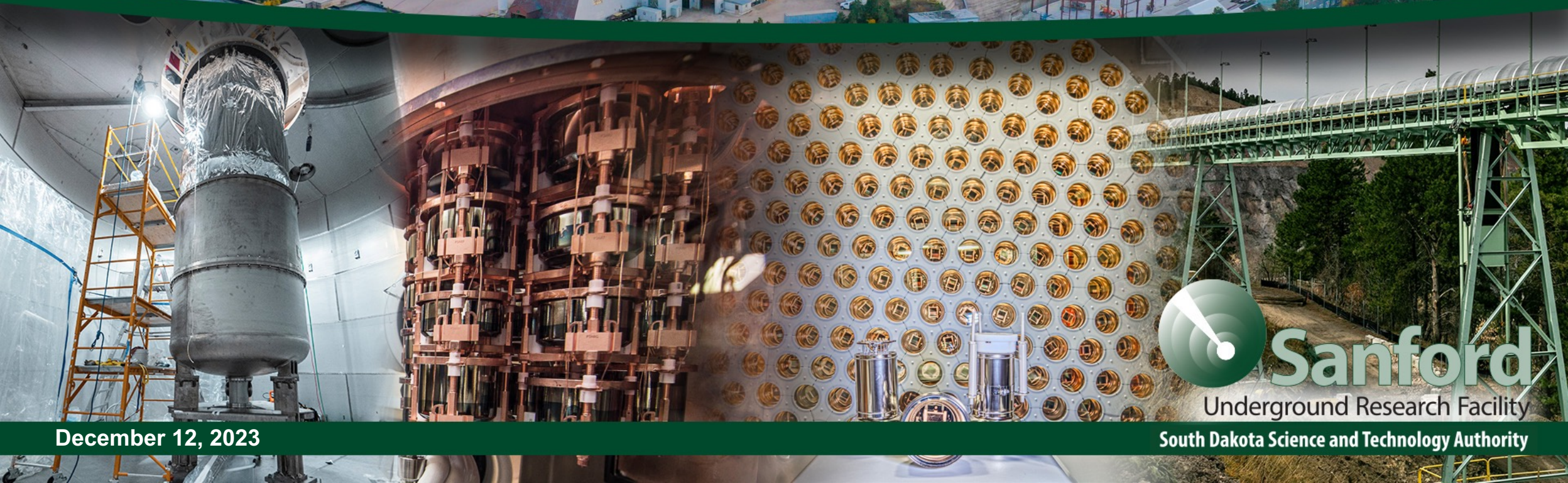
# Sanford Underground Research Facility Update
## Town-Hall Meeting

