.01	0.23	11.8	-23.7	-35.5	0.25	-23.9
1212-078-02	3123-N9	12/12/12	1-3	3.56	4.30	57.7	24.8	18.4	12.8	2.76	57.50	23.75	18.75	SL	-1.96	0.68	0.36	<0.01	0.34	21.2	-19.6	-40.9	<0.01	-19.6
1212-078-03	3127-N9	12/12/12	0-1	6.11	3.80	40.7	27.8	31.5	15.7	2.88	32.50	35.00	32.50	CL	0.05	0.44	0.28	<0.01	0.16	13.6	0.53	-13.1	<0.01	0.53
1212-078-04	3127-N9	12/12/12	1-3	5.28	7.35	40.9	21.3	55.6	62.9	10.15	35.00	32.50	32.50	CL	-0.25	1.07	0.74	0.06	0.27	33.3	-2.50	-35.8	1.84	-4.34
1212-078-05	3331-N9	12/12/12	0-1	5.28	3.80	40.0	23.9	40.1	14.8	2.62	36.25	33.75	30.00	CL	0.76	0.76	0.55	<0.01	0.23	23.7	7.59	-16.1	<0.01	7.59
1212-078-06	3331-N9	12/12/12	1-3	4.71	4.60	38.4	22.8	97.1	9.53	1.23	40.00	33.75	26.25	L	-0.55	1.27	0.93	0.04	0.30	39.7	-5.52	-45.2	1.31	-6.83
QC-29															0.76	0.21	0.10	0.01	0.10	6.57	7.59	1.02	0.44	7.15
QC-45				8.18	3.50	50.1	4.63	2.44	37.4	19.9	32.50	30.00	37.50	CL										

2012-2

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MG/L	MAGNESIUM MG/L	SODIUM MG/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT %	SULFATE %	PYR %	ORG %	ACID POT TH/100TN	NEUT POT TH/100TN	AB POT TH/100TN	PYR A POT TH/100TN	PYR S AB TH/100TN
1304-084-11	J19 1964	4/11/13	0-1	3.56	15	35.3	21.1	189	30.4	2.97	41.25	36.25	22.50	L	-0.61	1.34	0.89	0.14	0.32	42.0	-6.15	-48.1	4.25	-10.4
1304-084-12	J19 1964	4/11/13	1-3	5.89	7.68	36.1	19.7	67.3	30.3	4.60	42.50	33.75	23.75	L	0.16	0.79	0.52	0.07	0.20	24.6	1.62	-23.0	2.19	-0.57
1304-84-33	J19 1982	4/11/13	0-1	7.15	4.61	37.1	22.1	8.54	27.4	6.89	35.00	35.00	30.00	CL	0.65	0.36	0.10	0.14	0.12	11.2	6.47	-4.72	4.44	2.03
1304-84-34	J19 1982	4/11/13	1-3	7.18	5.2	35.7	26.0	17.0	27.1	5.85	36.25	36.25	27.50	CL	0.74	0.44	0.19	0.09	0.16	13.8	7.44	-6.37	2.87	4.56
1304-84-41	N9 3330	4/11/13	0-1	6.28	4.19	41.4	21.5	29.3	9.74	1.93	37.50	36.25	26.25	L	0.45	0.66	0.44	0.01	0.22	20.8	4.53	-16.2	0.19	4.34
1304-84-42	N9 3330	4/11/13	1-3	6.04	4.14	38.6	19.9	31.9	8.74	1.91	40.00	32.50	27.50	CL	0.36	0.73	0.51	0.02	0.20	22.8	3.56	-19.2	0.69	2.87
1304-84-43	N9 3120	4/11/13	0-1	6.02	3.46	46.1	21.7	13.0	10.7	2.57	32.50	35.00	32.50	CL	0.26	0.24	0.14	0.00	0.10	7.44	2.59	-4.85	-0.03	2.62
1304-84-44	N9 3120	4/11/13	1-3	7.20	3.17	45.8	23.8	13.1	7.74	1.80	32.50	35.00	32.50	CL	0.65	0.14	0.14	0.00	0.00	4.29	6.47	2.18	0.00	6.47
1304-84-45	N9 3126	4/11/13	0-1	4.69	7.01	44.8	18.2	80.0	19.4	2.76	32.50	37.50	30.00	CL	-0.13	0.86	0.62	0.02	0.22	26.7	-1.30	-28.0	0.53	-1.83
1304-84-46	N9 3126	4/11/13	1-3	5.23	6.33	41.6	19.6	32.9	35.3	6.89	35.00	35.00	30.00	CL	0.06	0.83	0.60	0.05	0.17	25.8	0.65	-25.2	1.69	-1.04
1304-84-47	N9 3121	4/11/13	0-1	8.27	4.64	62.6	1.46	0.93	45.0	41.2	16.25	41.25	42.50	SIC	4.53	0.17	0.17	0.00	0.00	5.21	45.3	40.1	0.00	45.3
1304-84-48	N9 3121	4/11/13	1-3	8.87	2.42	76.0	0.59	0.25	23.1	35.5	17.50	37.50	45.00	C	1.33	0.17	0.17	0.00	0.00	5.24	13.3	8.03	0.00	13.3

2013-1

QAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MG/L	MAGNESIUM MG/L	SODIUM MG/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CACO3	TOT S %	SULFATE %	PYR S %	ORG %	ACID POT TINT/100TN	NEUT POT TINT/100TN	AS POT TINT/100TN	PYA POT TINT/100TN	PIRS AS TINT/100TN
1402-153-15	2128	2/11/14	0-1	6.25	8.76	46.7	20.3	31.7	63.5	12.5	31.25	36.25	32.50	CL	0.367	0.706	0.431	0.086	0.190	22.1	3.67	-18.4	2.69	0.98
1402-153-16	2128	2/11/14	1-3	6.44	8.75	43.7	20.5	29.6	85.3	13.0	31.25	36.25	32.50	CL	0.166	0.833	0.445	0.180	0.208	26.0	1.66	-24.3	5.62	-3.95
1402-153-19	1960	2/13/14	0-1	3.91	6.56	53.5	20.9	103.7	2.79	0.35	26.25	45.00	28.75	CL	<0.010	1.144	0.809	0.060	0.275	35.7	-5.36	-41.1	1.86	-7.22
1402-153-20	1960	2/13/14	1-3	4.48	8.43	37.5	18.3	162.1	1.95	0.21	30.00	47.50	22.50	L	<0.010	1.090	0.812	0.022	0.259	34.1	-2.35	-36.5	0.69	-3.04
1402-153-20R	1960	2/13/14	1-3	4.41	8.56	39.9	18.2	153.0	1.83	0.20	31.25	48.25	22.50	L	<0.010	1.189	0.882	0.033	0.274	37.1	-2.35	-39.5	1.03	-3.38
1402-153-21	2071	2/11/14	0-1	5.57	11.6	43.5	20.2	46.5	86.1	15.2	38.75	32.50	28.75	CL	0.166	0.915	0.518	0.149	0.247	28.6	1.66	-26.9	4.65	-2.99
1402-153-22	2071	2/11/14	1-3	5.82	9.79	46.4	19.0	31.7	77.4	15.4	33.75	36.25	30.00	CL	0.166	0.685	0.386	0.100	0.199	21.4	1.66	-19.7	3.12	-1.46
1402-153-37	2109	2/11/14	0-1	5.89	7.58	42.2	16.2	30.9	45.8	9.41	36.25	33.75	30.00	CL	0.166	1.062	0.695	0.044	0.323	33.2	1.66	-31.5	1.37	0.29
1402-153-38	2109	2/11/14	1-3	5.26	9.53	39.0	18.7	48.4	58.7	10.1	37.50	33.75	28.75	CL	<0.010	1.119	0.721	0.079	0.319	35.0	-0.34	-35.3	2.47	-2.81
1402-153-39	2081	2/12/14	0-1	6.81	7.03	53.6	18.8	18.2	50.5	11.7	28.75	36.25	35.00	CL	0.467	0.598	0.345	0.077	0.176	18.7	4.67	-14.0	2.41	2.27
1402-153-40	2081	2/12/14	1-3	7.35	7.40	48.8	19.4	15.3	59.2	14.2	36.25	32.50	31.25	CL	0.668	0.709	0.394	0.113	0.202	22.1	6.68	-15.5	3.53	3.15
1402-153-40R	2081	2/12/14	1-3	7.40	7.49	47.0	19.3	15.1	58.7	14.2	36.25	32.50	31.25	CL	0.668	0.690	0.369	0.129	0.192	21.6	6.68	-14.9	4.03	2.65
1402-153-45	1941	2/13/14	0-1	7.31	3.06	52.4	24.6	22.4	6.61	1.38	26.25	41.25	32.50	CL	1.069	0.793	0.571	0.013	0.209	24.8	10.7	-14.1	0.41	10.28
1402-153-46	1941	2/13/14	1-3	7.24	3.20	50.4	24.5	27.4	5.22	1.02	27.50	42.50	30.00	CL	1.269	0.940	0.686	<0.010	0.283	29.4	12.7	-16.7	-0.28	12.97
1402-153-51	1962	2/13/14	0-1	6.78	4.62	38.4	21.7	50.6	14.1	2.34	38.75	36.25	25.00	L	0.467	1.029	0.652	0.072	0.306	32.1	4.67	-27.5	2.24	2.43
1402-153-62	1962	2/13/14	1-3	6.02	6.46	32.6	24.5	37.8	42.1	7.54	45.00	38.75	16.25	L	0.166	0.951	0.515	0.235	0.201	29.7	1.66	-28.1	7.35	-5.69
1402-153-59	298	2/13/14	0-1	7.85	6.23	60.5	6.49	4.21	57.4	24.8	21.25	37.50	41.25	C	0.467	0.242	0.117	0.010	0.114	7.55	4.67	-2.88	0.32	4.35
1402-153-60	298	2/13/14	1-3	7.52	6.86	57.9	8.58	5.27	63.1	24.0	22.50	32.50	45.00	C	0.467	0.267	0.142	0.006	0.119	8.35	4.67	-3.68	0.20	4.47
1402-153-60R	298	2/13/14	1-3	7.42	6.84	58.7	8.53	5.23	62.6	23.9	22.50	32.50	45.00	C	0.467	0.281	0.151	0.019	0.112	8.79	4.67	-4.12	0.60	4.07
1402-153-61	298	2/12/14	0-1	7.45	6.93	57.8	20.7	14.1	62.6	15.0	26.25	33.75	40.00	CL/C	0.567	0.354	0.199	0.204	0.135	11.1	5.67	-5.39	6.37	-0.70
1402-153-62	299	2/12/14	1-3	8.38	2.8	62.7	1.44	0.81	30.4	28.7	21.25	31.25	47.50	C	0.567	0.174	0.066	0.032	0.229	5.44	5.67	0.23	1.00	-0.34
1402-153-71	2072	2/11/14	0-1	6.08	6.63	46.3	18.2	27.8	49.2	10.2	36.25	33.75	30.00	CL	0.066	0.673	0.412	0.032	0.229	21.0	0.66	-20.4	1.00	-0.34
1402-153-72	2072	2/11/14	1-3	6.32	7.21	46.4	19.4	29.0	54.4	11.1	31.25	37.50	31.25	CL	0.166	0.735	0.432	0.073	0.230	23.0	1.66	-21.3	2.28	-0.62
1402-153-89	2053	2/12/14	0-1	5.95	5.89	44.4	18.3	32.7	45.2	8.96	36.25	37.50	26.25	CL	0.066	0.795	0.477	0.139	0.180	24.8	0.66	-24.2	4.34	-3.68
1402-153-90	2053	2/12/14	1-3	6.01	5.85	43.6	19.8	34.3	43.9	8.45	40.00	32.50	27.50	CL	0.166	0.687	0.345	0.154	0.205	21.5	1.66	-19.8	4.81	-3.15
1402-153-90R	2053	2/12/14	1-3	6.08	5.67	45.2	20.3	33.6	43.9	8.46	40.00	32.50	27.50	CL	0.166	0.712	0.358	0.169	0.186	22.2	1.66	-20.6	5.28	-3.62
1402-153-93	1959	2/13/14	0-1	4.40	8.19	37.6	20.6	273.1	2.33	0.19	32.50	47.50	20.00	L	<0.010	1.418	0.813	0.067	0.538	44.3	-3.35	-47.6	2.09	-5.44
1402-153-94	1959	2/13/14	1-3	3.31	17.7	35.3	22.4	693.5	0.43	0.02	46.25	38.75	15.00	L	<0.010	1.995	0.999	<0.010	1.014	62.3	-10.4	-72.7	-0.56	-9.81
1402-153-99	438	2/12/14	0-1	8.06	6.00	47.9	20.3	14.3	53.1	12.8	43.75	28.75	27.50	CL	1.771	0.176	0.067	0.032	0.117	5.50	17.7	12.21	1.00	7.68
1402-153-AA	438	2/12/14	1-3	7.95	6.23	49.3	19.3	16.6	55.2	13.0	41.25	30.00	28.75	CL	0.868	0.272	0.124	0.032	0.117	8.50	8.68	0.18	1.00	7.68
1402-153-AAR	438	2/12/14	1-3	7.98	6.06	47.7	18.3	15.7	50.9	12.3	41.25	30.00	28.75	CL	0.868	0.299	0.172	0.014	0.114	9.34	8.68	-0.66	0.44	8.24

2014-1

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CACO3	TOT %	SULFATE %	PIR %	ORG %	ACID POT TN/100TN	NEUT POT TN/100TN	AB POT TN/100TN	PIR A-B TN/100TN	PYS A-B TN/100TN
1402-159-01	3015	2/14/14	0-1	7.04	5.83	38.1	20.4	39.2	51.3	9.40	37.50	35.00	27.50	CL	<0.010	0.556	0.344	0.047	0.166	17.4	-4.35	-21.7	1.47	-5.62
1402-159-02	3015	2/14/14	1-3	6.86	6.04	37.3	21.1	46.2	50.9	8.78	50.00	26.25	23.75	SCL	0.267	0.417	0.280	0.001	0.136	13.0	2.67	-10.4	0.03	2.63
1402-159-03	2881	2/14/14	0-1	6.63	6.12	42.4	19.7	62.4	45.2	7.08	40.00	31.25	28.75	CL	0.768	0.757	0.451	0.094	0.212	23.6	7.68	-16.0	2.94	4.74
1402-159-04	2881	2/14/14	1-3	7.43	6.79	42.0	19.9	61.9	53.1	8.29	48.75	27.50	23.75	SCL	0.868	0.528	0.351	0.049	0.128	16.5	8.68	-7.82	1.53	7.15
1402-159-05	2910	2/14/14	0-1	3.95	7.83	45.1	18.6	160	52.6	5.58	30.00	38.75	31.25	CL	<0.010	1.236	0.800	<0.010	0.502	38.6	-4.35	-43.0	-2.06	-2.29
1402-159-06	2910	2/14/14	1-3	3.99	11.8	45.3	17.8	173	118	12.1	36.25	32.50	31.25	CL	<0.010	1.319	0.843	<0.010	0.509	41.2	-2.35	-43.6	-1.03	-1.32
1402-159-07	2992	2/14/14	0-1	5.12	2.65	54.9	7.63	5.55	23.5	9.17	37.50	27.50	35.00	CL	0.166	0.534	0.068	0.142	0.324	16.7	1.66	-15.0	4.44	-2.77
1402-159-08	2992	2/14/14	1-3	5.29	7.25	57.5	16.9	10.3	87.4	23.7	45.00	23.75	31.25	CL/SCL	0.066	0.625	0.143	0.114	0.368	19.5	0.66	-18.9	3.56	-2.90
1402-159-09	2937	2/14/14	0-1	6.99	6.03	42.2	20.8	39.4	53.1	9.68	32.50	33.75	33.75	CL	2.272	1.072	0.636	0.097	0.340	33.5	22.72	-10.8	3.03	19.69
1402-159-10	2937	2/14/14	1-3	7.66	6.85	41.7	18.1	27.9	64.4	13.4	42.50	28.75	28.75	CL	3.375	0.809				25.3	33.75	8.46		
1402-159-10R	2937	2/14/14	1-3	7.65	6.74	42.4	19.1	28.6	66.6	13.6	42.50	28.75	28.75	CL	3.375	0.823				25.7	33.75	8.04		
1402-159-11	2911	2/14/14	0-1	7.61	6.86	40.4	19.9	32.9	62.6	12.2	40.00	31.25	28.75	CL	3.576	0.682				21.3	35.76	14.4		
1402-159-12	2911	2/14/14	1-3	7.10	5.67	41.2	19.2	34.9	48.3	9.29	42.50	28.75	28.75	CL	2.272	0.626				19.6	22.72	3.15		
1402-159-13	2965	2/14/14	0-1	3.55	6.16	42.3	17.9	128.3	14.2	1.66	37.50	33.75	28.75	CL	<0.010	1.290	0.739	0.010	0.541	40.3	-4.35	-44.7	0.31	-4.67
1402-159-14	2965	2/14/14	1-3	2.62	12.0	43.2	22.3	290.4	0.39	0.03	42.50	28.75	28.75	CL	<0.010	2.155	1.191	0.046	0.918	67.3	-11.37	-78.7	1.44	-12.81
1402-159-15	2991	2/14/14	0-1	4.98	11.1	52.3	17.5	88.0	108	14.9	30.00	35.00	35.00	CL	<0.010	1.058	0.733	<0.010	0.342	33.1	-10.37	-43.4	-0.53	-9.84
1402-159-16	2991	2/14/14	1-3	6.49	10.9	45.9	17.7	53.7	107	18.0	41.25	30.00	28.75	CL	0.467	0.958	0.513	0.126	0.320	29.9	4.67	-25.3	3.93	0.74
1402-159-17	2990	2/14/14	0-1	7.14	3.82	45.4	22.0	24.0	21.4	4.46	32.50	35.00	32.50	CL	1.971	1.067	0.568	0.161	0.338	33.3	19.71	-13.6	5.02	14.69
1402-159-18	2990	2/14/14	1-3	7.35	10.3	41.1	18.6	43.3	109	19.6	40.00	28.75	31.25	CL	1.871	1.016	0.562	0.190	0.263	31.7	18.71	-13.0	5.94	12.76
															0.968	0.195	0.075	0.023	0.098	6.09	9.68	3.59	0.72	8.97

2014-2

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MMH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	GLASS	% CACOG	TOTS %	SULFATE %	PFR %	ORG %	ACD POT T/N/100TN	NEUT POT T/N/100TN	AS POT T/N/100TN	PVR & POT T/N/100TN	PVRS AS T/N/100TN
1402-161-05	2130	2/10/14	0-1	6.87	7.88	45.6	19.8	27.0	77.0	15.9	32.50	36.25	31.25	CL	0.367	0.831	0.438	0.144	0.239	25.9	3.67	-22.3	4.50	-0.83
1402-161-06	2130	2/10/14	1-3	6.68	8.04	48.2	19.0	26.6	76.6	16.2	32.50	37.50	30.00	CL	0.467	0.770	0.423	0.108	0.239	24.1	4.67	-19.4	3.37	1.30
1402-161-09	2092	2/11/14	0-1	4.06	3.82	45.7	22.8	42.7	15.4	2.68	35.00	38.75	26.25	L	<0.010	1.083	0.546	0.038	0.470	32.9	-4.35	-37.2	1.19	-5.54
1402-161-10	2092	2/11/14	1-3	4.02	11.7	40.0	27.8	27.1	55.2	4.52	30.00	46.00	25.00	L	<0.010	1.289	0.804	0.001	0.484	39.6	-4.35	-44.0	0.03	-4.39
1402-161-10R	2092	2/11/14	1-3	4.02	11.8	36.8	24.9	24.2	49.6	4.29	28.75	46.25	25.00	L	<0.010	1.288	0.841	-0.035	0.463	40.2	-4.35	-44.6	-1.09	-3.26
1402-161-13	2110	2/11/14	0-1	6.18	8.39	50.9	19.6	28.5	71.8	14.6	33.75	37.50	28.75	CL	0.166	0.799	0.455	0.105	0.239	25.0	1.66	-23.3	3.28	-1.62
1402-161-14	2110	2/11/14	1-3	6.08	9.06	48.9	20.9	34.8	81.8	16.5	33.75	36.25	30.00	CL	0.267	0.768	0.428	0.089	0.251	24.0	2.67	-21.3	2.78	-0.12
1402-161-19	2111	2/11/14	0-1	6.65	5.13	48.5	19.6	15.6	43.5	10.4	40.00	32.50	27.50	CL	0.367	0.739	0.355	0.139	0.245	23.1	3.67	-19.4	4.33	-0.66
1402-161-20	2111	2/11/14	1-3	6.27	5.34	48.0	15.5	14.4	43.3	11.2	35.00	35.00	30.00	CL	0.367	0.730	0.333	0.178	0.218	22.8	3.67	-19.1	5.56	-1.89
1402-161-20R	2111	2/11/14	1-3	6.31	5.4	47.5	16.9	16.1	47.4	11.7	35.00	36.25	28.75	CL	0.367	0.732	0.339	0.162	0.230	22.9	3.67	-19.2	5.07	-1.40
1402-161-21	200	2/13/14	0-1	6.98	6.57	51.5	19.2	25.0	58.3	12.4	35.00	35.00	30.00	CL	0.567	0.467	0.183	0.086	0.198	14.6	5.67	-8.92	2.68	3.00
1402-161-22	200	2/13/14	1-3	6.29	6.88	51.8	19.3	56.4	53.9	8.76	32.50	37.50	30.00	CL	0.467	0.934	0.551	0.100	0.283	29.2	4.67	-24.5	3.12	1.55
1402-161-27	1981	2/13/14	0-1	5.93	3.60	47.2	22.3	23.8	10.3	2.02	42.50	35.00	22.50	L	0.567	0.878	0.533	0.103	0.241	27.4	5.67	-21.7	3.23	2.45
1402-161-28	1981	2/13/14	1-3	6.54	4.40	41.8	26.0	48.0	11.9	1.93	37.50	37.50	25.00	L	1.169	0.431	0.342	0.002	0.087	13.5	11.69	-1.78	0.07	11.6
1402-161-37	2017	2/11/14	0-1	6.75	5.79	39.1	27.7	72.8	11.8	1.87	45.00	30.00	25.00	L	0.467	0.907	0.604	0.041	0.262	28.3	4.67	-23.7	1.29	3.38
1402-161-38	2017	2/11/14	1-3	7.38	7.62	34.2	48.2	78.9	11.4	1.43	55.00	26.25	18.75	SL	2.773	0.823				25.7	27.73	2.01		
1402-161-39	2056	2/11/14	0-1	3.96	7.40	38.4	17.4	17.4	17.1	1.75	47.50	30.00	22.50	L	<0.010	1.166	0.712	0.015	0.429	36.1	-2.35	-38.5	0.47	-2.82
1402-161-40	2056	2/11/14	1-3	3.87	7.95	39.8	19.5	188	20.4	2.01	40.00	35.00	25.00	L	<0.010	1.117	0.635	0.039	0.443	34.9	-2.35	-37.2	1.22	-3.57
1402-161-40R	2056	2/11/14	1-3	3.86	8.00	38.0	19.4	188	20.4	2.00	41.25	33.75	25.00	L	<0.010	1.117	0.636	0.009	0.472	34.9	-2.35	-37.2	0.28	-2.63
1402-161-47	2051	2/12/14	0-1	6.05	6.52	39.8	19.4	36.3	61.8	11.7	32.50	41.25	26.25	L	0.367	0.715	0.274	0.174	0.267	22.3	3.67	-18.7	5.44	-1.77
1402-161-48	2051	2/12/14	1-3	6.94	7.03	42.7	16.3	16.9	79.2	18.9	30.00	40.00	30.00	CL	0.267	0.414	0.201	0.044	0.169	12.9	2.67	-10.3	1.37	1.30
1402-161-51	1958	2/13/14	0-1	4.12	6.77	32.4	21.0	21.7	13.9	1.28	42.50	37.50	20.00	L	<0.010	1.577	1.008	0.084	0.485	49.3	-5.36	-54.6	2.62	-7.98
1402-161-52	1958	2/13/14	1-3	4.58	5.67	32.6	23.7	169	8.92	0.91	46.25	33.75	20.00	L	<0.010	1.351	0.759	0.084	0.508	42.2	-2.35	-44.6	2.62	-4.97
1402-161-53	2128	2/11/14	0-1	6.24	5.15	40.0	19.9	30.7	48.3	9.80	37.50	36.25	26.25	L	0.267	0.766	0.393	0.106	0.267	23.9	2.67	-21.3	3.32	-0.65
1402-161-54	2129	2/11/14	1-3	5.88	4.68	37.8	18.4	30.9	40.0	8.07	37.50	37.50	25.00	L	0.166	0.785	0.323	0.218	0.244	24.5	1.66	-22.9	6.80	-5.14
1402-161-61	2095	2/11/14	0-1	4.95	3.43	39.7	25.9	48.0	8.26	1.04	47.50	30.00	22.50	L	0.166	0.560	0.280	0.114	0.186	17.5	1.66	-15.8	3.55	-1.89
1402-161-62	2095	2/11/14	1-3	5.51	3.23	42.0	25.3	40.5	5.96	1.04	42.50	32.50	25.00	L	0.467	0.608	0.282	0.152	0.174	19.0	4.67	-14.3	4.75	-0.08
1402-161-63	2148	2/10/14	0-1	5.86	6.32	48.6	21.8	38.4	52.6	9.52	35.00	35.00	30.00	CL	<0.010	0.894	0.422	0.167	0.245	26.0	-1.35	-27.4	3.80	-6.55
1402-161-71	2150	2/10/14	1-3	5.48	5.70	49.2	22.3	44.8	43.1	7.45	30.00	37.50	32.50	CL	0.166	0.691	0.293	0.122	0.277	21.6	1.66	-19.9	3.80	-2.13
1402-161-72	2150	2/10/14	1-3	6.28	6.30	43.7	18.6	28.8	58.2	12.2	38.75	36.75	27.50	CL	0.367	0.744	0.250	0.271	0.122	23.3	3.67	-19.6	8.47	-4.80
1402-161-73	2167	2/10/14	0-1	3.25	9.38	36.4	20.6	169	34.4	3.53	38.75	36.25	25.00	L	<0.010	0.994	0.656	0.044	0.294	31.0	-10.4	-41.4	1.37	-11.7
1402-161-74	2167	2/10/14	1-3	3.44	7.44	36.5	19.6	133	31.7	3.62	47.50	32.50	20.00	L	<0.010	0.855	0.529	0.076	0.250	26.7	-6.36	-33.1	2.38	-8.74
1402-161-75	2148	2/10/14	0-1	7.42	3.94	38.7	20.3	11.8	32.4	8.08	41.25	32.50	26.25	L	1.069	0.298	0.143	0.005	0.150	9.31	10.7	1.37	0.17	10.5
1402-161-76	2148	2/10/14	1-3	6.76	4.31	38.3	22.9	20.6	31.7	6.79	47.50	30.00	22.50	L	0.567	0.622	0.424	-0.007	0.205	19.4	5.67	-13.8	-0.20	5.88
1402-161-83	2165	2/10/14	0-1	4.72	4.67	44.2	20.3	36.0	42.5	8.01	32.50	36.25	31.25	CL	<0.010	0.700	0.416	0.065	0.220	21.9	-10.4	-32.3	2.01	-12.4
1402-161-84	2165	2/10/14	1-3	5.33	6.14	45.3	20.8	42.2	62.2	11.1	30.00	37.50	32.50	CL	0.066	0.645	0.360	0.084	0.201	20.1	0.66	-19.5	2.64	-1.98
1402-161-85	580	2/14/14	0-1	4.80	6.75	45.4	19.3	80.0	63.9	9.05	30.00	41.25	28.75	CL	<0.010	0.959	0.546	0.093	0.320	30.0	-0.34	-30.3	2.91	-3.25
1402-161-86	580	2/14/14	1-3	6.96	5.68	42.0	14.3	29.1	64.8	13.9	30.00	42.50	27.50	CL	0.467	1.006	0.325	0.083	0.374	31.4	4.67	-26.8	9.61	-4.94
1402-161-89	2036	2/11/14	0-1	3.92	4.96	37.4	14.3	131	10.9	1.28	47.50	31.25	21.25	L	<0.010	1.216	0.829	0.019	0.368	38.0	-4.35	-42.3	0.59	-4.94
1402-161-90	2036	2/11/14	1-3	3.88	5.57	37.6	16.3	151	11.4	1.25	47.50	32.50	20.00	L	<0.010	1.234	0.814	-0.030	0.451	38.6	-4.35	-42.9	-0.95	-3.41
1402-161-90R	2036	2/11/14	1-3	3.86	5.63	39.3	16.9	156	11.6	1.25	47.50	32.50	20.00	L	<0.010	1.173	0.726	0.004	0.443	36.6	-4.35	-41.0	0.11	-4.47

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QAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQL	MAGNESIUM MEQL	SODIUM MEQL	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT %	SULFATE %	PVR %	ORG %	ACID POT TN/100TN	NEUT POT TN/100TN	A-S POT TN/100TN	PYR A POT TN/100TN	PYR S-B TN/100TN
1402-162-07	2073	2/11/14	0-1	4.33	6.44	35.8	18.8	125.1	44.4	5.23	37.50	35.00	27.50	CL	<0.010	1.301	0.577	0.390	0.335	40.6	-1.35	-42.0	12.2	-13.5
1402-162-08	2073	2/11/14	1-3	4.31	4.35	36.8	17.8	86.4	23.0	3.19	37.50	36.25	26.25	L	<0.010	1.278	0.582	0.357	0.338	39.9	-5.36	-45.3	11.2	-16.5
1402-162-09	2052	2/12/14	0-1	5.56	6.26	41.3	17.0	42.5	60.5	11.1	35.00	36.25	28.75	CL	0.267	0.812	0.460	0.123	0.229	25.4	2.67	-22.7	3.84	-1.18
1402-162-10	2052	2/12/14	1-3	5.11	7.46	39.9	18.3	62.1	71.8	11.3	37.50	35.00	27.50	CL	<0.010	0.953	0.532	0.125	0.296	29.8	-0.34	-30.1	3.91	-4.25
1402-162-10R	2052	2/12/14	1-3	5.19	7.47	38.6	17.3	58.6	68.3	11.1	37.50	35.00	27.50	CL	<0.010	1.003	0.564	0.148	0.291	31.3	-0.34	-31.7	4.62	-4.97
1402-162-11	2091	2/11/14	0-1	6.22	6.44	41.7	18.8	30.9	83.1	12.7	36.25	33.75	30.00	CL	0.367	0.599	0.306	0.095	0.198	18.7	3.67	-15.0	2.97	0.70
1402-162-12	2091	2/11/14	1-3	6.32	6.48	42.2	19.0	29.9	59.2	12.0	37.50	33.75	28.75	CL	0.367	0.658	0.325	0.119	0.214	20.5	3.67	-16.9	3.72	-0.05
QC-29															1.069	0.200	0.071	0.028	0.101	6.25	10.7	4.43	0.87	9.81
QC-48				6.81	4.00	53.8	18.3	8.12	33.8	9.28	31.25	31.25	37.50	CL										

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GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT % S	SULFATE %	PHR % S	ORG %	ACID POT TN/100TN	NEUT POT TN/100TN	AB POT TN/100TN	PYR A-B TN/100TN	PYR A-B TN/100TN
1408-144-01	2909	6/13/14	0-1	4.18	7.40	36.2	20.0	88.7	47.7	6.47	43.75	30.00	26.25	L	<0.01	0.97	0.59	0.16	0.23	30.3	-2.79	-33.1	4.94	-7.73
1408-144-02	2909	6/13/14	1-3	6.21	9.26	38.5	20.1	43.3	82.7	14.7	41.25	32.50	26.25	L	0.05	0.68	0.24	0.21	0.24	21.3	0.51	-20.8	6.50	-5.99
1408-144-03	2935	6/13/14	0-1	4.68	8.23	36.0	20.9	61.9	61.3	9.53	45.00	27.50	27.50	CL/SOL	<0.01	0.72	0.41	0.04	0.27	22.4	-2.79	-25.2	1.25	-4.04
1408-144-04	2935	6/13/14	1-3	7.41	6.16	35.7	21.0	24.6	42.7	8.94	62.50	20.00	17.50	SL	0.71	0.17				5.34	7.11	1.77		
1408-144-05	2938	6/13/14	0-1	6.90	10.0	32.6	20.9	56.4	81.7	13.1	38.75	36.25	25.00	L	1.26	0.59	0.27	0.03	0.30	18.5	12.6	-5.87	0.84	11.8
1408-144-06	2938	6/13/14	1-3	7.44	7.02	29.8	17.5	28.3	56.9	11.9	46.25	32.50	21.25	L	1.37	0.38				11.8	13.7	1.89		
1408-144-07	2936	6/13/14	0-1	5.33	8.40	39.5	17.3	69.3	57.4	8.72	40.00	30.00	30.00	CL	0.05	0.92	0.41	0.17	0.33	28.6	0.51	-28.1	5.34	-4.83
1408-144-08	2936	6/13/14	1-3	5.83	7.85	40.3	20.0	57.1	56.2	9.08	38.75	32.50	28.75	CL	0.16	1.01	0.46	0.20	0.35	31.5	1.61	-29.8	6.31	-4.70
1408-144-09	2988	6/13/14	0-1	5.77	9.36	41.6	19.3	33.7	86.6	16.8	36.25	33.75	30.00	CL	0.38	0.68	0.24	0.21	0.23	21.1	3.81	-17.3	6.50	-2.69
1408-144-10	2988	6/13/14	1-3	6.37	8.57	40.7	17.5	18.5	74.4	17.5	43.75	28.75	27.50	CL	0.38	0.87	0.09	0.34	0.25	20.9	3.81	-17.1	10.6	-6.75
1408-144-10R	2988	6/13/14	1-3	6.35	7.94	41.6	17.1	18.3	72.6	17.2	43.75	28.75	27.50	CL	0.49	0.66	0.27	0.38	0.27	20.5	4.91	-15.6	11.7	-6.84
1408-144-11	2963	6/13/14	0-1	5.65	12.6	38.2	17.7	51.6	125.8	21.4	31.25	36.25	32.50	CL	0.05	0.75	0.18	0.31	0.26	23.6	0.51	-23.0	9.78	-9.27
1408-144-12	2963	6/13/14	1-3	6.69	14.7	38.4	16.3	28.3	155.6	33.0	35.00	36.25	28.75	CL	0.49	0.88	0.29	0.27	0.33	27.5	4.91	-22.6	8.28	-3.37
1408-144-13	2989	6/13/14	0-1	6.25	5.91	40.0	15.8	39.8	37.9	7.19	48.75	26.25	25.00	SOL	0.16	0.50	0.16	0.15	0.20	15.8	1.61	-14.2	4.53	-2.92
1408-144-14	2989	6/13/14	1-3	7.03	7.95	36.7	16.6	23.7	65.2	14.5	46.25	28.75	25.00	L	1.48	0.62	0.24	0.12	0.26	19.5	14.8	-4.71	3.87	10.9
1408-144-15	2964	6/13/14	0-1	5.87	6.30	36.6	16.5	50.5	36.2	6.25	38.75	33.75	27.50	CL	0.38	0.83	0.34	0.18	0.31	25.8	3.81	-22.0	5.50	-1.69
1408-144-16	2964	6/13/14	1-3	6.62	10.3	39.9	14.6	36.1	87.9	17.5	43.75	28.75	27.50	CL	0.38	0.89	0.31	0.23	0.35	27.8	3.81	-24.0	7.06	-3.25
QC-29				6.66	4.64	44.2	20.8	9.71	36.8	9.43	38.75	26.25	35.00	CL	0.82	0.20				6.30	8.21	1.90		
QC-46																								

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GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT %	SULFATE %	PYR %	ORG %	ACID POT TN/1000TN	NEUT POT TN/1000TN	AS POT TN/1000TN	PYR A POT TN/1000TN	PYR AS TN/1000TN
1410-184-03	56-355	10/15/14	0-1	6.80	7.19	44.7	17.4	25.4	50.9	11.0	13.75	47.50	38.75	SiCL	0.50	0.41	0.17	0.04	0.20	12.8	4.96	-7.81	1.09	3.86
1410-184-04	56-355	10/15/14	1-3	7.25	7.17	50.9	16.9	18.9	68.7	16.2	18.75	40.00	41.25	SiC/C	0.89	0.28				8.83	8.92	0.10		
1410-184-05	56-354	10/15/14	0-1	6.59	8.44	43.6	21.3	38.7	42.2	7.71	31.25	37.50	31.25	CL	0.79	0.80	0.40	0.09	0.32	25.1	7.93	-17.2	2.78	5.15
1410-184-06	56-354	10/15/14	1-3	6.44	7.73	37.0	18.6	46.1	45.2	7.95	28.75	38.75	32.50	CL	0.69	0.83	0.33	0.20	0.30	26.0	6.94	-19.0	6.28	0.66
1410-184-07	56-358	10/15/14	0-1	5.18	9.49	38.1	17.5	93.0	42.3	5.69	31.25	37.50	31.25	CL	<0.01	0.84	0.45	0.11	0.29	26.3	-1.00	-27.3	3.47	-4.47
1410-184-08	56-358	10/15/14	1-3	5.19	11.7	39.8	16.8	116.0	58.3	7.15	32.50	37.50	30.00	CL	0.00	0.88	0.55	0.07	0.26	27.4	0.00	-27.4	2.19	-2.19
1410-184-09	56-368	10/15/14	0-1	7.12	5.68	41.3	17.1	17.5	36.8	8.84	23.75	40.00	36.25	CL	0.89	0.46	0.17	0.09	0.20	14.3	8.92	-5.35	2.72	6.21
1410-184-10	56-368	10/15/14	1-3	7.00	6.19	37.3	16.4	30.8	38.1	7.84	28.75	37.50	33.75	CL	0.89	0.59	0.26	0.10	0.23	18.4	8.92	-9.51	3.16	5.77
1410-184-10R	56-368	10/15/14	1-3	7.00	6.65	39.3	17.6	32.4	40.4	8.07	28.75	37.50	33.75	CL	0.79	0.60	0.27	0.10	0.22	18.6	7.93	-10.7	3.22	4.71
1410-184-11	56-368	10/15/14	0-1	5.96	8.68	39.9	16.2	48.8	54.8	9.61	26.25	40.00	33.75	CL	0.40	0.83	0.34	0.20	0.29	25.9	3.96	-21.9	6.34	-2.38
1410-184-12	56-366	10/15/14	1-3	6.24	8.87	35.2	16.3	47.6	58.3	10.3	36.25	35.00	28.75	CL	0.79	0.87	0.36	0.23	0.28	27.3	7.93	-19.3	7.28	0.65
1410-184-13	56-364	10/15/14	0-1	6.42	7.42	42.9	14.8	23.6	55.2	12.6	25.00	36.25	38.75	CL	0.59	0.66	0.29	0.12	0.26	20.6	5.95	-14.6	3.72	2.23
1410-184-14	56-364	10/15/14	1-3	6.37	8.89	45.8	15.1	24.6	69.2	15.5	20.00	38.75	41.25	C	0.20	0.53	0.26	0.05	0.23	16.6	1.98	-14.6	1.47	0.51
1410-184-15	56-128	10/15/14	0-1	6.05	6.20	65.0	4.04	2.69	56.7	30.4	13.75	35.00	51.25	C	<0.01	0.28	0.14	0.04	0.10	8.82	0.00	-8.82	1.34	-1.35
1410-184-16	56-128	10/15/14	1-3	6.05	7.85	58.6	8.88	5.34	70.5	26.4	20.00	28.75	51.25	C	<0.01	0.31	0.04	0.11	0.16	9.69	0.00	-9.69	3.47	-3.47
1410-184-21	56-125	10/15/14	0-1	6.55	8.77	38.5	15.7	30.2	66.6	13.9	27.50	38.75	33.75	CL	0.59	0.85	0.35	0.20	0.30	26.5	5.95	-20.5	6.19	-0.24
1410-184-22	56-125	10/15/14	1-3	6.27	8.83	38.3	14.6	29.3	66.1	14.1	33.75	33.75	32.50	CL	0.59	0.89	0.38	0.14	0.36	27.7	5.95	-21.7	4.47	1.48
1410-184-23	56-123	10/15/14	0-1	6.83	9.45	52.3	16.1	21.0	79.2	18.4	18.75	45.00	36.25	SiCL	0.69	0.41	0.16	0.07	0.18	12.8	6.94	-5.91	2.12	4.82
1410-184-24	56-123	10/15/14	1-3	6.84	9.60	51.8	16.4	20.4	82.2	19.2	21.25	42.50	36.25	CL	0.89	0.38	0.17	0.07	0.14	11.8	8.92	-2.91	2.09	6.83

2014-6

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQL	MAGNESIUM MEQL	SODIUM MEQL	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT %	SULFATE %	PYR %	ORG %	ACID POT TN/100TN	NEUT POT TN/100TN	A-B POT TN/100TN	PYR A POT TN/100TN	PYR A-B TN/100TN
1411-214-01	24-3016	11/20/14	0-1	5.64	11.9	37.5	17.6	100	77.0	10.0	38.75	32.50	28.75	CL	0.288	0.974	0.627	0.017	0.329	30.4	2.88	-27.5	0.53	2.34
1411-214-02	24-3016	11/20/14	1-3	5.94	11.5	36.5	17.9	66.8	87.4	13.4	43.75	28.75	27.50	CL	0.478	0.975	0.605	0.066	0.305	30.5	4.78	-25.7	2.06	2.72
1411-214-03	25-2860	11/20/14	0-1	5.53	14.3	35.6	17.7	112	101	12.5	31.25	36.25	32.50	CL	0.288	1.069	0.667	0.087	0.316	33.4	2.88	-30.5	2.72	0.16
1411-214-04	25-2860	11/20/14	1-3	5.88	6.68	43.3	17.6	17.2	50.0	12.0	53.75	25.00	21.25	SCL	0.669	1.253	1.145	0.010	0.098	39.1	6.69	-32.5	0.31	6.38
1411-214-05	25-2860	11/20/14	0-1	5.90	12.6	36.6	17.0	107	80.9	10.3	40.00	32.50	27.50	CL	0.383	1.182	1.076	<0.010	0.113	36.9	3.83	-33.1	<0.01	3.83
1411-214-06	25-2860	11/20/14	1-3	5.02	12.0	36.2	17.2	108	71.3	9.0	38.75	32.50	28.75	CL	0.097	1.141	1.026	0.011	0.104	35.6	0.97	-34.7	0.34	0.62
1411-214-07	25-2851	11/20/14	0-1	7.09	10.1	30.2	18.1	63.8	68.3	10.7	40.00	32.50	27.50	CL	1.051	0.864	0.750	0.013	0.101	27.0	10.5	-16.5	0.41	10.1
1411-214-08	25-2851	11/20/14	1-3	7.72	7.80	36.8	17.5	20.2	82.2	14.3	42.50	30.00	27.50	CL	3.150	0.415				13.0	31.5	18.6		
1411-214-08R	25-2851	11/20/14	0-1	7.72	7.90	35.7	17.5	20.8	84.4	14.7	42.50	30.00	27.50	CL	3.150	0.419				13.1	31.5	18.4		

