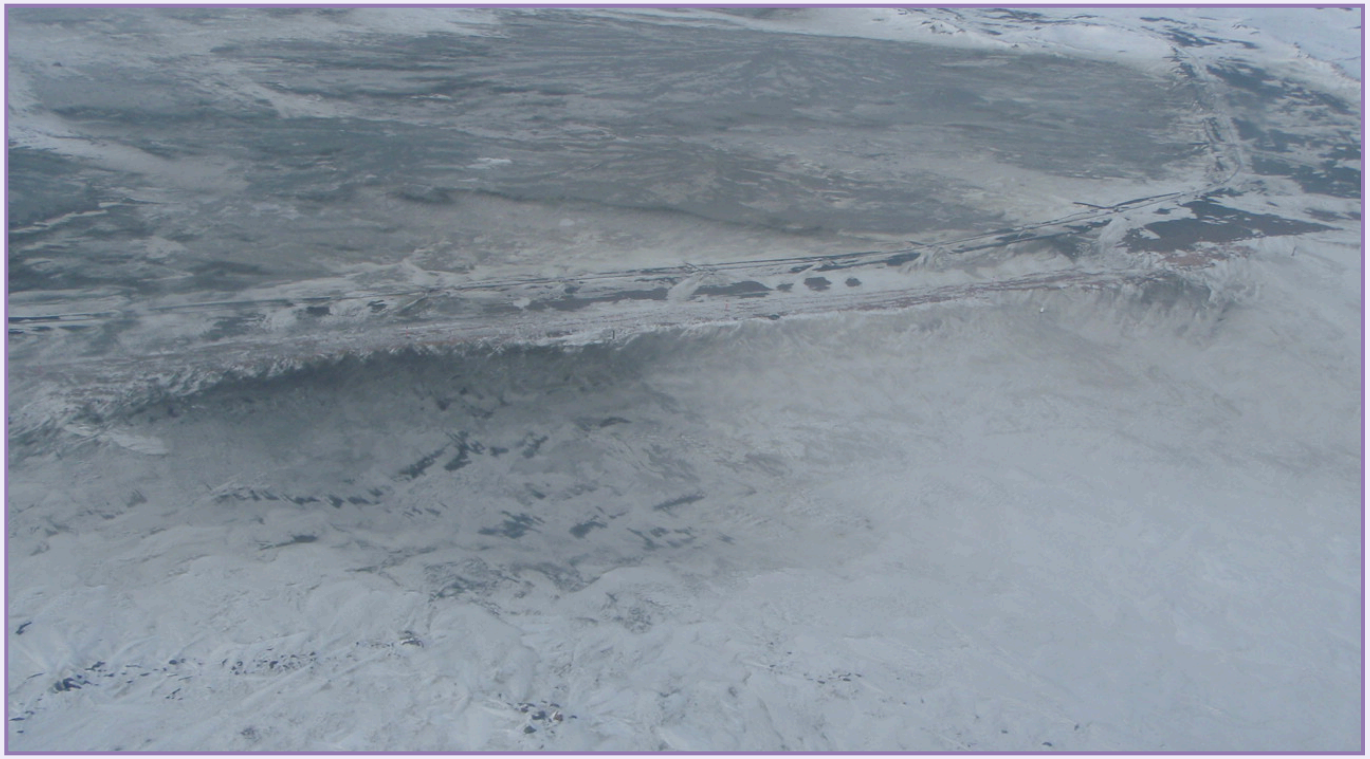
shear diamonds

Airborne Deposition of FPK
Jericho Diamond Mine
Technical Meetings
Cambridge Bay, NU
June 20-21,2011

