3. BMP Construction Update

Dirt Road Rehabilitation/Maintenance

Completed or planned for:

- Several fire roads within the Outfall 008 watershed (completed)
- Roads used to access CTLI-1 and B1-1 ISRA areas, and soil borrow area, in the Outfall 009 watershed (completed)
- Access road below (north of) the Area II Landfill in the Outfall 009 watershed (planned in 2011)

Hillside Erosion Controls

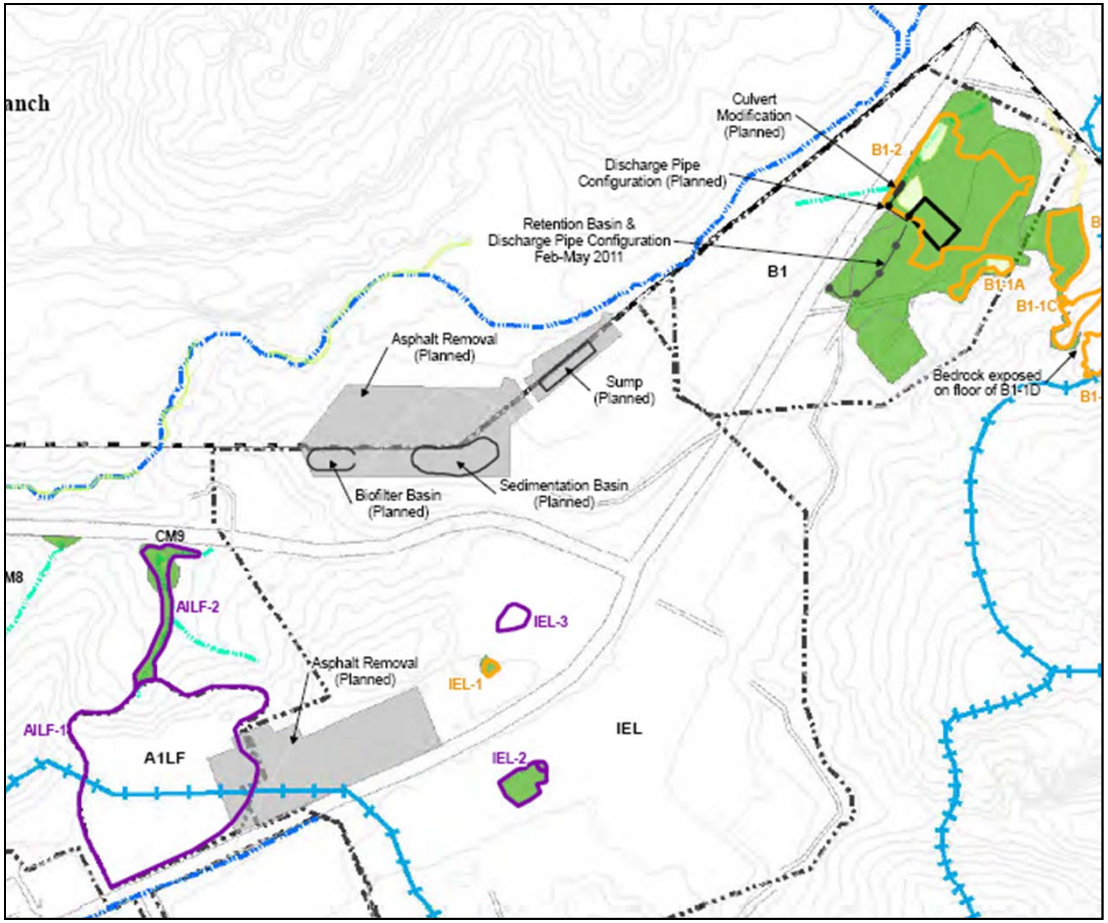
Hydroseed mulch, straw wattles, and erosion control blankets are installed, inspected, and maintained

Culvert Modifications (CMs)

- 12 CMs previously placed in 009 watershed (map shown earlier)
- New CM now being constructed at culvert adjacent to the entrance road in the B-1 RFI site
- Additional CMs will be recommended based on monitoring data