2014-7

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT % S	SULFATE %	PFR % S	ORG % S	ACID POT TN/100TN	NEUT POT TN/100TN	AM POT TN/100TN	PYR A POT TN/100TN	PYR AB TN/100TN	BORON PPM	TOT SE PPM	ABOTPA SE PPM	SOL SE PPM
1411-215-01	43-622	11/20/14	0-1	6.50	8.92	31.4	18.3	34.5	68.3	13.3	35.00	32.25	28.75	CL	1.255	0.547	0.340	0.047	0.160	17.1	12.7	-4.44	1.47	11.18				
1411-215-02	43-622	11/20/14	1-3	6.40	8.55	32.6	17.5	36.0	63.5	12.3	43.75	31.25	25.00	L	0.779	0.755	0.495	0.045	0.215	23.6	7.79	-15.8	1.41	6.38				
1411-215-03	43-621	11/20/14	0-1	7.58	2.23	38.7	7.93	7.44	8.74	3.15	43.75	30.00	26.25	L	1.362	0.033				1.03	13.6	12.6						
1411-215-04	43-621	11/20/14	1-3	7.64	2.04	33.2	6.79	6.79	8.66	3.32	46.25	30.00	23.75	L	1.557	0.347				10.8	15.6	4.74						
1411-215-05	41-620	11/20/14	0-1	6.50	5.10	33.0	21.4	24.4	24.0	5.02	46.25	28.75	25.00	L	1.265	0.194				6.05	12.7	6.60						
1411-215-06	41-620	11/20/14	1-3	6.65	5.45	34.7	21.6	23.4	29.1	6.13	48.75	28.25	25.00	SCL	1.362	0.143				4.48	13.8	9.15						
1411-215-07	41-619	11/20/14	0-1	7.43	12.2	31.6	15.8	24.4	116	25.8	45.00	32.50	22.50	L	0.779	0.386	0.232	0.016	0.138	12.0	7.79	-4.26	0.50	7.29				
1411-215-08	41-619	11/20/14	1-3	6.59	10.6	30.7	18.0	27.2	90.9	19.1	47.50	32.50	20.00	L	0.195	0.495	0.223	0.073	0.199	15.5	1.95	-13.5	2.28	-0.33				

2014-8

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CACOD	TOT %	SULFATE %	PYR %	ORG %	ACID POT TN/100TN	NEUT POT TN/100TN	A-B POT TN/100TN	PYR A POT TN/100TN	PYR B AS TN/100TN
1505-099-01	24-2962	5/5/15	0-1	6.03	6.84	41.1	18.7	12.8	50.5	12.7	30.00	40.00	30.00	CL	0.351	0.473	0.142	0.151	0.180	14.8	3.51	-11.3	4.72	-1.21
1505-099-02	24-2962	5/5/15	1-3	7.31	37.2	37.2	17.0	23.0	137	30.6	47.50	27.50	25.00	SCL	1.120	0.476	0.297	0.070	0.109	14.9	11.2	-3.67	2.19	9.01
1505-099-03	25-2335	5/5/15	0-1	5.73	8.57	38.0	18.5	70.0	51.3	7.72	40.00	37.50	22.50	L	0.639	1.100	0.295	0.085	0.722	34.4	6.39	-28.0	2.66	3.74
1505-099-04	25-2335	5/5/15	1-3	7.06	11.0	38.8	20.3	62.9	86.8	13.4	41.25	33.75	25.00	L	1.696	0.651	0.330	0.047	0.274	20.3	17.0	-3.38	1.47	15.49
1505-099-07	25-2367	5/5/15	0-1	6.80	10.6	37.7	18.1	29.9	91.8	18.7	33.75	35.00	31.25	CL	0.639	0.837	0.434	0.162	0.241	26.1	6.39	-19.8	5.06	1.33
1505-099-08	25-2367	5/5/15	1-3	5.93	12.0	35.6	17.0	70.5	92.2	13.9	35.00	32.50	32.50	CL	0.447	1.800	0.972	0.027	0.800	56.2	4.47	-51.8	0.84	3.63
1505-099-09	25-2334	5/5/15	0-1	7.55	7.60	34.9	20.2	30.3	53.5	10.6	45.00	28.75	26.25	L	2.561	0.448				14.0	25.6			
1505-099-10	25-2334	5/5/15	1-3	7.48	7.40	33.9	18.5	27.0	52.6	11.0	46.25	28.75	25.00	L	2.273	0.450				14.1	22.7	8.67		
1505-099-10R	25-2334	5/5/15	1-3	7.48	7.27	33.4	18.6	27.2	53.7	11.2	46.25	28.75	25.00	L	2.369	0.438				13.7	23.7	10.0		
1505-099-11	25-2849	5/5/15	0-1	7.45	8.22	41.2	19.2	27.1	66.1	13.7	38.75	33.75	27.50	CL	1.504	0.840	0.410	0.071	0.359	26.2	15.0	-11.2	2.22	12.82
1505-099-12	25-2849	5/5/15	1-3	7.27	7.95	43.8	18.5	26.8	59.6	12.5	32.50	36.25	31.25	CL	1.600	0.796	0.359	0.073	0.384	24.9	16.0	-8.9	2.28	13.72
1505-099-13	25-2879	5/5/15	0-1	6.75	9.10	39.7	18.0	40.7	67.9	12.5	35.00	36.00	30.00	CL	0.447	0.854	0.458	0.021	0.375	26.7	4.47	-22.2	0.66	3.82
1505-099-14	25-2879	5/5/15	1-3	7.05	10.7	39.7	19.3	33.9	89.2	17.3	35.00	36.25	28.75	CL	1.120	0.690	0.304	0.167	0.219	21.5	11.2	-10.3	5.22	5.98
1505-099-15	25-2808	5/5/15	0-1	5.61	11.7	37.7	17.3	46.7	99.2	17.5	32.50	37.50	30.00	CL	0.543	0.903	0.549	-0.010	0.364	28.2	5.43	-22.8	-0.31	5.74
1505-099-16	25-2908	5/5/15	1-3	6.87	11.9	36.0	17.5	20.1	107.0	24.7	37.50	35.00	27.50	CL	0.159	0.788	0.322	0.065	0.401	24.6	1.59	-23.0	2.03	-0.44
1505-099-17	25-2907	5/5/15	0-1	7.37	7.48	36.3	18.9	20.9	53.1	11.9	45.00	30.00	25.00	L	1.504	0.326				10.2	15.0	4.86		
1505-099-18	25-2907	5/5/15	1-3	7.03	7.76	34.2	17.9	17.2	59.6	14.2	52.50	23.75	23.75	SCL	0.928	0.355	0.097	0.029	0.229	11.1	9.28	-1.81	0.91	8.37
1505-099-19	25-2878	5/5/15	0-1	7.18	7.78	41.1	18.6	19.6	56.5	12.9	42.50	30.00	27.50	CL	0.735	0.396	0.164	-0.005	0.237	12.4	7.35	-5.02	-0.16	7.51
1505-099-20	25-2878	5/5/15	1-3	7.15	6.93	37.9	16.2	24.5	47.4	10.5	47.50	26.25	26.25	SCL	0.928	0.432	0.202	0.103	0.126	13.5	9.28	-4.22	3.22	6.06
1505-099-20R	25-2878	5/5/15	1-3	7.17	6.69	42.2	16.8	24.2	44.8	9.89	47.50	26.25	26.25	SCL	0.831	0.440	0.207	0.102	0.131	13.7	8.31	-5.43	3.19	5.13
1505-099-21	25-2848	5/5/15	0-1	7.79	11.8	36.7	22.4	22.7	90.9	19.1	56.25	25.00	18.75	SL	1.312	0.270				8.4	13.12	4.70		
1505-099-22	25-2848	5/5/15	1-3	7.77	11.7	38.6	19.4	20.6	92.6	20.7	53.75	26.25	20.00	SL/SCL	2.369	0.504				15.7	23.7	7.94		
1505-099-23	25-2333	5/5/15	0-1	7.38	11.1	41.6	20.6	25.2	82.6	17.3	45.00	31.25	23.75	L	0.831	0.439	0.218	0.093	0.128	13.7	8.31	-5.38	2.91	5.41
1505-099-24	25-2333	5/5/15	1-3	5.68	17.4	45.7	19.4	67.5	123	18.6	32.50	38.75	28.75	CL	1.024	1.060	0.617	0.085	0.382	33.1	10.2	-22.9	2.66	7.58
1505-099-25	25-2368	5/5/15	0-1	6.65	15.1	42.2	21.2	43.0	111	19.6	37.50	33.75	28.75	CL	<0.010	1.130	0.659	0.091	0.381	35.3	<0.010	-35.3	2.84	-2.84
1505-099-26	25-2368	5/5/15	1-3	6.96	13.3	40.7	19.8	26.9	104.4	21.6	33.75	40.00	26.25	L	2.080	1.030	0.585	0.092	0.416	32.2	20.8	-11.4	1.00	19.8
1505-099-27	25-2365	5/5/15	0-1	7.55	11.2	42.3	19.0	15.4	88.3	21.3	41.25	33.75	25.00	L	1.312	0.472	0.215	0.028	0.229	14.7	13.1	-1.62	0.87	12.2
1505-099-28	25-2365	5/5/15	1-3	7.06	11.5	42.3	20.7	29.2	90.0	18.0	41.25	32.50	26.25	L	1.024	0.693	0.373	0.123	0.197	21.6	10.2	-11.4	3.84	6.39
1505-099-29	25-2332	5/5/15	0-1	7.66	9.49	39.7	17.9	11.8	74.4	19.3	43.75	31.25	25.00	L	1.408	0.302				9.43	14.1	4.64		
1505-099-30	25-2332	5/5/15	1-3	7.73	9.15	34.9	16.8	13.8	74.8	19.1	48.75	28.75	22.50	L	0.639	0.198				6.19	6.39	0.21		
1505-099-30R	25-2332	5/5/15	1-3	7.68	9.50	35.6	17.1	13.6	71.8	18.3	48.75	28.75	22.50	L	0.735	0.220				6.87	7.35	0.48		
1505-099-31	25-2847	5/5/15	0-1	6.34	9.94	42.3	20.9	51.7	96.1	16.0	37.50	35.00	27.50	CL	0.351	0.939	0.467	0.141	0.330	29.3	3.51	-25.8	4.40	-0.89
1505-099-32	25-2847	5/5/15	1-3	6.36	15.4	38.9	21.9	52.8	108	17.7	42.50	33.75	23.75	L	0.159	1.010	0.542	0.264	0.204	31.6	1.59	-30.0	8.25	-6.66
1505-099-33	25-2877	5/5/15	0-1	6.69	5.39	31.5	21.7	34.6	15.1	2.84	61.25	23.75	15.00	SL	0.735	0.263	0.160	0.011	0.091	8.2	7.35	-0.85	0.34	7.01
1505-099-34	25-2877	5/5/15	1-3	6.47	6.22	37.3	22.5	40.1	20.3	3.62	52.50	28.75	18.75	SL	0.639	0.540	0.341	0.015	0.184	16.9	6.39	-10.5	0.47	5.92
1505-099-35	25-2906	5/5/15	0-1	7.44	11.3	38.1	20.5	23.9	88.3	18.1	47.50	30.00	22.50	L	1.888	0.502				15.7	18.9	3.21		
1505-099-36	25-2906	5/5/15	1-3	7.34	11.9	34.4	18.3	28.4	97.9	20.3	50.00	28.75	21.25	L	1.216	0.702	0.398	0.061	0.243	21.9	12.2	-9.77	1.91	10.3
1505-099-38	26-2720	5/5/15	0-1	4.54	5.47	41.3	20.2	59.5	5.83	0.92	41.25	32.50	26.25	L	0.063	0.493	0.270	0.033	0.191	15.4	0.63	-14.8	1.03	-0.40
1505-099-39R	26-2720	5/5/15	0-1	4.60	5.74	40.4	19.7	60.4	5.87	0.93				L										
1505-099-40	26-2720	5/5/15	1-3	6.19	4.70	33.1	26.1	28.4	7.83	1.50	47.50	30.00	22.50	L	0.198	0.396	0.278	-0.011	0.129	12.4	2.0	-10.4	-0.34	2.32
1505-099-40R	26-2720	5/5/15	1-3								48.75	28.75	22.50	L	0.299	0.391	0.266	-0.022	0.146	12.2	3.0	-9.2	-0.69	3.68

2015-1

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT S %	SULFATE %	PYR S %	ORG %	ACID POT TH/100TN	NEUT POT TH/100TN	A-B POT TH/100TN	PYR A POT TH/100TN	PYR A S TH/100TN
1505-100-01	58-1963	5/6/15	0-1	6.01	11.8	34.19	20.8	163	23.4	2.44	41.25	30.00	28.75	CL	<0.01	0.997	0.816	0.011	0.150	31.15	<0.01	-31.2	0.34	-0.34
1505-100-02	58-1963	5/6/15	1-3	7.57	3.22	47.49	23.9	10.0	7.53	1.83	58.75	18.75	22.50	SCL	8.84	0.094			2.95	88.4	88.4	85.4		
1505-100-05	62-2121	5/6/15	0-1	6.55	7.17	38.74	16.2	31.3	47.8	9.82	38.75	28.75	32.50	CL	0.64	0.746	0.430	0.137	0.179	23.3	6.36	-16.9	4.28	2.08
1505-100-06	62-2121	5/6/15	1-3	5.49	11.8	38.20	15.9	50.8	94.0	16.3	33.75	30.00	36.25	CL	0.35	0.999	0.594	0.152	0.253	31.2	3.47	-27.7	4.75	-1.27
1505-100-07	62-2139	5/6/15	0-1	7.30	8.96	46.98	12.9	8.17	77.0	23.7	31.25	28.75	40.00	CL/C	0.54	0.397	0.246	0.064	0.087	12.4	5.40	-7.00	2.00	3.40
1505-100-08	62-2139	5/6/15	1-3	7.32	8.60	42.38	10.2	6.61	73.9	25.5	32.50	28.75	38.75	CL	0.54	0.413	0.219	0.077	0.118	12.9	5.40	-7.52	2.41	2.99
1505-100-09	62-2138	5/6/15	0-1	7.33	9.02	41.38	17.6	14.2	74.4	18.6	42.50	26.25	31.25	CL	0.732	0.457	0.317	0.027	0.114	14.3	7.32	-6.97	0.84	6.48
1505-100-10	62-2138	5/6/15	1-3	7.44	6.66	43.70	16.3	10.2	50.9	14.0	48.75	17.50	33.75	SCL	0.83	0.387	0.238	0.033	0.117	12.1	8.28	-3.82	1.03	7.25
1505-100-10R	62-2138	5/6/15	1-3	7.45	6.50	40.38	14.7	9.5	50.0	14.4	47.50	17.50	35.00	SCL/SC	0.64	0.373	0.238	0.043	0.093	11.7	6.36	-5.30	1.34	5.02
1505-100-11	62-2120	5/6/15	0-1	7.42	7.96	45.12	16.1	11.8	64.4	17.2	48.75	18.75	32.50	SCL	0.732	0.349	0.196	0.065	0.087	10.9	7.32	-3.58	2.03	5.29
1505-100-12	62-2120	5/6/15	1-3	7.43	7.11	37.58	16.9	15.8	51.8	12.8	46.25	23.75	30.00	SCL	1.02	0.381	0.209	0.065	0.107	11.9	10.2	-1.68	2.03	8.17
1505-100-13	62-2119	5/6/15	0-1	7.60	5.98	38.30	17.7	17.1	38.5	9.2	42.50	26.25	31.25	CL	2.17	0.290			9.07	9.07	21.7	12.7		
1505-100-14	62-2119	5/6/15	1-3	7.65	6.13	43.53	13.0	12.3	45.2	12.7	45.00	25.00	30.00	CL/SCL	1.12	0.266			8.32	8.32	11.2	2.84		
1505-100-15	62-393	5/6/15	0-1	8.25	4.02	59.63	1.36	0.70	35.3	34.8	28.75	48.75	22.50	L	1.02	0.325			10.2	10.2	10.2	0.04		
1505-100-16	62-393	5/6/15	1-3	7.00	10.4	37.86	16.6	23.9	89.6	19.9	38.75	25.00	36.25	CL	0.35	0.355	0.163	0.028	0.164	11.1	3.47	-7.63	0.87	2.60
1505-100-17	57-440	5/6/15	0-1	5.15	6.40	38.43	16.0	48.7	30.6	5.38	47.50	21.25	31.25	SCL	<0.010	0.843	0.656	0.013	0.174	26.3	<0.01	-26.3	0.41	-0.41
1505-100-18	57-440	5/6/15	1-3	7.28	7.53	38.48	18.2	28.7	55.2	11.7	48.75	22.50	28.75	SCL	0.25	0.616	0.377	0.074	0.164	19.2	2.51	-16.7	2.31	0.20
1505-100-19	57-437	5/6/15	0-1	7.86	7.27	53.87	6.2	4.96	67.0	28.4	40.00	22.50	37.50	CL	0.54	0.451	0.241	0.079	0.131	14.1	5.40	-8.70	2.47	2.93
1505-100-20	57-437	5/6/15	1-3	7.32	8.25	42.50	10.0	7.22	75.3	25.7	37.50	26.25	36.25	CL	0.92	0.469	0.177	0.134	0.159	14.7	9.24	-5.41	4.19	5.06
1505-100-20R	57-437	5/6/15	1-3	7.34	8.21	40.84	10.5	7.40	73.9	24.7	37.50	26.25	36.25	CL	0.83	0.467	0.209	0.103	0.155	14.6	8.28	-6.30	3.22	5.06
1505-100-21	57-2100	5/6/15	0-1	6.96	5.95	42.64	15.7	28.7	35.9	7.62	36.25	31.25	32.50	CL	0.64	0.737	0.393	0.178	0.166	23.0	6.36	-16.7	5.56	0.80
1505-100-22	57-2100	5/6/15	1-3	6.49	7.09	37.54	15.6	36.1	46.5	9.15	40.00	28.75	31.25	CL	0.92	0.954	0.616	0.200	0.138	29.8	9.24	-20.5	6.25	2.99
1505-100-23	57-2101	5/6/15	0-1	6.64	5.91	40.30	17.5	29.5	33.6	6.92	45.00	26.25	28.75	CL/SCL	0.92	0.914	0.536	0.261	0.118	28.6	9.24	-19.3	8.15	1.09
1505-100-24	57-2101	5/6/15	1-3	6.44	6.92	36.90	17.1	36.1	46.1	8.94	45.00	25.00	30.00	CL/SCL	0.732	0.978	0.593	0.241	0.143	30.5	7.32	-23.2	7.53	-0.21
1505-100-25	57-297	5/6/15	0-1	6.12	5.41	70.43	3.63	2.07	50.0	29.6	30.00	22.50	47.50	C	0.64	0.660	0.404	0.163	0.093	20.6	6.36	-14.3	5.09	1.27
1505-100-26	57-297	5/6/15	1-3	7.40	5.63	52.17	2.98	1.69	51.8	33.9	16.25	32.50	51.25	C	0.54	0.412	0.067	0.178	0.167	12.9	5.40	-7.48	5.56	-0.16
1505-100-27	57-303	5/6/15	0-1	7.69	7.50	45.33	16.9	14.2	62.2	15.8	37.50	21.25	41.25	C	1.79	0.300			9.36	9.36	17.9	8.53		
1505-100-28	57-303	5/6/15	1-3	7.76	5.67	44.33	11.0	8.31	45.7	14.7	41.25	17.50	41.25	C	2.17	0.285			8.90	8.90	21.7	12.8		

2015-2

QAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEOL	MAGNESIUM MEOL	SODIUM MEOL	SAR	% SAND	% SILT	% CLAY	CLASS	% CACO3	TOT S %	SULFATE %	PYR S %	ORG %	ACID POT TN/100TN	NEUT POT TN/100TN	AS POT TN/100TN	PYR A POT TN/100TN	PYR S A-B TN/100TN
1507-046-15	46-221	7/3/15	0-1	6.90	9.18	53.6	25.3	30.5	66.6	12.6	36.25	30.00	33.75	CL	1.289	0.320				10.0	12.9	2.89		
1507-046-16	46-221	7/3/15	1-3	7.40	5.48	50.7	26.3	27.1	20.2	3.90	33.75	33.75	32.50	CL	2.083	0.281				8.77	20.8	12.1		
1507-046-25	46-381	7/3/15	0-1	7.52	2.81	43.4	14.5	15.2	7.22	1.87	50.00	25.00	25.00	SCL	0.198	0.215	-0.016	0.114	0.115	6.71	1.98	-4.7	3.56	-1.58
1507-046-26	46-381	7/3/15	1-3	7.51	6.09	45.5	19.7	29.4	33.9	6.84	52.50	26.00	22.50	SCL	1.388	0.172				5.39	13.9	8.50		

2015-3

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CACDS	TOT S %	SULFATE S %	PYR S %	ORG S %	ACID POT TH/100TN	NEUT POT TH/100TN	AB POT TH/100TN	PYR A POT TH/100TN	PHYS AB TH/100TN
1507 047-01	25-2557	7/3/15	0-1	7.42	9.64	51.0	24.6	28.0	70.5	13.8	40.00	28.75	31.25	CL	0.821	0.533	0.254	0.128	0.152	16.6	8.21	-8.43	4.00	4.2
1508 047-02	25-2557	7/3/15	1-3	7.76	10.6	55.9	23.9	27.3	87.0	17.2	38.75	30.00	31.25	CL	1.610	0.583	0.296	0.146	0.141	18.2	16.1	-2.11	4.56	11.5
1509 047-03	26-2664	7/3/15	0-1	7.90	12.0	45.9	25.9	22.2	110	22.3	37.50	31.25	31.25	CL	2.792	0.352				11.0	27.9	16.9		
1510 047-04	26-2664	7/3/15	1-3	7.97	14.5	50.1	27.8	24.6	134	26.1	36.25	33.75	30.00	CL	1.807	0.322				10.1	18.1	8.00		
1511 047-05	26-2631	7/3/15	0-1	7.05	11.2	49.1	25.2	27.6	88.3	17.2	35.00	33.75	31.25	CL	1.117	0.492	0.298	0.059	0.135	15.4	11.2	-4.19	1.84	9.32
1512 047-06	26-2631	7/3/15	1-3	8.60	7.18	46.5	2.23	2.94	70.9	44.1	41.25	33.75	25.00	L	1.708	0.119				3.70	17.1	13.4		
1513 047-07	26-2594	7/3/15	0-1	7.18	10.6	53.4	26.2	31.5	92.6	17.2	33.75	35.00	31.25	CL	1.412	0.675	0.324	0.167	0.164	21.1	14.1	-8.96	5.22	8.91
1514 047-08	26-2594	7/3/15	1-3	7.63	12.4	51.2	23.2	21.3	113	24.0	38.75	30.00	31.25	CL	0.525	0.824	0.878	0.046	0.100	25.8	5.25	-20.5	1.44	3.62
1515 047-09	26-2589	7/3/15	0-1	7.38	10.3	49.6	23.6	39.6	72.6	12.9	37.50	34.80	27.70	CL	1.610	1.004	0.448	0.364	0.203	31.4	16.1	-15.3	11.06	5.04
1516 047-10	26-2589	7/3/15	1-3	7.72	11.2	40.0	24.2	34.6	86.6	16.0	40.00	32.50	27.50	CL	2.299	0.846	0.236	0.391	0.218	26.4	23.0	-3.43	12.21	10.8
1517 047-10R	26-2589	7/3/15	1-3	7.72	11.2	46.4	25.3	36.4	90.9	16.4	40.00	31.25	28.75	CL	2.201	0.830	0.350	0.285	0.214	25.9	22.0	-3.91	9.00	5.13
1518 047-11	26-2590	7/3/15	0-1	7.47	9.26	48.9	26.9	25.7	62.2	12.1	33.75	36.25	30.00	CL	1.412	0.631	0.166	0.288	0.177	19.7	14.1	-5.59	8.28	13.7
1519 047-12	26-2590	7/3/15	1-3	7.00	11.3	53.3	20.3	31.2	92.2	18.2	41.25	32.50	26.25	L	0.723	1.437	0.522	0.538	0.376	44.9	7.23	-37.7	16.84	-9.61
1520 047-13	26-2628	7/3/15	0-1	6.95	11.9	51.3	22.4	63.8	90.5	13.8	43.75	31.25	25.00	L	1.708	1.282	0.810	0.356	0.316	40.0	17.1	-23.0	11.12	5.96
1521 047-14	26-2628	7/3/15	1-3	7.04	12.0	48.9	22.8	63.5	91.3	13.9	40.00	35.00	25.00	L	1.610	0.866	0.476	0.066	0.204	21.4	16.1	-5.32	9.00	5.13
1522 047-15	26-2629	7/3/15	0-1	7.29	7.81	47.1	23.1	24.5	61.3	12.6	47.50	28.75	23.75	L	1.708	0.717	0.282	0.206	0.230	22.4	17.1	-5.32	6.44	10.6
1523 047-16	26-2629	7/3/15	1-3	6.60	11.8	55.0	20.4	29.0	100	20.2	52.50	23.75	23.75	SCL	0.821	0.845	0.375	0.260	0.220	26.4	8.21	-18.2	7.81	0.40
1524 047-17	26-2630	7/3/15	0-1	7.10	10.5	47.8	20.2	29.0	80.9	16.3	41.25	31.25	27.50	CL	0.821	0.708	0.422	0.134	0.152	22.1	8.21	-13.9	4.19	4.02
1525 047-18	26-2630	7/3/15	1-3	7.60	9.17	52.4	19.4	29.6	63.9	12.9	52.50	25.00	22.50	SCL	2.004	0.515				16.1	20.0	3.95		
1526 047-19	26-2593	7/3/15	0-1	7.37	33.3	30.3	75.3	162.9	90.5	8.29	58.75	22.50	18.75	SL	1.708	0.245	0.155	0.131	0.148	7.67	17.1	9.41	4.09	9.05
1527 047-20	26-2593	7/3/15	1-3	7.61	10.8	53.8	20.1	23.7	74.8	16.0	46.25	27.50	26.25	SCL	1.314	0.434	0.155	0.139	0.134	13.6	13.1	-0.41	4.34	8.89
1528 047-20R	26-2593	7/3/15	1-3	7.56	10.8	55.4	19.7	23.0	75.3	16.3	47.50	27.50	25.00	SCL	1.293	0.428	0.155	0.139	0.134	13.4	12.9	-0.43	4.34	8.89
1529 047-21	26-2592	7/3/15	0-1	7.19	6.38	47.8	25.5	28.5	53.1	10.2	42.50	28.75	28.75	CL	1.190	0.479	0.194	0.115	0.170	15.0	11.9	-3.06	3.59	8.31
1530 047-22	26-2592	7/3/15	1-3	7.06	11.4	51.7	23.1	24.2	91.8	18.9	48.75	25.00	26.25	SCL	1.785	0.505				15.8	17.9	2.06		
1531 047-23	26-2591	7/3/15	0-1	7.63	14.0	42.8	25.4	25.4	119	23.5	43.75	31.25	25.00	L	1.886	0.399	0.359	0.119	0.254	12.4	16.9	4.41	3.72	13.1
1532 047-24	26-2591	7/3/15	1-3	7.30	12.4	40.0	26.6	35.2	97.9	17.6	35.00	36.25	28.75	CL	1.886	0.731	0.359	0.119	0.254	22.8	16.9	-5.97	3.72	13.1
1533 047-25	26-2552	7/3/15	0-1	7.50	11.4	45.7	24.7	23.9	94.0	19.1	38.75	33.75	27.50	CL	1.587	0.628	0.137	0.345	0.144	19.5	15.9	-3.68	10.78	5.09
1534 047-26	26-2552	7/3/15	1-3	7.61	11.2	44.2	22.2	19.5	94.8	20.8	47.50	26.25	26.25	SCL	1.388	0.492	0.163	0.164	0.146	15.4	13.9	-1.49	5.75	8.14
1507-047-27	26-2554	7/3/15	0-1	6.80	8.91	52.9	22.8	31.3	62.6	12.1	35.00	33.75	31.25	CL	0.694	0.862	0.416	0.240	0.206	26.9	8.94	-20.0	7.50	-0.56
1507-047-28	26-2554	7/3/15	1-3	6.98	11.3	53.0	23.1	26.1	94.0	19.0	33.75	35.00	31.25	CL	0.892	0.784	0.398	0.202	0.183	24.5	8.92	-15.6	6.31	2.61
1507-047-29	26-2555	7/3/15	0-1	7.19	10.6	47.3	23.6	18.0	91.8	20.1	43.75	31.25	25.00	L	0.992	0.666	0.292	0.128	0.246	20.8	9.92	-10.9	4.00	5.92
1507-047-30	26-2555	7/3/15	1-3	7.17	8.61	48.2	23.2	24.8	59.6	12.2	50.00	26.25	23.75	SCL	1.587	0.765	0.388	0.140	0.236	23.9	15.9	-8.03	4.37	11.5
1507-047-30R	26-2555	7/3/15	1-3	7.20	9.03	47.6	24.9	26.4	63.1	12.5	48.75	27.50	23.75	SCL	1.666	0.763	0.362	0.139	0.263	23.8	16.9	-6.99	4.34	12.5
1507-047-31	26-2558	7/3/15	0-1	7.17	10.9	50.4	25.0	41.8	77.4	13.4	36.25	32.50	31.25	CL	0.992	0.733	0.396	0.170	0.167	22.9	9.92	-13.0	5.31	4.60
1507-047-32	26-2558	7/3/15	1-3	7.43	12.1	54.7	20.7	28.4	104	21.0	33.75	35.00	31.25	CL	0.892	0.625	0.303	0.080	0.142	16.4	8.92	-7.49	2.50	6.42
1507-047-33	26-2516	7/3/15	0-1	7.51	10.0	56.5	19.8	14.0	87.4	20.6	33.75	33.75	32.50	CL	1.587	0.738	0.301	0.216	0.222	23.1	15.9	-7.19	6.75	9.12
1507-047-34	26-2516	7/3/15	1-3	7.43	9.99	56.1	21.5	14.5	87.4	20.6	33.75	33.75	32.50	CL	1.388	0.760	0.258	0.264	0.238	23.8	13.9	-9.87	8.25	5.64
1507-047-35	26-2517	7/3/15	0-1	6.56	9.33	53.0	21.7	36.4	66.1	12.3	41.25	31.25	27.50	CL	0.987	0.937	0.359	0.140	0.285	29.2	0.00	-29.2	4.37	-4.37
1507-047-36	26-2517	7/3/15	1-3	5.17	13.7	54.6	21.7	56.5	108	17.3	42.50	30.00	27.50	CL	<0.001	0.933	0.529	0.140	0.285	29.2	0.00	-29.2	4.37	-4.37
1507-047-37	25-2518	7/3/15	0-1	4.29	5.62	53.9	21.2	21.8	29.8	6.43	40.00	33.75	28.25	L	<0.001	0.859	0.272	0.158	0.229	20.6	-2.98	-23.5	4.94	-7.92
1507-047-38	25-2518	7/3/15	1-3	6.73	5.83	50.1	20.4	13.8	38.5	9.30	52.50	27.50	20.00	SUSCL	1.091	0.593	0.226	0.125	0.242	18.5	10.9	-7.60	3.91	7.00
1507-047-39	25-2519	7/3/15	0-1	6.86	12.1	48.0	22.3	51.5	87.9	14.5	40.00	28.75	31.25	CL	1.785	1.283	0.812	0.227	0.245	40.1	17.9	-22.2	7.09	10.8
1507-047-40	25-2519	7/3/15	1-3	7.18	12.1	45.4	24.3	42.0	91.8	16.0	45.00	27.50	27.50	CL	2.460	1.156	0.660	0.179	0.262	36.1	24.8	-11.3	5.59	19.2
1507-047-40R	25-2519	7/3/15	1-3	7.15	11.9	48.4	23.7	40.8	90.0	15.9	43.75	27.50	28.75	CL	2.460	1.120	0.691	0.136	0.249	35.0	24.8	-10.2	4.25	20.5

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GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MMH/CN	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT S %	SULFATE S%	PYR S %	DRG S%	ACID POT TN/100TN	NEUT POT TN/100TN	A-B POT TN/100TN	PYR A POT TN/100TN	PYR S A-B TN/100TN
1510 298-03	26-4681	10/27/15	0-1	7.35	7.49	45.8	24.6	28.8	42.8	8.29	42.50	27.50	30.00	CL	2.89	1.11	0.40	0.44	0.27	34.6	28.9	-5.7	13.6	15.4
1510 298-04	26-4681	10/27/15	1-3	6.65	12.5	44.7	20.7	16.9	99.2	22.9	37.50	33.75	28.75	CL	2.19	2.05	<0.010	1.80	0.34	64.1	21.9	-42.2	56.2	-34.3
1510 298-05	26-4715	10/27/15	0-1	3.93	15.0	34.8	21.5	191	23.4	2.27	45.00	31.25	23.75	L	-0.010	1.79	1.08	0.18	0.53	55.9	-5.3	-61.1	5.75	-11.0
1510 298-06	26-4715	10/27/15	1-3	4.63	14.6	31.9	24.0	179	27.2	2.70	50.00	25.00	25.00	SCL	-0.010	1.56	1.04	0.00	0.52	48.8	-5.29	-54.1	0.03	-5.32
1510 298-63	56-2844	10/26/15	0-1	4.42	10.8	39.9	17.2	56.4	74.4	12.3	50.00	20.00	30.00	SCL	<0.010	1.72	0.77	0.40	0.55	53.7	-0.33	-54.1	12.4	-12.7
1510 298-64	56-2844	10/26/15	1-3	6.62	10.0	46.2	20.1	23.9	81.3	17.3	26.25	38.75	35.00	CL	0.45	1.17	0.46	0.40	0.31	36.4	4.51	-31.9	12.6	-8.08

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GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MMHCO3H	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CACO3	TOT S %	SULFATE S %	PFR S %	ORG S %	ACID POT TN/100TN	NEUT POT TN/100TN	ALB POT TN/100TN	PFR & POT TN/100TN	PFRS ALB TN/100TN
1601169-33	57-2867	1/20/16	0-1	7.46	9.90	49.7	18.6	22.3	73.5	16.3	28.75	28.75	42.50	C	0.82	0.44	0.24	0.06	0.14	13.8	8.24	-5.56	1.72	6.52
1601169-34	57-2867	1/20/16	1-3	7.51	9.47	50.5	18.1	19.8	69.6	16.0	30.00	27.50	42.50	C	0.62	0.46	0.24	0.06	0.16	14.3	6.25	-8.06	1.81	4.44
1601169-49	57-2864	1/20/16	0-1	7.78	8.02	50.0	15.7	11.3	61.8	16.8	27.50	21.25	51.25	C	1.82	0.32				10.0	18.2	8.19		
1601169-50	57-2864	1/20/16	1-3	7.66	7.29	51.0	17.7	11.9	58.7	15.3	27.50	21.25	51.25	C	1.52	0.39				12.1	15.2	3.14		
1601169-50R	57-2864	1/20/16	1-3	7.63	7.49	52.1	17.8	11.8	58.7	15.3	28.75	21.25	50.00	C	1.42	0.37				11.7	14.2	2.53		
1601169-51	57-2862	1/20/16	0-1	7.59	5.63	34.9	20.4	28.8	27.8	5.60	27.50	42.50	30.00	CL	0.82	0.22				6.94	8.24	1.31		
1601169-52	57-2862	1/20/16	1-3	7.92	4.22	34.2	15.8	19.9	19.6	4.63	57.50	16.25	26.25	SCL	1.42	0.08				2.62	14.2	11.6		
1601169-55	56-2918	1/20/16	0-1	6.24	8.53	39.9	17.1	50.0	51.3	8.86	35.00	30.00	35.00	CL	0.33	1.03	0.50	0.22		32.2	3.25	-29.0	6.81	-3.55
1601169-56	56-2918	1/20/16	1-3	5.99	10.5	37.1	17.1	75.9	59.6	8.74	37.50	28.75	33.75	CL	0.33	1.07	0.59	0.18	0.30	33.3	3.26	-30.1	5.65	-2.39
1601169-57	57-2994	1/20/16	0-1	7.97	8.47	48.6	23.9	20.2	86.3	18.8	30.00	31.25	38.75	CL	2.02	0.36				11.2	20.2	8.97		
1601169-68	57-2994	1/20/16	1-3	7.18	8.26	42.5	20.3	26.5	74.8	15.5	36.25	30.00	33.75	CL	1.29	0.66	0.34	0.11	0.21	20.7	12.9	-7.76	3.37	9.55
1601169-73	57-2865	1/20/16	0-1	4.96	9.39	53.0	19.7	59.2	67.9	10.8	28.75	27.50	43.75	C	0.21	0.90	0.50	0.09	0.31	28.1	2.08	-26.0	2.66	-0.58
1601169-74	57-2865	1/20/16	1-3	4.15	9.16	44.2	19.9	165	26.3	2.74	42.50	25.00	32.50	CL	0.39	1.43	0.89	0.10	0.44	44.8	3.89	-40.9	3.06	0.83
1601169-75	62-2950	1/20/16	0-1	7.16	5.33	36.8	16.3	23.7	38.1	8.53	47.50	26.25	26.25	SCL	1.20	0.38	0.42	0.07	0.11	11.9	12.0	0.08	2.09	10.83
1601169-76	62-2950	1/20/16	1-3	7.23	6.86	37.5	18.0	25.2	52.2	11.2	47.50	26.25	26.25	SCL	1.29	0.42	0.25			13.3	12.9	-0.32		
1601169-77	57-2996	1/20/16	0-1	7.83	6.63	40.4	18.1	13.0	55.7	14.1	40.00	27.50	32.50	CL	2.29	0.29				9.16	22.9	13.7		
1601169-78	57-2996	1/20/16	1-3	7.84	4.70	36.7	17.3	15.5	30.1	7.43	43.75	25.00	31.25	CL	4.94	0.26				7.98	49.4	41.4		
1601169-83	56-2820	1/21/16	0-1	6.37	8.52	44.5	18.1	46.4	67.4	11.9	30.00	32.50	37.50	CL	1.02	1.09	0.57	0.19	0.33	34.0	-10.2	-23.7	6.00	4.22
1601169-84	56-2820	1/21/16	1-3	6.42	7.61	42.0	14.5	43.4	55.7	10.3	30.00	32.50	37.50	CL	1.02	1.18	0.69	0.14	0.36	36.8	10.2	-26.6	4.31	5.90
1601169-87	59-2829	1/21/16	0-1	6.82	7.93	46.0	16.4	36.9	62.2	12.1	38.75	27.50	33.75	CL	1.47	0.91	0.54	0.12	0.26	28.6	14.7	-13.8	3.66	11.08
1601169-88	59-2829	1/21/16	1-3	7.12	9.08	47.0	17.4	34.1	79.2	15.6	36.25	27.50	36.25	CL	1.56	0.75	0.48	0.01	0.27	23.5	15.6	-7.88	0.16	-15.48

2016-1

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MMH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT S %	SULFATE %	PYR S %	ORG %	ACID POT TN/1000TN	NEUT POT TN/1000TN	A-B POT TN/1000TN	PYR A-B TN/1000TN
1604-089-01	24-4323	4/6/16	0-1	4.82	5.69	41.4	20.1	60.8	9.48	1.49	35.00	30.00	35.00	CL	<0.001	0.838	0.513	0.019	0.307	26.2	-31.5	-57.7	0.59
1604-089-02	24-4323	4/6/16	1-3	5.28	7.06	40.8	19.8	83.9	16.8	2.3	38.75	27.50	33.75	CL	0.36	0.919	0.621	0.133	0.164	28.7	3.57	-25.14	-0.58
1604-089-03	24-4287	4/6/16	0-1	4.71	6.28	47.7	20.2	60.4	18.7	2.940	33.75	32.50	33.75	CL	<0.001	0.894	0.493	0.111	0.290	27.9	-8.76	-37	-12.2
1604-089-04	24-4287	4/6/16	1-3	6.02	6.52	38.2	20.7	73.1	18.1	2.64	35.00	33.75	31.25	CL	0.17	0.782	0.397	0.098	0.287	24.4	1.68	-22.7	-1.39
1604-089-05	24-4321	4/6/16	0-1	5.66	5.54	36.4	22.2	55.2	9.79	1.57	45.00	27.50	27.50	CL/SCL	0.45	0.565	0.319	0.077	0.169	17.6	4.52	-13.1	2.41
1604-089-06	24-4321	4/6/16	1-3	6.41	4.98	35.1	24.0	43.0	8.87	1.53	50.00	23.75	28.25	SCL	0.74	0.347	0.198	0.044	0.105	10.8	7.36	-3.48	1.37
1604-089-07	24-4322	4/6/16	0-1	5.83	5.35	40.7	20.5	52.7	5.97	0.97	38.75	38.75	42.50	C	0.55	0.866	0.420	0.138	0.308	27.0	5.47	-21.6	4.31
1604-089-08	24-4322	4/6/16	1-3	6.55	9.78	43.5	16.7	89.7	48.7	6.68	16.25	40.00	43.75	Si/C	0.55	0.753	0.596	0.032	0.125	23.5	5.47	-18.1	1.00
1604-089-09	24-3493	4/6/16	0-1	7.50	3.38	39.9	24.1	22.9	1.74	0.36	40.00	26.25	33.75	CL	2.44	0.563				17.6	24.4	8.84	4.47
1604-089-10	24-3493	4/6/16	1-3	7.67	5.85	54.7	19.2	72.6	6.35	0.94	13.75	36.25	50.00	C	1.86	0.321				10.0	18.6	8.61	
1604-089-10R	24-3493	4/6/16	1-3	7.67	5.85	53.8	19.1	72.2	6.26	0.93	13.75	35.00	51.25	C	1.77	0.355				11.1	17.7	6.59	
1604-089-19	25-4535	4/6/16	0-1	7.35	7.19	40.5	17.9	8.80	59.6	16.3	42.50	30.00	27.50	CL	1.87	0.849				26.5	18.7	-7.78	13.1
1604-089-20	25-4535	4/6/16	1-3	7.38	7.22	39.5	18.9	9.71	61.3	16.2	46.25	25.00	28.75	SCL	2.16	0.846				26.4	21.6	-4.84	8.56
1604-089-20R	25-4535	4/6/16	1-3	7.39	6.94	38.2	17.5	8.97	57.4	15.8	41.25	26.25	32.50	CL	2.06	0.860				26.9	20.6	-6.25	14.4
1604-089-25	25-4375	4/6/16	0-1	7.69	10.2	38.5	21.3	22.5	106	22.6	30.00	31.25	38.75	CL	1.50	0.526				16.4	15.0	-1.48	4.81
1604-089-26	25-4375	4/6/16	1-3	6.88	9.00	43.6	18.4	34.1	70.0	13.7	33.75	30.00	36.25	CL	1.12	0.788				24.6	11.2	-13.5	7.19
1604-089-27	25-4342	4/6/16	0-1	6.14	13.1	38.5	22.0	76.8	140	20.0	31.25	32.50	36.25	CL	0.83	1.230				38.4	8.31	-30.1	13.8
1604-089-28	25-4342	4/6/16	1-3	6.52	9.58	38.6	17.1	42.2	78.7	14.5	40.00	25.00	35.00	CL	1.02	0.894				27.9	10.2	-17.7	11.5
1604-089-31	25-4902	4/6/16	0-1	7.36	7.86	37.4	15.1	15.1	63.9	16.5	51.25	20.00	28.75	SCL	1.31	0.645				20.2	13.1	-7.11	4.53
1604-089-32	25-4902	4/6/16	1-3	7.35	7.85	37.9	17.7	18.8	61.8	14.5	52.50	20.00	27.50	SCL	1.12	0.579				18.1	11.2	-6.92	6.87
1604-089-33	25-4932	4/6/16	0-1	7.28	5.08	37.4	18.3	20.5	24.5	5.57	56.25	21.25	22.50	SCL	2.06	0.643				20.1	20.6	0.54	10.7
1604-089-34	25-4932	4/6/16	1-3	7.06	5.69	38.5	18.6	16.1	34.9	8.38	55.00	20.00	25.00	SCL	1.78	0.572				17.9	17.8	-0.09	7.06
1604-089-35	24-4889	4/6/16	0-1	6.90	5.75	38.8	16.4	16.4	37.1	9.15	52.50	21.25	28.25	SCL	0.74	0.328				10.3	7.36	-2.89	2.12
1604-089-36	24-4889	4/6/16	1-3	6.70	4.79	38.6	17.3	19.6	23.1	5.37	38.75	27.50	33.75	CL	1.21	0.204				6.39	12.1	5.72	5.24
1604-089-37	24-5017	4/6/16	0-1	7.35	10.2	34.2	20.6	24.1	111	23.6	48.75	25.00	26.25	SCL	2.73	0.738				23.1	27.3	4.22	6.72
1604-089-38	24-5017	4/6/16	1-3	7.19	9.20	33.8	16.9	19.8	87.0	20.3	50.00	23.75	26.25	SCL	1.68	0.798				24.9	16.8	-8.08	10.1
1604-089-39	24-5044	4/6/16	0-1	7.65	4.80	38.3	19.4	31.9	14.1	2.79	42.50	26.25	31.25	CL	2.82	0.213				6.65	28.2	21.6	
1604-089-40	24-5044	4/6/16	1-3	7.30	5.15	35.4	19.3	31.2	19.7	3.91	50.00	22.50	27.50	SCL	2.44	0.525				16.4	24.4	8.04	
1604-089-41	24-5044	4/6/16	1-3	7.30	5.18	35.8	18.8	30.9	20.1	4.02	48.75	23.75	27.50	SCL	2.44	0.560				17.5	24.4	6.95	
1604-089-42	24-5018	4/6/16	0-1	7.00	9.09	43.2	20.1	22.6	73.9	16.0	45.00	22.50	32.50	CL/SCL	1.31	0.785				24.5	13.1	-11.5	5.84
1604-089-43	24-4990	4/6/16	1-3	7.14	8.09	43.3	20.1	27.1	67.9	14.0	41.25	25.00	33.75	CL	1.40	0.753				23.5	14.0	-9.52	9.25
1604-089-44	24-4990	4/6/16	0-1	6.13	7.17	38.7	19.2	32.7	44.4	8.72	42.50	26.25	31.25	CL	0.64	0.620				19.4	6.42	-12.9	4.35
1604-089-45	24-4990	4/6/16	1-3	6.77	8.99	38.6	21.8	49.4	66.6	11.1	48.75	23.75	27.50	SCL	0.83	0.462				14.4	8.31	-6.13	6.84
1604-089-46	24-4286	4/7/16	0-1	6.89	5.57	35.9	24.4	57.8	14.0	2.18	45.00	28.75	26.25	L	1.02	0.785				24.5	10.2	-14.3	0.59
1604-089-47	24-4286	4/7/16	1-3	7.24	8.51	39.2	24.6	11.1	35.3	4.29	42.50	27.50	30.00	CL	1.02	1.167				36.5	10.2	-26.2	9.93
1604-089-48	24-3494	4/7/16	0-1	6.27	5.55	38.7	24.1	46.6	14.5	2.51	35.00	31.25	33.75	CL	0.83	0.877				21.1	8.31	-12.8	1.37
1604-089-49	24-3494	4/7/16	1-3	4.09	8.16	43.5	20.1	89.7	39.5	5.24	52.50	22.50	25.00	SCL	0.26	1.124				35.1	2.62	-32.5	4.53
1604-089-51	56-2876	4/7/16	0-1	7.41	6.61	60.7	5.54	3.40	62.6	29.5	13.75	27.50	58.75	C	0.64	0.750				23.4	6.42	-17.0	1.75
1604-089-52	56-2876	4/7/16	1-3	8.57	3.89	64.8	1.69	0.89	36.2	31.9	7.50	33.75	58.75	C	0.93	0.160				4.99	9.26	4.28	4.67

