



Performance Audit

Road Surface Repairs  
on the  
Arterial and Distributor Road Network

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## List of Abbreviations

A&CE	Architect and Civil Engineer
AD	Arterial and Distributor (roads)
ADT	Awtorita' Dwar it-Trasport
ASTM	American Society for Testing Material
COO	Chief Operations Officer
DOC	Department Of Contracts
ETC	Employment and Training Corporation
FA	Framework Agreement
FO	Field Officer
LN	Legal Notice
LTD	Land Transport Directorate
MCAST	Malta College of Arts, Science and Technology
MCCEI	Malta Chamber of Commerce, Enterprise and Industry
MIP	Malta Industrial Parks
MITC	Ministry of Infrastructure, Technology and Communications
MNL	Malta National Laboratory
MU	Maintenance Unit
NAO	National Audit Office
OTSW	Order To Start Works
QA	Quality Assurance
QC	Quality Control
RID	Road and Infrastructure Directorate
RSRW	Road Side Repair Works
SOP	Standard Operating Procedure
TM	Transport Malta
TS	Trenching Section
VAT	Value Added Tax
WO	Works Order



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## Executive Summary

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## Executive Summary

**1.** The overall standard and quality of roads in Malta is of interest to a broad spectrum of the local population. Of primary concern is the persistent development of defects and damages to the road surface. This is inevitably of detriment to the road user. It is the responsibility of the Roads and Infrastructure Directorate (RID) to repair and maintain the local Arterial and Distributor (AD) road network. Although the repair of link roads falls under the responsibility of the respective local councils, RID at times intervenes and executes the necessary repairs itself. The National Audit Office (NAO) saw fit to conduct a study to determine the efficiency, effectiveness and economical underpinnings of RID with respect to road surface repair works carried out on the AD road network. Hereunder are the major findings, conclusions and recommendations.

### **2. Findings and Conclusions**

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|---|--|
| <p>a) The inspection system whereby RID's Field Officers (FOs) identify the defects and damages present in the local AD road network was found to have a number of shortcomings, particularly with respect to the way in which inspection rounds were carried out and the subsequent documentation generated. These weaken the overall system and consequently do not allow RID to perform to its fullest potential. Although this is a concern to NAO, RID contends that this risk is mitigated by the supervision provided by the Area Architect and Civil Engineers (A&amp;CE).</p> <p>b) The prioritisation process by which roads are selected for intervention is carried out on the professional judgement of RID's regional A&amp;CEs. However, no particular scientific methods or technical apparatus is used and the A&amp;CEs form their opinion on what can be seen by the naked eye, possibly omitting hidden deep-rooted problems in the underlying layers of asphalt.</p> | <p>c) Some of RID's FOs have very limited expertise and training, thereby increasing the risk of them not being able to fully shoulder the responsibilities expected of them.</p> <p>d) RID's awarded departmental tenders were all issued for the same quantity of works, irrelevant of the actual amount of works required. Failure to specifically tailor each of the tender documents to match the intended works created a significant risk for RID in potentially not choosing the most economically favourable bid.</p> <p>e) Of the reviewed contracts, there were numerous instances where the awarded tenders were not sufficiently covered with the required performance guarantee. This shortcoming presented the obvious risk of RID not being able to easily enforce penalties on contractors with poor performance.</p> <p>f) Whilst all the contractors submitted the required insurance policies, RID had no indication of whether the level of indemnity covered by these policies complies with the minimum amount as stipulated in the tender documents. Lack of documentation was also observed with regards to the required certification, stating that the relevant contractors are engaging their workforce according to local legislation and regulations.</p> <p>g) In the hot asphalt projects under review, NAO observed that RID commissioned these works whilst specifically stating that the provisions for skid resistance as per Legal Notice (LN) 364 of 2003 were not applicable, raising compliance concerns.</p> <p>h) 33 out of the 35 reviewed major patching contracts and four out of the eight reviewed Road Side Repair Works (RSRW) contracts were contested by single</p> |
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bidders. This is NAO's predominant concern, as this could potentially have resulted in the decrease of competitive bidding.

- i) A possible contributor to this decrease in competition might have been the fact that all the tenders under review were issued in a relatively short period of time (more specifically in September 2009). By creating a sudden false inflation in demand, RID might have presented the industry with an opportunity to act in an uncompetitive manner.
- j) NAO noted that the departmental tender value limit in hot asphaltting projects, on most occasions, restricted RID from addressing road repairs in a holistic manner. This limit proved to be only sufficient to cover parts of the respective roads, thereby resulting in a number of patches, rather than one continuous intervention. It was noted that, by using this approach, a number of defects in the selected roads were still not addressed due to this limitation in the tender value.
- k) During review, NAO noted that issued documentation outlining the details of the required work interventions were not comprehensively filled in by RID personnel. Having certain details missing increases the risk of miscommunication between the authority and the contractor, possibly resulting in works not being carried out as specifically required.
- l) The permits issued by RID for hot patching interventions featured major inconsistencies with the nature of the work interventions required, thereby causing concerns about the validity of the permit documents. This has since been rectified by RID through the issuance of a new permit template in the last quarter of 2010.

### 3. Recommendations

- a) Keeping an updated and reliable database of the defects in the AD road network should be a strategic priority for RID, so that it can plan its work interventions with greater ease. NAO is also of the opinion that a consolidated system be implemented for use by FOs during their inspection rounds. It might also be of benefit to support this process with technological equipment.
- b) NAO fully supports the initiative of organising training targeted at FOs as they form an integral part of the road defect identification process. Consequently, it urges RID to carry out the mentioned training programme at the earliest possible time, in order to start reaping its benefits without delay.
- c) NAO is of the opinion that the authority should endeavour to provide more accurate quantities at tendering stage, which would present it with a clearer picture of what the final cost is going to be for the works it specifically requires.
- d) NAO opines that RID should dedicate more effort in ensuring that all the awarded contracts are sufficiently covered by adequate performance guarantees. NAO also strongly recommends that RID endeavours in gathering the necessary information from all its contractors about the level of indemnity their respective insurance policies cover.
- e) RID, more so it being a public entity, should ensure that basic employment conditions are being adhered to by all the contractors it deals with. It should actively discourage malpractice by not awarding contracts to bidders who are not able to provide the required certification.
- f) Given that skid resistance is considered an integral part of the overall quality of road surfaces, NAO strongly urges RID to reconsider its position and aim to, at all times, comply with local regulations. If RID is of the professional opinion that the material currently being used provides sufficient properties to ensure skid resistant surfaces, NAO recommends that it pushes forward an amendment to the specifications in local legislation so as to ensure compliance.
- g) NAO recommends that calls for tenders are issued sporadically in an attempt to draw more competition, therefore attracting lower prices and possibly better quality standards. In this regard, RID is of the opinion that such a practice could potentially disrupt the programme of works.
- h) NAO proposes that RID should endeavour to plan the reinstatement of individual roads in a more holistic approach rather than in a partial manner, as was the case with the projects under review. This should be made possible through the new Framework Agreement (FA), whereby the maximum value limit of works interventions was increased considerably. In contrast, RID maintains that the adopted approach of reinstating the largest possible number of roads to a basic level of ridability provides more value for money.

- i) It is NAO's opinion that all government entities responsible for commissioning road surface repair works should engage in efforts at coordinating, standardising and formalising a uniform approach in the procurement of such works.
- j) NAO urges RID to ensure that the responsible FO conducts an on-site visit immediately after the completion of RSRW works, thereby reducing the risk of FOs not identifying delays and defects in the completed works.
- k) NAO opines that RID introduces a Standard Operating Procedure (SOP) regulating the on-site inspections during hot asphaltting works, together with the necessary checks to make sure that this SOP is adhered to by the officials concerned.
- l) NAO strongly recommends that RID enforces a more rigid approach in its reaction to non-compliant quality test results, thereby immediately seeking corrective action. In addition RID should include a mechanism triggered by non-compliant quality results to ensure acceptable standards, or alternatively seek an extension of the guarantee period.
- m) NAO strongly supports the FA initiative adopted by RID. It however urges the Authority to utilise this tool to its utmost by enforcing the parameters established in the FA in a comprehensive and consistent manner.





## Chapter 1

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### Introduction

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## Chapter 1 – Introduction

### 1.1. Background

1.1.1. Due to a number of factors, local roads persistently develop defects and damages in their surfaces, rendering them unsuitable for their use by the taxpayer. Such defects may cause damages or add to the wear and tear of privately owned vehicles and, more importantly, increase the risk to the overall health and safety of road users. In view of this, repairs are carried out to reinstate the road surfaces' evenness and integrity, thereby improving its overall ridability as well as mitigating the risks of damages to vehicles and to health and safety.

1.1.2. The local road network is classified under six main categories, namely Arterial, Distributor, Linking, Residential and Private Roads, as well as roads within Industrial Estates.

1.1.3. The upkeep of the different types of roads falls under the responsibility of different entities. The maintenance of private roads is the responsibility of the respective private owners, whilst roads within industrial estates are maintained by Malta Industrial Parks (MIP). Local Councils attend to the upkeep of residential and linking roads falling within their constituency, while maintenance of the road network on the island of Gozo is the sole responsibility of the Ministry for Gozo.

1.1.4. On the other hand, the Ministry for Infrastructure, Transport and Communications (MITC), through Transport Malta's (TM) Land Transport Directorate (LTD), is responsible for the overall repair and maintenance of the Arterial and Distributor (AD) roads. Further to the repair of AD roads, RID also intervenes in the maintenance and repair of linking roads. The responsibilities of TM in this regard are outlined in subsidiary legislation 499.57, which specifically states:

*“The Authority shall provide, either by itself or through an undertaking, and where appropriate in consultation*

*with the Malta Environment and Planning Authority, for the construction, reconstruction, widening, renewal, upkeep, improvement, management, maintenance and classification of roads: Provided that where the road is neither an arterial road nor a distributor road, the upkeep, improvement and maintenance thereof shall be provided for by the appropriate Local Council in accordance with article 33 of the Local Council Act.”*

1.1.5. The AD roads cover approximately 150 kilometres of the local road network. These form the backbone of the land transportation grid, facilitating the movement of people and goods throughout the country. Unlike the other types of roads, which are usually concentrated in one location, the purpose of AD roads is to connect different towns and villages together, thereby joining the different hubs on the island. Table 1.1 describes these road categories as well as linking roads in more detail.

1.1.6. RID is the department within LTD which is entrusted with the responsibility of overseeing the local AD road network. It operates under the direction of its Chief Operations Officer (COO) and is segmented into a number of departments, including the Domestic Road Construction and Maintenance Unit (MU), the Quality Assurance Unit (QA) and the Quality Control Unit (QC). MU is responsible for coordinating projects relating to the construction of residential roads as well as the construction and repair of the AD roads. Amongst other responsibilities, the QA is also tasked with issuing the necessary permits for all works to be carried out, while QC is responsible for the overall testing and, approval of completed projects.

1.1.7. In order to better organise MU's work, the local road network is divided into four main regions, namely North, South, East and Central as illustrated in Figure 1.1. Under the overall supervision of the Unit Manager, each region is assigned to an Area A&CE, who in turn is assisted by amongst other responsibilities, the QA is also tasked with FOs. Amongst other duties, the Area A&CEs

**Table 1.1 Definition of Arterial, Distributor and Linking Roads**

Type of Road	Description
<i>Arterial Roads</i>	These are the principal longer distance traffic flow roads which carry a high proportion of all vehicle miles driven on the Islands. These roads are typically dual-carriageway standard, and junctions connecting these types of roads will sometimes be graded separately.
<i>Distributor Roads</i>	These are the roads that give access to arterial roads. The distributor network will normally be single carriageway and junctions will generally be at grade (ground level).
<i>Linking Roads</i>	These are the roads that link towns/villages to the arterial/distributor network (e.g. The Strand-Sliema and Gzira).

Source (Adapted): The Quality Assurance Unit – Policy Framework Regulating Intervention Works on the Road Network, Ministry of Infrastructure, Technology and Communication (2008)

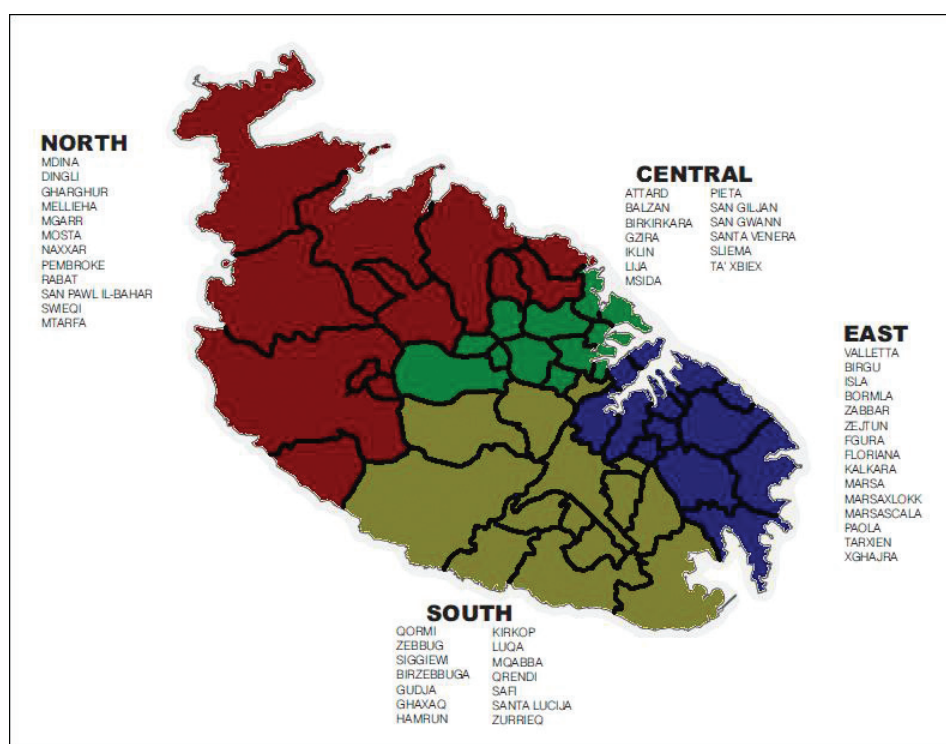
are responsible for the co-ordination and management of projects related to the upkeep of the surface of AD roads in their particular region.