Mike Headley
Executive Director



Sanford Underground Research Facility

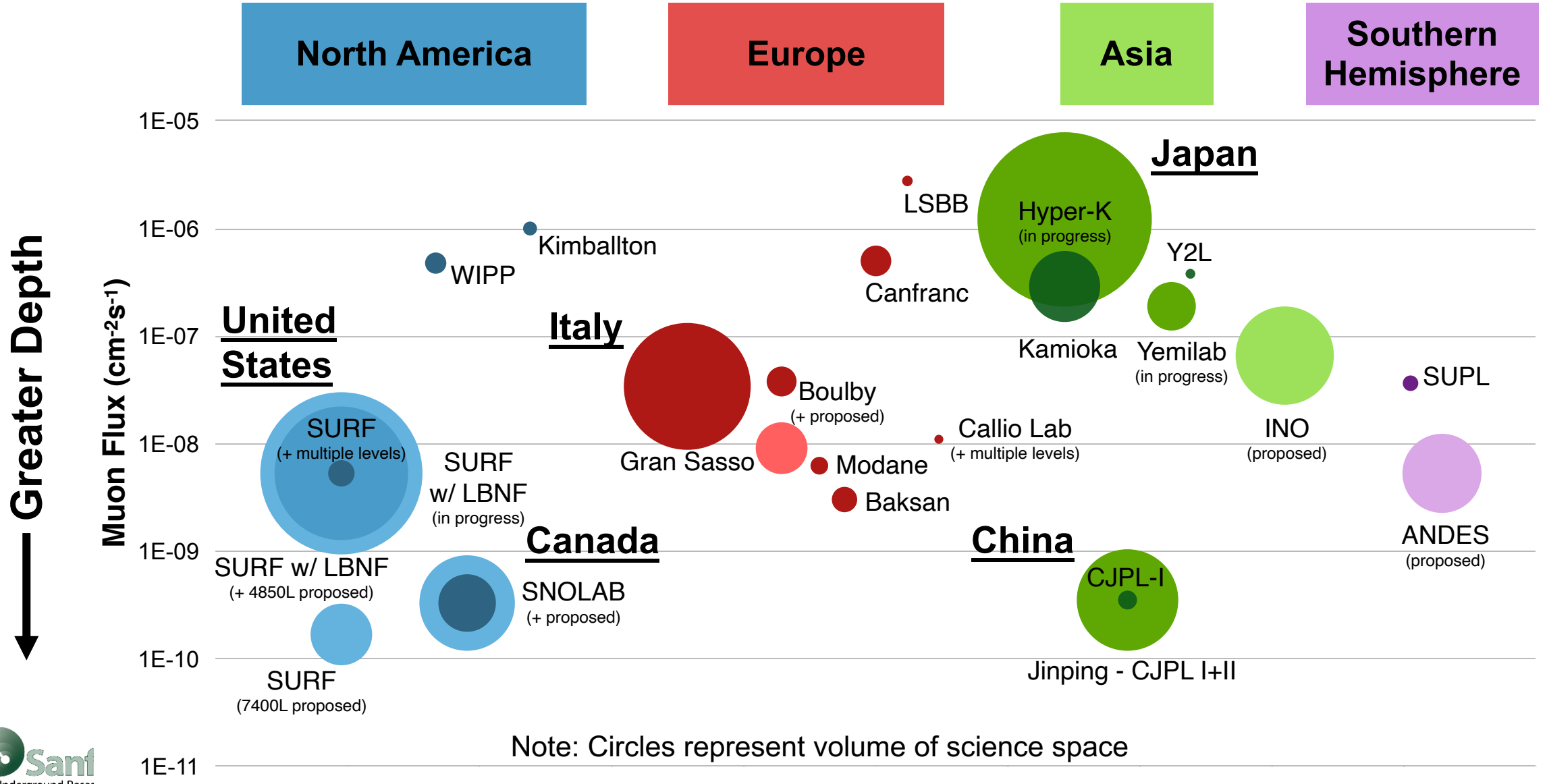
December 12, 2023

South Dakota Science and Technology Authority

# Agenda

- 4850L Expansion Drift Project
- Plans for rebuilding the Yates Shaft
- Cooperative Agreement 2.0
- Safety Milestone

