



**Safety and Operations Committee**

**Board Information Item III-B**

**March 11, 2021**

**Silver Line Phase 2 Update**

Washington Metropolitan Area Transit Authority

## Board Action/Information Summary

☐ Action ☒ Information

MEAD Number:  
202255

Resolution:  
☐ Yes ☒ No

### TITLE:

Silver Line Phase 2 Update

### PRESENTATION SUMMARY:

Staff will present the Board with an update on the status of Silver Line Phase 2 open issues including an outline of key activities that have to be completed prior to Acceptance.

### PURPOSE:

To provide the Safety and Operations Committee with an update on open issues on the Silver Line Phase 2 project.

### DESCRIPTION:

**Capital Rail Constructors**, a joint venture of **Clark Construction Group, LLC** and **Kiewit Infrastructure South Co.**, is the design-build contractor for Package A of the Silver Line Phase 2 (mainline and stations), and **Hensel Phelps Construction Company** is the design-build contractor for Package B (Dulles Rail Yard). Major subcontractors and consultants under these entities include **Mass. Electric Construction Company**, **Parsons Corporation**, **Dewberry**, **Systra**, and **M.C. Dean**.

Major consultants and contractors supporting Metro's efforts on the project include **Mott MacDonald**, **Gannett Fleming**, **HNTB**, and **Cubic Transportation Systems**.

### Key Highlights:

- As part of Metro's ongoing review of the Silver Line Phase 2 project, of the 17 issues included in the Board briefing on February 11, 2021, one issue has been resolved (Yard Crib Heaters). Seven Issues are currently being remediated ("Underway"), 10 issues remain "Unresolved" including one new issue (Cracked Third Rail Support Brackets) that has been recently identified.
- Throughout the duration of this project, a number of quality issues have been identified. These fall in several categories such as non-compliance with design and/or performance requirements, unapproved design modifications, premature component failures, or safety concerns. Over time, many of the issues have been resolved. However, as the project approaches Substantial Completion (SSCD now projected by MWAA to be in the third quarter of 2021), many of the issues remain open. Depending on the specific issue, satisfactory resolution must occur prior to SSCD, Operational Testing, or at the very latest prior to acceptance/start of revenue service. The current status of the open issues is included in the attached

presentation.

- Metro will establish a revenue service date after all identified deficiencies have been resolved to meet acceptance standards.
- As the intended future owner and operator, Metro determines when all the conditions necessary for Metro acceptance have been satisfied, and whether Phase 2 of the project is accepted into the Adopted Regional System (ARS).

### **Background and History:**

Phase 2 of the Silver Line will extend the Metrorail system into Loudoun County, Virginia, and provide 11.4 miles of new track from the interim terminus at Wiehle-Reston East Station, through the Washington Dulles International Airport, to a terminus in Loudoun County. It includes six new Metrorail stations (Reston Town Center, Herndon, Innovation Center, Washington Dulles International Airport, Loudoun Gateway, and Ashburn), and a new service & inspection yard.

Metro's role and responsibilities for the design-build phase of the Silver Line Phase 2 project are as defined in the Cooperative Agreement executed between the Airports Authority and Metro on August 7, 2013.

The Board of Directors amended the ARS to incorporate the Dulles Metrorail Extension (Silver Line) subject to the fulfillment of certain "ARS Contingencies" adopted in Resolution 2012-24. Additional conditions precedent for acceptance are established in Article 6 of the Cooperative Agreement.

### **Discussion:**

Construction of the Silver Line Phase 2 is nearing completion. Facility construction is complete, and systems installations and testing are well advanced.

In addition to Dynamic Testing Readiness, the project will advance through several milestones moving towards the start of revenue service. The milestones are defined and summarized as follows:

- Dynamic Testing Readiness – determination that the contractor has completed the work in accordance with the contract documents which renders the project safe and capable of supporting dynamic testing. This determination is supported by documentation of the following: final alignment and track configuration; operational traction and third rail power; completion of prerequisite automatic train control static testing; activation of contractor start-up railroad safety procedures; and verification of train, track and structure clearances.
- Substantial Completion (SC) – the work is substantially complete. System Performance Demonstration is complete. All conditions of substantial completion have been met, and the project is ready for operational readiness testing. Conditions to substantial completion include performance of contractor inspections and tests, delivery of record documents and spare parts, completion of training and contractor safety certification, correction of all defects that materially

adversely impact the operations of the Project, and provision of O & M manuals and punch list completion schedule.