2016-2

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CACO3	TOT S %	SULFATE %	PIR %	ORG %	ACID POT TN/100TN	NEUT POT TN/100TN	AB POT TN/100TN	PVR A POT TN/100TN	PYR A B TN/100TN
1606-237-35	3058	6/16/16	0-1	7.48	3.20	28.1	21.0	6.70	6.48	1.74	68.75	25.00	6.25	SL	0.51	0.06				1.94	5.10	3.16		
1606-237-36	3058	6/16/16	1-3	7.72	1.32	34.8	6.74	1.58	1.48	0.73	60.00	21.25	18.75	SL	1.44	0.06				1.80	14.4	12.6		
1606-237-37	3075	6/16/16	0-1	7.39	5.50	40.8	20.9	24.1	21.7	4.57	33.75	31.25	35.00	CL	1.07	0.34	0.089	0.032	0.220	10.7	10.7	-0.01	1.00	9.65
1606-237-38	3075	6/16/16	1-3	6.48	5.01	38.5	18.9	30.8	13.8	2.77	35.00	31.25	33.75	CL	0.60	0.62	0.384	0.051	0.181	19.2	6.03	-13.2	1.59	4.43
1606-237-39	3076	6/16/16	0-1	6.92	7.44	39.9	18.8	18.0	48.7	11.4	43.75	27.50	28.75	CL	0.79	0.53	0.119	0.120	0.292	16.6	7.88	-8.68	3.75	4.13
1606-237-40	3076	6/16/16	1-3	6.60	7.77	37.6	19.8	25.3	48.7	10.3	43.75	28.75	27.50	CL	0.79	0.62	0.085	0.199	0.340	19.5	7.88	-11.6	6.22	1.66
1606-237-40R	3076	6/16/16	1-3	6.55	7.31	36.0	17.9	23.0	44.8	9.92	43.75	28.75	27.50	CL	0.60	0.68	0.109	0.164	0.410	21.3	6.03	-15.3	5.12	0.90
1606-237-41	4533	6/16/16	0-1	4.37	8.99	35.2	17.3	76.4	40.0	5.94	36.25	27.50	36.25	CL	<0.010	1.14	0.812	0.122	0.402	35.5	-1.38	-36.9	3.81	-5.19
1606-237-42	4533	6/16/16	1-3	4.25	13.8	35.8	16.9	149	79.2	8.70	36.25	32.50	31.25	CL	0.14	1.45	0.897	0.179	0.370	45.2	1.40	-43.8	5.59	-4.19
1606-237-43	4570	6/16/16	0-1	7.06	10.3	41.9	19.6	18.8	81.8	18.7	38.75	23.75	37.50	CL	1.16	0.56	0.086	0.191	0.289	17.6	11.6	-6.07	5.97	5.61
1606-237-44	4570	6/16/16	1-3	7.21	8.24	43.3	15.3	13.8	61.8	16.2	40.00	23.75	36.25	CL	0.88	0.48	0.099	0.237	0.146	15.1	8.80	-6.28	7.40	1.40
1606-237-45	4609	6/16/16	0-1	6.73	7.46	35.4	18.2	30.7	43.5	8.80	36.25	31.25	32.50	CL	1.16	0.79	0.233	0.307	0.252	24.7	11.6	-13.2	9.59	1.98
1606-237-46	4609	6/16/16	1-3	6.87	9.52	38.6	15.7	22.0	73.5	16.9	38.75	27.50	33.75	CL	0.88	0.88	0.269	0.190	0.423	27.6	8.80	-18.8	5.94	2.86
1606-237-47	4806	6/16/16	0-1	6.07	15.9	42.8	14.7	81.2	140	20.2	41.25	26.25	32.50	CL	1.99	1.33	0.646	0.382	0.304	41.6	19.9	-21.7	11.9	7.97
1606-237-48	4806	6/16/16	1-3	6.94	10.6	31.9	16.3	24.0	87.0	19.4	42.50	26.25	31.25	CL	2.64	0.79				24.6	26.4	1.81		
1606-237-51	4805	6/16/16	0-1	5.30	12.7	39.1	15.5	51.4	102	17.6	41.25	30.00	28.75	CL	0.42	2.02	-0.120	1.377	0.764	63.1	4.18	-59.0	43.0	-38.8
1606-237-52	4805	6/16/16	1-3	6.17	9.92	36.9	18.1	24.1	77.4	16.9	46.25	25.00	28.75	SCL	1.16	1.96	-0.318	1.525	0.756	61.3	11.6	-49.7	47.6	-36.1
1606-237-53	4843	6/16/16	0-1	7.05	9.62	42.3	17.2	24.8	72.6	15.8	26.25	36.25	37.50	CL	1.71	0.72	-0.048	0.267	0.499	22.4	17.1	-5.29	8.34	8.78
1606-237-54	4843	6/16/16	1-3	6.83	10.3	39.4	18.1	26.3	82.6	17.5	28.75	35.00	36.25	CL	1.25	1.03	0.145	0.538	0.346	32.1	12.5	-19.6	16.8	-4.31

2016-3

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT %	SULFATE %	PIR %	ORG %	ACID POT TN/100TN	HEUT POT TN/100TN	A-S POT TN/100TN	PYR & POT TN/100TN	PYRS A-B TN/100TN
1608-155-11	N9 4536	8/12/16	0-1	7.50	6.98	40.3	18.4	19.4	57.0	13.1	42.50	27.50	30.00	CL	3.01	0.541				16.9	30.1	13.2		
1608-155-12	N9 4536	8/12/16	1-3	7.41	7.29	42.7	18.2	24.4	57.0	12.4	41.25	28.75	30.00	CL	2.37	0.720				22.5	23.7	1.18		
1608-155-15	N9 4569	8/12/16	0-1	5.77	9.96	42.6	17.6	30.7	94.0	19.1	38.75	26.25	35.00	CL	<0.001	0.832	0.051	0.349	0.432	26.0	-2.15	-28.1	10.9	-13.1
1608-155-16	N9 4569	8/12/16	1-3	3.37	7.25	43.5	20.3	74.0	21.9	3.19	50.00	22.50	27.50	SCL	<0.001	1.73	1.159	0.109	0.466	54.2	-4.91	-59.1	3.41	-8.32

2016-4

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/ODM	% SAT	CALCIUM MEQL	MAGNESIUM MEQL	SODIUM MEQL	SAR	% SAND	% SILT	% CLAY	GLASS	% CACODS	TOT S %	SULFATE %	PYR %	ORG %	ACID POT TN/1000TN	NETUT POT TN/1000TN	A-S POT TN/1000TN	PYR A POT TN/1000TN	PYR S A-B TN/1000TN
1611-119-03	N9 4614	11/9/16	0-1	6.73	8.20	42.1	20.3	18.3	90.9	20.7	50.00	21.25	28.75	SCL	0.96	0.48	0.00	0.16	0.36	14.9	9.56	-5.4	4.97	4.60
1611-119-04	N9 4614	11/9/16	1-3	6.17	9.24	47.7	20.6	16.0	115	27.0	42.50	22.50	35.00	CL	0.56	0.63	0.00	0.17	0.58	19.7	5.57	-14.2	5.40	0.16
1611-119-07	N9 4719	11/9/16	0-1	7.30	7.03	43.2	21.2	23.3	58.7	12.5	50.00	23.75	26.25	SCL	3.35	0.39	0.00	0.17	0.58	12.2	33.5	21.4		
1611-119-08	N9 4719	11/9/16	1-3	7.11	6.89	44.2	18.4	20.0	60.5	13.8	31.25	35.00	33.75	CL	2.87	0.74				23.2	28.7	5.51		
1611-119-11	N9 4988	11/9/16	0-1	6.68	6.34	39.5	19.4	17.0	56.5	13.3	60.00	17.50	22.50	SCL	1.04	0.40	0.11	0.05	0.24	12.5	10.4	-2.13	1.50	8.86
1611-119-12	N9 4988	11/9/16	1-3	6.86	5.75	38.6	20.6	20.0	46.1	10.2	57.50	17.50	25.00	SCL	0.96	0.28				8.8	9.56	0.72		
1611-119-13	N9 5016	11/9/16	0-1	6.63	7.66	37.4	19.4	17.9	79.2	18.4	63.75	16.25	20.00	SUSCL	0.80	0.48	0.14	0.06	0.28	14.9	7.97	-6.91	1.94	5.03
1611-119-14	N9 5016	11/9/16	1-3	6.46	8.45	40.4	19.4	22.5	88.7	19.4	55.00	21.25	23.75	SCL	1.12	0.73	0.17	0.16	0.41	22.8	11.16	-11.7	4.84	6.32
1611-119-15	N9 4960	11/15/16	0-1	5.83	4.77	43.0	21.2	26.1	27.9	5.74	45.00	26.25	28.75	CL/SCL	0.72	0.41	0.10	0.07	0.24	12.7	7.17	-5.51	2.09	5.07
1611-119-16	N9 4960	11/15/16	1-3	6.37	6.53	38.7	20.5	25.8	54.4	11.3	56.25	21.25	22.50	SCL	0.88	0.59	0.21	0.14	0.24	18.5	8.76	-9.78	4.44	-4.33

2016-5

QAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQL	MAGNESIUM MEQL	SODIUM MEQL	SAR	% SAND	% SILT	% CLAY	CLASS	% CACCS	TOTS %	SULFATE %	PVR %	ORG %	ACID POT T/1000TN	NEUT POT T/1000TN	AS POT T/1000TN	PVR & POT T/1000TN	PYR & AS T/1000TN
1611-120-01	J19 4254	11/9/16	0-1	7.16	6.06	47.1	22.9	29.8	42.5	8.28	50.00	20.00	30.00	SCL	1.595	0.43				13.5	16.0	2.46		
1611-120-02	J19 4254	11/9/16	1-3	6.51	5.69	45.4	28.6	33.4	30.2	5.43	48.75	22.50	28.75	SCL	1.675	0.43				13.4	16.8	3.32		
1611-120-03	J19 4240	11/9/16	0-1	5.38	4.93	45.8	22.0	43.0	20.9	3.97	46.25	26.25	27.50	SCL	0.397	0.76	0.38	0.12	0.27	23.8	3.97	-19.9	3.62	0.35
1611-120-04	J19 4240	11/9/16	1-3	4.13	2.92	51.1	25.9	11.9	5.87	1.35	57.50	22.50	20.00	SUSCL	<0.001	0.40	0.18	<0.01	0.27	12.5	-0.02	-19.9	<0.01	-0.02
1611-120-05	J19 4235	11/9/16	0-1	4.99	6.04	43.3	21.9	72.9	20.6	2.99	58.75	17.50	23.75	SCL	0.966	0.70	0.63	0.02	0.26	22.0	9.56	-12.4	0.53	9.03
1611-120-06	J19 4235	11/9/16	1-3	4.99	7.31	40.8	20.7	93.8	32.5	4.30	50.00	28.75	21.25	L	0.397	0.91	0.63	0.04	0.24	28.5	3.97	-24.5	1.28	2.69
1611-120-07	J19 4246	11/9/16	0-1	5.23	6.47	42.2	19.2	35.8	50.9	9.71	41.25	28.75	30.00	CL	0.317	0.78	0.42	0.11	0.25	24.5	3.17	-21.3	3.47	-0.30
1611-120-08	J19 4246	11/9/16	1-3	5.30	6.15	48.5	20.0	35.5	45.2	8.59	40.00	31.25	28.75	CL	0.557	0.72	0.33	0.10	0.29	22.5	5.57	3.09	2.48	7.86
1611-120-09	J19 4230	11/9/16	0-1	5.55	6.59	42.0	25.0	106	16.4	2.03	55.00	22.50	22.50	SCL	1.036	0.84	0.56	0.08	0.20	26.3	10.4	-16.0	2.50	7.86
1611-120-10	J19 4230	11/9/16	1-3	5.70	5.53	38.0	22.5	79.7	10.3	1.44	57.50	21.25	21.25	SCL	0.557	1.18	0.82	0.02	0.34	37.0	5.57	-31.4	0.72	4.85
1611-120-11	J19 4230	11/9/16	1-3	4.86	7.01	41.8	21.1	116	10.3	1.23	46.25	28.75	25.00	L	0.317	1.12	0.78	<0.01	1.13	35.1	3.17	-31.9	<0.01	3.17
1611-120-12	J19 4228	11/9/16	0-1	4.08	7.63	38.0	22.7	118	11.8	1.18	45.00	31.25	23.75	L	0.237	1.25	0.73	0.01	0.52	39.2	2.37	-36.8	0.28	2.09
1611-120-13	J19 4228	11/9/16	1-3	4.80	6.39	43.0	20.5	92.1	17.7	2.35	56.25	20.00	23.75	SCL	<0.001	0.95	0.60	0.01	0.33	29.6	-0.02	-29.6	0.44	-0.46
1611-120-14	J19 4231	11/9/16	0-1	4.81	6.91	47.6	19.6	145	7.98	0.88	45.00	28.75	26.25	L	0.078	1.24	0.77	0.01	0.46	38.7	0.78	-37.9	0.25	0.53
1611-120-14R	J19 4231	11/9/16	1-3	4.57	7.37	44.3	20.1	158	8.74	0.93	43.75	30.00	26.25	L	0.158	1.26	0.89	<0.01	0.62	39.5	1.58	-37.9	<0.01	1.58
1611-120-15	J19 4275	11/9/16	0-1	7.07	4.79	39.3	22.7	37.8	17.1	3.11	48.75	26.25	25.00	SCL	1.064	0.84	0.58	0.08	0.18	26.3	10.5	-15.8	2.39	8.15
1611-120-16	J19 4275	11/9/16	1-3	6.47	6.73	37.9	18.2	64.4	33.2	5.16	48.75	26.25	27.50	SCL	0.395	0.74	0.44	0.03	0.27	23.1	3.95	-19.1	0.89	3.06
1611-120-17	J19 4261	11/9/16	0-1	4.02	14.0	11/9/16	22.2	99.5	48.3	6.19	73.75	16.25	10.00	SL	<0.001	0.78	0.72	0.01	0.05	24.3	2.64	-26.9	0.28	-2.90
1611-120-18	J19 4261	11/9/16	1-3	2.85	20.6	35.6	25.7	181.8	11.4	11.19	56.25	27.50	16.25	SL	<0.001	1.60	1.55	<0.01	0.04	49.8	-15.8	-65.6	<0.01	-15.8
1611-120-19	J19 4253	11/9/16	0-1	5.62	5.74	46.1	16.8	32.3	40.1	8.10	40.00	28.75	31.25	CL	0.113	0.92	0.48	0.10	0.34	28.7	1.13	-27.5	3.16	-2.03
1611-120-20	J19 4253	11/9/16	1-3	6.22	6.28	48.8	19.0	32.0	47.0	9.30	40.00	26.25	33.75	CL	0.395	0.84	0.44	0.06	0.34	26.1	3.95	-22.1	1.81	2.15
1611-120-20R	J19 4253	11/9/16	1-3	6.35	6.32	49.6	19.5	51.8	31.2	9.36	41.25	25.00	33.75	CL	0.113	0.85	0.36	0.16	0.32	25.3	3.95	-21.4	2.08	1.87
1611-120-21	J19 4239	11/9/16	0-1	5.24	5.08	40.6	18.0	50.2	47.4	5.31	50.00	23.75	26.25	SCL	0.113	0.85	0.36	0.16	0.32	26.6	1.13	-25.5	4.94	-3.81
1611-120-22	J19 4239	11/9/16	1-3	5.49	5.24	44.3	17.5	47.7	35.1	6.15	43.75	26.25	30.00	CL	0.301	0.75	0.17	0.17	0.41	23.3	3.01	-20.3	5.31	-2.30
1611-120-23	J19 4227	11/9/16	0-1	4.08	6.77	35.4	17.7	184	11.0	1.10	51.25	28.25	22.50	SCL	<0.001	1.45	0.62	0.05	0.63	45.2	-1.70	-46.9	6.04	-7.74
1611-120-24	J19 4227	11/9/16	1-3	3.99	7.95	35.0	20.4	215	13.7	1.27	56.25	21.25	22.50	SCL	<0.001	1.35	0.76	0.19	0.29	35.6	1.13	-34.4	3.54	-2.41
1611-120-25	J19 4234	11/9/16	0-1	5.15	4.17	45.7	18.9	46.1	13.7	2.40	38.75	27.50	33.75	CL	0.113	0.69	0.35	0.07	0.27	21.6	1.13	-20.5	2.17	-1.04
1611-120-26	J19 4234	11/9/16	1-3	6.42	3.84	46.2	24.1	30.9	14.8	2.83	41.25	26.25	32.50	CL	0.678	0.65	0.40	0.05	0.21	20.4	6.78	-13.6	1.51	5.26
1611-120-27	J19 4233	11/9/16	0-1	4.71	4.49	44.1	18.2	40.2	22.6	4.18	46.25	22.50	31.25	SCL	0.019	0.86	0.49	0.04	0.22	23.6	0.19	-23.4	1.25	-1.08
1611-120-28	J19 4233	11/9/16	1-3	4.53	3.87	41.1	18.0	31.6	19.5	3.91	52.50	22.50	25.00	SCL	0.019	0.86	0.43	0.15	0.28	26.7	0.19	-26.5	4.72	-4.53
1611-120-29	J19 4276	11/9/16	0-1	5.13	7.45	37.6	18.5	127	35.8	4.20	51.25	22.50	26.25	SCL	0.019	1.23	0.94	<0.01	0.30	38.5	0.19	-38.3	<0.01	0.19
1611-120-30	J19 4276	11/9/16	1-3	4.92	7.13	34.1	17.0	119	35.8	4.34	50.00	25.00	25.00	SCL	0.019	1.20	0.84	0.10	0.26	37.8	0.19	-37.4	3.06	-2.87
1611-120-30R	J19 4276	11/9/16	1-3	4.93	7.16	34.4	17.8	122	36.6	4.38	50.00	23.75	26.25	SCL	0.113	1.14	0.73	0.11	0.29	35.6	1.13	-34.4	3.54	-2.41
1611-120-31	J19 4245	11/9/16	0-1	5.97	5.25	48.2	17.6	31.5	38.0	7.67	42.50	23.75	33.75	CL	0.207	0.94	0.46	0.11	0.36	29.3	2.07	-27.2	3.56	-1.49
1611-120-32	J19 4245	11/9/16	1-3	6.48	5.91	47.1	17.4	31.3	47.8	9.89	37.50	26.25	36.25	CL	0.395	1.04	0.17	0.50	0.36	32.4	3.95	-28.4	15.8	-11.8
1611-120-33	J19 4238	11/9/16	0-1	6.98	3.94	45.0	20.1	25.1	20.4	4.28	45.00	27.50	31.25	CL/SCL	1.337	0.74	0.40			22.5	13.4	0.91		
1611-120-34	J19 4238	11/9/16	1-3	6.98	5.44	54.4	18.0	13.7	46.5	11.7	32.50	27.50	40.00	CL/C	0.489	0.70	0.27	<0.01	0.52	23.3	4.89	-18.4	<0.01	4.89
1611-120-35	J19 4262	11/9/16	0-1	5.47	4.06	43.1	20.8	50.7	7.31	1.22	33.75	32.50	33.75	CL	0.301	0.65	0.44	<0.01	0.23	20.2	3.01	-17.2	<0.01	3.01
1611-120-36	J19 4262	11/9/16	1-3	5.38	3.64	44.7	21.8	35.5	6.97	1.28	38.75	27.50	33.75	CL	0.489	0.61	0.41	0.01	0.18	19.1	4.89	-14.2	0.43	4.48
1611-120-37	J19 4270	11/9/16	0-1	5.63	3.70	46.4	25.1	32.2	7.09	1.32	37.50	27.50	35.00	CL	0.678	0.71	0.35	0.18	0.19	22.3	6.78	-15.5	5.48	1.30
1611-120-38	J19 4270	11/9/16	1-3	6.06	3.69	48.3	23.4	32.0	7.44	1.41	32.50	30.00	37.50	CL	0.395	0.79	0.52	0.04	0.23	24.6	3.95	-20.6	1.12	2.84
1611-120-39	J19 4225	11/9/16	0-1	5.66	5.45	41.4	41.3	40.6	8.00	1.25	46.25	25.00	28.75	SCL	1.431	0.84	0.61	<0.01	0.28	26.3	14.3	-12.0	<0.01	14.3
1611-120-40	J19 4225	11/9/16	1-3	6.94	5.03	42.3	33.4	45.5	7.74	1.23	50.00	23.75	26.25	SCL	1.901	0.99	0.66	0.00	0.33	31.0	19.0	-12.0	0.04	19.0
1611-120-40R	J19 4225	11/9/16	1-3	6.78	5.00	42.7	32.9	44.6	7.53	1.21	51.25	22.50	26.25	SCL	1.995	1.04	0.68	0.03	0.33	32.5	20.0	-12.5	0.91	19.0
1611-120-41	J19 4277	11/9/16	0-1	7.01	4.77	37.9	26.9	29.7	12.1	2.27	52.50	26.25	21.25	SCL	1.346	0.70	0.47	0.02	0.21	21.9	13.5	-8.45	0.63	12.8
1611-120-42	J19 4277	11/9/16	1-3	7.37	3.40	30.3	27.5	11.7	8.31	1.43	58.75	23.75	17.50	SL	6.540	0.17	0.54			5.41	65.4	60.0		
1611-120-43	J19 4226	11/9/16	0-1	4.80	7.50	41.8	17.8	104	9.09	1.16	45.00	32.50	22.50	L	<0.001	1.12	0.57	0.11	0.47	35.0	-0.63	-35.6	3.59	-4.22
1611-120-44	J19 4226	11/9/16	1-3	4.67	7.45	43.7	20.0	96.3	10.0	1.31	43.75	30.00	26.25	L	0.125	1.07	0.57	0.05	0.44	33.5	1.25	-32.2	1.65	-0.40
1611-120-45	J19 4232	11/9/16	0-1	6.77	5.82	38.0	30.2	42.9	7.48	1.24	52.50	27.50	20.00	SUSCL	1.815	0.88	0.54	0.10	0.24	27.6	18.1	-8.43	3.09	15.1
1611-120-46	J19 4232	11/9/16	1-3	7.05	5.12	35.4	31.4	29.9	6.61	1.19	56.25	26.25	17.50	SL	2.190	0.62	0.54			19.3	21.9	2.60		
1611-120-47	J19 4268	11/																						

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH/LITS	EC MMHOM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT S %	SULFATE %	PVR S %	ORG %	ACID POT TN/100TN	NEUT POT TN/100TN	A-B POT TN/100TN	PVR A POT TN/100TN	PTVS A-B TN/100TN
1704-115-01	J19 3040	4/11/17	0-1	7.27	3.51	45.1	24.9	14.9	9.26	2.08	41.3	31.3	27.5	CL	1.62	0.14	0.15	0.04	0.14	4.38	16.2	11.8	1.34	8.42
1704-115-02	J19 3040	4/11/17	1-3	7.00	4.95	46.8	25.7	22.5	21.3	4.34	38.8	31.3	30.0	CL	0.98	0.34	0.15	0.04	0.14	10.6	9.77	-0.84	1.34	8.42
1704-115-05	J19 3048	4/11/17	0-1	5.11	10.2	44.3	18.4	78.3	67.4	9.70	38.8	32.5	28.8	CL	0.06	0.89	0.49	0.18	0.22	27.9	2.45	-27.3	5.65	-5.03
1704-115-06	J19 3048	4/11/17	1-3	5.53	11.0	44.4	19.0	68.3	79.2	12.0	42.5	31.3	26.3	L	0.25	0.95	0.63	0.03	0.29	29.8	2.45	-27.3	0.97	1.48
1704-115-07	J19 3049	4/11/17	0-1	4.05	7.74	44.8	19.8	78.5	35.6	5.08	42.5	28.8	28.8	CL	<0.01	0.98	0.57	0.08	0.34	30.7	-1.21	-31.9	2.34	-3.55
1704-115-08	J19 3049	4/11/17	1-3	4.23	9.72	44.0	16.8	93.0	52.6	7.10	40.0	31.3	26.3	CL	<0.01	0.89	0.39	0.18	0.31	27.7	-0.29	-28.0	5.75	-6.04
1704-115-09	J19 3059	4/11/17	0-1	5.89	8.12	43.3	18.1	21.2	64.8	14.6	40.0	33.8	26.3	CL	0.52	0.57	0.19	0.06	0.32	17.9	5.19	-12.7	1.94	3.26
1704-115-10	J19 3059	4/11/17	1-3	6.36	5.64	44.4	19.2	12.8	38.0	9.51	50.0	28.8	21.3	L	0.52	0.54	0.07	0.13	0.34	16.8	5.19	-11.6	4.09	1.10
1704-115-10R	J19 3059	4/11/17	1-3	6.49	5.70	44.7	20.3	13.1	38.1	9.33	48.8	27.5	23.8	SCL	0.52	0.50	0.06	0.06	0.38	15.6	5.19	-10.4	1.84	3.35
1704-115-11	J19 3066	4/11/17	0-1	6.83	6.19	46.5	18.8	15.5	43.5	10.5	43.8	31.3	25.0	L	0.52	0.55	0.08	0.06	0.41	17.2	5.19	-12.0	1.94	3.26
1704-115-12	J19 3066	4/11/17	1-3	6.64	7.70	38.5	13.1	9.0	63.1	19.0	53.8	17.5	28.8	SCL	0.43	0.46	<0.01	0.12	0.52	14.3	4.28	-10.0	3.84	0.44
1704-115-13	J19 3162	4/11/17	0-1	7.41	3.46	47.3	16.7	11.5	13.9	3.71	42.5	28.8	28.8	CL	2.17	0.09	<0.01	0.12	0.52	2.71	21.7	18.9		
1704-115-14	J19 3162	4/11/17	1-3	7.71	2.40	48.9	8.3	6.6	11.0	4.02	36.3	31.3	32.5	CL	2.71	0.06				1.74	27.1	25.4		
1704-115-15	J19 3163	4/11/17	0-1	7.02	5.58	39.5	21.2	19.1	29.9	6.67	55.0	23.8	21.3	SCL	0.34	0.65	0.32	0.01	0.32	20.3	3.37	-16.9	0.31	3.05
1704-115-16	J19 3163	4/11/17	1-3	7.05	9.17	38.4	24.9	12.3	65.7	15.2	73.8	18.8	7.5	SL	<0.01	0.96	0.44	0.13	0.39	29.9	-0.29	-30.2	3.91	-4.20
1704-115-17	J19 3164	4/11/17	0-1	7.03	5.44	38.8	20.9	24.4	25.1	5.28	48.8	27.5	23.8	SCL	0.70	0.52	0.21	0.12	0.20	16.3	7.02	-9.27	3.69	3.34
1704-115-18	J19 3164	4/11/17	1-3	6.77	7.60	44.7	19.7	39.7	41.0	7.52	41.3	31.3	27.5	CL	0.70	0.67	0.36	0.05	0.25	20.8	7.02	-13.8	1.69	5.34
1704-115-19	J19 3165	4/11/17	0-1	6.50	5.43	38.9	21.2	24.1	24.7	5.20	60.0	15.0	25.0	SCL	0.43	0.47	0.26	0.02	0.20	14.8	4.28	-10.5	0.62	3.66
1704-115-20	J19 3165	4/11/17	1-3	5.48	7.26	41.9	18.1	41.6	37.8	6.91	42.5	31.3	26.3	L	0.15	0.72	0.40	0.08	0.24	22.5	1.54	-21.0	2.53	-0.99
1704-115-20R	J19 3165	4/11/17	1-3	5.38	7.66	43.0	20.3	45.0	40.8	7.15	43.8	30.0	26.3	L	0.70	0.73	0.39	0.07	0.28	22.9	7.02	-15.9	2.16	4.87
1704-115-21	J19 3060	4/11/17	0-1	5.79	4.89	39.4	21.8	31.3	15.4	2.99	46.3	30.0	23.8	L	0.15	1.22	0.49	0.17	0.56	38.2	1.54	-36.7	5.22	-3.68
1704-115-22	J19 3060	4/11/17	1-3	6.14	9.56	40.6	19.1	104	30.0	3.82	47.5	31.3	21.3	L	<0.01	2.27	1.05	0.31	0.90	70.8	-3.03	-73.9	9.78	-12.8
1704-115-23	J19 3061	4/11/17	0-1	5.67	6.45	40.7	18.9	18.5	41.1	9.51	52.5	27.5	20.0	SL/SCL	0.25	0.61	0.10	0.11	0.41	19.2	2.45	-16.7	3.28	-0.83
1704-115-24	J19 3061	4/11/17	1-3	7.13	10.2	36.1	21.7	11.2	77.0	19.0	63.8	22.5	13.8	SL	0.52	0.79	0.34	0.16	0.29	24.7	5.19	-19.5	5.06	0.13
1704-115-25	J19 3062	4/11/17	0-1	3.45	6.55	40.7	21.3	46.1	18.7	3.22	33.8	37.5	28.8	CL	<0.01	1.01	0.49	0.14	0.38	31.5	-3.03	-34.5	4.34	-7.37
1704-115-26	J19 3062	4/11/17	1-3	5.29	6.58	41.0	18.6	37.1	33.7	6.39	38.8	35.0	26.3	L	0.25	0.72	0.32	0.07	0.33	22.5	2.45	-20.1	2.03	0.42
1704-115-27	J19 3063	4/11/17	0-1	5.58	9.11	45.8	17.9	16.1	70.0	17.0	40.0	35.0	25.0	L	0.25	0.69	0.09	0.12	0.49	21.6	2.45	-19.2	3.75	-1.30
1704-115-28	J19 3064	4/11/17	1-3	6.27	10.9	46.3	15.4	10.4	89.6	25.0	40.0	32.5	27.5	CL	0.25	0.67	0.00	0.38	0.32	20.9	2.45	-18.4	11.9	-9.45
1704-115-30	J19 3064	4/11/17	0-1	6.47	7.75	42.8	18.6	27.4	47.4	9.89	45.0	28.8	26.3	L	0.98	0.50	0.27	0.01	0.22	15.7	9.77	-5.93	0.34	9.42
1704-115-30R	J19 3064	4/11/17	1-3	6.82	9.19	40.3	16.9	25.9	62.6	13.5	43.8	30.0	26.3	L	0.61	0.50	0.33	0.02	0.14	15.5	6.11	-9.43	0.69	5.42
1704-115-31	J19 3077	4/11/17	1-3	6.84	9.22	41.5	17.2	26.5	63.1	13.5	43.8	30.0	26.3	L	0.61	0.55	0.00	0.18	0.18	17.0	6.11	-10.9	0.00	6.11
1704-115-32	J19 3077	4/11/17	0-1	4.82	8.75	39.2	18.2	63.7	38.3	5.89	47.5	31.3	21.3	L	1.11	1.11	0.74	0.11	0.26	34.6	1.54	-33.1	3.34	-1.81
1704-115-33	N9 5095	4/11/17	1-3	4.93	12.9	39.0	18.4	116	67.4	8.23	48.8	28.8	22.5	L	0.25	1.03	0.69	0.08	0.25	32.0	2.45	-29.6	2.47	-0.02
1704-115-33	N9 5095	4/11/17	0-1	5.88	4.80	41.8	22.3	48.6	4.48	0.75	43.8	31.3	25.0	L	0.70	1.16	0.43	0.14	0.59	35.1	7.02	-29.1	4.25	2.77
1704-115-34	N9 5095	4/11/17	1-3	2.67	14.0	49.0	21.7	129	5.44	0.63	60.0	21.3	18.8	SL	<0.01	2.46	0.97	0.20	1.29	76.9	-9.43	-86.3	6.34	-15.8

2017-1

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MMH/CM	% SAT	CALCIUM MG/L	MAGNESIUM MG/L	SODIUM MG/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CACO3	TOT S %	SULFATE S%	PVR S %	ORG S%	ACID POT TN/100TN	NEUT POT TN/100TN	A-S POT TN/100TN	PVR A POT TN/100TN	PYR A-B TN/100TN
1706-001-03	J19 3166	5/24/17	0-1	6.83	5.00	44.4	23.3	24.9	34.2	6.96	40.00	30.00	30.00	CL	0.74	0.47	0.19	0.05	0.23	14.8	7.42	-7.34	1.53	5.89
1706-001-04	J19 3166	5/24/17	1-3	6.68	6.09	47.4	20.6	35.0	47.0	8.91	43.75	28.75	27.50	CL	0.56	0.53	0.19	0.09	0.26	16.6	5.61	-11.0	2.69	2.92
1706-001-05	J19 3167	5/24/17	0-1	6.94	6.99	43.4	19.7	30.5	57.9	11.5	45.00	30.00	25.00	L	0.65	0.57	0.21	0.07	0.30	17.9	6.51	-11.4	2.28	4.23
1706-001-06	J19 3167	5/24/17	1-3	7.06	6.88	50.7	19.7	23.9	66.6	14.3	35.00	33.75	31.25	CL	0.83	0.60	<0.01	0.26	0.36	18.6	8.32	-10.3	8.22	0.11
1706-001-06R	J19 3167	5/24/17	1-3	7.11	7.05	47.3	19.4	24.3	68.7	14.7	35.00	33.75	31.25	CL	0.83	0.62	0.06	0.25	0.31	19.3	8.32	-11.0	7.78	0.55

2017-2

QAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT %	SULFATE %	PVR %	ORG %	ACID POT TINT/100TN	NEUT POT TINT/100TN	AS POT TINT/100TN	PYR A POT TINT/100TN	PYR B A-B TINT/100TN
1707-068-01	2837	7/6/17	0-1	7.73	3.54	42.9	13.1	20.7	14.7	3.58	41.25	23.75	35.00	CL	1.18	0.08				2.45	11.8	9.33		
1707-068-02	2837	7/6/17	1-3	7.42	5.53	40.9	22.0	48.7	17.7	2.98	47.50	21.25	31.25	SCL	1.08	0.24				7.37	10.8	3.46		
1707-068-03	2833	7/6/17	0-1	7.18	9.33	49.9	22.9	32.3	73.1	13.9	37.50	28.75	33.75	CL	1.46	0.48	0.20	0.14		15.0	14.6	-0.36	4.44	10.2
1707-068-04	2833	7/6/17	1-3	7.55	7.56	44.3	22.0	30.8	54.4	10.6	38.75	28.75	32.50	CL	3.46	0.45				13.9	34.6	20.7		
1707-068-05	2836	7/6/17	0-1	7.05	8.55	45.1	20.4	28.3	66.6	13.5	36.25	30.00	33.75	CL	1.46	0.58	0.20	0.24		18.0	14.6	-3.39	7.44	7.20
1707-068-06	2836	7/6/17	1-3	7.43	8.32	46.5	22.6	29.8	63.1	12.3	38.75	27.50	33.75	CL	1.37	0.47	0.24	0.09		14.7	13.7	-1.00	2.84	10.8
1707-068-07	2834	7/6/17	0-1	7.31	8.63	51.5	20.9	34.1	65.7	12.5	32.50	30.00	37.50	CL	0.99	0.37	0.16	0.06		11.4	9.9	-1.52	1.72	8.16
1707-068-08	2834	7/6/17	1-3	7.37	6.59	33.4	23.2	34.5	38.4	7.15	52.50	23.75	23.75	SCL	1.08	0.38	0.25	0.04		11.9	10.8	-1.04	1.28	9.55
1707-068-09	2838	7/6/17	0-1	6.96	5.74	43.1	22.4	29.0	31.4	6.19	43.75	27.50	28.75	CL	0.99	0.51	0.15	0.17		15.8	9.88	-5.96	5.15	4.72
1707-068-10	2838	7/6/17	1-3	6.83	6.46	55.4	20.8	22.6	45.7	9.80	40.00	26.25	33.75	CL	0.80	0.38	-0.01	0.15		12.0	7.88	-3.99	4.65	3.32
1707-068-10R	2938	7/6/17	1-3	6.82	6.80	55.2	21.7	23.1	46.5	9.84	38.75	27.50	33.75	CL	0.80	0.41	0.00	0.07		12.8	7.98	-4.78	2.25	5.73
1707-068-11	2902	7/6/17	0-1	6.23	9.61	41.5	21.1	39.4	75.3	13.7	41.25	27.50	31.25	CL	1.27	0.73	0.22	0.28		22.7	12.7	-10.0	9.18	3.55
1707-068-12	2902	7/6/17	1-3	7.25	8.11	41.2	21.7	16.9	67.4	15.4	42.50	25.00	32.50	CL	1.94	0.31				9.78	19.4	9.61		
1707-068-15	2910	7/6/17	0-1	6.24	11.2	48.5	20.3	28.3	99.2	20.1	42.50	28.75	28.75	CL	0.51	0.94	0.10	0.53		29.4	5.13	-24.3	16.5	-11.4
1707-068-16	2910	7/6/17	1-3	6.27	9.15	43.9	17.0	16.1	82.2	20.2	42.50	30.00	27.50	CL	0.70	0.96	0.18	0.58		30.1	7.03	-23.1	18.1	-11.1
1707-068-17	2907	7/6/17	0-1	6.10	8.88	40.8	20.7	39.7	66.6	12.1	40.00	30.00	30.00	CL	0.99	0.87	0.28	0.27		27.2	9.88	-17.3	8.28	1.60
1707-068-18	2907	7/6/17	1-3	6.23	9.50	43.9	19.5	46.2	69.8	12.1	40.00	28.75	31.25	CL	0.51	1.04	0.48	0.36		32.5	5.13	-22.9	11.3	-6.18
1707-068-19	2905	7/6/17	0-1	5.62	10.1	38.9	19.2	60.1	69.2	11.0	43.75	30.00	26.25	L	0.70	0.96	0.39	0.26		29.9	7.03	-22.9	8.00	-0.97
1707-068-20	2905	7/6/17	1-3	5.67	11.6	39.4	20.9	76.8	78.7	11.3	42.50	28.75	28.75	CL	0.51	1.06	0.57	0.19		33.1	5.13	-27.9	5.97	-0.84
1707-068-20R	2905	7/6/17	1-3	5.63	10.9	38.4	19.2	70.7	73.5	11.0	42.50	28.75	28.75	CL	0.32	0.94	0.41	0.25		29.3	3.23	-26.1	7.87	-4.65
1707-068-21	3023	7/6/17	0-1	5.02	13.6	39.4	21.6	97.9	104	13.4	43.75	28.75	27.50	CL	0.42	1.23	0.71	0.22		30.0	1.32	-28.7	1.75	-0.42
1707-068-22	3023	7/6/17	1-3	5.74	12.3	40.2	21.3	48.8	104	17.6	40.00	31.25	28.75	CL	0.42	1.24	0.58	0.28		38.6	4.18	-34.4	6.84	-2.67
1707-068-23	2908	7/6/17	0-1	5.00	11.7	43.7	19.2	97.1	76.6	10.0	36.25	32.50	31.25	CL	0.13	0.96	0.58	0.08		30.0	1.32	-28.7	1.75	-0.42
1707-068-24	2908	7/6/17	1-3	5.06	9.15	44.1	19.8	81.6	51.8	7.27	38.25	32.50	31.25	CL	0.13	1.00	0.50	0.16		31.2	1.32	-29.9	5.09	-3.77
1707-068-25	2904	7/6/17	0-1	6.02	10.3	41.4	20.1	54.8	79.2	12.9	38.75	30.00	31.25	CL	0.81	1.00	0.05	0.52		31.4	6.08	-25.3	16.3	-10.2
1707-068-26	2904	7/6/17	1-3	5.91	9.61	48.9	19.7	48.2	75.3	13.1	38.75	28.75	32.50	CL	0.81	0.86	0.19	0.47		29.6	6.08	-23.5	14.7	-8.61
1707-068-27	3050	7/6/17	0-1	5.54	11.2	43.1	19.7	43.2	100	17.8	41.25	26.25	32.50	CL	0.32	0.86	0.38	0.20		26.8	3.23	-23.6	6.12	2.53
1707-068-28	3050	7/6/17	1-3	6.30	9.47	44.9	19.4	24.4	85.3	18.2	40.00	25.00	35.00	CL	0.51	0.64	0.26	0.08		19.9	5.13	-14.8	2.59	2.53
1707-068-29	3051	7/6/17	0-1	5.37	9.72	36.5	26.3	31.8	81.8	15.2	36.25	27.50	36.25	CL	0.32	0.62	0.37	0.04		19.3	3.23	-16.0	1.25	1.88
1707-068-30	3051	7/6/17	1-3	5.80	9.77	37.6	29.2	24.1	86.1	16.7	40.00	26.25	33.75	CL	0.70	0.61	0.35	0.04		18.9	7.03	-11.9	1.25	5.78
1707-068-30R	3051	7/6/17	1-3	5.82	9.59	36.9	28.4	23.5	84.4	16.6	37.50	26.25	36.25	CL	0.61	0.57	0.31	0.09		17.9	6.08	-11.8	2.72	3.36
1707-068-31	3054	7/6/17	0-1	6.51	10.3	33.5	23.2	34.9	88.3	16.4	50.00	25.00	25.00	SCL	1.46	0.66	0.40	0.28		20.5	14.6	-5.91	8.25	6.38
1707-068-32	3054	7/6/17	1-3	6.79	10.3	42.8	22.1	23.9	97.9	20.4	32.50	33.75	33.75	CL	1.18	0.72	0.32	0.18		22.4	11.8	-10.6	5.56	6.22
1707-068-33	3026	7/6/17	0-1	6.42	9.72	30.1	30.7	16.6	84.4	17.3	81.25	20.00	18.75	SL	2.80	0.86	0.32	0.22		26.6	26.0	-0.77	6.87	19.2
1707-068-34	3026	7/6/17	1-3	6.73	9.68	32.1	20.4	54.0	71.3	11.7	60.00	21.25	18.75	SL	2.89	0.95	0.85	0.32		26.8	28.9	2.29		
1707-068-35	3022	7/6/17	0-1	6.19	14.3	43.4	21.3	13.1	97.0	11.1	36.25	32.50	31.25	SL	0.99	0.89	0.47	0.22		27.8	9.88	-17.9	6.75	3.13
1707-068-36	3022	7/6/17	1-3	5.87	8.65	37.3	30.0	6.52	77.0	18.0	45.00	26.25	28.75	CUSCL	0.61	0.94	0.31	0.35		29.3	6.08	-23.3	11.0	-4.95