# Competing Underground Facilities



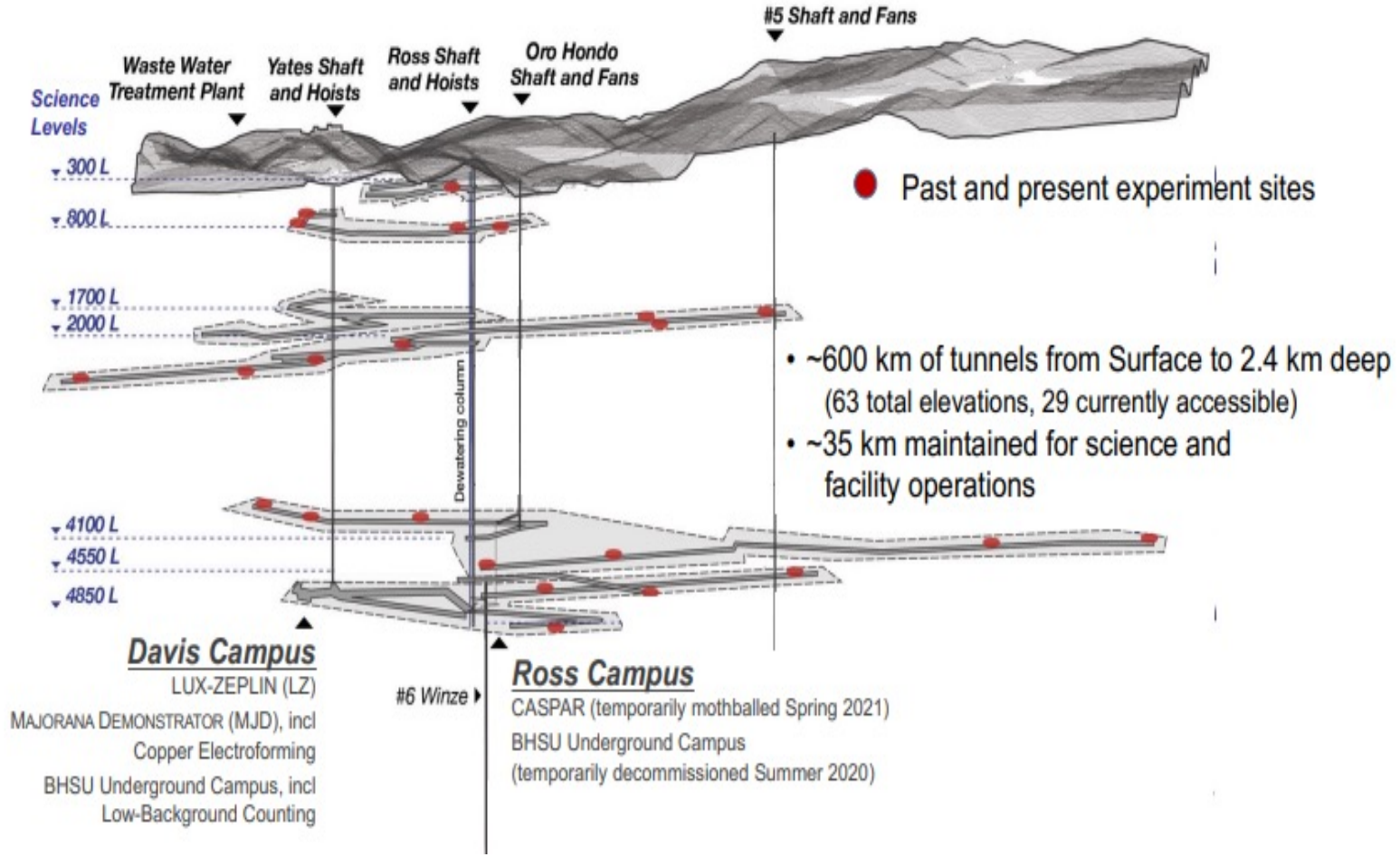
# 2024 Particle Physics Strategic Plan Released Dec 7

## 10 year strategic plan with a 20 year vision

- SURF summary: With SURF, the **US has created a premier underground laboratory** that is built on a decades-old, **distinguished history**. The realization of this **facility adds unparalleled infrastructure capability to the suite of national laboratories in the US**. This facility enables the US to be **an international host** for future neutrino and dark matter experiments.
- Generation 3 Dark Matter: Investment in the **expansion of SURF** would enable such siting. A second, complementary G3 experiment would maximize the discovery potential.
- Recommendation 2.b: Re-envisioned second phase of DUNE with an early implementation of an enhanced 2.1 MW beam, **a third far detector**, and an upgraded near-detector complex as the definitive long-baseline neutrino oscillation experiment of its kind.
- Recommendation 2.d: An **ultimate Generation 3 (G3) dark matter direct detection experiment** reaching the neutrino fog, in coordination with international partners and preferably sited in the US.
- Recommendation 4e: R&D and eventual construction of a **DUNE fourth far detector**.
- Area Recommendation 14: To **provide infrastructure for neutrino and/or dark matter experiments**, we recommend **DOE fund the cavern outfitting of the SURF expansion**.

# SURF UG Laboratory Expansion – Mission Needs

- Essentially all near term and existing UG lab space at SURF is fully subscribed.
- Expansion of UG laboratory space at multiple levels is needed to keep SURF attractive to developing/future science needs.
- Next-generation experiments would require space to be available ~2030
- SURF is playing a strong role in the UG Science Community:
  - **User Association** serving as a catalyst for community discussions to leverage future planning.
  - **Strong Community Support** endorsing more space at SURF (Vision Workshop 2021, Snowmass 2021).
  - Anticipating strong recognition and support for SURF in upcoming **P5 report for U.S. strategic planning.**



