IMPROVING THE EFFICIENCY OF AN EXISTING GROUNDWATER REMEDIATION SYSTEM

LeeAnn Thomas – Director, Environmental Remediation

Aimee Zack – Manager, Environmental Remediation

Golder Associates

CP

CORPORATE SUSTAINABILITY CREATES VALUE

- Corporate sustainability creates value

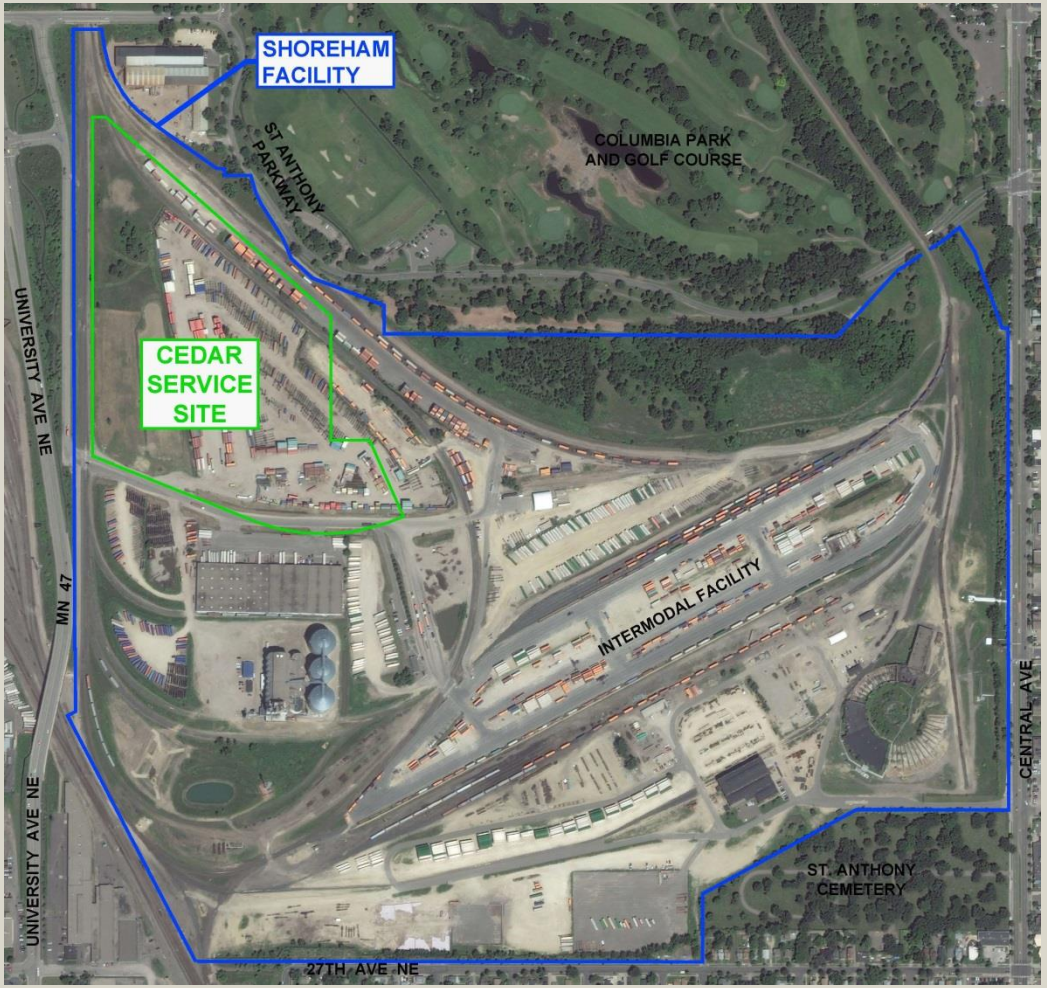
- Improve the efficiency, cost-effectiveness and sustainability of environmental remedies

SITE BACKGROUND

- The Shoreham Facility
- 230 acres
- Northeast Minneapolis, Minnesota
- Railroad operations by CP and its predecessors from the late 1880s.