1.1.8. The upkeep of the local roads used to be carried out in accordance with LN 364/2003, which dealt with the requirements and specifications governing the construction and repair of roads. The projects under NAO's review were therefore regulated by this legislation. It is important to point out however that this legal notice was later superseded with LN 29/2010.

1.1.9. Supplementing this legal notice (LN 364/2003) was a study carried out locally in 2000 by the German

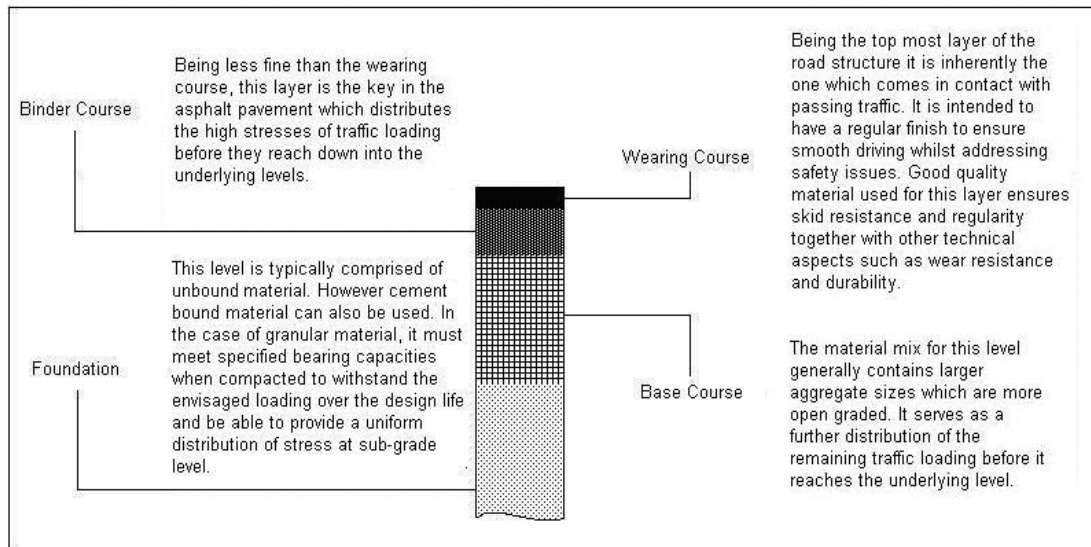
company GTZ, which identified the specifications required in the construction of new roads. The study outlines that several layers of different materials must be laid down, one on top of the other, to form the road structure, starting from the foundation and finishing with the final road surface. The material used in the different levels varies in properties and depth to form the optimum composition of the final structure as illustrated in Figure 1.2.

1.1.10. The study also highlights that roads fall under different classes, depending on the traffic volume that is expected to be endured during their lifetime. In view of this, different compositions should therefore be used for different classes of roads. Asphalt maintenance and repair

**Figure 1.1 Regional Boundaries**

Source (Adapted): Regional Boundaries, Roads and Infrastructure Directorate (2010)

**Figure 1.2 Typical Road Composition Cross-Section**



works are however carried out solely in the upper-most level of the road structure, which usually has the same composition in all the local roads. On average, this level of asphalt approximates four to five centimetres in depth. Even though this is not a common occurrence, sometimes excavation works may have to take place at the second layer, as this would have also been affected by the identified fault. Replacing or repairing anything below these levels is considered to be a reconstruction of the road rather than a repair intervention.

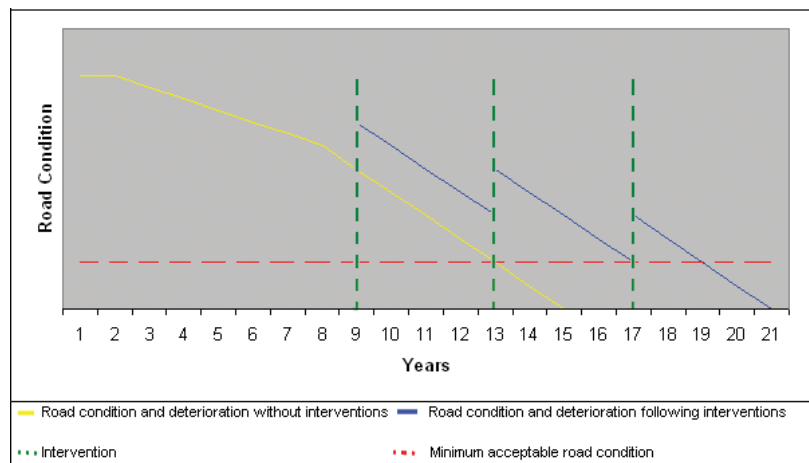
1.1.11. The best way to keep the road network up to a suitable quality standard is to formulate and implement an adequate preventive maintenance programme. Such a programme would generally dictate having all the roads in the network being systematically resurfaced with hot asphalt after a predetermined number of years. Apart from the overall improvement in the ridability of the road surface, such measures will extend the life expectancy

of the road structure. Amongst other benefits, these maintenance interventions will greatly reduce the risk of water penetration and help to prevent cracking and potholes. Figure 1.3 illustrates the process of extending life expectancy through patching.






1.1.12. An effective maintenance programme would mostly feature anticipatory rather than reactive interventions, with works being carried out before damages to the road surface actually occur. This kind of maintenance programme cannot however guarantee that no damages will occur to the road surface. In view of this, an adequate repair system has to be in place to address emerging damages.

1.1.13. There are numerous types of road surface defects, which can be mainly classified as Potholes, Depressions, Edge Deterioration, Cracking and Reduced Skid Resistance. Different types of damages can be attributed to

**Figure 1.3 The Extension of Road Surface Life Expectancy due to Maintenance**



**Table 1.2 Road Surface Damages and Potential Causes**

Damage		Cause
<b>Cracking</b>		Generally, cracking is the first stage leading to the formation of potholes and depressions. There are many types of cracking including transverse, longitudinal, crocodiling, fatigue, block and edge cracking. Such cracking develops due to various reasons which commonly include the hardening and ageing of bitumen, side movements of a retaining structure/embankment, inadequate asphalt concrete thickness (required to support traffic loads) or the breaking of an area where the surface is torn under the pressure of the passing vehicles' tyres. High local temperatures may also contribute to the formation of cracks on the road surface.
<b>Potholes</b>		Potholes are caused by water entering a cracked road surface. These must be repaired quickly because they are a safety hazard and lead to further road damage.
<b>Depressions</b>		These are localised low spots in the pavement surface. These flaws can be caused by either settlement or other failure in the lower pavement layers, as well as by poor construction techniques. Depressions can occur due to filtration of fine material in the unbound layers, either due to water penetration or to inadequate compaction in either one of the layers. Inadequate road design thickness can also cause such depressions.
<b>Edge Deterioration</b>		Edges in the asphalt layer can be either in the centre joint (formed between the two hot asphalt carpets usually laid side by side to cover the width of an average AD road) or at the sides. Edge deterioration in the centre of a road is mostly caused by a cold joint not being properly trimmed. Inadequate compaction is also a cause of this defect. If the edges have some form of retaining support, the joint has to be coated with hot bitumen to adequately seal the joint and the asphalt layer has to be properly compacted. If no retaining support is available, it has to be properly compacted and also sealed to prevent water penetrating in the lower layers.
<b>Reduced Skid Resistance</b>		This defect sometimes occurs due to the softness of the local limestone mineral aggregates (which are used in the production of asphalt) and this polishing effect has a tendency to increase in wet conditions. Excessive binder content can also cause a slippery effect on the surface. In newly constructed roads however, this is eliminated by using imported basalt for wearing courses.

a variety of factors and causes, as explained in detail in Table 1.2. In addressing such damages, one of two main methods of repair works are carried out, namely Cold or Hot Asphaltting.

**1.1.14.** Cold asphalt is generally applied to fill individual potholes. Workers lay the required volume of the mixture to the effected area to reinstate the evenness of the road surface. Given that cold asphalt can be laid down in a relatively short time, with minimal expertise and at a relatively low cost, this type of asphaltting is considered to be ideal for emergency works (for example to fill a

pothole which would have formed overnight after a storm). Such asphaltting is however considered to be a very short-term remedial solution as the laid material is very easily displaced by passing traffic and storm water, causing the defect to re-emerge after a relatively short period of time.

**1.1.15.** On the other hand, hot asphaltting is considered to be a more long-term remedial solution to road surface defects. It can be employed to reinstate a wider range of road surface defects, as long as the damage does not originate from the road's foundations. Hot asphalt is generally applied by first removing the wearing course of

the damaged road surface and then relaying and levelling a new surface of hot asphalt in the excavated area. After the hot mixture cools down, the new surface becomes firmly attached to the other underlying layers and to the adjacent old surface, making it a much more durable fix than its cold asphalt counterpart. It is however a relatively demanding operation which requires specialized machinery and a considerable level of expertise, making it a slower and more expensive process than cold asphaltting.

## 1.2. Scope and Objectives

1.2.1. The report will address repairs carried out on the road surfaces and will not delve into issues concerning construction and reconstruction of roads or repairs of road furniture, signage or walls. It will also focus solely on the AD road network, and selected linking roads identified for repairs by RID, thereby omitting from its assessment all other roads.

1.2.2. This study aims to provide an in-depth view of the processes involved in the awarding of the contracts under review and it seeks to report findings and conclusions on the level of efficiency and effectiveness of these processes, thereby determining whether they represent good value for money. The report also features the NAO's recommendations on identified shortcomings.

1.2.3. The findings presented in this report are as at 21<sup>st</sup> February 2011.

## 1.3. Methodology

1.3.1. For the purpose of this examination, NAO has selected 43 contracts (35 hot asphaltting tenders, covering a total of 61 local AD and linking roads, and eight road side repair works tenders) which were awarded between August 2009 and January 2010 as its sample for case study analysis.

1.3.2. The information required to complete this report was gathered by applying different research and analytical methods. A number of meetings with the auditees (namely MITC, TM and RID) were conducted so that the audit team could better understand the overall processes, policies and procedures related to the subject in question. These were complemented by rigorous data analyses and the review

of files and other documentation. Site visits during works were carried out together with NAO's appointed consultant, giving the audit team an opportunity to better understand the technical processes involved in the actual projects. Other meetings were also held with this same consultant so as to enable the audit team to get a professional opinion on the analyses and recommendations that are being presented in this report.

## 1.4. Report Structure

1.4.1. The structure for this report is as follows. Conclusions and recommendations are integrated in each chapter.

- **Chapter 1: Background** – Outlines a brief overview of the concepts of road surface repair works and of the entities involved in the related processes. It also features the scope and objectives of the study as well as the methodology used to collect the information required for the drawing up of this report.
- **Chapter 2: Identifying the Need for Road Surface Repair Works** – Presents the process by which RID identifies the need for different required interventions and the resources at the Authority's disposal.
- **Chapter 3: Issuing and Adjudicating Tenders for Road Resurfacing Works** – Gives an overview of the procurement method used for the projects under review and the specifications included in the contracts for repair services; RID's estimates of the acquired services; supply side issues and limitations; the bids' evaluation process; and the actual procurement of these services by RID.
- **Chapter 4: Management of Awarded Contracts** – Presents processes and procedures by which RID communicates with the engaged contractors, oversees works in progress and conducts quality tests on finished projects.
- **Chapter 5: Framework Agreement** – Delves into the new FA with which RID is expected to start procuring the required services in the near future.



## Chapter 2

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### Identifying the Need for Road Surface Repair Works

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## Chapter 2 – Identifying the Need for Road Surface Repair Works

### 2.1. Inspecting the Arterial and Distributor Road Network

2.1.1. In order to adequately assess and get a clear picture of the required interventions, RID needs to identify and locate the various surface defects on the roads under its responsibility. By doing so, RID would be in a position to better plan and conduct the necessary repairs and maintenance efficiently and effectively.