2017-3

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOTS %	SULFATE %	PYR %	ORG %	ACID POT TH/100G	NET POT TH/100G	A-S POT TH/100G	PYR A POT TH/100G	PHYS AB TH/100G
1707-095-01	3186	7/7/17	0-1	6.98	6.83	50.3	22.1	20.8	48.7	10.5	37.50	30.00	32.50	CL	1.37	0.30				9.34	13.7	4.34		
1707-095-02	3186	7/7/17	1-3	6.98	6.01	43.2	23.2	25.0	36.8	7.49	38.75	31.25	30.00	CL	1.37	0.22				6.87	13.7	6.81		
1707-095-03	3188	7/7/17	0-1	7.06	7.02	40.1	24.1	38.3	40.6	7.27	43.75	28.75	27.50	CL	1.94	0.46				14.5	19.4	4.87		
1707-095-04	3188	7/7/17	1-3	7.31	6.05	40.4	23.8	27.7	34.4	6.79	41.25	28.75	30.00	CL	2.70	0.24				7.56	27.0	19.4		
1707-095-07	3189	7/7/17	0-1	7.12	5.60	35.6	26.0	32.0	25.3	4.70	48.75	27.50	23.75	SCL	2.13	0.27				8.35	21.3	12.9		
1707-095-08	3189	7/7/17	1-3	7.28	7.05	35.9	23.8	26.7	44.4	8.84	46.25	27.50	26.25	SCL	2.13	0.34				10.8	21.3	10.5		
1707-095-11	3185	7/7/17	0-1	7.26	7.31	38.6	23.0	25.8	51.3	10.4	40.00	30.00	30.00	CL	0.99	0.31				9.69	9.88	0.19		
1707-095-12	3185	7/7/17	1-3	7.02	7.45	36.6	24.7	23.3	54.4	11.1	46.25	26.25	27.50	SCL	0.80	0.49	0.17	0.06	0.26	15.2	7.98	7.75	1.72	6.26
1707-095-15	3187	7/7/17	0-1	6.95	7.08	38.1	22.3	28.1	49.2	9.80	38.75	31.25	30.00	CL	2.13	0.43				13.5	21.3	7.75		
1707-095-16	3187	7/7/17	1-3	7.13	6.57	40.0	23.4	28.2	43.5	8.57	37.50	30.00	32.50	CL	1.84	0.42				13.2	18.4	5.23		
1707-095-17	3088	7/7/17	0-1	6.28	8.35	40.7	22.3	44.9	55.7	9.60	33.75	33.75	32.50	CL	0.61	0.79	0.35	0.09	0.36	24.8	6.08	-18.7	2.81	3.27
1707-095-18	3088	7/7/17	1-3	5.01	8.41	42.4	21.3	83.9	39.4	5.43	35.00	32.50	32.50	CL	0.04	1.18	0.81	0.11	0.26	36.7	0.37	-36.4	3.31	-2.94
1707-095-21	3070	7/7/17	0-1	5.93	9.68	40.1	21.3	58.0	65.7	10.6	36.25	32.50	31.25	CL	0.32	0.88	0.36	0.09	0.43	27.5	3.23	-24.3	2.81	0.41
1707-095-22	3070	7/7/17	1-3	5.79	9.32	40.8	21.1	55.0	62.2	10.1	36.25	31.25	32.50	CL	0.32	0.83	0.44	0.03	0.36	25.8	3.23	-22.6	0.81	2.41
1707-095-23	3173	7/7/17	0-1	5.74	9.27	40.1	20.9	54.9	60.9	9.90	35.00	32.50	32.50	CL	0.51	0.85	0.46	0.11	0.28	26.6	5.13	-21.4	3.47	1.66
1707-095-24	3173	7/7/17	1-3	5.33	10.2	40.7	21.1	61.2	68.3	10.6	37.50	30.00	32.50	CL	0.23	0.78	0.33	0.15	0.30	24.5	2.28	-22.2	4.75	-2.47
1707-095-25	3089	7/7/17	0-1	5.65	9.26	39.6	21.5	43.5	67.0	11.8	37.50	31.25	31.25	CL	0.32	0.81	0.35	0.13	0.33	25.4	3.23	-22.2	4.15	-0.93
1707-095-26	3089	7/7/17	1-3	4.48	10.7	38.4	20.1	86.4	64.8	8.88	37.50	32.50	30.00	CL	0.04	0.90	0.56	0.06	0.29	28.3	0.37	-27.9	1.87	-1.50
1707-095-33	3053	7/6/17	0-1	6.99	9.92	47.8	19.6	23.7	82.2	17.7	32.50	28.75	38.75	CL	1.18	0.44	0.00	0.16	0.28	13.6	11.8	-1.83	5.03	6.75
1707-095-34	3053	7/6/17	1-3	7.06	7.39	43.3	20.2	25.0	86.1	18.1	41.25	26.25	32.50	CL	1.65	0.74	0.29	0.10	0.35	23.1	16.5	-6.60	3.25	13.3
1707-095-35	3052	7/6/17	0-1	3.57	10.3	43.3	21.0	81.9	23.1	3.2	33.75	33.75	32.50	CL	<0.01	1.24	0.77	<0.01	0.48	38.7	-3.43	-42.1	<0.01	-3.43
1707-095-36	3052	7/6/17	1-3	5.22	8.93	45.1	19.6	44.3	64.4	11.4	36.25	30.00	33.75	CL	0.04	1.02	0.55	<0.01	0.51	32.0	0.37	-31.6	<0.01	0.37

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GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MG/L	MAGNESIUM MG/L	SODIUM MG/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT S %	SULFATE %	PVR %	ORG %	ACID POT TIT/100TH	NEUT POT TIT/100TH	AB POT TIT/100TH	PYRA POT TIT/100TH	PHRS AB TIT/100TH
1708296-11	5020	8/25/17	0-1	2.16	12.2	39.5	30.9	110	0.13	0.01	26.25	46.25	27.50	CL	<0.01	1.57	1.00	-0.04	0.82	49.2	-6.28	-55.5	-1.37	-4.91
1708296-12	5020	8/25/17	1-3	1.94	23.9	37.4	28.0	178	0.26	0.03	26.25	46.25	27.50	CL	<0.01	2.06	1.04	0.02	1.00	64.4	-12.0	-76.4	0.56	-12.5
1708296-13	5069	8/25/17	0-1	7.07	13.4	33.4	22.0	71.2	87.4	12.8	50.00	30.00	20.00	L	0.89	0.59	0.38	0.05	0.16	18.5	8.93	-9.60	1.56	7.37
1708296-14	5069	8/25/17	1-3	5.36	13.4	40.5	20.0	40.8	108	19.6	41.25	31.25	27.50	CL	0.23	1.05	0.36	0.46	0.23	32.9	2.28	-30.6	14.3	-12.0
1708296-15	5068	8/25/17	0-1	7.12	2.69	41.2	25.2	11.2	3.81	0.89	36.25	33.75	30.00	CL	2.13	0.51				15.9	21.3	5.41		
1708296-16	5068	8/25/17	1-3	6.54	5.17	39.9	24.5	35.2	19.1	3.50	42.50	28.75	28.75	CL	1.18	1.04	0.49	0.25	0.29	32.3	11.8	-20.6	7.87	3.91
1708296-17	5045	8/25/17	0-1	4.29	9.10	36.9	24.1	90.5	32.8	4.33	41.25	31.25	27.50	CL	0.13	1.01	0.74	0.03	0.23	31.4	1.32	-30.1	1.00	0.32
1708296-18	5045	8/25/17	1-3	6.41	6.03	38.7	29.6	51.4	11.5	1.80	50.00	26.25	23.75	SCL	0.51	1.07	0.70	0.02	0.35	33.4	5.13	-28.3	0.69	4.44
1708296-27	2838	8/24/17	0-1	7.44	9.52	42.1	22.3	31.9	57.0	10.9	36.25	31.25	32.50	CL	2.13	0.46				14.5	21.3	8.80		
1708296-28	2838	8/24/17	1-3	7.10	10.9	43.3	21.8	42.9	62.2	10.9	36.25	30.00	33.75	CL	1.37	0.84	0.45	0.03	0.16	20.0	13.7	-6.34	0.91	12.8
1708296-29	2856	8/24/17	0-1	7.24	9.22	42.6	29.0	45.2	66.6	10.9	36.25	31.25	32.50	CL	1.84	0.58				18.0	18.4	0.46		
1708296-30	2856	8/24/17	1-3	7.23	10.4	43.1	27.2	40.7	76.1	13.1	35.00	32.50	32.50	CL	1.56	0.54	0.34	0.07	0.13	17.0	15.6	-1.39	2.16	13.4
1708296-30R	2856	8/24/17	1-3	7.24	10.5	42.1	25.1	37.9	71.8	12.8	38.75	28.75	32.50	CL	1.75	0.51				16.0	17.5	1.53		
1708296-31	5021	8/25/17	0-1	7.10	3.32	43.6	24.5	24.2	1.67	0.34	28.75	33.75	37.50	CL	1.84	0.23				7.29	18.4	11.1		
1708296-32	5021	8/25/17	1-3	7.29	4.15	41.5	24.8	33.7	3.90	0.72	28.75	37.50	33.75	CL	1.84	0.32				9.89	18.4	8.55		
1708296-33	2832	8/24/17	0-1	7.29	12.9	47.1	20.4	30.9	83.5	16.5	28.75	35.00	36.25	CL	1.37	0.71	0.39	0.13	0.19	22.2	13.7	-8.51	3.94	9.74
1708296-34	2832	8/24/17	1-3	7.41	10.2	46.3	21.3	25.3	65.7	13.6	36.25	31.25	32.50	CL	1.65	0.53	0.29	0.05	0.19	16.7	16.5	-0.14	1.56	15.0

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GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MMHCO3	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CAC03	TOT S %	SULFATE S %	PWR S %	ORG S %	ACID POT TIT/100TN	NEUT POT TIT/100TN	AB POT TIT/100TN	PVR A POT TIT/100TN	PYR A-B TIT/100TN
1710-194-01	4721	10/18/17	0-1	6.16	8.33	39.4	21.2	33.0	59.2	11.4	36.25	30.00	33.75	CL	0.27	0.55	0.26	0.05	0.22	17.18	2.71	-14.5	1.50	1.21
1710-194-02	4721	10/18/17	1-3	6.35	11.0	42.2	23.1	46.0	99.2	16.9	45.00	25.00	30.00	CL/SC	0.17	0.86	0.51	0.10	0.25	26.7	1.71	-25.0	3.09	-1.36
1710-194-03	4532	10/18/17	0-1	4.28	15.1	38.7	21.0	249	60.5	5.20	40.00	28.75	31.25	CL	<0.010	1.70	1.22	0.04	0.44	53.0	-5.26	-58.2	1.16	-6.42
1710-194-04	4532	10/18/17	1-3	4.45	14.7	41.3	20.7	234	65.2	5.79	42.50	28.75	28.75	CL	<0.010	2.05	1.49	0.08	0.48	63.9	-4.27	-68.2	2.62	-6.89
1710-194-08	4753	10/18/17	0-1	5.93	7.59	39.4	22.4	60.7	38.3	5.94	46.25	25.00	28.75	SCL	0.27	1.06	0.68	0.09	0.30	33.1	2.71	-30.4	2.72	-0.01
1710-194-10	4753	10/18/17	1-3	7.00	7.45	42.0	22.4	57.8	39.7	6.27	46.25	26.25	27.50	SCL	0.87	1.03	0.69	0.07	0.28	32.2	8.68	-23.5	2.12	6.56
1710-194-10R	4753	10/18/17	1-3	7.02	7.41	42.1	21.7	55.5	38.3	6.16	45.00	26.25	28.75	CL/SC	0.87	1.01	0.66	0.13	0.22	31.6	8.68	-22.9	4.00	4.68
1710-194-11	4688	10/19/17	0-1	6.72	8.63	43.2	21.3	35.5	64.8	12.2	37.50	30.00	32.50	CL	0.97	0.95	0.64	0.11	0.20	29.8	9.68	-20.1	3.34	6.33
1710-194-12	4688	10/19/17	1-3	6.70	8.35	41.0	20.6	34.6	60.9	11.6	37.50	31.25	31.25	CL	0.67	0.79	0.46	0.15	0.19	24.7	6.69	-18.0	4.65	2.03
1710-194-15	4716	10/19/17	0-1	5.13	7.63	37.9	19.5	54.2	43.1	7.09	41.25	28.75	30.00	CL	<0.010	1.65	0.64	0.57	0.44	51.4	-3.27	-54.7	17.7	-21.0
1710-194-16	4716	10/19/17	1-3	5.18	8.38	37.5	20.0	63.0	49.6	7.70	42.50	27.50	30.00	CL	<0.010	1.63	0.74	0.45	0.44	51.0	-5.26	-56.2	14.1	-19.3
1710-194-17	4717	10/19/17	0-1	6.24	6.85	37.5	24.4	29.5	44.8	8.63	47.50	26.25	26.25	SCL	0.87	0.98	0.29	0.35	0.35	30.6	8.68	-21.9	10.8	-2.16
1710-194-18	4717	10/19/17	1-3	6.16	6.91	38.9	22.5	27.1	43.3	9.69	46.25	26.25	27.50	SCL	0.67	1.12	0.39	0.35	0.39	35.1	6.69	-28.4	10.8	-4.09
1710-194-19	4718	10/19/17	0-1	5.74	8.19	36.2	20.8	54.1	50.5	8.24	47.50	26.25	26.25	SCL	0.17	0.90	0.33	0.25	0.33	28.2	1.71	-26.5	7.65	-5.94
1710-194-20	4718	10/19/17	1-3	3.03	10.7	37.2	23.4	169	21.1	2.15	51.25	25.00	23.75	SCL	<0.010	1.77	1.18	0.15	0.44	55.3	-10.2	-65.5	4.75	-14.9
1710-194-20R	4718	10/19/17	1-3	3.03	10.8	37.3	22.3	166	20.8	2.15	51.25	23.75	25.00	SCL	<0.010	1.82	1.24	0.15	0.44	57.0	-10.2	-67.2	4.72	-14.9
1710-194-29	4722	10/18/17	0-1	6.32	10.2	41.2	19.3	46.6	78.3	13.6	40.00	27.50	32.50	CL	0.47	0.91	0.44	0.15	0.32	28.3	4.70	-23.6	4.75	-0.05
1710-194-30	4722	10/18/17	1-3	4.66	13.0	40.3	23.2	69.4	132	19.4	36.25	28.75	35.00	CL	<0.010	1.50	0.97	0.09	0.45	47.0	-2.28	-49.3	2.84	-5.12
1710-194-30R	4722	10/18/17	1-3	4.66	12.1	42.1	18.0	51.7	101	17.2	36.25	30.00	33.75	CL	<0.010	1.55	1.05	0.03	0.46	48.3	-3.27	-51.6	1.06	-4.33
1710-194-31	4651	10/19/17	0-1	6.99	8.98	39.9	20.5	31.8	73.9	14.5	37.50	28.75	33.75	CL	0.87	0.81	0.52	0.07	0.23	25.4	8.68	-16.7	2.16	6.53
1710-194-32	4651	10/19/17	1-3	7.12	8.99	40.6	20.8	31.4	69.2	13.5	36.25	31.25	32.50	CL	1.07	0.75	0.50	0.05	0.20	23.4	10.7	-12.8	1.66	9.02

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GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT S %	SULFATE %	PIR S %	ORG %	ACID POT IN/100TN	NEUT POT IN/100TN	AE POT IN/100TN	PIR A POT IN/100TN	PIR B IN/100TN
1710-195-01	5066	10/18/17	0-1	6.52	8.67	38.0	20.1	55.3	56.1	9.14	47.50	22.50	30.00	SCL	1.07	0.76	0.45	0.08	0.24	23.9	10.7	-13.2	2.41	8.27
1710-195-02	5066	10/18/17	1-3	7.12	9.74	40.9	18.1	18.8	90.0	21.0	45.00	22.50	32.50	CL/SCL	0.77	0.71	0.00	0.31	0.42	22.3	7.69	-14.6	9.56	-1.87
1710-195-03	4531	10/18/17	0-1	6.83	9.21	40.1	19.6	15.4	85.7	20.5	50.00	25.00	25.00	SCL	<0.010	0.71	0.09	0.17	0.45	22.1	-3.27	-25.4	5.373	-8.64
1710-195-04	4531	10/18/17	1-3	6.80	8.82	40.6	19.8	11.8	82.6	20.8	56.25	21.25	22.50	SCL	0.07	0.76	0.09	0.23	0.44	23.8	0.71	-23.1	7.3	-6.60
1710-195-07	5064	10/18/17	0-1	7.23	6.63	39.6	19.7	24.8	46.5	9.88	46.25	25.00	28.75	SCL	0.47	0.57	0.16	0.19	0.21	17.7	4.70	-13.0	5.97	-1.27
1710-195-08	5064	10/18/17	1-3	7.17	6.85	22.3	20.1	31.6	45.7	8.98	48.75	23.75	27.50	SCL	0.27	0.67	0.31	0.12	0.25	21.0	2.71	-18.3	3.62	-0.92
1710-195-09	5065	10/18/17	0-1	6.55	5.98	34.8	20.8	42.0	27.6	4.92	57.50	21.25	21.25	SCL	1.07	0.54	0.34	0.06	0.14	16.9	10.7	-6.24	1.87	8.80
1710-195-10	5065	10/18/17	1-3	7.02	3.44	33.1	23.5	20.8	5.74	1.22	55.00	23.75	21.25	SCL	0.97	0.50	0.08	0.26	0.15	15.5	9.68	-5.79	8.12	1.55
1710-195-10R	5065	10/18/17	1-3	7.03	3.49	32.6	23.5	20.9	5.79	1.23	56.25	22.50	21.25	SCL	0.87	0.50	0.23	0.11	0.16	15.7	8.68	-6.97	3.47	5.21
1710-195-13	4882	10/18/17	0-1	6.59	6.93	38.4	21.3	26.6	48.3	9.87	43.75	26.25	30.00	CL	0.57	1.24	0.04	0.75	0.45	38.7	5.69	-33.0	23.5	-17.8
1710-195-14	4882	10/18/17	1-3	7.04	8.94	41.8	19.6	21.0	78.3	17.4	36.25	31.25	32.50	CL	0.67	0.76	0.13	0.30	0.33	23.9	6.69	-17.2	9.31	-2.62
1710-195-15	4883	10/18/17	0-1	7.33	9.71	40.0	18.9	39.6	80.0	14.8	36.25	30.00	33.75	CL	1.37	1.00	0.41	0.26	0.33	31.2	13.7	-17.5	8.25	5.41
1710-195-16	4883	10/18/17	1-3	7.47	10.9	41.8	18.6	34.6	95.3	18.5	37.50	27.50	35.00	CL	1.86	0.86	0.38	0.18	0.31	26.9	18.6	-8.26	5.50	13.1
1710-195-21	4748	10/19/17	0-1	6.56	7.32	37.5	22.6	52.3	39.1	6.38	37.50	27.50	35.00	CL	0.77	1.42	0.74	0.26	0.42	44.2	7.69	-36.6	8.03	-0.34
1710-195-22	4748	10/19/17	1-3	6.8	7.15	41.3	22.8	44.7	39.6	6.82	36.25	27.50	36.25	CL	1.37	1.31	0.64	0.32	0.35	41.0	13.7	-27.3	10.0	3.66
1710-195-23	4749	10/19/17	0-1	7.46	6.54	42.5	19.0	20.9	48.3	10.8	33.75	28.75	37.50	CL	5.79	0.32	0.17	0.20	0.10	10.0	57.9	47.9	6.09	0.60
1710-195-24	4749	10/19/17	1-3	7.34	10.0	45.1	18.3	23.1	90.9	20.0	33.75	28.75	37.50	CL	0.67	0.47	0.17	0.20	0.10	14.6	6.69	-7.89	6.09	0.60
1710-195-25	4750	10/19/17	0-1	7.14	8.41	44.2	19.5	31.7	66.1	13.1	31.25	30.00	38.75	CL	1.27	0.74	0.40	0.13	0.22	23.2	12.7	-10.5	4.12	8.54
1710-195-26	4750	10/19/17	1-3	7.62	10.7	43.4	17.9	22.0	99.2	22.2	30.00	33.75	36.25	CL	1.07	0.42	0.19	<0.010	0.23	13.0	10.7	-2.35	<0.01	10.7
1710-195-29	4752	10/19/17	0-1	7.30	8.37	42.0	19.1	25.4	67.0	14.2	30.00	30.00	40.00	CL/C	1.66	0.68	0.29	0.08	0.31	21.3	16.6	-4.69	2.56	14.1
1710-195-30	4752	10/19/17	1-3	7.36	7.93	44.0	19.0	22.5	63.5	13.9	36.25	26.25	37.50	CL	2.06	0.68	0.30	0.11	0.27	21.2	20.6	-0.58	3.44	17.2
1710-195-30R	4752	10/19/17	1-3	7.36	8.14	41.7	19.2	22.9	65.7	14.3	36.25	26.25	37.50	CL	2.06	0.69	0.36	0.01	0.31	21.4	20.6	-0.81	0.37	20.3

2017-7

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH/UNITS	EC/MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CACO3	TOTS %	SULFATE %	PIR %	ORG %	ACID POT TN/100TN	NEUT POT TN/100TN	AS POT TN/100TN	PIR A.S TN/100TN	PYR A.S TN/100TN	
1804-127-01	2945	4/13/18	0-1	7.50	4.91	40.7	2.88	2.85	48.3	28.5	38.75	26.25	35.00	CL	1.19	0.14					4.25	11.9	7.85		
1804-127-02	2945	4/13/18	1-3	8.46	3.78	33.1	0.83	1.04	37.7	39.0	50.00	25.00	25.00	SCL	1.29	0.04					1.40	12.9	11.5		
1804-127-51	4256	4/13/18	0-1	7.56	4.97	40.1	56.9	2.74	49.6	9.08	32.50	38.75	28.75	CL	0.50	0.15					4.56	4.99	0.43		
1804-127-52	4256	4/13/18	1-3	8.13	4.59	42.6	53.4	1.31	46.5	8.90	30.00	36.25	33.75	CL	0.90	0.15					4.78	8.96	4.18		
1804-127-57	4493	4/11/18	0-1	6.33	11.0	34.9	110.3	49.1	96.1	10.8	37.50	31.25	31.25	CL	0.60	0.96	0.37	0.36	0.23		29.9	5.98	-23.9	11.4	-5.39
1804-127-58	4493	4/11/18	1-3	6.03	8.75	39.2	73.4	35.8	63.9	8.66	41.25	28.75	30.00	CL	0.70	1.03	0.60	0.19	0.24		32.2	6.97	-25.2	5.94	1.04
1804-127-59	4494	4/11/18	0-1	3.19	7.97	33.3	8.03	133	7.00	0.83	37.50	32.50	30.00	CL	<0.01	1.72	1.07	0.30	0.35		53.6	-4.92	-56.6	9.28	-14.2
1804-127-60	4494	4/11/18	1-3	3.32	7.38	35.3	19.5	100	17.0	2.20	37.50	31.25	31.25	CL	<0.01	1.81	1.16	0.13	0.52		56.6	-8.89	-85.5	4.06	-13.0
1804-127-60R	4494	4/11/18	1-3	3.32	7.41	38.5	20.7	127	15.5	1.81	36.25	32.50	31.25	CL	<0.01	2.23	1.58	0.17	0.48		69.5	-10.9	-80.4	5.34	-16.2
1804-127-65	5126	4/11/18	0-1	5.62	8.35	37.3	20.9	77.8	39.8	5.67	47.50	26.25	26.25	SCL	0.10	1.23	0.74	0.13	0.35		38.3	1.03	-37.3	4.15	-3.13
1804-127-66	5126	4/11/18	1-3	4.51	9.55	37.6	25.7	91.3	64.8	8.47	43.75	28.79	27.50	CL	<0.01	2.03	1.18	0.33	0.52		63.4	-0.96	-64.4	10.4	-11.3
1804-127-69	5142	4/11/18	0-1	7.04	6.82	34.2	23.9	69.1	23.8	3.50	53.75	23.75	22.50	SCL	<0.01	0.80	0.62	0.04	0.14		24.9	-19.8	-44.7	1.16	-21.0
1804-127-70	5142	4/11/18	1-3	6.91	6.11	35.2	24.0	66.3	17.8	2.65	56.25	22.50	21.25	SCL	0.70	0.99	0.81	0.02	0.16		31.0	6.97	-24.0	0.66	6.32
1804-127-70R	5142	4/11/18	1-3	6.83	6.48	34.1	25.2	71.2	19.5	2.81	56.25	22.50	21.25	SCL	0.60	0.79	0.58	0.05	0.15		24.5	5.98	-18.6	1.69	4.30

2018-1

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MG/L	MAGNESIUM MG/L	SODIUM MG/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CAO2	TOT S %	SULFATE %	PYR S %	ORP %	ACID POT TH/100TH	NEUT POT TH/100TH	AS POT TH/100TH	PVA POT TH/100TH	PYR AS TH/100TH
1806-195-13	4496	6/19/18	0-1	6.51	10.8	38.1	20.3	28.1	73.9	15.0	40.00	27.50	32.50	CL	0.97	1.14	0.65	0.32	0.17	35.6	9.66	-25.9	9.87	-0.21
1806-195-14	4496	6/19/18	1-3	5.09	13.9	35.8	18.0	118	71.8	8.72	38.75	27.50	33.75	CL	<0.01	1.81	1.05	0.36	0.40	56.6	-3.23	-59.8	11.3	-14.5
1806-195-17	4495	6/19/18	0-1	6.49	10.6	34.4	21.5	44.7	79.6	13.8	38.75	28.75	32.50	CL	0.87	0.83	0.36	0.16	0.31	25.8	8.67	-17.2	5.00	3.67
1806-195-18	4495	6/19/18	1-3	6.63	11.5	32.2	17.7	35.4	81.8	15.9	35.00	31.25	33.75	CL	1.16	0.82	0.32	0.26	0.24	25.8	11.6	-14.1	8.06	3.58
1806-195-19	4534	6/19/18	0-1	6.64	4.85	38.1	22.5	18.4	6.05	1.34	66.25	22.50	11.25	SL	2.95	0.12				3.65	29.5	25.8		
1806-195-20	4534	6/19/18	1-3	6.75	5.58	40.8	24.3	19.4	22.7	4.87	50.00	27.50	22.50	SCL	7.76	0.22				6.93	77.6	70.6		
1806-195-20R	4534	6/19/18	1-3	6.80	5.26	40.5	22.1	17.7	21.0	4.71	51.25	26.25	22.50	SCL	7.76	0.24				7.52	77.6	70.0		
1806-195-25	4571	6/19/18	0-1	6.42	9.16	40.3	21.8	28.9	58.3	11.6	38.75	30.00	31.25	CL	0.97	0.69	0.19	0.33	0.17	21.4	9.66	-11.8	10.3	-0.69
1806-195-26	4571	6/19/18	1-3	6.52	10.2	40.3	18.1	29.3	70.9	14.6	31.25	32.50	36.25	CL	0.67	1.11	0.56	0.35	0.19	34.5	6.69	-27.9	11.0	-4.32
1806-195-33	5092	6/19/18	0-1	6.05	6.00	38.9	24.7	40.3	17.7	3.11	36.25	31.25	32.50	CL	1.16	0.69	0.30	0.10	0.29	21.4	11.6	-9.79	3.06	8.58
1806-195-34	5092	6/19/18	1-3	6.18	5.79	37.4	24.5	40.4	16.0	2.80	36.25	30.00	33.75	CL	1.96	0.78	0.36	0.14	0.27	24.3	19.5	-4.74	4.43	15.15
1806-195-35	5114	6/19/18	0-1	8.13	12.8	38.7	20.0	75.4	72.2	10.5	46.25	25.00	28.75	SCL	0.67	1.00	0.38	0.16	0.45	31.1	6.69	-24.5	5.00	1.68
1806-195-36	5114	6/19/18	1-3	6.04	11.7	37.8	18.7	82.0	56.5	7.97	42.50	26.25	31.25	CL	0.57	1.01	0.41	0.16	0.43	31.4	5.70	-25.7	5.06	0.63
1806-195-37	5093	6/19/18	0-1	6.05	9.71	34.6	27.6	79.4	34.8	4.75	41.25	30.00	28.75	CL	0.67	1.11	0.70	0.02	0.40	34.6	6.69	-28.0	0.50	6.18
1806-195-38	5093	6/19/18	1-3	6.18	7.07	29.5	26.6	60.9	13.8	2.09	53.75	25.00	21.25	SCL	1.66	0.55	0.28	0.04	0.23	17.2	16.6	-0.56	1.21	15.4

2018-2

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MMHOC/M	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT S %	SULFATE S%	PVR S %	ORG S%	ACID POT TH100G/1N	NEUT POT TH100G/1N	AB POT TH100G/1N	PYR A POT TH100G/1N	PYR A-B TH100G/1N
1808-214-35	5087	8/15/18	0-1	5.48	5.43	33.1	23.1	39.3	13.4	2.39	53.8	23.8	22.5	SCL	0.272	0.578	0.402	0.038	0.137	18.1	2.72	-15.3	1.20	1.52
1808-214-36	5087	8/15/18	1-3	5.61	9.37	32.2	19.6	72.7	40.0	5.89	51.3	25.0	23.8	SCL	0.371	0.890	0.509	0.138	0.243	27.8	3.71	-24.1	4.31	-0.60

2018-3

GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MMHOM	% SAT	CALCIUM MEQL	MAGNESIUM MEQL	SODIUM MEQL	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT %	SULFATE %	PYR S %	ORG %	ACID POT TH1000TN	NEUT POT TH1000TN	A-B POT TH1000TN	PYR A POT TH1000TN	PYR A-B TH1000TN
1809-178-05	4644	9/21/18	0-1	5.51	10.6	37.6	18.4	63.3	67.4	10.5	35.00	30.00	35.00	CL	0.20	1.27	0.44	0.45	0.37	39.6	1.97	-37.7	14.2	-12.2
1809-178-06	4644	9/21/18	1-3	5.57	16.3	38.4	19.8	111	113	13.9	33.75	30.00	36.25	CL	0.20	1.33	0.72	0.26	0.35	41.5	1.97	-39.5	8.20	-6.23
1809-178-06R	4644	9/21/18	1-3	5.59	14.8	39.9	19.3	110	111	13.8	36.25	28.75	35.00	CL	0.20	1.14	0.58	0.25	0.31	35.7	1.97	-33.8	7.67	-5.69

2018-4

GAL #	LOCATION	SAMPLE DEPTH	PH UNITS	EC MIN/CM	% SAT	CALCIUM MED/L	MAGNESIUM MED/L	SODIUM MED/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CACO3	TOT S %	SULFATE S %	PYR S %	ORG S %	ACID POT TN/1000TN	NEUT POT TN/1000TN	A-B POT TN/1000TN	PYR A POT TN/1000TN	PYR S-A-B TN/1000TN
1811-256-01	5088	11/28/18	0-1	6.97	6.30	41.7	19.7	57.9	8.40	40.00	31.25	28.75	CL	0.90	0.99	0.54	0.18	0.27	31.1	9.02	-22.1	5.69	3.34
1811-256-02	5089	11/28/18	1-3	6.75	6.79	39.3	19.1	68.3	8.81	42.50	27.50	30.00	CL	0.70	1.15	0.73	0.14	0.29	35.9	7.02	-26.9	4.25	2.77
1811-256-03	5091	11/28/18	0-1	5.61	9.08	44.1	19.6	97.0	13.9	32.50	36.25	31.25	CL	0.30	1.22	0.46	0.36	0.39	39.0	3.01	-35.0	11.3	-8.30
1811-256-04	5091	11/28/18	1-3	6.35	9.10	37.0	20.6	38.3	20.3	51.25	25.00	23.75	SCL	1.20	0.81	0.41	0.14	0.25	25.2	12.0	-13.1	4.47	7.66
1811-256-05	5099	11/28/18	0-1	6.12	8.15	38.9	20.6	135	5.97	41.25	28.75	30.00	CL	0.70	1.87	1.04	0.13	0.49	52.1	8.02	-45.1	4.09	2.93
1811-256-06	5099	11/28/18	1-3	4.92	6.53	42.5	19.9	77.5	44.8	45.00	27.50	27.50	CL	0.80	1.26	0.10	0.40	0.40	39.3	8.02	-31.3	3.12	4.90
1811-256-07	5090	11/28/18	0-1	7.54	5.21	35.6	21.8	62.9	4.00	56.25	23.75	20.00	SCL	0.60	0.36	0.27	0.01	0.09	11.2	6.01	-5.19	0.19	5.83
1811-256-08	5090	11/28/18	0-1 Dup	7.48	4.23	35.3	23.6	46.2	2.70	56.25	23.75	20.00	SCL	0.60	0.33	0.24	0.02	0.07	10.2	6.01	-4.18	0.53	5.48
1811-256-09	5090	11/28/18	1-3	7.27	4.89	33.2	21.1	59.6	3.27	61.25	21.25	17.50	SL	0.70	0.70	0.18	0.02	0.06	7.9	7.02	-0.92	0.47	6.55
1811-256-10	5110	11/28/18	0-1	6.21	5.93	39.2	21.9	59.6	5.62	46.25	27.50	26.25	SCL	0.60	1.02	0.61	0.12	0.29	31.7	6.01	-25.7	3.82	2.39
1811-256-11	5110	11/28/18	0-1	6.40	5.80	41.5	21.9	68.4	5.10	47.50	27.50	25.00	SCL	0.60	0.97	0.55	0.08	0.32	30.2	6.01	-24.2	3.12	2.86
1811-256-12	5110	11/28/18	1-3	6.32	6.32	37.5	21.5	72.1	6.49	46.25	28.75	25.00	L	0.30	0.91	0.56	0.08	0.27	28.3	3.01	-25.3	2.53	0.48
1811-256-13	5046	11/28/18	0-1	5.84	6.51	36.9	35.7	85.6	2.78	50.00	28.75	21.25	L	0.50	0.70	0.56	0.00	0.14	21.9	5.01	-16.8	0.06	4.95
1811-256-14	5046	11/28/18	1-3	4.46	4.40	39.9	21.0	104	1.35	45.00	31.25	23.75	L	<0.001	1.10	0.81	0.00	0.29	34.3	-4.01	-38.3	0.03	-4.04
1811-256-15	5070	11/28/18	0-1	7.41	5.57	40.9	35.7	57.8	1.62	48.75	28.75	22.50	L	2.11	0.59				18.5	21.1	2.51		
1811-256-16	5070	11/28/18	1-3	7.80	4.27	41.5	40.0	24.1	8.48	52.50	27.50	20.00	SCL	7.02	0.35				11.0	7.02	59.2		
1811-256-17	5071	11/28/18	0-1	7.55	4.26	36.8	31.7	32.0	13.8	51.25	27.50	21.25	SCL	2.51	0.31				9.53	25.1	15.5		
1811-256-18	5071	11/28/18	1-3	6.88	5.10	39.5	34.2	57.6	1.85	46.25	28.75	25.00	L	3.01	0.95				29.8	30.1	0.26		
1811-256-19	5094	11/28/18	0-1	6.74	4.34	40.0	28.9	36.8	2.98	37.50	32.50	30.00	CL	1.70	0.65				20.2	17.0	-3.15	<0.01	17.0
1811-256-20	5115	11/28/18	0-1	7.88	4.83	33.8	21.9	64.5	2.46	56.25	26.25	17.50	SL	1.20	0.13				4.08	12.0	7.95		
1811-256-21	5115	11/28/18	0-1	7.99	4.83	32.5	21.8	64.3	2.43	56.25	26.25	17.50	SL	1.20	0.13				4.05	12.0	8.0		
1811-256-22	5115	11/28/18	1-3	8.10	5.41	32.7	21.8	91.3	1.66	60.00	22.50	17.50	SL	1.20	0.20				6.26	12.0	5.786		
1811-256-23	5115	11/28/18	1-3 Dup	8.12	5.82	31.8	22.2	101	1.82	61.25	22.50	16.25	SL	1.10	0.18				5.68	11.0	5.34		
1811-256-24	5113	11/28/18	0-1	6.53	7.64	38.5	19.3	61.7	8.95	42.50	27.50	30.00	CL	0.70	0.85				26.7	7.02	-19.7	3.03	3.99
1811-256-25	5113	11/28/18	1-3	8.24	9.78	41.4	18.7	80.8	11.9	38.75	28.75	32.50	CL	0.60	1.11				34.6	6.01	-28.6	2.06	3.95
1811-256-26	5112	11/28/18	0-1	6.58	7.91	40.7	18.7	63.8	9.01	38.75	30.00	31.25	CL	0.70	1.05				32.7	7.02	-25.7	6.00	1.02
1811-256-27	5112	11/28/18	0-1 Dup	6.56	8.02	40.1	19.3	67.4	8.72	41.25	28.75	30.00	CL	0.60	0.99				30.8	6.01	-24.8	5.00	1.02
1811-256-28	5112	11/28/18	1-3	6.26	8.51	38.2	18.4	83.1	8.9	43.75	26.25	30.00	CL	0.40	1.10				34.3	4.01	-30.3	4.59	-0.58
1811-256-29	5111	11/28/18	0-1	6.54	8.47	36.8	20.5	68.1	10.4	47.50	26.25	26.25	SCL	0.60	1.02				31.7	6.01	-25.7	5.34	0.67
1811-256-30	5111	11/28/18	1-3	6.46	8.28	35.4	19.9	77.4	8.86	46.25	27.50	26.25	SCL	0.40	0.88				27.4	4.01	-23.4	3.67	0.14
1811-256-31	5127	11/28/18	0-1	5.52	7.69	36.5	21.2	88.9	5.59	43.75	28.75	27.50	CL	0.20	1.14				35.7	2.01	-38.7	2.37	-0.37
1811-256-32	5127	11/28/18	0-1 Dup	5.62	7.87	33.6	22.7	91.3	5.68	45.00	28.75	26.25	L	0.20	1.11				34.7	2.01	-32.7	2.62	-0.62
1811-256-33	5127	11/28/18	1-3	5.94	5.53	38.9	22.5	50.3	4.24	43.75	27.50	28.75	CL	0.30	1.04				32.5	3.01	-29.5	6.22	-3.21
1811-256-34	5094	11/28/18	1-3	6.68	4.35	47.7	37.9	79.2	1.38	48.75	27.50	23.75	SCL	3.71	0.83				25.0	37.1	11.1		
1811-256-35	5094	11/28/18	0-1	6.56	6.15	38.7	22.7	47.8	6.58	40.00	28.75	31.25	CL	0.50	0.96				30.1	5.01	-25.0	1.69	3.33
1811-256-36	5132	11/28/18	1-3	6.33	5.25	37.2	23.3	37.8	6.34	43.75	28.75	27.50	CL	0.40	0.68				21.4	4.01	-17.3	4.06	-0.05
1811-256-37	5131	11/28/18	0-1	6.67	4.35	32.7	29.0	31.2	18.9	56.25	22.50	21.25	SCL	1.30	0.25				7.96	13.0	5.07		
1811-256-38	5131	11/28/18	1-3	3.94	5.50	34.2	24.7	74.3	1.63	58.25	22.50	21.25	SCL	<0.001	0.89				27.9	-5.01	-32.9	1.22	-8.23
1811-256-39	5130	11/28/18	0-1	6.46	9.55	37.2	22.0	38.8	17.7	40.00	28.75	31.25	CL	0.70	1.13				35.2	7.02	-28.2	11.2	-4.17
1811-256-40	5130	11/28/18	0-1 Dup	6.48	9.65	35.1	22.5	39.2	17.8	40.00	28.75	31.25	CL	0.70	1.13				35.2	7.02	-28.2	12.4	-5.42
1811-256-41	5130	11/28/18	1-3	6.51	8.76	35.2	23.2	39.4	18.3	41.25	27.50	31.25	CL	0.70	1.14				35.5	7.02	-28.5	12.7	-5.73
1811-256-42	5130	11/28/18	1-3	3.73	11.2	33.6	24.0	277	4.01	47.50	27.50	25.00	SCL	<0.01	1.31				40.9	-8.02	-48.9	22.8	-30.8
1811-256-43	5129	11/28/18	0-1	5.88	9.08	33.6	24.0	277	4.01	47.50	27.50	25.00	SCL	0.20	1.06				33.2	2.01	-31.2	4.72	-2.71
1811-256-44	5129	11/28/18	1-3	6.22	8.45	38.3	22.2	85.6	9.60	40.00	30.00	30.00	CL	0.30	0.94				29.2	3.01	-26.2	3.78	-0.77

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GAL #	LOCATION	SAMPLE DATE	SAMPLE DEPTH	PH UNITS	EC MH/CM	% SAT	CALCIUM MEQ/L	MAGNESIUM MEQ/L	SODIUM MEQ/L	SAR	% SAND	% SILT	% CLAY	CLASS	% CaCO3	TOT S %	SULFATE %	PYR S %	ORG S%	ACID POT TN/1000TN	NEUT POT TN/1000TN	A.B POT TN/1000TN	PYR A POT TN/1000TN	PYRS A-B TN/1000TN
1811-257-01	4436	11/28/18	0-1	5.49	4.96	33.0	25.0	30.7	29.4	5.58	45.00	28.75	26.25	L	0.20	0.61	0.42	<0.01	0.21	19.0	2.01	-17.0	-0.59	2.60
1811-257-02	4436	11/28/18	1-3	4.90	8.56	36.7	21.9	212.3	31.4	2.90	45.00	27.50	27.50	CL	0.00	0.93	0.75	<0.01	0.21	29.0	0.00	-29.0	-0.81	0.81
1811-257-03	4435	11/28/18	0-1	6.28	6.23	33.9	29.8	27.8	52.2	9.73	45.00	30.00	25.00	L	0.80	1.01	0.83	0.04	0.15	31.6	8.02	-23.5	1.09	6.93
1811-257-04	4435	11/28/18	1-3	4.86	9.07	33.1	30.5	100.4	75.3	9.30	60.00	23.75	16.25	SL	0.10	1.49	1.21	0.06	0.22	46.5	1.00	-45.5	1.72	-0.72
1811-257-05	4435	11/28/18	0-1 Dup	6.34	6.56	34.1	27.6	32.7	57.9	10.5	41.25	31.25	27.50	CL	0.80	1.14	0.94	0.04	0.16	35.5	8.02	-27.5	1.34	6.68
1811-257-06	4447	11/28/18	0-1	6.44	8.11	42.2	25.1	41.5	48.7	8.44	35.00	30.00	35.00	CL	0.60	0.80	0.59	0.03	0.18	24.9	6.01	-18.9	0.97	5.05
1811-257-07	4447	11/28/18	1-3	7.95	10.8	39.3	23.4	238	59.2	5.18	30.00	38.75	31.25	CL	2.01	1.72	1.16	<0.01	0.60	53.8	20.1	-33.8	-0.97	21.0
1811-257-08	4447	11/28/18	1-3 Dup	7.97	11.3	41.4	24.4	268	63.5	5.25	32.50	37.50	30.00	CL	2.81	1.94	1.23	<0.01	0.73	60.7	28.1	-32.7	-0.28	28.4
1811-257-09	4446	11/28/18	0-1	5.33	6.81	39.3	22.4	41.8	59.6	10.5	43.75	32.50	23.75	L	<0.01	1.17	0.55	0.14	0.48	36.5	<0.01	-36.5	4.31	-4.31
1811-257-10	4446	11/28/18	1-3	6.21	8.48	36.5	20.5	65.0	78.7	12.0	35.00	36.25	28.75	CL	<0.01	1.08	0.68	0.07	0.33	33.6	<0.01	-33.6	2.03	-2.03
1811-257-10R	4446	11/28/18	1-3	6.25	8.45	37.5	21.5	68.1	80.5	12.0	35.00	35.00	30.00	CL	<0.01	1.04	0.64	0.06	0.34	32.5	<0.01	-32.5	1.94	-1.94
1811-257-11	4457	11/28/18	0-1	7.40	7.22	46.4	20.8	18.0	73.1	16.8	22.50	35.00	42.50	C	1.00	0.48	0.29	0.03	0.16	15.0	10.0	-4.93	0.91	9.12
1811-257-12	4457	11/28/18	1-3	7.30	7.90	45.9	20.1	16.1	82.2	19.3	26.25	32.50	41.25	C	1.90	0.56				17.6	19.0	1.45		

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Laboratory Data Used to Evaluate Spoil Suitability and Determine Mitigation Thickness Values for the
J19W Coal Resource Area (June 2020)

Sample Site ID as Shown on Map 2.2.1*	Sample Site ID as Listed on Laboratory Data Sheet	Year Sampled	Year Reported to OSMRE	Mitigation Thickness** (feet)	Attachment Page for Laboratory Data
1	2225 61RG	2012	2013	2	2012-1
8	2185 61RG	2012	2013	4	2012-1
9	2182 61RG	2012	2013	4	2012-1
10	2181 61RG	2012	2013	2	2012-1
2404*	61RG9	2010	2011	1	2010-1
2430	61RG15	2011	2012	1	2011-1
2431	2183 61RG	2012	2013	4	2012-1
2432	2184 61RG	2012	2013	1	2012-1
2434	61RG23	2011	2012	4	2011-1
2435	61RG22	2011	2012	4	2011-1
2458	2167	2014	2015	4	2014-3
2465	2190 60RG	2012	2013	4	2012-1
2468	J19 2468	2016	2017	2	2016-6
2469	2168 60RG	2012	2013	4	2012-1
2470	2166 60RG	2012	2013	2	2012-1
2471	2147 60RG	2012	2013	4	2012-1
2472	2146 60RG	2012	2013	2	2012-1
2480	2165	2014	2015	4	2014-3
2481	2164 61RG	2012	2013	2	2012-1
2672	J19 1964	2013	2014	4	2013-1
2675	J19 1982	2013	2014	1	2013-1
2690	1941	2014	2015	1	2014-1
2702	2017	2014	2015	1	2014-3
2711	2036	2014	2015	4	2014-3
2715	2051	2014	2015	1	2014-3
2716	2052	2014	2015	2	2014-4
2717	2053	2014	2015	1	2014-1
2720	2056	2014	2015	4	2014-3
2723	2071	2014	2015	2	2014-1
2724	2072	2014	2015	1	2014-1
2725	2073	2014	2015	4	2014-4
2730	2091	2014	2015	1	2014-4
2731	2092	2014	2015	4	2014-3
2734	2095	2014	2015	2	2014-3
2736	2109	2014	2015	1	2014-1
2737	2110	2014	2015	1	2014-3
2738	2111	2014	2015	1	2014-3
2741	2128	2014	2015	1	2014-1
2742	2129	2014	2015	1	2014-3
2743	2130	2014	2015	1	2014-3
2746	2148	2014	2015	1	2014-3
2747	2149	2014	2015	2	2014-3
2748	2150	2014	2015	2	2014-3
2749	1958	2014	2015	4	2014-3

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Laboratory Data Used to Evaluate Spoil Suitability and Determine Mitigation Thickness Values for the J19W Coal Resource Area (June 2020)

Sample Site ID as Shown on Map 2.2.1*	Sample Site ID as Listed on Laboratory Data Sheet	Year Sampled	Year Reported to OSMRE	Mitigation Thickness** (feet)	Attachment Page for Laboratory Data
2750	1959	2014	2015	3	2014-1
2751	1960	2014	2015	4	2014-1
2752	1961	2014	2015	1	2014-3
2753	1962	2014	2015	1	2014-1
4225	J19 4225	2016	2017	1	2016-6
4226	J19 4226	2016	2017	2	2016-6
4227	J19 4227	2016	2017	4	2016-6
4228	J19 4228	2016	2017	4	2016-6
4230	J19 4230	2016	2017	1	2016-6
4231	J19 4231	2016	2017	2	2016-6
4232	J19 4232	2016	2017	1	2016-6
4233	J19 4233	2016	2017	2	2016-6
4234	J19 4234	2016	2017	2	2016-6
4235	J19 4235	2016	2017	2	2016-6
4238	J19 4238	2016	2017	1	2016-6
4239	J19 4239	2016	2017	2	2016-6
4240	J19 4240	2016	2017	3	2016-6
4244	J19 4244	2016	2017	1	2016-6
4245	J19 4245	2016	2017	3	2016-6
4246	J19 4246	2016	2017	2	2016-6
4252	J19 4252	2016	2017	2	2016-6
4253	J19 4253	2016	2017	2	2016-6
4254	J19 4254	2016	2017	1	2016-6
4260	J19 4260	2016	2017	3	2016-6
4261	J19 4261	2016	2017	4	2016-6
4262	J19 4262	2016	2017	1	2016-6
4269	J19 4269	2016	2017	2	2016-6
4270	J19 4270	2016	2017	1	2016-6
4274	58-1963	2015	2016	1	2015-2
4275	J19 4275	2016	2017	1	2016-6
4276	J19 4276	2016	2017	2	2016-6
4277	J19 4277	2016	2017	1	2016-6
4435	4435	2018	2019	1	2018-6
4436	4436	2018	2019	1	2018-6
4446	4446	2018	2019	2	2018-6
4447	4447	2018	2019	1	2018-6
4448	J19 4448	2016	2017	1	2016-6
4457	4457	2018	2019	1	2018-6

* Sites denoted with an asterisk (*) have not been topsoiled nor has suitable spoil or red rock been applied. ** Per the Sampling Results and Redistribution section of the annual reports (1999, 2002-2006, 2010-2018), suitable plant growth material (weathered overburden, residual soils, and spoil) was used as subsoil and substratum to bury unsuitable spoil prior to topsoil replacement and for areas requiring erosion resistant material.