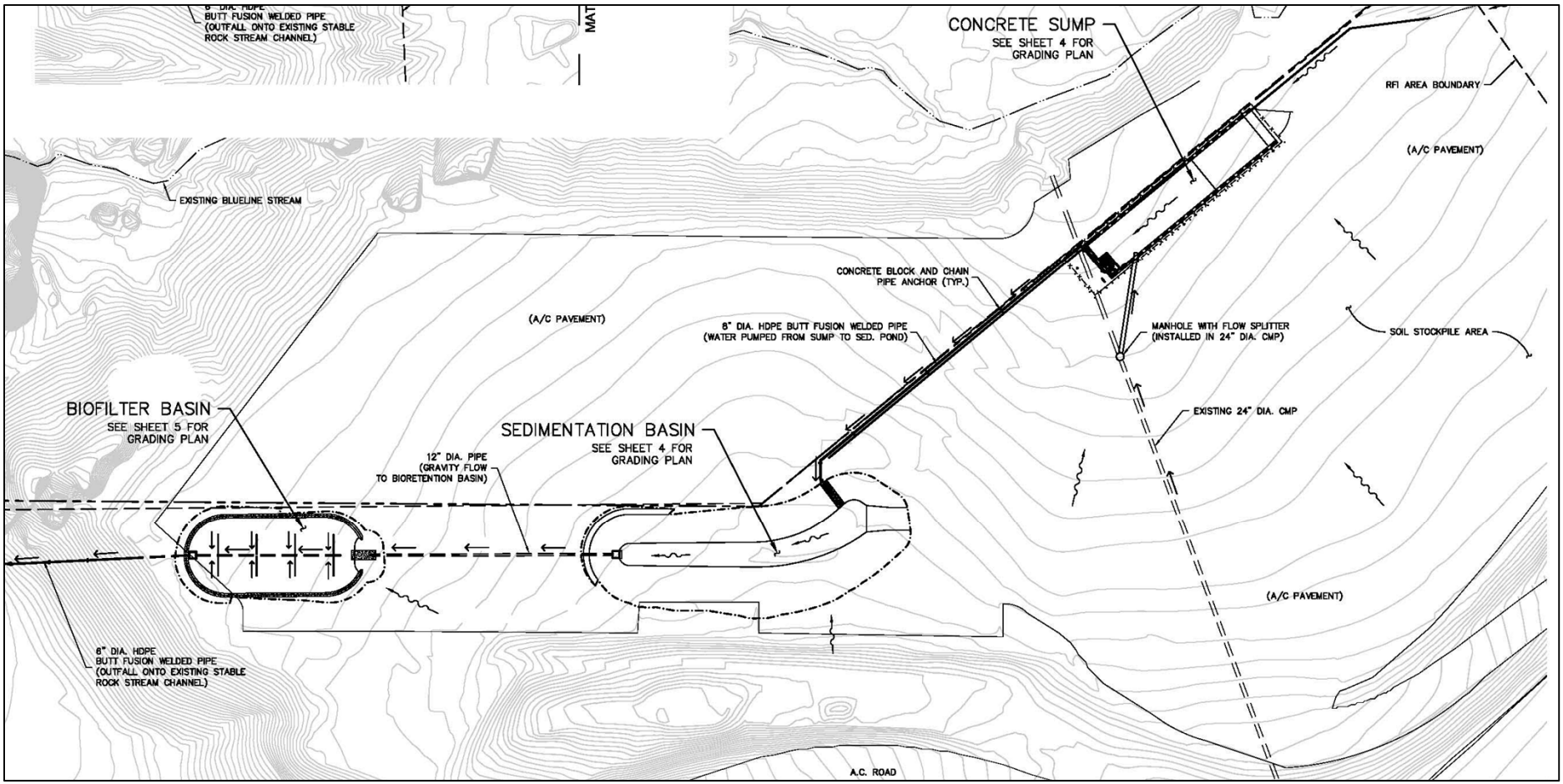
2011 Asphalt Removal

- Asphalt removal is expected to reduce runoff volumes and contaminant loads
- 1.5 acres near Building 324
- 1.8 acres near lower parking lot
- Additional building and pavement areas to be demolished in 2012 and beyond