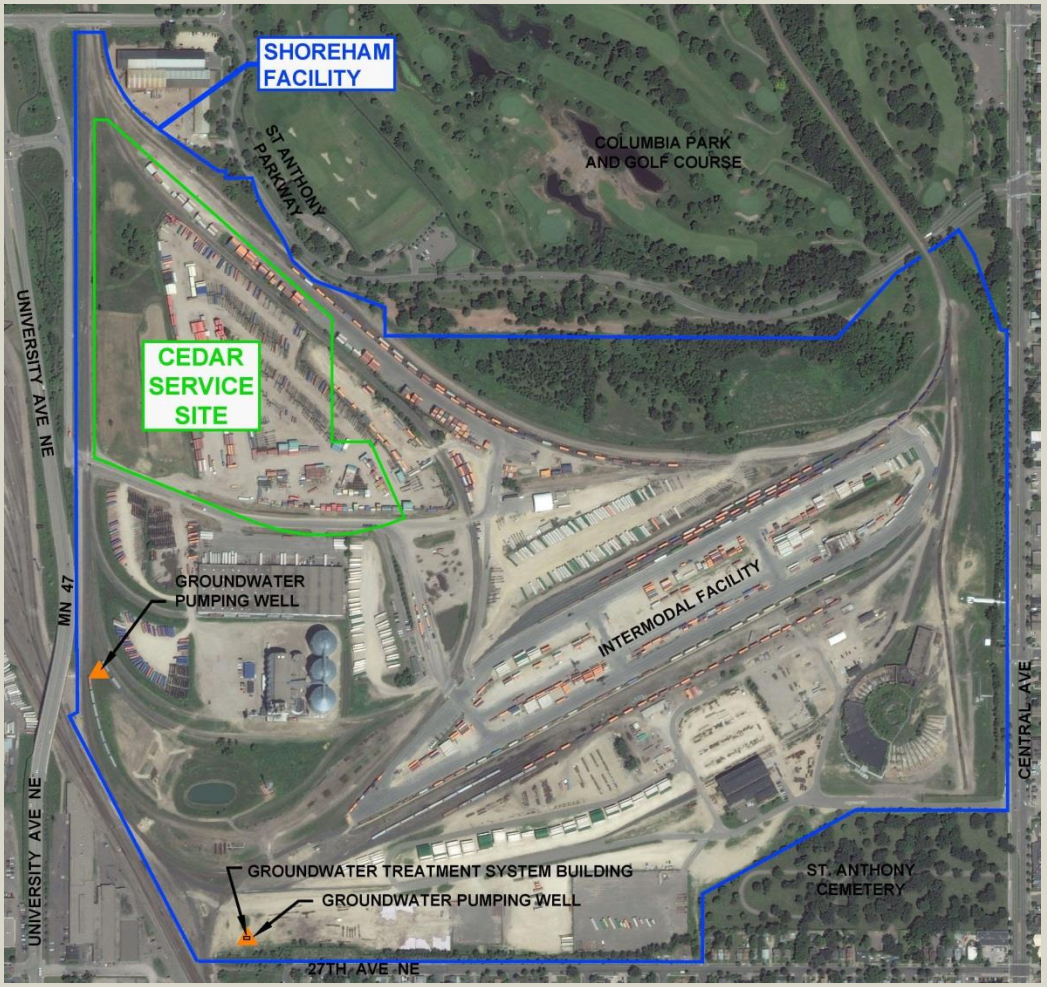
CORRECTIVE ACTIONS: SOIL

- 1926-1972-Wood treating lessee
- PCP release
- Soil Corrective actions included:
  - Excavation
  - On-site soil treatment