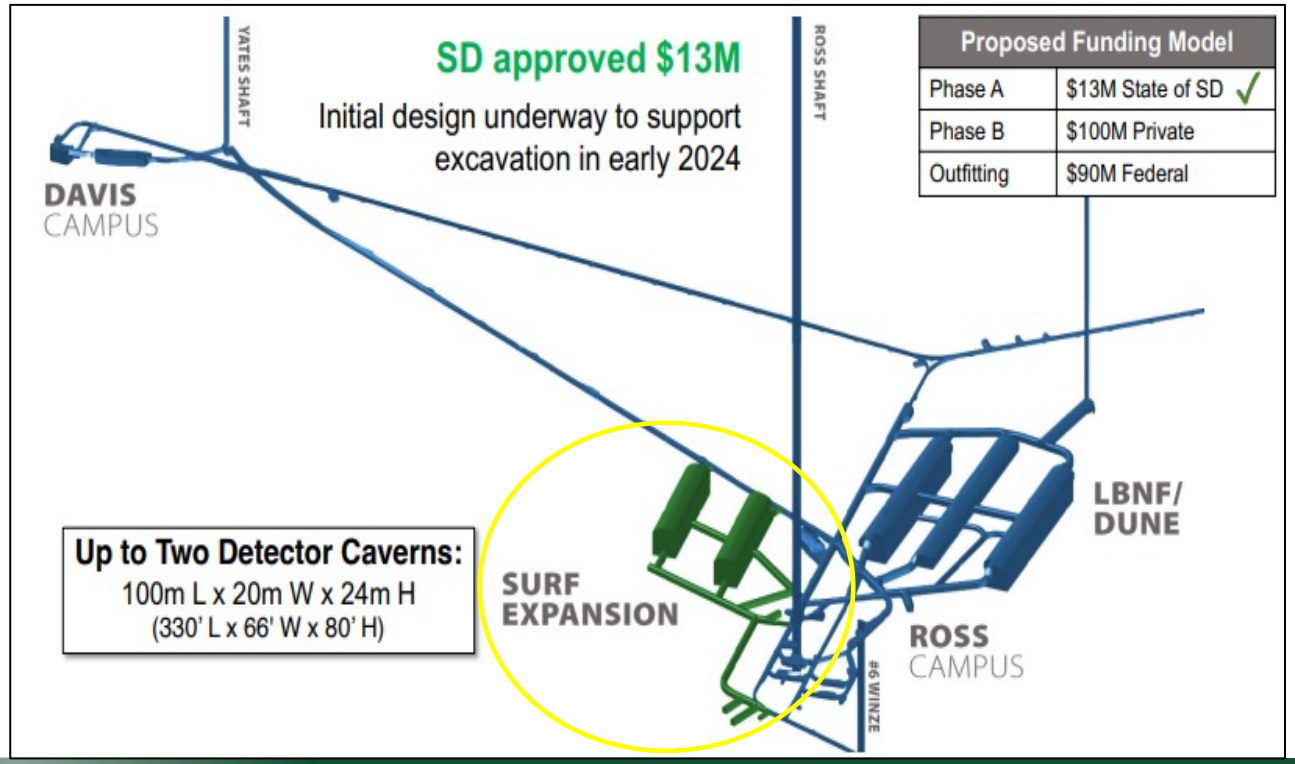
# 4850L SURF UG Laboratory Expansion

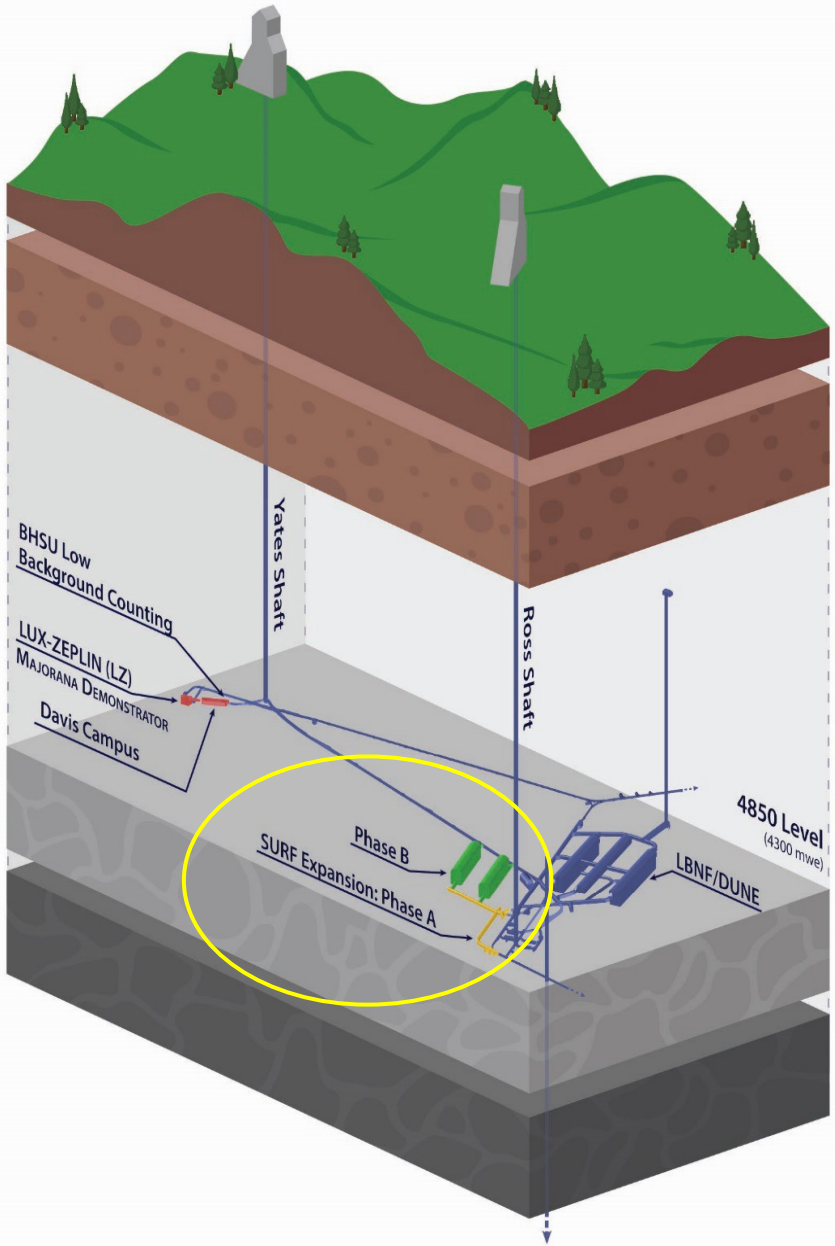
## Two Phases of Development

- Phase A : By-Pass Drift for ventilation, waste rock handling/access development, set-up for Phase B mobilization.
  *6 to 7 month duration - 2024 excavation timeframe*

- Phase B: Construction of two large science-detector caverns, utility areas, primary access drifts.
  *Possible 2028 – 2030 excavation timeframe*