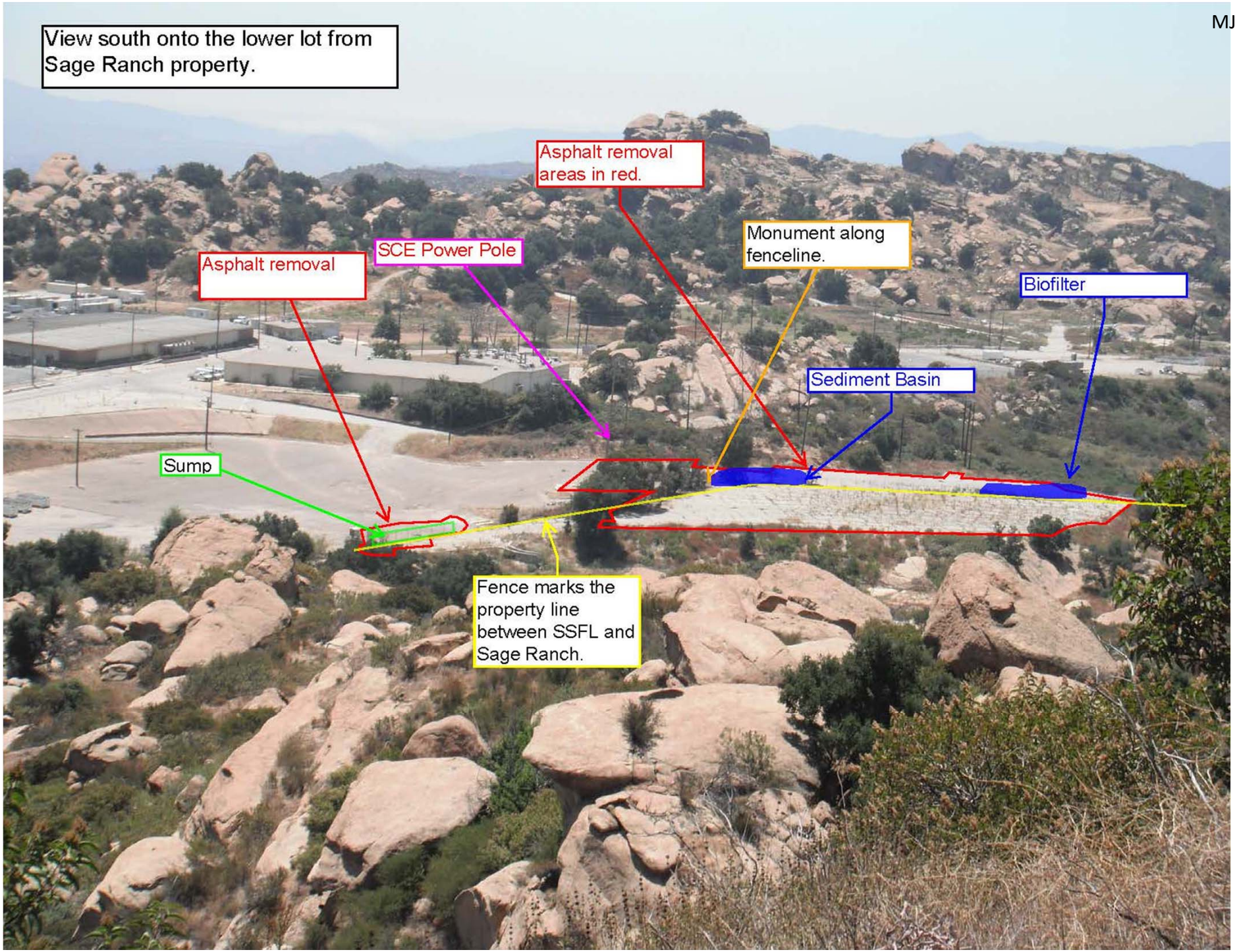


Soil Stockpile Biofilter

- Treat runoff from 5 acre paved lot where soil stockpiling activities occur
- Treat low flows from larger upstream drainage area
- Design complete, construction planned to begin once permits acquired