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Laboratory Data Used to Evaluate Spoil Suitability and Determine Mitigation Thickness Values for the J19 Coal Resource Area (June 2020)

Sample Site ID as Shown on Map 2.2.1*	Sample Site ID as Listed on Laboratory Data Sheet	Year Sampled	Year Reported to OSMRE	Mitigation Thickness** (feet)	Attachment Page for Laboratory Data
922	58RG24	1999	2000	1	1999-1
1674	45RG26	2002	2003	1	2002-1
1816	46RG33	2003	2004	4	2003-1
1818	46RG35	2003	2004	4	2003-1
1891	43RG13	2004	2005	2	2004-1
2175	41RG14	2005	2006	1	2005-1
2177	41RG17	2005	2006	4	2005-1
2178	45RG33	2005	2006	1	2005-1
2179	45RG32	2005	2006	1	2005-1
2180	45RG34	2005	2006	1	2005-1
2181	45RG36	2005	2006	1	2005-1
2182	45RG35	2005	2006	1	2005-1
2205	41RG18	2005	2006	1	2005-2
2527	41RG21	2006	2007	1	2006-1
2528	41RG20	2006	2007	1	2006-1
2529	41RG19	2006	2007	1	2006-1
2771*	200	2014	2015	1	2014-3
2780*	298	2014	2015	2	2014-1
2781*	299	2014	2015	2	2014-1
2782*	438	2014	2015	1	2014-1
2783*	2081	2014	2015	1	2014-1
2784	580	2014	2015	2	2014-3
2814*	56-123	2014	2015	1	2014-6
2816*	56-125	2014	2015	1	2014-6
2818*	56-128	2014	2015	2	2014-6
2820*	56-2820	2016	2017	1	2016-1
2829*	56-2829	2016	2017	1	2016-1
2832*	2832	2017	2018	1	2017-5
2833	2833	2017	2018	1	2017-3
2834	2834	2017	2018	1	2017-3
2837	2837	2017	2018	1	2017-3
2838*	2838	2017	2018	1	2017-5
2844*	56-2844	2015	2016	4	2015-5
2855	46-221	2015	2016	1	2015-3
2856*	2856	2017	2018	1	2017-5
2862*	57-2862	2016	2017	1	2016-1
2864*	57-2864	2016	2017	4	2016-1
2865*	57-2865	2016	2017	3	2016-1
2866*	57-297	2015	2016	4	2015-2
2867*	57-2867	2016	2017	1	2016-1
2868*	57-303	2015	2016	1	2015-2
2876*	56-2876	2016	2017	4	2016-2
2902	2902	2017	2018	1	2017-3
2904	2904	2017	2018	4	2017-3

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Laboratory Data Used to Evaluate Spoil Suitability and Determine Mitigation Thickness Values for the J19 Coal Resource Area (June 2020)

Sample Site ID as Shown on Map 2.2.1*	Sample Site ID as Listed on Laboratory Data Sheet	Year Sampled	Year Reported to OSMRE	Mitigation Thickness** (feet)	Attachment Page for Laboratory Data
2905	2905	2017	2018	2	2017-3
2907	2907	2017	2018	3	2017-3
2908	2908	2017	2018	2	2017-3
2910	2910	2017	2018	4	2017-3
2913*	56-354	2014	2015	1	2014-6
2914*	56-355	2014	2015	1	2014-6
2917*	56-358	2014	2015	2	2014-6
2918*	56-2918	2016	2017	1	2016-1
2923*	56-364	2014	2015	1	2014-6
2925*	56-366	2014	2015	1	2014-6
2927*	56-368	2014	2015	1	2014-6
2936	2936	2017	2018	1	2017-3
2938	2938	2017	2018	1	2017-3
2940	46-381	2015	2016	1	2015-3
2945*	2945	2018	2019	3	2018-1
2950*	62-2950	2016	2017	1	2016-1
2951*	62-393	2015	2016	2	2015-2
2994*	57-2994	2016	2017	1	2016-1
2995*	57-437	2015	2016	2	2015-2
2996*	57-2996	2016	2017	1	2016-1
2997*	57-440	2015	2016	1	2015-2
3022	3022	2017	2018	4	2017-3
3023	3023	2017	2018	4	2017-3
3026	3026	2017	2018	1	2017-3
3040	J19 3040	2017	2018	1	2017-1
3048	J19 3048	2017	2018	2	2017-1
3049	J19 3049	2017	2018	4	2017-1
3050	3050	2017	2018	2	2017-3
3051	3051	2017	2018	2	2017-3
3052	3052	2017	2018	4	2017-4
3053	3053	2017	2018	1	2017-4
3054	3054	2017	2018	1	2017-3
3058	3058	2016	2017	1	2016-3
3059	J19 3059	2017	2018	1	2017-1
3060*	J19 3060	2017	2018	3	2017-1
3061	J19 3061	2017	2018	1	2017-1
3062	J19 3062	2017	2018	4	2017-1
3063	J19 3063	2017	2018	3	2017-1
3064	J19 3064	2017	2018	1	2017-1
3066	J19 3066	2017	2018	1	2017-1
3068	3068	2017	2018	1	2017-4
3069	3069	2017	2018	1	2017-4
3070	3070	2017	2018	1	2017-4
3075	3075	2016	2017	1	2016-3
3076	3076	2016	2017	1	2016-3

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Laboratory Data Used to Evaluate Spoil Suitability and Determine Mitigation Thickness Values for the J19 Coal Resource Area (June 2020)

Sample Site ID as Shown on Map 2.2.1*	Sample Site ID as Listed on Laboratory Data Sheet	Year Sampled	Year Reported to OSMRE	Mitigation Thickness** (feet)	Attachment Page for Laboratory Data
3077	J19 3077	2017	2018	3	2017-1
3162	J19 3162	2017	2018	1	2017-1
3163	J19 3163	2017	2018	1	2017-1
3164	J19 3164	2017	2018	1	2017-1
3165	J19 3165	2017	2018	1	2017-1
3166	J19 3166	2017	2018	1	2017-2
3167	J19 3167	2017	2018	1	2017-2
3168	41-619	2014	2015	2	2014-8
3169	41-620	2014	2015	1	2014-8
3170	43-621	2014	2015	1	2014-8
3171	43-622	2014	2015	1	2014-8
3173	3173	2017	2018	1	2017-4
3185	3185	2017	2018	1	2017-4
3186*	3186	2017	2018	1	2017-4
3187*	3187	2017	2018	1	2017-4
3188*	3188	2017	2018	1	2017-4
3189*	3189	2017	2018	1	2017-4
4241*	57-2100	2015	2016	1	2015-2
4242*	57-2101	2015	2016	1	2015-2
4248	62-2119	2015	2016	1	2015-2
4249*	62-2120	2015	2016	1	2015-2
4250*	62-2121	2015	2016	1	2015-2
4256*	4256	2018	2019	1	2018-1
4257	62-2138	2015	2016	1	2015-2
4258*	62-2139	2015	2016	2	2015-2

* Sites denoted with an asterisk (*) have not been topsoiled nor has suitable spoil or red rock been applied. ** Per the Sampling Results and Redistribution section of the annual reports (1999, 2002-2006, 2010-2018), suitable plant growth material (weathered overburden, residual soils, and spoil) was used as subsoil and substratum to bury unsuitable spoil prior to topsoil replacement and for areas requiring erosion resistant material.

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Laboratory Data Used to Evaluate Spoil Suitability and Determine Mitigation Thickness Values for the N9 Coal Resource Area (June 2020)

Sample Site ID as Shown on Map 2.2.2*	Sample Site ID as Listed on Laboratory Data Sheet	Year Sampled	Year Reported to OSMRE	Mitigation Thickness** (feet)	Attachment Page for Laboratory Data
2493	3123-N9	2012	2013	4	2012-2
2494	3127-N9	2012	2013	1	2012-2
2495	3331-N9	2012	2013	2	2012-2
2658	N9-3120	2013	2014	1	2013-1
2659	N9-3121	2013	2014	4	2013-1
2660	N9-3126	2013	2014	2	2013-1
2661	N9-3330	2013	2014	1	2013-1
2680	3015	2014	2015	1	2014-2
2681	2965	2014	2015	4	2014-2
2682	2991	2014	2015	4	2014-2
2683	2911	2014	2015	1	2014-2
2684	2881	2014	2015	1	2014-2
2685	2910	2014	2015	4	2014-2
2686	2990	2014	2015	1	2014-2
2687	2937	2014	2015	1	2014-2
2688	2992	2014	2015	2	2014-2
2792	2909	2014	2015	4	2014-5
2793	2935	2014	2015	2	2014-5
2794	2936	2014	2015	2	2014-5
2795	2938	2014	2015	1	2014-5
2796	2963	2014	2015	4	2014-5
2797	2964	2014	2015	1	2014-5
2798	2988	2014	2015	2	2014-5
2799	2989	2014	2015	1	2014-5
3493	24-3493	2016	2017	3	2016-2
3494	24-3494	2016	2017	3	2016-2
4286	24-4286	2016	2017	1	2016-2
4287	24-4287	2016	2017	4	2016-2
4321	24-4321	2016	2017	1	2016-2
4322	24-4322	2016	2017	1	2016-2
4323	24-4323	2016	2017	4	2016-2
4342	25-4342	2016	2017	4	2016-2
4343	25-2332	2015	2016	1	2015-1
4344*	25-2333	2015	2016	3	2015-1
4345	25-2334	2015	2016	1	2015-1
4346	25-2335	2015	2016	1	2015-1
4375*	25-4375	2016	2017	2	2016-2
4376*	25-2365	2015	2016	2	2015-1
4377*	25-2366	2015	2016	4	2015-1
4378*	25-2367	2015	2016	1	2015-1
4493	4493	2018	2019	1	2018-1
4494	4494	2018	2019	4	2018-1
4495	4495	2018	2019	1	2018-2
4496	4496	2018	2019	3	2018-2

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Laboratory Data Used to Evaluate Spoil Suitability and Determine Mitigation Thickness Values for the N9 Coal Resource Area (June 2020)

Sample Site ID as Shown on Map 2.2.2*	Sample Site ID as Listed on Laboratory Data Sheet	Year Sampled	Year Reported to OSMRE	Mitigation Thickness** (feet)	Attachment Page for Laboratory Data
4531	4531	2017	2018	4	2017-7
4532	4532	2017	2018	4	2017-6
4533	4533	2016	2017	3	2016-3
4534	4534	2018	2019	1	2018-2
4535	25-4535	2016	2017	1	2016-2
4536	N9 4536	2016	2017	1	2016-4
4569	N9 4569	2016	2017	4	2016-4
4570	4570	2016	2017	1	2016-3
4571	4571	2018	2019	1	2018-2
4572	26-2516	2015	2016	2	2015-4
4573	26-2517	2015	2016	3	2015-4
4574	25-2518	2015	2016	4	2015-4
4575	25-2519	2015	2016	1	2015-4
4605	4605	2016	2017	4	2016-3
4606	4606	2016	2017	4	2016-3
4607	26-2551	2015	2016	1	2015-4
4608	26-2552	2015	2016	1	2015-4
4609	4609	2016	2017	1	2016-3
4610	26-2554	2015	2016	1	2015-4
4611	26-2555	2015	2016	1	2015-4
4612	26-2556	2015	2016	1	2015-4
4613	25-2557	2015	2016	1	2015-4
4614	N9 4614	2016	2017	1	2016-4
4643*	4643	2016	2017	1	2016-3
4644*	4644	2018	2019	4	2018-4
4645	26-2589	2015	2016	1	2015-4
4646	26-2590	2015	2016	3	2015-4
4647	26-2591	2015	2016	3	2015-4
4648	26-2592	2015	2016	1	2015-4
4649	26-2593	2015	2016	4	2015-4
4650	26-2594	2015	2016	1	2015-4
4651	4651	2017	2018	1	2017-6
4681*	26-4681	2015	2016	3	2015-5
4682	4682	2017	2018	4	2017-7
4683	4683	2017	2018	1	2017-7
4684	26-2628	2015	2016	1	2015-4
4685	26-2629	2015	2016	1	2015-4
4686	26-2630	2015	2016	1	2015-4
4687	26-2631	2015	2016	3	2015-4
4688	4688	2017	2018	1	2017-6
4715*	26-4715	2015	2016	4	2015-5
4716	4716	2017	2018	4	2017-6
4717	4717	2017	2018	1	2017-6
4718	4718	2017	2018	3	2017-6
4719*	N9 4719	2016	2017	1	2016-5

ATTACHMENT 2.3c TABLE OF CONTENTS

Laboratory Data Used to Evaluate Spoil Suitability and Determine Mitigation Thickness Values for the N9 Coal Resource Area (June 2020)

Sample Site ID as Shown on Map 2.2.2*	Sample Site ID as Listed on Laboratory Data Sheet	Year Sampled	Year Reported to OSMRE	Mitigation Thickness** (feet)	Attachment Page for Laboratory Data
4720*	26-2664	2015	2016	3	2015-4
4721	4721	2017	2018	1	2017-6
4722	4722	2017	2018	3	2017-6
4748	4748	2017	2018	1	2017-7
4749	4749	2017	2018	1	2017-7
4750*	4750	2017	2018	1	2017-7
4752	4752	2017	2018	1	2017-7
4753	4753	2017	2018	1	2017-6
4776*	26-2720	2015	2016	2	2015-1
4902	25-4902	2016	2017	1	2016-2
4903	25-2847	2015	2016	3	2015-1
4904	25-2848	2015	2016	1	2015-1
4905	25-2849	2015	2016	1	2015-1
4906	25-2850	2014	2015	2	2014-7
4907	25-2851	2014	2015	1	2014-7
4932	25-4932	2016	2017	1	2016-2
4933	25-2877	2015	2016	1	2015-1
4934	25-2878	2015	2016	1	2015-1
4935	25-2879	2015	2016	1	2015-1
4936	25-2880	2014	2015	2	2014-7
4960	N9 4960	2016	2017	1	2016-5
4961	25-2906	2015	2016	1	2015-1
4962	25-2907	2015	2016	1	2015-1
4963	25-2908	2015	2016	1	2015-1
4988	N9 4988	2016	2017	1	2016-5
4989	24-4989	2016	2017	1	2016-2
4990	24-4990	2016	2017	1	2016-2
5016	N9 5016	2016	2017	1	2016-5
5017	24-5017	2016	2017	2	2016-2
5018	24-5018	2016	2017	1	2016-2
5019	24-2962	2015	2016	3	2015-1
5020*	5020	2017	2018	4	2017-5
5021*	5021	2017	2018	1	2017-5
5044	24-5044	2016	2017	1	2016-2
5045*	5045	2017	2018	2	2017-5
5046*	5046	2018	2019	1	2018-5
5064*	5064	2017	2018	1	2017-7
5065*	5065	2017	2018	1	2017-7
5066*	5066	2017	2018	1	2017-7
5067	24-3016	2014	2015	1	2014-7
5068	5068	2017	2018	1	2017-5
5069*	5069	2017	2018	4	2017-5
5070*	5070	2018	2019	1	2018-5
5071*	5071	2018	2019	1	2018-5
5087*	5087	2018	2019	1	2018-3

ATTACHMENT 2.3c TABLE OF CONTENTS

Laboratory Data Used to Evaluate Spoil Suitability and Determine Mitigation Thickness Values for the N9 Coal Resource Area (June 2020)

Sample Site ID as Shown on Map 2.2.2*	Sample Site ID as Listed on Laboratory Data Sheet	Year Sampled	Year Reported to OSMRE	Mitigation Thickness** (feet)	Attachment Page for Laboratory Data
5088*	5088	2018	2019	1	2018-5
5089*	5089	2018	2019	1	2018-5
5090*	5090	2018	2019	1	2018-5
5091*	5091	2018	2019	4	2018-5
5092*	5092	2018	2019	1	2018-2
5093*	5093	2018	2019	1	2018-2
5094*	5094	2018	2019	1	2018-5
5095*	N9 5095	2017	2018	3	2017-1
5110*	5110	2018	2019	1	2018-5
5111*	5111	2018	2019	1	2018-5
5112*	5112	2018	2019	1	2018-5
5113*	5113	2018	2019	1	2018-5
5114*	5114	2018	2019	2	2018-2
5115*	5115	2018	2019	1	2018-5
5126*	5126	2018	2019	3	2018-1
5127*	5127	2018	2019	1	2018-5
5129*	5129	2018	2019	2	2018-5
5130*	5130	2018	2019	3	2018-5
5131*	5131	2018	2019	3	2018-5
5132*	5132	2018	2019	1	2018-5
5142*	5142	2018	2019	4	2018-1

* Sites denoted with an asterisk (*) have not been topsoiled nor has suitable spoil or red rock been applied. ** Per the Sampling Results and Redistribution section of the annual reports (1999, 2002-2006, 2010-2018), suitable plant growth material (weathered overburden, residual soils, and spoil) was used as subsoil and substratum to bury unsuitable spoil prior to topsoil replacement and for areas requiring erosion resistant material.

KAYENTA MINE
PHASE I BOND RELEASE
WATERSHED & CHANNEL DESIGNS
J19

TABLE J19-2020
Channel Design Summary

Channel J19-13W														
Typical Rip Rap Lined Channel														
Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-13W	3.12	11.40	28	3	0.1	2.25	1	1.1	N/A	-	5.0	0.034	80	A

Design Flow: 10-year, 6-hour Storm

J19-13W WATERSHED DESIGN (10YR- 6HR)

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-13W WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	5.000	5.000	3.12	0.14

Structure Detail:

Structure #1 (Null)

J19-13W WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	5.000	0.034	0.000	0.000	80.000	M	3.12	0.139
	Σ	5.000						3.12	0.139

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	6. Grassed waterway	17.16	70.00	408.00	6.210	0.018
		8. Large gullies, diversions, and low flowing streams	11.44	70.00	612.00	10.140	0.016
#1	1	Time of Concentration:					0.034

J19-13W CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
28.00	3.0:1	3.0:1	11.4	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	3.12 cfs	
Depth:	0.05 ft	1.05 ft
Top Width:	28.30 ft	34.30 ft
Velocity:	2.25 fps	
X-Section Area:	1.39 sq ft	
Hydraulic Radius:	0.049 ft	
Froude Number:	1.79	

TABLE J19-2020
Channel Design Summary

Channel J19-14W														
Typical Rip Rap Lined Channel														
Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-14W	8.58	7.10	12	3	0.2	3.98	1	1.2	N/A	GRAVEL	21.8	0.098	75	A

Design Flow: 10-year, 6-hour Storm

J19-14W WATERSHED DESIGN (10YR- 6HR)

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-14W WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	21.800	21.800	8.58	0.37

Structure Detail:

Structure #1 (Null)

J19-14W WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	21.800	0.098	0.000	0.000	75.000	M	8.58	0.368
	Σ	21.800						8.58	0.368

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	6. Grassed waterway	8.83	106.00	1,200.00	4.450	0.074
		8. Large gullies, diversions, and low flowing streams	7.08	50.00	706.00	7.980	0.024
#1	1	Time of Concentration:					0.098

J19-14W CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
12.00	3.0:1	3.0:1	7.1	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	8.58 cfs	
Depth:	0.17 ft	1.17 ft
Top Width:	13.03 ft	19.03 ft
Velocity:	3.98 fps	
X-Section Area:	2.16 sq ft	
Hydraulic Radius:	0.165 ft	
Froude Number:	1.72	

TABLE J19-2020
Channel Design Summary

Channel J19-15W														
Typical Rip Rap Lined Channel														
Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-15W	6.81	16.80	14	3	0.1	4.48	1	1.1	N/A	-	10.1	0.058	81	A

Design Flow: 10-year, 6-hour Storm

J19-15W WATERSHED DESIGN (10YR- 6HR)

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-15W WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	10.100	10.100	6.81	0.31

Structure Detail:

Structure #1 (Null)

J19-15W WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	10.100	0.058	0.000	0.000	81.000	M	6.81	0.308
	Σ	10.100						6.81	0.308

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	6. Grassed waterway	10.54	86.00	816.00	4.860	0.046
		8. Large gullies, diversions, and low flowing streams	16.78	95.00	566.00	12.290	0.012
#1	1	Time of Concentration:					0.058

J19-15W CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
14.00	3.0:1	3.0:1	16.8	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	6.81 cfs	
Depth:	0.11 ft	1.11 ft
Top Width:	14.64 ft	20.64 ft
Velocity:	4.48 fps	
X-Section Area:	1.52 sq ft	
Hydraulic Radius:	0.103 ft	
Froude Number:	2.45	

TABLE J19-2020
Channel Design Summary

Channel J19-16W														
Typical Rip Rap Lined Channel														
Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-16W	13.15	13.10	14	3	0.2	5.36	1	1.2	GRAVEL	GRAVEL	19.5	0.073	81	B

Design Flow: 10-year, 6-hour Storm

J19-16W WATERSHED DESIGN (10Y- 6HR)

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-16W WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	19.500	19.500	13.15	0.59

Structure Detail:

Structure #1 (Null)

J19-16W WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	19.500	0.073	0.000	0.000	81.000	M	13.15	0.595
	Σ	19.500						13.15	0.595

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	6. Grassed waterway	5.87	45.00	766.00	3.630	0.058
		8. Large gullies, diversions, and low flowing streams	13.13	78.00	594.00	10.870	0.015
#1	1	Time of Concentration:					0.073

J19-16W GRAVEL CHANNEL DESIGN (13.1%)

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
14.00	3.0:1	3.0:1	13.1	0.0300	1.00			5.5

	w/o Freeboard	w/ Freeboard
Design Discharge:	13.15 cfs	
Depth:	0.17 ft	1.17 ft
Top Width:	15.01 ft	21.01 ft
Velocity:	5.36 fps	
X-Section Area:	2.45 sq ft	
Hydraulic Radius:	0.163 ft	
Froude Number:	2.34	

TABLE J19-2020
Channel Design Summary

Channel J19-9W														
Typical Rip Rap Lined Channel														
Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-9W	19.31	9.80	16	3	0.2	5.41	1	1.2	GRAVEL	3	33.6	0.090	79	B

Design Flow: 10-year, 6-hour Storm

J19-9W WATERSHED DESIGN (10YR- 6HR)

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-9W WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	33.600	33.600	19.31	0.85

Structure Detail:

Structure #1 (Null)

J19-9W WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	33.600	0.090	0.000	0.000	79.000	M	19.31	0.853
	Σ	33.600						19.31	0.853

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	6. Grassed waterway	6.28	35.00	557.00	3.760	0.041
		8. Large gullies, diversions, and low flowing streams	9.81	165.00	1,682.00	9.390	0.049
#1	1	Time of Concentration:					0.090

J19-9W GRAVEL CHANNEL DESIGN (9.8%)

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
16.00	3.0:1	3.0:1	9.8	0.0300	1.00			5.5

	w/o Freeboard	w/ Freeboard
Design Discharge:	19.30 cfs	
Depth:	0.21 ft	1.21 ft
Top Width:	17.29 ft	23.29 ft
Velocity:	5.41 fps	
X-Section Area:	3.57 sq ft	
Hydraulic Radius:	0.205 ft	
Froude Number:	2.10	

TABLE J19-2020
Channel Design Summary

Channel J19-11W														
Typical Rip Rap Lined Channel														
Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-11W	14.17	12.00	16	3	0.2	5.12	1	1.2	GRAVEL	3	21.0	0.051	81	B

Design Flow: 10-year, 6-hour Storm

J19-11W WATERSHED DESIGN (10YR- 6HR)

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-11W WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	21.000	21.000	14.17	0.64

Structure Detail:

Structure #1 (Null)

J19-11W WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	21.000	0.051	0.000	0.000	81.000	M	14.17	0.640
	Σ	21.000						14.17	0.640

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	6. Grassed waterway	6.17	10.00	162.00	3.720	0.012
		8. Large gullies, diversions, and low flowing streams	11.98	175.00	1,461.00	10.380	0.039
#1	1	Time of Concentration:					0.051

J19-11W GRAVEL CHANNEL DESIGN (12.0%)

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
16.00	3.0:1	3.0:1	12.0	0.0300	1.00			5.5

	w/o Freeboard	w/ Freeboard
Design Discharge:	14.17 cfs	
Depth:	0.17 ft	1.17 ft
Top Width:	17.01 ft	23.01 ft
Velocity:	5.12 fps	
X-Section Area:	2.77 sq ft	
Hydraulic Radius:	0.162 ft	
Froude Number:	2.24	

TABLE J19-2020
Channel Design Summary

Channel J19-2W.1C.1D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-2W.1C.1D	8.67	2.40	35	3	0.1	1.93	1	1.1	N/A	GRAVEL	22.9	0.164	81	A

Design Flow: 10-year, 6-hour Storm

J19-2W.1C.1D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-2W.1C.1D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	22.900	22.900	8.67	0.57

Structure Detail:

Structure #1 (Null)

J19-2W.1C.1D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	22.900	0.164	0.000	0.000	81.000	M	8.67	0.570
	Σ	22.900						8.67	0.570

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	6. Grassed waterway	1.01	5.00	494.00	1.500	0.091
		8. Large gullies, diversions, and low flowing streams	2.44	30.00	1,230.00	4.680	0.073
#1	1	Time of Concentration:					0.164

J19-2W.1C.1D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
35.00	3.0:1	3.0:1	2.4	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	8.67 cfs	
Depth:	0.13 ft	1.13 ft
Top Width:	35.76 ft	41.76 ft
Velocity:	1.93 fps	
X-Section Area:	4.49 sq ft	
Hydraulic Radius:	0.126 ft	
Froude Number:	0.96	

TABLE J19-2020
Channel Design Summary

Channel J19-10W.1C														
Typical Rip Rap Lined Channel														
Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-10W.1C	9.04	7.00	20	3	0.1	3.36	1	1.1	N/A	3	27.0	0.233	81	A

Design Flow: 10-year, 6-hour Storm

J19-10W.1C WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-10W.1C WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	27.000	27.000	9.04	0.67

Structure Detail:

Structure #1 (Null)

J19-10W.1C WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	27.000	0.233	0.000	0.000	81.000	M	9.04	0.666
	Σ	27.000						9.04	0.666

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	2.90	22.00	759.00	1.360	0.155
		6. Grassed waterway	9.20	110.00	1,196.00	4.540	0.073
		8. Large gullies, diversions, and low flowing streams	6.99	10.00	143.00	7.930	0.005
#1	1	Time of Concentration:					0.233

J19-10W.1C CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
20.00	3.0:1	3.0:1	7.0	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	9.04 cfs	
Depth:	0.13 ft	1.13 ft
Top Width:	20.79 ft	26.79 ft
Velocity:	3.36 fps	
X-Section Area:	2.69 sq ft	
Hydraulic Radius:	0.129 ft	
Froude Number:	1.64	

TABLE J19-2020
Channel Design Summary

Channel J19-12W														
Typical Rip Rap Lined Channel														
Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-12W	2.57	7.00	18	3	0.1	2.13	1	1.1	N/A	3	11.9	0.133	76	A

Design Flow: 10-year, 6-hour Storm

J19-12W WATERSHED DESIGN (10YR- 6HR)

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-12W WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	11.900	11.900	2.57	0.18

Structure Detail:

Structure #1 (Null)

J19-12W WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	11.900	0.133	0.000	0.000	76.000	M	2.57	0.183
	Σ	11.900						2.57	0.183

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	6.07	40.00	659.00	1.970	0.092
		6. Grassed waterway	6.80	10.00	147.00	3.910	0.010
		8. Large gullies, diversions, and low flowing streams	6.99	62.00	887.00	7.930	0.031
#1	1	Time of Concentration:					0.133

J19-12W CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
18.00	3.0:1	3.0:1	7.0	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	2.57 cfs	
Depth:	0.07 ft	1.07 ft
Top Width:	18.40 ft	24.40 ft
Velocity:	2.13 fps	
X-Section Area:	1.20 sq ft	
Hydraulic Radius:	0.065 ft	
Froude Number:	1.47	

TABLE J19-2020
Channel Design Summary

Channel J19-10W.2C														
Typical Rip Rap Lined Channel														
Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-10W.2C	15.74	7.20	20	3	0.2	4.20	1	1.2	N/A	3	41.6	0.136	81	A

Design Flow: 10-year, 6-hour Storm

J19-10W.2C WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-10W.2C WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	41.600	41.600	15.74	1.04

Structure Detail:

Structure #1 (Null)

J19-10W.2C WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	41.600	0.136	0.000	0.000	81.000	M	15.74	1.036
	Σ	41.600						15.74	1.036

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	6.34	35.00	552.00	2.010	0.076
		6. Grassed waterway	15.04	40.00	266.00	5.810	0.012
		8. Large gullies, diversions, and low flowing streams	7.24	102.00	1,408.00	8.070	0.048
#1	1	Time of Concentration:					0.136

J19-10W.2C CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
20.00	3.0:1	3.0:1	7.2	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	15.74 cfs	
Depth:	0.18 ft	1.18 ft
Top Width:	21.09 ft	27.09 ft
Velocity:	4.20 fps	
X-Section Area:	3.75 sq ft	
Hydraulic Radius:	0.177 ft	
Froude Number:	1.76	

TABLE J19-2020
Channel Design Summary

Channel J19-22W.3C.3D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-22W.3C.3D	5.07	6.20	40	3	0.1	1.97	1	1.1	N/A	-	10.0	0.251	86	A

Design Flow: 10-year, 6-hour Storm

J19-22W.3C.3D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-22W.3C.3D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	10.000	10.000	5.07	0.37

Structure Detail:

Structure #1 (Null)

J19-22W.3C.3D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	10.000	0.251	0.000	0.000	86.000	M	5.07	0.374
	Σ	10.000						5.07	0.374

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	1.17	7.00	596.00	0.860	0.192
		6. Grassed waterway	6.02	15.00	249.00	3.680	0.018
		8. Large gullies, diversions, and low flowing streams	6.22	70.00	1,126.00	7.470	0.041
#1	1	Time of Concentration:					0.251

J19-22W.3C.3D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
40.00	3.0:1	3.0:1	6.2	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	5.07 cfs	
Depth:	0.06 ft	1.06 ft
Top Width:	40.38 ft	46.38 ft
Velocity:	1.97 fps	
X-Section Area:	2.57 sq ft	
Hydraulic Radius:	0.064 ft	
Froude Number:	1.38	

TABLE J19-2020
Channel Design Summary

Channel J19-22W.3C.2D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-22W.3C.2D	12.50	5.70	25	3	0.2	3.29	1	1.2	N/A	-	21.4	0.127	86	A

Design Flow: 10-year, 6-hour Storm

J19-22W.3C.2D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-22W.3C.2D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	21.400	21.400	12.50	0.81

Structure Detail:

Structure #1 (Null)

J19-22W.3C.2D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	21.400	0.127	0.000	0.000	86.000	M	12.50	0.811
	Σ	21.400						12.50	0.811

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	6.10	15.00	246.00	1.970	0.034
		6. Grassed waterway	4.90	35.00	714.00	3.320	0.059
		8. Large gullies, diversions, and low flowing streams	5.70	50.00	877.00	7.160	0.034
#1	1	Time of Concentration:					0.127

J19-22W.3C.2D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
25.00	3.0:1	3.0:1	5.7	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	12.50 cfs	
Depth:	0.15 ft	1.15 ft
Top Width:	25.90 ft	31.90 ft
Velocity:	3.29 fps	
X-Section Area:	3.80 sq ft	
Hydraulic Radius:	0.146 ft	
Froude Number:	1.52	

TABLE J19-2020
Channel Design Summary

Channel J19-22W.3C.4D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-22W.3C.4D	9.44	4.30	22	3	0.2	2.84	1	1.2	N/A	-	9.9	0.087	86	A

Design Flow: 10-year, 6-hour Storm

J19-22W.3C.4D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-22W.3C.4D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	9.900	9.900	9.44	0.46

Structure Detail:

Structure #1 (Null)

J19-22W.3C.4D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	9.900	0.087	0.000	0.000	86.000	M	9.44	0.460
	Σ	9.900						9.44	0.460

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	6. Grassed waterway	2.17	10.00	461.00	2.200	0.058
		8. Large gullies, diversions, and low flowing streams	4.29	28.00	652.00	6.210	0.029
#1	1	Time of Concentration:					0.087

J19-22W.3C.4D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
22.00	3.0:1	3.0:1	4.3	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	9.44 cfs	
Depth:	0.15 ft	1.15 ft
Top Width:	22.89 ft	28.89 ft
Velocity:	2.84 fps	
X-Section Area:	3.32 sq ft	
Hydraulic Radius:	0.145 ft	
Froude Number:	1.31	

TABLE J19-2020
Channel Design Summary

Channel J19-24W.1C.1D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-24W.1C.1D	10.00	1.80	11	3	0.3	2.82	1	1.3	N/A	-	24.5	0.176	82	A

Design Flow: 10-year, 6-hour Storm

J19-24W.1C.1D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-24W.1C.1D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	24.500	24.500	10.00	0.66

Structure Detail:

Structure #1 (Null)

J19-24W.1C.1D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	24.500	0.176	0.000	0.000	82.000	M	10.00	0.665
	Σ	24.500						10.00	0.665

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	6. Grassed waterway	9.45	95.00	1,005.00	4.610	0.060
		8. Large gullies, diversions, and low flowing streams	1.78	30.00	1,681.00	4.000	0.116
#1	1	Time of Concentration:					0.176

J19-24W.1C.1D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
11.00	3.0:1	3.0:1	1.8	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	10.00 cfs	
Depth:	0.30 ft	1.30 ft
Top Width:	12.79 ft	18.79 ft
Velocity:	2.82 fps	
X-Section Area:	3.55 sq ft	
Hydraulic Radius:	0.275 ft	
Froude Number:	0.94	

TABLE J19-2020
Channel Design Summary

Channel J19-23W.2C.3D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-23W.2C.3D	106.07	1.30	25	3	0.8	4.68	1	1.8	N/A	-	569.8	0.855	82	A

Design Flow: 10-year, 6-hour Storm

J19-23W.2C.3D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-23W.2C.3D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	569.800	569.800	106.07	15.19

Structure Detail:

Structure #1 (Null)

J19-23W.2C.3D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	569.800	0.855	0.000	0.000	82.000	M	106.07	15.188
	Σ	569.800						106.07	15.188

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	5.17	73.00	1,412.01	1.810	0.216
		6. Grassed waterway	2.61	95.00	3,642.07	2.420	0.418
		8. Large gullies, diversions, and low flowing streams	1.29	35.00	2,709.00	3.400	0.221
#1	1	Time of Concentration:					0.855

J19-23W.2C.3D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
25.00	3.0:1	3.0:1	1.3	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	106.07 cfs	
Depth:	0.83 ft	1.83 ft
Top Width:	29.95 ft	35.95 ft
Velocity:	4.68 fps	
X-Section Area:	22.68 sq ft	
Hydraulic Radius:	0.750 ft	
Froude Number:	0.95	

TABLE J19-2020
Channel Design Summary

Channel J19-23W.2C.4D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-23W.2C.4D	14.35	1.30	23	3	0.3	2.28	1	1.3	N/A	-	43.0	0.235	81	A

Design Flow: 10-year, 6-hour Storm

J19-23W.2C.4D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-23W.2C.4D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	43.000	43.000	14.35	1.06

Structure Detail:

Structure #1 (Null)

J19-23W.2C.4D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	43.000	0.235	0.000	0.000	81.000	M	14.35	1.061
	Σ	43.000						14.35	1.061

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	3.35	19.00	567.01	1.460	0.107
		6. Grassed waterway	5.05	10.00	198.00	3.370	0.016
		8. Large gullies, diversions, and low flowing streams	7.73	62.00	802.00	8.340	0.026
		8. Large gullies, diversions, and low flowing streams	1.25	13.00	1,041.00	3.350	0.086
#1	1	Time of Concentration:					0.235

J19-23W.2C.4D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
23.00	3.0:1	3.0:1	1.3	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	14.35 cfs	
Depth:	0.26 ft	1.26 ft
Top Width:	24.59 ft	30.59 ft
Velocity:	2.28 fps	
X-Section Area:	6.30 sq ft	
Hydraulic Radius:	0.255 ft	
Froude Number:	0.79	

TABLE J19-2020
Channel Design Summary

Channel J19-23W.2C.5D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
J19-23W.2C.5D	4.16	7.70	13	3	0.1	3.00	1	1.1	N/A	-	11.0	0.149	81	A

Design Flow: 10-year, 6-hour Storm

J19-23W.2C.5D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	J19-23W.2C.5D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	11.000	11.000	4.16	0.27

Structure Detail:

Structure #1 (Null)

J19-23W.2C.5D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	11.000	0.149	0.000	0.000	81.000	M	4.16	0.274
	Σ	11.000						4.16	0.274

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	3.35	19.00	567.00	1.460	0.107
		6. Grassed waterway	5.05	10.00	198.00	3.370	0.016
		8. Large gullies, diversions, and low flowing streams	7.73	62.00	802.00	8.340	0.026
#1	1	Time of Concentration:					0.149

J19-23W.2C.5D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
13.00	3.0:1	3.0:1	7.7	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	4.16 cfs	
Depth:	0.10 ft	1.10 ft
Top Width:	13.62 ft	19.62 ft
Velocity:	3.00 fps	
X-Section Area:	1.39 sq ft	
Hydraulic Radius:	0.101 ft	
Froude Number:	1.66	

SECTION 2

Phase I Bond Release Supporting Information

Introduction

The Phase I Bond Release information contained in this application for the J19, J19-West (J19W), and N9 Coal Resource Areas (CRAs) consists primarily of backfilling, grading, suitable plant growth material replacement, drainage channel as-builts, and slope analysis.

Backfilling and Grading

There are no permanent support facilities included in this J19, J19W, and N9 Phase I Bond Release Application. The permanent support facilities will be included in later bond release applications. Final grading of permanent program lands within the J19, J19W, and N9 areas occurred from 1999 to 2018. Final grading status for the release areas shown on Maps 1.1.1 and 1.1.2 were previously reported and submitted with supporting maps to the regulatory authority in the following annual monitoring reports.