eba
A TETRA TECH COMPANY

Issue Identified

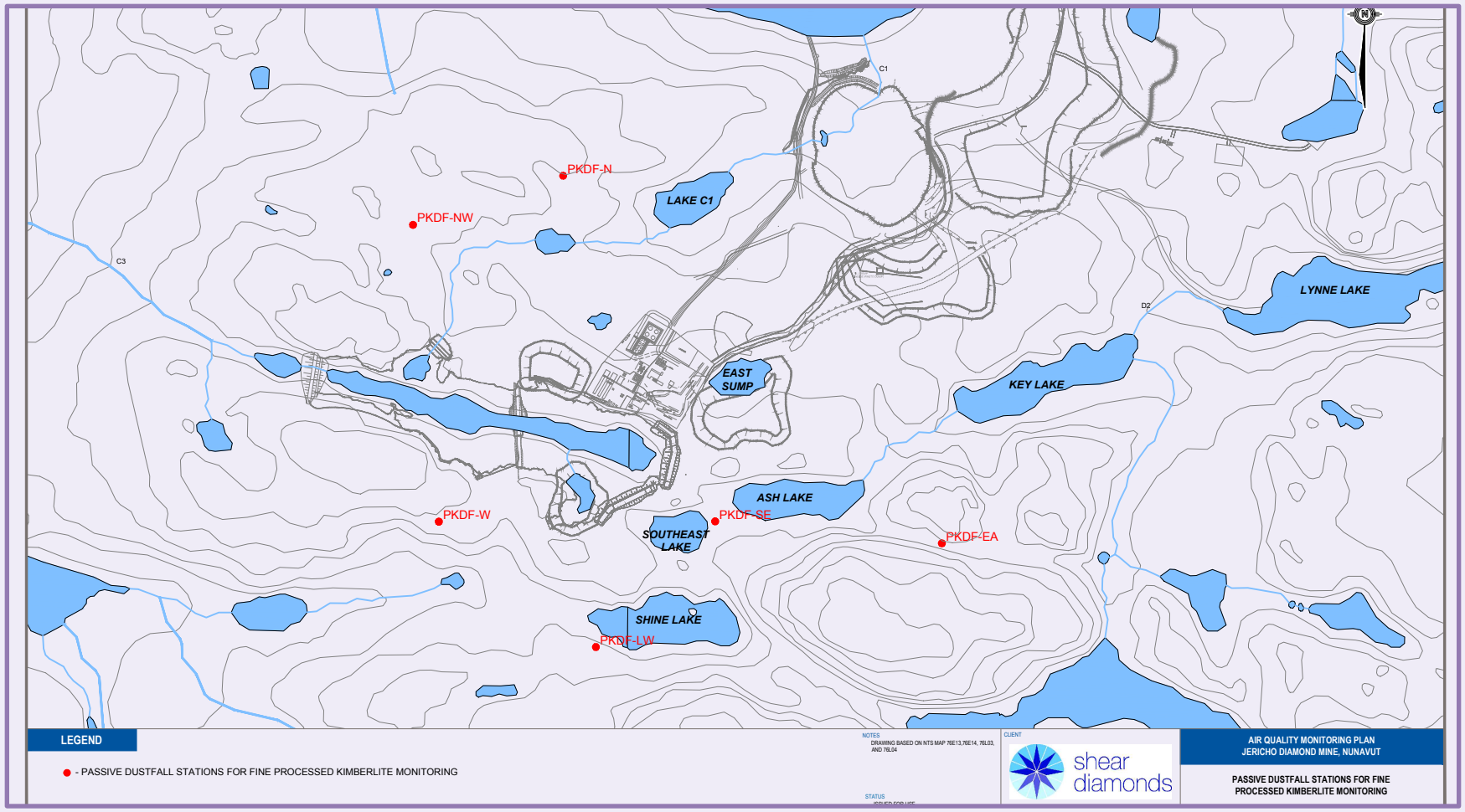


During the under ice sampling round of the AEMP it was noted that airborne FPK had deposited outside of the PKCA.