- Operational Readiness Date (ORD) – the date on which Metro determines that the Project is sufficiently complete for Metro to commence simulated rail service. A key condition of operational readiness is the successful completion of operational readiness testing conducted by Metro.

Between ORD and Acceptance, Metro has provisional care, custody and control of the project, and performs activities in preparation for revenue service. These activities include verification that conditions precedent for acceptance have been met; simulated service; emergency drills; safety certification; mobilization of stations and yard; re-keying all facilities; providing escorts to support contractor punch list completion; control right-of-way operations; and performance of preventive maintenance inspections. An outline of these activities is included in the attached presentation.

Metro's acceptance determination is supported by the completion of certain ARS Acceptance Tasks, verification that all conditions precedent for acceptance have been met, and Metro's determination that Phase 2 is eligible and ready for Metro Acceptance.

The conditions precedent for acceptance of Phase 2 into the ARS as established in the Cooperative Agreement are summarized as follows:

- Condition 1. Punch List – all punch list work completed to Metro's satisfaction. If not completed, Metro has the right to complete punch list items at the Airport Authority's expense.
- Condition 2. Property Transfers – the Airports Authority shall have transferred to Metro the appropriate property interests as indicated in the approved Right-of-Ways plans.
- Condition 3. Spare Parts and Training – Metro shall have received all spare parts, O&M manuals, and necessary training.
- Condition 4. Record Deliverables – record deliverables have been received by Metro.
- Condition 5. Assignment of Warranties – all warranties have been assigned to Metro, and all documentation necessary to enforce the warranties has been provided to Metro.
- Condition 6. Permits – the Airports Authority shall have obtained for Metro all land use and permitting approvals necessary for Metro's operations.
- Condition 7. Payments – the Airports Authority shall have paid Metro all funds due and owing.
- Condition 8. Safety and Security – project has achieved certification by Metro Chief Safety Officer.

- Condition 9. Insurance – Metro shall have received all certificates of insurance.
- Condition 10. Storm Water Management – the Airports Authority shall have obtained maintenance agreements as required.

The update on the currently open issues is as follows:

#### Resolved

- Cross Bond Spacing
- Non-Compliant Crib Heaters (Yard)

#### Underway

- Surge Arrestor Failures
- Fuel Center Deficiencies at Dulles Yard
- Insufficient Line of Sight to Track Signals
- Rail Car Hoists
- Precast Panels at Dulles Yard
- Tight Gauge at Switches in the Yard
- Non-Compliant Snow Melter Calrods

#### Unresolved

- Cracked 3rd Rail Insulators
- Cracked Impedance Bonds
- Damaged Direct Fixation Track Fasteners
- Malfunctioning UPS Fans (Mainline and Yard)
- Incorrect Distance between Insulated Joints (IJ's) and Signals at Dulles Yard
- Station Platform Paver Installation
- Turntable Deficiencies at Service & Inspection Building at Dulles Yard
- Embedded Track Deficiencies at Maintenance Buildings at Dulles Yard
- Non-Compliant Clearance in Elevator Machine Room at Dulles Yard
- Cracked Third Rail Cover Support Brackets (**New Issue**)

In summary, since the February 11, 2021 briefing to the Safety & Operations Committee:

- One Issue is Resolved (Non-Compliant Crib Heaters in the Yard))
- Seven are Underway (being resolved or have agreed upon path forward), and
- 10 are Unresolved (including the newly identified issue of Cracked Third Rail Support Brackets)

Updates on the status of all the open issues are discussed in the attached presentation.

#### **FUNDING IMPACT:**

There is no direct impact on funding for presenting this update. However, based on future

assessment of Silver Line Phase 2 revenue service ramp up in FY2021, the FY22 budget may need to be modified to reflect revised start of service. Changes for FY21 budget have already been incorporated.