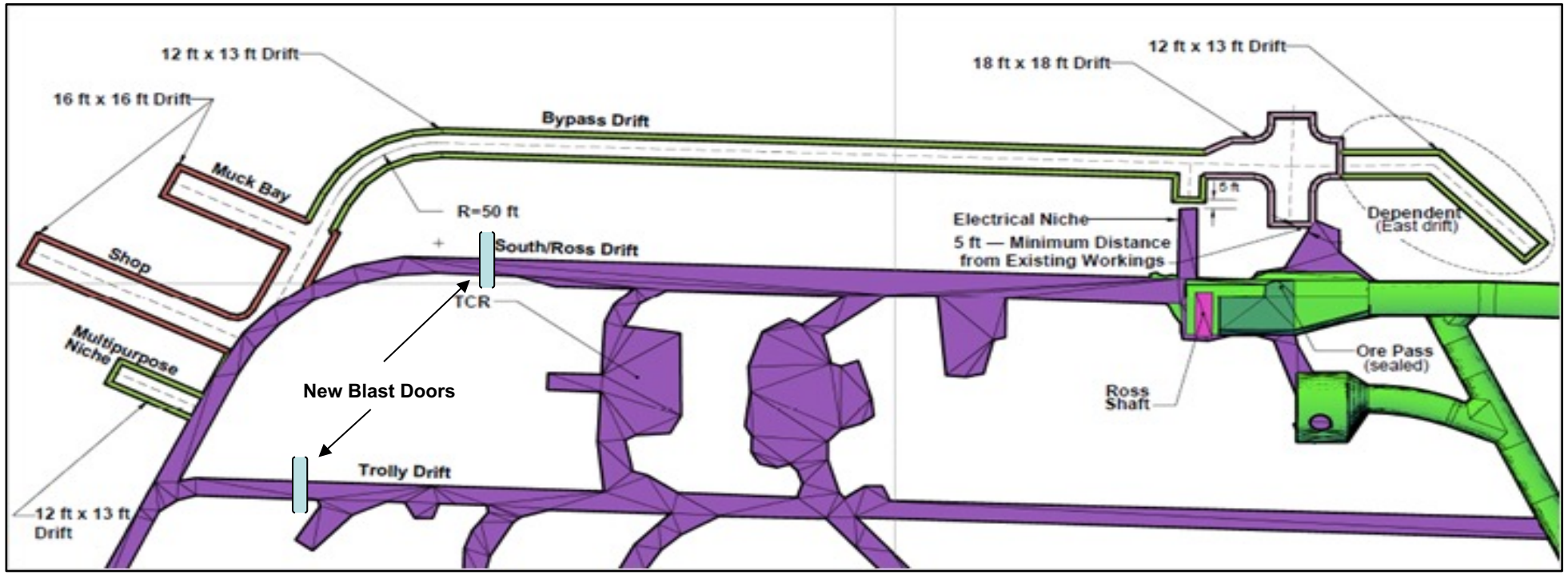
4850L UG Laboratory Expansion




Sanford Underground Research Facility

# 4850L Laboratory Expansion – Phase A  By-Pass Drift Excavation
## Project Status & Timeline




- Currently in the final stages of design.
- 95% Design due mid December 2023, construction proposals due late December 2023.
- Finalize design, negotiate & award construction contract - January 2024.
- Expected mobilization for excavation – March 2024.
- 6 - 7 month project duration.