Peabody Western Coal Company (PWCC). 2000-2019. 1999-2018 Minesoil Reconstruction and Revegetation Activities Reports, Black Mesa and Kayenta Mines, Flagstaff and Kayenta, Arizona. Reports Prepared for: The Office of Surface Mining Reclamation and Enforcement, Western Service Center, Denver, Colorado.

The pre-mining and post-mining topography consists of rolling hills dissected by ephemeral drainage channels. The regulations require the post-mining graded slopes must approximate the pre-mining natural slopes. Approximate original contour means that surface configuration is achieved by backfilling and grading of the mined area so that the reclaimed area resembles the general surface configuration of the surrounding terrain with all final highwall and spoil piles eliminated. In order to perform a realistic comparison of the pre-mining and post-mining slope measurements, PWCC utilized ESRI ArcGIS 10 Spatial Analyst software to generate slope measurement polygons within the entire J19, J19W, and N9 reclamation areas included in this submittal. The J19, J19W, and N9 release areas included with this Phase I bond release application are all Permanent Program Lands. The J19, J19W, and N9 reclamation areas were evaluated to compare the slope stability of the pre- and post-mining landforms and general surface configuration.

The slope polygons were grouped into slope measurement ranges based on the following six slope measurement classifications:

1. <9%
2. 9% to 13%
3. 13% to 18%
4. 18% to 25%
5. 25% to 33%
6. >33%

These slope measurement classifications are like the classifications utilized in the AZ-0001F Permit, Chapter 26, Surface Stabilization. The location of the area associated with each of the pre- and post-mine slope measurement classes for the J19, J19W, and N9 reclamation areas can be found on Maps 2.3.1 and 2.3.2 (Post-Mine) and Maps 2.4.1 and 2.4.2 (Pre-Mine). Tables 2.1.1, 2.1.2, and 2.1.3 provide a summary of the area in each slope measurement classification before mining and after mining for the N9, J19, and J19W release areas, respectively:

Table 2.1.1. Pre and Post-Mining Slope Analysis for N9 Permanent Program Reclaimed Areas.

POST - MINING SLOPE ANALYSIS:

RANGE	BEGINNING (%)	END (%)	AREA(Ac.)	PERCENT of TOTAL AREA	POST - MINING SLOPE AREA vs. PRE - MINING SLOPE AREA (%)
1	0	9	205.8	50.1	+12.4
2	9	13	85.7	20.9	-4.6
3	13	18	65.5	15.9	-4.6
4	18	25	42.0	10.2	-1.9
5	25	33	9.2	2.2	-1.5
6	33	+	2.5	0.6	0

PRE - MINING SLOPE ANALYSIS:

RANGE	BEGINNING (%)	END (%)	AREA(Ac.)	PERCENT of TOTAL AREA
1	0	9	154.8	37.7
2	9	13	104.5	25.5
3	13	18	84.1	20.5
4	18	25	49.6	12.1
5	25	33	15.1	3.7
6	33	+	2.5	0.6

Table 2.1.2. Pre and Post-Mining Slope Analysis for J19 Permanent Program Reclaimed Areas.

POST - MINING SLOPE ANALYSIS:

RANGE		END (%)	AREA(Ac.)	PERCENT of TOTAL AREA	POST - MINING SLOPE AREA vs. PRE - MINING SLOPE AREA (%)
	BEGINNING (%)				
1	0	9	130.9	49.1	-20.3
2	9	13	45.1	16.9	-0.3
3	13	18	45.7	17.1	+9.5
4	18	25	37.5	14.1	+11.0
5	25	33	6.6	2.5	+1.3
6	33	+	0.8	0.3	-1.1

PRE - MINING SLOPE ANALYSIS:

RANGE	BEGINNING (%)	END (%)	AREA(Ac.)	PERCENT of TOTAL AREA
1	0	9	185.0	69.4
2	9	13	46.0	17.2
3	13	18	20.2	7.6
4	18	25	8.3	3.1
5	25	33	3.3	1.2
6	33	+	3.8	1.4

Table 2.1.3. Pre and Post-Mining Slope Analysis for J19W Permanent Program Reclaimed Areas.

POST - MINING SLOPE ANALYSIS:

RANGE	BEGINNING (%)		AREA(Ac.)	PERCENT of TOTAL AREA	POST - MINING SLOPE AREA vs. PRE - MINING SLOPE AREA (%)
		END (%)			
1	0	9	96.5	38.4	+18.0
2	9	13	40.0	15.9	-0.9
3	13	18	51.9	20.6	-2.7
4	18	25	43.7	17.4	-6.5
5	25	33	14.2	5.6	-5.6
6	33	+	4.9	1.9	-2.6

PRE - MINING SLOPE ANALYSIS:

RANGE	BEGINNING (%)	END (%)	AREA(Ac.)	PERCENT of TOTAL AREA
1	0	9	51.2	20.4
2	9	13	42.1	16.8
3	13	18	58.6	23.3
4	18	25	59.9	23.9
5	25	33	28.2	11.2
6	33	+	11.2	4.5

As illustrated above, the post-mine topography has very similar slope gradient percentages in each of the six range categories compared with the original pre-mine topography. Overall, post-mine topography has slightly less steep slopes than the pre-mine topography. The as-built post-mine surface was compared to the Estimated Post-mining Topographic (PMT), Drawing 85352, Sheets K6, K7, M9, and M10, Volume 29 of Permit AZ-0001F. The comparison did not reflect any areas outside the +/- 20 feet of the estimated post-mine contours as required in the permit.

Attachment 2.1 includes the as-built information for the J19, J19W, and N9 reclamation drainage channels shown on Map 2.5.1 (Sheets 1 to 3 of 3) and Map 2.5.2 (Sheets 1 to 2 of 2). This is similar to the map submitted previously in the Annual Surface Stabilization Reports. Based on the information in Attachment 2.1 and a field inspection of the J19, J19W, and N9 areas, PWCC has demonstrated the post-mining reclamation drainage structures are stable and can safely pass the design runoff. The locations of these drainage structures are shown on Map 2.5.1 (3 sheets) and Map 2.5.2 (2 sheets).

In conclusion, the J19, J19W, and N9 reclamation areas have been graded to very similar overall slopes compared to pre-mine topography. Grading was completed to eliminate final highwalls and spoil piles, to ensure stability, to reestablish a positive stable drainage network, and to facilitate the livestock grazing, wildlife habitat, and cultural plant post-mining land uses. The J19, J19W, and N9 backfilling, grading, and drainage system construction was conducted in conformance with the applicable regulatory requirements and approved reclamation plans.

Surface Water Data

There have been very few NPDES discharges from Pond J16-L located in Reed Valley Wash and no NPDES discharges from Ponds J7-JR, J19-A, J19-B, J19-D, and J19-E located in tributaries of Red Peak Valley Wash down gradient from the J19 and J19W bond release watersheds. There have been no NPDES discharges from Ponds N9-A, N9-B, N9-C, N9-D, N9-E, N9-F, and N9-G located in tributaries of Yellow Water Canyon Wash down gradient from the N9 bond release watershed. Lagoon dewatering was conducted at Pond J16-L on August 24, 2007 and February through May 2011 to perform maintenance activities per MSHA regulations. Lagoon dewatering was also conducted at Pond J16-L during August 2008 to restore enough storage capacity. No applicable effluent limitations were exceeded for the duration of these lagoon dewatering activities. Eleven (11) water quality samples have been collected from two of these thirteen ponds during the past five (5) years per the approved monitoring schedule presented in Table

10, Chapter 16 of the Permit Application Package (PAP) for Permit AZ-0001F. Ten water quality samples (two per year) were collected from Pond J7-JR over the past five years and one sample from Pond J16-L in 2019. Laboratory data for all eleven samples met livestock water quality standards.

Spoil Sampling and Suitable Material Replacement

Final graded spoil for the J19, J19W, and N9 CRAs permanent program lands was sampled during fifteen (15) years from 1999 to 2018 (as documented in Attachments 2.3a, 2.3b, and 2.3c) to comprehensively evaluate suitability and determine suitable plant growth material replacement requirements per Chapter 22, Volume 11, Permit AZ-0001F. All spoil sampling and data evaluations were completed using procedures and suitability criteria presented in Chapter 22, Volume 11, Permit AZ-0001F. Spoil sampling results were previously reported and submitted with supporting maps to the regulatory authority in fifteen (15) annual monitoring reports as referenced below and documented in Attachments 2.3a, 2.3b, and 2.3c.

Peabody Western Coal Company (PWCC). 2000, 2003-2007, 2011-2019. 1999, 2002-2006, 2010-2018 Minesoil Reconstruction and Revegetation Activities Reports, Black Mesa and Kayenta Mines, Flagstaff and Kayenta, Arizona. Reports Prepared for: The Office of Surface Mining Reclamation and Enforcement, Western Service Center, Denver, Colorado.

Spoil sample laboratory data from the reports listed above that is pertinent to the Phase I bond release area is included in Attachment 2.3a for the J19W CRA, Attachment 2.3b for the J19 CRA, and Attachment 2.3c for the N9 CRA. A total of 351 sites, 82 in J19W, 114 in J19, and 155 in N9 were located on final graded spoil slopes and sampled within the designated Phase I release areas. Two hundred seven (207) of the 351 sites sampled (59%) as listed in Attachments 2.3a, 2.3b, and 2.3c and shown on Maps 2.2.1 and 2.2.2 had suitable spoil characteristics from the surface to three (3) feet and required no additional suitable subsoil and substratum material to be replaced before applying one foot of suitable surface soil. Topsoil, suitable residual soils, and weathered overburden derived from mostly scoria, sandstone, and siltstone were used to bury unsuitable spoil at J19, J19W, and N9 when 2, 3, or 4 feet of suitable mitigation material was required as shown on Maps 2.2.1 and 2.2.2. Four feet of suitable residual soils and weathered overburden were used in six (6) cultural planting and two (2) steep slope areas that total 34.4 and 16.3 acres, respectively. Durable sandstone, siltstone, and scoria overburden were used to construct seventeen (17) rocked downdrains and drainages (2.7 acres). Occasionally, topsoil was used in J19, J19W, and N9 as mitigation material as observed by the field supervisors during reclamation work and as noted by the suitable plant growth material thickness survey. An average of 0.84 feet of mitigation material was required for the entire Phase I release

area (929 acres) based on the comprehensive graded spoil sampling suitability analysis presented in Attachments 2.3a, 2.3b, and 2.3c. For areas that have had suitable plant growth material replaced (696 acres), an average of 0.88 feet of mitigation material was required based on the comprehensive graded spoil sampling suitability analysis presented in Attachments 2.3a, 2.3b, and 2.3c. As documented in the next section titled Suitable Plant Growth Material Thickness, the mean thickness of mitigation material replaced for this 696 acre area equaled 1.2 feet (excluding one (1) foot of topsoil, suitable residual soils, and weathered scoria overburden at the surface).

Suitable Plant Growth Material Thickness

Four feet of suitable plant growth material as defined in Chapter 22, Volume 11, Permit AZ-001F was replaced on final graded slopes of permanent program lands within the J19, J19W, and N9 CRAs from 1999 to 2019. Suitable plant growth material replacement status for most of the release areas shown on Maps 1.1.1 and 1.1.2 were previously reported to the regulatory authority on the Reclamation Status Map 2 (as of December 31, 2018) shown on the Southeast and Northwest Sheets contained in the 2018 Reclamation Status and Monitoring Report, Black Mesa and Kayenta Mines (submitted May 2019). Suitable plant growth material replacement areas for the 2019 calendar year will be submitted to the regulatory authority with the next annual report in August 2020. Soil was redistributed on final graded slopes from stockpiles or replaced directly from soil removal areas prior to ripping and contour discing. Pursuant to Chapter 22 of Permit AZ-0001F, the thickness of soil replaced shall exceed the minimum average of 1 foot.

Six (6) cultural planting and two (2) steep slope sites, totaling approximately 51 acres combined as shown on Maps 2.1.1 and 2.1.2, received four feet of suitable residual soils and weathered overburden. Seventeen (17) rock downdrains and drainages, totaling about 2.7 acres as shown on Maps 2.2.1 and 2.2.2, received suitable overburden derived from predominantly scoria, sandstone, and siltstone. Topsoil was not replaced at these twenty-five (25) sites that totaled about 54 acres.

One suitable plant growth material thickness survey of the J19, J19W, and N9 reclaimed areas included with this Phase I bond release application was completed during May 2020 as shown on Maps 2.1.1 and 2.1.2. Personnel from Peabody Western Coal Company (PWCC) observed sites in the J19, J19W, and N9 reclaimed areas in order to verify the suitable plant growth material replacement thickness. A stratified grid sampling scheme using a random number generator program was used for the PWCC survey to locate 47 sites within the topsoiled,

cultural planting, and steep slope areas of J19 (162 acres), J19W (247 acres), and N9 (286 acres) prior to going into the field. Suitable plant growth material thickness verification sites were not placed within the rocked down drain, large drainage areas, and areas that have not yet been topsoiled. A sampling density of about 1 site per 15 acres was used; a slightly higher density than those used and approved previously at Kayenta Mine for the N1/N2, N7/N8, N11, N14, J16, J19, and J21 soil thickness evaluations. A Trimble GeoXT survey grade GPS unit was used to navigate to each of the sites. At all sites, either a 3 ½-inch bucket auger or backhoe pit were used to verify the soil and mitigation material thickness by excavating to the contact with spoil. The results of the soil and mitigation material thickness verification survey are shown in Table 2.2 and Maps 2.1.1 and 2.1.2 show all sampled sites with corresponding thickness values.

Forty-seven (47) sample sites were randomly placed within the 696 acres of disturbed lands that received suitable plant growth material within the release area. Suitable plant growth material thickness was verified at all 47 sites. Suitable plant growth material thickness among the 47 profiles placed over the J19, J19W, and N9 release area ranged from 0.8 to 5.6 feet. The mean topsoil thickness value, excluding thickness attributed to suitable residual soils and suitable overburden derived from predominantly scoria and sandstone used in the cultural planting and steep slope areas noted in Table 2.2 was 1.9 feet over 45 sites. The mean soil and suitable material thickness of 1.9 feet exceeds the minimum 1-foot average topsoil thickness requirements presented in the approved reclamation plan in Chapter 22 of Permit AZ-0001F.

When the topsoiled reclamation areas (644 acres) are combined with the cultural planting, steep slope, and select mitigative areas (52 acres), the mean thickness of suitable plant growth material is 2.2 feet (Table 2.2). This mean thickness of 2.2 feet exceeds the average combined topsoil and mitigation material thickness of 1.9 feet as required by the spoil suitability mitigation requirements discussed in the previous section and shown on Maps 2.2.1 and 2.2.2. In conclusion, PWCC has satisfied topsoil and suitable plant growth material thickness replacement requirements in conformance with applicable regulatory requirements and as stipulated by the approved reclamation plan for the J19, J19W, and N9 Phase I release areas shown on Maps 1.1.1 and 1.1.2.

Table 2.2. Suitable Plant Growth Material Thickness Verification Sites Sampled by PWCC at J19, J19W, and N9 During May 2020 (See Maps 2.1.1 and 2.1.2 for Site Locations).

Site ID ⁽¹⁾	Easting (feet) ⁽²⁾	Northing (feet) ⁽²⁾	Soil/Mitigation Thickness (feet)	Coal Resource Area
1	26612	10794	1.0	N9
2	21549	5270	1.0	N9
3	24986	6506	1.0	N9
4	25951	7045	1.0	N9
5	26979	9406	2.5	N9
6	19996	2150	3.6	N9
7	23727	7586	2.6	N9
8	21301	5560	0.8	N9
9	24911	6861	1.3	N9
10	23572	7050	1.6/4.0 ⁽⁴⁾	N9
11	26392	10541	2.0	N9
12	21633	5646	2.0	N9
13	22132	4398	2.3	N9
14	22588	4702	2.6	N9
15	25322	8912	4.5 ⁽³⁾	N9
16	25789	8663	3.5 ⁽³⁾	N9
17	48363	-35744	2.3	J19W
18	48869	-37887	1.7	J19W
19	49698	-34785	1.5	J19W
20	50141	-35800	2.4	J19W
21	48841	-36101	1.7/1.2 ⁽⁴⁾	J19W
22	48186	-36179	2.4	J19W
23	47995	-35556	2.2	J19W
24	50158	-36254	3.1	J19W
25	50061	-35615	0.9	J19W
26	48209	-35115	2.8	J19W
27	49626	-35443	0.9	J19W
28	47533	-33981	2.2	J19W
29	49415	-36426	2.1/2.9 ⁽⁴⁾	J19W
30	47776	-35033	2.3	J19W
31	48527	-37519	1.4	J19W

Table 2.2. Continued.				
Site ID ⁽¹⁾	Easting (feet) ⁽²⁾	Northing (feet) ⁽²⁾	Soil Thickness (feet)	Coal Resource Area
32	49940	-35059	1.2	J19W
33	47481	-33253	1.5	J19W
34	47471	-34648	3.5	J19W
35	48186	-34027	3.1	J19W
36	49534	-34324	1.1	J19W
37	49313	-36021	1.4/1.0 ⁽⁴⁾	J19W
38	58959	-34045	4.2	J19
39	58758	-40322	2.3	J19
40	59490	-37362	2.4	J19
41	58854	-32935	1.2	J19
42	58670	-39493	1.3	J19
43	59160	-40740	1.9	J19
44	53043	-35847	1.3	J19
45	58968	-41457	1.4	J19
46	59586	-40740	1.5	J19
47	55374	-29444	1.1	J19
MEAN			1.9/2.2⁽⁵⁾	
⁽¹⁾ For location see Maps 2.1.1 and 2.1.2. ⁽²⁾ PWCC coordinate system. ⁽³⁾ Cultural planting area. ⁽⁴⁾ Suitable mitigation material replaced between topsoil and spoil. ⁽⁵⁾ Total thickness attributed to topsoil and suitable mitigative material.				

CERTIFICATION

PEABODY WESTERN COAL COMPANY
KAYENTA MINE, J19, J19W, AND N9 COAL RESOURCE AREAS, PHASE I BOND RELEASE APPLICATION
NAVAJO COUNTY, ARIZONA

I HEREBY CERTIFY that, to the best of my knowledge and belief, all applicable reclamation activities described in the attached Phase I Bond Release Application for the J19, J19 West (J19W), and N9 Coal Resource Areas dated June 17, 2020 have been accomplished in accordance with the reclamation requirements of the Act, the regulatory program, and the approved reclamation plan contained in the AZ-0001F Permit. The bond release parcel is free from enforcement actions.

Peabody Western Coal Company - Kayenta Mine

By:



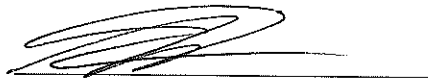
Randy Lehn
Director Operations Support - Kayenta Mine

STATE OF ARIZONA

~~NAVAJO~~ COUNTY

Coconino

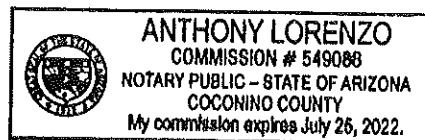
Signed or attested before me this 9 day of June 2020, by Randy Lehn, Director Operations Support of Kayenta Mine owned by Peabody Western Coal Company, a Delaware Corporation, on behalf of said Kayenta Mine.

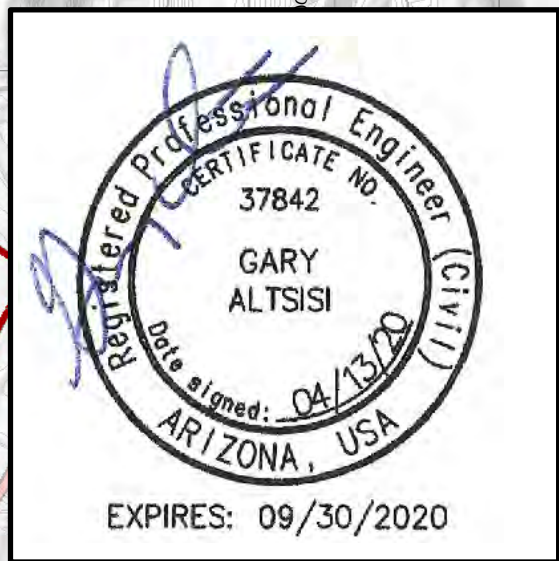
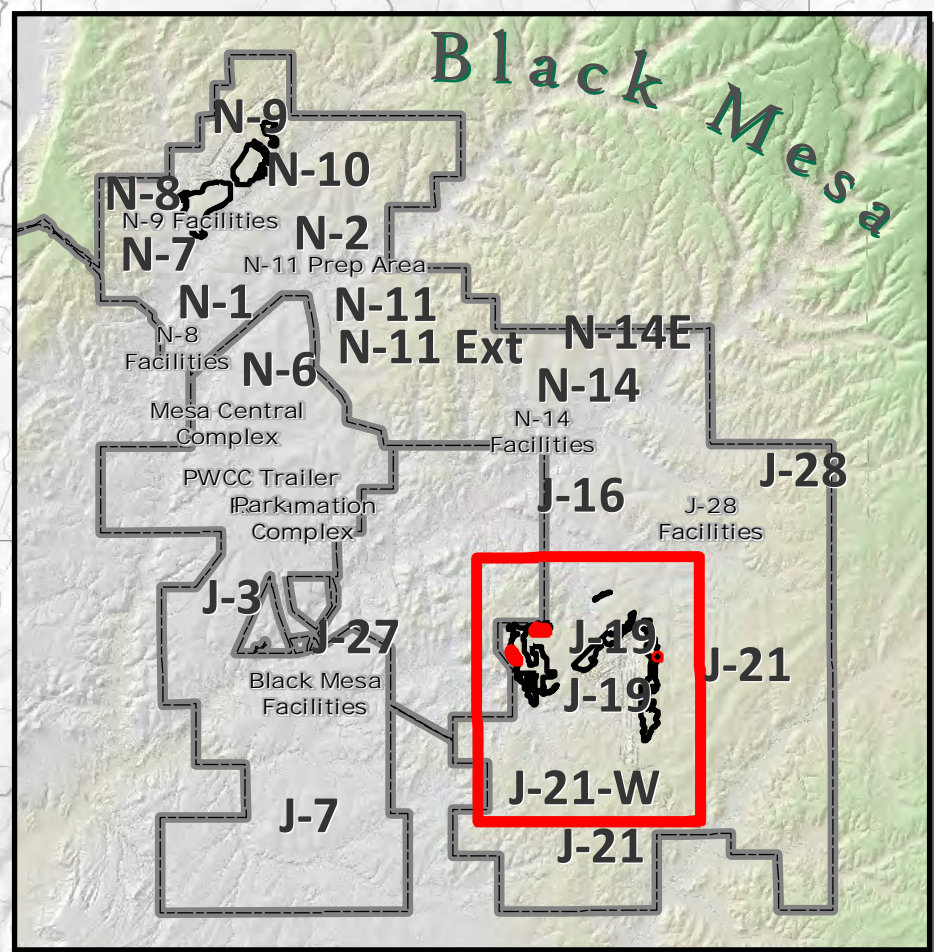
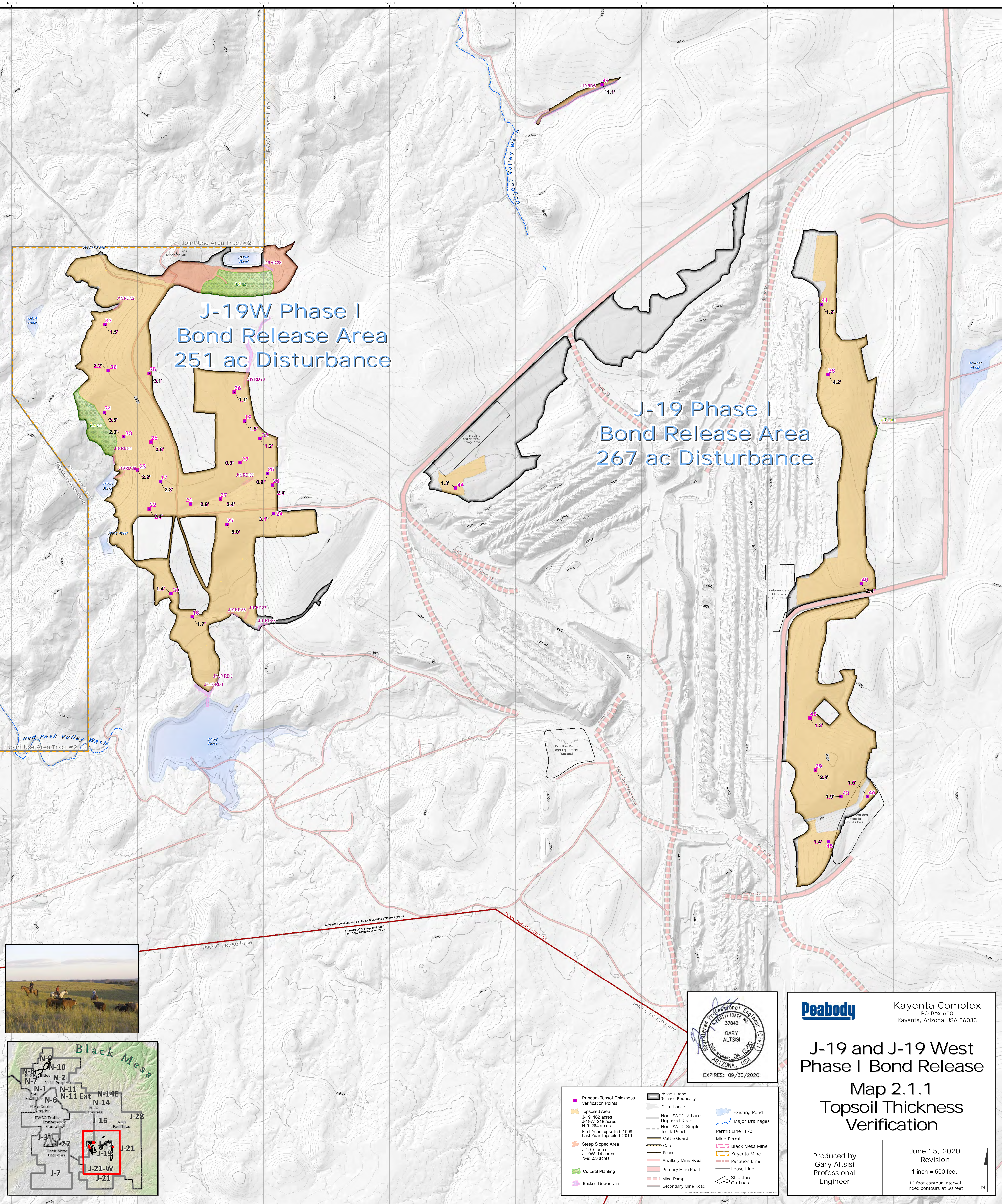


Notary Public

My commission expires:

July 25 2022





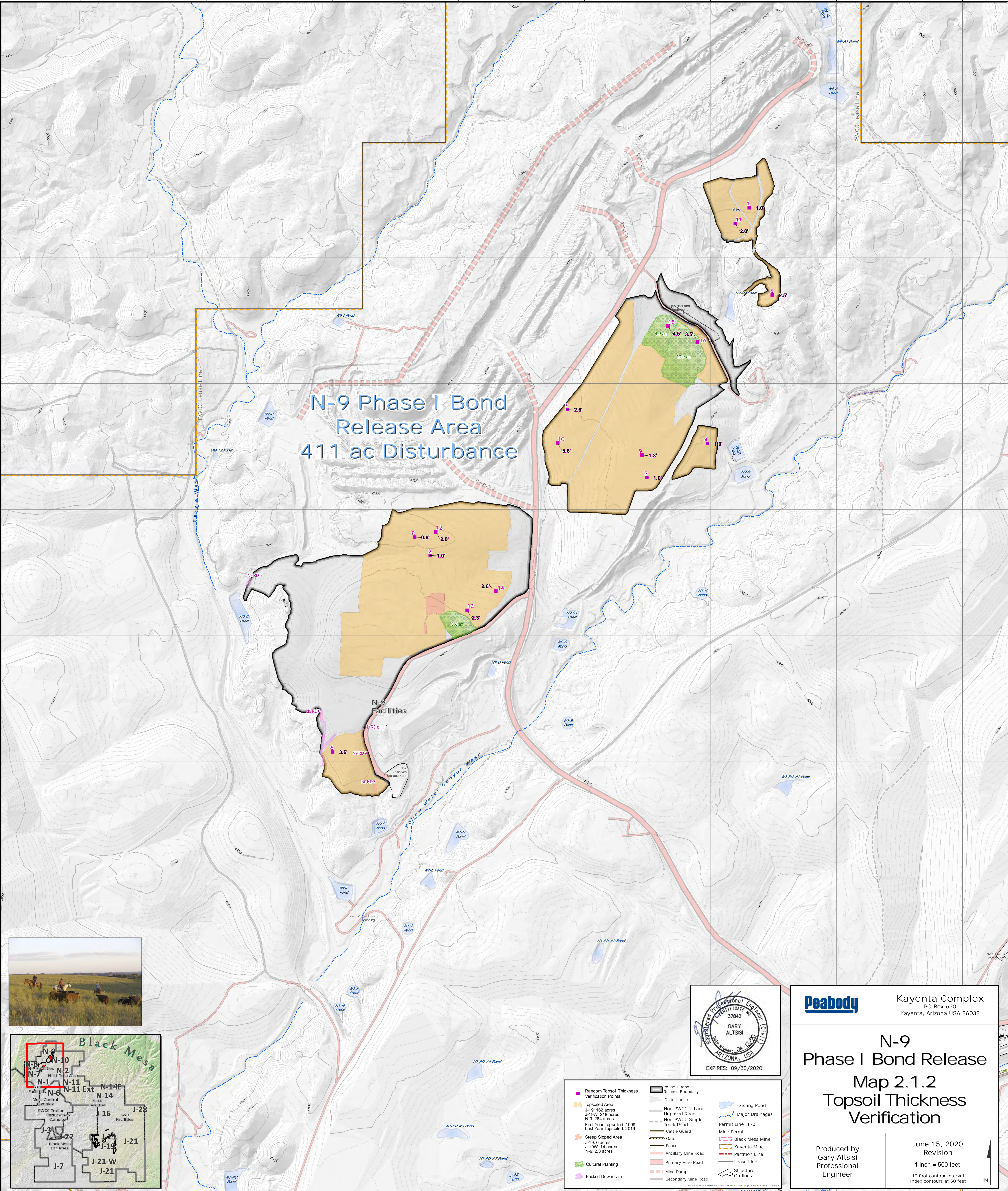
Kayenta Complex
PO Box 650
Kayenta, Arizona USA 86033

J-19 and J-19 West Phase I Bond Release Map 2.1.1 Topsoil Thickness Verification

Produced by
Gary Altsisi
Professional
Engineer

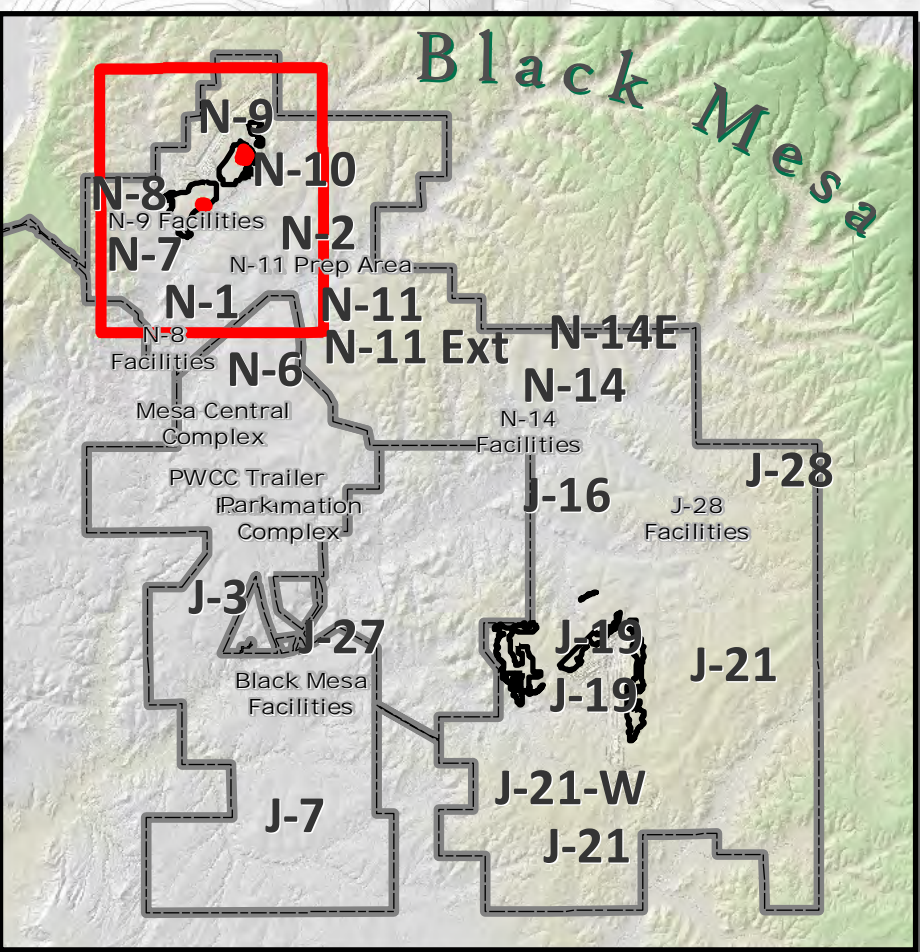
June 15, 2020
Revision
1 inch = 500 feet
10 foot contour interval
Index contours at 50 feet





N-9 Phase I Bond
Release Area
411 ac Disturbance

N-9
Facilities



- | | |
|---|--|
| <ul style="list-style-type: none">Random Topsoil Thickness Verification PointsTopsold Area<ul style="list-style-type: none">J-19: 162 acresJ-19W: 218 acresN-9: 264 acresFirst Year Topsold: 1999Last Year Topsold: 2019Steep Sloped Area<ul style="list-style-type: none">J-19: 0 acresJ-19W: 14 acresN-9: 2.3 acresCultural PlantingRocked Downrain | <ul style="list-style-type: none">Phase I Bond Release BoundaryDisturbanceNon-PWCC 2-Lane Unpaved RoadNon-PWCC Single Track RoadCattle GuardGateFenceAncillary Mine RoadPrimary Mine RoadMine RampSecondary Mine RoadExisting PondMajor DrainagesPermit Line 1F/01 Mine PermitBlack Mesa MinePartition LineLease LineStructure Outlines |
|---|--|



Kayenta Complex
PO Box 650
Kayenta, Arizona USA 86033

N-9
Phase I Bond Release
Map 2.1.2
Topsoil Thickness
Verification

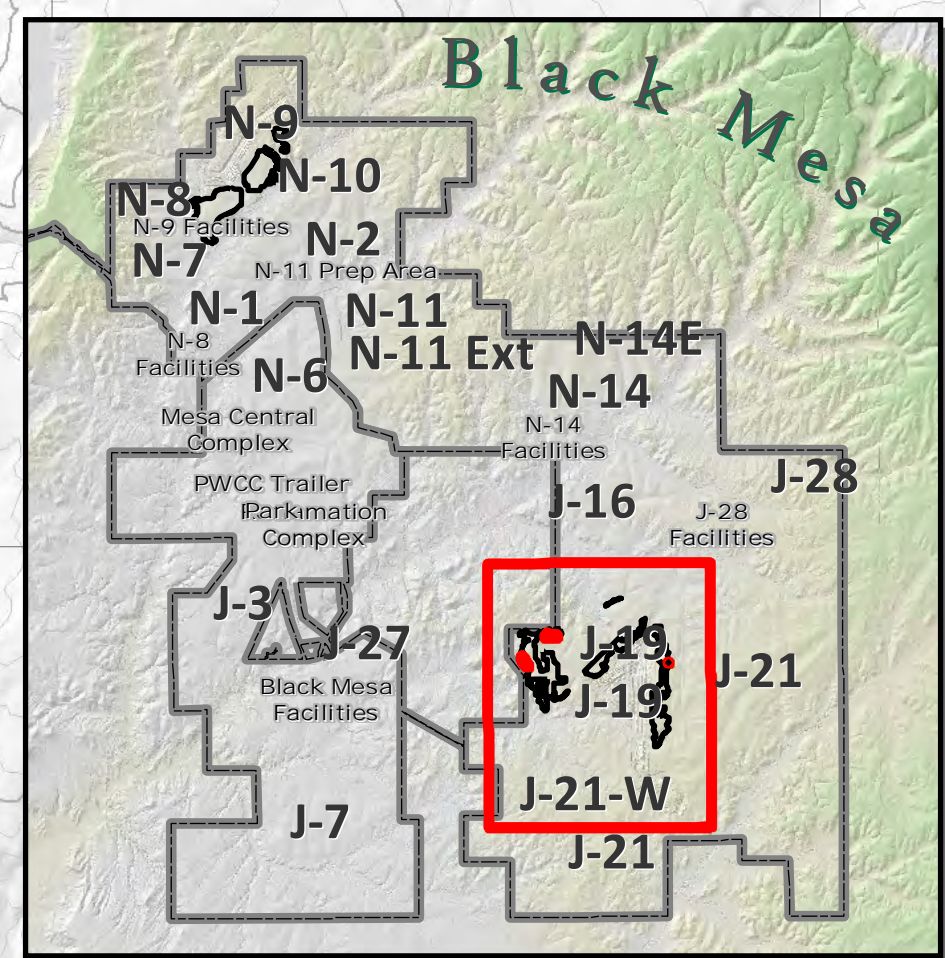
Produced by
Gary Altsisi
Professional
Engineer

June 15, 2020
Revision
1 inch = 500 feet
10 foot contour interval
Index contours at 50 feet

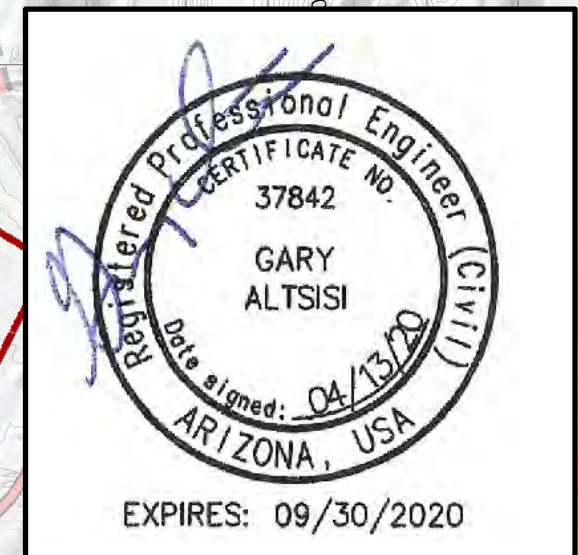


J-19W Phase I Bond Release Area 251 ac Disturbance

J-19 Phase I Bond Release Area 267 ac Disturbance



<p>Spoil Sample Depth</p> <ul style="list-style-type: none">1234 <p>N-9: 155 points J-19: 114 points J-19W: 82 points</p> <p>N-9: 0.9 acres J-19: 0.8 acres J-19W: 1.0 acres</p> <p>N-9: 19.4 acres J-19: < 0.1 acres J-19W: 15.0 acres</p>	<p>Phase I Bond Release Boundary</p> <p>Disturbance</p> <p>First Year Graded: 1999 Last Year Graded: 2018</p> <p>Rocked Downdrain</p> <p>Cultural Planting</p> <p>Topsailed Area</p> <p>Steep Sloped Area</p>	<p>Ranch Road</p> <p>Non-PWCC 2-Lane Unpaved Road</p> <p>Non-PWCC Single Track Road</p> <p>Cattle Guard</p> <p>Gate</p> <p>Fence</p> <p>Ancillary Mine Road</p> <p>Primary Mine Road</p> <p>Mine Ramp</p> <p>Secondary Mine Road</p>	<p>Existing Pond</p> <p>Major Drainages</p> <p>Permit Line 1F/01</p> <p>Mine Permit</p> <p>Black Mesa Mine</p> <p>Kayenta Mine</p> <p>Partition Line</p> <p>Lease Line</p> <p>Structure Outlines</p>
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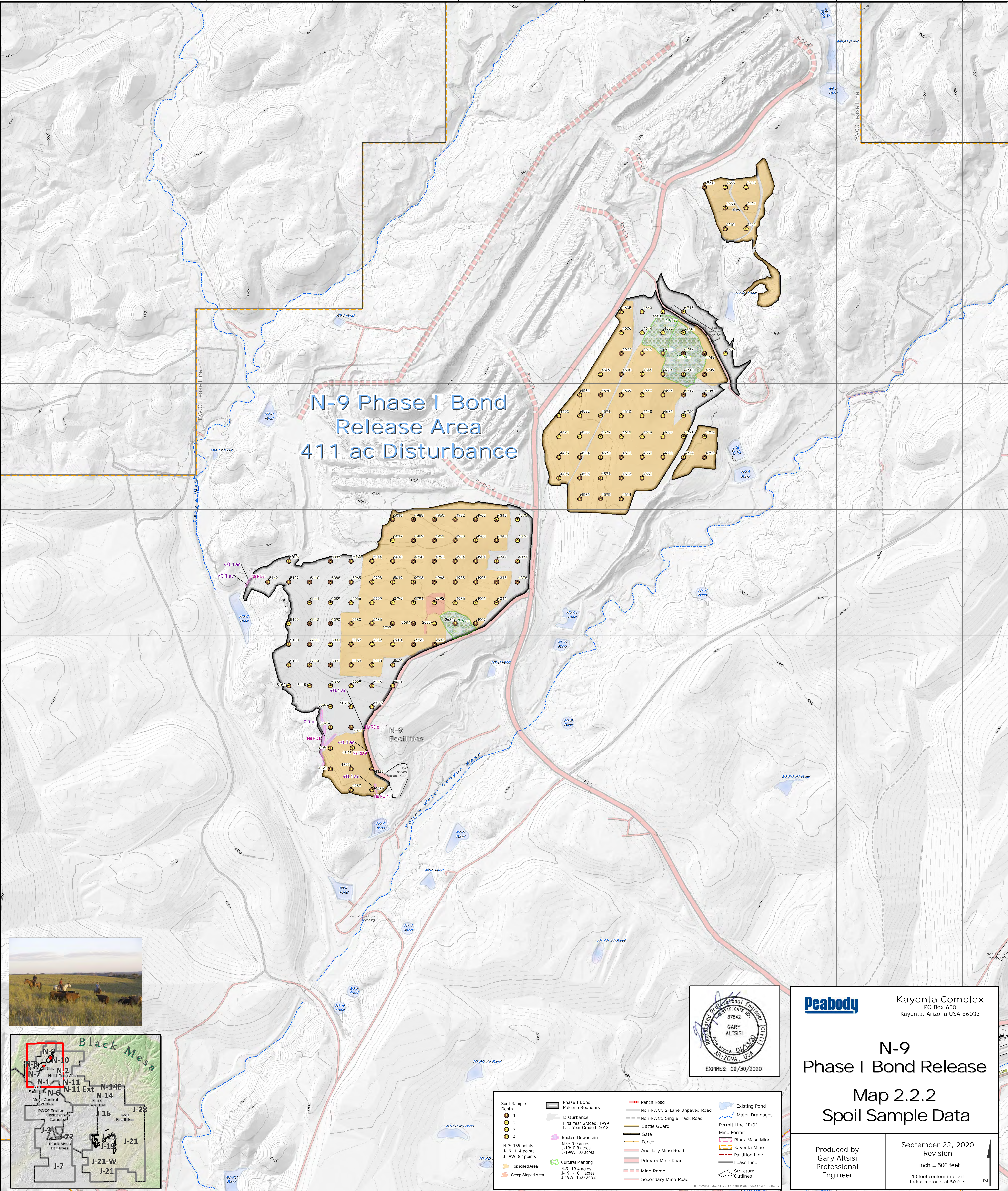