CORRECTIVE ACTIONS: GROUNDWATER

- The selected groundwater remedy included 2 groundwater recovery wells



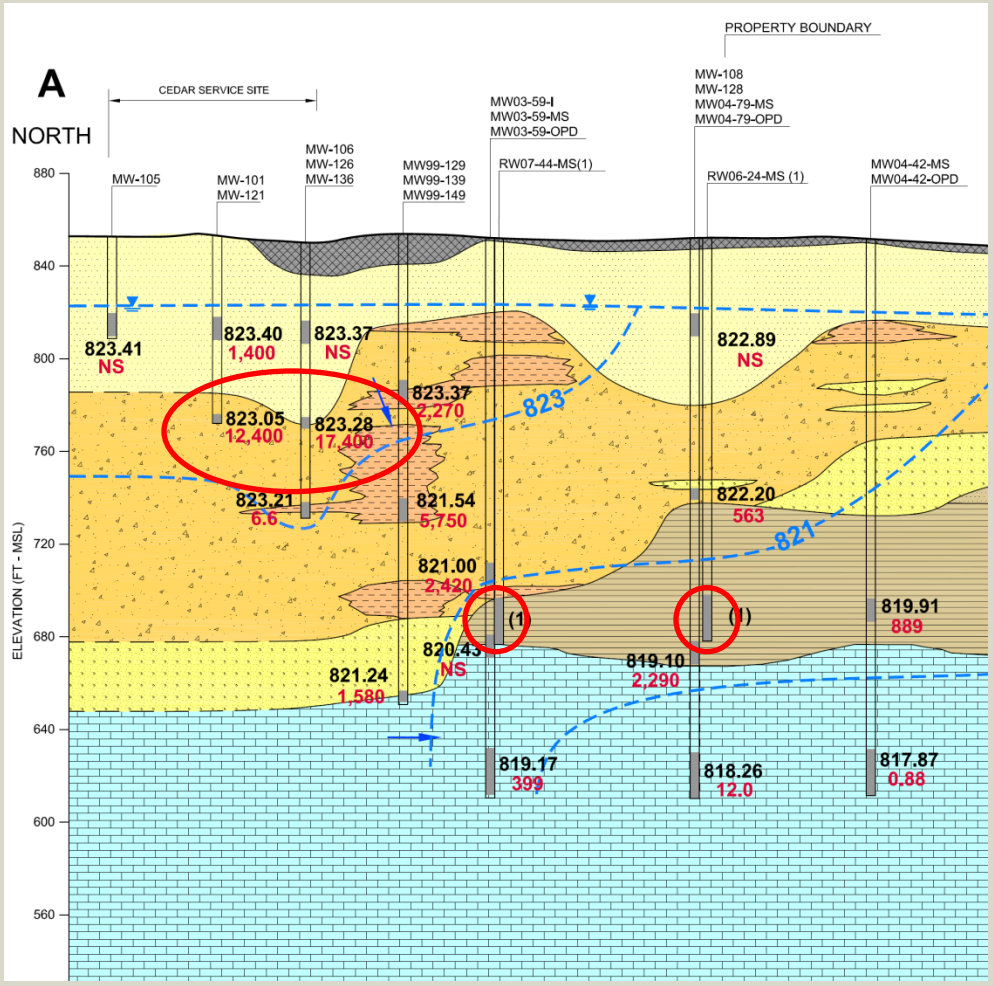
CORRECTIVE ACTIONS: GROUNDWATER

- Groundwater is treated with Granular Activated Carbon (GAC).

- Treated water was discharged under permit to the municipal sewage treatment plant.

CORRECTIVE ACTIONS: GROUNDWATER

- Groundwater flow
- The two groundwater recovery wells are screened 155-175 ft bgs



GROUNDWATER REMEDY ASSESSMENT

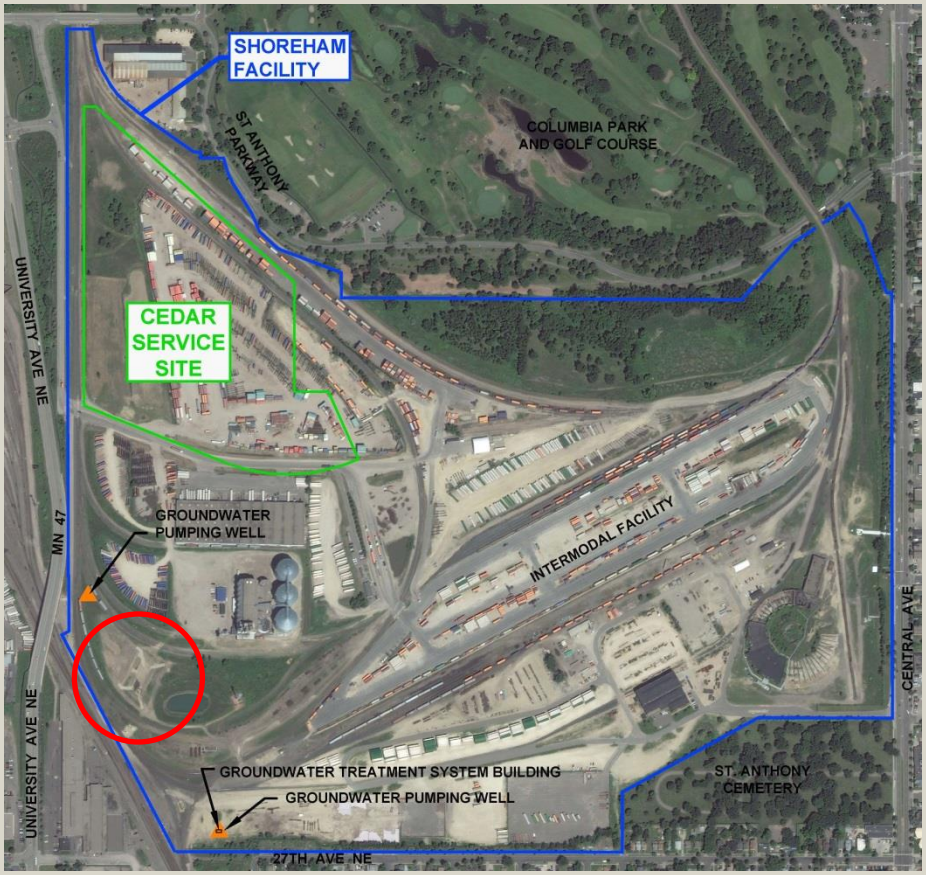
- Monitoring demonstrated that the treatment system is effective
- Depleted the groundwater resource
- Incurred unnecessary cost
- Long term use of energy resources