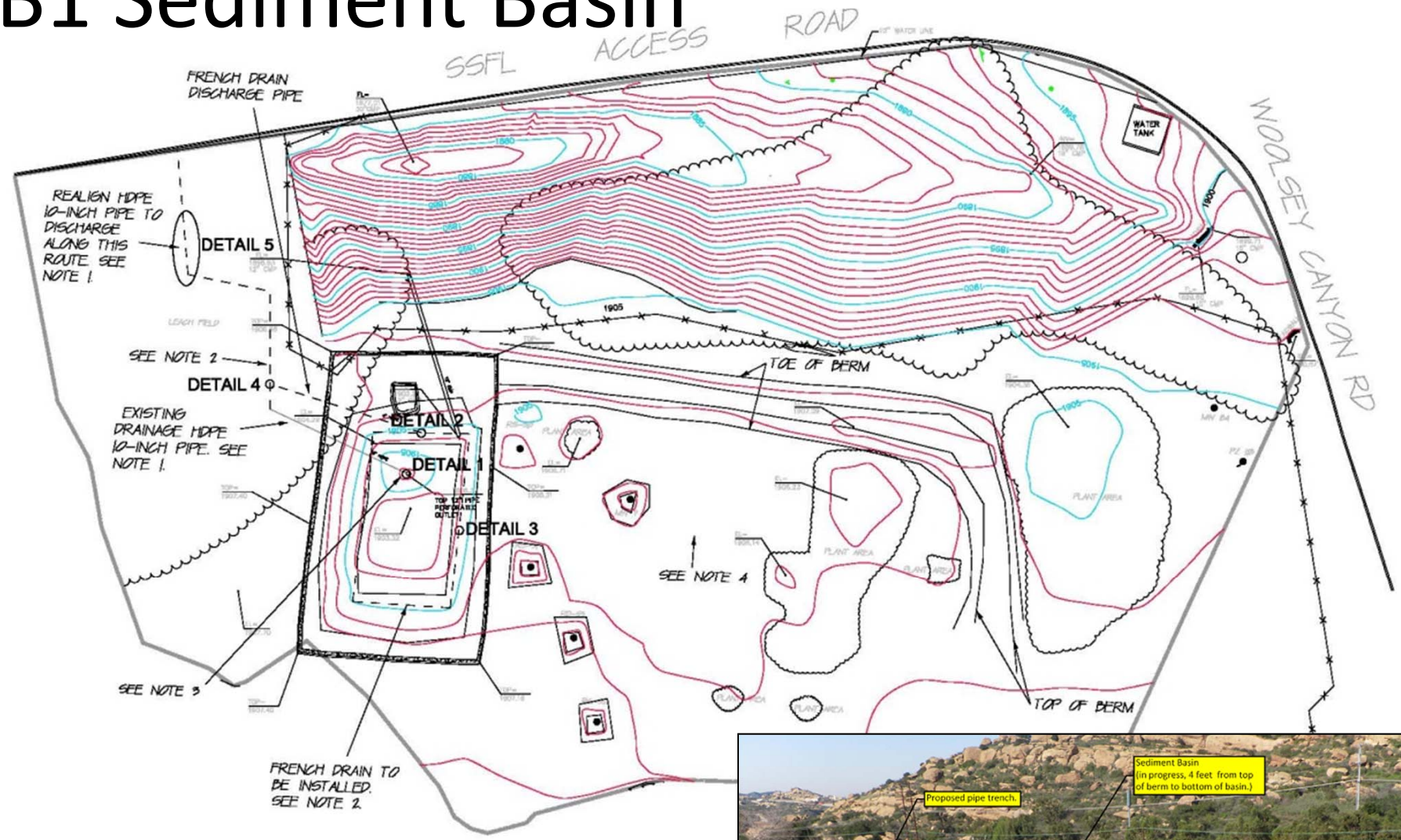


MJ

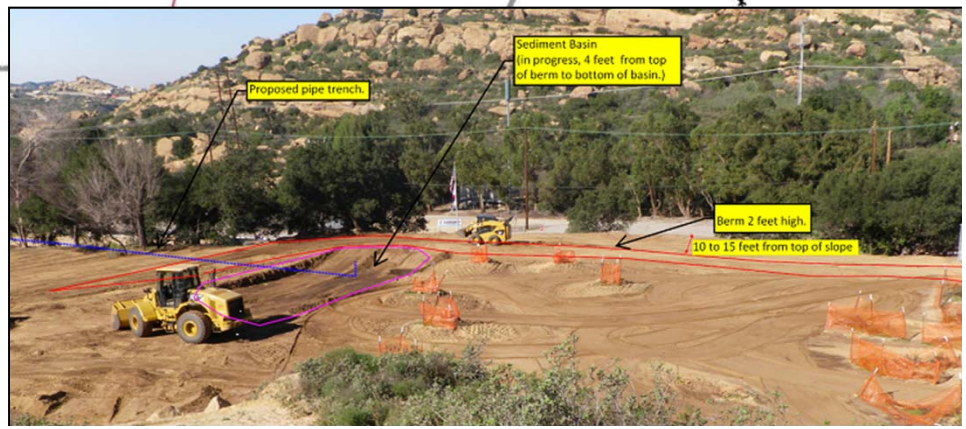

View south onto the lower lot from Sage Ranch property.
Asphalt removal areas in red.
Monument along fenceline.
SCE Power Pole
Asphalt removal
Biofilter
Sediment Basin
Sump
Fence marks the property line between SSFL and Sage Ranch.

MJ

B1 Sediment Basin

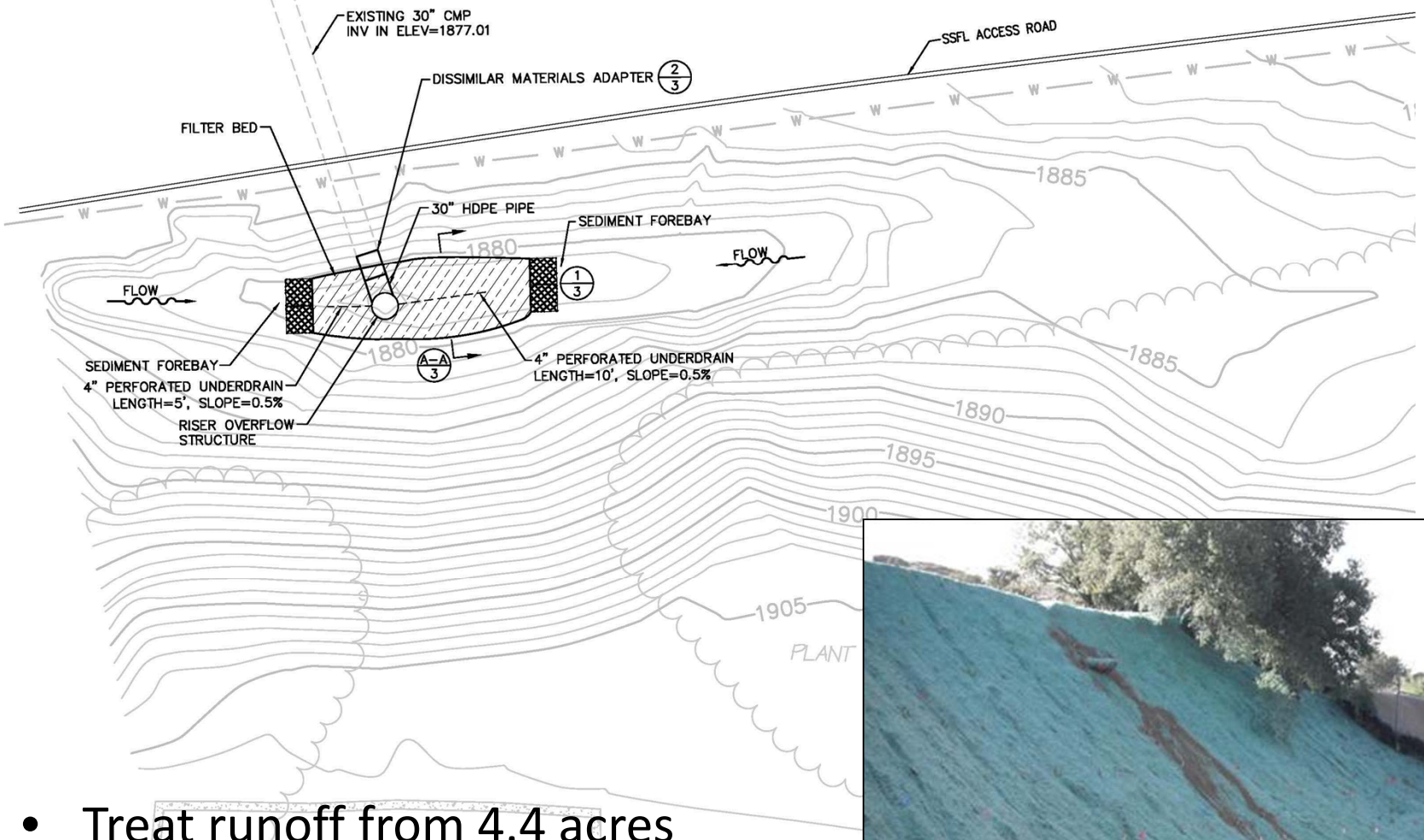


- Treat runoff from ~2 acres including RFI & ISRA areas
- Design complete, construction planned to begin soon



