



EFFECTIVE AND EFFICIENT **POTHOLE REPAIR**

1 INTRODUCTION

The Land Transport Authority (LTA) spearheads land transport developments in Singapore. We plan, design, build and maintain Singapore's land transport infrastructure and systems. We aspire to strengthen Singapore's land transport connectivity and integrate a greener and more inclusive public transport system complemented by walk and cycle options. We harness technology to strengthen our rail and bus infrastructure and develop exciting options for future land transport.

As we embark on our strategies that are encapsulated under the Land Transport Masterplan 2040 ([LTMP2040](#)), the operating environment in the land transport sector will continue to evolve rapidly. Hence, we encourage interested innovators, via this "Call for Solutions – Effective and Efficient Pothole Repair", to co-create solutions to solve land transport sector challenges and achieve cost-effectiveness, manpower optimisation, environment sustainability, reliability and safe operations.

2 PROBLEM STATEMENT

Road pavement defects such as potholes (Figure 1) pose safety risks to road users, especially for motorcyclists and cyclists. Such occurrence can happen during dry and wet seasons, and starts out as cracks on the road surface. When rainfall is prolonged during the wet seasons, the surfaces within the cracks will be exposed more continuously to rainwater. With continuous movement of vehicles over the road surface, this situation will cause the initial cracks to widen, which will then result in formation of significantly higher number of potholes during rainy seasons.



Figure 1: Illustration of pothole on roads.

This phenomenon has been observed during several rainy seasons. For example, in January 2021, a record high of 2,603 potholes were reported when Singapore experienced the second wettest year since 1980 – as compared to 1,000 monthly during typical wet seasons and 200 monthly during dry seasons.

We are looking to enhance our current pothole repair procedures (Figure 2) to address situations of increased pothole occurrences like during prolonged rainy seasons as well as to improve work productivity.



Figure 2: Current pothole repair method (cutting & patching till minimum 50mm depth).

Current pothole patching work (Figure 2) requires 4-7 workers at each worksite to complete the repair works, and a typical repair duration of at least 60 mins per job. This takes into consideration the time and manpower resources required for lane closures, safety banksmen etc. Hot asphalt mixes are currently being used for pothole repair and can only effectively be laid on dry surfaces to have good bonding and durability. The typical hot mix is not suitable for repair works to be done under wet weather conditions as the rainwater will significantly reduce the durability and quality of the repaired patch. As such, contractors and workers will often have to wait for the rain conditions to subside before repair works can be carried out. This is undesired during prolonged rainy seasons, as repair will inevitably have to be delayed which will then impact the safety of road users especially when more potholes are expected during such seasons.

While alternative repair materials (e.g. cold patching) had been explored previously, such mixes are not readily available locally and they are pre-packaged with a limited shelf-life. Once a package mix has been opened for use, it must be expended within the day, which can result in wastage if no further jobs are required. Local asphalt contractors tend to prefer the use of hot asphalt mixes as fresh hot asphalt mixes are readily available from local asphalt plants and easily scaled up to any required quantity.

To manage the increased potholes during rainy seasons, LTA is looking for an enhanced pothole repair strategy & method which can be more effective and efficient under various

weather conditions in Singapore. The strategy should enhance the effectiveness and productivity of the repair work, by enabling quality repair works to be done under dry and wet conditions, especially not requiring fully dry road surfaces before work can be conducted; and reducing the required resources & work duration of the repair work. The proposed solution would therefore require the proposer/consortium to address both the material and the process and/or equipment used to conduct road defect repair.