REMEDY ENHANCEMENT OBJECTIVES

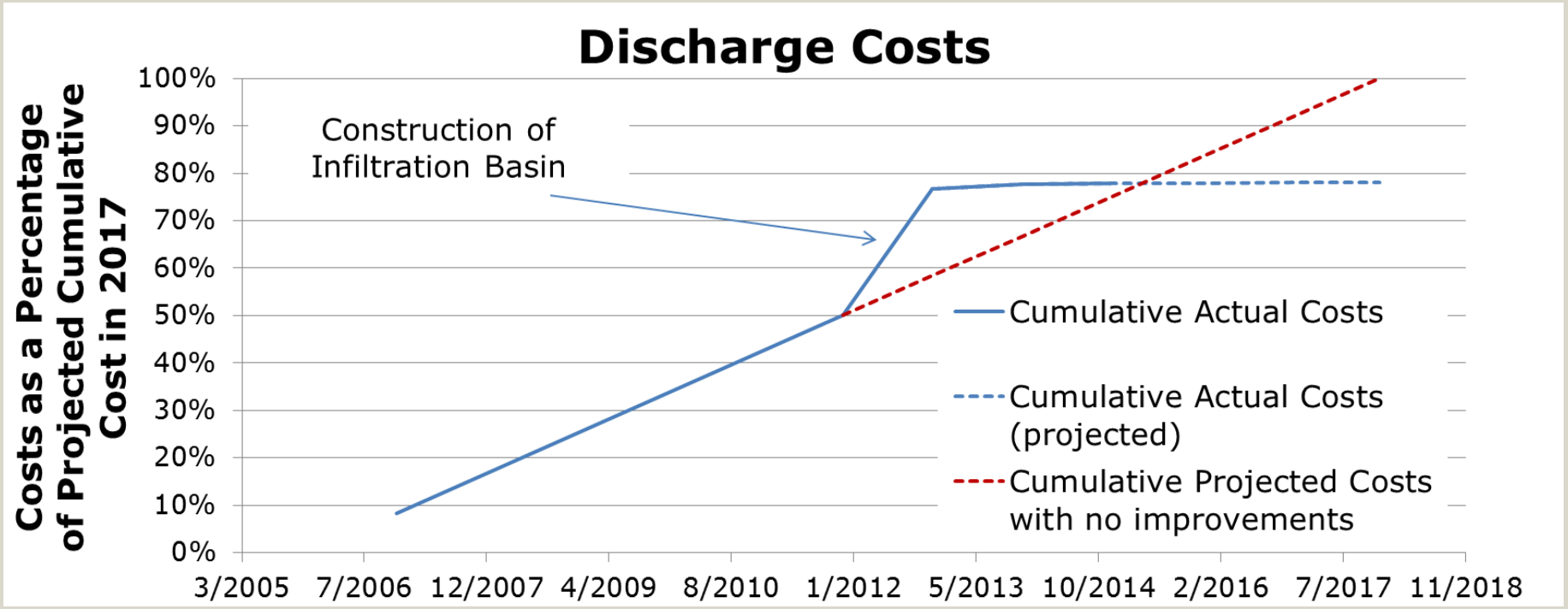
- **Reduce**
  - The impact on the groundwater resource
  - The load on the municipal infrastructure
  - The cost of the system's operations and maintenance
- **Maintain** the same remedial effectiveness