2.1.2. RID's FOs are responsible for a number of tasks, one of which (as outlined in the full Role Profile in Appendix A) is to conduct inspection rounds whereby needs for road surface repairs are identified. The prevailing road surface defect which would normally require emergency intervention, and therefore is one of the FOs' top priorities, is potholes. While other road surface defects, such as cracking and depressions, are not considered to be of such urgent nature, FOs take note of all identified damages so that RID would have an overall picture of which roads are in most need of major patching works.

2.1.3. The inspection rounds carried out by FOs also serve to identify other damages apart from those on the road surface, including road signs, street lighting, walls, manholes, gratings, footpaths and kerbs. As stated in the scope of this study, these will however not feature in this report.

2.1.4. These inspection rounds consist of the FO driving through the AD roads within his area of responsibility (North, South, East or Central) to identify defects and damages whilst taking notes accordingly.

2.1.5. During on site visits, NAO noted that FOs carry out these inspection rounds individually. This means that the FOs have to drive along the predetermined route whilst simultaneously identifying defects and taking necessary notes. NAO opines that this practice gives rise to two basic concerns, namely:

- Health and safety considerations related to the respective FO and other road users due to less than full attention given to driving; and
- An increased risk of road defects not being identified as the respective FO has to partially concentrate on driving. This concern can be substantiated with observations made by NAO during the site visits carried out. It was noted that, since FOs were directing all of their attention to driving, they subsequently failed to identify a number of defects.

2.1.6. These concerns were also identified by the then MU Manager in an undated internal report. The report clearly states that driving necessitates one's full attention, and not adhering to such principles essentially conflicts with the then ADT's promotion of safety in driving.

2.1.7. This report goes on to propose a system whereby these inspection rounds are carried out by a team of two FOs per region. Such a system would involve one FO is responsible for driving through the whole network under the team's responsibility, whilst the other is responsible for identifying road defects, making the necessary observations and compiling relevant notes accordingly.

2.1.8. While this undoubtedly can be considered to be a safer approach to conduct these inspection rounds, NAO is concerned about the possible waste of man-hours involved. The tasks involved in the proposed system, although difficult to be handled by one person, do not require the full input of two FOs simultaneously. On the other hand, it is likely that by employing this system, a more complete, accurate and reliable picture of the current road defects could be achieved. It is therefore important for RID to carefully weigh the projected added benefits of implementing this procedure against the projected increase in costs and hence act accordingly.



2.1.9. On average, the FO aims to inspect the whole AD road network, within his appointed region, once every week. This inspection round is usually carried out in short, partial visits over a number of days as the FOs have to attend to other responsibilities within RID (Table 2.1). These other commitments are however likely to take precedence over the weekly inspection routines and, in certain cases, the one week cycle for these rounds is extended over a longer period of time, which results in less inspections carried out per year.

2.1.10. MU has devised a checklist onto which the FO can log the defects identified during inspection routines. This sheet lists all the roads under the responsibility of the respective FOs as well as the different kind of damages which the FOs are expected to identify. The FO marks the cell pertaining to the type of identified damage which corresponds to the respective road he would be inspecting. The defects noted on the respective inspection sheets are consequently logged onto a central database by a part time MCAST student and kept by the MU manager.

2.1.11. Whilst NAO supports the idea of documenting the identified defects, it is concerned about the continuity and effectiveness of the system currently in place. During site visits carried out by the NAO, it was observed that the FOs do not always use the template checklist devised by RID and rather opt to take notes on blank paper. Such a practice may hinder the integrity of the inspection process since a uniform approach across the four regions would be lacking. The lack of an enforced, standardised documentation system may generate the risk of having incomplete information

and may present difficulties when checking whether all the AD roads were actually inspected. Scattered information may lead to an ineffective system whereby damages are not addressed in an appropriate timeframe and projects or delays are not adequately followed up to ensure quality. RID however contends that this risk is mitigated by the support provided by the A&CEs.

## 2.2. Identifying the Need for Cold Patching Works

2.2.1. Following due inspection, the need to commission patching works is identified by RID personnel. As stated previously in this report, RID makes use of either hot or cold asphalt to address different kinds of road surface damages, depending on the nature, extent and urgency of damages.

2.2.2. Cold asphalt works are carried out on road surface defects that would have formed over a relatively short period of time, predominantly potholes, and which would present considerable risk to the health and safety of the road user as well as increasing the possibility of damaging passing motor vehicles. These types of works are usually commissioned by the FOs through already awarded regional Road Side Repair Works (RSRW) contracts.

2.2.3. One of these contracts is awarded for each of the four regions of the country. These contracts cover a variety of repair works, including amongst others cold patching and repairs of street walls, traffic signs, and pelican lights. The RSRW contracts under NAO's review were issued for

**Table 2.1 Field Officer's Technical Responsibilities**

Key Responsibilities	Key Elements
<i>Commercial Management</i>	<ul style="list-style-type: none"> <li>- Carry out routine inspections on AD roads in order to identify areas where maintenance is required.</li> <li>- Carry out inspections in other parts of the road network as may be requested by the Line Manager.</li> <li>- Inspect sites in order for tenders to be compiled.</li> <li>- Prepare surveys, plans and photos of the sites in question.</li> <li>- Update all related files whilst works are in progress.</li> <li>- Verify claims for payment together with the Quantity Surveyor of the Directorate.</li> <li>- Verify final bills in order for the work to be considered complete and finalised.</li> </ul>
<i>Quality Assurance</i>	<ul style="list-style-type: none"> <li>- Carry out regular inspections to make sure that the terms of contract are being adhered to.</li> <li>- Keep record of inspections carried out through the necessary checklists as requested by the Maintenance Manager.</li> </ul>
<i>External/Third Party Management</i>	<ul style="list-style-type: none"> <li>- Coordinate with the relevant entities in order to gather information needed regarding the necessary works to be carried out.</li> <li>- Coordinate with contractors a stipulated date of commencement of work according to the terms of contract.</li> </ul>

Source: Role Profiling – Field Officer, Roads and Infrastructure Directorate (2008)



a total value of €46,587.47 (excluding VAT) each, which was the highest value for which a departmental tender could be issued during that period. Once the contract would have been awarded, the FO would be able to issue a Works Order (WO) whenever an intervention is required.

**2.2.4.** Each work intervention commissioned by RID is paid for from the funds allocated for the awarded contract. Once the total value of the invoices start bordering on the maximum value of the departmental contract, a new call for tenders is issued for a new contract to be awarded, thus ensuring the continuity of RSRW coverage.

### **2.3. Identifying the Need for Hot Patching Works**

**2.3.1.** In the absence of a suitable preventive maintenance programme, major patching works are carried out on roads which are in a considerably degraded state. Major planned patching works are, more often than not, compiled in programmes (as is the sample chosen by NAO) covering a number of AD roads from all of the four regional areas.

**2.3.2.** The major hot asphaltting projects under NAO's review were selected by RID through the weekly inspections carried out by the FOs, and subsequently endorsed by the then MU Manager. Prior to the final selection of the roads requiring intervention, the sole A&CE deployed within MU at the time, accompanied the FOs on some of their inspection rounds to reconfirm their observations.

**2.3.3.** During this selection process, RID personnel resorted to perception and judgment rather than specific scientific techniques. RID officials stated that the damage on these roads was evident, and therefore, any form of scientific testing was considered to be a waste of resources. They however indicated that such testing should be carried out on recently reconstructed roads which do not feature any obvious signs of degradation. By doing so, RID

would be in a position to adopt a proactive approach to maintaining the local AD road network rather than keeping the practice of reactive repairs.

**2.3.4.** It is important to note that, during the selection process for the works under review by NAO, RID officials also took into consideration the traffic load each road is expected to sustain, thereby gauging and prioritising according to the expected level of usage. This therefore takes into consideration the relevant priority of the identified needs, as works are directed to the areas which are more likely to benefit a larger number of road users.

**2.3.5.** Hot asphaltting projects would normally consist of resurfacing considerable areas of the respective chosen roads, rather than having defects addressed individually. As stated earlier, this type of intervention is more financially demanding than its cold counter part. Due to this, any compiled programme at any one time can never fully address the national need, but rather see to a part of the whole problem.

**2.3.6.** Like the RSRW contract, the awarded contracts for hot asphaltting works are usually issued as Departmental Tenders with a limit of €46,587.47 (excluding VAT) each. The sample under NAO's review featured a number of tenders covering repair works from one up to three AD roads. This means that the value of the awarded contract had to be divided between the respective roads. Given that the departmental limit at that time was already relatively low, and as a consequence could not even provide enough funds to address the defects of one major local road, this combination of multiple roads into one contract left RID with even less available resources per road. During on-site visits, where NAO was accompanied by an external consultant, it was noted that the A&CE responsible for each respective project was constrained to identify and commission works on what s/he thinks are the parts of the particular road in most need of repairs, leaving other



identified defects unattended (consultant's report in Appendix B refers).

**2.3.7.** In view of this, A&CEs have to prioritise between defects, identifying which are the most important and/or urgent to address. Like in the case of cold asphaltting, the A&CEs classify remedial action to address potholes as the top priority. Following this, other already developed damages, such as cracking, are attended to till the total allocated funds for the awarded contract are exhausted.

**2.3.8.** Identifying and prioritising between different kinds of damages require technical expertise and a reliable information system. RID's regional A&CEs, being qualified individuals, all satisfy the technical requirements governing their position. Concerns however exist on the integrity of the information system on which they base their decision and prioritisation processes. As stated earlier, it was pointed out to NAO, that each A&CE relies solely on his/her professional judgement to decide which damages are to be addressed and which are to be left pending. No particular scientific methods or specific technical apparatus are used to identify emerging damages which could be of a graver nature to the ones already visible. This can lead to the risk of conducting a hot asphaltting project on a particular road, and having worse damages emerge in unattended spots after a short period of time, resulting in limited funds not being directed where they would be most needed.

## **2.4. The Level of Expertise of Field Officers**

**2.4.1.** As the prioritisation process of both cold and hot asphaltting works is largely dependent on the work of the FOs, NAO is concerned with the level of qualifications of some of the FOs presently in RID's employ. RID has also confirmed that it may find difficulty in motivating some of the FOs towards further training due to them nearing their retirement age. On the other hand, RID management

has also pointed out that some of the FOs, particularly the younger ones, are very committed to their jobs, highly motivated and able to absorb new knowledge with considerable ease.

**2.4.2.** The role profile, as set by RID for MU's FOs, outlines the experience, qualifications, knowledge, skills and attributes needed by the role holder to achieve the requirements of the position (Table 2.2). However, observations made by the NAO, which were also confirmed by RID's management, show that a number of the FOs substantially lack basic computer skills and do not possess an adequate standard of written and spoken English. These shortcomings raise concerns about the efficiency and effectiveness with which the FOs are carrying out their duties. This consequently raises concerns on the adequacy of the reporting and logging system of the identified defects in the AD road network, to the detriment of the overall efficiency and effectiveness of the maintenance programme.

**2.4.3.** In addition to these basic requirements, in order for the FOs to provide RID with a reliable and complete account of the defects in the AD road network, they are also expected to have solid technical knowledge about their area of expertise. Work experience in the area is an important factor. However, this has to be complemented by other theoretical knowledge, making the FOs more fluent and suitably skilled for their position. In view of this, RID organised a 30 hour training course in 2008 delivering to the FOs the basic principals and technical issues involved in the FOs' work. It is important to point out that this course was not considered to be sufficient in ensuring that the candidates become fully competent for their posts, though it provided the participants with an elementary level of knowledge.

**2.4.4.** RID had nine FOs attend this course, five of which work within the MU. Following this course, the

**Table 2.2 Job Requirements for the Position of Field Officer**

<i>Essential (E)</i>	<i>Desirable (D)</i>
Knowledge of civil, surveying and architectural maps (E)	
Proven Experience in road construction sector (E)	
Computer skills particularly Word and Excel (E), Microsoft Project (D) and Powerpoint (D)	
Excellent standard of written and spoken English/Maltese (E)	
Numerically proficient and information focused (E)	
Report writing skills (D)	
Highly organised, rational and able to make decisions (E)	
Ability to meet deadlines (E)	
Positive attitude and able to challenge objectively with ‘can do’ attitude (E)	
Experience of multi-functional operations (E)	

Source: Role Profiling – Field Officer, Roads and Infrastructure Directorate (2008)

participants were tested and their respective assessments were compiled in a report by the Paper Revision Board. This report shows that three of the five FOs working within MU failed the test on their first attempt but managed to pass after a resit interview. Although all the FOs within MU managed to pass the test by the second sitting, the average mark obtained was relatively low at 54.8%. It is also important to indicate that two out of the remaining four FOs working in other sections at RID also failed the test on their first attempt and subsequently did not manage to obtain a pass mark in the resit interview.

2.4.5. This relatively poor performance in this elementary test raises concerns about the level of expertise that RID’s FOs possess. A more skilled and knowledgeable FO could possibly identify emergent and potential road defects earlier on in the screening process, thereby avoiding the further aggravation of damages.

2.4.6. RID has however indicated to NAO that further training will be provided to the FOs in 2011. Although RID still has to decide on the exact composition of this training programme, it has indicated that it will include training on inspection procedures, reporting, inspection of works and work practices.