Project Manager:	Neil Nott
Project Department/Office:	Capital Delivery/Project Implementation and Planning (CAPD/PICO)

**TIMELINE:**

<b>Previous Actions</b>	August 2013 – Metro and the Airports Authority executed the negotiated Cooperative Agreement that provides for Metro support throughout the design-build phase of the Silver Line Phase 2 project.
<b>Anticipated actions after presentation</b>	Board Action approving Service Plan and Title VI Equity Analysis Acceptance of Silver Line Phase 2

# Silver Line Phase 2 Update

Safety & Operations Committee  
March 11, 2021



# Purpose

- Provide an update on the status of significant Open Issues
- Provide information on Prerequisite Activities and Milestones
- Review Project Schedule



# Open/Unresolved Issues Summary

Issue Status	February 11, 2021	March 11, 2021
<i>Resolved Issues (removed from list)</i>	1	1
"Underway" - tentative agreement exists and resolution in progress	8	7
"Unresolved" - lack agreement on path to resolution	9	9
<i>New Issues</i>	0	1
<i>Total Count of Open Issues</i>	17	17

- New issue to elevate to Board: Cracked Third Rail Cover Board Brackets
- “Resolved” since February 11, 2021 briefing: Yard Crib Heaters

# Open Issues by Status & Impact

*Impacts System Performance Demonstration  
(MWAA Substantial Completion)*

*Impacts Operational Readiness  
(WMATA Project Acceptance)*

*Underway*

- Insufficient Line of Sight to Track Signals

- Rail Car Hoists
- Surge Arrestors
- Precast Panels at Yard
- Fuel Center Slabs
- Tight Gauge at Switches in Yard
- Non-Compliant Snow Melter/Calrods

*Unresolved*

- Incorrect Distance Between Insulated Joints and Signals at Yard
- Malfunctioning UPS Fans (Mainline and Yard)

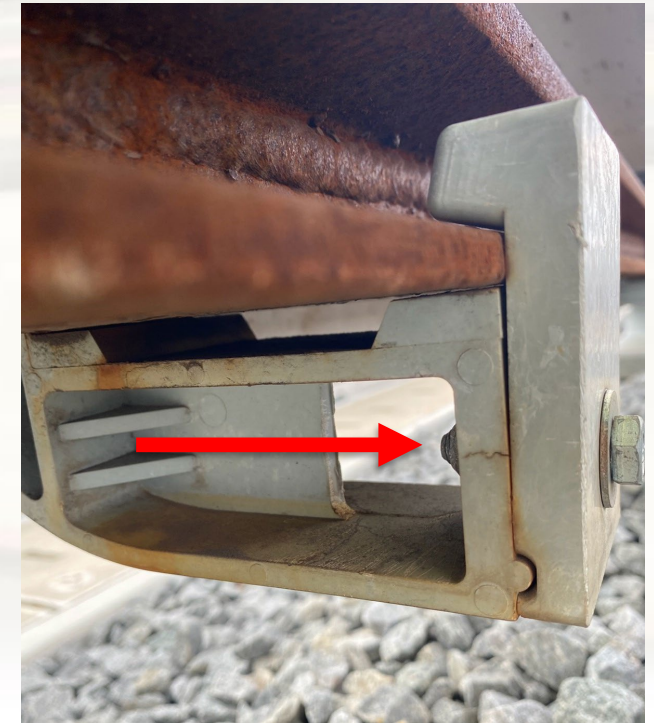
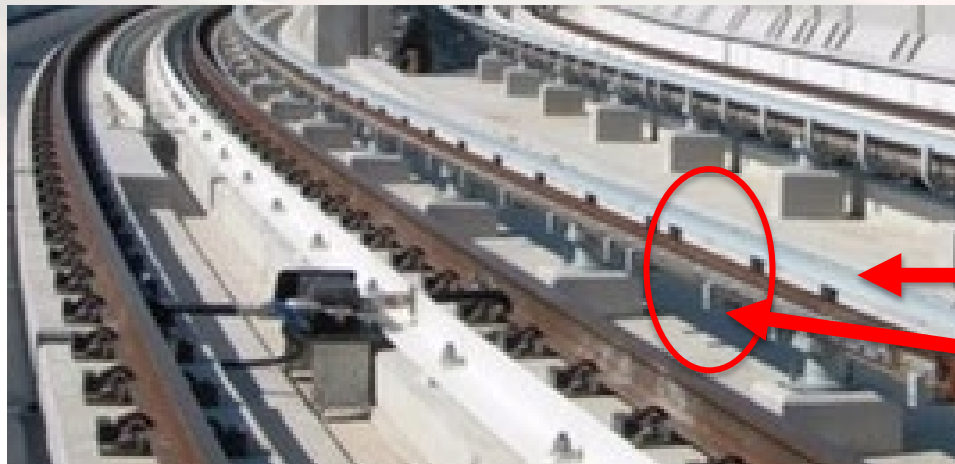
- Non-Compliant Clearance in Yard Elevator Machine Room
- Cracked Impedance Bonds
- Damaged Direct Fixation Fasteners
- Station Platform Pavers
- Turntable Deficiencies at Yard
- Embedded Track Deficiencies at Yard
- Cracked Third Rail Insulators
- Cracked Third Rail Cover Brackets