GROUNDWATER SYSTEM IMPROVEMENTS

- Objectives achieved
- Constructed an infiltration basin:
  - Regulatory agency support
  - Provided recharge
  - Reduced the load on municipal infrastructure
  - O&M costs significantly reduced



RETURN ON INVESTMENT: INFILTRATION BASIN



GROUNDWATER SYSTEM IMPROVEMENTS

- Treated water discharged under NPDES permit

- Advantages
  - Space available on property
  - Lithology allows for easy infiltration

- Challenges
  - Directional drilling
  - Procedural changes to maintain water flow in pipes
  - Establish vegetation in sand

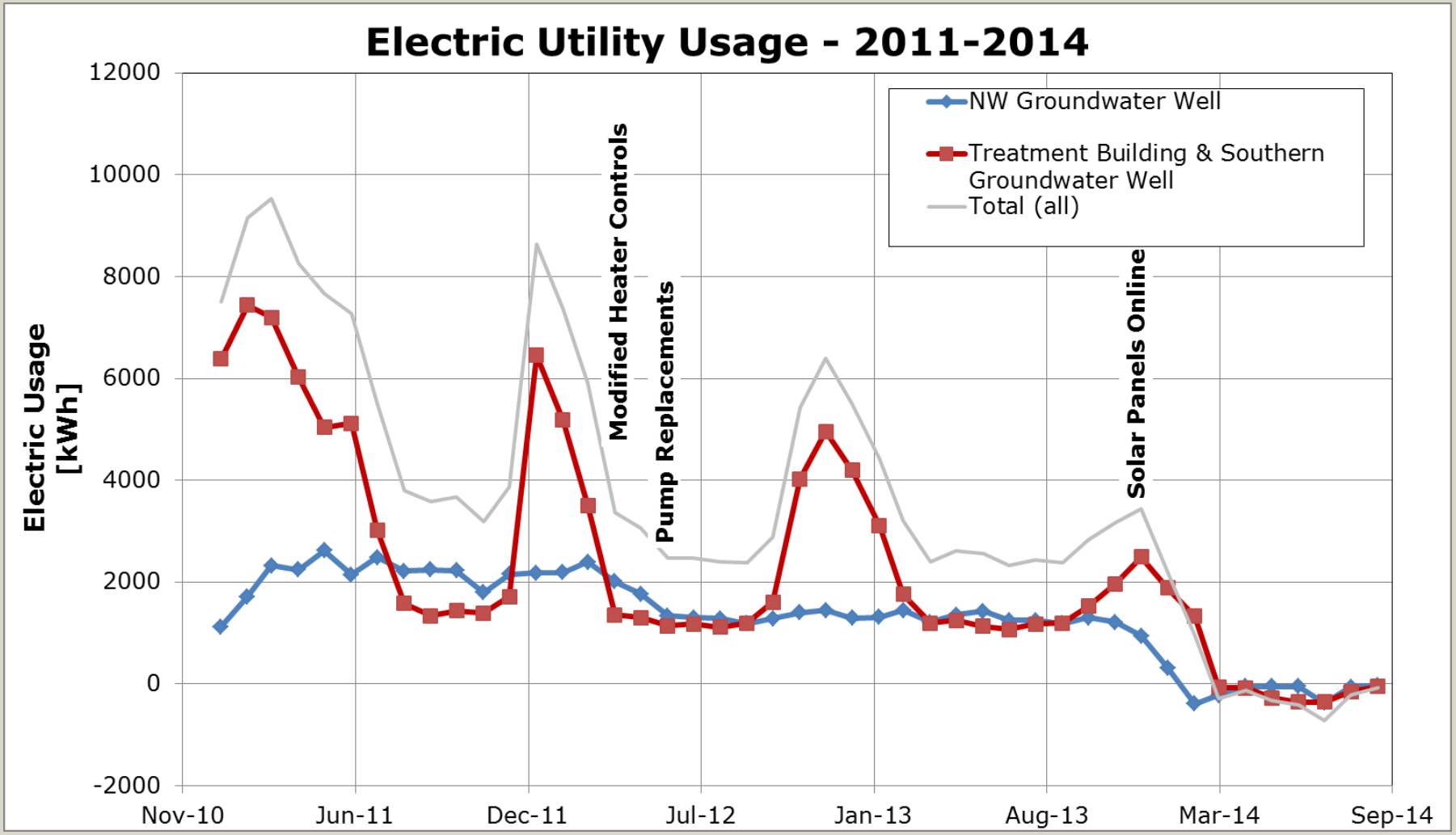
GROUNDWATER SYSTEM ENERGY IMPROVEMENTS

- Took advantage of available rebates to install solar panels
  - Southern Solar Array: 60 panel system (11.7 kilowatt total)