MJ

B1 Culvert Modification



- Treat runoff from 4.4 acres including RFI/ISRA area
- Construction planned to begin soon

ISRA Activities Update

008 Summary:

- 2009: 10 areas, total volume 5,200 cubic yards (cy)

009 Summary:

- 2009: 2 areas, 180 cy
- 2010: 11 areas, 7,500 cy
- 2011: 7 areas (planned), ~7,000 cy
- 2012+: 11 areas (planned), ~9,000 cy
- Erosion controls and/or containerized plants installed at all areas

4. Northern Drainage Restoration, Mitigation and Monitoring Plan (RMMP) Summary

Northern Drainage Cleanup

- 2007-2010 work included debris and impacted soil removal activities, in response to DTSC and RWQCB orders
- Removal work complete, now channel and vegetation restoration can begin, as required under RWQCB order

Channel Erosion Examples

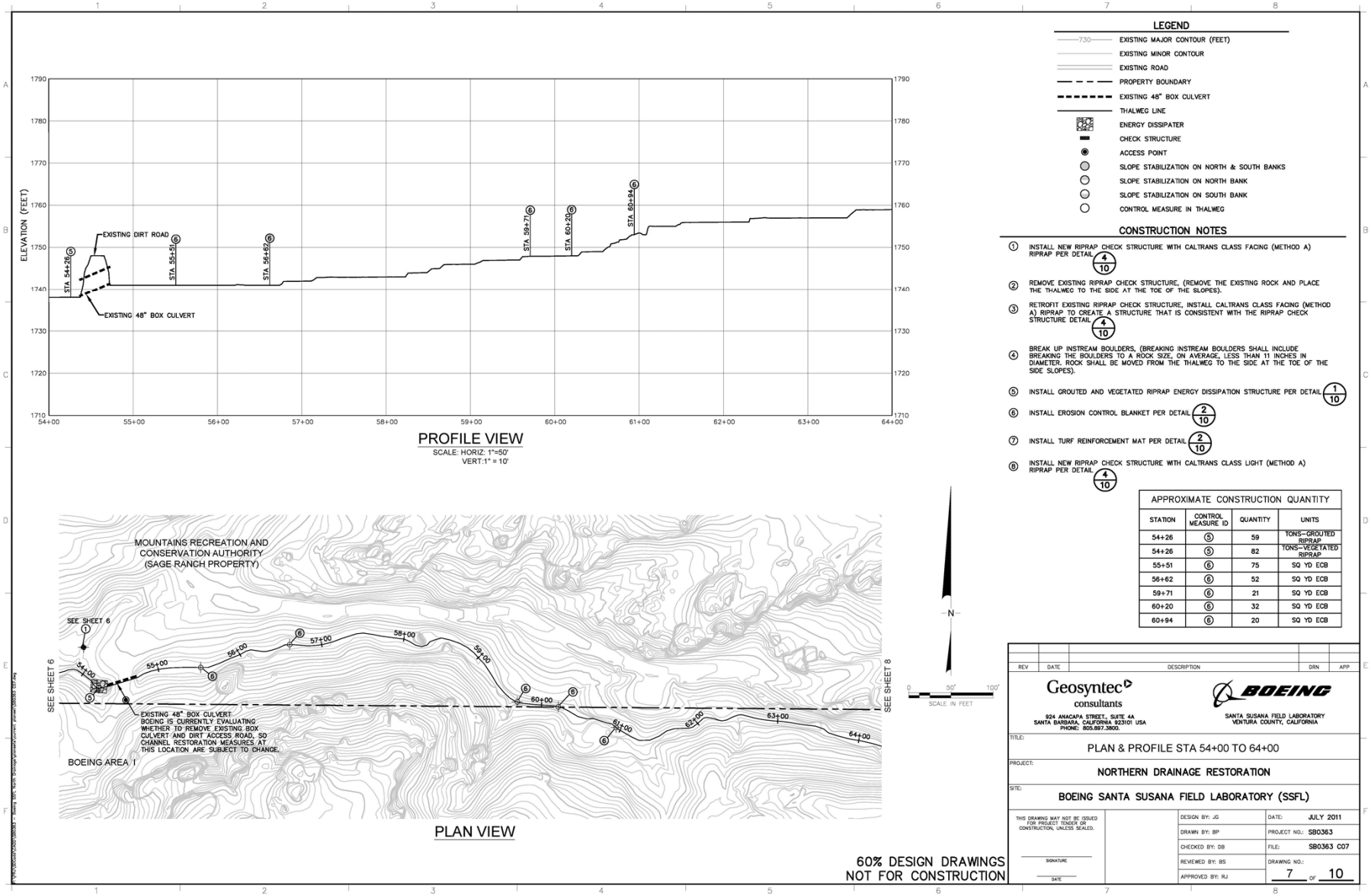
Northern Drainage Restoration

- 2010: Initial channel stabilization measures implemented east of the LOX site
- 2011: Holistic plan (RMMP) developed to identify restoration, mitigation, and monitoring activities along entire length of drainage, for agency review and approval
- 2012: Begin RMMP implementation