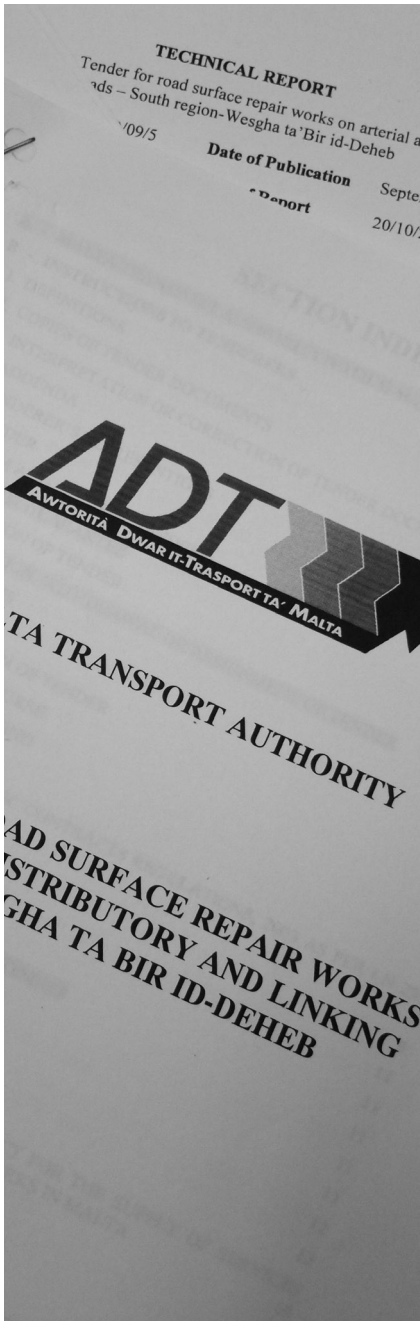
## 2.5. Recommendations

2.5.1. Keeping an updated and reliable database of the defects in the AD road network should be a strategic priority for RID so that it can better plan its works interventions. Given the critical importance of this process, NAO strongly recommends that it is attributed higher

priority by the individual FOs, especially if RID comes to the conclusion that the proposed system of having two FOs conducting the inspection rounds for each region does to prove cost-effective. RID management should ensure and encourage the necessary changes to FO work practices that would allow adequate time for more detailed surveying of road defects by the individual FO executing this task. Alternatively, NAO recommends the introduction of a dedicated driver as a common resource to assist the FOs on their respective inspection rounds. This would undoubtedly help the FOs focus their attention solely on the observation and recording of road defects.

2.5.2. NAO is of the opinion that a consolidated, standardised and comprehensive system be implemented for the use of the FOs during their inspection rounds in the shortest possible timeframe. RID should endeavour in making sure that the weekly inspection rounds are carried out in a consistent manner to minimise the risk of delay in the identification of formed defects. It might also be of benefit to support this process with technology, whereby identified defects can be logged on portable electronic equipment and the data can be later downloaded onto a central database. Such a tool would provide a clear picture of the current situation of the AD road network to anyone who accesses it.

2.5.3. NAO fully supports the initiative of organising training to the FOs as they form an integral part of the road defect identification process. Consequently it urges RID to carry out the mentioned training programme at the earliest possible time, in order to start reaping its benefits without delay.



## Chapter 3

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# Issuing and Adjudicating Tenders for Road Resurfacing Works

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## Chapter 3 – Issuing and Adjudicating Tenders for Road Resurfacing Works

### 3.1. Procurement Method for the Projects under Review

3.1.1. As stated earlier, the projects under NAO's review were all issued through departmental tenders with a limit of €46,587.47 (excluding VAT). RID stated that this procurement method was generally preferred to the alternative of issuing larger value contracts through the Department of Contracts (DOC), mainly due to the fact that it transpired to be a less time-consuming process.

3.1.2. It was outlined by RID that departmental tenders can be issued and processed internally. In this way the Authority would have more control on the effort put into the whole process and not depend on a third party to carry out these proceedings. RID stated that the choice of procuring through departmental tenders rendered the process quicker and allowed for a more efficient response to emerging needs in AD road network.

3.1.3. NAO is however concerned about the restrictions the departmental tender value limit might have presented to the hot asphaltting projects under review. Due to the fact that tenders could not be issued for higher values and the relatively costly nature of major patching works, it was inevitable that the interventions carried out could not address all present damages in the respective roads selected for repair. This resulted in roads still featuring damages after an intervention was carried out.

3.1.4. The then established value limit of departmental tenders could have restricted RID in benefiting from potential economies of scale present in larger projects. As stated earlier, the A&CE responsible for the particular project would have to prioritise which parts of the road in question are the most in need of repairs and commission these works accordingly. This would however result in a

stretch of road having multiple patches rather than a whole new surface. The resulting outcome undoubtedly features negatively in the overall ridability of the road in question, decreasing the overall value of the project. Furthermore, by having a number of patches rather than a whole stretch, more joints would have to be formed on the road surface. The joint is a vulnerable part of the patching process, as it is less tolerant of workmanship errors. As a result, the joint is more likely to allow water seepage than a continuous patch, eventually causing damage to the road surface. The increased number of joints therefore presents a higher risk of damage than its continuous counterpart.

### 3.2. The Tender Document

3.2.1. The templates used for the departmental tenders under review had identical general conditions and requirements for RSRW contracts and hot asphaltting projects alike. The only differences between the two templates were the clauses relating directly to the specifications and details of the works required and the schedule of rates.

3.2.2. Each tender issued by RID identified the area in which works were to be carried out. In the case of major patching works, a map of the immediate area surrounding the road(s) in question was attached to the document. The particular road(s) was/were marked with a red marker for easier identification. In the case of RSRW contracts, a map of the country was attached with each document, clearly showing the segmentation of Malta into the four different regions. Each region was also labelled (North, South, East or West)<sup>1</sup> This illustrated the area in which the winning bidder was expected to conduct works, depending on which region the particular tender was related to.

<sup>1</sup> West and Central are used interchangeably

**Table 3.1 Tender Documentation Requirements**

Documentation required at Tendering Stage
<ul style="list-style-type: none"> <li>a) Tender Guarantee amounting to €2,329.37</li> <li>b) Form of Tender for the Supply of Goods or the Execution of Works (the "Form of Tender")</li> <li>c) The Non-Collusive Certificate</li> <li>d) The priced Bill of Quantities</li> <li>e) Certification stating that employment conditions with the tenderer are in compliance with national laws and/or regulations</li> <li>f) Certificate issued by ETC including the number and details of employees duly registered by the Corporation</li> <li>g) Present Commitments Form</li> </ul>
Documentation required following Award of Contract, prior to Commencement of Works
<ul style="list-style-type: none"> <li>a) Performance Bond amounting to 15% of total tendered price.</li> <li>b) Insurance Policy against legal liabilities for death of, or injury to, any person or for loss/damage to any material property, for a minimum amount of €232,937.34</li> </ul>

3.2.3. Other than the site plan or map, the tender documentation for every awarded contract was identical to the others relating to the same type of works<sup>2</sup>. Of interest is the fact that all of the issued tenders for hot asphaltting projects also quoted identical quantities of required works in their respective schedule of rates. The same applies to the reviewed RSRW contracts.

3.2.4. Identical amounts of required work in the schedule of rates for all major patching projects meant that all bids for these tenders had to be quoted for equal quantities of work, even though the actual required quantities varied from one project to another. Similarly, by quoting the same amount of required works for every issued RSRW tender, RID may not have acquired the clearest picture of which bid was actually the cheapest. Some items listed in the schedule of rates might have actually been procured in greater quantities than specified and others in lesser volumes.

### 3.3. Documentation Required by Bidding Parties

3.3.1. As illustrated in Table 3.1, the tender documents of both major patching works and RSRW highlighted a number of required documents, which had to be submitted during the bidding stage. They also outlined the requirement of subsequent submission of other documents should the bidder be successful.

3.3.2. During the review of the chosen sample, NAO noticed a number of shortcomings in the documentation submitted by the contractors. The first identified concern was the inadequacy of bank guarantee coverage submitted with some of the bids. As outlined in Table 3.1, the tender

document requires the submission of €2,329.37 as a Tender Guarantee at the tendering stage and a Performance Bond amounting to 15% of the total tendered price following the award of contract.

3.3.3. Out of the 35 hot asphaltting tenders under NAO's review, copies of only 12 bid bonds were forwarded to NAO by RID. It is unclear to NAO whether it was the case that the remaining 23 tenders were not covered by bid bonds or whether RID could not make copies of them available to NAO at the time of publication of this report.

3.3.4. In the case of the required performance bonds, NAO was forwarded with copies of 18 of these bonds, which correspondingly covered 29 out of the 35 hot asphaltting tenders under review. Three of these performance bonds, covering one project each, were found to be of the required amount, that is, 15% of the total tendered price. It was also noted, however, that 12 of these bonds, relating to a total of 21 projects covered amounts which were less than the 15% stipulated in the tender document. The three other performance bonds, pertaining to five tenders, were found to be covering significantly larger amounts than was required. It is unclear however, whether in this latter case these bonds were covering other awarded tenders not accounted for in the 18 bonds forwarded to NAO.

3.3.5. With respect to the eight reviewed RSRW contracts, NAO was forwarded three bid bonds pertaining to three of these contracts and a single performance bond. The performance bond amounted to €8,136.92, which is close to the required 15% of the contract in question, the bidding price of which amounted to €54,466.

3.3.6. NAO is concerned with the large amount of awarded tenders which were not sufficiently covered by

<sup>2</sup> Apart from the site plan, every major hot asphaltting tender document was identical. Likewise, apart from the map, every RSRW tender document was one and the same with the others.



a performance bond. This created considerable risk in the eventuality of a dispute between RID and the contracting party. The insufficient performance bond coverage posed the obvious risk of RID not having a strong enforcement tool to address inadequate or low quality works. The acceptance of inadequate performance guarantee coverage can also contribute to the decrease of the contractors' incentive of working with a 'right first time' mindset, thereby increasing the possibility of sub-standard works. Such a situation may possibly transpire in additional financial and time costs for RID, as well as added inconvenience to the taxpayer.

**3.3.7.** It is also a concern that RID does not keep readily available copies of all the bid bonds and performance bonds relating to the contracts it awards. This could result in preventable complications should RID not be satisfied with the service provided by the contractor.

**3.3.8.** As mentioned earlier, the tender document specifies that one of the required documents upon submission of bids is an insurance policy for a minimum indemnity amount of €232,937.34. The contracting parties do not submit a copy of this policy with each bid they place, but forward one copy of a valid insurance policy to RID's Trenching Section (TS).

**3.3.9.** It was noted that all contractors engaged in the projects under review successfully submitted to RID a copy of a valid insurance policy. It is however a concern that a considerable number of these policies did not specify the limit of indemnity. With the value of this indemnity being a clearly specified requirement in the tender document, NAO is concerned that RID is not aware whether the limit of indemnity of some of the policies provides the stipulated coverage.

**3.3.10.** When questioned about this lack of information, RID stated that it leaves the level of indemnity to the discretion of the contracting parties and that it is only

concerned with the contractor producing a valid insurance policy.

**3.3.11.** NAO considers this practice to be unacceptable, as the requirements and conditions in the tender document should be strictly adhered to. Knowing that the contractor has a valid insurance policy, but not being aware of the level of indemnity it covers, is not sufficient for the Authority to reassure itself that the contracting party is sufficiently covered in the eventuality of an accident.

**3.3.12.** During the analysis of files pertaining to the projects under review, NAO noted that, on numerous occasions, the statement certifying compliance with employment conditions and the relevant certification issued by ETC (which includes the number and details of employees duly registered by the Corporation) were not always included in the relevant project files.

**3.3.13.** The absence of such documents reduces the contractors' accountability towards ensuring adequate employment conditions. This may increase the risk of having workers deployed on RID's projects while not being engaged on at least the minimum employment conditions as set by local legislation.

**3.3.14.** NAO also noted that the other required documentation, namely: (a) the Form of Tender for the supply of goods or the execution of works (referred to as the "Form of Tender"); (b) the Non-Collusive Certificate; (c) the priced Bill of Quantities; and (d) the Present Commitments Form, were generally found to be adequately filled in by the contracting party for the projects under review.

## **3.4. Tender Standards and Specifications**

**3.4.1.** The tender document templates of both the awarded major asphaltting works and RSRW under NAO's





review specifically stated that all works carried out or goods supplied under these contracts should have conformed to the provisions of the LN 364 of 2003, entitled “Road Works (Design & Construction) Standards of Regulations, 2003”. They also stated that should any particular items of works or goods not be covered by these specifications, the American Society for Testing and Materials (ASTM) specification or any other equivalent standard specifications should apply. It is important to note that the tender document template referred to the legal notice (LN 364/2003) as a main source of standards and specifications. This legal notice subsequently cites the directives of the study carried out by GTZ in 2000, mentioned earlier in this report. The said study provides in-depth and clear directions on road construction and consequently on patching works, thereby supplementing the specifications found in the volumes of the legal notice.

