

2013 Flood-Related Impacts along Highway 40

Post-Event Recovery Efforts in Kananaskis Alberta



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April 10, 2014

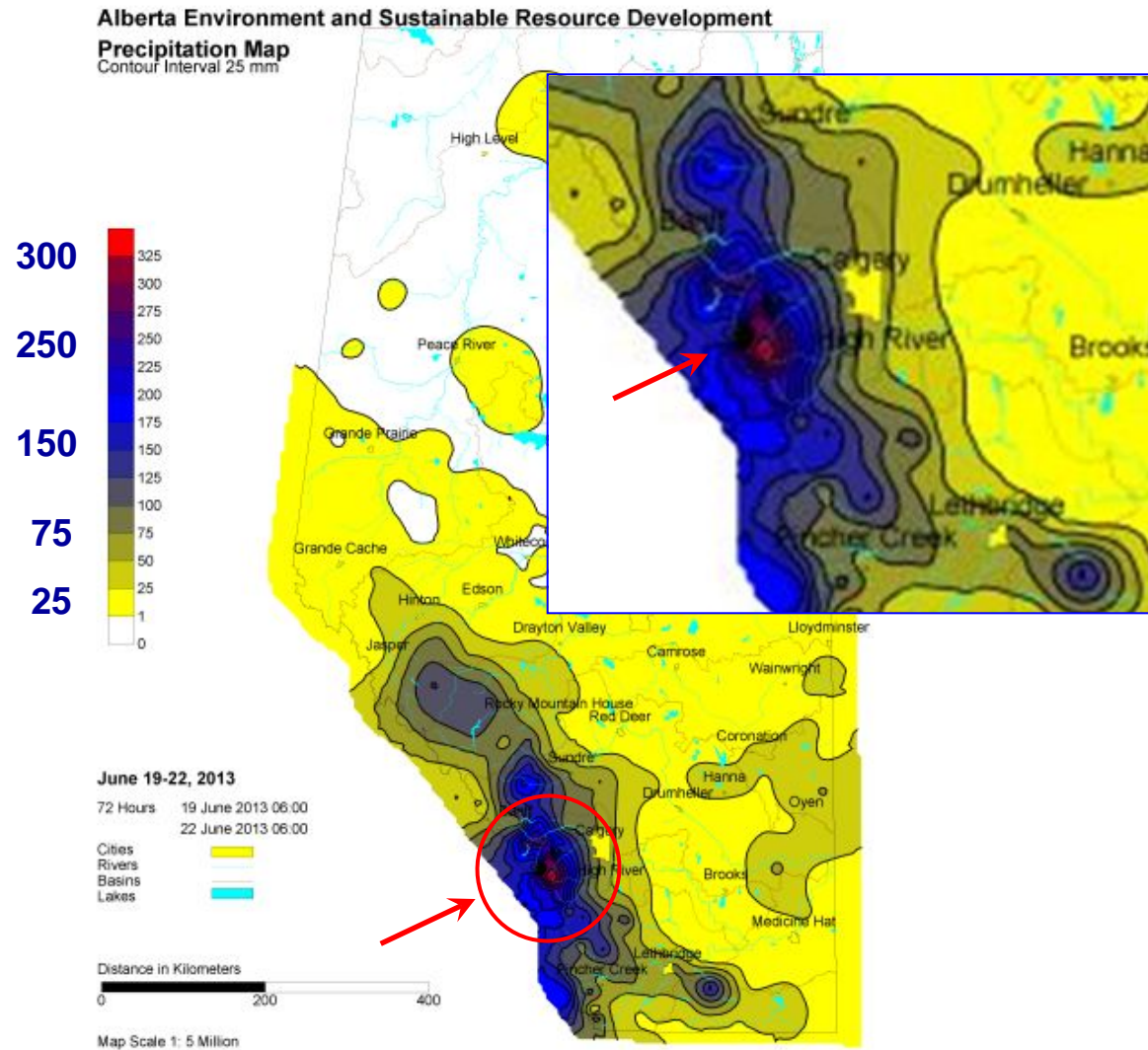
Outline

Introduction

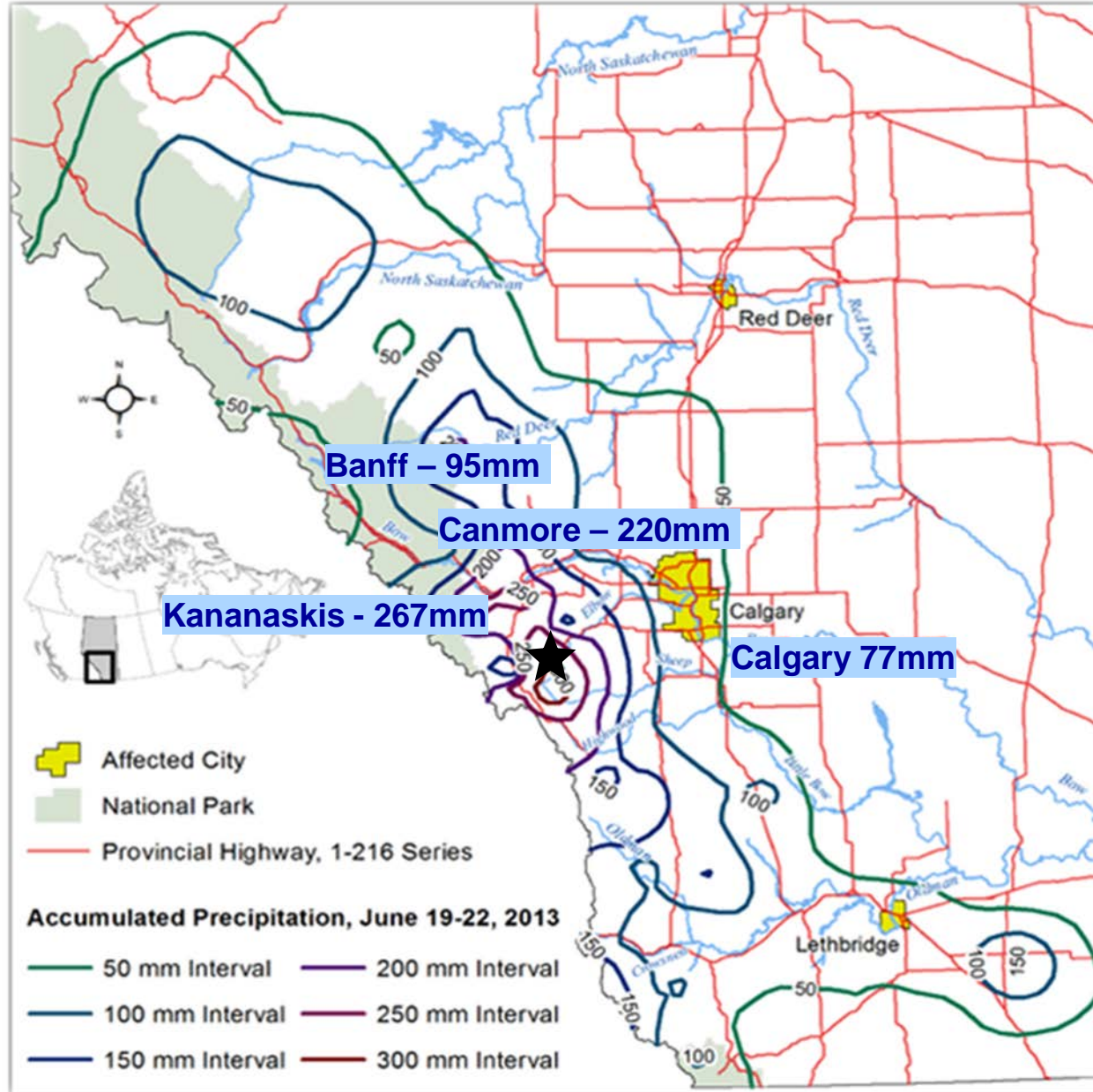
- Part 1: What happened ?
- Part 2: Response & Challenges ...
 - Environmental Impacts
 - Construction Challenges
- Part 3: Recovery & Details – Site 92

Summary

And then the rain came down...