- Project completion & closeout – currently tracking September/October 2024.

- Workforce of 47 people
- 24-7 operation

# Yates Shaft Rehabilitation – Mission Need

Why do we need Yates Shaft?

- Per code, MSHA requires two or more separate, properly maintained escapeways to the surface from UG facilities.

***Both the Ross and Yates shafts are required to meet this code***

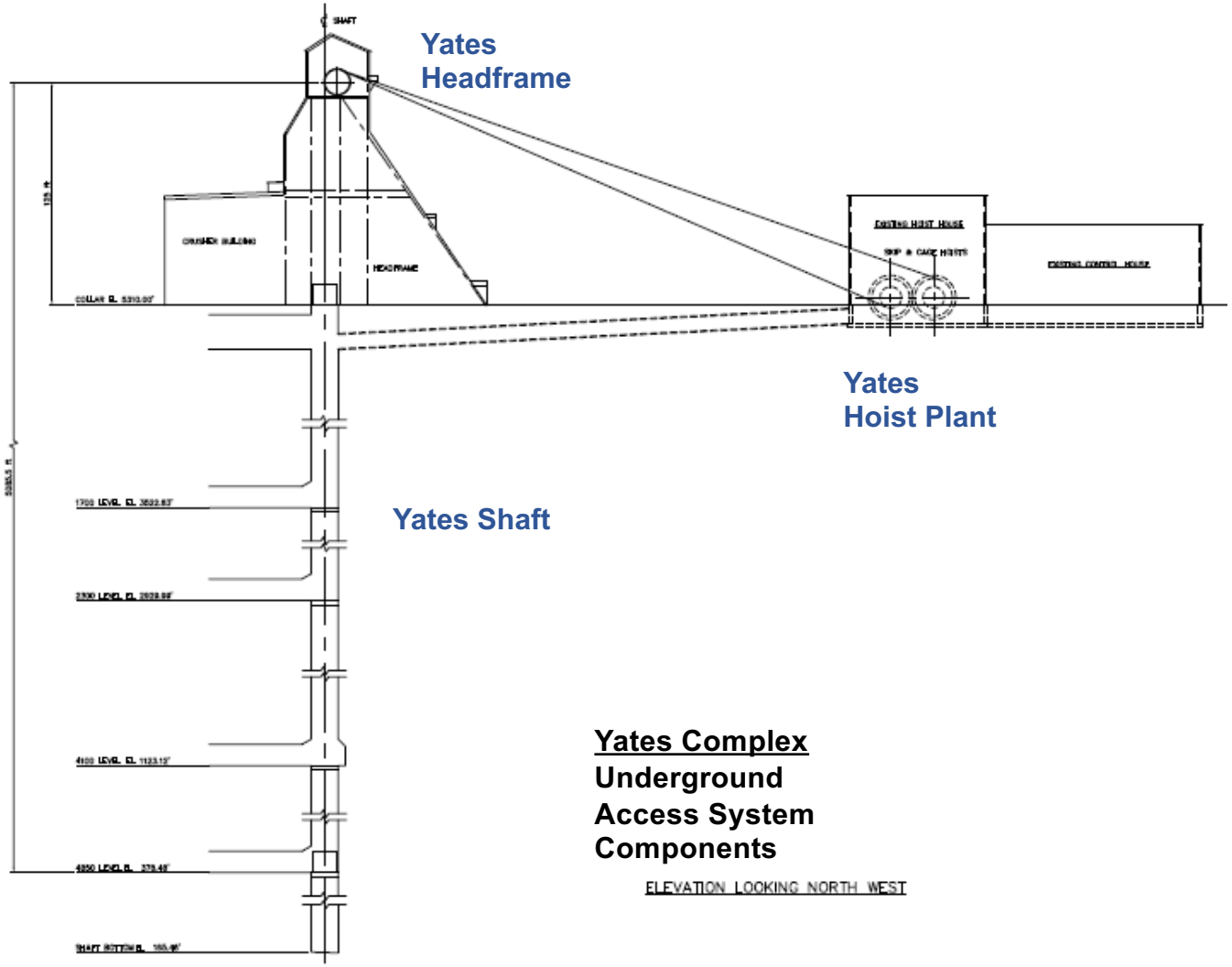
- Yates shaft is the secondary access/egress for LBNF/DUNE and the primary access/egress for Davis Campus, 4100L geology experiments, and 1700L CAT lab