Kayenta Complex
PO Box 650
Kayenta, Arizona USA 86033

J-19 and J-19 West Phase I Bond Release Map 2.2.1 Spoil Sample Data

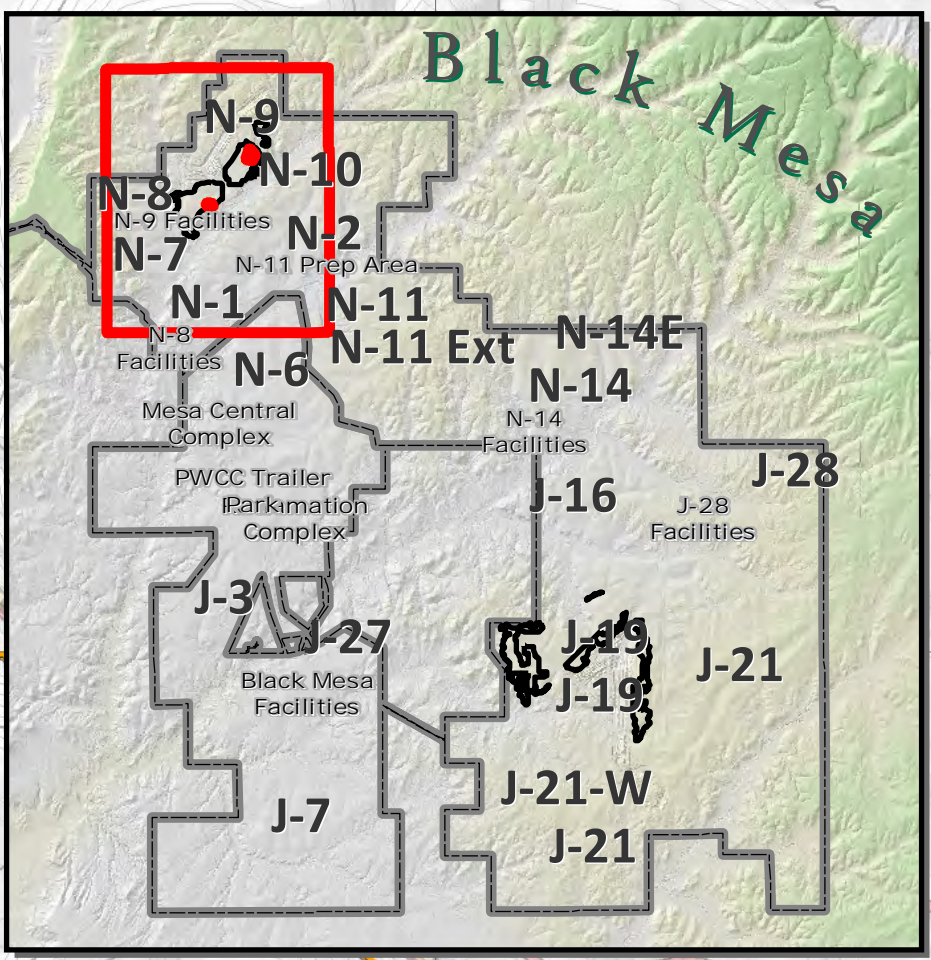
Produced by
Gary Altsisi
Professional
Engineer

September 22, 2020
Revision
1 inch = 500 feet
10 foot contour interval
Index contours at 50 feet



N-9 Phase I Bond
Release Area
411 ac Disturbance

N-9
Facilities



Spoil Sample Depth ● 1 ● 2 ● 3 ● 4 N-9: 155 points J-19: 114 points J-19W: 82 points	Phase I Bond Release Boundary Disturbance First Year Graded: 1999 Last Year Graded: 2018 Rocked Downstream N-9: 0.9 acres J-19: 0.8 acres J-19W: 1.0 acres Cultural Planting N-9: 19.4 acres J-19: < 0.1 acres J-19W: 15.0 acres	Ranch Road Non-PWCC 2-Lane Unpaved Road Non-PWCC Single Track Road Cattle Guard Gate Fence Ancillary Mine Road Primary Mine Road Lease Line Mine Ramp Secondary Mine Road	Existing Pond Major Drainages Permit Line 1F/01 Mine Permit Black Mesa Mine Kayenta Mine Partition Line Lease Line Structure Outlines
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Peabody

Kayenta Complex
PO Box 650
Kayenta, Arizona USA 86033

**N-9
Phase I Bond Release
Map 2.2.2
Spoil Sample Data**

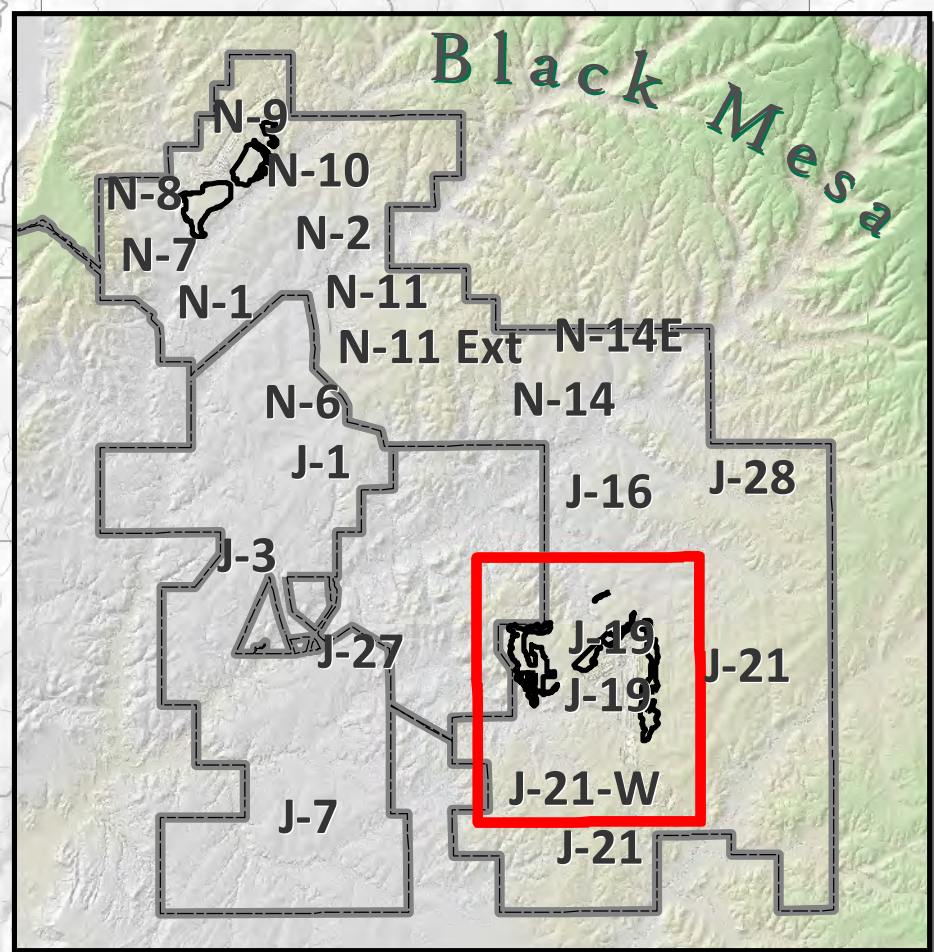
Produced by
Gary Altsisi
Professional
Engineer













September 22, 2020
Revision
1 inch = 500 feet
10 foot contour interval
Index contours at 50 feet

	% Slope	J-19		J-19 West	
		Acres	% of Total	Acres	% of Total
	0 - 9	130.9	49.1	96.5	38.4
	9 - 13	45.1	16.9	40.0	15.9
	13 - 18	45.7	17.1	51.9	20.6
	18 - 25	37.5	14.1	43.7	17.4
	25 - 33	6.6	2.5	14.2	5.6
	33 +	0.8	0.3	4.9	1.9
Total		266.6		251.1	

J-19W Phase I
Bond Release Area
251 ac Disturbance

J-19 Phase
I Bond Release Area
267 ac Disturbance



 Phase I Bond Release Boundary Disturbance	 Non-PWCC 2-Lane Unpaved	 Existing Pond
 Non-PWCC Single Track	 Cattle Guard	 Major Drainages
 Fence	 Ancillary Mine Road	 Permit Line 1F/01
 Primary Mine Road	 Mine Ramp	 Black Mesa Mine
Secondary Mine Road	Structure Outlines	Kayenta Mine
		Partition Line
		Lease Line
		Structure Outlines

Peabody

Kayenta Complex
PO Box 650
Kayenta, Arizona USA 86033

J-19 and J-19 West
Phase I Bond Release

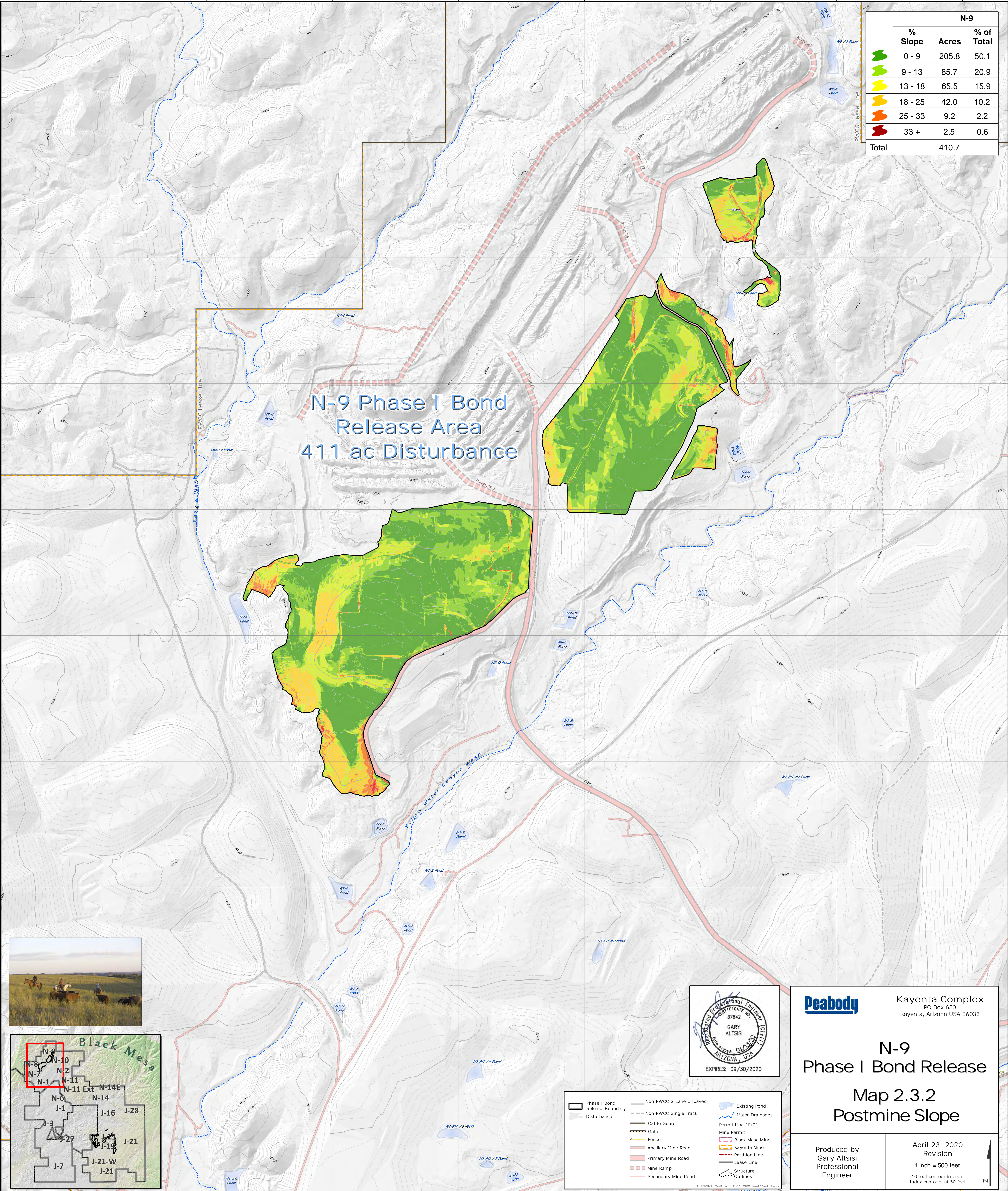
Map 2.3.1
Postmine Slope

Produced by
Gary Altsisi
Professional
Engineer

April 23, 2020
Revision

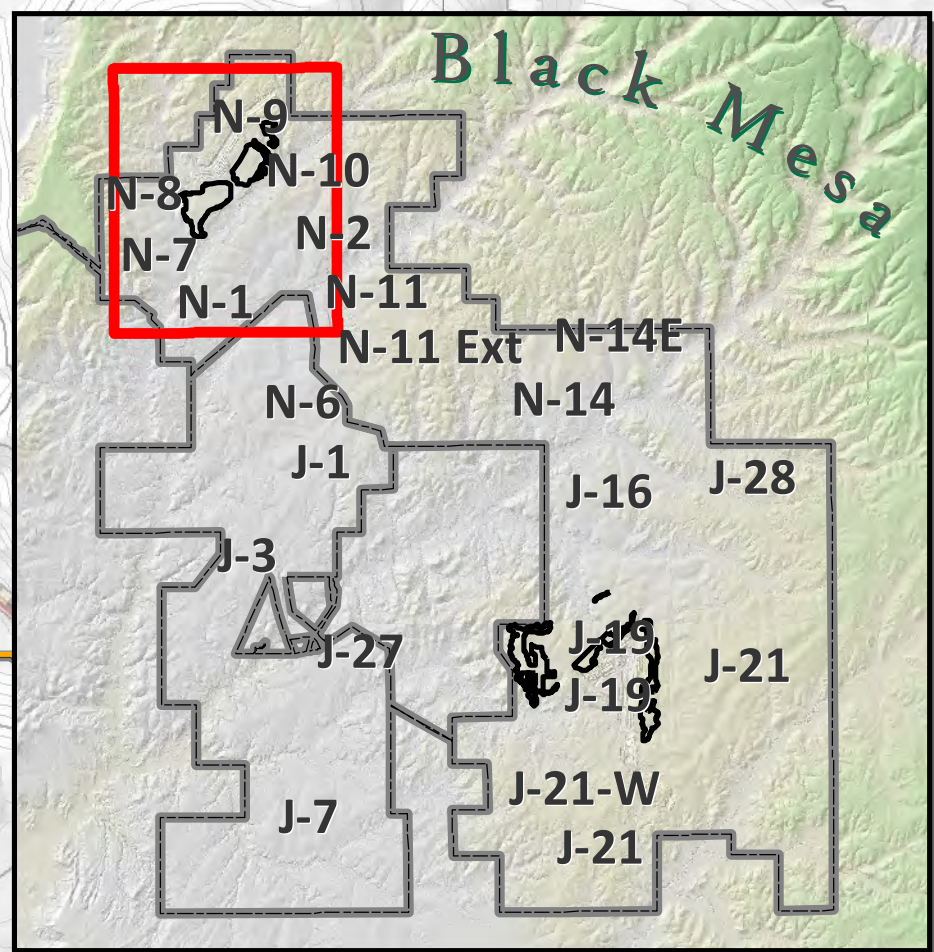
1 inch = 500 feet
10 foot contour interval
Index contours at 50 feet





N-9			
	% Slope	Acres	% of Total
	0 - 9	205.8	50.1
	9 - 13	85.7	20.9
	13 - 18	65.5	15.9
	18 - 25	42.0	10.2
	25 - 33	9.2	2.2
	33 +	2.5	0.6
Total		410.7	

N-9 Phase I Bond
Release Area
411 ac Disturbance









Peabody Kayenta Complex
PO Box 650
Kayenta, Arizona USA 86033

N-9
Phase I Bond Release
Map 2.3.2
Postmine Slope

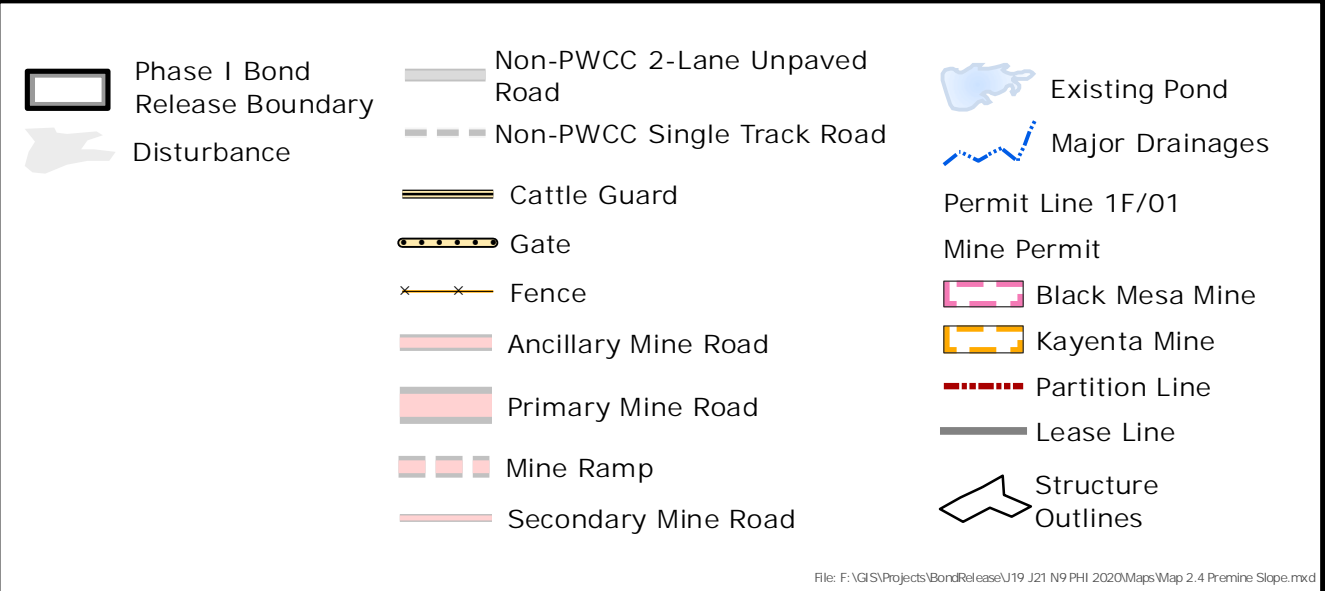
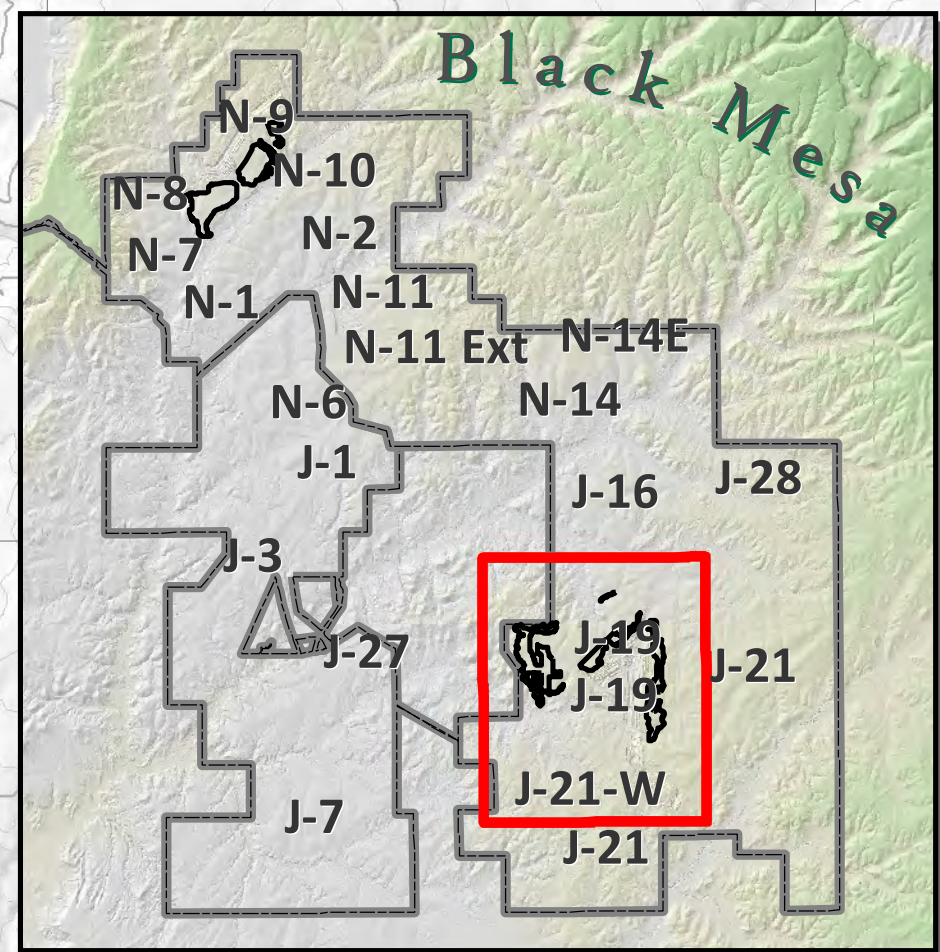
Produced by
Gary Altsisi
Professional
Engineer


April 23, 2020
Revision
1 inch = 500 feet
10 foot contour interval
Index contours at 50 feet

	% Slope	J-19		J-19 West	
		Acres	% of Total	Acres	% of Total
	0 - 9	185.0	69.4	51.2	20.4
	9 - 13	46.0	17.2	42.1	16.8
	13 - 18	20.2	7.6	58.6	23.3
	18 - 25	8.3	3.1	59.9	23.9
	25 - 33	3.3	1.2	28.2	11.2
	33 +	3.8	1.4	11.2	4.5
Total		266.6		251.1	

J-19W Phase I
Bond Release Area
251 ac Disturbance

J-19 Phase
I Bond Release Area
267 ac Disturbance





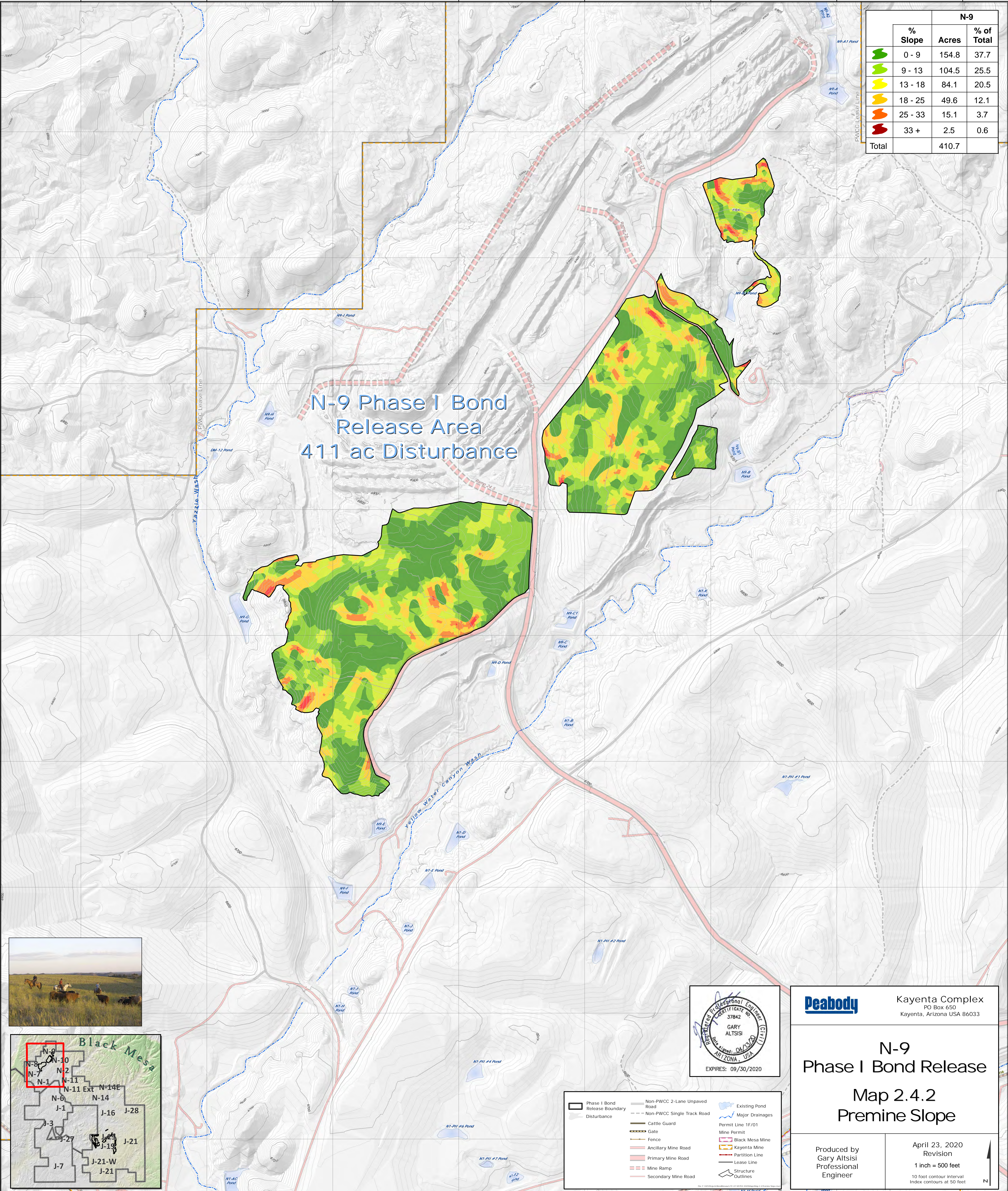
Kayenta Complex
PO Box 650
Kayenta, Arizona USA 86033

J-19 and J-19 West Phase I Bond Release

Map 2.4.1 Premine Slope

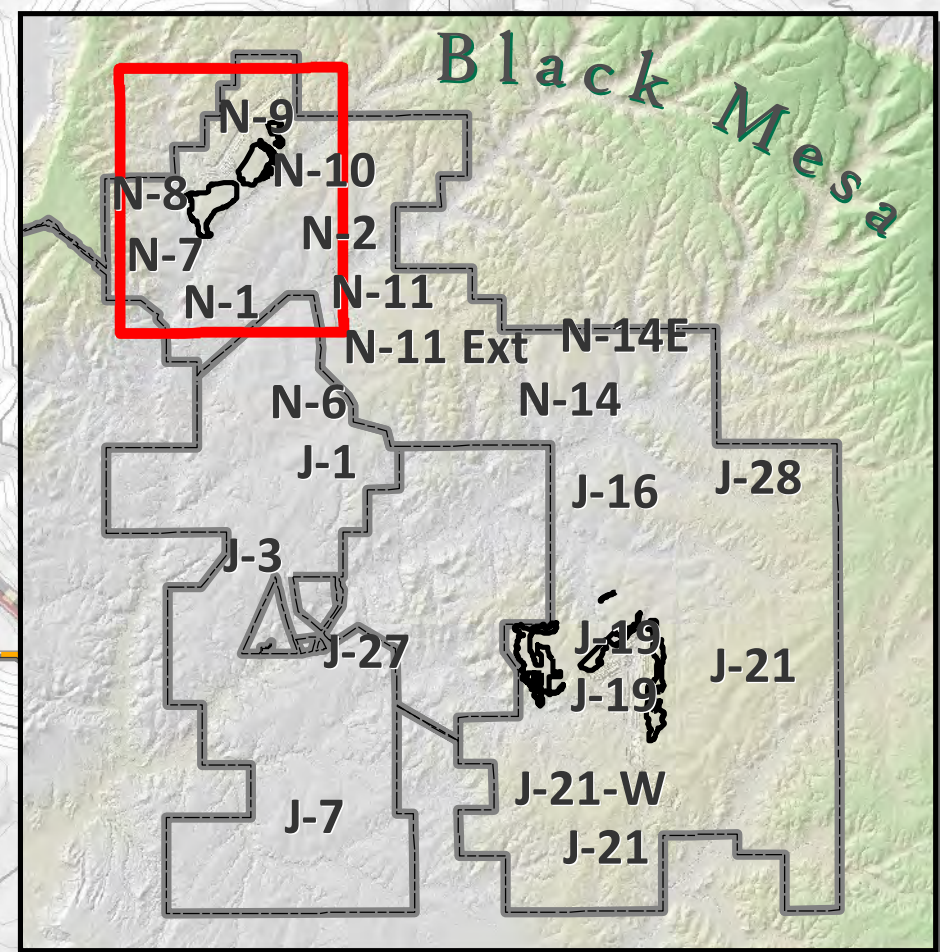
Produced by
Gary Altsisi
Professional
Engineer

April 23, 2020
Revision
1 inch = 500 feet
10 foot contour interval
Index contours at 50 feet



N-9			
	% Slope	Acres	% of Total
	0 - 9	154.8	37.7
	9 - 13	104.5	25.5
	13 - 18	84.1	20.5
	18 - 25	49.6	12.1
	25 - 33	15.1	3.7
	33 +	2.5	0.6
Total		410.7	

N-9 Phase I Bond
Release Area
411 ac Disturbance



Kayenta Complex
PO Box 650
Kayenta, Arizona USA 86033

N-9 Phase I Bond Release Map 2.4.2 Premine Slope

Produced by
Gary Altsisi
Professional
Engineer

April 23, 2020
Revision
1 inch = 500 feet
10 foot contour interval
Index contours at 50 feet

KAYENTA MINE
PHASE I BOND RELEASE
WATERSHED & CHANNEL DESIGNS
N9

TABLE N9-2020
Channel Design Summary

Channel N9-1W.1C.1D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
N9-1W.1C.1D	14.27	5.30	25	3	0.2	3.39	1	1.2	N/A	-	42.2	0.227	81	A

Design Flow: 10-year, 6-hour Storm

N9-1W.1C.1D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	N9-1W.1C.1D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	42.200	42.200	14.27	1.04

Structure Detail:

Structure #1 (Null)

N9-1W.1C.1D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	42.200	0.227	0.000	0.000	81.000	M	14.27	1.040
	Σ	42.200						14.27	1.040

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	3.24	22.00	678.00	1.440	0.130
		6. Grassed waterway	6.78	50.00	737.00	3.900	0.052
		8. Large gullies, diversions, and low flowing streams	5.30	60.00	1,133.00	6.900	0.045
#1	1	Time of Concentration:					0.227

N9-1W.1C.1D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
25.00	3.0:1	3.0:1	5.3	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	14.27 cfs	
Depth:	0.17 ft	1.17 ft
Top Width:	25.99 ft	31.99 ft
Velocity:	3.39 fps	
X-Section Area:	4.21 sq ft	
Hydraulic Radius:	0.162 ft	
Froude Number:	1.49	

TABLE N9-2020
Channel Design Summary

Channel N9-1W.2C

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
N9-1W.2C	18.14	3.40	30	3	0.2	3.04	1	1.2	N/A	-	59.7	0.365	82	A

Design Flow: 10-year, 6-hour Storm

N9-1W.2C WATERSHED DESIGN (10YR- 6HR)

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	N9-1W.2C WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	59.700	59.700	18.14	1.60

Structure Detail:

Structure #1 (Null)

N9-1W.2C WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	59.700	0.365	0.000	0.000	82.000	M	18.14	1.595
	Σ	59.700						18.14	1.595

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	2.10	20.00	951.00	1.160	0.227
		6. Grassed waterway	6.52	80.00	1,227.00	3.830	0.088
		8. Large gullies, diversions, and low flowing streams	3.79	40.00	1,056.00	5.830	0.050
#1	1	Time of Concentration:					0.365

N9-1W.2C CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
30.00	3.0:1	3.0:1	3.4	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	18.14 cfs	
Depth:	0.20 ft	1.20 ft
Top Width:	31.17 ft	37.17 ft
Velocity:	3.04 fps	
X-Section Area:	5.97 sq ft	
Hydraulic Radius:	0.191 ft	
Froude Number:	1.22	

TABLE N9-2020
Channel Design Summary

Channel N9-2W.1C.1D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
N9-2W.1C.1D	12.41	11.80	15	3	0.2	4.95	1	1.2	N/A	-	18.4	0.084	81	A

Design Flow: 10-year, 6-hour Storm

N9-2W.1C.1D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	N9-2W.1C.1D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	18.400	18.400	12.41	0.56

Structure Detail:

Structure #1 (Null)

N9-2W.1C.1D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	18.400	0.084	0.000	0.000	81.000	M	12.41	0.561
	Σ	18.400						12.41	0.561

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	7.03	18.00	256.00	2.120	0.033
		6. Grassed waterway	8.28	40.00	483.00	4.310	0.031
		8. Large gullies, diversions, and low flowing streams	11.83	90.00	761.00	10.310	0.020
#1	1	Time of Concentration:					0.084

N9-2W.1C.1D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
15.00	3.0:1	3.0:1	11.8	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	12.41 cfs	
Depth:	0.16 ft	1.16 ft
Top Width:	15.97 ft	21.97 ft
Velocity:	4.95 fps	
X-Section Area:	2.51 sq ft	
Hydraulic Radius:	0.156 ft	
Froude Number:	2.20	

TABLE N9-2020
Channel Design Summary

Channel N9-2W.1C.3D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
N9-2W.1C.3D	12.94	4.30	20	3	0.2	3.33	1	1.2	N/A	-	17.8	0.094	82	A

Design Flow: 10-year, 6-hour Storm

N9-2W.1C.3D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	N9-2W.1C.3D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	17.800	17.800	12.94	0.59

Structure Detail:

Structure #1 (Null)

N9-2W.1C.3D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	17.800	0.094	0.000	0.000	82.000	M	12.94	0.593
	Σ	17.800						12.94	0.593

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	6. Grassed waterway	7.46	59.00	791.00	4.090	0.053
		8. Large gullies, diversions, and low flowing streams	4.29	40.00	932.00	6.210	0.041
#1	1	Time of Concentration:					0.094

N9-2W.1C.3D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
20.00	3.0:1	3.0:1	4.3	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	12.94 cfs	
Depth:	0.19 ft	1.19 ft
Top Width:	21.13 ft	27.13 ft
Velocity:	3.33 fps	
X-Section Area:	3.89 sq ft	
Hydraulic Radius:	0.184 ft	
Froude Number:	1.37	

TABLE N9-2020
Channel Design Summary

Channel N9-6W.1C

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
N9-6W.1C	20.12	6.00	26	3	0.2	3.97	1	1.2	N/A	9	81.7	0.537	82	A

Design Flow: 10-year, 6-hour Storm

N9-6W.1C WATERSHED DESIGN (10YR- 6HR)

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	N9-6W.1C WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	81.700	81.700	20.12	2.18

Structure Detail:

Structure #1 (Null)

N9-6W.1C WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	81.700	0.537	0.000	0.000	82.000	M	20.12	2.179
	Σ	81.700						20.12	2.179

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	3.32	55.00	1,659.00	1.450	0.317
		6. Grassed waterway	2.34	10.00	427.00	2.290	0.051
		8. Large gullies, diversions, and low flowing streams	4.12	40.00	971.00	6.080	0.044
		8. Large gullies, diversions, and low flowing streams	0.65	5.00	771.00	2.410	0.088
		8. Large gullies, diversions, and low flowing streams	6.02	60.00	996.00	7.360	0.037
#1	1	Time of Concentration:					0.537

N9-6W.1C CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
26.00	3.0:1	3.0:1	6.0	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	20.12 cfs	
Depth:	0.19 ft	1.19 ft
Top Width:	27.14 ft	33.14 ft
Velocity:	3.97 fps	
X-Section Area:	5.07 sq ft	
Hydraulic Radius:	0.186 ft	
Froude Number:	1.62	

TABLE N9-2020
Channel Design Summary

Channel N9-6W.1C.1D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
N9-6W.1C.1D	8.64	4.12	30	3	0.1	2.41	1	1.1	N/A	-	30.2	0.412	82	A

Design Flow: 10-year, 6-hour Storm

N9-6W.1C.1D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	N9-6W.1C.1D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	30.200	30.200	8.64	0.81

Structure Detail:

Structure #1 (Null)

N9-6W.1C.1D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	30.200	0.412	0.000	0.000	82.000	M	8.64	0.808
	Σ	30.200						8.64	0.808

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	3.32	55.00	1,659.00	1.450	0.317
		6. Grassed waterway	2.34	10.00	427.00	2.290	0.051
		8. Large gullies, diversions, and low flowing streams	4.12	40.00	971.00	6.080	0.044
#1	1	Time of Concentration:					0.412

N9-6W.1C.1D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
30.00	3.0:1	3.0:1	4.1	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	8.64 cfs	
Depth:	0.12 ft	1.12 ft
Top Width:	30.71 ft	36.71 ft
Velocity:	2.41 fps	
X-Section Area:	3.59 sq ft	
Hydraulic Radius:	0.117 ft	
Froude Number:	1.24	

TABLE N9-2020
Channel Design Summary

Channel N9-6W.1C.2D

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
N9-6W.1C.2D	12.50	2.60	35	3	0.2	2.28	1	1.2	N/A	-	21.4	0.126	86	A

Design Flow: 10-year, 6-hour Storm

N9-6W.1C.2D WATERSHED DESIGN **(10YR-6HR)**

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	N9-6W.1C.2D WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	21.400	21.400	12.50	0.81

Structure Detail:

Structure #1 (Null)

N9-6W.1C.2D WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	21.400	0.126	0.000	0.000	86.000	M	12.50	0.811
	Σ	21.400						12.50	0.811

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	4.08	12.00	294.00	1.610	0.050
		6. Grassed waterway	15.66	70.00	447.00	5.930	0.020
		8. Large gullies, diversions, and low flowing streams	2.56	25.00	976.00	4.800	0.056
#1	1	Time of Concentration:					0.126

N9-6W.1C.2D CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
35.00	3.0:1	3.0:1	2.6	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	12.50 cfs	
Depth:	0.15 ft	1.15 ft
Top Width:	35.93 ft	41.93 ft
Velocity:	2.28 fps	
X-Section Area:	5.48 sq ft	
Hydraulic Radius:	0.152 ft	
Froude Number:	1.03	

TABLE N9-2020
Channel Design Summary

Channel N9-8W.1C

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
N9-8W.1C	7.70	11.50	25	3	0.1	3.37	1	1.1	N/A	9	9.2	0.097	84	A

Design Flow: 10-year, 6-hour Storm

N9-8W.1C WATERSHED DESIGN (10YR- 6HR)

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	N9-8W.1C WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	9.200	9.200	7.70	0.36

Structure Detail:

Structure #1 (Null)

N9-8W.1C WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	9.200	0.097	0.000	0.000	84.000	M	7.70	0.363
	Σ	9.200						7.70	0.363

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	1.93	5.00	259.00	1.110	0.064
		6. Grassed waterway	9.36	25.00	267.00	4.580	0.016
		8. Large gullies, diversions, and low flowing streams	11.47	75.00	654.00	10.150	0.017
#1	1	Time of Concentration:					0.097

N9-8W.1C CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
25.00	3.0:1	3.0:1	11.5	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	7.70 cfs	
Depth:	0.09 ft	1.09 ft
Top Width:	25.54 ft	31.54 ft
Velocity:	3.37 fps	
X-Section Area:	2.29 sq ft	
Hydraulic Radius:	0.089 ft	
Froude Number:	1.98	

TABLE N9-2020
Channel Design Summary

Channel N9-9W.1C

Typical Rip Rap Lined Channel

Channel	Flow (Q) (cfs)	Slope (%)	Bottom Width (ft)	Side Slope H:1 (ft)	Designed					As-Built	Watershed (acres)	Time of Concentration (hr)	Curve Number	Design
					Depth Flow (ft)	Velocity (fps)	Free Board (ft)	Total Depth (ft)	Rip Rap (in)	Rip Rap (in)				
N9-9W.1C	13.06	12.00	23	3	0.1	4.34	1	1.1	N/A	9	33.1	0.248	83	C

Design Flow: 10-year, 6-hour Storm

N9-9W.1C WATERSHED DESIGN (10YR- 6HR)

Kurtis Silversmith

Peabody Western Coal Co.
P.O. Box 650
Kayenta, AZ 86033

General Information

Storm Information:

Storm Type:	NRCS Type II
Design Storm:	10 yr - 6 hr
Rainfall Depth:	1.600 inches

Structure Networking:

Type	Stru #	(flows into)	Stru #	Musk. K (hrs)	Musk. X	Description
Null	#1	= =>	End	0.000	0.000	N9-9W.1C WATERSHED

#1
Null

Structure Summary:

	Immediate Contributing Area (ac)	Total Contributing Area (ac)	Peak Discharge (cfs)	Total Runoff Volume (ac-ft)
#1	33.100	33.100	13.06	0.97

Structure Detail:

Structure #1 (Null)

N9-9W.1C WATERSHED

Subwatershed Hydrology Detail:

Stru #	SWS #	SWS Area (ac)	Time of Conc (hrs)	Musk K (hrs)	Musk X	Curve Number	UHS	Peak Discharge (cfs)	Runoff Volume (ac-ft)
#1	1	33.100	0.248	0.000	0.000	83.000	M	13.06	0.970
	Σ	33.100						13.06	0.970

Subwatershed Time of Concentration Details:

Stru #	SWS #	Land Flow Condition	Slope (%)	Vert. Dist. (ft)	Horiz. Dist. (ft)	Velocity (fps)	Time (hrs)
#1	1	3. Short grass pasture	4.72	35.00	741.00	1.730	0.118
		6. Grassed waterway	4.42	50.00	1,132.00	3.150	0.099
		8. Large gullies, diversions, and low flowing streams	11.99	142.00	1,184.00	10.380	0.031
#1	1	Time of Concentration:					0.248

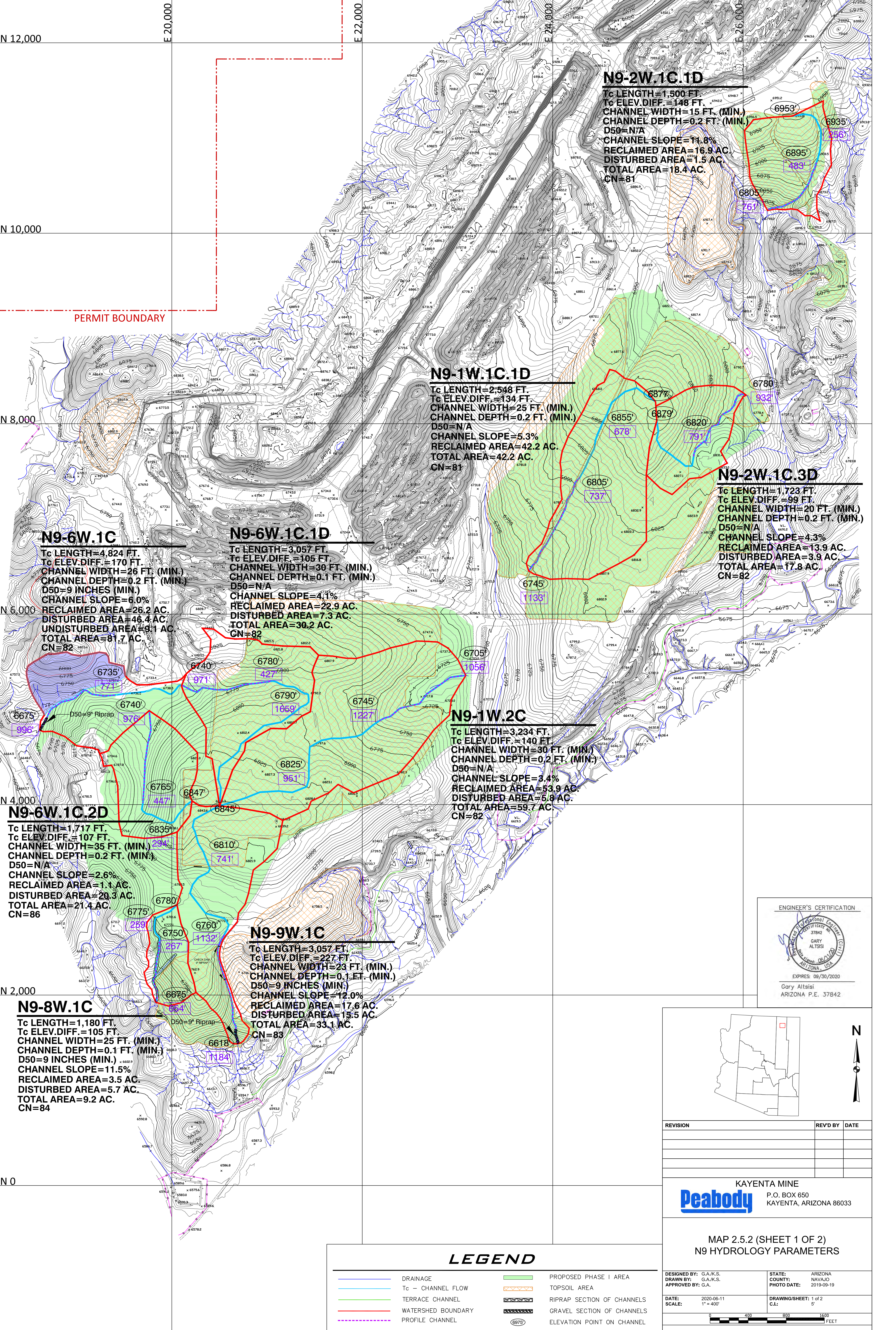
N9-9W.1C CHANNEL DESIGN

Material: Graded Spoil

Trapezoidal Channel

Bottom Width (ft)	Left Sideslope Ratio	Right Sideslope Ratio	Slope (%)	Manning's n	Freeboard Depth (ft)	Freeboard % of Depth	Freeboard Mult. x (VxD)	Limiting Velocity (fps)
23.00	3.0:1	3.0:1	12.0	0.0300	1.00			5.0

	w/o Freeboard	w/ Freeboard
Design Discharge:	13.06 cfs	
Depth:	0.13 ft	1.13 ft
Top Width:	23.77 ft	29.77 ft
Velocity:	4.34 fps	
X-Section Area:	3.01 sq ft	
Hydraulic Radius:	0.126 ft	
Froude Number:	2.15	