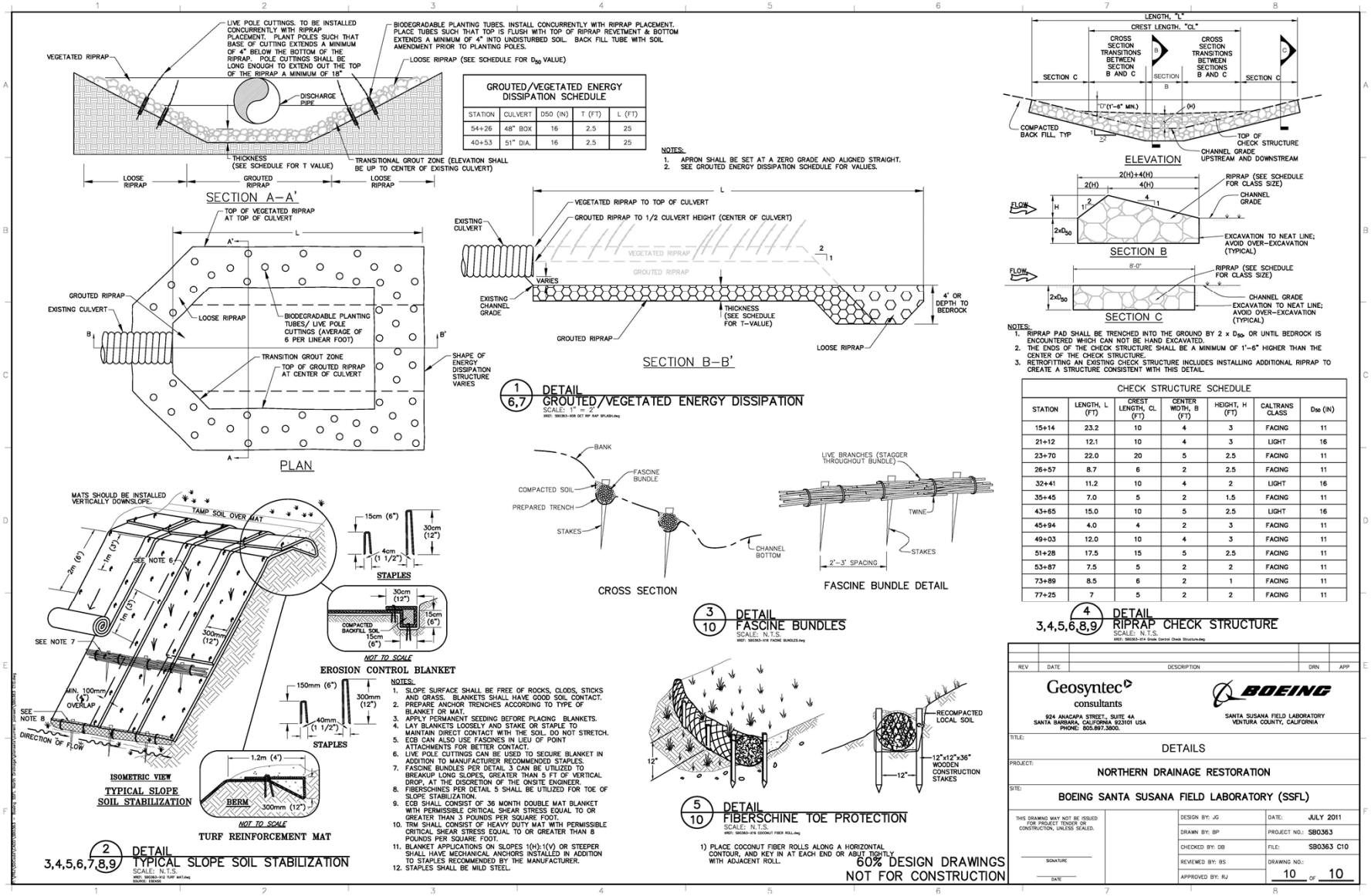
Northern Drainage RMMP Summary

- RMMP will describe/include:
  - Proposed placement of riprap grade controls and in-stream culvert outlet energy dissipation structures, as well as bank protection
  - Design drawings that specify which measure will be sited where, and the quantity of material required for each
  - Mitigation planting and monitoring program

