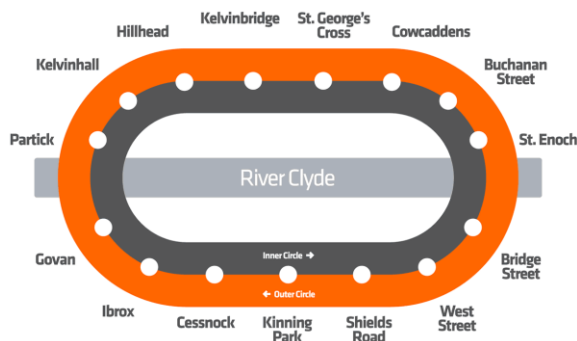


Project title	Glasgow Subway – Rolling Stock ISA
Client name	Stadler Rheintal AG

PROJECT SCOPE

The Strathclyde Partnership for Transport (SPT) is implementing a modernisation programme of the Glasgow Subway that will include refurbished stations with platform screen doors and an enhanced signalling & Control system with new Operation Control Centre (OCC). The modernised subway will be serviced by new metro rolling stock manufactured by Stadler.



Glasgow's Subway comprises a four-foot gauge double track in a circular 10.5km tunnel. First opened in 1896, it is the world's third oldest underground railway after London and Budapest. The modernisation marks the first major enhancement of the subway for 40 years and will link to other transport infrastructure improvements across Glasgow to contribute to the city's regeneration programme.

TECHNOLOGY UPGRADE

The subway modernisation represents a step change in train operation and signalling systems with the deployment of Communications Based Train Control (CBTC) for the implementation of automatic train protection (ATP) and automatic train

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operation (ATO). The new trains will eventually operate driverless in Unattended Train Operation (UTO), Grade of Automation 4 (GOA4).



The transition to UTO requires a complex programme of test and commissioning, including type testing on the purpose-built test track at Edmiston Drive before testing in the tunnel at night when there is no public service. Once commissioned, the new units will be operated alongside the existing trains in semi-automatic mode during a transitional period until withdrawal of the existing fleet and introduction of UTO.

HOW WE HELPED

AEGIS Certification Services (ACS) has been appointed by Stadler as Independent Safety Assessor (ISA) for the activities leading from final approved design to the completion of phase GOA2, which will form the basis for the subsequent phase GOA4.

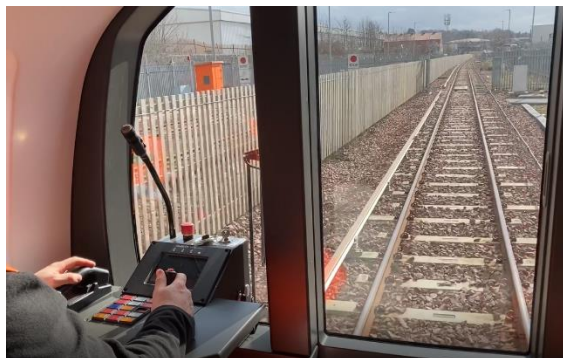
We were able to assist Stadler at a challenging stage of the project where the transition from design ISA to test stage ISA required careful review to ensure that there were no gaps in assessment and open points

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were fully addressed. Our support included the review and assessment of key safety documentation deliverables, including the hazard record supporting the Authorisation for Test 2 (Aft2) stage of test and commissioning activities. The achievement of Aft2 enabled test vehicles to enter the subway tunnels for the first time.

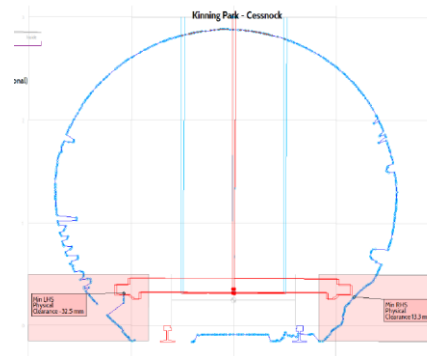


A key activity for the safety assessment of this project stage was the safety audit undertaken by ACS at the new test facility at Edmiston Drive, Glasgow. The stabling depot and test track allows the new 3-car metro trains to be tested with the integrated signalling system supplied by Stadler's project partner Hitachi STS. The ACS ISA team undertook a walkthrough inspection of a test unit, interviewed test and commissioning staff and witnessed a typical test activity on the test track.



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To support Stadler's safety case for test activities within the subway tunnels, ACS has provided independent review of the gauging strategy, assurance statement and supporting technical reports including standards compliance evidence in order to support the acceptance of the approach adopted and assessment data presented.



OUTCOME

Working within the project time constraints, ACS completed the staged ISA review to provide Stadler with an ISA declaration of no objection for tunnel entry. Subsequently, a new passenger unit successfully entered the tunnel for the first time in November 2021.

ACS will continue to provide ISA support as progressive sections of the tunnel are accessed according to the gauging strategy and further type test activities are undertaken.

