November 8, 2024 Project No. 23-01-200

Alan Pineda, PE
Professional Engineer
Bureau of Industrial Site Cleanup
Nevada Division of Environmental Protection
375 E. Warm Springs Rd., Ste. 200
Las Vegas, NV 89119

Attn: Mr. Pineda

Re: **Modification No. 3 to the Remedial Design Report/Modification No. 2 to the Leaching Analysis Report**
Increase in Thickness of Waste Rock Fill in Central Valley Area, Revision 1
Three Kids Mine, Henderson, Nevada

Dear Mr. Pineda:

Broadbent & Associates, Inc. (Broadbent) is pleased to submit this revised modification to the *Remedial Design Report, Revision 1* and the *Leaching Analysis Report, Revision 1* for the Three Kids Mine located in Henderson, Nevada.

Please do not hesitate to contact us if you should have any questions or require additional information.

Sincerely,
BROADBENT & ASSOCIATES, INC.

Kirk Stowers, CEM
Principal Geologist

cc: JD Dotchin, NDEP
Joe McGinley, McGinley & Associates, Inc.
Caitlin Jelle, McGinley & Associates, Inc.
Ann Verwiel, ToxStrategies
Robert Unger, Lakemoor Ventures LLC
Mindy Unger-Wadkins, Lakemoor Ventures LLC
Leo Drozdoff, Drozdoff Group, LLC
Karen Gastineau, Broadbent & Associates, Inc.
Christene Klimek, City of Henderson
Sean Robertson, City of Henderson
Stephanie Garcia-Vause, City of Henderson
Anthony Molloy, City of Henderson
Quincy Edwards, Pulte Group
Doug Adair, Pulte Group
Paul Kenner, on behalf of Pulte Group
Michael Ford, Snell & Wilmer
Brad Cahoon, Dentons
Bryan Douglass, Douglass, Inc.
Charles M. Damus, Laker Development, LLC
Darryn Padfield, River Mountain Bike Shop
David Grossheim, Laker Plaza, Inc.
Frank Sator, Laker Development, LLC
Laird Sanders, Lake Mead Boat Storage
Rhonda Sanders, Lake Mead Boat Storage
Tyler Cahoon, Dentons

Modification No. 3 to the Remedial Design Report, Revision 1/
Modification No. 2 to the Leaching Analysis Report, Revision 1
Increase in Thickness of Waste Rock Fill in Central Valley Area, Revision 1
Three Kids Mine
Henderson, Nevada

JURAT: I, Karen Gastineau, certify that I am responsible for the services in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and to the best of my knowledge comply with all applicable federal, State, and local statutes, regulations, ordinances, and the requirements of the Mine Remediation and Reclamation Agreement and Administrative Order on Consent for the Three Kids Mine Site.

Karen Gastineau

Karen Gastineau
Senior Hydrogeologist
CEM #2468 (4/1/2025)

November 8, 2024
Date

ATTACHMENT A

Responses to NDEP Comments made on November 7, 2024 to the Modification No. 3 to the Remedial Design Report/Modification No. 2 to the Leaching Analysis Report, Expansion of the Central Valley Area, dated October 17, 2024

1. **Increase in Thickness of Waste Rock Fill in Central Valley Area** – The second paragraph in this section states that "this modification would allow for waste rock fills up to 60 feet thick in the Central Valley Area." Suggest editing to clarify that fills will be up to 60 feet of waste rock plus 10 feet of cover.

   The second paragraph was modified as suggested.

2. **Remodel of Central Valley Area Scenario** – The first paragraph in this section states that "the total depth of the model domain below ground surface (top of 10-foot cover) remained the same at 508.5 feet." Suggest editing to clarify that this represents the anticipated depth to groundwater.

   Clarification was added to the first paragraph stating that 508.5 feet is the anticipated depth to groundwater.

3. **"Observation Nodes: Concentration" Figure** – This figure appears to show a longer simulation than 72 years. Is it due to a longer time frame to reach the observation point (due to more depth)? This differs from both the *Leaching Analysis Report, Revision 1* and from the current modification text. Please revise as necessary.

   The timeframe of 72 years for the simulation was unchanged from the *Leaching Analysis Report, Revision 1* (Leaching Analysis), and the x axis in the graphs in Appendix H of the Leaching Analysis (0 to 30,000 days) matches the x axis in this modification. Although the x axis extends to 30,000 days, the model was run for 26,768 days, which is where the line depicting concentration truncates on the graph.