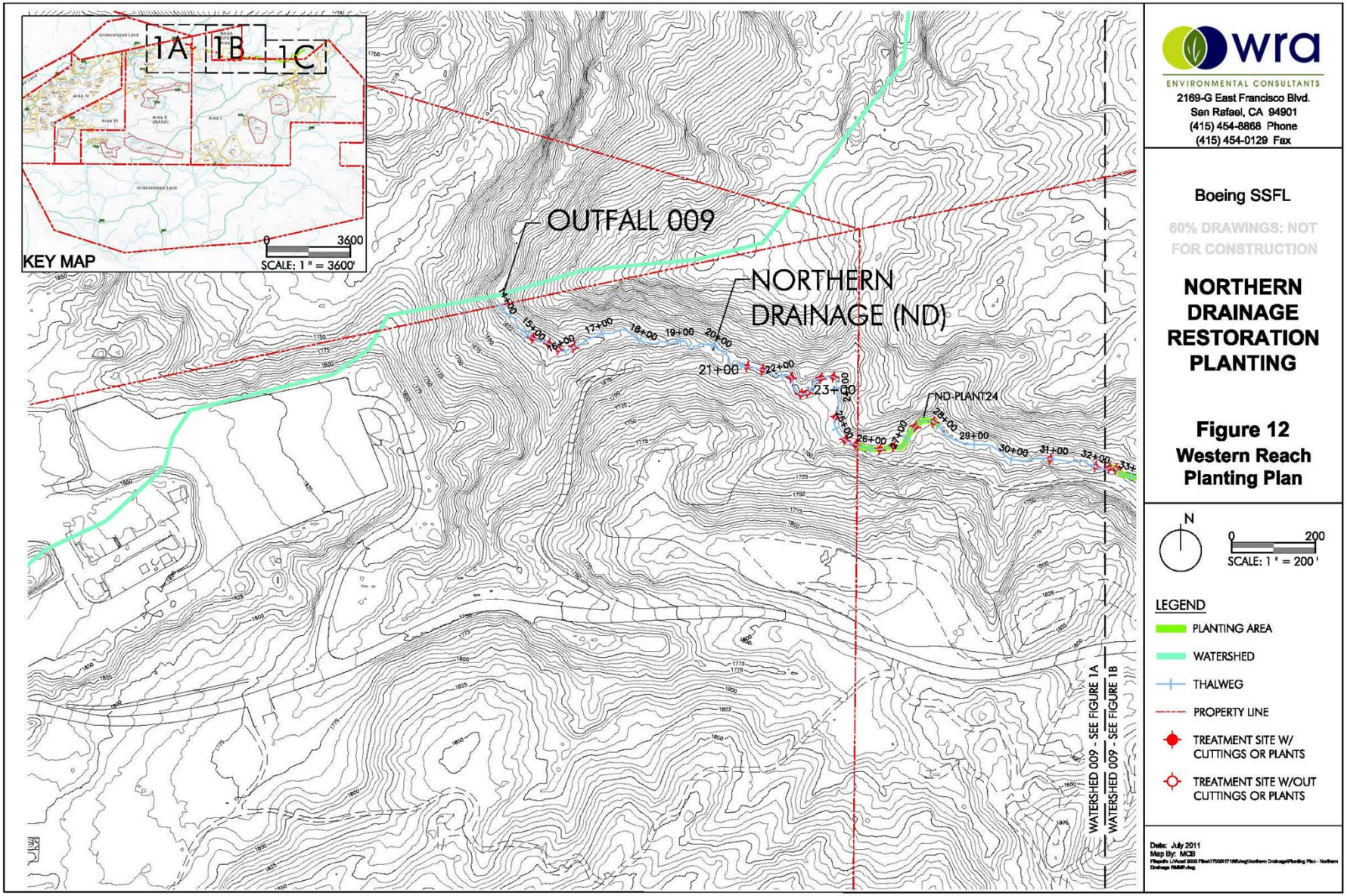
Example Design Drawing



Example Design Details



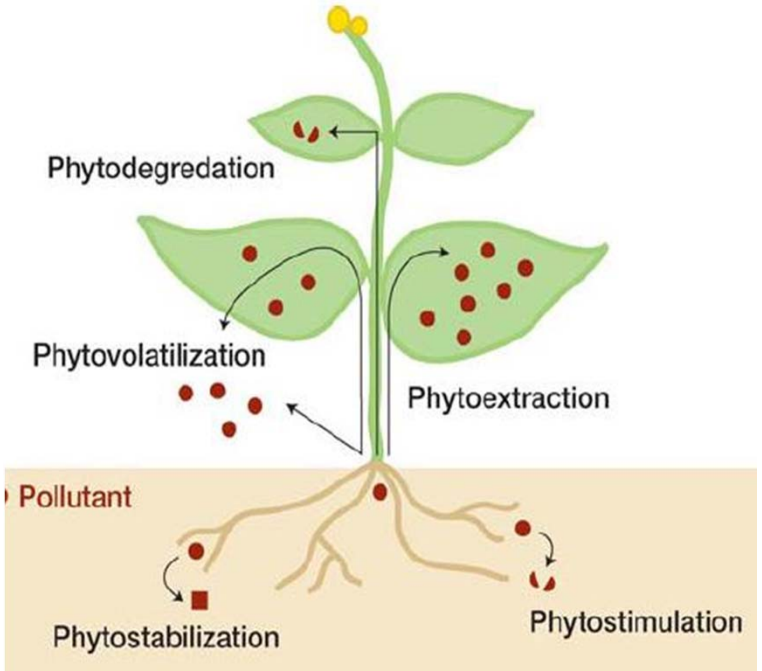
Example Planting Plan



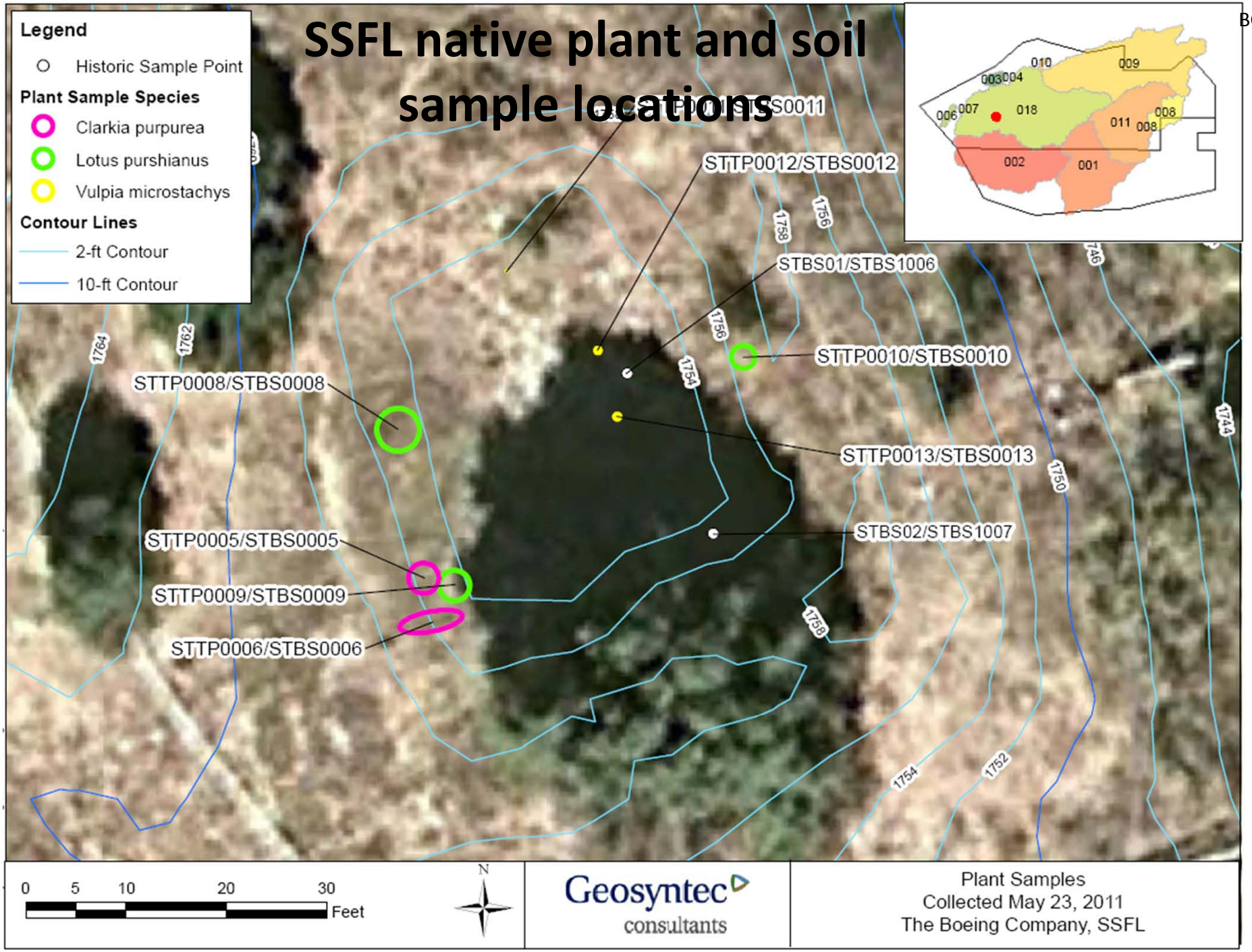
5. Phytoremediation

NIH Phytoremediation Study

- Boeing submitted mercury-impacted soils to a National Institutes of Health (NIH)-funded study to investigate the mercury-accumulating properties of rabbitsfoot grass (a non-native at SSFL)
- Rabbitsfoot grass shown to take up 110 times more mercury than the control plant species, with mercury maintained in roots (which reduces risk of exposure to ecological receptors)
- Proprietary soil amendment was also tested to trigger increased mercury uptake into the roots of rabbitsfoot grass, and it resulted in an accumulation factor of 50 as insoluble HgS
- Rabbitsfoot grass is NOT currently recommended for planting at SSFL, rather this off-site study represented an opportunity to evaluate the effectiveness of a known mercury hyperaccumulator



BG


SSFL native plant and soil sample locations
Legend
Historic Sample Point
Plant Sample Species
Clarkia purpurea
Lotus purshianus
Vulpia microstachys
Contour Lines
2-ft Contour
10-ft Contour
STTP0012/STBS0012
STBS01/STBS1006
STTP0010/STBS0010
STTP0008/STBS0008
STTP0013/STBS0013
STBS02/STBS1007
STTP0005/STBS0005
STTP0009/STBS0009
STTP0006/STBS0006
010
009
003004
006
007
018
008
011