3 WHAT ARE WE LOOKING FOR?

The proposal should cover key points such as:

1. Overall strategy (equipment & materials) to enable effective and efficient pothole repair works in dry and wet surface condition, while ensuring that the quality of the repaired patch and work safety are not compromised.
2. Demonstrate a strong business case for the developed solution, i.e. the solution is a sound business proposition for road repair contractors to adopt if successful.
3. Clear concept of operations of the solution including, but not limited to:
 - a. Extent of resources required for this solution. The manpower required should be < 4 workers per work site and the repair job should be completed within 60 mins (including pre- and post- repair processes such as lane closures and re-opening).
 - b. The repaired patch should be reliable and durable, and capable of lasting for a minimum of 2 years. If an alternative asphalt mix is proposed, it should comply to all relevant LTA's standards and requirements (structural, functional and mechanical). The proposal should also include details on the laboratory tests to be conducted for verification. LTA is also open to consider potential materials which might still be under development.
 - c. Estimated cost breakdown for the development and its timeline. The cost breakdown should include logistics, manpower and materials costs. Development of solution with trial implementation should not exceed 12 months.
4. Detailed milestones and corresponding Key Performance Indicators (KPIs) to be monitored and measured during the progressive development stages of the trial/evaluation of the proposed solution.
5. Detailed plan for trial implementation with accompanying monitoring plans and assessment criteria.
6. The solution should be easily adopted with minimum training and scaled up within a reasonably short duration, with readily available supply of parts or materials to tap on.

4 EVALUATION GUIDELINES

The evaluation of the proposal will be guided by, but not limited to, the evaluation criteria set out below.

1. Provision of the relevant lab tests results or technical reports on the alternative asphalt patch material.
2. The solution should enable up to a 3-man team to complete the repair within 60 mins.
3. Solution to be overall cost effective, inclusive of logistics, manpower and material costs. Benchmarking of costs in the proposal will be useful.

After the close of the Call for Solutions, LTA may engage shortlisted solution providers to explore the possibility of a proof-of-concept (POC) or trial. Should you be selected, please note that you may be expected to co-fund part of the POC/trial via cash and/or in-kind contribution.

5 TIMELINE

LTA may hold a briefing to provide clarifications on the problem statement between 11 and 18 October 2023 (both dates inclusive) at the Land Transport Authority (LTA). If you are interested to attend the briefing, please register [here](#) by 9 October 2023. Kindly note that the briefing will only be conducted if enough registrations have been received. All registered attendees will receive a confirmation by 10 October 2023.

All submissions must be submitted by 15 November 2023, **1600 hours (SGT/GMT +8) via this [submission form](#)**.

We encourage interested parties to visit the Land Transport Innovation Portal for the latest updates.

6 GUIDELINES FOR PARTICIPATION

1. The purpose of this brief is to provide preliminary information on the problem statement on “<Effective and Efficient Pothole Repair>”. Please note that the information provided does not form part of any subsequent contract.
2. To register for this Call for Solutions, you must be from one of the following:
 - a. Private company, with local business registration
 - b. Tertiary institution based in and operating from Singapore
 - c. Research institution based in and operating from Singapore
 - d. A consortium of any of the above
3. If you will be registering as a consortium, do appoint a lead member as the main applicant and make all submissions through this lead member. The actions by the lead member of the team will be treated as representative of the consortium. All correspondence will be directed to the lead member.

4. Please provide relevant information on your (or consortium members') past experiences that are relevant for this submission.
5. Do note that all proposals submitted through this call should be sufficiently brief and for LTA's preliminary evaluation and shortlisting only. If your solution is shortlisted after the close of this call, we will contact you for further clarifications. You may be asked to make presentations and/or provide more information on your solution to LTA and/or requested to host LTA at any proposed venue and/or facilities for visits and better understanding of the proposed solution.
6. If your proposal is further shortlisted for detailed development, the approach for funding will be discussed and you may be asked to fill up further application forms to include more details on your proposed solution. Do also note that you may be required to co-fund part of the solution development trial, subject to the respective funding guidelines.
7. Any documents submitted will be treated as confidential and will not be returned. By submitting any documents, you hereby consent to any disclosure by LTA of your documents to the Government of Singapore, the relevant Government Agencies, and/ or government-related agencies, as LTA considers appropriate in our discretion for purpose of evaluation in this Call for Solutions.
8. Notwithstanding any other provision in this Call for Solutions, LTA may amend, suspend or withdraw all or any part of the Call for Solutions or the Call for Solution process, which will be informed via the [Land Transport Innovation Portal](#).

7 CONTACT US

Should you have any further queries regarding this Call for Solutions, please direct them via email to inno@lta.gov.sg.