BROADBENT

TECHNICAL MEMORANDUM

To: Alan Pineda, Nevada Division of Environmental Protection

From: Karen Gastineau, Broadbent & Associates, Inc.

Subject: Modification No. 3 to the Remedial Design Report/
Modification No. 2 to the Leaching Analysis Report
Increase in Thickness of Waste Rock Fill in Central Valley Area, Revision 1
Three Kids Mine Site, Henderson, Nevada

Date: November 8, 2024

This Technical Memorandum presents Broadbent & Associates, Inc.'s recommended Modification No. 3 to the *Remedial Design Report, Revision 1* dated March 4, 2024 (Remedial Design Report)/Modification No. 2 to the *Leaching Analysis Report, Revision 1* (Leaching Analysis) dated August 17, 2022 for the Three Kids Mine Site (Site) in Henderson, Nevada.

Increase in Thickness of Waste Rock Fill in Central Valley Area

The Central Valley Area is a portion of the Site where waste rock is permitted to be used as fill below the 10-foot native soil cover to achieve final grade. A geochemical model was completed to evaluate potential impacts of the waste rock fill on groundwater, and findings suggested that the waters of the state of Nevada would not be impacted. The Central Valley Area Scenario model (CVS) considered a cross section with 40 feet of waste rock fill. However, as tailings remediation progresses, the maximum depth of tailings and waste rock has in some cases exceeded the 1917 topography, which was used as an estimate during planning stages of the project. More recent data from geotechnical borings also indicated potential for tailings deeper than the 1917 topography. As a result, fills greater than 50 feet (40 feet of waste rock plus 10 feet of cover) are anticipated.

EA Engineering, Science, and Technology (EA Engineering) remodeled the CVS based on a cross section with 60 feet of waste rock fill plus 10 feet of cover. Results indicate that the increase in waste rock thickness would not have an adverse impact on groundwater. Additional details on the remodel are provided below. If approved, this modification would allow for waste rock fills up to 60 feet thick in the Central Valley Area.

Remodel of Central Valley Area Scenario

EA Engineering analyzed the effect of waste rock thickness on infiltration and drainage past the root zone and contaminant migration through supplemental numerical modeling with Hydrus software. The CVS base case model domain in the Leaching Analysis (Broadbent 2022) was modified to include 60 feet of waste rock fill beneath the alluvial 10-foot cover and on top of the Muddy Creek Formation. This represents a 20-foot increase in the thickness of the waste rock fill over the previous simulation, which had a 40-foot-thick layer of waste rock in the model domain. Other input parameters were held the same as in the base case CVS as defined in Appendix H Table H-1 (Broadbent 2022). The total depth of the model domain below ground surface (top of 10-foot cover) remained the same at 508.5 feet, which is the anticipated depth to groundwater. Output graphs for the remodel are attached and can be compared to graphs in Appendix H in the Leaching Analysis.

The 60-foot waste rock simulation results are compared to the CVS base case results with a 40-foot waste rock fill layer in Table 17-M below, and results are the same with one minor change. The zone of elevated arsenic representing the waste rock layer is thicker as specified in the model's initial conditions, which increased the depth of the observation point by 20 feet (i.e., the depth at which waste rock transitions to Muddy Creek Formation). As with the 40-foot-thick waste rock CVS simulation, only a small increase in arsenic occurred after 72 years (less than 0.1 micrograms per liter [µg/l]) at the observation point. Hence very little arsenic migrates above the top of the waste rock into the cover or below the bottom of the waste rock boundary into the Muddy Creek Formation. The travel time for this minor increase in arsenic concentration at the waste rock/Muddy Creek Formation interface to reach groundwater is 671 years compared to 763 years in the previous model results because the bottom of the waste rock layer is 20 feet deeper and therefore the distance to groundwater is 20 feet shorter. The difference in travel time for the <0.1 µg/l increase in arsenic is 92 years, which is a 12.1 percent difference. The results of supplemental unsaturated flow and contaminant transport modeling demonstrate that increasing waste rock thickness in the CVS reclamation design to 60 feet will not impact the waters of Nevada for the foreseeable future.