Precipitation Totals from June 19-22, 2013

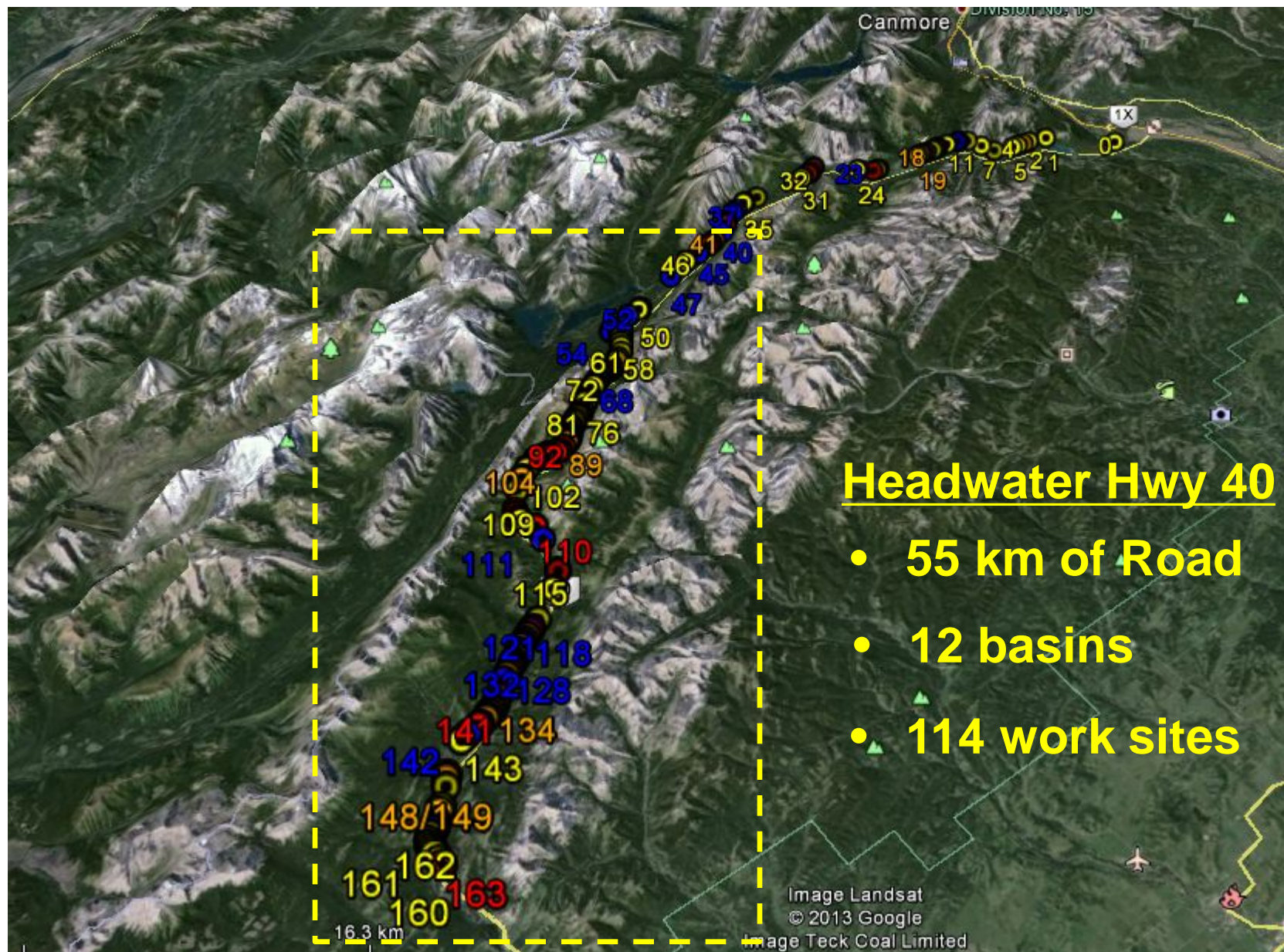


Damage to Gauging Stations in Kananaskis – Marmot Creek



Kananaskis – Marmot Creek





Part I

Environmental Impacts

Sideslope Washout and Erosion - Site #90