Immediate Action Taken

- Additional sampling stations added to the AEMP
  - Under ice samples to include Lynn and Key lakes
  - Open water samples to include Southeast and Shine lakes
- Six additional dustfall stations in support of the Air Quality Monitoring Program
- EBA Engineering contracted to assist in assessing mitigation options

Figure 1 – Dustfall Locations



Dustfall

Follow Up Action Taken

- An area of approximately 4 m2 was excavated to bottom (1.7 m) to expose a clean face to see stratification
- Two snow core samples were collected from top of snow to ground level and sent for analysis for particle size and total particulate
- A sample was collected from the top layer of the consolidated FPK and sent for chemical composition and shake flask analysis
- Approximately 35 m3 of FPK snow was excavated from the banks of southeast dam and placed inside the PKCA

FPK Stratification

FPK In the Snow

FPK – Leeward Side of Southeast Dam

Observations

- Observations were made by EBA on June 2, 2011

- The key observations were:
  - The upper area of the PK facility showed evidence of material transport by wind.
  - The middle and lower areas did not.
  - Sandy material is being transported up and over the dams and is being captured in the leeward windbreak.
  - The observed wind affected area of the PKCA has an approximate area of 40,000m2 (4 hectares) which is approximately 40% of the total PK covered area.

Samples

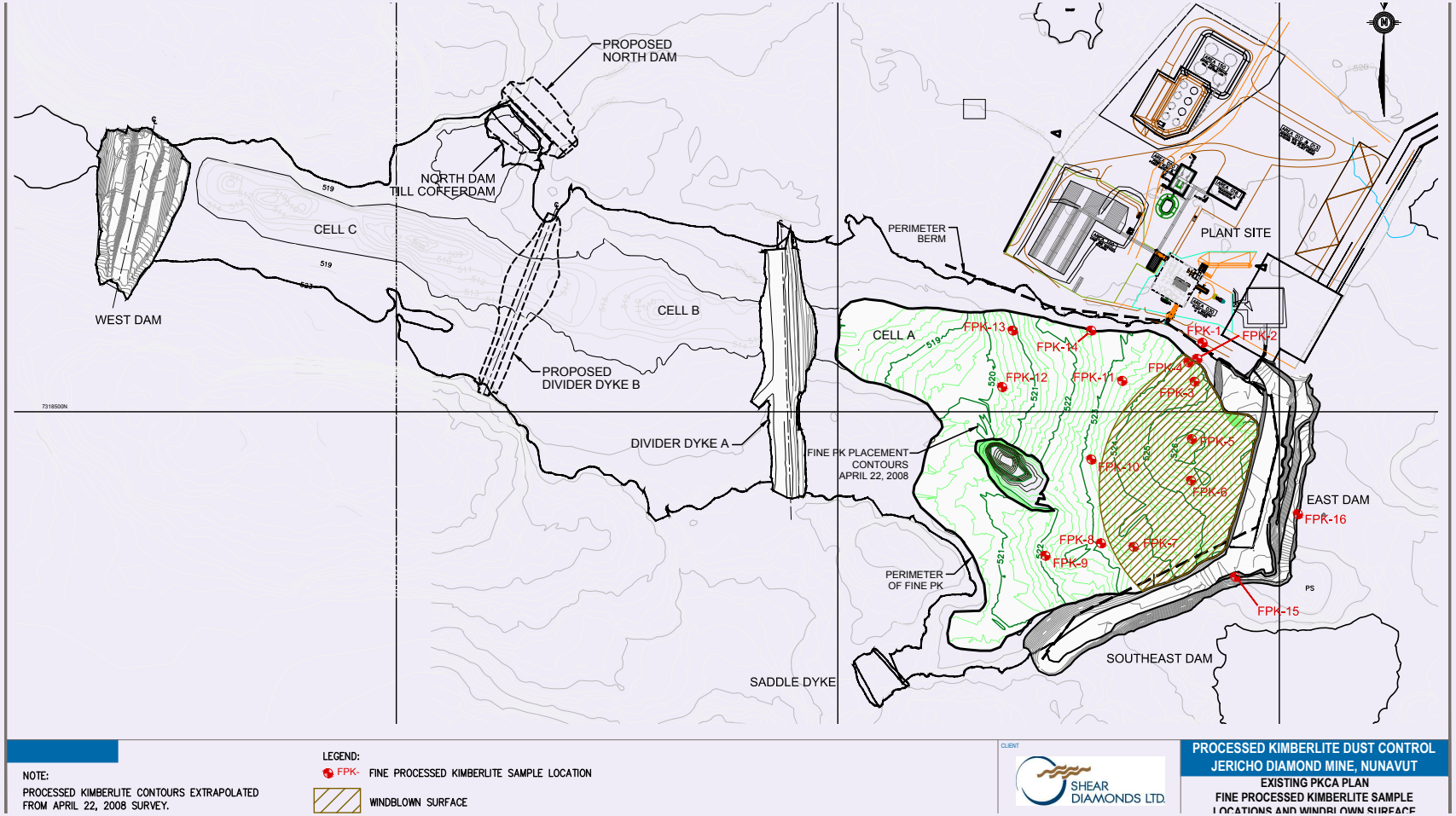
- Samples were collected from:
  - The upper area
    - Predominantly fine sands
  - The middle area
    - Silty material
  - The leeward side
    - Sandy mixed with snow