3.4.2. LN 364/2003 was divided into nine volumes containing the standards and specifications for road works. Volumes one and two, specifically series 700 and 900, dealt with Road Pavements and Bituminous Bound Materials and served as the main reference for contractors carrying out patching works. As pointed out earlier in the report, this legal notice has since been superseded by LN 29/2010.

3.4.3. After making the necessary references to legally established standards and specifications, the tender document template for both types of reviewed works goes on to include a clause stating:

*‘The provisions of Series 900, Section 921, Para 3, “Road Works (Design & Construction) Standard Regulations 2003”, as per Legal Notice 364 of 2003, the requirement to*

*skid resistance is not applicable in these contracts due to the nature of the interventions envisaged.’*

3.4.4. This clause is in direct breach of LN364/2003, which states:

*‘The Design and Construction Standards for Road Works provided for in regulation 3 of these regulations shall apply to all road works undertaken after the coming into force of these regulations but shall not apply to any road works which have been completed or commenced on the said date.’*

3.4.5. When questioned about the reason for the inclusion of this clause in these contracts, the then MU manager, who was responsible for the issuance of the tenders under review, stated that this clause was introduced due to the fact that RID at the time saw it as not being a cost-effective practice to patch with higher quality material. This superior quality material complies with skid resistance regulations and is more costly than the one used locally. RID argued that patching a greater road surface area with lesser quality material, rather than using the more expensive legally compliant skid resistant material, effectively presented better value to the road user.

3.4.6. NAO was also informed that if RID had opted to procure the material compliant with skid resistance regulations rather than the one used for these projects, it would have cost €10.99 per square meter as opposed to €8.08 as indicated in the estimate schedule of rates<sup>3</sup>. In view of this, and given that this item (i.e. the wearing course) accounts for most of the costs involved in hot asphaltting works, RID therefore opted to waive this requirement to be

<sup>3</sup> This schedule of rates was compiled by RID, quoting the average price the Authority expected contractors to more or less bid for the respective items. The contractors’ average bidding price for this item, i.e. 50mm thick wearing course, was that of €9.15, which is higher than RID’s estimate item but less than the €10.99 quoted for the superior material.

able to repair larger areas of the damaged road network by utilising the cheaper material.

3.4.7. This however is cause for concern, as the newly patched parts of the local AD road network would not be up to the required standards as outlined in the legal notice, to the possible detriment of road users.

### 3.5. Tender Adjudication

3.5.1. Following the issue of each tender for works, the received bids were each recorded in a separate schedule of tenders. These schedules generally included the name of the bidder as well as the bid amount and were usually signed by three officials who would be present during the opening of the tender box.

3.5.2. The adjudication process of the departmental tenders under review (both hot patching works and RSRW) was generally carried out by the three Area A&CEs who were not tasked with the responsibility of the respective project. It was noted that, on occasions, another RID official would be part of the adjudication committee in the absence of one of the Area A&CEs.

3.5.3. The adjudication process and outcome of the projects under review were documented on a one page technical report, signed by all the three participating committee members. This report again identified the details of the bidders whilst confirming that the Tender Form and Bill of Quantities had been duly submitted with the bid. Each report also stated that the interested parties had agreed to complete the works within the stipulated timeframe.

3.5.4. It was indicated to NAO that RID's policy of procurement is to consistently opt for the cheapest bid. This was the case with the projects under review as the Department always sought to obtain the lowest price for the works required.

3.5.5. The predominant concern noted by NAO during its review was that a large number of the issued tenders attracted only a single bidder. More specifically, 33 out of the 35 tenders issued with respect to major hot asphaltting projects featured a single bid, as was the case for four out of the eight reviewed RSRW contracts.

3.5.6. The programme of hot asphaltting tenders under review was issued in September 2009. As illustrated in Table 3.2, the average bid for this type of works was that of €64,322.81.

3.5.7. NAO has serious concerns on the bidding patterns apparent in the selected sample of tenders, particularly when one considers the short timeframe within which

the programme of tenders was published. This concern is strongly substantiated through analysis of the bidding pattern of one particular contractor (labelled 'J' in Table 3.2).

3.5.8. This particular contractor placed bids for a total of six major patching works contracts. In five of these contracts the contractor was the sole bidder and the average quoted price was that of €62,908.22. The other remaining contract was the only instance in which this contractor was not the sole bidder in the projects under review. On this occasion, the quoted price dropped to that of €55,778.05, that is, a decrease of €7,130.17 or 11.33% from the average price of the other bids.

3.5.9. This reduced bid is significantly inconsistent with other bids placed by the same contractor, particularly so when one keeps in mind that all major hot asphaltting projects under review specified quantitative requirements of the precise same amount of works and were issued practically simultaneously. In the circumstances, a change in the bidding price cannot be attributed to a possible change in operational costs.

3.5.10. It is also important to point out, however, that the bidding pattern of another contractor (labelled 'C' in Table 3.2) remained unchanged in both the occasion when he was the sole bidder and in the other case where he faced competition.

3.5.11. As illustrated in Table 3.3, in the case of the eight reviewed RSRW contracts, which were all issued for the identical amount of works, four attracted a sole bidder while the remaining four featured multiple bidders.

3.5.12. It can be noted that in all the RSRW contracts featuring a single bid, the bidding contractor quoted a total price which averaged an increase of 14% above the quoted prices for those tenders which attracted more than one bid.

3.5.13. Further analysis of Table 3.3 illustrates a significant increase in the value of tendered bids from 2008 to 2009. Although it may be argued that this increase is due to greater operational costs, any such argument is offset by analysis of the trend of sole bidding in 2009, as opposed to multiple bids in 2008.

3.5.14. Having the vast majority of the tenders issued by RID contested by a sole bidder poses considerable risks of reduced competitiveness and exposes dubious bidding patterns. Reduced competitiveness in the tendering process has a twofold effect. The first is a lowering of quality standards as each contractor has no particular incentive to perform, comfortable in the knowledge of a competitor-free environment. Secondly, with reduced competition, bidding parties were more likely to place consistently higher bids at the expense of RID and therefore the taxpayer.

**Table 3.2 Details of Bids for Major Patching Work Projects**

Hot Asphaltting Projects			
Contract Number	Winning Bidder	Total Number of Bids for Tender	Winning Bid Value (€)
1	A	1	62,998
2	B	1	65,603
3	B	1	65,603
4	A	1	62,998
5	B	1	65,603
6	C	2	62,837
7	D	1	66,788
8	A	1	62,998
9	E	1	66,067
10	E	1	66,788
11	F	1	61,583
12	F	1	61,505
13	G	1	67,973
14	G	1	67,973
15	H	1	61,206
16	I	1	67,238
17	G	1	67,973
18	J	1	62,908
19	J	1	62,908
20	J	1	62,908
21	J	2	55,778
22	H	1	61,206
23	I	1	67,238
24	F	1	61,390
25	D	1	66,788
26	H	1	64,203
27	G	1	67,973
28	J	1	62,908
29	I	1	67,238
30	E	1	65,834
31	B	1	65,603
32	C	1	62,837
33	J	1	62,908
34	A	1	63,009
35	K	1	67,382

Total number of contracts	35
Total number of contracts attracting only one bid	33
Total number of contracts attracting more than one bid	2
Average bid price	€ 64,422

**Table 3.3 Details of Bids for Road Surface Repair Works Contracts**

Road Side Repair Works Contracts				
Issued In	Contract Number	Contractor	Number of Bids	Winning Bid Value (€)
2008	1	M	2	48,391
2008	2	N	3	54,246
2008	3	O	2	47,834
2008	4	L	3	48,057
2009	5	L	1	54,916
2009	6	N	1	61,365
2009	7	O	1	54,866
2009	8	L	1	54,916

### 3.6. Recommendations

3.6.1. NAO is of the opinion that the Authority should endeavour to provide more accurate quantities at tendering stage, which would present it with a clearer picture of the expected costs for required works. Especially in the case of major patching works, the schedule of rates should feature more accurate quantities of work required (depending on the expected area of intervention), so that bidding parties could provide a more accurate total cost, and RID benefits from the subsequent accuracy.

3.6.2. NAO also opines that RID should dedicate more effort in ensuring that all the awarded contracts are sufficiently covered by adequate performance guarantees. If the relevant winning bidder does not comply with the tender requirements, RID should immediately inform the bidder and request corrective action to be carried out within the shortest possible timeframe. NAO also recommends that RID should keep readily available copies of both the bid bonds and performance bonds relating to the awarded contracts for ease of reference.

3.6.3. RID should endeavour in gathering the necessary information from all its contractors about the level of indemnity their respective insurance policies cover. RID should not allow any contracting party that does not satisfy this requirement to perform any of the works commissioned until such a situation is rectified by the relevant contractor.

3.6.4. RID, more so it being a public entity, should ensure that basic employment conditions are being adhered to by all the contractors it deals with and discourage malpractice by not awarding contracts to bidders who are not prepared to or do not produce the required and relevant certification.

3.6.5. Given that skid resistance is considered an integral part of the overall quality of road surfaces, NAO strongly urges RID to reconsider its position and aim to, at all times, comply with local regulations. Alternatively, if RID is of the professional opinion that the material currently being used provides sufficient properties to ensure skid resistant surfaces, it should therefore push forward an amendment to the specifications in local legislation so as to ensure compliance.

3.6.6. The fact that a large number of tenders were issued in a relatively short period of time is of concern to NAO. Such a practice tends to create a false inflation in demand, thereby possibly encouraging decreased competitiveness. NAO therefore recommends that call for tenders are issued sporadically in an attempt to encourage more competition and multiple bids for issued tenders, therefore potentially attracting lower prices and possibly better quality standards. RID however rebutted NAO's recommendation, stating that such a practice may disrupt the programme of works.



## Chapter 4

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### Management of Awarded Contracts

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## Chapter 4 – Management of Awarded Contracts

### 4.1. Communication with Contractors

4.1.1. Once the need for interventions was identified, works planned and the necessary contractual coverage obtained for the projects under review, RID sought to communicate with the relevant contractor to start the required work interventions. NAO noted that this process varied between cold and hot asphaltting works.

4.1.2. In the case of cold patching works a WO was issued by the FOs after consulting with their respective Area A&CE. This WO consisted of a one page document template and was used for every type of work intervention covered by RSRW contracts. This template contained a number of fields soliciting different details on the work interventions being procured, including: the name of the contractor and contact details; the date, time and requested response time; the locality, street name and exact location of where the interventions are required; and a description of the works being procured.

4.1.3. Communication with the contractor for this kind of intervention is generally carried out in a relatively informal manner, where the FO and the contractor would correspond by telephone. During file review, it was also noted that, on a number of occasions, RID forwards the WO to the contractor by fax.

4.1.4. NAO however observed that most of the WOs with respect to the RSRW contracts under its review were not duly filled in by the FO upon issuance. On occasions, the 'REQUESTED RESPONSE TIME' field was left empty, thereby invariably increasing the risk of delay as the contractor was not bound by a set timeframe. The schedule of rates of the RSRW contracts included a 3% reduction from the total invoice for every day that the works were delayed. Therefore, in those cases where the commissioning officer failed to document the requested response time for any particular intervention, RID was left with no documentary evidence to indicate the expected

timeframe within which the contractor was expected to conduct the necessary works. Such an administrative shortcoming precluded RID from the possibility of actually enforcing the 3% daily penalty on defaulting contractors, and possibly weakened management of contractor response time.

4.1.5. NAO also observed that the details given in these forms were, on occasion, very limited especially in the case of the 'DESCRIPTION OF WORKS'. It was noted that details of the required intervention were generally not more than a few words, such as "patching with cold asphalt", and lacked specific detail, such as the number of observed potholes needing intervention.

4.1.6. Failure to include an appropriate level of specific detail when describing contracted works results in additional risks for RID. Such risks include the contractor not completing all of the necessary works and therefore not delivering exactly what is required by RID, as well as not carrying out the required works in a timely manner, creating further inconvenience to road users.

4.1.7. As stated before, this process of engaging with contractors for RSRW differs from that relating to hot patching works. In the latter cases under NAO's review, it was the Area A&CE who generally communicated with the contracting party. After the contract had been awarded, the A&CE responsible for the particular project normally conducted a site visit with the contractor on the location of the planned intervention. The A&CE would mark the parts of the road where interventions were required with florescent paint, and verbally discuss required works with the contractor. Following this meeting, an Order To Start Work (OTSW) was issued and forwarded to the contractor so that works would commence.

4.1.8. The OTSW for the hot asphaltting projects under NAO's review were documented on a one page report, whereby the contractor is instructed to commence work on

a particular date and finish within a given timeframe. They however lacked certain additional detail with respect to the actual work required, such as the quantity of works and the exact location. These details were verbally agreed upon by both parties during the on-site visit carried out prior to the commencement of works, but were not formally documented.

4.1.9. This shortcoming again presented the risk of the contractor not carrying out the works precisely as required by RID. In the case of hot asphaltting projects, the associated risk is accentuated by virtue of the higher costs involved when compared to the cold asphaltting counterpart.