High Water, Sediment and Debris Flows - Site #110



Sediment Transport, Channel Avulsions – Site #110



Slope Failures and Bank Erosion – Site #129

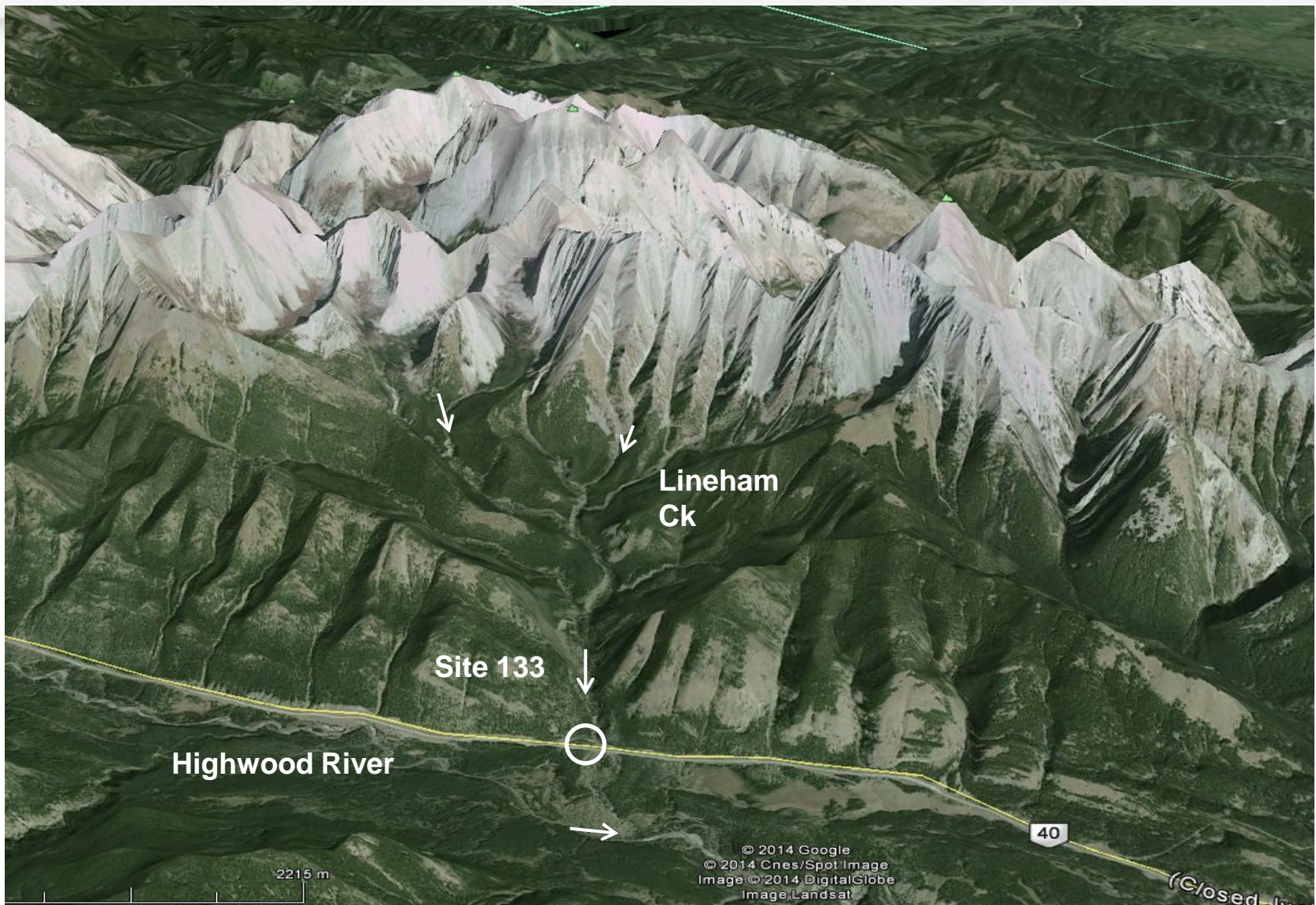


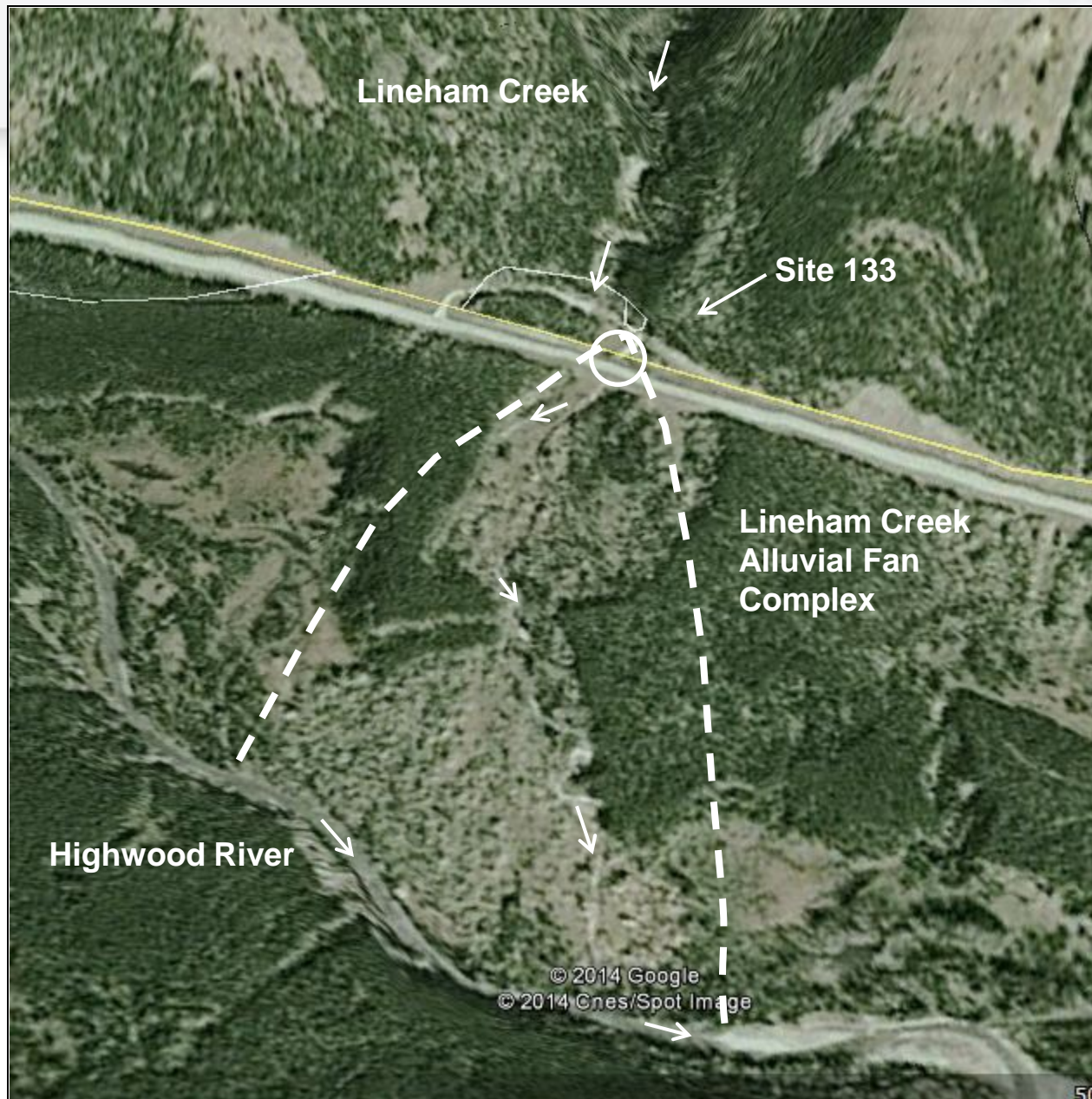
Slope Failures and Bank Erosion – Site #129