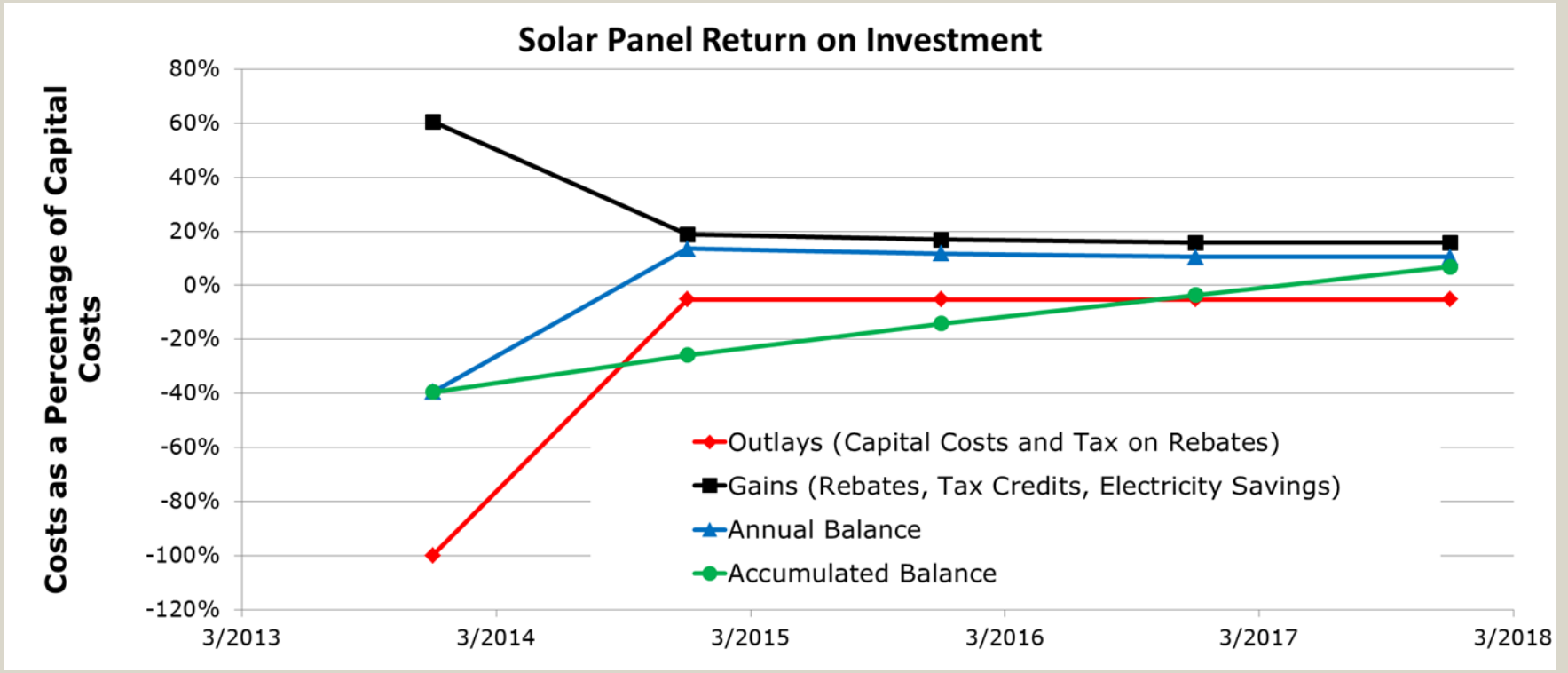
GROUNDWATER SYSTEM ENERGY IMPROVEMENTS

– Northern Solar Array: 56 panel system (10.9 kilowatt total)

ENERGY IMPROVEMENT BENEFITS



RETURN ON INVESTMENT: SOLAR PANELS



CONCLUSION

- Infiltration basin created a sustainable groundwater remediation system
- Reduced consumption of grid energy with solar panel arrays
- Long-term operations and maintenance costs were significantly reduced

THANK YOU!

Questions?