Table 17-M. Modified CVS base case simulation results with 60 feet of waste rock fill compared to 40 feet of waste rock fill at 72 years

Central Valley Scenario, 72-year Climate Simulation	Net Infiltration (inches per year)	Net Infiltration, percent of mean precipitation	Increase in Conservative Concentration at Base of Waste Rock (millimole per cubic meter)	Increase in Conservative Concentration, As equivalent (µg/l)	Travel Time to Groundwater (years)	Notes
Root Uptake with Alluvium Borrow TP Cover, McCarran Climate #1**, 60 feet of Waste Rock** below Cover and above Muddy Creek Fm	0.8	19.3%	1.00E-3	0.0749	671	Travel time calculation assumes water content of 10 percent
Root Uptake with Alluvium Borrow TP Cover, McCarran Climate #1, **40 feet of Waste Rock** below Cover and above Muddy Creek Fm (Broadbent 2022)	0.8	19.3%	1.00E-3	0.0749	763	Travel time calculation assumes water content of 10 percent
Relative Percent Difference	0.0	0.0	0.0	0.0	12.1%	

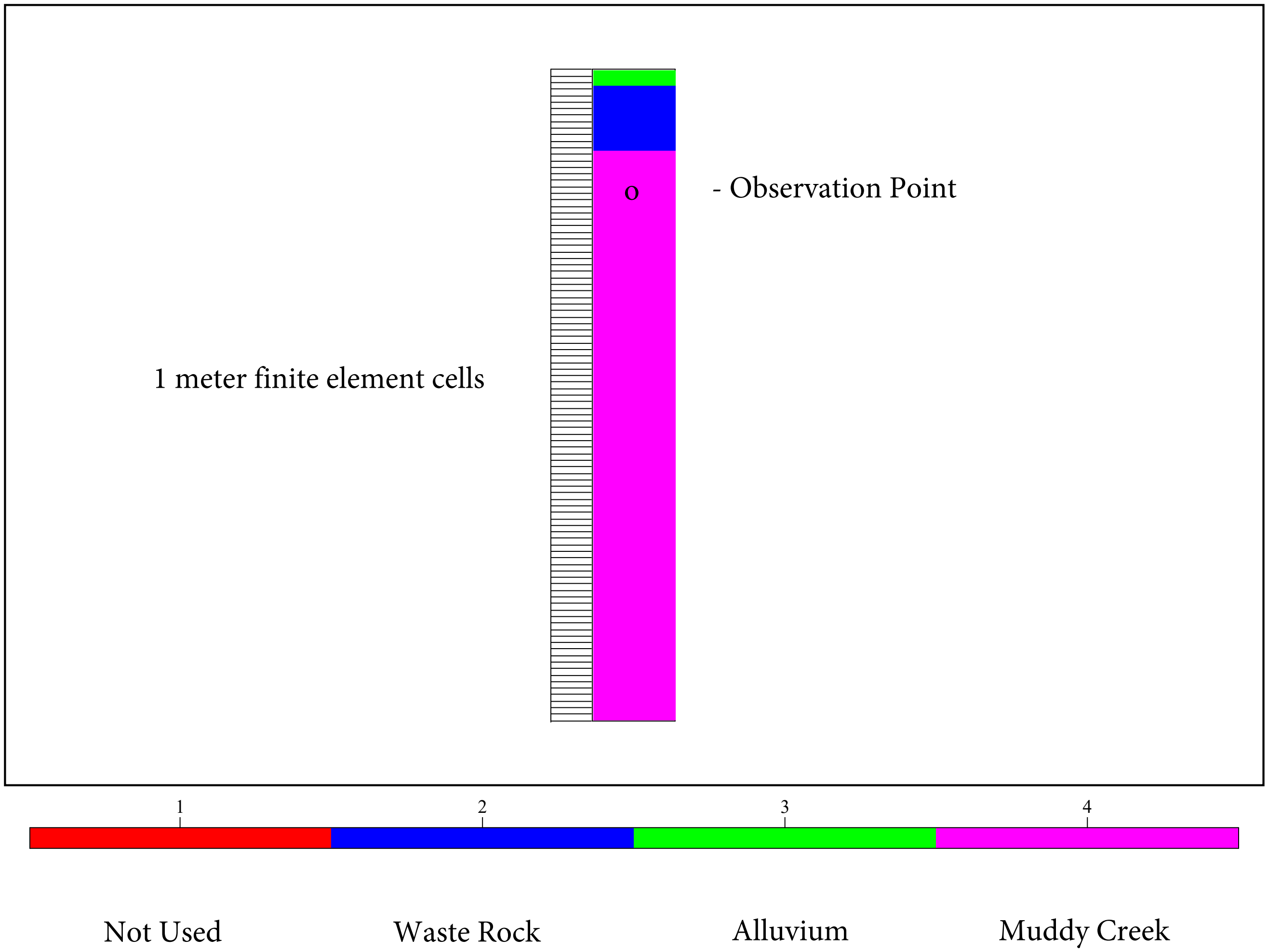
Attachments

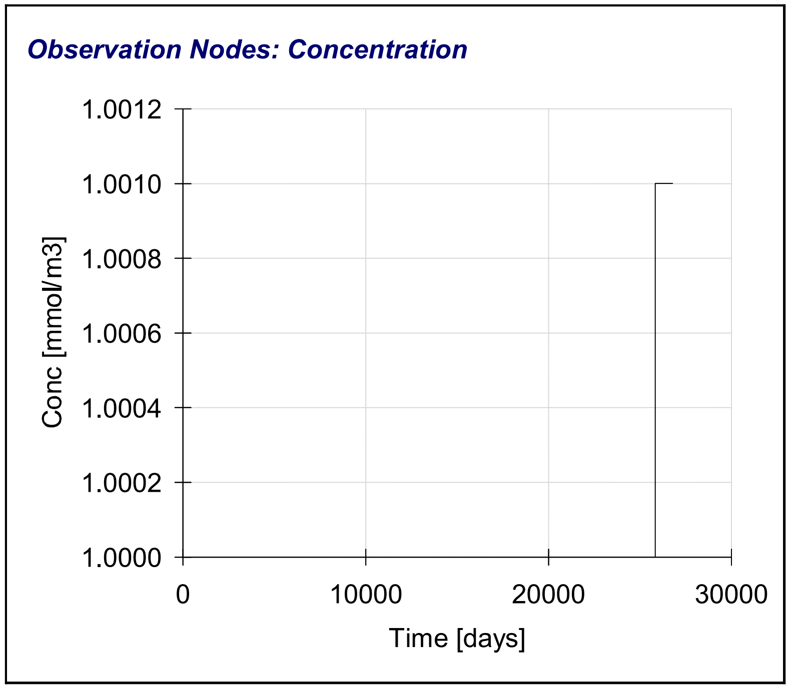
Model Output

References

Broadbent. 2024. *Remedial Design Report, Revision 1, Three Kids Mine, Henderson, Nevada*. March 4.

Broadbent. 2022. *Leaching Analysis Report, Revision 1, Three Kids Mine, Henderson, Nevada*. August 17.


- Observation Point
1 meter finite element cells
1
2
3
4
Not Used
Waste Rock
Alluvium
Muddy Creek


Observation Nodes: Concentration
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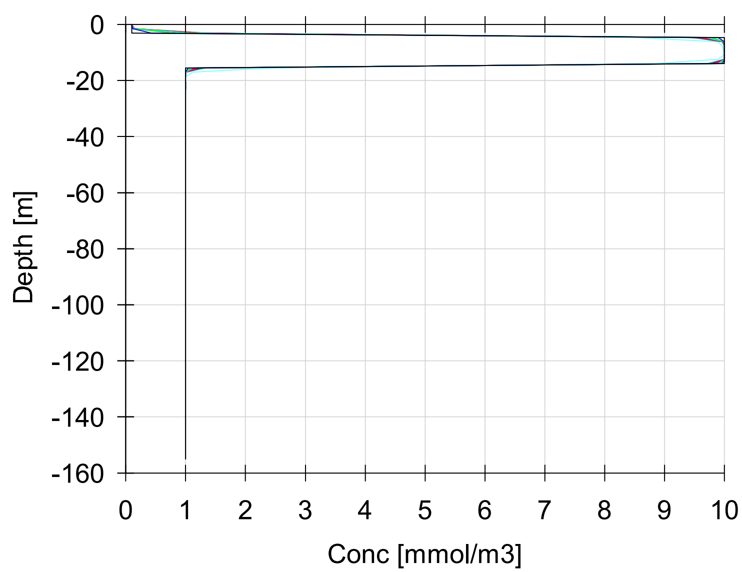
1.0010
1.0008
1.0006
1.0004
1.0002
1.0000
Conc [mmol/m3]
0
10000
20000
30000
Time [days]