Steep Mountainous Drainage Basins – Site #133

Look
East





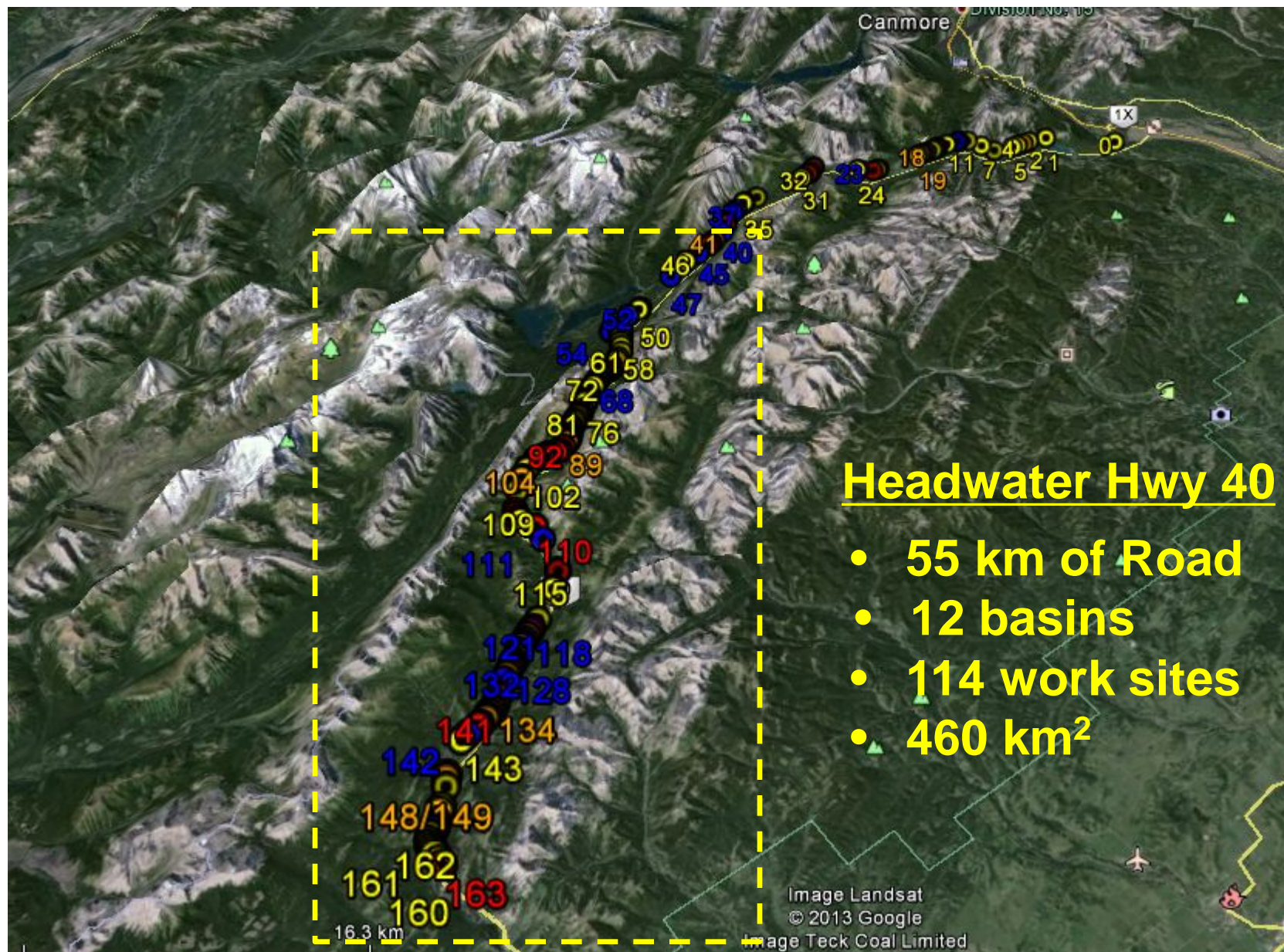
Site 133



October 2013

Part II

Construction Challenges



Headwater Hwy 40

- 55 km of Road
- 12 basins
- 114 work sites
- 460 km²

Cleaning Snow & Debris from Road



First Day of Construction – September 30, 2013

Access Issues - Site #106, Storm Creek



Access Issues – Site #106, Storm Creek