# Open Issues Progress Since February

- Damaged Direct Fixation Fasteners
  - Contractor submitted root cause analysis indicating damage done from installation process
  - WMATA and MWAA analysis of root cause continues
- Station Platform Paver System
  - MWAA directed contractor to perform remedial work required to replace failing joint material
  - WMATA concern remains that this work will not fully address system deficiencies
- Non-Compliant Crib Heaters at Yard
  - Issue resolved through agreement to provide correct length heaters as spares

# Cracked Third Rail Cover Board Brackets

- Contractor identified ~ 5,000 third rail cover brackets (13%) exhibit cracks
- Root cause analysis has not yet been submitted – contractor believes cracking to be result of over-tightening

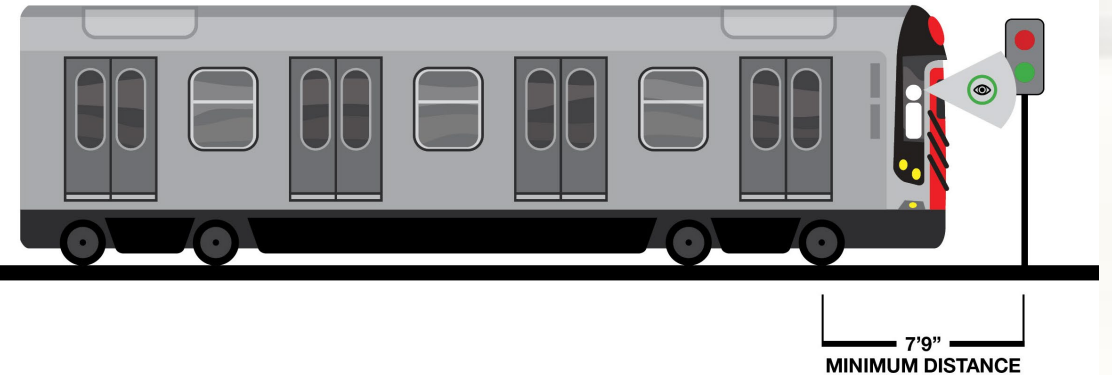


Third Rail Cover Board  
Cover Board Bracket

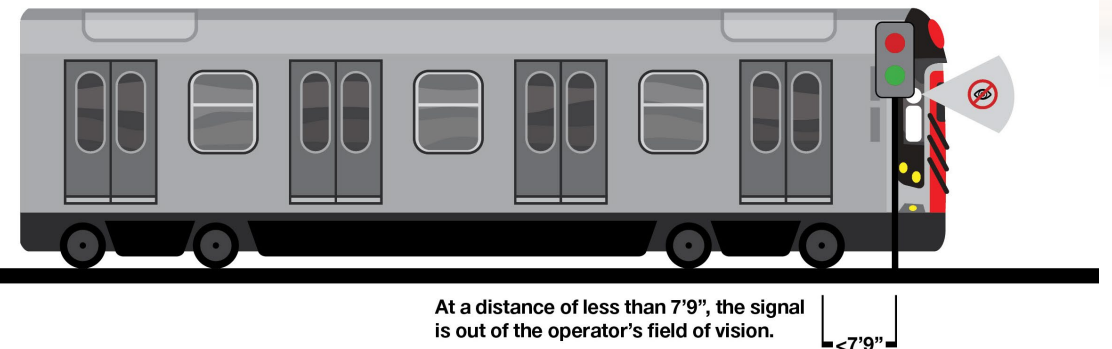
# Distance Between Insulated Joints and Signals at Yard