Profile Information: Concentration



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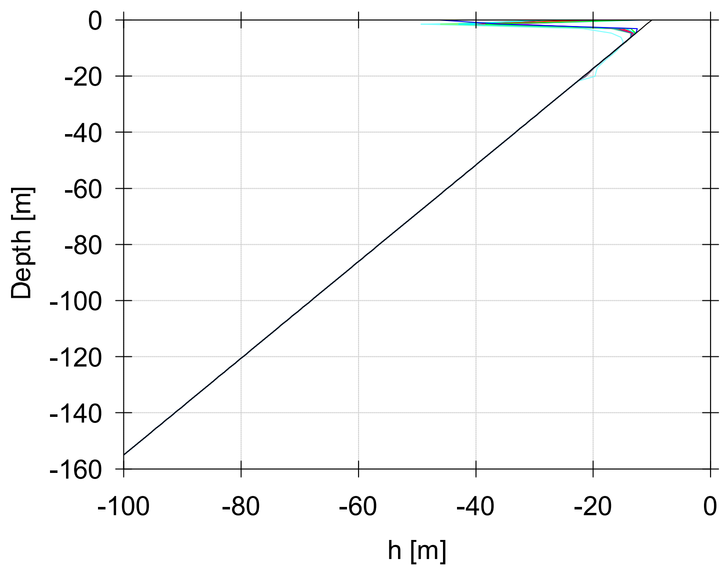

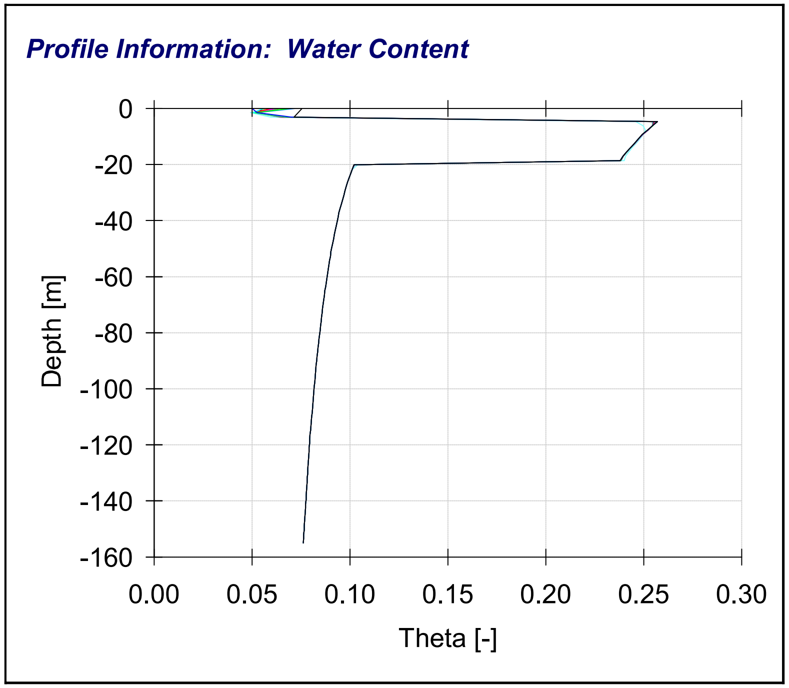
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-20
-40
-60
-80
-100
-120
-140
-160
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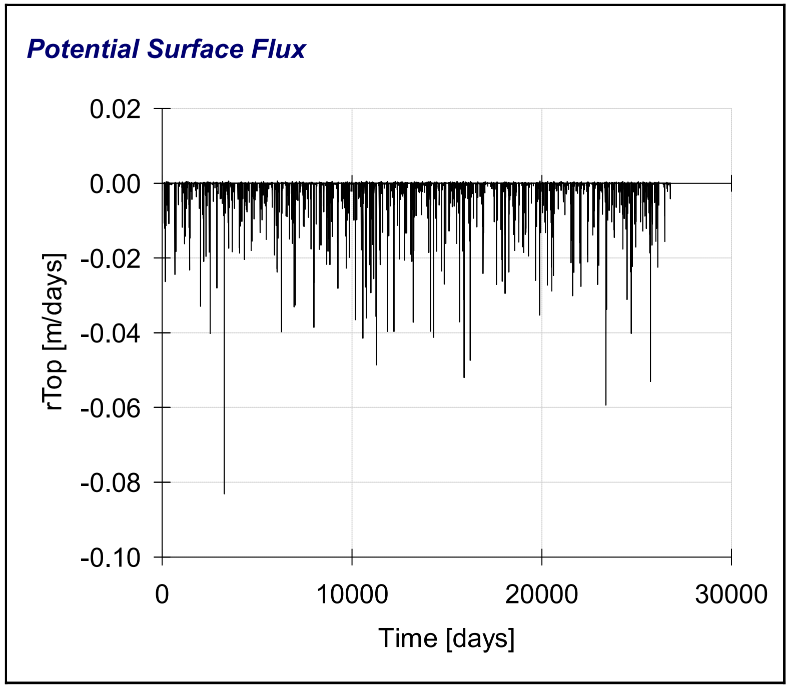
0.10
0.15
0.20
0.25
0.30
Theta [-]