Upper Area

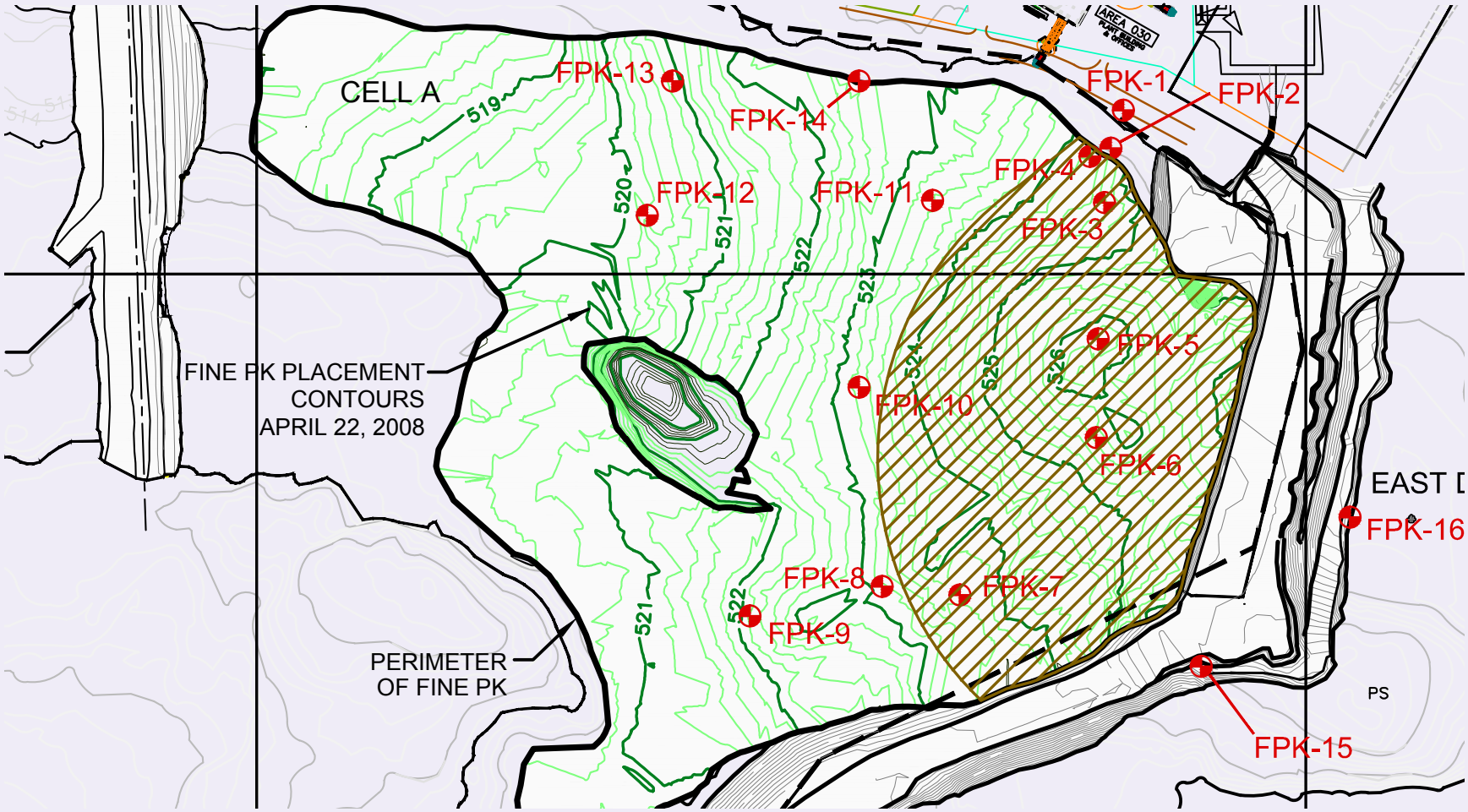
Middle Area

Leeward Side

PKCA - FPK


PROPOSED
NORTH DAM
NORTH DAM
TILL COFFERDAM
CELL C
WEST DAM
CELL B
PROPOSED
DIVIDER DYKE B
DIVIDER DYKE A
SADDLE DYKE
PERIMETER
BERM
PLANT SITE
CELL A
FPK-13
FPK-14
FPK-12
FPK-11
FPK-1
FPK-2
FPK-4
FPK-3
FPK-5
FPK-10
FPK-6
FPK-8
FPK-7
FPK-9
FPK-16
EAST DAM
FPK-15
SOUTHEAST DAM
FINE PK PLACEMENT
CONTOURS
APRIL 22, 2008
PERIMETER
OF FINE PK
NOTE:
PROCESSED KIMBERLITE CONTOURS EXTRAPOLATED
FROM APRIL 22, 2008 SURVEY.
LEGEND:
FPK- FINE PROCESSED KIMBERLITE SAMPLE LOCATION
WINDBLOWN SURFACE
SHEAR
DIAMONDS LTD.
PROCESSED KIMBERLITE DUST CONTROL
JERICHO DIAMOND MINE, NUNAVUT
EXISTING PKCA PLAN
FINE PROCESSED KIMBERLITE SAMPLE

FPK – Sampling Locations



Options for Mitigation

- Surface Wind Speed Controls
  - Most preferred
- Dust Suppressant Products
  - Requires discussion with regulators and further investigations
- Watering
  - Least preferred

Surface Wind Speed Controls

- Decrease the surface wind velocity through increased surface friction or larger topographical controls.
- Have the additional advantage of increasing snow accumulation on the tailings surface.
- Common wind speed control methods:
  - Snow fencing
  - Windrows
  - Other wind break ideas
    - On-site supplies (old haul truck tires), ditches, furrows, hay bales

Dust Suppressant Products

- Skin-forming, dust-suppressant products could be effective for the tailings facility.
- Present during the winter months and can cover a large area.
- Extensive environmental testing with many of the products.
- Application of the mixture would be done on foot using a water hose and nozzle or a truck-mounted water cannon.

Watering

- Impractical - large area to cover, would require continual watering during dry periods in summer.
- Could lead to other issues – erosion, remobilization of FPK.
- Large capital investment.
- Wind plays a strong role in any watering scenario.

Plan of Action

- Install snow fencing on upper, high wind, area.
- Use on-site materials to create wind breaks.
- Begin discussions with regulators on dust suppressant products for areas which continue to exhibit high erosion.
- Document observations for report to be submitted at the end of the trial period (1 year)