- WMATA concern is insufficient distance between the signal and related insulated joint (IJ) to ensure safe train movement
- WMATA specification is 7' - 9" minimum distance - contractor's design based on 6' - 0" (as-built condition many less than 6' - 0")
  - *67 out of 71 signals are too close*
- Operational Safety issue as operator can be "clear" of the signal but not actually able to see the signal; very important for reverse moves
  - Increased risk of red signal overruns in the Yard

**SAFE**



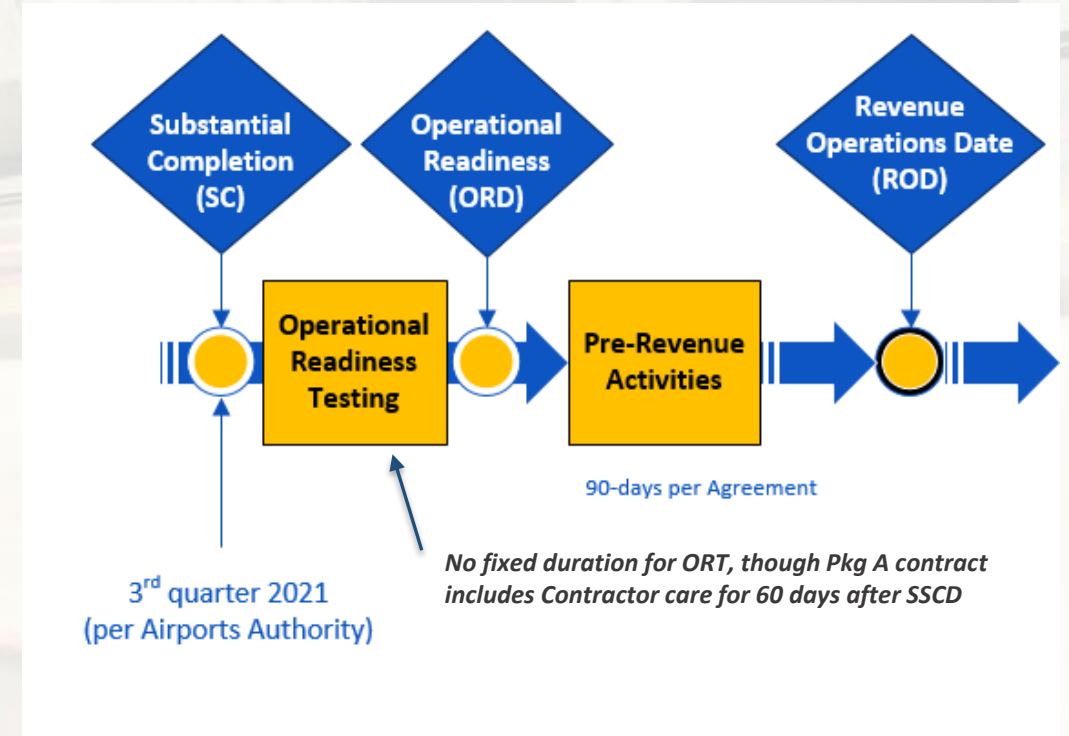
**UNSAFE**





# Projected Completion

- Airports Authority currently projects Substantial Completion in third quarter 2021 (Package A)
  - Critical path through implementation and regression testing of revised cross-bonding design and resumption of ATC testing
- Operational Readiness Testing
  - WMATA's period for testing to determine Operational Readiness.
  - No fixed duration, depends on results of testing. Assume 2 months
- Pre-Revenue Activities
  - 90 Days, per Comprehensive Agreement



# Significant WMATA Work after ORD

- On boarding Assets
  - Complete Asset Database
  - Implement Warranty Management
  - Verify and Tag all Assets
  - Transfer or Creation of Utility and Consumables Supply Accounts
- Staff & First Responder Familiarization
  - Conduct Staff Orientation
  - Execute Emergency Exercises
  - Establish Access Controls
  - Conduct First Responder Training
- Final Documents
  - Complete Safety Certification
  - Execute Maintenance and Property Conveyance Agreements
- Policy & Procedure Updates
  - Update Maintenance Policies
  - Update Standard Operating Procedures, Operational Systems, and Training
- Final Station Mobilization
  - Marketing Campaign/Advertising Installs
  - Implement Parking Operations per County Agreements
  - Distribute Station Maintenance Materials (e.g., Snow Removal Equipment)
  - Deployment of kiosk materials & Station AEDS
  - Deploy New System Maps Systemwide
  - Exercise Automatic Fare Collection Equipment