4.1.10. RID has however indicated that this procedure will change with the introduction of the FA (as outlined in Chapter 5). Under this new procurement mechanism, the bidding parties shall be informed of the exact location of the required works on paper and at tendering stage. RID stated that this information will be complimented with all the necessary details required for the winning bidders to carry out the works to the required standards.

4.1.11. In order for contractors to be able to engage in major patching works, RID issues permits via its TS shortly after the OTSW. The permits are based on a standard template, outlining the details of the project and quoting an extract from the Code of Police regulating the activity of road works.

4.1.12. A number of conditions were outlined on the first page of the permit template. During its review, NAO noted that two of these conditions were not consistent with the nature of major patching works, as shown in Table 4.1.

4.1.13. The permit in force when the projects under review were carried out featured major contradictory conditions, thereby causing concern about the validity of this permit document. Due to these contradictions, the permit could not be relied upon as a safeguard for RID in the eventuality of a disagreement between the Authority and the contracting party.

4.1.14. RID has however indicated that this permit template has been superseded in the last quarter of 2010 with a revised version, which is in line with the nature of works required in such interventions.

4.1.15. In addition to the works permit for each project, RID issued a one page document outlining the ‘Traffic Conditions of Permit’. In this document, reference was made to the permit number and road name of each particular project, whilst identifying the traffic management conditions required for the execution of the respective works. These conditions did not vary from one project to another, as major patching works generally consist of the same work activities and have minimal variance in terms of execution. These conditions were clearly identified in the document and any contractor should not have found difficulty in adhering to them.

4.1.16. NAO fully supports this initiative by RID and urges the Authority to consistently issue such conditions to the contracting parties so as to ensure a smoother approach to the whole process.

## 4.2. Overseeing Works

4.2.1. In the case of cold patching works, FOs are generally not present during the execution of works. It was, however, indicated that they would later visually inspect the completed works and take relevant photographs as evidence that the contracting party would have carried out the required works.

4.2.2. During its review, NAO however observed that the mentioned photographs were the only documentation kept with respect to the completion of RSRW. It is also important to note that such photographs could not be found for all the works carried out during the period under review. This, together with the fact that no other documentation was found (for example the date and time of completion of works and whether the final product was up to the required quality standards), raises concern on the reliability of the monitoring RID is conducting with respect to these

**Table 4.1 Inconsistencies between Permit Template and the Nature of Major Patching Works**

Condition	Inconsistency
<i>The total surface area of the excavation does not exceed 5.00 sq. m and the maximum depth 1.5m.</i>	Major patching works usually deal with large stretches of road which far exceed 5m <sup>2</sup> and therefore this condition can never be observed in such works.
<i>Only hand or pneumatic hand tools are used during excavation. No mechanical excavators are to be engaged on this work.</i>	Given the extensive area of operation during such works, it is highly impractical not to use mechanical excavators. During site visits, the NAO observed that in fact, contractors do use machinery for excavation.

Source (Adapted): Permit for Plant Maintenance and Street/Road Surface Repair Works, Malta Transport Authority (2009)



works. By not generating the necessary documentation to adequately record the outcome of a particular project, RID creates the risk of not having a failsafe system should it need to approach a contractor on poorly executed works.

4.2.3. The monitoring of works in the case of hot asphaltting projects was observed to be somewhat different than that for RSRW contracts. The FO working under the Area A&CE responsible for the particular project was expected to conduct a number of inspection visits during the progression of works and document actual progress. During these visits, the FO monitors the work carried out and documents the progress on a daily report template. This sheet outlines a very detailed account of the progression of works and is categorised into three main sections as shown in Table 4.2.

4.2.4. In order to reap the full advantages presented by such a system, these on-site inspection visits should be standardised in terms of periodicity and what is to be recorded. RID however does not have any such SOPs and these site visits are carried out at random, both in terms of periodicity and in the way they are conducted. During its review, NAO observed that documentation on these site visits was not consistently found. A large number of the projects under review did not contain any documentation or on-site photos. It is unclear whether the absence of such documentation is indicative that an FO was not present at the time works were being carried out, or whether it was the case that while on site, the respective FO did not document progress accordingly. Failure to maintain and record appropriate documentary evidence throughout the intervention period gives rise to additional potential

**Table 4.2 Factors Taken into Consideration in Field Officer’s Daily Report**

<b>General Conditions</b>	<ul style="list-style-type: none"> <li>• Weather conditions</li> <li>• Site condition prior to and after works</li> <li>• Photos of site taken prior to commencement of works</li> <li>• Approximate area of road surface repair works</li> </ul>
<b>Traffic Management</b>	<ul style="list-style-type: none"> <li>• Traffic diversions</li> <li>• Traffic calming signage</li> <li>• Water barriers</li> <li>• Machinery obstructing traffic flow and lighting</li> </ul>
<b>Road Works</b>	<ul style="list-style-type: none"> <li>• Cold milling</li> <li>• Sweeping of loose material</li> <li>• Joints cut by rotary saw</li> <li>• Tack coat</li> <li>• Regulating course</li> <li>• Type of asphalt</li> <li>• Asphalt compaction</li> <li>• Number of asphalt samples taken</li> <li>• Sealing of joints</li> <li>• Manholes</li> </ul>

Source (Adapted): Field Officers’ Daily Report Template, Malta Transport Authority (2009)





risks. Even though the final product might appear to be of satisfactory quality, certain underlying problems, such as an already existing crack in the road foundation, (if undetected during the repair intervention) might lead to a reduced lifespan of the final product, thereby reducing the overall value of the investment.

### 4.3. Quality Control

4.3.1. While RID conducts quality tests on hot asphaltting works, it does not do so in the case of cold patching interventions. Given the rather straightforward nature and relatively low cost of these types of work, RID is of the opinion that scientific quality tests are unwarranted and would not prove to be cost effective.

4.3.2. RID however indicated that FOs conduct visual tests on completed RSRW to determine whether they have been carried out with skill and to a satisfactory level of quality. While NAO supports this initiative, it is again concerned about the lack of comprehensive documentation generated and kept by the FOs.

4.3.3. Referring back to the case of hot asphaltting works, RID conducted two scientific tests on these projects, namely full-mix tests and core-cut tests. The full-mix tests (or raw-material test) analyses the mix content of the asphalt sample (usually collected from the Paver-Machine by the assigned FO), prior to it being laid down on the road surface. It determines whether there are the appropriate quantities of aggregate and bituminous material, as well as whether the hot asphaltting mixture was at an appropriate temperature when it was delivered on-site by the contractor. Consequently, this test therefore confirms the suitability of the hot asphaltting mixture that was laid during a particular work project. The results of these tests are compared with an already submitted copy of the respective contractor's mix-design. The mix-design is a formula of specifications which the contractor adheres

to when producing or procuring raw material. This mix design has to be submitted and approved by RID's QC section before the contractor is allowed to engage in any projects.

4.3.4. On the other hand, a core test is carried out on a core-cut taken from the already resurfaced road. This involves the extraction of samples with a 15cm diameter taken at an interval of 3,000 square metres from a completed road surface for testing. This test determines whether the contractor excavated and laid material to the specified depth (usually 5cm) and, more importantly, whether the material has been compacted to the required density.

4.3.5. Both of these types of tests are not carried out internally by RID, but are subcontracted to the Malta National Laboratory (MNL). However, it was indicated by RID that MNL does not have the necessary equipment to carry out these tests, and consequently sends the material for testing overseas. As mentioned earlier, the tests carried out cover a wide spectrum of variables, which all contribute to the overall quality of the material laid.

4.3.6. In order to carry out these tests, RID incurred two basic costs. These include the costs of the tests themselves and the transportation costs incurred in sending the samples overseas. RID indicated that, on average, the costs of the tests amounted to €496, whilst transportation costs for each sample amounted to €139, giving a total cost of €749 when adding 18% VAT.

4.3.7. RID stated that the above referred tests are carried out for verification purposes, as the individual contractors are obliged to provide results of tests carried out by independent laboratories certifying compliance to the required quality standards.

4.3.8. During review, RID forwarded to NAO copies of tests conducted by MNL, relating to works carried out on

45 out of the 61 roads covered in the 35 hot asphaltting contracts under review. The QC Officer responsible for the compilation of these tests drafted remarks on each and every test, stating whether the results were compliant or not.

4.3.9. It is a concern that the vast majority of the tests featured results outside the acceptable parameters. Despite these results, it was nonetheless recommended by the responsible QC officer not to take immediate action, but to monitor the project till the expiration of the guarantee period.

4.3.10. NAO does not consider this as good practice, since the approximate lifespan of major patching works, if carried out properly, is of six to seven years. By accepting identified shortcomings, RID increases the risk of such projects not lasting their full lifespan. By monitoring the finished works up till the expiration of the two year guarantee period, RID is still not ensuring that the full value is obtained from these works, as it can easily be the case that defects and damages emerge soon after, but well in advance of the full expected lifespan.

4.3.11. RID has confirmed that it could not make available to NAO the remaining tests at the time of publication of this report. It is unclear to NAO whether the projects under review, for which tests were not made available, were actually covered by tests or not. RID indicated that samples collected from some of the reviewed sites were not sent immediately for testing, but rather retained to be tested in the eventuality that any damages are observed within the guarantee period.

4.3.12. This is again an area of concern, as such practices further entrench RID into a reactive rather than a proactive approach to maintenance. This also contributes to the risk of newly resurfaced roads featuring damages well in advance of their likely lifespan, therefore not reaping the full potential value of the investment made.

#### 4.4. Recommendations

4.4.1. Bearing in mind, that the nature of the works involved in the RSRW contracts is straightforward, uncomplicated and does not merit a lengthy description, NAO nonetheless opines that RID should endeavour in documenting each work intervention as extensively and as clearly as possible, thereby minimising the risk of misunderstandings between the parties involved. Given the minor effort required, NAO strongly recommends that RID ensures that these sheets are duly filled in so as to minimise the risks of deficiencies in the provision of services by contractors.

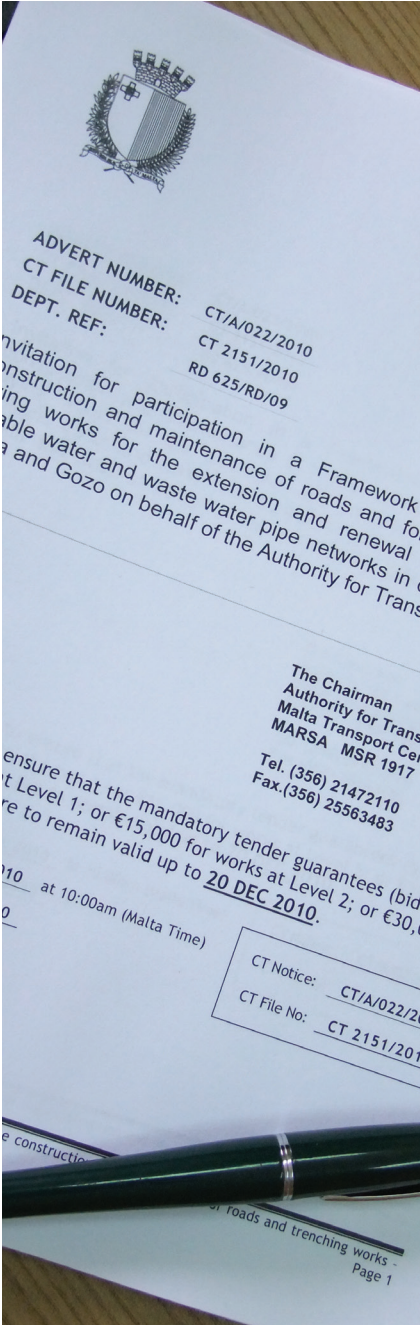
4.4.2. NAO fully supports the notion of informing the contracting parties of the precise work involved at tendering stage, as is in fact proposed in the new FA. It therefore urges RID to rigorously adhere to such practices in future projects, so as to minimise the risks of failure in communication with contractors and of works not being carried out to RID's exact requirements.

4.4.3. Given the rather basic nature of the operation involved in cold patching works, NAO supports the idea of FOs being directed to other more important tasks rather than accompanying the contractors during the execution of works. NAO, however, urges RID to ensure that the responsible FO conducts an on-site visit immediately after the completion of works, thereby verifying the actual completion date and time of the repair intervention. This will reduce the risk of FOs failing to identify delays and defects in the works. This inspection should be complemented with well documented reports on the final product, which will contribute to the overall better management of the contract.

4.4.4. Being an important part of the monitoring process, NAO recommends that RID introduces a SOP regulating the on-site inspections during hot asphaltting works. NAO opines that RID should also introduce the necessary checks to ensure that this SOP is adhered to by the officials concerned. This would help to secure an element of consistency in the monitoring of ongoing works, further decreasing the risk of allowing contracting parties to supply poor workmanship or a low quality final product.

4.4.5. NAO is inclined to agree with RID in not conducting extensive scientific quality tests on cold patching interventions, as expensive tests on such low value works may prove to be an unsustainable overhead. However, in view of this, NAO opines that FOs should endeavour to document their inspection of finished cold asphaltting interventions clearly and comprehensively, whilst logging this information in a central database. This will help RID identify any trends of poor workmanship among its contractors and act accordingly.