Lineham Creek Bridge – Site #133



Lineham Creek Bridge - Site #133



Cleaning Culverts - Site #92



Cleaning Culverts – Site #92

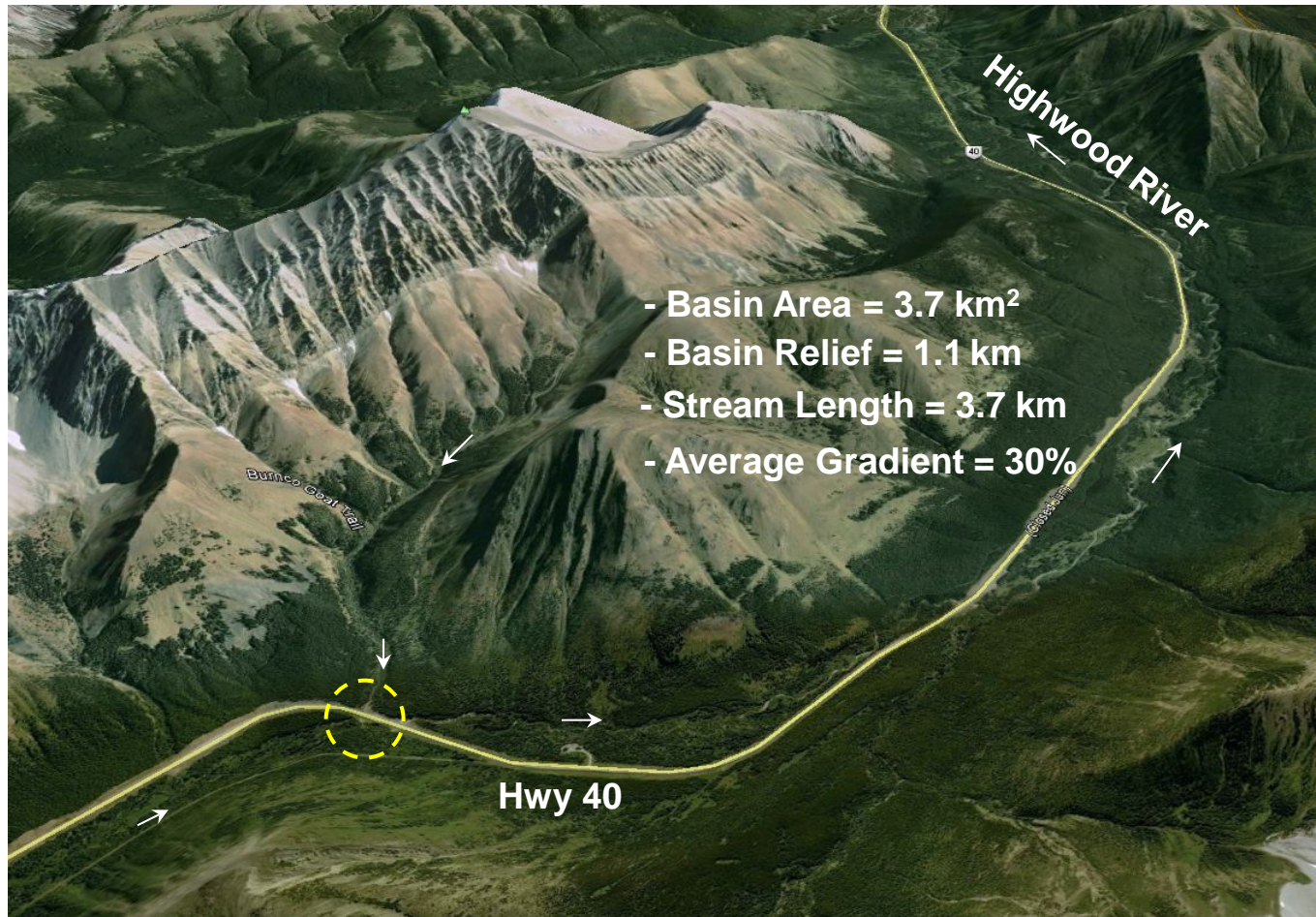


Cleaning Culverts – Site #136

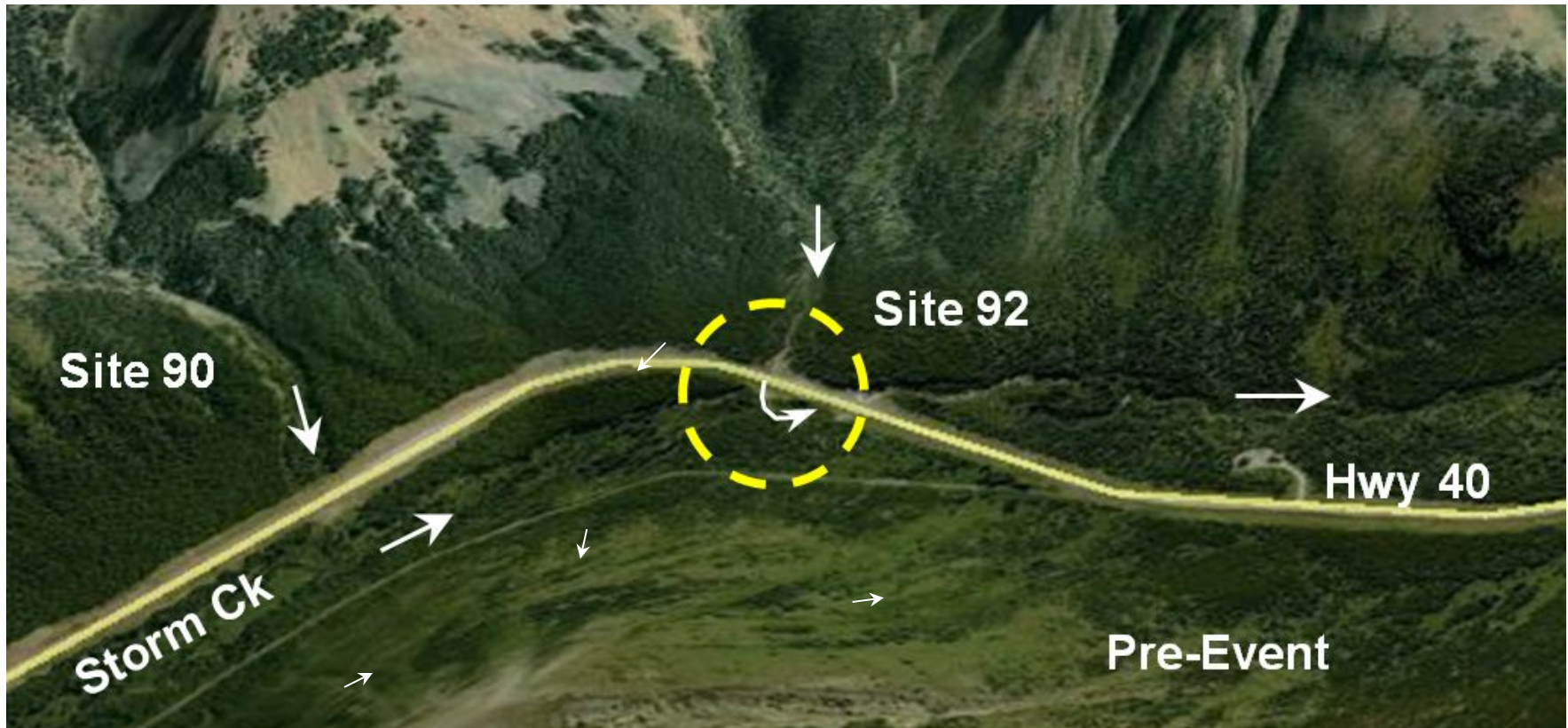


Case Study – Site 92

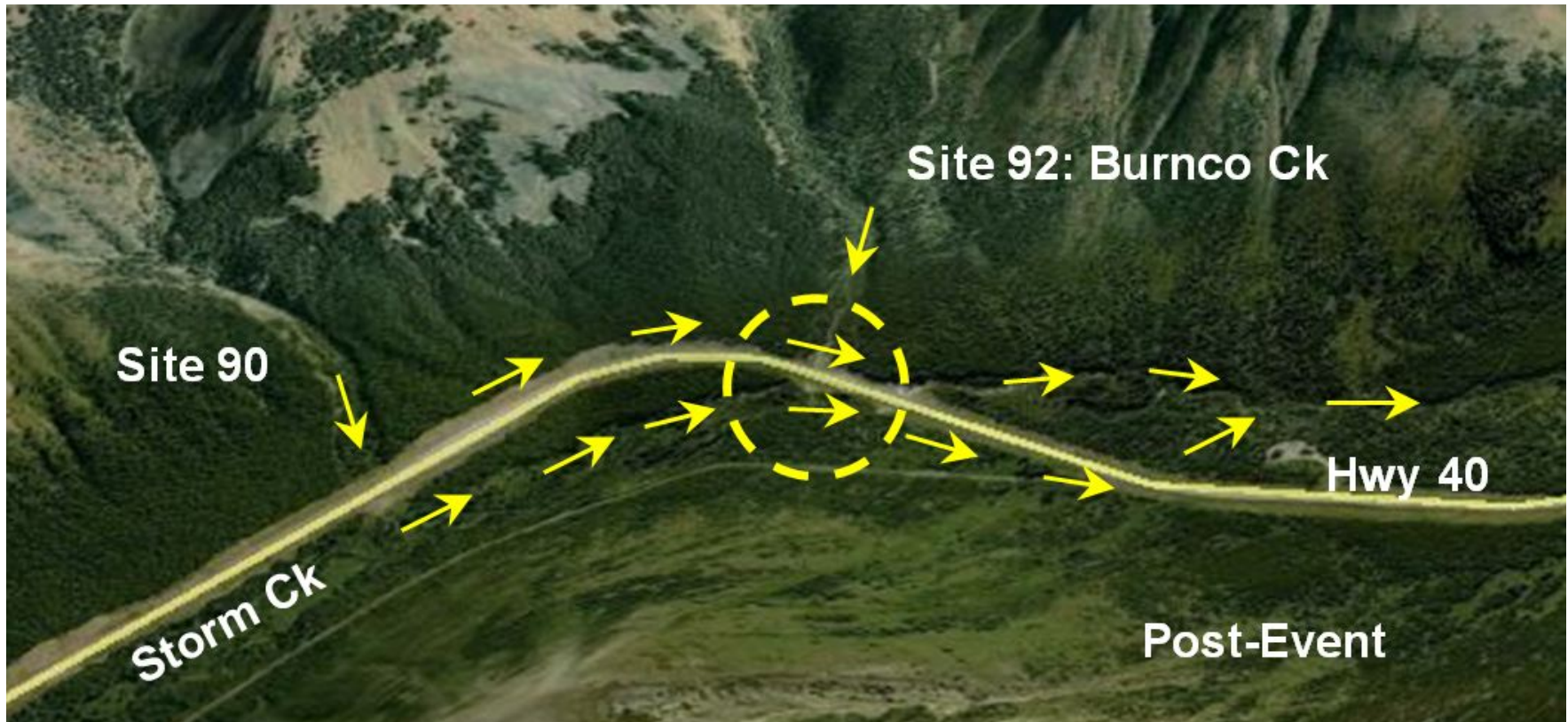
Site 92: Burnco Creek



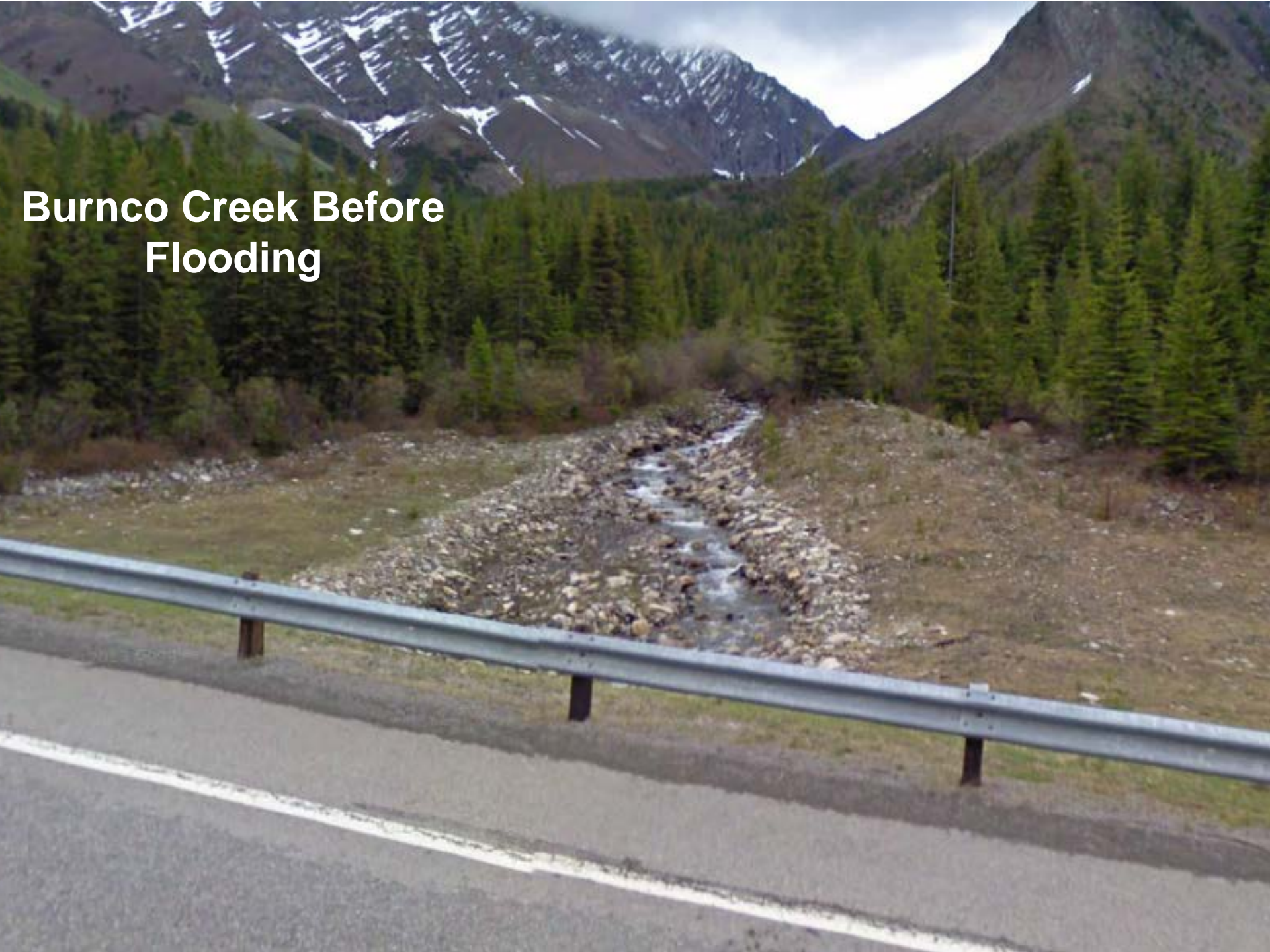
Site 92: Drainage Impacts



Site 92: Drainage Impacts



Burnco Creek Before Flooding



A photograph of a mountain stream, Burnco Creek, after a flood event. The stream is characterized by a wide, rocky bed and a narrow channel of water flowing through it. The surrounding landscape is a dense forest of evergreen trees, and in the background, steep, rocky mountains rise under a clear blue sky with a few wispy clouds. The water is white with foam as it flows over the rocks.