# Summary

- Several issues remain unresolved or open
  - Metro continues to work with the Airports Authority to mutually agree on a path forward to resolve open issues as required to achieve key milestones:
    - Systems Performance Demonstration (Substantial Completion)
    - Operational Readiness
    - Acceptance of the Project by WMATA for Revenue Operations
- Airports Authority's response to the open issues will determine path forward and timing for Metro acceptance of the project and ultimate start of passenger service



# Appendix: Full List of Open Issues

# Open Issues: Component Failures

- Cracked 3<sup>rd</sup> Rail Insulators (April 2020)
  - Contractor has replaced 1500+ insulators that were exhibiting cracks - WMATA awaiting response to comments on root cause
- Cracked Impedance Bonds (October 2019)
  - Seven bonds significantly cracked, requiring replacement bonds; others with potential hairline cracks being investigated
  - Field investigation by WMATA remains underway - eighth cracked bond identified (contractor indicates cracked bonds replaced)
- Damaged Direct Fixation Track Fasteners (May 2020)
  - Several thousand damaged direct fixation track fasteners have required replacement - root cause has not been agreed upon
- Malfunctioning UPS Fans (Yard and Mainline) (March 2018)
  - UPS exhaust fans continually running at high speed, burning out fan motors. Root cause preliminarily identified; solution has been implemented. Awaiting confirmation through demonstration that issue has been resolved
- Surge Arrestor Failures (March 2016)
  - Systemic positive surge arrestor failures experienced throughout project - surge arrestors replaced with product of different manufacturer with no further failures - awaiting further root cause analysis by Airports Authority
- Cracked Third Rail Cover Brackets (February 2021)
  - 5,000 brackets (of a total of approximately 50,000) are cracked; awaiting root cause analysis

# Open Issues: Stations & Systems

- Incorrect Distance Between Insulated Joints (IJ) and Signals (Yard) (June 2019)
  - WMATA concern is insufficient distance between the signals and related IJ's to ensure safe train movement
  - Airports Authority challenges applicability in the Yard
- Station Platform Paver Installation (November 2017)
  - Systemic joint failures at pavers, water penetrating setting bed, significant efflorescence deposits at the platform edges
  - Airports Authority has not identified comprehensive program to address the issues
- Non-Compliant Snow Melter/Calrods (Mainline) (September 2018)
  - Length of heater elements not compliant with requirements. Proposal to use 'as is' under consideration.
- Insufficient Line of Sight to Track Signals (July 2018)
  - Multiple locations identified where there is insufficient line-of-sight to ATC signals; all resolved except one
  - Field investigation after mitigation identified one location that sighting is difficult despite compliance with specs

# Open Issues: Yard

- Railcar Hoists at Dulles Yard (April 2016/September 2020)
  - During performance testing issues were identified with the control systems, auto chock systems, and others
- Tight Gauge at Switches in Dulles Yard
  - Tight gauge identified at 39 switches in Dulles Yard
  - Acceptance of mitigation pending verification of gauge following completion of Dynamic testing
- Precast Concrete Wall panel Cracks at Dulles Yard Buildings
  - Airports Authority concluded cracking on surface of exterior wall panels due to panel connections restraining panel thermal and shrinkage movement, and have stabilized
  - Metro OIG Sept. 2020 report concluded that sealer application is acceptable remediation; however, costs for future re-application of sealer should be considered – responsibility for cost of re-application not identified
- Turntable Deficiencies at Service & Inspection Building (October 2020)
  - Issues include excessive rocking, gaps and misalignment at flange way, undocumented modifications

## Open Issues: Yard (continued)

- Embedded Track Deficiencies at Maintenance Buildings (October 2018)
  - Embedded track in shop buildings and aprons - flange ways too wide, shop floor not flush with track
- Non-Compliant Clearance in Elevator Machine Room (May 2018)
  - Metro assesses that elevator machine room equipment clearances do not meet code requirements
  - Awaiting field inspection to be scheduled with contractor
- Fuel Center Deficiencies at Dulles Yard (July 2018)
  - Recommendation of Metro OIG March 2020 Interim Report was that contractor provide evidence that final construction complies with design requirements - acceptance request for nonconforming slab in progress