

**CITIES OF TOMORROW (CoT) R&D PROGRAMME
GRANT CALL 1
FOR VERTICAL 5: CITY IN NATURE**

FREQUENTLY ASKED QUESTIONS (FAQS)

**CALL TOPIC 1: TREE-ROOT ANCHORAGE AND NON-DESTRUCTIVE TESTING
DEVELOPMENT FOR CONSTRAINED URBAN PLANTING SPACES**

Please note that the FAQs will be updated periodically. Please refer to the [CoT V5 programme 1st Grant Call website](#) and [IGMS website](#) for the latest version of the FAQs.

T1. CALL TOPIC 1

T1.1 Besides root morphology, will the functions of tree roots (e.g., water transport) be of interest for this Call Topic? (02 March 2023)

The functions of tree roots in water transport will be of interest only if it is relevant to rooting anchorage, which is the primary focus of the Call Topic. Submitted proposals will be evaluated accordingly, based on their proposed project scope.

T1.2 What is non-destructive testing (NDT) supposed to test for specifically (e.g., tree stability, tree decay, etc.)? (02 March 2023)

NDT is intended to be a less intrusive method of testing to identify trees with weakened root anchorage, either due to decay, damage or constrained urban planting spaces.

T1.3 Will the project team need to identify the tree species that are to be modelled for their root architecture, or will the species be identified by NParks? (02 March 2023)

Project teams will need to identify the tree species that are to be modelled for their root architecture as part of their proposal submission.

During the proposal scrubbing stage, NParks will work further together with the shortlisted project team on the selection of tree species to be modelled. Subsequently during the project phase, NParks will work with the project team to identify the specific trees to be investigated.

T1.4 Will Phases I and II of the research be executed sequentially? Are there any requirements on the maximum project duration for each of the two phases? (02 March 2023)

Yes, Phases I and II will be executed sequentially (i.e., Phase II will follow on from Phase I).

The maximum duration for the overall project is 5 years, and applicants can propose how to split this duration between the two phases.

- T1.5 Should the proposal cover both Phases I and II? Will Phase II of the project proceed only if the deliverables and outcomes from Phase I are met and deemed satisfactory? (02 March 2023)**

Yes, the proposal should cover Phases I and II. The project will move forward to Phase II only if the deliverables and outcomes from Phase I are met and deemed satisfactory.

- T1.6 In relation to acquiring 3D models of tree root architecture – i) what are the goals of acquiring such 3D models, and; ii) what is the typical depth of a tree root system? (02 March 2023)**

The purpose of acquiring 3D models of tree root architecture is to understand root anchorage in constrained spaces. This includes understanding how major structural roots grow, and the extent to which these roots are bound to soil and/or urban structures to stabilise the tree.

In general, tree structural roots mostly are found within a soil depth of 1m. However, proposals should also consider that tree root architecture is also greatly influenced by available soil volume and the constraints of the urban structures (e.g., kerbs). In addition, root architecture also differs across various tree species, hence the Call Topic has indicated for the 10 most widely planted tree species to be modelled.

- T1.7 What are the data parameters of the Tree Structural Model Plus (TSM+), and how does the TSM+ work? (02 March 2023)**

The TSM+, which is developed by NParks, takes into account the following data: tree geometry (e.g., canopy, girth and height dimensions, lean etc.), anchorage and wood strength, trunk damage, self-weight and wind drag forces. The TSM+ is used to assign tree biomechanical strength ratings for individual trees.

Research under this Call Topic should deliver numerical models, as verified by field testing, to verify as well as provide additional parameters to TSM+.

- T1.8 Regarding the Phase I technical deliverable on “load/deformation behaviour of urban trees of different species, sizes, modes of tree failure and planting space characteristics (static and dynamic)” – i) does this refer to load/deformation behaviour that indicates the tree’s anchorage strength properties, and; ii) should this be accomplished through numerical prediction or physical testing? (02 March 2023)**

Yes, this technical deliverable should examine tree load/deformation behaviour as indicative of tree anchorage strength properties.

Both methods should be used to examine load/deformation behaviour, i.e., numerical modelling validated by physical testing.

T1.9 Regarding the Phase I technical deliverable on “threshold values of static or dynamic moduli for the development of future field-testing protocols” – does this solely refer to the mechanical properties of the trunk? (02 March 2023)

Proposals should look at the whole tree response in terms of its static or dynamic moduli, i.e., not only trunk or wood mechanical properties in isolation. The whole tree moduli or response, including considerations for rooting architecture, soil properties/volumes, surrounding urban structures and other trees etc., will help define the tree root anchorage.

T1.10 How are the following Phase I technical deliverables for the Call Topic related to one another? (02 March 2023)

(b) Load/deformation behaviour of urban trees of different species, sizes, modes of tree failure and planting space characteristics (static and dynamic), and;

(d) Threshold values of static or dynamic moduli for development of future field-testing protocols

Technical deliverable (b) refers to the load/deformation behaviour of urban trees, including the testing methodologies to measure and characterize such behaviour. Technical deliverable (d) should be interpreted from the testing outcomes from (b) and would be used for Phase II of the project.