008
002
001
1764
1762
1758
1756
1746
1754
1744
1750
1752
0 5 10 20 30
Feet
N
Geosyntec consultants
Plant Samples
Collected May 23, 2011
The Boeing Company, SSFL

Phytoremediation Study with Native Grasses

- Onsite plant sampling to evaluate native species for similar mercury-accumulating properties as rabbitsfoot grass (which is a naturalized non-native)
- Three native plant species collected in watershed 018, in a pond area known to have elevated soil mercury concentrations: winecup clarkia, Spanish clover, and small fescue
- Plant-to-soil mercury ratios ranged from 0.0 to 11.3, indicating that none of the tested, native plant species would be effective for phytoremediation purposes
- Possible future work to further study naturalized non-native grasses, if acceptable to agencies and others

008/009 Next Steps

- Surface water monitoring (NPDES, ISRA, CM, and BMP), including:
  - Annual data evaluation
  - Annual consideration of new BMPs through 2014
- Public tour of new BMPs in 009 watershed -- late 2011 or early 2012
- Implement recommended activities:
  - Northern Drainage RMMP
  - Additional 009 ISRA areas
  - Asphalt/building demolition
  - New BMPs

Questions

For more information on Outfall 008 & 009
ISRA and BMP planning, please visit:
http://www.boeing.com/aboutus/environment/santa_susana/isra.html
Slides from this presentation will be posted here soon.