4.4.6. NAO strongly recommends that RID enforces a more rigid approach in its reaction to non-compliant quality test results, thereby immediately seeking corrective action. Additionally, RID should include a mechanism triggered by non-compliant quality results to ensure acceptable standards. Alternatively, it ought to seek an extension of the guarantee period (particularly in cases where non-compliance is marginal), so that the integrity of the works is ensured for a longer period of time, thereby maximising the value for the costs incurred.



# Chapter 5

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## The Framework Agreement

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## Chapter 5 – The Framework Agreement

### 5.1. Adopting the Framework Agreement

5.1.1. In an attempt to address the limitations presented by the system of procuring patching works via departmental tenders, RID prepared and consequently published, on the 13<sup>th</sup> October 2009, a FA. It incorporated a wide variety of work interventions, including road surface repair works.

5.1.2. This Agreement featured an invitation addressed to interested parties so as to submit their offers to engage

in projects falling under one of three identified levels of works. As illustrated in Table 5.1, these different levels varied in terms of complexity and volume of work. Different contractors with different capacities and capabilities were expected to show interest in the level of works they deemed themselves able to satisfy. Nevertheless, should a contractor wish to engage in a different level of works to that originally applied for, the Agreement allowed for discussions with RID so as to reach a conclusion in the best interest of all parties. It is important to point out that

**Table 5.1 Classification of Work Assignments in the Framework Agreement**

Level	1	2	3
<b>Type of road works interventions</b>	a) Repair & maintenance of residential/urban roads b) Trenching works not exceeding a maximum trench length of 50m at any one point in time and not in arterial roads	a) Repair & maintenance of residential/urban, distributor, commercial and tourist areas roads b) Repairs & maintenance in arterial roads when site occupancy is less than 5sq.m. c) Trenching works not exceeding a maximum trench length of 200m at any one time	a) Repair & maintenance of arterial and distributor roads b) Construction of residential/urban roads c) Trenching works exceeding 200m in length at any one time
<b>Location of works (Occupancy)</b>	Residential/urban roads	Residential/urban, distributor, commercial and tourist areas roads, and arterial roads in particular circumstances	Residential/urban, distributor, commercial and tourist areas roads, and arterial roads
<b>Provision of materials for works</b>	N/A	N/A	The provision of materials and products used in any part of the above types of work

Source: Framework Agreement (CT 2592/2009), Transport Malta (2009)

this Agreement did not only feature road surface repair works, but also other works, such as trench excavation, installation of buried infrastructures, footpath construction and reinstatement works. It was therefore the case that contractors entering into this Agreement would be able to bid for a variety of works.

5.1.3. Under the FA, when the need for an intervention was identified, RID would then issue a call-off for works relating to the particular level that the project falls under. The contractors registered for that particular level would then submit their bids, and an adjudication of the offers would be carried out. The bids submitted by the contractors were to be regulated by maximum prices for each of the work items. Contractors could have therefore placed their respective bids with prices per item, not exceeding those stated in the Agreement, so as to be considered eligible for the contract. With this condition, competition would have been preserved as each contractor could still out-price competitors by offering the lowest price for the project.

5.1.4. This FA was issued through DOC and had an unspecified value. Once the Agreement was to be entered into by RID and the interested parties, RID was to be in a position to issue call-offs for works which exceeded the departmental contractual limit of €46,587.47 (excluding VAT). This, together with the fact that the call-offs could be processed internally by RID, made this FA an ideal tool for the Authority to be compliant and at the same time highly efficient and effective in addressing the patching needs of the local road network in the shortest possible time.

5.1.5. However, the initial attempt to implement this FA was largely unsuccessful. During the bidding period, a number of concerns were voiced to RID by potential applicants, but the most pressing issue was the rates at which RID proposed the works to be carried out. Prospective bidders felt that the maximum capped amounts, as quoted in the FA, were too low and did not reflect the actual costs they incurred in providing the required

services. Consequently, the Director General of the Malta Chamber of Commerce, Enterprise and Industry (MCCEI) informed TM in a letter dated 24<sup>th</sup> November 2009, that the unfavourable conditions set by this Agreement had forced the contractors not to submit their tender bids. In addition to the rates, the letter also referred to the fact that no mechanism for the revision of prices, with respect to raw materials, labour and fuel, had been included in the tender document, thereby burdening the contractors with all the risks associated with the nature of these works.

5.1.6. In this letter, reference is made to previous correspondence, dated 11<sup>th</sup> November 2009, whereby MCCEI had already raised the issue of the considerable difference between the prices quoted in the FA and the actual (or ‘realistic’) rates based on the conditions being stipulated in the Agreement. Five items from the schedule of rates were handpicked and used as examples to illustrate the difference in rates. This comparison is reproduced in Table 5.2.

5.1.7. Even though MCCEI informed RID that the contractors were not going to submit their bids, four contractors still came forward and tendered for the Agreement. It however transpired that none of them were accepted by RID, as they were found to be unable to satisfy the contractual obligations of the Agreement, or that their submitted bids were incompletely documented.

5.1.8. Contributing to the failure of this initiative was also the fact that MIP had issued a similar tender during the tendering period of RID’s Agreement. Contracting parties saw MIP’s tender as enjoying considerably more favourable rates than RID’s FA. The wearing course item, which makes up for the largest portion of the contract cost in hot asphaltting works, was offered at a considerably higher value in the MIP Agreement when compared to RID’s original FA. Notably, the maximum capped price for this item in MIP’s agreement was offered at a higher value than the average bid price the contractors were

**Table 5.2 Comparison between the Road and Infrastructure Directorate’s Estimates and the Malta Chamber of Commerce, Enterprise and Industry Rates**

Item	Tender Document CT2592/2009		MCCEI Rates	Difference in rates
	Item Reference in Volume 4	Capped Rate (€/sq.m.)	(€/sq.m.)	%
Combined base-wearing course	11.024	14.14	23.10	63.3
Combined base-wearing course	11.025	17.67	28.87	63.4
Base Course	11.011	13.15	19.73	50.0
Binder Course	11.012	10.02	15.11	50.7
Wearing Course	11.014	6.96	10.82	55.5

Source: Correspondence with Department of Contracts, Malta Chamber of Commerce (2009)

submitting for the projects under review. Being the most substantial item in hot asphalt contracts, this made the MIP Agreement much more appealing to potential bidders than RID's estimates. Table 5.3 illustrates a comparison of rates of three of the more substantial items in hot asphalt projects. This difference in rates for similar road works commissioned by two governmental institutions put RID in a comparatively weaker position, thereby reducing its strength as a contractor of services.

5.1.9. In assessing the best way forward on the issue, an internal report was drafted by an RID Officer in Grade 4 and addressed to the then COO. This report concluded that these contractors would not be eligible to participate even if the FA was to prove successful. This was due to the fact that most contractors had outstanding work contracts with various government entities, which were expected to last well into the first quarter of 2010. In view of this, it was suggested that RID suspends any further proceedings with respect to the FA till the already issued works are completed.

5.1.10. In June 2010, a new call for tenders was issued with regards to a freshly revised FA. It is important to note that, on this occasion, RID held a clarification meeting with the interested parties a few days after the issuance of the tender, whereby queries were forwarded by potential bidders to RID officials. Unlike the preceding Agreement, the new Agreement attracted considerable interest. More

specifically, 32 contractors applied to participate under this new framework.

5.1.11. Following this, an adjudication committee was formed and an evaluation report was compiled accordingly. This report shows that 29 out of the 32 bidders were accepted by RID and were categorised into the three levels of works according to their capabilities. More specifically, four bidders were categorised in Level 1, nine in Level 2 and sixteen in Level 3.

5.1.12. The increase in interest and participation in the revised FA can be mostly attributed to a revision in the rates. RID indicated that, after an extensive study, the rates were adjusted to reflect fluctuations in oil prices, which was one of the major concerns of the potential bidders in the first FA. Notably, the maximum bidding price for supplying the wearing course was one of the items with a substantial upward revision in prices, as illustrated in Table 5.4.

5.1.13. It is also important to note that, under the new FA, RID can issue work projects of value up to €500,000, as opposed to the €46,587.47 (excluding VAT) departmental limit, as in the case of the projects under review. This gives RID the option of commissioning larger repair interventions on particular stretches of road, thereby attaining greater economies of scale.

**Table 5.3 Comparison of Rates including Malta Industrial Parks Framework Agreement**

Item	Average Contractor Bidding Rates	RID Departmental Estimates	RID's unsuccessful Framework Agreement	MIP Framework Agreement (Average)
Oversite excavation using planar equipment in any type of ground and remove material from site (per cubic metre)	€16.86	€15.09	€13.25	n/a
<b>Wearing Course 0/12.5mm 40mm thick</b> compaction degree 97% (Marshall specimen, 50 blows each site) Regularity: 4mm, 4m straight edge, Cross Slope +/- 0.4%	€7.70	€6.46	€6.96	€9.55
Supply and spray tack coat between different layers of asphalt	€0.58	€0.34	€0.40	€0.27

**Table 5.4 Comparison of Rates including the Revised Framework Agreement**

Item	Average Contractor Bidding Rates	RID Departmental Estimates	RID's unsuccessful Framework Agreement	MIP Framework Agreement (Average)	RID's Revised Framework Agreement
Oversite excavation using planar equipment in any type of ground and remove material from site (per cubic metre)	€16.86	€15.09	€13.25	n/a	€13.25
<b>Wearing Course 0/12.5mm 40mm thick</b> compaction degree 97% (Marshall specimen, 50 blows each site) Regularity: 4mm, 4m straight edge, Cross Slope +/- 0.4%	€7.70	€6.46	€6.96	€9.55	€7.44
Supply and spray tack coat between different layers of asphalt	€0.58	€0.34	€0.40	€0.27	€0.40

## 5.2. Recommendations

5.2.1. NAO suggests that RID, through the new FA whereby the maximum value limit of work interventions was increased considerably, should endeavour to plan the reinstatement of individual roads in a more holistic approach, rather than in a partial manner, as was the case with the projects under review. This will transpire in better ridability for the road users and a decrease in the number of joints, thereby resulting in a decline in weak spots in the works carried out. In contrast, RID maintains that the adopted approach of reinstating the largest possible number of roads to a basic level of ridability provides more value for money.

5.2.2. It is NAO's opinion that all government entities responsible for commissioning road surface repair works should engage in efforts at coordinating, standardising and formalising a uniform approach in the procurement of such works. It is envisaged that such an approach would ultimately result in works commissioned in a more standardised and cost-effective manner across government.

5.2.3. NAO strongly supports the FA initiative adopted by RID. It however urges the Authority to utilise this tool to its utmost by enforcing the parameters established in the FA in a comprehensive and consistent manner.








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## Appendices

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## Appendix A – Field Officer Role Profile



### ROLE PROFILING

Role title	Field Officer
Reporting to	Maintenance / Projects Section, Network Infrastructure Directorate
Role purpose Why the role exists and its contribution to the organisation	To plan, organise and control "field" operations of the Network Infrastructure Directorate within the parameters of the Directorate's objectives to attain set targets
Date	26 <sup>th</sup> March 2008

### ROLE SPECIFICATION

What the role holder needs to do to achieve the role purpose.

Key responsibilities	Key elements	Priority % of time
Commercial management	<ul style="list-style-type: none"> <li>To carry out routine inspections on arterial and distributor roads network in order to identify areas where maintenance is required</li> <li>To carry out inspections in other parts of the road network as may be requested by the Line Manager and report back</li> <li>To inspect sites in order for the tenders to be compiled</li> <li>To prepare surveys, plans and photos of the sites in question</li> <li>To update all related files whilst the work is in progress</li> <li>To verify claims for payment together with the Quantity Surveyor of the Directorate</li> <li>To verify final bills in order for the work to be considered complete and finalised</li> </ul>	50%
Team management	<ul style="list-style-type: none"> <li>To be a member of maintenance and/or projects team of the Network Infrastructure Directorate</li> <li>To participate during in house meetings as requested by the Line Manager in order to discuss the operations of the Maintenance Unit.</li> </ul>	5%
Quality assurance	<ul style="list-style-type: none"> <li>To carry out regular inspections to make sure that the terms of contract are being adhered to</li> <li>To keep record of inspections carried out through the necessary checklists as requested by the Maintenance Manager</li> </ul>	20%
External/ Third party management	<ul style="list-style-type: none"> <li>To coordinate with the relevant entities in order to gather information needed regarding the necessary works that need to be carried out, such as Water Services Corporation, Maltacom, MelitaCable, Enemalta, MEPA, the Drainage Section - Works Department, and Local Councils</li> <li>To coordinate with Contractors a stipulated date of commencement of work according to the terms of contract</li> </ul>	10%
ADT General operations	<ul style="list-style-type: none"> <li>To understand the targets of the work area and how these contribute to the success of the organisation</li> <li>To meet own and team targets</li> <li>To make suggestions for more cost effective ways of doing things</li> </ul>	5%
Organisation and administration	<ul style="list-style-type: none"> <li>To have a clear understanding of personal role and responsibility in the achievement of targets and milestones</li> <li>To implement action plans into day to day operations and schedules</li> <li>To take responsibility for meeting day to day operations, schedules and targets</li> <li>To take responsibility for developing and using skills and knowledge</li> </ul>	10%

	effectively in order to achieve results To approach work in a highly focussed and goal oriented manner To report outcomes as required To actively seeks solutions to problems and builds on solutions proposed by others To seek ways of doing things more effectively	
<b>The key decision making areas in role</b>		
To conduct all business related activities in a professional manner. This would include avoiding potential conflict of interest situations as well as other activities that could undermine the overall Authority's image in the eyes of the Authority personnel		

### PERSON SPECIFICATION

The experience, qualifications, knowledge, skills and attributes needed by the role holder to achieve the role responsibilities  
**ESSENTIAL (E) - DESIRABLE (D)**

Knowledge of civil, surveying and architectural maps (E) Proven experience in road construction sector (E) Computer skills particularly Word and Excel (E), Microsoft Project (D) and Powerpoint (D) Excellent standard of written and spoken English / Maltese (E) Numerically proficient and information focused (E) Report writing skills (D)  Highly organized, rational and able to make decisions (E) Ability to meet deadlines (E) Positive attitude and able to challenge objectively with a 'can do' attitude (E) Experience of multi-functional operations (E)
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<b>ADT Collective Agreement Grade</b>	
Field Officer	Technical Grade

<b>Salary Scale</b>	
Technical Grade	€ 14,150.94

PP/NID/26/03/08

**Job Description- Field Officer**

**Position:** Field Officer  
**Directorate:** Traffic Management  
**Position reports to:** Traffic Management Director

**Main Objectives**

To plan, organise and control all "field" operations of the Traffic Management Directorate within the parameters of the directorate's objectives to attain set targets.