Potential Surface Flux
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-0.06
-0.08
-0.10
rTop [m/days]
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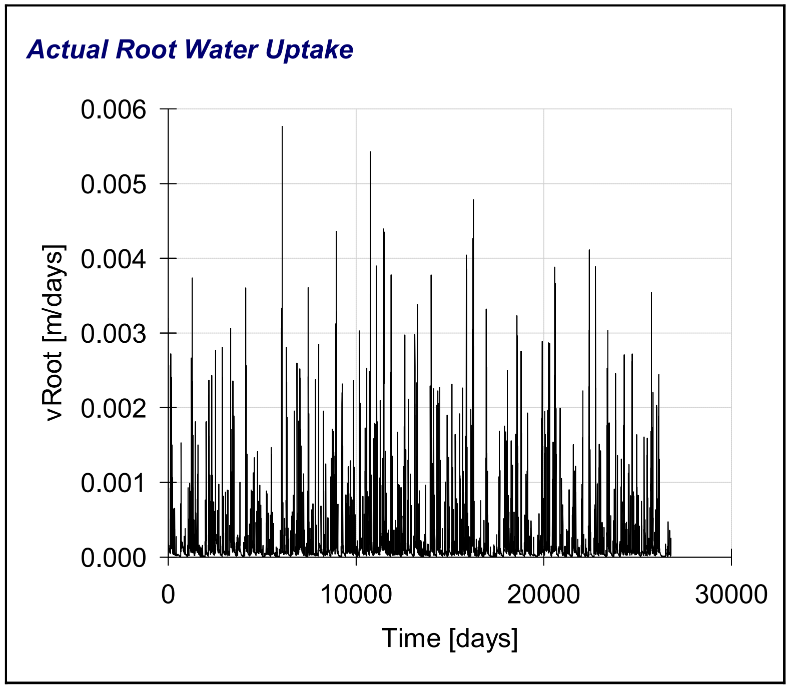
10000
20000
30000
Time [days]