***A fully updated & operational Yates Shaft is integral to SURF's future***

# Yates Shaft Rehabilitation

## Hoists, Headframe & Shaft Evaluation

- **Hoists** - Drives, Brakes & Clutches Upgrades (Cage & Skip Hoists)
  - *1930's hoist electro-mechanical controls technology and non-redundant braking systems require modernization*
- **Headframe** – 1930's structure is in good condition
  - *Recommend ongoing inspection & monitoring plan. Do not modify or trigger new building codes*
- **Shaft Timber** – 1930 to 1940's timber shaft is in poor condition
  - *Timber has reached the end of its useful life*
  - *Costs to maintain shaft are expected to significantly rise*
  - *Recommend replacement with steel sets in near future*




**Stantec performed an evaluation of the whole Yates UG access system**

# Yates Shaft Rehab – Schedule Overview

## FY 24

**Early Work projects**

- UG electrical install
- Begin hoist upgrades

**Shaft Rehab**

- Project planning and concept design

## FY 25

**Early Work projects**

- Hoist upgrades continue

**Shaft Rehab**

- Procurement and award of design/build contract

## FY 26

**Early Work projects**

- Complete hoist upgrades

**Shaft Rehab**

- Final Design
- Mobilization

## FY 27 - FY 29

**Shaft Rehab**

- Construction

# Cooperative Agreement #2

- We are in the final year of our first 5-year Cooperative Agreement with DOE for day-to-day SURF Operations.
- DOE has asked SDSTA to submit a proposal to continue SURF Operations via a second Cooperative Agreement with the Office of Science.
- CA#2 will provide financial assistance for operations through September 2029.
- The current scope will remain in force with the following DOE-requested additions:
  - Upgrade Yates Shaft hoists as an “early works” project to prepare for Yates Shaft Rehab.
  - Establish and staff a 24x7 operations control center.
  - Develop and implement a more formal facility configuration control process.
  - Augment ESH with additional MSHA-trained staff.

# Cooperative Agreement #2

- Key Infrastructure Improvement Projects include:
  - Yates Hoist upgrades (FY24-FY26)
  - Continued pump room rehabilitation (FY24-FY26)
  - Electrical distribution upgrades (FY25-FY26)
  - Ellison Hill reconstruction and new entrance (FY26-FY27)
  - Yates Shaft rehabilitation (FY27-FY29)
- Additional items to address:
  - Add positions to expand support for LBNF/DUNE.
  - Recommend additional positions where staffing is lean or to address new requirements.
- CA#2 proposal will be submitted in mid-January for a September 2024 award.

# Safety Performance Data

## Over two years of performance with no lost time injuries

| Days Away Restricted or Transferred FREE<br>*(July 1st, 2021 – October 31st, 2023)* | |
|---|---|
| SDSTA | 786,871 hours |
| Researchers | 58,735 hours |
| Contractors | 63,622 hours |
| **Combined** | **909,228 hours** |