**Main Duties/Responsibilities**

1. To conduct all business related activities in a professional manner. This would include avoiding potential conflict of interest situations as well as other activities that could undermine the overall Authority's image in the eyes of the authority personnel.
2. To compile and maintain a database of road accidents.
3. To handle the system for ' Reserved Parking for the Disabled' and all related procedures and correspondence.
4. To make site inspections for requests made by local councils.
5. To compile and maintain a database for ' un/loading- keep clear- reserved' bays.
6. The above duties require site visits and inspections.
7. To perform other field related duties as required from time to time.

## Appendix B – Consultant's Report

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Architects, Civil and Structural Engineering Consultants.  
No43, Main Street, Balzan, BZN 06.  
Tel.: (356) 2149 8532, Fax.: (356) 2149 8534 e-mail: tbaperiti@tbaperiti.com

Job No.  
Your Ref.

Performance Audit – Surface Maintenance and Patching Works on the Arterial and Distributor Road Network

Technical Notes

### 1. Introduction

The objective of the Performance Audit was to evaluate whether surface maintenance and patching works carried out by ADT/Transport Malta, on the local arterial and distributor road network, are of a sufficient standard, and whether they represent good value for money.

The role of the undersigned was to assist the NAO team with technical advice, to participate in meetings with officials from ADT (subsequently Transport Malta), and to accompany the audit team on site visits.

The following documentation was made available during the course of the assignment:

**Legal Notice 364 of 2003**, which sets out the design and construction standards that are mandatory for Road Works, (including maintenance works) by making reference to Volumes 1 to 7 of the **Design and Construction Standards for Road Works** published by the Malta Transport Authority, and a Copy of the said Standards;

A copy of the document "**Directives for the Standardisation of Pavements for Traffic Areas**" written by Prof. Dr. Klaus Müller, for the then Roads Department;

Copies of typical **Tender Documents**: one for Road Surface Repair Works on Arterial, Distributory and Linking Roads – Triq 13 ta' Dicembru, Marsa; Triq il-Labour, Marsa; Triq is-Salib tal-Marsa, Marsa; one for Road Side Repair Works on Arterial and Distributory Roads in the East Region; and one for Road Surface Repair Works on Arterial and Distributory Roads in the North Region.

Copy of a Typical Contractor Submission for a Mix Design for the Base Course.

### 2. Methodology

The undersigned participated in site visits to on-going works, with Mr. Simon Vassallo of the audit team, and participated in discussions with the audit team, and in meetings between the audit team and representatives of ADT/Transport Malta, over the period November 2009 and February 2010. The road works inspected included Mdina Road, Attard, Nutar Zarb Road, Attard, Birkirkara By-Pass, B'Kara, The Strand, Gzira/Sliema, and Ta' Xbiex Waterfront, Gzira.

Prof. Dr. Alex Torpiano  
Victor Torpiano  
Antoine Zammit

Dr Dion Buhagiar  
Fleur Coleiro Schembri

Dr Marc A Bonello  
Duncan Polidano  
Gaston Camilleri

REGISTRY

11 AUG 2010

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### 3. Observations

The following issues were raised after the site inspections, for clarification and discussion with the audit team and with representatives of ADT.

- (i) What were the criteria used for the selection of the stretches of road where patching works were to be applied?
- (ii) How was the extent of the works required for each patching intervention determined?
- (iii) What were the specifications that were contractually binding on the Contractors carrying out the works?
- (iv) What procedures were adopted, if any, to assess whether additional works, beyond the standard defined in the tender document, if any became obvious after the scarifying of the existing surface, were to be carried out by the Contractor?
- (v) What independent testing was adopted by Transport Malta for the works?
- (vi) What level of visual inspection of the final quality was the norm for these works?

It is acknowledged that the Programme of Surface Maintenance and Patching Works (using hot asphalt) is effectively an improvement on the alternative system of emergency pothole repair with cold asphalt, in the sense that, with this Programme, longer stretches of poor quality road surface are identified, and the relative wearing courses removed and re-laid. Nevertheless, the undersigned agrees with the position explained by the officials of Transport Malta that this Programme still falls short of the programme of preventive road maintenance which should be in place to cover the whole road network. The “Surface Maintenance and Patching Works” carried out are, in effect, a “reactive” programme of works, reacting, that is, to road surfaces on which significant damage *has already occurred*, and do not constitute a “pre-emptive” programme of regular maintenance, which is intended *to delay the appearance of significant damage* to the road surface.

It is therefore inevitable that, within the context of a finite budget, the selection of the stretches of road, where patching works were to be applied, be based on the subjective assessment of the professional and technical officials of ADT/Transport Malta, (obviously keeping in mind objective issues such as road condition, traffic load, danger), rather than on a pre-planned programme of road maintenance. In addition, since the superficial area of currently “damaged” road surfaces, which urgently need repair, is very extensive, it is inevitable that all available resources are currently addressed at such repair works – and spread out as much as possible to achieve maximum improvement to the road surface – rather than at preventive maintenance.

It is not surprising, therefore, that the answers, received from ADT/Transport Malta officials, to issues (i) and (ii) above, demonstrated a high degree of individual assessment, and subjective prioritization, strongly conditioned by the budget resources made available.

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The Programme in question is, it was explained to the undersigned, intended to add about six to seven years of life to the road surfaces in question, and the interventions were, therefore, far from a whole-sale re-construction of the road, including sub-base etc., - which would be much more expensive. In other words, it was not intended, by this Programme, to solve deep-seated defects in road sub-base and base, but to address those situations where the deteriorating weathering surface could be renewed at least cost – and to maximum effect.

The Specification Documents, which describe the works to be carried out, are, in fact, rather generic. The Scope includes a wide range of potential road surface repair works, including temporary reinstatement of potholes and replacement of manhole covers. The Specifications applicable to the Works are also rather generic – the 35-plus page Tender document typically includes a couple of paragraphs, that refer the Bidder/Contractor to the Legal Notice, and to the Design and Construction Standards for Road Works, referred to above. In the opinion of the undersigned, these Contracts should be let under a more specific Specifications section, since making a generic reference to the 7-Volume Design and Construction Standards does not actually give any guidance on the tasks required, and on the “measurable” quality of the works required.

The issue of “measurability” is, in the opinion of the undersigned, important. There are established procedures by which Contractors submit design mixes for the wearing surfaces to be reinstated. These design mixes are tested before the Works, and during and after the Works. However, the quality of a road surface does not depend only on the quality of the mix. It depends on the condition of the sub-base, on the processes of deterioration that may have affected specific tracts of the road, on the quality of the containment of the road, etc. It was observed, for example, that in some instances, when the existing wearing surface was scarified, certain defects in the sub-base were visible. In one instance, the sub-base was obviously affected by tree roots, and in another instance, the confining kerbs, at the edge of the road, transformed into a ramp leading to a parking area – with the result that the thickness of the applied weathering surface decreased to nothing in these locations, and was soon damaged a few weeks after the completion of the works.

However, it did not seem that there was anything, in the Specifications Document, that required the Contractor to assess what was uncovered after the scarification process, or any criteria by which the suitability of the standard reinstatement of the wearing course could be assessed, or, as an alternative, any requirement for the Contractor to call in the relative engineer of Transport Malta for direction or guidance. It seemed as if there was one specific procedure – which all contractors inspected on site seemed to know and seemed to follow well, although such procedure was not actually spelled out in the Specifications Document – but no allowance for any variations.

On the other hand, it is acknowledged that, if the repair works required more than standard processes, then the objective of the current programme – namely to spread the resources available to cover as large an area of damaged road surface as possible – would be thwarted.

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As indicated previously, the standard procedures envisage that samples of the mix used for the weathering surface are collected by independent testing agencies (independent, that is, of the Contractor), and the results of the tests compared to the mix design tests submitted in advance by the Contractor. It was pointed out that, in some instances, cores would be cut out of the finished surface, for additional testing. The process is theoretically correct. The rub is in the detail. In at least one case of the on-going works visited, the independent inspector had not yet collected the sample that had already been prepared for him by the Contractor – even if it is not suggested that any malpractice was intended, it has to be emphasized that, for proper independent testing, the sampling has to be carried out by the independent inspector – otherwise the independent test has no value.

The final assessment of the quality of work carried out inevitably depends on visual assessment. It is suggested, however, that some more scientific criteria should be developed to guide such visual inspection – so as to reduce the degree of subjectivity and increase the degree of consistence.

#### 4. Conclusions

There is no doubt that the engineers and technical staff in ADT/Transport Malta have a very clear concept of what they should be doing to ensure a well-maintained stock of arterial and distributor roads. They know what they want to do. They are however constrained by obvious limitations of financial and human resources. Two Field Officers to monitor the condition of the kilometers of road surface under ADT's responsibility is clearly not enough. More, and better trained, Field Officers are required.

Financial resources are not enough to cater for the kilometers of road whose surface needs immediate repair and upgrading, and for the roads that need major reconstruction, to leave anything for the preventive maintenance which could avoid the recurrence of the dramatic road surface conditions, that the country found itself in the last decade – and the situation is not helped by the fact that the allocated budget is often not known at the beginning of the year.

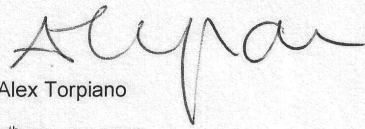
In the opinion of the undersigned, the hot asphalted works, subject of this Performance Audit, are of good quality and represent good value. In spite of the observations made above, in all the site operations that the under-signed visited, the Contractors appeared to know very well what they were doing, and the quality of the materials used seemed to be well under control. In spite of the reservations expressed about the assessment of the road sub-base, when the weathering course is removed, the instances observed, in the said site visits, where there was anything "unusual" visible, represent a small percentage of the total area of the works. It is reasonable to accept, therefore, that since the objective is to avoid interventions on deep-seated problems, the Programme of Works proposed was appropriate, and represented good value.

Nevertheless, the undersigned would suggest the following. (i) Improvements in the Tender Documents published, and in particular the Specifications for the works



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envisaged – simply referring to a seven volume document which covers everything under the sun is not good practice, and is not conducive to measurable quality indicators. In general, it could be said that the Tender document says many things, but few things that are actually useful to guaranteeing quality in the specific works required. (ii) Clarification of the process of inspection of the road sub-base after scarifying of the weathering surface, to allow potentially inexpensive variations to the standard procedures, in order to address the specific problems exposed.



Alex Torpiano

5<sup>th</sup> August 2010

## Recent NAO Publications

### NAO Audit Reports

February 2010	Performance Audit: <i>Inter Vivos</i> Transfer of Property
April 2010	Investigation relating to the Enemalta Corporation Tender for Generating Capacity
May 2010	Performance Audit: Physical Education and Sport in State Primary and Secondary Schools
June 2010	Malta's Renewable Energy Contingent Liability Potential Costs relating to the non-attainment of the EU's mandatory 2020 targets
July 2010	Performance Audit: Child Care Arrangements for Public Employees
September 2010	Performance Audit: Implementing Producer Responsibility for Packaging Waste in Malta
October 2010	Performance Audit: Malta Communications Authority Regulation of the Universal Postal Service
November 2010	Report by the Auditor General 2009
February 2011	Performance Audit: Renewable Energy in Malta Follow-up

### Internal NAO Publications

March 2010	NAO Financial and Compliance Audit Manual
August 2010	NAO Performance Audit Manual

### NAO Work and Activities Report

January 2011	Work and Activities of the National Audit Office 2010
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