Actual Root Water Uptake
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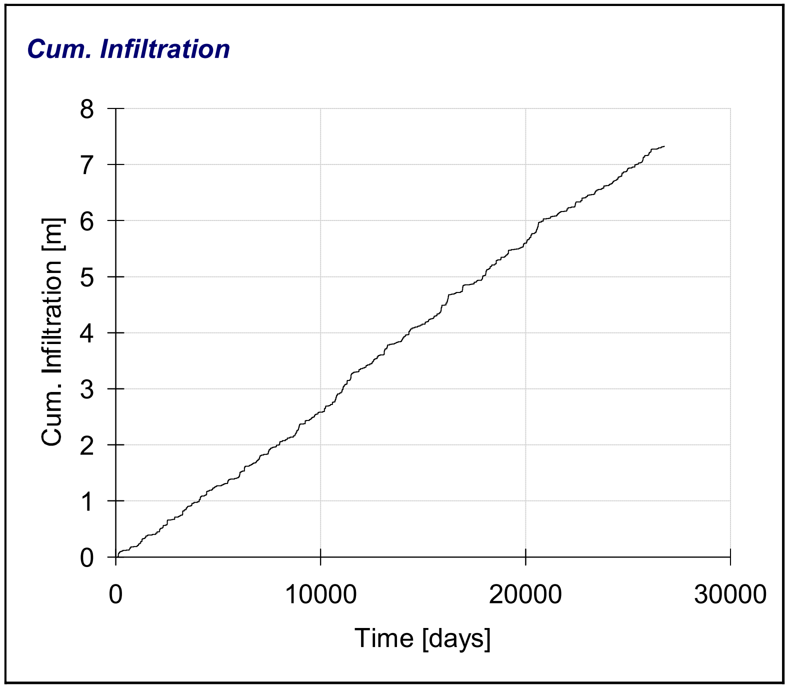
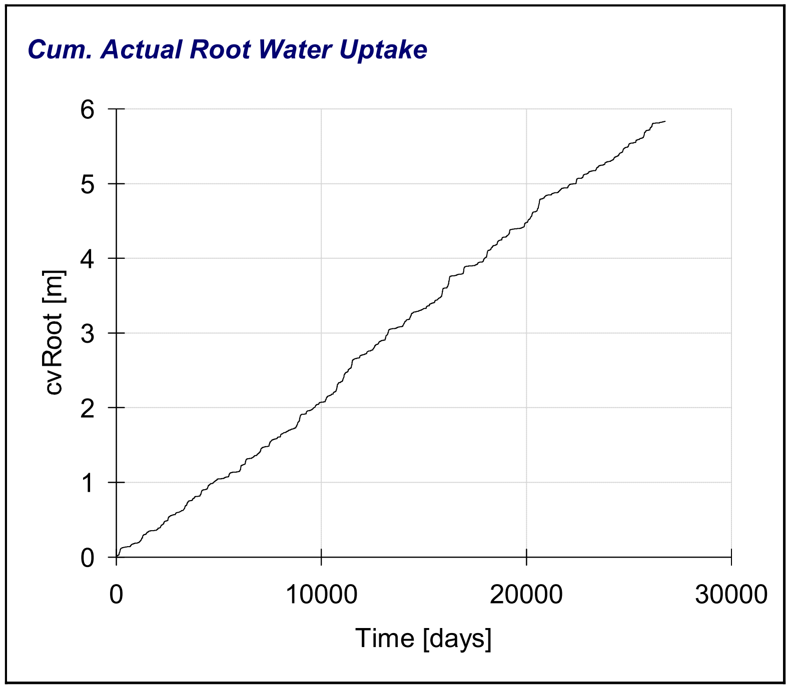
0.005
0.004
0.003
0.002
0.001
0.000
vRoot [m/days]
0
10000
20000
30000
Time [days]


Cum. Infiltration
Cum. Infiltration [m]
Time [days]
0
1
2
3
4
5
6
7
8
0
10000
20000
30000


Cum. Actual Root Water Uptake
cvRoot [m]
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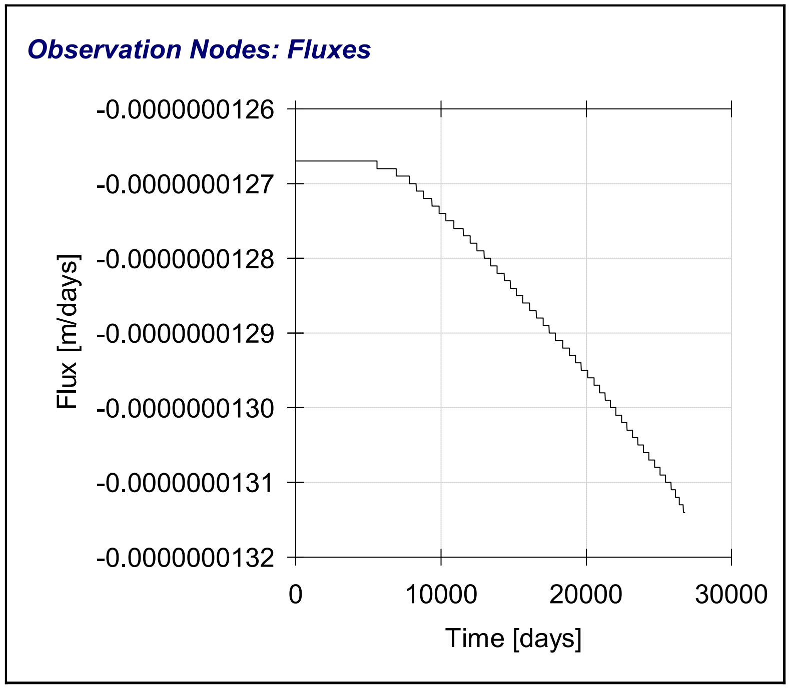
1
2
3
4
5
6
0
10000
20000
30000
Time [days]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-0.0000000129
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Flux [m/days]
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10000
20000
30000
Time [days]