N9-2W.1C.1D

Tc LENGTH=1,500 FT.
Tc ELEV.DIFF.=148 FT.
CHANNEL WIDTH=15 FT. (MIN.)
CHANNEL DEPTH=0.2 FT. (MIN.)
D50=N/A
CHANNEL SLOPE=11.8%
RECLAIMED AREA=16.9 AC.
DISTURBED AREA=1.5 AC.
TOTAL AREA=18.4 AC.
CN=81

N9-1W.1C.1D

Tc LENGTH=2,548 FT.
Tc ELEV.DIFF.=134 FT.
CHANNEL WIDTH=25 FT. (MIN.)
CHANNEL DEPTH=0.2 FT. (MIN.)
D50=N/A
CHANNEL SLOPE=5.3%
RECLAIMED AREA=42.2 AC.
TOTAL AREA=42.2 AC.
CN=81

N9-2W.1C.3D

Tc LENGTH=1,723 FT.
Tc ELEV.DIFF.=99 FT.
CHANNEL WIDTH=20 FT. (MIN.)
CHANNEL DEPTH=0.2 FT. (MIN.)
D50=N/A
CHANNEL SLOPE=4.3%
RECLAIMED AREA=13.9 AC.
DISTURBED AREA=3.9 AC.
TOTAL AREA=17.8 AC.
CN=82

N9-6W.1C

Tc LENGTH=4,824 FT.
Tc ELEV.DIFF.=170 FT.
CHANNEL WIDTH=26 FT. (MIN.)
CHANNEL DEPTH=0.2 FT. (MIN.)
D50=9 INCHES (MIN.)
CHANNEL SLOPE=6.0%
RECLAIMED AREA=26.2 AC.
DISTURBED AREA=46.4 AC.
UNDISTURBED AREA=9.1 AC.
TOTAL AREA=81.7 AC.
CN=82

N9-6W.1C.1D

Tc LENGTH=3,057 FT.
Tc ELEV.DIFF.=105 FT.
CHANNEL WIDTH=30 FT. (MIN.)
CHANNEL DEPTH=0.1 FT. (MIN.)
D50=N/A
CHANNEL SLOPE=4.1%
RECLAIMED AREA=22.9 AC.
DISTURBED AREA=7.3 AC.
TOTAL AREA=30.2 AC.
CN=82

N9-1W.2C

Tc LENGTH=3,234 FT.
Tc ELEV.DIFF.=140 FT.
CHANNEL WIDTH=30 FT. (MIN.)
CHANNEL DEPTH=0.2 FT. (MIN.)
D50=N/A
CHANNEL SLOPE=3.4%
RECLAIMED AREA=53.9 AC.
DISTURBED AREA=5.8 AC.
TOTAL AREA=59.7 AC.
CN=82

N9-6W.1C.2D

Tc LENGTH=1,717 FT.
Tc ELEV.DIFF.=107 FT.
CHANNEL WIDTH=35 FT. (MIN.)
CHANNEL DEPTH=0.2 FT. (MIN.)
D50=N/A
CHANNEL SLOPE=2.6%
RECLAIMED AREA=1.1 AC.
DISTURBED AREA=29.3 AC.
TOTAL AREA=30.4 AC.
CN=86

N9-9W.1C

Tc LENGTH=3,057 FT.
Tc ELEV.DIFF.=227 FT.
CHANNEL WIDTH=23 FT. (MIN.)
CHANNEL DEPTH=0.1 FT. (MIN.)
D50=9 INCHES (MIN.)
CHANNEL SLOPE=12.0%
RECLAIMED AREA=17.6 AC.
DISTURBED AREA=15.5 AC.
TOTAL AREA=33.1 AC.
CN=83

N9-8W.1C

Tc LENGTH=1,180 FT.
Tc ELEV.DIFF.=105 FT.
CHANNEL WIDTH=25 FT. (MIN.)
CHANNEL DEPTH=0.1 FT. (MIN.)
D50=9 INCHES (MIN.)
CHANNEL SLOPE=11.5%
RECLAIMED AREA=3.5 AC.
DISTURBED AREA=5.7 AC.
TOTAL AREA=9.2 AC.
CN=84

ENGINEER'S CERTIFICATION

EXPIRES: 09/30/2020

Gary Altisi
ARIZONA P.E. 37842

Peabody

KAYENTA MINE
P.O. BOX 650
KAYENTA, ARIZONA 86033

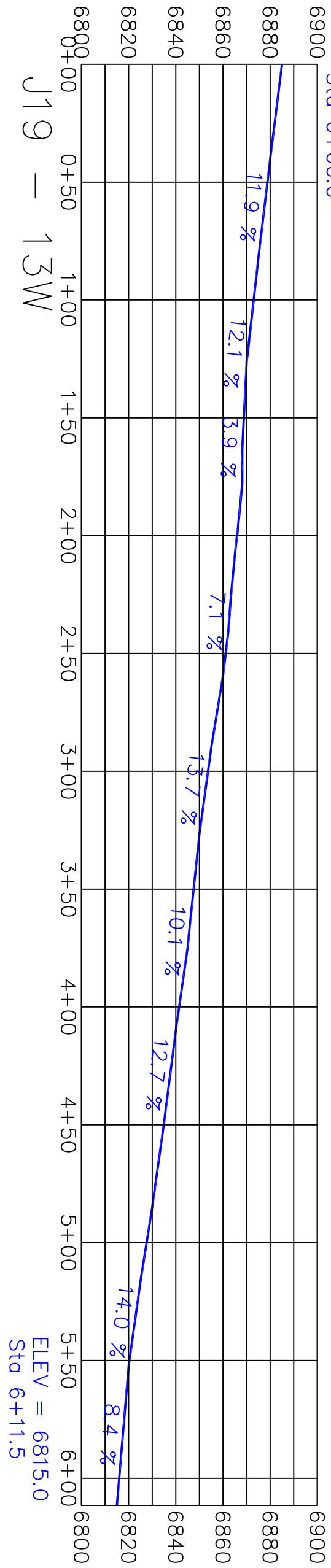
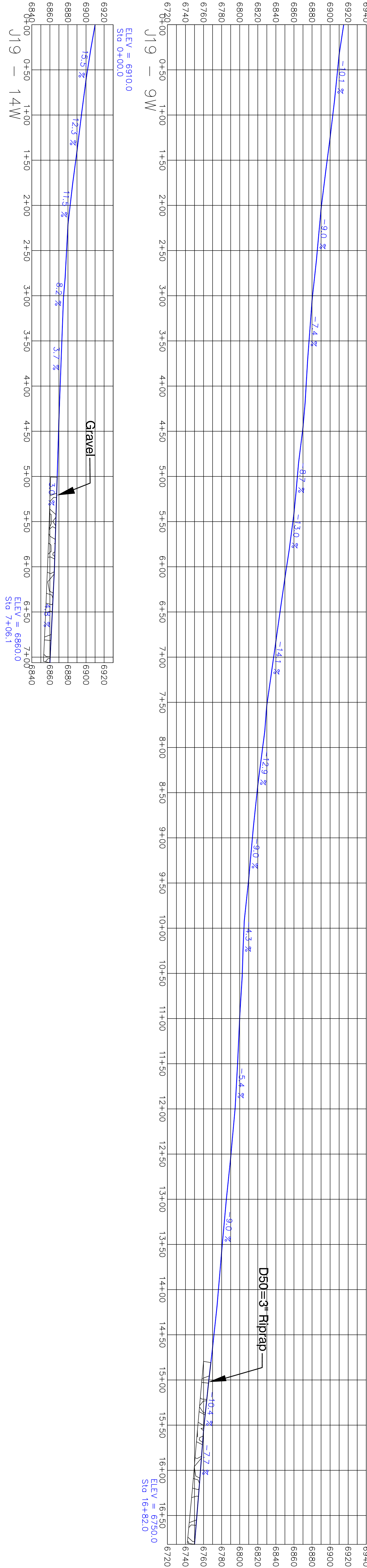
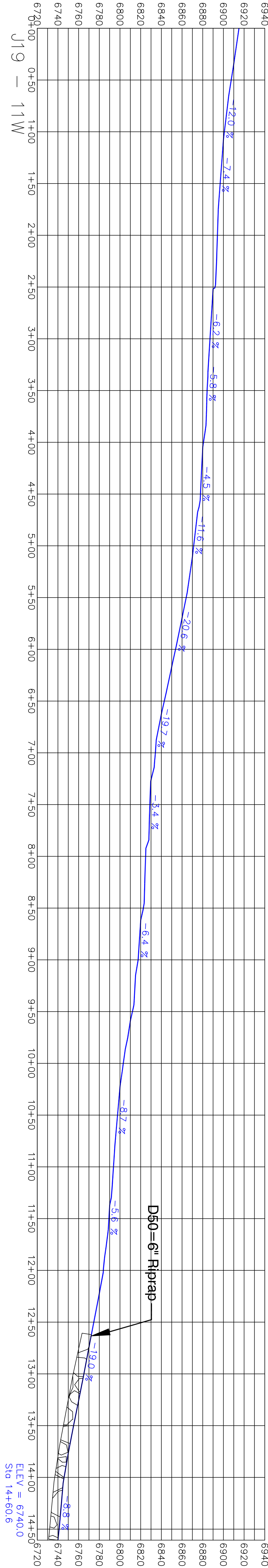
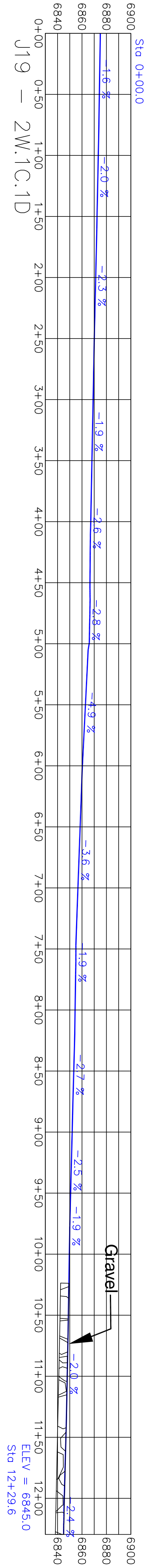
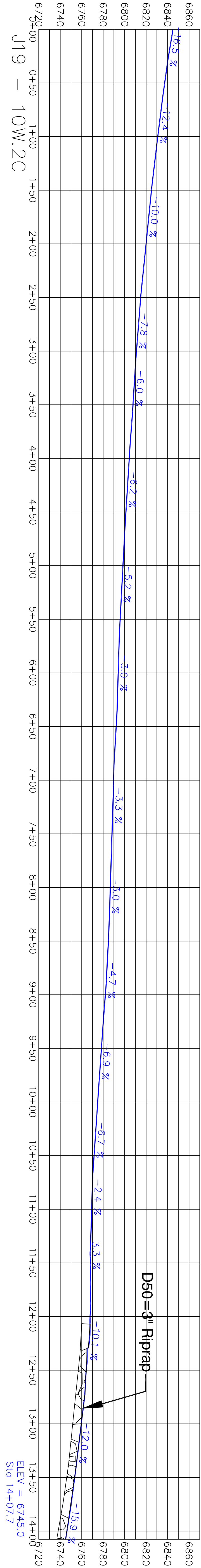
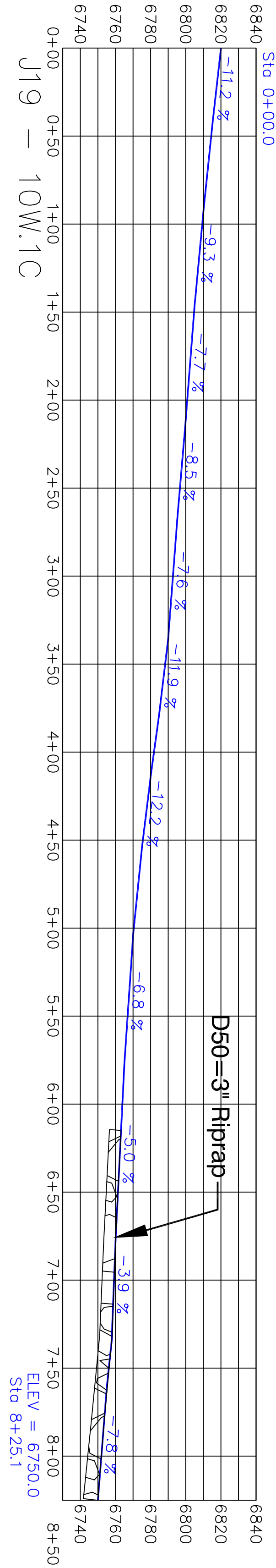
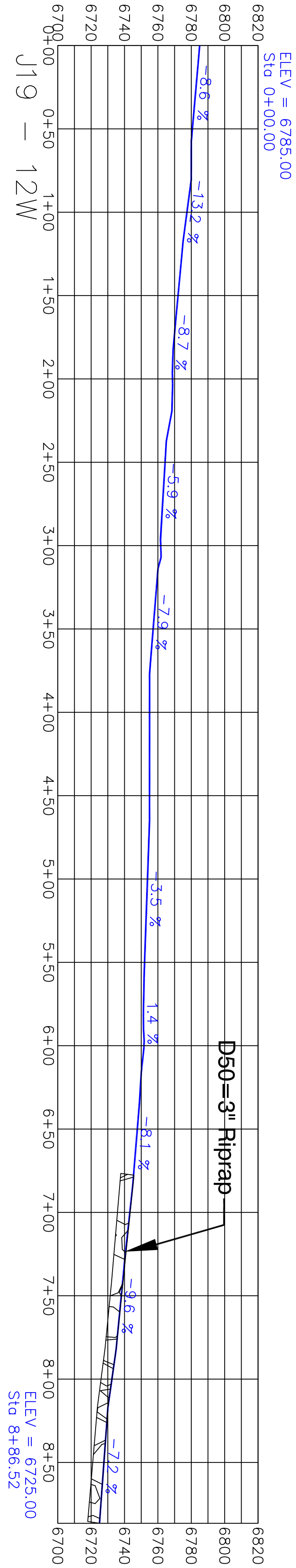
MAP 2.5.2 (SHEET 1 OF 2)
N9 HYDROLOGY PARAMETERS

DESIGNED BY:	G.A./K.S.	STATE:	ARIZONA
DRAWN BY:	G.A./K.S.	COUNTY:	NAVAJO
APPROVED BY:	G.A.	PHOTO DATE:	2019-09-19
DATE:	2020-06-11	DRAWING/SHEET:	1 of 2
SCALE:	1" = 400'	C.I.:	5'

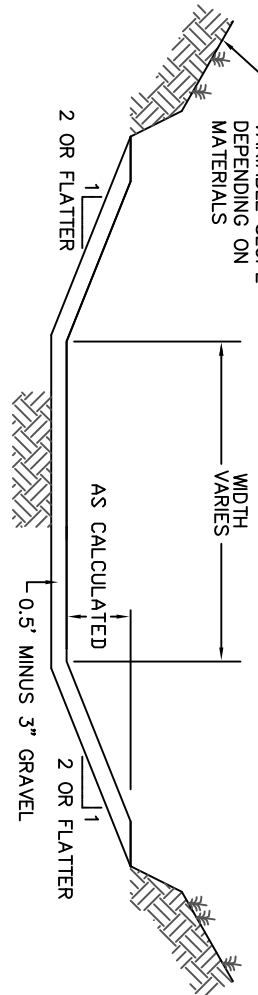
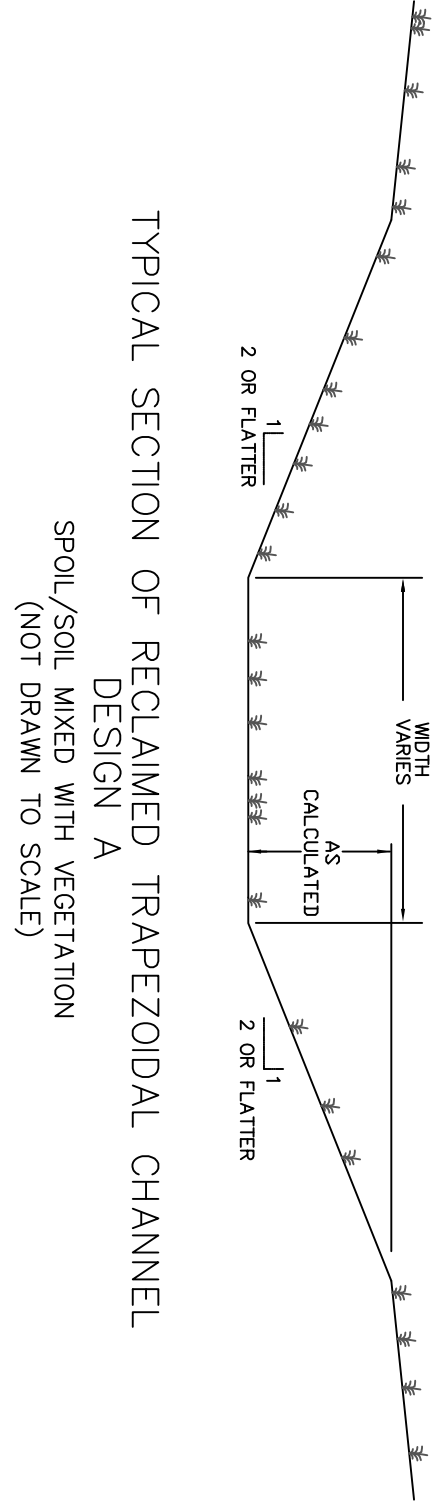
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LEGEND

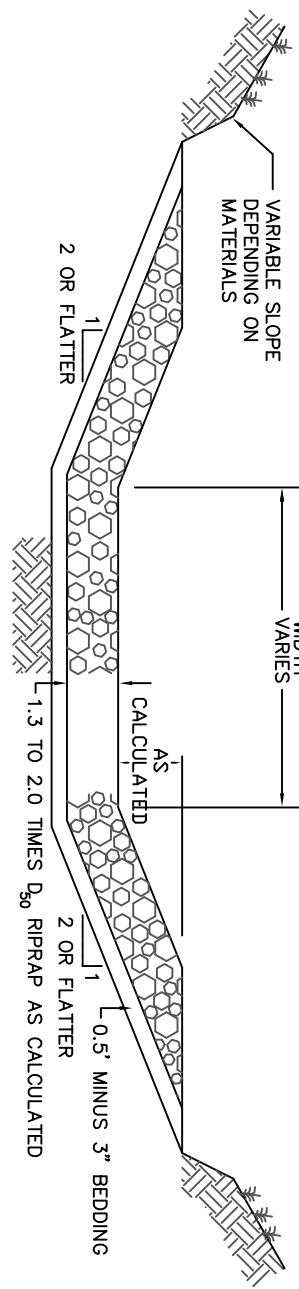
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	Tc - CHANNEL FLOW		TOPSOIL AREA
	TERRACE CHANNEL		RIPRAP SECTION OF CHANNELS
	WATERSHED BOUNDARY		GRAVEL SECTION OF CHANNELS
	PROFILE CHANNEL		ELEVATION POINT ON CHANNEL



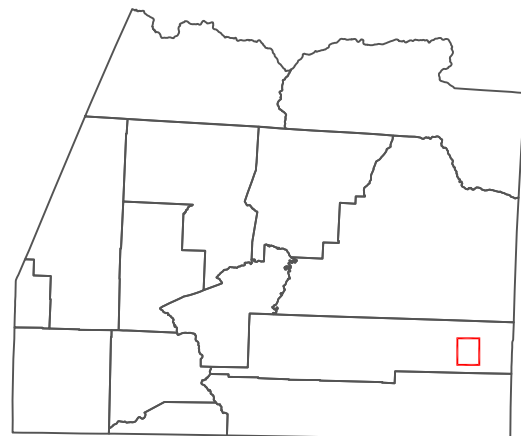
ELEV = 6850.0
Sta 6+11.5



TYPICAL SECTION OF RECLAIMED TRAPEZOIDAL CHANNEL
DESIGN B
GRAVEL MIXED WITH VEGETATION
(NOT DRAWN TO SCALE)



TYPICAL SECTION OF RECLAIMED TRAPEZOIDAL CHANNEL
DESIGN C
(NOT DRAWN TO SCALE)



REVISION	REV'D BY	DATE

KAYENTA MINE
P.O. BOX 680
KAYENTA, ARIZONA 86033

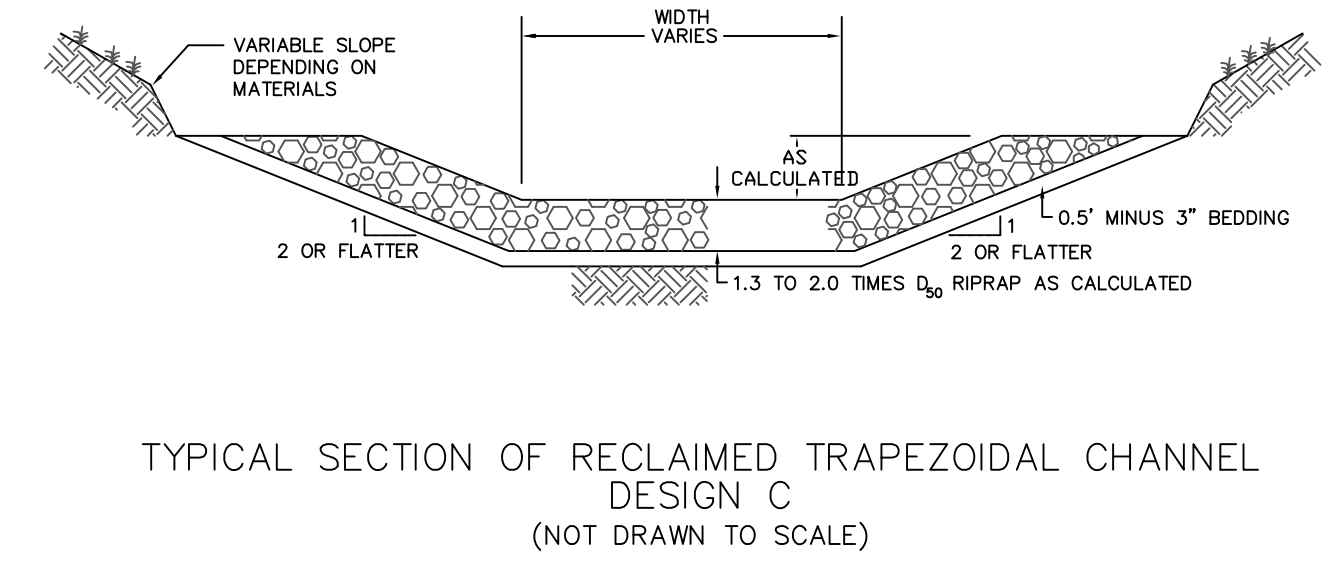
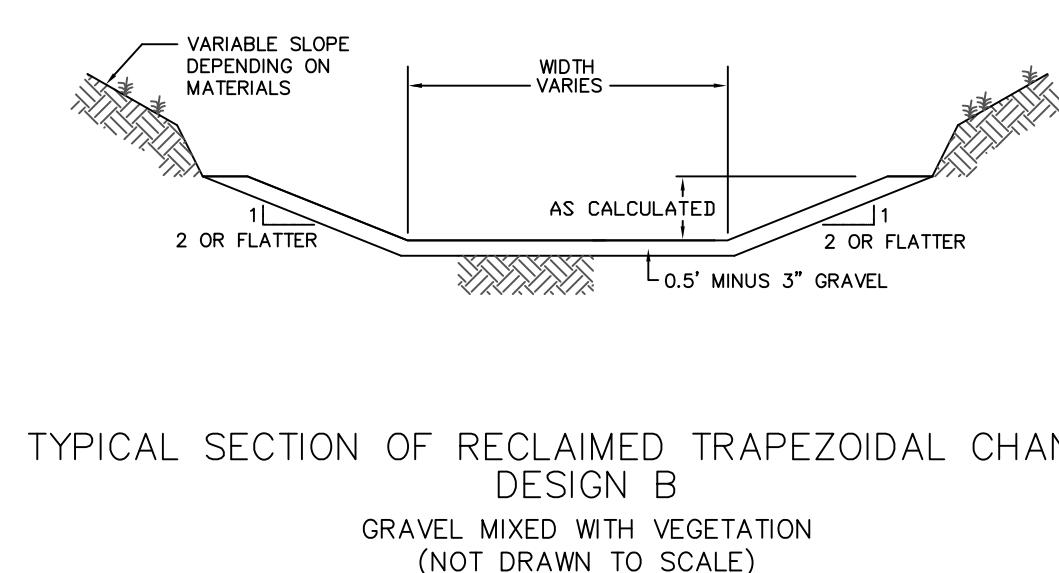
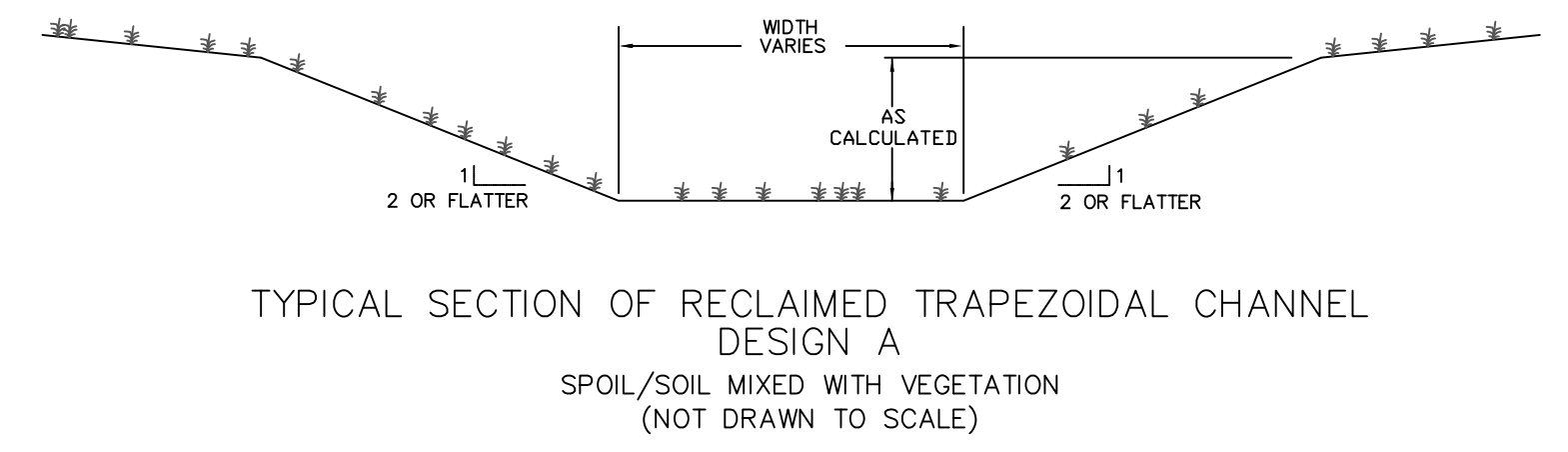
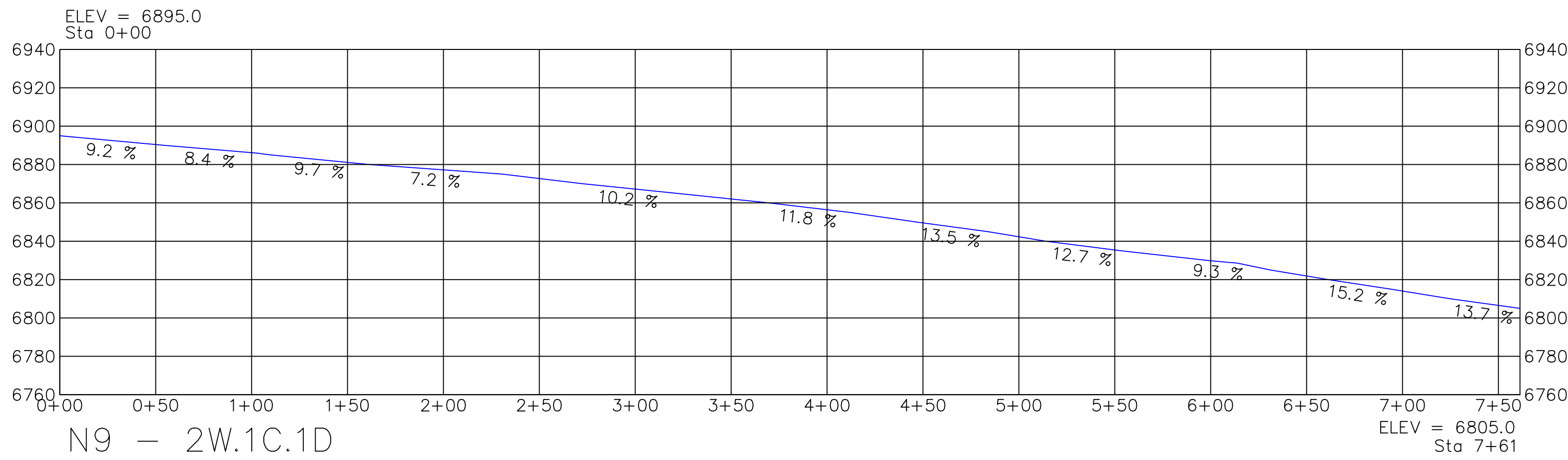
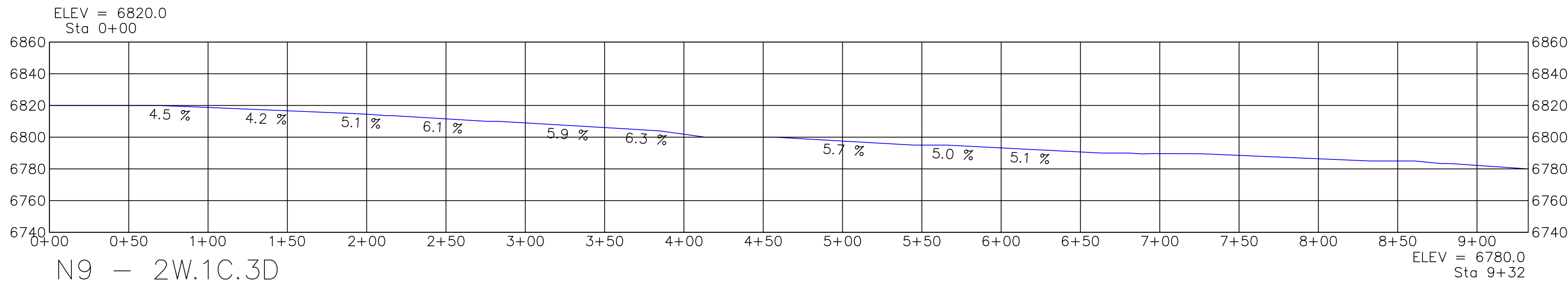
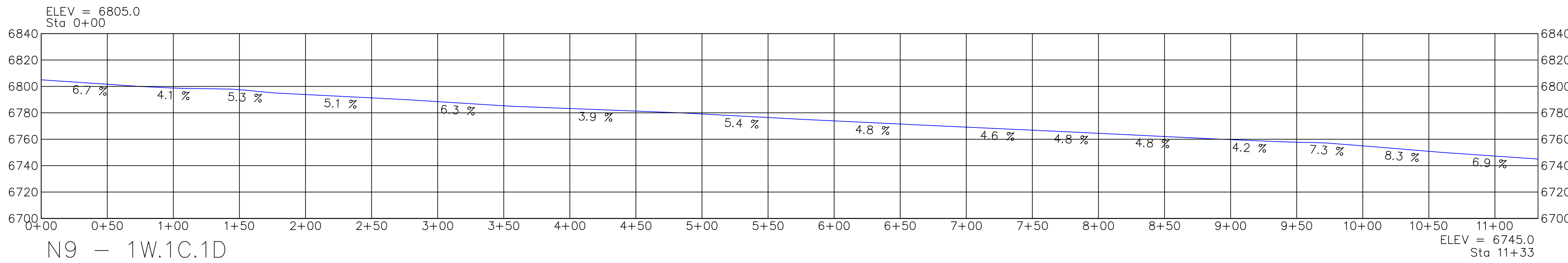
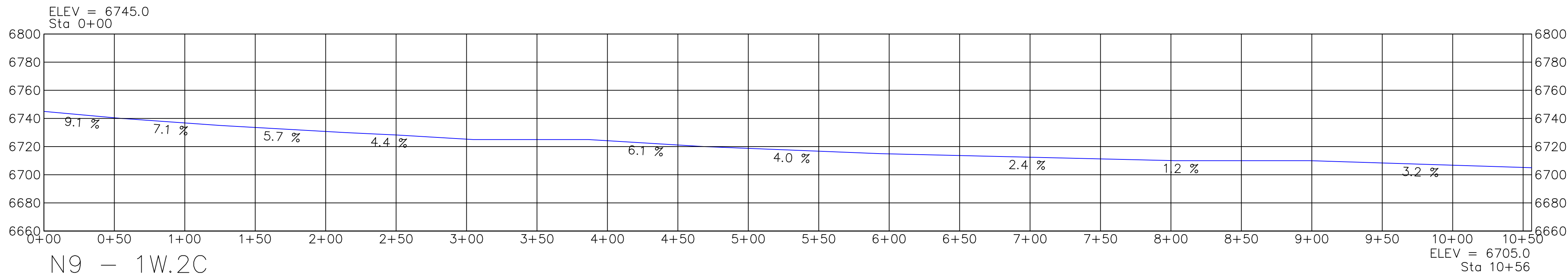
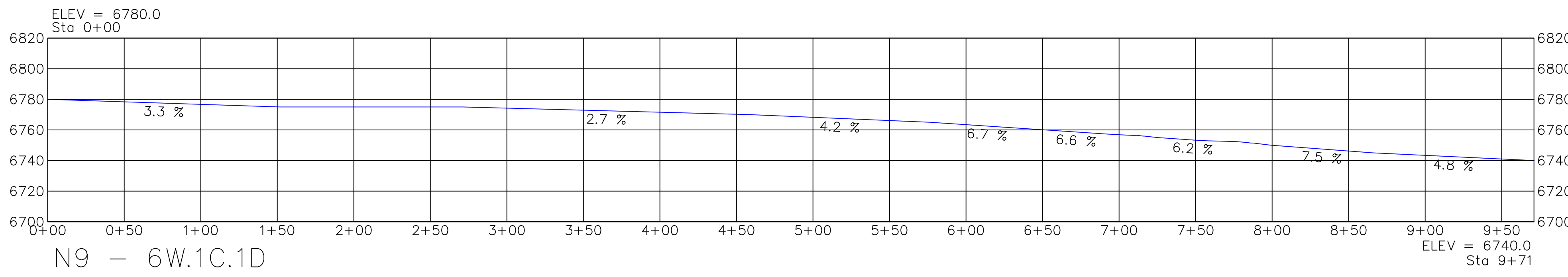
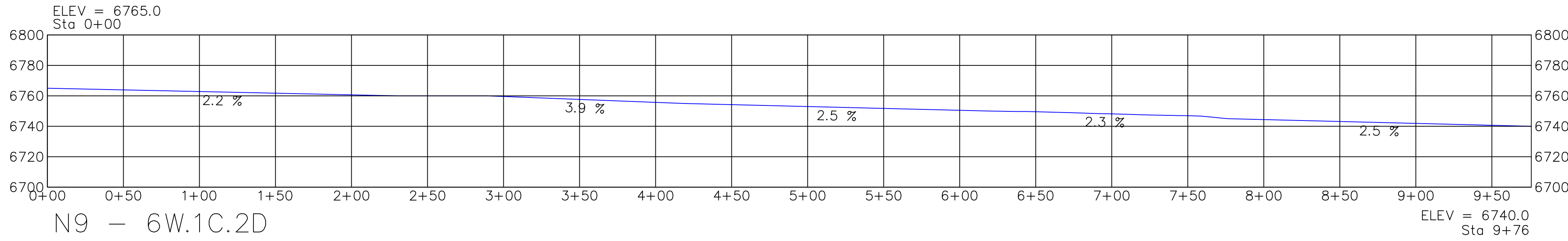
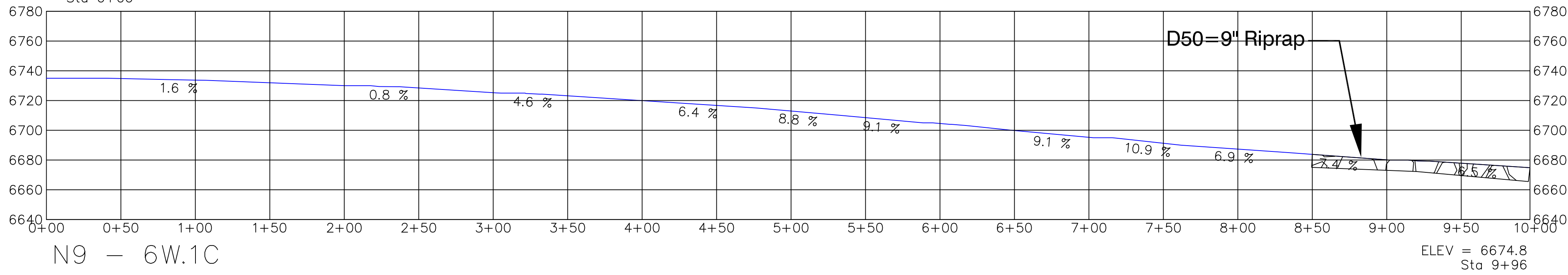
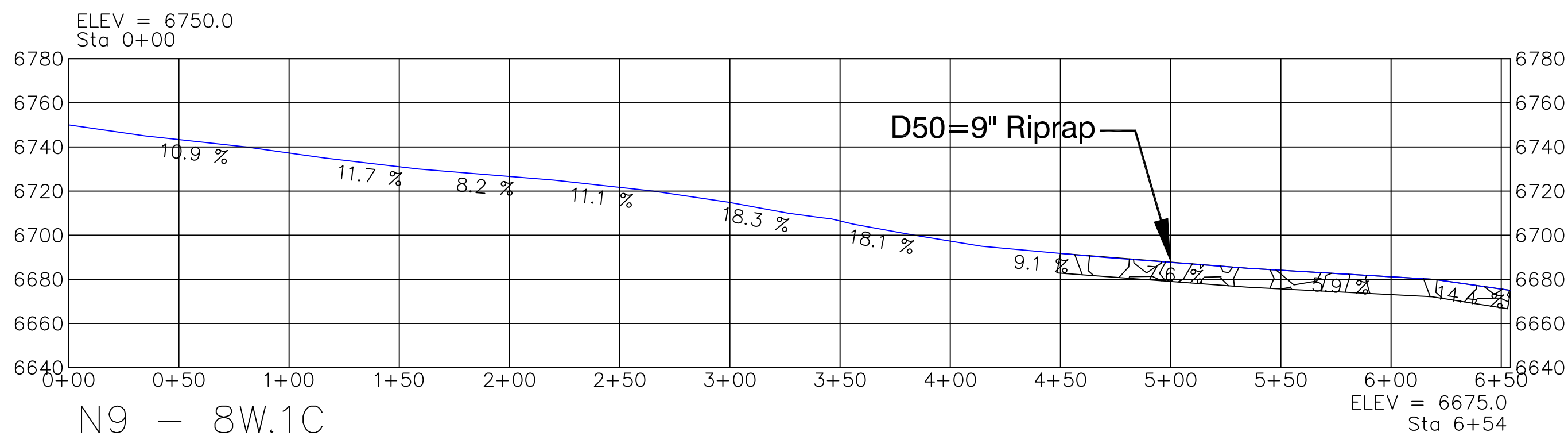
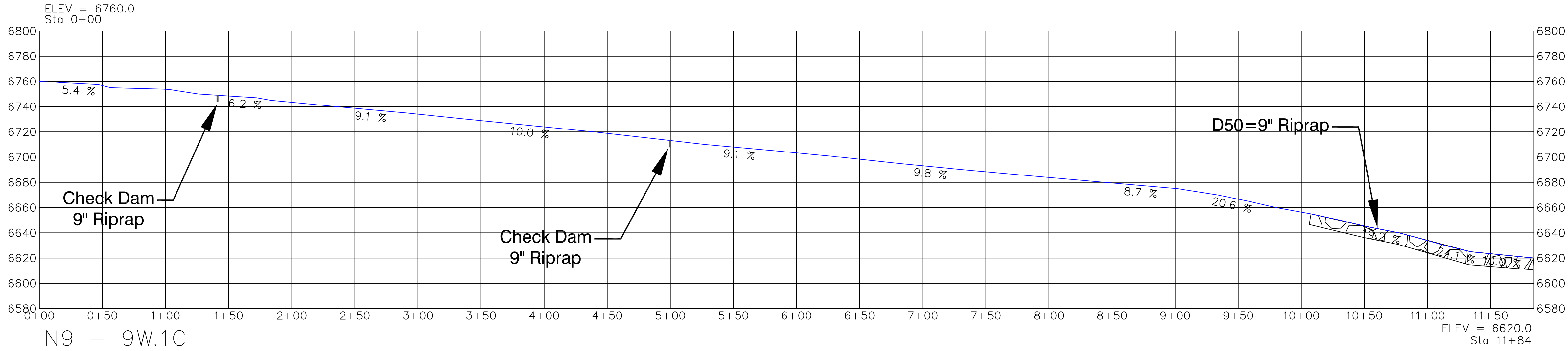
MAP 2.5.1 (SHEET 3 OF 3)
J-19 CHANNEL PROFILES

DESIGNED BY: G.A.
DRAWN BY: G.A.W.S.
APPROVED BY: G.A.
DATE: 2/20/2011
SHEET: 3 OF 3

STATE: ARIZONA
COUNTY: MARICOPA
CITY: PHOENIX
DATE: 2/20/2011
SHEET: 3 OF 3

ARIZONA P.E. 37842

NOTES:
1) For channel location, see Map 2.5.1 of 4.
2) Channel profiles shown are for released units only.



NOTES:
1) For channel locations, see Map 6.1A, (Sheet 1 of 4).
2) Channel profiles shown are for released areas only.



KAYENTA MINE P.O. BOX 650 KAYENTA, ARIZONA 86033		
MAP 2.5.2 (SHEET 2 OF 2) N-9 CHANNEL PROFILES		
DESIGNED BY: G.A.	STATE: ARIZONA	
DRAWN BY: G.A.K.S.	COUNTY: NAVAJO	
APPROVED BY: G.A.	PHOTO DATE: 2019-09-08	
DATE: 2020-06-11	C/E	
SCALE: 1" = 50'	DRAWINGSHEET: 2 of 2	