Burnco Creek After Flooding

09/08/2013 21:05

Burnco Creek Looking Downstream Towards Culvert Inlet



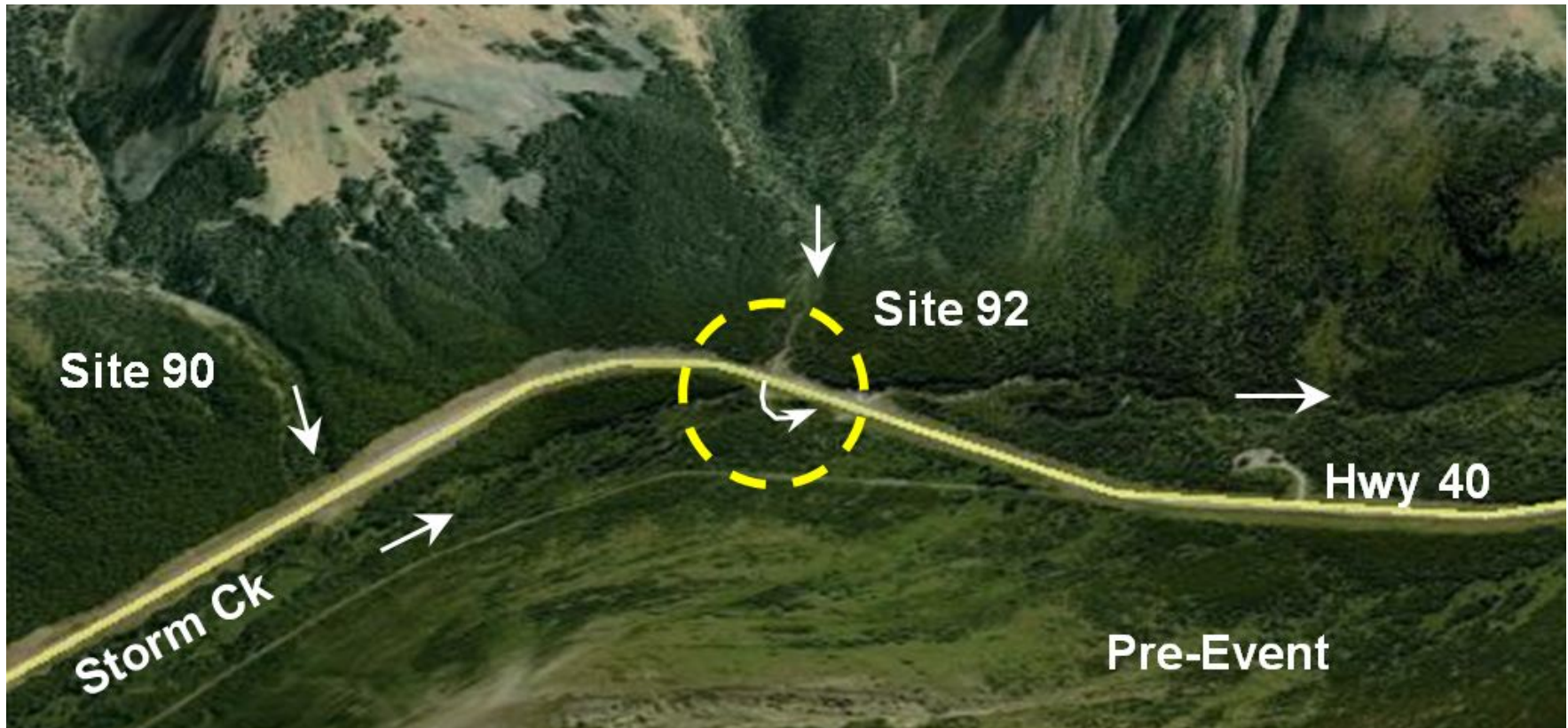
09/08/2013 21:04

Burnco Creek After Flooding, East Side of Highway 40



09/09/2013 01:30

Site 92: Drainage Impacts



**Upstream Culvert Outlet
along Burnco Creek on
West Side of Highway 40**



08/22/2013 16:50

**New Path of Storm Creek
Flowing 1.2 km Down along
the West Side of Hwy 40**



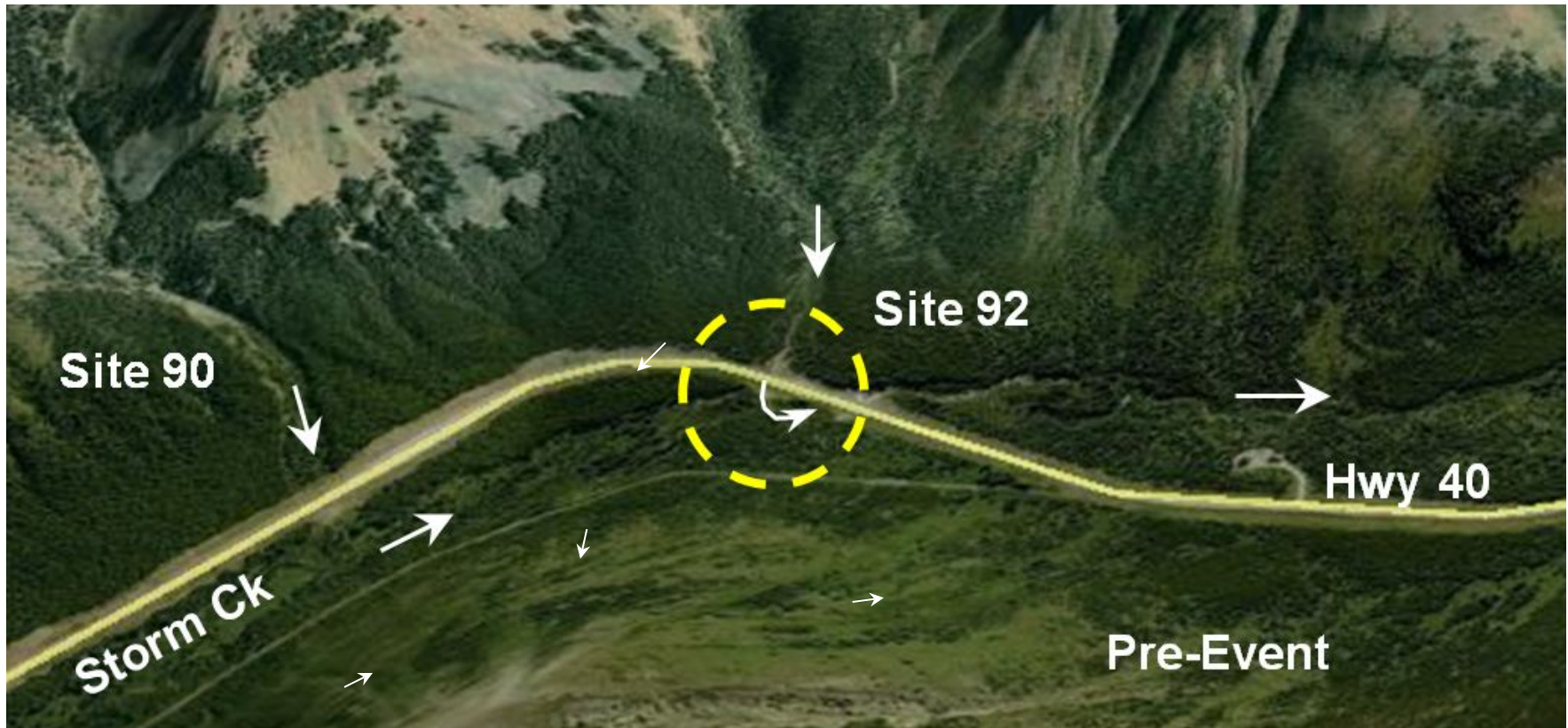
08/22/2013 17:10

Reconstructed Channel and Culvert Inlet of Storm Creek along West Side of Highway 40



10/31/2013 00:13

Site 92: Drainage Impacts



Storm Creek on East Side of Highway 40 Before Flooding



Storm Creek on East Side of Highway 40 After Flooding



2013/07/24 14:35

Storm Creek on East Side of Highway 40 After Construction



Summary

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Thank you!

Additional questions?

Contact Fiona Mulvenna

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